ALLIED MACHINE & ENGINEERING

Holemaking Solutions for Today's Manufacturing

Drilling

Reaming

Burnishing

Threading

Specials

Wohlhaupter™

▶ *BORING*

MultiBore® System Tools

WOHLHAUPTER®

It's so much easier when you make

BETTER CHIPS

Allied Machine specializes in developing innovative solutions designed to ***pulverize*** material. Our tools achieve the chip formation and chip evacuation you need to increase your production.

Allied Machine & Engineering
Registered to ISO 9001
10001329

Our Commitment to **YOU**

Manufacturing is the DNA of success everywhere in the world. When you're manufacturing, you're building, creating, and developing something that physically didn't exist before.

At Allied Machine, our core purpose is to provide practical and dependable solutions to improve your manufacturing processes. We know you face challenges and difficulties every day, so we're here to simplify your holemaking processes and improve your production.

However, many factors must be incorporated to truly improve production.

Some of those factors include increasing penetration rates while also improving chip formation and evacuation, reducing scrap rates by producing better parts, reducing setup times, and increasing tool life to get the most from your investment.

Not only does our tooling achieve these results, but our customer service is also an extension of our tooling advantages. Our Application Engineers and Field Sales Engineers are available to assist with any problems you encounter. Don't hesitate to put their skills and knowledge to the test. They won't disappoint.

This is our commitment to manufacturing, and it's our promise to you.

ALLIED MACHINE & ENGINEERING

North America

Allied Machine
120 Deeds Drive
Dover, OH 44622
United States

Allied Machine
485 West 3rd Street
Dover, OH 44622
United States

ThreadMills USA™
4185 Crosstowne Ct #B
Evans, GA 30809
United States

Superion®
1285 S Patton St.
Xenia, OH 45385
United States

Europe

Allied Machine Europe
93 Vantage Point
Pensnett Estate
Kingswinford
West Midlands
DY6 7FR, United Kingdom

Wohlhaupter™ GmbH
Maybachstrasse 4
Postfach 1264
72636 Frickenhausen
Germany

Asia

Wohlhaupter™ India
B-23, 2nd Floor
B Block Community Centre
Janakpuri, New Delhi - 110058
India

Allied Machine & Engineering is a worldwide leader in holemaking and finishing solutions. We are committed to providing practical and dependable solutions to our customers through innovative designs and superior customer and technical support.

We continue to expand our product offering in order to provide new and different solutions. With Field Sales Engineers located around the world, we position ourselves to provide technical support on site, right at your spindle.

ALLIED MACHINE & ENGINEERING®

www.alliedmachine.com

Wohlhaupter™ Product

CATALOG

Flipbooks and Digital PDF Downloads

Every Section Available Online

AMPC*
Allied Master Product Catalog

Section A10
ASC 320®

Section A20 (AMPC-A2*)
GEN3SYS® XT and XT Pro

Section A30
Original T-A® and GEN2 T-A®

Section A40 (AMPC-A4*)
High Performance / Universal

Section A50
APX™ Drill

Section A55*
4TEX® Drill

Section A60
Revolution Drill®

Section A70
Opening Drill®

Section A91
Structural Steel Solutions

Section A92
AccuPort 432®

Section A93
BT-A Drill

Section B10
Wohlhaupter™ Product Overview

Section B20*
Criterion® Modular Boring

Section C
Reaming

Section D (AMPC-D*)
Burnishing

Section E
Threading

Section X
Special Tooling Solutions

EcoCut (EC*)
Multifunction Tooling

AccuThread™ T3 (E-AT3*)
3-Tooth Style Thread Mills

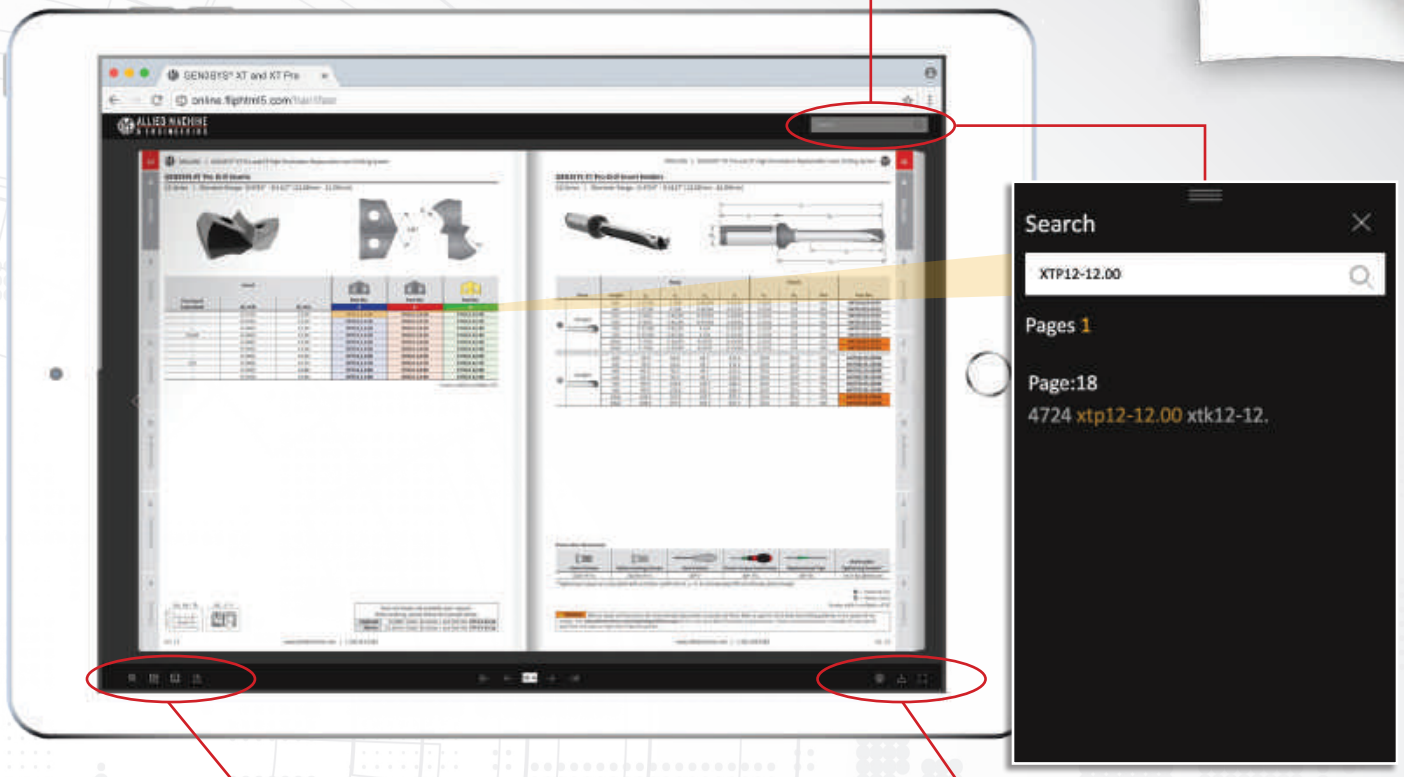
View, download, and share individual product line sections at

www.alliedmachine.com/Support/Literature

*Also available in print

Find what you need. *Now.*

Flipbook gives you the ability to search for a specific item number and find the page(s) where it's located. Save time searching the catalog by hand if you already know what item number you need. Visit the Flipbooks now at alliedmachine.com/support/literature.



Zoom in for a closer look.

Scroll through the pages in thumbnail view.

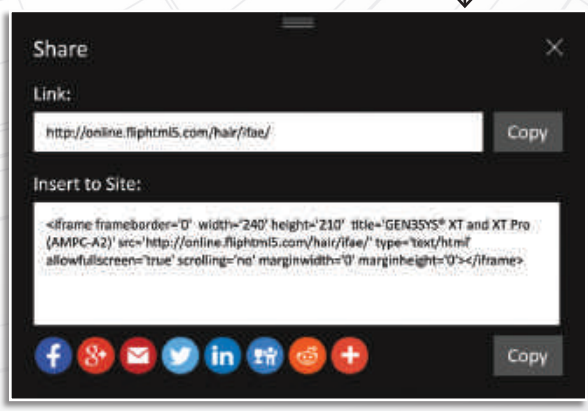
Set the catalog to auto flip.

Share the Flipbook with others.

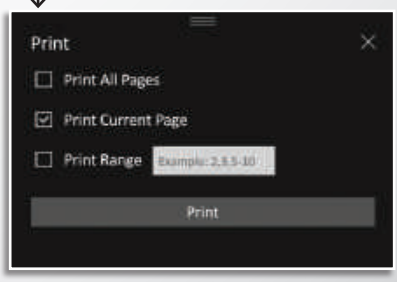
Print the full catalog or specific pages.

Download the catalog PDF.

View in full screen mode.



Share the link to each Flipbook via email and social media.



Allied Machine & Engineering

The Foundation

Since 1941, Allied Machine & Engineering has provided dependable and practical holemaking solutions to the world. What was once a small job shop in Ohio is now a worldwide leader in cutting tool technology. With three manufacturing facilities in Ohio, one in Georgia, another in Germany, and headquarters in both the United States and Europe, Allied Machine is positioned to bring innovative solutions and technical expertise directly to the customers' hands.

The Beginning

Harold E. Stokey founded Allied Machine & Engineering to aid the war effort, manufacturing taper bearing lock nuts for the production of M1 tanks. Years later, after a sales meeting gone wrong, Stokey possessed a warehouse stocked with spade drill inserts. He set forth into the industry that would become Allied Machine's thriving identity: holemaking.

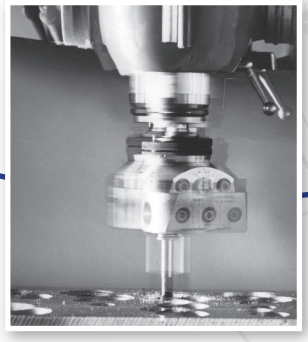
The T-A®

When Harold's son, William H. Stokey, became the president and CEO, he developed the Throw Away, or T-A®, spade drill insert system. The T-A revolutionized the holemaking industry, launching Allied Machine ahead of the competition. Since then, numerous innovations and advancements have been created from the T-A's inspiration.

Wohlhaupter™

The Foundation

On October 1, 1929, Emil Wohlhaupter founded a small mechanical workshop in Stuttgart-Feuerbach, Germany, reconditioning cutting and stamping tools by hand. A few years later, the company was subcontracted to carry out small-scale batch productions.



The UPA Beginning

In 1936, the first model of the Universal Facing and Boring head was developed. One year later, it was shown at the Leipzig Trade Fair. The UPA became known around the world along with Wohlhaupter's name. The Universal Facing and Boring head can be used on different machines for individual and batch productions. Since then, numerous boring innovations and advancements have been created.

The MultiBore® System

Wohlhaupter developed the world's first modular boring system in 1973 called MultiBore. MultiBore was created with a system of modular components that is compatible with every machine spindle.

The Innovation

Since the development of the T-A®, Allied Machine has expanded its product offering to support a vast range of customer applications, including large diameter and deep hole drilling, boring, reaming, burnishing, porting, and threading.

Today

In 2016, Allied Machine & Engineering joined forces with Wohlhaupter to create a globally sought after specialist for the entire holemaking process. Our customer support is crucial to what we do, and that's why we make sure the best engineers and customer service associates are in place to assist our customers around the world.

Steve Stokey
Executive Vice President
Allied Machine & Engineering

Frank-M. Wohlhaupter
Managing Director
Wohlhaupter GmbH

Paul Crawford
Managing Director
Allied Machine & Engineering (Europe) Ltd.

William H. Stokey
President and CEO

Mike Stokey
Executive Vice President
Allied Machine & Engineering

ALLIED MACHINE & ENGINEERING

Holemaking Solutions for Today's Manufacturing

WOHLHAUPTER® ThreadMills USA SUPERION® CRITERION®

Contents

Introduction

Icon Reference Guide iii

Product Offering Overview . . . . . iv - vii

Customer Support and Training Information . . . . . viii - ix

Online Tools . . . . . x - xi

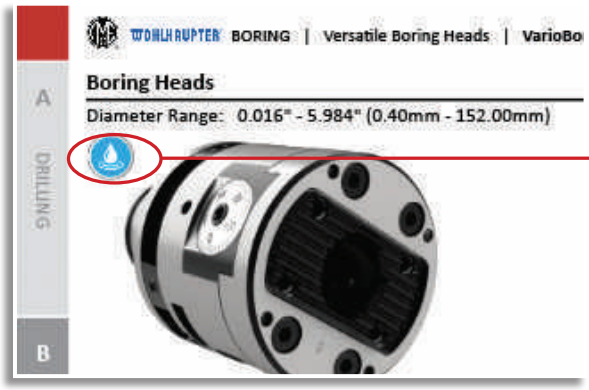
MVS Connection . . . . . xii - xiii

A	**Versatile Boring Heads** VarioBore, 249 (248), PrimeBore, Digital 511 (510), DigiBore	B10-A: 1 - 79
B	**Fine Boring** 320 (310), 365 (364), 565 (564), 338 (337), 538 (537)	B10-B: 1 - 31
C	**Rough and Finish Boring** Combi-Line	B10-C: 1 - 7
D	**Rough Machining** Twin Cutters, Chamfering Tools, Grooving Tools, Axial Grooving Tools, Reverse Machining Tools	B10-D: 1 - 25
E	**Large Diameter Boring** Ø 7.874" - 128.14" (200mm - 3255mm)	B10-E: 1 - 27
F	**Inserts** Wohlhaupter™ Boring Inserts	B10-F: 1 - 47
G	**Intermediate Modules**	B10-G: 1 - 15
H	**Master Shanks**	B10-H: 1 - 17
I	**Clamping Tools**	B10-I: 1 - 43
J	**UPA** Universal Facing and Boring Heads	B10-J: 1 - 17
K	**Specials**	B10-K: 1 - 9
L	**Lay Down Cartridges**	B10-L: 1 - 21
M	**Semi-Standard Insert Holders**	B10-M: 1 - 21
N	**Accessories / Technical Information and Guides** Speeds / Feeds, Warnings, Length to Diameter Ratio, Weight Capacity	B10-N: 1 - 13
	Index	INDEX

Visit **www.alliedmachine.com/Support/Literature** to access the complete Allied Machine & Engineering product catalogs.

For a Guaranteed Test/Demo Application, see the last page of this book.

Icon Reference Guide



Navigate with ease.

The following icons will appear throughout the catalog to help you navigate between products and find the best solution quickly.

Tool Options

Coolant Through

Safety Information

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

Patent Information

Allied Machine & Engineering and Wohlhaupter patent information can be found at **www.alliedmachine.com/patents**

Product Offering Overview

Replaceable Insert Drills

- Reduce costs by decreasing setup time and utilizing a single holder for the lives of multiple inserts
- Provide flexibility to quickly switch between inserts with different geometries
- Products:
  - **GEN3SYS® XT | GEN3SYS® XT Pro**
  - **T-A® | T-A® GEN2**
  - **High Performance | Universal**

Indexable Insert Drills

- Protect your investment and reduce your inventory with replaceable cartridges that allow the same holder to be used repeatedly
- Indexable inserts increase productivity and tool life while reducing costs
- Products:
  - **4TEX® Drill**
  - **Revolution Drill®**
  - **Opening Drill®**

Replaceable / Indexable Insert Drills

- Drill large diameter holes and maximize penetration rates even on low horsepower machines
- Delivers strength and versatility needed for any deep hole drilling application
- Holders cover a range of sizes with the replaceable heads determining the cutting diameter
- Products:
  - **APX™ Drill**

Solid Carbide Drills

- Offer greater strength and stability when drilling tougher materials
- Available in diameters from 3mm - 20mm
- Can be made-to-order specifically for your application (Superion® quoted specials)
  - **ASC 320®**
  - **Superion®**

Structural Steel Solutions

- Deliver outstanding performance and durability in structural steel applications
- Designed to produce optimal results in difficult-to-machine materials
- Available in multiple lengths and diameters
- T-A® style drills have different insert geometry options to improve performance depending on material
- Products:
  - **T-A® | T-A® GEN2**
  - **GEN3SYS® XT Pro**

BTA (STS) Machining Solutions

- The internal ejection system flushes chips and debris from the hole with no interference to the cutting process
- Utilizes the advantages of the T-A® drill insert
- Designed to significantly increase penetration rates over brazed heads and traditional gun drills
- Products:
  - **BT-A Drill**

Hydraulic Port Contour Cutters

- Save significant time and money by performing four processes in one step
- Replaceable insert design reduces costs, inventory, and setup times
- Available in four industry specifications:
  - Imperial: SAE J-1926
  - Metric: ISO 6149-1:2006
  - Military: SAE AS5202
  - John Deere: JDS-G173.1
- Products:
  - **AccuPort 432®**

4 IN 1

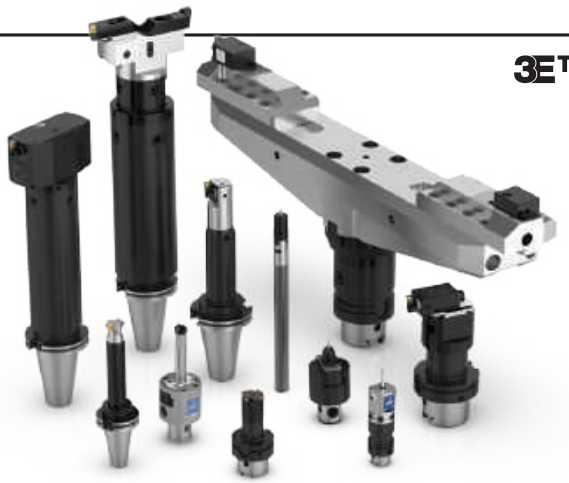
Enhanced Special Drilling Capabilities

- Allied Machine engineers are available to meet with you to evaluate your application and recommend the best solution for you
- Special drilling solutions can incorporate advanced features such as adjustable diameter locations, multiple steps, additional coolant designs, special lengths and diameters, and more
- Special drills can drastically reduce your cost per hole and increase your overall productivity by eliminating multiple processes and increasing tool life

Product Offering Overview

WOHLHAUPTER®
High Precision Boring Systems

- Designs available for high volume applications that increase rigidity to improve performance
- Versatile boring heads that are flexible with changing applications while maintaining excellent performance
- Provides high precision with absolute repeatability to ensure every part is held to tolerance
- Offers an industry leading modular shank connection that maintains rigidity and reduces inventory on your boring system
- Available with both digital and analog settings
- Products:
  - **Wohlhaupter™ Boring Tools**



3E TECH

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

CRITERION®
Modular Boring Systems

- The modular capabilities are ideal for use across multiple different projects
- Offers versatile boring heads suitable for job shops and tooling rooms
- Provides an economical solution for low volume and/or short-term production applications
- Offers finish boring solutions
- Products:
  - **Criterion® Boring Tools**

S.C.A.M.I.®
Expandable Reaming Solutions

- Expandable cutting diameters accommodate for wear, which extends tool life
- Replaceable cutting heads and rings reduce waste and improve production time versus solid high speed steel and carbide reamers
- Hold tight tolerances to ensure processes are performed to accurate specifications
- Reduce tooling costs because many items are available for reconditioning
- Products:
  - **ALVAN® Reamers**

S.C.A.M.I.®
Roller Burnishing Solutions

- Produce excellent surface finishes
- Provide accurate size control
- Increase surface hardness
- Solutions for both through hole and blind hole applications
- Products:
  - **S.C.A.M.I.® Roller Burnishing Tools**

Solid Carbide Thread Mills

- Available with coolant through options
- Cover a wide range of thread forms
- Provide optimal solutions for both high production projects and short-run applications
- Products
  - **AccuThread™ 856**
  - **AccuThread™ T3**
  - **ThreadMills USA™**

Indexable Insert Thread Mills

- Three insert lengths are available that cover a wide range of thread forms
- Holders can utilize inserts with different pitches and thread forms
- Repeatability is achieved by both the bolt-in style and the pin style locking systems
- Increase tool life by 25 - 50% with Allied Machine's AM210® coating
- Products
  - **AccuThread™ 856: Bolt-in Style**
  - **AccuThread™ 856: Pin Style**

SPECIAL CAPABILITIES

When it comes to designing and developing special solutions for customers, Allied Machine is the top choice. If your application requires special tooling, give us a call. Our engineered specials are developed by the brightest engineers in the industry. Most of our standard tooling can be altered as specials, or we can create entirely new concepts for particularly unique applications.

One special tooling solution is Insta-Quote®, the online system that allows you to design your own special tooling 24/7. Receive a quote and drawings within minutes just by following the steps.

And with the addition of Superion® technology and capabilities, we can customize made-to-order solid carbide tools to achieve optimal results for your applications.

Whatever your application, Allied Machine has the answer.

Insta-Quote®

SUPERION®

Customer Support

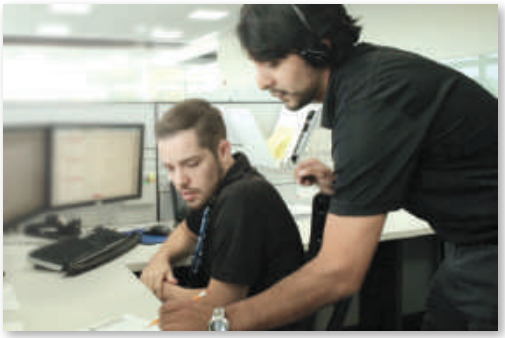
Support You Can Count On

Allied Machine has many lines of support to ensure we're available to assist you at all times. It's important to establish relationships with new customers, but we also know it's equally important to strengthen and support relationships with existing customers. Whether you need help with an order or you need someone to come assist you at the spindle, we have the right people to get you what you need.

1 Inside Sales Support

Our Inside Sales Team is trained to handle your account information and general inquiries. We are happy to assist you and find the answers to your questions.

- 1.330.343.4283 ext. 8610
- 1.800.321.5537 (toll free United States and Canada)
- insidesales@alliedmachine.com



2 Engineering Support

Our highly trained and skilled Application Engineers (AEs) are here to assist you. If you are experiencing technical difficulties, our engineers will recommend the best solutions to the problem. Speeds and feeds, coolant pressure, and other machining components all affect the performance of our tooling. Our AEs are experienced in working with difficult materials in many different environments. Give us a call and put our knowledge to the test.

- 1.330.343.4283 ext. 7611
- 1.800.321.5537 (toll free United States and Canada)
- appeng@alliedmachine.com

3 Field Support

Allied Machine provides local engineering support all over the world. Our Field Sales Engineers (FSEs) spend months training in-house before going to the field. This support line allows us to provide assistance to our customers right at the spindle. They are available to visit your facility, run demos and tests, and work hand-in-hand with machine operators and engineers to find the best possible tooling solutions.

NOTE: If you do not know your local FSE, please contact us

- 1.330.343.4283
- 1.800.321.5537 (toll free United States and Canada)
- info@alliedmachine.com

Customer Training

An Opportunity You Don't Want to Miss

Allied Machine's Technical Education Seminar (TES) puts the attendees in front of the machines. When you attend TES, you'll gain first-hand experience in real-life application situations. Test and experiment with different speeds and feeds, observe the results, and discover the best solution.

The training is conducted by Allied's skilled engineers, giving you the opportunity to work alongside the people who have the answers for all your application problems. You will also take guided tours of Allied Machine's two manufacturing facilities in Dover, Ohio.

TES
Technical Education Seminar

Register online today:
www.alliedmachine.com/TES

Training Lab

- In-depth training at the spindle allows you to choose the speeds and feeds
- Test the products the way you need to in order to discover the potential and the limitations in various applications
- Work side-by-side with Allied Machine's training technicians and engineers
- Witness the action of your tests and see the results up close

Learning Lab

- Quick, brief sessions in Allied Machine's learning lab provide basic knowledge to get you acclimated with the products
- Interact with Application Engineers and discuss specific issues you're experiencing in your applications
- Gain confidence and take your Allied Machine product knowledge to the next level with TES sessions in the training lab

Facility Tours

- Take guided tours of Allied Machine's two manufacturing facilities located in Dover, Ohio
- Follow the path of production and see the different steps and processes involved in the manufacturing of Allied Machine products
- See the magnitude of our capabilities and learn what's in store for the future

Allied Machine Training Facility
485 West 3rd Street
Dover, OH 44622

Online Tools | Design Anytime From Anywhere

ToolMD™

Increase the production and success of your applications today.

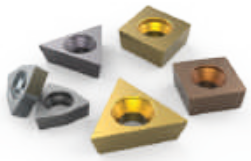
- Direct access to 2D drawings and 3D models
- Assemble and view tool images in your browser
- Download drawings for use in most machining software programs
- Browse products, search item numbers, and save assemblies for future use

toolmd.com

WOHLHAUPTER® Boring Insert Selector

Find the best insert for your application.

- Generate the correct boring insert for your job in just six easy steps
- Choose type, shape, substrate, insert form, nose radius, and material
- Order easily by adding the item to your cart



alliedmachine.com/bis

Product Selector

Use the product selector to find the right tool for your application.

- Follow guided steps to generate the right tool for your application
- Learn about your recommended tool and how to maximize its performance

alliedmachine.com/productselector

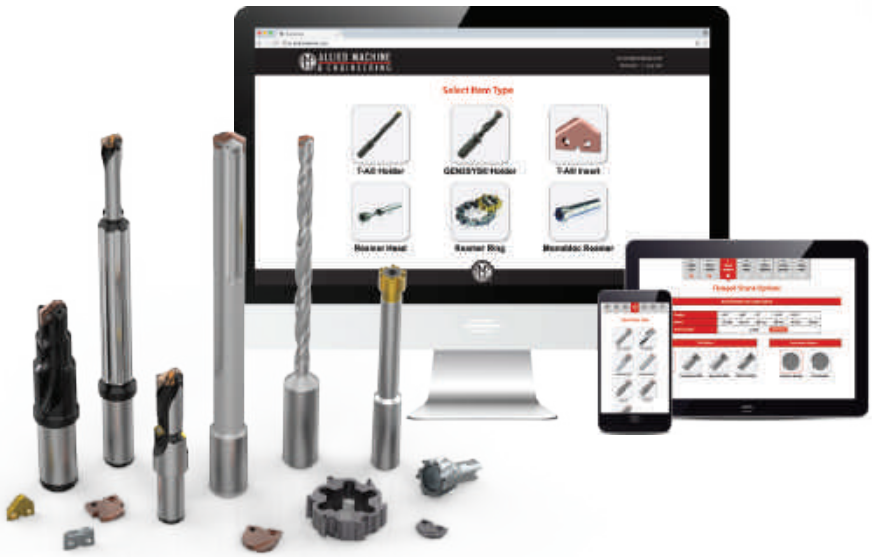
Insta-Code®

Eliminate the wait. Get your program now.

- Choose the best thread mill for your application
- Create program code for your machine
- Available as a PC download app (that can be used offline)
- Website app available 24/7

Insta-Code also has a **Cycle Time Calculator**

alliedmachine.com/InstaCode



Insta-Quote®

Design your custom tooling and receive a drawing and quote...all within minutes.

- Design and quote your own tooling
- Generate the solution you need in just a few steps
- Features the following products:
  - **T-A® Inserts**
  - **T-A® Holders**
  - **GEN3SYS® XT Holders**
  - **ALVAN® Reamers**

iq.alliedmachine.com

Solution Hub App

All Allied all the time.

- Quickly look up product information
- Links to our free online tools
- Locate distributors
- Stay up to date on news and events

Google play

Available on the App Store

Machinist Tool App

Quickly convert cutting tool parameters for the machine inputs you need.

- Input data to calculate the RPM and speed and feed rates
- Also features the Boring Insert Selector
- Access product literature right at your fingertips

Google play

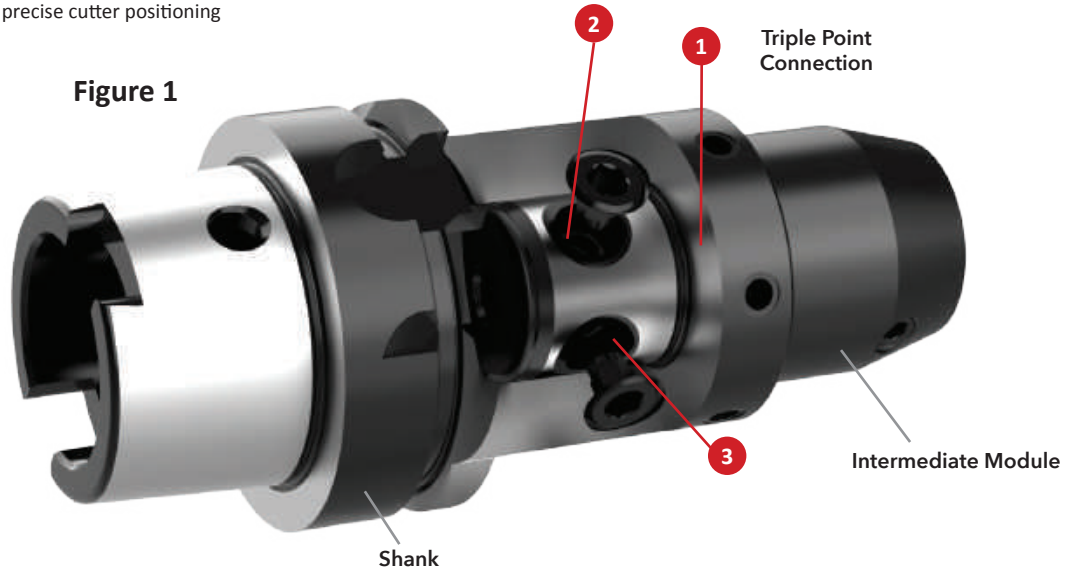
Available on the App Store

The MVS Connection

Wohlhaupter™ GmbH developed the world's first modular tooling system called MultiBore in 1973. The modular tooling system was designed to be compatible with all machine spindles, and its connection features a triple point clamp (Figure 1). The triple point clamp maximizes rigidity, and creates an accuracy less than 3µm when the tool is changed.

- Ensures high axial clamping forces on mating surfaces
- Provides maximum rigidity
- Threaded taper pins for precise cutter positioning

Figure 1



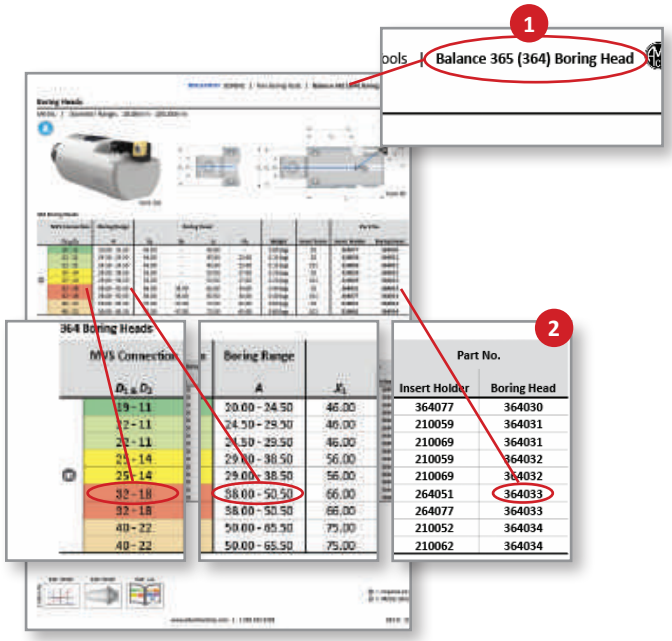
MVS Connection Color Guide

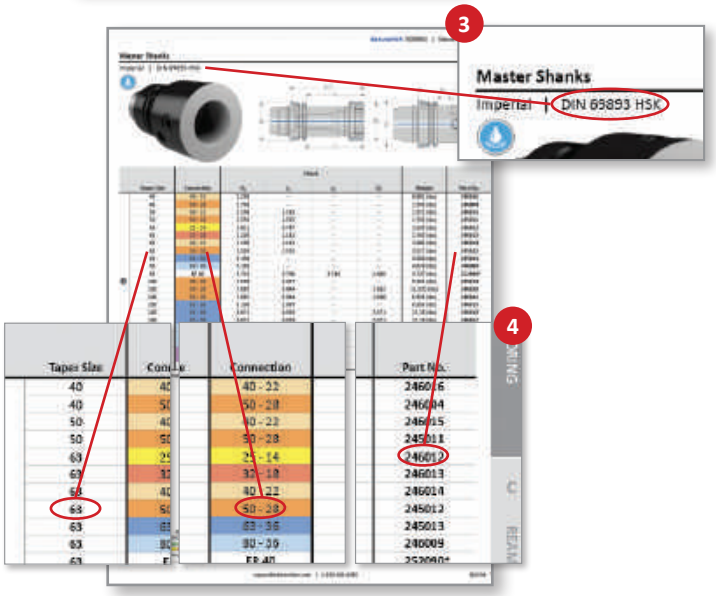
Wohlhaupter™ created a unique color-coding system to find the right connections for different tool components quickly and easily. Each Wohlhaupter / MVS connection size has its own color-coding. Simply match the colors to select the correct combination of tool components (Figure 2). We've also incorporated the color-coding system into our packaging to reduce setup time even more.

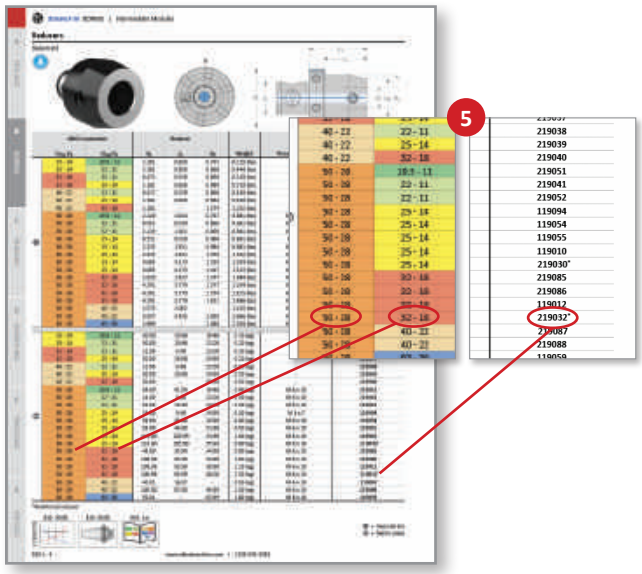
Figure 2

M 8	19.5 - 22	22 - 11	25 - 14	32 - 18	40 - 22	50 - 28	63 - 36	80 - 36	100 - 56	D 40	D 60

MVS Connection Example - Selecting the Correct Intermediate Module







Example Machining Parameters

Hole Diameter: 1.968" (50.00mm)
Hole Depth: 3.149" (80.00mm)
Machine Spindle: HSK-A 63 DIN 69893

1 Select your boring tool

Example: 364 Balance Boring Head

2 Select the tool that meets the required boring range

MVS connection: 32 - 18
A = 1.496" - 1.988" (38.00mm - 50.50mm)
Part No. : **364033**

3 Select the master shank that fits your spindle

Machine spindle: DIN 69893 HSK

4 Choose the connection that fits your application

MVS connection: 50 - 28
Part No. : **245012**

5 Select the correct intermediate module

Must meet the hole depth requirements and MVS connections for both the boring head and shank

Hole depth: 3.149" (80.00mm)
Boring tool 364033 length (X_1): 2.598" (66mm)
Min. required length of adapter: 0.551" (14mm)
Boring tool 364033 MVS connection: 32 - 18
Master shank 245012 MVS connection: 50 - 28
Adapter Part No.: **219032**

SECTION

B10-A

Versatile Boring Heads

Wohlhaupter™ Versatile Boring Heads

VarioBore | 249 (248) | PrimeBore | Digital 511 (510) | DigiBore

- **Diameter Range:** 0.016" - 8.188" (0.40mm - 208.00mm)

WOHLHAUPTER®

Precision boring at its finest.

From high precision to high production, Wohlhaupter has the right solution for your hole finishing applications. With the most reliable digital readout displays, the Wohlhaupter versatile boring product line offers the most precise and flexible modular system on the market.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

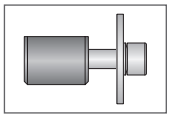
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

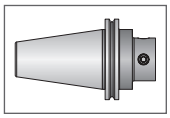
Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

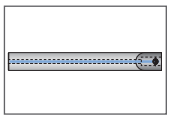
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



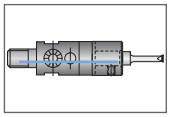
Clamping Elements
For use with insert holders and boring heads



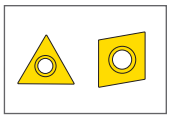
Shanks
A variety of shanks for different machines



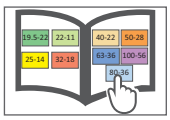
249 (248) Shanks
A variety of shanks for different machines



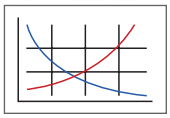
249 (248) Boring Head
249 (248) boring head that connects into the adapter shanks



Inserts
For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Series	Diameter Range	
	Imperial (inch)	Metric (mm)
VarioBore 563 (536)	0.016 - 5.984	0.40 - 152.00
249 (248) Boring Head	0.118 - 1.188	3.00 - 30.20
PrimeBore 451 (450)	0.118 - 8.189	3.00 - 208.00
Digital 511 (510)	0.016 - 0.472	0.40 - 12.00
DigiBore 504 (501)	0.118 - 8.189	3.00 - 208.00

Versatile Boring Head Contents

VarioBore
Product Overview . . . . . 2 - 3
Boring Heads . . . . . 4 - 5
Boring Bars . . . . . 6 - 9
Serrated Tool Bodies & Insert Holders . . . . . 10 - 11
Serrated Slides & Insert Holders 12
Insert Holders for Boring Heads 13
Outside Turning Tools . . . . . 14 - 15
Accessories 16
VarioBore Kits . . . . . 17 - 24

249 (248)
Product Overview . . . . . 26 - 27
Boring Heads 28
Boring Bars . . . . . 29 - 30
Adapters . . . . . 31 - 32
Shanks 33
Accessories 34

PrimeBore
Product Overview . . . . . 36 - 37
Boring Heads 38
Boring Bars . . . . . 39 - 41
Serrated Tool Bodies & Insert Holders 42
Serrated Slides & Insert Holders . . . . . 43 - 44
Outside Turning Tools . . . . . 45 - 46
Accessories 47
PrimeBore Kits . . . . . 48 - 49

Digital 511 (510)
Product Overview . . . . . 50 - 51
Boring Heads 52
Boring Bars . . . . . 53 - 55
Accessories 56

DigiBore
Product Overview . . . . . 58 - 59
Boring Heads 60
Boring Bars . . . . . 61 - 63
Serrated Tool Bodies & Insert Holders . . . . . 64 - 65
Serrated Slides & Insert Holders 66
Outside Turning Tools . . . . . 67 - 68
Accessories . . . . . 69 - 70
DigiBore Kits . . . . . 71 - 78

VarioBore Product Overview

VarioBore with 3E^TECH
VERSATILE BORING

Need more versatility?

The Wohlhaupter™ VarioBore head offers precision and versatility, and the 3E^TECH docking port provides convenient and simple diameter adjustments. Turn your vernier VarioBore tools into easy-to-read digital boring tools with the 3E^TECH external digital module.

Experience ***precision boring*** for yourself.

- Diameter range: 0.016" - 5.984" (0.40mm - 152.00mm)
- Offers outside turning capabilities
- Ease the stress of working on different day-to-day projects with boring kits
- 3E^TECH module provides a simple digital readout
- Max spindle speed: 25,000 RPM

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

VARIO BORE with 3E TECH Universal Digital Readout Module

3E TECH
Universal Digital
Module

VarioBore Head

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Coolant Delivery System

Insert Holder
Ø 2.047" - 4.016"
(Ø 52mm - 102mm)

Outside Turning
Ø 0.157" - 2.598"
(Ø 4mm - 66mm)

Serrated Tool Body

Serrated Tool Body

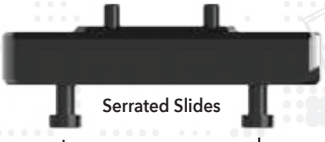
Carbide Boring Bar
Ø 0.394" - 0.787"
(Ø 10mm - 20mm)

Heavy Metal Boring Bar
Ø 0.236" - 0.394"
(Ø 6mm - 10mm)

Steel Boring Bar
Ø 0.236" - 1.063"
(Ø 6mm - 27mm)

Adapter

Reducing Sleeve



Serrated Slides

Insert Holder
Ø 1.142" - 2.087"
(Ø 29mm - 53mm)

Insert Holder
Ø 0.787" - 1.260"
(Ø 20mm - 32mm)

Mini-Boring Bar
Ø 0.118" - 0.394"
(Ø 3mm - 10mm)

Coated Carbide Mini-Boring Bar
Ø 0.016" - 0.118"
(Ø 0.4mm - 3mm)

Counter Weight

Outside Turning
Ø 0.079" - 2.283"
(Ø 2mm - 58mm)

Insert Holder
Ø 2.677" - 5.984"
(Ø 68mm - 152mm)

OPERATION **VERSATILITY**

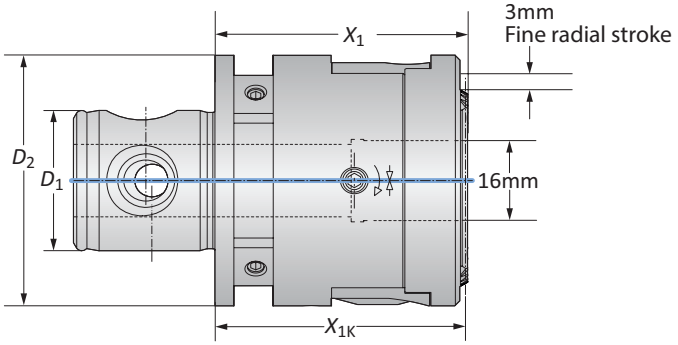
from **0.016"** to **5.984"** (**0.4mm** to **152mm**)
plus outside turning

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Boring Heads

Diameter Range: 0.016" - 5.984" (0.40mm - 152.00mm)



VarioBore Boring Heads

	MVS Connection D_2 | D_1	Boring Range	Boring Head X_1	Boring Head X_2	Weight	Part No.
i	50 - 28	0.016 - 5.984	1.968	1.948	1.543 (lbs)	**563001**
m	50 - 28	0.40 - 152.00	50.00	49.50	0.70 (kg)	**536001**

NOTE: VarioBore heads are compatible with Kaiser® connection

B10-N: 10-13 | B10-H | B10: xii-xiii

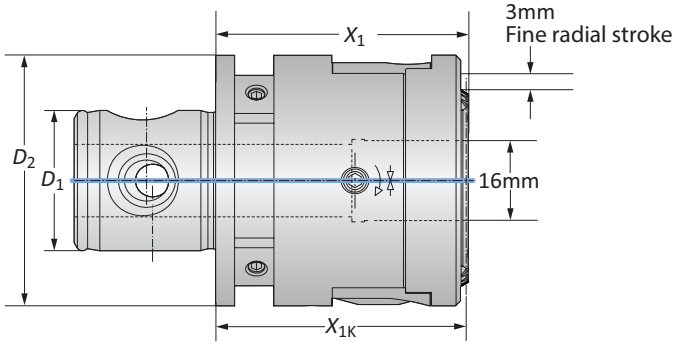
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Boring Heads with 3E^{TECH}

Diameter Range: 0.016" - 5.984" (0.40mm - 152.00mm)



VarioBore Boring Head

	MVS Connection D_2 | D_1	Boring Range	Boring Head X_1	Boring Head X_2	Weight	Part No.
i	50 - 28	0.016 - 5.984	1.968	1.948	1.543 (lbs)	**563002**
m	50 - 28	0.40 - 152.00	50.00	49.50	0.70 (kg)	**536002**

NOTE: 3E^{TECH} digital readout module must be ordered separately.
NOTE: VarioBore heads are compatible with Kaiser® connection

3E^{TECH} Digital Readout Module

	Part No.
i	**563010**
m	**536010**

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

B10-N: 10-13 | B10-H | B10: xii-xiii

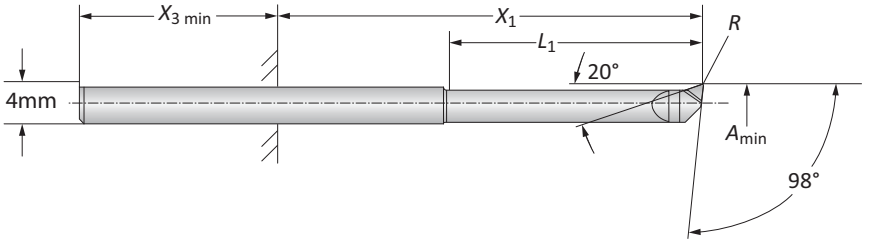
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Mini Boring Bars

WHC126 Coated Carbide | Diameter Range: 0.016" - 0.118" (0.40mm - 3.00mm)

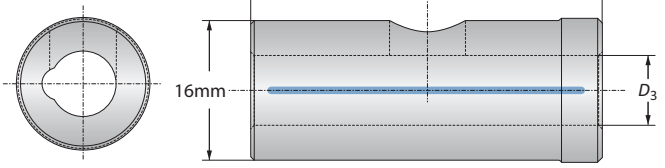


Mini Boring Bars

	Boring Range	Boring Bar				
	A_{min}	X_1	$X_{3\ min}$	L_1	R	Part No.
ⓘ	0.016	0.118 - 0.669	0.980	0.079	0.0010	**081401HC126**
ⓘ	0.024	0.157 - 0.709	0.980	0.118	0.0020	**081402HC126**
ⓘ	0.031	0.197 - 0.748	0.980	0.157	0.0020	**081403HC126**
ⓘ	0.039	0.236 - 0.787	0.980	0.197	0.0025	**081404HC126**
ⓘ	0.059	0.335 - 0.886	0.980	0.295	0.0025	**081405HC126**
ⓘ	0.079	0.433 - 0.984	0.980	0.394	0.0025	**081406HC126**
ⓘ	0.098	0.531 - 1.083	0.980	0.492	0.0025	**081407HC126**
ⓘ	0.110	0.591 - 1.142	0.980	0.551	0.0030	**081408HC126**
ⓜ	0.40	3.00 - 17.00	25.00	2.00	0.03	**081401HC126**
ⓜ	0.60	4.00 - 18.00	25.00	3.00	0.04	**081402HC126**
ⓜ	0.80	5.00 - 19.00	25.00	4.00	0.04	**081403HC126**
ⓜ	1.00	6.00 - 20.00	25.00	5.00	0.05	**081404HC126**
ⓜ	1.50	8.50 - 22.50	25.00	7.50	0.05	**081405HC126**
ⓜ	2.00	11.00 - 25.00	25.00	10.00	0.05	**081406HC126**
ⓜ	2.50	13.50 - 27.50	25.00	12.50	0.05	**081407HC126**

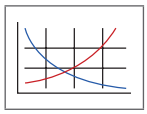
Reducing Sleeve

	Reducing Sleeve		
	D_3	Weight	Part No.
ⓜ	4.00	0.05 (kg)	**450129**

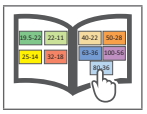


B10-N: 10-13

Key on B10-A: 1



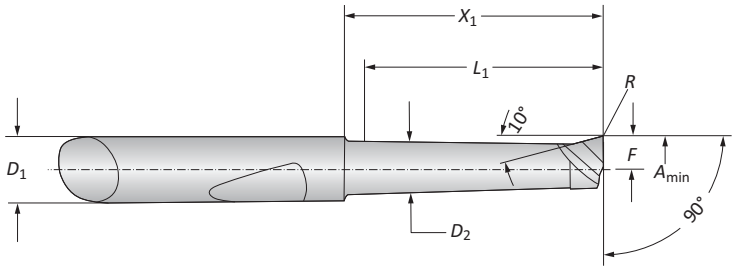
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Mini Boring Bars

WHC05 | WHW04 | WBN150 | Diameter Range: 0.118" - 0.394" (3.00mm - 10.00mm)

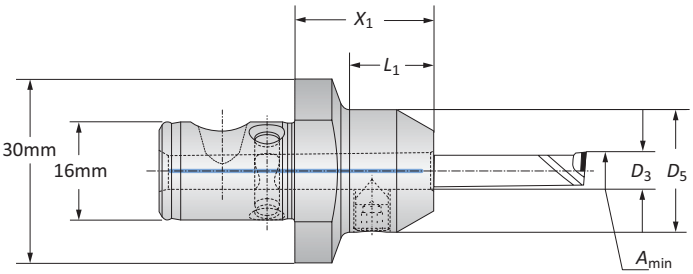


Mini Boring Bars

	Boring Range	Boring Bar						Part No.		
	A_{min}	D_1	D_2	X_1	L_1	F	R	Coated Carbide	Uncoated Carbide	CBN
	0.118	0.236	0.102	0.452	0.393	0.055	0.003	**081306HC05**	–	**081322BN150**
	0.118	0.236	0.102	0.649	0.590	0.055	0.003	**081307HC05**	**081307HW04**	–
	0.157	0.236	0.141	0.472	0.393	0.074	0.007	**081308HC05**	–	**081317BN150**
	0.157	0.236	0.141	0.669	0.590	0.074	0.007	**081309HC05**	–	**081341BN150**
	0.157	0.236	0.141	0.866	0.787	0.074	0.007	**081310HC05**	**081310HW04**	–
	0.196	0.236	0.181	0.472	0.393	0.074	0.007	**081311HC05**	–	**081318BN150**
ⓘ	0.196	0.236	0.181	0.866	0.787	0.074	0.007	**081312HC05**	–	**081319BN150**
	0.196	0.236	0.181	1.259	1.181	0.074	0.007	**081313HC05**	**081313HW04**	–
	0.236	0.236	0.220	0.866	0.787	0.114	0.007	**081314HC05**	–	**081320BN150**
	0.236	0.236	0.220	1.259	1.181	0.114	0.007	**081315HC05**	–	**081321BN150**
	0.236	0.236	0.220	1.653	1.574	0.114	0.007	**081316HC05**	**081316HW04**	–
	0.314	0.314	0.229	0.984	0.905	0.153	0.007	**081323HC05**	–	–
	0.314	0.314	0.229	1.968	1.889	0.153	0.007	**081324HC05**	–	–
	3.00	6.00	2.60	11.50	10.00	1.40	0.10	**081306HC05**	–	**081322BN150**
	3.00	6.00	2.60	16.50	15.00	1.40	0.10	**081307HC05**	**081307HW04**	–
	4.00	6.00	3.60	12.00	10.00	1.90	0.20	**081308HC05**	–	**081317BN150**
	4.00	6.00	3.60	17.00	15.00	1.90	0.20	**081309HC05**	–	**081341BN150**
	4.00	6.00	3.60	22.00	20.00	1.90	0.20	**081310HC05**	**081310HW04**	–
	5.00	6.00	4.60	12.00	10.00	2.40	0.20	**081311HC05**	–	**081318BN150**
ⓜ	5.00	6.00	4.60	22.00	20.00	2.40	0.20	**081312HC05**	–	**081319BN150**
	5.00	6.00	4.60	32.00	30.00	2.40	0.20	**081313HC05**	**081313HW04**	–
	6.00	6.00	5.60	22.00	20.00	2.90	0.20	**081314HC05**	–	**081320BN150**
	6.00	6.00	5.60	32.00	30.00	2.90	0.20	**081315HC05**	–	**081321BN150**
	6.00	6.00	5.60	42.00	40.00	2.90	0.20	**081316HC05**	**081316HW04**	–
	8.00	8.00	7.60	25.00	23.00	3.90	0.20	**081323HC05**	–	–
	8.00	8.00	7.60	50.00	48.00	3.90	0.20	**081324HC05**	–	–

Adapters

	Boring Range	Adapter				
	A_{min}	D_3	D_5	X_1	L_1	Part No.
ⓜ	3.00	6.00	20.00	22.50	14.00	**319010**
	8.00	8.00	22.00	22.50	14.00	**236071**

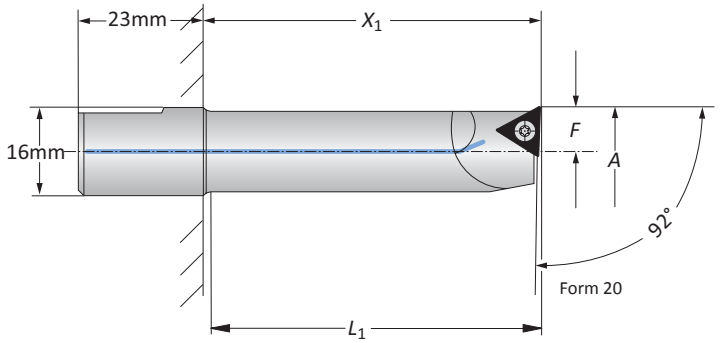


B10-N: 10-13
Key on B10-A:1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Boring Bars

Steel 92° Angle | Diameter Range: 0.236" - 1.063" (6.00mm - 27.00mm)



	Boring Range	Boring Bar							
	A	X_1	L_1	*F*	Weight	Insert Form	Part No.	Insert Form	Part No.
	0.236 - 0.315	0.866	0.748	0.110	0.070 (lbs)	–	–	211	**081053**
	0.315 - 0.394	1.181	1.063	0.150	0.090 (lbs)	–	–	211	**218071**
	0.394 - 0.472	1.772	1.654	0.189	0.110 (lbs)	–	–	20*	**081044**
	0.394 - 0.472	0.984	0.866	0.189	0.090 (lbs)	101*	**218047**	20*	**218058**
	0.394 - 0.472	1.378	1.260	0.189	0.110 (lbs)	101*	**218048**	20*	**218059**
	0.472 - 0.551	1.181	1.063	0.228	0.110 (lbs)	101*	**218012**	20*	**218014**
	0.472 - 0.551	1.772	1.654	0.228	0.130 (lbs)	101*	**218049**	20*	**218060**
	0.551 - 0.630	1.378	1.260	0.268	0.130 (lbs)	101*	**218050**	20*	**218061**
ⓘ	0.551 - 0.630	1.969	1.850	0.268	0.180 (lbs)	101*	**218051**	20*	**218062**
	0.591 - 0.669	1.457	1.339	0.291	0.130 (lbs)	–	–	20*	**081048**
	0.591 - 0.669	2.362	2.244	0.291	0.180 (lbs)	101*	**081041**	20*	**081045**
	0.630 - 0.786	1.575	1.457	0.307	0.180 (lbs)	101*	**218052**	20*	**218063**
	0.630 - 0.786	2.362	2.244	0.307	0.200 (lbs)	101*	**218053**	20*	**218064**
	0.787 - 0.983	1.457	1.299	0.386	0.150 (lbs)	–	–	20*	**081049**
	0.787 - 0.983	2.756	2.480	0.386	0.240 (lbs)	101*	**081042**	20*	**081046**
	0.984 - 1.063	1.457	1.299	0.484	0.150 (lbs)	–	–	20*	**081050**
	0.984 - 1.063	2.756	2.638	0.484	0.240 (lbs)	101*	**081043**	20*	**081047**
	6.00 - 8.00	22.00	19.00	2.80	0.03 (kg)	–	–	211	**081053**
	8.00 - 10.00	30.00	27.00	3.80	0.04 (kg)	–	–	211	**218071**
	10.00 - 12.00	45.00	42.00	4.80	0.05 (kg)	–	–	20*	**081044**
	10.00 - 12.00	25.00	22.00	4.80	0.04 (kg)	101*	**218047**	20*	**218058**
	10.00 - 12.00	35.00	32.00	4.80	0.05 (kg)	101*	**218048**	20*	**218059**
	12.00 - 14.00	30.00	27.00	5.80	0.05 (kg)	101*	**218012**	20*	**218014**
	12.00 - 14.00	45.00	42.00	5.80	0.06 (kg)	101*	**218049**	20*	**218060**
	14.00 - 16.00	35.00	32.00	6.80	0.06 (kg)	101*	**218050**	20*	**218061**
ⓜ	14.00 - 16.00	50.00	47.00	6.80	0.08 (kg)	101*	**218051**	20*	**218062**
	15.00 - 17.00	37.00	34.00	7.40	0.06 (kg)	–	–	20*	**081048**
	15.00 - 17.00	60.00	57.00	7.40	0.08 (kg)	101*	**081041**	20*	**081045**
	16.00 - 20.00	40.00	37.00	7.80	0.08 (kg)	101*	**218052**	20*	**218063**
	16.00 - 20.00	60.00	57.00	7.80	0.09 (kg)	101*	**218053**	20*	**218064**
	20.00 - 25.00	37.00	33.00	9.80	0.07 (kg)	–	–	20*	**081049**
	20.00 - 25.00	70.00	63.00	9.80	0.11 (kg)	101*	**081042**	20*	**081046**
	25.00 - 27.00	37.00	33.00	12.30	0.07 (kg)	–	–	20*	**081050**
	25.00 - 27.00	70.00	67.00	12.30	0.11 (kg)	101*	**081043**	20*	**081047**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

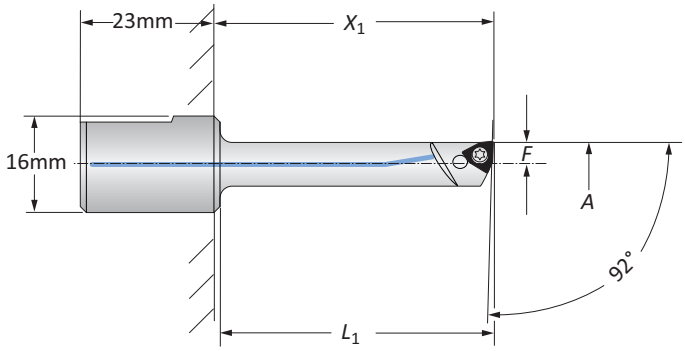
B10: 10-13 | B10-F | B10: xii-xiii

Key on B10-A:1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Boring Bars

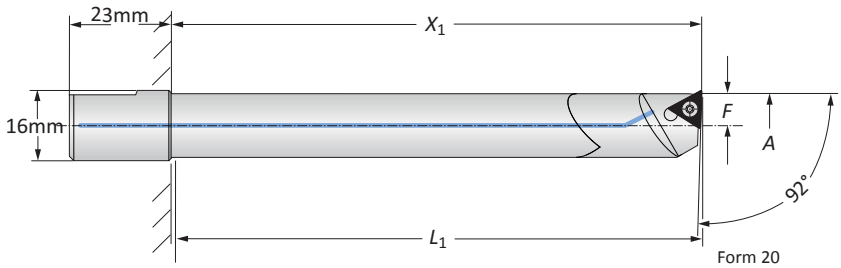
Heavy Metal | Carbide



Heavy Metal Boring Bars | Diameter Range: 0.236" - 0.394" (6.00mm - 10.00mm)

	Boring Range	Boring Bar					
	A	X_1	L_1	*F*	Weight	Insert Form	Part No.
i	0.236 - 0.315	1.260	1.142	0.110	0.176 (lbs)	211	**081055**
i	0.315 - 0.394	1.772	1.654	0.150	0.198 (lbs)	211	**218072**
m	6.00 - 8.00	32.00	29.00	2.80	0.08 (kg)	211	**081055**
m	8.00 - 10.00	45.00	42.00	3.80	0.09 (kg)	211	**218072**

Form 101



Form 20

Carbide Boring Bars | Diameter Range: 0.394" - 0.787" (10.00mm - 20.00mm)

	Boring Range	Boring Bar							
	A	X_1	L_1	*F*	Weight	Insert Form	Part No.	Insert Form	Part No.
i	0.394 - 0.472	2.165	2.047	0.189	0.154 (lbs)	101*	**218042**	20*	**218037**
i	0.394 - 0.472	2.953	2.835	0.189	0.198 (lbs)	101*	**218032**	20*	**218029**
i	0.472 - 0.551	2.756	2.638	0.228	0.220 (lbs)	101*	**218043**	20*	**218038**
i	0.472 - 0.551	3.543	3.425	0.228	0.331 (lbs)	101*	**218033**	20*	**218030**
i	0.551 - 0.630	2.953	2.835	0.268	0.353 (lbs)	101*	**218044**	20*	**218039**
i	0.551 - 0.630	3.937	3.819	0.268	0.441 (lbs)	101*	**218045**	20*	**218040**
i	0.630 - 0.787	3.543	3.425	0.307	0.573 (lbs)	101*	**218046**	20*	**218041**
i	0.630 - 0.787	4.724	4.606	0.307	0.728 (lbs)	101*	**218034**	20*	**218031**
m	10.00 - 12.00	55.00	52.00	4.80	0.07 (kg)	101*	**218042**	20*	**218037**
m	10.00 - 12.00	75.00	72.00	4.80	0.09 (kg)	101*	**218032**	20*	**218029**
m	12.00 - 14.00	70.00	67.00	5.80	0.10 (kg)	101*	**218043**	20*	**218038**
m	12.00 - 14.00	90.00	87.00	5.80	0.15 (kg)	101*	**218033**	20*	**218030**
m	14.00 - 16.00	75.00	72.00	6.80	0.16 (kg)	101*	**218044**	20*	**218039**
m	14.00 - 16.00	100.00	97.00	6.80	0.20 (kg)	101*	**218045**	20*	**218040**
m	16.00 - 20.00	90.00	87.00	7.80	0.26 (kg)	101*	**218046**	20*	**218041**
m	16.00 - 20.00	120.00	117.00	7.80	0.33 (kg)	101*	**218034**	20*	**218031**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

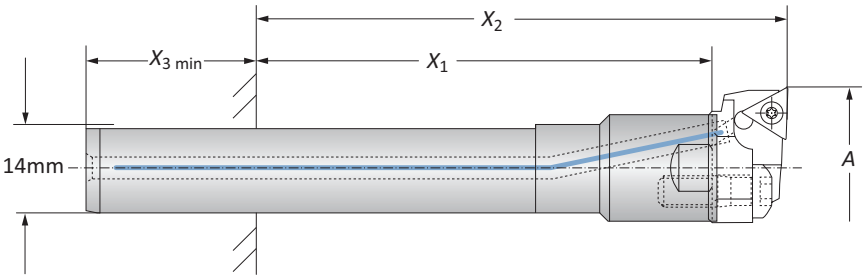
B10: 10-13 | B10-F | B10: xii-xiii

Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Serrated Tool Bodies | Insert Holders

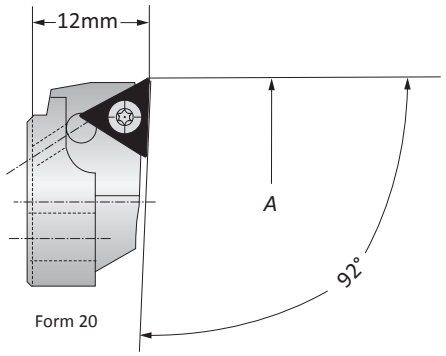
Diameter Range: 0.787" - 1.339" (20.00mm - 34.00mm)



Serrated Tool Bodies

	Substrate	Boring Range A	Serrated Tool Body X_1	X_2	$X_{3\ min}$	Weight	Part No.
i	Steel	0.787 - 1.339	1.457 - 2.835	1.929 - 3.307	1.181	0.287 (lbs)	**514029**
i	Carbide	0.787 - 1.339	2.550 - 3.937	3.031 - 4.409	1.181	0.551 (lbs)	**514030**
i	Carbide	0.787 - 1.339	3.937 - 5.315	4.409 - 5.787	1.181	0.728 (lbs)	**514031**
m	Steel	20.00 - 34.00	37.00 - 72.00	49.00 - 84.00	30.00	0.13 (kg)	**514029**
m	Carbide	20.00 - 34.00	65.00 - 100.00	77.00 - 112.00	30.00	0.25 (kg)	**514030**
m	Carbide	20.00 - 34.00	100.00 - 135.00	112.00 - 147.00	30.00	0.33 (kg)	**514031**

Form 101



Form 20

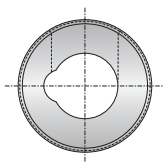
Insert Holders

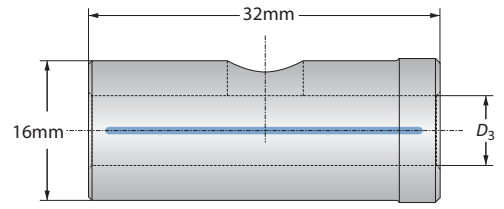
	Boring Range A	Weight	Insert Form	Part No.	Insert Form	Part No.
i	0.787 - 0.866	0.022 (lbs)	101*	**502052**	20*	**502046**
i	0.866 - 0.945	0.022 (lbs)	101*	**502053**	20*	**502047**
i	0.945 - 1.024	0.022 (lbs)	101*	**502054**	20*	**502048**
i	1.024 - 1.102	0.022 (lbs)	101*	**502055**	20*	**502049**
i	1.102 - 1.181	0.022 (lbs)	101*	**502056**	20*	**502050**
i	1.181 - 1.260	0.022 (lbs)	101*	**502057**	20*	**502051**
m	20.00 - 22.00	0.01 (kg)	101*	**502052**	20*	**502046**
m	22.00 - 24.00	0.01 (kg)	101*	**502053**	20*	**502047**
m	24.00 - 26.00	0.01 (kg)	101*	**502054**	20*	**502048**
m	26.00 - 28.00	0.01 (kg)	101*	**502055**	20*	**502049**
m	28.00 - 30.00	0.01 (kg)	101*	**502056**	20*	**502050**
m	30.00 - 32.00	0.01 (kg)	101*	**502057**	20*	**502051**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

Reducing Sleeve

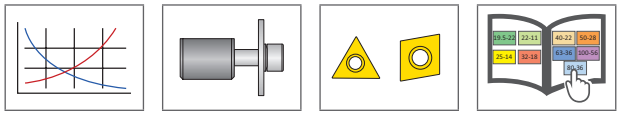
	Reducing Sleeve D_3	Weight	Part No.
m	14.00	0.01 (kg)	**450136**





B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

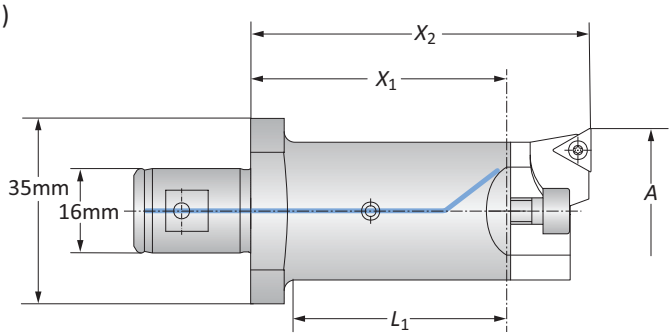
Key on B10-A: 1



i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Serrated Tool Bodies | Insert Holders

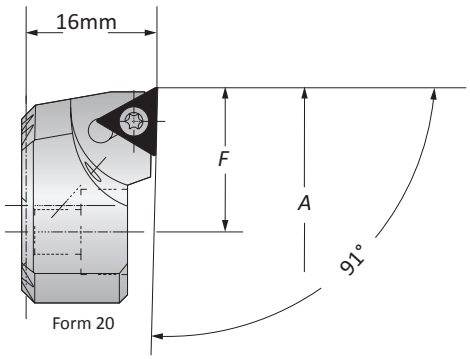
Diameter Range: 1.142" - 2.087" (29.00mm - 53.00mm)



Serrated Tool Bodies

	Boring Range A	Serrated Tool Body X_1	X_2	L_1	Weight	Part No.
i	1.142 - 2.087	2.520	1.890	2.205	0.441 (lbs)	**236021**
i	1.142 - 2.087	3.937	3.307	3.622	0.661 (lbs)	**236031**
m	29.00 - 53.00	64.00	48.00	56.00	0.20 (kg)	**236021**
m	29.00 - 53.00	100.00	84.00	92.00	0.30 (kg)	**236031**

Form 101



Form 20

Insert Holders

	Boring Range A	Insert Holder F	Weight	Insert Form	Part No.
i	1.142 - 1.614	0.698	0.088 (lbs)	20*	**236022**
i	1.142 - 1.614	0.698	0.088 (lbs)	101	**236023**
i	1.575 - 2.087	0.925	0.132 (lbs)	20*	**236024**
i	1.575 - 2.087	0.925	0.132 (lbs)	101	**236025**
m	29.00 - 41.00	17.75	0.04 (kg)	20*	**236022**
m	29.00 - 41.00	17.75	0.04 (kg)	101	**236023**
m	40.00 - 53.00	23.50	0.06 (kg)	20*	**236024**
m	40.00 - 53.00	23.50	0.06 (kg)	101	**236025**

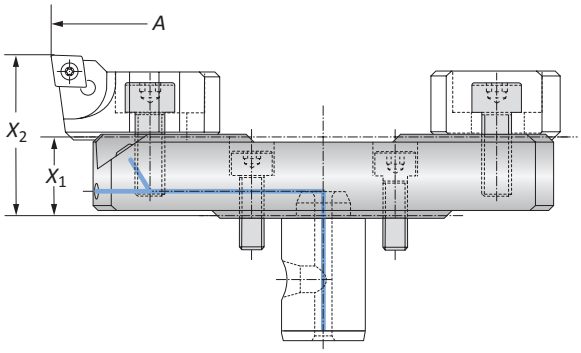
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Alu-Line Serrated Slides | Insert Holders

Diameter Range: 2.677" - 5.984" (68.00mm - 152.00mm)



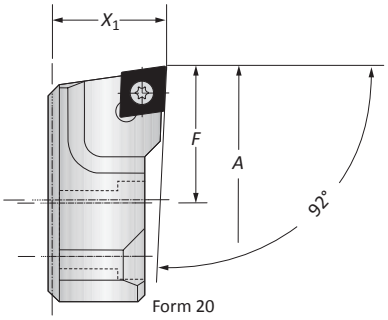
Alu-Line Serrated Slides

	Boring Range A	Serrated Slide X_1	Serrated Slide X_2	Weight	Part No.
i	2.677 - 3.780	0.630	1.279	0.220 (lbs)	**501054**
i	3.780 - 4.882	0.630	1.279	0.220 (lbs)	**501055**
i	4.882 - 5.984	0.630	1.279	0.440 (lbs)	**501056**
m	68.00 - 96.00	16.00	32.50	0.10 (kg)	**501054**
m	96.00 - 124.00	16.00	32.50	0.10 (kg)	**501055**
m	124.00 - 152.00	16.00	32.50	0.20 (kg)	**501056**

Insert Holders

	Boring Range	Weight	Insert Form	Part No.
i	2.677 - 5.984	0.110 (lbs)	101	**502064**
i	2.677 - 5.984	0.110 (lbs)	20	**502069**
m	68.00 - 152.00	0.05 (kg)	101	**502064**
m	68.00 - 152.00	0.05 (kg)	20	**502069**

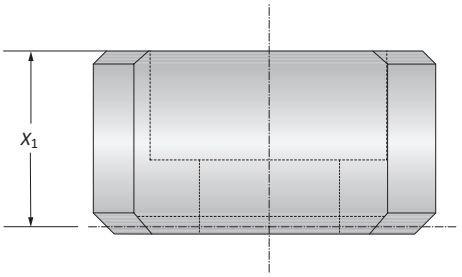
Form 101



Form 20

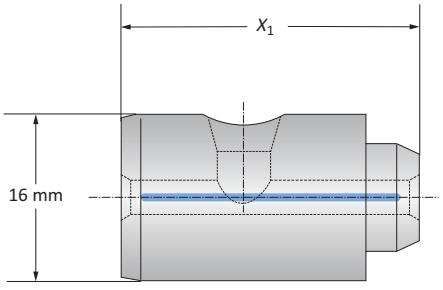
Counter Weights

	Counter Weight X_1	Weight	Part No.
i	1.004	0.110 (lbs)	**502165**
m	13.40	0.05 (kg)	**502165**



Alu-Line Coolant Delivery Sections

	Coolant Delivery X_1	Weight	Part No.
i	1.004	0.022 (lbs)	**450137**
m	25.50	0.01 (kg)	**450137**



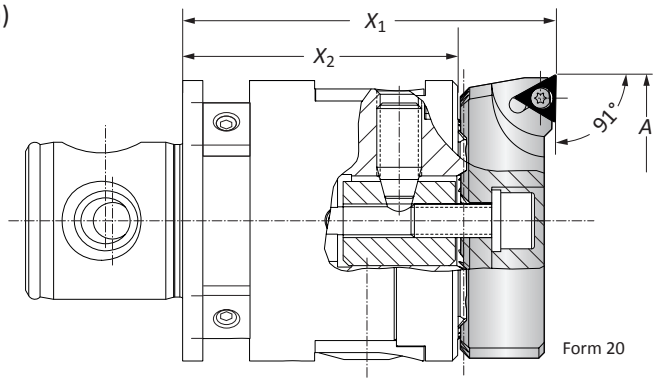
B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Insert Holders for Boring Heads

Diameter Range: 2.047" - 4.016" (52.00mm - 102.00mm)

Form 101



Form 20

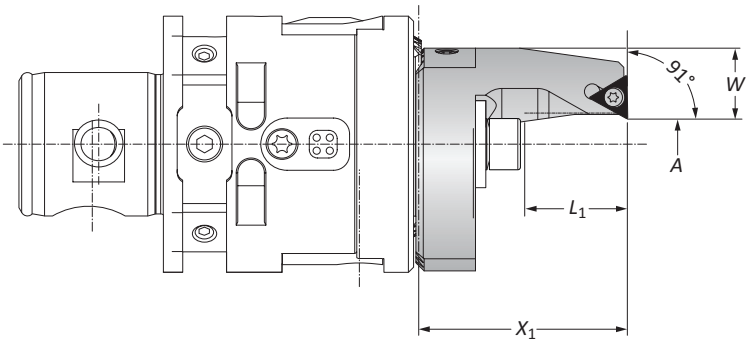
	Boring Range A	Insert Holder X_1	Insert Holder X_2	Weight	Insert Form	Part No.
i	2.047 - 3.031	2.598	1.949	0.132 (lbs)	20	**236026**
i	2.047 - 3.031	2.598	1.949	0.132 (lbs)	101	**236027**
i	2.992 - 4.016	2.598	1.949	0.220 (lbs)	20	**236028**
i	2.992 - 4.016	2.598	1.949	0.220 (lbs)	101	**236029**
m	52.00 - 77.00	66.00	49.50	0.06 (kg)	20	**236026**
m	52.00 - 77.00	66.00	49.50	0.06 (kg)	101	**236027**
m	76.00 - 102.00	66.00	49.50	0.10 (kg)	20	**236028**
m	76.00 - 102.00	66.00	49.50	0.10 (kg)	101	**236029**

B10-N: 10-13
B10-A: 16
B10-F
B10: xii-xiii
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Outside Turning Insert Holders for Boring Heads

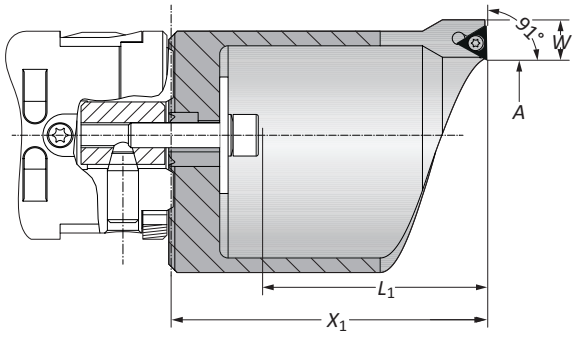
Outside Turning | Diameter Range: 0.157" - 2.598" (4.00mm - 66.00mm)



Type A Insert Holders

	Boring Range	Insert Holder						
	A	X_1	L_1	*W*	Weight	Type	Insert Form	Part No.
i	0.157 - 0.689	3.543	0.787	0.653	0.220	A	20*	**236081**
i	0.650 - 1.181	3.937	1.181	0.437	0.220	A	20*	**236082**
m	4.00 - 17.50	45.00	20.00	16.60	0.10	A	20*	**236081**
m	16.50 - 30.00	52.50	30.00	11.10	0.10	A	20*	**236082**

NOTE: Clockwise and neutral execution
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)



Type B Insert Holders

	Boring Range	Insert Holder						
	A	X_1	L_1	*W*	Weight	Type	Insert Form	Part No.
i	1.142 - 1.732	4.921	2.126	0.377	0.661 (lbs)	B	20*	**236083**
i	1.693 - 2.598	5.905	3.110	0.377	0.882 (lbs)	B	20*	**236084**
m	29.00 - 44.00	63.50	54.00	9.60	0.30 (kg)	B	20*	**236083**
m	43.00 - 66.00	85.50	79.00	9.60	0.40 (kg)	B	20*	**236084**

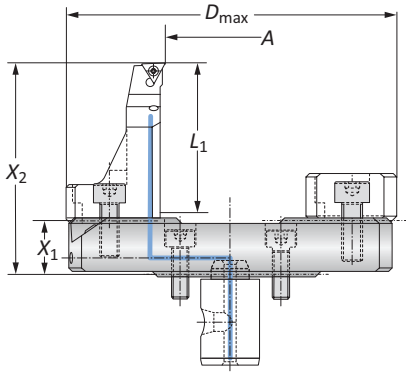
NOTE: Clockwise and neutral execution
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Outside Turning Serrated Slides | Insert Holders

Diameter Range: 0.079" - 4.488" (2.00mm - 114.00mm)

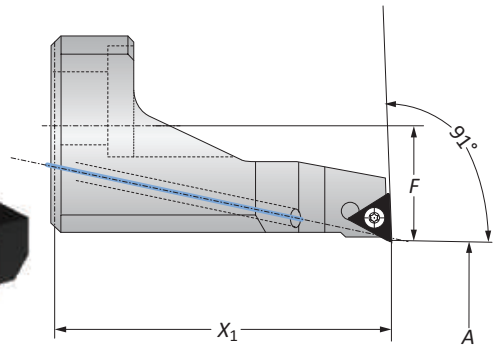


Serrated Slides

	Outside Turning Range	Serrated Slide				Interfering Diameter	
	A	X_1	X_2	L_1	Weight	D_{max}	Part No.
i	0.079 - 1.181	0.630	2.874	2.165	0.220 (lbs)	3.976	**501064**
	1.181 - 2.283	0.630	2.874	2.165	0.441 (lbs)	5.079	**501065**
m	2.00 - 30.00	16.00	73.00	55.00	0.10 (kg)	101.00	**501064**
	30.00 - 58.00	16.00	73.00	55.00	0.20 (kg)	129.00	**501065**

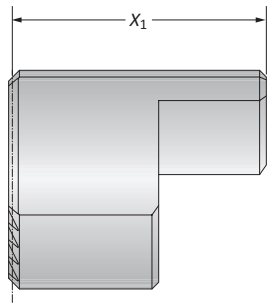
Insert Holders

	Boring Range	Insert Holder				
	A	X_1	F	Weight	Inset Form	Part No.
i	0.079 - 4.488	2.244	0.776	0.331 (lbs)	20	**502082**
m	2.00 - 114.00	57.00	19.70	0.15 (kg)	20	**502082**



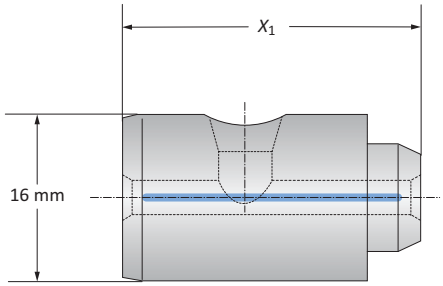
Counter Weights

	Counter Weight		
	X_1	Weight	Part No.
i	1.486	0.352 (lbs)	**502183**
m	37.75	0.16 (kg)	**502183**



Alu-Line Coolant Delivery Sections

	Coolant Delivery Section		
	X_1	Weight	Part No.
i	1.004	0.022 (lbs)	**450137**
m	25.50	0.01 (kg)	**450137**



B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

Key on B10-A: 1

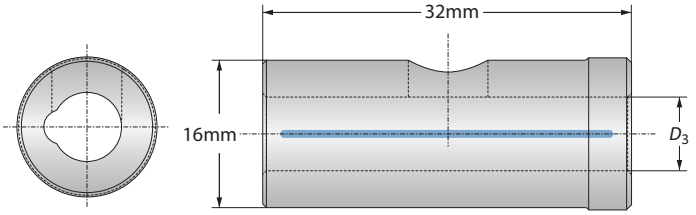
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Accessories

Imperial Reducing Sleeves | Clamping Elements | Thread Pin | Balancing Element | 3E[TECH] Accessories

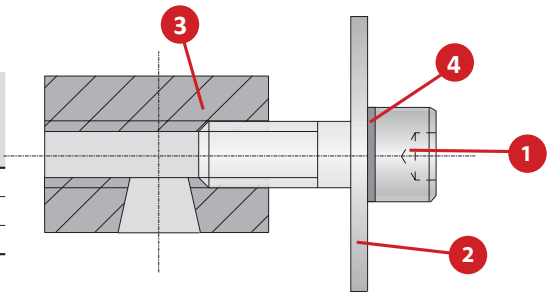
Imperial Reducing Sleeves

	D_3	Weight	Part No.
	0.125	0.110 (lbs)	**450142**
	0.250	0.088 (lbs)	**450143**
ⓘ	0.312	0.088 (lbs)	**450144**
	0.375	0.088 (lbs)	**450145**
	0.500	0.066 (lbs)	**450146**



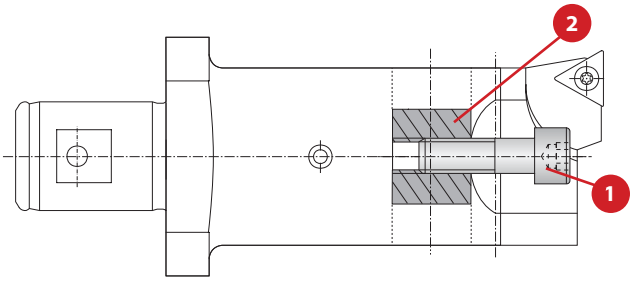
Clamping Elements for Insert Holders

	Boring Range	1 Cap Screw	Hex Size	2 Washer	3 Clamping Nut	4 Locking Washer	Complete Part No.
	4 - 30	**070153**	**s5**	**315155**	**236120**	**215254**	**236088**
ⓜ	29 - 66	**070153**	**s5**	**315156**	**236120**	**215254**	**236089**
	52 - 102	**115147**	**s5**	**115725**	**236120**	-	**236020**



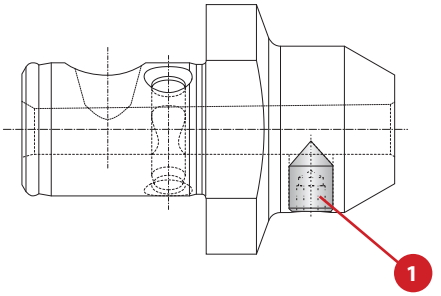
Clamping Elements for Serrated Tool Body

1 Cap Screw	Hex Size	2 Clamping Piece
027154	**s4**	**145184**



Thread Pin

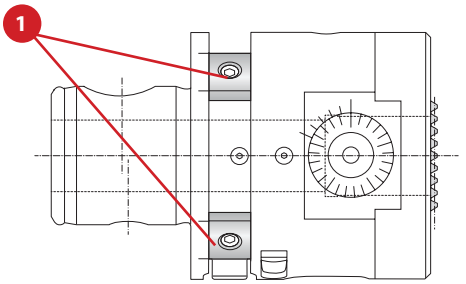
Service Key	1 Part No.
S3 / A	**415244**



Balancing Element

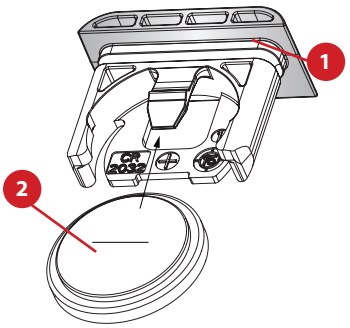
Nominal Size	Key Size / Type	1 Part No.
M8x8	s2 / A	**536005**

NOTE: Sold in quantities of 1



3E[TECH] Accessories

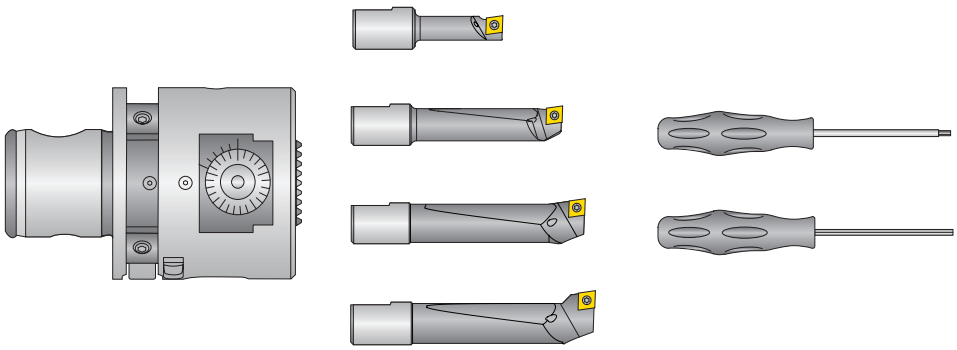
1 Sealing Ring Part No.	2 Battery CR2032 Part No.
215483	**515491**



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Kit Components

Non-Digital | Insert Form 101 | Diameter Range: 0.393" - 1.181" (10.00mm - 30.00mm)



Kit Components					
	Boring Head	Boring Bar Range	Boring Bars	Service Keys	Kit No.
ⓘ	563001	0.393 - 0.590	218048	115575 (s2.5)	**104050**
		0.590 - 0.787	081041	215403 (s4)	
		0.787 - 0.984	081042	115590 (T7)	
		0.984 - 1.181	081043		
ⓜ	536001	10.00 - 15.00	218048	115575 (s2.5)	**103050**
		15.00 - 20.00	081041	215403 (s4)	
		20.00 - 25.00	081042	115590 (T7)	
		25.00 - 30.00	081043		

NOTE: Inserts sold separately

B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

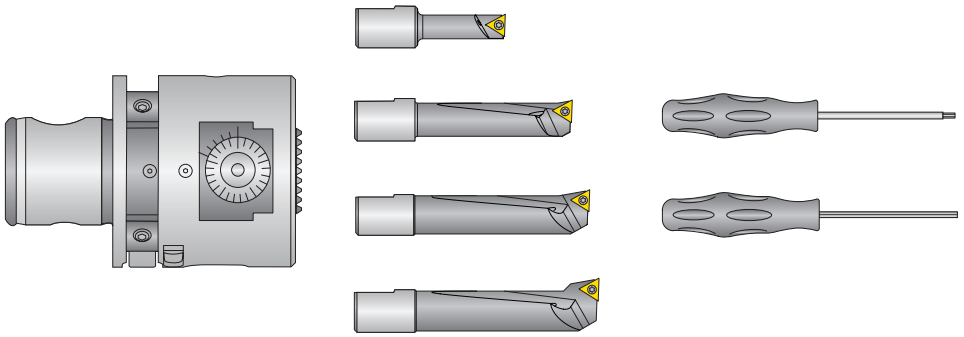
Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

Non-Digital | Insert Form 20 | Diameter Range: 0.393" - 1.181" (10.00mm - 30.00mm)



	Kit Components				
	Boring Head	**Boring Bar Range**	**Boring Bars**	**Service Keys**	**Kit No.**
ⓘ	563001	0.393 - 0.590	218059	115575 (s2.5)	**104049**
		0.590 - 0.787	081045	215403 (s4)	
		0.787 - 0.984	081046	115590 (T7)	
		0.984 - 1.181	081047		
ⓜ	536001	10.00 - 15.00	218059	115575 (s2.5)	**103049**
		15.00 - 20.00	081045	215403 (s4)	
		20.00 - 25.00	081046	115590 (T7)	
		25.00 - 30.00	081047		

NOTE: Inserts sold separately

B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

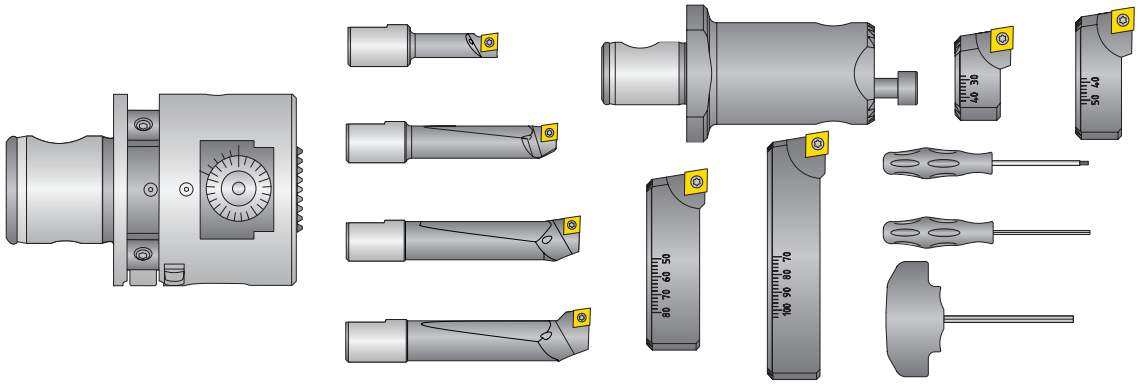
Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

Non-Digital | Insert Form 101 | Diameter Range: 0.393" - 4.016" (10.00mm - 102.00mm)



Kit Components

	Boring Head	Boring Bars: Boring Bar Range	Boring Bars: Part No.	Insert Holders for Boring Head: Insert Holder Range	Insert Holders for Boring Head: Part No.	Insert Holders for Boring Head: Clamping Piece	Serrated Tool Body & Insert Holders: Serrated Tool Body	Serrated Tool Body & Insert Holders: Insert Holder Range	Serrated Tool Body & Insert Holders: Part No.	Service Keys	Kit No.
ⓘ	563001	0.393 - 0.590	218048	1.141 - 1.614	236023	236020	236021	2.047 - 3.031	236027	115575 (s2.5)	**104052**
		0.590 - 0.787	081041	1.574 - 2.086	236025			2.992 - 4.016	236029	215403 (s4)	
		0.787 - 0.984	081042							215521 (s5)	
		0.984 - 1.181	081043							115590 (T7)	
ⓜ	536001	10.00 - 15.00	218048	29.00 - 41.00	236023	236020	236021	52.00 - 77.00	236027	115575 (s2.5)	**103052**
		15.00 - 20.00	081041	40.00 - 53.00	236025			76.00 - 102.00	236029	215403 (s4)	
		20.00 - 25.00	081042							215521 (s5)	
		25.00 - 30.00	081043							115590 (T7)	

NOTE: Inserts sold separately

B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

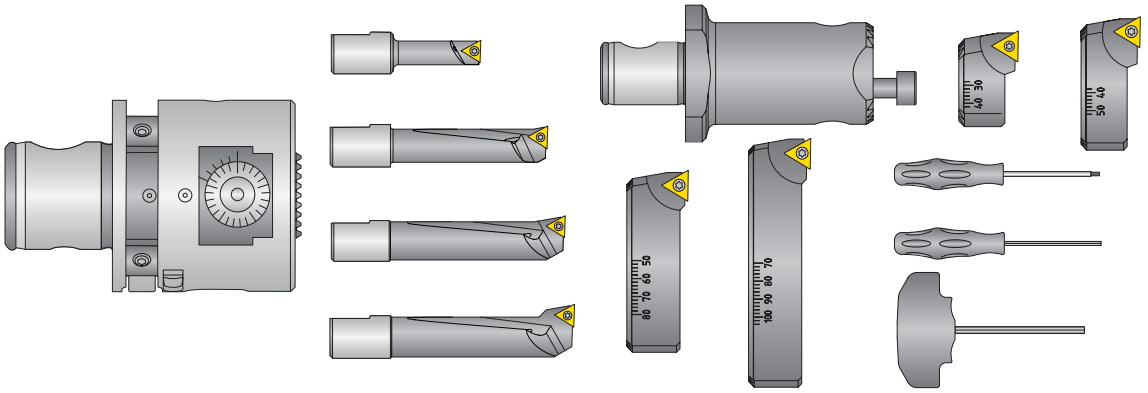
Key on B10-A:1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

Non-Digital | Insert Form 20 | Diameter Range: 0.393" - 4.016" (10.00mm - 102.00mm)



	Boring Head	Boring Bars: Boring Bar Range	Boring Bars: Part No.	Insert Holders for Boring Head: Insert Holder Range	Insert Holders for Boring Head: Part No.	Insert Holders for Boring Head: Clamping Piece	Serrated Tool Body & Insert Holders: Serrated Tool Body	Serrated Tool Body & Insert Holders: Insert Holder Range	Serrated Tool Body & Insert Holders: Part No.	Service Keys	Kit No.
	Kit Components										
ⓘ	563001	0.393 - 0.590	218059	1.141 - 1.614	236022	236020	236021	2.047 - 3.031	236026	115575 (s2.5)	**104051**
		0.590 - 0.787	081045	1.574 - 2.086	236024			2.992 - 4.016	236028	215403 (s4)	
		0.787 - 0.984	081046							215521 (s5)	
		0.984 - 1.181	081047							115590 (T7)	
ⓜ	536001	10.00 - 15.00	218059	29.00 - 41.00	236022	236020	236021	52.00 - 77.00	236026	115575 (s2.5)	**103051**
		15.00 - 20.00	081045	40.00 - 53.00	236024			76.00 - 102.00	236028	215403 (s4)	
		20.00 - 25.00	081046							215521 (s5)	
		25.00 - 30.00	081047							115590 (T7)	

NOTE: Inserts sold separately

Key on B10-A: 1

B10-N: 10-13

B10-A: 16

B10-F

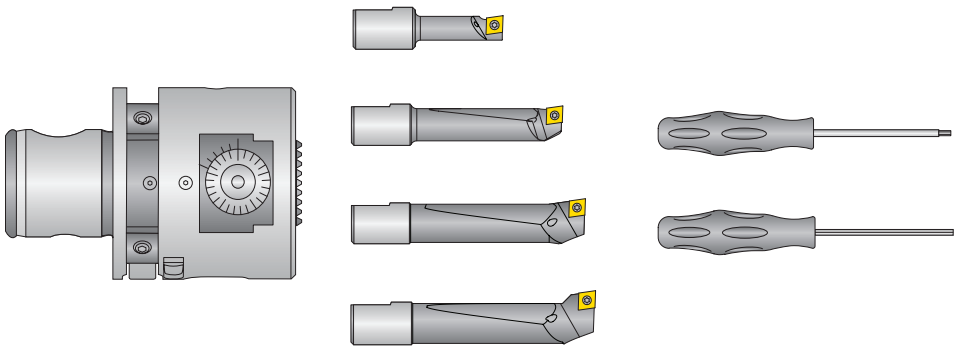
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

3E[TECH] | Insert Form 101 | Diameter Range: 0.393" - 1.181" (10.00mm - 30.00mm)



Kit Components					
	Boring Head	Boring Bar Range	Boring Bars	Service Keys	Kit No.
(i)	563002	0.393 - 0.590	218048	115575 (s2.5)	**104046**
		0.590 - 0.787	081041	215403 (s4)	
		0.787 - 0.984	081042	115590 (T8)	
		0.984 - 1.181	081043		
(m)	536002	10.00 - 15.00	218048	115575 (s2.5)	**103046**
		15.00 - 20.00	081041	215403 (s4)	
		20.00 - 25.00	081042	115590 (T8)	
		25.00 - 30.00	081043		

NOTE: Inserts sold separately
NOTE: 3E[TECH] digital readout module sold separately

3E[TECH] Digital Readout Module

	Part No.
(i)	**563010**
(m)	**536010**

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

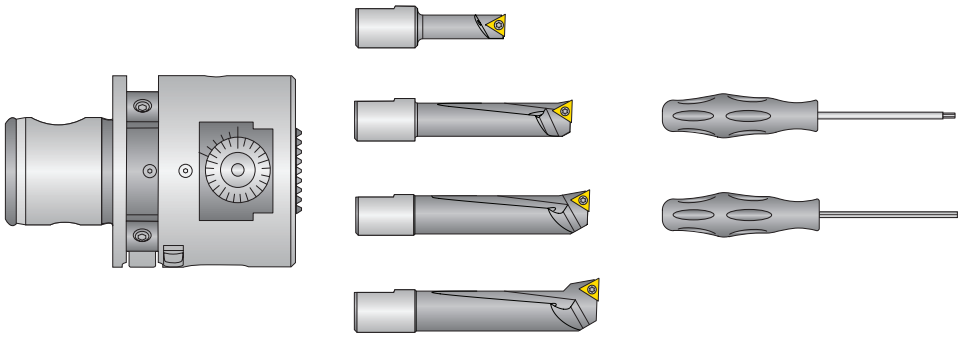
Key on B10-A:1

(i) = Imperial (in)
(m) = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

3E[TECH] | Insert Form 20 | Diameter Range: 0.393" - 1.181" (10.00mm - 30.00mm)



	Kit Components				
	Boring Head	**Boring Bar Range**	**Boring Bars**	**Service Keys**	**Kit No.**
ⓘ	563002	0.393 - 0.590	218059	115575 (s2.5)	**104045**
		0.590 - 0.787	081045	215403 (s4)	
		0.787 - 0.984	081046	115591 (T7)	
		0.984 - 1.181	081047		
ⓜ	536002	10.00 - 15.00	218059	115575 (s2.5)	**103045**
		15.00 - 20.00	081045	215403 (s4)	
		20.00 - 25.00	081046	115591 (T7)	
		25.00 - 30.00	081047		

NOTE: Inserts sold separately
NOTE: 3E[TECH] digital readout module sold separately

3E[TECH] Digital Readout Module

	Part No.
ⓘ	**563010**
ⓜ	**536010**

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Key on B10-A: 1

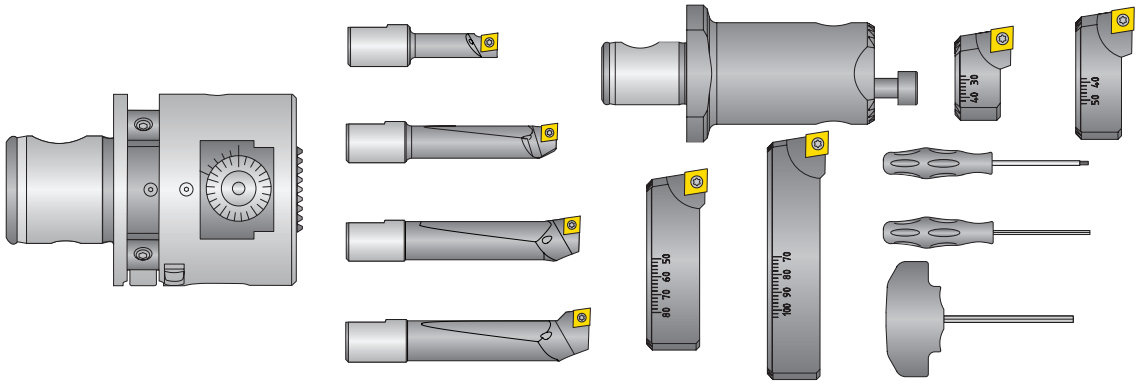
B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

3E[TECH] | Insert Form 101 | Diameter Range: 0.393" - 4.016" (10.00mm - 102.00mm)



Kit Components

	Boring Head	Boring Bars: Boring Bar Range	Boring Bars: Part No.	Insert Holders for Boring Head: Insert Holder Range	Insert Holders for Boring Head: Part No.	Insert Holders for Boring Head: Clamping Piece	Serrated Tool Body & Insert Holders: Serrated Tool Body	Serrated Tool Body & Insert Holders: Insert Holder Range	Serrated Tool Body & Insert Holders: Part No.	Service Keys	Kit No.
ⓘ	563002	0.393 - 0.590	218048	1.141 - 1.614	236023	236020	236021	2.047 - 3.031	236027	115575 (s2.5)	**104048**
		0.590 - 0.787	081041	1.574 - 2.086	236025			2.992 - 4.016	236029	215403 (s4)	
		0.787 - 0.984	081042							215521 (s5)	
		0.984 - 1.181	081043							115590 (T7)	
ⓜ	536002	10.00 - 15.00	218048	29.00 - 41.00	236023	236020	236021	52.00 - 77.00	236027	115575 (s2.5)	**103048**
		15.00 - 20.00	081041	40.00 - 53.00	236025			76.00 - 102.00	236029	215403 (s4)	
		20.00 - 25.00	081042							215521 (s5)	
		25.00 - 30.00	081043							115590 (T7)	

NOTE: Inserts sold separately
NOTE: 3E[TECH] digital readout module sold separately

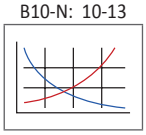
3E[TECH] Digital Readout Module

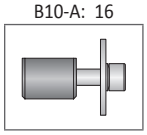
	Part No.
ⓘ	**563010**
ⓜ	**536010**

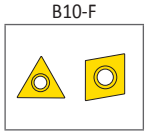
NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Key on B10-A:1

B10-N: 10-13 

B10-A: 16 

B10-F 

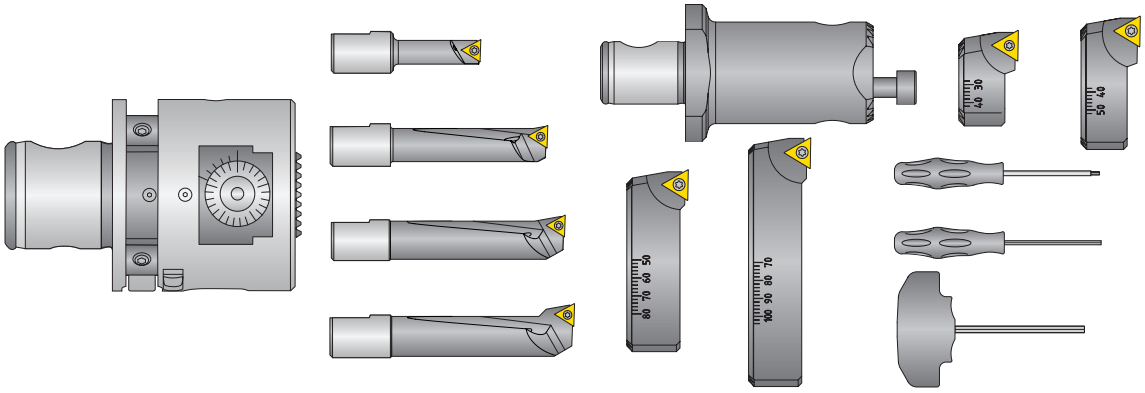
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

3E[TECH] | Insert Form 20 | Diameter Range: 0.393" - 4.016" (10.00mm - 102.00mm)



Kit Components

	Boring Head	Boring Bars: Boring Bar Range	Boring Bars: Part No.	Insert Holders for Boring Head: Insert Holder Range	Insert Holders for Boring Head: Part No.	Insert Holders for Boring Head: Clamping Piece	Serrated Tool Body & Insert Holders: Serrated Tool Body	Serrated Tool Body & Insert Holders: Insert Holder Range	Serrated Tool Body & Insert Holders: Part No.	Service Keys	Kit No.
ⓘ	563002	0.393 - 0.590	218059	1.141 - 1.614	236022	236020	236021	2.047 - 3.031	236026	115575 (s2.5)	**104047**
		0.590 - 0.787	081045	1.574 - 2.086	236024			2.992 - 4.016	236028	215403 (s4)	
		0.787 - 0.984	081046							215521 (s5)	
		0.984 - 1.181	081047							115590 (T7)	
ⓜ	536002	10.00 - 15.00	218059	29.00 - 41.00	236022	236020	236021	52.00 - 77.00	236026	115575 (s2.5)	**103047**
		15.00 - 20.00	081045	40.00 - 53.00	236024			76.00 - 102.00	236028	215403 (s4)	
		20.00 - 25.00	081046							215521 (s5)	
		25.00 - 30.00	081047							115590 (T7)	

NOTE: Inserts sold separately
NOTE: 3E[TECH] digital readout module sold separately

3E[TECH] Digital Readout Module

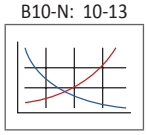
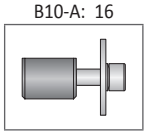
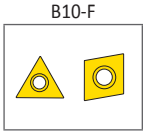
	Part No.
ⓘ	**563010**
ⓜ	**536010**

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

B10-N: 10-13 | B10-A: 16 | B10-F | B10: xii-xiii

Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Notes

249 (248) Product Overview

249 (248)
VERSATILE BORING

Compact design. Precision boring.

The Wohlhaupter™ 249 (248) compact boring head allows for higher spindle speeds and achieves long-reach boring jobs. Its cylindrical shank provides variable length adjustments up to 9xD.

Test this ***compact design*** for finish machining today.

- Diameter range: 0.118" - 1.188" (3.00mm - 30.20mm)
- Length adjustment up to 9xD
- Coolant-through boring tool
- 0.0005" (0.01mm) adjust on diameter
- Max spindle speed: 20,000 RPM

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

249 (248) Head

Insert Holder
Ø 0.623" - 1.181"
(Ø 15.9mm - 30.2mm)

Adapter

Boring Bar
Ø 0.146" - 0.630"
(Ø 3.7mm - 16mm)

Adapter

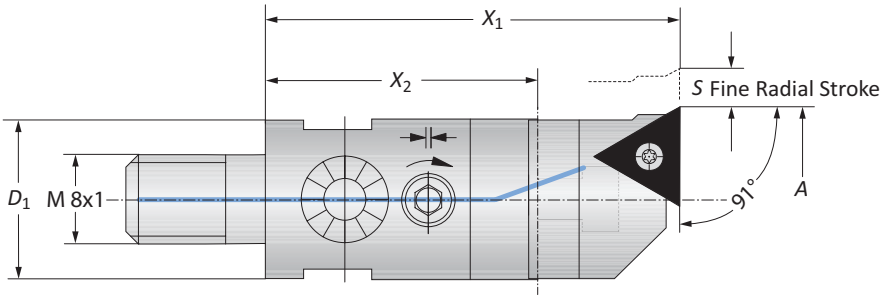
Mini Boring Bar
Ø 0.118" - 0.236"
(Ø 3mm - 6mm)

OPERATION **VERSATILITY**

from **0.118"** to **1.188"** (**3mm** to **30.2mm**)

Boring Heads

Diameter Range: 0.625" - 1.189" (15.90mm - 30.20mm)



	Boring Connection	Boring Range A	Boring Head X_1	X_2	D_1	S	Weight	Inset Form	Part No. Inset Holder	Boring Head
	M 8 x 1.0	0.625 - 0.791	1.654	1.024	0.591	0.025	0.132 (lbs)	20*	**248051**	**249001**
	M 8 x 1.0	0.625 - 0.791	1.654	1.024	0.591	0.055	0.132 (lbs)	101*	**248054**	**249001**
ⓘ	M 8 x 1.0	0.783 - 0.976	1.811	1.181	0.709	0.071	0.198 (lbs)	20*	**248052**	**249002**
	M 8 x 1.0	0.783 - 0.976	1.811	1.181	0.709	0.071	0.198 (lbs)	101*	**248055**	**249002**
	M 8 x 1.0	0.965 - 1.189	1.811	1.181	0.906	0.091	0.287 (lbs)	20*	**248053**	**249003**
	M 8 x 1.0	0.965 - 1.189	1.811	1.181	0.906	0.091	0.287 (lbs)	101*	**248056**	**249003**
	M 8 x 1.0	15.90 - 20.10	42.00	26.00	15.00	1.40	0.06 (kg)	20*	**248051**	**248001**
	M 8 x 1.0	15.90 - 20.10	42.00	26.00	15.00	1.40	0.06 (kg)	101*	**248054**	**248001**
ⓜ	M 8 x 1.0	19.90 - 24.80	46.00	30.00	18.00	1.80	0.09 (kg)	20*	**248052**	**248002**
	M 8 x 1.0	19.90 - 24.80	46.00	30.00	18.00	1.80	0.09 (kg)	101*	**248055**	**248002**
	M 8 x 1.0	24.50 - 30.20	46.00	30.00	23.00	2.30	0.13 (kg)	20*	**248053**	**248003**
	M 8 x 1.0	24.50 - 30.20	46.00	30.00	23.00	2.30	0.13 (kg)	101*	**248056**	**248003**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

B10-N: 10-13 | B10-A: 33 | B10: xii-xiii

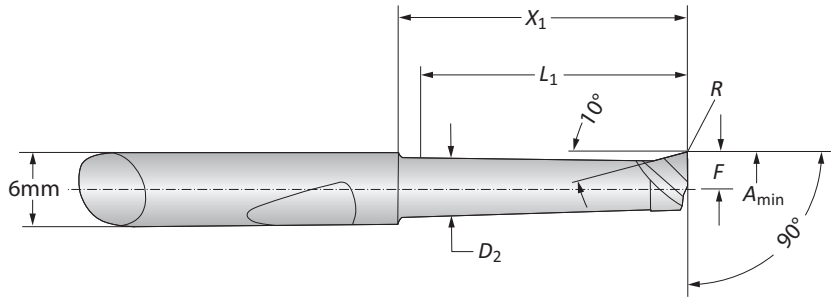
Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Mini Boring Bars

WHC05 | WHW04 | WBN150 | Diameter Range: 0.118" - 0.236" (3.00mm - 6.00mm)

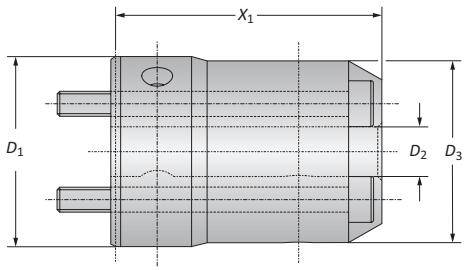


Mini Boring Bars

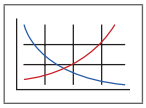
	Boring Range	Boring Bar					Part No.		
	A_{min}	D_2	X_1	L_1	F	R	Coated Carbide	Uncoated Carbide	CBN
	0.118	0.102	0.453	0.394	0.055	0.004	**081306HC05**	–	**081322BN150**
	0.118	0.102	0.650	0.591	0.055	0.004	**081307HC05**	**081307HW04**	–
	0.157	0.142	0.472	0.394	0.075	0.008	**081308HC05**	–	**081317BN150**
	0.157	0.142	0.669	0.591	0.075	0.008	**081309HC05**	–	**081341BN150**
	0.157	0.142	0.866	0.787	0.075	0.008	**081310HC05**	**081310HW04**	–
ⓘ	0.197	0.181	0.472	0.394	0.094	0.008	**081311HC05**	–	**081318BN150**
	0.197	0.181	0.866	0.787	0.094	0.008	**081312HC05**	–	**081319BN150**
	0.197	0.181	1.260	1.181	0.094	0.008	**081313HC05**	**081313HW04**	–
	0.236	0.220	0.866	0.787	0.114	0.008	**081314HC05**	–	**081320BN150**
	0.236	0.220	1.260	1.181	0.114	0.008	**081315HC05**	–	**081321BN150**
	0.236	0.220	1.654	1.575	0.114	0.008	**081316HC05**	**081316HW04**	–
	3.00	2.60	11.50	10.00	1.40	0.10	**081306HC05**	–	**081322BN150**
	3.00	2.60	16.50	15.00	1.40	0.10	**081307HC05**	**081307HW04**	–
	4.00	3.60	12.00	10.00	1.90	0.20	**081308HC05**	–	**081317BN150**
	4.00	3.60	17.00	15.00	1.90	0.20	**081309HC05**	–	**081341BN150**
	4.00	3.60	22.00	20.00	1.90	0.20	**081310HC05**	**081310HW04**	–
ⓜ	5.00	4.60	12.00	10.00	2.40	0.20	**081311HC05**	–	**081318BN150**
	5.00	4.60	22.00	20.00	2.40	0.20	**081312HC05**	–	**081319BN150**
	5.00	4.60	32.00	30.00	2.40	0.20	**081313HC05**	**081313HW04**	–
	6.00	5.60	22.00	20.00	2.90	0.20	**081314HC05**	–	**081320BN150**
	6.00	5.60	32.00	30.00	2.90	0.20	**081315HC05**	–	**081321BN150**
	6.00	5.60	42.00	40.00	2.90	0.20	**081316HC05**	**081316HW04**	–

Adapter

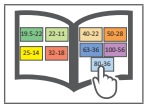
	Adapter				
	X_1	D_1	D_2	D_3	Part No.
ⓜ	32.00	23.00	6.00	22.00	**248071**



B10-N: 10-13



B10: xii-xiii

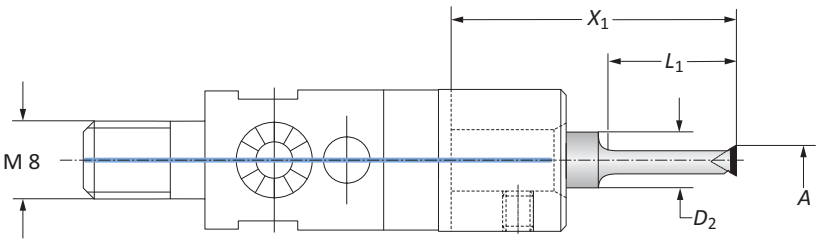


Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Boring Bars

Diameter Range: 0.146" - 0.630" (3.70mm - 16.00mm)



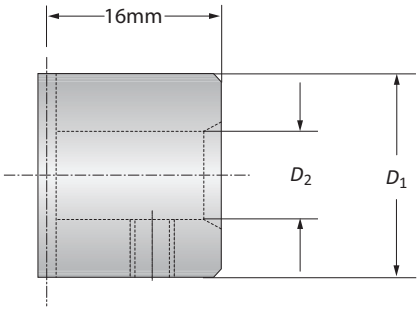
Boring Bars

	Boring Range A	Boring Bar D_2	Boring Bar X_1	Boring Bar L_1	Insert Form	Part No.
	0.146 - 0.197	–	2.618	0.709	325*	**218074**
	0.193 - 0.236	–	2.835	0.906	47*	**218075**
	0.232 - 0.315	–	2.874	0.984	211*	**218076**
	0.311 - 0.394	–	3.071	1.181	211*	**218077**
ⓘ	0.390 - 0.472	–	3.268	1.378	20*	**218079**
	0.390 - 0.472	–	3.268	1.378	101*	**218082**
	0.469 - 0.551	–	3.661	1.772	20*	**218080**
	0.469 - 0.551	–	3.661	1.772	101*	**218083**
	0.547 - 0.630	–	3.858	1.968	20*	**218081**
	0.547 - 0.630	–	3.858	1.968	101*	**218084**
	3.70 - 5.00	8.00	66.50	18.00	325*	**218074**
	4.90 - 6.00	8.00	72.00	23.00	47*	**218075**
	5.90 - 8.00	8.00	73.00	25.00	211*	**218076**
	7.90 - 10.00	8.00	78.00	30.00	211*	**218077**
ⓜ	9.90 - 12.00	8.00	83.00	35.00	20*	**218079**
	9.90 - 12.00	8.00	83.00	35.00	101*	**218082**
	11.90 - 14.00	10.00	93.00	45.00	20*	**218080**
	11.90 - 14.00	10.00	93.00	45.00	101*	**218083**
	13.90 - 16.00	10.00	98.00	50.00	20*	**218081**
	13.90 - 16.00	10.00	98.00	50.00	101*	**218084**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

Adapters

	Adapter D_1	Adapter D_2	Part No.
	0.709	–	**248063**
ⓘ	0.906	–	**248064**
	0.906	–	**248065**
	18.00	8.00	**248063**
ⓜ	23.00	8.00	**248064**
	23.00	10.00	**248065**

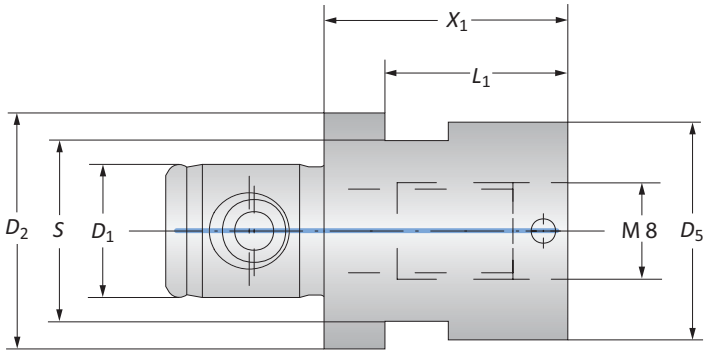


B10-N: 10-13 | B10-F | B10: xii-xiii

Key on B10-A:1

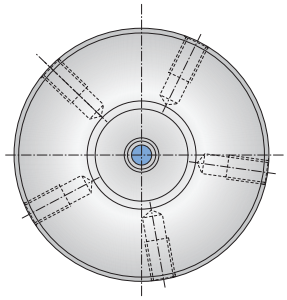
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

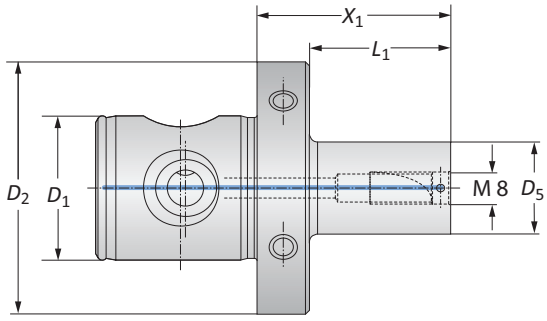
Adapters



Adapters

	MVS Connection D_2 | D_1	Boring Connection	Adapter X_1	L_1	S	D_5	Weight	Service Key	Part No.
i	19.5 - 11	M8	0.787	0.590	15/P	0.708	0.110 (lbs)	15mm / P	**219168**
	23 - 11	M8	0.787	–	19/P	0.905	0.154 (lbs)	19mm / P	**219169**
m	19.5 - 11	M8	20.00	15.00	15/P	18.00	0.05 (kg)	15mm / P	**219168**
	23 - 11	M8	20.00	–	19/P	23.00	0.07 (kg)	19mm / P	**219169**





Adapters

	MVS Connection D_2 | D_1	Boring Connection	Adapter X_1	L_1	D_5	Weight	Thread Precision	Part No.
i	50 - 28	M8	1.259	0.748	0.590	0.771 (lbs)	M6 x 10	**219185**
	50 - 28	M8	1.890	1.377	0.708	0.881 (lbs)	M6 x 10	**219176**
	50 - 28	M8	1.890	1.377	0.905	0.992 (lbs)	M6 x 10	**219177**
m	50 - 28	M8	32.00	19.00	15.00	0.35 (kg)	M6 x 10	**219185**
	50 - 28	M8	48.00	35.00	18.00	0.40 (kg)	M6 x 10	**219176**
	50 - 28	M8	48.00	35.00	23.00	0.45 (kg)	M6 x 10	**219177**

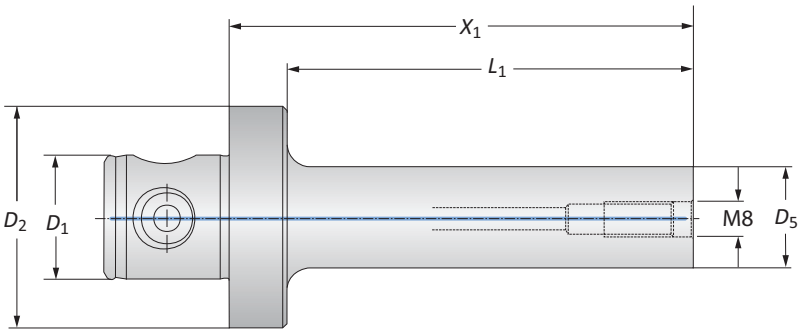
NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

B10-N: 10-13 | B10-A: 28 | B10-A: 33 | B10: xii-xiii
Key on B10-A: 1

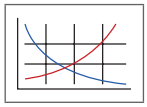
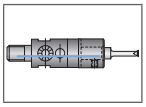
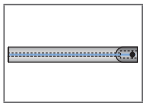
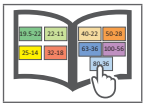
i = Imperial (in)
m = Metric (mm)

Adapters

Heavy Metal



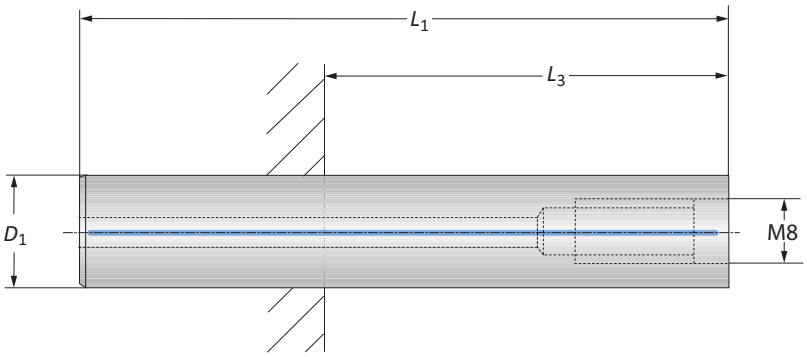
	MVS Connection D_2 | D_1	Boring Connection	Adapter X_1	L_1	D_5	Weight	Part No.
ⓘ	50 - 28	M8	2.677	2.165	0.590	1.763 (lbs)	**248147**
ⓘ	50 - 28	M8	3.307	2.795	0.748	2.204 (lbs)	**248148**
ⓘ	50 - 28	M8	4.094	3.582	0.905	2.866 (lbs)	**248149**
ⓜ	50 - 28	M8	68.00	55.00	15.00	0.80 (kg)	**248147**
ⓜ	50 - 28	M8	84.00	71.00	19.00	1.00 (kg)	**248148**
ⓜ	50 - 28	M8	104.00	91.00	23.00	1.30 (kg)	**248149**

B10-N: 10-13
Key on B10-A:1

B10-A: 28

B10-A: 33

B10: xii-xiii


ⓘ = Imperial (in)
ⓜ = Metric (mm)

Shanks

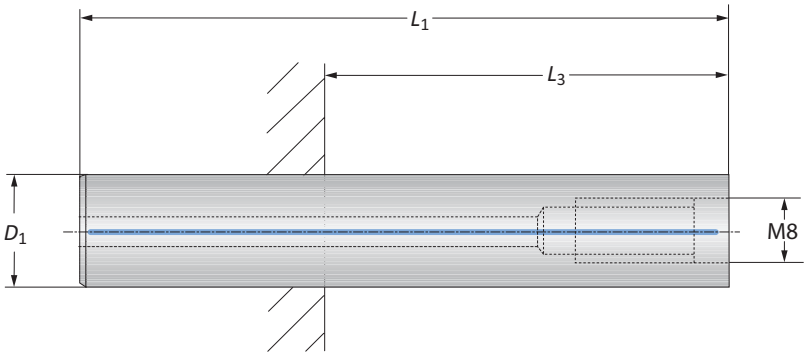
Steel | Carbide



Steel Shanks

	Connection	Shank D_1	Shank L_1	Shank $L_{3\ max}$*	$L_{3\ min}$* SK 40+50	$L_{3\ min}$* HSK-A 63	$L_{3\ min}$* HSK-A 100	Weight	Part No.
ⓘ	M8	0.591	3.346	1.456	–	–	–	0.220 (lbs)	**248136**
ⓘ	M8	0.709	3.937	2.047	–	0.196	0.472	0.440 (lbs)	**248137**
ⓘ	M8	0.906	4.606	2.716	–	0.866	1.141	0.881 (lbs)	**248138**
ⓜ	M8	15.00	85.00	37.00	–	–	–	0.10 (kg)	**248136**
ⓜ	M8	18.00	100.00	52.00	–	5.00	12.00	0.20 (kg)	**248137**
ⓜ	M8	23.00	117.00	69.00	–	22.00	29.00	0.40 (kg)	**248138**

*L_3 dimensions apply to collet chucks



Carbide Shanks

	Connection	Shank D_1	Shank L_1	Shank $L_{3\ max}$*	$L_{3\ min}$* SK 40	$L_{3\ min}$* SK 50	$L_{3\ min}$* HSK-A 63	$L_{3\ min}$* HSK-A 100	Weight	Part No.
ⓘ	M8	0.591	5.118	3.228	0.787	0.787	1.377	1.653	0.661 (lbs)	**248142**
ⓘ	M8	0.709	6.102	4.212	1.535	0.826	2.362	2.637	1.322 (lbs)	**248143**
ⓘ	M8	0.906	7.086	5.196	2.519	1.811	3.346	3.622	2.425 (lbs)	**248144**
ⓘ	M8	0.906	9.527	7.637	4.960	4.251	5.787	6.062	3.086 (lbs)	**248145**
ⓜ	M8	15.00	130.00	82.00	20.00	20.00	35.00	42.00	0.30 (kg)	**248142**
ⓜ	M8	18.00	155.00	107.00	39.00	21.00	60.00	67.00	0.60 (kg)	**248143**
ⓜ	M8	23.00	180.00	132.00	64.00	46.00	85.00	92.00	1.10 (kg)	**248144**
ⓜ	M8	23.00	242.00	194.00	126.00	108.00	147.00	154.00	1.40 (kg)	**248145**

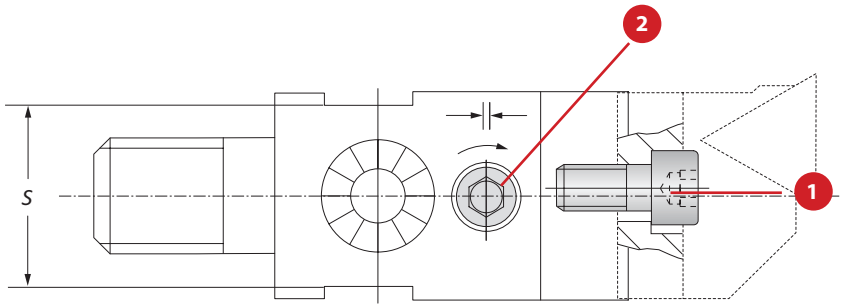
*L_3 dimensions apply to collet chucks

B10-N: 10-13
Key on B10-A: 1
B10-A: 28
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

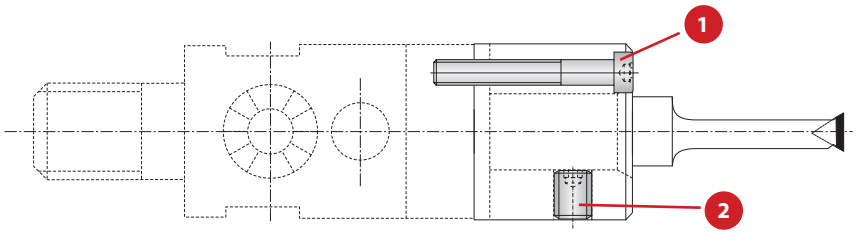
Accessories

Clamping Elements



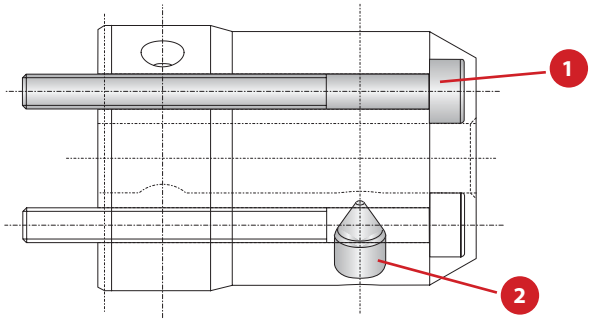
Clamping Elements for Boring Heads

	Boring Head	Service Key S / Type	1 Cap Screw Part No.	1 Cap Screw Service Key	2 Set Screw Part No.	2 Set Screw Service Key
ⓘ	249001	13mm / P	**315631**	s3 / A	**315629**	s2 / A
ⓘ	249002	15mm / P	**315631**	s3 / A	**315684**	s2 / A
ⓘ	249003	19mm / P	**315631**	s3 / A	**315687**	s2 / A
ⓜ	248001	13mm / P	**315631**	s3 / A	**315629**	s2 / A
ⓜ	248002	15mm / P	**315631**	s3 / A	**315684**	s2 / A
ⓜ	248003	19mm / P	**315631**	s3 / A	**315687**	s2 / A



Clamping Elements for Adapters

	Boring Head	1 Cap Screw Part No.	1 Cap Screw Service Key	2 Set Screw Part No.	2 Set Screw Service Key
ⓜ	248063	**315801**	S 2.5 / A	**115136**	S 2.5 / A
ⓜ	248064	**315801**	S 2.5 / A	**031141**	S 2.5 / A
ⓜ	248065	**315801**	S 2.5 / A	**031141**	S 2.5 / A



Screws

	Boring Head	1 Cap Screw Part No.	Service Key	2 Set Screw Part No.	Service Key
ⓜ	248063	**515166**	S 2.5 / A	**415244**	S 3 / A

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Notes

PrimeBore Product Overview

PrimeBore
VERSATILE BORING

Advancing versatile technology.

With over 30 years of development, the Wohlhaupter™ PrimeBore boring head offers versatility and precision. The PrimeBore head can bore multiple hole sizes ranging from 0.118" - 8.189" (3mm - 208mm) with our broad range of compatible boring bars.

Complete your boring job with ***technology that continues to advance***.

- Diameter range: 0.118" - 8.189" (3.00mm - 208.00mm)
- Ease the stress of working on different day-to-day projects with boring kits
- 0.0001" (0.002mm) adjust on diameter
- Economical precision and versatility
- Max spindle speed: 11,000 RPM

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

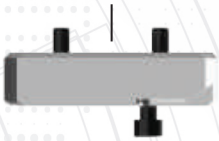
PRIME BORE

PrimeBore Head

Coolant Delivery System

Outside Turning
Ø 0.157" - 2.598"
(Ø 4mm - 66mm)

Coolant Delivery System



Serrated Slide

Serrated Tool Body

Carbide Boring Bar
Ø 0.394" - 0.787"
(Ø 10mm - 20mm)

Heavy Metal Boring Bar
Ø 0.236" - 0.394"
(Ø 6mm - 10mm)

Steel Boring Bar
Ø 0.236" - 0.945"
(Ø 6mm - 24mm)

Adapter

Mini-Boring Bar
Ø 0.118" - 0.394"
(Ø 3mm - 10mm)

Counter Weight

Outside Turning
Ø 0.157" - 2.598"
(Ø 4mm - 66mm)

Insert Holder
Ø 2.677" - 8.189"
(Ø 68mm - 208mm)

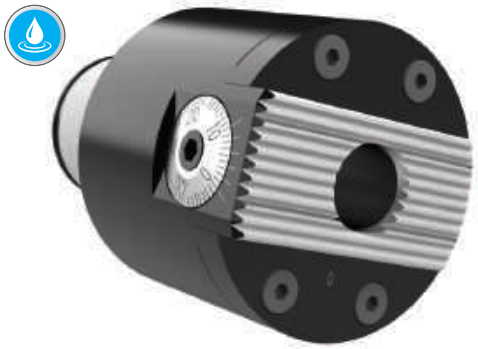
Insert Holder
Ø 0.945" - 5.039"
(Ø 24mm - 128mm)

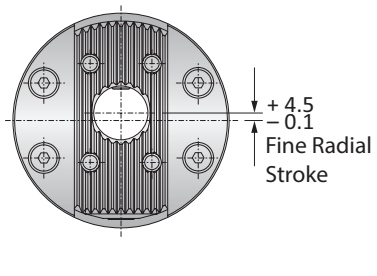
OPERATION **VERSATILITY**

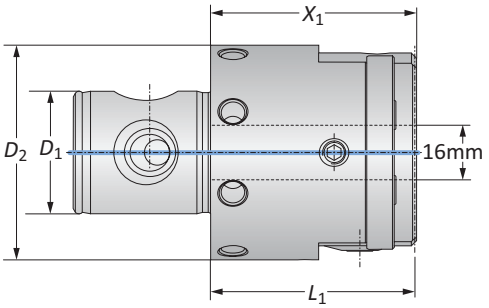
from **0.118"** to **8.189"** (**3mm** to **208mm**)
plus outside turning

Boring Heads

Diameter Range: 0.118" - 8.189" (3.00mm - 208.00mm)







	Connection D_2 | D_1	Boring Range	Boring Head X_1	Boring Head L_1	Weight	Part No.
i	63 - 36	0.118 - 8.189	2.362	2.343	2.866 (lbs)	**451001**
m	63 - 36	3.00 - 208.00	60.00	59.50	1.30 (kg)	**450001**

NOTE: PrimeBore heads are compatible with Kaiser® connection

B10-N: 10-13 | B10-H | B10: xii-xiii

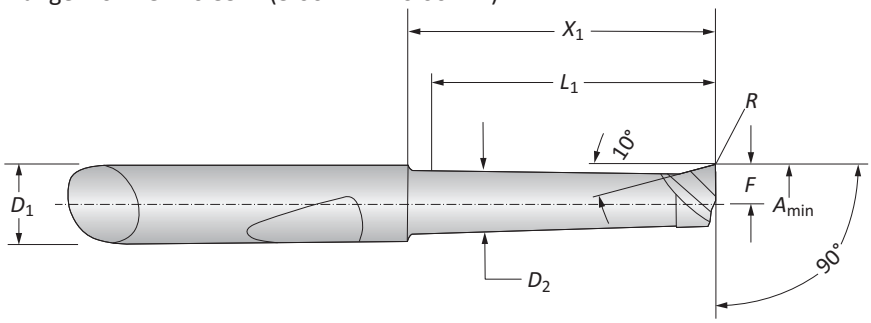
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Mini Boring Bars

WHC05 | WHW04 | WBN150 | Diameter Range: 0.118" - 0.394" (3.00mm - 10.00mm)

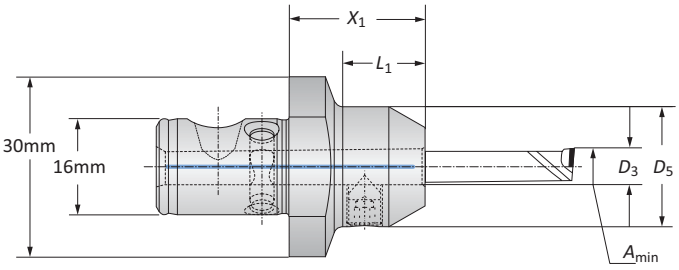


Mini Boring Bars

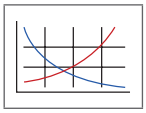
	Boring Range	Boring Bar						Part No.		
	A_{min}	D_1	D_2	X_1	L_1	F	R	Coated Carbide	Uncoated Carbide	CBN
	0.118	–	0.102	0.453	0.394	0.055	0.004	**081306HC05**	–	**081322BN150**
	0.118	–	0.102	0.650	0.590	0.055	0.004	**081307HC05**	**081307HW04**	–
	0.157	–	0.142	0.472	0.394	0.075	0.008	**081308HC05**	–	**081317BN150**
	0.157	–	0.142	0.669	0.590	0.075	0.008	**081309HC05**	–	**081341BN150**
	0.157	–	0.142	0.866	0.787	0.075	0.008	**081310HC05**	**081310HW04**	–
	0.197	–	0.181	0.472	0.394	0.094	0.008	**081311HC05**	–	**081318BN150**
ⓘ	0.197	–	0.181	0.866	0.787	0.094	0.008	**081312HC05**	–	**081319BN150**
	0.197	–	0.181	1.260	1.181	0.094	0.008	**081313HC05**	**081313HW04**	–
	0.236	–	0.220	0.866	0.787	0.114	0.008	**081314HC05**	–	**081320BN150**
	0.236	–	0.220	1.260	0.181	0.114	0.008	**081315HC05**	–	**081321BN150**
	0.236	–	0.220	1.654	1.575	0.114	0.008	**081316HC05**	**081316HW04**	–
	0.315	–	0.299	0.984	0.906	0.154	0.008	**081323HC05**	–	–
	0.315	–	0.299	1.968	1.890	0.154	0.008	**081324HC05**	–	–
	3.00	6.00	2.60	11.50	10.00	1.40	0.10	**081306HC05**	–	**081322BN150**
	3.00	6.00	2.60	16.50	15.00	1.40	0.10	**081307HC05**	**081307HW04**	–
	4.00	6.00	3.60	12.00	10.00	1.90	0.20	**081308HC05**	–	**081317BN150**
	4.00	6.00	3.60	17.00	15.00	1.90	0.20	**081309HC05**	–	**081341BN150**
	4.00	6.00	3.60	22.00	20.00	1.90	0.20	**081310HC05**	**081310HW04**	–
	5.00	6.00	4.60	12.00	10.00	2.40	0.20	**081311HC05**	–	**081318BN150**
ⓜ	5.00	6.00	4.60	22.00	20.00	2.40	0.20	**081312HC05**	–	**081319BN150**
	5.00	6.00	4.60	32.00	30.00	2.40	0.20	**081313HC05**	**081313HW04**	–
	6.00	6.00	5.60	22.00	20.00	2.90	0.20	**081314HC05**	–	**081320BN150**
	6.00	6.00	5.60	32.00	30.00	2.90	0.20	**081315HC05**	–	**081321BN150**
	6.00	6.00	5.60	42.00	40.00	2.90	0.20	**081316HC05**	**081316HW04**	–
	8.00	8.00	7.60	25.00	23.00	3.90	0.20	**081323HC05**	–	–
	8.00	8.00	7.60	50.00	48.00	3.90	0.20	**081324HC05**	–	–

Adapters

	Adapter				
	D_3	D_5	X_1	L_1	Part No.
ⓜ	6.00	20.00	22.50	14.00	**319010**
	8.00	22.00	22.50	14.00	**236071**

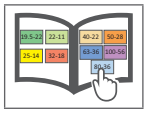


B10-N: 10-13



Key on B10-A:1

B10: xii-xiii

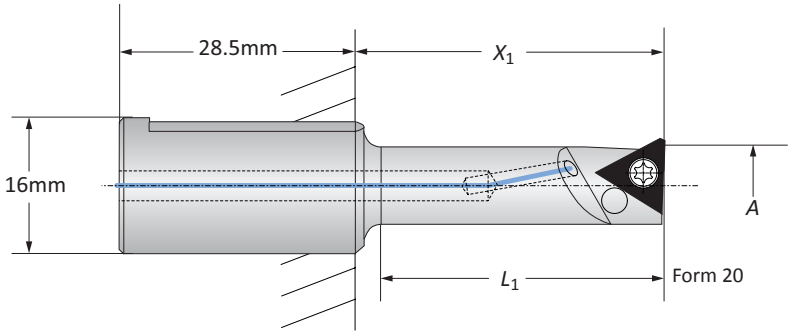


ⓘ = Imperial (in)
ⓜ = Metric (mm)

Boring Bars

Steel | Heavy Metal

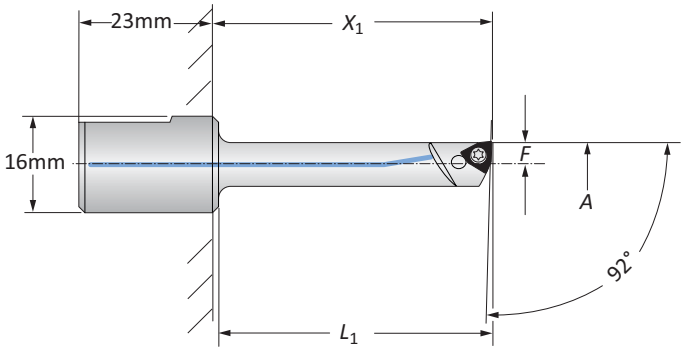
Form 101



Steel Boring Bars | Diameter Range: 0.236" - 0.945" (6.00mm - 24.00mm)

	Boring Range	Boring Bar				
	A	X_1	L_1	Weight	Insert Form	Part No.
	0.236 - 0.394	0.866 - 1.260	0.787	0.090 (lbs)	211	**450026**
	0.394 - 0.630	1.378 - 1.772	1.299	0.130 (lbs)	101*	**450027**
i	0.394 - 0.630	1.378 - 1.772	1.299	0.130 (lbs)	20*	**450038**
	0.630 - 0.945	2.362 - 2.756	2.283	0.220 (lbs)	101*	**450028**
	0.630 - 0.945	2.362 - 2.756	2.283	0.220 (lbs)	20*	**450039**
	6.00 - 10.00	22.00 - 32.00	20.00	0.04 (kg)	211	**450026**
	10.00 - 16.00	35.00 - 45.00	33.00	0.06 (kg)	101*	**450027**
m	10.00 - 16.00	35.00 - 45.00	33.00	0.06 (kg)	20*	**450038**
	16.00 - 24.00	60.00 - 70.00	58.00	0.10 (kg)	101*	**450028**
	16.00 - 24.00	60.00 - 70.00	58.00	0.10 (kg)	20*	**450039**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)



Heavy Metal Boring Bars | Diameter Range: 0.236" - 0.394" (6.00mm - 10.00mm)

	Boring Range	Boring Bar					
	A	X_1	L_1	*F*	Weight	Insert Form	Part No.
i	0.236 - 0.315	1.260	1.142	0.110	0.176 (lbs)	211	**081055**
	0.315 - 0.394	1.772	1.654	0.150	0.198 (lbs)	211	**218072**
m	6.00 - 8.00	32.00	29.00	2.80	0.08 (kg)	211	**081056**
	8.00 - 10.00	45.00	42.00	3.80	0.09 (kg)	211	**218072**

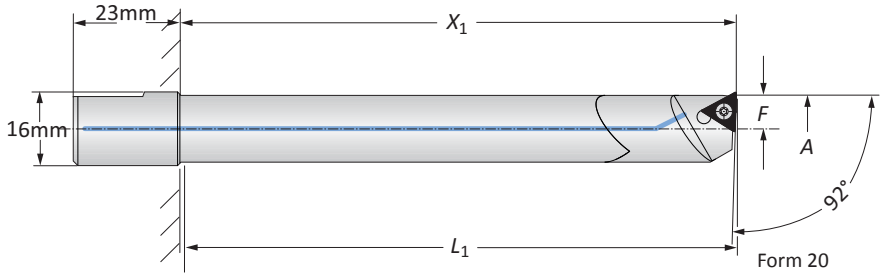
B10: 10-13 Key on B10-A:1 | B10-F | B10: xii-xiii

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Boring Bars

Carbide | Diameter Range: 0.393" - 0.787" (10.00mm - 20.00mm)

Form 101



Form 20

Carbide Boring Bars

	Boring Range	Boring Bar							
	A	X_1	L_1	*F*	Weight	Insert Form	Part No.	Insert Form	Part No.
	0.394 - 0.472	2.165	2.047	0.189	0.154 (lbs)	101*	**218042**	20*	**218037**
	0.394 - 0.472	2.953	2.835	0.189	0.198 (lbs)	101*	**218032**	20*	**218029**
	0.472 - 0.551	2.756	2.638	0.228	0.220 (lbs)	101*	**218043**	20*	**218038**
ⓘ	0.472 - 0.551	3.543	3.425	0.228	0.331 (lbs)	101*	**218033**	20*	**218030**
	0.551 - 0.630	2.953	2.835	0.268	0.353 (lbs)	101*	**218044**	20*	**218039**
	0.551 - 0.630	3.937	3.819	0.268	0.441 (lbs)	101*	**218045**	20*	**218040**
	0.630 - 0.709	3.543	3.425	0.307	0.573 (lbs)	101*	**218046**	20*	**218041**
	0.630 - 0.709	4.724	4.606	0.307	0.728 (lbs)	101*	**218034**	20*	**218031**
	10.00 - 12.00	55.00	52.00	4.80	0.07 (kg)	101*	**218042**	20*	**218037**
	10.00 - 12.00	75.00	72.00	4.80	0.09 (kg)	101*	**218032**	20*	**218029**
	12.00 - 14.00	70.00	67.00	5.80	0.10 (kg)	101*	**218043**	20*	**218038**
ⓜ	12.00 - 14.00	90.00	87.00	5.80	0.15 (kg)	101*	**218033**	20*	**218030**
	14.00 - 16.00	75.00	72.00	6.80	0.16 (kg)	101*	**218044**	20*	**218039**
	14.00 - 16.00	100.00	97.00	6.80	0.20 (kg)	101*	**218045**	20*	**218040**
	16.00 - 20.00	90.00	87.00	7.80	0.26 (kg)	101*	**218046**	20*	**218041**
	16.00 - 20.00	120.00	117.00	7.80	0.33 (kg)	101*	**218034**	20*	**218031**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

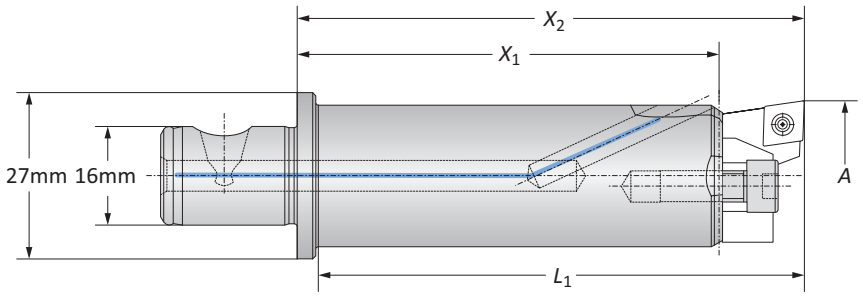
B10: 10-13 | B10-F | B10: xii-xiii

Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

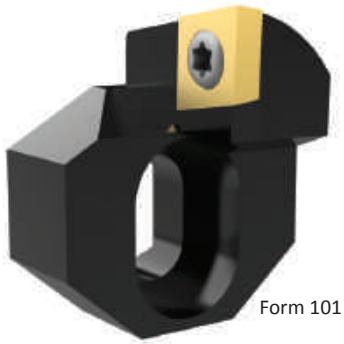
Serrated Tool Bodies | Insert Holders

Diameter Range: 0.945" - 2.559" (24.00mm - 65.00mm)

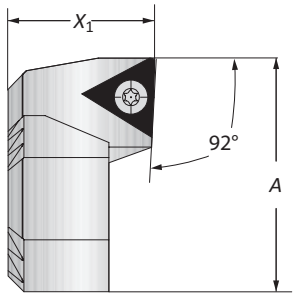


Serrated Tool Bodies

	Boring Range	Serrated Tool Body					
	A	X_1	X_2	L_1	Weight	Part No.
i	0.945 - 2.559	2.667	3.228	3.110	0.441 (lbs)	**450021**
m	24.00 - 65.00	68.00	82.00	79.00	0.20 (kg)	**450021**



Form 101



Form 20

Insert Holders

	Boring Range	Insert Holder			
	A	X_1	Weight	Insert Form	Part No.
i	0.945 - 1.575	0.551	0.044 (lbs)	101*	**450022**
i	0.945 - 1.575	0.551	0.044 (lbs)	20*	**450040**
m	24.00 - 40.00	14.00	0.02 (kg)	101*	**450022**
m	24.00 - 40.00	14.00	0.02 (kg)	20*	**450040**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

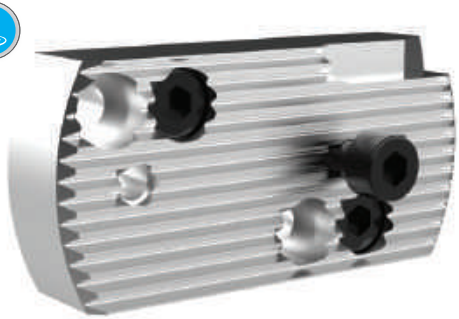
B10-N: 10-13 | B10-A: 47 | B10-F | B10: xii-xiii

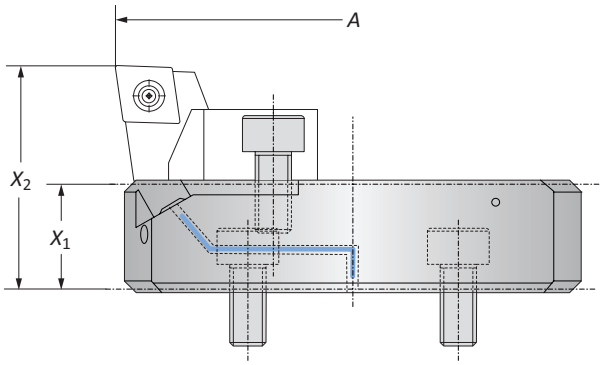
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Serrated Slides | Insert Holders

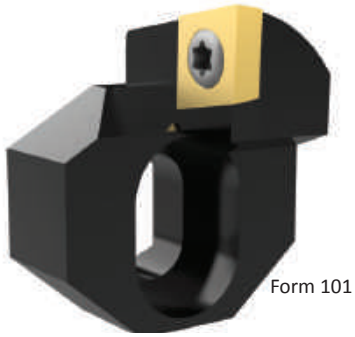
Diameter Range: 2.559" - 5.039" (65.00mm - 128.00mm)

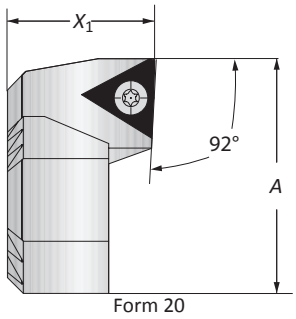




Serrated Slides

	Boring Range A	Serrated Slide X_1	Serrated Slide X_2	Weight	Part No.
i	2.559 - 5.039	0.571	1.161	0.176 (lbs)	**450024**
m	65.00 - 128.00	14.50	29.50	0.08 (kg)	**450024**





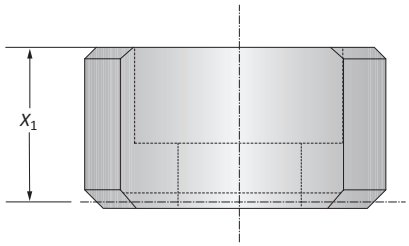
Insert Holders

	Boring Range A	Insert Holder X_1	Weight	Insert Form	Part No.
i	2.559 - 5.039	0.551	0.044 (lbs)	101*	**450023**
	2.559 - 5.039	0.551	0.044 (lbs)	20*	**450041**
m	65.00 - 128.00	14.00	0.03 (kg)	101*	**450023**
	65.00 - 128.00	14.00	0.03 (kg)	20*	**450041**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

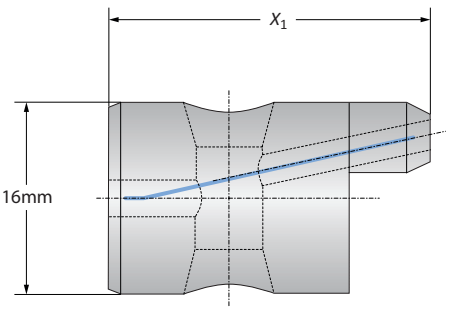
Counter Weights

	Counter Weight X_1	Weight	Part No.
i	0.528	0.110 (lbs)	**502165**
m	13.40	0.05 (kg)	**502165**



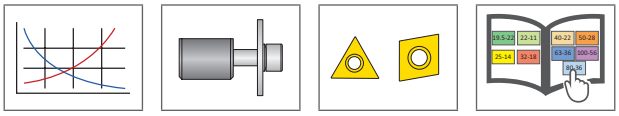
Alu-Line Coolant Delivery Sections

	Coolant Delivery Section X_1	Weight	Part No.
m	26.75	0.01 (kg)	**450125**



B10-N: 10-13 | B10-A: 47 | B10-F | B10: xii-xiii

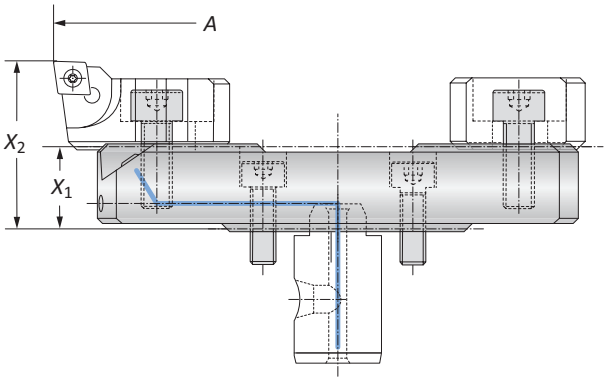
Key on B10-A: 1



i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Alu-Line Serrated Slides | Insert Holders

Diameter Range: 2.667" - 8.189" (68.00mm - 208.00mm)



Alu-Line Serrated Slides

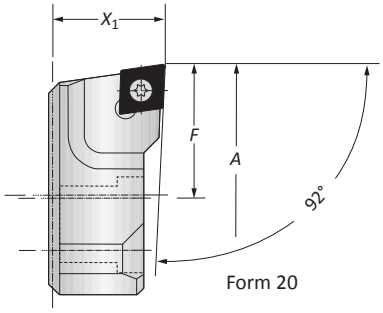
	Boring Range A	Serrated Slide X_1	Serrated Slide X_2	Weight	Part No.
i	2.667 - 3.780	0.630	1.280	0.220 (lbs)	**501054**
	3.780 - 4.881	0.630	1.280	0.220 (lbs)	**501055**
	4.881 - 5.984	0.630	1.280	0.441 (lbs)	**501056**
	5.984 - 7.088	0.866	1.516	0.551 (lbs)	**501058**
	7.088 - 8.189	0.866	1.516	0.661 (lbs)	**501059**
m	68.00 - 96.00	16.00	32.50	0.10 (kg)	**501054**
	96.00 - 124.00	16.00	32.50	0.10 (kg)	**501055**
	124.00 - 152.00	16.00	32.50	0.20 (kg)	**501056**
	152.00 - 180.00	22.00	38.50	0.25 (kg)	**501058**
	180.00 - 208.00	22.00	38.50	0.30 (kg)	**501059**

Insert Holders

	Boring Range	Weight	Insert Form	Part No.
i	2.677 - 8.189	0.110 (lbs)	101	**502064**
	2.677 - 8.189	0.110 (lbs)	20	**502069**
m	68.00 - 208.00	0.05 (kg)	101	**502064**
	68.00 - 208.00	0.05 (kg)	20	**502069**

NOTE: Other insert holders available upon request

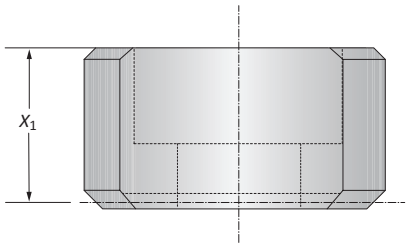
Form 101



Form 20

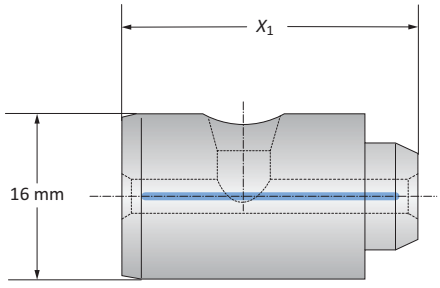
Counter Weights

	Counter Weights X_1	Weight	Part No.
i	0.528	0.110 (lbs)	**502165**
m	13.40	0.05 (kg)	**502165**



Alu-Line Coolant Delivery Sections

	Coolant Delivery Section X_1	Weight	Part No.
i	1.004	0.022 (lbs)	**450137**
m	25.50	0.01 (kg)	**450137**



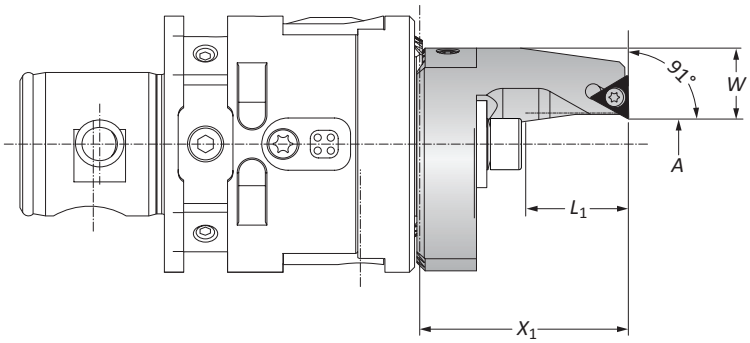
B10-N: 10-13 | B10-A: 47 | B10-F | B10: xii-xiii

Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Outside Turning Insert Holders for Boring Heads

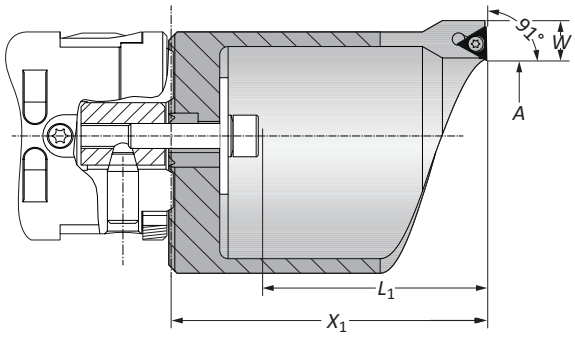
Diameter Range: 0.157" - 2.598" (4.00mm - 66.00mm)



Type A Insert Holders | Diameter Range: 0.157" - 1.181" (4.00mm - 30.00mm)

	Boring Range A	Insert Holder X_1	L_1	W	Weight	Type	Insert Form	Part No.
i	0.157 - 0.689	3.543	0.787	0.653	0.220 (lbs)	A	20*	**236081**
	0.650 - 1.181	3.937	1.181	0.437	0.220 (lbs)	A	20*	**236082**
m	4.00 - 17.50	45.00	20.00	16.60	0.10 (kg)	A	20*	**236081**
	16.50 - 30.00	52.50	30.00	11.10	0.10 (kg)	A	20*	**236082**

NOTE: Clockwise and neutral execution
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)



Type B Insert Holders | Diameter Range: 1.142" - 2.598" (29.00mm - 66.00mm)

	Boring Range A	Insert Holder X_1	L_1	W	Weight	Type	Insert Form	Part No.
i	1.142 - 1.732	4.921	2.126	0.377	0.661 (lbs)	B	20*	**236083**
	1.693 - 2.598	5.905	3.110	0.377	0.882 (lbs)	B	20*	**236084**
m	29.00 - 44.00	63.50	54.00	9.60	0.30 (kg)	B	20*	**236083**
	43.00 - 66.00	85.50	79.00	9.60	0.40 (kg)	B	20*	**236084**

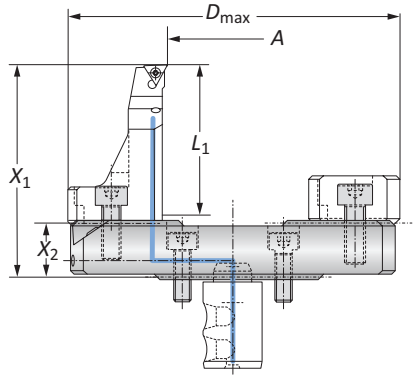
NOTE: Clockwise and neutral execution
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

B10-N: 10-13 | B10-A: 47 | B10-F | B10: xii-xiii
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

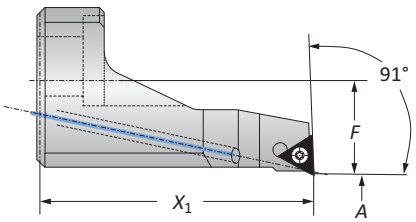
Outside Turning Serrated Slides | Insert Holders

Diameter Range: 0.078" - 4.488" (2.00mm - 114.00mm)



Outside Turning Serrated Slides

	Boring Range A	Serrated Slide X_1	X_2	L_1	D_{max}	Weight	Part No.
i	0.078 - 1.181	2.874	0.630	2.874	3.396	0.220 (lbs)	**501064**
	1.181 - 2.283	2.874	0.630	2.874	5.078	0.220 (lbs)	**501065**
	2.283 - 3.385	3.110	0.866	2.874	6.181	0.441 (lbs)	**501066**
	3.385 - 4.488	3.110	0.866	3.110	7.283	0.551 (lbs)	**501067**
m	2.00 - 30.00	73.00	16.00	73.00	101.00	74.00 (kg)	**501064**
	30.00 - 58.00	73.00	16.00	73.00	129.00	102.00 (kg)	**501065**
	58.00 - 86.00	79.00	22.00	73.00	157.00	129.00 (kg)	**501066**
	86.00 - 114.00	79.00	22.00	79.00	185.00	157.00 (kg)	**501067**



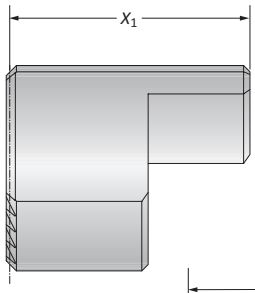
Insert Holders

	Outside Turning Range A	Insert Holder X_1	F	Weight	Insert Form	Part No.
i	0.079 - 4.488	2.244	0.776	0.331 (lbs)	20	**502082**
m	2.00 - 114.00	57.00	19.70	0.15 (kg)	20	**502082**

NOTE: clockwise and neutral execution

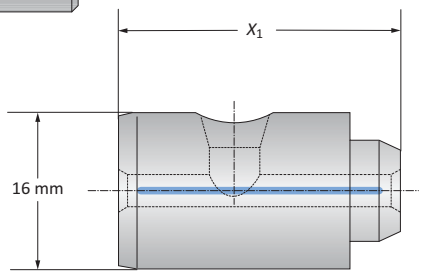
Counter Weights

	Counter Weight X_1	Weight	Part No.
i	1.486	0.350 (lbs)	**502183**
m	37.75	0.16 (kg)	**502183**



Coolant Delivery Sections

	Coolant Delivery Section X_1	Weight	Part No.
i	1.004	0.022 (lbs)	**450137**
m	25.50	0.01 (kg)	**450137**



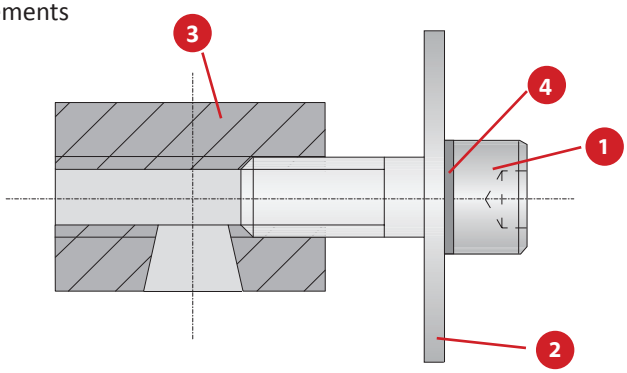
B10-N: 10-13 | B10-A: 47 | B10-F | B10: xii-xiii

Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Accessories

Clamping Elements

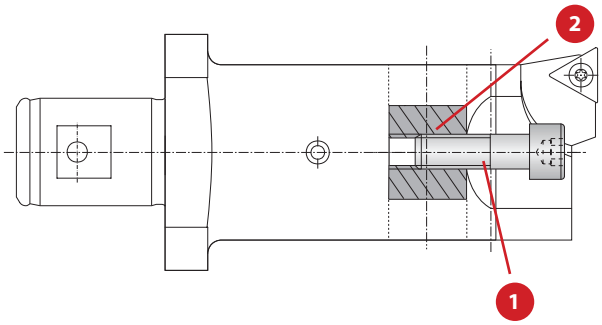


Clamping Elements for Insert Holders

	Boring Range	1 Cap Screw	Hex Size	2 Washer	3 Clamping Nut	4 Locking Washer	Complete Part No.
	4.00 - 30.00	070153	s5	315155	236120	215254	236088
ⓜ	29.00 - 66.00	070153	s5	315156	236120	215254	236089
	52.00 - 102.00	115147	s5	115725	236120	–	236020

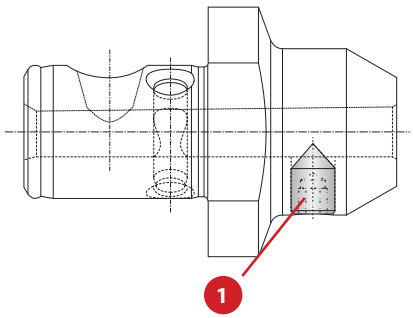
Clamping Elements for Serrated Tool Body

1 Cap Screw	Hex Size	2 Clamping Piece
027154	s4	145184



Thread Pin

Service Key	1 Part No.
S3 / A	415244



B10-N: 10-13

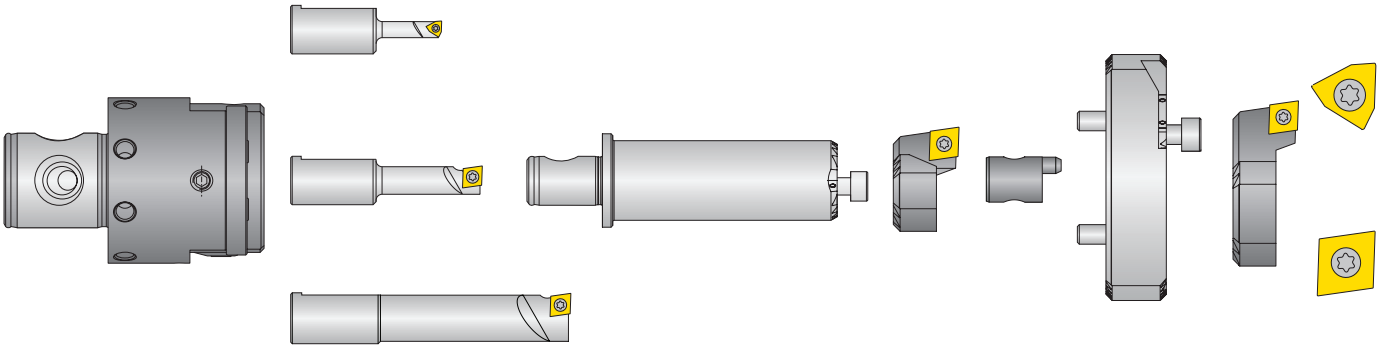
Key on B10-A: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Kit Components

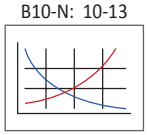
Form 101 | Diameter Range: 0.236" - 5.039" (6.00mm - 128.00mm)



	Kit Components									
	Boring Head	Boring Bars	Insert Holders	Serrated Tool Body	Serrated Slide	Coolant Delivery Section	Service Keys	Inserts (2x)	Inserts (3x)	Kit No.
ⓘ	451001	450026 (Form 211) 450027 (Form 101) 450028 (Form 101)	450022 450023	450021	450024	450125	003195 (s4) 515451 (T6) 515452 (T8)	397676WHC19	297531WHC19	**104088**
ⓜ	450001	450026 (Form 211) 450027 (Form 101) 450028 (Form 101)	450022 450023	450021	450024	450125	003195 (s4) 515451 (T6) 515452 (T8)	397676WHC19	297531WHC19	**103088**

NOTE: Inserts are included in PrimeBore kits

B10-N: 10-13



Key on B10-A: 1

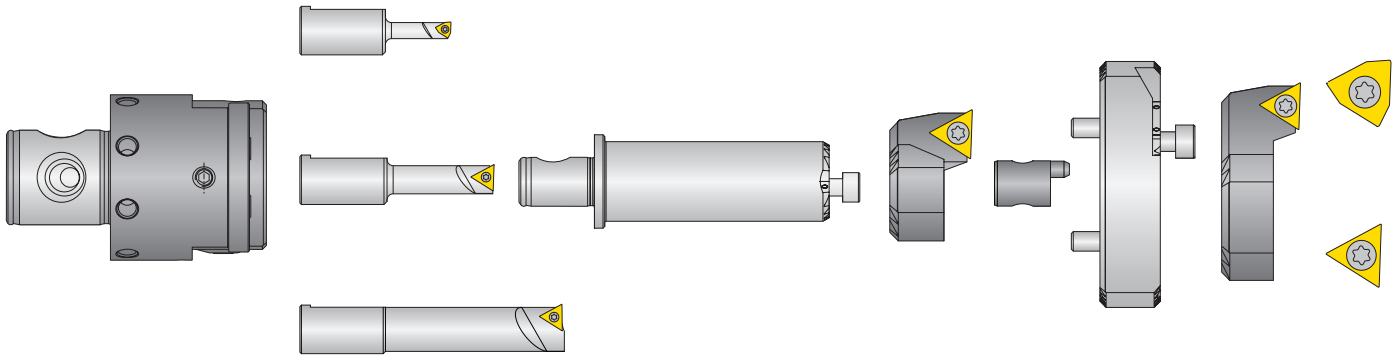
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

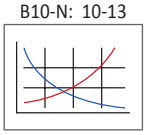
Form 20 | Diameter Range: 0.236" - 5.039" (6.00mm - 128.00mm)



	Kit Components									
	Boring Head	Boring Bars	Insert Holders	Serrated Tool Body	Serrated Slide	Coolant Delivery Section	Service Keys	Inserts (2x)	Inserts (2x)	Kit No.
(i)	451001	450026 (Form 211) 450038 (Form 20) 450039 (Form 20)	450040 450041	450021	450024	450125	003195 (s4) 515451 (T6) 515452 (T8)	397676WHC19	397673WHC19	**104089**
(m)	450001	450026 (Form 211) 450038 (Form 20) 450039 (Form 20)	450040 450041	450021	450024	450125	003195 (s4) 515451 (T6) 515452 (T8)	397676WHC19	397673WHC19	**103089**

NOTE: Inserts are included in PrimeBore kits

B10-N: 10-13



Key on B10-A:1

B10: xii-xiii

(i) = Imperial (in)
(m) = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Digital 511 (510) Product Overview

Digital *511 (510)*
VERSATILE BORING

Improve your boring job with the Digital 511 (510) boring head.

The Wohlhaupter™ Digital 511 (510) boring head offers precision, quality, and efficiency. Our integrated digital display makes the 511 (510) the smallest precision boring tool available and allows for easy opto-electronic adjusting.

Experience ***precision boring*** for yourself.

- Diameter range: 0.016" - 0.472" (0.40mm - 12.00mm)
- Easy-to-read digital display
- Coolant-through
- External counter weight for balancing
- Protected against coolant and dust according to IP65
- Fine adjustments of 0.0001" (0.002mm)
- Ideal for CAT40, BT30, HSK40
- Max spindle speed: 35,000 RPM

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

DIGITAL

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Digital 511 (510) Boring Head

Carbide Boring Bar
Ø 0.393" - 0.472"
(Ø 10mm - 12mm)

Steel Boring Bar
Ø 0.393" - 0.472"
(Ø 10mm - 12mm)

Reducing Sleeve

Carbide Boring Bar
Ø 0.236" - 0.393"
(Ø 6mm - 10mm)

Steel Boring Bar
Ø 0.236" - 0.393"
(Ø 6mm - 10mm)

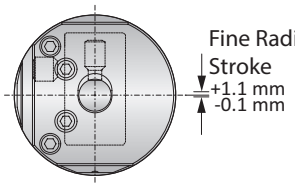
Mini Boring Bar (Coated Carbide)
Ø 0.016" - 0.255"
(Ø 0.4mm - 6.5mm)

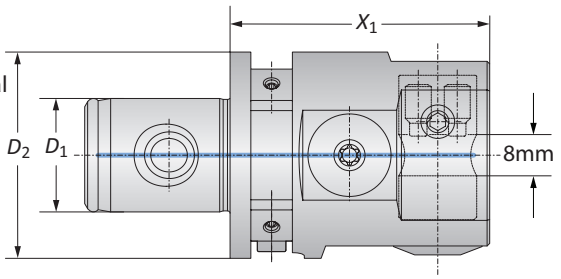
OPERATION **VERSATILITY**

from **0.016"** to **0.472"** (**0.4mm** to **12mm**)

Boring Heads

Diameter Range: 0.016" - 0.472" (0.40mm - 12.00mm)



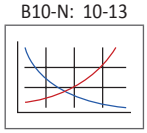


NOTE: Imperial item pictured

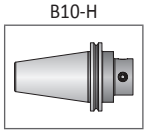
NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

	Connection D_2 | D_1	Boring Range	Boring Head X_1	Weight	Part No.
i	40 - 22	0.016 - 0.472	1.969	0.926 (lbs)	**511001**
m	40 - 22	0.40 - 12.00	50.00	2.19 (kg)	**510001**

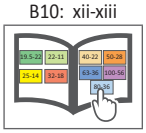
B10-N: 10-13



B10-H



B10: xii-xiii

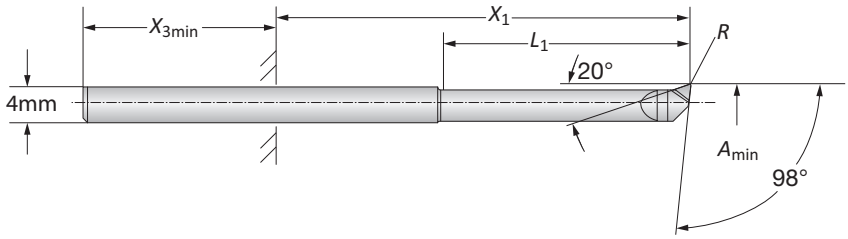


i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Mini Boring Bars

Diameter Range: 0.016" - 0.118" (0.40mm - 3.00mm)

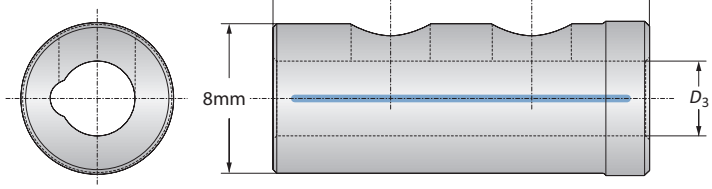


Mini Boring Bars

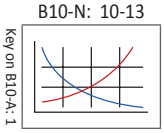
	Boring Range	Boring Bar				
	A_{min}	X_1	$X_{3\ min}$	L_1	R	Part No.
i	0.016	0.118 - 1.042	0.630	0.079	0.001	**081401HC126**
	0.024	0.157 - 1.063	0.630	0.118	0.002	**081402HC126**
	0.031	0.197 - 1.102	0.630	0.157	0.002	**081403HC126**
	0.039	0.236 - 1.142	0.630	0.197	0.002	**081404HC126**
	0.059	0.335 - 1.220	0.630	0.295	0.002	**081405HC126**
	0.079	0.433 - 1.339	0.630	0.394	0.002	**081406HC126**
	0.098	0.531 - 1.437	0.630	0.492	0.002	**081407HC126**
	0.110	0.591 - 1.496	0.630	0.551	0.002	**081408HC126**
m	0.40	3.00 - 26.00	16.00	2.00	0.03	**081401HC126**
	0.60	4.00 - 27.00	16.00	3.00	0.04	**081402HC126**
	0.80	5.00 - 28.00	16.00	4.00	0.04	**081403HC126**
	1.00	6.00 - 29.00	16.00	5.00	0.05	**081404HC126**
	1.50	8.50 - 31.50	16.00	7.50	0.05	**081405HC126**
	2.00	11.00 - 34.00	16.00	10.00	0.05	**081406HC126**
	2.50	13.50 - 36.50	16.00	12.50	0.05	**081407HC126**
	2.80	15.00 - 38.00	16.00	14.00	0.07	**081408HC126**

Reducing Sleeve

	Reducing Sleeve	
	D_3	Part No.
m	4.00	**514201**

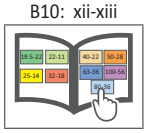


B10-N: 10-13



Key on B10-A: 1

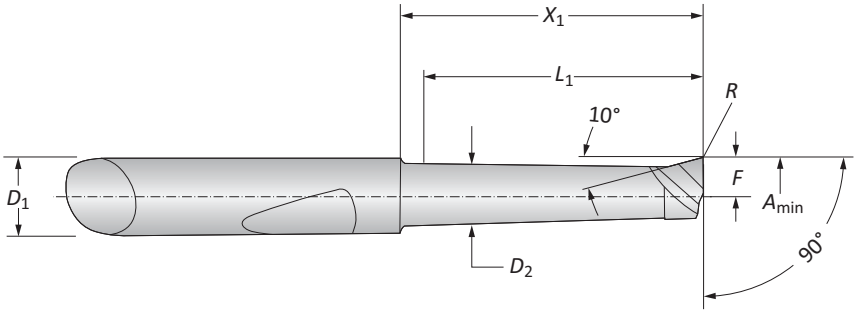
B10: xii-xiii



i = Imperial (in)
m = Metric (mm)

Mini Boring Bars

WHC05 | WHW04 | WBN150 | Diameter Range: 0.118" - 0.393" (3.00mm - 10.00mm)

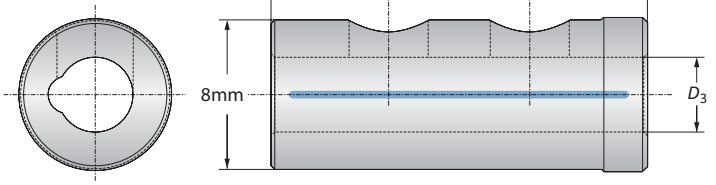


Mini Boring Bars

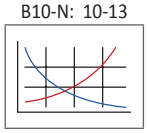
	Boring Range	Boring Bar						Part No.		
	A_{min}	D_1	D_2	X_1	L_1	F	R	Coated Carbide	Uncoated Carbide	CBN
	0.118	–	0.102	0.452	0.393	0.055	0.003	**081306HC05**	–	**081322BN150**
	0.118	–	0.102	0.649	0.590	0.055	0.003	**081307HC05**	**081307HW04**	–
	0.157	–	0.141	0.472	0.393	0.074	0.007	**081308HC05**	–	**081317BN150**
	0.157	–	0.141	0.669	0.590	0.074	0.007	**081309HC05**	–	**081341BN150**
	0.157	–	0.141	0.866	0.787	0.074	0.007	**081310HC05**	**081310HW04**	–
	0.196	–	0.181	0.472	0.393	0.094	0.007	**081311HC05**	–	**081318BN150**
ⓘ	0.196	–	0.181	0.866	0.787	0.094	0.007	**081312HC05**	–	**081319BN150**
	0.196	–	0.181	1.259	1.181	0.094	0.007	**081313HC05**	**081313HW04**	–
	0.236	–	0.220	0.866	0.787	0.114	0.007	**081314HC05**	–	**081320BN150**
	0.236	–	0.220	1.259	1.181	0.114	0.007	**081315HC05**	–	**081321BN150**
	0.236	–	0.220	1.653	1.574	0.114	0.007	**081316HC05**	**081316HW04**	–
	0.314	–	0.299	0.984	0.905	0.153	0.007	**081323HC05**	–	–
	0.314	–	0.299	1.968	1.889	0.153	0.007	**081324HC05**	–	–
	3.00	6.00	2.60	11.50	10.00	1.40	0.10	**081306HC05**	–	**081322BN150**
	3.00	6.00	2.60	16.50	15.00	1.40	0.10	**081307HC05**	**081307HW04**	–
	4.00	6.00	3.60	12.00	10.00	1.90	0.20	**081308HC05**	–	**081317BN150**
	4.00	6.00	3.60	17.00	15.00	1.90	0.20	**081309HC05**	–	**081341BN150**
	4.00	6.00	3.60	22.00	20.00	1.90	0.20	**081310HC05**	**081310HW04**	–
	5.00	6.00	4.60	12.00	10.00	2.40	0.20	**081311HC05**	–	**081318BN150**
ⓜ	5.00	6.00	4.60	22.00	20.00	2.40	0.20	**081312HC05**	–	**081319BN150**
	5.00	6.00	4.60	32.00	30.00	2.40	0.20	**081313HC05**	**081313HW04**	–
	6.00	6.00	5.60	22.00	20.00	2.90	0.20	**081314HC05**	–	**081320BN150**
	6.00	6.00	5.60	32.00	30.00	2.90	0.20	**081315HC05**	–	**081321BN150**
	6.00	6.00	5.60	42.00	40.00	2.90	0.20	**081316HC05**	**081316HW04**	–
	8.00	8.00	7.60	25.00	23.00	3.90	0.20	**081323HC05**	–	–
	8.00	8.00	7.60	50.00	48.00	3.90	0.20	**081324HC05**	–	–

Reducing Sleeve

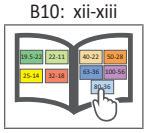
	Reducing Sleeve	
	D_3	Part No.
ⓜ	6.00	**514210**



B10-N: 10-13



B10: xii-xiii

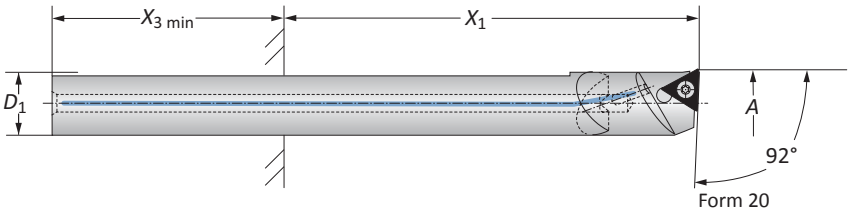


ⓘ = Imperial (in)
ⓜ = Metric (mm)

Boring Bars

Diameter Range: 0.236" - 0.472" (6.00mm - 12.00mm)

Form 101



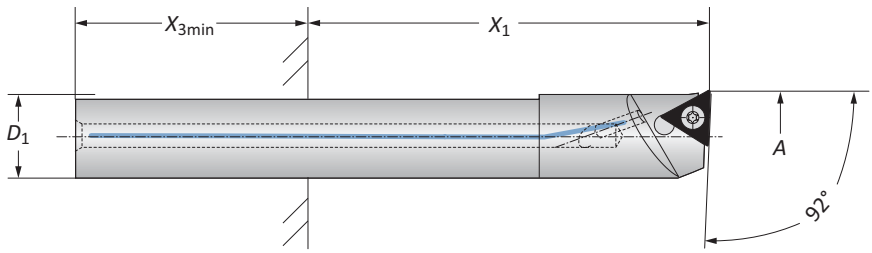
Form 20

Steel Boring Bars

	Boring Range	Boring Bar				Part No.			
	A	D_1	X_1	$X_{3\,min}$	Weight	Insert Form	Boring Bar	Insert Form	Boring Bar
i	0.236 - 0.315	–	0.492 - 2.559	0.630	0.044 (lbs)	211**	**514034**	–	–
i	0.315 - 0.394	–	0.826 - 3.307	0.630	0.110 (lbs)	211**	**514035**	–	–
i	0.394 - 0.472	–	2.047 - 3.622	0.748	0.154 (lbs)	101**	**514015**	20**	**514016**
m	6.00 - 8.00	5.00*	12.50 - 65.00	16.00	0.02 (kg)	211**	**514034**	–	–
m	8.00 - 10.00	7.00*	21.00 - 84.00	16.00	0.05 (kg)	211**	**514035**	–	–
m	10.00 - 12.00	8.00	52.00 - 92.00	19.00	0.07 (kg)	101**	**514015**	20**	**514016**

*Fixture-through reducing sleeves
**Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

Form 101



Form 20

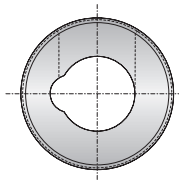
Carbide Boring Bars

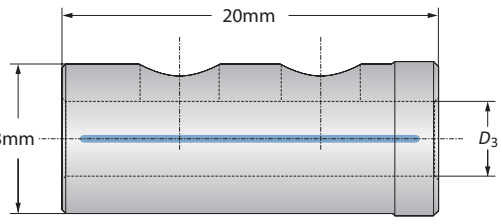
	Boring Range	Boring Bar				Part No.			
	A	D_1	X_1	$X_{3\,min}$	Weight	Insert Form	Boring Bar	Insert Form	Boring Bar
i	0.236 - 0.315	–	0.492 - 1.772	0.630	0.022 (lbs)	211**	**514032**	–	–
i	0.315 - 0.394	–	0.689 - 2.205	0.630	0.044 (lbs)	211**	**514033**	–	–
i	0.394 - 0.472	–	0.787 - 2.362	0.748	0.066 (lbs)	101**	**514003**	20**	**514004**
m	6.00 - 8.00	5.00*	12.50 - 45.00	16.00	0.01 (kg)	211**	**514032**	–	–
m	8.00 - 10.00	7.00*	17.50 - 56.00	16.00	0.02 (kg)	211**	**514033**	–	–
m	10.00 - 12.00	8.00	20.00 - 60.00	19.00	0.03 (kg)	101**	**514003**	20**	**514004**

*Fixture-through reducing sleeves
**Not suitable for indexable inserts with a radius of 0.031" (0.8mm)

Reducing Sleeves

	Reducing Sleeve	
	D_3	Part No.
m	5.00	**514202**
m	7.00	**514203**





B10-N: 10-13 | B10-A: 56 | B10-F | B10: xii-xiii

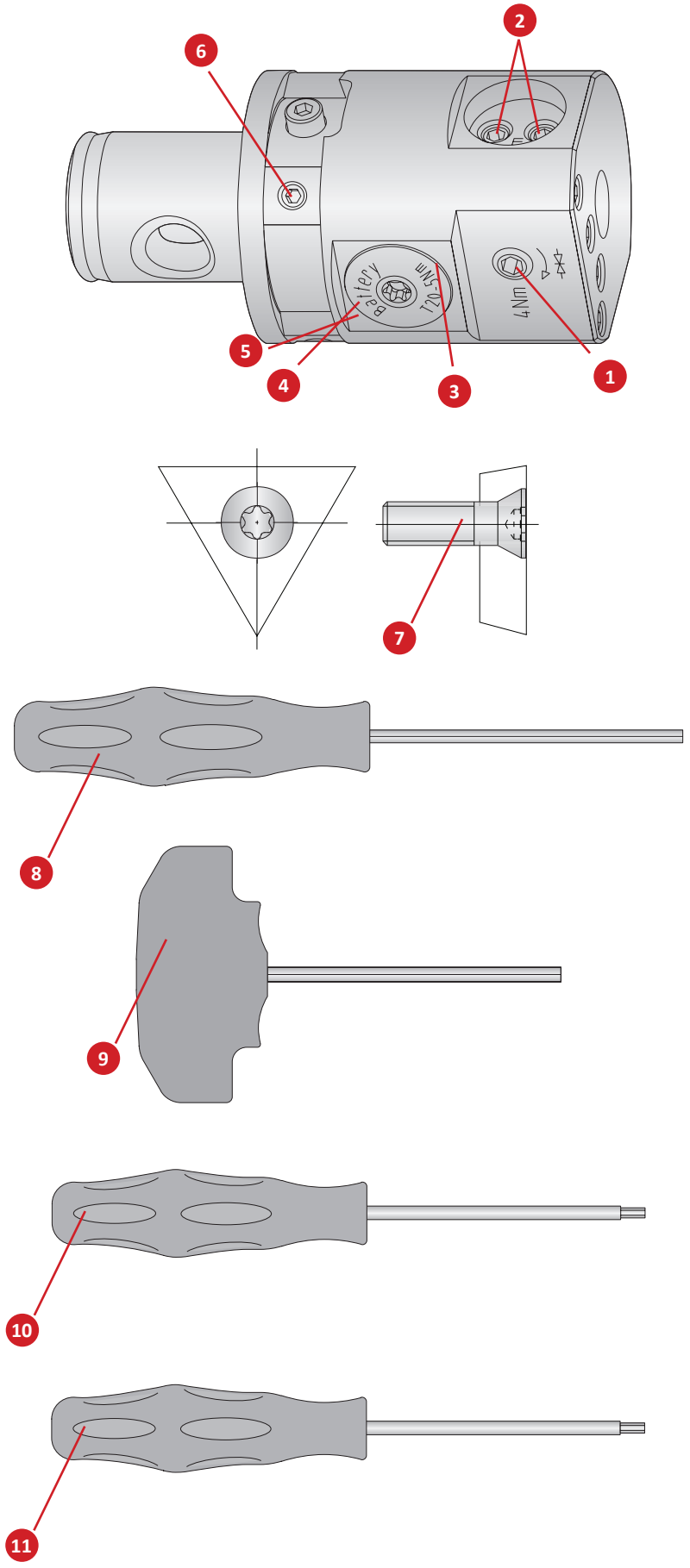
Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Boring Head Accessories

No.	Part	Insert Form	Size	Part No.
1	Clamping screw	–	–	**115985**
2	Thread pin for tool clamping	–	–	**070333**
3	Sealing ring for battery cover	–	–	**415895**
4	Battery*	–	–	**415896**
5	Battery cover	–	–	**501016**
6	Thread pin	–	–	**510114**
7	Insert screws	Form 20 Form 101 Form 337	T7 T8 T6	**115535** **115676** **515286**
8	Hex wrench	–	s2	**215473**
9	Hex wrench	–	s2.5 s3.0	**415577** **415578**
10	Torx driver	–	T6 T7 T8 T20	**115537** **115591** **115590** **215150**
11	Torx screwdriver	Form 211 Form 20 Form 101	T6 T7 T8	**415507** **415508** **415514**

*Always change two batteries
NOTE: Please use VARTA batteries



Notes

DigiBore
VERSATILE BORING

Advanced versatile technology.

The Wohlhaupter™ DigiBore boring head provides internal balancing, which makes this tool the stress-free choice to meet your required surface finish. Its digital display allows for quick and accurate diameter corrections at the machine.

Engineered with the ***future in mind***.

- Diameter range: 0.118" - 8.189" (3.00mm - 208.00mm)
- Digital readout for simple 0.0001" (0.002mm) diameter adjustments
- Ease the stress of working on different day-to-day projects with boring kits
- Automatic internal balancing improves surface finish, tool life, and accuracy
- Max spindle speed: 16,000 RPM

NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

DIGI BORE

NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Coolant Delivery System

DigiBore Head

Serrated Slide

Counter Weight

Outside Turning
Ø 0.079" - 4.488"
(Ø 2mm - 114mm)

Insert Holder
Ø 2.677" - 8.189"
(Ø 68mm - 208mm)

Outside Turning
Ø 0.157" - 2.598"
(Ø 4mm - 66mm)

Serrated Tool Body

Insert Holder
Ø 1.260" - 2.677"
(Ø 32mm - 68mm)

Carbide Serrated Tool Body

Insert Holder
Ø 0.787" - 1.260"
(Ø 20mm - 32mm)

Serrated Tool Body

Carbide Boring Bar
Ø 0.394" - 0.787"
(Ø 10mm - 20mm)

Steel Boring Bar
Ø 0.236" - 0.787"
(Ø 6mm - 20mm)

Adapter

Mini-Boring Tool
Ø 0.118" - 0.394"
(Ø 3mm - 10mm)

OPERATION **VERSATILITY**

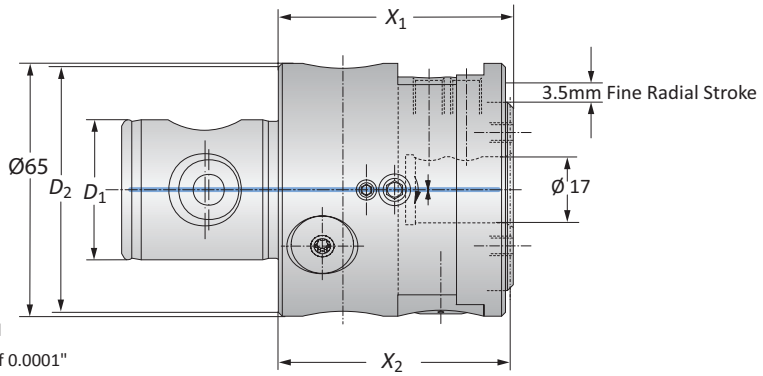
from **0.118"** to **8.189"** (**3mm** to **208mm**)
plus outside turning

NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Boring Heads

Diameter Range: 0.118" - 8.189" (3.00mm - 208.00mm)



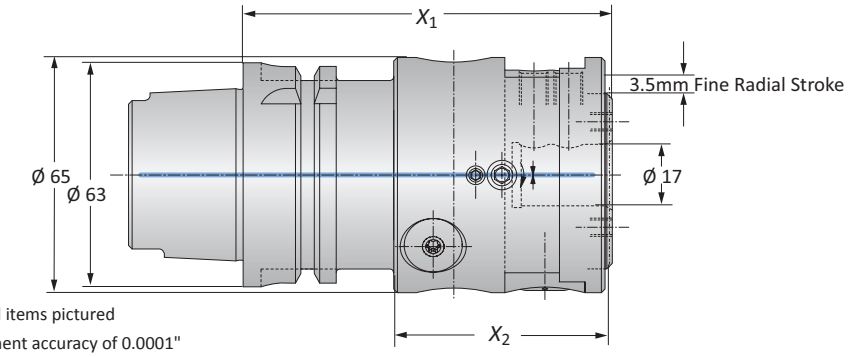
NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

DigiBore Boring Heads

	Connection D_2 | D_1	Boring Range	Boring Head X_1	Boring Head X_2	Weight	Part No.
i	50 - 28	0.118 - 8.189	2.362	2.342	2.866 (lbs)	**504003**
	63 - 36	0.118 - 8.189	2.362	2.342	3.307 (lbs)	**504001**
m	50 - 28	3.00 - 208.00	60.00	59.50	1.30 (kg)	**501005**
	63 - 36	3.00 - 208.00	60.00	59.50	1.50 (kg)	**501001**

NOTE: DigiBore heads are compatible with Kaiser® connection



NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

DigiBore Boring Heads

	Connection	Boring Range	Boring Head X_1	Boring Head X_2	Weight	Part No.
i	HSK-A 63	0.118 - 8.189	4.015	2.342	4.630 (lbs)	**504004**
	PSC 63 (Polygon Shank)	0.118 - 8.189	4.015	2.342	4.630 (lbs)	**504019**
m	HSK-A 63	3.00 - 208.00	102.00	59.50	2.10 (kg)	**501004**
	PSC 63 (Polygon Shank)	3.00 - 208.00	102.00	59.50	2.10 (kg)	**501019**

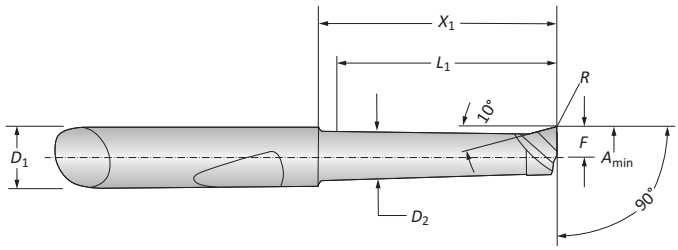
B10-N: 10-13
Key on B10-A: 1
B10-H
B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Mini Boring Bars

WHC05 | WHW04 | WBN150 | Diameter Range: 0.118" - 0.394" (3.00mm - 10.00mm)

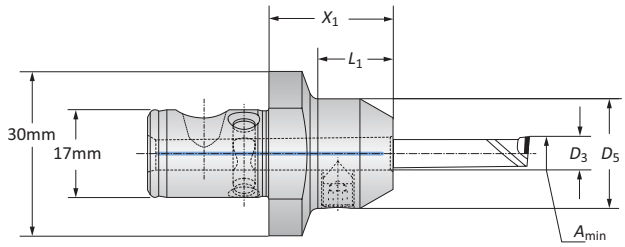


Mini Boring Bars

	Boring Range	Boring Bar						Part No.		
	A_{min}	D_1	D_2	X_1	L_1	F	R	Coated Carbide	Uncoated Carbide	CBN
	0.118	–	0.102	0.453	0.394	0.055	0.004	**081306HC05**	–	**081322BN150**
	0.118	–	0.102	0.650	0.590	0.055	0.004	**081307HC05**	**081307HW04**	–
	0.157	–	0.142	0.472	0.394	0.075	0.008	**081308HC05**	–	**081317BN150**
	0.157	–	0.142	0.669	0.590	0.075	0.008	**081309HC05**	–	**081341BN150**
	0.157	–	0.142	0.866	0.787	0.075	0.008	**081310HC05**	**081310HW04**	–
	0.197	–	0.181	0.472	0.394	0.094	0.008	**081311HC05**	–	**081318BN150**
ⓘ	0.197	–	0.181	0.866	0.787	0.094	0.008	**081312HC05**	–	**081319BN150**
	0.197	–	0.181	1.260	1.181	0.094	0.008	**081313HC05**	**081313HW04**	–
	0.236	–	0.220	0.866	0.787	0.114	0.008	**081314HC05**	–	**081320BN150**
	0.236	–	0.220	1.260	0.181	0.114	0.008	**081315HC05**	–	**081321BN150**
	0.236	–	0.220	1.654	1.575	0.114	0.008	**081316HC05**	**081316HW04**	–
	0.315	–	0.299	0.984	0.906	0.154	0.008	**081323HC05**	–	–
	0.315	–	0.299	1.968	1.890	0.154	0.008	**081324HC05**	–	–
	3.00	6.00	2.60	11.50	10.00	1.40	0.10	**081306HC05**	–	**081322BN150**
	3.00	6.00	2.60	16.50	15.00	1.40	0.10	**081307HC05**	**081307HW04**	–
	4.00	6.00	3.60	12.00	10.00	1.90	0.20	**081308HC05**	–	**081317BN150**
	4.00	6.00	3.60	17.00	15.00	1.90	0.20	**081309HC05**	–	**081341BN150**
	4.00	6.00	3.60	22.00	20.00	1.90	0.20	**081310HC05**	**081310HW04**	–
	5.00	6.00	4.60	12.00	10.00	2.40	0.20	**081311HC05**	–	**081318BN150**
ⓜ	5.00	6.00	4.60	22.00	20.00	2.40	0.20	**081312HC05**	–	**081319BN150**
	5.00	6.00	4.60	32.00	30.00	2.40	0.20	**081313HC05**	**081313HW04**	–
	6.00	6.00	5.60	22.00	20.00	2.90	0.20	**081314HC05**	–	**081320BN150**
	6.00	6.00	5.60	32.00	30.00	2.90	0.20	**081315HC05**	–	**081321BN150**
	6.00	6.00	5.60	42.00	40.00	2.90	0.20	**081316HC05**	**081316HW04**	–
	8.00	8.00	7.60	25.00	23.00	3.90	0.20	**081323HC05**	–	–
	8.00	8.00	7.60	50.00	48.00	3.90	0.20	**081324HC05**	–	–

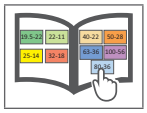
Adapters

	Boring Range	Adapter					
	A_{min}	X_1	L_1	D_3	D_5	Weight	Part No.
ⓜ	3.00 - 8.00	22.50	14.00	6.00	20.00	0.04 (kg)	**501050**
	8.00 - 10.00	22.50	14.00	8.00	22.00	0.04 (kg)	**501051**



B10-N: 10-13

Key on B10-A: 1



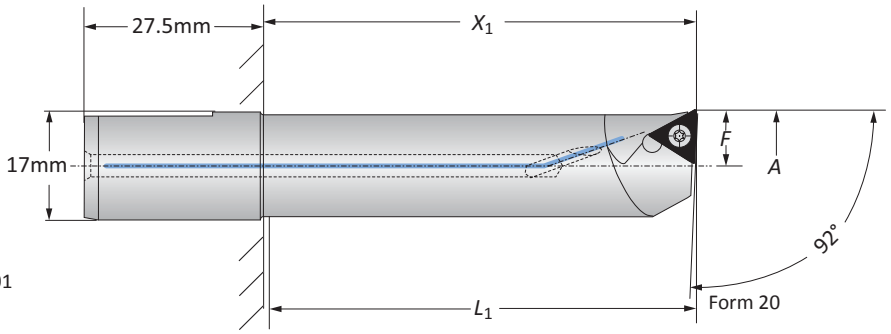
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Boring Bars

Steel | Diameter Range: 0.236" - 0.787" (6.00mm - 20.00mm)

Form 101



	Boring Range	Boring Bar							
	A	X_1	L_1	*F*	Weight	Insert Form	Part No.	Insert Form	Part No.
i	0.236 - 0.315	0.866	0.748	0.110	0.110 (lbs)	211	**502068**	–	**–**
	0.315 - 0.394	1.181	1.063	0.150	0.110 (lbs)	211	**502066**	–	**–**
	0.394 - 0.433	1.181	1.063	0.189	0.132 (lbs)	101*	**502012**	20*	**502001**
	0.433 - 0.472	1.181	1.063	0.203	0.132 (lbs)	101*	**502075**	20*	**502070**
	0.472 - 0.512	1.772	1.654	0.228	0.154 (lbs)	101*	**502013**	20*	**502002**
	0.512 - 0.551	1.772	1.654	0.248	0.176 (lbs)	101*	**502076**	20*	**502071**
	0.551 - 0.591	1.968	1.850	0.268	0.176 (lbs)	101*	**502014**	20*	**502003**
	0.591 - 0.630	1.968	1.850	0.287	0.198 (lbs)	101*	**502077**	20*	**502072**
	0.630 - 0.669	2.362	2.244	0.307	0.220 (lbs)	101*	**502015**	20*	**502004**
	0.669 - 0.709	2.362	2.244	0.327	0.265 (lbs)	101*	**502078**	20*	**502073**
	0.709 - 0.748	2.677	2.559	0.346	0.287 (lbs)	101*	**502016**	20*	**502005**
	0.748 - 0.787	2.677	2.559	0.366	0.309 (lbs)	101*	**502079**	20*	**502074**
m	6.00 - 8.00	22.00	19.00	2.80	0.05 (kg)	211	**502068**	–	**–**
	8.00 - 10.00	30.00	27.00	3.80	0.05 (kg)	211	**502066**	–	**–**
	10.00 - 11.00	30.00	27.00	4.80	0.06 (kg)	101*	**502012**	20*	**502001**
	11.00 - 12.00	30.00	27.00	5.30	0.06 (kg)	101*	**502075**	20*	**502070**
	12.00 - 13.00	45.00	42.00	5.80	0.07 (kg)	101*	**502013**	20*	**502002**
	13.00 - 14.00	45.00	42.00	6.30	0.08 (kg)	101*	**502076**	20*	**502071**
	14.00 - 15.00	50.00	47.00	6.80	0.08 (kg)	101*	**502014**	20*	**502003**
	15.00 - 16.00	50.00	47.00	7.30	0.09 (kg)	101*	**502077**	20*	**502072**
	16.00 - 17.00	60.00	57.00	7.80	0.10 (kg)	101*	**502015**	20*	**502004**
	17.00 - 18.00	60.00	57.00	8.30	0.12 (kg)	101*	**502078**	20*	**502073**
	18.00 - 19.00	68.00	65.00	8.80	0.13 (kg)	101*	**502016**	20*	**502005**
	19.00 - 20.00	68.00	65.00	9.30	0.14 (kg)	101*	**502079**	20*	**502074**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

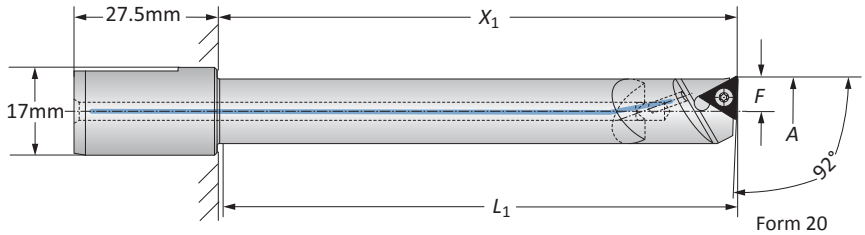
B10-N: 10-13
Key on B10-A: 1
B10-F
B10: xii-xiii

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Boring Bars

Carbide | Diameter Range: 0.394" - 0.787" (10.00mm - 20.00mm)

Form 101



Form 20

	Boring Range	Boring Bar							
	A	X_1	L_1	*F*	Weight	Insert Form	Part No.	Insert Form	Part No.
	0.394 - 0.472	2.165	2.047	0.189	0.265 (lbs)	101*	**502093**	20*	**502088**
	0.394 - 0.472	2.756	2.638	0.189	0.309 (lbs)	101*	**502034**	20*	**502023**
	0.472 - 0.551	2.559	2.441	0.228	0.287 (lbs)	101*	**502094**	20*	**502089**
	0.472 - 0.551	3.346	3.228	0.228	3.975 (lbs)	101*	**502035**	20*	**502024**
ⓘ	0.551 - 0.630	2.953	2.835	0.268	0.375 (lbs)	101*	**502095**	20*	**502090**
	0.551 - 0.630	3.543	3.425	0.268	0.485 (lbs)	101*	**502036**	20*	**502025**
	0.630 - 0.709	3.346	3.228	0.307	0.573 (lbs)	101*	**502096**	20*	**502091**
	0.630 - 0.709	4.331	4.213	0.307	0.706 (lbs)	101*	**502037**	20*	**502026**
	0.709 - 0.787	3.740	3.622	0.346	0.617 (lbs)	101*	**502097**	20*	**502092**
	0.709 - 0.787	4.724	4.606	0.346	0.882 (lbs)	101*	**502038**	20*	**502027**
	10.00 - 12.00	55.00	52.00	4.80	0.12 (kg)	101*	**502093**	20*	**502088**
	10.00 - 12.00	70.00	67.00	4.80	0.14 (kg)	101*	**502034**	20*	**502023**
	12.00 - 14.00	65.00	62.00	5.80	0.13 (kg)	101*	**502094**	20*	**502089**
	12.00 - 14.00	85.00	82.00	5.80	0.18 (kg)	101*	**502035**	20*	**502024**
ⓜ	14.00 - 16.00	75.00	72.00	6.80	0.17 (kg)	101*	**502095**	20*	**502090**
	14.00 - 16.00	90.00	87.00	6.80	0.22 (kg)	101*	**502036**	20*	**502025**
	16.00 - 18.00	85.00	82.00	7.80	0.26 (kg)	101*	**502096**	20*	**502091**
	16.00 - 18.00	110.00	107.00	7.80	0.32 (kg)	101*	**502037**	20*	**502026**
	18.00 - 20.00	95.00	92.00	8.80	0.28 (kg)	101*	**502097**	20*	**502092**
	18.00 - 20.00	120.00	117.00	8.80	0.40 (kg)	101*	**502038**	20*	**502027**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

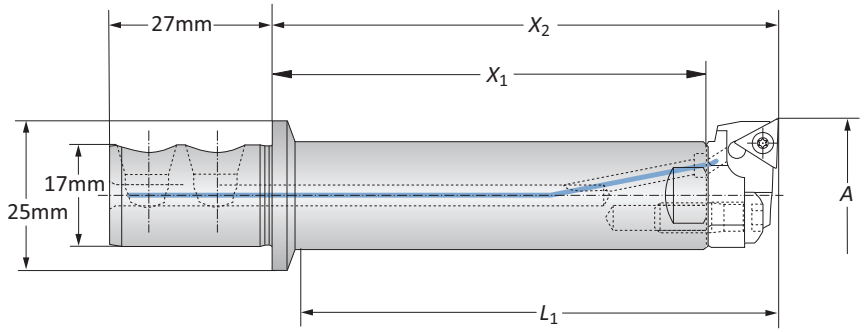
B10-N: 10-13 | B10-F | B10: xii-xiii

Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

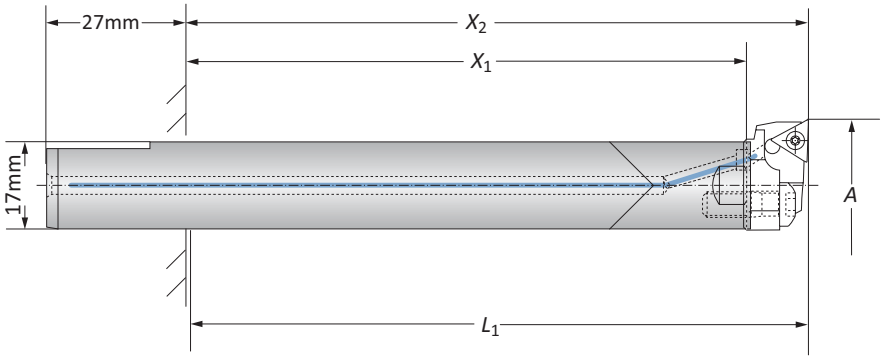
Serrated Tool Bodies | Insert Holders

Steel | Carbide | Diameter Range: 0.787" - 1.260" (20.00mm - 32.00mm)



Steel Serrated Tool Bodies

	Boring Range	Serrated Tool Body					
	A	X_1	X_2	L_1	Weight	Part No.
i	0.787 - 1.260	2.835	3.307	3.031	0.441 (lbs)	**502045**
m	20.00 - 32.00	72.00	84.00	77.00	0.20 (kg)	**502045**



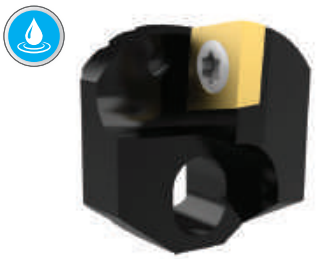
Carbide Serrated Tool Bodies

	Boring Range	Serrated Tool Body					
	A	X_1	X_2	L_1	Weight	Part No.
i	0.787 - 1.260	4.252	4.724	4.606	0.882 (lbs)	**502062**
m	20.00 - 32.00	108.00	120.00	117.00	0.40 (kg)	**502062**

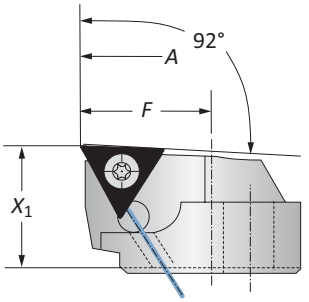
Insert Holders

	Boring Range	Insert Holder			Insert		Insert	
	A	X_1	*F*	Weight	Form	Part No.	Form	Part No.
i	0.787 - 0.866	0.472	0.386	0.022 (lbs)	101*	**502052**	20*	**502046**
	0.866 - 0.945	0.472	0.425	0.022 (lbs)	101*	**502053**	20*	**502047**
	0.945 - 1.024	0.472	0.465	0.022 (lbs)	101*	**502054**	20*	**502048**
	1.024 - 1.102	0.472	0.504	0.022 (lbs)	101*	**502055**	20*	**502049**
	1.102 - 1.181	0.472	0.543	0.022 (lbs)	101*	**502056**	20*	**502050**
	1.181 - 1.260	0.472	0.583	0.022 (lbs)	101*	**502057**	20*	**502051**
m	20.00 - 22.00	12.00	9.80	0.01 (kg)	101*	**502052**	20*	**502046**
	22.00 - 24.00	12.00	10.80	0.01 (kg)	101*	**502053**	20*	**502047**
	24.00 - 26.00	12.00	11.80	0.01 (kg)	101*	**502054**	20*	**502048**
	26.00 - 28.00	12.00	12.80	0.01 (kg)	101*	**502055**	20*	**502049**
	28.00 - 30.00	12.00	13.80	0.01 (kg)	101*	**502056**	20*	**502050**
	30.00 - 32.00	12.00	14.80	0.01 (kg)	101*	**502057**	20*	**502051**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)



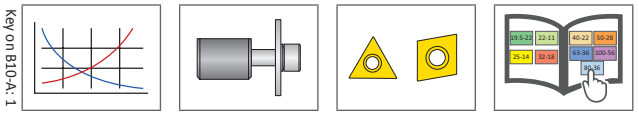
Form 101



Form 20

B10-N: 10-13 | B10-A: 69 | B10-F | B10: xii-xiii

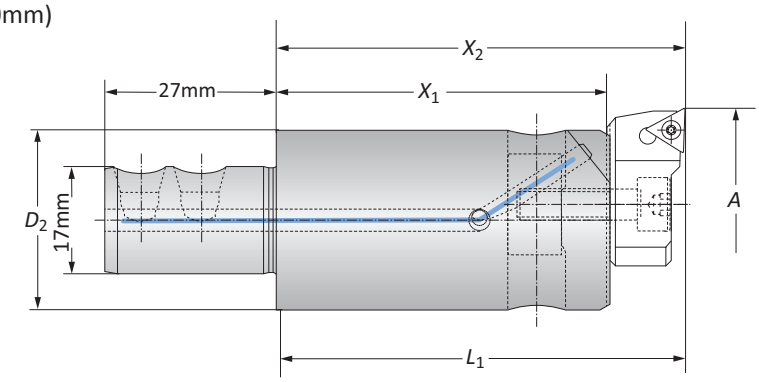
Key on B10-A: 1



i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Alu-Line Serrated Tool Bodies | Insert Holders

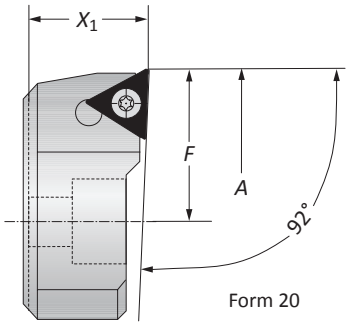
Diameter Range: 1.260" - 2.677" (32.00mm - 68.00mm)



Alu-Line Serrated Tool Bodies

	Boring Range	Serrated Tool Body					
	A	*D_2*	*X_1*	*X_2*	*L_1*	Weight	Part No.
ⓘ	1.260 - 1.968	1.122	2.047	2.598	2.480	0.220 (lbs)	**501052**
ⓘ	1.260 - 1.968	1.122	3.465	4.016	3.898	0.441 (lbs)	**501060**
ⓘ	1.968 - 2.677	1.811	2.402	2.953	2.835	0.441 (lbs)	**501053**
ⓘ	1.968 - 2.677	1.811	4.173	7.724	4.606	0.661 (lbs)	**501061**
ⓜ	32.00 - 50.00	28.50	52.00	66.00	63.00	0.10 (kg)	**501052**
ⓜ	32.00 - 50.00	28.50	88.00	102.00	99.00	0.20 (kg)	**501060**
ⓜ	50.00 - 68.00	46.00	61.00	75.00	72.00	0.20 (kg)	**501053**
ⓜ	50.00 - 68.00	46.00	106.00	120.00	117.00	0.30 (kg)	**501061**

Form 101



Form 20

Insert Holders

	Serrated Tool Body	Boring Range	Insert Holder		Weight	Insert Form	Part No.
		A	*X_1*	*F*			
ⓘ	**501052 / 501060**	1.260 - 1.614	0.551	0.809	0.066 (lbs)	20*	**502060**
ⓘ		1.614 - 1.968	0.551	0.889	0.088 (lbs)	20*	**502061**
ⓘ		1.260 - 1.614	0.551	0.809	0.066 (lbs)	101*	**502058**
ⓘ		1.614 - 1.968	0.551	0.886	0.088 (lbs)	101*	**502059**
ⓘ		1.968 - 2.323	0.551	0.809	0.066 (lbs)	20*	**502060**
ⓘ		2.323 - 2.677	0.551	0.886	0.088 (lbs)	20*	**502061**
ⓘ		1.968 - 2.323	0.551	0.809	0.066 (lbs)	101*	**502058**
ⓘ		2.323 - 2.677	0.551	0.886	0.088 (lbs)	101*	**502059**
ⓜ	**501053 / 501061**	32.00 - 41.00	14.00	18.00	0.03 (kg)	20*	**502060**
ⓜ		41.00 - 50.00	14.00	22.50	0.04 (kg)	20*	**502061**
ⓜ		32.00 - 41.00	14.00	18.00	0.03 (kg)	101*	**502058**
ⓜ		41.00 - 50.00	14.00	22.50	0.04 (kg)	101*	**502059**
ⓜ		50.00 - 59.00	14.00	18.00	0.03 (kg)	20*	**502060**
ⓜ		59.00 - 68.00	14.00	22.50	0.04 (kg)	20*	**502061**
ⓜ		50.00 - 59.00	14.00	18.00	0.03 (kg)	101*	**502058**
ⓜ		59.00 - 68.00	14.00	22.50	0.04 (kg)	101*	**502059**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

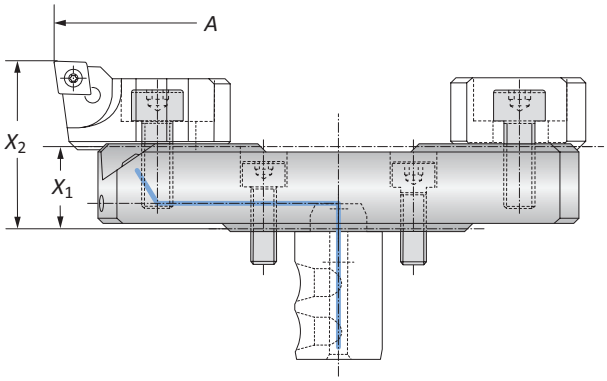
B10-N: 10-13 | B10-A: 69 | B10-F | B10: xii-xiii

Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Alu-Line Serrated Slides | Insert Holders

Diameter Range: 2.667" - 8.189" (68.00mm - 208.00mm)



Alu-Line Serrated Slides

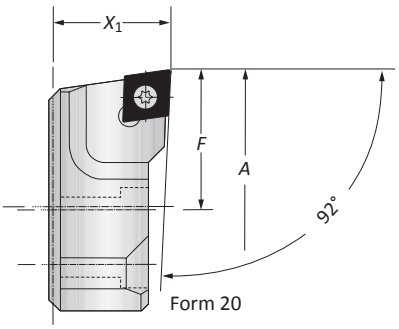
	Boring Range A	Serrated Slide X_1	Serrated Slide X_2	Weight	Part No.
i	2.667 - 3.780	0.630	1.280	0.220 (lbs)	**501054**
	3.780 - 4.881	0.630	1.280	0.220 (lbs)	**501055**
	4.881 - 5.984	0.630	1.280	0.441 (lbs)	**501056**
	5.984 - 7.088	0.866	1.516	0.551 (lbs)	**501058**
	7.088 - 8.189	0.866	1.516	0.661 (lbs)	**501059**
m	68.00 - 96.00	16.00	32.50	0.10 (kg)	**501054**
	96.00 - 124.00	16.00	32.50	0.10 (kg)	**501055**
	124.00 - 152.00	16.00	32.50	0.20 (kg)	**501056**
	152.00 - 180.00	22.00	38.50	0.25 (kg)	**501058**
	180.00 - 208.00	22.00	38.50	0.30 (kg)	**501059**

Insert Holders

	Boring Range	Weight	Insert Form	Part No.
i	2.677 - 8.189	0.110 (lbs)	101	**502064**
	2.677 - 8.189	0.110 (lbs)	20	**502069**
m	68.00 - 208.00	0.05 (kg)	101	**502064**
	68.00 - 208.00	0.05 (kg)	20	**502069**

NOTE: Other insert holders available upon request

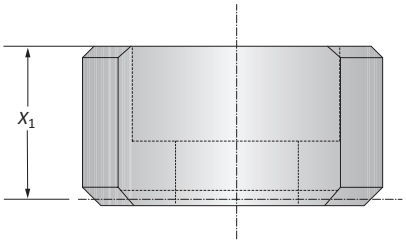
Form 101



Form 20

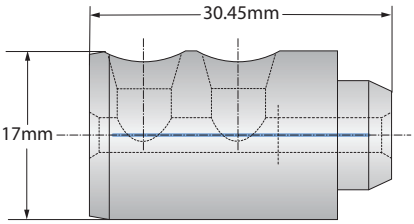
Counter Weights

	Counter Weight X_1	Weight	Part No.
i	0.528	0.110 (lbs)	**502165**
m	13.40	0.05 (kg)	**502165**



Coolant Delivery Systems

	Coolant Delivery System Weight	Part No.
i	0.044 (lbs)	**501157**
m	0.02 (kg)	**501157**



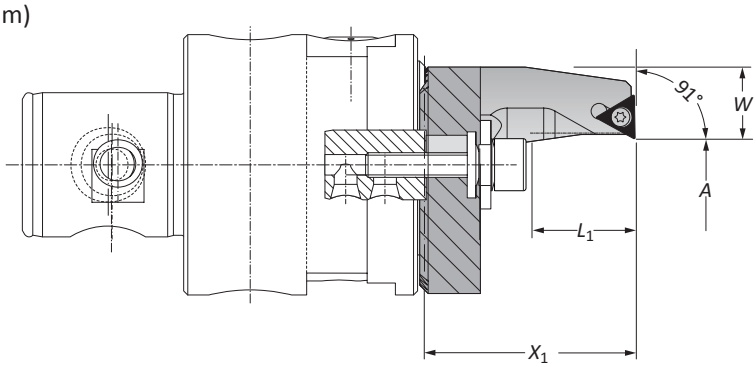
B10-N: 10-13 | B10-A: 69 | B10-F | B10: xii-xiii

Key on B10-A: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Outside Turning Insert Holders for Boring Heads

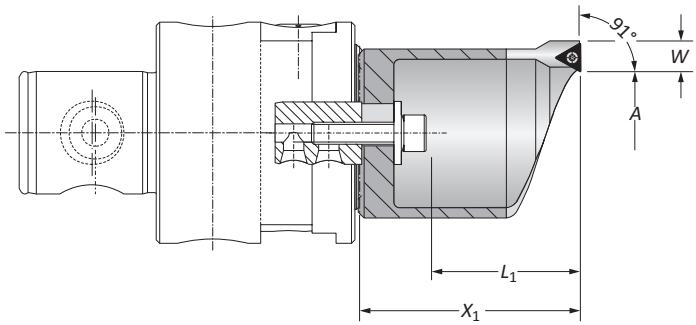
Diameter Range: 0.157" - 2.598" (4.00mm - 66.00mm)



Type A Insert Holders | Diameter Range: 0.157" - 1.181" (4.00mm - 30.00mm)

	Boring Range	Insert Holder						
	A	X_1	L_1	*W*	Weight	Type	Insert Form	Part No.
ⓘ	0.157 - 0.689	1.594	0.787	0.653	0.220 (lbs)	A	20*	**236081**
	0.650 - 1.181	1.988	1.181	0.437	0.220 (lbs)	A	20*	**236082**
ⓜ	4.00 - 17.50	40.50	20.00	16.60	0.10 (kg)	A	20*	**236081**
	16.50 - 30.00	50.50	30.00	11.10	0.10 (kg)	A	20*	**236082**

NOTE: Clockwise and neutral execution
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)



Type B Insert Holders | Diameter Range: 1.142" - 2.598" (29.00mm - 66.00mm)

	Boring Range	Insert Holder						
	A	X_1	L_1	*W*	Weight	Type	Insert Form	Part No.
ⓘ	1.142 - 1.732	4.921	2.126	0.377	0.661 (lbs)	B	20*	**236083**
	1.693 - 2.598	5.905	3.110	0.377	0.882 (lbs)	B	20*	**236084**
ⓜ	29.00 - 44.00	63.50	54.00	9.60	0.30 (kg)	B	20*	**236083**
	43.00 - 66.00	85.50	79.00	9.60	0.40 (kg)	B	20*	**236084**

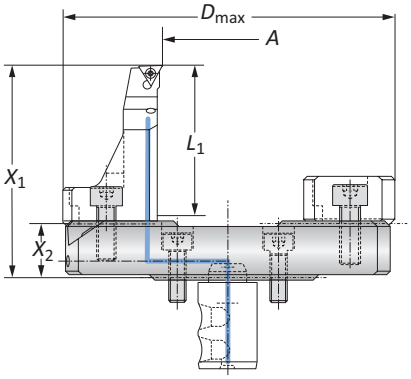
NOTE: Clockwise and neutral execution
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

B10-N: 10-13 | B10-A: 69 | B10-F | B10: xii-xiii
Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Outside Turning Serrated Slides | Insert Holders

Diameter Range: 0.078" - 4.488" (2.00mm - 114.00mm)



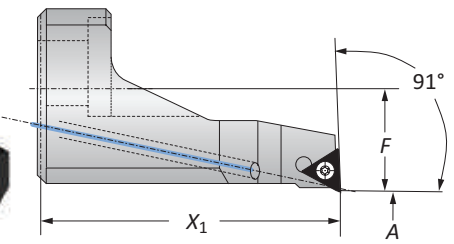
Outside Turning Serrated Slides

	Boring Range A	Serrated Slide X_1	X_2	L_1	D_{max}	Weight	Part No.
i	0.078 - 1.181	2.874	0.630	2.874	3.396	0.220 (lbs)	**501064**
i	1.181 - 2.283	2.874	0.630	2.874	5.078	0.220 (lbs)	**501065**
i	2.283 - 3.385	3.110	0.866	2.874	6.181	0.441 (lbs)	**501066**
i	3.385 - 4.488	3.110	0.866	3.110	7.283	0.551 (lbs)	**501067**
m	2.00 - 30.00	73.00	16.00	73.00	101.00	74.00 (kg)	**501064**
m	30.00 - 58.00	73.00	16.00	73.00	129.00	102.00 (kg)	**501065**
m	58.00 - 86.00	79.00	22.00	73.00	157.00	129.00 (kg)	**501066**
m	86.00 - 114.00	79.00	22.00	79.00	185.00	157.00 (kg)	**501067**

Outside Turning Insert Holders

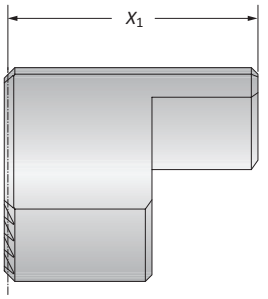
	Outside Turning Range A	Insert Holder X_1	F	Weight	Insert Form	Part No.
i	0.079 - 4.488	2.244	0.776	0.331 (lbs)	20	**502082**
m	2.00 - 114.00	57.00	19.70	0.15 (kg)	20	**502082**

NOTE: Clockwise and neutral execution



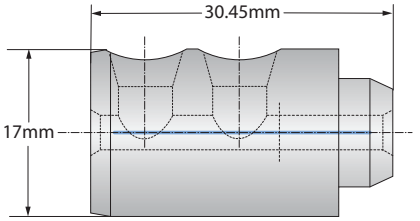
Counter Weights

	Counter Weight X_1	Weight	Part No.
i	1.486	0.352 (lbs)	**502183**
m	37.75	0.16 (kg)	**502183**

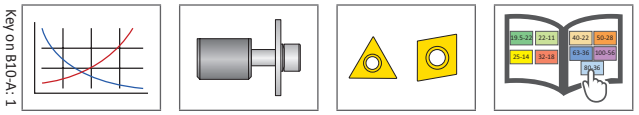


Coolant Delivery Systems

	Weight	Part No.
i	0.044 (lbs)	**501157**
m	0.02 (kg)	**501157**



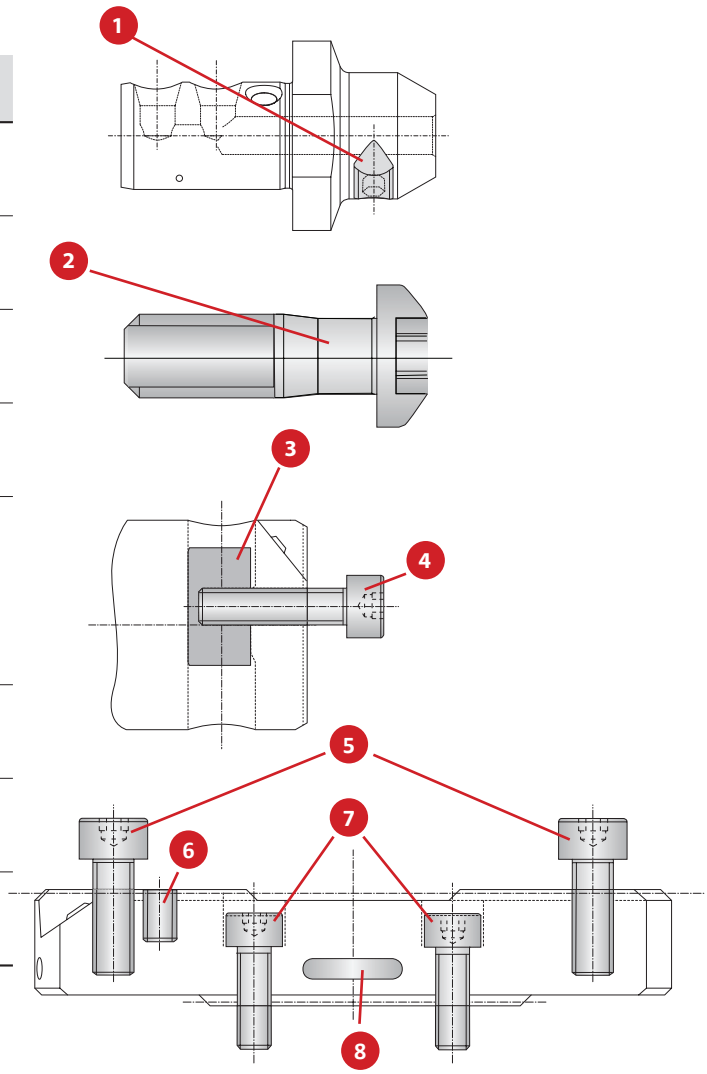
B10-N: 10-13 | B10-A: 69 | B10-F | B10: xii-xiii

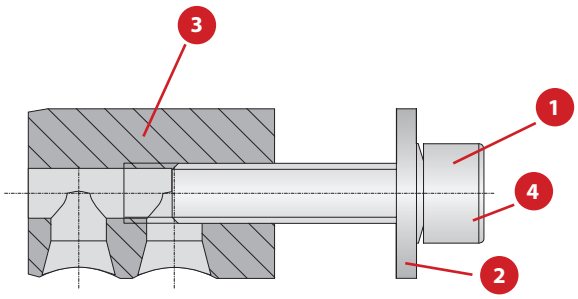


i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Accessories

No.	Part	Size	Part No.
1	Set screw	s3	**415244**
2	Screw for securing insert holder	T25	**415112**
3	Clamping piece	–	**145184**
4	Cap screw for securing insert holders	s4	**027154**
5	Cap screw for securing insert holder/counter weight	s4	**315248**
6	Set screw - coolant	s1.5	**114224**
7	Cap screw for securing serrated slide	s4	**115166**
8	Sealing ring for coolant delivery	–	**415386**



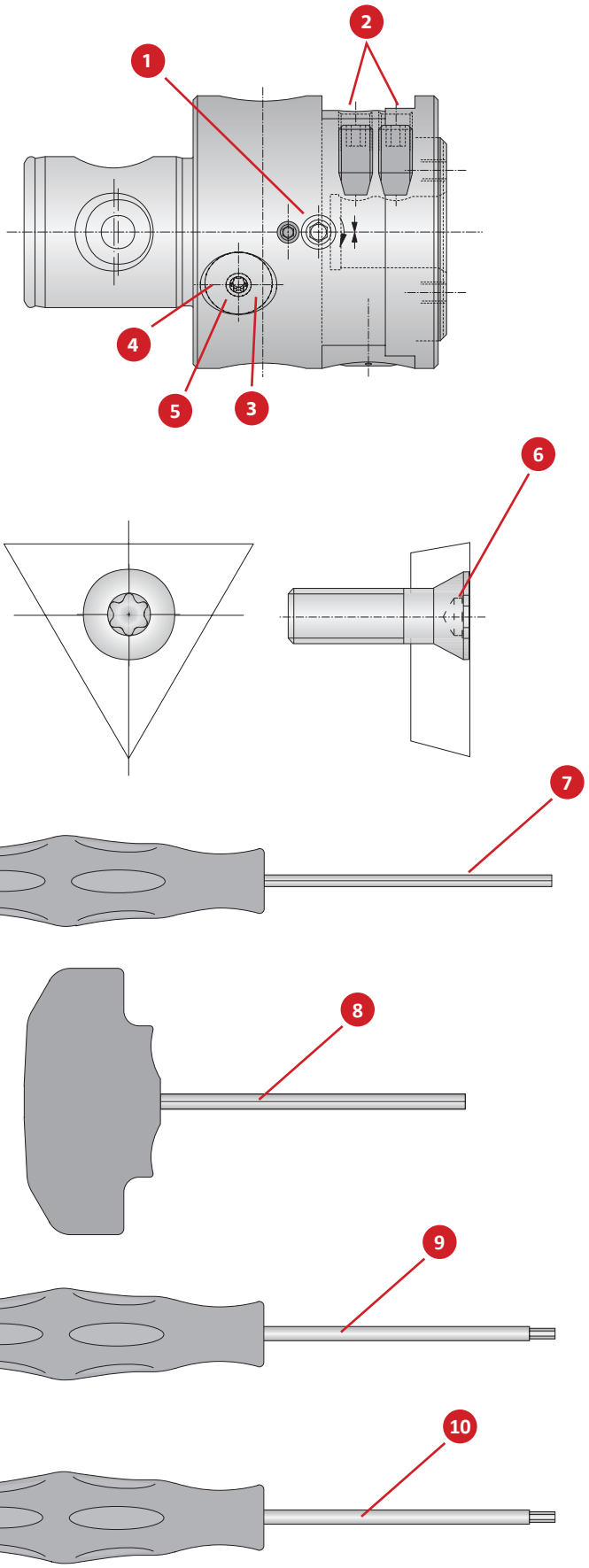


	Boring Range	Type	Hex Size	Clamping Screw Parts 1 Cap Screw	2 Washer	3 Clamping Piece	4 Locking Washer	Complete Part No.
i	0.157 - 1.181	A	s5	070153	315155	502180	215254	**502080**
	1.142 - 2.598	B	s5	070153	315156	502180	215254	**502081**
m	4.00 - 30.00	A	s5	070153	315155	502180	215254	**502080**
	29.00 - 66.00	B	s5	070153	315156	502180	215254	**502081**

Accessories

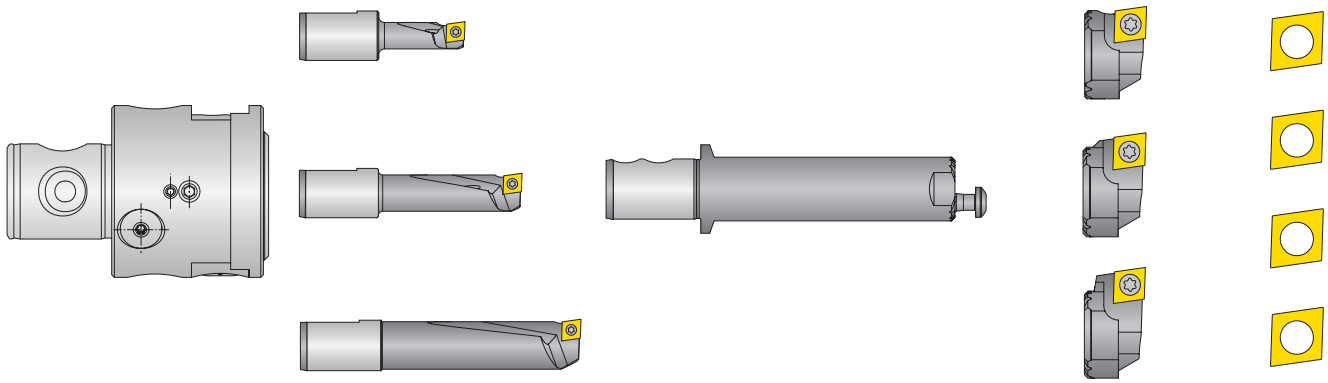
No.	Part	Insert Form	Size	Part No.
1	Clamping screw	–	–	**415353**
2	Set screw for clamping tool	–	–	**215674**
3	Battery cover	–	–	**415895**
4	Battery*	–	–	**415896**
5	Battery access cover with sealing ring	–	–	**501016**
6	Insert screws	Form 211 Form 20 Form 101	T6 T7 T8	**215377** **115535** **115676**
7	Hex driver	–	s1.5 s3	**215472** **115630**
8	Hex driver	–	s4	**115576**
9	Torx driver	–	T6 T7 T8 T20	**115537** **115591** **115590** **215150**
10	Torx driver	Form 211 Form 20 Form 101	T6 T7 T8	**415507** **415508** **415514**

*Always change two batteries
NOTE: Please use VARTA batteries



Kit Components

Insert Form 101 | Diameter Range: 0.393" - 1.259" (10.00mm - 32.00mm)



	Boring Range	Kit Components						Kit No.
		Boring Head	Boring Bars	Serrated Tool Body	Insert Holders	Inserts (x4)	Service Keys	
ⓘ	0.393 - 1.259	504001	502012 502014 502016	502045	502052 502054 502056	297531WHC19	115576 (s4) 415121 (T25) 115590 (T8)	**104061**
ⓜ	10.00 - 32.00	501001	218012 081014 081016	502045	502052 502054 502056	297531WHC19	115576 (s4) 415121 (T25) 115590 (T8)	**103061**

NOTE: Inserts are included in DigiBore kits

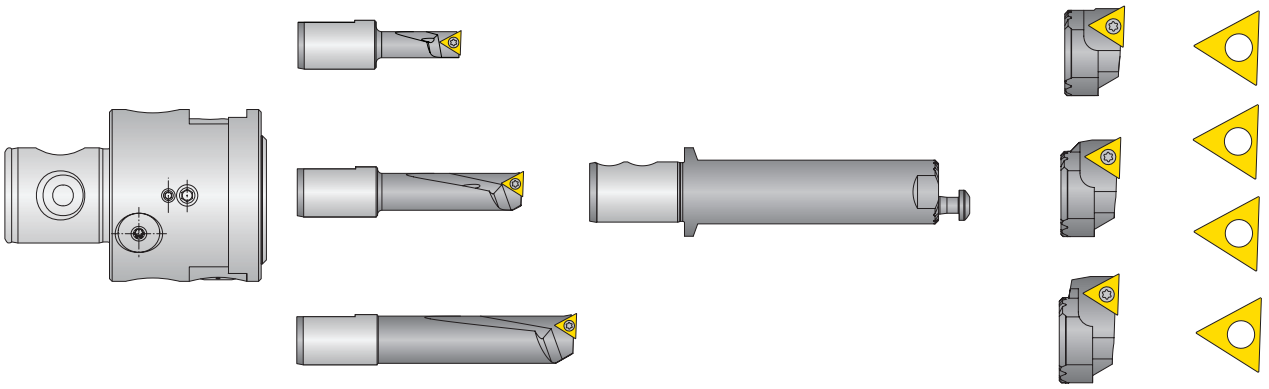
B10-N: 10-13
B10: xii-xiii
Key on B10-A: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

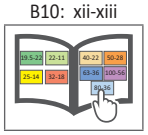
Insert Form 20 | Diameter Range: 0.393" - 1.259" (10.00mm - 32.00mm)



	Boring Range	Kit Components: Boring Head	Boring Bars	Serrated Tool Body	Insert Holders	Inserts (x4)	Service Keys	Kit No.
ⓘ	0.393 - 1.259	504001	502001 502003 502005	502045	502046 502048 502050	397673WHC19	115576 (s4) 415121 (T25) 115591 (T7)	**104062**
ⓜ	10.00 - 32.00	501001	502001 502003 502005	502045	502046 502048 502050	397673WHC19	115576 (s4) 415121 (T25) 115591 (T7)	**103062**

NOTE: Inserts are included in DigiBore kits

B10-N: 10-13
Key on B10-A: 1



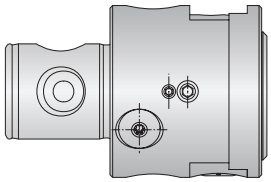
B10: xii-xiii

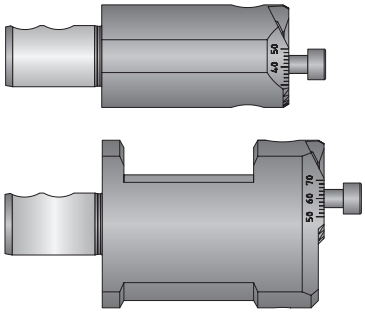
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

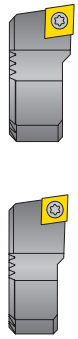
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

Insert Form 101 | Diameter Range: 1.259" - 2.677" (32.00mm - 68.00mm)





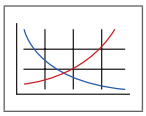


	Boring Range	Kit Components: Boring Head	Serrated Tool Body	Insert Holders	Inserts (x4)	Service Keys	Kit No.
i	1.259 - 2.667	504001	502052 502053	502058 502059	297531WHC19	115576 (s4) 115590 (T8)	**104063**
m	32.00 - 68.00	501001	502052 502053	502058 502059	297531WHC19	115576 (s4) 115590 (T8)	**103063**

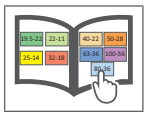
NOTE: Inserts are included in DigiBore kits

B10-N: 10-13

Key on B10-A: 1



B10: xii-xiii

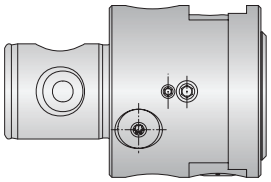


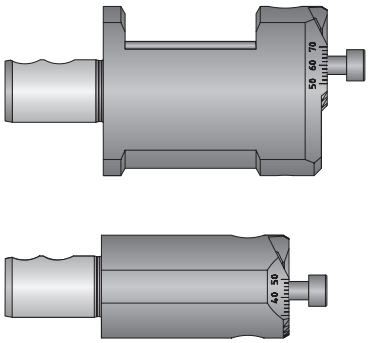
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

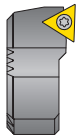
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

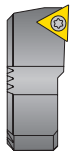
Kit Components

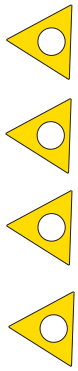
Insert Form 20 | Diameter Range: 1.259" - 2.677" (32.00mm - 68.00mm)







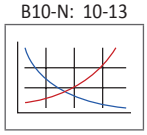




	Boring Range	Kit Components: Boring Head	Serrated Tool Body	Insert Holders	Inserts (x4)	Service Keys	Kit No.
ⓘ	1.259 - 2.667	504001	502052 502053	502060 502061	397673WHC19	115576 (s4) 115591 (T7)	**104064**
ⓜ	32.00 - 68.00	501001	502052 502053	502060 502061	397673WHC19	115576 (s4) 115591 (T7)	**103064**

NOTE: Inserts are included in DigiBore kits

B10-N: 10-13



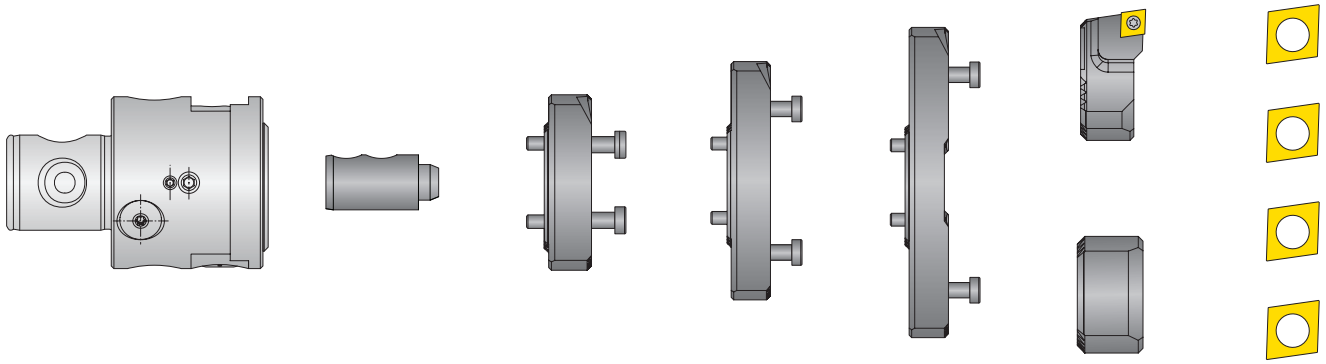
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

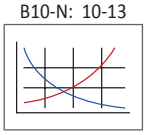
Insert Form 101 | Diameter Range: 2.667" - 5.984" (68.00mm - 152.00mm)



	Boring Range	Kit Components: Boring Head	Serrated Slides	Insert Holder	Inserts (x4)	Counter Weight	Coolant Delivery	Service Keys	Kit No.
ⓘ	2.667 - 5.984	504001	501054 501055 501056	502064	297531WHC19	502165	501157	115576 (s4) 115590 (T8)	**104065**
ⓜ	68.00 - 152.00	501001	501054 501055 501056	502064	297531WHC19	502165	501157	115576 (s4) 115590 (T8)	**103065**

NOTE: Inserts are included in DigiBore kits

B10-N: 10-13



Key on B10-A:1

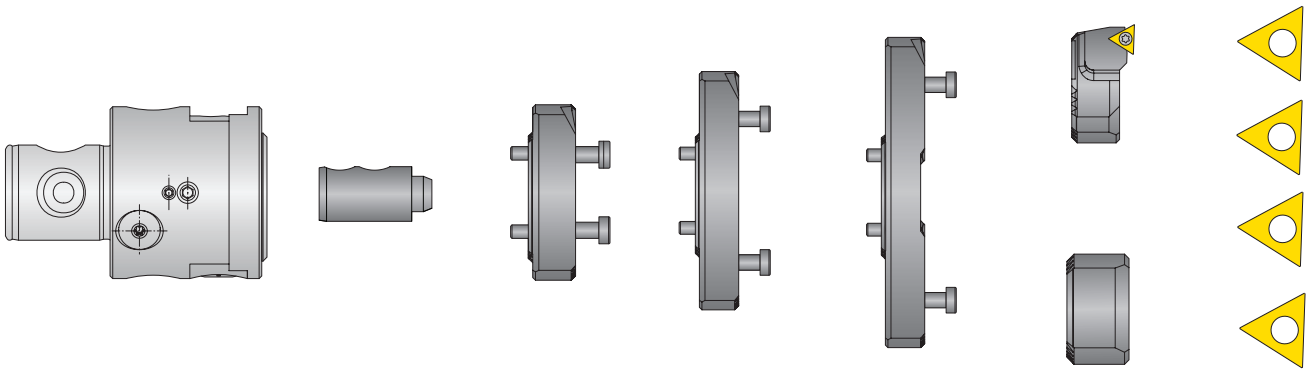
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

Insert Form 20 | Diameter Range: 2.667" - 5.984" (68.00mm - 152.00mm)

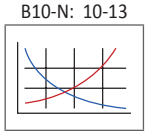


	Boring Range	Kit Components							
		Boring Head	Serrated Slides	Insert Holder	Inserts (x4)	Counter Weight	Coolant Delivery	Service Keys	Kit No.
ⓘ	2.667 - 5.984	504001	501054 501055 501056	502069	397673WHC19	502165	501157	115576 (s4) 115591 (T7)	**104066**
ⓜ	68.00 - 152.00	501001	501054 501055 501056	502060	397673WHC19	502165	501157	115576 (s4) 115591 (T7)	**103066**

NOTE: Inserts are included in DigiBore kits

B10-N: 10-13

Key on B10-A: 1



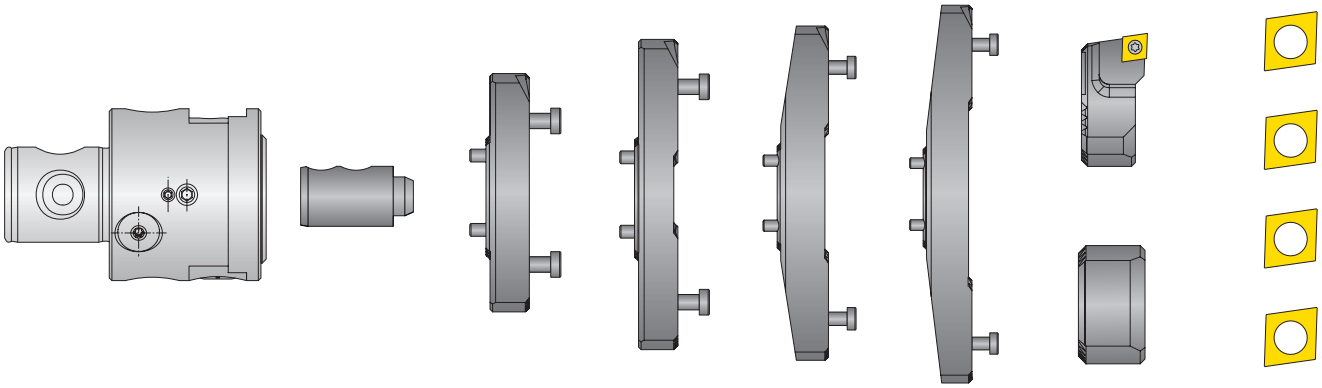
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

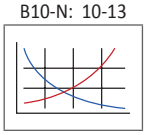
Insert Form 101 | Diameter Range: 3.779" - 8.188" (96.00mm - 208.00mm)



	Boring Range	Kit Components							
		Boring Head	Serrated Slides	Insert Holder	Inserts (x4)	Counter Weight	Coolant Delivery	Service Keys	Kit No.
ⓘ	3.779 - 8.188	504001	501055 501056 501058 501059	502064	297531WHC19	502165	501157	115576 (s4) 115590 (T8)	**104081**
ⓜ	96.00 - 208.00	501001	501055 501056 501058 501059	502064	297531WHC19	502165	501157	115576 (s4) 115590 (T8)	**103081**

NOTE: Inserts are included in DigiBore kits

B10-N: 10-13



Key on B10-A: 1

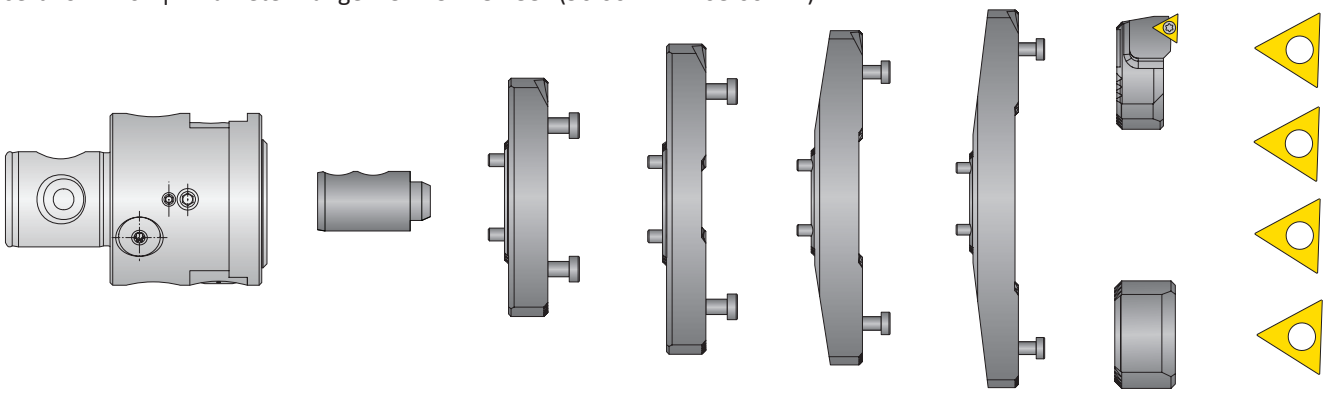
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Kit Components

Insert Form 20 | Diameter Range: 3.779" - 8.188" (96.00mm - 208.00mm)

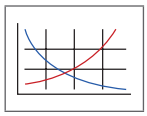


	Boring Range	Kit Components: Boring Head	Serrated Slides	Insert Holder	Inserts (x4)	Counter Weight	Coolant Delivery	Service Keys	Kit No.
ⓘ	3.779 - 8.188	504001	501055 501056 501058 501059	502069	397673WHC19	502165	501157	115576 (s4) 115591 (T7)	**104080**
ⓜ	96.00 - 208.00	501001	501055 501056 501058 501059	502060	397673WHC19	502165	501157	115576 (s4) 115591 (T7)	**103080**

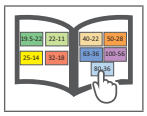
NOTE: Inserts are included in DigiBore kits

B10-N: 10-13

Key on B10-A: 1



B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Notes

SECTION

B10-B

Fine Boring

Wohlhaupter™ Fine Boring

320 (310) | 365 (364) | 565 (564) | 338 (337) | 538 (537)

- **Diameter Range:** 0.787"- 8.070" (20.00mm - 205.00mm)

Boring has never been more exciting.

Wohlhaupter's fine boring systems are offered in both vernier and easy-to-read digital readout boring heads and cassettes. The lightweight Alu-Line serrated tool bodies reduce weight on the machine spindle.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

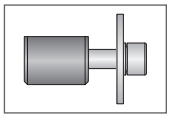
NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

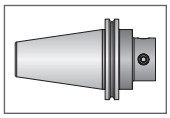
Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries

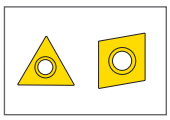
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



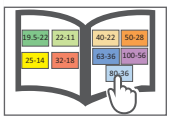
Clamping Elements
For use with insert holders and boring heads



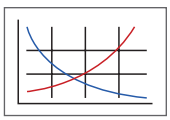
Shanks
A variety of shanks for different machines



Inserts
For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Series	Diameter Range	
	Imperial (inch)	Metric (mm)
320 (310)	0.787 - 8.070	20.00 - 205.00
365 (364)	0.787 - 8.070	20.00 - 205.00
565 (564)	1.968 - 8.070	50.00 - 205.00
338 (337)	3.937 - 8.070	100.00 - 205.00
538 (537)	3.937 - 8.070	100.00 - 205.00

Fine Boring Tools Table of Contents

320 (310)
Product Overview . . . . . 2 - 3
Boring Heads . . . . . 4 - 5
Insert Holders 6
Accessories 7

Balance 365 (364)
Product Overview . . . . . 8 - 9
Boring Heads . . . . . 10 - 11
Insert Holders 12
Accessories 13

Digital Balance 565 (564)
Product Overview . . . . . 14 - 15
Boring Heads . . . . . 16 - 17
Insert Holders 18
Accessories 19

338 (337)
Product Overview . . . . . 20 - 21
Cassette and Serrated Tool Bodies 22
Insert Holders 23
Accessories 24

Digital 538 (537)
Product Overview . . . . . 26 - 27
Cassette and Serrated Tool Bodies 28
Insert Holders 29
Accessories 30

320 (310) Product Overview

320 (310)
FINE BORING

Engineered with wear and tear in mind.

Wohlhaupter's 320 (310) boring head is made from steel for Ø 0.787" - 4.077" (20.00mm - 103.00mm), and coated Alu-Line material for Ø 3.937" - 8.070" (100.00mm - 205.00mm) boring heads to protect against corrosion and wear. The insert holder can be rotated quickly for reverse machining.

- Diameter range: 0.787" - 4.055" (20.00mm - 103.00mm)
  Alu-Line: 3.937" - 8.070" (100.00mm - 205.00mm)
- Special coating on Alu-Line provides hard, durable surface
- Alu-Line body reduces tool weight by 50%, reducing stress on the spindle
- Coolant through
- Vernier diameter adjustment of 0.0001" (0.002mm)
- Max spindle speed: 3,281 SFM (1,000 m/min)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

WOHLHAUPTER™ 320 BORING HEAD
*with NOVI*TECH™

Time is money, so make it count.

If you want to improve your machining processes, cycle time is a key factor to examine. After all, the longer it takes you to produce a part, the fewer parts you can produce in a given time. Our customer was experiencing lengthy cycle times while machining pumps from gray cast iron. The parts required 3 bored holes, each with a 12" depth and a 22" reach.

In order to free up machine time, the customer questioned if their process could be more efficient. The main objectives were to decrease the current cycle time and to maintain a160 Ra finish, which was required to perform the burnishing process that followed.

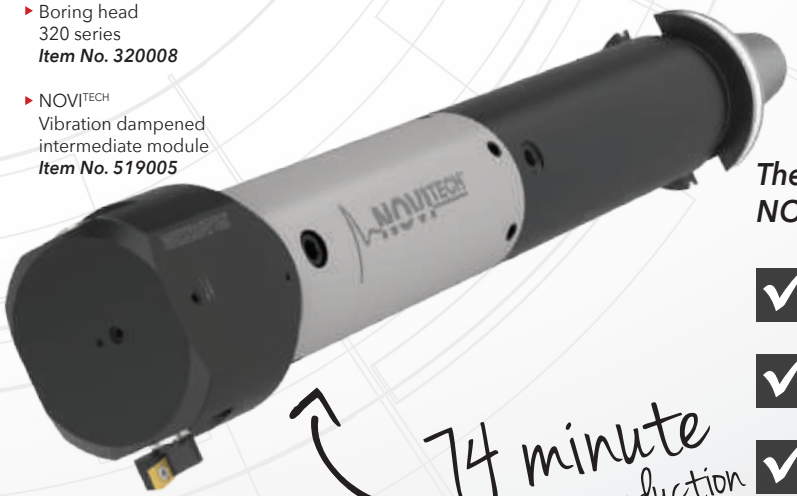
The previous tooling ran at a slow 0.47 IPM and a paint-drying 84-minute cycle time to bore the three holes on each part. With our **Wohlhaupter 320 Boring Head** utilizing the **NOVI**TECH™ **Vibration Dampened Module**, the customer increased to a more efficient 3.75 IPM and slashed the cycle time to 10.5 minutes (*an 87% decrease*). Along with the increased speed, the Wohlhaupter tooling also achieved a 155 Ra finish, accomplishing everything the customer needed.

The Wohlhaupter solution reduced the process cycle time by 74 minutes. Improvements in speed and cycle time can free up machine hours, which means more throughput and higher profit for your company. ***Are you losing money on applications with substantially long cycle times?***

Product:	Wohlhaupter™ 320 Boring Head with NOVITECH™
Objectives:	(1) Decrease cycle time (2) Maintain 160 Ra hole finish
Industry:	Oil & gas/petrochemical
Part:	Pump
Material:	Gray cast iron
Hole Ø:	5.500"
Hole Depth:	12.000"

Measure	Competitor Boring Head	320 Boring Head w/ NOVITECH
RPM	39	469
Speed Rate	56 SFM	675 SFM
Feed Rate	0.012 IPR	0.008 IPR
Penetration Rate	0.47 IPM	3.75 IPM
Cycle Time (per hole)	27 min 54 sec	3 min 32 sec
Hole Finish	160 Ra	155 Ra

- Boring head 320 series ***Item No. 320008***
- NOVITECH Vibration dampened intermediate module ***Item No. 519005***



© Allied Machine & Engineering CS4001

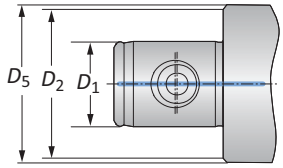
The Wohlhaupter 320 boring head with the NOVITECH™ vibration dampened module provided:

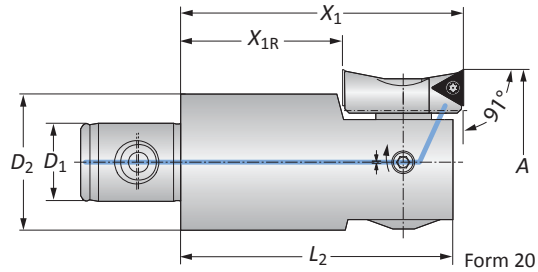
- ✓ **Increased penetration rate**
- ✓ **Decreased cycle time**
- ✓ **Excellent finish in deep hole application**

Boring Heads

Diameter Range: 0.787" - 4.055" (20.00mm - 103.00mm)

Form 101





Form 20

320 Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{1R}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	19 - 11	0.787 - 0.965	1.810	–	1.693	0.748	0.221 (lbs)	20	**364077***	**320010**
	22 - 11	0.965 - 1.161	1.810	–	1.713	0.906	0.331 (lbs)	20	**210059**	**320020**
	22 - 11	0.965 - 1.161	1.810	–	1.713	0.906	0.331 (lbs)	101	**210069**	**320020**
	25 - 14	1.142 - 1.457	2.200	–	2.106	1.024	0.441 (lbs)	20	**210059**	**320001**
	25 - 14	1.142 - 1.457	2.200	–	2.106	1.024	0.441 (lbs)	101	**210069**	**320001**
	25 - 14	1.141 - 1.732	2.200	1.100	2.106	1.024	0.441 (lbs)	20	**210052**	**320001**
	25 - 14	1.141 - 1.732	2.200	1.100	2.106	1.024	0.441 (lbs)	101	**210062**	**320001**
	32 - 18	1.693 - 2.126	2.590	1.490	2.500	–	0.882 (lbs)	20	**210052**	**320003**
ⓘ	32 - 18	1.693 - 2.126	2.590	1.490	2.500	–	0.882 (lbs)	101	**210062**	**320003**
	40 - 22	2.087 - 2.598	2.950	1.530	2.854	–	1.543 (lbs)	20	**210020**	**320004**
	40 - 22	2.087 - 2.598	2.950	1.530	2.854	–	1.543 (lbs)	101	**210063**	**320004**
	40 - 22	2.087 - 2.598	2.950	1.530	2.854	–	1.543 (lbs)	103	**210064**	**320004**
	50 - 28	2.559 - 3.267	2.950	1.530	2.854	–	2.646 (lbs)	20	**210020**	**320005**
	50 - 28	2.559 - 3.267	2.950	1.530	2.854	–	2.646 (lbs)	101	**210063**	**320005**
	50 - 28	2.559 - 3.267	2.950	1.530	2.854	–	2.646 (lbs)	103	**210064**	**320005**
	63 - 36	3.228 - 4.055	3.540	2.120	3.445	–	4.850 (lbs)	20	**210020**	**320006**
	63 - 36	3.228 - 4.055	3.540	2.120	3.445	–	4.850 (lbs)	101	**210063**	**320006**
	63 - 36	3.228 - 4.055	3.540	2.120	3.445	–	4.850 (lbs)	103	**210064**	**320006**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

NOTE: X_{1R} = rotated inset holder for reverse machining

NOTE: Insert holders and inserts sold separately

310 Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{IR}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	19 - 11	20.00 - 24.50	46.00	–	43.00	19.00	0.10 (kg)	20	**364077***	**310010**
	22 - 11	24.50 - 29.50	46.00	–	43.50	23.00	0.15 (kg)	20	**210059**	**310020**
	22 - 11	24.50 - 29.50	46.00	–	43.50	23.00	0.15 (kg)	101	**210069**	**310020**
	25 - 14	29.00 - 37.00	56.00	–	53.50	26.00	0.20 (kg)	20	**210059**	**310001**
	25 - 14	29.00 - 37.00	56.00	–	53.50	26.00	0.20 (kg)	101	**210069**	**310001**
	25 - 14	36.00 - 44.00	56.00	28.00	53.50	26.00	0.20 (kg)	20	**210052**	**310001**
	25 - 14	36.00 - 44.00	56.00	28.00	53.50	26.00	0.20 (kg)	101	**210062**	**310001**
	32 - 18	43.00 - 54.00	66.00	38.00	63.50	–	0.40 (kg)	20	**210052**	**310003**
ⓜ	32 - 18	43.00 - 54.00	66.00	38.00	63.50	–	0.40 (kg)	101	**210062**	**310003**
	40 - 22	53.00 - 65.90	75.00	39.00	72.50	–	0.70 (kg)	20	**210020**	**310004**
	40 - 22	53.00 - 65.90	75.00	39.00	72.50	–	0.70 (kg)	101	**210063**	**310004**
	40 - 22	53.00 - 65.90	75.00	39.00	72.50	–	0.70 (kg)	103	**210064**	**310004**
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	–	1.20 (kg)	20	**210020**	**310005**
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	–	1.20 (kg)	101	**210063**	**310005**
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	–	1.20 (kg)	103	**210064**	**310005**
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	–	2.20 (kg)	20	**210020**	**310006**
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	–	2.20 (kg)	101	**210063**	**310006**
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	–	2.20 (kg)	103	**210064**	**310006**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)

NOTE: X_{1R} = rotated inset holder for reverse machining

NOTE: Insert holders and inserts sold separately

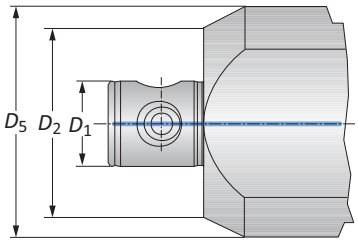
ⓘ = Imperial (in)
ⓜ = Metric (mm)

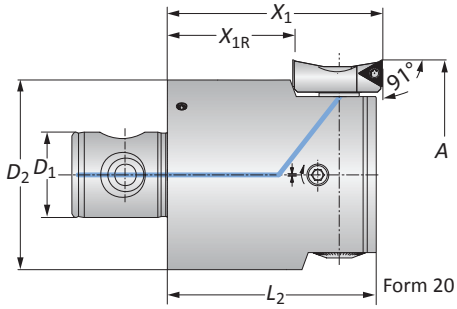
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Boring Heads

Alu-Line | Diameter Range: 3.937" - 8.070" (100.00mm - 205.00mm)

Form 101





Form 20

Alu-Line 320 Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{IR}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	3.150	3.086 (lbs)	20	**210020**	**320007**
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	3.150	3.086 (lbs)	101	**210063**	**320007**
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	3.150	3.086 (lbs)	103	**210064**	**320007**
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.150	3.968 (lbs)	20	**210020**	**320008**
ⓘ	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.150	3.968 (lbs)	101	**210063**	**320008**
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	3.968 (lbs)	103	**210064**	**320008**
	80 - 36	6.397 - 8.070	3.543	2.126	3.445	3.937	5.291 (lbs)	20	**210020**	**320009**
	80 - 36	6.397 - 8.070	3.543	2.126	3.445	3.937	5.291 (lbs)	101	**210063**	**320009**
	80 - 36	6.397 - 8.070	3.543	2.126	3.445	3.937	5.291 (lbs)	103	**210064**	**320009**

NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

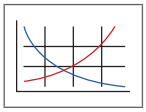
Alu-Line 310 Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{IR}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	80.00	1.40 (kg)	20	**210020**	**310007**
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	80.00	1.40 (kg)	101	**210063**	**310007**
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	80.00	1.40 (kg)	103	**210064**	**310007**
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.80 (kg)	20	**210020**	**310008**
ⓜ	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.80 (kg)	101	**210063**	**310008**
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.80 (kg)	103	**210064**	**310008**
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.40 (kg)	20	**210020**	**310009**
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.40 (kg)	101	**210063**	**310009**
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.40 (kg)	103	**210064**	**310009**

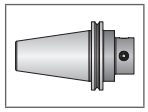
NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

B10:-N: 10-13

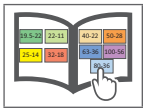
Key on B10-B: 1



B10-H



B10: xii-xiii

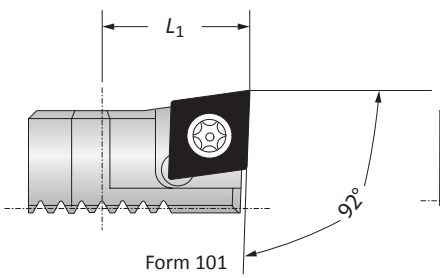


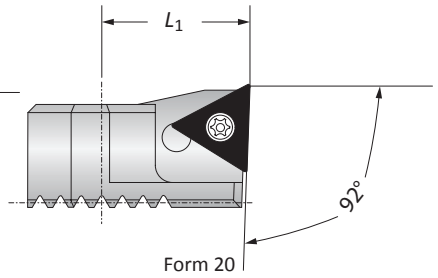
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Abrasive Materials | Serrated Shims

Diameter Range: 2.559" - 8.070" (65.00mm - 205.00mm)

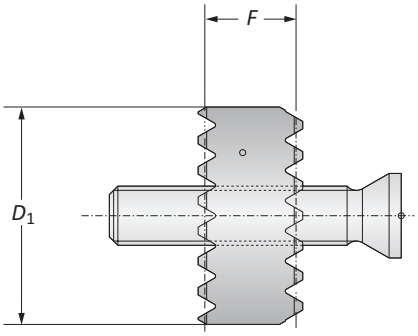




Insert Holders

	Boring Range	Insert Holder L_1	Weight	Insert Form	Part No.
i	2.559 - 8.070	0.709	0.066 (lbs)	20	**211061**
i	2.559 - 8.070	0.709	0.066 (lbs)	101	**211063**
i	2.559 - 8.070	0.709	0.066 (lbs)	103	**211065**
m	65.00 - 205.00	18.00	0.03 (kg)	20	**211061**
m	65.00 - 205.00	18.00	0.03 (kg)	101	**211063**
m	65.00 - 205.00	18.00	0.03 (kg)	103	**211065**

NOTE: 320 (310) insert holders are used for abrasive materials to protect boring head against chip wash

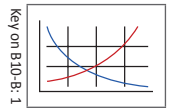


Serrated Shims

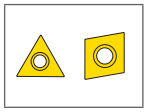
	Boring Range	Serrated Shim F	Serrated Shim D_1	Weight	Part No. Serrated Shim	Part No. Set Screw
i	1.141 - 2.125	0.157	0.472	0.022 (lbs)	**310070**	**415360**
i	1.141 - 2.125	0.236	0.472	0.022 (lbs)	**310071**	**415342**
i	2.086 - 8.070	0.196	0.708	0.022 (lbs)	**310074**	**515595**
i	2.086 - 8.070	0.295	0.708	0.022 (lbs)	**310075**	**515596**
m	29.00 - 54.00	4.00	12.00	0.01 (kg)	**310070**	**415360**
m	29.00 - 54.00	6.00	12.00	0.01 (kg)	**310071**	**415342**
m	53.00 - 205.00	5.00	18.00	0.01 (kg)	**310074**	**515595**
m	53.00 - 205.00	7.50	18.00	0.01 (kg)	**310075**	**515596**

NOTE: Serrated shim must be used with required screw

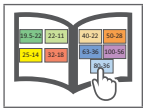
B10:-N: 10-13
Key on B10-B: 1



B10-F



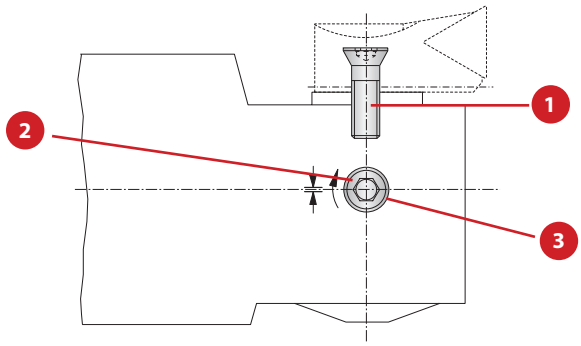
B10: xii-xiii



i = Imperial (in)
m = Metric (mm)
Inserts sold separately

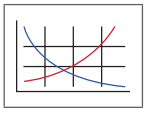
Accessories

Screws



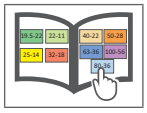
Boring Head	1 Countersunk Screw		2 Clamping Screw		3 Ball
	Part No.	Service Key	Part No.	Service Key	Part No.
310010	**215323**	T15 / H	**364260**	s2.0 / A	**364270**
310020	**215338**	T15 / H	**364138**	s2.5 / A	**364139**
310001	**215338**	T15 / H	**115136**	s2.5 / A	–
310003	**215338**	T15 / H	**115180**	s2.5 / A	–
310004	**214462**	T20 / H	**115249**	s4 / B	–
310005	**215462**	T20 / H	**115185**	s4 / B	–
310006	**215462**	T20 / H	**315279**	s4 / B	–
310007	**215462**	T20 / H	**115186**	s4 / B	–
310008	**215462**	T20 / H	**115186**	s4 / B	–
310009	**215462**	T20 / H	**115186**	s4 / B	–

B10:-N: 10-13



Key on B10-B: 1

B10: xii-xiii



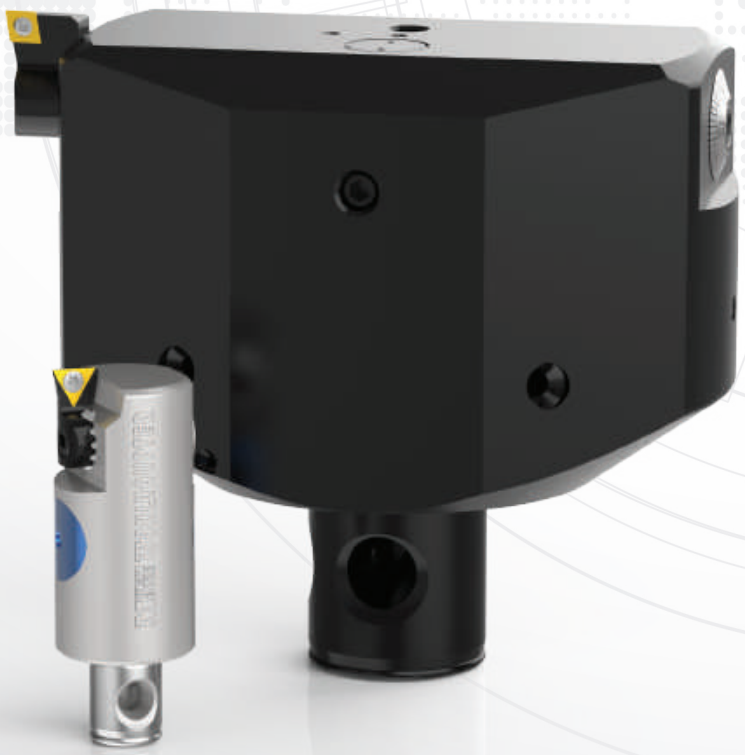
= Imperial (in)
= Metric (mm)

Balance 365 (364)
FINE BORING

Boring for the future.

The Wohlhaupter™ Balance 365 (364) boring head offers precision boring with automatic balancing. Its lightweight aluminum design from 2.559" - 8.070" (65.00mm - 205.00mm) with a wear-resistant coating reduces weight on the spindle up to 50%, yet is durable in boring applications. It is specifically engineered to minimize the residual imbalance produced by insert holder displacement. The insert holder can also be rotated for reverse machining jobs.

- Diameter range: 0.787" - 2.579" (20.00mm - 65.50mm)
  Alu-Line: 2.559" - 8.070" (65.00mm - 205.00mm)
- Special coating on Alu-Line for wear-resistant surface
- Alu-Line body reduces tool weight by 50%, reducing stress on the spindle
- Coolant through
- Vernier diameter adjustment of 0.0001" (0.002mm)
- Internal balancing improves tool life and surface finish
- Max spindle speed: 6,562 SFM (2,000 m/min)



IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

WOHLHAUPTER™ 365 (364) BORING HEAD

Product: Wohlhaupter™ 365 Boring Head

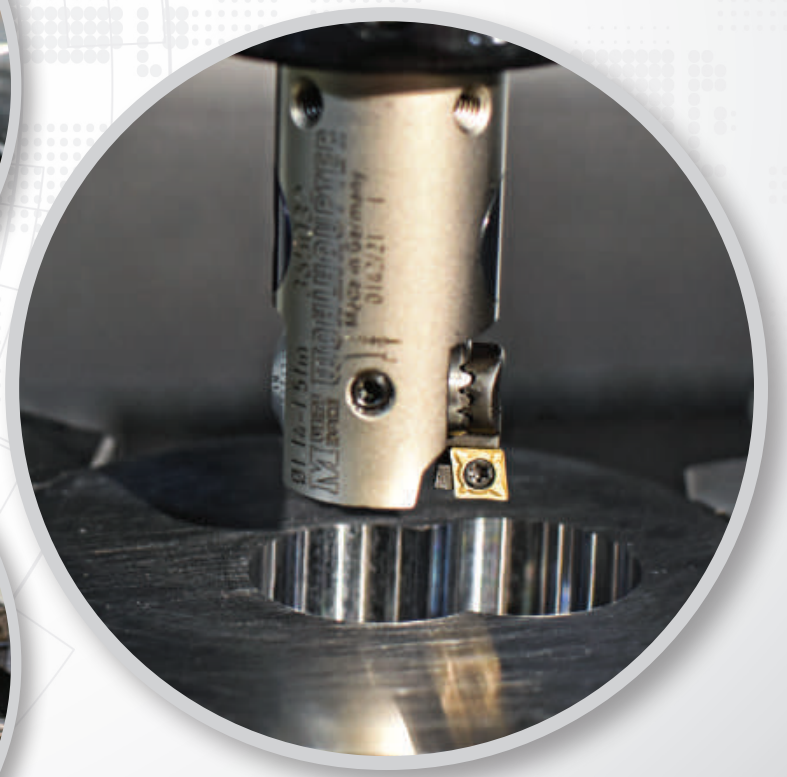
Material: 4150

Hole Ø: 1.2402" ± 0.0002" (31.50mm ± 0.005mm)

Hole Depth: 1.500" (38.10mm)

Measure	365 Boring Head
RPM	1,540
Speed Rate	500 SFM
Feed Rate	0.0025 IPR (0.064 mm/rev)
Penetration Rate	3.85 IPM (98.6mm/min)
Cycle Time/Hole	23 seconds
Hole Finish/Hole	30 Ra

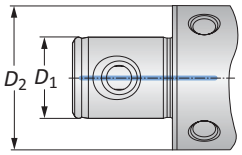
Finished "Figure 8" Boring Application

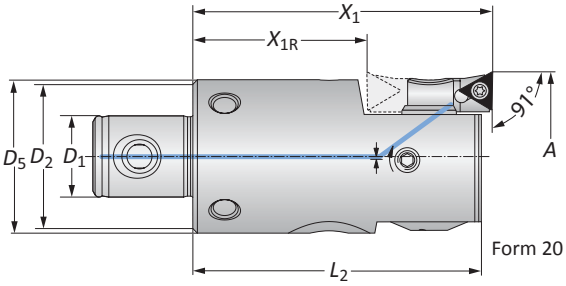


Boring Heads

Diameter Range: 0.787" - 2.579" (20.00mm - 65.50mm)

Form 101





Form 20

365 Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{1R}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	19 - 11	0.787 - 0.965	1.811	–	1.693	–	0.198 (lbs)	20	**364077***	**365030**
	22 - 11	0.965 - 1.161	1.811	–	1.713	0.906	0.331 (lbs)	20	**210059**	**365031**
	22 - 11	0.965 - 1.161	1.811	–	1.713	0.906	0.331 (lbs)	101	**210069**	**365031**
	25 - 14	1.142 - 1.516	2.205	–	2.106	1.063	0.441 (lbs)	20	**210059**	**365032**
ⓘ	25 - 14	1.142 - 1.516	2.205	–	2.106	1.063	0.441 (lbs)	101	**210069**	**365032**
	32 - 18	1.496 - 1.988	2.598	1.496	2.450	1.339	0.882 (lbs)	20	**264051**	**365033**
	32 - 18	1.496 - 1.988	2.598	1.496	2.450	1.339	0.882 (lbs)	101	**264077**	**365033**
	40 - 22	1.968 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	20	**210052**	**365034**
	40 - 22	1.968 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	101	**210062**	**365034**

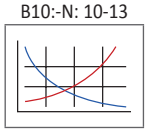
*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)
NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

364 Boring Heads

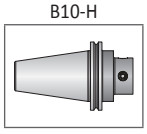
	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{1R}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	19 - 11	20.00 - 24.50	46.00	–	43.00	–	0.09 (kg)	20	**364077***	**364030**
	22 - 11	24.50 - 29.50	46.00	–	43.50	23.00	0.15 (kg)	20	**210059**	**364031**
	22 - 11	24.50 - 29.50	46.00	–	43.50	23.00	0.15 (kg)	101	**210069**	**364031**
	25 - 14	29.00 - 38.50	56.00	–	53.50	27.00	0.20 (kg)	20	**210059**	**364032**
ⓜ	25 - 14	29.00 - 38.50	56.00	–	53.50	27.00	0.20 (kg)	101	**210069**	**364032**
	32 - 18	38.00 - 50.50	66.00	38.00	63.50	34.00	0.40 (kg)	20	**264051**	**364033**
	32 - 18	38.00 - 50.50	66.00	38.00	63.50	34.00	0.40 (kg)	101	**264077**	**364033**
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	20	**210052**	**364034**
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	101	**210062**	**364034**

*Not suitable for indexable inserts with a radius of 0.031" (0.80mm)
NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

B10:-N: 10-13
Key on B10-B: 1



B10-H



B10: xii-xiii

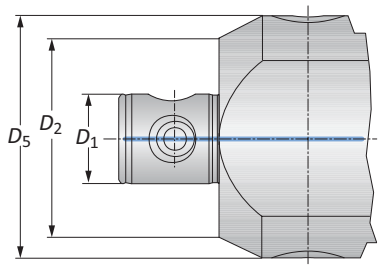
ⓘ = Imperial (in)
ⓜ = Metric (mm)

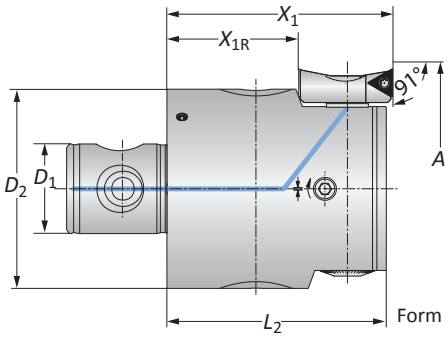
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Boring Heads

Alu-Line | Diameter Range: 2.559" - 8.070" (20.00mm - 205.00mm)

Form 101





Form 20

365 Alu-Line Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{1R}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	50 - 28	2.559 - 3.268	2.953	1.535	2.854	1.968	1.323 (lbs)	20	**210020**	**365045**
	50 - 28	2.559 - 3.268	2.953	1.535	2.854	1.968	1.323 (lbs)	101	**210063**	**365045**
	50 - 28	2.559 - 3.268	2.953	1.535	2.854	1.968	1.323 (lbs)	103	**210064**	**365045**
	63 - 36	3.228 - 4.055	3.543	2.126	3.445	2.480	2.205 (lbs)	20	**210020**	**365046**
	63 - 36	3.228 - 4.055	3.543	2.126	3.445	2.480	2.205 (lbs)	101	**210063**	**365046**
	63 - 36	3.228 - 4.055	3.543	2.126	3.445	2.480	2.205 (lbs)	103	**210064**	**365046**
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	3.150	3.307 (lbs)	20	**210020**	**365047**
ⓘ	80 - 36	3.937 - 5.118	3.543	2.126	3.445	3.150	3.307 (lbs)	101	**210063**	**365047**
	80 - 36	3.937 - 5.118	3.543	2.126	3.445	3.150	3.307 (lbs)	103	**210064**	**365047**
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	4.189 (lbs)	20	**210020**	**365048**
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	4.189 (lbs)	101	**210063**	**365048**
	80 - 36	4.921 - 6.594	3.543	2.126	3.445	3.937	4.189 (lbs)	103	**210064**	**365048**
	80 - 36	6.398 - 8.070	3.543	2.126	3.445	5.315	5.512 (lbs)	20	**210020**	**365049**
	80 - 36	6.398 - 8.070	3.543	2.126	3.445	5.315	5.512 (lbs)	101	**210063**	**365049**
	80 - 36	6.398 - 8.070	3.543	2.126	3.445	5.315	5.512 (lbs)	103	**210064**	**365049**

NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

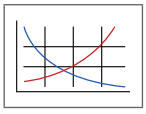
364 Alu-Line Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{1R}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	50.00	0.60 (kg)	20	**210020**	**364045**
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	50.00	0.60 (kg)	101	**210063**	**364045**
	50 - 28	65.00 - 83.00	75.00	39.00	72.50	50.00	0.60 (kg)	103	**210064**	**364045**
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	63.00	1.00 (kg)	20	**210020**	**364046**
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	63.00	1.00 (kg)	101	**210063**	**364046**
	63 - 36	82.00 - 103.00	90.00	54.00	87.50	63.00	1.00 (kg)	103	**210064**	**364046**
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	80.00	1.50 (kg)	20	**210020**	**364047**
ⓜ	80 - 36	100.00 - 130.00	90.00	54.00	87.50	80.00	1.50 (kg)	101	**210063**	**364047**
	80 - 36	100.00 - 130.00	90.00	54.00	87.50	80.00	1.50 (kg)	103	**210064**	**364047**
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.90 (kg)	20	**210020**	**364048**
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.90 (kg)	101	**210063**	**364048**
	80 - 36	125.00 - 167.50	90.00	54.00	87.50	100.00	1.90 (kg)	103	**210064**	**364048**
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.50 (kg)	20	**210020**	**364049**
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.50 (kg)	101	**210063**	**364049**
	80 - 36	162.50 - 205.00	90.00	54.00	87.50	135.00	2.50 (kg)	103	**210064**	**364049**

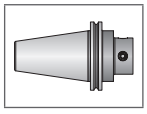
NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

B10:-N: 10-13

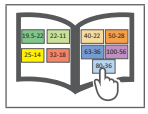
Key on B10-B: 1



B10-H



B10: xii-xiii

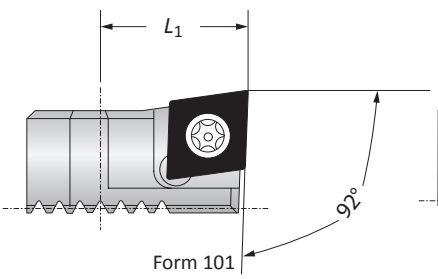


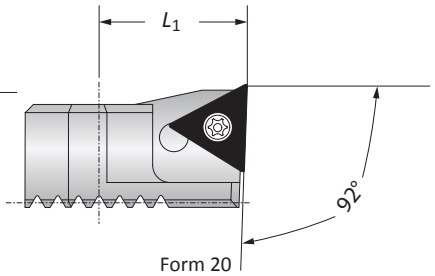
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Abrasive Materials

Diameter Range: 2.559" - 8.070" (65.00mm - 205.00mm)





	Boring Range	Insert Holder L_1	Weight	Insert Form	Part No.
ⓘ	2.559 - 8.070	0.709	0.066 (lbs)	20	**211061**
ⓘ	2.559 - 8.070	0.709	0.066 (lbs)	101	**211063**
ⓘ	2.559 - 8.070	0.709	0.066 (lbs)	103	**211065**
ⓜ	65.00 - 205.00	18.00	0.03 (kg)	20	**211061**
ⓜ	65.00 - 205.00	18.00	0.03 (kg)	101	**211063**
ⓜ	60.00 - 205.00	18.00	0.03 (kg)	103	**211065**

NOTE: Insert holders are used for abrasive materials to protect boring head against chip wash

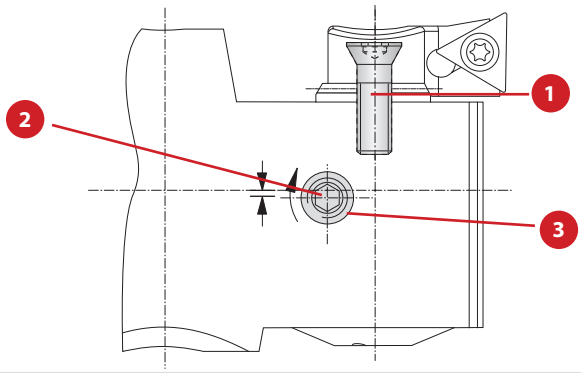
B10:-N: 10-13 | B10-F | B10: xii-xiii

Key on B10-B: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Accessories

Screws



Boring Head	Part No. 1 Countersunk Screw	Countersunk Screw Service Key	2 Clamping Screw	Clamping Screw Service Key	3 Ball
365030	**215323**	Tx - 15 / H	**364260**	s2.5 / A	**364270**
365031	**215338**	Tx - 15 / H	**364138**	s2.5 / A	**364139**
365032	**215338**	Tx - 15 / H	**364138**	s2.5 / A	**364139**
365033	**215338**	Tx - 15 / H	**315278**	s2.5 / A	–
365034	**215338**	Tx - 15 / H	**115505**	s3 / B	–
365045	**215462**	Tx - 20 / H	**115249**	s4 / B	–
365046	**215462**	Tx - 20 / H	**115185**	s4 / B	–
365047	**215462**	Tx - 20 / H	**115834**	s4 / B	–
365048	**215462**	Tx - 20 / H	**115834**	s4 / B	–
365049	**215462**	Tx - 20 / H	**115834**	s4 / B	–

B10:-N: 10-13
Key on B10-B: 1
B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

Balance Digital 565 (564) Product Overview

Balance Digital *565 (564)*
FINE BORING

Adjustable diameter for precise machining.

The Wohlhaupter™ Balance Digital 565 (564) boring head, for a diameter range above 2.559" (65.50mm), features a lightweight aluminum boring head with automatic balancing in the easy-to-read digital display. It is specifically engineered to minimize the residual imbalance produced by insert holder displacement. The boring insert holders can be rotated easily for reverse machining boring applications.

Test the ***engineered lightweight*** boring head today.

- Diameter range: 1.968" - 2.579" (50.00mm - 65.50mm)
  Alu-Line: 2.559" - 8.070" (65.00mm - 205.00mm)
- Special coating on Alu-Line for wear-resistant surface
- Alu-Line body reduces tool weight by 50%, reducing stress on the spindle
- Digital readout advantage for diameter adjustments of 0.0001" (0.002mm)
- Coolant through
- Internal balancing improves tool life and surface finish
- Max spindle speed: 6,562 SFM (2,000 m/min)

Aluminum Boring Head
2.559" - 8.071" (65mm - 205mm)

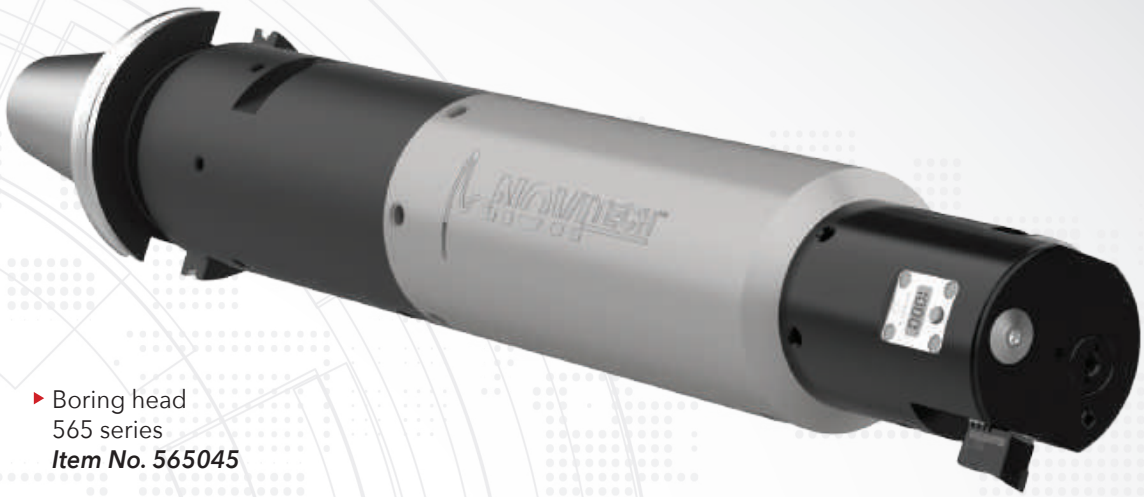
Steel Boring Head
1.968" - 2.579" (50mm - 65.5mm)

NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

WOHLHAUPTER™ 565 BORING HEAD
with NOVI^{TECH}™



- Boring head
  565 series
  Item No. 565045
- NOVI^{TECH} Vibration dampened
  intermediate module
  Item No. 519005

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001"
or 0.002mm on diameter

The Wohlhaupter 565 boring head with the NOVI^{TECH}™ vibration dampened module provided:

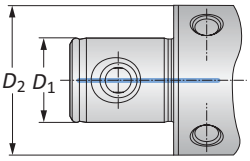
- ✓ **Excellent surface finish**
- ✓ **Eliminated vibration and chatter**

Product:	Wohlhaupter™ 565 Boring Head with NOVI^{TECH}™
Objectives:	0.002" concentricity over the length of 2 bores spaced 14" apart
Material:	Cast iron
Hole Ø:	3.125"
Depth:	7xD

Measure	565 Boring Head with NOVI^{TECH}
RPM	430 RPM
Speed Rate	352 SFM
Feed Rate	0.003 IPR
Penetration Rate	1.29 IPM
Cycle Time (per hole)	3 min 32 sec
Hole Finish	155 Ra

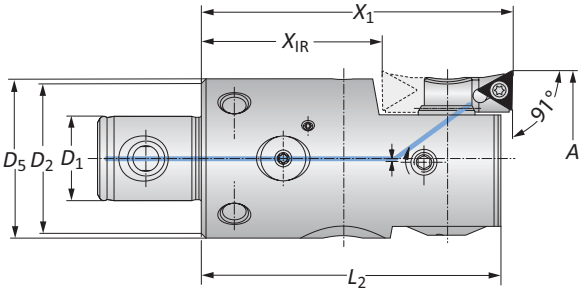
Boring Heads

Diameter Range: 1.968" - 2.579" (50.00mm - 65.50mm)



NOTE: Imperial item pictured
NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Form 101



Form 20

565 Digital Boring Heads

	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{IR}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
ⓘ	40 - 22	1.968 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	20	**210052**	**565034**
	40 - 22	1.968 - 2.579	2.953	1.850	2.854	1.654	1.764 (lbs)	101	**210062**	**565034**

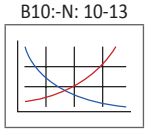
NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

564 Digital Boring Heads

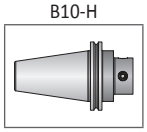
	MVS Connection	Boring Range	Boring Head						Part No.	
	D_2 | D_1	A	X_1	X_{IR}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
ⓜ	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	20	**210052**	**564034**
	40 - 22	50.00 - 65.50	75.00	47.00	72.50	42.00	0.80 (kg)	101	**210062**	**564034**

NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

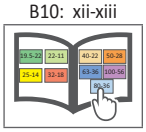
B10:-N: 10-13
Key on B10-B: 1



B10-H



B10: xii-xiii



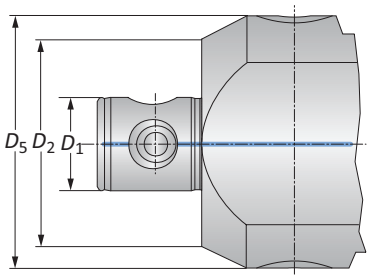
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

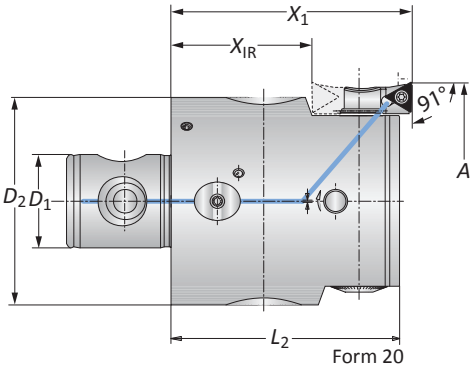
Boring Heads

Alu-Line | Diameter Range: 2.559" - 8.070" (50.00mm - 205.00mm)

NOTE: Imperial item pictured
NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter



Form 101



Form 20

565 Digital Alu-Line Boring Heads

MVS Connection	Boring Range	Boring Head						Part No.	
D_2 | D_1	A	X_1	X_{IR}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
50 - 28	2.559 - 3.268	2.953	1.535	2.874	–	1.323 (lbs)	20	**210020**	**565045**
50 - 28	2.559 - 3.268	2.953	1.535	2.874	–	1.323 (lbs)	101	**210063**	**565045**
50 - 28	2.559 - 3.268	2.953	1.535	2.874	–	1.323 (lbs)	103	**210064**	**565045**
63 - 36	3.228 - 4.005	3.543	2.126	3.464	–	2.205 (lbs)	20	**210020**	**565046**
63 - 36	3.228 - 4.005	3.543	2.126	3.464	–	2.205 (lbs)	101	**210063**	**565046**
63 - 36	3.228 - 4.005	3.543	2.126	3.464	–	2.205 (lbs)	103	**210064**	**565046**
80 - 36	3.937 - 4.005	3.543	2.126	3.464	–	3.307 (lbs)	20	**210020**	**565047**
80 - 36	3.937 - 4.005	3.543	2.126	3.464	–	3.307 (lbs)	101	**210063**	**565047**
80 - 36	3.937 - 4.005	3.543	2.126	3.464	–	3.307 (lbs)	103	**210064**	**565047**
80 - 36	4.921 - 6.594	3.543	2.126	3.464	–	3.307 (lbs)	20	**210020**	**565048**
80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.937	4.189 (lbs)	101	**210063**	**565048**
80 - 36	4.921 - 6.594	3.543	2.126	3.464	3.937	4.189 (lbs)	103	**210064**	**565048**
80 - 36	6.397 - 8.070	3.543	2.126	3.464	3.937	4.189 (lbs)	20	**210020**	**565049**
80 - 36	6.397 - 8.070	3.543	2.126	3.464	3.937	4.189 (lbs)	101	**210063**	**565049**
80 - 36	6.397 - 8.070	3.543	2.126	3.464	5.315	5.512 (lbs)	103	**210064**	**565049**

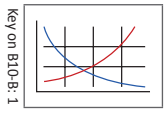
NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

564 Digital Alu-Line Boring Heads

MVS Connection	Boring Range	Boring Head						Part No.	
D_2 | D_1	A	X_1	X_{IR}	L_2	D_5	Weight	Insert Form	Insert Holder	Boring Head
50 - 28	65.00 - 83.00	75.00	39.00	73.00	–	0.60 (kg)	20	**210020**	**564045**
50 - 28	65.00 - 83.00	75.00	39.00	73.00	–	0.60 (kg)	101	**210063**	**564045**
50 - 28	65.00 - 83.00	75.00	39.00	73.00	–	0.60 (kg)	103	**210064**	**564045**
63 - 36	82.00 - 103.00	90.00	54.00	88.00	–	1.00 (kg)	20	**210020**	**564046**
63 - 36	82.00 - 103.00	90.00	54.00	88.00	–	1.00 (kg)	101	**210063**	**564046**
63 - 36	82.00 - 103.00	90.00	54.00	88.00	–	1.00 (kg)	103	**210064**	**564046**
80 - 36	100.00 - 103.00	90.00	54.00	88.00	–	1.50 (kg)	20	**210020**	**564047**
80 - 36	100.00 - 103.00	90.00	54.00	88.00	–	1.50 (kg)	101	**210063**	**564047**
80 - 36	100.00 - 103.00	90.00	54.00	88.00	–	1.50 (kg)	103	**210064**	**564047**
80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	20	**210020**	**564048**
80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	101	**210063**	**564048**
80 - 36	125.00 - 167.50	90.00	54.00	88.00	100.00	1.90 (kg)	103	**210064**	**564048**
80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	20	**210020**	**564049**
80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	101	**210063**	**564049**
80 - 36	162.50 - 205.00	90.00	54.00	88.00	135.00	2.50 (kg)	103	**210064**	**564049**

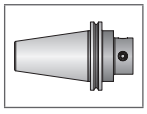
NOTE: X_{1R} = rotated inset holder for reverse machining
NOTE: Insert holders and inserts sold separately

B10:-N: 10-13

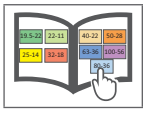


Key on B10-B: 1

B10-H



B10: xii-xiii

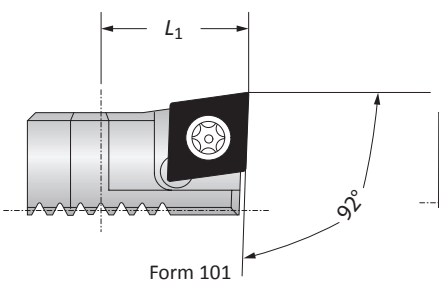


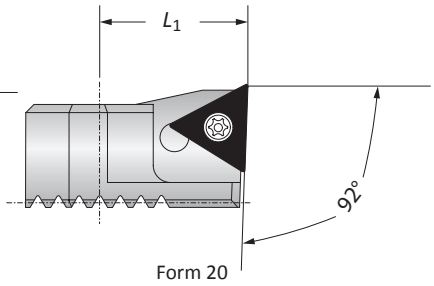
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Insert Holder for Abrasive Materials

Diameter Range: 2.559" - 8.070" (65.00mm - 205.00mm)





	Boring Range	Insert Holder L_1	Weight	Insert Form	Part No.
i	2.559 - 8.070	0.709	0.066 (lbs)	20	**211061**
i	2.559 - 8.070	0.709	0.066 (lbs)	101	**211063**
i	2.559 - 8.070	0.709	0.066 (lbs)	103	**211065**
m	65.00 - 205.00	18.00	0.03 (kg)	20	**211061**
m	66.00 - 205.00	18.00	0.03 (kg)	101	**211063**
m	67.00 - 205.00	18.00	0.03 (kg)	103	**211065**

NOTE: Insert holders are used for abrasive materials to protect boring head against chip wash

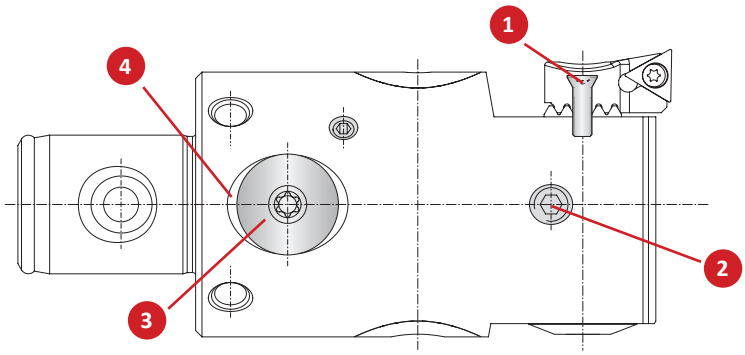
B10:-N: 10-13 | B10-F | B10: xii-xiii

Key on B10-B: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Accessories

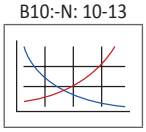
Screws | Battery Cover | Batteries



Boring Head	Part No. 1 Countersunk Screw	Service Key	2 Clamping Screw	Service Key	3 Battery Cover	Service Key	4 Sealing Ring	Battery*
565034	**215338**	T15 / H	**115505**	s3 / B	**501016**	T20 / H	**415895**	**415896**
565045	**215462**	T20 / H	**315943**	s4 / B	**501016**	T20 / H	**415895**	**415896**
565046	**215462**	T20 / H	**515178**	s4 / B	**501016**	T20 / H	**415895**	**415896**
565047	**215462**	T20 / H	**515178**	s4 / B	**501016**	T20 / H	**415895**	**415896**
565048	**215462**	T20 / H	**515178**	s4 / B	**501016**	T20 / H	**415895**	**415896**
565049	**215462**	T20 / H	**515178**	s4 / B	**501016**	T20 / H	**415895**	**415896**

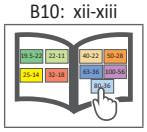
*Replace both batteries

B10:-N: 10-13



Key on B10-B: 1

B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

338 (337) Product Overview

338 (337)
FINE BORING

Go big with the lightweight 338 (337).

The Wohlhaupter™ 338 (337) cassette is engineered with lightweight aluminum that can be used on serrated tool bodies and serrated slides for large diameter boring. The insert holder can also be rotated for reverse machining.

Engineered for ***large diameter boring***.

- Diameter range: 3.937" - 8.070" (100.00mm - 205.00mm)
- Cassettes can be used on large diameter serrated slides **(pg. B10-E: 8):** 7.874" - 128.100" (100.00mm - 3255.00mm)
- Coolant through
- Vernier diameter adjustments of 0.0001" (0.002mm)
- Special coating for increased durability
- Max spindle speed: 3,937 SFM (1,200 m/min)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

WOHLHAUPTER COMBI-LINE
with 338 boring cassette

One tooling switch can provide a smörgåsbord of benefits.

When you're searching for a new tooling solution, it's always nice when you find an answer that goes above and beyond the improvements you need. Our customer was roughing and finishing steel roller housings for the structural steel/fabricator industry. The application required 3 boring passes to complete, resulting in lengthy cycle times and sub-par hole finishes. Each pass was made by a different tool, which caused additional headaches and increased inventory costs. And on top of that, the tooling produced non-round holes and inconsistent insert wear that caused tool failures.

Our customer tested the **Wohlhaupter Combi-Line** boring system, and the results provided even more improvements than they had hoped for. For starters, the Combi-Line tool completed both the rough and finish processes in a single pass, eliminating 2 tools and our customer's inventory woes in one shot. It also eliminated the tool failures. The one pass completion also slashed cycle time from nearly 4.5 minutes to 3 minutes (***a 33% reduction***).

But the benefits didn't stop there. The Combi-Line tool impressed our customer with a significant increase in tool life. Where the previous tooling produced 150 linear inches, the Combi-Line produced 400 linear inches (***a 167% increase***). Also, the Combi-Line improved the resulting hole surface finish from 125 Ra to a much nicer 63 Ra (***a 50% improvement***).

Cycle time decrease, inventory reduction, tool life increase, tool failure elimination, surface finish improvement...this smörgåsbord of benefits resulted from one switch in tooling. ***Don't underestimate the impact a simple tooling change can have on your productivity; feast on the benefits.***

Product: Wohlhaupter™ Combi-Line

Objectives: (1) Reduce inventory requirements
(2) Decrease cycle time

Industry: Structural steel/fabricator

Part: Steel roller housing

Material: 4140 alloy steel/A36 structural steel

Hole Ø: 8.858"

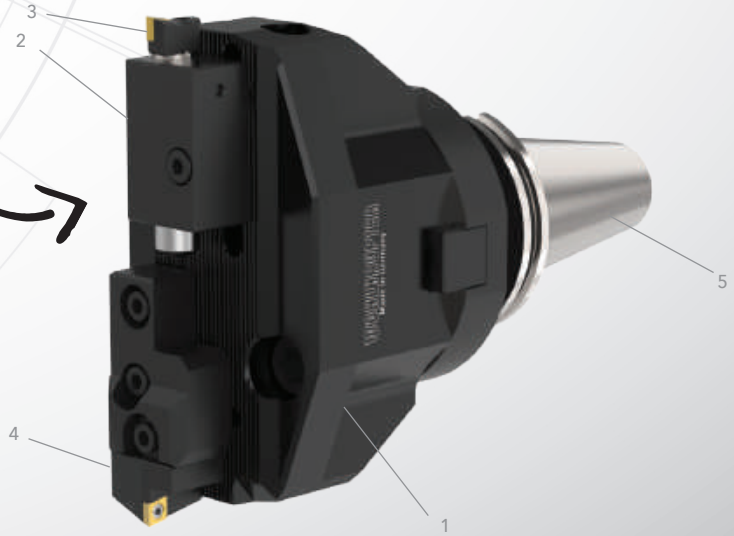
Hole Depth: 3.500"

Measure	Competitor Boring Tool	Combi-Line
RPM	215	290
Speed Rate	500 SFM	675 SFM
Feed Rate	0.004 IPR	0.004 IPR
Penetration Rate	0.86 IPM	1.16 IPM
Cycle Time	4 min 20 sec	3 min
Hole Finish	125 Ra	63 Ra
Tool Life	150 linear inches	400 linear inches
Tool Failure?	Yes	No

- Combi-Line assembly:
  (1) ***Serrated slide: 349051***
  (2) ***Precision boring tool: 338037***
  (3) ***Insert holder: 210064***
  (4) ***Roughing unit: 149059***
  (5) ***Master shank: 357003***

- Boring inserts
  Item No. 297653WHC19

167% tool life increase



The Wohlhaupter Combi-Line tool:

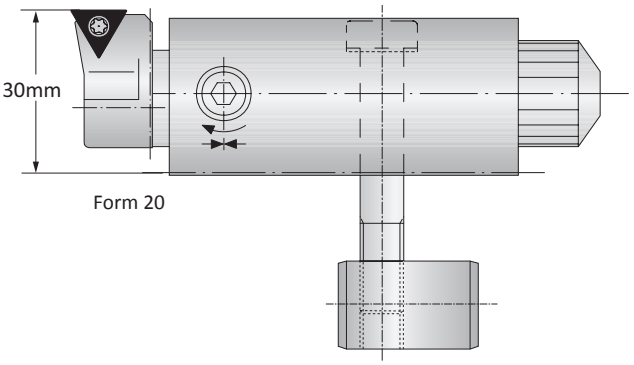
- Decreased cycle time ✓
- Increased tool life ✓
- Reduced inventory requirements ✓
- Improved hole surface finish ✓
- Eliminated tool failures ✓

© Allied Machine & Engineering CS4004

Cassettes | Serrated Tool Bodies

Diameter Range: 3.937" - 8.070" (100.00mm - 205.00mm)

Form 101



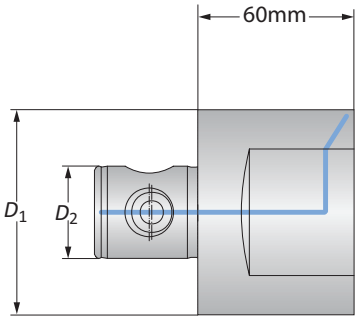
338 (337) Cassettes

	Boring Range	Weight	Insert Form	Part No. Insert Holder	Clamping Piece	Cassette*
ⓘ	3.937 - 8.070	0.6831 (lbs)	20	**210020**	**137026**	**338037**
ⓘ	3.937 - 8.070	0.6831 (lbs)	101	**210063**	**137026**	**338037**
ⓘ	3.937 - 8.070	0.6831 (lbs)	103	**210064**	**137026**	**338037**
ⓜ	100.00 - 205.00	0.31 (kg)	20	**210020**	**137026**	**337017**
ⓜ	100.00 - 205.00	0.31 (kg)	101	**210063**	**137026**	**337017**
ⓜ	100.00 - 205.00	0.31 (kg)	103	**210064**	**137026**	**337017**

*Required serrated tool body sold separately

NOTE: Cassette and insert holder can be used on large diameter serrated slides (B10-E: 8)

NOTE: Insert holders and inserts sold separately



Serrated Tool Bodies

	MVS Connection D_2 | D_1	Boring Range	Part No.
ⓘ	80 - 36	3.937 - 6.102	**148007**
ⓘ	80 - 36	5.905 - 8.070	**148009**
ⓜ	80 - 36	100.00 - 155.00	**148007**
ⓜ	80 - 36	150.00 - 205.00	**148009**

B10:-N: 10-13 | B10-H | B10: xii-xiii

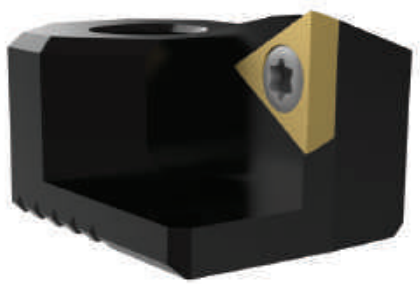
Key on B10-B: 1

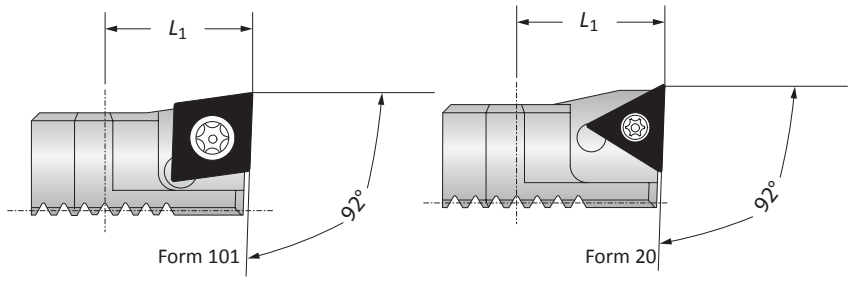
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Abrasive Materials

Diameter Range: 3.937" - 128.150" (100.00mm - 3255.00mm)





	Boring Range	Insert Holder L_1	Weight	Insert Form	Part No.
ⓘ	3.937 - 128.150	0.709	0.066 (lbs)	20	**211061**
ⓘ	3.937 - 128.150	0.709	0.066 (lbs)	101	**211063**
ⓘ	3.937 - 128.150	0.709	0.066 (lbs)	103	**211065**
ⓜ	100.00 - 3255.00	18.00	0.03 (kg)	20	**211061**
ⓜ	100.00 - 3255.00	18.00	0.03 (kg)	101	**211063**
ⓜ	100.00 - 3255.00	18.00	0.03 (kg)	103	**211065**

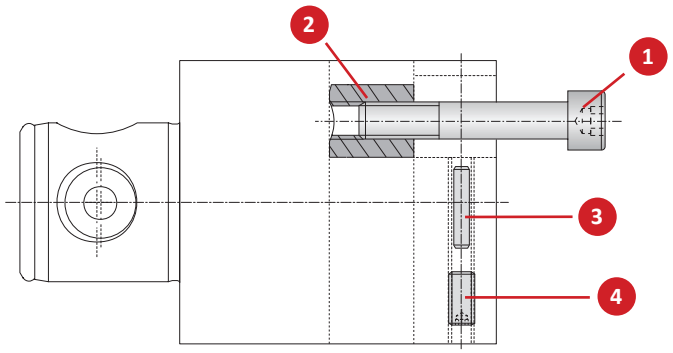
NOTE: Insert holders are used for abrasive materials to protect boring head against chip wash

B10:-N: 10-13
Key on B10-B: 1
B10-F
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Accessories

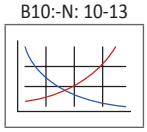
Screws | Clamping Pieces | Adjustment Pins



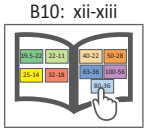
	Part No.					
Serrated Tool Body	1 Cap Screw	Hex Size / Type	2 Clamping Nut	3 Adjustment Pin	4 Set Screw	Hex Size / Type
148007	**115730**	**s6 / B**	**140119**	**–**	**364270**	**s2.5 / A**
148009	**115730**	**s6 / B**	**140119**	**140120**	**364139**	**s2.5 / A**

B10:-N: 10-13

Key on B10-B: 1



B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Notes

Digital 538 (537) Product Overview

Digital 538 (537)
FINE BORING

Engineered for easy precision.

The Wohlhaupter™ Digital 538 (537) features an integrated digital readout and lightweight aluminum body that can be used with serrated tool bodies and serrated slides. The insert holder can be rotated easily for reverse machining applications.

Experience ***digital precision boring*** for yourself.

- Diameter range: 3.937" - 8.070" (100.00mm - 205.00mm)
- Cassette can be used on large diameter serrated slides **(pg. B10-E: 8):** 7.874" - 128.100" (100.00mm - 3255.00mm)
- Coolant through
- Digital readout advantage for diameter adjustments of 0.0001" (0.002mm)
- Special coating for increased durability
- Max spindle speed: 3,937 SFM (1,200 m/min)

NOTE: Imperial items pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

WOHLHAUPTER™ COMBI-LINE
with 538 boring cassette

Cycle time is crucial, so what's taking *you* so long?

Time is money when it comes to moving finished parts through your manufacturing process. Our customer was machining 316 stainless steel to produce pump covers for the food processing industry. Each part had 2 holes that included an interrupted cut, and our customer needed 2 different tools to complete the process. The roughing tool they used ran for 8.5 minutes per hole, and the finishing tool ran for 23.5 minutes per hole. Overall, our customer was spending over 1 hour to complete a single part.

The cycle time was killing productivity, and our customer knew there had to be a more efficient solution available. They tested the **Wohlhaupter Combi-Line** boring system, and the results were exactly what our customer needed. The Combi-Line tool slashed the cycle time from 1 hour to just 17 minutes, less than 1/3 the previous cycle time (***a 73% reduction***). Equipped with a height adjustable roughing unit on one side and a precision finishing tool on the other, the Combi-Line achieved both the rough and finish processes with 1 solution. This multi-function combination eliminated the need for multiple tools and reduced our customer's inventory requirements.

Another challenge our customer faced with their previous tooling was insert damage. They struggled to produce even 1 part without chipping an insert in the stainless steel material. With Wohlhaupter's stainless steel grade inserts designed specifically for success in this type of material, the Combi-Line tool solved the chip damage issue for our customer.

Thanks to the Combi-Line tooling solution, our customer's lengthy, troublesome process became a worry-free application that could be completed 73% faster. ***Don't struggle with inefficient applications; call your local tooling specialist, and find the right tool for your job today.***

Product:	Wohlhaupter™ Combi-Line
Objectives:	(1) Improve cycle time (2) Eliminate insert damage
Industry:	General machining
Part:	Pump cover
Material:	316 stainless steel
Hole Ø:	8.500"
Hole Depth:	8.500"

Measure	Previous Process		Wohlhaupter Combi-Line
	Roughing Tool	Finishing Tool	
RPM	200	180	250
Speed Rate	445 SFM	401 SFM	556 SFM
Feed Rate	0.005 IPR	0.002 IPR	0.004 IPR
Penetration Rate	1.00 IPM	0.36 IPM	1.00 IPM
Cycle Time (per hole)	8 min 30 sec	23 min 36 sec	8 min 30 sec
Cycle Time (per part)	1 hr 4 min		17 min

- Combi-Line assembly:
  (1) ***Serrated slide: 349051***
  (2) ***Digital finish boring tool: 538001***
  (3) ***Insert holder: 210064***
  (4) ***Rough boring tool: 149059***
  (5) ***Master shank: 327023***
- Boring inserts
  Item No. 397166WHC114

73% cycle time decrease

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

The Wohlhaupter Combi-Line tool:

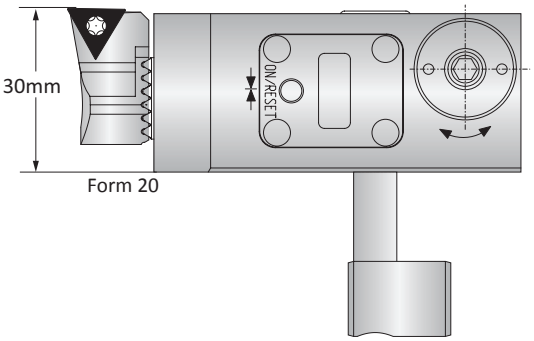
- Decreased cycle time ✓
- Eliminated insert damage ✓
- Reduced inventory requirements ✓
- Provided worry-free machining ✓

© Allied Machine & Engineering CS4005

Cassettes | Serrated Tool Bodies

Diameter Range: 3.937" - 8.070" (100.00mm - 205.00mm)

Form 101



NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

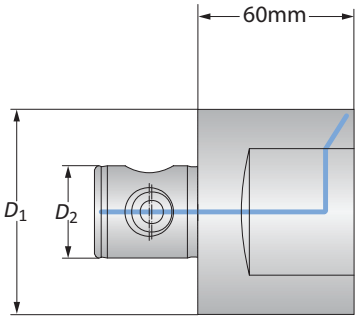
Digital 538 (537) Cassettes

	Boring Range	Weight	Insert Form	Part No. Insert Holder	Part No. Clamping Piece	Part No. Cassette*
ⓘ	3.937 - 8.070	0.816 (lbs)	20	**210020**	**137026**	**538001**
ⓘ	3.937 - 8.070	0.816 (lbs)	101	**210063**	**137026**	**538001**
ⓘ	3.937 - 8.070	0.816 (lbs)	103	**210064**	**137026**	**538001**
ⓜ	100.00 - 205.00	0.37 (kg)	20	**210020**	**137026**	**537001**
ⓜ	100.00 - 205.00	0.37 (kg)	101	**210063**	**137026**	**537001**
ⓜ	100.00 - 205.00	0.37 (kg)	103	**210064**	**137026**	**537001**

*Required serrated tool body sold separately

NOTE: Cassette and insert holder can be used on large diameter serrated slides (B10-E: 8)

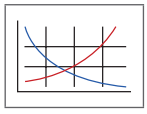
NOTE: Insert holders and inserts sold separately



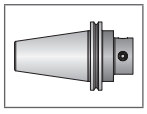
Serrated Tool Bodies

	MVS Connection D_2 | D_1	Serrated Tool Body Boring Range	Serrated Tool Body Part No.
ⓘ	80 - 36	3.937 - 6.102	**148007**
ⓘ	80 - 36	5.905 - 8.070	**148009**
ⓜ	80 - 36	100.00 - 155.00	**148007**
ⓜ	80 - 36	150.00 - 205.00	**148009**

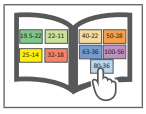
B10:-N: 10-13
Key on B10-B: 1



B10-H



B10: xii-xiii

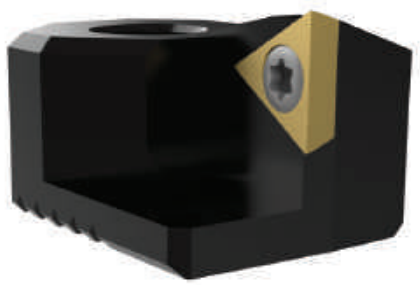


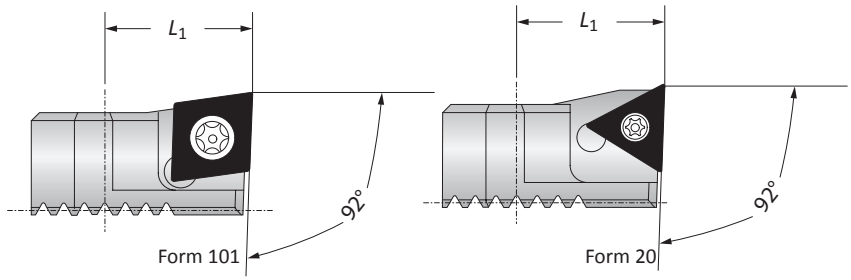
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Abrasive Materials

Diameter Range: 3.937" - 128.150" (100.00mm - 3255.00mm)





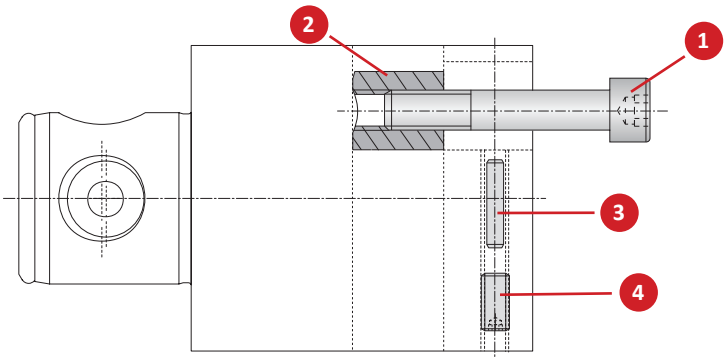
	Boring Range	Insert Holder L_1	Weight	Insert Form	Part No.
ⓘ	3.937 - 128.150	0.709	0.066 (lbs)	20	**211061**
ⓘ	3.937 - 128.150	0.709	0.066 (lbs)	101	**211063**
ⓘ	3.937 - 128.150	0.709	0.066 (lbs)	103	**211065**
ⓜ	100.00 - 3255.00	18.00	0.03 (kg)	20	**211061**
ⓜ	100.00 - 3255.00	18.00	0.03 (kg)	101	**211063**
ⓜ	100.00 - 3255.00	18.00	0.03 (kg)	103	**211065**

NOTE: Insert holders are used for abrasive materials to protect boring head against chip wash

B10:-N: 10-13
Key on B10-B: 1
B10-F
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Accessories



Serrated Tool Body	Part No. 1 Cap Screw	Hex Size / Type	2 Clamping Nut	3 Adjustment Pin	4 Set Screw	Hex Size / Type
148007 / 348007	**115730**	**s6 / B**	**140119**	**–**	**116550**	**s2.5 / A**
148009 / 348009	**115730**	**s6 / B**	**140119**	**140120**	**115519**	**s2.5 / A**

B10:-N: 10-13
Key on B10-B: 1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Notes

SECTION

B10-C

Combi-Line Rough and Finish Boring

Wohlhaupter™ Rough and Finish Boring

Combi-Line

- Diameter Range: 0.965" - 7.913" (24.50mm - 201.00mm)

One tool. Two operations.

The Wohlhaupter Combi-Line combines both rough and finish boring into one operation. The front insert holder is the roughing cutting edge, while the shorter holder finishes the hole, saving you time and money.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

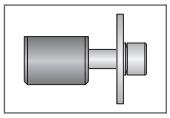
NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

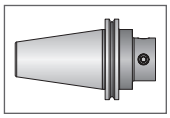
Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries

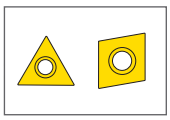
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



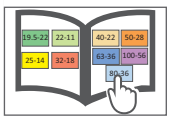
Clamping Elements
For use with insert holders and boring heads



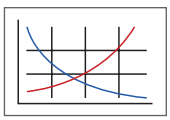
Shanks
A variety of shanks for different machines



Inserts
For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Combined Rough and Finish Boring Table of Contents

Combi-Line Introduction

Combi-Line Product Overview . . . . . 2 - 3
Boring Head and Insert Holder 4
Accessories 5

Series	Diameter Range	
	Imperial (inch)	Metric (mm)
Combi-Line 404 (401)	0.965 - 7.913	24.50 - 201.00

Combi-Line Product Overview

Combi-Line
ROUGH & FINISH BORING

Two operations. One Tool.

Decrease cycle time and tool changes with the Wohlhaupter Combi-Line. The Combi-Line combines rough and finish boring into one tool with height displaced insert holders.

Reduce your ***cycle time*** with the Combi-Line.

- Diameter range: 0.965" - 7.913" (24.50mm - 201.00mm)
- Reduce cycle and tool changing time
- Available in semi-standard same level or height displaced insert holders
- Coolant-through
- 0.0001" (0.002mm) vernier adjustment on finishing insert holder
- Max spindle speed: 5,000 SFM

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Cycle time is crucial. Why not choose the best process?

Application: Ductile Cast Iron

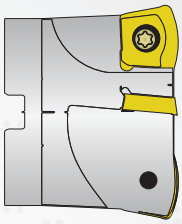
Finish Diameter: 1.968" (50mm) (+/- 0.0005" [0.013mm])

Pre-Hole Diameter: 1.771" (45mm)

Boring Depth: 8.228" (209mm)

Hole Finish: 32 Ra

Measure	1st Process Option	
	Step 1 Rough 49mm Competitor 1.5" High Feed Milling Tool	Step 2 Finish 50mm Wohlhaupter 320 Boring Head
Speed	1000 SFM (2500 RPM)	600 SFM (1165 PRM)
Feed Rate	0.020 IPT (153 IPM)	0.004 IPR (0.466 IPM)
Total Passes	77	1
Cycle Time (per hole)	1.93 min	1.77 min
Tool Change Time	15 sec	
Cycle Time (per part)	**3 min 54 sec**	



1.5" High Feed Milling Tool

Wohlhaupter 320 Boring Head

Measure	2nd Process Option	
	Step 1 Rough 49mm Wohlhaupter Twin Cutter @49mm Ø	Step 2 Finish 50mm Wohlhaupter 320 Boring Head
Speed	500 SFM (990 RPM)	600 SFM (1165 PRM)
Feed Rate	0.012 IPR (11.88 IPM)	0.004 IPR (0.466 IPM)
Total Passes	1	1
Cycle Time (per hole)	.69 min	1.77 min
Tool Change Time	15 sec	
Cycle Time (per part)	**2 min 46 sec**	

Wohlhaupter Twin Cutter

Wohlhaupter 320 Boring Head

OUR ***SOLUTION***

Combi-Line Rough and Finish Boring

Measure	3rd Process Option Finish 50mm Wohlhaupter Combi-Line
Speed	600 SFM (1165 RPM)
Feed Rate	0.004 IPR (0.466 IPM)
Total Passes	1
Cycle Time (per hole)	1.77 min
Tool Change Time	0
Cycle Time (per part)	**1 min 46 sec**

60 seconds of total cycle time saved

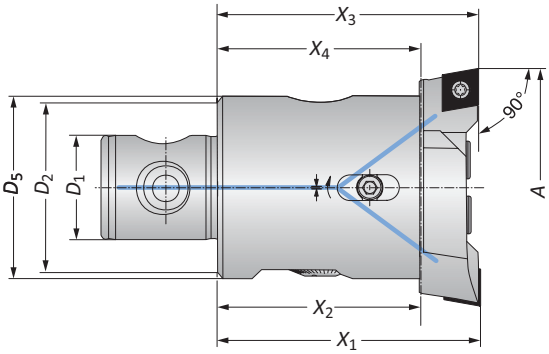
- Combi-Line assembly:
  (1) ***Insert holders (x2): 402021***
  (2) ***Serrated tool body: 404006***
  (3) ***Shank: 353014***

Boring inserts
- ***Item No. 297653WHC19***

1 tool vs. 2 tools saves you time and money

Boring Heads and Insert Holders

Diameter Range: 0.965" - 7.913" (24.50mm - 201.00mm)



COMBI LINE

	Connection	Boring Range	Boring Head							Part No.	
	$D_2 \mid D_1$	A	X_1	X_2	X_3	X_4	D_5	Weight	Insert Form	(x2)* Insert Holder**	Boring Head
	22 - 11	0.965 - 1.161	1.803	1.338	1.800	1.330	33.750	0.220 (lbs)	101	**402029**	**404003**
	25 - 14	1.142 - 1.457	2.205	1.614	2.192	1.600	40.750	0.440 (lbs)	101	**402009**	**404004**
	25 - 14	1.142 - 1.458	2.205	1.614	2.192	1.600	40.750	0.440 (lbs)	103	**402011**	**404004**
	25 - 14	1.417 - 1.732	2.205	1.614	2.192	1.600	40.750	0.661 (lbs)	101	**402017**	**404005**
	25 - 14	1.417 - 1.733	2.205	1.614	2.192	1.600	40.750	0.661 (lbs)	103	**402019**	**404005**
	32 - 18	1.693 - 2.126	2.598	1.889	2.592	1.880	47.700	0.881 (lbs)	103	**402021**	**404006**
i	40 - 22	2.087 - 2.598	2.953	2.165	2.940	2.150	54.700	1.543 (lbs)	103	**402005**	**404007**
	50 - 28	2.559 - 3.268	2.953	2.165	2.940	2.150	54.700	2.425 (lbs)	103	**402013**	**404008**
	63 - 36	3.228 - 4.055	3.543	2.755	3.530	2.740	69.700	4.850 (lbs)	103	**402001**	**404009**
	80 - 36	4.016 - 5.000	3.543	2.598	3.530	2.590	65.700	6.613 (lbs)	103	**402025**	**404010**
	80 - 36	5.000 - 5.984	3.543	2.598	3.530	2.590	65.700	6.834 (lbs)	103	**402026**	**404010**
	80 - 36	5.945 - 7.913	3.543	2.598	3.530	2.590	65.700	8.377 (lbs)	103	**402025**	**404011**
	80 - 36	6.929 - 7.913	3.543	2.598	3.530	2.590	65.700	8.598 (lbs)	103	**402026**	**404011**
	22 - 11	24.50 - 29.50	46.00	34.00	45.70	33.70	22.00	0.10 (kg)	101	**402029**	**401003**
	25 - 14	29.00 - 37.00	56.00	41.00	55.70	40.70	26.00	0.20 (kg)	101	**402009**	**401004**
	25 - 14	29.00 - 37.00	56.00	41.00	55.70	40.70	26.00	0.20 (kg)	103	**402011**	**401004**
	25 - 14	36.00 - 44.00	56.00	41.00	55.70	40.70	30.00	0.30 (kg)	101	**402017**	**401005**
	25 - 14	36.00 - 44.00	56.00	41.00	55.70	40.70	30.00	0.30 (kg)	103	**402019**	**401005**
	32 - 18	43.00 - 54.00	66.00	48.00	65.70	47.70	34.00	0.40 (kg)	103	**402021**	**401006**
m	40 - 22	53.00 - 66.00	75.00	55.00	74.70	54.70	40.00	0.70 (kg)	103	**402005**	**401007**
	50 - 28	65.00 - 83.00	75.00	55.00	74.70	54.70	50.00	1.10 (kg)	103	**402013**	**401008**
	63 - 36	82.00 - 103.00	90.00	70.00	89.70	69.70	63.00	2.20 (kg)	103	**402001**	**401009**
	80 - 36	102.00 - 127.00	90.00	66.00	89.70	65.70	85.00	3.00 (kg)	103	**402025**	**401010**
	80 - 36	127.00 - 152.00	90.00	66.00	89.70	65.70	85.00	3.10 (kg)	103	**402026**	**401010**
	80 - 36	151.00 - 176.00	90.00	66.00	89.70	65.70	134.00	3.80 (kg)	103	**402025**	**401011**
	80 - 36	176.00 - 201.00	90.00	66.00	89.70	65.70	134.00	3.90 (kg)	103	**402026**	**401011**

*(2) insert holders are required
**Insert holders sold individually

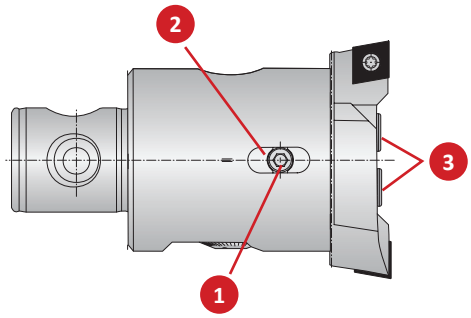
B10-N: 10-13 (Key on B10-C: 1) | B10-C: 5 | B10-H | B10-F | B10: xii-xiii

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Accessories

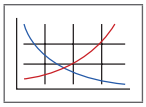
Screws | Clamping Elements



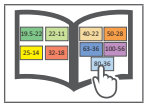
	Boring Head Part No.	Part No. 1 Clamp Screw	Service Key	2 Clamping Piece	3 Cap Screw	Service Key
	404003	**401223**	s2.5 / B	**401203**	**401323**	s3 / B
	404004	**401224**	s2.5 / B	**401204**	**401324**	s4 / B
	404005	**401225**	s2.5 / B	**401205**	**401324**	s4 / B
	404006	**401226**	s3 / B	**401206**	**401324**	s4 / B
i	404007	**402227**	s3 / B	**401207**	**401327**	s5 / B
	404008	**115288**	s4 / B	**401208**	**401329**	s6 / B
	404009	**215501**	s4 / B	**401209**	**401329**	s6 / B
	404010	**401230**	s4 / B	**401210**	**019183**	s8 / C
	404011	**401230**	s4 / B	**401210**	**019138**	s8 / C
	401003	**401223**	s2.5 / B	**401203**	**401323**	s3 / B
	401004	**401224**	s2.5 / B	**401204**	**401324**	s4 / B
	401005	**401225**	s2.5 / B	**401205**	**401324**	s4 / B
	401006	**401226**	s3 / B	**401206**	**401324**	s4 / B
m	401007	**402227**	s3 / B	**401207**	**401327**	s5 / B
	401008	**115288**	s4 / B	**401208**	**401329**	s6 / B
	401009	**215501**	s4 / B	**401209**	**401329**	s6 / B
	401010	**401230**	s4 / B	**401210**	**019183**	s8 / C
	401011	**401230**	s4 / B	**401210**	**019138**	s8 / C

B10-N: 10-13

Key on B10-C: 1



B10: xii-xiii



i = Imperial (in)
m = Metric (mm)

Notes

Notes

SECTION

B10-D

Rough Machining

Wohlhaupter™ Rough Machining

Twin Cutters | Chamfering Tools | Grooving Tools | Axial Grooving | Reverse Machining

- Diameter Range: 0.768" - 9.645" (19.50mm - 245.00mm)

Variety of tooling. Versatile operations.

A versatile range of tools for rough machining includes rough boring, chamfering, reverse machining, circular milling, and axial grooving. The insert holders with various insert pockets as well as height displaced insert holders are able to be easily adjusted for a quick setup process.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

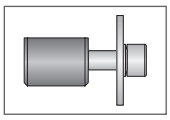
NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

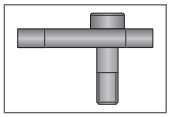
Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries

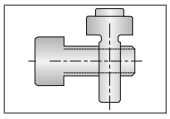
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



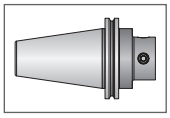
Clamping Elements
For use with insert holders and boring heads



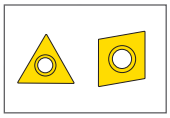
Cover Plates



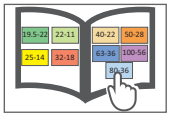
Recessing Tools



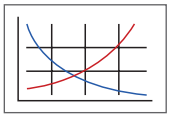
Shanks
A variety of shanks for different machines



Inserts
For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Rough Machining Table of Contents

Introduction
Product Overview . . . . . 2 - 4

Twin Cutters
Twin Cutters Same Level . . . . . 5 - 9
Twin Cutters Same Level Tangential Inserts. 10
Twin Cutters Height Displaced . . . . . 11 - 13
Twin Cutters Height Displaced Tangential Inserts. 14

Chamfering
Chamfering Tools . . . . . 15 - 18

Grooving
Grooving Tools for Circular Milling. 19
Axial Grooving Tools. 20

Reverse Machining
Reverse Machining Tools. 21

Accessories . . . . . 22 - 23

Series	Diameter Range	
	Imperial (inch)	Metric (mm)
Twin Cutters	0.767 - 8.070	19.50 - 205.00
Chamfering	0.984 - 7.913	20.00 - 201.00
Grooving	0.787 - 8.501	20.00 - 79.00
Axial Grooving	0.787 - 8.070	20.00 - 205.00
Reverse Machining	1.141 - 9.645	29.00 - 245.00

Roughing Tools
ROUGH MACHINING

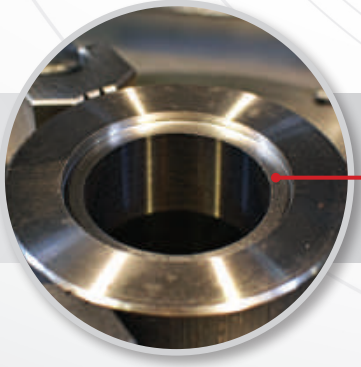
Versatile tools for a variety of applications.

- Diameter range: 0.768" - 9.645" (19.50mm - 245.00mm)
- Tangential inserts and insert holders also available
- Serrated tool bodies can be used for multiple applications, including rough boring, chamfering, back boring, and axial grooving
- Insert holders can be used on large diameter Alu-Line serrated tool bodies and slides located in section E: 3.940" - 128.15" (100.00mm - 3255.00mm)

Roughing Applications

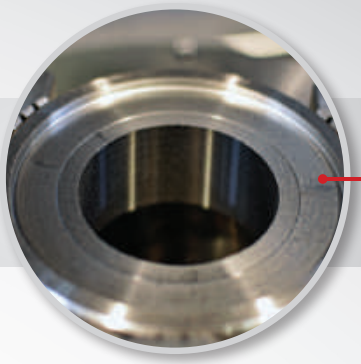
Twin Cutter Assembly:
(1) Reducer: 219087
(2) Serrated tool body: 148004
(3) Insert holders: 151004
(4) Inserts: 10408M158HC79

Tangential Cutter Assembly:
(1) Shank: 353007
(2) Serrated tool body: 148005
(3) Insert holders: 151043
(4) Inserts: 00508M880HC198



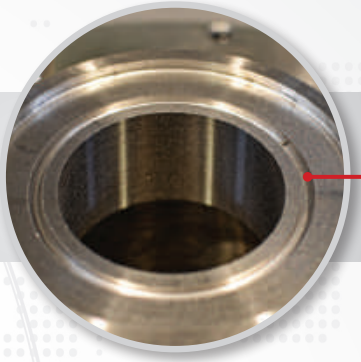
First Tangential Cut

- Tangential Cutter Assembly:
  (1) Shank: 353008
  (2) Serrated tool body: 148006
  (3) Insert holders: 151035
  (4) Inserts: 397594WHC198



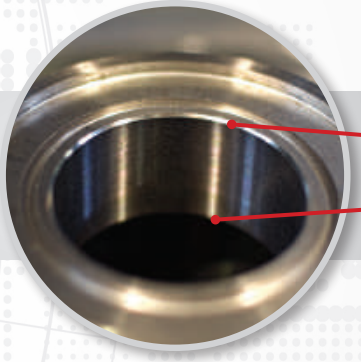
Second Tangential Cut

- Axial Grooving Assembly:
  (1) Shank: 353009
  (2) Serrated tool body: 148007
  (3) Support block: 151004
  (4) Insert holder: 226010
  (5) Insert: 297978WCH136



Axial Groove Cut

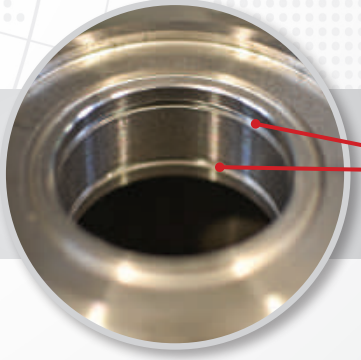
- Chamfer Assembly:
  (1) Shank: 353003
  (2) Serrated tool body: 148004
  (3) Insert holder: 201009
  (4) Inserts: 297497WHC79



Top Chamfer

Bottom Chamfer

- Radial Grooving Assembly:
  (1) Shank: 353007
  (2) Grooving tool: 143055
  (3) Inserts: 097254WCH136



Grooves

- Finished Application

Case Study

Cycle time is crucial. Why not choose the best process?

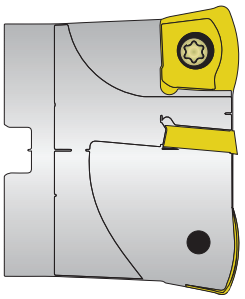
Application: Ductile Cast Iron

Finish Diameter: 1.930" (49mm)

Pre-Hole Diameter: 1.77" (45mm)

Boring Depth: 8.23" (209mm)

Measure	Rough 49mm Competitor 1.5" High Feed Milling Tool
Speed	1000 SFM (2500 RPM)
Feed Rate	0.020 IPT (153 IPM)
Total Passes	77
Cycle Time (per part)	**1.93 min**



1.5" High Feed Milling Tool

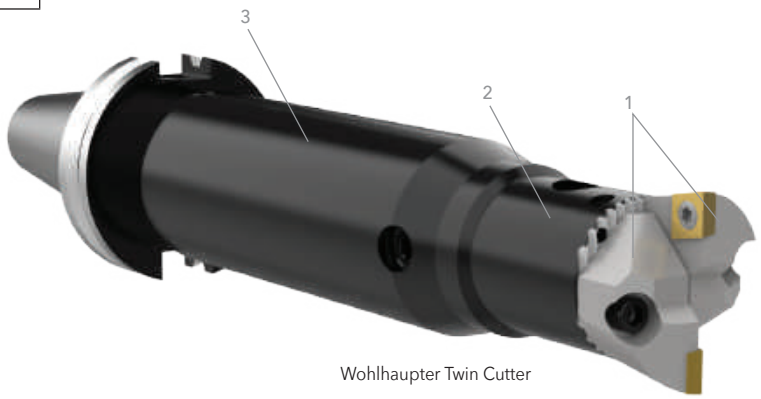
OUR *SOLUTION*

Wohlhaupter™ Twin Cuter

Measure	Rough 49mm Wohlhaupter Twin Cutter
Speed	500 SFM (900 RPM)
Feed Rate	0.012 IPR (11.88 IPM)
Total Passes	1
Cycle Time (per part)	**0.69 min**

- Twin Cutter assembly:
  (1) ***Insert Holders (x2): 151023***
  (2) ***Serrated tool body: 148018***
  (3) ***Shank: 353015***

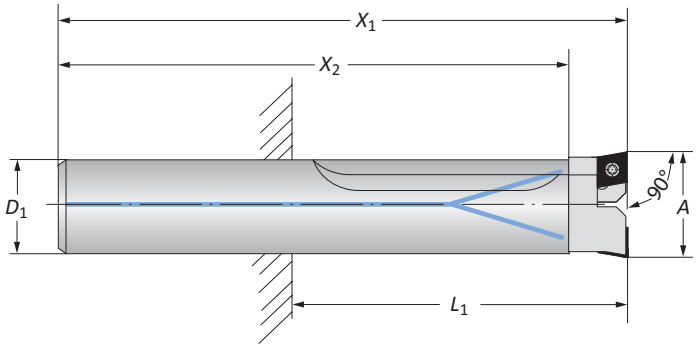
Boring inserts
- ***Item No.: 297239WHC79***



Wohlhaupter Twin Cutter

Twin Cutters Same Level

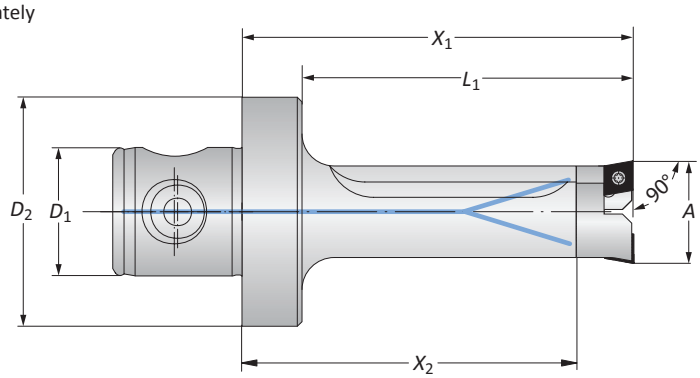
90° | Diameter Range: 0.767" - 1.181" (19.50mm - 30.00mm)



Twin Cutters Same Level

	Connection	Boring Range	Twin Cutter					Part No.	
	D_1	A	X_1	X_2	L_1	Weight	Insert Form	Insert Holder	Serrated Body
i	18	0.767 - 0.905	5.910	5.433	3.149	0.661 (lbs)	101	**235031**	**235021**
	20	0.885 - 1.023	5.910	5.433	3.543	0.661 (lbs)	101	**235032**	**235022**
	23	1.003 - 1.181	6.299	5.826	3.937	0.661 (lbs)	101	**235033**	**235023**
m	18	19.50 - 23.00	150.00	138.00	80.00	0.30 (kg)	101	**235031**	**235021**
	20	22.50 - 26.00	150.00	138.00	90.00	0.30 (kg)	101	**235032**	**235022**
	23	25.50 - 30.00	160.00	148.00	100.00	0.30 (kg)	101	**235033**	**235023**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately



Twin Cutters Same Level

	Connection	Boring Range	Twin Cutter					Part No.	
	$D_2 \mid D_1$	A	X_1	X_2	L_1	Weight	Insert Form	Insert Holder	Serrated Body
i	50 - 28	0.767 - 0.905	3.346	2.874	2.834	0.881 (lbs)	101	**235031**	**235001**
	50 - 28	0.885 - 1.023	3.543	3.070	3.031	1.102 (lbs)	101	**235032**	**235002**
	50 - 28	1.003 - 1.181	3.740	3.268	3.228	1.102 (lbs)	101	**235033**	**235003**
	63 - 36	0.767 - 0.905	3.346	2.874	2.834	1.543 (lbs)	101	**235031**	**235011**
	63 - 36	0.885 - 1.023	3.543	3.070	3.031	1.543 (lbs)	101	**235032**	**235012**
	63 - 36	1.003 - 1.181	3.740	3.268	3.228	1.843 (lbs)	101	**235033**	**235013**
m	50 - 28	19.50 - 23.00	85.00	73.00	72.00	0.40 (kg)	101	**235031**	**235001**
	50 - 28	22.50 - 26.00	90.00	78.00	77.00	0.50 (kg)	101	**235032**	**235002**
	50 - 28	25.50 - 30.00	95.00	83.00	82.00	0.50 (kg)	101	**235033**	**235003**
	63 - 36	19.50 - 23.00	85.00	73.00	72.00	0.70 (kg)	101	**235031**	**235011**
	63 - 36	22.50 - 26.00	90.00	78.00	77.00	0.70 (kg)	101	**235032**	**235012**
	63 - 36	25.50 - 30.00	95.00	83.00	82.00	0.83 (kg)	101	**235033**	**235013**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-H | B10-F | B10: xii-xiii

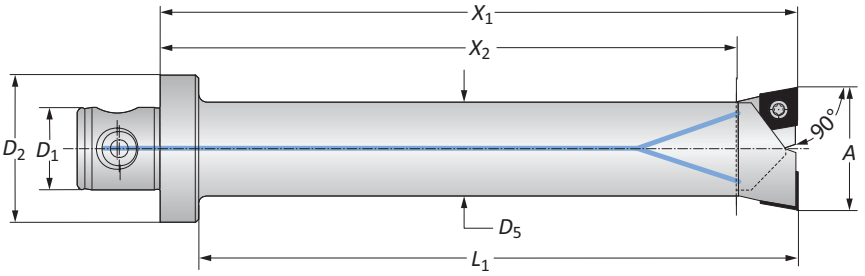
Key on B10-D:1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Same Level

90° | 5xD | Diameter Range: 1.141" - 2.598" (29.00mm - 66.00mm)



	Connection	Boring Range	Twin Cutter						Part No.	
	$D_2 \mid D_1$	A	X_1	X_2	L_1	D_5	Weight	Insert Form	Insert Holder	Serrated Body
	50 - 28	1.141 - 1.456	6.102	5.551	5.590	1.023	1.984 (lbs)	103	**151001**	**148021**
	50 - 28	1.417 - 1.732	6.889	6.338	6.377	1.259	2.866 (lbs)	103	**151002**	**148022**
ⓘ	50 - 28	1.692 - 2.125	8.465	7.677	7.952	1.456	4.188 (lbs)	103	**151023**	**148023**
	50 - 28	1.692 - 2.125	8.465	7.677	7.952	1.456	4.188 (lbs)	104	**151003**	**148023**
	50 - 28	2.086 - 2.598	8.465	7.677	7.952	1.732	5.511 (lbs)	103	**151024**	**148024**
	50 - 28	2.086 - 2.598	8.465	7.677	7.952	1.732	5.511 (lbs)	104	**151004**	**148024**
	50 - 28	29.00 - 37.00	155.00	141.00	142.00	26.00	0.90 (kg)	103	**151001**	**148021**
	50 - 28	36.00 - 44.00	175.00	161.00	162.00	32.00	1.30 (kg)	103	**151002**	**148022**
ⓜ	50 - 28	43.00 - 54.00	215.00	195.00	202.00	37.00	1.90 (kg)	103	**151023**	**148023**
	50 - 28	43.00 - 54.00	215.00	195.00	202.00	37.00	1.90 (kg)	104	**151003**	**148023**
	50 - 28	53.00 - 66.00	215.00	195.00	202.00	44.00	2.50 (kg)	103	**151024**	**148024**
	50 - 28	53.00 - 66.00	215.00	195.00	202.00	44.00	2.50 (kg)	104	**151004**	**148024**

NOTE: Different lengths available upon request.
NOTE: Insert holders sold in quantities of 1 and inserts sold separately

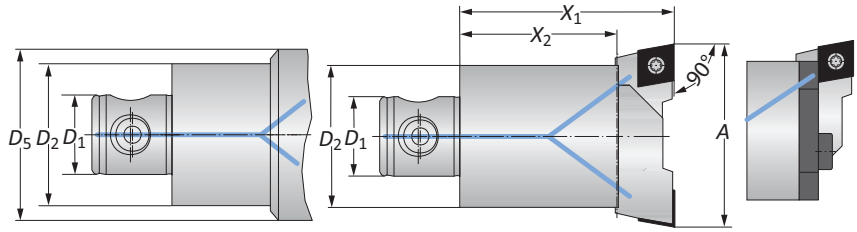
B10-N: 10-13 | B10-D: 22 | B10-H | B10-F | B10: xii-xiii
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Same Level

90° | Diameter Range: 1.141" - 4.055" (29.00mm - 103.00mm)



	Connection	Boring Range	Twin Cutter					Part No.	
	D_2 | D_1	A	X_1	X_2	D_5	Weight	Insert Form	Insert Holder	Serrated Body
ⓘ	25 - 14	1.141 - 1.456	2.205	1.653	–	0.441 (lbs)	103	**151001**	**148001**
	25 - 14	1.417 - 1.732	2.205	1.653	1.811	0.441 (lbs)	103	**151002**	**148002**
	32 - 18	1.417 - 1.732	2.205	1.653	1.811	0.881 (lbs)	103	**151002**	**148017**
	32 - 18	1.692 - 2.125	2.598	1.811	1.417	0.881 (lbs)	103	**151023**	**148003**
	32 - 18	1.692 - 2.125	2.598	1.811	1.417	0.881 (lbs)	104	**151003**	**148003**
	40 - 22	1.692 - 2.125	2.598	1.811	1.417	1.543 (lbs)	104	**151003**	**148018**
	40 - 22	2.086 - 2.598	2.953	2.165	1.417	1.543 (lbs)	103	**151023**	**148018**
	40 - 22	2.086 - 2.598	2.953	2.165	–	1.543 (lbs)	103	**151024**	**148004**
	40 - 22	2.086 - 2.598	2.953	2.165	–	1.543 (lbs)	104	**151004**	**148004**
	50 - 28	2.559 - 3.267	2.953	2.165	–	2.425 (lbs)	103	**151025**	**148005**
	50 - 28	2.559 - 3.267	2.953	2.165	–	2.425 (lbs)	104	**151005**	**148005**
	63 - 36	3.228 - 4.055	3.543	2.362	–	4.188 (lbs)	103	**151026**	**148006**
	63 - 36	3.228 - 4.055	3.543	2.362	–	4.188 (lbs)	104	**151086**	**148006**
	63 - 36	3.228 - 4.055	3.543	2.362	–	4.188 (lbs)	105	**151006**	**148006**
ⓜ	25 - 14	29.00 - 37.00	56.00	42.00	–	0.20 (kg)	103	**151001**	**148001**
	25 - 14	36.00 - 44.00	56.00	42.00	30.00	0.20 (kg)	103	**151002**	**148002**
	32 - 18	36.00 - 44.00	56.00	42.00	30.00	0.40 (kg)	103	**151002**	**148017**
	32 - 18	43.00 - 54.00	66.00	46.00	36.00	0.40 (kg)	103	**151023**	**148003**
	32 - 18	43.00 - 54.00	66.00	46.00	36.00	0.40 (kg)	104	**151003**	**148003**
	40 - 22	43.00 - 54.00	66.00	46.00	36.00	0.70 (kg)	104	**151003**	**148018**
	40 - 22	53.00 - 66.00	75.00	55.00	36.00	0.70 (kg)	103	**151023**	**148018**
	40 - 22	53.00 - 66.00	75.00	55.00	–	0.70 (kg)	103	**151024**	**148004**
	40 - 22	53.00 - 66.00	75.00	55.00	–	0.70 (kg)	104	**151004**	**148004**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.10 (kg)	103	**151025**	**148005**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.10 (kg)	104	**151005**	**148005**
	63 - 36	82.00 - 103.00	90.00	60.00	–	1.90 (kg)	103	**151026**	**148006**
	63 - 36	82.00 - 103.00	90.00	60.00	–	1.90 (kg)	104	**151086**	**148006**
	63 - 36	82.00 - 103.00	90.00	60.00	–	1.90 (kg)	105	**151006**	**148006**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii

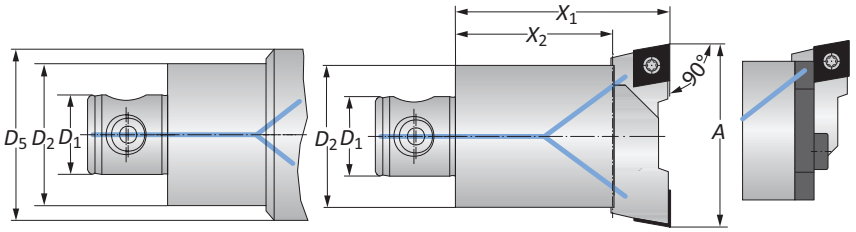
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Same Level

90° | Diameter Range: 3.937" - 8.070" (100.00mm - 205.00mm)



	Connection	Boring Range	Twin Cutter					Part No.	
	D_2 | D_1	A	X_1	X_2	D_5	Weight	Insert Form	Insert Holder	Serrated Body
	80 - 36	3.937 - 5.118	3.543	2.362	–	6.613 (lbs)	104	**151087**	**148007**
	80 - 36	3.937 - 5.118	3.543	2.362	–	6.613 (lbs)	105	**151007**	**148007**
	80 - 36	3.937 - 5.118	3.543	2.362	–	6.613 (lbs)	103	**151027**	**148007**
	80 - 36	4.921 - 6.102	3.543	2.362	–	7.054 (lbs)	104	**151088**	**148007**
ⓘ	80 - 36	4.921 - 6.102	3.543	2.362	–	7.054 (lbs)	105	**151008**	**148007**
	80 - 36	4.921 - 6.102	3.543	2.362	–	7.054 (lbs)	103	**151028**	**148007**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	104	**151088**	**148009**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	105	**151008**	**148009**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	103	**151028**	**148009**
	80 - 36	100.00 - 130.00	90.00	60.00	–	3.00 (kg)	104	**151087**	**148007**
	80 - 36	100.00 - 130.00	90.00	60.00	–	3.00 (kg)	105	**151007**	**148007**
	80 - 36	100.00 - 130.00	90.00	60.00	–	3.00 (kg)	103	**151027**	**148007**
	80 - 36	125.00 - 155.00	90.00	60.00	–	3.20 (kg)	104	**151088**	**148007**
ⓜ	80 - 36	125.00 - 155.00	90.00	60.00	–	3.20 (kg)	105	**151008**	**148007**
	80 - 36	125.00 - 155.00	90.00	60.00	–	3.20 (kg)	103	**151028**	**148007**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	104	**151088**	**148009**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	105	**151008**	**148009**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	103	**151028**	**148009**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii

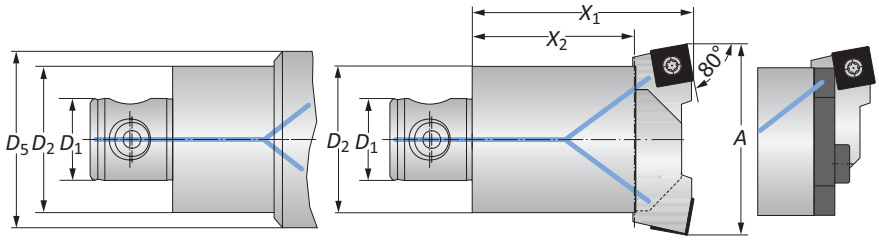
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Same Level

80° | Diameter Range: 1.141" - 8.070" (29.00mm - 205.00mm)



	Connection	Boring Range	Twin Cutter					Part No.	
	D_2 | D_1	A	X_1	X_2	D_5	Weight	Insert Form	Insert Holder	Serrated Tool Body
	25 - 14	1.141 - 1.456	2.205	1.653	–	0.440 (lbs)	112	**151011**	**148001**
	25 - 14	1.417 - 1.732	2.205	1.653	1.181	0.440 (lbs)	112	**151012**	**148002**
	32 - 18	1.417 - 1.732	2.441	1.653	1.181	0.881 (lbs)	112	**151012**	**148017**
	32 - 18	1.692 - 2.125	2.598	1.811	1.417	0.440 (lbs)	113	**151013**	**148003**
	40 - 22	1.692 - 2.125	2.598	1.811	1.417	1.543 (lbs)	113	**151013**	**148018**
ⓘ	40 - 22	2.086 - 2.598	2.952	1.811	1.417	1.543 (lbs)	112	**151014**	**148004**
	50 - 28	2.559 - 3.267	2.952	2.165	–	2.425 (lbs)	113	**151015**	**148005**
	63 - 36	3.228 - 4.055	3.543	2.165	–	5.070 (lbs)	112	**151036**	**148006**
	80 - 36	3.937 - 5.118	3.543	2.165	–	6.613 (lbs)	133	**151037**	**148007**
	80 - 36	3.937 - 6.102	3.543	2.362	–	7.054 (lbs)	113	**151038**	**148007**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	114	**151038**	**148009**
	25 - 14	29.00 - 37.00	56.00	42.00	–	0.20 (kg)	112	**151011**	**148001**
	25 - 14	36.00 - 44.00	56.00	42.00	30.00	0.20 (kg)	112	**151012**	**148002**
	32 - 18	36.00 - 44.00	62.00	42.00	30.00	0.40 (kg)	112	**151012**	**148017**
	32 - 18	43.00 - 54.00	66.00	46.00	36.00	0.40 (kg)	113	**151013**	**148003**
	40 - 22	43.00 - 54.00	66.00	46.00	36.00	0.70 (kg)	113	**151013**	**148018**
ⓜ	40 - 22	53.00 - 66.00	75.00	46.00	36.00	0.70 (kg)	112	**151014**	**148004**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.10 (kg)	113	**151015**	**148005**
	63 - 36	82.00 - 103.00	90.00	55.00	–	2.30 (kg)	112	**151036**	**148006**
	80 - 36	100.00 - 130.00	90.00	55.00	–	3.00 (kg)	133	**151037**	**148007**
	80 - 36	100.00 - 155.00	90.00	60.00	–	3.20 (kg)	113	**151038**	**148007**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	114	**151038**	**148009**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii

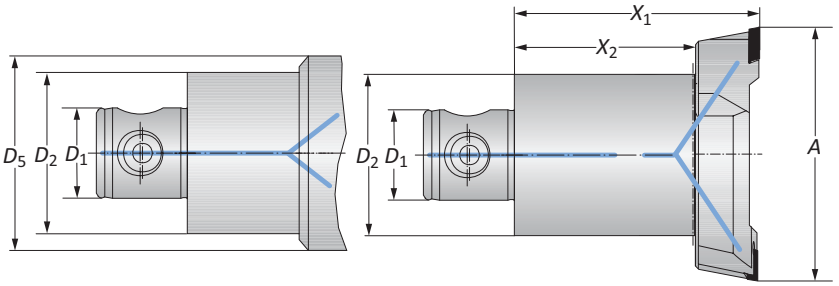
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Same Level Tangential Inserts

Diameter Range: 2.086" - 8.070" (53.00mm - 205.00mm)



	Connection	Boring Range	Twin Cutter					Part No.	
	D_2 | D_1	A	X_1	X_2	D_5	Weight	Insert Form	Insert Holder	Serrated Body
	40 - 22	2.086 - 2.598	2.953	2.165	–	1.543 (lbs)	04	**151022**	**148004**
	50 - 28	2.559 - 3.267	2.953	2.165	–	2.204 (lbs)	04	**151032**	**148005**
	50 - 28	2.559 - 3.267	2.953	2.165	–	2.204 (lbs)	05	**151043**	**148005**
ⓘ	63 - 36	3.228 - 4.055	3.543	2.362	–	4.850 (lbs)	05	**151035**	**148006**
	80 - 36	3.937 - 5.118	3.543	2.362	–	6.613 (lbs)	05	**151009**	**148007**
	80 - 36	4.921 - 6.102	3.543	2.362	–	6.843 (lbs)	05	**151010**	**148007**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	05	**151010**	**148009**
	40 - 22	53.00 - 66.00	75.00	55.00	–	0.70 (kg)	04	**151022**	**148004**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.00 (kg)	04	**151032**	**148005**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.00 (kg)	05	**151043**	**148005**
ⓜ	63 - 36	82.00 - 103.00	90.00	60.00	–	2.20 (kg)	05	**151035**	**148006**
	80 - 36	100.00 - 130.00	90.00	60.00	–	3.00 (kg)	05	**151009**	**148007**
	80 - 36	125.00 - 155.00	90.00	60.00	–	3.10 (kg)	05	**151010**	**148007**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	05	**151010**	**148009**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-H | B10-F | B10: xii-xiii

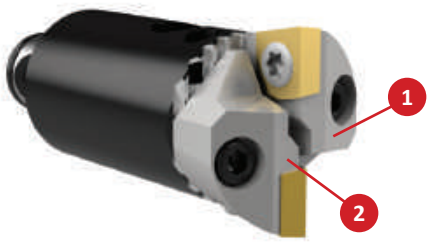
Key on B10-D: 1

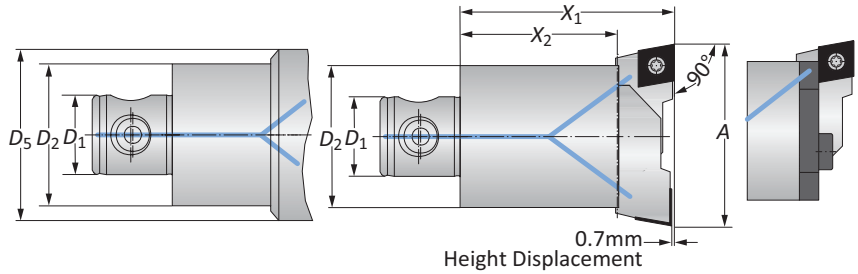
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Height Displaced

Diameter Range: 1.141" - 4.055" (29.00mm - 103.00mm)





	Connection	Boring Range	Twin Cutter					Part No.		
	D_2 | D_1	A	X_1	X_2	D_5	Weight	Insert Form	1 Insert Holder	2. Insert Holder	Serrated Body
	25 - 14	1.141 - 1.456	2.205	1.653	–	0.440 (lbs)	103	**151001**	**151061**	**148001**
	25 - 14	1.417 - 1.732	2.205	1.653	1.811	0.440 (lbs)	103	**151002**	**151062**	**148002**
	32 - 18	1.417 - 1.732	2.205	1.653	1.811	0.881 (lbs)	103	**151002**	**151062**	**148017**
	32 - 18	1.692 - 2.125	2.598	1.811	1.417	0.881 (lbs)	104	**151003**	**151093**	**148003**
ⓘ	40 - 22	1.692 - 2.125	2.598	1.811	1.417	1.543 (lbs)	104	**151003**	**151093**	**148018**
	40 - 22	2.086 - 2.598	2.953	2.165	–	1.543 (lbs)	104	**151004**	**151094**	**148004**
	50 - 28	2.559 - 3.267	2.953	2.165	–	2.425 (lbs)	104	**151005**	**151095**	**148005**
	63 - 36	3.229 - 4.055	3.543	2.362	–	5.291 (lbs)	104	**151086**	**151090**	**148006**
	63 - 36	3.229 - 4.055	3.543	2.362	–	5.291 (lbs)	105	**151006**	**151096**	**148006**
	25 - 14	29.00 - 37.00	56.00	42.00	–	0.20 (kg)	103	**151001**	**151061**	**148001**
	25 - 14	36.00 - 44.00	56.00	42.00	30.00	0.20 (kg)	103	**151002**	**151062**	**148002**
	32 - 18	36.00 - 44.00	56.00	42.00	30.00	0.40 (kg)	103	**151002**	**151062**	**148017**
	32 - 18	43.00 - 54.00	66.00	46.00	36.00	0.40 (kg)	104	**151003**	**151093**	**148003**
ⓜ	40 - 22	43.00 - 54.00	66.00	46.00	36.00	0.70 (kg)	104	**151003**	**151093**	**148018**
	40 - 22	53.00 - 66.00	75.00	55.00	–	0.70 (kg)	104	**151004**	**151094**	**148004**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.10 (kg)	104	**151005**	**151095**	**148005**
	63 - 36	82.00 - 103.00	90.00	60.00	–	2.40 (kg)	104	**151086**	**151090**	**148006**
	63 - 36	82.00 - 103.00	90.00	60.00	–	2.40 (kg)	105	**151006**	**151096**	**148006**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii

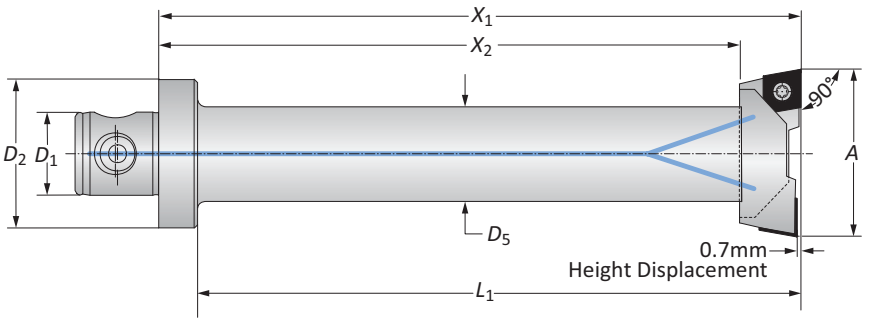
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Height Displaced

5xD | Diameter Range: 1.141" - 2.598" (29.00mm - 66.00mm)



	Connection	Boring Range	Twin Cutter						Part No.		
	$D_2 \mid D_1$	A	X_1	X_2	L_1	D_5	Weight	Insert Form	1. Insert Holder	2. Insert Holder	Serrated Body
i	50 - 28	1.141 - 1.456	6.102	5.551	5.590	1.023	1.984 (lbs)	103	**151001**	**151061**	**148021**
	50 - 28	1.417 - 1.732	6.889	6.338	6.377	1.259	2.866 (lbs)	103	**151002**	**151062**	**148022**
	50 - 28	1.692 - 2.125	8.465	7.677	7.952	1.456	4.188 (lbs)	104	**151003**	**151093**	**148023**
	50 - 28	2.086 - 2.598	8.465	7.677	7.951	1.732	5.511 (lbs)	104	**151004**	**151094**	**148024**
m	50 - 28	29.00 - 37.00	155.00	141.00	142.00	26.00	0.90 (kg)	103	**151001**	**151061**	**148021**
	50 - 28	36.00 - 44.00	175.00	161.00	162.00	32.00	1.30 (kg)	103	**151002**	**151062**	**148022**
	50 - 28	43.00 - 54.00	215.00	195.00	202.00	37.00	1.90 (kg)	104	**151003**	**151093**	**148023**
	50 - 28	53.00 - 66.00	215.00	195.00	202.00	44.00	2.50 (kg)	104	**151004**	**151094**	**148024**

NOTE: Different lengths available upon request.
NOTE: Insert holders sold in quantities of 1 and inserts sold separately

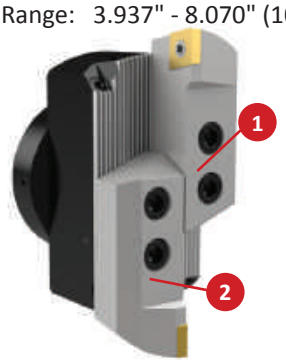
B10-N: 10-13
Key on B10-D: 1
B10-D: 22
B10-H
B10-F
B10: xii-xiii

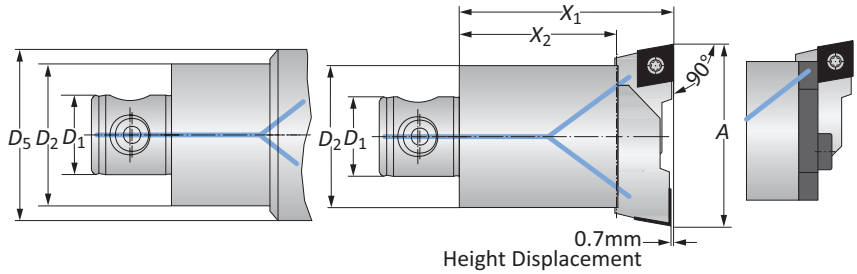
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Height Displaced

Diameter Range: 3.937" - 8.070" (100.00mm - 205.00mm)





	Connection	Boring Range	Twin Cutter					Part No.		
	D_2 | D_1	A	X_1	X_2	D_5	Weight	Insert Form	1. Insert Holder	2. Insert Holder	Serrated Body
ⓘ	80 - 36	3.937 - 5.118	3.543	2.362	–	6.613 (lbs)	104	**151087**	**151091**	**148007**
	80 - 36	3.937 - 5.118	3.543	2.362	–	6.613 (lbs)	105	**151007**	**151097**	**148007**
	80 - 36	4.921 - 6.102	3.543	2.362	–	7.054 (lbs)	104	**151088**	**151092**	**148007**
	80 - 36	4.921 - 6.102	3.543	2.362	–	7.054 (lbs)	105	**151008**	**151098**	**148007**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	104	**151088**	**151092**	**148009**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	105	**151008**	**151098**	**148009**
ⓜ	80 - 36	100.00 - 130.00	90.00	60.00	–	3.00 (kg)	104	**151087**	**151091**	**148007**
	80 - 36	100.00 - 130.00	90.00	60.00	–	3.00 (kg)	105	**151007**	**151097**	**148007**
	80 - 36	125.00 - 155.00	90.00	60.00	–	3.20 (kg)	104	**151088**	**151092**	**148007**
	80 - 36	125.00 - 155.00	90.00	60.00	–	3.20 (kg)	105	**151008**	**151098**	**148007**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	104	**151088**	**151092**	**148009**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	105	**151008**	**151098**	**148009**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii

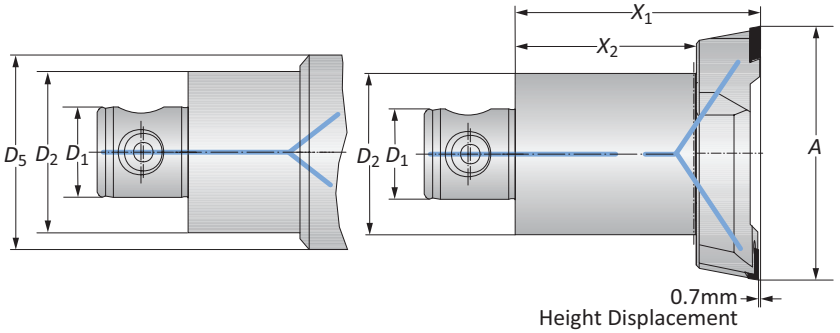
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Twin Cutters Height Displaced Tangential Inserts

Diameter Range: 2.086" - 8.070" (53.00mm - 205.00mm)



	Connection	Boring Range	Twin Cutter					Part No.		
	$D_2 \mid D_1$	A	X_1	X_2	D_5	Weight	Insert Form	1. Insert Holder	2. Insert Holder	Serrated Body
	40 - 22	2.086 - 2.598	2.953	2.165	–	1.543 (lbs)	04	**151022**	**268009**	**148004**
	50 - 28	2.559 - 3.267	2.953	2.165	–	2.204 (lbs)	04	**151032**	**268010**	**148005**
	50 - 28	2.559 - 3.267	2.953	2.165	–	2.204 (lbs)	05	**151043**	**268019**	**148005**
ⓘ	63 - 36	3.229 - 4.055	3.543	2.362	–	5.291 (lbs)	04	**151034**	**268020**	**148006**
ⓘ	63 - 36	3.229 - 4.055	3.543	2.362	–	5.291 (lbs)	05	**151035**	**268021**	**148006**
	80 - 36	3.937 - 5.118	3.543	2.362	–	6.613 (lbs)	05	**151009**	**268022**	**348007**
	80 - 36	4.921 - 6.102	3.543	2.362	–	6.834 (lbs)	05	**151010**	**268023**	**348007**
	80 - 36	5.905 - 8.070	3.543	2.362	4.921	8.818 (lbs)	05	**151010**	**268023**	**349009**
	40 - 22	53.00 - 66.00	75.00	55.00	–	0.70 (kg)	04	**151022**	**268009**	**148004**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.00 (kg)	04	**151032**	**268010**	**148005**
	50 - 28	65.00 - 83.00	75.00	55.00	–	1.00 (kg)	05	**151043**	**268019**	**148005**
ⓜ	63 - 36	82.00 - 103.00	90.00	60.00	–	2.20 (kg)	04	**151034**	**268020**	**148006**
ⓜ	63 - 36	82.00 - 103.00	90.00	60.00	–	2.20 (kg)	05	**151035**	**268021**	**148006**
	80 - 36	100.00 - 130.00	90.00	60.00	–	3.00 (kg)	05	**151009**	**268022**	**348007**
	80 - 36	125.00 - 155.00	90.00	60.00	–	3.10 (kg)	05	**151010**	**268023**	**348007**
	80 - 36	150.00 - 205.00	90.00	60.00	125.00	4.00 (kg)	05	**151010**	**268023**	**349009**

NOTE: Insert holders sold in quantities of 1 and inserts sold separately

B10-N: 10-13 | B10-D: 22 | B10-H | B10-F | B10: xii-xiii

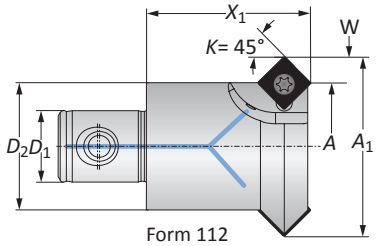
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

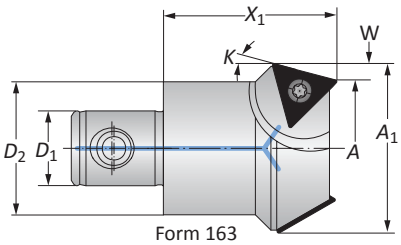
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Chamfering Tools

Diameter Range: 0.984" - 1.259" (20.00mm - 32.00mm)



Form 112



Form 163

	Connection D_2 | D_1	Approach Angle K	Boring Range A	Cutter Diameter A_1	Chamfering Tool X_1	Chamfering Tool W	Weight	Insert Form	Number of Inserts	Part No.
	25 - 14	15°	0.984	1.299	1.220	0.157	0.330 (lbs)	163	2	**201087**
	25 - 14	45°	0.787	1.299	1.220	0.255	0.330 (lbs)	112	2	**201082**
ⓘ	32 - 18	15°	1.259	1.574	1.614	0.157	0.440 (lbs)	163	2	**201088**
	32 - 18	30°	0.984	1.614	1.614	0.314	0.440 (lbs)	163	2	**201089**
	32 - 18	45°	1.259	1.771	1.614	0.255	0.440 (lbs)	112	3	**201083**
	25 - 14	15°	25.00	33.00	31.00	4.00	0.15 (kg)	163	2	**201087**
	25 - 14	45°	20.00	33.00	31.00	6.50	0.15 (kg)	112	2	**201082**
ⓜ	32 - 18	15°	32.00	40.00	41.00	4.00	0.20 (kg)	163	2	**201088**
	32 - 18	30°	25.00	41.00	41.00	8.00	0.20 (kg)	163	2	**201089**
	32 - 18	45°	32.00	45.00	41.00	6.50	0.20 (kg)	112	3	**201083**

NOTE: K 45° for front and reverse side chamfering
NOTE: Insert holders and inserts sold separately

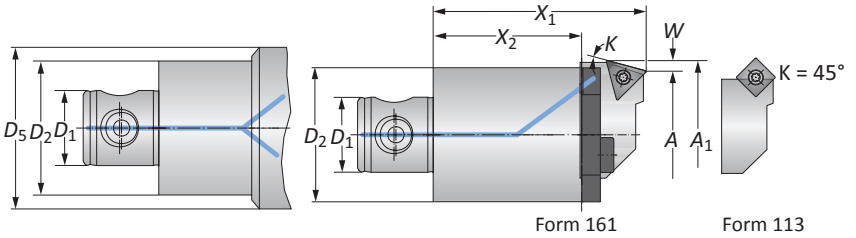
B10-N: 10-13 | B10-D: 22 | B10-H | B10-F | B10: xii-xiii
Key on B10-D: 1

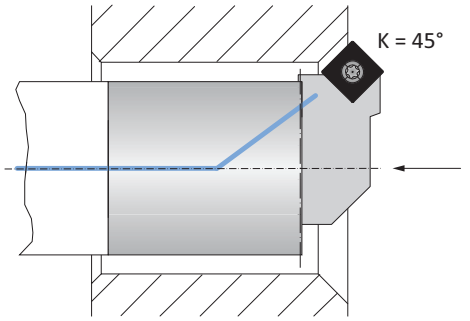
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Chamfering Tools

Imperial | Diameter Range: 0.944" - 2.204"





	Connection $D_2 \mid D_1$	Approach Angle K	Boring Range A	Chamfering Range A_1	Chamfering Tool X_1	X_2	D_5	W	Weight (lbs)	Insert Form	Part No. Insert Holder	Serrated Body
	25 - 14	15°	0.945 - 1.260	1.141 - 1.456	2.362	1.653	–	0.098	0.440 (lbs)	161	**201057**	**148001**
	25 - 14	15°	1.220 - 1.535	1.417 - 1.732	2.362	1.653	1.181	0.098	0.440 (lbs)	161	**201058**	**148002**
	25 - 14	20°	0.866 - 1.181	1.141 - 1.456	2.362	1.653	–	0.138	0.440 (lbs)	161	**201017**	**148001**
	25 - 14	20°	1.142 - 1.457	1.417 - 1.732	2.362	1.653	1.181	0.138	0.440 (lbs)	161	**201018**	**148002**
	25 - 14	30°	0.787 - 1.102	1.141 - 1.456	2.362	1.653	-	0.138	0.440 (lbs)	161	**201067**	**148001**
	25 - 14	30°	1.063 - 1.378	1.417 - 1.732	2.362	1.653	1.181	0.138	0.440 (lbs)	161	**201068**	**148002**
	25 - 14	45°	0.748 - 1.063	1.141 - 1.456	2.283	1.653	–	0.197	0.440 (lbs)	161	**201003***	**148001**
	25 - 14	45°	1.024 - 1.339	1.417 - 1.732	2.283	1.653	–	0.197	0.440 (lbs)	161	**201004***	**148001**
	25 - 14	45°	1.220 - 1.535	1.692 - 2.007	2.362	1.653	1.181	0.236	0.440 (lbs)	112	**201007**	**148002**
	32 - 18	15°	1.220 - 1.535	1.417 - 1.732	2.362	1.653	1.181	0.098	0.440 (lbs)	161	**201058**	**148017**
	32 - 18	20°	1.142 - 1.457	1.417 - 1.732	2.362	1.653	1.181	0.138	0.440 (lbs)	161	**201018**	**148017**
	32 - 18	30°	1.063 - 1.378	1.417 - 1.732	2.362	1.653	1.181	0.138	0.440 (lbs)	161	**201068**	**148017**
ⓘ	32 - 18	45°	1.220 - 1.535	1.692 - 2.007	2.362	1.653	1.181	0.236	0.440 (lbs)	112	**201007**	**148017**
	32 - 18	15°	1.378 - 1.811	1.692 - 2.125	2.795	1.811	1.417	0.157	0.881 (lbs)	163	**201059**	**148003**
	32 - 18	20°	1.299 - 1.732	1.692 - 2.125	2.795	1.811	1.417	0.197	0.881 (lbs)	163	**201019**	**148003**
	32 - 18	30°	1.102 - 1.535	1.692 - 2.125	2.795	1.811	1.417	0.197	0.881 (lbs)	163	**201069**	**148003**
	32 - 18	45°	1.378 - 1.811	1.196 - 2.401	2.598	1.811	1.417	0.295	0.881 (lbs)	113	**201008**	**148003**
	40 - 22	15°	1.378 - 1.811	1.692 - 2.125	2.795	1.811	1.417	0.157	0.881 (lbs)	163	**201059**	**148018**
	40 - 22	20°	1.299 - 1.732	1.692 - 2.125	2.795	1.811	1.417	0.197	0.881 (lbs)	163	**201019**	**148018**
	40 - 22	30°	1.102 - 1.535	1.692 - 2.125	2.795	1.811	1.417	0.197	0.881 (lbs)	163	**201069**	**148018**
	40 - 22	45°	1.378 - 1.811	1.196 - 2.401	2.598	1.811	1.417	0.295	0.881 (lbs)	113	**201008**	**148018**
	40 - 22	15°	1.457 - 1.969	1.771 - 2.283	3.150	2.165	–	0.157	1.543 (lbs)	163	**201060**	**148004**
	40 - 22	20°	1.457 - 1.969	1.850 - 2.362	3.150	2.165	–	0.197	1.543 (lbs)	163	**201020**	**148004**
	40 - 22	30°	1.457 - 1.969	2.047 - 2.559	3.150	2.165	–	0.197	1.543 (lbs)	163	**201070**	**148004**
	40 - 22	45°	1.963 - 2.205	2.283 - 2.795	3.150	2.165	–	0.295	1.543 (lbs)	113	**201009**	**148004**

*Insert holder cannot be used for reverse machining.
NOTE: K 45° for front and reverse side chamfering above Ø 1.220"
NOTE: Insert holders, cover plates, and inserts sold separately

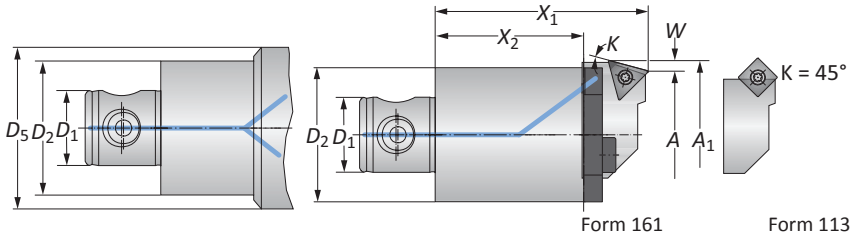
B10-N: 10-13 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii
Key on B10-D: 1

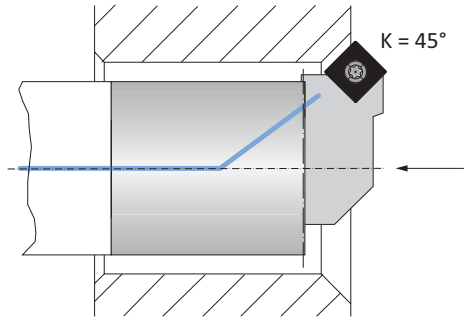
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Chamfering Tools

Metric | Diameter Range: (24.00mm - 56.00mm)





	Connection	Approach Angle	Boring Range	Chamfering Range	Chamfering Tool				Weight	Insert	Part No.	
	$D_2 \mid D_1$	K	A	A_1	X_1	X_2	D_5	W	(lbs)	Form	Insert Holder	Serrated Body
	25 - 14	15°	24.00 - 32.00	29.00 - 37.00	60.00	42.00	–	2.50	0.20 (kg)	161	**201057**	**148001**
	25 - 14	15°	31.00 - 39.00	36.00 - 44.00	60.00	42.00	30.00	2.50	0.20 (kg)	161	**201058**	**148002**
	25 - 14	20°	22.00 - 30.00	29.00 - 37.00	60.00	42.00	–	3.50	0.20 (kg)	161	**201017**	**148001**
	25 - 14	20°	29.00 - 37.00	36.00 - 44.00	60.00	42.00	30.00	3.50	0.20 (kg)	161	**201018**	**148002**
	25 - 14	30°	20.00 - 28.00	29.00 - 37.00	60.00	42.00	-	3.50	0.20 (kg)	161	**201067**	**148001**
	25 - 14	30°	27.00 - 35.00	36.00 - 44.00	60.00	42.00	30.00	3.50	0.20 (kg)	161	**201068**	**148002**
	25 - 14	45°	19.00 - 27.00	29.00 - 37.00	58.00	42.00	–	5.00	0.20 (kg)	161	**201005**	**148001**
	25 - 14	45°	26.00 - 34.00	36.00 - 44.00	58.00	42.00	–	5.00	0.20 (kg)	161	**201006**	**148001**
	25 - 14	45°	31.00 - 39.00	43.00 - 51.00	60.00	42.00	30.00	6.00	0.20 (kg)	112	**201007**	**148002**
	32 - 18	15°	31.00 - 39.00	36.00 - 44.00	60.00	42.00	30.00	2.50	0.20 (kg)	161	**201058**	**148017**
	32 - 18	20°	29.00 - 37.00	36.00 - 44.00	60.00	42.00	30.00	3.50	0.20 (kg)	161	**201018**	**148017**
	32 - 18	30°	27.00 - 35.00	36.00 - 44.00	60.00	42.00	30.00	3.50	0.20 (kg)	161	**201068**	**148017**
ⓜ	32 - 18	45°	31.00 - 39.00	43.00 - 51.00	60.00	42.00	30.00	6.00	0.20 (kg)	112	**201077**	**148017**
	32 - 18	15°	35.00 - 46.00	43.00 - 54.00	71.00	46.00	36.00	4.00	0.40 (kg)	163	**201059**	**148003**
	32 - 18	20°	33.00 - 44.00	43.00 - 54.00	71.00	46.00	36.00	5.00	0.40 (kg)	163	**201019**	**148003**
	32 - 18	30°	28.00 - 39.00	43.00 - 54.00	71.00	46.00	36.00	5.00	0.40 (kg)	163	**201069**	**148003**
	32 - 18	45°	35.00 - 46.00	50.00 - 61.00	66.00	46.00	36.00	7.50	0.40 (kg)	113	**201008**	**148003**
	40 - 22	15°	35.00 - 4600	43.00 - 54.00	71.00	46.00	36.00	4.00	0.40 (kg)	163	**201059**	**148018**
	40 - 22	20°	33.00 - 44.00	43.00 - 54.00	71.00	46.00	36.00	5.00	0.40 (kg)	163	**201019**	**148018**
	40 - 22	30°	28.00 - 39.00	43.00 - 54.00	71.00	46.00	36.00	5.00	0.40 (kg)	163	**201069**	**148018**
	40 - 22	45°	35.00 -46.00	50.00 - 61.00	66.00	46.00	36.00	7.50	0.40 (kg)	113	**201008**	**148018**
	40 - 22	15°	37.00 - 50.00	45.00 - 58.00	80.00	55.00	–	4.00	0.70 (kg)	163	**201060**	**148004**
	40 - 22	20°	37.00 - 50.00	47.00 - 60.00	80.00	55.00	–	5.00	0.70 (kg)	163	**201020**	**148004**
	40 - 22	30°	37.00 - 50.00	52.00 - 65.00	80.00	55.00	–	5.00	0.70 (kg)	163	**201070**	**148004**
	40 - 22	45°	43.00 - 56.00	58.00 - 71.00	80.00	55.00	–	7.50	0.70 (kg)	113	**201009**	**148004**

*Insert holder cannot be used for reverse machining.
NOTE: K 45° for front and reverse side chamfering above Ø 31.00mm
NOTE: Insert holders, cover plates, and inserts sold separately

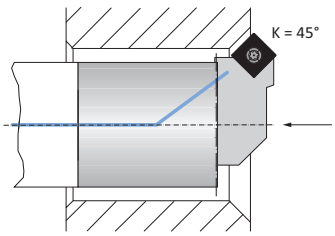
B10-N: 10-13 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii
Key on B10-D: 1

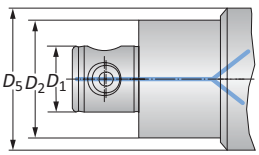
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

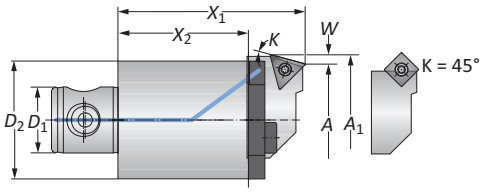
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Chamfering Tools

Diameter Range: 1.968" - 7.913" (50.00mm - 201.00mm)







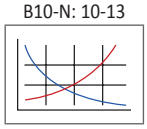
Form 161 Form 113

	Connection	Approach Angle	Boring Range	Chamfering Range	Chamfering Tool				Weight	Insert Form	Part No.	
	D_2 | D_1	K	A	A_1	X_1	X_2	D_5	W			Insert Holder	Serrated Body
ⓘ	50 - 28	15°	1.968 - 2.677	2.283 - 2.992	3.150	2.165	–	0.157	2.204 (lbs)	163	**201061**	**148005**
	50 - 28	20°	1.968 - 2.677	2.362 - 3.070	3.150	2.165	–	0.197	2.204 (lbs)	163	**201021**	**148005**
	50 - 28	30°	1.968 - 2.677	2.559 - 3.267	3.150	2.165	–	0.197	2.204 (lbs)	163	**201071**	**148005**
	50 - 28	45°	2.165 - 2.874	2.755 - 3.464	3.150	2.165	–	0.295	2.204 (lbs)	113	**201010**	**148005**
	63 - 36	15°	2.677 - 3.503	2.992 - 3.818	3.543	2.362	–	0.157	4.188 (lbs)	163	**201062**	**148006**
	63 - 36	20°	2.677 - 3.503	3.070 - 3.897	3.543	2.362	–	0.197	4.188 (lbs)	163	**201022**	**148006**
	63 - 36	30°	2.677 - 3.503	3.267 - 4.094	3.543	2.362	–	0.197	4.188 (lbs)	163	**201072**	**148006**
	63 - 36	45°	2.834 - 3.661	3.425 - 4.251	3.543	2.362	–	0.295	4.188 (lbs)	113	**201011**	**148006**
	80 - 36	15°	3.503 - 4.685	3.818 - 5.000	3.543	2.362	–	0.157	5.732 (lbs)	163	**201063**	**148007**
	80 - 36	15°	4.685 - 5.866	5.000 - 6.259	3.543	2.362	–	0.157	5.952 (lbs)	163	**201064**	**148007**
	80 - 36	15°	5.669 - 7.834	5.984 - 8.149	3.543	2.362	4.921	0.157	7.936 (lbs)	163	**201064**	**148009**
	80 - 36	20°	3.503 - 4.685	3.989 - 5.078	3.543	2.362	–	0.197	5.732 (lbs)	163	**201023**	**148007**
	80 - 36	20°	4.685 - 5.866	5.078 - 6.259	3.543	2.362	–	0.197	5.952 (lbs)	163	**201024**	**148007**
	80 - 36	20°	5.669 - 7.834	6.062 - 8.228	3.543	2.362	4.921	0.197	7.936 (lbs)	163	**201024**	**148009**
	80 - 36	30°	3.503 - 4.685	4.094 - 5.275	3.543	2.362	–	0.197	5.732 (lbs)	163	**201073**	**148007**
	80 - 36	30°	4.685 - 5.866	5.275 - 6.456	3.543	2.362	–	0.197	5.952 (lbs)	163	**201074**	**148007**
	80 - 36	30°	5.666 - 7.834	6.259 - 8.425	3.543	2.362	4.921	0.197	7.936 (lbs)	163	**201074**	**148009**
	80 - 36	45°	3.622 - 4.803	4.212 - 5.393	3.543	2.362	–	0.295	5.732 (lbs)	113	**201012**	**148007**
	80 - 36	45°	4.763 - 5.944	5.354 - 6.535	3.543	2.362	–	0.295	5.952 (lbs)	113	**201013**	**148007**
	80 - 36	45°	5.748 - 7.913	6.338 - 8.503	3.543	2.362	4.921	0.295	7.936 (lbs)	113	**201013**	**148009**
	50 - 28	15°	50.00 - 68.00	58.00 - 76.00	80.00	55.00	–	4.00	1.00 (kg)	163	**201061**	**148005**
	50 - 28	20°	50.00 - 68.00	60.00 - 78.00	80.00	55.00	–	5.00	1.00 (kg)	163	**201021**	**148005**
	50 - 28	30°	50.00 - 68.00	65.00 - 83.00	80.00	55.00	–	5.00	1.00 (kg)	163	**201071**	**148005**
	50 - 28	45°	55.00 - 73.00	70.00 - 88.00	80.00	55.00	–	7.50	1.00 (kg)	113	**201010**	**148005**
	63 - 36	15°	68.00 - 89.00	76.00 - 97.00	90.00	60.00	–	4.00	1.90 (kg)	163	**201062**	**148006**
	63 - 36	20°	68.00 - 89.00	78.00 - 99.00	90.00	60.00	–	5.00	1.90 (kg)	163	**201022**	**148006**
	63 - 36	30°	68.00 - 89.00	83.00 - 104.00	90.00	60.00	–	5.00	1.90 (kg)	163	**201072**	**148006**
	63 - 36	45°	72.00 - 93.00	87.00 - 108.00	90.00	60.00	–	7.50	1.90 (kg)	113	**201011**	**148006**
	80 - 36	15°	89.00 - 119.00	97.00 - 127.00	90.00	60.00	–	4.00	2.60 (kg)	163	**201063**	**148007**
ⓜ	80 - 36	15°	119.00 - 149.00	127.00 - 159.00	90.00	60.00	–	4.00	2.70 (kg)	163	**201064**	**148007**
	80 - 36	15°	144.00 - 199.00	152.00 - 207.00	90.00	60.00	125.00	4.00	3.60 (kg)	163	**201064**	**148009**
	80 - 36	20°	89.00 - 119.00	99.00 - 129.00	90.00	60.00	–	5.00	2.60 (kg)	163	**201023**	**148007**
	80 - 36	20°	119.00 - 149.00	129.00 - 159.00	90.00	60.00	–	5.00	2.70 (kg)	163	**201024**	**148007**
	80 - 36	20°	144.00 - 199.00	154.00 - 209.00	90.00	60.00	125.00	5.00	3.60 (kg)	163	**201024**	**148009**
	80 - 36	30°	89.00 - 119.00	104.00 - 134.00	90.00	60.00	–	5.00	2.60 (kg)	163	**201073**	**148007**
	80 - 36	30°	119.00 - 149.00	134.00 - 164.00	90.00	60.00	–	5.00	2.70 (kg)	163	**201074**	**148007**
	80 - 36	30°	144.00 - 199.00	159.00 - 214.00	90.00	60.00	125.00	5.00	3.60 (kg)	163	**201074**	**148009**
	80 - 36	45°	92.00 - 122.00	107.00 - 137.00	90.00	60.00	–	7.50	2.60 (kg)	113	**201012**	**148007**
	80 - 36	45°	121.00 - 151.00	136.00 - 166.00	90.00	60.00	–	7.50	2.70 (kg)	113	**201013**	**148007**
	80 - 36	45°	146.00 - 201.00	161.00 - 216.00	90.00	60.00	125.00	7.50	3.60 (kg)	113	**201013**	**148009**

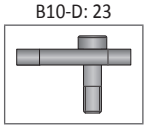
NOTE: K 45° = front and reverse side chamfering

NOTE: Insert holders, cover plates, and inserts sold separately

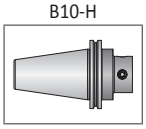
B10-N: 10-13 (Key on B10-D: 1)



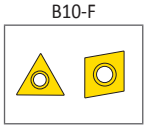
B10-D: 23



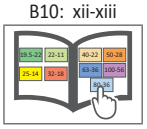
B10-H



B10-F



B10: xii-xiii

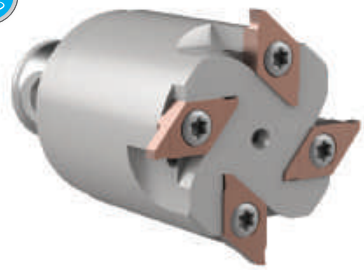


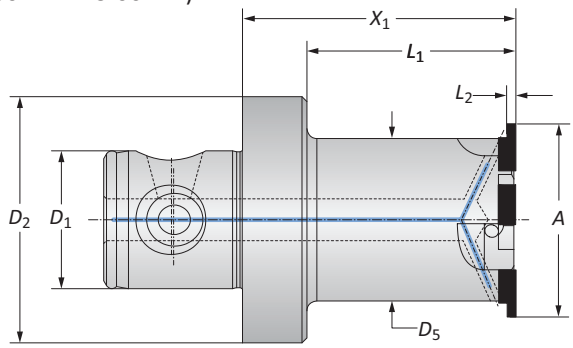
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Grooving Tools for Circular Milling

Diameter Range: > Ø 0.787" (20.00mm) 0.787" - 3.110" (20.00mm - 79.00mm)





	Connection	Cutter Diameter	Grooving Tool			Groove Width					
	$D_2 \mid D_1$	A	X_1	L_1	D_5	L_2	Groove Depth	Number of Inserts	Weight	Insert Form	Part No.
	50 - 28	0.787	2.165	1.575	0.669	0.093	0.059	2	0.881 (lbs)	89	**143051**
	50 - 28	0.787	3.740	3.228	0.669	0.093	0.059	2	0.881 (lbs)	89	**143052**
	50 - 28	1.535	2.165	1.654	1.299	0.133	0.098	4	1.322 (lbs)	90	**143053**
ⓘ	32 - 18	1.535	1.575	1.575	1.299	0.133	0.098	4	0.661 (lbs)	90	**143054**
	50 - 28	1.929	2.165	1.575	1.692	0.133	0.098	5	1.543 (lbs)	90	**143055**
	40 - 22	1.929	1.575	1.575	1.692	0.133	0.098	5	1.102 (lbs)	90	**143056**
	50 - 28	2.480	1.575	1.575	2.086	0.231	0.185	6	1.543 (lbs)	91	**143057**
	63 - 36	3.110	1.575	1.575	2.716	0.231	0.185	8	2.645 (lbs)	91	**143058**
	50 - 28	20.00	55.00	40.00	17.00	2.37	1.50	2	0.40 (kg)	89	**143051**
	50 - 28	20.00	95.00	82.00	17.00	2.37	1.50	2	0.40 (kg)	89	**143052**
	50 - 28	39.00	55.00	42.00	33.00	3.37	2.50	4	0.60 (kg)	90	**143053**
ⓜ	32 - 18	39.00	40.00	40.00	33.00	3.37	2.50	4	0.30 (kg)	90	**143054**
	50 - 28	49.00	55.00	40.00	43.00	3.37	2.50	5	0.70 (kg)	90	**143055**
	40 - 22	49.00	40.00	40.00	43.00	3.37	2.50	5	0.50 (kg)	90	**143056**
	50 - 28	63.00	40.00	40.00	53.00	5.87	4.70	6	0.70 (kg)	91	**143057**
	63 - 36	79.00	40.00	40.00	69.00	5.87	4.70	8	1.20 (kg)	91	**143058**

NOTE: Different lengths available upon request.
NOTE: Insert holders, cover plates, and inserts sold separately

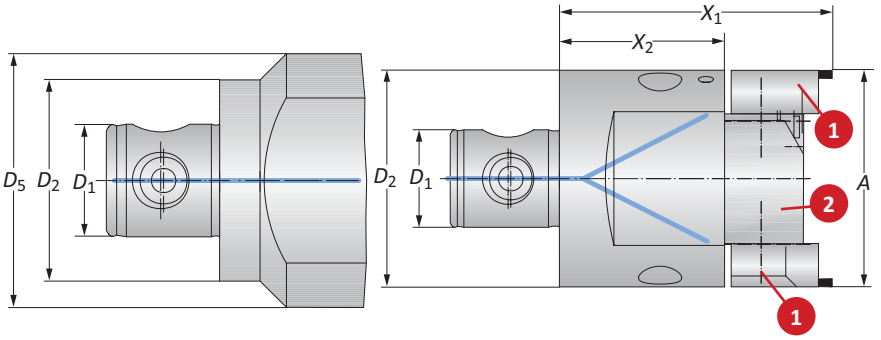
B10-N: 10-13 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Axial Grooving Tools

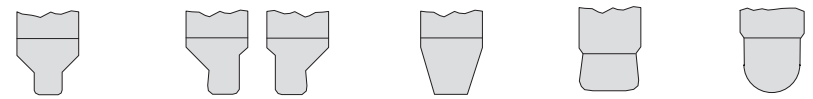
Diameter Range: 0.787" - 8.070" (20.00mm - 205.00mm)



	Connection	Boring Range	Grooving Tool				Part No.			
	$D_2 \mid D_1$	A	X_1	X_2	D_5	Weight	1. Support Block	Insert Form	2. Insert Holder	Serrated Tool Body
ⓘ	50 - 28	0.787 - 2.125	3.268	2.165	2.480	2.866 (lbs)	–	304	226009	148010
	80 - 36	2.086 - 3.267	3.937	2.362	–	5.732 (lbs)	226011	304	226010	148007
	80 - 36	3.228 - 6.102	3.937	2.362	4.921	8.157 (lbs)	226012	304	226010	348009
	80 - 36	5.905 - 8.070	3.937	2.362	4.921	8.157 (lbs)	226013	304	226010	148009
ⓜ	50 - 28	20.00 - 54.00	83.00	55.00	63.00	1.30 (kg)	–	304	226009	148010
	80 - 36	53.00 - 83.00	100.00	60.00	–	2.60 (kg)	226011	304	226010	148007
	80 - 36	82.00 - 155.00	100.00	60.00	125.00	3.70 (kg)	226012	304	226010	348009
	80 - 36	150.00 - 205.00	100.00	60.00	125.00	3.70 (kg)	226013	304	226010	148009

NOTE: Groove width is 0.039" - 0.196" (1.00mm - 5.00mm) | Groove depth is 0.000" - 0.157" (0.00mm - 4.00mm)
NOTE: Support block with machining diameters smaller than 4.842" (123.00mm) can only be secured with one screw
NOTE: Insert holders, support blocks and inserts sold separately

Examples of recessing replaceable inserts:



Two-Sided Cutting Form | Single-Sided Cutting Form (Right / Left) | Two-Sided Angle Cutting | With Corner Radius | Full Radius

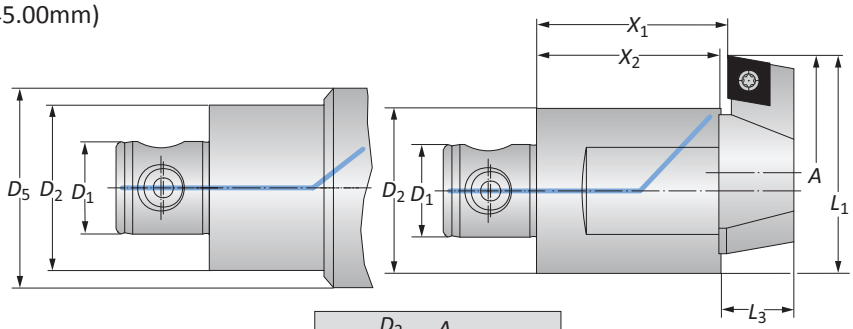
B10-N: 10-13 | B10-D: 22-23 | B10-H | B10-F | B10: xii-xiii
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Reverse Machining Tools

Diameter Range: 1.141" - 9.645" (29.00mm - 245.00mm)



$$L_1 = \frac{D_2}{2} + \frac{A}{2} + 0.5\text{mm}$$

	Connection	Boring Range	Reverse Machining						Part No.	
	D_2 | D_1	A	X_1	X_2	L_3	D_5	Weight	Insert Form	Insert Holder	Serrated Tool Body
	25 - 14	1.141 - 1.456	1.575	1.535	0.551	–	0.440 (lbs)	103	**251001**	**148011**
	25 - 14	1.338 - 1.653	1.575	1.535	0.551	–	0.440 (lbs)	103	**251002**	**148011**
	25 - 14	1.417 - 1.732	1.575	1.535	0.551	–	0.440 (lbs)	103	**251002**	**148012**
	25 - 14	1.732 - 2.047	1.575	1.535	0.708	–	0.440 (lbs)	104	**251003**	**148012**
	32 - 18	1.692 - 2.125	1.575	1.535	0.708	–	0.661 (lbs)	104	**251003**	**148013**
	32 - 18	2.165 - 2.598	1.575	1.535	0.708	–	0.881 (lbs)	104	**251004**	**148013**
	40 - 22	2.086 - 2.834	1.575	1.535	0.708	–	1.102 (lbs)	104	**251004**	**148014**
ⓘ	40 - 22	2.598 - 3.346	1.575	1.535	0.708	–	1.102 (lbs)	104	**251005**	**148014**
	50 - 28	2.755 - 3.740	2.205	2.165	0.866	–	2.425 (lbs)	104	**251006**	**148015**
	50 - 28	3.622 - 4.606	2.205	2.165	0.866	–	2.866 (lbs)	104	**251007**	**148015**
	63 - 36	3.622 - 4.803	2.205	2.165	0.866	–	3.747 (lbs)	104	**251007**	**148016**
	80 - 36	4.724 - 5.905	2.441	2.362	1.023	–	5.952 (lbs)	104	**251008**	**148007**
	80 - 36	6.535 - 7.716	2.441	2.362	1.023	–	6.393 (lbs)	104	**251009**	**148007**
	80 - 36	5.708 - 7.874	2.441	2.362	1.023	4.921	7.936 (lbs)	104	**251008**	**148009**
	80 - 36	7.480 - 9.645	2.441	2.362	1.023	4.921	8.157 (lbs)	104	**251009**	**148009**
	25 - 14	29.00 - 37.00	40.00	39.00	14.00	–	0.20 (kg)	103	**251001**	**148011**
	25 - 14	34.00 - 42.00	40.00	39.00	14.00	–	0.20 (kg)	103	**251002**	**148011**
	25 - 14	36.00 - 44.00	40.00	39.00	14.00	–	0.20 (kg)	103	**251002**	**148012**
	25 - 14	44.00 - 52.00	40.00	39.00	18.00	–	0.20 (kg)	104	**251003**	**148012**
	32 - 18	43.00 - 54.00	40.00	39.00	18.00	–	0.30 (kg)	104	**251003**	**148013**
	32 - 18	55.00 - 66.00	40.00	39.00	18.00	–	0.40 (kg)	104	**251004**	**148013**
	40 - 22	53.00 - 72.00	40.00	39.00	18.00	–	0.50 (kg)	104	**251004**	**148014**
ⓜ	40 - 22	66.00 - 85.00	40.00	39.00	18.00	–	0.50 (kg)	104	**251005**	**148014**
	50 - 28	70.00 - 95.00	56.00	55.00	22.00	–	1.00 (kg)	104	**251006**	**148015**
	50 - 28	92.00 - 117.00	56.00	55.00	22.00	–	1.30 (kg)	104	**251007**	**148015**
	63 - 36	92.00 - 122.00	56.00	55.00	22.00	–	1.70 (kg)	104	**251007**	**148016**
	80 - 36	120.00 - 150.00	62.00	60.00	26.00	–	2.70 (kg)	104	**251008**	**148007**
	80 - 36	166.00 - 196.00	62.00	60.00	26.00	–	2.90 (kg)	104	**251009**	**148007**
	80 - 36	145.00 - 200.00	62.00	60.00	26.00	125.00	3.60 (kg)	104	**251008**	**148009**
	80 - 36	190.00 - 245.00	62.00	60.00	26.00	125.00	3.70 (kg)	104	**251009**	**148009**

NOTE: Only use inserts with chip grooves all around
NOTE: Insert holders and inserts sold separately

B10-N: 10-13 | B10-D: 23 | B10-H | B10-F | B10: xii-xiii

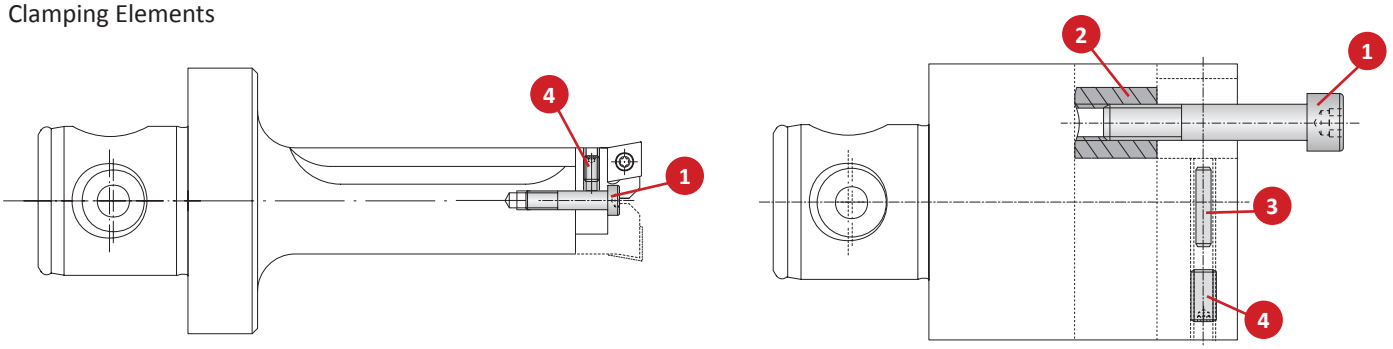
Key on B10-D: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

Accessories

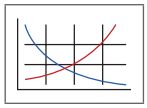
Clamping Elements



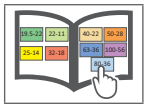
Connection	Serrated Tool Body	Part No. 1. Cap Screw	Service Key	2. Clamping Nut	3. Adjustment Pin	4. Thread Pin	Service Key
25 - 14	148001	**140108**	**s4 / B**	**140114**	**–**	**115280**	**s2.5 / A**
25 - 14	148002	**148110**	**s4 / B**	**115667**	**–**	**126157**	**s2.5 / A**
25 - 14	148011	**148110**	**s4 / B**	**148113**	**–**	**117148**	**s2.5 / A**
25 - 14	148012	**148110**	**s4 / B**	**115666**	**–**	**117148**	**s2.5 / A**
32 - 18	148003	**148110**	**s4 / B**	**115667**	**–**	**126157**	**s2.5 / A**
32 - 18	148013	**148110**	**s4 / B**	**148114**	**–**	**115192**	**s2.5 / A**
32 - 18	148017	**148110**	**s4 / B**	**115667**	**–**	**126157**	**s2.5 / A**
40 - 22	148004	**148110**	**s4 / B**	**140116**	**–**	**115407**	**s2.5 / A**
40 - 22	148014	**148110**	**s4 / B**	**148114**	**–**	**126157**	**s2.5 / A**
40 - 22	148018	**148110**	**s4 / B**	**115667**	**–**	**126157**	**s2.5 / A**
50 - 28	148005	**140111**	**s6 / B**	**140117**	**–**	**140121**	**s2.5 / A**
50 - 28	148010	**140111**	**s6 / B**	**140117**	**–**	**140121**	**s2.5 / A**
50 - 28	148015	**140112**	**s6 / B**	**140117**	**–**	**215111**	**s2.5 / A**
50 - 28	235001	**415111**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
50 - 28	235002	**415112**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
50 - 28	235003	**415113**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
50 - 28	148021	**140108**	**s4 / B**	**140114**	**–**	**115280**	**s2.5 / A**
50 - 28	148022	**140110**	**s5 / B**	**115667**	**–**	**126157**	**s2.5 / A**
50 - 28	148023	**140110**	**s5 / B**	**115667**	**–**	**126157**	**s2.5 / A**
50 - 28	148024	**140110**	**s5 / B**	**140116**	**–**	**115407**	**s2.5 / A**
63 - 36	148006	**140112**	**s6 / B**	**140118**	**–**	**140121**	**s2.5 / A**
63 - 36	148016	**140112**	**s6 / B**	**140117**	**–**	**116550**	**s2.5 / A**
63 - 36	235011	**415111**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
63 - 36	235012	**415112**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
63 - 36	235013	**415113**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
80 - 36	140007	**115730**	**s6 / B**	**140119**	**–**	**116550**	**s1.5 / A**
80 - 36	148009	**115730**	**s6 / B**	**140119**	**140120**	**115519**	**s1.5 / A**
Ø 18	235021	**415111**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
Ø 20	235022	**415112**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**
Ø 23	235023	**415113**	**T25 / B**	**–**	**–**	**215346**	**s1.5 / A**

B10-N: 10-13

Key on B10-D: 1



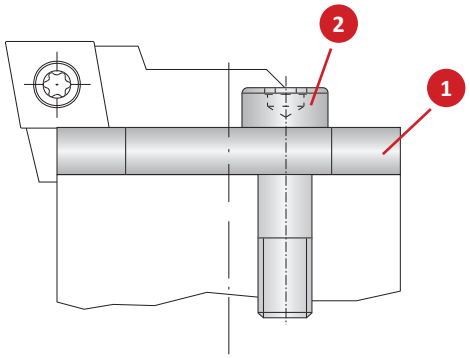
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

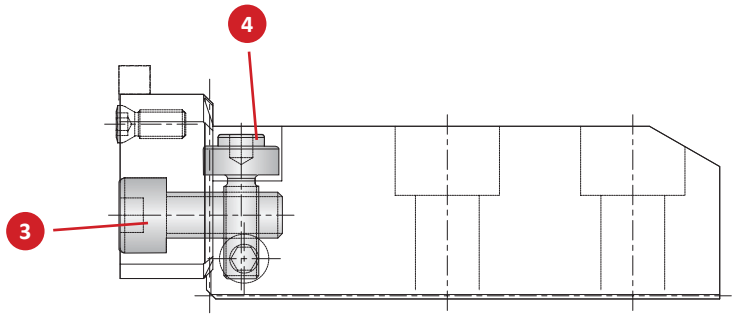
Accessories

Cover Plates | Axial Grooving Accessories



Cover Plates

Connection	Serrated Tool Body	Part No. 1. Cover Plate	Part No. 2. Cap Screw	Part No. Service Key
25 - 14	148001	**160001**	**215432**	**s4 / B**
25 - 14	148002 / 148017	**160002**	**115329**	**s5 / B**
32 - 18	148003 / 148018	**160003**	**115329**	**s5 / B**
40 - 22	148004	**160004**	**068112**	**s5 / B**
50 - 28	148005	**160005**	**068115**	**s6 / B**
63 - 36	148006	**160006**	**068115**	**s6 / B**
80 - 36	148007	**160018**	**068115**	**s6 / B**
80 - 36	148009	**160009**	**068115**	**s6 / B**
80 - 36	148009	**160019**	**068115**	**s6 / B**



Axial Grooving Accessories

Support Base	Cap Screw	Part No. 3. Service Key	Part No. 4. Axial Adjustment Screw	Part No. Service Key
226011	023182	**s6 / B**	**215374**	s4 / B
226012	023182	**s6 / B**	**215374**	s4 / B
226013	023182	**s6 / B**	**215374**	s4 / B

B10-N: 10-13
Key on B10-D:1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Notes

Notes

SECTION

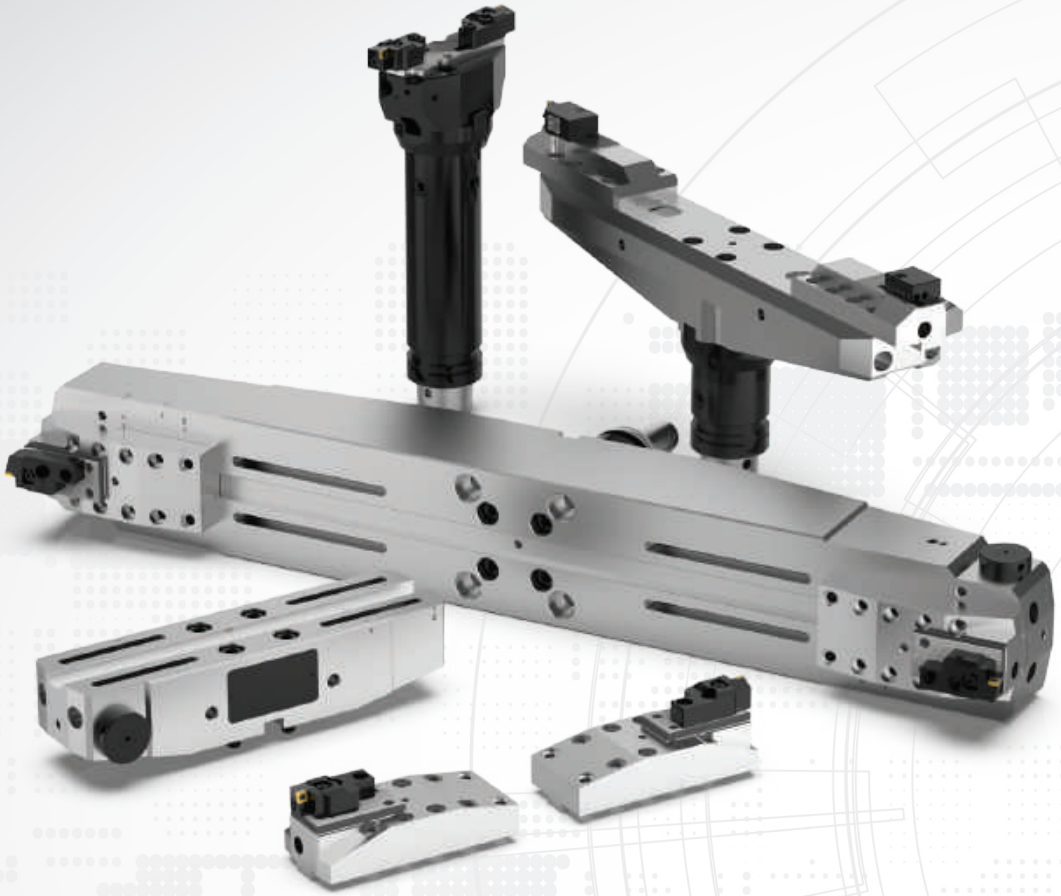
B10-E

Large Diameter Boring Tools

Wohlhaupter™ Large Diameter Boring Tools

Basic D 40 | Basic D 60 | Eco D 60 | Flex D 60

- Diameter Range: 7.874" - 128.150" (200.00mm - 3255.00mm)



Boring Big?

Wohlhaupter has continued to expand our large diameter boring capabilities with Alu-Line. Our Alu-Line serrated slides and tool bodies are made of lightweight aluminum alloy to minimize the weight while still getting the heavy boring job done. The versatile serrated slides and serrated tool bodies allow for boring 7.874" (200.00mm) up to 128.150" (3255.00mm), offering the most powerful and versatile tool ranges to our customers.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

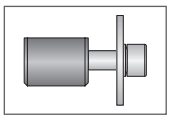
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

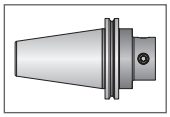
Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

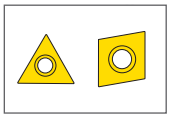
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



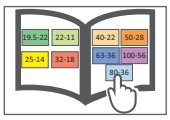
Clamping Elements
For use with insert holders and boring heads



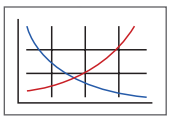
Shanks
A variety of shanks for different machines



Inserts
For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Large Diameter Boring Tools Table of Contents

Introduction

Product Overview . . . . . 2 - 3

Serrated Slides

Alu-Line Basic D 40 Serrated Slides 4
Alu-Line Basic D 60 Serrated Slides 5
Alu-Line Eco D 60 Serrated Slides 6
Alu-Line Flex D 60 Serrated Slides 7

338 (337) 538 (537) Boring Cassettes

338 (337) Cassettes 8
538 (537) Cassettes 9

Insert Holders

Insert Holders for Rough Machining . . . . . 10 - 11
Insert Holders for Height Adjustments 12
Insert Holders for Axial Grooving 13

Adapters and Shanks

Adapters with Serrated Body 14
Holding Arbors 15
Master Shanks . . . . . 16 - 19

Accessories . . . . . 20 - 25

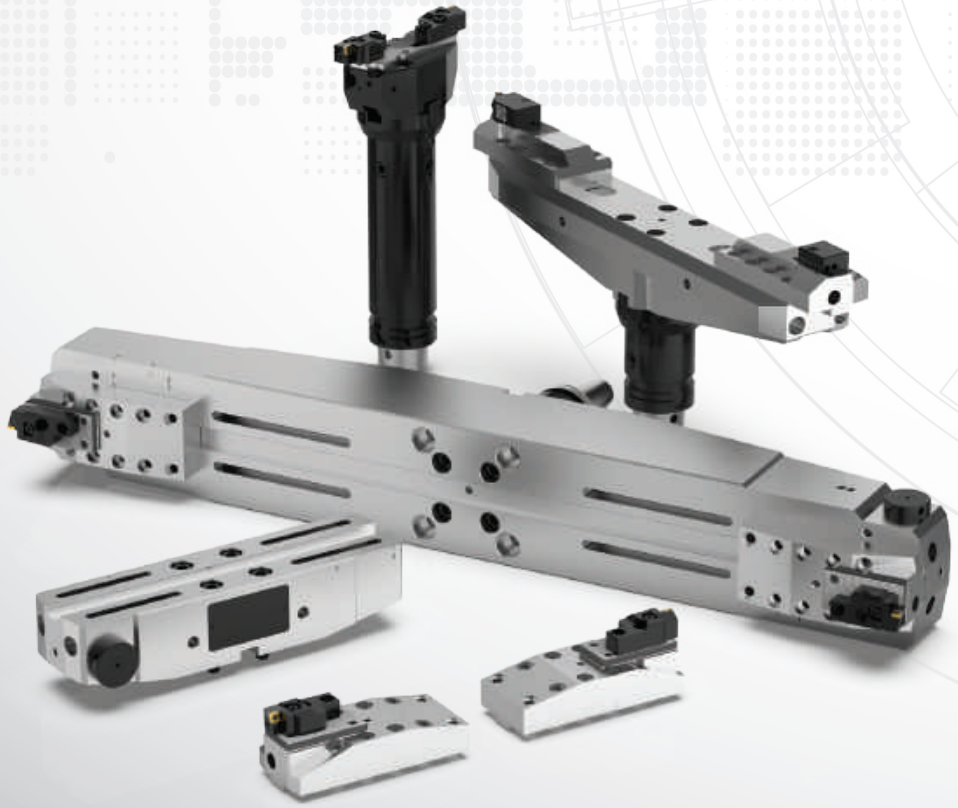
Series	Diameter Range	
	Imperial (inch)	Metric (mm)
Basic D 40 Slides	7.874 - 20.470	200.00 - 520.00
Basic D 60 Slides	7.874 - 19.880	200.00 - 505.00
Eco D 60 Slides	18.300 - 40.150	465.00 - 1020.00
Flex D 60 Slides	19.680 - 128.150	500.00 - 3255.00

Large Diameter
BORING

Boring big? We've got you covered.

Our versatile tooling system can provide the power and precision your large diameter boring jobs demand. The large diameter boring system offers four different Alu-Line serrated slides, a wide range of rough and finish boring insert holders, vernier and digital cassettes, and combined rough and finish insert holders.

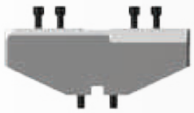
- Diameter range: 7.874" - 128.150" (200.00mm - 3255.00mm)
- Basic, Eco, and Flex serrated slides
- Roughing, finishing, or combined roughing and finishing can be achieved in one pass
- Digital readout cassettes available for quick and easy adjustments
- Alu-Line serrated slides and tool bodies are made of lightweight aluminum



Basic D 40 Serrated Slides for Finish Boring

350021 (349021)
Ø 7.874" - 11.023"
(Ø 200.00mm – 280.00mm)

350022 (349022)
Ø 14.173" - 17.322"
(Ø 360.00mm – 440.00mm)

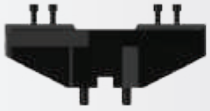


350022 (349022)
Ø 11.023" - 14.173"
(Ø 280.00mm – 360.00mm)

350022 (349022)
Ø 17.322" - 20.472"
(Ø 440.00mm – 520.00mm)

Basic D 60 Serrated Slides for Semi Rough Finish and Finish Boring

350051 (349051)
Ø 7.874" - 11.023"
(Ø 200.00mm – 280.00mm)



350053 (349053)
Ø 13.779" - 16.929"
(Ø 350.00mm – 430.00mm)

350052 (349052)
Ø 10.826" - 13.976"
(Ø 275.00mm – 355.00mm)

350054 (349054)
Ø 16.732" - 19.881"
(Ø 425.00mm – 505.00mm)

Eco D 60 Serrated Slides for Rough and Finish Boring

350005 (349005)
Ø 18.307" - 29.330"
(Ø 465.00mm – 745.00mm)

350014 (349014) / 350015 (350015)
Serrated slide for base slides
350005 (349005) / 350006 (349006)

350006 (349006)
Ø 29.133" - 40.157"
(Ø 740.00mm – 1020.00mm)

Flex D 60 Serrated Slides for Rough and Finish Boring

350031 (349031)
Ø 19.685" - 41.535"
(Ø 500.00mm – 1055.00mm)

350035 (349035)
Serrated slide for base slides
350031 (349031) | 350032 (349032)
350033 (349033) | 350034 (349034)

350032 (349032)
Ø 29.724" - 63.188"
(Ø 755.00mm – 1605.00mm)

350036 (349036)
Serrated slide for base slides
350031 (349031) | 350032 (349032)
350033 (349033) | 350034 (349034)

350033 (349033)
Ø 52.165" - 95.669"
(Ø 1325.00mm – 2430.00mm)

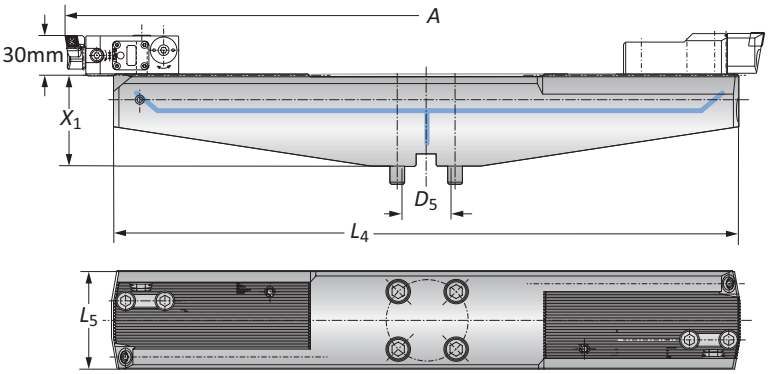
350037 (349037)
Serrated slide for base slides
350032 (349032) | 350033 (349033)
350034 (349034)

350034 (349034)
Ø 84.645" - 128.149"
(Ø 2150.00mm – 3255.00mm)

350038 (349038)
Serrated slide for base slides
350033 (349033) | 350034 (349034)

Alu-Line Basic D 40 Serrated Slides

Diameter Range: 7.874" - 20.470" (200.00mm - 520.00mm)



	Connection	Boring Range	Serrated Slide				
	D_5	A	X_1	L_4	L_5	Weight	Part No.
ⓘ	D 40	7.874 - 11.020	2.952	7.480	3.149	6.172 (lbs)	**350021**
ⓘ	D 40	11.020 - 14.170	2.952	10.620	3.149	8.377 (lbs)	**350022**
ⓘ	D 40	14.170 - 17.320	2.952	13.770	3.149	10.800 (lbs)	**350023**
ⓘ	D 40	17.320 - 20.470	2.952	16.320	3.149	13.000 (lbs)	**350024**
ⓜ	D 40	200.00 - 280.00	75.00	190.00	80.00	2.19 (kg)	**349021**
ⓜ	D 40	280.00 - 360.00	75.00	270.00	80.00	3.80 (kg)	**349022**
ⓜ	D 40	360.00 - 440.00	75.00	350.00	80.00	4.90 (kg)	**349023**
ⓜ	D 40	440.00 - 520.00	75.00	430.00	80.00	5.90 (kg)	**349024**

B10-N: 10-13 | B10-E: 22 | B10-E: 16-19 | B10-F | B10: xii-xiii

Key on B10-E : 1

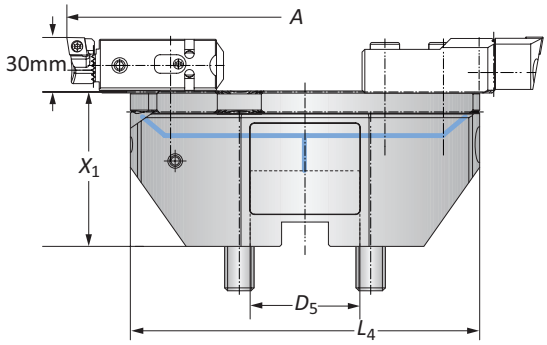
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

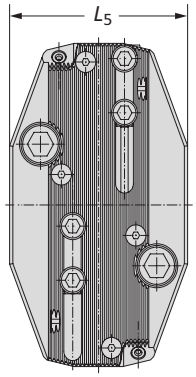
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Alu-Line Basic D 60 Serrated Slides

Diameter Range: 7.874" - 19.880" (200.00mm - 505.00mm)





	Connection	Boring Range	Serrated Slide				
	D_5	A	X_1	L_4	L_5	Weight	Part No.
ⓘ	D 60	7.874 - 11.020	3.346	7.519	4.330	9.038 (lbs)	**350051**
ⓘ	D 60	10.820 - 13.970	3.346	10.390	4.330	11.464 (lbs)	**350052**
ⓘ	D 60	13.770 - 16.920	3.346	13.340	4.921	15.211 (lbs)	**350053**
ⓘ	D 60	16.730 - 19.880	3.346	16.290	4.921	17.637 (lbs)	**350054**
ⓜ	D 60	200.00 - 280.00	85.00	191.00	110.00	4.10 (kg)	**349051**
ⓜ	D 60	275.00 - 355.00	85.00	264.00	110.00	5.20 (kg)	**349052**
ⓜ	D 60	350.00 - 430.00	85.00	339.00	125.00	6.90 (kg)	**349053**
ⓜ	D 60	425.00 - 505.00	85.00	414.00	125.00	8.00 (kg)	**349054**

B10-N: 10-13
B10-E: 22
B10-E: 16-19
B10-F
B10: xii-xiii
Key on B10-E : 1

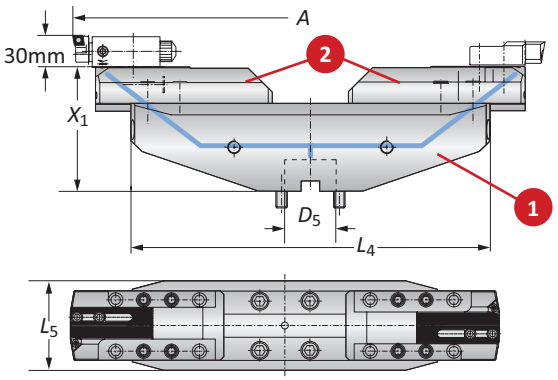
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Alu-Line Eco D 60 Serrated Slides

Diameter Range: 18.300" - 40.150" (465.00mm - 1020.00mm)

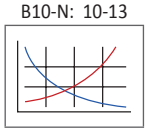
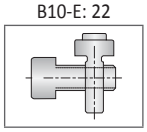
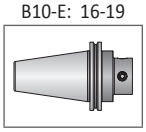
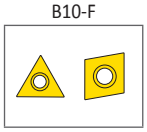
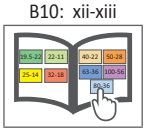


	Connection	Boring Range	Serrated Slide			1 Base Slide		2 Serrated Slide (Alu-Line)*		2 Serrated Slide (steel)**	
	D_5	A	X_1	L_4	L_5	Weight	Part No.	Weight	Part No.	Weight	Part No.
(i)	D 60	18.300 - 29.330	6.102	17.590	5.078	26.010 (lbs)	**350005**	4.850 (lbs)	**350015**	12.560 (lbs)	**350014**
	D 60	29.130 - 40.150	6.102	28.420	5.078	39.680 (lbs)	**350006**	4.850 (lbs)	**350015**	12.560 (lbs)	**350014**
(m)	D 60	465.00 - 745.00	155.00	447.00	129.00	11.80 (kg)	**349005**	2.20 (kg)	**349015**	5.70 (kg)	**349014**
	D 60	740.00 - 1020.00	155.00	722.00	129.00	18.00 (kg)	**349006**	2.20 (kg)	**349015**	5.70 (kg)	**349014**

*Finish boring: serrated slide in Alu-Line
**Rough boring: serrated slide in steel

B10-N: 10-13 | B10-E: 22 | B10-E: 16-19 | B10-F | B10: xii-xiii

Key on B10-E : 1

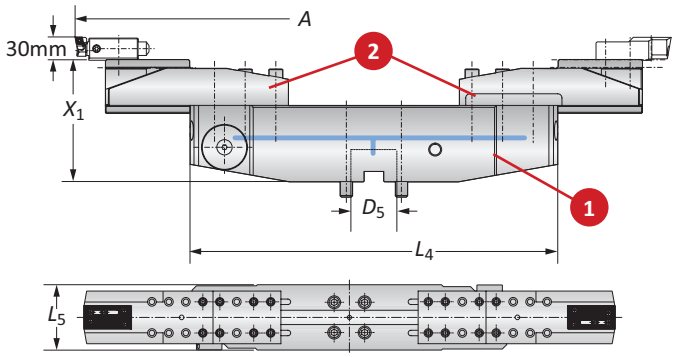
(i) = Imperial (in)
(m) = Metric (mm)
Inserts sold separately

WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

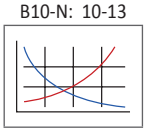
WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

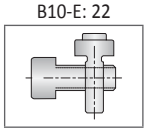
Alu-Line Flex D 60 Serrated Slides

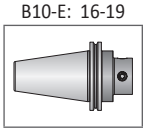
Diameter Range: 19.680" - 128.150" (500.00mm - 3255.00mm)

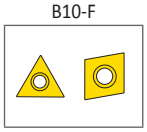


	Connection	Boring Range	Serrated Slide				Part No.	
	D_5	A	X_1	L_4	L_5	Weight (1 + 2)	1 Base Slide	2 Serrated Slide
	D 60	19.680 - 30.700	6.299	18.890	5.118	53.360 (lbs)	**350031**	**350035**
	D 60	37.400 - 41.530	7.283	18.890	5.118	91.060 (lbs)	**350031**	**350036**
	D 60	29.720 - 41.530	7.283	29.720	6.102	93.710 (lbs)	**350032**	**350035**
	D 60	41.330 - 52.360	8.267	29.720	6.102	131.400 (lbs)	**350032**	**350036**
	D 60	56.770 - 63.180	8.858	29.720	6.102	190.200 (lbs)	**350032**	**350037**
	D 60	52.160 - 63.180	8.267	51.370	7.283	194.400 (lbs)	**350033**	**350035**
ⓘ	D 60	52.160 - 74.010	9.251	51.370	7.283	232.100 (lbs)	**350033**	**350036**
	D 60	62.990 - 84.840	9.842	51.370	7.283	291.000 (lbs)	**350033**	**350037**
	D 60	78.340 - 95.660	10.030	51.370	7.283	374.400 (lbs)	**350033**	**350038**
	D 60	84.640 - 95.660	9.251	83.850	8.858	424.400 (lbs)	**350034**	**350035**
	D 60	84.640 - 106.500	10.230	83.850	8.858	462.100 (lbs)	**350034**	**350036**
	D 60	84.640 - 117.300	10.820	83.850	8.858	520.300 (lbs)	**350034**	**350037**
	D 60	84.640 - 128.150	11.020	83.850	8.858	604.100 (lbs)	**350034**	**350038**
	D 60	500.00 - 780.00	160.00	480.00	130.00	24.20 (kg)	**349031**	**349035**
	D 60	950.00 - 1055.00	185.00	480.00	130.00	41.30 (kg)	**349031**	**349036**
	D 60	755.00 - 1055.00	185.00	755.00	155.00	42.50 (kg)	**349032**	**349035**
	D 60	1050.00 - 1330.00	210.00	755.00	155.00	59.60 (kg)	**349032**	**349036**
	D 60	1442.00 - 1605.00	225.00	755.00	155.00	86.30 (kg)	**349032**	**349037**
	D 60	1325.00 - 1605.00	210.00	1305.00	185.00	88.20 (kg)	**349033**	**349035**
ⓜ	D 60	1325.00 - 1880.00	235.00	1305.00	185.00	105.30 (kg)	**349033**	**349036**
	D 60	1600.00 - 2155.00	250.00	1305.00	185.00	132.00 (kg)	**349033**	**349037**
	D 60	1990.00 - 2430.00	255.00	1305.00	185.00	169.80 (kg)	**349033**	**349038**
	D 60	2150.00 - 2430.00	235.00	2130.00	225.00	192.50 (kg)	**349034**	**349035**
	D 60	2150.00 - 2705.00	260.00	2130.00	225.00	209.60 (kg)	**349034**	**349036**
	D 60	2150.00 - 2980.00	275.00	2130.00	225.00	236.00 (kg)	**349034**	**349037**
	D 60	2150.00 - 3255.00	280.00	2130.00	225.00	274.00 (kg)	**349034**	**349038**

B10-N: 10-13

Key on B10-E : 1

B10-E: 22


B10-E: 16-19


B10-F


B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

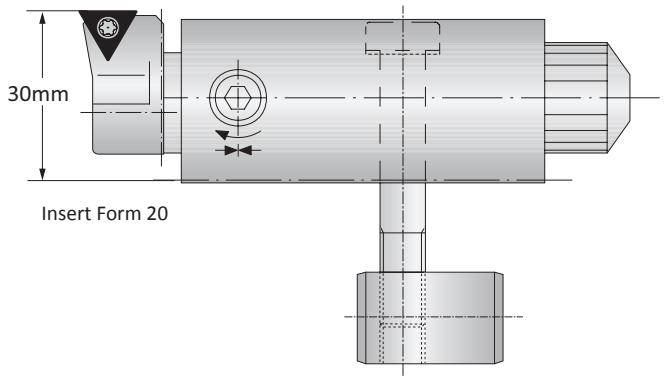
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

338 (337) Cassettes

Diameter Range: 3.937" - 128.100" (100.00mm - 3255.00mm)

Insert Form 101



338 (337) Cassette with Insert Holders and Clamping Pieces

	Slide Type	Boring Range	Weight	Insert Form	Part No. Insert Holder	Clamping Piece	Cassette
	Serrated Tool Bodies	3.937 - 8.071	0.683 (lbs)	20	**210020**	**137026**	**338037**
		3.937 - 8.071	0.683 (lbs)	101	**210063**	**137026**	**338037**
		3.937 - 8.071	0.683 (lbs)	103	**210064**	**137026**	**338037**
ⓘ	Basic / Eco Slides	7.874 - 40.150	0.683 (lbs)	20	**210020**	**137027**	**338037**
ⓘ		7.874 - 40.150	0.683 (lbs)	101	**210063**	**137027**	**338037**
ⓘ		7.874 - 40.150	0.683 (lbs)	103	**210064**	**137027**	**338037**
	Flex Slides	19.680 - 128.100	0.683 (lbs)	20	**210020**	**137019**	**338037**
		19.680 - 128.100	0.683 (lbs)	101	**210063**	**137019**	**338037**
		19.680 - 128.100	0.683 (lbs)	103	**210064**	**137019**	**338037**
	Serrated Tool Bodies	100.00 - 205.00	0.31 (kg)	20	**210020**	**137026**	**337017**
		100.00 - 205.00	0.31 (kg)	101	**210063**	**137026**	**337017**
		100.00 - 205.00	0.31 (kg)	103	**210064**	**137026**	**337017**
ⓜ	Basic / Eco Slides	200.00 - 1020.00	0.31 (kg)	20	**210020**	**137027**	**337017**
ⓜ		200.00 - 1020.00	0.31 (kg)	101	**210063**	**137027**	**337017**
ⓜ		200.00 - 1020.00	0.31 (kg)	103	**210064**	**137027**	**337017**
	Flex Slides	500.00 - 3255.00	0.31 (kg)	20	**210020**	**137019**	**337017**
		500.00 - 3255.00	0.31 (kg)	101	**210063**	**137019**	**337017**
		500.00 - 3255.00	0.31 (kg)	103	**210064**	**137019**	**337017**

B10-N: 10-13 | B10-E: 22 | B10-E: 16-19 | B10-F | B10: xii-xiii

Key on B10-E : 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

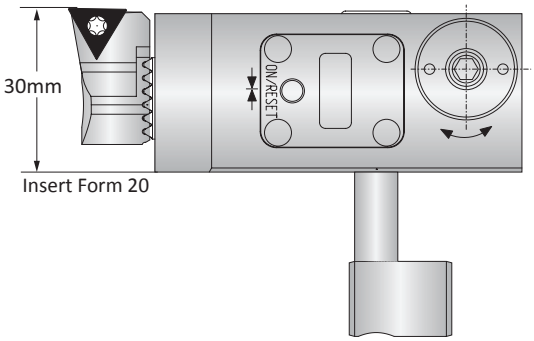
538 (537) Cassettes

Diameter Range: 3.937" - 128.100" (100.00mm - 3255.00mm)

Insert Form 101

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter



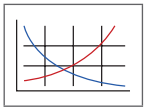
Insert Form 20

Digital 538 (537) Cassette with Insert Holders and Clamping Pieces

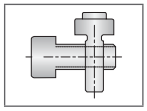
	Slide Type	Boring Range	Weight	Insert Form	Part No. Insert Holder	Clamping Pieces	Cassette
	Serrated Tool Bodies	3.937 - 8.071	0.816 (lbs)	20	**210020**	**137026**	**538001**
		3.937 - 8.071	0.816 (lbs)	101	**210063**	**137026**	**538001**
		3.937 - 8.071	0.816 (lbs)	103	**210064**	**137026**	**538001**
	Basic / Eco Slides	7.874 - 40.150	0.816 (lbs)	20	**210020**	**137027**	**538001**
ⓘ		7.874 - 40.150	0.816 (lbs)	101	**210063**	**137027**	**538001**
		7.874 - 40.150	0.816 (lbs)	103	**210064**	**137027**	**538001**
	Flex Slides	19.680 - 128.100	0.816 (lbs)	20	**210020**	**137019**	**538001**
		19.680 - 128.100	0.816 (lbs)	101	**210063**	**137019**	**538001**
		19.680 - 128.100	0.816 (lbs)	103	**210064**	**137019**	**538001**
	Serrated Tool Bodies	100.00 - 205.00	0.37 (kg)	20	**210020**	**137026**	**537001**
		100.00 - 205.00	0.37 (kg)	101	**210063**	**137026**	**537001**
		100.00 - 205.00	0.37 (kg)	103	**210064**	**137026**	**537001**
	Basic / Eco Slides	200.00 - 1020.00	0.37 (kg)	20	**210020**	**137027**	**537001**
ⓜ		200.00 - 1020.00	0.37 (kg)	101	**210063**	**137027**	**537001**
		200.00 - 1020.00	0.37 (kg)	103	**210064**	**137027**	**537001**
	Flex Slides	500.00 - 3255.00	0.37 (kg)	20	**210020**	**137019**	**537001**
		500.00 - 3255.00	0.37 (kg)	101	**210063**	**137019**	**537001**
		500.00 - 3255.00	0.37 (kg)	103	**210064**	**137019**	**537001**

B10-N: 10-13

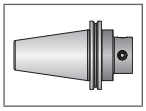
Key on B10-E : 1



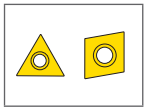
B10-E: 22



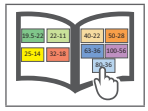
B10-E: 16-19



B10-F



B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

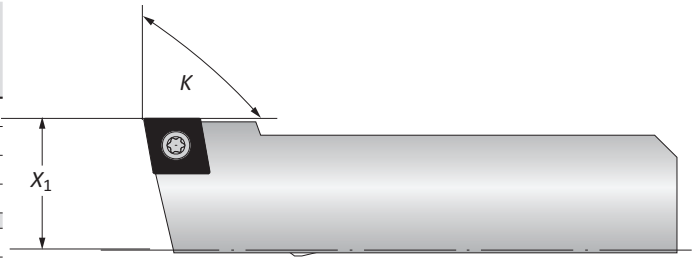
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Rough Machining

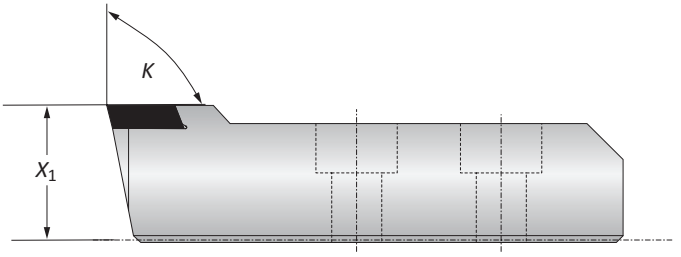
90° Insert Holders

	Insert Holder K	Insert Holder X_1	Weight	ISO Code	Insert Form	Part No.
i	90°	1.180	1.322 (lbs)	CC..09T3..	103	**149090**
i	90°	1.180	1.322 (lbs)	CC..1204..	104	**149099**
i	90°	1.150	1.322 (lbs)	CC..1204..	104	**149083**
i	90°	1.180	1.322 (lbs)	CC..1605..	105	**149093**
m	90°	30.00	0.60 (kg)	CC..09T3..	103	**149090**
m	90°	30.00	0.60 (kg)	CC..1204..	104	**149099**
m	90°	29.30	0.60 (kg)	CC..1204..	104	**149083**
m	90°	30.00	0.60 (kg)	CC..1605..	105	**149093**



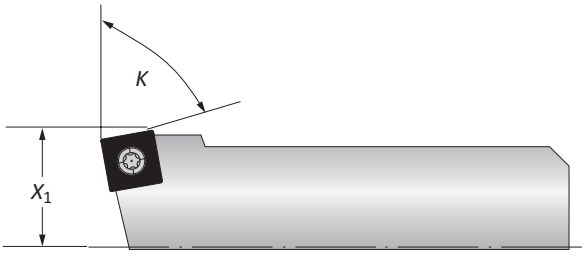
90° Tangential Insert Holders

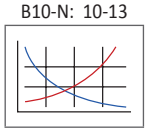
	Insert Holder K	Insert Holder X_1	Weight	ISO Code	Insert Form	Part No.
i	90°	1.180	1.322 (lbs)	Tangential	05	**149010**
i	90°	1.150	1.322 (lbs)	Tangential	05	**149020**
m	90°	30.00	0.60 (kg)	Tangential	05	**149010**
m	90°	29.30	0.60 (kg)	Tangential	05	**149020**

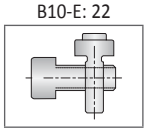


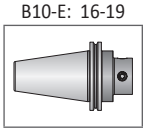
80° Insert Holders

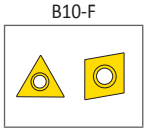
	Insert Holder K	Insert Holder X_1	Weight	ISO Code	Insert Form	Part No.
i	80°	1.180	1.322 (lbs)	SC..1204..	113	**149089**
i	80°	1.180	1.322 (lbs)	SC..1505..	114	**149094**
i	80°	1.180	1.322 (lbs)	SN..1506..	134	**149096**
m	80°	30.00	0.60 (kg)	SC..1204..	113	**149089**
m	80°	30.00	0.60 (kg)	SC..1505..	114	**149094**
m	80°	30.00	0.60 (kg)	SN..1506..	134	**149096**

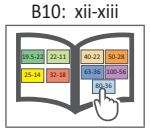


B10-N: 10-13
Key on B10-E : 1


B10-E: 22


B10-E: 16-19


B10-F


B10: xii-xiii


i = Imperial (in)
m = Metric (mm)
Inserts sold separately

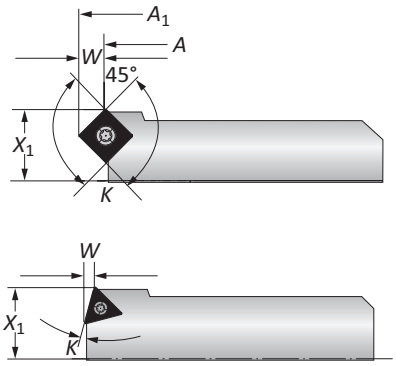
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Rough Machining | Boring Range Example

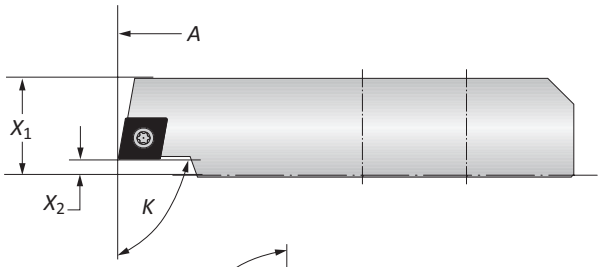
Chamfering Insert Holders

	Insert Holder K	X_1	A / A_1	W	Weight	ISO Code	Insert Form	Part No.
i	15°	1.180	+0.275	0.157	1.322 (lbs)	TC..16T3..	163	**201065**
	20°	1.180	+0.354	0.208	1.322 (lbs)	TC..16T3..	163	**201025**
	30°	1.180	+0.551	0.303	1.322 (lbs)	TC..16T3..	163	**201075**
	45°	1.180	+0.787	0.389	1.322 (lbs)	SC..1505..	114	**201015**
m	15°	30.00	+7.00	4.00	0.60 (kg)	TC..16T3..	163	**201065**
	20°	30.00	+9.00	5.30	0.60 (kg)	TC..16T3..	163	**201025**
	30°	30.00	+14.00	7.70	0.60 (kg)	TC..16T3..	163	**201075**
	45°	30.00	+20.00	9.90	0.60 (kg)	SC..1505..	114	**201015**



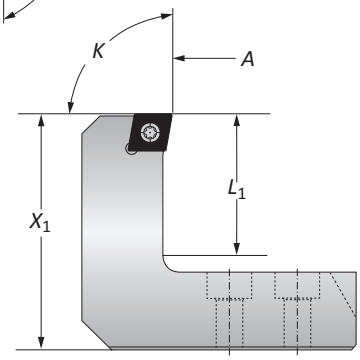
Back-Boring Insert Holders

	Insert Holder K	X_1	X_2	A	Weight	ISO Code	Insert Form	Part No.
i	90°	3.540	0.196	+1.574	1.763 (lbs)	CC..1204..	104	**251010**
	90°	3.540	0.196	+2.952	1.984 (lbs)	CC..1204..	104	**251011**
m	90°	30.00	5.00	+40.00	0.80 (kg)	CC..1204..	104	**251010**
	90°	30.00	5.00	+75.00	0.90 (kg)	CC..1204..	104	**251011**



OD Turning Insert Holders

	Insert Holder K	X_1	L_1	A	Weight	ISO Code	Insert Form	Part No.
i	90°	198.400	2.440	-1.968	2.204 (lbs)	CC..1204..	104	**149040**
m	90°	90.00	62.00	-50.00	1.00 (kg)	CC..1204..	104	**149040**



Boring Range Example

	Serrated Slide Part No.	Bore Range	Insert Holder Part No.	Modified Bore Range	Total Bore Range
i	350051	7.874 - 11.023	201065	+0.280	8.150 - 11.300
	350051	7.874 - 11.023	251010	+1.600	9.450 - 12.600
	350051	7.874 - 11.023	149040	-2.000	5.900 - 9.055
m	349051	200.00 - 280.00	201065	+7.00	207.00 - 287.00
	349051	200.00 - 280.00	251010	+40.00	240.00 - 320.00
	349051	200.00 - 280.00	149040	-50.00	150.00 - 230.00

NOTE: Boring range for serrated slides or base slides are found on pg. B10-E: 4 - 7
NOTE: Additional insert holders available upon request

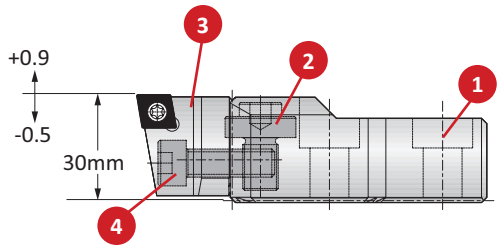
B10-N: 10-13 | B10-E: 22 | B10-E: 16-19 | B10-F | B10: xii-xiii
Key on B10-E: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

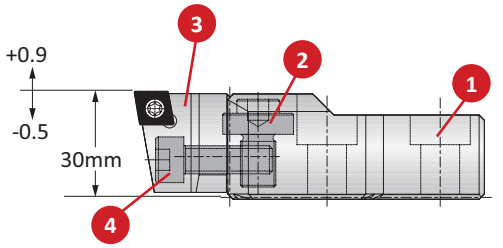
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Height Adjustments



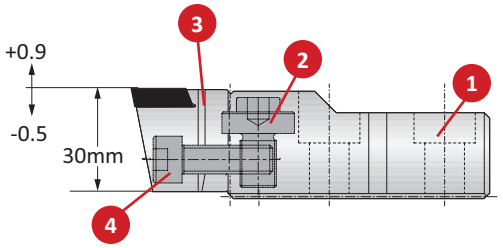
Insert Form 103

	Boring Range	1 Support Part No.	2 Adjusting Screw Part No.	2 Adjusting Screw Service Key	3 Insert Holder Insert Form	3 Insert Holder Part No.	4 Fixing Screw Part No.	4 Fixing Screw Service Key	Complete Part No.
(i)	7.874 - 128.100	149055	315355	s6 / B	103	149058	070369	s6 / B	**149059**
(m)	200.00 - 3255.00	149055	315355	s6 / B	103	149058	070369	s6 / B	**149059**



Insert Form 104

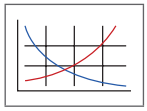
	Boring Range	1 Support Part No.	2 Adjusting Screw Part No.	2 Adjusting Screw Service Key	3 Insert Holder Insert Form	3 Insert Holder Part No.	4 Fixing Screw Part No.	4 Fixing Screw Service Key	Complete Part No.
(i)	7.874 - 128.100	149055	315355	s6 / B	104	149056	070369	s6 / B	**149057**
(m)	200.00 - 3255.00	149055	315355	s6 / B	104	149056	070369	s6 / B	**149057**



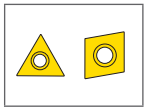
Insert Form 05

	Boring Range	1 Support Part No.	2 Adjusting Screw Part No.	2 Adjusting Screw Service Key	3 Insert Holder Insert Form	3 Insert Holder Part No.	4 Fixing Screw Part No.	4 Fixing Screw Service Key	Complete Part No.
(i)	7.874 - 128.100	149055	315355	s6 / B	05	149085	070369	s6 / B	**149086**
(m)	200.00 - 3255.00	149055	315355	s6 / B	05	149085	070369	s6 / B	**149086**

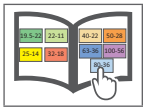
B10-N: 10-13
Key on B10-E : 1



B10-F



B10: xii-xiii

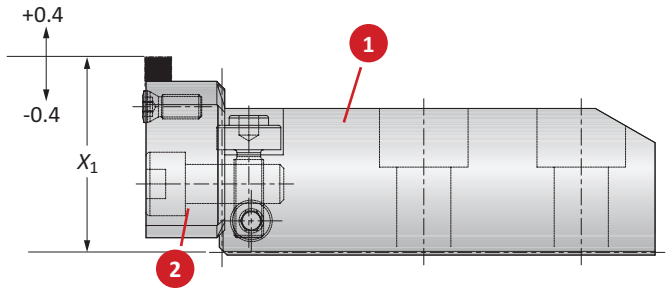


(i) = Imperial (in)
(m) = Metric (mm)
Inserts sold separately

WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Insert Holders for Axial Grooving



	Insert Holder X_1	1 Support Module Part No.	2 Insert Holder Part No.	Weight	Insert Form	Complete Part No.
i	1.574	226014	226010	0.661 (lbs)	304	**226029**
m	40.00	226014	226010	0.30 (kg)	304	**226029**

B10-N: 10-13 | B10-F | B10: xii-xiii

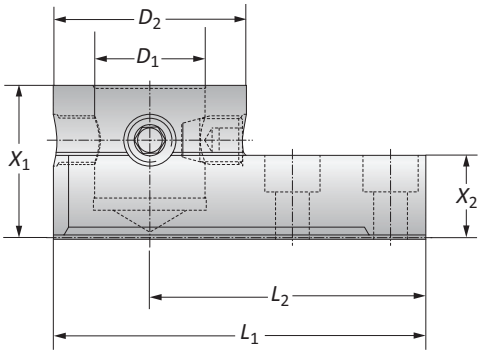
Key on B10-E : 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Serrated Adapter with MVS Connection



	MVS Connection	Mounting Adapters					
	$D_2 \mid D_1$	X_1	X_2	L_1	L_2	Weight	Part No.
i	50 - 28	1.968	1.062	4.527	3.543	3.306 (lbs)	**349046**
m	50 - 28	50.00	27.00	115.00	90.00	1.50 (kg)	**349046**

Outside Turning Example

NOTE: Imperial item pictured

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

Inside Boring

Application: Longer Reach Inside Boring

Slide	Boring Heads	i ID Bore Range	m ID Bore Range
349/350051	320005/365045/565045	9.840 - 12.990	250.00 - 330.00
349/350052	320005/365045/565045	12.800 - 15.950	325.12 - 405.13
349/350053	320005/365045/565045	15.750 - 18.900	400.05 - 480.06
349/350054	320005/365045/565045	18.700 - 21.850	474.98 - 555.00
349/350005/350015	320005/365045/565045	20.280 - 31.300	515.10 - 795.02

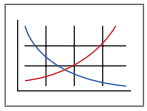
Outside Boring

Application: OD Finish Turning Longer Reaches

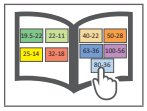
Slide	Boring Heads	i OD Bore Range	m OD Bore Range
349/350051	320005/365045/565045	4.720 - 6.280	120.00 - 160.00
349/350052	320005/365045/565045	6.240 - 10.830	158.50 - 275.00
349/350053	320005/365045/565045	10.630 - 13.780	270.00 - 350.00
349/350054	320005/365045/565045	13.580 - 16.730	345.00 - 425.00
349/350005/350015	320005/365045/565045	15.160 - 26.180	385.00 - 665.00

NOTE: LH only spindle rotation

B10-N: 10-13



B10: xii-xiii

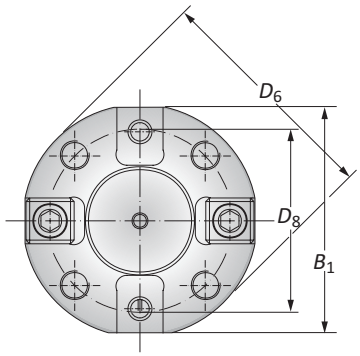


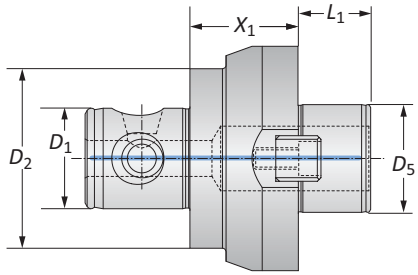
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

MVS Holding Arbors





	MVS Connection D_2 | D_1	Holding Arbor Connection	Holding Arbor X_1	L_1	D_5	D_6	D_8	B_1	Weight	Part No.
	80 - 36	D 40 Alu-Line	0.748	1.181	1.574	3.503	2.625	3.149	1.102 (lbs)	**309001**
	80 - 36	D 60	2.362	1.574	2.362	5.082	4.000	4.921	9.038 (lbs)	**209060**
ⓘ	100 - 56	D 40 Alu-Line	1.181	1.181	1.574	3.503	2.625	3.149	2.204 (lbs)	**309041**
	100 - 56	D 60	2.362	1.574	2.362	5.082	4.000	4.921	13.880 (lbs)	**209043**
	100 - 56	D 40 Alu-Line	2.362	1.574	2.362	5.082	4.000	4.921	4.850 (lbs)	**309043**
	80 - 36	D 40 Alu-Line	19.00	30.00	40.00	89.00	66.70	80.00	0.50 (kg)	**309001**
	80 - 36	D 60	60.00	40.00	60.00	129.10	101.60	125.00	4.10 (kg)	**209060**
ⓜ	100 - 56	D 40 Alu-Line	30.00	30.00	40.00	89.00	66.70	80.00	1.00 (kg)	**309041**
	100 - 56	D 60	60.00	40.00	60.00	129.10	101.60	125.00	6.30 (kg)	**209043**
	100 - 56	D 40 Alu-Line	60.00	40.00	60.00	129.10	101.60	125.00	2.20 (kg)	**309043**

B10-N: 10-13
Key on B10-E : 1

B10: xii-xiii

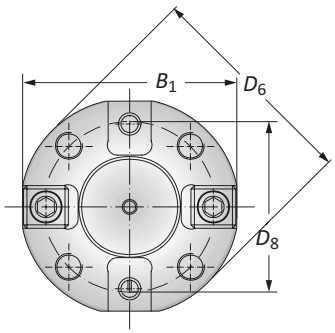
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

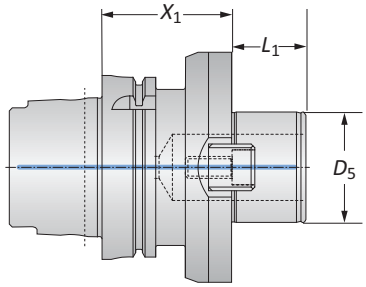
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Master Shanks D 40 / D 60

HSK-A (DIN 69 893) Shanks

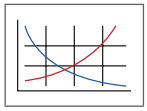




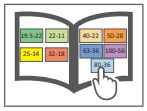
HSK-A (DIN 69 893) Shanks

	Taper Size	Connection	Shank X_1	Shank L_1	Shank D_5	Shank D_6	Shank D_8	Shank B_1	Weight	Part No.
ⓘ	63	D 40	2.362	1.181	1.570	3.504	2.626	3.150	4.200 (lbs)	**358015**
ⓘ	100	D 40	2.362	1.181	1.570	3.504	2.626	3.150	7.900 (lbs)	**258021**
ⓘ	100	D 60	2.756	1.570	2.362	5.083	4.000	4.921	11.500 (lbs)	**258061**
ⓘ	100	D 60	2.756	1.570	2.362	5.083	4.000	4.331	11.000 (lbs)	**258098**
ⓜ	63	D 40	60.00	30.00	40.00	89.00	66.70	80.00	1.90 (kg)	**358015**
ⓜ	100	D 40	60.00	30.00	40.00	89.00	66.70	80.00	3.60 (kg)	**258021**
ⓜ	100	D 60	70.00	40.00	60.00	129.10	101.60	125.00	5.20 (kg)	**258061**
ⓜ	100	D 60	70.00	40.00	60.00	129.10	101.60	110.00	5.00 (kg)	**258098**

B10-N: 10-13
Key on B10-E : 1



B10: xii-xiii



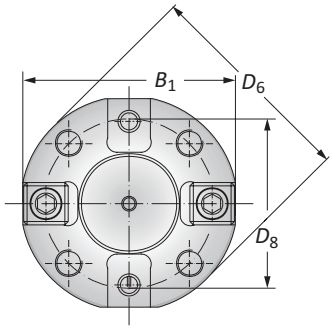
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

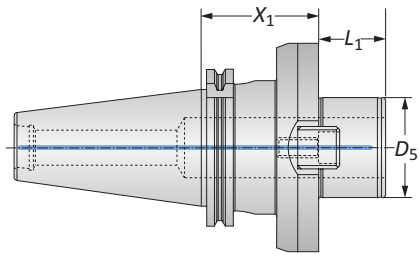
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Master Shanks D 40 / D 60

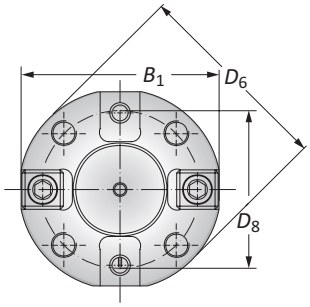
CAT 40 / 50 Shanks with Imperial Threads | CAT 50 Shank with Metric Threads

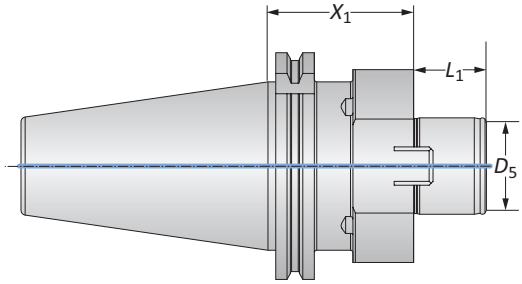




CAT 40 / 50 Shanks with Imperial Threads

	Taper Size	Connection	Shank X_1	L_1	D_5	D_6	D_8	B_1	Weight	Part No.
	40	D 40	1.970	1.181	1.570	3.504	2.626	3.150	4.000 (lbs)	**357004**
ⓘ	50	D 40	1.970	1.181	1.570	3.504	2.626	3.150	8.400 (lbs)	**357001**
	50	D 60	2.756	1.570	2.362	5.083	4.000	4.331	11.700 (lbs)	**357002**
	50	D 60	2.756	1.570	2.362	5.083	4.000	4.921	12.100 (lbs)	**357003**





CAT 50 Shanks with Metric Threads

	Taper Size	Connection	Shank X_1	L_1	D_5	D_6	D_8	B_1	Weight	Part No.
ⓜ	50	D 40	60.00	30.00	40.00	89.00	66.70	80.00	4.60 (kg)	**326083**

B10-N: 10-13
Key on B10-E : 1

B10: xii-xiii

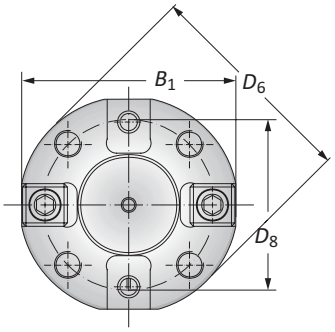
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

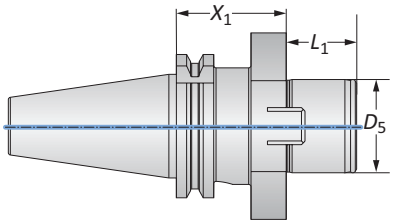
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Master Shanks D 40 / D 60

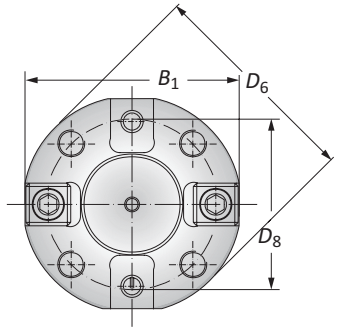
SK (DIN 69 871-AD/B) | BT / JIS B 6339 Shanks

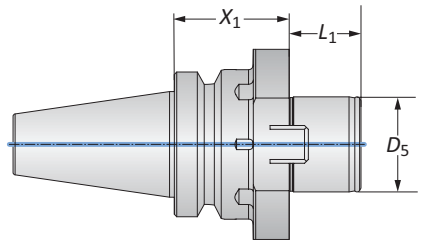




SK (DIN 69 871-AD/B) Shanks

	Taper Size	Connection	Shank X_1	L_1	D_5	D_6	D_8	B_1	Weight	Part No.
i	40	D 40	1.970	1.180	1.570	3.500	2.630	0.310	4.190 (lbs)	**326080**
i	50	D 40	1.970	1.180	1.570	3.500	2.630	0.310	9.040 (lbs)	**326081**
i	50	D 60	2.760	1.570	2.360	5.080	4.000	4.920	12.790 (lbs)	**198054T019539**
i	50	D 60	2.760	1.570	2.360	5.080	4.000	4.330	12.130 (lbs)	**198081T019539**
m	40	D 40	50.00	30.00	40.00	89.00	66.70	80.00	1.90 (kg)	**326080**
m	50	D 40	50.00	30.00	40.00	89.00	66.70	80.00	4.10 (kg)	**326081**
m	50	D 60	70.00	40.00	60.00	129.10	101.60	125.00	5.80 (kg)	**198054T019539**
m	50	D 60	70.00	40.00	60.00	129.10	101.60	110.00	5.50 (kg)	**198081T019539**

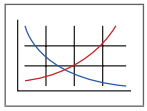




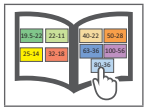
BT / JIS B 6339 Shanks

	Taper Size	Connection	Shank X_1	L_1	D_5	D_6	D_8	B_1	Weight	Part No.
i	40	D 40	1.970	1.181	1.570	3.504	2.626	3.150	4.000 (lbs)	**326084**
i	50	D 40	2.165	1.181	1.570	3.504	2.626	3.150	9.900 (lbs)	**326082**
i	50	D 60	3.150	1.570	2.362	5.0833	4.000	–	17.600 (lbs)	**326062**
m	40	D 40	50.00	30.00	40.00	89.00	66.70	80.00	1.80 (kg)	**326084**
m	50	D 40	55.00	30.00	40.00	89.00	66.70	80.00	4.50 (kg)	**326082**
m	50	D 60	80.00	40.00	60.00	19.10	101.60	–	8.00 (kg)	**326062**

B10-N: 10-13
Key on B10-E : 1



B10: xii-xiii



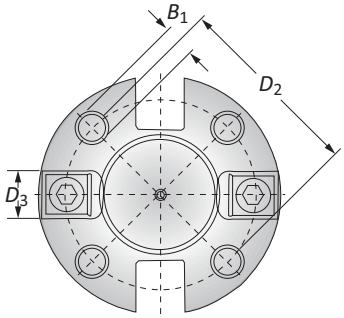
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

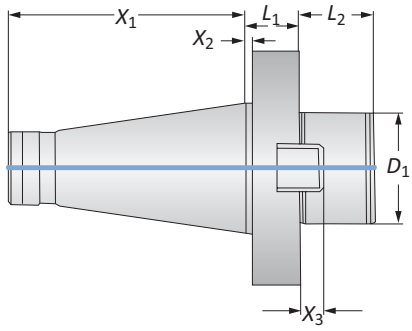
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Master Shanks D 40 / D 60

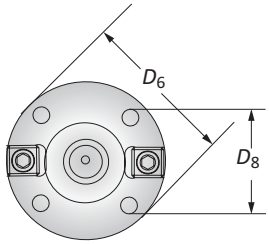
NMTB Shanks | DIN 2080 Shanks

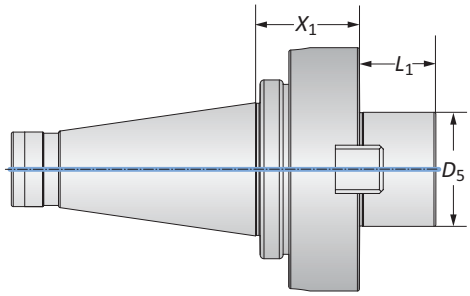




NMTB Shanks

	Taper Size	Connection	Shank X_1	X_2	L_1	L_2	D_1	X_3	D_2	D_3	B_1	Weight	Part No.
i	50	D 60	4.992	0.125	1.141	1.574	2.362	0.492	4.000	1.000	M16	17.637 (lbs)	**198051T004480**
m	50	D 60	126.80	3.20	29.00	40.00	60.00	12.50	101.60	25.40	M16	8.00 (kg)	**198051T004480**





DIN 2080 Shanks

	Taper Size	Connection	Shank X_1	L_1	D_5	D_6	D_8	B_1	Weight	Part No.
i	50	D 60	2.165	1.574	2.362	5.039	4.000	–	14.991 (lbs)	**326035**
m	50	D 60	55.00	40.00	60.00	128.00	101.60	–	6.80 (kg)	**326035**

B10-N: 10-13
Key on B10-E : 1
B10: xii-xiii

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

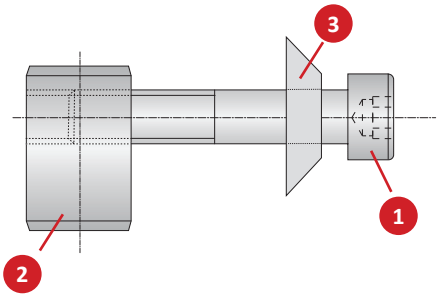
WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

338 (337) / 538 (537) Accessories

Clamping Pieces | Counter Weights | Insert Holders for Abrasive Materials

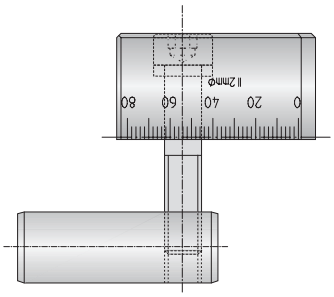
338 (337) and 538 (537) Clamping Pieces

	Boring Range	1 Cap Screw Part No.	1 Cap Screw Service Key	2 Clamping Nut Part No.	3 Disk Spring Part No.	Complete Part No.
i	7.870 - 33.070	**215101**	s6 / B	**140118**	**337105**	**137026**
i	7.870 - 40.160	**215101**	s6 / B	**215105**	**337105**	**137027**
i	19.690 - 128.150	**215101**	s6 / B	**215105**	**337105**	**137019**
m	100.00 - 205.00	**215101**	s6 / B	**140118**	**337105**	**137026**
m	200.00 - 1020.00	**215102**	s6 / B	**215105**	**337105**	**137027**
m	500.00 - 3255.00	**415900**	s6 / B	**215105**	**337105**	**137019**



338 (337) Counter Weights

	Boring Range	Part No.
i	7.870 - 33.070	**338011**
i	7.870 - 40.160	**338012**
i	19.690 - 128.150	**338076**
m	200.00 - 840.00	**337011**
m	200.00 - 1020.00	**337011**
m	500.00 - 3255.00	**337076**

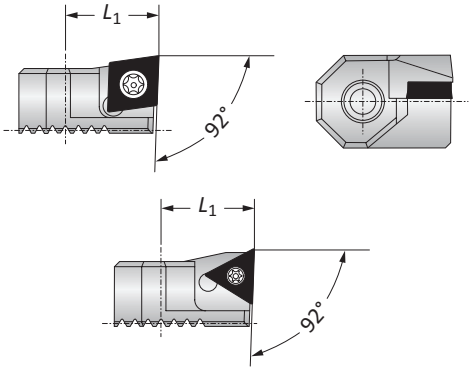


538 (537) Counter Weights

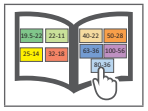
	Boring Range	Part No.
i	7.870 - 33.070	**538041**
i	7.870 - 40.160	**538041**
i	19.690 - 128.150	**538042**
m	200.00 - 840.00	**537041**
m	200.00 - 1020.00	**537041**
m	500.00 - 3255.00	**537042**

Insert Holders for Abrasive Materials

	Boring Range	L_1	Weight	Insert Form	Part No.
i	7.874 - 33.070	0.708	0.066 (lbs)	20	**211061**
i	7.874 - 40.157	0.708	0.066 (lbs)	101	**211063**
i	19.685 - 128.149	0.708	0.066 (lbs)	103	**211065**
m	200.00 - 840.00	18.00	0.03 (kg)	20	**211061**
m	200.00 - 1020.00	18.00	0.03 (kg)	101	**211063**
m	500.00 - 3255.00	18.00	0.03 (kg)	103	**211065**



B10-N: 10-13
Key on B10-E : 1



B10: xii-xiii

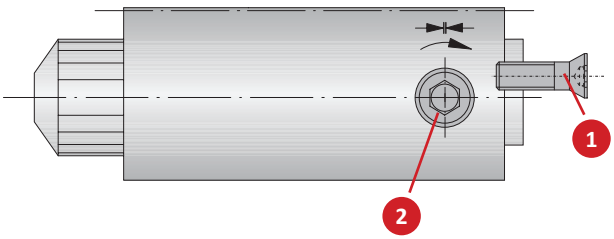
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

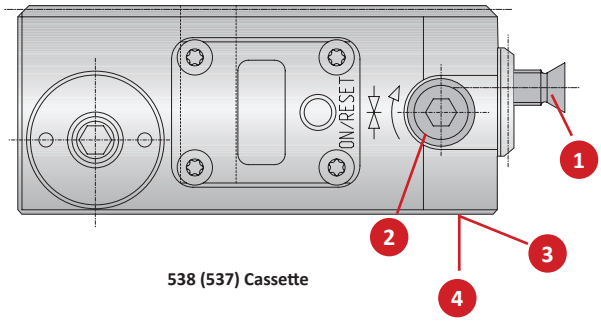
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

338 (337) / 538 (537) Accessories

Clamping Pieces



338 (337) Cassette



538 (537) Cassette

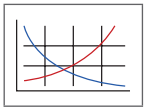
338 (337) and 538 (537) Clamping Pieces

	Cassette Part No.	1 Countersunk Screw		2 Clamping Screw		3 Battery Access Cover		4 Sealing Ring	*Battery
		Part No.	Service Key	Part No.	Service Key	Part No.	Service Key	Part No.	Part No.
ⓘ	338017	**215462**	**T20 / H**	**136193**	**s4 / F**	–	–	–	–
	538001	**415985**	**T20 / H**	**136193**	**s4 / F**	**501016**	**T20 / H**	**415895**	**415896**
ⓜ	337017	**215462**	**T20 / H**	**136193**	**s4 / F**	–	–	–	–
	537001	**415985**	**T20 / H**	**136193**	**s4 / F**	**501016**	**T20 / H**	**415895**	**415896**

*Always change two batteries

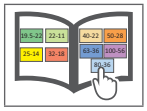
NOTE: Please use VARTA batteries

B10-N: 10-13



Key on B10-E : 1

B10: xii-xiii



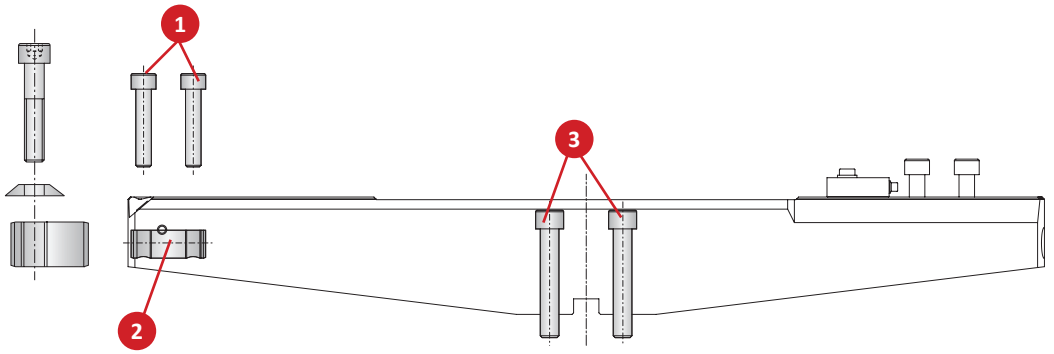
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Serrated Slide Basic D 40 Accessories

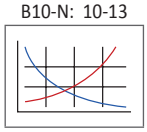
Clamping Pieces



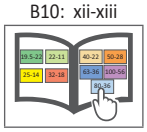
Clamping Pieces

	Connection	Serrated Slide Part No.	1 Cap Screw Part No.	1 Cap Screw Service Key	2 Clamping Nut Part No.	3 Thread Pin Part No.	3 Thread Pin Service Key	Cap Screw Part No.	Cap Screw Service Key
ⓘ	D 40	350021	**115118**	s8 / B	**115669**	**349010**	s4 / F	**315186**	s10 / C
ⓘ	D 40	350022	**115118**	s8 / B	**115669**	**349011**	s4 / F	**315186**	s10 / C
ⓘ	D 40	350023	**115118**	s8 / B	**115669**	**349012**	s4 / F	**315186**	s10 / C
ⓘ	D 40	350024	**115118**	s8 / B	**115669**	**349013**	s4 / F	**315186**	s10 / C
ⓜ	D 40	349021	**115118**	s8 / B	**115669**	**349010**	s4 / F	**315186**	s10 / C
ⓜ	D 40	349022	**115118**	s8 / B	**115669**	**349011**	s4 / F	**315186**	s10 / C
ⓜ	D 40	349023	**115118**	s8 / B	**115669**	**349012**	s4 / F	**315186**	s10 / C
ⓜ	D 40	349024	**115118**	s8 / B	**115669**	**349013**	s4 / F	**315186**	s10 / C

B10-N: 10-13
Key on B10-E : 1



B10: xii-xiii



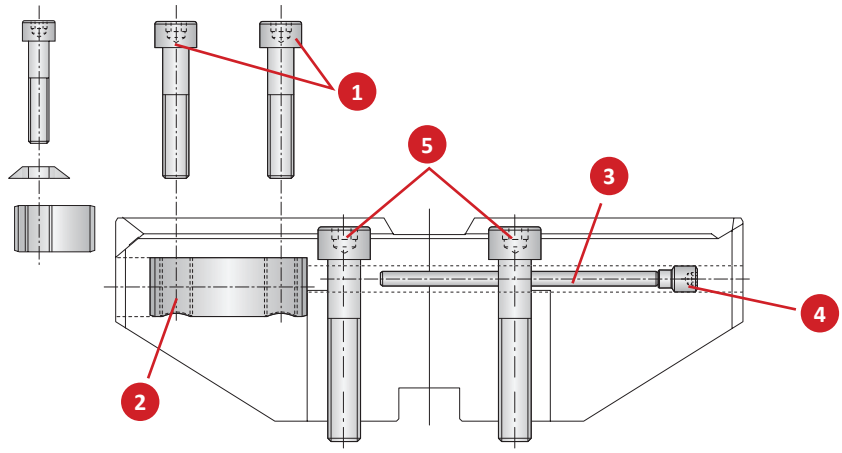
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

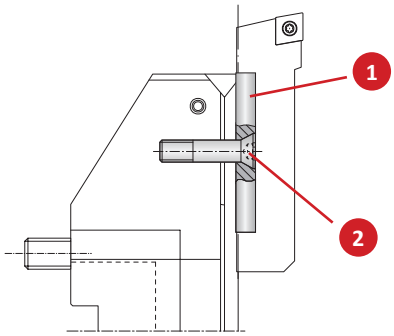
Serrated Slide Basic D 60 Accessories

Clamping Pieces | Cover Plates



Clamping Pieces

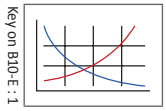
	Connection	Serrated Slide Part No.	1 Cap Screw Part No.	1 Cap Screw Service Key	2 Clamping Nut Part No.	3 Adjustment Pin Part No.	4 Thread Pin Part No.	4 Thread Pin Service Key	5 Cap Screw Part No.	5 Cap Screw Service Key
ⓘ	D 60	350051	**115118**	s8 / B	**115669**	**114112**	**115196**	s4 / F	**115170**	s14 / C
ⓘ	D 60	350052	**115118**	s8 / B	**115669**	**114113**	**115196**	s4 / F	**115170**	s14 / C
ⓘ	D 60	350053	**115118**	s8 / B	**115669**	**114114**	**115196**	s4 / F	**115170**	s14 / C
ⓘ	D 60	350054	**115118**	s8 / B	**115669**	**114115**	**115196**	s4 / F	**115170**	s14 / C
ⓜ	D 60	349051	**115118**	s8 / B	**115669**	**114112**	**115196**	s4 / F	**115170**	s14 / C
ⓜ	D 60	349052	**115118**	s8 / B	**115669**	**114113**	**115196**	s4 / F	**115170**	s14 / C
ⓜ	D 60	349053	**115118**	s8 / B	**115669**	**114114**	**115196**	s4 / F	**115170**	s14 / C
ⓜ	D 60	349054	**115118**	s8 / B	**115669**	**114115**	**115196**	s4 / F	**115170**	s14 / C



Cover Plates for Basic D 60 Serrated Slides

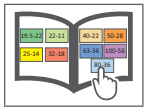
	Connection	Serrated Slide Part No.	1 Cover Plate Part No.	2 Countersunk Screw Part No.	Service Key
ⓘ	D 60	350051	**349016**	**063106**	s4 / B
ⓘ	D 60	350052	**349017**	**063106**	s4 / B
ⓘ	D 60	350053	**349017**	**063106**	s4 / B
ⓘ	D 60	350054	**349017**	**063106**	s4 / B
ⓜ	D 60	349051	**349016**	**063106**	s4 / B
ⓜ	D 60	349052	**349017**	**063106**	s4 / B
ⓜ	D 60	349053	**349017**	**063106**	s4 / B
ⓜ	D 60	349054	**349017**	**063106**	s4 / B

B10-N: 10-13



Key on B10-E : 1

B10: xii-xiii



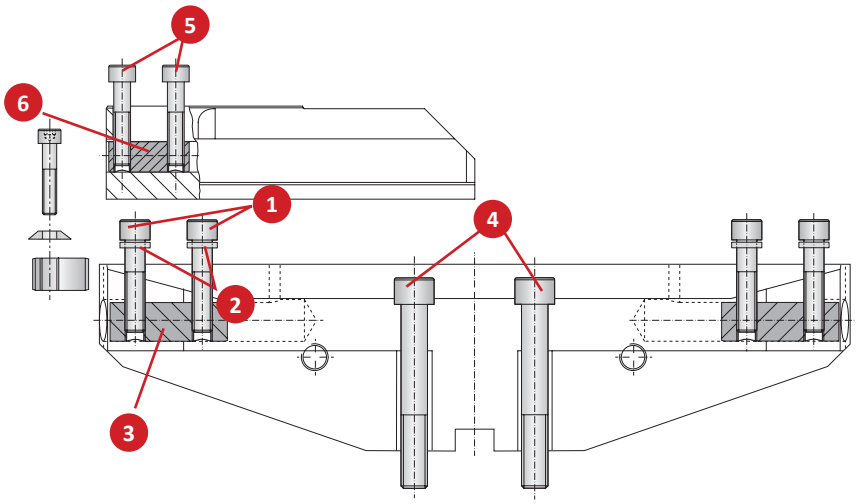
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Serrated Slide Eco D 60 Accessories

Clamping Pieces



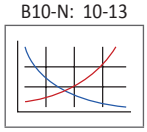
Base Slide Clamping Pieces

	Connection	Base Slide Part No.	1 Cap Screw Part No.	1 Cap Screw Service Key	2 Disc Part No.	3 Clamping Nut Part No.	4 Cap Screw Part No.	4 Cap Screw Service Key
ⓘ	D 60	350005	**115771**	s10 / C	**115737**	**415181**	**077128**	s14 / C
	D 60	350006	**115771**	s10 / C	**115737**	**415181**	**077128**	s14 / C
ⓜ	D 60	349005	**115771**	s10 / C	**115737**	**415181**	**077128**	s14 / C
	D 60	349006	**115771**	s10 / C	**115737**	**415181**	**077128**	s14 / C

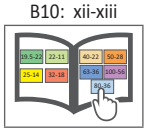
Serrated Slide Clamping Pieces

	Serrated Slide Part No.	Service Key	5 Cap Screw Part No.	5 Cap Screw Service Key	6 Clamping Nut Part No.
ⓘ	350014	s14 / C	**115118**	s8 / B	**115669**
	350015	s14 / C	**115118**	s8 / B	**115669**
ⓜ	349014	s14 / C	**115118**	s8 / B	**115669**
	349015	s14 / C	**115118**	s8 / B	**115669**

B10-N: 10-13



B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

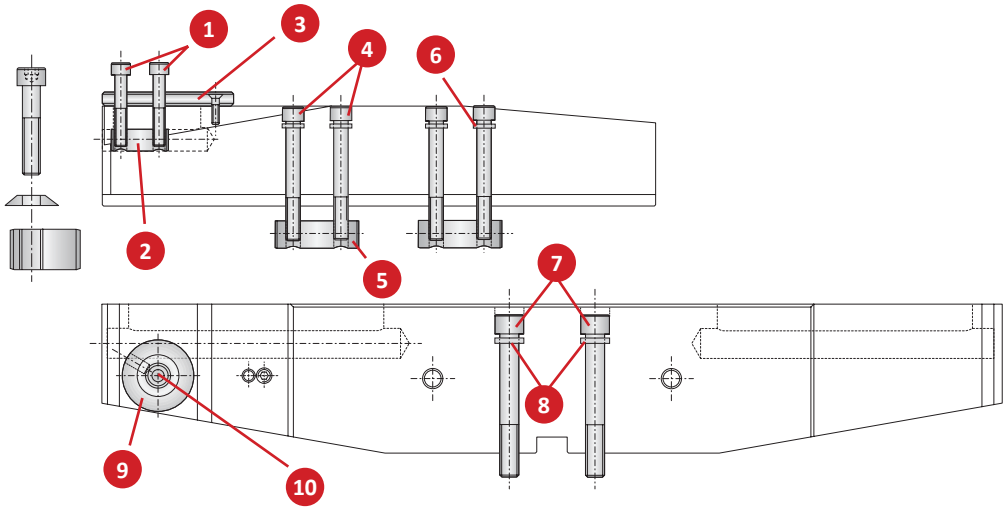
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Serrated Slide Flex D 60 Accessories

Clamping Pieces



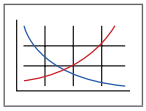
Serrated Slide Clamping Pieces

	Serrated Slide	1 Cap Screw		2 Clamping Nut	3 Adapter		4 Cap Screw		5 Clamping Nut	6 Disk
	Part No.	Part No.	Service Key	Part No.	Part No.	Service Key	Part No.	Service Key	Part No.	Part No.
ⓘ	350035	**115307**	s8 / B	**115669**	**349043**	s4 / B	**315186**	s10 / C	**349202**	**115737**
ⓘ	350036	**115307**	s8 / B	**115669**	**349043**	s4 / B	**077110**	s10 / C	**415181**	**115737**
ⓘ	350037	**115307**	s8 / B	**115669**	**349043**	s4 / B	**315403**	s10 / C	**415181**	**115737**
ⓘ	350038	**115307**	s8 / B	**115669**	**349043**	s4 / B	**315415**	s10 / C	**415181**	**115737**
ⓜ	349035	**115307**	s8 / B	**115669**	**349043**	s4 / B	**315186**	s10 / C	**349202**	**115737**
ⓜ	349036	**115307**	s8 / B	**115669**	**349043**	s4 / B	**077110**	s10 / C	**415181**	**115737**
ⓜ	349037	**115307**	s8 / B	**115669**	**349043**	s4 / B	**315403**	s10 / C	**415181**	**115737**
ⓜ	349038	**115307**	s8 / B	**115669**	**349043**	s4 / B	**315415**	s10 / C	**415181**	**115737**

Base Slide Clamping Pieces

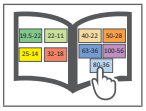
	Base Slide	7 Cap Screw		8 Disk	9 Injector	10 Countersunk Screw	
	Connection	Part No.	Part No.	Service Key	Part No.	Part No.	Part No.	Service Key
ⓘ	D 60	350031	**115736**	s14 / C	**068168**	**349201**	**415898**	s6 / B
ⓘ	D 60	350032	**415913**	s14 / C	**068168**	**349201**	**415898**	s6 / B
ⓘ	D 60	350033	**215509**	s14 / C	**068168**	**349201**	**415898**	s6 / B
ⓘ	D 60	350034	**415636**	s14 / C	**068168**	**349201**	**415898**	s6 / B
ⓜ	D 60	349031	**115736**	s14 / C	**068168**	**349201**	**415898**	s6 / B
ⓜ	D 60	349032	**415913**	s14 / C	**068168**	**349201**	**415898**	s6 / B
ⓜ	D 60	349033	**215509**	s14 / C	**068168**	**349201**	**415898**	s6 / B
ⓜ	D 60	349034	**415636**	s14 / C	**068168**	**349201**	**415898**	s6 / B

B10-N: 10-13



Key on B10-E : 1

B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Notes

Notes

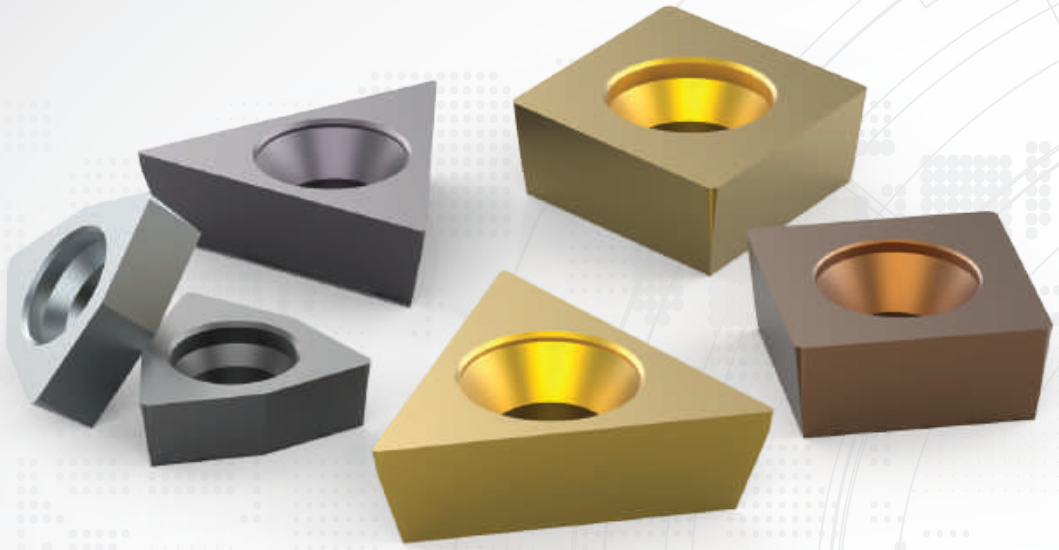
SECTION

B10-F

Inserts

Wohlhaupter™ Inserts

Replaceable Boring Inserts



Cutting-Edge Technology

Wohlhaupter has the cutting-edge technology to achieve all of your boring applications. With precision in mind, our inserts are available in multiple insert geometries, coatings, and nose radii. Wohlhaupter inserts are offered in uncoated and coated carbide, cermet, as well as CBN and PCD materials.

Try our easy-to-use boring insert selector available online or download from the app store to find the perfect inserts for your boring applications.
www.alliedmachine.com/bis

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

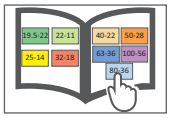
NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

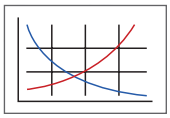
Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries

Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Wohlhaupter™ Inserts Table of Contents

Product Nomenclature

Wohlhaupter Product Nomenclature 2
ISO Insert Nomenclature 3

Insert Grades . . . . . 4 - 9

Insert Geometries . . . . . 10 - 13

Insert Forms

Form 211 . . . . . 14 - 15
Form 20 . . . . . 16 - 17
Form 161 and 163 18
Form 47 19
Form 101, 103, 104, and 105 . . . . . 20 - 25
Form 123 and 124 . . . . . 26 - 27
Form 39 . . . . . 28 - 29
Form 75 . . . . . 30 - 31
Form 262 and 264 . . . . . 32 - 33
Form 112, 113, and 114 34
Form 04 and 05 35
Grooving Insert Form 89, 90, and 91 . . . . . 36 - 37
Grooving Insert Form 304 . . . . . 38 - 40
Grooving Insert Form 325 41

Insert Accessories 42

Technical Information

Surface Finish and General Formulas 43
Wiper Geometries 44

Wear Patterns 45

WOHLHAUPTER®
Boring Insert Selector

Find the best insert for your application.

- Generate the correct boring insert for your job in just six easy steps
- Choose type, shape, substrate, insert form, nose radius, and material
- Order easily by adding the item to your cart

www.alliedmahcine.com/bis

Wohlhaupter Insert Product Nomenclature

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼	Universal - Main Application
▽▽	Universal - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
○	Good - Extended Application
◕	Average - Main Application
◔	Average - Extended Application
✱	Difficult - Main Application
✲	Difficult - Extended Application

Reference Key

Symbol	Wohlhaupter Insert Grades
WHW	Uncoated carbide (HW)
WHC	Coated carbide (HC)
WHT	Uncoated cermet (HT)
WTC	Coated cermet (HC)
WCN	Ceramic cutting material (CN)
WBN	Cubic boron nitride CBN (BN)
WBC	Coated CBN (BC)
PCD	Polycrystalline diamond PCD (DP)

Wohlhaupter Inserts

F101	04	M	N	–	158	W
1	2	3	4		5	6

1. Wohlhaupter Insert Form

211	**262**
20	**264**
161	**112**
163	**113**
47	**114**
101	**04**
103	**05**
104	**89**
105	**90**
123	**91**
124	**304**
39	**325**
75	

2. Corner Radius

Metric (mm)

005 = 0.05mm
01 = 0.10mm
02 = 0.20mm
03 = 0.30mm
04 = 0.40mm
06 = 0.60mm
08 = 0.80mm
12 = 1.20mm
16 = 1.60mm
20 = 2.00mm
24 = 2.40mm

3. Tolerance Group

	Metric (mm)	
	Length of edge	±0.025
G	IC	±0.025
	Thickness	±0.13
	Length of edge	±0.08-0.15*
M	IC	±0.05-0.10*
	Thickness	±0.13
	Length of edge	±0.013
F	IC	±0.005
	Thickness	±0.025
	Length of edge	±0.13
C	IC	±0.025
	Thickness	±0.025

*Varies upon insert size

4. Machining Direction

N = Neutral
L = Left
R = Right

5. Geometry

Carbide	Carbide	Tangential	Ceramic	PCD	CBN
108	**155**	**880**	**711**	**530**	**538**
109	**158**	**811**		**720**	**741**
112	**161**			**730**	**742**
114	**161**			**735**	**745**
117	**174W**				**747**
121	**192**				**748**
122	**199**				**749**
126	**200**				**768**
127	**650**				
128	**840**				
129	**850**				
145	**860**				

6. Optional Information

W = Wiper Geometry

ISO Insert Nomenclature

DIN ISO 1832

C	C	M	T	09	T3	02
1	2	3	4	5	6	7

1. Basic Insert Form

- **C** = Rhomboid 80°
- **D** = Rhomboid 55°
- **L** = Rectangular
- **R** = Round
- **S** = Square
- **T** = Triangular
- **V** = Rhomboid 35°
- **W** = Trigon

2. Clearance Angle

- **B** = 5°
- **C** = 7°
- **N** = 0°
- **P** = 11°
- **O** = 10°

3. Tolerance Group

	Metric (mm)	
G	Length of edge	±0.025
	IC	±0.025
	Thickness	±0.13
M	Length of edge	±0.08-0.15*
	IC	±0.05-0.10*
	Thickness	±0.13
F	Length of edge	±0.013
	IC	±0.005
	Thickness	±0.025
C	Length of edge	±0.13
	IC	±0.025
	Thickness	±0.025

*Varies upon insert size

4. Mounting Style

T = One sided countersunk	Cylindrical fixing hole Countersunk 40° - 60°
H = One sided chipbreaker	Cylindrical fixing hole Countersunk 70° - 90°
W = Without chipbreaker	Cylindrical fixing hole Countersunk 40° - 60°
X = Special design	Special insert design
A = Without chipbreaker	Cylindrical fixing hole Without countersunk

5. Insert Size / Cutting Edge

Metric (mm)	C	D	R	S	T	V	W
3.97mm					006		03
5.00mm					F20		
6.00mm					F21		
6.35mm	06				11	11	
7.94mm				07			
9.52mm	09	11		09	16	16	
10.00mm		10					
12.00mm	12	12					
12.70mm	16	15		12			
15.87mm			15	15			
16.00mm			16				
19.05mm		19		19			
20.00mm			20				
25.00mm			25				
25.40mm				25			

6. Insert Thickness

Metric (mm)

- **01** = 1.59mm
- **02** = 2.38mm
- **T2** = 2.78mm
- **03** = 3.18mm
- **T3** = 3.97mm
- **04** = 4.76mm
- **05** = 5.56mm
- **06** = 6.35mm
- **07** = 7.94mm

7. Corner Radius

Metric (mm)

- **005** = 0.05mm
- **01** = 0.10mm
- **02** = 0.20mm
- **03** = 0.30mm
- **04** = 0.40mm
- **06** = 0.60mm
- **08** = 0.80mm
- **12** = 1.20mm
- **16** = 1.60mm
- **20** = 2.00mm
- **24** = 2.40mm

Wohlhaupter Insert Grades

Uncoated Carbides

Uncoated Carbides

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WHW01 (HW)	• Fine-grain carbide • Finishing & light roughing • Non-ferrous metals, cast materials & difficult-to-machine alloys	P								
		M								
		K	■	■	■					
		N	■	■	■					
		S	■	■						
		H								
WHW03 (HW)	• Fine-grain carbide • Grooving & roughing • Non-ferrous metals, cast materials & difficult-to-machine alloys	P								
		M								
		K			■	■				
		N			■	■				
		S			■	■				
		H								
WHW16 (HW)	• Fine-grain carbide • Finishing & light roughing • Non-ferrous metals, cast materials & difficult-to-machine alloys	P								
		M								
		K		■	■					
		N		■	■					
		S		■	■					
		H								
WHW20 (HW)	• Tough fine-grain carbide • Finishing roughing & grooving. Steel & cast materials, cast steel • Non-ferrous materials & difficult-to-machine alloys	P			■	■				
		M								
		K			■	■				
		N			■	■				
		S			■	■				
		H								

Wohlhaupter Insert Grades

Coated Carbides

Coated Carbides

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WHC05 (HC)	• PVD coating with nano-composite structure • Finishing & roughing • Steels, stainless steels, cast materials, & difficult-to-machine alloys	P		■	■					
		M		■	■					
		K		■	■					
		N								
		S		■	■					
		H								
WHC18 (HC)	• PVD-TiB2 coating • Finishing & light roughing • Non-ferrous metals	P								
		M								
		K								
		N		■	■	■				
		S								
		H								
WHC19 (HC)	• Multi-layer PVD coating • Finishing & roughing • Stainless steels	P				■	■	■	■	
		M				■	■	■		
		K					■	■	■	
		N								
		S				■	■	■		
		H								
WHC20 (HC)	• Multi-layer CVD coating • Finishing • Steels & stainless steels	P		■	■	■				
		M		■	■					
		K								
		N								
		S								
		H								
WHC30 (HC)	• CVD coating • Roughing • Steel & cast steel	P					■	■		
		M				■	■			
		K					■	■		
		N								
		S								
		H								
WHC79 (HC)	• Multi-layer MT CVD coating • Roughing & finishing • Steels, stainless steels & cast materials	P				■	■	■		
		M			■	■	■			
		K			■	■	■			
		N								
		S								
		H								
WHC98 (HC)	• PVD TiAlN coating • Roughing & finishing • Steels, stainless steels & difficult-to-machine materials	P				■	■	■		
		M				■	■	■		
		K				■	■	■		
		N								
		S				■	■			
		H								

Wohlhaupter Insert Grades

Coated Carbides

Coated Carbides

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WHC110 (HC)	• Multi-layer PVD coating • Finishing • Steels & stainless steels	P		■	■	■				
		M		■	■					
		K			■	■				
		N								
		S								
		H								
WHC111 (HC)	• PVD TiAlN coating • Finishing • Machining of steels after heat treating with high Cr content up to 60 HRC • Hard - soft transitions, difficult-to-machine alloys & stainless steels	P	■	■						
		M	■	■						
		K	■	■	■					
		N								
		S	■	■						
		H	■	■						
WHC114 (HC)	• Multi-layer PVD coating • Finishing & roughing • Steels, stainless steels, & difficult-to-machine materials	P			■	■	■			
		M			■	■	■			
		K			■	■	■			
		N								
		S			■	■	■			
		H								
WHC136 (HC)	• Stronger PVD coating with improved coating adhesion • High oxidation resistance allows a wide range of applications	P			■	■	■			
		M			■	■	■			
		K				■	■			
		N								
		S			■	■	■			
		H								
WHC164 (HC)	• Thick MT-CVD coating with a dominant AC_2O_3 • Primarily developed for the material groups P-K & alternatively H • Full & discontinuous cut • High cutting speeds possible	P				■	■	■		
		M								
		K				■	■	■		
		N								
		S								
		H		■	■					
WHC168 (HC)	• Multi-layer MT CVD coating • Excellent combination of toughness & reliability • Steels, cast materials & alternatively for stainless steel	P				■	■	■		
		M				■	■			
		K				■	■	■		
		N								
		S								
		H								
WHC198 (HC)	• Upgraded PVD grade with hard AlTiN coating • Optimized cutting edge stability • General machining of steel, stainless steel, high temperature resistant alloys, titanium, iron, cast iron, & non-ferrous materials	P				■	■	■		
		M				■	■			
		K				■	■	■		
		N				■	■	■	■	
		S				■	■			
		H								

Wohlhaupter Insert Grades

Uncoated Cermet | Coated Cermet

Uncoated Cermet

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WHT10 (HT)	• Uncoated cermet • Finishing • Steels, stainless steels & cast materials	P								
		M								
		K								
		N								
		S								
		H								
WHT12 (HC)	• Uncoated cermet • Finishing • Steels, cast materials, sintered metals, & non-ferrous metals	P								
		M								
		K								
		N								
		S								
		H								
WHT32 (HC)	• Uncoated cermet • Finishing • Steels & cast materials	P								
		M								
		K								
		N								
		S								
		H								

Coated Cermet

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WTC15 (TC)	• New PVD brilliant coating • Reduce friction coefficient in turning applications • Coated cermet general purpose grade for material group • Achieves excellent surface finish with excellent wear resistance • Usable in stainless steels	P								
		M								
		K								
		N								
		S								
		H								
WTC121 (TC)	• PVD coated cermet • Finishing of steels & stainless steels	P								
		M								
		K								
		N								
		S								
		H								

Wohlhaupter Insert Grades

Uncoated Cubic Boron Nitride | Coated Cubic Boron Nitride

Uncoated Cubic Boron Nitride

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WBN150 (BN)	• Uncoated CBN grade • Roughing & finishing smooth & slightly discontinuous cuts • Hardened steels 58 - 64 HRC • Grain size 2 µm • CBN content: 50%	P								
		M								
		K								
		N								
		S								
		H								
WBN200 (BN)	• Uncoated CBN grade • Roughing & finishing highly discontinuous cuts • Hardened steels 58 - 64 HRC • Grain size 3 µm • CBN content: 65%	P								
		M								
		K								
		N								
		S								
		H								
WBN300 (BN)	• Uncoated CBN grade • Roughing & finishing smooth cuts • Hardened steels 58 - 64 HRC • Grain size 0.5 - 1.0 µm • CBN content: approximately 50%	P								
		M								
		K								
		N								
		S								
		H								
WBN450 (BN)	• Uncoated CBN grade • Roughing & finishing smooth & discontinuous cuts • Pearlite gray cast iron & sintered metals • Grain size 2 µm • CBN content: 90%	P								
		M								
		K								
		N								
		S								
		H								

Coated Cubic Boron Nitride

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WBC... (BC)	• Single and multiple assembled • Different sizes & designs available upon request. Please contact our Application Engineering Department *email*: **appeng@alliedmachine.com** *ext*: **7611**	P								
		M								
		K								
		N								
		S								
		H								

Wohlhaupter Insert Grades

Polycrystalline Diamond | Ceramic Cutting Material

Polycrystalline Diamond

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
PCD D30 (DP)	• PCD medium grain grade • Finishing • Al alloys & Mg alloys up to 12% Si • Grain size 10 µm	P								
		M								
		K								
		N								
		S								
		H								
PCD D50 (DP)	• PCD mixed-grain grade • Finishing • CFRP, GRP, MMC, Al alloys over 12% Si • Grain size 2 - 30 µm	P								
		M								
		K								
		N								
		S								
		H								

Ceramic Cutting Material

Cutting Material	Description	Material	ISO Application 05	10	15	20	25	30	35	40
WCN06 (CN)	• Uncoated silicon-nitride ceramic • Roughing • Pearlite gray cast-iron	P								
		M								
		K								
		N								
		S								
		H								

Wohlhaupter Insert Geometries

Cermet | Carbide

Cermet | Carbide

Geometry	Description	Application	Available Form
108	• Sintered chip breaker for higher feeds • Suitable for highly discontinuous cuts	▼▼▼ ▼	F101, F103, F104, F112, F113
109	• Sintered geometry with V-shaped chip breaker for roughing & finishing • Good chip control even for shallow depth of cut	▼▼▼ ▼	F101, F103, F104
112	• Sintered chip breaker • Finishing & light roughing	▼▼▼ ▽	F101, F03
117	• Sintered geometry for medium machining & roughing • Main application in material groups P, M, & K	▼▼▼ ▼	F75, F123, F124
121	• Positive geometry with stable cutting edge • Finishing in different material groups • Good chip control	▼▼▼	F20, F211
122	• Sintered chip breaker • Good chip control - even with long-chipping materials	▼▼▼	F101, F103, F161
126	• Sintered version with a wide range of applications	▼	F105
127	• Highly positive sintered geometry • For non-ferrous metals & cast iron	▼▼▼ ▼	F39, F101, F103, F104, F112, F113, F262, F264
128	• Highly positive sintered geometry • Polished for finishing non-ferrous metals, cast iron, & steel	▼▼▼	F20
129	• Highly positive chip breaking geometry • Polished for non-ferrous metals, cast iron, & steel • Ideal for structural steel applications	▼▼▼ ▼	F39, F101, F103, F262, F264
145	• Geometry for finishing in smooth & discontinuous cut • Good chip control - even with long-chipping materials	▼▼▼ ▼	F101, F103, F112, F113, F161

Wohlhaupter Insert Geometries

Cermet | Carbide

Cermet | Carbide

Geometry	Description	Application	Available Form
155	• Positive sintered geometry • Special cutting edge design in combination with the chip breaker design enables exceptional chip control even at shallow cutting depths & light feeds	▼▼▼	F20, F101, F103, F39, F264
158	• Stable sintered geometry for roughing & finishing with & without discontinuous cuts	▼▼▼ ▼	F75, F101, F103, F104, F105, F113, F114, F123, F124, F163
161	• Slightly positive & stable geometry • Main application material groups S & M. Alternatively suitable for P & K • Roughing & finishing in full & interrupted cuts	▼▼▼ ▼	F75, F123
167	• Positive sintered geometry with sharp cutting edges • Finishing up to medium machining • Excellent for M & S materials	▼▼▼ ▼	F75, F123
174W	• Wiper geometry for highly productive turning & boring • Can be used with pitch angle 92° - 95° • Good chip breaking properties even at lower feed rates	▼▼▼ ▽	F101, F103
192	• Sintered version for a variety of applications • Low cutting pressure because of sharp cutting edge prep	▼▼▼ ▼	F39, F101, F103, F104, F112, F113, F163, F161, F262, F264
199	• Positive sintered geometry for wide variety of applications • Special chip breaker allows chip control with different radial depth of cut	▼▼▼ ▼	F101, F103, F104, F112, F113
200	• Highly positive sintered geometry • Applicable for various material groups for low cutting pressure	▼▼▼ ▼	F39, F101, F103, F104, F264
650	• Obliquely ground chip breaker reduces cutting forces • Finishing & smooth interrupted cuts	▼▼▼	F20, F211
840	• Parallel ground chip breaker • For finish operations with stable cutting edge	▼▼▼	F20
850	• Parallel ground chip breaker • Good chip control with short to medium feeds	▼▼▼	F161
860	• Parallel ground chip breaker reduces cutting forces • Stable for a wide range of applications	▼▼▼ ▼	F101, F103, F104, F105, F325

Wohlhaupter Insert Geometries

Tangential | Ceramic

Tangential

Geometry	Description	Application	Available Form
880	• Large parallel ground chip breaker with 10° rake angle for reduced cutting force	▼	F04, F05
811	• Smooth geometry without additional ground chip breaker • Reinforced cutting edges provide stability • Excellent for cast materials	▼	F05

Ceramic

Geometry	Description	Application	Available Form
711	• Smooth geometry with 0° rake angle • High cutting edge stability particularly in discontinuous cuts	▼	F75, F103, F104, F123

Wohlhaupter Insert Geometries

PCD | CBN

PCD

Geometry	Description	Application	Available Form
530	• PCD-tipped cutting edge	▼▼▼ ▼	F101, F103
720	• Smooth geometry in positive version with 7° rake angle for PCD • Sharp cutting edge	▼▼▼	F20, F101, F103
730	• Smooth geometry with 0° rake angle for PCD • Sharp cutting edge	▼▼▼	F20, F39, F75, F101, F103, F123, F211, F262, F264
735	• Smooth geometry • Laser-cut chip breaker for PCD • Suitable for long-chipping aluminum wrought alloys	▼▼▼	F20, F39, F101, F103, F211, F262, F264

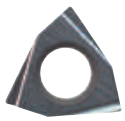
CBN

Geometry	Description	R	Fb	Fw	Application	Available Form
548	• Smooth geometry with 0° rake angle for afforded CBN • Rounded cutting edge - not for chamfering • For cast materials	0.015			▼▼▼ ▼	F101, F103
741	• Smooth geometry with 0° rake angle for CBN • Rounded cutting edge with 30° chamfer	0.015	0.15	30°	▼▼▼	F20, F101, F103
742	• Smooth geometry with 0° rake angle for CBN • Rounded cutting edge with 15° chamfer	0.015	0.1	15°	▼▼▼	F20, F101, F103
745	• Smooth geometry with 0° rake angle for CBN • Rounded cutting edge with 30° chamfer	0.015	0.05	30°	▼▼▼	F20, F211
747	• Smooth geometry with 0° rake angle for CBN • Rounded cutting edge with a small 20° chamfer	0.015	0.1	20°	▼▼▼	F39, F104, F262, F264
748	• Smooth geometry with 0° rake angle for CBN • Rounded cutting edge • No chamfer	0.015	0.2	20°	▼▼▼	F20, F101, F103, F211
749	• Smooth geometry with 0° rake angle for CBN • Rounded cutting edge with a large 20° chamfer	0.015			▼▼▼ ▼	F75, F123, F264
768	• Smooth geometry with 7° rake angle for CBN • Rounded cutting edge	0.015			▼▼▼	F20, F101, F103

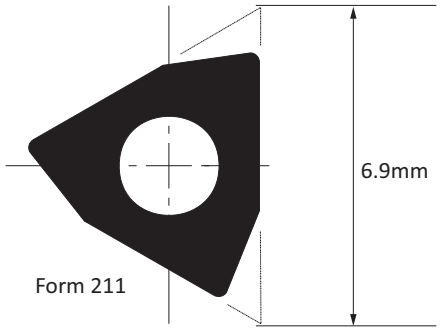
Insert Form 211

Cermet | Carbide

121 Geometry



650 Geometry



		Cermet						Carbide									
		Uncoated				Coated		Uncoated		Coated							
Steel	P	▼▼▼								▼▼▼		▼▼▼			▼▼▼		▼▼▼
Stainless Steel	M									▽▽▽		▼▼▼			▼▼▼		▼▼▼
Cast Iron	K	▽▽▽						▽▽▽		▼▼▼		▽▽▽			▼▼▼		▽▽▽
Non-Ferrous Materials	N	▽▽▽						▼▼▼			▼▼▼						
Titanium	S							▽▽▽				▼▼▼			▼▼▼		▼▼▼
Hard Materials	H														▼▼▼		

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
121	0.004	0.10	WBGX030101	F21101GN121	**397675**											✱			◕			
121	0.008	0.20	WBGX030102	F21102GN121	**397676**											✱			◕			
650	0.004	0.10	WBGX030101	F21101GL650	**097755**		●					●		●	●						◕	
650	0.008	0.20	WBGX030102	F21102GL650	**097454**		●					●		●							◕	

Reference Key

Symbol	Insert Type
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
✱	Difficult - Main Application

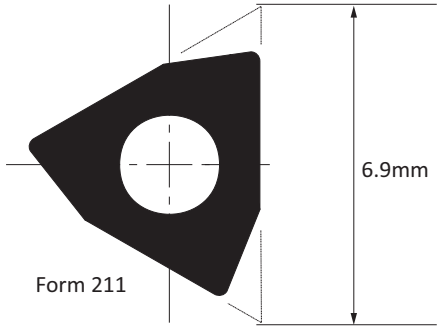
Insert Form 211

CBN | PCD

730 Geometry

735 Geometry

748 Geometry



		Ceramic					CBN								PCD			
		Uncoated			Coated		Uncoated						Coated					
Steel	P																	
Stainless Steel	M																	
Cast Iron	K									▼▼▼								
Non-Ferrous Materials	N														▼▼▼	▼▼▼		
Titanium	S																	
Hard Materials	H							▼▼▼										
Geometry	Radius in	Radius mm	ISO Code	Description	Part No.			WBN150	WBN200	WBN300	WBN450				PKDD30	PKDD50		
730	0.004	0.10	WBGX030101	F21101GN730	**397763**										●			
730	0.008	0.20	WBGX030102	F21102GN730	**097557**										●	●		
735	0.008	0.20	WBGX030102	F21102GN735	**397237**										●			
748	0.004	0.10	WBGX030101	F21101GN748	**097486**				●		●					●		
748	0.008	0.20	WBGX030102	F21102GN748	**097552**				●		●							

Reference Key

Symbol	Insert Type
▼▼▼	Finishing - Main Application

Reference Key

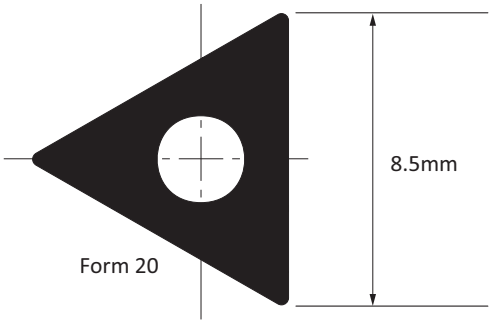
Symbol	Machining Conditions
●	Average - Main Application

Insert Form 20

Cermet | Carbide

121 Geometry 128 Geometry

155 Geometry 650 Geometry 840 Geometry



		Cermet						Carbide									
		Uncoated				Coated		Uncoated		Coated							
Steel	P	▼▼▼				▼▼▼	▼▼▼			▼▼▼		▼▼▼			▼▼▼		▼▼▼
Stainless Steel	M	▽▽▽				▽▽▽	▽▽▽			▽▽▽		▼▼▼			▼▼▼		▼▼▼
Cast Iron	K	▽▽▽				▽▽▽		▽▽▽	▽▽▽	▼▼▼		▽▽▽			▼▼▼		▽▽▽
Non-Ferrous Materials	N	▽▽▽						▼▼▼	▼▼▼		▼▼▼						
Titanium	S							▽▽▽	▽▽▽			▼▼▼			▼▼▼		▼▼▼
Hard Materials	H														▼▼▼		

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136
121	0.004	0.10	TOGX080201	F02001GN121	397672											✖			◔		
121	0.008	0.20	TOGX080202	F02002GN121	397673											✖			◔		
121	0.016	0.40	TOGX080204	F02004GN121	397674											✖			◔		
128	0.008	0.20	TOGX080202	F02002GN128	297541								●	●	●						
128	0.016	0.40	TOGX080204	F02004GN128	297542								●	●	●						
155	0.008	0.20	TOMX080202	F02002MN155	397688					◔											
155	0.016	0.40	TOMX080204	F02004MN155	397689					◔											
650	0.004	0.10	TOGX080201	F02001GL650	097153		●				◔	●		●							◔
650	0.008	0.20	TOGX080202	F02002GL650	097546		●				◔	●		●							◔
650	0.012	0.30	TOGX080203	F02003GL650	097154							●		●							◔
650	0.016	0.40	TOGX080204	F02004GL650	097599		●				◔	●		●							◔
650	0.031	0.80	TOGX080208	F02008GL650	397764							●									◔
840	0.008	0.20	TOGX080202	F02002GR840	097701		●							●							

Reference Key

Symbol	Insert Type
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◔	Average - Main Application
✖	Difficult - Main Application

Insert Form 20

CBN | PCD

720 Geometry

730 Geometry

735 Geometry

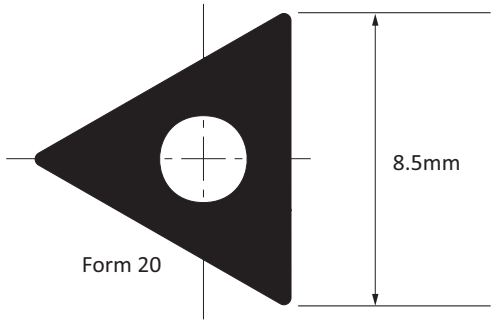
741 Geometry

742 Geometry

745 Geometry

748 Geometry

768 Geometry



		CBN								PCD			
		Uncoated						Coated					
Steel	P												
Stainless Steel	M												
Cast Iron	K			▼▼▼	▼▼▼								
Non-Ferrous Materials	N									▼▼▼	▼▼▼		
Titanium	S												
Hard Materials	H		▼▼▼	▼▼▼									

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WBN150	WBN200	WBN300	WBN450					PKDD30	PKDD50		
720	0.008	0.20	TOGX080202	F02002GN720	**297692**									◕			
720	0.016	0.40	TOGX080204	F02004GN720	**297845**									◕			
730	0.008	0.20	TOGX080202	F02002GN730	**097487**									◕	◕		
730	0.016	0.40	TOGX080204	F02004GN730	**097686**									◕	◕		
730	0.031	0.80	TOGX080208	F02008GN730	**097877**									◕			
735	0.008	0.20	TOGX080202	F02002GN735	**397133**									◕			
735	0.016	0.40	TOGX080204	F02004GN735	**397301**									◕			
741	0.008	0.20	TOGX080202	F02002GN741	**297260**		◕										
741	0.016	0.40	TOGX080204	F02004GN741	**297262**		◕										
742	0.008	0.20	TOGX080202	F02002GN742	**297264**			●									
742	0.016	0.40	TOGX080204	F02004GN742	**397610**			●									
745	0.004	0.10	TOGX080201	F02001GN745	**297259**		◕										
748	0.008	0.20	TOGX080202	F02002GN748	**297780**				◕								
748	0.016	0.40	TOGX080204	F02004GN748	**297782**				◕								
768	0.008	0.20	TOGX080202	F02002GN768	**397146**				◕								
768	0.016	0.40	TOGX080204	F02004GN768	**397192**				◕								

Reference Key

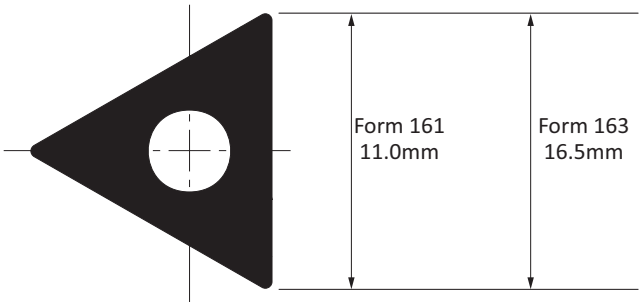
Symbol	Insert Type
▼▼▼	Finishing - Main Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application

Insert Forms 161, 163

Cermet | Carbide



		Cermet						Carbide											
		Uncoated				Coated		Uncoated	Coated										
Steel	P	▼▼▼	▼▼▼							▼▼▼		▼▼▼	▼▼▼		▼▼▼				▼▼▼
Stainless Steel	M									▽▽▽		▼▼▼	▽▽▽		▼▼▼				
Cast Iron	K	▽▽▽	▽▽▽						▽▽▽	▼▼▼		▽▽▽	▼▼▼		▼▼▼				▼▼▼
Non-Ferrous Materials	N	▽▽▽	▽▽▽						▼▼▼										
Titanium	S								▽▽▽			▼▼▼			▼▼▼				
Hard Materials	H														▼▼▼				▽▽▽

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC110	WHC111	WHC114	WHC136	WHC164
122	0.016	0.40	TCMT110204	F16104MN122	**097953**	●																
129	0.008	0.20	TCGT110202	F16102GN129	**397769**								●	●								
129	0.016	0.40	TCGT110204	F16104GN129	**397770**								●	●								
129	0.016	0.40	TCGT16T304	F16304GN129	**397771**								●	●								
145	0.016	0.40	TCGT110204	F16104GN145	**297993**														●			
158	0.016	0.40	TCMT16T304	F16304MN158	**297604**												◕					
192	0.016	0.40	TCMT110204	F16104MN192	**397663**											✱						◕
192	0.016	0.40	TCMT16T304	F16304MN192	**397654**											✱						◕
192	0.031	0.80	TCMT16T308	F16308MN192	**397772**											✱						
850	0.008	0.20	TCGT110202	F16102GL850	**097512**		●															

Reference Key

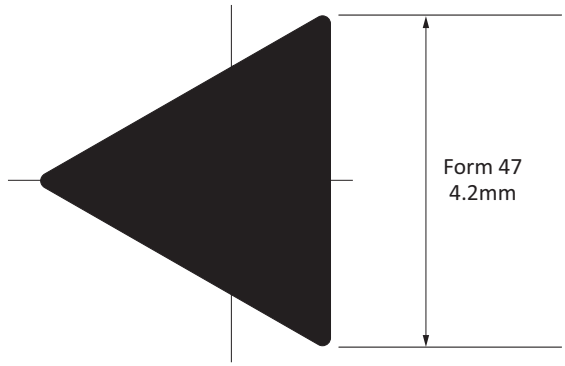
Symbol	Insert Type
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
✱	Difficult - Main Application

Insert Form 47

Cermet | Carbide



650 Geometry

		Carbide										
		Uncoated		Coated								
Steel	P					▼▼▼						
Stainless Steel	M					▽▽▽						
Cast Iron	K	▽▽▽				▽▽▽						
Non-Ferrous Materials	N	▼▼▼										
Titanium	S	▽▽▽										
Hard Materials	H											

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHW01	WHW16	WHC05	WHC18	WHC20	WHC79	WHC110	WHC111	WHC114	WHC136	WHC164
650	0.004	0.10	TOFX040101	F04701FL650	**097832**	●				●						
650	0.008	0.20	TOFX040102	F04702FL650	**097833**	●				●						

Reference Key

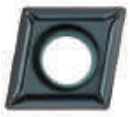
Symbol	Insert Type
▼▼▼	Finishing - Main Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application

Insert Forms 101, 103, 104, 105

Cermet | Carbide


108 Geometry

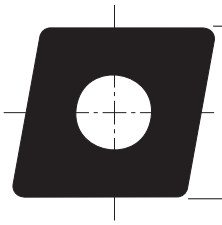
109 Geometry

112 Geometry

122 Geometry

126 Geometry

127 Geometry



		Cermet						Carbide											
		Uncoated				Coated		Uncoated	Coated										
Steel	P	▼▼▼			▽									▼			▼		
Stainless Steel	M													▼			▽		
Cast Iron	K	▽▽▽			▽▽▽				▽					▽			▽		
Non-Ferrous Materials	N	▽▽▽			▽▽▽				▼		▼								
Titanium	S								▽								▼		
Hard Materials	H																		

Geometry	Radius in	Radius mm	ISO Description	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
108	0.008	0.20	CCMT060202	F10102MN108	297833													◕				
108	0.016	0.40	CCMT060204	F10104MN108	297537													◕				
108	0.016	0.40	CCMT09T304	F10304MN108	297891													◕				
108	0.031	0.80	CCMT09T308	F10308MN108	397118													◕				
108	0.016	0.40	CCMT120404	F10404MN108	297725													◕				
108	0.031	0.80	CCMT120408	F10408MN108	297724													◕				
109	0.008	0.20	CCMT060202	F10102MN109	397352																◕	
109	0.016	0.40	CCMT060204	F10104MN109	397765																◕	
109	0.016	0.40	CCMT09T304	F10304MN109	397354																◕	
109	0.031	0.80	CCMT09T308	F10308MN109	397355																◕	
109	0.016	0.40	CCMT120404	F10404MN109	397356																◕	
109	0.031	0.80	CCMT120408	F10408MN109	397357																◕	
112	0.008	0.20	CCGT060202	F10102GN112	297485				◕													
112	0.016	0.40	CCMT060204	F10104MN112	297434				◕													
112	0.008	0.20	CCGT09T302	F10302GN112	297534				◕													
112	0.016	0.40	CCMT09T304	F10304MN112	297387				◕													
122	0.008	0.20	CCMT060202	F10102MN122	097899	●																
122	0.016	0.40	CCMT060204	F10104MN122	097926	●																
122	0.008	0.20	CCMT09T302	F10302MN122	097862	●																
122	0.016	0.40	CCMT09T304	F10304MN122	097957	●																
126	0.031	0.80	CCMT160508	F10508MN126	297557																◕	
126	0.047	1.20	CCMT160512	F10512MN126	297558																◕	
127	0.008	0.20	CCGT060202	F10102GN127	097529								●		●							
127	0.016	0.40	CCGT060204	F10104GN127	097445								●		●							
127	0.008	0.20	CCGT09T302	F10302GN127	297550								●		●							
127	0.016	0.40	CCGT09T304	F10304GN127	097497								●		●							
127	0.016	0.40	CCGT120404	F10404GN127	097496								●		●							

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

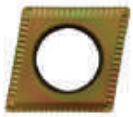
Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application

Insert Forms 101, 103, 104, 105

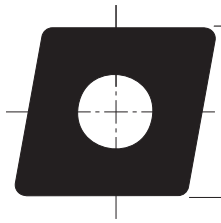
Cermet | Carbide

129 Geometry

145 Geometry



155 Geometry



		Cermet						Carbide									
		Uncoated				Coated		Uncoated	Coated								
Steel	P					▼▼▼				▽▼▼▼					▼▼▼ ▼		
Stainless Steel	M					▽▽▽				▽▽▽					▼▼▼ ▼		
Cast Iron	K					▽▽▽		▽▽▽ ▽		▼▼▼ ▼					▼▼▼ ▼		
Non-Ferrous Materials	N							▼▼▼ ▼			▼▼▼ ▼						
Titanium	S							▽▽▽ ▽							▼▼▼ ▼		
Hard Materials	H														▼▼▼ ▽		

Geometry	Radius in	Radius mm	ISO Description	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
129	0.002	0.05	CCGT0602005	F101005GN129	**397738**								●	●								
129	0.004	0.10	CCGT060201	F10101GN129	**397737**								●	●								
129	0.008	0.20	CCGT060202	F10102GN129	**297545**								●	●	●							
129	0.016	0.40	CCGT060204	F10104GN129	**297546**								●	●	●							
129	0.008	0.20	CCGT09T302	F10302GN129	**297547**								●	●	●							
129	0.016	0.40	CCGT09T304	F10304GN129	**297548**								●	●	●							
145	0.016	0.40	CCGT060204	F10104GN145	**297980**														●			
145	0.031	0.80	CCGT060208	F10108GN145	**397742**														●			
145	0.016	0.40	CCGT09T304	F10304GN145	**297994**														●			
145	0.031	0.80	CCGT09T308	F10308GN145	**297995**														●			
155	0.008	0.20	CCMT060202	F10102MN155	**397662**					◕												
155	0.016	0.40	CCMT060204	F10104MN155	**397739**					◕												
155	0.016	0.40	CCMT09T304	F10304MN155	**397740**					◕												

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application

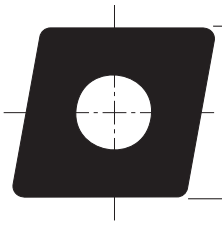
Insert Forms 101, 103, 104, 105

Carbide

158 Geometry

174W Geometry

192 Geometry



		Carbide											
		Uncoated		Coated									
Steel	P			▼▼▼ ▽		▼▼▼ ▼	▼▼▼ ▼		▼▼▼ ▼			▼▼▼ ▼	
Stainless Steel	M			▽▽▽		▼▼▼ ▼	▽▽▽ ▽		▼▼▼ ▼				
Cast Iron	K			▼▼▼ ▼		▽▽▽ ▽	▼▼▼ ▼		▼▼▼ ▼			▼▼▼ ▼	
Non-Ferrous Materials	N												
Titanium	S					▼▼▼ ▼			▼▼▼ ▼				
Hard Materials	H								▼▼▼ ▼			▽▽▽	

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
158	0.008	0.20	CCMT060202	F10102MN158	297248						◕		●			
158	0.016	0.40	CCMT060204	F10104MN158	297377						◕		●			
158	0.016	0.40	CCMT09T304	F10304MN158	297239						◕		●			
158	0.031	0.80	CCMT09T308	F10308MN158	297240						◕		●			
158	0.016	0.40	CCMT120404	F10404MN158	297242						◕		●			
158	0.031	0.80	CCMT120408	F10408MN158	297241						◕		●			
158	0.031	0.80	CCMT160508	F10508MN158	297559			●			◕					
158	0.047	1.20	CCMT160512	F10512MN158	297560						◕					
174W	0.016	0.40	CCMT060204	F10104MN174W	397766					✱						◕
174W	0.016	0.40	CCMT09T304	F10304MN174W	397767					✱						◕
174W	0.031	0.80	CCMT09T308	F10308MN174W	397768					✱						◕
192	0.008	0.20	CCMT060202	F10102MN192	297531					✱						◕
192	0.016	0.40	CCMT060204	F10104MN192	297658					✱						◕
192	0.031	0.80	CCMT060208	F10108MN192	297588					✱						◕
192	0.008	0.20	CCMT09T302	F10302MN192	297958					✱						
192	0.016	0.40	CCMT09T304	F10304MN192	297653					✱						◕
192	0.031	0.80	CCMT09T308	F10308MN192	397614					✱						◕
192	0.016	0.40	CCMT120404	F10404MN192	397666					✱						◕
192	0.031	0.80	CCMT120408	F10408MN192	297878					✱						◕
192	0.047	1.20	CCMT120412	F10412MN192	397632											◕

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
✱	Difficult - Main Application

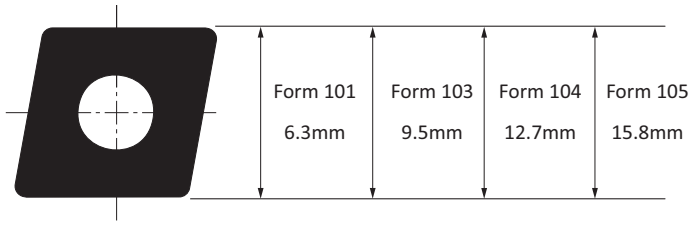
Insert Forms 101, 103, 104, 105

Cermet | Carbide

199 Geometry

200 Geometry

860 Geometry



		Cermet						Carbide									
		Uncoated				Coated		Uncoated		Coated							
Steel	P					▼▼▼				▼▼▼ ▼				▼▼▼ ▼	▼▼▼ ▼	▼▼▼ ▼	
Stainless Steel	M					▽▽▽				▽▽▽ ▽				▼▼▼ ▼	▼▼▼ ▼	▼▼▼ ▼	
Cast Iron	K							▽▽▽ ▽		▼▼▼ ▼				▼▼▼ ▼	▽▽▽ ▽	▽▽▽ ▽	
Non-Ferrous Materials	N							▼▼▼ ▼									
Titanium	S													▼▼▼ ▼	▼▼▼ ▼	▼▼▼ ▼	
Hard Materials	H													▼▼▼ ▽			

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
199	0.008	0.20	CCMT060202	F10102MN199	397164															◕		
199	0.016	0.40	CCMT060204	F10104MN199	397165															◕		
199	0.008	0.20	CCMT09T302	F10302MN199	397702															◕		
199	0.016	0.40	CCMT09T304	F10304MN199	397166															◕		
199	0.031	0.80	CCMT09T308	F10308MN199	397167															◕		
199	0.016	0.40	CCMT120404	F10404MN199	397191															◕		
199	0.031	0.80	CCMT120408	F10408MN199	397168															◕		
200	0.008	0.20	CCGT060202	F10102GN200	397585														●			
200	0.016	0.40	CCGT060204	F10104GN200	397586														●			
200	0.008	0.20	CCGT09T302	F10302GN200	397587														●			
200	0.016	0.40	CCGT09T304	F10304GN200	397588														●			
200	0.016	0.40	CCGT120404	F10404GN200	397589														●			
860	0.004	0.10	CCGT060201	F10101GL860	097324						◕	●		●							◕	
860	0.008	0.20	CCGT060202	F10102GL860	097241						◕	●		●							◕	
860	0.016	0.40	CCGT060204	F10104GL860	097242							●		●							◕	
860	0.008	0.20	CCGT09T302	F10302GL860	097245							●		●							◕	
860	0.016	0.40	CCGT09T304	F10304GL860	097244							●		●							◕	
860	0.016	0.40	CCGT120404	F10404GL860	097738							●									◕	
860	0.031	0.80	CCGT120408	F10408GL860	097247							●		●							◕	
860	0.031	0.80	CCMT160508	F10508ML860	097249							●		●							◕	

Reference Key

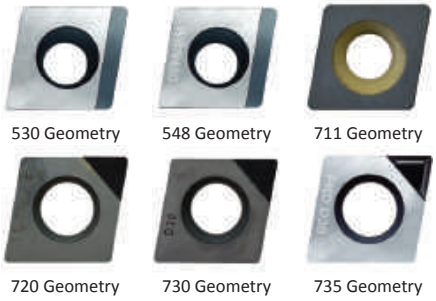
Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

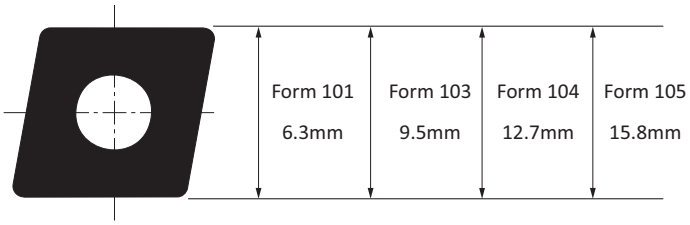
Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application

Insert Forms 101, 103, 104

Ceramic | CBN | PCD





		Ceramic					CBN								PCD			
		Uncoated			Coated		Uncoated					Coated						
Steel	P																	
Stainless Steel	M																	
Cast Iron	K	▼								▼▼▼ ▼								
Non-Ferrous Materials	N														▼▼▼ ▼	▼▼▼ ▼		
Titanium	S																	
Hard Materials	H																	
Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WCN06					WBN150	WBN200	WBN300	WBN450					PKDD30	PKDD50		
530	0.016	0.40	CCGW060204	F10104GL530	397207														●			
530	0.016	0.40	CCGW060204	F10104GR530	397242														●			
530	0.016	0.40	CCGW09T304	F10304GL530	397249														●			
530	0.016	0.40	CCGW09T304	F10304GR530	397250														●			
548	0.016	0.40	CCGW060204	F10104GL548	397245									●								
548	0.016	0.40	CCGW060204	F10104GR548	397246									●								
548	0.016	0.40	CCGW09T304	F10304GL548	397604									●								
548	0.016	0.40	CCGW09T304	F10304GR548	397605									●								
711	0.016	0.40	CCGW09T304	F10304GN711	297561	■																
711	0.031	0.80	CCGW09T308	F10308GN711	297192	■																
711	0.031	0.80	CCGW120408	F10408GN711	297249	■																
711	0.047	1.20	CCGW120412	F10412GN711	297234	■																
720	0.008	0.20	CCGT060202	F10102GN720	297501														●			
720	0.016	0.40	CCGT060204	F10104GN720	297502														●			
720	0.008	0.20	CCGT09T302	F10302GN720	297578														●			
720	0.016	0.40	CCGT09T304	F10304GN720	297483														●			
730	0.008	0.20	CCGW060202	F10102GN730	097462														●	●		
730	0.016	0.40	CCGW060204	F10104GN730	297164														●	●		
730	0.031	0.80	CCGW060208	F10108GN730	297165														●			
730	0.008	0.20	CCGW09T302	F10302GN730	397251														●	●		
730	0.016	0.40	CCGW09T304	F10304GN730	297533														●	●		
730	0.016	0.40	CCGW120404	F10404GN730	397257														●	●		
730	0.031	0.80	CCGW120408	F10408GN730	297871														●	●		
735	0.008	0.20	CCGT060202	F10102GN735	297872														●			
735	0.016	0.40	CCGT060204	F10104GN735	397244														●			
735	0.008	0.20	CCGT09T302	F10302GN735	397252														●			
735	0.016	0.40	CCGT09T304	F10304GN735	297870														●			

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
■	Difficult - Main Application

Insert Forms 101, 103, 104

CBN

741 Geometry

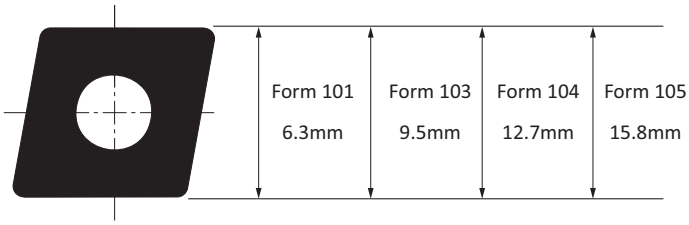
742 Geometry

747 Geometry

748 Geometry

749 Geometry

768 Geometry



		CBN							
		Uncoated						Coated	
Steel	P								
Stainless Steel	M								
Cast Iron	K	▽▽▽ ▽		▼▼▼ ▽	▼▼▼ ▼				
Non-Ferrous Materials	N								
Titanium	S								
Hard Materials	H	▼▼▼ ▽	▼▼▼ ▽	▼▼▼ ▽					

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WBN150	WBN200	WBN300	WBN450				
741	0.008	0.20	CCGW060202	F10102GN741	**297290**		◕						
741	0.016	0.40	CCGW060204	F10104GN741	**297291**		◕						
741	0.016	0.40	CCGW09T304	F10304GN741	**297303**		◕						
742	0.008	0.20	CCGW060202	F10102GN742	**297293**			●					
742	0.016	0.40	CCGW060204	F10104GN742	**297294**			●					
742	0.016	0.40	CCGW09T304	F10304GN742	**297306**			●					
747	0.016	0.40	CCGW120404	F10404GN747	**397260**	◕			◕				
748	0.008	0.20	CCGW060202	F10102GN748	**297787**				◕				
748	0.016	0.40	CCGW060204	F10104GN748	**297788**				◕				
748	0.008	0.20	CCGW09T302	F10302GN748	**297790**				◕				
748	0.016	0.40	CCGW09T304	F10304GN748	**297419**				◕				
749	0.031	0.80	CCGW120408	F10408GN749	**397261**	◕			◕				
768	0.008	0.20	CCGT060202	F10102GN768	**297486**				◕				
768	0.016	0.40	CCGT060204	F10104GN768	**297659**				◕				
768	0.008	0.20	CCGT09T302	F10302GN768	**397439**				◕				
768	0.016	0.40	CCGT09T304	F10304GN768	**297660**								

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application

Insert Forms 123, 124

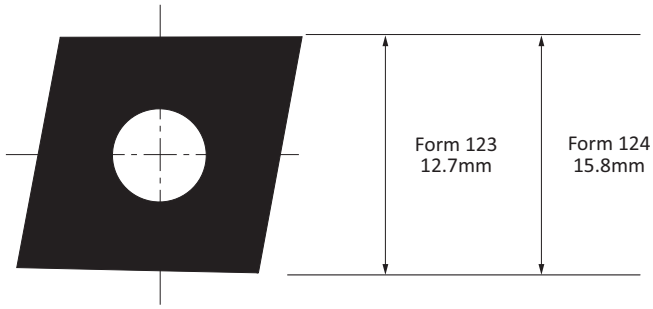
Carbide

117 Geometry

158 Geometry

161 Geometry

167 Geometry



		Carbide											
		Uncoated		Coated									
Steel	P					▼▼▼ ▼			▼▼▼ ▼		▼▼▼ ▼	▼▼▼ ▼	
Stainless Steel	M					▼▼▼ ▼			▼▼▼ ▼		▼▼▼ ▼		
Cast Iron	K					▼▼▼ ▽			▼▼▼ ▼		▼▼▼ ▽	▼▼▼ ▼	
Non-Ferrous Materials	N												
Titanium	S					▼▼▼ ▼			▼▼▼ ▼		▼▼▼ ▼		
Hard Materials	H								▼▼▼ ▽			▼▼▼ ▽	

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
117	0.031	0.80	CNMG120408	F12308MN117	**397683**					✱			●			◕
117	0.047	1.20	CNMG120412	F12312MN117	**397777**					✱			●			◕
117	0.031	0.80	CNMG160608	F12408MN117	**397608**					✱						◕
117	0.047	1.20	CNMG160612	F12412MN117	**397778**					✱			●			◕
158	0.016	0.40	CNMG120404	F12304MN158	**397799**										◕	
158	0.031	0.80	CNMG120408	F12308MN158	**397800**										◕	
158	0.047	1.20	CNMG120412	F12312MN158	**397801**										◕	
158	0.031	0.80	CNMG160608	F12408MN158	**397802**										◕	
158	0.047	1.20	CNMG160612	F12412MN158	**397803**										◕	
161	0.016	0.40	CNMG120404	F12304MN161	**397758**					✱			●			◕
161	0.031	0.80	CNMG120408	F12308MN161	**397759**					✱			●			◕
167	0.016	0.40	CNMG120404	F12304MN167	**397756**					✱			●			◕
167	0.031	0.80	CNMG120408	F12308MN167	**397757**					✱			●			◕

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▽▽▽	Finishing - Extended Application

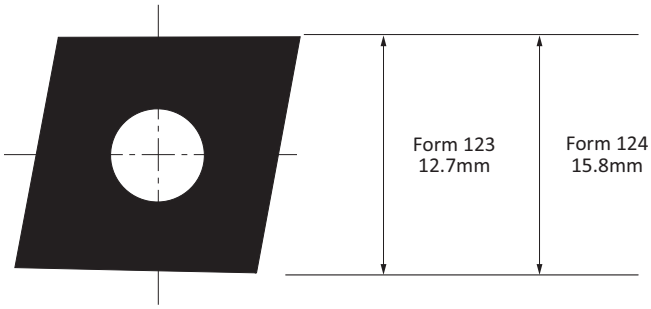
Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
✱	Difficult - Main Application

Insert Form 123

Ceramic | CBN | PCD

711 Geometry 730 Geometry 749 Geometry



		Ceramic					CBN								PCD			
		Uncoated			Coated		Uncoated						Coated					
Steel	P																	
Stainless Steel	M																	
Cast Iron	K	▽▽▽ ▼					▽▽▽ ▽			▼▼▼ ▼								
Non-Ferrous Materials	N														▼▼▼ ▼			
Titanium	S																	
Hard Materials	H						▼▼▼ ▽											
Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WCN06					WBN150	WBN200	WBN300	WBN450				PKDD30	PKDD50		
711	0.031	0.80	CNGA120408	F12308GN711	397842	✱															
711	0.047	1.20	CNGA120412	F12312GN711	397843	✱															
730	0.031	0.80	CNGA120408	F12308GN730	397849													●			
749	0.031	0.80	CNGA120408	F12308GN749	397262						●			●							

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Average - Main Application
✱	Difficult - Main Application

Insert Form 39

Cermet | Carbide

121 Geometry

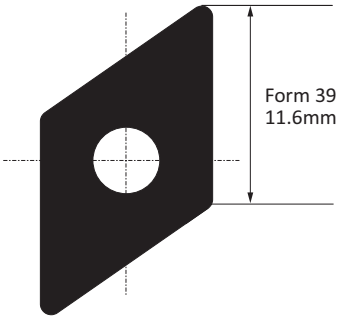
127 Geometry

129 Geometry

155 Geometry

192 Geometry

200 Geometry



		Cermet						Carbide									
		Uncoated				Coated		Uncoated	Coated								
Steel	P					▼▼▼				▼▼▼ ▼		▼▼▼ ▼			▼▼▼ ▽		▼▼▼ ▼
Stainless Steel	M					▽▽▽				▽▽▽ ▽		▼▼▼ ▼			▼▼▼ ▽		
Cast Iron	K					▽▽▽			▽▽▽ ▽	▼▼▼ ▼		▽▽▽ ▽			▼▼▼ ▼		▼▼▼ ▼
Non-Ferrous Materials	N								▼▼▼ ▼								
Titanium	S								▽▽▽			▼▼▼ ▼			▼▼▼ ▽		
Hard Materials	H																▽▽▽

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
121	0.008	0.20	DCMT11T302	F03902MN121	397787											✱						
121	0.016	0.40	DCMT11T304	F03904MN121	397788											✱						
127	0.008	0.20	DCGT11T302	F03902GN127	397235								●									
127	0.016	0.40	DCGT11T304	F03904GN127	097559								●									
129	0.008	0.20	DCGT11T302	F03902GN129	397816								●	●								
129	0.016	0.40	DCGT11T304	F03904GN129	397817								●	●								
155	0.008	0.20	DCMT11T302	F03902MN155	397809					◕												
155	0.016	0.40	DCMT11T304	F03904MN155	397810					◕												
192	0.008	0.20	DCMT11T302	F03902MN192	397783											✱						◕
192	0.016	0.40	DCMT11T304	F03904MN192	297721											✱						◕
192	0.031	0.80	DCMT11T308	F03908MN192	397784											✱						◕
200	0.008	0.20	DCGT11T302	F03902GN200	397785														●			
200	0.016	0.40	DCGT11T304	F03904GN200	397786														●			

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
✱	Difficult - Main Application

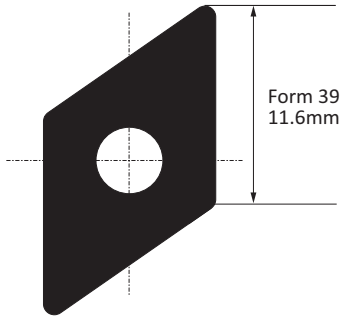
Insert Form 39

CBN | PCD

730 Geometry

735 Geometry

747 Geometry



		CBN								PCD			
		Uncoated						Coated					
Steel	P												
Stainless Steel	M												
Cast Iron	K	▽▽▽			▼▼▼								
Non-Ferrous Materials	N									▼▼▼			
Titanium	S												
Hard Materials	H	▼▼▼ ▽											

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WBN150	WBN200	WBN300	WBN450	WBN200				PKDD30	PKDD50		
730	0.008	0.20	DCGW11T302	F03902GN730	**397269**									◕			
730	0.016	0.40	DCGW11T304	F03904GN730	**397270**									◕			
735	0.008	0.20	DCGT11T302	F03902GN735	**397271**									●			
735	0.016	0.40	DCGT11T304	F03904GN735	**397272**									●			
747	0.008	0.20	DCGW11T302	F03902GN747	**397273**	◕			◕								
747	0.016	0.40	DCGW11T304	F03904GN747	**397274**	◕			◕								

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

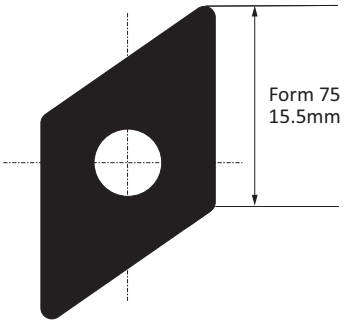
Reference Key

Symbol	Machining Conditions
◕	Average - Main Application
✱	Difficult - Main Application

Insert Form 75

Carbide

117 Geometry | 158 Geometry | 161 Geometry | 167 Geometry



		Carbide											
		Uncoated		Coated									
Steel	P					▼			▼		▼	▼	
Stainless Steel	M					▼			▼		▼		
Cast Iron	K								▼		▼	▼	
Non-Ferrous Materials	N												
Titanium	S					▼			▼		▼		
Hard Materials	H								▽			▽	

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
117	0.031	0.80	DNMG150608	F07508MN117	**397779**					■						◕
158	0.016	0.40	DNMG150604	F07504MN158	**397804**										◕	
158	0.031	0.80	DNMG150608	F07508MN158	**397805**										◕	
158	0.047	1.20	DNMG150612	F07512MN158	**397806**										◕	
161	0.016	0.40	DNMG150604	F07504MN161	**397746**					■			●			◕
161	0.031	0.80	DNMG150608	F07508MN161	**397747**					■			●			◕
161	0.047	1.20	DNMG150612	F07512MN161	**397748**					■			●			◕
167	0.016	0.40	DNMG150604	F07504MN167	**397749**					■			●			◕
167	0.031	0.80	DNMG150608	F07508MN167	**397750**					■			●			◕

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▽▽▽	Finishing - Extended Application

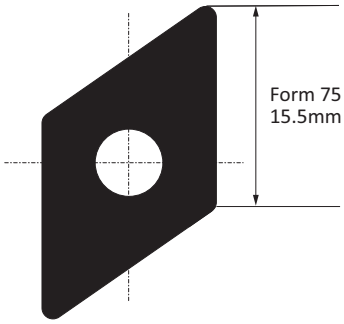
Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
■	Difficult - Main Application

Insert Form 75

Ceramic | CBN | PCD

711 Geometry 730 Geometry 749 Geometry



		Ceramic					CBN								PCD			
		Uncoated			Coated		Uncoated						Coated					
Steel	P																	
Stainless Steel	M																	
Cast Iron	K	▼▽▽▽					▽▽▽			▼▼▼								
Non-Ferrous Materials	N														▼▼▼			
Titanium	S																	
Hard Materials	H						▽▼▼▼											
Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WCN06					WBN150	WBN200	WBN300	WBN450	WBN200				PKDD30	PKDD50		
711	0.031	0.80	DNGA150608	F07508GN711	**397840**	●																
711	0.047	1.20	DNGA150612	F07512GN711	**397841**	●																
730	0.031	0.80	DNGA150608	F07508GN730	**397276**														◕			
749	0.031	0.80	DNGA150608	F07508GN749	**397277**						◕			◕								

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
◕	Average - Main Application
●	Difficult - Main Application

Insert Forms 262, 264

Cermet | Carbide

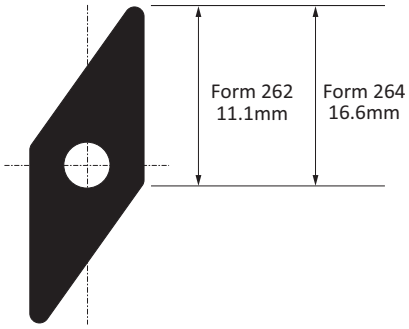
127 Geometry

129 Geometry

155 Geometry

192 Geometry

200 Geometry



		Cermet						Carbide									
		Uncoated				Coated		Uncoated		Coated							
Steel	P																
Stainless Steel	M																
Cast Iron	K																
Non-Ferrous Materials	N																
Titanium	S																
Hard Materials	H																

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHT10	WHT12	WHT16	WHT32	WTC15	WTC121	WHW01	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
127	0.008	0.20	VCGT110302	F26202GN127	**297146**								●									
127	0.016	0.40	VCGT110304	F26204GN127	**097954**								●									
127	0.008	0.20	VCGT160402	F26402GN127	**397813**								●									
127	0.016	0.40	VCGT160404	F26404GN127	**297900**								●									
127	0.031	0.80	VCGT160408	F26408GN127	**397179**								●									
129	0.008	0.20	VCGT110302	F26202GN129	**397811**								●	●								
129	0.016	0.40	VCGT110304	F26204GN129	**397812**								●	●								
129	0.016	0.40	VCGT160404	F26404GN129	**397814**								●	●								
129	0.031	0.80	VCGT160408	F26408GN129	**397815**								●	●								
155	0.016	0.40	VCMT160404	F26404MN155	**397807**					◕												
155	0.031	0.80	VCMT160408	F26408MN155	**397808**					◕												
192	0.016	0.40	VCMT110304	F26204MN192	**397628**											✱						◕
192	0.031	0.80	VCMT110308	F26208MN192	**397627**											✱						◕
192	0.016	0.40	VCMT160404	F26404MN192	**397611**											✱						◕
192	0.031	0.80	VCMT160408	F26408MN192	**397780**											✱						◕
200	0.016	0.40	VCGT160404	F26404GN200	**397782**														●			
200	0.031	0.80	VCGT160408	F26408GN200	**397781**														●			

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

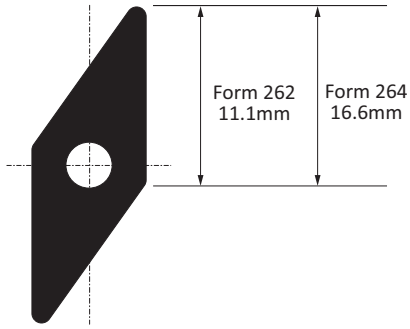
Reference Key

Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
✱	Difficult - Main Application

Insert Forms 262, 264

CBN | PCD

730 Geometry | 735 Geometry | 747 Geometry | 749 Geometry



		CBN								PCD			
		Uncoated						Coated					
Steel	P												
Stainless Steel	M												
Cast Iron	K	▽▽▽ ▽			▼▼▼ ▽								
Non-Ferrous Materials	N									▼▼▼ ▽			
Titanium	S												
Hard Materials	H	▼▼▼ ▽											

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WBN150	WBN200	WBN300	WBN450					PKDD30	PKDD50		
730	0.008	0.20	VCGW110302	F26202GN730	**397284**									●			
730	0.016	0.40	VCGW110304	F26204GN730	**397285**									●			
730	0.008	0.20	VCGW160402	F26402GN730	**397407**									●			
730	0.016	0.40	VCGW160404	F26404GN730	**397278**									●			
730	0.031	0.80	VCGW160408	F26408GN730	**397279**									●			
735	0.008	0.20	VCGW110302	F26202GN735	**397818**									●			
735	0.016	0.40	VCGW110304	F26204GN735	**397286**									●			
735	0.016	0.40	VCGT160404	F26404GN735	**397280**									●			
735	0.031	0.80	VCGT160408	F26408GN735	**397281**									●			
747	0.016	0.40	VCGW110304	F26204GN747	**397287**	●			●								
747	0.031	0.80	VCGW160408	F26408GN747	**397283**				●								
749	0.031	0.80	VCGW160408	F26408GN749	**397282**	●											

Reference Key

Symbol	Insert Type
▽	Roughing - Extended Application
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Average - Main Application
◆	Difficult - Main Application

Insert Forms 112, 113, 114

Carbide

108 Geometry

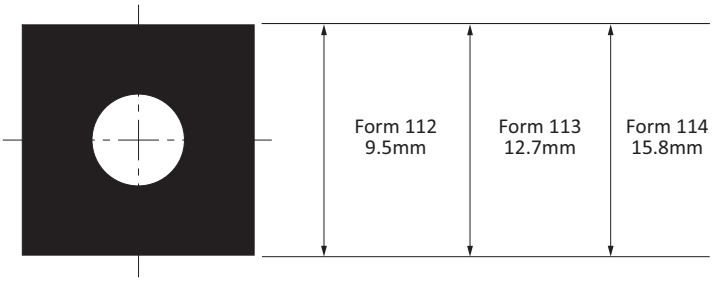
127 Geometry

145 Geometry

158 Geometry

192 Geometry

199 Geometry



		Carbide											
		Uncoated		Coated									
Steel	P				▼	▼	▼	▼	▼	▼			▼
Stainless Steel	M				▼	▼	▽	▼	▼	▼			
Cast Iron	K		▽		▽	▽	▼	▽	▼	▽			▼
Non-Ferrous Materials	N		▼										
Titanium	S		▽		▼	▼			▼	▼			
Hard Materials	H								▽				▽

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHW01	WHW16	WHC05	WHC19	WHC30	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
108	0.016	0.40	SCMT09T304	F11204MN108	297535							◕				
108	0.031	0.80	SCMT120408	F11308MN108	397110							◕				
127	0.016	0.40	SCGT09T304	F11204GN127	097539		●									
127	0.016	0.40	SCGT120404	F11304GN127	397590		●									
127	0.031	0.80	SCGT120408	F11308GN127	097566		●									
145	0.031	0.80	SCGT09T308	F11208GN145	297996								●			
145	0.031	0.80	SCGT120408	F11308GN145	297997								●			
158	0.031	0.80	SCMT120408	F11308MN158	297497						◕					
158	0.047	1.20	SCMT150512	F11312MN158	097252					◆						
192	0.016	0.40	SCMR09T304	F11204MN192	397741				◆							◕
192	0.031	0.80	SCMT09T308	F11208MN192	397640				◆							◕
192	0.031	0.80	SCMT120408	F11308MN192	397709				◆							◕
192	0.047	1.20	SCMT120412	F11312MN192	397710				◆							
199	0.016	0.40	SCMT09T304	F11204MN199	397703									◕		
199	0.031	0.80	SCMT09T308	F11208MN199	397704									◕		
199	0.031	0.80	SCMT120408	F11308MN199	397705									◕		

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application
▽▽▽	Finishing - Extended Application

Reference Key

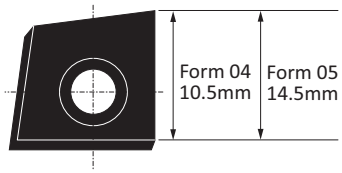
Symbol	Machining Conditions
●	Good - Main Application
◕	Average - Main Application
◆	Difficult - Main Application

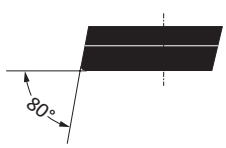
Insert Forms 04, 05

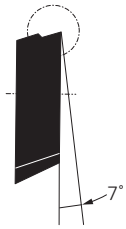
Carbide

880 Geometry

811 Geometry







		Carbide										
		Uncoated		Coated								
Steel	P										▼	▼
Stainless Steel	M										▽	▼
Cast Iron	K										▼	▼
Non-Ferrous Materials	N											▽
Titanium	S											▽
Hard Materials	H											

Geometry	Radius in	Radius mm	ISO Code	Description	Part No.	WHW16	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC168	WHC198
880	0.016	0.40	–	F00404ML880	**397595**											●
880	0.016	0.40	–	F00504ML880	**397593**										■	●
880	0.031	0.80	–	F00508ML880	**397594**										■	●
811	0.031	0.80	–	F00508ML811	**397844**										■	

Reference Key

Symbol	Insert Type
▼	Roughing - Main Application
▽	Roughing - Extended Application

Reference Key

Symbol	Machining Conditions
●	Average - Main Application
■	Difficult - Main Application

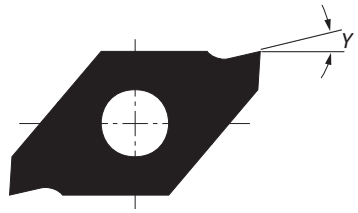
Radial Grooving Insert Forms 89, 90, 91

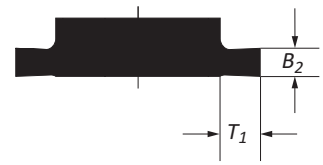
Carbide

Insert Form 89

Insert Form 90

Insert Form 91





							Carbide												
							Uncoated				Coated								
Steel	P									▼▼								▼▼	
Stainless Steel	M									▽▽								▽▽	
Cast Iron	K									▽▽								▼▼	
Non-Ferrous Materials	N									▼▼									
Titanium	S									▽▽								▼▼	
Hard Materials	H																		
	Insert Form	B_2	Y	T_1	Circlip Width	Part No.	WHW01	WHW03	WHW16	WHW20	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
	89	0.048	13°	0.051	0.039	097257				●								●	
	89	0.056	13°	0.051	0.047	097258				●								●	
	89	0.068	13°	0.059	0.059	097259				●								●	
	90	0.078	9°	0.094	0.068	097256				●								●	
	90	0.090	9°	0.094	0.078	097253				●								●	
i	90	0.109	9°	0.094	0.098	097254				●								●	
	90	0.129	9°	0.094	0.118	097255				●								●	
	91	0.109	9°	0.094	0.098	097260				●								●	
	91	0.129	9°	0.094	0.118	097261				●								●	
	91	0.168	9°	0.129	0.157	097262				●								●	
	91	0.208	9°	0.177	0.196	097294				●								●	
	89	1.24	13°	1.30	1.00	097257				●								●	
	89	1.44	13°	1.30	1.20	097258				●								●	
	89	1.74	13°	1.50	1.50	097259				●								●	
	90	1.99	9°	2.40	1.75	097256				●								●	
	90	2.29	9°	2.40	2.00	097253				●								●	
m	90	2.79	9°	2.40	2.50	097254				●								●	
	90	3.29	9°	2.40	3.00	097255				●								●	
	91	2.79	9°	2.40	2.50	097260				●								●	
	91	3.29	9°	2.40	3.00	097261				●								●	
	91	4.29	9°	3.30	4.00	097262				●								●	
	91	5.29	9°	4.50	5.00	097294				●								●	

Reference Key

Symbol	Insert Type
▼▼	Universal - Main Application
▽▽	Universal - Extended Application

Reference Key

Symbol	Machining Conditions
●	Average - Main Application

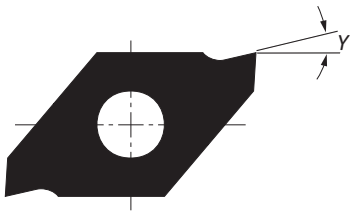
Radial Grooving Insert Forms 89, 90, 91

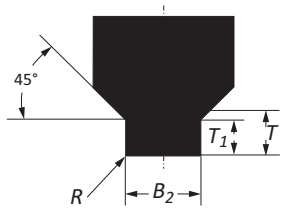
Carbide

Insert Form 89

Insert Form 90

Insert Form 91





										Carbide												
										Uncoated				Coated								
Steel									P												▼▼	
Stainless Steel									M												▽▽	
Cast Iron									K												▼▼	
Non-Ferrous Materials									N													
Titanium									S												▼▼	
Hard Materials									H													
	Insert Form	Boring Ø	B_2	Y	R	T_1	T	Circlip Width	Part No.	WHW01	WHW03	WHW16	WHW20	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
	89	0.944 - 1.023	0.056	13°	0.004	0.021	0.025	0.047	297937												◕	
	89	1.102 - 1.181	0.056	13°	0.004	0.025	0.029	0.047	297938												◕	
	89	1.220 - 1.259	0.056	13°	0.004	0.030	0.035	0.047	297939												◕	
	89	1.338	0.068	13°	0.004	0.030	0.035	0.059	297940												◕	
	89	1.377 - 1.496	0.068	13°	0.004	0.036	0.041	0.059	297941												◕	
ⓘ	90	1.574 - 1.889	0.078	9°	0.006	0.046	0.051	0.068	297942												◕	
	90	1.968 - 2.480	0.090	9°	0.006	0.056	0.062	0.078	297943												◕	
	91	2.559 - 3.070	0.109	9°	0.008	0.056	0.062	0.098	297944												◕	
	91	3.149 - 3.228	0.109	9°	0.008	0.066	0.072	0.098	297945												◕	
	91	3.346 - 3.937	0.129	9°	0.008	0.066	0.072	0.118	297946												◕	
	91	4.015 - 5.708	0.168	9°	0.008	0.076	0.084	0.157	297947												◕	
	89	24.00 - 26.00	1.44	13°	0.10	0.54	0.65	1.20	297937												◕	
	89	28.00 - 30.00	1.44	13°	0.10	0.64	0.75	1.20	297938												◕	
	89	31.00 - 32.00	1.44	13°	0.10	0.78	0.91	1.20	297939												◕	
	89	34.00	1.74	13°	0.10	0.78	0.91	1.50	297940												◕	
	89	35.00 - 38.00	1.74	13°	0.10	0.93	1.06	1.50	297941												◕	
ⓜ	90	40.00 - 48.00	1.99	9°	0.15	1.18	1.31	1.75	297942												◕	
	90	50.00 - 63.00	2.29	9°	0.15	1.43	1.58	2.00	297943												◕	
	91	65.00 - 78.00	2.79	9°	0.20	1.43	1.58	2.50	297944												◕	
	91	80.00 - 82.00	2.79	9°	0.20	1.68	1.84	2.50	297945												◕	
	91	85.00 - 100.00	3.29	9°	0.20	1.68	1.84	3.00	297946												◕	
	91	102.00 - 145.00	4.29	9°	0.20	1.94	2.14	4.00	297947												◕	

Reference Key

Symbol	Insert Type
▼▼	Universal - Main Application
▽▽	Universal - Extended Application

Reference Key

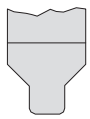
Symbol	Machining Conditions
◕	Average - Main Application

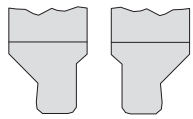
Axial Grooving Insert Blanks Form 304

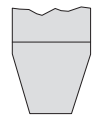
Carbide

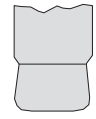
		Carbide											
		Uncoated				Coated							
Steel	P												
Stainless Steel	M												
Cast Iron Non-Ferrous Materials	K				▽▽								
Non-Ferrous Materials	N				▼▼								
Titanium	S				▽▽								
Hard Materials	H												

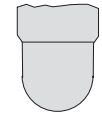
Geometry	S_1	Part No.	WHW01	WHW03	WHW16	WHW20	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
	0.137	297150				●									
	0.169	297151				●									
	0.208	297152				●									
	0.255	297154				●									
	0.295	297493				●									
	0.137	397850				●									
	0.169	397851				●									
	0.208	397852				●									
	0.255	397853				●									
	0.295	397854				●									
	3.50	297150				●									
	4.30	297151				●									
	5.30	297152				●									
	6.50	297154				●									
	7.50	297493				●									
	3.50	397850				●									
	4.30	397851				●									
	5.30	397852				●									
	6.50	397853				●									
	7.50	397854				●									


Two-Sided Cutting Form


Single-Sided Cutting Form (Right / Left)


Two-Sided Angle Cutting


With Corner Radius


Full Radius

Reference Key

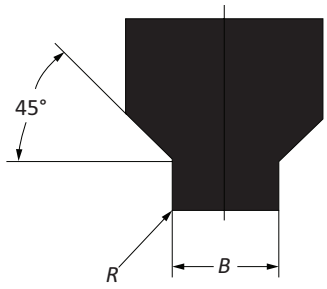
Symbol	Insert Type
▼▼	Universal - Main Application
▽▽	Universal - Extended Application

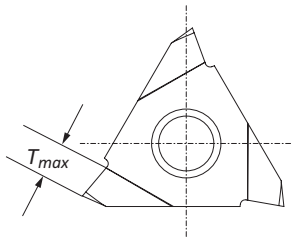
Reference Key

Symbol	Machining Conditions
●	Average - Main Application

Axial Grooving O-Rings for Single Cutter Tools Insert Form 304

Carbide





									Carbide													
									Uncoated				Coated									
Steel	P																				▼▼	
Stainless Steel	M																				▽▽	
Cast Iron Non-Ferrous Materials	K																				▼▼	
Non-Ferrous Materials	N																					
Titanium	S																				▼▼	
Hard Materials	H																					
	Geometry	Boring Range	O-Ring Cross Section	*B + 0.05*	B_{max}	T_{max}	*R ± 0.05*	Part No.	WHW01	WHW03	WHW16	WHW20	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164	
i		0.787 - 2.125	0.039	0.059	0.059	0.064	0.008	**297969**												●		
		0.787 - 2.125	0.059	0.086	0.086	0.092	0.012	**297970**												●		
		0.787 - 2.125	0.078	0.114	0.114	0.124	0.016	**297971**												●		
		0.787 - 2.125	0.098	0.137	0.137	0.151	0.020	**297972**												●		
		0.787 - 2.125	0.118	0.161	0.161	0.175	0.024	**297973**												●		
		0.787 - 2.125	0.157	0.212	0.212	0.194	0.031	**297974**												●		
		0.787 - 2.125	0.196	0.267	0.267	0.194	0.031	**297975**												●		
m		20 - 54	1.00	1.50	1.50	1.65	0.20	**297969**												●		
		20 - 54	1.50	2.20	2.20	2.35	0.30	**297970**												●		
		20 - 54	2.00	2.90	2.90	3.15	0.40	**297971**												●		
		20 - 54	2.50	3.50	3.50	3.85	0.50	**297972**												●		
		20 - 54	3.00	4.10	4.10	4.45	0.60	**297973**												●		
		20 - 54	4.00	5.40	5.40	4.95	0.80	**297974**												●		
		20 - 54	5.00	6.80	6.80	4.95	0.80	**297975**												●		

Reference Key

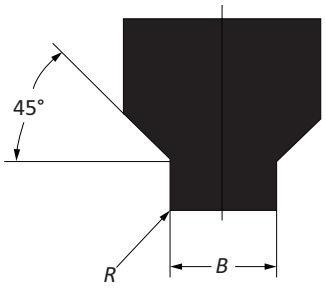
Symbol	Insert Type
▼▼	Universal - Main Application
▽▽	Universal - Extended Application

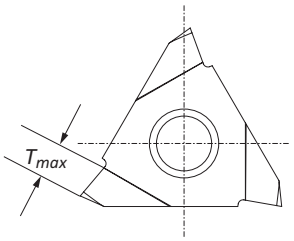
Reference Key

Symbol	Machining Conditions
●	Average - Main Application

Axial Grooving O-Rings for Twin Cutter Tools Insert Form 304

Carbide





									Carbide													
									Uncoated				Coated									
Steel								P													▼▼	
Stainless Steel								M													▽▽	
Cast Iron Non-Ferrous Materials								K													▼▼	
Non-Ferrous Materials								N														
Titanium								S													▼▼	
Hard Materials								H														
	Geometry	Boring Range	O-Ring Cross Section	*B + 0.05*	B_{max}	T_{max}	*R ± 0.05*	Part No.	WHW01	WHW03	WHW16	WHW20	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
i		2.086 - 39.37	0.039 - 0.059	0.059	0.098	0.064	0.008	**297976**												●	
		2.086 - 39.37	0.039 - 0.059	0.086	0.145	0.092	0.012	**297977**												●●	
		2.086 - 39.37	0.039 - 0.059	0.133	0.224	0.261	0.020	**297978**												●●	
		2.086 - 39.37	0.039 - 0.059	0.212	0.358	0.194	0.031	**297979**												●●	
m		53.00 - 1000.00	1.00 - 1.50	1.50	2.50	1.65	0.20	**297976**												●	
		53.00 - 1000.00	1.50 - 2.40	2.20	3.70	2.35	0.30	**297977**												●●	
		53.00 - 1000.00	2.40 - 4.00	3.40	5.70	6.65	0.50	**297978**												●●	
		53.00 - 1000.00	4.00 - 5.50	5.40	9.10	4.95	0.80	**297979**												●	

Reference Key

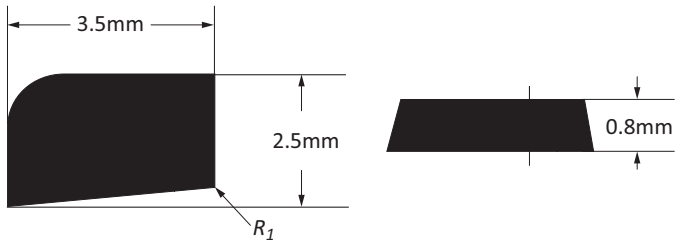
Symbol	Insert Type
▼▼	Universal - Main Application
▽▽	Universal - Extended Application

Reference Key

Symbol	Machining Conditions
●	Average - Main Application

Insert Form 325

Carbide



		Carbide												
		Uncoated				Coated								
Steel	P												▼▼▼	
Stainless Steel	M												▼▼▼	
Cast Iron Non-Ferrous Materials	K				▼▼▼								▽▽▽	
Non-Ferrous Materials	N				▽▽▽									
Titanium	S												▼▼▼	
Hard Materials	H													

	Geometry	Radius R_1	Description	Part No.	WHW01	WHW03	WHW16	WHW20	WHC05	WHC18	WHC19	WHC79	WHC98	WHC111	WHC114	WHC136	WHC164
i	860	0.004	**F32501CN860**	**097831**				◕								◕	
m	860	0.10	**F32501CN860**	**097831**				◕								◕	

Reference Key

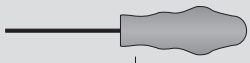
Symbol	Insert Type
▼▼▼	Finishing - Main Application
▽▽▽	Finishing - Extended Application

Reference Key

Symbol	Machining Conditions
◕	Average - Main Application

Insert Accessories

Countersunk Screws | Torque Drivers

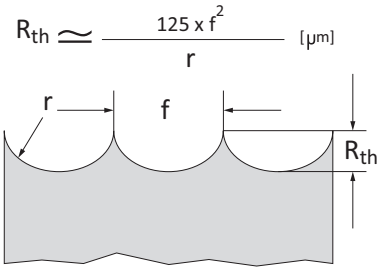
						Technical Data	
Insert Form	**Countersunk Screw**		**Clamping Jaw**	**Torque Driver**	**Service Key**	**Torque**	**Key Size**
04	**415977**	M4x7.9	–	**415510**	**115664**	3.0 Nm	T15
05	**415949**	M4x11	–	**415543**	**215150**	5.0 Nm	T20
20	**115535**	M2x5	–	**415508**	**115591**	0.9 Nm	T7
47	**315324**	M1.8x4	–	**–**	**115537**	0.5 Nm	T6
89	**115676**	M2.5x5	–	**415514**	**115590**	1.2 Nm	T8
90	**115531**	M3x7.5	–	**415514**	**115590**	1.2 Nm	T8
91	**115802**	M3x12	–	**415514**	**115590**	1.2 Nm	T8
101	**115676**	M2.5x5	–	**415514**	**115590**	1.2 Nm	T8
103	**115672**(<Ø37mm)	M3.5x7.5	–	**415510**	**115664**	3.0 Nm	T15
103	**115673**(<Ø36mm)	M3.5x9	–	**415510**	**115664**	3.0 Nm	T15
104	**215149**	M4.5x11.5	–	**415543**	**215150**	5.0 Nm	T20
105	**215149**	M4.5x11.5	–	**415543**	**215150**	5.0 Nm	T20
111	**115531**	M3x7.5	–	**415514**	**115590**	1.2 Nm	T8
112	**115672**(<Ø37mm)	M3.5x7.5	–	**415510**	**115664**	3.0 Nm	T15
112	**115673**(<Ø36mm)	M3.5x9	–	**415510**	**115664**	3.0 Nm	T15
113	**215149**	M4.5x11.5	–	**415543**	**215150**	5.0 Nm	T20
114	**215149**	M4.5x11.5	–	**415543**	**215150**	5.0 Nm	T20
161	**115676**	M2.5x5	–	**415514**	**115590**	1.2 Nm	T8
163	**115673**	M3.5x9	–	**415510**	**115664**	3.0 Nm	T15
211	**215377**	M2x4	–	**415507**	**115537**	0.6 Nm	T6
304	**215392**	M5x12.9	–	**415543**	**215150**	5.0 Nm	T20
325	**315321**	M1.6x3	–	**–**	**315322**	0.3 Nm	0.5x3
394	**215915**	M2.5x7	–	**415514**	**115590**	1.1 Nm	T8
395	**215985**	M3x7.5	–	**415514**	**115590**	1.2 Nm	T8
396	**415320**	M3.5x11	–	**415510**	**115664**	3.0 Nm	T15
397	**215149**	M4.5x11.5	–	**415543**	**215150**	5.0 Nm	T20

Technical Information

Surface Finish | General Formulas

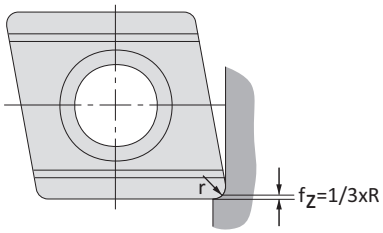
The corner radius of replaceable inserts is very important in finish machining. Large corner radii (0.031") (0.8mm) or higher) allow for high feed rates with good surface quality.

The expected surface quality can be estimated by using the function of corner radius and feed rate formula.



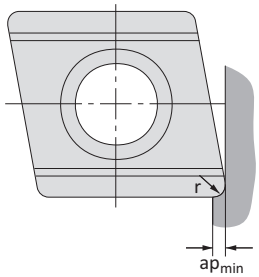
1. The larger the corner radius and the lighter the feed rate is, the better the surface quality.

2. If the feed is approximately 1/3 of the corner radius, the better the machining time and surface finish will be in finish machining applications.



3. A larger corner radius increases radial forces which can negatively affect dimensional accuracy. Large corner radii also require increased depth of cut.

Minimum depth of cut (a_p) should at least match the corner radius. This minimizes the radial forces.

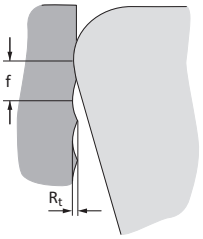
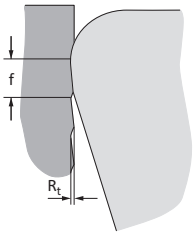
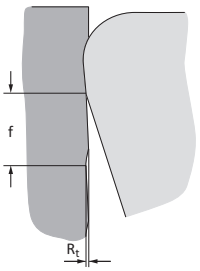


General Formulas		
Cutting Speed	$Vc = \frac{D \times \pi \times n}{1000}$	**(m/min)**
RPM	$n = \frac{Vc \times 1000}{D \times \pi}$	**(min^{-1})**
Feed Speed	$V_f = f \times n$	**(mm/min)**
	D = Machining Ø	**(mm)**
	f= Feed	**(mm/u)**
	V_c= Cutting Speed	**(m/min)**
	n = RPM	**(min^{-1})**

Technical Information

Wiper Geometries

Replaceable Inserts with Wiper Geometry

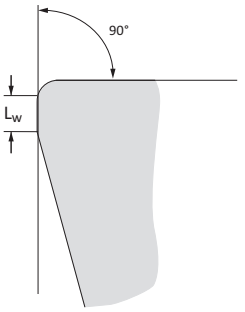
Insert with conventional corner radius with feed (f)	
Insert with wiper geometry radius with same feed (f)	
Insert with wiper geometry with increased feed (f)	

Wiper Geometry for 90° Approach Angle

Replaceable inserts produce a right-angled step at the bottom of the hole. When used in a Wohlhaupter standard insert holder that has a 90° approach angle, the secondary wiper cutting edge is nearly parallel with the wall of the hole.

Wiper geometry for 90° approach angle

Lw = length of the wiper secondary cutting edge

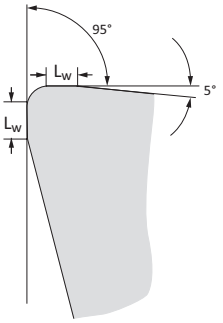


Wiper Geometry for 95° Approach Angle

Wiper inserts can also be used with 95° insert holders, which are included in the Wohlhaupter standard insert range.

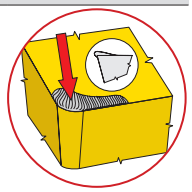
Wiper geometry for 95° approach angle (left and right cutting)

Lw = length of the secondary wiper cutting edge



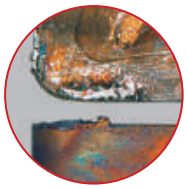
Boring Insert Wear Patterns

Built-up Edge



Potential Problem

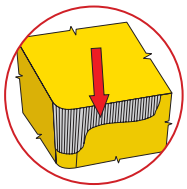
- Machined material adheres to the cutting edge of insert
- When it breaks, the edge becomes brittle and cracks
- This can negatively affect machined surface



Possible Solution

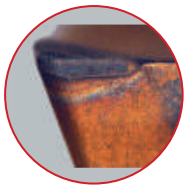
- Increase temperature by increasing speed or feed
- Use an insert with higher lubricity coating
- Choose a freer cutting insert geometry

Flank Wear



Potential Problem

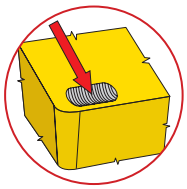
- Caused by friction between the insert and machined material
- It cannot be fully eliminated, but it can be reduced



Possible Solution

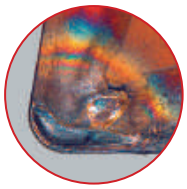
- Use a more wear-resistant grade
- Reduce cutting speed
- Use coolant or increase coolant flow to the cutting edge

Cratering



Potential Problem

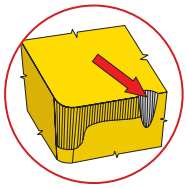
- Appears when the geometry is too neutral or material is too hard for the substrate



Possible Solution

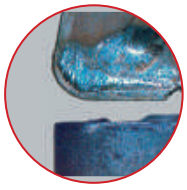
- Use a more wear-resistant grade
- Reduce cutting speed or feed
- Use coolant or increase coolant flow to the cutting edge

Notch Wear



Potential Problem

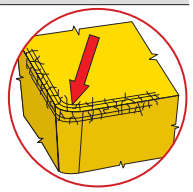
- Occurs when cutting edge of insert comes in contact with surface of machined material
- Caused by hardening of surface layer of material and burrs
- Often appears on stainless austenitic steels and other high temperature alloy steels



Possible Solution

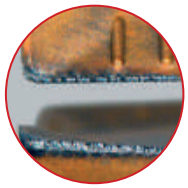
- Use a more wear-resistant grade (Al_2O_3)
- Select a tool with a smaller approach angle
- Vary the radial depth of cut
- Use coolant or increase coolant flow to the cutting edge

Comb Cracks



Potential Problem

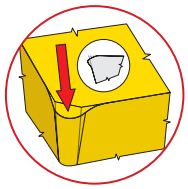
- Caused by high stress on the cutting edge during interrupted cuts



Possible Solution

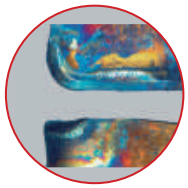
- Switch off coolant or increase coolant flow to obtain an even temperature level
- Reduce cutting speed
- Use tougher insert grade

Plastic Deformation



Potential Problem

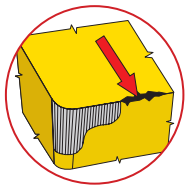
- Caused by high thermal stress on the cutting edge from excessive feed rate and cutting speed



Possible Solution

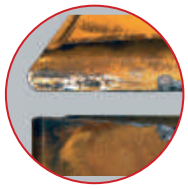
- Use a more wear-resistant grade
- Reduce cutting speed
- Reduce feed rate
- Use coolant or increase coolant flow to the cutting edge

Chipping of Cutting Edge (Out of Cut)



Potential Problem

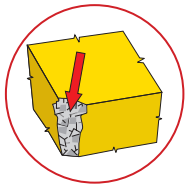
- Caused by poor chip control
- Can damage the portion of the cutting edge that might not be engaged in the cut



Possible Solution

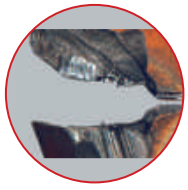
- Change feed rate to gain chip control
- Select a tool with a different approach angle
- Use an insert with a different geometry
- Use a tougher grade of carbide

Insert Fracture



Potential Problem

- Caused by workpiece material, grade, condition, the rigidity of the machine-tool-workpiece, extent of wear, and cutting conditions



Possible Solution

- Use a tougher grade of carbide
- Reduce the feed and depth of cut
- Use an insert with a stronger chip breaker
- Use an insert with a bigger corner radius

Notes

Notes

SECTION

B10-G

Intermediate Modules

Wohlhaupter™ Intermediate Modules

Reducers | Extensions | NOVI[TECH™]

Increase Tool Stability with Intermediate Modules

- Allow for expanded use of existing components
- Add flexibility to setups
- Reduce need for specials and their associated cost and lead time
- Each component individually balanced

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

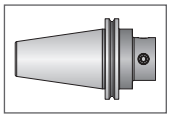
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

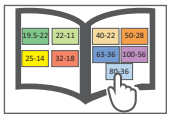
Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

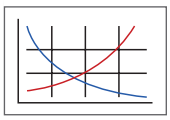
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



Shanks
A variety of shanks for different machines



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Intermediate Modules Table of Contents

Introduction
Product Overview . . . . . 2 - 3

Reducers . . . . . 4 - 7

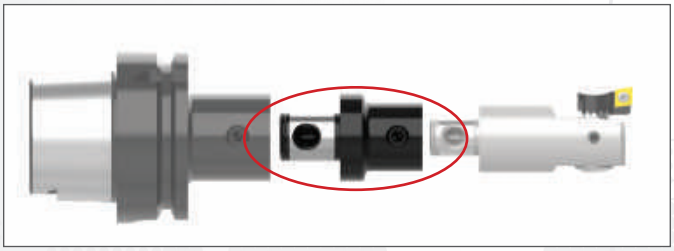
Extensions . . . . . 8 - 10

NOVI$^{TECH™}$ Vibration Dampening Modules 11

Intermediate Modules Product Overview

Intermediate **MODULES**

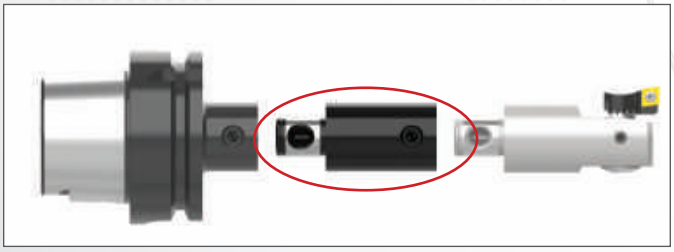
Reducers



Features:

- Improves rigidity by stepping-down to smaller MVS connection sizes
- Connects quickly and easily with the MVS connection
- Accommodates smaller diameter applications

Extensions

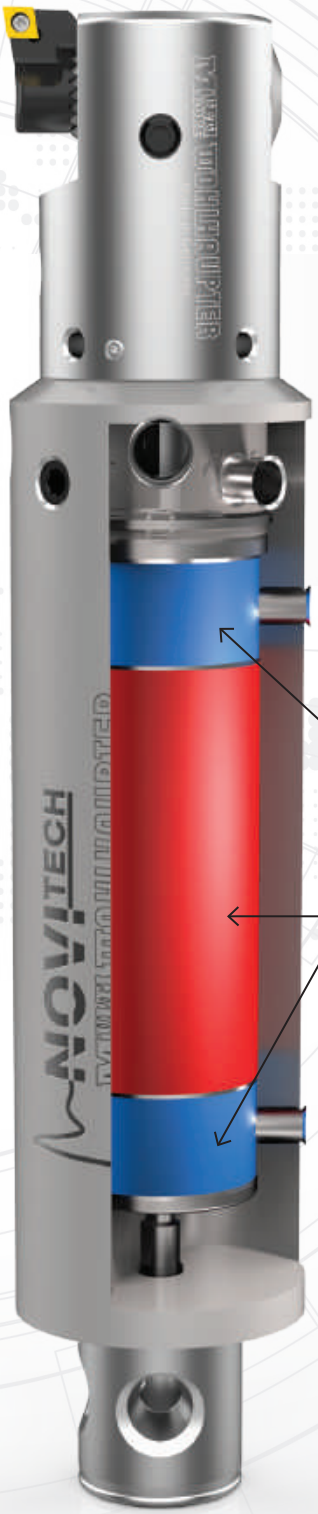


Features:

- Used to increase bore depth
- Connects quickly and easily with the MVS connection
- Aluminum components available to reduce stress on the spindle

THE **DEEP** HOLE BORING ***SOLUTION*** YOU'VE BEEN LOOKING FOR

NOVITECH™
Vibration Dampened Intermediate Module

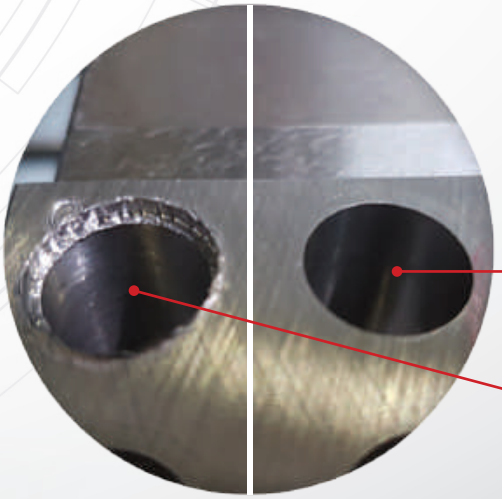


OUR ***SOLUTION***

- Machine up to **10xD**
- Connect quickly and easily with the **MVS connection**
- Utilize existing **Wohlhaupter™ components**
- **Increase** your productivity, surface quality, and process reliability
- **Increase** your tool and spindle life

YOUR ***ADVANTAGE***

THE SURFACE QUALITY TELLS IT ALL



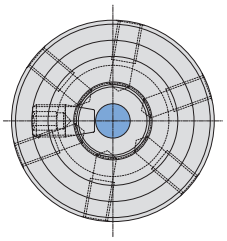
When machining alloy steel to 9xD, the NOVI[TECH™] provided reliable machining which achieved high surface quality (Ra = 32)

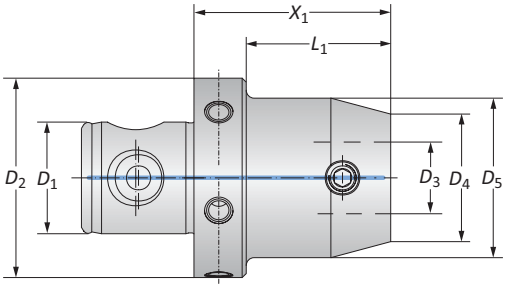
Wohlhaupter™ NOVI[TECH™] with VarioBore precision boring head

Standard tool construction with steel extension

Reducers

Imperial | Balanced



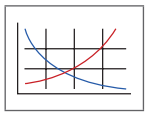


MVS Connection		Reducer					
D_2 | D_1	D_4 | D_3	X_1	L_1	D_5	Weight	Thread Precision	Part No.
25 - 14	19.5 - 11	1.181	0.826	0.767	0.220 (lbs)	–	**219034**
25 - 14	22 - 11	1.181	0.826	0.866	0.440 (lbs)	–	**219035**
32 - 18	22 - 11	0.472	0.019	0.866	0.220 (lbs)	–	**219036**
32 - 18	25 - 14	1.181	0.826	0.984	0.220 (lbs)	–	**219037**
40 - 22	22 - 11	0.472	0.019	0.866	0.440 (lbs)	–	**219038**
40 - 22	25 - 14	1.181	0.826	0.984	0.440 (lbs)	–	**219039**
40 - 22	32 - 18	1.181	–	1.574	1.102 (lbs)	–	**219040**
50 - 28	19.5 - 11	2.126	1.614	0.767	0.881 (lbs)	M 6 x 10	**219051**
50 - 28	22 - 11	0.551	0.019	0.866	0.661 (lbs)	M 6 x 10	**219041**
50 - 28	22 - 11	2.126	1.614	0.866	0.881 (lbs)	M 6 x 10	**219052**
50 - 28	25 - 14	0.551	0.019	0.984	0.661 (lbs)	M 6 x 7	**119094**
50 - 28	25 - 14	2.323	1.811	0.984	0.881 (lbs)	M 6 x 10	**119054**
50 - 28	25 - 14	2.323	1.811	1.259	1.102 (lbs)	M 6 x 10	**119055**
50 - 28	25 - 14	4.685	4.173	1.259	2.204 (lbs)	M 6 x 10	**119010**
50 - 28	25 - 14	4.685	4.173	1.417	1.322 (lbs)	M 6 x 10	**219030***
50 - 28	32 - 18	1.929	1.417	1.377	1.984 (lbs)	M 6 x 10	**219085**
50 - 28	32 - 18	4.291	3.779	1.377	2.204 (lbs)	M 6 x 10	**219086**
50 - 28	32 - 18	4.291	3.779	1.574	2.425 (lbs)	M 6 x 10	**119012**
50 - 28	32 - 18	4.291	3.779	1.811	2.866 (lbs)	M 6 x 10	**219032***
50 - 28	40 - 22	1.575	1.062	–	1.102 (lbs)	M 6 x 10	**219087**
50 - 28	40 - 22	3.937	3.425	1.850	2.866 (lbs)	M 6 x 10	**219088**
50 - 28	63 - 36	1.969	–	2.480	2.204 (lbs)	M 6 x 10	**119059**

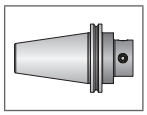
*Reinforced reducer

NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

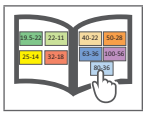
B10-N: 10-13
Key on B10-G:1



B10-H



B10: xii-xiii



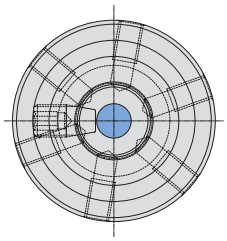
ⓘ = Imperial (in)
ⓜ = Metric (mm)

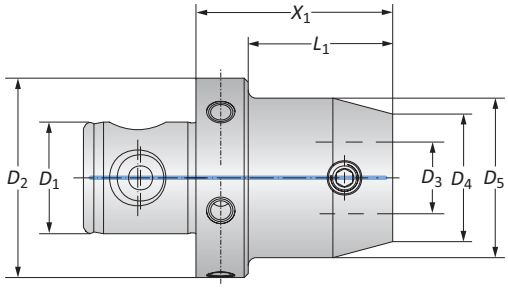
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Reducers

Metric | Balanced



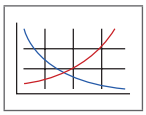


MVS Connection		Reducer					
D_2 | D_1	D_4 | D_3	X_1	L_1	D_5	Weight	Thread Precision	Part No.
25 - 14	19.5 - 11	30.00	21.00	19.50	0.10 (kg)	–	**219034**
25 - 14	22 - 11	30.00	21.00	22.00	0.20 (kg)	–	**219035**
32 - 18	22 - 11	12.00	0.50	22.00	0.10 (kg)	–	**219036**
32 - 18	25 - 14	30.00	21.00	25.00	0.10 (kg)	–	**219037**
40 - 22	22 - 11	12.00	0.50	22.00	0.20 (kg)	–	**219038**
40 - 22	25 - 14	30.00	21.00	25.00	0.20 (kg)	–	**219039**
40 - 22	32 - 18	30.00	–	40.00	0.50 (kg)	–	**219040**
50 - 28	19.5 - 11	54.00	41.00	19.50	0.40 (kg)	M 6 x 10	**219051**
50 - 28	22 - 11	14.00	0.50	22.00	0.30 (kg)	M 6 x 10	**219041**
50 - 28	22 - 11	54.00	29.49	22.00	0.40 (kg)	M 6 x 10	**219052**
50 - 28	25 - 14	14.00	0.48	25.00	0.30 (kg)	M 6 x 7	**119094**
50 - 28	25 - 14	59.00	46.00	25.00	0.40 (kg)	M 6 x 10	**119054**
50 - 28	25 - 14	59.00	46.00	32.00	0.50 (kg)	M 6 x 10	**119055**
50 - 28	25 - 14	119.00	106.00	32.00	1.00 (kg)	M 6 x 10	**119010**
50 - 28	25 - 14	119.00	106.00	36.00	0.60 (kg)	M 6 x 10	**219030***
50 - 28	32 - 18	49.00	36.00	35.00	0.90 (kg)	M 6 x 10	**219085**
50 - 28	32 - 18	109.00	96.00	35.00	1.00 (kg)	M 6 x 10	**219086**
50 - 28	32 - 18	109.00	96.00	40.00	1.10 (kg)	M 6 x 10	**119012**
50 - 28	32 - 18	109.00	96.00	46.00	1.30 (kg)	M 6 x 10	**219032***
50 - 28	40 - 22	40.00	27.00	–	0.50 (kg)	M 6 x 10	**219087**
50 - 28	40 - 22	100.00	87.00	47.00	1.30 (kg)	M 6 x 10	**219088**
50 - 28	63 - 36	50.00	–	63.00	1.00 (kg)	M 6 x 10	**119059**

*Reinforced reducer

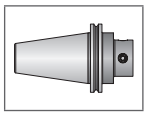
NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

B10-N: 10-13

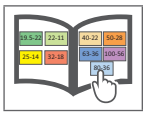


Key on B10-G:1

B10-H



B10: xii-xiii



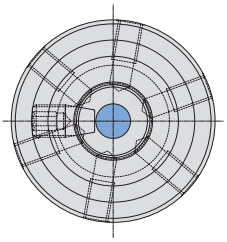
ⓘ = Imperial (in)
ⓜ = Metric (mm)

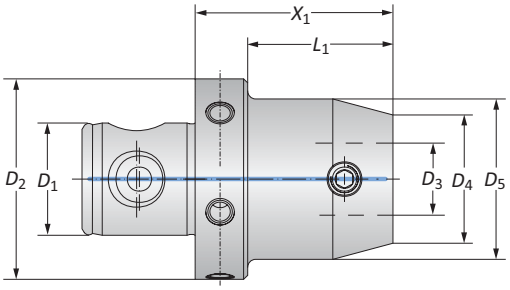
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Reducers

Imperial | Balanced



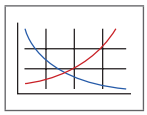


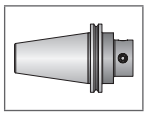
MVS Connection		Reducer					
D_2 | D_1	D_4 | D_3	X_1	L_1	D_5	Weight	Thread Precision	Part No.
63 - 36	19.5 - 11	2.126	1.614	0.767	1.322 (lbs)	M 6 x 10	**219053**
63 - 36	22 - 11	0.551	0.019	0.866	1.322 (lbs)	M 6 x 10	**219042**
63 - 36	22 - 11	2.126	1.614	0.866	1.543 (lbs)	M 6 x 10	**219054**
63 - 36	25 - 14	0.551	0.019	0.984	1.322 (lbs)	M 6 x 10	**119095**
63 - 36	25 - 14	2.323	1.811	0.984	1.543 (lbs)	M 6 x 10	**119060**
63 - 36	25 - 14	2.323	1.811	1.259	1.763 (lbs)	M 6 x 10	**119061**
63 - 36	25 - 14	4.685	4.173	1.259	2.425 (lbs)	M 6 x 15	**119019**
63 - 36	25 - 14	4.685	4.173	1.417	2.866 (lbs)	M 6 x 10	**219031***
63 - 36	32 - 18	1.929	1.417	1.377	1.543 (lbs)	M 6 x 10	**219089**
63 - 36	32 - 18	4.291	3.779	1.377	2.645 (lbs)	M 6 x 10	**219090**
63 - 36	32 - 18	4.291	3.779	1.574	3.086 (lbs)	M 6 x 10	**119021**
63 - 36	32 - 18	4.291	3.779	1.811	3.527 (lbs)	M 6 x 10	**219033***
63 - 36	40 - 22	1.575	1.062	–	1.763 (lbs)	M 6 x 10	**219091**
63 - 36	40 - 22	3.937	3.425	1.850	3.527 (lbs)	M 6 x 15	**219092**
63 - 36	40 - 22	5.906	5.393	1.968	5.291 (lbs)	M 6 x 15	**119067**
63 - 36	50 - 28	1.575	–	2.480	2.204 (lbs)	M 6 x 10	**119064**
63 - 36	50 - 28	1.575	1.062	1.968	1.763 (lbs)	M 6 x 10	**119096****
63 - 36	50 - 28	3.937	–	2.480	5.291 (lbs)	M 6 x 15	**119025**
63 - 36	50 - 28	3.937	3.425	1.968	3.747 (lbs)	M 6 x 10	**119097****
80 - 36	63 - 36	1.969	–	3.147	3.527 (lbs)	M 6 x 15	**119098**
100 - 56	80 - 36	2.756	2.047	3.147	7.936 (lbs)	M 8 x 20	**219066**

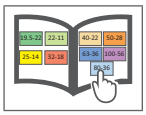
* Reinforced reducer
**For milling applications
NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

B10-N: 10-13 | B10-H | B10: xii-xiii

Key on B10-G:1







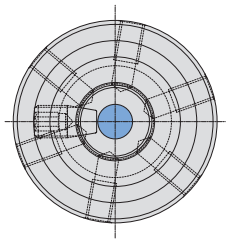
ⓘ = Imperial (in)
ⓜ = Metric (mm)

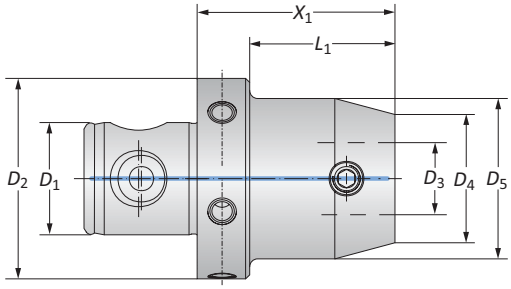
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Reducers

Metric | Balanced



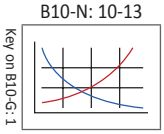


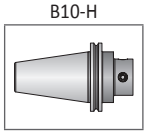
MVS Connection		Reducer					
D_2 | D_1	D_4 | D_3	X_1	L_1	D_5	Weight	Thread Precision	Part No.
63 - 36	19.5 - 11	54.00	41.00	19.50	0.60 (kg)	M 6 x 10	**219053**
63 - 36	22 - 11	14.00	0.50	22.00	0.60 (kg)	M 6 x 10	**219042**
63 - 36	22 - 11	54.00	41.00	22.00	0.70 (kg)	M 6 x 10	**219054**
63 - 36	25 - 14	14.00	0.50	25.00	0.60 (kg)	M 6 x 10	**119095**
63 - 36	25 - 14	59.00	46.00	25.00	0.70 (kg)	M 6 x 10	**119060**
63 - 36	25 - 14	59.00	46.00	32.00	0.80 (kg)	M 6 x 10	**119061**
63 - 36	25 - 14	119.00	106.00	32.00	1.10 (kg)	M 6 x 15	**119019**
63 - 36	25 - 14	119.00	106.00	36.00	1.30 (kg)	M 6 x 10	**219031***
63 - 36	32 - 18	49.00	36.00	35.00	0.70 (kg)	M 6 x 10	**219089**
63 - 36	32 - 18	109.00	96.00	35.00	1.20 (kg)	M 6 x 10	**219090**
63 - 36	32 - 18	109.00	96.00	40.00	1.40 (kg)	M 6 x 10	**119021**
63 - 36	32 - 18	109.00	96.00	46.00	1.60 (kg)	M 6 x 10	**219033***
63 - 36	40 - 22	40.00	27.00	–	0.80 (kg)	M 6 x 10	**219091**
63 - 36	40 - 22	100.00	86.00	47.00	1.60 (kg)	M 6 x 15	**219092**
63 - 36	40 - 22	150.00	137.00	50.00	2.40 (kg)	M 6 x 15	**119067**
63 - 36	50 - 28	40.00	–	63.00	1.00 (kg)	M 6 x 10	**119064**
63 - 36	50 - 28	40.00	27.00	50.00	0.80 (kg)	M 6 x 10	**119096****
63 - 36	50 - 28	100.00	–	63.00	2.40 (kg)	M 6 x 15	**119025**
63 - 36	50 - 28	100.00	87.00	50.00	1.70 (kg)	M 6 x 10	**119097****
80 - 36	63 - 36	50.00	–	80.00	1.60 (kg)	M 6 x 15	**119098**
100 - 56	80 - 36	70.00	52.00	80.00	3.60 (kg)	M 8 x 20	**219066**

* Reinforced reducer
**For milling applications
NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

B10-N: 10-13 | B10-H | B10: xii-xiii

Key on B10-G:1





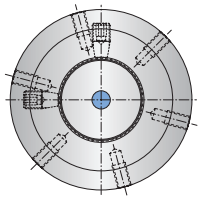
ⓘ = Imperial (in)
ⓜ = Metric (mm)

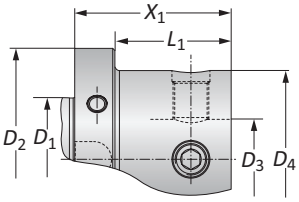
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

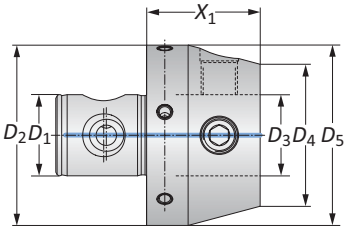
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Reducers

Balanced Alu-Line



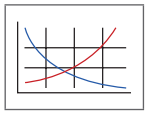




	MVS Connection		Reducer					
	$D_2 \mid D_1$	$D_4 \mid D_3$	X_1	L_1	D_5	Weight	Thread Precision	Part No.
ⓘ	63 - 36	50 - 28	1.575	–	2.480	0.881 (lbs)	M 6 x 8	**319014**
ⓘ	63 - 36	50 - 28	3.937	–	2.480	1.984 (lbs)	M 6 x 12	**319015**
ⓘ	80 - 36	63 - 36	1.969	–	3.149	1.322 (lbs)	M 8 x 12	**319012**
ⓘ	100 - 56	80 - 36	2.756	2.047	–	2.866 (lbs)	M 8 x 20	**319013**
ⓜ	63 - 36	50 - 28	40.00	–	63.00	0.40 (kg)	M 6 x 8	**319014**
ⓜ	63 - 36	50 - 28	100.00	–	63.00	0.90 (kg)	M 6 x 12	**319015**
ⓜ	80 - 36	63 - 36	50.00	–	80.00	0.60 (kg)	M 8 x 12	**319012**
ⓜ	100 - 56	80 - 36	70.00	52.00	–	1.30 (kg)	M 8 x 20	**319013**

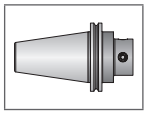
NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

B10-N: 10-13

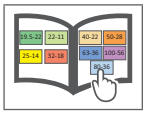


Key on B10-G:1

B10-H



B10: xii-xiii



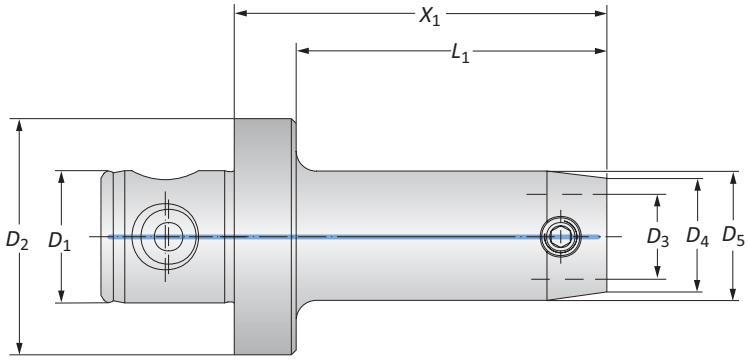
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Heavy Metal Reducers

Vibration Reduction



	MVS Connection		Heavy Metal Reducer				
	$D_2 \mid D_1$	$D_4 \mid D_3$	X_1	L_1	D_5	Weight	Part No.
	50 - 28	19.5 - 11	3.543	3.031	0.767	2.204 (lbs)	**219055**
	50 - 28	22 - 11	4.331	3.818	0.905	2.866 (lbs)	**219056**
	50 - 28	25 - 14	4.882	4.370	1.102	3.747 (lbs)	**219057**
ⓘ	50 - 28	25 - 14	5.669	5.157	1.259	5.070 (lbs)	**219058**
	50 - 28	25 - 14	6.457	5.944	1.377	6.393 (lbs)	**219059**
	50 - 28	32 - 18	6.063	5.551	1.456	6.393 (lbs)	**219093**
	50 - 28	32 - 18	6.063	5.551	1.653	8.157 (lbs)	**219060**
	50 - 28	19.5 - 11	90.00	77.00	19.50	1.00 (kg)	**219055**
	50 - 28	22 - 11	110.00	97.00	23.00	1.30 (kg)	**219056**
	50 - 28	25 - 14	124.00	111.00	28.00	1.70 (kg)	**219057**
ⓜ	50 - 28	25 - 14	144.00	131.00	32.00	2.30 (kg)	**219058**
	50 - 28	25 - 14	164.00	151.00	35.00	2.90 (kg)	**219059**
	50 - 28	32 - 18	154.00	141.00	37.00	2.90 (kg)	**219093**
	50 - 28	32 - 18	154.00	141.00	42.00	3.70 (kg)	**219060**

NOTE: Heavy metal reducers are used to reduce vibration when machining deep boring applications. When using heavy metal reducers, the maximum cutting speed (V_c) is 200 m/min. If steel extensions are also used, reduce the cutting speed by 50% and use replaceable inserts where r = 0.10mm.

B10-N: 10-13 | B10-H | B10: xii-xiii

Key on B10-G:1

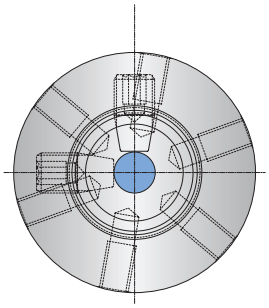
ⓘ = Imperial (in)
ⓜ = Metric (mm)

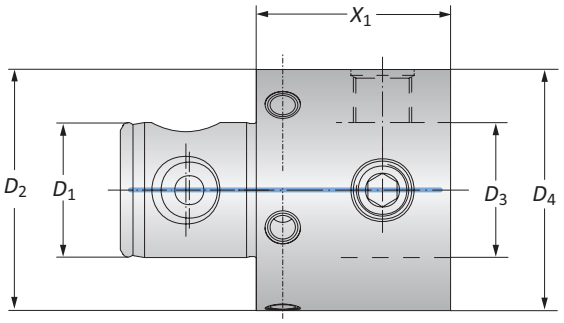
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Extensions

Imperial | Balanced



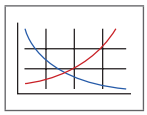


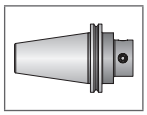
MVS Connection D_2 | D_1	MVS Connection D_4 | D_3	Extension X_1	Weight	Thread Precision	Part No.
19.5 - 11	19.5 - 11	1.575	0.220 (lbs)	–	**219043**
22 - 11	22 - 11	1.575	0.220 (lbs)	–	**219044**
25 - 14	25 - 14	0.984	0.220 (lbs)	–	**219068**
25 - 14	25 - 14	1.575	0.220 (lbs)	–	**119001**
32 - 18	32 - 18	1.575	0.440 (lbs)	–	**119002**
40 - 22	40 - 22	1.575	0.881 (lbs)	–	**119003**
50 - 28	50 - 28	1.575	1.322 (lbs)	M 6 x 10	**119004**
50 - 28*	50 - 28*	2.953	2.425 (lbs)	M 6 x 10	**219097**
50 - 28	50 - 28	2.953	2.425 (lbs)	M 6 x 10	**219082**
50 - 28	50 - 28	3.937	3.306 (lbs)	M 6 x 10	**119058**
63 - 36	63 - 36	1.969	2.425 (lbs)	M 6 x 10	**119005**
63 - 36	63 - 36	2.953	3.747 (lbs)	M 6 x 15	**219083**
63 - 36	63 - 36	4.921	6.393 (lbs)	M 6 x 15	**119065**
80 - 36	80 - 36	1.969	4.188 (lbs)	M 6 x 15	**119006**
80 - 36	80 - 36	2.953	6.172 (lbs)	M 6 x 15	**219084**
80 - 36	80 - 36	4.921	10.580 (lbs)	M 8 x 15	**119066**
80 - 36	80 - 36	7.874	16.310 (lbs)	M 6 x 15	**219094**
80 - 36	80 - 36	10.82	22.260 (lbs)	M 8 x 21	**119069**
100 - 56	100 - 56	2.953	9.479 (lbs)	M 8 x 20	**219095**
100 - 56	100 - 56	3.937	12.340 (lbs)	M 8 x 20	**219061**
100 - 56	100 - 56	5.906	17.850 (lbs)	M 8 x 20	**219096**
100 - 56	100 - 56	7.874	22.480 (lbs)	M 8 x 20	**219062**
100 - 56	100 - 56	11.810	32.180 (lbs)	M 8 x 20	**219063**

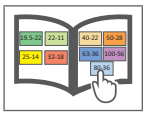
*D_2 / D_4 = 1.948" (49.50mm) for boring 1.968" (50.00mm) applications
NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

B10-N: 10-13 | B10-H | B10: xii-xiii

Key on B10-G:1







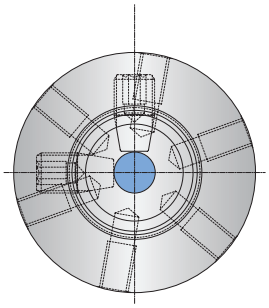
ⓘ = Imperial (in)
ⓜ = Metric (mm)

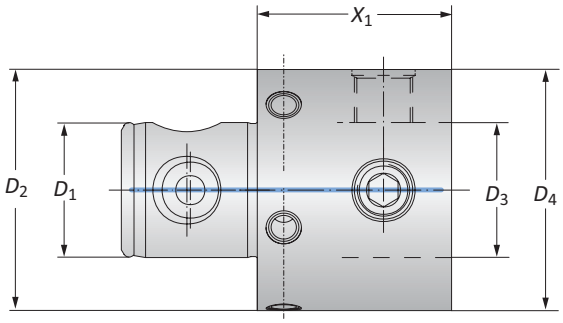
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Extensions

Metric | Balanced



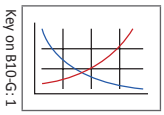


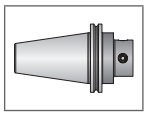
	MVS Connection D_2 | D_1	MVS Connection D_4 | D_3	Extension X_1	Weight	Thread Precision	Part No.
	19.5 - 11	19.5 - 11	40.00	0.10 (kg)	–	**219043**
	22 - 11	22 - 11	40.00	0.10 (kg)	–	**219044**
	25 - 14	25 - 14	25.00	0.10 (kg)	–	**219068**
	25 - 14	25 - 14	40.00	0.10 (kg)	–	**119001**
	32 - 18	32 - 18	40.00	0.20 (kg)	–	**119002**
	40 - 22	40 - 22	40.00	0.40 (kg)	–	**119003**
	50 - 28	50 - 28	40.00	0.60 (kg)	M 6 x 10	**119004**
	50 - 28	50 - 28	75.00	1.10 (kg)	M 6 x 10	**219097**
	50 - 28	50 - 28	75.00	1.10 (kg)	M 6 x 10	**219082**
	50 - 28	50 - 28	100.00	1.50 (kg)	M 6 x 10	**119058**
	63 - 36	63 - 36	50.00	1.10 (kg)	M 6 x 10	**119005**
ⓜ	63 - 36	63 - 36	75.00	1.70 (kg)	M 6 x 15	**219083**
	63 - 36	63 - 36	125.00	2.90 (kg)	M 6 x 15	**119065**
	80 - 36	80 - 36	50.00	1.90 (kg)	M 6 x 15	**119006**
	80 - 36	80 - 36	75.00	2.80 (kg)	M 6 x 15	**219084**
	80 - 36	80 - 36	125.00	4.80 (kg)	M 8 x 15	**119066**
	80 - 36	80 - 36	200.00	7.40 (kg)	M 6 x 15	**219094**
	80 - 36	80 - 36	275.00	10.10 (kg)	M 8 x 21	**119069**
	100 - 56	100 - 56	75.00	4.30 (kg)	M 8 x 20	**219095**
	100 - 56	100 - 56	100.00	5.60 (kg)	M 8 x 20	**219061**
	100 - 56	100 - 56	150.00	8.10 (kg)	M 8 x 20	**219096**
	100 - 56	100 - 56	200.00	10.20 (kg)	M 8 x 20	**219062**
	100 - 56	100 - 56	300.00	14.60 (kg)	M 8 x 20	**219063**

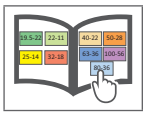
*D_2 / D_4 = 1.948" (49.50mm) for boring 1.968" (50.00mm) applications
NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

B10-N: 10-13 | B10-H | B10: xii-xiii

Key on B10-G:1







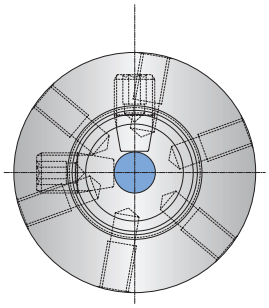
ⓘ = Imperial (in)
ⓜ = Metric (mm)

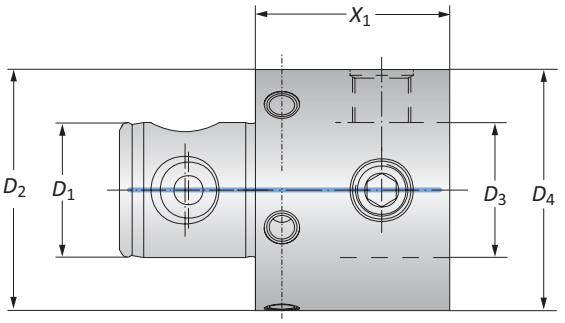
IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Extensions

Balanced Alu-Line

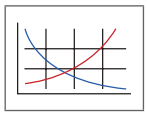




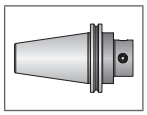
	MVS Connection D_2 | D_1	MVS Connection D_4 | D_3	Modules X_1	Weight	Thread Precision	Part No.
	50 - 28	50 - 28	1.575	0.440 (lbs)	M 6 x 8	**319021**
	50 - 28	50 - 28	2.953	0.881 (lbs)	M 6 x 10	**319022**
	50 - 28	50 - 28	3.937	1.322 (lbs)	M 6 x 10	**319023**
	63 - 36	63 - 36	1.969	0.881 (lbs)	M 6 x 8	**319002**
	63 - 36	63 - 36	4.921	2.425 (lbs)	M 6 x 10	**319003**
	80 - 36	80 - 36	1.969	1.543 (lbs)	M 6 x 10	**319004**
	80 - 36	80 - 36	2.953	2.204 (lbs)	M 6 x 10	**319016**
ⓘ	80 - 36	80 - 36	4.921	3.968 (lbs)	M 6 x 10	**319005**
	80 - 36	80 - 36	7.874	5.952 (lbs)	M 6 x 10	**319017**
	80 - 36	80 - 36	10.820	8.157 (lbs)	M 6 x 10	**319006**
	100 - 56	100 - 56	2.953	3.306 (lbs)	M 8 x 20	**319019**
	100 - 56	100 - 56	3.937	4.850 (lbs)	M 8 x 20	**319007**
	100 - 56	100 - 56	5.906	6.613 (lbs)	M 8 x 20	**319018**
	100 - 56	100 - 56	7.874	8.377 (lbs)	M 8 x 20	**319008**
	100 - 56	100 - 56	11.810	11.900 (lbs)	M 8 x 20	**319009**
	50 - 28	50 - 28	40.00	0.20 (kg)	M 6 x 8	**319021**
	50 - 28	50 - 28	75.00	0.40 (kg)	M 6 x 10	**319022**
	50 - 28	50 - 28	100.00	0.60 (kg)	M 6 x 10	**319023**
	63 - 36	63 - 36	50.00	0.40 (kg)	M 6 x 8	**319002**
	63 - 36	63 - 36	125.00	1.10 (kg)	M 6 x 10	**319003**
	80 - 36	80 - 36	50.00	0.70 (kg)	M 6 x 10	**319004**
	80 - 36	80 - 36	75.00	1.00 (kg)	M 6 x 10	**319016**
ⓜ	80 - 36	80 - 36	125.00	1.80 (kg)	M 6 x 10	**319005**
	80 - 36	80 - 36	200.00	2.70 (kg)	M 6 x 10	**319017**
	80 - 36	80 - 36	275.00	3.70 (kg)	M 6 x 10	**319006**
	100 - 56	100 - 56	75.00	1.50 (kg)	M 8 x 20	**319019**
	100 - 56	100 - 56	100.00	2.20 (kg)	M 8 x 20	**319007**
	100 - 56	100 - 56	150.00	3.00 (kg)	M 8 x 20	**319018**
	100 - 56	100 - 56	200.00	3.80 (kg)	M 8 x 20	**319008**
	100 - 56	100 - 56	300.00	5.40 (kg)	M 8 x 20	**319009**

NOTE: Balance refers to a specific residual imbalance of ≤ 10 g mm/kg

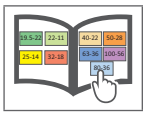
B10-N: 10-13



B10-H



B10: xii-xiii



Key on B10-G:1

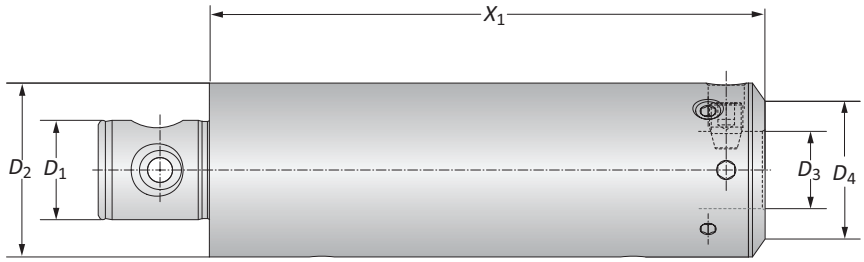
ⓘ = Imperial (in)
ⓜ = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

NOVI[TECH™] Vibration Dampened Modules

Machining Diameter: 1.968" - 8.070" (50.00mm - 205.00mm)



	MVS Connection		NOVI[TECH]		
	D_2 | D_1	D_4 | D_3	X_1	Weight	Part No.
i	50 - 28	40 - 22	7.874	6.172 (lbs)	**519002***
	63 - 36	50 - 28	7.874	12.560 (lbs)	**519003**
	80 - 36	63 - 36	7.874	16.530 (lbs)	**519004**
	80 - 36	80 - 36	7.874	16.530 (lbs)	**519005**
m	50 - 28	40 - 22	200.00	2.80 (kg)	**519002**
	63 - 36	50 - 28	200.00	5.70 (kg)	**519003**
	80 - 36	63 - 36	200.00	7.50 (kg)	**519004**
	80 - 36	80 - 36	200.00	7.50 (kg)	**519005**

*D_2 =49.50mm

B10-N: 10-13 | B10-H | B10: xii-xiii

Key on B10-G:1

i = Imperial (in)
m = Metric (mm)

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-N: 10 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
ext: **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Notes

Notes

SECTION

B10-H

Master Shanks

Wohlhaupter™ Master Shanks

The MVS Connection

Wohlhaupter MVS connection shanks provide a high level of accuracy when building or replacing components. Our master shanks adapt to any machine tool spindle, making it easy to find the shank you need.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

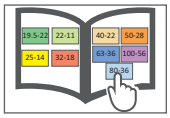
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

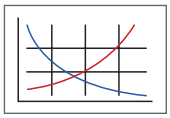
Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

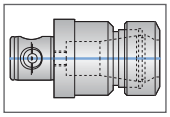
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring



Clamping Elements
Collet chucks for carbide shanks

Master Shanks Table of Contents

Carbide Shanks 2

HSK Shanks (DIN 69893) . . . . . 3 - 4

Polygon Shaft Shanks (PSC) (ISO26623-1) 5

Dual Contact CAT Shanks with Imperial Threads 6

CAT Shanks with Imperial Threads 7

CAT Shanks with Metric Threads 8

SK Shanks (DIN 69871-AD / B-D) 9

BT Shanks (JIS B 6339) 10

NMTB Shanks 11

DIN 2080 Shanks 12

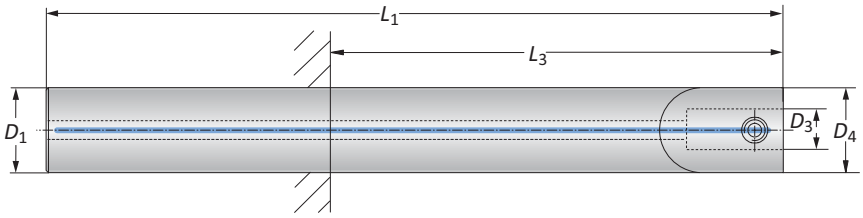
Morse Taper Shanks (DIN 228 A / 2207) 13

Morse Taper Shanks (DIN 1806) 13

R8 Shanks 14

Mounting Fixtures 15

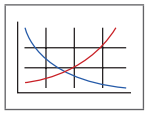
Carbide Shanks



	Connection D_4 | D_3	Shank L_1	D_1	$L_{3\,max}$	$L_{3\,min}$ SK 40	SK 50	HSK-A 63	HSK-A 100	Weight	Part No.
	18 - 11	6.102	0.709	4.213	1.535	1.024	2.362	2.638	1.102 (lbs)	**299009***
	22 - 11	5.512	0.866	3.622	1.102	1.102	1.772	2.047	1.543 (lbs)	**299001***
	22 - 11	7.480	0.866	5.591	2.913	2.205	3.740	4.016	1.984 (lbs)	**299002***
	22 - 11	9.049	0.866	7.205	4.528	3.819	5.354	5.630	2.425 (lbs)	**299003***
ⓘ	25 - 14	6.496	0.984	4.606	1.929	1.417	2.756	3.031	2.205 (lbs)	**299004***
	25 - 14	8.465	0.984	6.575	3.898	3.189	4.724	5.000	2.866 (lbs)	**299005***
	32 - 18	8.268	1.260	–	5.354	5.354	5.572	5.394	4.630 (lbs)	**299006**
	32 - 18	10.236	1.260	–	7.323	7.323	7.441	7.362	5.732 (lbs)	**299007****
	40 - 22	16.399	1.575	–	–	13.110	–	13.110	11.460 (lbs)	**299008****
	18 - 11	155.00	18.00	107.00	39.00	26.00	60.00	67.00	0.50 (kg)	**299009***
	22 - 11	140.00	22.00	92.00	28.00	28.00	45.00	52.00	0.70 (kg)	**299001***
	22 - 11	190.00	22.00	142.00	74.00	56.00	95.00	102.00	0.90 (kg)	**299002***
	22 - 11	231.00	22.00	183.00	115.00	97.00	136.00	143.00	1.10 (kg)	**299003***
ⓜ	25 - 14	165.00	25.00	117.00	49.00	36.00	70.00	77.00	1.00 (kg)	**299004***
	25 - 14	215.00	25.00	167.00	99.00	81.00	120.00	127.00	1.30 (kg)	**299005***
	32 - 18	210.00	32.00	–	136.00	136.00	139.00	137.00	2.10 (kg)	**299006****
	32 - 18	260.00	32.00	–	186.00	186.00	189.00	187.00	2.60 (kg)	**299007****
	40 - 22	415.00	40.00	–	–	333.00	–	333.00	5.20 (kg)	**299008****

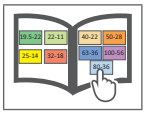
NOTE: Adapter shanks are used for extensions up to 10xD
*Recommended clamping element: collet chuck ISO 15488 (DIN 6499-B) (pg. B10-I: 5)
**Recommended clamping element: collet chuck ISO 10897 (DIN 6388) (pg. B10-I: 5)

B10-N: 10-13

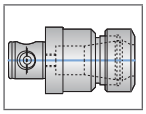


Key on B10-H: 1

B10: xii-xiii



B10-I: 5



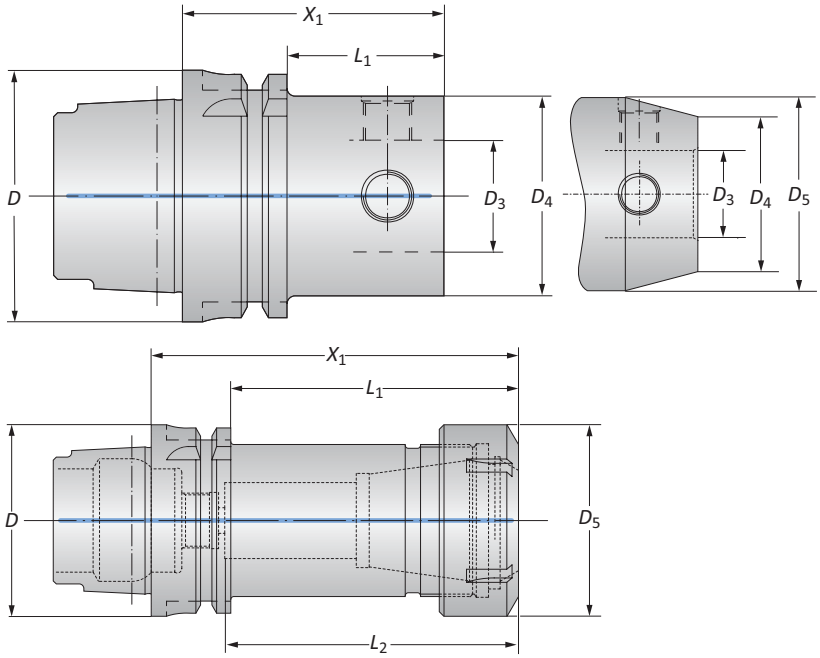
ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

HSK Shanks (DIN 69893)

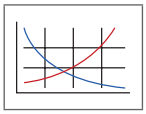
Imperial | Balanced



	Taper Size	Connection	Shank					
	D	*D*$_4$ | *D*$_3$	*X*$_1$	*L*$_1$	*L*$_2$	*D*$_5$	Weight	Part No.
	40	40 - 22	2.205	–	–	–	0.881 (lbs)	**246016**
	40	50 - 28	2.756	–	–	–	1.543 (lbs)	**246004**
	50	40 - 22	2.205	1.181	–	–	1.322 (lbs)	**246015**
	50	50 - 28	2.559	1.535	–	–	1.763 (lbs)	**245011**
	63	25 - 14	1.811	0.787	–	–	1.543 (lbs)	**246012**
	63	32 - 18	2.205	1.181	–	–	1.763 (lbs)	**246013**
	63	40 - 22	2.205	1.181	–	–	1.984 (lbs)	**246014**
	63	50 - 28	2.559	1.535	–	–	3.527 (lbs)	**245012**
	63	63 - 36	3.150	–	–	–	3.306 (lbs)	**245013**
	63	80 - 36	3.150	–	–	–	4.629 (lbs)	**246009**
	63	ER 40	4.724	3.700	3.740	2.480	3.747 (lbs)	**252090***
ⓘ	100	50 - 28	2.559	1.417	–	–	5.291 (lbs)	**245014**
	100	50 - 28	7.087	5.944	–	2.362	11.020 (lbs)	**246020**
	100	50 - 28	7.087	5.944	–	1.948	6.393 (lbs)	**246021**
	100	63 - 36	3.150	2.007	–	–	6.393 (lbs)	**246015**
	100	63 - 36	8.071	6.929	–	3.070	17.190 (lbs)	**246019**
	100	63 - 36	8.071	6.929	–	3.070	17.190 (lbs)	**246022**
	100	80 - 36	3.150	2.007	–	–	8.157 (lbs)	**245016**
	100	80 - 36	10.03	8.897	–	3.543	27.770 (lbs)	**246018**
	100	80 - 36	10.03	8.897	–	–	22.920 (lbs)	**246023**
	100	100 - 56	3.937	–	–	–	11.020 (lbs)	**246010**
	100	100 - 56	11.810	8.700	–	–	38.580 (lbs)	**246017**
	100	ER 40	4.724	3.582	3.464	2.480	7.716 (lbs)	**252091***

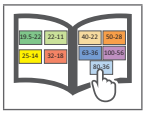
NOTE: Balanced refers to a specific residual imbalance of ≤4.00 gmm/kg
*Balanced without clamping nut

B10-N: 10-13



Key on B10-H: 1

B10: xii-xiii



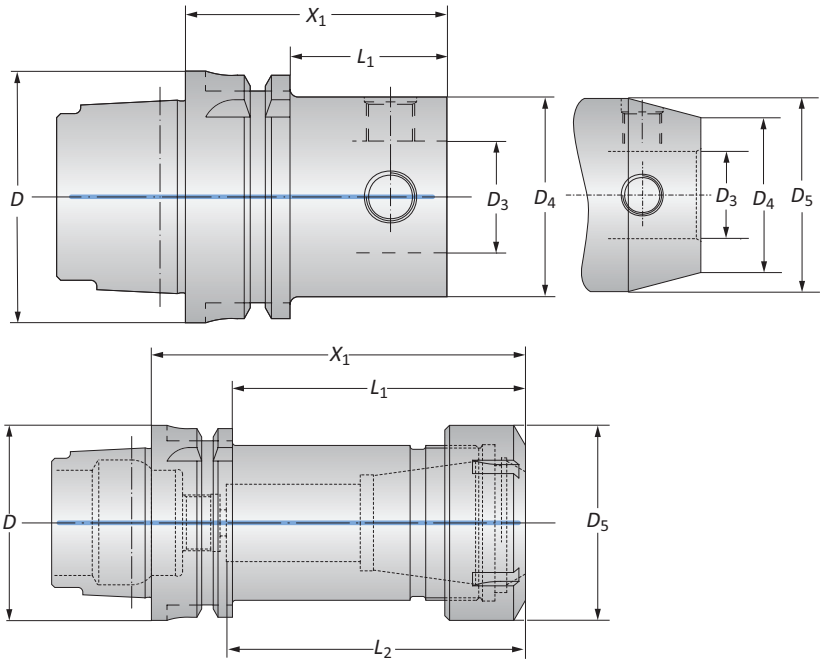
ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

HSK Shanks (DIN 69893)

Metric | Balanced

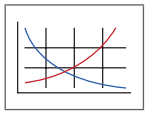


	Taper Size	Connection	Shank					
	D	D_4 | D_3	X_1	L_1	L_2	D_5	Weight	Part No.
	40	40 - 22	56.00	–	–	–	0.40 (kg)	**246016**
	40	50 - 28	70.00	–	–	–	0.70 (kg)	**246004**
	50	40 - 22	56.00	30.00	–	–	0.60 (kg)	**246015**
	50	50 - 28	65.00	39.00	–	–	0.80 (kg)	**245011**
	63	25 - 14	46.00	20.00	–	–	0.70 (kg)	**246012**
	63	32 - 18	56.00	30.00	–	–	0.80 (kg)	**246013**
	63	40 - 22	56.00	30.00	–	–	0.90 (kg)	**246014**
	63	50 - 28	65.00	39.00	–	–	1.60 (kg)	**245012**
	63	63 - 36	80.00	–	–	–	1.50 (kg)	**245013**
	63	80 - 36	80.00	–	–	–	2.10 (kg)	**246009**
	63	ER 40	120.00	94.00	95.00	63.00	1.70 (kg)	**252090***
ⓜ	100	50 - 28	65.00	36.00	–	–	2.40 (kg)	**245014**
	100	50 - 28	180.00	151.00	–	60.00	5.00 (kg)	**246020**
	100	50 - 28	180.00	151.00	–	49.50	4.00 (kg)	**246021**
	100	63 - 36	80.00	51.00	–	–	2.90 (kg)	**246015**
	100	63 - 36	205.00	176.00	–	78.00	7.80 (kg)	**246019**
	100	63 - 36	205.00	176.00	–	78.00	7.80 (kg)	**246022**
	100	80 - 36	80.00	51.00	–	–	3.70 (kg)	**245016**
	100	80 - 36	255.00	226.00	–	90.00	12.60 (kg)	**246018**
	100	80 - 36	255.00	226.00	–	–	10.40 (kg)	**246023**
	100	100 - 56	100.00	–	–	–	5.00 (kg)	**246010**
	100	100 - 56	300.00	221.00	–	–	17.50 (kg)	**246017**
	100	ER 40	120.00	91.00	88.00	63.00	3.50 (kg)	**252091***

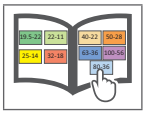
NOTE: Balanced refers to a specific residual imbalance of ≤4.00 gmm/kg
*Balanced without clamping nut

B10-N: 10-13

Key on B10-H: 1



B10: xii-xiii



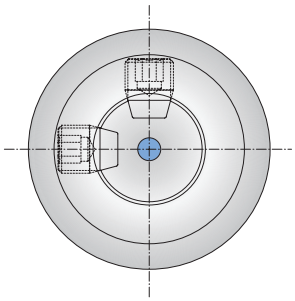
ⓘ = Imperial (in)
ⓜ = Metric (mm)

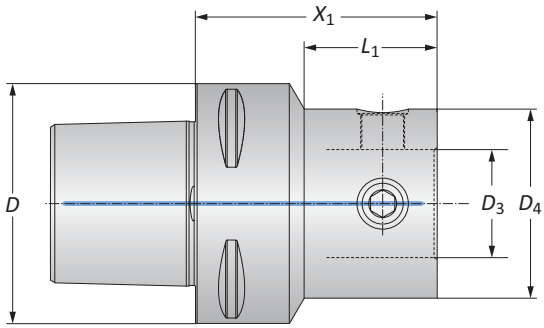
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Polygon Shaft Shanks (PSC) (ISO 26623-1)

Balanced

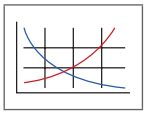




	PSC	Connection	Shank			
	D	D_4 | D_3	X_1	L_1	Weight	Part No.
	50	40 - 22	2.126	1.224	1.543 (lbs)	**227014**
	50	50 - 28	2.559	–	2.205 (lbs)	**227001**
	50	63 - 36	3.150	–	3.527 (lbs)	**227002**
	50	80 - 36	3.150	–	5.512 (lbs)	**227012**
	63	25 - 14	2.126	0.838	2.205 (lbs)	**227010**
	63	32 - 28	2.126	0.917	2.205 (lbs)	**227009**
ⓘ	63	40 - 22	2.559	1.433	2.425 (lbs)	**227008**
	63	50 - 28	2.559	1.555	2.866 (lbs)	**227003**
	63	63 - 36	3.150	–	4.189 (lbs)	**227004**
	63	80 - 36	3.150	–	5.952 (lbs)	**227005**
	80	50 - 28	2.559	1.047	5.071 (lbs)	**227011**
	80	63 - 36	3.150	1.783	5.952 (lbs)	**227006**
	80	80 - 36	3.150	–	7.496 (lbs)	**227007**
	50	40 - 22	54.00	31.10	0.70 (kg)	**227014**
	50	50 - 28	65.00	–	1.00 (kg)	**227001**
	50	63 - 36	80.00	–	1.60 (kg)	**227002**
	50	80 - 36	80.00	–	2.50 (kg)	**227012**
	63	25 - 14	54.00	21.10	1.00 (kg)	**227010**
	63	32 - 28	54.00	23.00	1.00 (kg)	**227009**
ⓜ	63	40 - 22	65.00	36.40	1.10 (kg)	**227008**
	63	50 - 28	65.00	39.00	1.30 (kg)	**227003**
	63	63 - 36	80.00	-	1.90 (kg)	**227004**
	63	80 - 36	80.00	-	2.70 (kg)	**227005**
	80	50 - 28	65.00	25.00	2.30 (kg)	**227011**
	80	63 - 36	80.00	45.10	2.70 (kg)	**227006**
	80	80 - 36	80.00	-	3.40 (kg)	**227007**

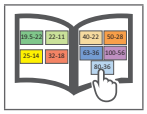
NOTE: Balanced refers to a specific residual imbalance of ≤4.00 gmm/kg

B10-N: 10-13



Key on B10-H: 1

B10: xii-xiii

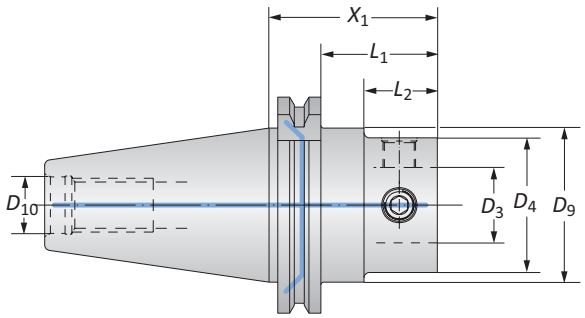


ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

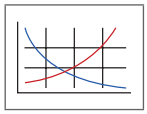
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Dual Contact CAT Master Shanks with Imperial Threads

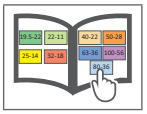


	Taper Size	Connection D_4 | D_3	Shank X_1	L_1	L_2	D_9	D_{10}	Weight	Part No.
ⓘ	40	50 - 28	2.440	1.688	1.062	1.751	⅝ - 11	2.645 (lbs)	**353062**
ⓘ	40	63 - 36	3.228	2.440	1.850	1.751	⅝ - 11	3.747 (lbs)	**353063**
ⓘ	50	50 - 28	2.440	1.964	1.062	2.751	1 - 8	7.054 (lbs)	**353061**
ⓘ	50	80 - 36	2.834	2.082	1.456	2.751	1 - 8	8.818 (lbs)	**353060**
ⓜ	40	50 - 28	62.00	42.90	27.00	44.50	⅝ - 11	1.20 (kg)	**353062**
ⓜ	40	63 - 36	82.00	62.90	47.00	44.50	⅝ - 11	1.70 (kg)	**353063**
ⓜ	50	50 - 28	62.00	49.90	27.00	69.90	1 - 8	3.20 (kg)	**353061**
ⓜ	50	80 - 36	72.00	52.90	37.00	69.90	1 - 8	4.00 (kg)	**353060**

B10-N: 10-13
Key on B10-H: 1



B10: xii-xiii

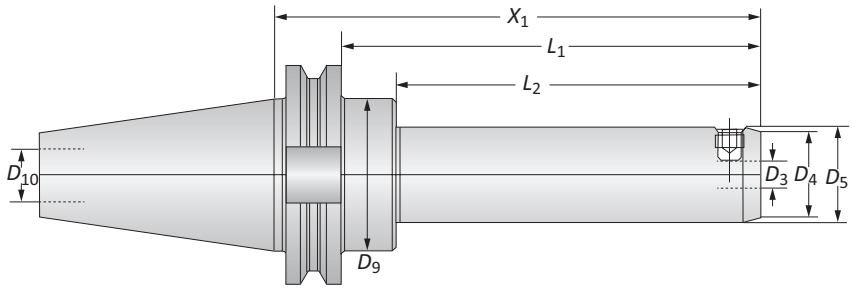


ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

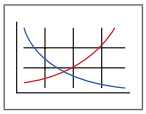
CAT Shanks with Imperial Threads



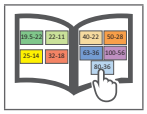
	Taper Size	Connection D_4 | D_3	Shank X_1	L_1	L_2	D_5	D_9	D_{10}	Weight	Part No.
	30	40 - 22	2.362	1.610	–	–	–	½ - 13	1.322 (lbs)	**353001**
	30	50 - 28	2.755	2.000	–	–	–	½ - 13	1.763 (lbs)	**353002**
	40	22 - 14	2.165	1.413	0.787	0.984	1.751	⅝ - 11	2.204 (lbs)	**353011**
	40	22 - 14	5.551	4.803	4.173	1.102	1.751	⅝ - 11	3.306 (lbs)	**353012**
	40	32 - 18	2.559	1.964	1.181	1.259	1.751	⅝ - 11	2.425 (lbs)	**353013**
	40	32 - 18	6.732	5.944	5.354	1.377	1.751	⅝ - 11	4.188 (lbs)	**353014**
	40	40 - 22	1.811	1.410	–	–	1.751	⅝ - 11	2.491 (lbs)	**353003**
	40	40 - 22	6.377	5.590	5.000	1.850	1.751	⅝ - 11	5.511 (lbs)	**353015**
	40	50 - 28	2.440	1.690	–	–	1.751	⅝ - 11	2.821 (lbs)	**353004**
	40	50 - 28	5.393	4.606	4.015	1.968	1.751	⅝ - 11	5.291 (lbs)	**353016**
	40	63 - 36	3.228	2.480	–	–	1.751	⅝ - 11	4.034 (lbs)	**353005**
	40	63 - 36	6.181	5.393	4.803	2.480	1.751	⅝ - 11	7.936 (lbs)	**353017**
i	50	40 - 22	1.811	1.410	–	–	2.750	1 - 8	7.297 (lbs)	**353006**
	50	40 - 22	6.377	5.590	5.000	1.850	2.751	1 - 8	9.920 (lbs)	**353018**
	50	50 - 28	2.440	1.690	–	–	2.751	1 - 8	7.583 (lbs)	**353007**
	50	50 - 28	7.952	7.165	6.574	1.948	2.751	1 - 8	11.680 (lbs)	**353025**
	50	50 - 28	7.952	7.165	6.574	2.362	2.751	1 - 8	14.100 (lbs)	**353019**
	50	63 - 36	2.834	2.080	–	–	2.751	1 - 8	8.223 (lbs)	**353008**
	50	63 - 36	8.740	7.952	7.362	2.480	2.751	1 - 8	15.650 (lbs)	**353023**
	50	63 - 36	8.740	7.952	7.362	3.070	2.751	1 - 8	20.500 (lbs)	**353020**
	50	80 - 36	2.834	2.080	–	–	2.751	1 - 8	9.413 (lbs)	**353009**
	50	80 - 36	10.700	9.921	9.330	3.149	2.751	1 - 8	26.230 (lbs)	**353024**
	50	80 - 36	10.700	9.921	9.330	3.543	2.751	1 - 8	31.300 (lbs)	**353021**
	50	100 - 56	4.133	3.350	–	–	2.751	1 - 8	13.600 (lbs)	**353010**
	50	100 - 56	12.000	11.220	10.620	3.937	2.751	1 - 8	39.460 (lbs)	**353022**

B10-N: 10-13

Key on B10-H: 1



B10: xii-xiii

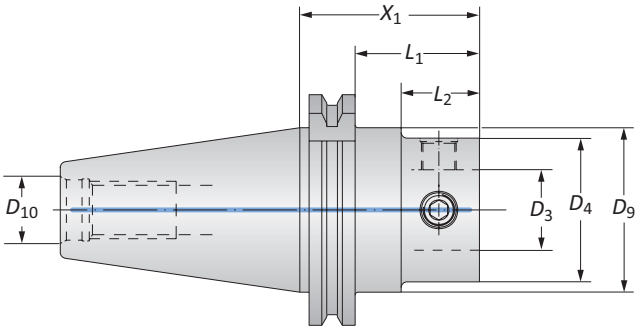


ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

CAT Shanks with Metric Threads



	Taper Size	Connection D_4 | D_3	Shank X_1	L_1	L_2	D_9	D_{10}	Weight	Part No.
	40	50 - 28	62.00	42.90	–	44.45	M16	1.70 (kg)	**132022T016960**
	40	63 - 36	82.00	62.90	–	44.45	M16	2.00 (kg)	**132066T016960**
ⓜ	50	50 - 28	62.00	42.90	27.00	69.85	M16	3.50 (kg)	**132022T016962**
	50	63 - 36	72.00	52.90	37.00	69.85	M16	3.80 (kg)	**132066T016962**
	50	80 - 86	72.00	52.90	–	69.85	M16	4.30 (kg)	**132088T016962**
	50	100 - 56	105.00	85.00	–	69.85	M16	5.20 (kg)	**132076T016962**

B10-N: 10-13
Key on B10-H: 1

B10: xii-xiii

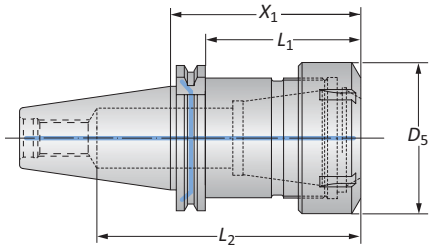
ⓘ = Imperial (in)
ⓜ = Metric (mm)

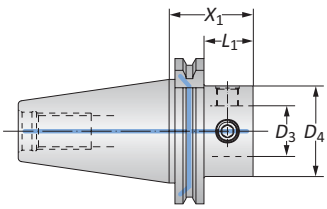
⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

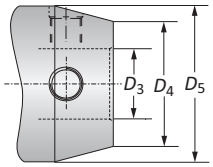
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

SK Shanks (DIN 69871-AD / B-D)

Balanced







	Taper Size	Connection D_4 | D_3	Shank X_1	Shank L_1	Shank L_2	Shank D_5	Weight	Part No.
	30	40 - 22	1.811	1.059	–	–	1.103 (lbs)	**327001**
	30	50 - 28	2.283	–	–	–	1.764 (lbs)	**327002**
	40	32 - 18	2.165	1.413	–	1.575	2.426 (lbs)	**327003**
	40	40 - 22	1.811	1.059	–	–	2.205 (lbs)	**327004**
	40	50 - 28	1.811	1.059	–	–	2.426 (lbs)	**327005**
	40	63 - 36	2.598	1.846	–	–	3.087 (lbs)	**327006**
	40	80 - 36	2.598	–	–	–	4.190 (lbs)	**327007**
	40	ER 40	3.149	2.397	4.566	2.480	2.860 (lbs)	**259079***
	50	50 - 28	1.811	1.059	–	–	6.395 (lbs)	**327017**
i	50	50 - 28	7.323	6.571	–	2.362	13.230 (lbs)	**327025**
	50	50 - 28	7.323	6.571	–	–	10.805 (lbs)	**327033**
	50	63 - 36	2.205	1.453	–	–	7.056 (lbs)	**327018**
	50	63 - 36	8.110	7.358	–	3.071	19.625 (lbs)	**327026**
	50	63 - 36	8.110	7.358	–	–	15.215 (lbs)	**327034**
	50	80 - 36	2.205	1.453	–	–	8.159 (lbs)	**327010**
	50	80 - 36	10.079	9.327	–	3.543	29.988 (lbs)	**327027**
	50	80 - 36	10.079	9.327	–	–	25.358 (lbs)	**327035**
	50	100 - 56	3.543	–	–	–	11.687 (lbs)	**327011**
	50	100 - 56	11.417	10.665	–	–	37.706 (lbs)	**327028**
	50	ER 40	3.149	2.173	5.275	2.480	6.834 (lbs)	**259080***
	30	40 - 22	46.00	26.90	–	–	0.50 (kg)	**327001**
	30	50 - 28	58.00	–	–	–	0.80 (kg)	**327002**
	40	32 - 18	55.00	35.90	–	40.00	1.10 (kg)	**327003**
	40	40 - 22	46.00	26.90	–	–	1.00 (kg)	**327004**
	40	50 - 28	46.00	26.90	–	–	1.10 (kg)	**327005**
	40	63 - 36	66.00	46.90	–	–	1.40 (kg)	**327006**
	40	80 - 36	66.00	–	–	–	1.90 (kg)	**327007**
	40	ER 40	80.00	60.90	116.00	63.00	1.30 (kg)	**259079***
	50	50 - 28	46.00	26.90	–	–	2.90 (kg)	**327017**
m	50	50 - 28	186.00	166.90	–	60.00	6.00 (kg)	**327025**
	50	50 - 28	186.00	166.90	–	–	4.90 (kg)	**327033**
	50	63 - 36	56.00	36.90	–	–	3.20 (kg)	**327018**
	50	63 - 36	206.00	186.90	–	78.00	8.90 (kg)	**327026**
	50	63 - 36	206.00	186.90	–	–	6.90 (kg)	**327034**
	50	80 - 36	56.00	36.90	–	–	3.70 (kg)	**327010**
	50	80 - 36	256.00	236.90	–	90.00	13.60 (kg)	**327027**
	50	80 - 36	256.00	236.90	–	–	11.50 (kg)	**327035**
	50	100 - 56	90.00	–	–	–	5.30 (kg)	**327011**
	50	100 - 56	290.00	270.90	–	–	17.10 (kg)	**327028**
	50	ER 40	80.00	55.20	134.00	63.00	3.10 (kg)	**259080***

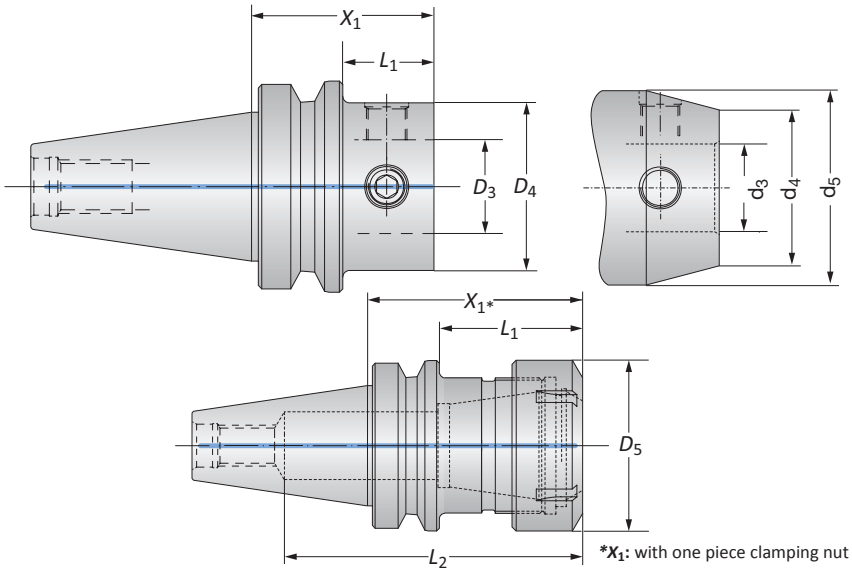
NOTE: Balanced refers to a specific residual imbalance of ≤4.00 gmm/kg
*Balanced without clamping nut

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

BT Shanks (JIS B 6339)

Balanced

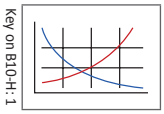


***X_1:** with one piece clamping nut

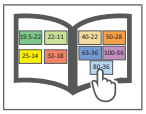
	Taper Size	Connection D_4 | D_3	Shank X_1	L_1	L_2	D_5	Weight	Part No.
	30	40 - 22	1.575	0.710	–	–	1.764 (lbs)	**327012**
	30	50 - 28	1.811	–	–	–	1.764 (lbs)	**327013**
	40	40 - 22	1.811	0.750	–	–	2.425 (lbs)	**327016**
	40	50 - 28	2.126	1.060	–	–	3.087 (lbs)	**327019**
	40	63 - 36	2.520	–	–	–	3.528 (lbs)	**327020**
ⓘ	40	ER 40	2.755	1.692	4.094	2.480	2.645 (lbs)	**259081***
	50	50 - 28	2.559	1.060	–	–	8.599 (lbs)	**327021**
	50	63 - 36	2.953	1.450	–	–	9.261 (lbs)	**327022**
	50	80 - 36	2.953	1.450	–	–	10.363 (lbs)	**327023**
	50	100 - 56	3.543	–	–	–	12.127 (lbs)	**327024**
	50	ER 40	3.149	1.645	5.314	2.480	8.377 (lbs)	**259082***
	30	40 - 22	40.00	18.00	–	–	0.80 (kg)	**327012**
	30	50 - 28	46.00	–	–	–	0.80 (kg)	**327013**
	40	40 - 22	46.00	19.00	–	–	1.10 (kg)	**327016**
	40	50 - 28	54.00	27.00	–	–	1.40 (kg)	**327019**
	40	63 - 36	64.00	–	–	–	1.60 (kg)	**327020**
ⓜ	40	ER 40	70.00	43.00	104.00	63.00	1.20 (kg)	**259081***
	50	50 - 28	65.00	26.80	–	–	3.90 (kg)	**327021**
	50	63 - 36	75.00	36.80	–	–	4.20 (kg)	**327022**
	50	80 - 36	75.00	36.80	–	–	4.70 (kg)	**327023**
	50	100 - 56	90.00	–	–	–	5.50 (kg)	**327024**
	50	ER 40	80.00	41.80	135.00	63.00	3.80 (kg)	**259082***

NOTE: Balanced refers to a specific residual imbalance of ≤4.00 gmm/kg
*Balanced without clamping nut

B10-N: 10-13



B10: xii-xiii

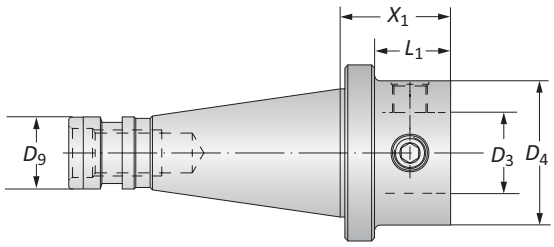


ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

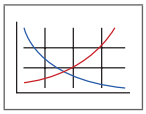
NMTB Shanks



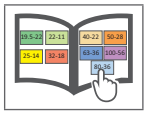
	Taper Size	Connection D_4 | D_3	Shank X_1	Shank L_1	Shank D_9	Weight	Part No.
	40	50 - 28	1.496	1.030	5/8 - 11	2.900 (lbs)	**132022T004498**
	40	63 - 36	1.890	1.430	5/8 - 11	3.300 (lbs)	**132066T004498**
ⓘ	50	50 - 28	1.654	1.060	1 - 8	6.600 (lbs)	**132022T004480**
	50	63 - 36	2.047	1.450	1 - 8	7.700 (lbs)	**132066T004480**
	50	80 - 36	2.047	1.450	1 - 8	8.800 (lbs)	**132088T004480**
	50	100 - 56	3.543	–	1 - 8	10.800 (lbs)	**132076T004480**
	40	50 - 28	38.00	26.20	5/8 - 11	1.30 (kg)	**132022T004498**
	40	63 - 36	48.00	36.20	5/8 - 11	1.50 (kg)	**132066T004498**
ⓜ	50	50 - 28	42.00	26.80	1 - 8	3.00 (kg)	**132022T004480**
	50	63 - 36	52.00	36.80	1 - 8	3.50 (kg)	**132066T004480**
	50	80 - 36	52.00	36.80	1 - 8	4.00 (kg)	**132088T004480**
	50	100 - 56	90.00	–	1 - 8	4.90 (kg)	**132076T004480**

B10-N: 10-13

Key on B10-H: 1



B10: xii-xiii

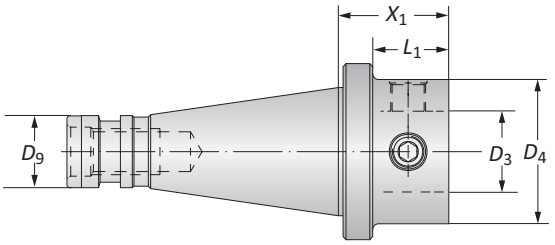


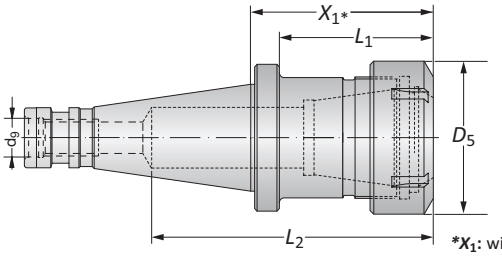
ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

DIN 2080 Shanks



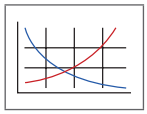


***X_1:** with one piece clamping nut

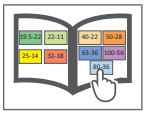
	Taper Size	Connection D_4 | D_3	Shank X_1	L_1	L_2	D_5	D_9	Weight	Part No.
	40	50 - 28	1.496	1.031	–	–	M16	2.866 (lbs)	**132022T010299**
	40	63 - 36	1.889	1.425	–	–	M16	3.306 (lbs)	**132066T010299**
	40	ER 40	3.149	2.685	4.566	2.480	M16	3.086 (lbs)	**259083**
	50	50 - 28	1.653	1.055	–	–	M24	6.613 (lbs)	**132022T003704**
	50	63 - 36	2.047	1.448	–	–	M24	7.716 (lbs)	**132066T003704**
	50	80 - 36	2.047	1.448	–	–	M24	8.818 (lbs)	**132088T003704**
	50	100 - 56	3.543	–	–	–	M24	10.800 (lbs)	**132076T003704**
	50	ER 40	3.149	1.645	5.314	2.480	M24	7.275 (lbs)	**259084**
	40	50 - 28	38.00	26.20	–	–	M16	1.30 (kg)	**132022T010299**
	40	63 - 36	48.00	36.20	–	–	M16	1.50 (kg)	**132066T010299**
	40	ER 40	80.00	68.20	116.00	63.00	M16	1.40 (kg)	**259083**
	50	50 - 28	42.00	26.80	–	–	M24	3.00 (kg)	**132022T003704**
	50	63 - 36	52.00	36.80	–	–	M24	3.50 (kg)	**132066T003704**
	50	80 - 36	52.00	36.80	–	–	M24	4.00 (kg)	**132088T003704**
	50	100 - 56	90.00	–	–	–	M24	4.90 (kg)	**132076T003704**
	50	ER 40	80.00	41.80	135.00	63.00	M24	3.30 (kg)	**259084**

*Balanced without clamping nut

B10-N: 10-13
Key on B10-H: 1



B10: xii-xiii

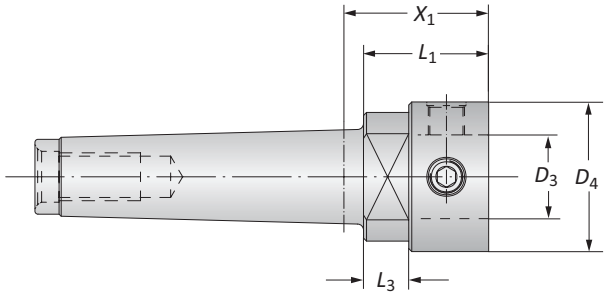


ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

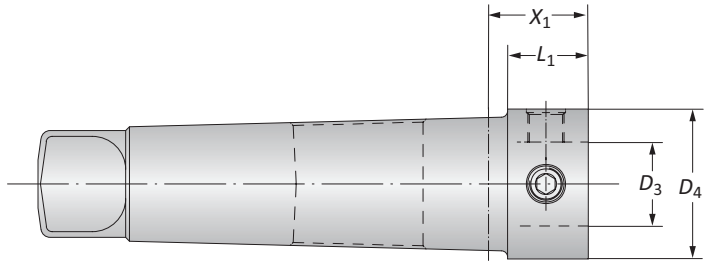
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Morse Taper Shanks: DIN 228 A / 2207 | DIN 1806



DIN 228 A / 2207 Shanks

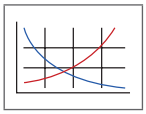
	Morse Taper Size	Connection D_4 | D_3	Shank X_1	Shank L_1	Shank L_3	Weight	Part No.
ⓘ	4	50 - 28	1.890	1.640	0.590	1.984 (lbs)	**132022T004256**
ⓜ	4	50 - 28	48.00	41.50	15.00	0.89 (kg)	**132022T004256**



DIN 1806 Master Shanks

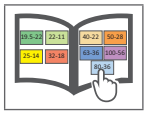
	Morse Taper Size	Connection D_4 | D_3	Shank X_1	Shank L_1	Weight	Part No.
ⓘ	4	50 - 28	1.693	1.440	2.425 (lbs)	**132022T003590**
ⓘ	5	50 - 28	1.299	1.050	3.968 (lbs)	**132022T003920**
ⓘ	5	63 - 36	2.087	1.840	4.850 (lbs)	**132066T003920**
ⓜ	4	50 - 28	43.00	36.50	1.09 (kg)	**132022T003590**
ⓜ	5	50 - 28	33.00	26.70	1.79 (kg)	**132022T003920**
ⓜ	5	63 - 36	53.00	46.70	2.19 (kg)	**132066T003920**

B10-N: 10-13



Key on B10-H: 1

B10: xii-xiii

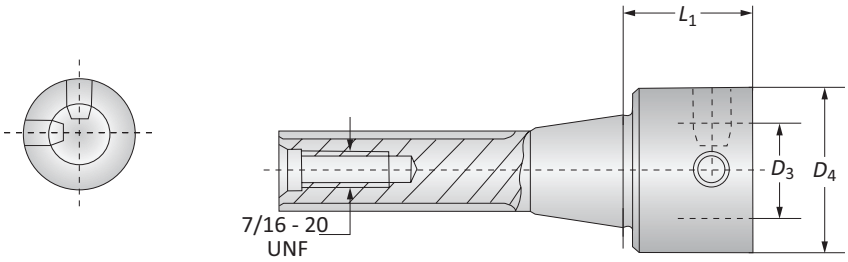


ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

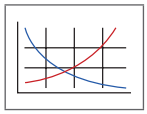
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

R8 Shanks

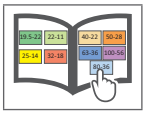


	Connection D_4 | D_3	Shank L_1	Weight	Part No.
i	50 - 28	1.770	2.204 (lbs)	**132022T007166**
m	50 - 28	45.00	1.00 (kg)	**132022T007166**

B10-N: 10-13
Key on B10-H: 1



B10: xii-xiii



i = Imperial (in)
m = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

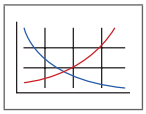
⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Mounting Fixtures

Mounting Fixture		
Code	**Type**	**Part No.**
Basic Body*	–	**098060**
Adapter	30 Taper	**098073**
Adapter	40 Taper	**098061**
Adapter	50 Taper	**098062**
Adapter	HSK-A 32	**098063**
Adapter	HSK-A 40	**098064**
Adapter	HSK-A 50	**098065**
Adapter	HSK-A 63	**098066**
Adapter	HSK-A 80	**098067**
Adapter	HSK-A 100	**098068**
Adapter	PSC 50	**098069**
Adapter	PSC 63	**098070**
Adapter	PSC 80	**098071**

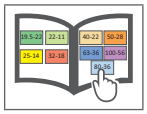
*Basic body and adapters sold separately

B10-N: 10-13



Key on B10-H: 1

B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Notes

Notes

SECTION

B10-I

Clamping Tools

Wohlhaupter™ Clamping Tools

Adapter Sleeves | Drill Chucks | Collet Chucks | Milling Arbors | Holding Arbors | Hydraulic Clamping Chucks
Tapping Chucks | Boring Bar Blanks

Clamping Tools with MVS Connection

Wohlhaupter offers a complete range of tool holders that incorporates the MVS connection. Our clamping tools allow for smaller MVS tools to connect and provide a quick and inexpensive alternative to special tooling. The clamping tools also feature coolant through capabilities.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries

Aerospace

Agriculture

Automotive

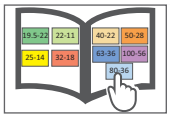
Firearms

General Machining

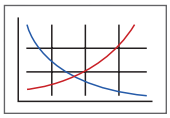
Oil & Gas

Renewable Energy

Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Clamping Tools Table of Contents

Adapter Sleeves for Cylindrical Shanks . . . . . 2 - 3

Drill Chucks 4

Collet Chucks 5

Milling Machine Arbors 6

Holding Arbors for Milling Cutters 7

Clamping Chucks 8

Boring Bar Blanks 9

Accessories for Adapter Sleeves . . . . . 10 - 12

Accessories for Drill Chucks 13

Accessories for Collet Chucks . . . . . 14 - 31

Sealing Disks for Collet Chucks . . . . . 32 - 35

Accessories for Milling Machine Arbors 36

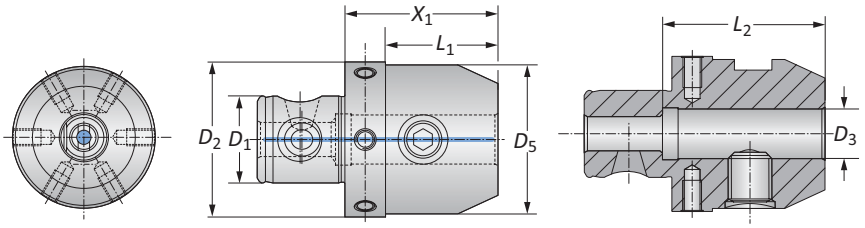
Reducing Sleeves for Hydraulic Clamping Chucks 37

Quick Change Adapters . . . . . 38 - 41

Service Keys for Collet Systems 42

Adapter Side Lock for Cylindrical Shanks DIN 1835B

Clamping Diameter Range: 0.236" - 1.575" (6.00mm - 40.00mm)



MVS Connection D_2 | D_1	Clamping Range D_3	Adapter Sleeve X_1	L_1	L_2	D_5	Weight	Thread Precision	Part No.
32 - 18	0.236	1.417	0.906	1.575	0.984	0.441 (lbs)	M 5x6	**228022**
32 - 18	0.315	1.417	0.906	1.575	1.102	0.441 (lbs)	M 5x6	**228023**
32 - 18	0.394	1.890	–	1.732	1.378	0.661 (lbs)	M 5x6	**228024**
40 - 22	0.472	2.047	–	1.929	1.654	1.102 (lbs)	M 5x8	**228025**
40 - 22	0.551	2.126	–	1.929	1.732	1.323 (lbs)	M 5x8	**228026**
50 - 28	0.236	1.417	0.906	1.575	0.984	0.882 (lbs)	M 6x10	**162015**
50 - 28	0.315	1.417	0.906	1.575	1.102	0.882 (lbs)	M 6x10	**162016**
50 - 28	0.394	1.732	1.220	1.732	1.378	1.102 (lbs)	M 6x10	**162017**
50 - 28	0.472	1.732	1.220	1.929	1.654	1.102 (lbs)	M 6x10	**162018**
50 - 28	0.630	1.929	1.417	2.047	1.890	2.205 (lbs)	M 6x10	**162019**
50 - 28	0.709	1.929	1.417	2.047	1.890	2.205 (lbs)	M 6x10	**228014**
50 - 28	0.787	2.362	–	2.126	2.047	2.646 (lbs)	M 6x10	**162020**
63 - 36	0.787	1.929	1.417	2.126	2.047	2.425 (lbs)	M 6x10	**161024**
63 - 36	0.984	2.953	–	2.323	2.480	4.189 (lbs)	M 6x15	**161026**
63 - 36	1.260	2.953	–	2.480	2.835	4.851 (lbs)	M 6x15	**161027**
80 - 36	1.575	3.346	–	2.874	3.150	5.512 (lbs)	M 6x15	**161028**
32 - 18	6.00	36.00	23.00	40.00	25.00	0.20 (kg)	M 5x6	**228022**
32 - 18	8.00	36.00	23.00	40.00	28.00	0.20 (kg)	M 5x6	**228023**
32 - 18	10.00	48.00	–	44.00	35.00	0.30 (kg)	M 5x6	**228024**
40 - 22	12.00	52.00	–	49.00	42.00	0.50 (kg)	M 5x8	**228025**
40 - 22	14.00	54.00	–	49.00	44.00	0.60 (kg)	M 5x8	**228026**
50 - 28	6.00	36.00	23.00	40.00	25.00	0.40 (kg)	M 6x10	**162015**
50 - 28	8.00	36.00	23.00	40.00	28.00	0.40 (kg)	M 6x10	**162016**
50 - 28	10.00	44.00	31.00	44.00	35.00	0.50 (kg)	M 6x10	**162017**
50 - 28	12.00	44.00	31.00	49.00	42.00	0.50 (kg)	M 6x10	**162018**
50 - 28	16.00	49.00	36.00	52.00	48.00	1.00 (kg)	M 6x10	**162019**
50 - 28	18.00	49.00	36.00	52.00	48.00	1.00 (kg)	M 6x10	**228014**
50 - 28	20.00	60.00	–	54.00	52.00	1.20 (kg)	M 6x10	**162020**
63 - 36	20.00	49.00	36.00	54.00	52.00	1.10 (kg)	M 6x10	**161024**
63 - 36	25.00	75.00	–	59.00	63.00	1.90 (kg)	M 6x15	**161026**
63 - 36	32.00	75.00	–	63.00	72.00	2.20 (kg)	M 6x15	**161027**
80 - 36	40.00	85.00	–	73.00	80.00	2.50 (kg)	M 6x15	**161028**

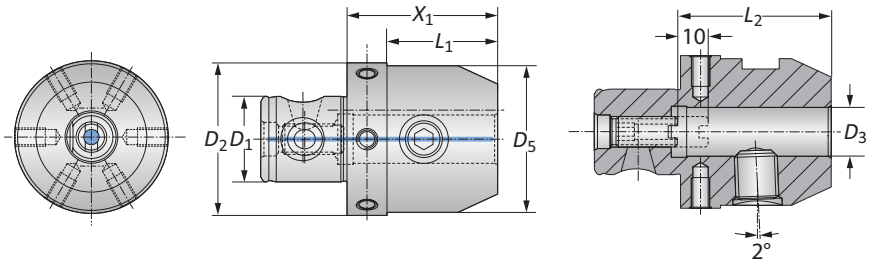
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Adapter Side Lock for Cylindrical Shanks DIN 1835E

Clamping Diameter Range: 0.236" - 1.575" (6.00mm - 40.00mm)



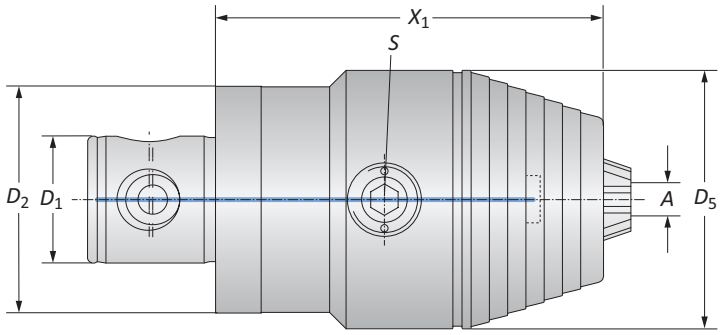
	MVS Connection D_2 | D_1	Clamping Range D_3	Adapter Sleeve X_1	L_1	L_2	D_5	Weight	Thread Precision	Part No.
	32 - 18	0.236	1.417	0.906	1.496	0.984	0.441 (lbs)	M 5x6	**228027**
	32 - 18	0.315	1.417	0.906	1.496	1.102	0.441 (lbs)	M 5x6	**228028**
	32 - 18	0.394	1.890	–	1.654	1.378	0.661 (lbs)	M 5x6	**228029**
	40 - 22	0.472	2.323	–	1.850	1.654	1.323 (lbs)	M 5x8	**228030**
	40 - 22	0.551	2.323	–	1.850	1.732	1.323 (lbs)	M 5x8	**228031**
ⓘ	50 - 28	0.630	1.929	1.417	1.969	1.890	2.205 (lbs)	M 6x10	**209011**
	50 - 28	0.709	1.929	1.417	1.969	1.890	2.205 (lbs)	M 6x10	**228013**
	50 - 28	0.787	2.362	–	2.047	2.047	2.646 (lbs)	M 6x10	**209012**
	63 - 36	0.787	1.929	1.417	2.047	2.047	2.425 (lbs)	M 6x10	**209018**
	63 - 36	0.984	2.953	–	2.244	2.480	4.189 (lbs)	M 6x15	**209019**
	63 - 36	1.260	2.953	–	2.402	2.835	4.851 (lbs)	M 6x15	**209020**
	80 - 36	1.575	3.346	–	2.795	3.150	5.512 (lbs)	M 6x15	**209021**
	32 - 18	6.00	36.00	23.00	38.00	25.00	0.20 (kg)	M 5x6	**228027**
	32 - 18	8.00	36.00	23.00	38.00	28.00	0.20 (kg)	M 5x6	**228028**
	32 - 18	10.00	48.00	–	42.00	35.00	0.30 (kg)	M 5x6	**228029**
	40 - 22	12.00	59.00	–	47.00	42.00	0.60 (kg)	M 5x8	**228030**
	40 - 22	14.00	59.00	–	47.00	44.00	0.60 (kg)	M 5x8	**228031**
ⓜ	50 - 28	16.00	49.00	36.00	50.00	48.00	1.00 (kg)	M 6x10	**209011**
	50 - 28	18.00	49.00	36.00	50.00	48.00	1.00 (kg)	M 6x10	**228013**
	50 - 28	20.00	60.00	–	52.00	52.00	1.20 (kg)	M 6x10	**209012**
	63 - 36	20.00	49.00	36.00	52.00	52.00	1.10 (kg)	M 6x10	**209018**
	63 - 36	25.00	75.00	–	57.00	63.00	1.90 (kg)	M 6x15	**209019**
	63 - 36	32.00	75.00	–	61.00	72.00	2.20 (kg)	M 6x15	**209020**
	80 - 36	40.00	85.00	–	71.00	80.00	2.50 (kg)	M 6x15	**209021**

B10-N: 10-13
Key on B10-I:1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Drill Chucks for Clockwise & Counterclockwise Rotation

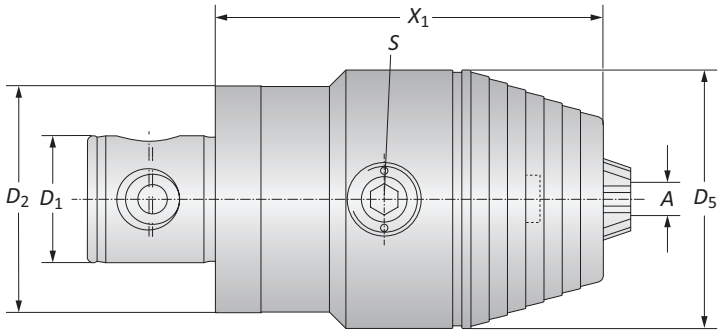
Clamping Diameter Range: 0.019" - 0.629" (0.50mm - 16.00mm)



Balanced | Coolant Through Drill Chucks

	MVS Connection D_2 | D_1	Clamping Range A	Drill Chuck X_1	D_5	S	Weight	Part No.
i	50 - 28	0.019 - 0.511	3.150	1.969	s6 / B	2.646 (lbs)	**209084**
	50 - 28	0.098 - 0.629	3.346	2.244	s6 / B	3.087 (lbs)	**209085**
	63 - 36	0.019 - 0.511	3.150	1.969	s6 / B	3.087 (lbs)	**209086**
	63 - 36	0.098 - 0.629	3.346	2.244	s6 / B	3.528 (lbs)	**208087**
m	50 - 28	0.50 - 13.00	80.00	50.00	s6 / B	1.20 (kg)	**209084**
	50 - 28	2.50 - 16.00	85.00	57.00	s6 / B	1.40 (kg)	**209085**
	63 - 36	0.50 - 13.00	80.00	50.00	s6 / B	1.40 (kg)	**209086**
	63 - 36	2.50 - 16.00	85.00	57.00	s6 / B	1.60 (kg)	**208087**

NOTE: Balance quality G 6.3 at 15,000 RPM. Balanced without clamping nut.



Non-Coolant Drill Chucks

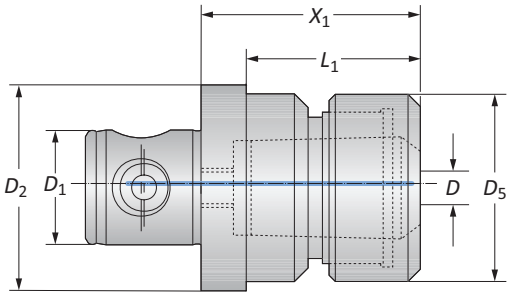
	MVS Connection D_2 | D_1	Clamping Range A	Drill Chuck X_1	D_5	S	Weight	Part No.
i	50 - 28	0.019 - 0.511	3.150	1.969	s6 / B	2.425 (lbs)	**209088**
	50 - 28	0.098 - 0.629	3.346	2.244	s6 / B	2.866 (lbs)	**209089**
	63 - 36	0.019 - 0.511	3.150	1.969	s6 / B	2.866 (lbs)	**209090**
	63 - 36	0.098 - 0.629	3.346	2.244	s6 / B	3.307 (lbs)	**209091**
m	50 - 28	0.50 - 13.00	80.00	50.00	s6 / B	1.10 (kg)	**209088**
	50 - 28	2.50 - 16.00	85.00	57.00	s6 / B	1.30 (kg)	**209089**
	63 - 36	0.50 - 13.00	80.00	50.00	s6 / B	1.30 (kg)	**209090**
	63 - 36	2.50 - 16.00	85.00	57.00	s6 / B	1.50 (kg)	**209091**

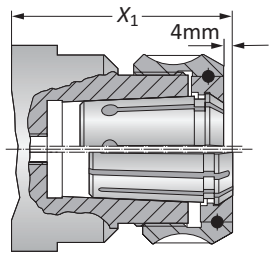
B10-N: 10-13
Key on B10-I: 1
B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

Collet Chucks ISO 10898 (DIN 6388) | ISO 15488 (DIN 6499)

Clamping Diameter Range: 0.078" - 1.259" (2.00mm - 32.00mm)

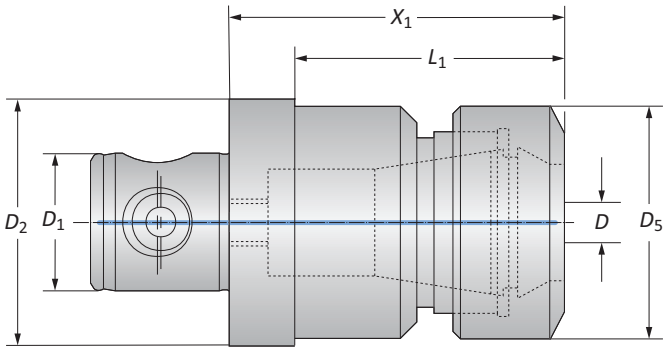




Collet Chucks ISO 10897 (DIN 6388) | Diameter Range: 0.078" - 1.259" (2.00mm - 32.00mm)

	MVS Connection	Clamping Range		Collet Chuck				
	$D_2 \mid D_1$	D	Nominal Size	X_1*	L_1	D_5	Weight	Part No.
ⓘ	40 - 22	0.078 - 0.629	16	2.520	–	1.693	1.102 (lbs)	**209082**
	50 - 28	0.078 - 0.629	16	2.480	1.968	1.693	1.984 (lbs)	**162011**
	50 - 28	0.078 - 0.984	25	2.913	–	2.362	2.205 (lbs)	**209083**
	63 - 36	0.078 - 0.984	25	2.913	–	2.362	3.087 (lbs)	**161016**
	63 - 36	0.157 - 1.259	32	3.504	–	2.835	3.969 (lbs)	**161098**
ⓜ	40 - 22	2.00 - 16.00	16	64.00	–	43.00	0.50 (kg)	**209082**
	50 - 28	2.00 - 16.00	16	63.00	50.00	43.00	0.90 (kg)	**162011**
	50 - 28	2.00 - 25.00	25	74.00	–	60.00	1.00 (kg)	**209083**
	63 - 36	2.00 - 25.00	25	74.00	–	60.00	1.40 (kg)	**161016**
	63 - 36	4.00 - 32.00	32	89.00	–	72.00	1.80 (kg)	**161098**

***X_1** Clamping nut with ball-bearing

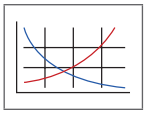


Collet Chucks ISO 15488 (DIN 6499) | Diameter Range: 0.039" - 1.023" (1.00mm - 26.00mm)

	MVS Connection	Clamping Range		Collet Chuck				
	$D_2 \mid D_1$	D	Nominal Size	X_1*	L_1	D_5	Weight	Part No.
ⓘ	32 - 18	0.039 - 0.393	ER 16	2.125	1.614	1.102	0.441 (lbs)	**228020**
	40 - 22	0.078 - 0.629	ER 25	2.953	–	1.654	1.323 (lbs)	**228021**
	50 - 28	0.078 - 0.629	ER 25	2.953	2.441	1.654	1.764 (lbs)	**228003**
	50 - 28	0.078 - 0.787	ER 32	2.992	–	1.969	1.764 (lbs)	**228004**
	63 - 36	0.078 - 0.787	ER 32	2.992	2.480	1.969	2.646 (lbs)	**228007**
	63 - 36	0.157 - 1.023	ER 40	3.465	–	2.480	2.646 (lbs)	**228006**
ⓜ	32 - 18	1.00 - 10.00	ER 16	54.00	4100	28.00	0.20 (kg)	**228020**
	40 - 22	2.00 - 16.00	ER 25	75.00	–	42.00	0.60 (kg)	**228021**
	50 - 28	2.00 - 16.00	ER 25	75.00	62.00	42.00	0.80 (kg)	**228003**
	50 - 28	2.00 - 20.00	ER 32	76.00	–	50.00	0.80 (kg)	**228004**
	63 - 36	2.00 - 20.00	ER 32	76.00	63.00	50.00	1.20 (kg)	**228007**
	63 - 36	4.00 - 26.00	ER 40	88.00	–	63.00	1.20 (kg)	**228006**

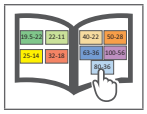
***X_1** Clamping nut with sliding ring

B10-N: 10-13



Key on B10-I-1

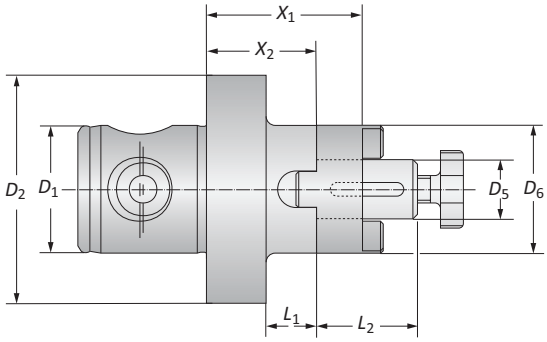
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Milling Machine Arbors

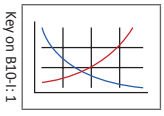
For Milling Cutters with Longitudinal or Transverse Drive | Shell Mill Adapter Range: 0.512" - 1.575" (13.00mm - 40.00mm)



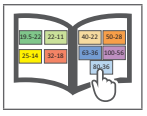
	MVS Connection $D_2 \mid D_1$	Adapter Range D_5	Milling Arbor X_1	X_2	L_1	L_2	D_6	Weight	Part No.
	50 - 28	0.512	1.339	0.945	0.433	0.866	1.024	0.882 (lbs)	**162002**
	50 - 28	0.630	1.575	1.181	0.669	1.063	1.260	1.102 (lbs)	**162003**
	50 - 28	0.866	1.575	1.102	0.591	1.220	1.575	1.323 (lbs)	**162004**
ⓘ	63 - 36	0.630	1.575	1.181	0.669	1.063	1.260	1.764 (lbs)	**161002**
ⓘ	63 - 36	0.866	1.575	1.102	0.591	1.220	1.575	1.984 (lbs)	**161003**
ⓘ	63 - 36	1.063	1.575	1.102	0.591	1.299	1.890	2.425 (lbs)	**161004**
ⓘ	63 - 36	1.260	1.575	1.024	0.512	1.496	2.283	2.866 (lbs)	**161005**
ⓘ	80 - 36	1.575	2.087	1.535	–	1.614	2.756*	5.733 (lbs)	**161006**
	50 - 28	13.00	34.00	24.00	11.00	22.00	26.00	0.40 (kg)	**162002**
	50 - 28	16.00	40.00	30.00	17.00	27.00	32.00	0.50 (kg)	**162003**
	50 - 28	22.00	40.00	28.00	15.00	31.00	40.00	0.60 (kg)	**162004**
ⓜ	63 - 36	16.00	40.00	30.00	17.00	27.00	32.00	0.80 (kg)	**161002**
ⓜ	63 - 36	22.00	40.00	28.00	15.00	31.00	40.00	0.90 (kg)	**161003**
ⓜ	63 - 36	27.00	40.00	28.00	15.00	33.00	48.00	1.10 (kg)	**161004**
ⓜ	63 - 36	32.00	40.00	26.00	13.00	38.00	58.00	1.30 (kg)	**161005**
ⓜ	80 - 36	40.00	53.00	39.00	–	41.00	70.00*	2.60 (kg)	**161006**

*Ø 2.756" (70.00mm) with clutch drive ring

B10-N: 10-13



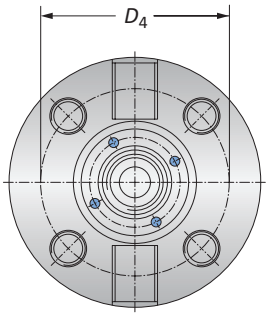
B10: xii-xiii

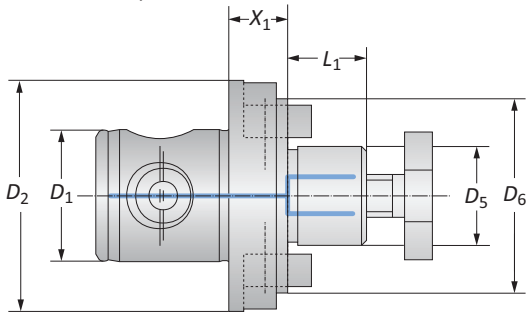


ⓘ = Imperial (in)
ⓜ = Metric (mm)

Holding Arbors for Milling Cutters

Central Coolant Feed | Shell Mill Adapter Range: 0.630" - 1.575" (16.00mm - 40.00mm)





	MVS Connection D_2 | D_1	Adapter Range D_5	Holding Arbor X_1	L_1	D_4	D_6	Weight	Part No.
	50 - 28	0.630	0.630	0.669	–	1.575	0.882 (lbs)	**162032**
	50 - 28	0.866	0.630	0.748	–	1.969	1.102 (lbs)	**162033**
i	63 - 36	1.063	0.630	0.827	–	2.362	1.764 (lbs)	**161082**
	80 - 36	1.260	0.630	0.945	–	3.071	2.425 (lbs)	**209080**
	80 - 36	1.575	0.748	1.063	2.626	3.504	3.307 (lbs)	**209081**
	50 - 28	16.00	16.00	17.00	–	40.00	0.40 (kg)	**162032**
	50 - 28	22.00	16.00	19.00	–	50.00	0.50 (kg)	**162033**
m	63 - 36	27.00	16.00	21.00	–	60.00	0.80 (kg)	**161082**
	80 - 36	32.00	16.00	24.00	–	78.00	1.10 (kg)	**209080**
	80 - 36	40.00	19.00	27.00	66.70	89.00	1.50 (kg)	**209081**

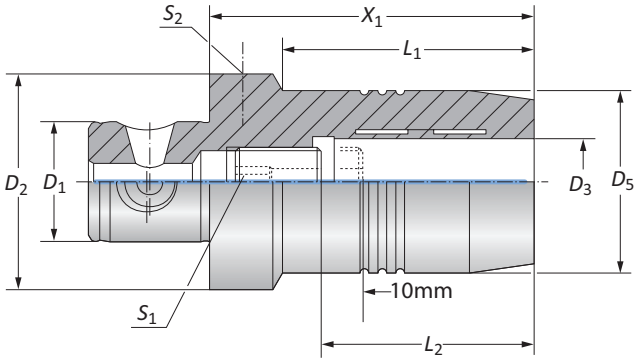
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

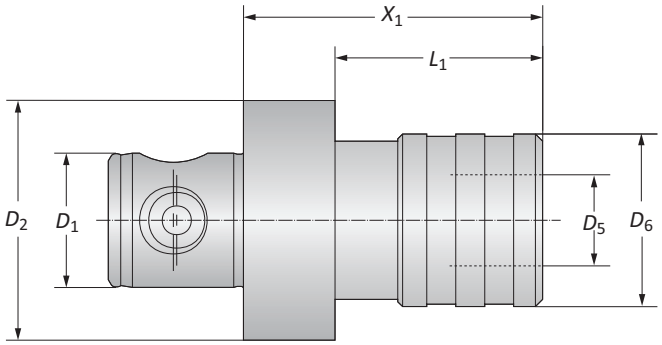
Clamping Chucks | Tapping Chucks

Clamping Range: 0.787" (20.00mm)



Coolant Through Hydraulic Clamping Chucks

	MVS Connection	Clamping Range	Clamping Chuck							
	$D_2 \mid D_1$	D_3	X_1	D_5	L_1	L_2	S_1	S_2	Weight	Part No.
ⓘ	50 - 28	0.787	2.953	1.654	2.283	2.008	s6	s5	1.764 (lbs)	**209044**
	63 - 36	0.787	2.953	1.654	2.283	2.008	s5	s5	2.425 (lbs)	**209045**
ⓜ	50 - 28	20.00	75.00	42.00	58.00	51.00	s6	s5	0.80 (kg)	**209044**
	63 - 36	20.00	75.00	42.00	58.00	51.00	s5	s5	1.10 (kg)	**209045**



Tapping Chucks (Non-Coolant)

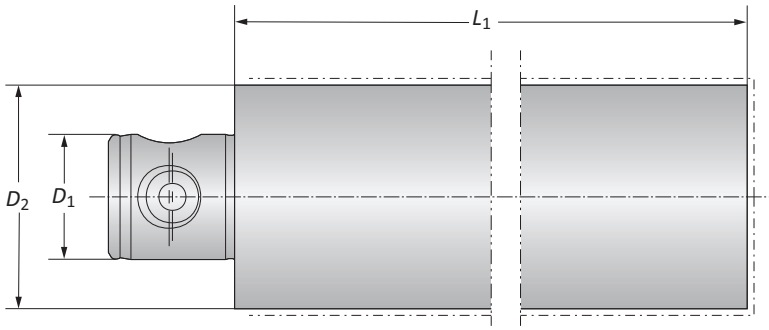
	MVS Connection	Quick Change Adapters		Tapping Chucks				Length Compensation			
	$D_2 \mid D_1$	For Taps	Nominal Size	X_1	L_1	D_5	D_6	Pressure	Tension	Weight	Part No.
ⓘ	40 - 22	M 3 - M 12	1	2.441	1.929	0.748	1.634	0.295	0.295	1.323 (lbs)	**209097**
	50 - 28	M 3 - M 12	1	2.441	1.929	0.748	1.634	0.295	0.295	1.543 (lbs)	**209098**
	50 - 28	M 6 - M 20	2	3.701	–	1.220	2.374	0.394	0.394	2.425 (lbs)	**209099**
	63 - 36	M 3 - M 12	1	2.205	1.693	0.748	1.634	0.295	0.295	1.764 (lbs)	**231005**
	80 - 36	M 6 - M 20	2	3.150	2.638	1.220	2.374	0.394	0.394	2.866 (lbs)	**231006**
	80 - 36	M 14 - M 33	3	5.984	–	1.890	3.386	0.689	0.689	9.040 (lbs)	**231007**
ⓜ	40 - 22	M 3 - M 12	1	62.00	49.00	19.00	41.50	7.50	7.50	0.60 (kg)	**209097**
	50 - 28	M 3 - M 12	1	62.00	49.00	19.00	41.50	7.50	7.50	0.70 (kg)	**209098**
	50 - 28	M 6 - M 20	2	94.00	–	31.00	60.30	10.00	10.00	1.10 (kg)	**209099**
	63 - 36	M 3 - M 12	1	56.00	43.00	19.00	41.50	7.50	7.50	0.80 (kg)	**231005**
	80 - 36	M 6 - M 20	2	80.00	67.00	31.00	60.30	10.00	10.00	1.30 (kg)	**231006**
	80 - 36	M 14 - M 33	3	152.00	–	48.00	86.00	17.50	17.50	4.10 (kg)	**231007**

B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

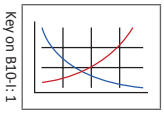
Boring Bar Blanks



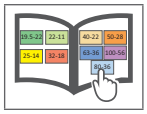
	MVS Connection D_2 | D_1	Boring Bar Blanks L_1	Weight	Part No.
ⓘ	50 - 28	6.299	5.733 (lbs)	**166103**
ⓘ	63 - 36	6.299	9.261 (lbs)	**166104**
ⓘ	80 - 36	6.299	14.550 (lbs)	**166105**
ⓜ	50 - 28	160.00	2.60 (kg)	**166103**
ⓜ	63 - 36	160.00	4.20 (kg)	**166104**
ⓜ	80 - 36	160.00	6.60 (kg)	**166105**

B10-N: 10-13

Key on B10-I: 1

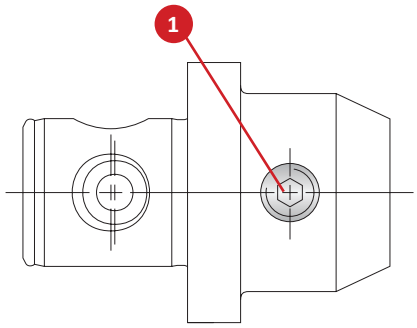


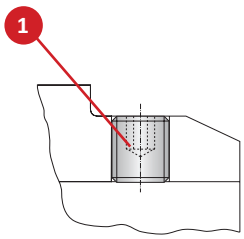
B10: xii-xiii

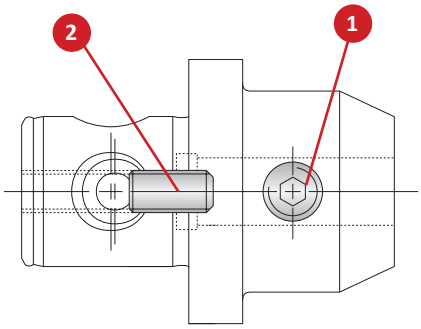


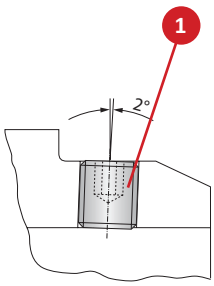
ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Adapter Sleeves



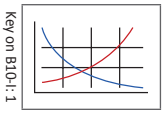




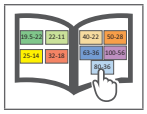


	Clamping Diameter	1 Thread Pin Part No.	1 Thread Pin Service Key	2 Thread Pin Part No.	2 Thread Pin Service Key	2 Thread Pin Thread
	0.236	**115680**	s3 / B	**415562**	s2.5 / B	M 5
	0.315	**115681**	s4 / B	**215863**	s3 / B	M 6
	0.394	**115682**	s5 / B	**215863**	s3 / B	M 6
	0.472	**115683**	s6 / B	**415563**	s4 / B	M 8
	0.551	**115683**	s6 / B	**415563**	s4 / B	M 8
	0.630	**115684**	s6 / B	**215849**	s5 / B	M 10
	0.709	**115684**	s6 / B	**215849**	s5 / B	M 10
ⓘ	0.787	**115685**	s8 / B	**215849**	s5 / B	M 10
	0.787	**115685**	s8 / B	**215865**	s8 / B	M 16
	0.984	**115686**	s10 / B	**215527**	s5 / B	M 10
	0.984	**115686**	s10 / B	**215865**	s8 / B	M 16
	1.260	**115687**	s10 / B	**215527**	s5 / B	M 10
	1.260	**115687**	s10 / B	**215865**	s8 / B	M 16
	1.575	**115687**	s10 / B	**215527**	s5 / B	M 10
	1.575	**115687**	s10 / B	**215865**	s8 / B	M 16
	6.00	**115680**	s3 / B	**415562**	s2.5 / B	M 5
	8.00	**115681**	s4 / B	**215863**	s3 / B	M 6
	10.00	**115682**	s5 / B	**215863**	s3 / B	M 6
	12.00	**115683**	s6 / B	**415563**	s4 / B	M 8
	14.00	**115683**	s6 / B	**415563**	s4 / B	M 8
	16.00	**115684**	s6 / B	**215849**	s5 / B	M 10
	18.00	**115684**	s6 / B	**215849**	s5 / B	M 10
ⓜ	20.00	**115685**	s8 / B	**215849**	s5 / B	M 10
	20.00	**115685**	s8 / B	**215865**	s8 / B	M 16
	25.00	**115686**	s10 / B	**215527**	s5 / B	M 10
	25.00	**115686**	s10 / B	**215865**	s8 / B	M 16
	32.00	**115687**	s10 / B	**215527**	s5 / B	M 10
	32.00	**115687**	s10 / B	**215865**	s8 / B	M 16
	40.00	**115687**	s10 / B	**215527**	s5 / B	M 10
	40.00	**115687**	s10 / B	**215865**	s8 / B	M 16

B10-N: 10-13
Key on B10-I: 1



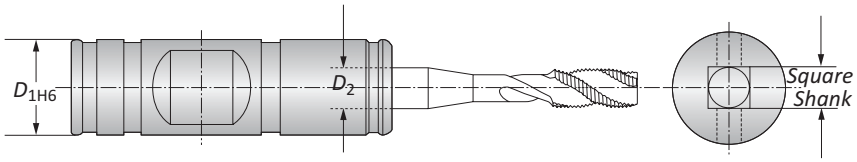
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Adapter Sleeves

Adapter Sleeve for Tap Shanks Suitable for Reduction Sleeves



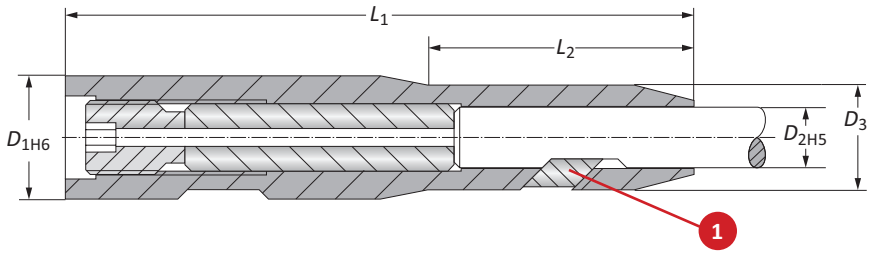
	Adapter Sleeves		
	D_{1H6}	D_2 x Square Shank	Part No.
ⓘ	0.315	0.082 x 0.098	**271190**
	0.315	0.082 x 0.110	**271191**
	0.394	0.106 x 0.137	**271192**
	0.394	0.118 x 0.157	**271193**
	0.394	0.133 x 0.177	**271194**
	0.472	0.192 x 0.236	**271195**
	0.551	0.216 x 0.275	**271196**
	0.551	0.244 x 0.314	**271197**
	0.630	0.275 x 0.354	**271198**
	0.630	0.314 x 0.393	**271199**
	0.709	0.354 x 0.433	**271200**
	0.787	0.354 x 0.472	**271201**
	0.984	0.433 x 0.551	**271202**
	0.984	0.472 x 0.629	**271203**
	1.260	0.570 x 0.708	**271204**
	1.260	0.629 x 0.787	**271205**
	1.260	0.708 x 0.866	**271206**
	1.575	0.866 x 0.984	**271207**
	1.575	0.866 x 1.102	**271208**
	1.969	0.944 x 1.259	**271209**
	1.969	1.141 x 1.417	**271210**
	1.969	1.259 x 1.574	**271211**
ⓜ	8.00	2.10 x 2.50	**271190**
	8.00	2.10 x 2.80	**271191**
	10.00	2.70 x 3.50	**271192**
	10.00	3.00 x 4.00	**271193**
	10.00	3.40 x 4.50	**271194**
	12.00	4.90 x 6.00	**271195**
	14.00	5.50 x 7.00	**271196**
	14.00	6.20 x 8.00	**271197**
	16.00	7.00 x 9.00	**271198**
	16.00	8.00 x 10.00	**271199**
	18.00	9.00 x 11.00	**271200**
	20.00	9.00 x 12.00	**271201**
	25.00	11.00 x 14.00	**271202**
	25.00	12.00 x 16.00	**271203**
	32.00	14.50 x 18.00	**271204**
	32.00	16.00 x 20.00	**271205**
	32.00	18.00 x 22.00	**271206**
	40.00	22.00 x 25.00	**271207**
	40.00	22.00 x 28.00	**271208**
	50.00	24.00 x 32.00	**271209**
	50.00	29.00 x 36.00	**271210**
	50.00	32.00 x 40.00	**271211**

B10-N: 10-13
Key on B10-I-1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Adapter Sleeves

Micro Clamping Chucks Suitable for Reduction Sleeves



	Micro Clamping Chuck					1 Clamping Wedge	
	D_{1H6}	D_{2H5}	D_3	L_1	L_2	Part No.	Part No.
ⓘ	0.630	0.236	0.472	3.937	1.575	**219170**	**219070**
	0.630	0.315	0.551	3.937	1.772	**219171**	**219071**
	0.787	0.394	0.669	3.937	1.693	**219172**	**219072**
	0.984	0.472	0.787	4.331	1.535	**219173**	**219073**
	0.984	0.551	0.866	4.331	1.811	**219174**	**219074**
	1.260	0.630	0.984	4.921	1.772	**219174**	**219075**
	1.260	0.709	1.063	5.118	2.126	**219174**	**219076**
	1.260	0.787	1.181	5.118	2.441	**219175**	**219077**
ⓜ	16.00	6.00	12.00	100.00	40.00	**219170**	**219170**
	16.00	8.00	14.00	100.00	45.00	**219171**	**219171**
	20.00	10.00	17.00	100.00	43.00	**219172**	**219172**
	25.00	12.00	20.00	110.00	39.00	**219173**	**219073**
	25.00	14.00	22.00	110.00	46.00	**219174**	**219074**
	32.00	16.00	25.00	125.00	45.00	**219174**	**219075**
	32.00	18.00	27.00	130.00	54.00	**219174**	**219076**
	32.00	20.00	30.00	130.00	62.00	**219175**	**219077**

NOTE: Clamping chucks are used in reduction sleeves for clamping tools with cylindrical shanks to DIN 1835-B (Fig. 1). The chucks' design allows the use of standard tools versus ordering special tools (Fig. 2).

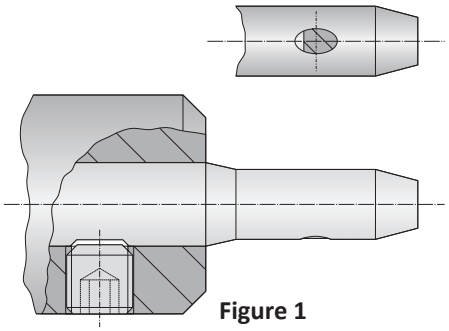


Figure 1

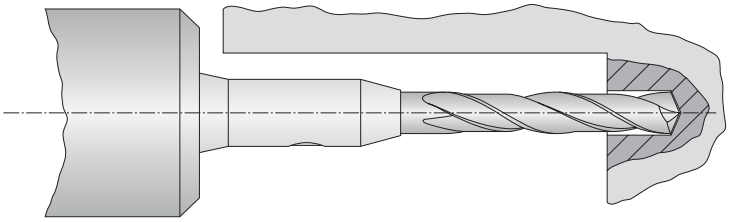


Figure 2

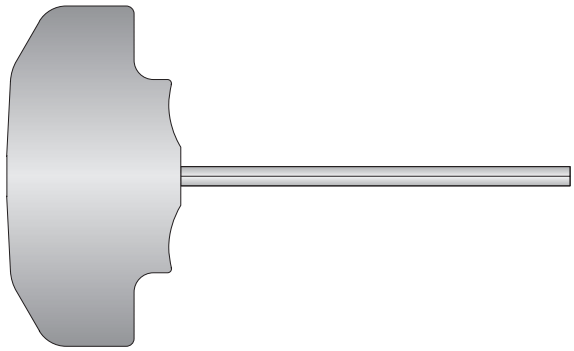
B10-N: 10-13
Key on B10-I: 1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Drill Chucks

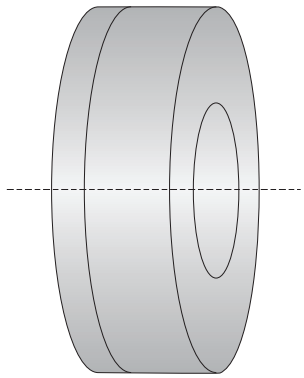
Service Keys for Drill Chucks

Service Key		Tightening Torque Nm	
Service Key	Type		Part No.
2.50	B	15	**415577**
6.00	B	15	**115578**



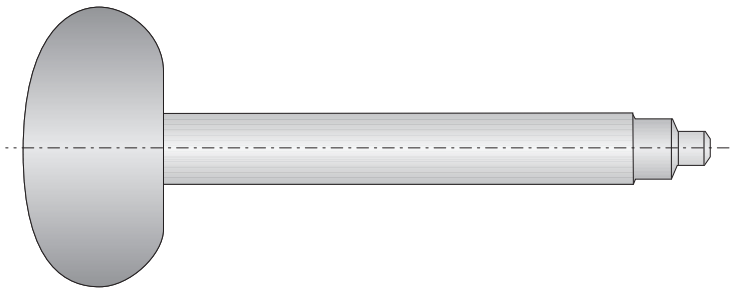
Gaskets for Drill Chucks

	Gasket		
	Gasket Diameter	Clamping Diameter	Part No.
i	0.118 - 0.236	0.019 - 0.511	**387113**
i	0.236 - 0.511	0.019 - 0.511	**387114**
i	0.118 - 0.236	0.098 - 0.629	**387115**
i	0.236 - 0.629	0.098 - 0.629	**387116**
m	3.00 - 6.00	0.50 - 13.00	**387113**
m	6.00 - 13.00	0.50 - 13.00	**387114**
m	3.00 - 6.00	2.50 - 16.00	**387115**
m	6.00 - 16.00	2.50 - 16.00	**387116**

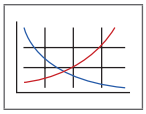


Assembly Tool for Gasket

Part No.
387112

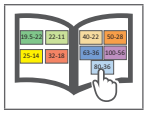


B10-N: 10-13



Key on B10-I:1

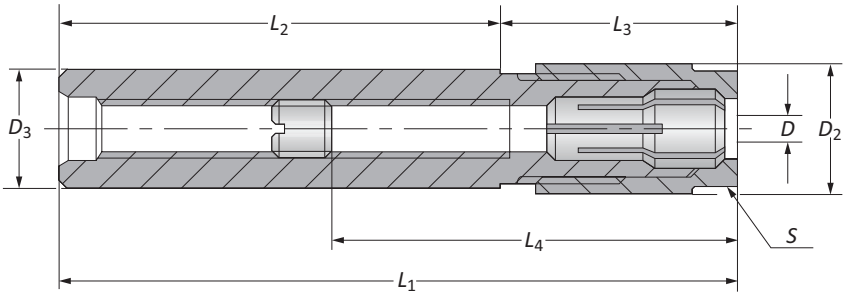
B10: xii-xiii



i = Imperial (in)
m = Metric (mm)

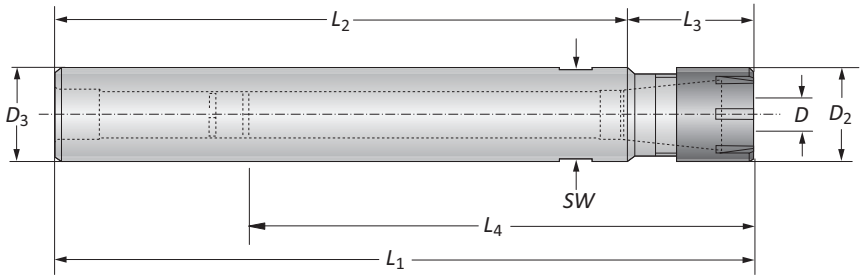
Collet Chucks for Erickson System | Cylindrical Collet Chucks for ISO 15488 (DIN 6499) Collets

Diameter Range: 0.039" - 0.393" (1.00mm - 10.00mm)



Collet Chucks for Erickson System

	Nominal Size	Clamping Range D	Collet Chuck D_2	D_3	L_1	L_2	L_3	$L_{4\ Min}$	$L_{4\ Max}$	Service Key S	Weight	Part No.
i	6	0.039 - 0.255	0.551	0.492	4.409	2.992	1.417	1.654	3.976	13	0.441 (lbs)	**162080**
i	6	0.039 - 0.255	0.551	0.492	6.929	5.512	1.417	1.654	4.016	13	0.441 (lbs)	**162081**
i	10	0.039 - 0.393	0.827	0.787	4.724	2.992	1.732	1.535	4.213	19	0.661 (lbs)	**162082**
i	10	0.039 - 0.393	0.827	0.787	7.244	5.512	1.732	1.535	4.685	19	0.661 (lbs)	**162083**
m	6	1.00 - 6.50	14.00	12.50	112.00	76.00	36.00	42.00	101.00	13	0.20 (kg)	**162080**
m	6	1.00 - 6.50	14.00	12.50	176.00	140.00	36.00	42.00	102.00	13	0.20 (kg)	**162081**
m	10	1.00 - 10.00	21.00	20.00	120.00	76.00	44.00	39.00	107.00	19	0.30 (kg)	**162082**
m	10	1.00 - 10.00	21.00	20.00	184.00	140.00	44.00	39.00	119.00	19	0.30 (kg)	**162083**



Cylindrical Collet Chucks for ISO 15488 (DIN 6499) Collets

	Nominal Size	Collet Chuck D	D_2	D_3	L_1	L_2	L_3	$L_{4\ Min}$	$L_{4\ Max}$	Hex Size SW	Part No.
i	ER 8	0.039 - 0.196	0.472	0.315	4.961	3.937	1.024	1.437	1.437	09	**209054**
i	ER 8	0.039 - 0.196	0.472	0.472	6.535	5.512	1.024	1.437	1.437	09	**209055**
i	ER 11	0.039 - 0.275	0.630	0.630	4.193	3.150	1.043	0.906	2.559	11	**209056**
i	ER 11	0.039 - 0.275	0.630	0.630	6.555	5.512	1.043	0.906	2.559	11	**209057**
i	ER 16	0.039 - 0.393	0.866	0.787	4.665	3.150	1.516	1.299	4.016	17	**209058**
i	ER 16	0.039 - 0.393	0.866	0.787	7.028	5.512	1.516	1.299	4.843	17	**209059**
m	ER 8	1.00 - 5.00	12.00	8.00	126.00	100.00	26.00	36.50	36.50	09	**209054**
m	ER 8	1.00 - 5.00	12.00	12.00	166.00	140.00	26.00	36.50	36.50	09	**209055**
m	ER 11	1.00 - 7.00	16.00	16.00	106.50	80.00	26.50	23.00	65.00	11	**209056**
m	ER 11	1.00 - 7.00	16.00	16.00	166.50	140.00	26.50	23.00	65.00	11	**209057**
m	ER 16	1.00 - 10.00	22.00	20.00	118.50	80.00	38.50	33.00	102.00	17	**209058**
m	ER 16	1.00 - 10.00	22.00	20.00	178.50	140.00	38.50	33.00	123.00	17	**209059**

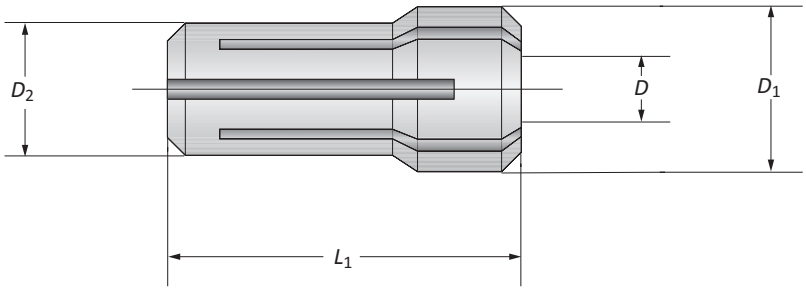
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

Accessories for Collet Chucks

Diameter Range: 0.019" - 0.393" (0.50mm - 10.00mm)



Collet Sets for Erickson System

	Nominal Size	Standard-No.	Set D_1	Set D_2	Set L_1	Set D	Part No.
ⓘ	6	416 E	0.374	0.300	1.004	0.019 - 0.236	**071016**
ⓘ	10	417 E	0.531	0.450	1.197	0.019 - 0.393	**071017**
ⓜ	6	416 E	9.50	7.62	25.50	0.50 - 6.00	**071016**
ⓜ	10	417 E	13.50	11.43	30.40	0.50 - 10.00	**071017**

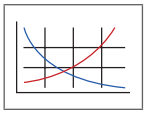
Collets for Erickson System

	Collet Nominal Size	Diameter Range D	Part No.
ⓘ	6	0.020 - 0.039	**071355**
ⓘ	6	0.039 - 0.059	**071356**
ⓘ	6	0.059 - 0.079	**071357**
ⓘ	6	0.079 - 0.098	**071358**
ⓘ	6	0.098 - 0.118	**071359**
ⓘ	6	0.118 - 0.138	**071360**
ⓘ	6	0.138 - 0.157	**071361**
ⓘ	6	0.157 - 0.177	**071362**
ⓘ	6	0.177 - 0.197	**071363**
ⓘ	6	0.197 - 0.217	**071364**
ⓘ	6	0.217 - 0.236	**071365**
ⓘ	10	0.020 - 0.039	**071368**
ⓘ	10	0.039 - 0.059	**071369**
ⓘ	10	0.059 - 0.079	**071370**
ⓘ	10	0.079 - 0.098	**071371**
ⓘ	10	0.098 - 0.118	**071372**
ⓘ	10	0.118 - 0.138	**071373**
ⓘ	10	0.139 - 0.157	**071374**
ⓘ	10	0.157 - 0.177	**071375**
ⓘ	10	0.177 - 0.197	**071376**
ⓘ	10	0.197 - 0.217	**071377**
ⓘ	10	0.217 - 0.236	**071378**
ⓘ	10	0.236 - 0.256	**071379**
ⓘ	10	0.256 - 0.276	**071380**
ⓘ	10	0.276 - 0.295	**071381**
ⓘ	10	0.295 - 0.315	**071382**
ⓘ	10	0.315 - 0.335	**071383**
ⓘ	10	0.335 - 0.354	**071384**
ⓘ	10	0.354 - 0.374	**071385**
ⓘ	10	0.374 - 0.394	**071681**

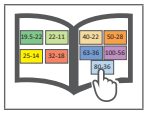
Collets for Erickson System

	Collet Nominal Size	Diameter Range D	Part No.
ⓜ	6	0.50 - 1.00	**071355**
ⓜ	6	1.00 - 1.50	**071356**
ⓜ	6	1.50 - 2.00	**071357**
ⓜ	6	2.00 - 2.50	**071358**
ⓜ	6	2.50 - 3.00	**071359**
ⓜ	6	3.00 - 3.50	**071360**
ⓜ	6	3.50 - 4.00	**071361**
ⓜ	6	4.00 - 4.50	**071362**
ⓜ	6	4.50 - 5.00	**071363**
ⓜ	6	5.00 - 5.50	**071364**
ⓜ	6	5.50 - 6.00	**071365**
ⓜ	10	0.50 - 1.00	**071368**
ⓜ	10	1.00 - 1.50	**071369**
ⓜ	10	1.50 - 2.00	**071370**
ⓜ	10	2.00 - 2.50	**071371**
ⓜ	10	2.50 - 3.00	**071372**
ⓜ	10	3.00 - 3.50	**071373**
ⓜ	10	3.50 - 4.00	**071374**
ⓜ	10	4.00 - 4.50	**071375**
ⓜ	10	4.50 - 5.00	**071376**
ⓜ	10	5.00 - 5.50	**071377**
ⓜ	10	5.50 - 6.00	**071378**
ⓜ	10	6.00 - 6.50	**071379**
ⓜ	10	6.50 - 7.00	**071380**
ⓜ	10	7.00 - 7.50	**071381**
ⓜ	10	7.50 - 8.00	**071382**
ⓜ	10	8.00 - 8.50	**071383**
ⓜ	10	8.50 - 9.00	**071384**
ⓜ	10	9.00 - 9.50	**071385**
ⓜ	10	9.50 - 10.00	**071681**

B10-N: 10-13
Key on B10-I-1



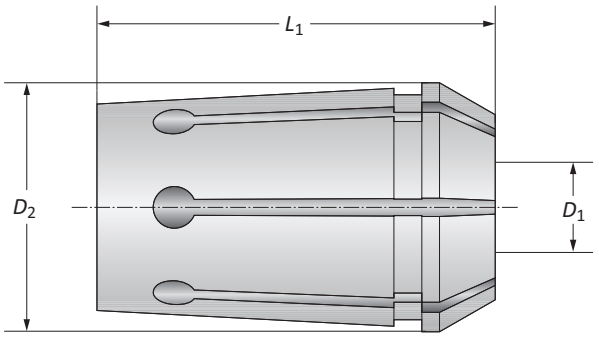
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks

ISO 10897-A (DIN 6388-A)



Collet Sets

	Nominal Size	Standard-No.	Set D_2	Set L_1	Set D_1	Part No.
ⓘ	A 16	410 E	0.891	1.574	0.078 - 0.629	**071003**
ⓘ	A 25	444 E	1.295	2.047	0.078 - 0.984	**071004**
ⓘ	A 32	450 E	1.625	2.362	0.157 - 1.259	**071019**
ⓜ	A 16	410 E	22.65	40.00	2.00 - 16.00	**071003**
ⓜ	A 25	444 E	32.90	52.00	2.00 - 25.00	**071004**
ⓜ	A 32	450 E	41.30	60.00	4.00 - 32.00	**071019**

Collets

	Nominal Size	Diameter D_1	Part No.
	A 16	0.079	**071140**
	A 16	0.098	**071141**
	A 16	0.118	**071142**
	A 16	0.138	**071143**
	A 16	0.157	**071144**
	A 16	0.177	**071145**
	A 16	0.197	**071146**
	A 16	0.217	**071147**
	A 16	0.236	**071148**
	A 16	0.256	**071149**
	A 16	0.276	**071150**
	A 16	0.295	**071151**
	A 16	0.315	**071152**
	A 16	0.335	**071153**
ⓘ	A 16	0.354	**071154**
	A 16	0.374	**071155**
	A 16	0.394	**071156**
	A 16	0.413	**071157**
	A 16	0.433	**071158**
	A 16	0.453	**071159**
	A 16	0.472	**071160**
	A 16	0.492	**071161**
	A 16	0.512	**071162**
	A 16	0.531	**071163**
	A 16	0.551	**071164**
	A 16	0.571	**071165**
	A 16	0.591	**071166**
	A 16	0.610	**071167**
	A 16	0.630	**071168**

Collets

	Nominal Size	Diameter D_1	Part No.
	A 16	2.00	**071140**
	A 16	2.50	**071141**
	A 16	3.00	**071142**
	A 16	3.50	**071143**
	A 16	4.00	**071144**
	A 16	4.50	**071145**
	A 16	5.00	**071146**
	A 16	5.50	**071147**
	A 16	6.00	**071148**
	A 16	6.50	**071149**
	A 16	7.00	**071150**
	A 16	7.50	**071151**
	A 16	8.00	**071152**
	A 16	8.50	**071153**
ⓜ	A 16	9.00	**071154**
	A 16	9.50	**071155**
	A 16	10.00	**071156**
	A 16	10.50	**071157**
	A 16	11.00	**071158**
	A 16	11.50	**071159**
	A 16	12.00	**071160**
	A 16	12.50	**071161**
	A 16	13.00	**071162**
	A 16	13.50	**071163**
	A 16	14.00	**071164**
	A 16	14.50	**071165**
	A 16	15.00	**071166**
	A 16	15.50	**071167**
	A 16	16.00	**071168**

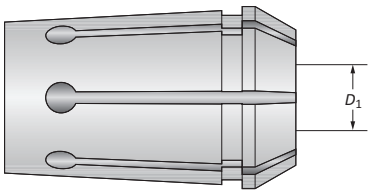
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks

ISO 10897-A (DIN 6388-A)



Collets

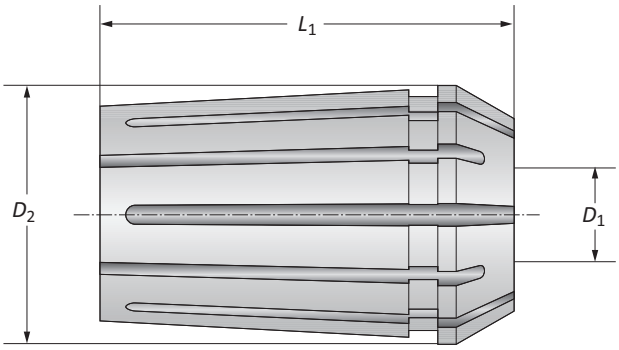
Nominal Size	Diameter D_1	Part No.
A 25	0.078	**071169**
A 25	0.118	**071170**
A 25	0.157	**071171**
A 25	0.196	**071172**
A 25	0.236	**071173**
A 25	0.275	**071174**
A 25	0.315	**071175**
A 25	0.354	**071176**
A 25	0.393	**071177**
A 25	0.433	**071178**
A 25	0.472	**071179**
A 25	0.511	**071180**
A 25	0.551	**071181**
A 25	0.590	**071182**
A 25	0.629	**071183**
A 25	0.669	**071184**
A 25	0.708	**071185**
A 25	0.748	**071186**
A 25	0.787	**071187**
A 25	0.826	**071188**
A 25	0.866	**071189**
A 25	0.905	**071190**
A 25	0.944	**071191**
A 25	0.984	**071192**
A 32	0.157	**071612**
A 32	0.196	**071419**
A 32	0.236	**071420**
A 32	0.275	**071613**
A 32	0.315	**071421**
A 32	0.354	**071614**
A 32	0.393	**071422**
A 32	0.433	**071666**
A 32	0.472	**071423**
A 32	0.511	**071667**
A 32	0.551	**071668**
A 32	0.590	**071669**
A 32	0.629	**071424**
A 32	0.669	**071670**
A 32	0.708	**071665**
A 32	0.748	**071671**
A 32	0.787	**071416**
A 32	0.826	**071672**
A 32	0.866	**071673**
A 32	0.905	**071674**
A 32	0.944	**071675**
A 32	0.984	**071417**
A 32	1.023	**071676**
A 32	1.063	**071677**
A 32	1.102	**071678**
A 32	1.141	**071679**
A 32	1.181	**071633**
A 32	1.220	**071680**
A 32	1.259	**071418**

Collets

Nominal Size	Diameter D_1	Part No.
A 25	2.00	**071169**
A 25	3.00	**071170**
A 25	4.00	**071171**
A 25	5.00	**071172**
A 25	6.00	**071173**
A 25	7.00	**071174**
A 25	8.00	**071175**
A 25	9.00	**071176**
A 25	10.00	**071177**
A 25	11.00	**071178**
A 25	12.00	**071179**
A 25	13.00	**071180**
A 25	14.00	**071181**
A 25	15.00	**071182**
A 25	16.00	**071183**
A 25	17.00	**071184**
A 25	18.00	**071185**
A 25	19.00	**071186**
A 25	20.00	**071187**
A 25	21.00	**071188**
A 25	22.00	**071189**
A 25	23.00	**071190**
A 25	24.00	**071191**
A 25	25.00	**071192**
A 32	4.00	**071612**
A 32	5.00	**071419**
A 32	6.00	**071420**
A 32	7.00	**071613**
A 32	8.00	**071421**
A 32	9.00	**071614**
A 32	10.00	**071422**
A 32	11.00	**071666**
A 32	12.00	**071423**
A 32	13.00	**071667**
A 32	14.00	**071668**
A 32	15.00	**071669**
A 32	16.00	**071424**
A 32	17.00	**071670**
A 32	18.00	**071665**
A 32	19.00	**071671**
A 32	20.00	**071416**
A 32	21.00	**071672**
A 32	22.00	**071673**
A 32	23.00	**071674**
A 32	24.00	**071675**
A 32	25.00	**071417**
A 32	26.00	**071676**
A 32	27.00	**071677**
A 32	28.00	**071678**
A 32	29.00	**071679**
A 32	30.00	**071633**
A 32	31.00	**071680**
A 32	32.00	**071418**

Accessories for Collet Chucks

ISO 10897-B (DIN 6388-B)



Collet Sets

	Nominal Size	Standard-No.	Set D_2	Set L_1	Set D_1	Part No.
ⓘ	B 16	415 E	0.892	1.575	0.059 - 0.630	**071005**
ⓘ	B 16	462 E	1.295	2.047	0.138 - 0.984	**071006**
ⓘ	B 16	467 E	1.626	2.362	0.217 - 1.260	**071022**
ⓜ	B 16	415 E	22.65	40.00	1.50 - 16.00	**071005**
ⓜ	B 16	462 E	32.90	52.00	3.50 - 25.00	**071006**
ⓜ	B 16	467 E	41.30	60.00	5.50 - 32.00	**071022**

Collets

	Nominal Size	Diameter D_1	Part No.
	B 16	0.059 - 0.079	**071625**
	B 16	0.079 - 0.098	**071626**
	B 16	0.098 - 0.118	**071621**
	B 16	0.118 - 0.138	**071622**
	B 16	0.138 - 0.157	**071193**
	B 16	0.157 - 0.177	**071194**
	B 16	0.177 - 0.197	**071195**
	B 16	0.197 - 0.217	**071196**
	B 16	0.217 - 0.236	**071197**
	B 16	0.236 - 0.256	**071198**
	B 16	0.256 - 0.276	**071199**
	B 16	0.276 - 0.295	**071200**
	B 16	0.295 - 0.315	**071201**
	B 16	0.315 - 0.335	**071202**
ⓘ	B 16	0.335 - 0.354	**071203**
	B 16	0.354 - 0.374	**071204**
	B 16	0.374 - 0.394	**071205**
	B 16	0.394 - 0.413	**071206**
	B 16	0.413 - 0.433	**071207**
	B 16	0.433 - 0.453	**071208**
	B 16	0.453 - 0.472	**071209**
	B 16	0.472 - 0.492	**071210**
	B 16	0.492 - 0.512	**071211**
	B 16	0.512 - 0.531	**071212**
	B 16	0.531 - 0.551	**071213**
	B 16	0.551 - 0.571	**071214**
	B 16	0.571 - 0.591	**071215**
	B 16	0.591 - 0.610	**071216**
	B 16	0.610 - 0.630	**071217**

Collets

	Nominal Size	Diameter D_1	Part No.
	B 16	1.50 - 2.00	**071625**
	B 16	2.00 - 2.50	**071626**
	B 16	2.50 - 3.00	**071621**
	B 16	3.00 - 3.50	**071622**
	B 16	3.50 - 4.00	**071193**
	B 16	4.00 - 4.50	**071194**
	B 16	4.50 - 5.00	**071195**
	B 16	5.00 - 5.50	**071196**
	B 16	5.50 - 6.00	**071197**
	B 16	6.00 - 6.50	**071198**
	B 16	6.50 - 7.00	**071199**
	B 16	7.00 - 7.50	**071200**
	B 16	7.50 - 8.00	**071201**
	B 16	8.00 - 8.50	**071202**
ⓜ	B 16	8.50 - 9.00	**071203**
	B 16	9.00 - 9.50	**071204**
	B 16	9.50 - 10.00	**071205**
	B 16	10.00 - 10.50	**071206**
	B 16	10.50 - 11.00	**071207**
	B 16	11.00 - 11.50	**071208**
	B 16	11.50 - 12.00	**071209**
	B 16	12.00 - 12.50	**071210**
	B 16	12.50 - 13.00	**071211**
	B 16	13.00 - 13.50	**071212**
	B 16	13.50 - 14.00	**071213**
	B 16	14.00 - 14.50	**071214**
	B 16	14.50 - 15.00	**071215**
	B 16	15.00 - 15.50	**071216**
	B 16	15.50 - 16.00	**071217**

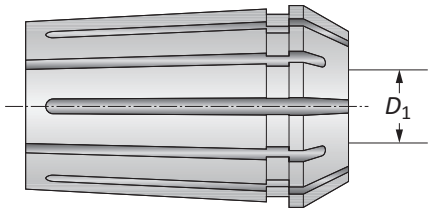
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks

ISO 10897-B (DIN 6388-B)



Collets

Nominal Size	Diameter D_1	Part No.
B 25	0.138 - 0.157	**071627**
B 25	0.157 - 0.177	**071628**
B 25	0.177 - 0.197	**071218**
B 25	0.197 - 0.217	**071219**
B 25	0.217 - 0.236	**071220**
B 25	0.236 - 0.256	**071221**
B 25	0.256 - 0.276	**071222**
B 25	0.276 - 0.295	**071223**
B 25	0.295 - 0.315	**071224**
B 25	0.315 - 0.335	**071225**
B 25	0.335 - 0.354	**071226**
B 25	0.354 - 0.374	**071227**
B 25	0.374 - 0.394	**071228**
B 25	0.394 - 0.413	**071229**
B 25	0.413 - 0.433	**071230**
B 25	0.433 - 0.453	**071231**
B 25	0.453 - 0.472	**071232**
B 25	0.472 - 0.492	**071233**
B 25	0.492 - 0.512	**071234**
B 25	0.512 - 0.531	**071235**
B 25	0.531 - 0.551	**071236**
B 25	0.551 - 0.571	**071237**
B 25	0.571 - 0.591	**071238**
B 25	0.591 - 0.610	**071239**
B 25	0.610 - 0.630	**071240**
B 25	0.630 - 0.650	**071241**
B 25	0.650 - 0.669	**071242**
B 25	0.669 - 0.689	**071243**
B 25	0.689 - 0.709	**071244**
B 25	0.709 - 0.728	**071245**
B 25	0.728 - 0.748	**071246**
B 25	0.748 - 0.768	**071247**
B 25	0.768 - 0.787	**071248**
B 25	0.787 - 0.807	**071249**
B 25	0.807 - 0.827	**071250**
B 25	0.827 - 0.846	**071251**
B 25	0.846 - 0.866	**071252**
B 25	0.866 - 0.866	**071253**
B 25	0.866 - 0.906	**071254**
B 25	0.906 - 0.925	**071255**
B 25	0.925 - 0.945	**071256**
B 25	0.945 - 0.965	**071257**
B 25	0.965 - 0.984	**071258**

Collets

Nominal Size	Diameter D_1	Part No.
B 25	3.50 - 4.00	**071627**
B 25	4.00 - 4.50	**071628**
B 25	4.50 - 5.00	**071218**
B 25	5.00 - 5.50	**071219**
B 25	5.50 - 6.00	**071220**
B 25	6.00 - 6.50	**071221**
B 25	6.50 - 7.00	**071222**
B 25	7.00 - 7.50	**071223**
B 25	7.50 - 8.00	**071224**
B 25	8.00 - 8.50	**071225**
B 25	8.50 - 9.00	**071226**
B 25	9.00 - 9.50	**071227**
B 25	9.50 - 10.00	**071228**
B 25	10.00 - 10.50	**071229**
B 25	10.50 - 11.00	**071230**
B 25	11.00 - 11.50	**071231**
B 25	11.50 - 12.00	**071232**
B 25	12.00 - 12.50	**071233**
B 25	12.50 - 13.00	**071234**
B 25	13.00 - 13.50	**071235**
B 25	13.50 - 14.00	**071236**
B 25	14.00 - 14.50	**071237**
B 25	14.50 - 15.00	**071238**
B 25	15.00 - 15.50	**071239**
B 25	15.50 - 16.00	**071240**
B 25	16.00 - 16.50	**071241**
B 25	16.50 - 17.00	**071242**
B 25	17.00 - 17.50	**071243**
B 25	17.50 - 18.00	**071244**
B 25	18.00 - 18.50	**071245**
B 25	18.50 - 19.00	**071246**
B 25	19.00 - 19.50	**071247**
B 25	19.50 - 20.00	**071248**
B 25	20.00 - 20.50	**071249**
B 25	20.50 - 21.00	**071250**
B 25	21.00 - 21.50	**071251**
B 25	21.50 - 22.00	**071252**
B 25	22.00 - 22.50	**071253**
B 25	22.50 - 23.00	**071254**
B 25	23.00 - 23.50	**071255**
B 25	23.50 - 24.00	**071256**
B 25	24.00 - 24.50	**071257**
B 25	24.50 - 25.00	**071258**

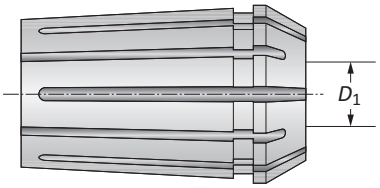
B10-N: 10-13
Key on B10-I-1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks

ISO 10897-B (DIN 6388-B)



Collets

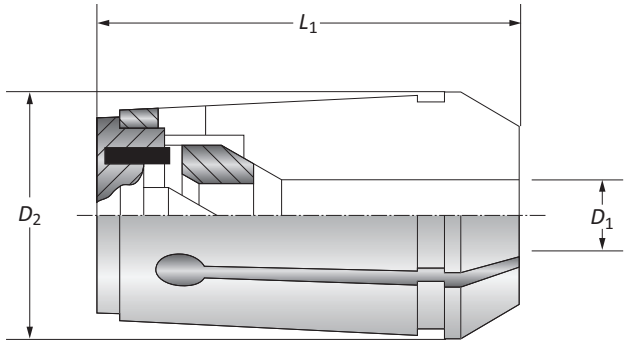
Nominal Size	Diameter D_1	Part No.
B 32	0.217 - 0.236	**071686**
B 32	0.236 - 0.256	**071687**
B 32	0.256 - 0.276	**071688**
B 32	0.276 - 0.295	**071689**
B 32	0.295 - 0.315	**071690**
B 32	0.315 - 0.335	**071691**
B 32	0.335 - 0.354	**071692**
B 32	0.354 - 0.374	**071693**
B 32	0.374 - 0.394	**071542**
B 32	0.394 - 0.413	**071543**
B 32	0.413 - 0.433	**071544**
B 32	0.433 - 0.453	**071545**
B 32	0.453 - 0.472	**071546**
B 32	0.472 - 0.492	**071547**
B 32	0.492 - 0.512	**071548**
B 32	0.512 - 0.531	**071549**
B 32	0.531 - 0.551	**071550**
B 32	0.551 - 0.571	**071551**
B 32	0.571 - 0.591	**071552**
B 32	0.591 - 0.610	**071553**
B 32	0.610 - 0.630	**071554**
B 32	0.630 - 0.650	**071555**
B 32	0.650 - 0.669	**071556**
B 32	0.669 - 0.689	**071557**
B 32	0.689 - 0.709	**071558**
B 32	0.709 - 0.728	**071559**
B 32	0.728 - 0.748	**071560**
B 32	0.748 - 0.768	**071561**
B 32	0.768 - 0.787	**071562**
B 32	0.787 - 0.807	**071563**
B 32	0.807 - 0.827	**071564**
B 32	0.827 - 0.846	**071565**
B 32	0.846 - 0.866	**071566**
B 32	0.866 - 0.866	**071567**
B 32	0.866 - 0.906	**071568**
B 32	0.906 - 0.925	**071569**
B 32	0.925 - 0.945	**071570**
B 32	0.945 - 0.965	**071571**
B 32	0.965 - 0.984	**071572**
B 32	0.984 - 1.004	**071573**
B 32	1.004 - 1.024	**071574**
B 32	1.024 - 1.043	**071575**
B 32	1.043 - 1.063	**071576**
B 32	1.063 - 1.083	**071577**
B 32	1.083 - 1.102	**071578**
B 32	1.102 - 1.122	**071579**
B 32	1.122 - 1.142	**071580**
B 32	1.142 - 1.161	**071581**
B 32	1.161 - 1.181	**071582**
B 32	1.181 - 1.201	**071583**
B 32	1.201 - 1.220	**071584**
B 32	1.220 - 1.240	**081585**
B 32	1.240 - 1.260	**071586**

Collets

Nominal Size	Diameter D_1	Part No.
B 32	5.50 - 6.00	**071686**
B 32	6.00 - 6.50	**071687**
B 32	6.50 - 7.00	**071688**
B 32	7.00 - 7.50	**071689**
B 32	7.50 - 8.00	**071690**
B 32	8.00 - 8.50	**071691**
B 32	8.50 - 9.00	**071692**
B 32	9.00 - 9.50	**071693**
B 32	9.50 - 10.00	**071542**
B 32	10.00 - 10.50	**071543**
B 32	10.50 - 11.00	**071544**
B 32	11.00 - 11.50	**071545**
B 32	11.50 - 12.00	**071546**
B 32	12.00 - 12.50	**071547**
B 32	12.50 - 13.00	**071548**
B 32	13.00 - 13.50	**071549**
B 32	13.50 - 14.00	**071550**
B 32	14.00 - 14.50	**071551**
B 32	14.50 - 15.00	**071552**
B 32	15.00 - 15.50	**071553**
B 32	15.50 - 16.00	**071554**
B 32	16.00 - 16.50	**071555**
B 32	16.50 - 17.00	**071556**
B 32	17.00 - 17.50	**071557**
B 32	17.50 - 18.00	**071558**
B 32	18.00 - 18.50	**071559**
B 32	18.50 - 19.00	**071560**
B 32	19.00 - 19.50	**071561**
B 32	19.50 - 20.00	**071562**
B 32	20.00 - 20.50	**071563**
B 32	20.50 - 21.00	**071564**
B 32	21.00 - 21.50	**071565**
B 32	21.50 - 22.00	**071566**
B 32	22.00 - 22.50	**071567**
B 32	22.50 - 23.00	**071568**
B 32	23.00 - 23.50	**071569**
B 32	23.50 - 24.00	**071570**
B 32	24.00 - 24.50	**071571**
B 32	24.50 - 25.00	**071572**
B 32	25.00 - 25.50	**071573**
B 32	25.50 - 26.00	**071574**
B 32	26.00 - 26.50	**071575**
B 32	26.50 - 27.00	**071576**
B 32	27.00 - 27.50	**071577**
B 32	27.50 - 28.00	**071578**
B 32	28.00 - 28.50	**071579**
B 32	28.50 - 29.00	**071580**
B 32	29.00 - 29.50	**071581**
B 32	29.50 - 30.00	**071582**
B 32	30.00 - 30.50	**071583**
B 32	30.50 - 31.00	**071584**
B 32	31.00 - 31.50	**081585**
B 32	31.50 - 32.00	**071586**

Accessories for Collet Chucks

ISO 10897-A (DIN 6388-A)



Collet Sets for Clarkson System

	Nominal Size	Standard-No.	Sets D_2	Sets L_1	Sets D_1	Part No.
	A 16	421 E	0.892	1.654	0.236 - 0.472	**071013**
ⓘ	A 25	459 E	1.295	2.047	0.236 - 0.984	**071014**
	A 32	460 E	1.626	2.480	0.236 - 1.260	**071020**
	A 16	421 E	22.65	42.00	6.00 - 12.00	**071013**
ⓜ	A 25	459 E	32.90	52.00	6.00 - 25.00	**071014**
	A 32	460 E	41.30	63.00	6.00 - 32.00	**071020**

NOTE: Recommended to use clamping nuts with ball-bearings to lock collets

Collets for Clarkson System

	Nominal Size	Diameter D_1	Part No.
	A 16	0.236	**071304**
	A 16	0.315	**071305**
	A 16	0.394	**071306**
	A 16	0.472	**071307**
	A 25	0.236	**071308**
	A 25	0.315	**071309**
	A 25	0.394	**071310**
	A 25	0.472	**071311**
	A 25	0.630	**071312**
ⓘ	A 25	0.787	**071313**
	A 25	0.984	**071684**
	A 32	0.236	**071427**
	A 32	0.315	**071428**
	A 32	0.394	**071429**
	A 32	0.472	**071430**
	A 32	0.630	**071431**
	A 32	0.787	**071432**
	A 32	0.984	**071433**
	A 32	1.260	**071685**

Collets for Clarkson System

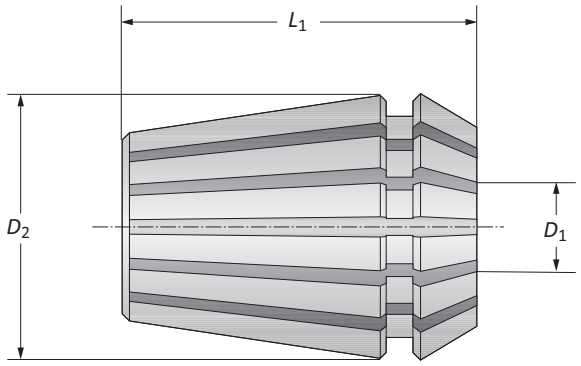
	Nominal Size	Diameter D_1	Part No.
	A 16	6.00	**071304**
	A 16	8.00	**071305**
	A 16	10.00	**071306**
	A 16	12.00	**071307**
	A 25	6.00	**071308**
	A 25	8.00	**071309**
	A 25	10.00	**071310**
	A 25	12.00	**071311**
	A 25	16.00	**071312**
ⓜ	A 25	20.00	**071313**
	A 25	25.00	**071684**
	A 32	6.00	**071427**
	A 32	8.00	**071428**
	A 32	10.00	**071429**
	A 32	12.00	**071430**
	A 32	16.00	**071431**
	A 32	20.00	**071432**
	A 32	25.00	**071433**
	A 32	32.00	**071685**

B10-N: 10-13
Key on B10-I-1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks

ISO 15488-B (DIN 6499-B)



Collet Sets

	Nominal Size	Standard-No.	Diameter D_1	Collet Set D_2	Collet Set L_1	Part No.
	ER 8	4004 E	0.039 - 0.197	0.335	0.531	**071034**
	ER 11	4008 E	0.039 - 0.276	0.433	0.709	**071028**
ⓘ	ER 16	426 E	0.020 - 0.394	0.630	1.083	**071029**
	ER 25	403 E	0.059 - 0.630	0.984	1.339	**071031**
	ER 32	470 E	0.079 - 0.787	1.260	1.575	**071032**
	ER 40	472 E	0.118 - 1.024	1.575	1.811	**071033**
	ER 8	4004 E	1.00 - 5.00	8.50	13.50	**071034**
	ER 11	4008 E	1.00 - 7.00	11.00	18.00	**071028**
ⓜ	ER 16	426 E	0.50 - 10.00	16.00	27.50	**071029**
	ER 25	403 E	1.50 - 16.00	25.00	34.00	**071031**
	ER 32	470 E	2.00 - 20.00	32.00	40.00	**071032**
	ER 40	472 E	3.00 - 26.00	40.00	46.00	**071033**

Collets

	Nominal Size	Diameter D_1	Part No.
	ER 8	0.039	**071986**
	ER 8	0.059	**071987**
	ER 8	0.079	**071988**
	ER 8	0.098	**071989**
	ER 8	0.102 - 0.118	**071990**
	ER 8	0.122 - 0.138	**071991**
	ER 8	0.142 - 0.157	**071992**
	ER 8	0.161 - 0.177	**071993**
	ER 8	0.181 - 0.197	**071994**
	ER 11	0.039	**071700**
ⓘ	ER 11	0.059	**071701**
	ER 11	0.079	**071702**
	ER 11	0.098	**071703**
	ER 11	0.102 - 0.118	**071704**
	ER 11	0.122 - 0.138	**071705**
	ER 11	0.142 - 0.157	**071706**
	ER 11	0.161 - 0.177	**071707**
	ER 11	0.181 - 0.197	**071708**
	ER 11	0.201 - 0.217	**071709**
	ER 11	0.220 - 0.354	**071710**
	ER 11	0.240 - 0.256	**071711**
	ER 11	0.260 - 0.276	**071712**

Collets

	Nominal Size	Diameter D_1	Part No.
	ER 8	1.00	**071986**
	ER 8	1.50	**071987**
	ER 8	2.00	**071988**
	ER 8	2.50	**071989**
	ER 8	2.60 - 3.00	**071990**
	ER 8	3.10 - 3.50	**071991**
	ER 8	3.60 - 4.00	**071992**
	ER 8	4.10 - 4.50	**071993**
	ER 8	4.60 - 5.00	**071994**
	ER 11	1.00	**071700**
ⓜ	ER 11	1.50	**071701**
	ER 11	2.00	**071702**
	ER 11	2.50	**071703**
	ER 11	2.60 - 3.00	**071704**
	ER 11	3.10 - 3.50	**071705**
	ER 11	3.60 - 4.00	**071706**
	ER 11	4.10 - 4.50	**071707**
	ER 11	4.60 - 5.00	**071708**
	ER 11	5.10 - 5.50	**071709**
	ER 11	5.60 - 6.00	**071710**
	ER 11	6.10 - 6.50	**071711**
	ER 11	6.60 - 7.00	**071712**

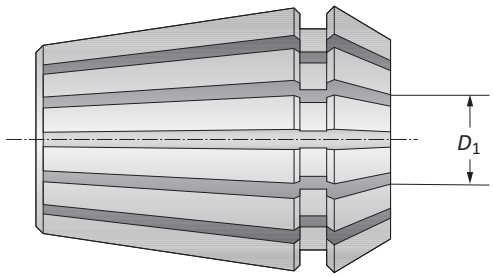
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks

ISO 15488-B (DIN 6499-B)



Collets

	Nominal Size	Diameter D_1	Part No.
	ER 16	0.020 - 0.039	**071713**
	ER 16	0.039 - 0.059	**071714**
	ER 16	0.039 - 0.079	**071715**
	ER 16	0.079 - 0.098	**071716**
	ER 16	0.098 - 0.118	**071717**
	ER 16	0.118 - 0.138	**071718**
	ER 16	0.138 - 0.157	**071719**
	ER 16	0.157 - 0.177	**271132**
	ER 16	0.157 - 0.197	**071720**
ⓘ	ER 16	0.197 - 0.217	**271133**
	ER 16	0.217 - 0.236	**071721**
	ER 16	0.236 - 0.256	**271134**
	ER 16	0.236 - 0.276	**071722**
	ER 16	0.276 - 0.295	**271135**
	ER 16	0.295 - 0.315	**071723**
	ER 16	0.315 - 0.335	**271136**
	ER 16	0.335 - 0.354	**071724**
	ER 16	0.354 - 0.374	**271137**
	ER 16	0.354 - 0.394	**071725**
	ER 16	0.50 - 1.00	**071713**
	ER 16	1.00 - 1.50	**071714**
	ER 16	1.00 - 2.00	**071715**
	ER 16	2.00 - 2.50	**071716**
	ER 16	2.50 - 3.00	**071717**
	ER 16	3.00 - 3.50	**071718**
	ER 16	3.50 - 4.00	**071719**
	ER 16	4.00 - 4.50	**271132**
	ER 16	4.00 - 5.00	**071720**
ⓜ	ER 16	5.00 - 5.50	**271133**
	ER 16	5.50 - 6.00	**071721**
	ER 16	6.00 - 6.50	**271134**
	ER 16	6.00 - 7.00	**071722**
	ER 16	7.00 - 7.50	**271135**
	ER 16	7.5 - 8.00	**071723**
	ER 16	8.00 - 8.50	**271136**
	ER 16	8.50 - 9.00	**071724**
	ER 16	9.00 - 9.50	**271137**
	ER 16	9.00 - 10.00	**071725**

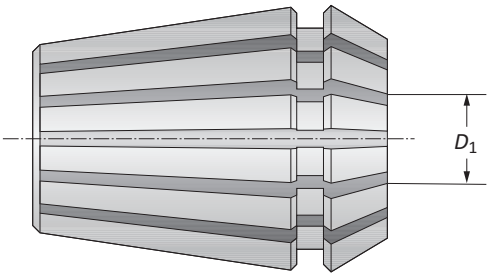
B10-N: 10-13
Key on B10-I:1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks

ISO 15488-B (DIN 6499-B)



Collets

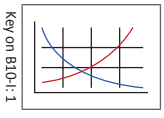
Nominal Size	Diameter D_1	Part No.
ER 25	0.059 - 0.079	**071743**
ER 25	0.079 - 0.098	**071744**
ER 25	0.098 - 0.118	**071745**
ER 25	0.118 - 0.138	**271128**
ER 25	0.138 - 0.157	**071746**
ER 25	0.157 - 0.177	**271129**
ER 25	0.177 - 0.197	**071747**
ER 25	0.197 - 0.217	**271130**
ER 25	0.217 - 0.236	**071748**
ER 25	0.236 - 0.256	**271131**
ER 25	0.256 - 0.276	**071749**
ER 25	0.276 - 0.315	**071750**
ER 25	0.315 - 0.354	**071751**
ER 25	0.354 - 0.394	**071752**
ER 25	0.394 - 0.433	**071753**
ER 25	0.433 - 0.472	**071754**
ER 25	0.472 - 0.512	**071755**
ER 25	0.512 - 0.551	**071756**
ER 25	0.551 - 0.591	**071757**
ER 25	0.591 - 0.630	**071758**
ER 32	0.079 - 0.118	**071761**
ER 32	0.118 - 0.157	**071762**
ER 32	0.157 - 0.197	**071763**
ER 32	0.197 - 0.236	**071764**
ER 32	0.236 - 0.276	**071765**
ER 32	0.276 - 0.315	**071766**
ER 32	0.315 - 0.354	**071767**
ER 32	0.354 - 0.394	**071768**
ER 32	0.394 - 0.433	**071769**
ER 32	0.433 - 0.472	**071770**
ER 32	0.472 - 0.512	**071771**
ER 32	0.512 - 0.551	**071772**
ER 32	0.551 - 0.591	**071773**
ER 32	0.591 - 0.630	**071774**
ER 32	0.630 - 0.669	**071775**
ER 32	0.669 - 0.709	**071776**
ER 32	0.709 - 0.748	**071777**
ER 32	0.748 - 0.787	**071778**
ER 32	0.669 - 0.709	**071776**
ER 32	0.709 - 0.748	**071777**
ER 32	0.748 - 0.787	**071778**

Collets

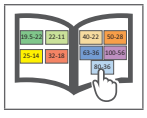
Nominal Size	Diameter D_1	Part No.
ER 25	1.50 - 2.00	**071743**
ER 25	2.00 - 2.50	**071744**
ER 25	2.50 - 3.00	**071745**
ER 25	3.00 - 3.50	**271128**
ER 25	3.50 - 4.00	**071746**
ER 25	4.00 - 4.50	**271129**
ER 25	4.50 - 5.00	**071747**
ER 25	5.00 - 5.50	**271130**
ER 25	5.50 - 6.00	**071748**
ER 25	6.00 - 6.50	**271131**
ER 25	6.50 - 7.00	**071749**
ER 25	7.00 - 8.00	**071750**
ER 25	8.00 - 9.00	**071751**
ER 25	9.00 - 10.00	**071752**
ER 25	10.00 - 11.00	**071753**
ER 25	11.00 - 12.00	**071754**
ER 25	12.00 - 13.00	**071755**
ER 25	13.00 - 14.00	**071756**
ER 25	14.00 - 15.00	**071757**
ER 25	15.00 - 16.00	**071758**
ER 32	2.00 - 3.00	**071761**
ER 32	3.00 - 4.00	**071762**
ER 32	4.00 - 5.00	**071763**
ER 32	5.00 - 6.00	**071764**
ER 32	6.00 - 7.00	**071765**
ER 32	7.00 - 8.00	**071766**
ER 32	8.00 - 9.00	**071767**
ER 32	9.00 - 10.00	**071768**
ER 32	10.00 - 11.00	**071769**
ER 32	11.00 - 12.00	**071770**
ER 32	12.00 - 13.00	**071771**
ER 32	13.00 - 14.00	**071772**
ER 32	14.00 - 15.00	**071773**
ER 32	15.00 - 16.00	**071774**
ER 32	16.00 - 17.00	**071775**
ER 32	17.00 - 18.00	**071776**
ER 32	18.00 - 19.00	**071777**
ER 32	19.00 - 20.00	**071778**
ER 32	17.00 - 18.00	**071776**
ER 32	18.00 - 19.00	**071777**
ER 32	19.00 - 20.00	**071778**

B10-N: 10-13

Key on B10-I: 1

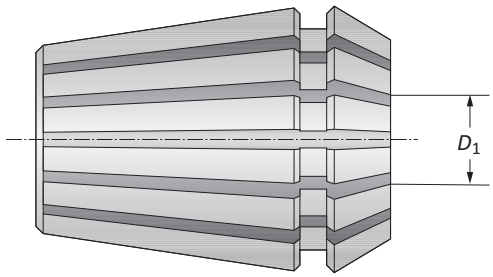


B10: xii-xiii



Accessories for Collet Chucks

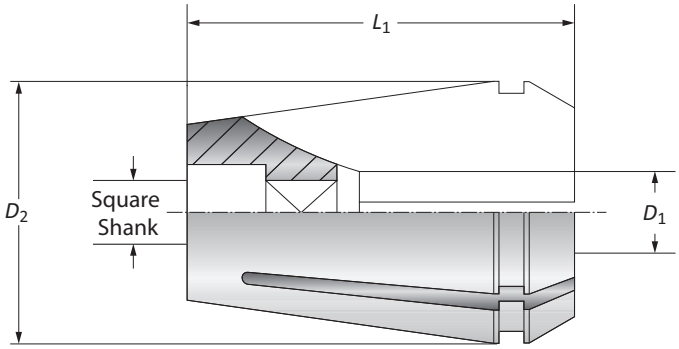
ISO 15488-B (DIN 6499-B)



	Nominal Size	Diameter D_1	Part No.
	ER 40	0.118 - 0.157	**071779**
	ER 40	0.157 - 0.197	**071780**
	ER 40	0.197 - 0.236	**071781**
	ER 40	0.236 - 0.276	**071782**
	ER 40	0.276 - 0.315	**071783**
	ER 40	0.315 - 0.354	**071784**
	ER 40	0.354 - 0.394	**071785**
	ER 40	0.394 - 0.433	**071786**
	ER 40	0.433 - 0.472	**071787**
	ER 40	0.472 - 0.512	**071788**
	ER 40	0.512 - 0.551	**071789**
i	ER 40	0.551 - 0.591	**071790**
	ER 40	0.591 - 0.630	**071791**
	ER 40	0.630 - 0.669	**071792**
	ER 40	0.669 - 0.709	**071793**
	ER 40	0.709 - 0.748	**071794**
	ER 40	0.748 - 0.787	**071795**
	ER 40	0.787 - 0.827	**071796**
	ER 40	0.827 - 0.866	**071797**
	ER 40	0.866 - 0.906	**071798**
	ER 40	0.906 - 0.945	**071799**
	ER 40	0.945 - 0.984	**071800**
	ER 40	0.984 - 1.024	**071801**
	ER 40	3.00 - 4.00	**071779**
	ER 40	4.00 - 5.00	**071780**
	ER 40	5.00 - 6.00	**071781**
	ER 40	6.00 - 7.00	**071782**
	ER 40	7.00 - 8.00	**071783**
	ER 40	8.00 - 9.00	**071784**
	ER 40	9.00 - 10.00	**071785**
	ER 40	10.00 - 11.00	**071786**
	ER 40	11.00 - 12.00	**071787**
	ER 40	12.00 - 13.00	**071788**
	ER 40	13.00 - 14.00	**071789**
m	ER 40	14.00 - 15.00	**071790**
	ER 40	15.00 - 16.00	**071791**
	ER 40	16.00 - 17.00	**071792**
	ER 40	17.00 - 18.00	**071793**
	ER 40	18.00 - 19.00	**071794**
	ER 40	19.00 - 20.00	**071795**
	ER 40	20.00 - 21.00	**071796**
	ER 40	21.00 - 22.00	**071797**
	ER 40	22.00 - 23.00	**071798**
	ER 40	23.00 - 24.00	**071799**
	ER 40	24.00 - 25.00	**071800**
	ER 40	25.00 - 26.00	**071801**

Accessories for Collet Sets for Taps DIN 371/374/376

ISO 15488-B (DIN 6499-B)



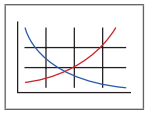
Collet Sets

	Nominal Size	Standard-No.	Clamping Range D_1	Collet Set D_2	Collet Set L_1	Part No.
	ER 16	426 EGB	0.177 - 0.276	0.630	1.083	**071045**
ⓘ	ER 25	430 EGB	0.177 - 0.472	0.984	1.339	**071047**
	ER 32	470 EGB	0.177 - 0.630	1.260	1.575	**071048**
	ER 40	472 EGB	0.276 - 0.787	1.575	1.811	**071049**
	ER 16	426 EGB	4.50 - 7.00	16.00	27.50	**071045**
ⓜ	ER 25	430 EGB	4.50 - 12.00	25.00	34.00	**071047**
	ER 32	470 EGB	4.50 - 16.00	32.00	40.00	**071048**
	ER 40	472 EGB	7.00 - 20.00	40.00	46.00	**071049**

Taps

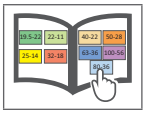
	Shank D_1	Shank Square Shank	Tap DIN 371	Tap DIN 374	Tap DIN 376
	0.177	0.134	M 4	M 6 x...	M 6
	0.217	0.169	–	M 7 x...	M 7
	0.236	0.193	M 4,5/5/6	M 8 x...	M 8
	0.276	0.217	M 7	M 9/10 x...	M 9/10
	0.315	0.244	M 8	M 6 x...	M 11
	0.354	0.276	M 9	M 6 x...	M 12
ⓘ	0.394	0.315	M 10	–	–
	0.433	0.354	–	M 14 x...	M 14
	0.472	0.354	M 12	M 16 x...	M 16
	0.551	0.433	–	M 18 x...	M 18
	0.630	0.472	–	M 20 x...	M 20
	0.709	0.551	–	M 22/24 x...	M 22/24
	0.787	0.630	–	M 27 x...	M 27
	4.50	3.40	M 4	M 6 x...	M 6
	5.50	4.30	–	M 7 x...	M 7
	6.00	4.90	M 4,5/5/6	M 8 x...	M 8
	7.00	5.50	M 7	M 9/10 x...	M 9/10
	8.00	6.20	M 8	M 6 x...	M 11
	9.00	7.00	M 9	M 6 x...	M 12
ⓜ	10.00	8.00	M 10	–	–
	11.00	9.00	–	M 14 x...	M 14
	12.00	9.00	M 12	M 16 x...	M 16
	14.00	11.00	–	M 18 x...	M 18
	16.00	12.00	–	M 20 x...	M 20
	18.00	14.00	–	M 22/24 x...	M 22/24
	20.00	16.00	–	M 27 x...	M 27

B10-N: 10-13



Key on B10-I: 1

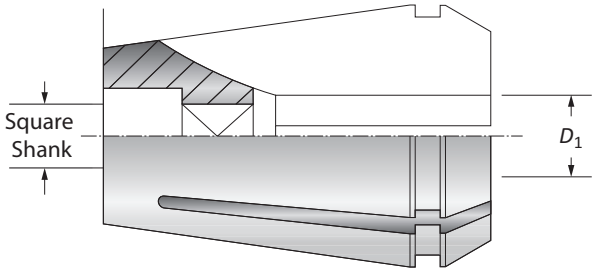
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Sets for Taps DIN 371/374/376

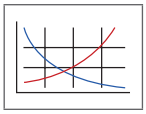
ISO 15488-B (DIN 6499-B)



Nominal Size	Suitable Taps D_1	Suitable Taps Square Shank	Part No.
ER 16	0.177	0.134	**071901**
ER 16	0.217	0.169	**071902**
ER 16	0.236	0.193	**071903**
ER 16	0.276	0.217	**071904**
ER 25	0.177	0.134	**071912**
ER 25	0.217	0.169	**071913**
ER 25	0.236	0.193	**071914**
ER 25	0.276	0.217	**071915**
ER 25	0.315	0.244	**071916**
ER 25	0.354	0.276	**071917**
ER 25	0.394	0.315	**071918**
ER 25	0.433	0.354	**071919**
ER 25	0.472	0.354	**071920**
ER 32	0.177	0.134	**071921**
ER 32	0.217	0.169	**071922**
ER 32	0.236	0.193	**071923**
ER 32	0.276	0.217	**071924**
ER 32	0.315	0.244	**071925**
ER 32	0.354	0.276	**071926**
ER 32	0.394	0.315	**071927**
ER 32	0.433	0.354	**071928**
ER 32	0.472	0.354	**071929**
ER 32	0.551	0.433	**071930**
ER 32	0.630	0.472	**071931**
ER 40	0.276	0.217	**071932**
ER 40	0.315	0.244	**071933**
ER 40	0.354	0.276	**071934**
ER 40	0.394	0.315	**071935**
ER 40	0.433	0.354	**071936**
ER 40	0.472	0.354	**071937**
ER 40	0.551	0.433	**071938**
ER 40	0.630	0.472	**071939**
ER 40	0.709	0.571	**071940**
ER 40	0.787	0.630	**071941**

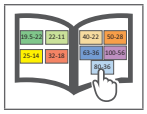
Nominal Size	Suitable Taps D_1	Suitable Taps Square Shank	Part No.
ER 16	4.50	3.40	**071901**
ER 16	5.50	4.30	**071902**
ER 16	6.00	4.90	**071903**
ER 16	7.00	5.50	**071904**
ER 25	4.50	3.40	**071912**
ER 25	5.50	4.30	**071913**
ER 25	6.00	4.90	**071914**
ER 25	7.00	5.50	**071915**
ER 25	8.00	6.20	**071916**
ER 25	9.00	7.00	**071917**
ER 25	10.00	8.00	**071918**
ER 25	11.00	9.00	**071919**
ER 25	12.00	9.00	**071920**
ER 32	4.50	3.40	**071921**
ER 32	5.50	4.30	**071922**
ER 32	6.00	4.90	**071923**
ER 32	7.00	5.50	**071924**
ER 32	8.00	6.20	**071925**
ER 32	9.00	7.00	**071926**
ER 32	10.00	8.00	**071927**
ER 32	11.00	9.00	**071928**
ER 32	12.00	9.00	**071929**
ER 32	14.00	11.00	**071930**
ER 32	16.00	12.00	**071931**
ER 40	7.00	5.50	**071932**
ER 40	8.00	6.20	**071933**
ER 40	9.00	7.00	**071934**
ER 40	10.00	8.00	**071935**
ER 40	11.00	9.00	**071936**
ER 40	12.00	9.00	**071937**
ER 40	14.00	11.00	**071938**
ER 40	16.00	12.00	**071939**
ER 40	18.00	14.50	**071940**
ER 40	20.00	16.00	**071941**

B10-N: 10-13



Key on B10-I-1

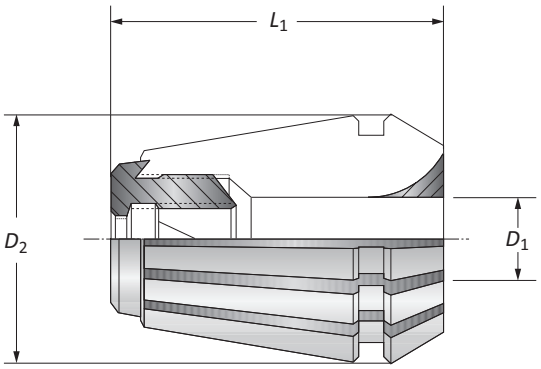
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Collet Chucks: ISO 15488-B (DIN 6499-B)

Collets



Collets for Mill Cutters with Pull Thread System

	Nominal Size	Standard-No.	Clamping Range D_2	Collet L_1	Collet D_1	Part No.
i	ER 32	470 ECL	1.260	1.811	0.236 - 0.630	**071052**
i	ER 40	472 ECL	1.575	2.047	0.236 - 0.984	**071053**
m	ER 32	470 ECL	32.00	46.00	6.00 - 16.00	**071052**
m	ER 40	472 ECL	40.00	52.00	6.00 - 25.00	**071053**

Collets

	Nominal Size	Collet D_1	Part No.
i	ER 32	0.236	**071826**
i	ER 32	0.315	**071827**
i	ER 32	0.394	**071828**
i	ER 32	0.472	**071829**
i	ER 32	0.630	**071830**
i	ER 32	0.236	**071831**
i	ER 32	0.315	**071832**
i	ER 32	0.394	**071833**
i	ER 32	0.472	**071834**
i	ER 32	0.630	**071835**
i	ER 32	0.787	**071836**
i	ER 32	0.984	**071837**
m	ER 32	6.00	**071826**
m	ER 32	8.00	**071827**
m	ER 32	10.00	**071828**
m	ER 32	12.00	**071829**
m	ER 32	16.00	**071830**
m	ER 32	6.00	**071831**
m	ER 32	8.00	**071832**
m	ER 32	10.00	**071833**
m	ER 32	12.00	**071834**
m	ER 32	16.00	**071835**
m	ER 32	20.00	**071836**
m	ER 32	25.00	**071837**

B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

Collet Kit Set Accessories for Collet Chucks

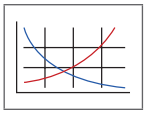
Collet Kit: ISO 15488 (DIN 6499)

	Nominal Size	Kit Width	Kit Depth	Kit Height	Kit Collet Space	Part No.
i	ER 16	5.512	2.835	1.772	0.394	**099049**
i	ER 25	7.717	4.409	1.969	0.591	**099050**
i	ER 32	9.882	5.512	2.205	0.709	**099051**
m	ER 16	140.00	72.00	45.00	10.00	**099049**
m	ER 25	196.00	112.00	50.00	15.00	**099050**
m	ER 32	251.00	140.00	56.00	18.00	**099051**

Collet Kit: ISO 10897 (DIN 6388)

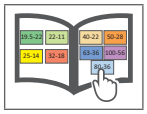
	Nominal Size	Kit Width	Kit Depth	Kit Height	Kit Collet Space	Part No.
i	ER 16	8.898	6.339	3.346	0.591	**099053**
i	ER 25	13.110	7.913	3.346	0.945	**099054**
i	ER 32	12.598	8.268	3.346	0.591	**099055**
m	ER 16	226.00	161.00	85.00	15.00	**099053**
m	ER 25	333.00	201.00	85.00	24.00	**099054**
m	ER 32	320.00	210.00	85.00	15.00	**099055**

B10-N: 10-13



Key on B10-I:1

B10: xii-xiii



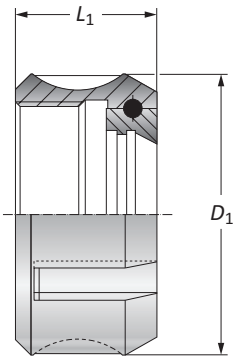
i = Imperial (in)
m = Metric (mm)

Accessories for Collet Chucks: ISO 10897 (DIN 6388)

Clamping Nuts

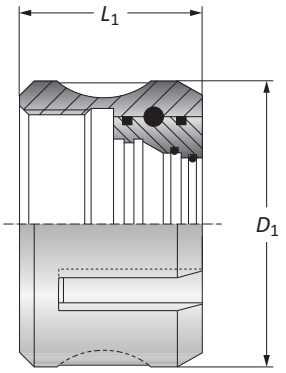
Clamping Nuts: DIN 6388 / ISO 10897 - 1:10

	Nominal Size	Clamping Nut D_1	Clamping Nut L_1	Clamping Range	Torque	Part No.
i	16	1.693	0.945	0.079 - 0.630	100	**068048**
	25	2.362	1.181	0.079 - 0.984	180	**068052**
	32	2.835	1.319	0.157 - 1.260	220	**161099**
m	16	43.00	24.00	2.00 - 16.00	100	**068048**
	25	60.00	30.00	2.00 - 25.00	180	**068052**
	32	72.00	33.50	4.00 - 32.00	220	**161099**



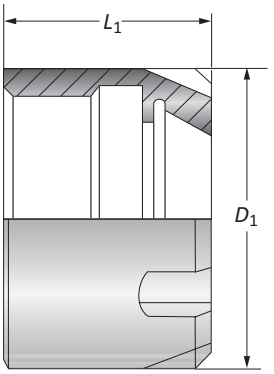
Clamping Nuts for Sealing Discs: DIN 6388 / ISO 10897 - 1:10

	Nominal Size	Clamping Nut D_1	Clamping Nut L_1	Clamping Range	Torque	Part No.
i	16	1.693	1.240	0.079 - 0.591	100	**275001**
	25	2.362	1.496	0.079 - 0.984	180	**275003**
	32	2.835	1.654	0.157 - 1.260	220	**276001**
m	16	43.00	31.50	2.00 - 15.00	100	**275001**
	25	60.00	38.00	2.00 - 25.00	180	**275003**
	32	72.00	42.00	4.00 - 32.00	220	**276001**



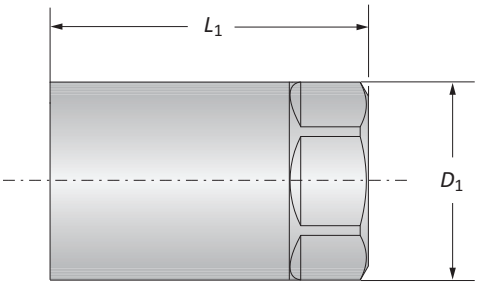
Mini Clamping Nuts

	Nominal Size	Clamping Nut D_1	Clamping Nut L_1	Clamping Range	Torque	Part No.
i	ER 08	0.472	0.425	0.039 - 0.157	8	**415357**
	ER 11	0.630	0.472	0.039 - 0.276	16	**415358**
	ER 16	0.866	0.709	0.039 - 0.394	25	**415359**
m	ER 08	12.00	10.80	1.00 - 4.00	8	**415357**
	ER 11	16.00	12.00	1.00 - 7.00	16	**415358**
	ER 16	22.00	18.00	1.00 - 10.00	25	**415359**



Clamping Nuts for Erickson Collet Chuck System

	Nominal Size	Clamping Nut D_1	Clamping Nut L_1	Clamping Range	Part No.
i	6	0.551	1.102	0.039 - 0.256	**162095**
	10	0.827	1.417	0.039 - 0.394	**162093**
m	6	14.00	28.00	1.00 - 6.50	**162095**
	10	21.00	36.00	1.00 - 10.00	**162093**



B10-N: 10-13
Key on B10-I: 1
B10: xii-xiii

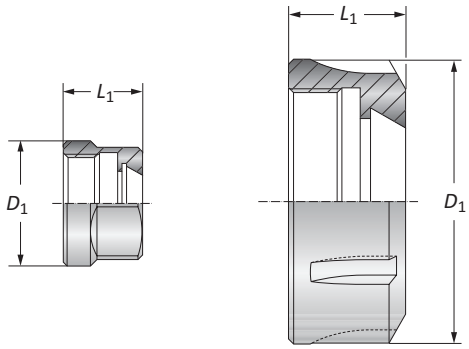
i = Imperial (in)
m = Metric (mm)

Accessories for Collet Chucks: ISO 15488 (DIN 6499)

Clamping Nuts

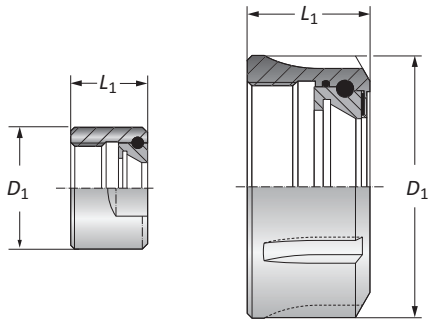
One Piece Clamping Nuts: DIN 6499 / ISO 15488 - 8°

	Nominal Size	Clamping Nut D_1	L_1	Clamping Range	Torque	Part No.
ⓘ	ER 16	1.102	0.689	0.039 - 0.394	60	**215922**
ⓘ	ER 25	1.654	0.787	0.079 - 0.630	100	**215924**
ⓘ	ER 32	1.969	0.886	0.079 - 0.787	140	**215925**
ⓘ	ER 40	2.480	1.004	0.157 - 1.024	180	**215926**
ⓜ	ER 16	28.00	17.50	1.00 - 10.00	60	**215922**
ⓜ	ER 25	42.00	20.00	2.00 - 16.00	100	**215924**
ⓜ	ER 32	50.00	22.50	2.00 - 20.00	140	**215925**
ⓜ	ER 40	63.00	25.50	4.00 - 26.00	180	**215926**



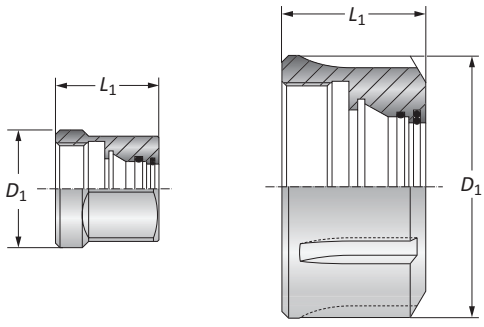
Clamping Nuts with Sliding Ring: DIN 6499 / ISO 15488 - 8°

	Nominal Size	Clamping Nut D_1	L_1	Clamping Range	Torque	Part No.
ⓘ	ER 16	1.102	0.984	0.039 - 0.394	60	**277001**
ⓘ	ER 25	1.654	1.083	0.079 - 0.630	100	**277005**
ⓘ	ER 32	1.969	1.201	0.079 - 0.787	140	**277007**
ⓘ	ER 40	2.480	1.339	0.157 - 1.024	180	**278001**
ⓜ	ER 16	28.00	25.00	1.00 - 10.00	60	**277001**
ⓜ	ER 25	42.00	27.50	2.00 - 16.00	100	**277005**
ⓜ	ER 32	50.00	30.50	2.00 - 20.00	140	**277007**
ⓜ	ER 40	63.00	34.00	4.00 - 26.00	180	**278001**



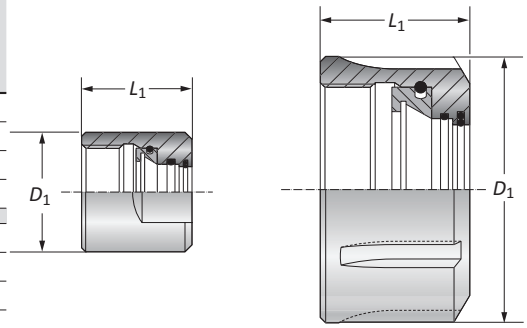
One Piece Clamping Nuts: DIN 6499 / ISO 15488 - 8°

	Nominal Size	Clamping Nut D_1	L_1	Clamping Range	Torque	Part No.
ⓘ	ER 16	1.102	0.984	0.039 - 0.394	60	**315015**
ⓘ	ER 25	1.654	1.083	0.079 - 0.630	100	**315016**
ⓘ	ER 32	1.969	1.201	0.079 - 0.787	140	**315017**
ⓘ	ER 40	2.480	1.339	0.157 - 1.024	180	**315018**
ⓜ	ER 16	28.00	20.30	1.00 - 10.00	60	**315015**
ⓜ	ER 25	42.00	22.40	2.00 - 16.00	100	**315016**
ⓜ	ER 32	50.00	25.00	2.00 - 20.00	140	**315017**
ⓜ	ER 40	63.00	28.30	4.00 - 26.00	180	**315018**



Clamping Nuts: DIN 6499 / ISO 15488 - 8°

	Nominal Size	Clamping Nuts : ISO 15488 (DIN 6499) D_1	L_1	Clamping Range	Torque	Part No.
ⓘ	ER 16	1.102	0.984	0.039 - 0.394	60	**277002**
ⓘ	ER 25	1.654	1.122	0.079 - 0.630	100	**277006**
ⓘ	ER 32	1.969	1.240	0.079 - 0.787	140	**277008**
ⓘ	ER 40	2.480	1.378	0.157 - 1.024	180	**278002**
ⓜ	ER 16	28.00	25.00	1.00 - 10.00	60	**277002**
ⓜ	ER 25	42.00	28.50	2.00 - 16.00	100	**277006**
ⓜ	ER 32	50.00	31.50	2.00 - 20.00	140	**277008**
ⓜ	ER 40	63.00	35.00	4.00 - 26.00	180	**278002**

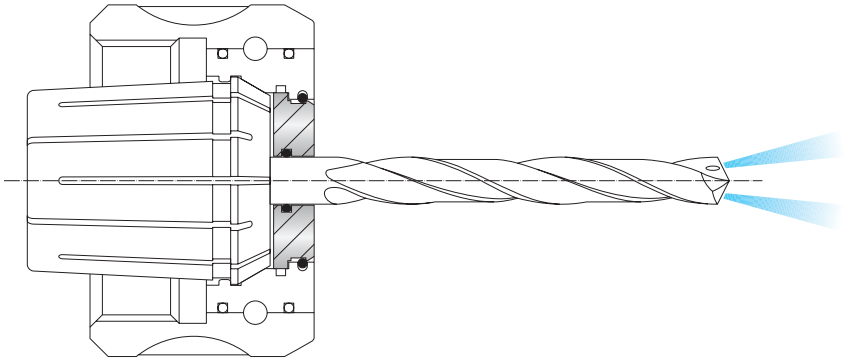


B10-N: 10-13
Key on B10-I-1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Sealing Disks for Collet Chucks: ISO 10897 (DIN 6388)

Imperial



	Nominal Size	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.
	16	0.098 - 0.118	**275010**	0.236 - 0.256	**275017**	0.374 - 0.394	**275024**	0.512 - 0.531	**275031**
	16	0.118 - 0.138	**275011**	0.256 - 0.276	**275018**	0.394 - 0.413	**275025**	0.531 - 0.551	**275032**
	16	0.138 - 0.157	**275012**	0.276 - 0.295	**275019**	0.413 - 0.433	**275026**	0.551 - 0.571	**275033**
	16	0.157 - 0.177	**275013**	0.295 - 0.315	**275020**	0.433 - 0.453	**275027**	0.571 - 0.591	**275034**
	16	0.177 - 0.197	**275014**	0.315 - 0.335	**275021**	0.453 - 0.472	**275028**	0.591 - 0.610	**275035**
	16	0.197 - 0.217	**275015**	0.335 - 0.354	**275022**	0.472 - 0.492	**275029**	0.610 - 0.630	**275036**
	16	0.217 - 0.236	**275016**	0.354 - 0.374	**275023**	0.492 - 0.512	**275030**	–	**–**
	25	0.098 - 0.118	**275040**	0.335 - 0.354	**275052**	0.571 - 0.591	**275064**	0.807 - 0.827	**275076**
	25	0.118 - 0.138	**275041**	0.354 - 0.374	**275053**	0.591 - 0.610	**275065**	0.807 - 0.846	**275077**
	25	0.138 - 0.157	**275042**	0.374 - 0.394	**275054**	0.610 - 0.630	**275066**	0.846 - 0.866	**275078**
	25	0.157 - 0.177	**275043**	0.394 - 0.413	**275055**	0.630 - 0.650	**275067**	0.866 - 0.886	**275079**
	25	0.177 - 0.197	**275044**	0.413 - 0.433	**275056**	0.650 - 0.669	**275068**	0.886 - 0.906	**275080**
	25	0.197 - 0.217	**275045**	0.433 - 0.453	**275057**	0.669 - 0.689	**275069**	0.906 - 0.925	**275081**
	25	0.217 - 0.236	**275046**	0.453 - 0.472	**275058**	0.689 - 0.709	**275070**	0.925 - 0.945	**275082**
	25	0.236 - 0.256	**275047**	0.472 - 0.492	**275059**	0.709 - 0.728	**275071**	0.945 - 0.965	**275083**
	25	0.256 - 0.276	**275048**	0.492 - 0.512	**275060**	0.728 - 0.748	**275072**	0.965 - 0.984	**275084**
ⓘ	25	0.276 - 0.295	**275049**	0.512 - 0.531	**275061**	0.748 - 0.768	**275073**	–	**–**
	25	0.295 - 0.315	**275050**	0.531 - 0.551	**275062**	0.768 - 0.787	**275074**	–	**–**
	25	0.315 - 0.335	**275051**	0.551 - 0.571	**275063**	0.787 - 0.807	**275075**	–	**–**
	32	0.138 - 0.157	**276005**	0.433 - 0.453	**276020**	0.728 - 0.748	**276035**	1.024 - 1.043	**276050**
	32	0.157 - 0.177	**276006**	0.453 - 0.472	**276021**	0.748 - 0.768	**276036**	1.043 - 1.063	**276051**
	32	0.177 - 0.197	**276007**	0.472 - 0.492	**276022**	0.768 - 0.787	**276037**	1.063 - 1.102	**276052**
	32	0.197 - 0.217	**276008**	0.492 - 0.512	**276023**	0.787 - 0.807	**276038**	1.063 - 1.102	**276053**
	32	0.217 - 0.236	**276009**	0.512 - 0.531	**276024**	0.807 - 0.827	**276039**	1.102 - 1.102	**276054**
	32	0.236 - 0.256	**276010**	0.531 - 0.551	**276025**	0.827 - 0.846	**276040**	1.122 - 1.142	**276055**
	32	0.256 - 0.276	**276011**	0.551 - 0.571	**276026**	0.846 - 0.866	**276041**	1.142 - 1.161	**276056**
	32	0.276 - 0.295	**276012**	0.571 - 0.591	**276027**	0.866 - 0.886	**276042**	1.161 - 1.181	**276057**
	32	0.295 - 0.315	**276013**	0.591 - 0.610	**276028**	0.886 - 0.906	**276043**	1.181 - 1.201	**276085**
	32	0.315 - 0.335	**276014**	0.610 - 0.630	**276029**	0.906 - 0.925	**276044**	1.201 - 1.220	**276059**
	32	0.335 - 0.354	**276015**	0.630 - 0.650	**276030**	0.925 - 0.945	**276045**	1.220 - 1.240	**276060**
	32	0.354 - 0.374	**276016**	0.650 - 0.669	**276031**	0.945 - 0.965	**276046**	1.240 - 1.260	**276061**
	32	0.374 - 0.394	**276017**	0.669 - 0.689	**276032**	0.965 - 0.984	**276047**	–	**–**
	32	0.394 - 0.413	**276018**	0.669 - 0.709	**276033**	0.984 - 1.004	**276048**	–	**–**
	32	0.413 - 0.433	**276019**	0.709 - 0.728	**276034**	1.004 - 1.024	**276049**	–	**–**

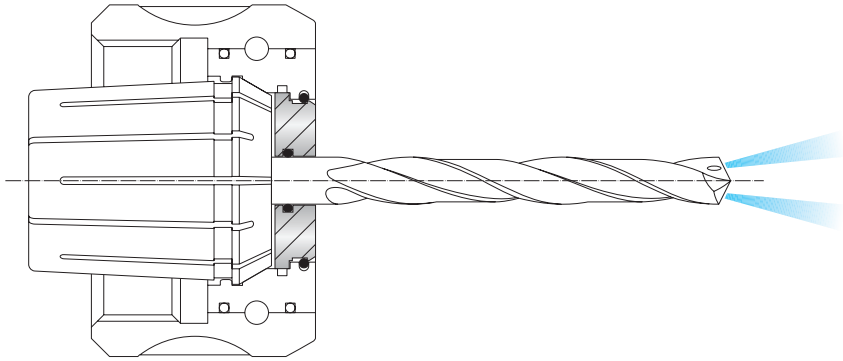
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Sealing Disks for Collet Chucks: ISO 10897 (DIN 6388)

Metric



	Nominal Size	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.
	16	2.50 - 3.00	**275010**	6.00 - 6.50	**275017**	9.50 - 10.00	**275024**	13.00 - 13.50	**275031**
	16	3.00 - 3.50	**275011**	6.50 - 7.00	**275018**	10.00 - 10.50	**275025**	13.50 - 14.00	**275032**
	16	3.50 - 4.00	**275012**	7.00 - 7.50	**275019**	10.50 - 11.00	**275026**	14.00 - 14.50	**275033**
	16	4.00 - 4.50	**275013**	7.50 - 8.00	**275020**	11.00 - 11.50	**275027**	14.50 - 15.00	**275034**
	16	4.50 - 5.00	**275014**	8.00 - 8.50	**275021**	11.50 - 12.00	**275028**	15.00 - 15.50	**275035**
	16	5.00 - 5.50	**275015**	8.50 - 9.00	**275022**	12.00 - 12.50	**275029**	15.50 - 16.00	**275036**
	16	5.50 - 6.00	**275016**	9.00 - 9.50	**275023**	12.50 - 13.00	**275030**	–	–
	25	2.50 - 3.00	**275040**	8.50 - 9.00	**275052**	14.50 - 15.00	**275064**	20.50 - 21.00	**275076**
	25	3.00 - 3.50	**275041**	9.00 - 9.50	**275053**	15.00 - 15.50	**275065**	21.00 - 21.50	**275077**
	25	3.50 - 4.00	**275042**	9.50 - 10.00	**275054**	15.50 - 16.00	**275066**	21.50 - 22.00	**275078**
	25	4.00 - 4.50	**275043**	10.00 - 10.50	**275055**	16.00 - 16.50	**275067**	22.00 - 22.50	**275079**
	25	4.50 - 5.00	**275044**	10.50 - 11.00	**275056**	16.50 - 17.00	**275068**	22.50 - 23.00	**275080**
	25	5.00 - 5.50	**275045**	11.00 - 11.50	**275057**	17.00 - 17.50	**275069**	23.00 - 23.50	**275081**
	25	5.50 - 6.00	**275046**	11.50 - 12.00	**275058**	17.50 - 18.00	**275070**	23.50 - 24.00	**275082**
	25	6.00 - 6.50	**275047**	12.00 - 12.50	**275059**	18.00 - 18.50	**275071**	24.00 - 24.50	**275083**
	25	6.50 - 7.00	**275048**	12.50 - 13.00	**275060**	18.50 - 19.00	**275072**	24.50 - 25.00	**275084**
ⓜ	25	7.00 - 7.50	**275049**	13.00 - 13.50	**275061**	19.00 - 19.50	**275073**	–	–
	25	7.50- 8.00	**275050**	13.50 - 14.00	**275062**	19.50 - 20.00	**275074**	–	–
	25	8.00 - 8.50	**275051**	14.00 - 14.50	**275063**	20.00 - 20.50	**275075**	–	–
	32	3.50 - 4.00	**276005**	11.00 - 11.50	**276020**	18.50 - 19.00	**276035**	26.00 - 26.50	**276050**
	32	4.00 - 4.50	**276006**	11.50 - 12.00	**276021**	19.00 - 19.50	**276036**	26.50 - 27.00	**276051**
	32	4.50 - 5.00	**276007**	12.00 - 12.50	**276022**	19.50 - 20.00	**276037**	27.50 - 28.00	**276052**
	32	5.00 - 5.50	**276008**	12.50 - 13.00	**276023**	20.00 - 20.50	**276038**	27.50 - 28.00	**276053**
	32	5.50 - 6.00	**276009**	13.00 - 13.50	**276024**	20.50 - 21.00	**276039**	28.00 - 28.50	**276054**
	32	6.00 - 6.50	**276010**	13.50 - 14.00	**276025**	21.00- 21.50	**276040**	28.50 - 29.00	**276055**
	32	6.50 - 7.00	**276011**	14.00 - 14.50	**276026**	21.50 - 22.00	**276041**	29.00 - 29.50	**276056**
	32	7.00 - 7.50	**276012**	14.50 - 15.00	**276027**	22.00 - 22.50	**276042**	29.50 - 30.00	**276057**
	32	7.50 - 8.00	**276013**	15.00 - 15.50	**276028**	22.50 - 23.00	**276043**	30.00 - 30.50	**276085**
	32	8.00 - 8.50	**276014**	15.50 - 16.00	**276029**	23.00 - 23.50	**276044**	30.50 - 31.00	**276059**
	32	8.50 - 9.00	**276015**	16.00 - 16.50	**276030**	23.50 - 24.00	**276045**	31.00 - 31.50	**276060**
	32	9.00 - 9.50	**276016**	16.50 - 17.00	**276031**	24.00 - 24.50	**276046**	31.50 - 32.00	**276061**
	32	9.50 - 10.00	**276017**	17.00 - 17.50	**276032**	24.50 - 25.00	**276047**	–	–
	32	10.00 - 10.50	**276018**	17.50 - 18.00	**276033**	25.00 - 25.50	**276048**	–	–
	32	10.50 - 11.00	**276019**	18.00 - 18.50	**276034**	25.50 - 26.00	**276049**	–	–

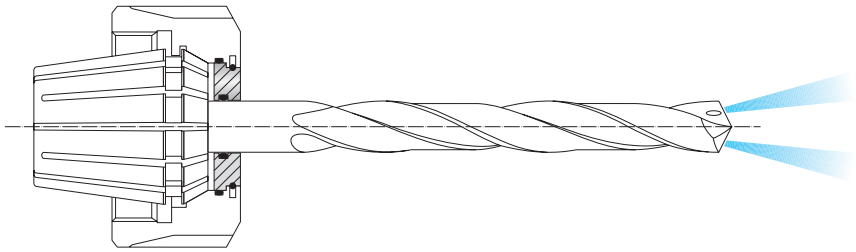
B10-N: 10-13
Key on B10-I:1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Sealing Disks Collet Chucks: ISO 15488 (DIN 6499)

Imperial



	Nominal Size	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.
	ER 16	0.098 - 0.118	**277010**	0.177 - 0.197	**277014**	0.256 - 0.276	**277018**	0.335 - 0.354	**277022**
	ER 16	0.117 - 0.138	**277011**	0.197 - 0.217	**277015**	0.276 - 0.295	**277019**	0.354 - 0.374	**277023**
	ER 16	0.138 - 0.157	**277012**	0.217 - 0.236	**277016**	0.295 - 0.315	**277020**	0.374 - 0.394	**277024**
	ER 16	0.157 - 0.177	**277013**	0.236 - 0.256	**277017**	0.315 - 0.335	**277021**	–	**–**
	ER 25	0.098 - 0.118	**277025**	0.236 - 0.256	**277032**	0.374 - 0.394	**277039**	0.512 - 0.531	**277046**
	ER 25	0.118 - 0.138	**277026**	0.256 - 0.276	**277033**	0.394 - 0.413	**277040**	0.531 - 0.551	**277047**
	ER 25	0.138 - 0.157	**277027**	0.276 - 0.295	**277034**	0.413 - 0.433	**277041**	0.551 - 0.571	**277048**
	ER 25	0.157 - 0.177	**277028**	0.295 - 0.315	**277035**	0.433 - 0.453	**277042**	0.571 - 0.591	**277049**
	ER 25	0.177 - 0.197	**277029**	0.315 - 0.335	**277036**	0.453 - 0.472	**277043**	0.591 - 0.610	**277050**
	ER 25	0.197 - 0.217	**277030**	0.335 - 0.354	**277037**	0.472 - 0.492	**277044**	0.610 - 0.630	**277051**
	ER 25	0.217 - 0.236	**277031**	0.354 - 0.374	**277038**	0.492 - 0.512	**277045**	–	**–**
	ER 32	0.098 - 0.118	**277055**	0.276 - 0.295	**277064**	0.453 - 0.472	**277073**	0.630 - 0.650	**277082**
	ER 32	0.118 - 0.138	**277056**	0.295 - 0.315	**277065**	0.472 - 0.492	**277074**	0.650 - 0.669	**277083**
	ER 32	0.138 - 0.157	**277057**	0.315 - 0.335	**277066**	0.492 - 0.512	**277075**	0.669 - 0.689	**277084**
	ER 32	0.157 - 0.177	**277058**	0.335 - 0.354	**277067**	0.512 - 0.531	**277076**	0.689 - 0.709	**277085**
ⓘ	ER 32	0.177 - 0.197	**277059**	0.354 - 0.374	**277068**	0.531 - 0.551	**277077**	0.709 - 0.728	**277086**
	ER 32	0.197 - 0.217	**277060**	0.374 - 0.394	**277069**	0.551 - 0.571	**277078**	0.728 - 0.748	**277087**
	ER 32	0.217 - 0.236	**277061**	0.394 - 0.413	**277070**	0.571 - 0.591	**277079**	0.748 - 0.768	**277088**
	ER 32	0.236 - 0.256	**277062**	0.413 - 0.433	**277071**	0.591 - 0.610	**277080**	0.768 - 0.787	**277089**
	ER 32	0.256 - 0.276	**277063**	0.433 - 0.453	**277072**	0.610 - 0.630	**277081**	–	**–**
	ER 40	0.098 - 0.118	**278005**	0.335 - 0.354	**278017**	0.571 - 0.591	**278029**	0.807 - 0.827	**278041**
	ER 40	0.118 - 0.138	**278006**	0.354 - 0.374	**278018**	0.591 - 0.610	**278030**	0.827 - 0.846	**278042**
	ER 40	0.138 - 0.157	**278007**	0.374 - 0.394	**278019**	0.610 - 0.630	**278031**	0.846 - 0.866	**278043**
	ER 40	0.157 - 0.177	**278008**	0.394 - 0.413	**278020**	0.630 - 0.650	**278032**	0.866 - 0.886	**278044**
	ER 40	0.177 - 0.197	**278009**	0.413 - 0.433	**278021**	0.650 - 0.669	**278033**	0.866 - 0.906	**278045**
	ER 40	0.197 - 0.217	**278010**	0.433 - 0.453	**278022**	0.669 - 0.689	**278034**	0.906 - 0.925	**278046**
	ER 40	0.217 - 0.236	**278011**	0.453 - 0.472	**278023**	0.689 - 0.709	**278035**	0.925 - 0.945	**278047**
	ER 40	0.236 - 0.256	**278012**	0.472 - 0.492	**278024**	0.709 - 0.728	**278036**	0.945 - 0.965	**278048**
	ER 40	0.256 - 0.276	**278013**	0.492 - 0.512	**278025**	0.728 - 0.748	**278037**	0.965 - 0.984	**278049**
	ER 40	0.276 - 0.295	**278014**	0.512 - 0.531	**278026**	0.748 - 0.768	**278038**	0.984 - 1.004	**278050**
	ER 40	0.295 - 0.315	**278015**	0.531 - 0.551	**278027**	0.768 - 0.787	**278039**	1.004 - 1.024	**278051**
	ER 40	0.315 - 0.335	**278016**	0.551 - 0.571	**278028**	0.787 - 0.807	**278040**	–	**–**

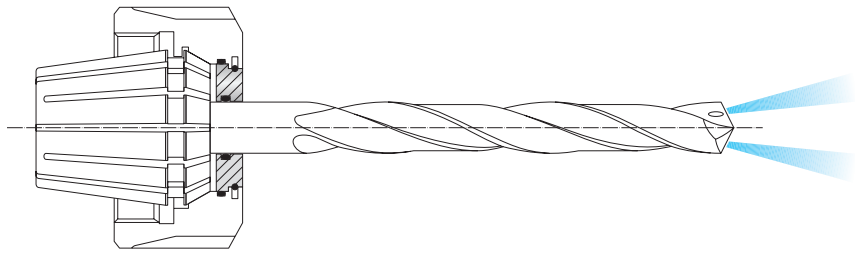
B10-N: 10-13
Key on B10-I: 1

B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

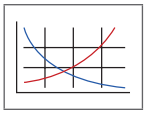
Sealing Disks Collet Chucks: ISO 15488 (DIN 6499)

Metric



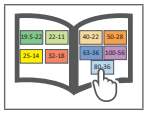
	Nominal Size	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.	Sealing Disk Diameter	Sealing Disk Part No.
	ER 16	2.50 - 3.00	**277010**	4.50 - 5.00	**277014**	6.50 - 7.00	**277018**	8.50 - 9.00	**277022**
	ER 16	3.00 - 3.50	**277011**	5.00 - 5.50	**277015**	7.00 - 7.50	**277019**	9.00 - 9.50	**277023**
	ER 16	3.50 - 4.00	**277012**	5.50 - 6.00	**277016**	7.50 - 8.00	**277020**	9.50 - 10.00	**277024**
	ER 16	4.00 - 4.50	**277013**	6.00 - 6.50	**277017**	8.00 - 8.50	**277021**	–	**–**
	ER 25	2.50 - 3.00	**277025**	6.00 - 6.50	**277032**	9.50 - 10.00	**277039**	13.00 - 13.50	**277046**
	ER 25	3.00 - 3.50	**277026**	6.50 - 7.00	**277033**	10.00 - 10.50	**277040**	13.50 - 14.00	**277047**
	ER 25	3.50 - 4.00	**277027**	7.00 - 7.50	**277034**	10.50 - 11.00	**277041**	14.00 - 14.50	**277048**
	ER 25	4.00 - 4.50	**277028**	7.50 - 8.00	**277035**	11.00 - 11.50	**277042**	14.50 - 15.00	**277049**
	ER 25	4.50 - 5.00	**277029**	8.00 - 8.50	**277036**	11.50 - 12.00	**277043**	15.00 - 15.50	**277050**
	ER 25	5.00 - 5.50	**277030**	8.50 - 9.00	**277037**	12.00 - 12.50	**277044**	15.50 - 16.00	**277051**
	ER 25	5.50 - 6.00	**277031**	9.00 - 9.50	**277038**	12.50 - 13.00	**277045**	–	**–**
	ER 32	2.50 - 3.00	**277055**	7.00 - 7.50	**277064**	11.50 - 12.00	**277073**	16.00 - 16.50	**277082**
	ER 32	3.00 - 3.50	**277056**	7.50 - 8.00	**277065**	12.00 - 12.50	**277074**	16.50 - 17.00	**277083**
	ER 32	3.50 - 4.00	**277057**	8.00 - 8.50	**277066**	12.50 - 13.00	**277075**	17.00 - 17.50	**277084**
	ER 32	4.00 - 4.50	**277058**	8.50 - 9.00	**277067**	13.00 - 13.50	**277076**	17.50 - 18.00	**277085**
ⓜ	ER 32	4.50 - 5.00	**277059**	9.00 - 9.50	**277068**	13.50 - 14.00	**277077**	18.00 - 18.50	**277086**
	ER 32	5.00 - 5.50	**277060**	9.50 - 10.00	**277069**	14.00 - 14.50	**277078**	18.50 - 19.00	**277087**
	ER 32	5.50 - 6.00	**277061**	10.00 - 10.50	**277070**	14.50 - 15.00	**277079**	19.00 - 19.50	**277088**
	ER 32	6.00 - 6.50	**277062**	10.50 - 11.00	**277071**	15.00 - 15.50	**277080**	19.50 - 20.00	**277089**
	ER 32	6.50 - 7.00	**277063**	11.00 - 11.50	**277072**	15.50 - 16.00	**277081**	–	**–**
	ER 40	2.50 - 3.00	**278005**	8.50 - 9.00	**278017**	14.50 - 15.00	**278029**	20.50 - 21.00	**278041**
	ER 40	3.00 - 3.50	**278006**	9.00 - 9.50	**278018**	15.00 - 15.50	**278030**	21.00 - 21.50	**278042**
	ER 40	3.50 - 4.00	**278007**	9.50 - 10.00	**278019**	15.50 - 16.00	**278031**	21.50 - 22.00	**278043**
	ER 40	4.00 - 4.50	**278008**	10.00 - 10.50	**278020**	16.00- 16.50	**278032**	22.00 - 22.50	**278044**
	ER 40	4.50 - 5.00	**278009**	10.50 - 11.00	**278021**	16.50 - 17.00	**278033**	22.50 - 23.00	**278045**
	ER 40	5.00 - 5.50	**278010**	11.00 - 11.50	**278022**	17.00 - 17.50	**278034**	23.00 - 23.50	**278046**
	ER 40	5.50 - 6.00	**278011**	11.50 - 12.00	**278023**	17.50 - 18.00	**278035**	23.50 - 24.00	**278047**
	ER 40	6.00 - 6.50	**278012**	12.00 - 12.50	**278024**	18.00 - 18.50	**278036**	24.00 - 24.50	**278048**
	ER 40	6.50 - 7.00	**278013**	12.50 - 13.00	**278025**	18.50 - 19.00	**278037**	24.50 - 25.00	**278049**
	ER 40	7.00 - 7.50	**278014**	13.00 - 13.50	**278026**	19.00 - 19.50	**278038**	25.00 - 25.50	**278050**
	ER 40	7.50 - 8.00	**278015**	13.50 - 14.00	**278027**	19.50 - 20.00	**278039**	25.50 - 26.00	**278051**
	ER 40	8.00 - 8.50	**278016**	14.00 - 14.50	**278028**	20.00 - 20.50	**278040**	–	**–**

B10-N: 10-13



Key on B10-I: 1

B10: xii-xiii

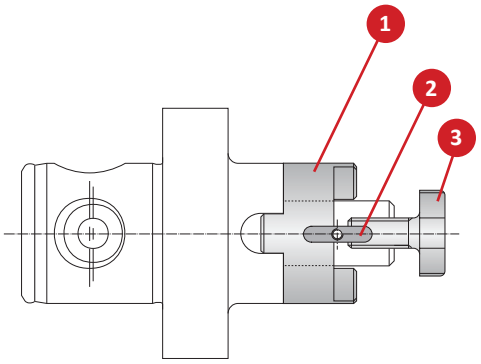


ⓘ = Imperial (in)
ⓜ = Metric (mm)

Accessories for Milling Machine Arbors

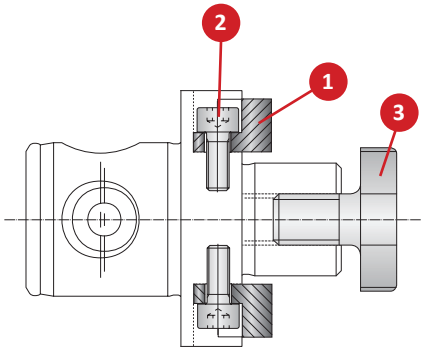
Accessories for Milling Machine Arbors

Shell-Mill Adapter	Part No. 1 Clutch Drive Ring	2 Axial Drive Key	3 Retaining Screw
13	**115708**	**115709**	**115707**
16	**115696**	**215608**	**115697**
22	**115341**	**215609**	**115345**
27	**115342**	**215610**	**115346**
32	**115343**	**215611**	**115347**
40	**115344**	**215612**	**115348**



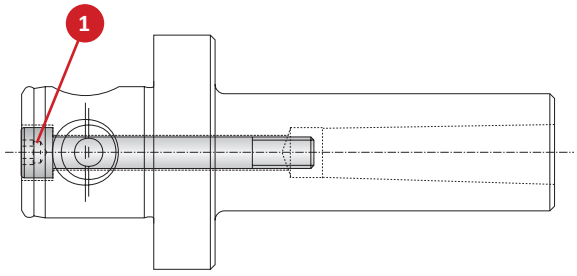
Accessories for Milling Machine Arbors

Shell-Mill Adapter	Part No. 1 Drive Key	2 Cap Screw	3 Retaining Screw
16	**215701**	**115566**	**115697**
22	**215702**	**108109**	**115345**
27	**215703**	**109109**	**115346**
32	**215704**	**115147**	**115347**
40	**215705**	**116152**	**115348**
60	**115643**	**115237**	–



Accessories for Holding Arbors

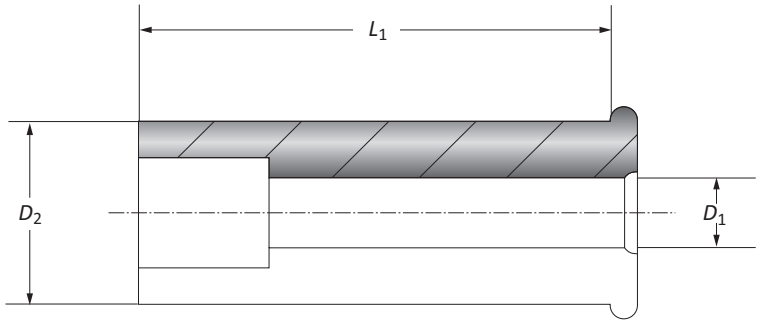
Adapter Sleeves	Part No. 1 Cap Screw	Service Key
209022	**115929**	s5
209023	**115930**	s7
209024	**115932**	s8
209025	**115933**	s5
209026	**115169**	s8
209027	**115934**	s10
209028	**115936**	s12



B10-N: 10-13
Key on B10-I: 1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Reducing Sleeves for Hydraulic Clamping Chucks

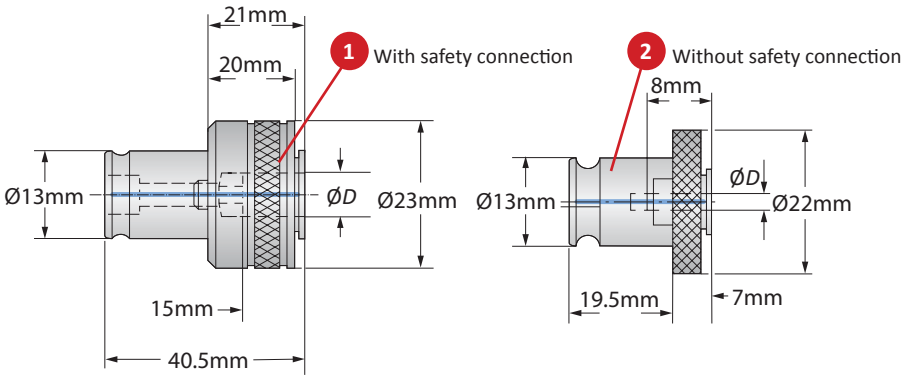


	Nominal Size	Reducing Sleeve		
	D_2	D_1	L_1	Part No.
ⓘ	0.787	0.118	1.988	**271045**
	0.787	0.157	1.988	**271046**
	0.787	0.197	1.988	**271047**
	0.787	0.236	1.988	**271003**
	0.787	0.276	1.988	**271049**
	0.787	0.315	1.988	**271004**
	0.787	0.354	1.988	**271050**
	0.787	0.394	1.988	**271005**
	0.787	0.433	1.988	**271051**
	0.787	0.472	1.988	**271006**
	0.787	0.512	1.988	**271052**
	0.787	0.551	1.988	**271007**
	0.787	0.591	1.988	**271018**
	0.787	0.630	1.988	**271008**
ⓜ	20.00	3.00	50.50	**271045**
	20.00	4.00	50.50	**271046**
	20.00	5.00	50.50	**271047**
	20.00	6.00	50.50	**271003**
	20.00	7.00	50.50	**271049**
	20.00	8.00	50.50	**271004**
	20.00	9.00	50.50	**271050**
	20.00	10.00	50.50	**271005**
	20.00	11.00	50.50	**271051**
	20.00	12.00	50.50	**271006**
	20.00	13.00	50.50	**271052**
	20.00	14.00	50.50	**271007**
	20.00	15.00	50.50	**271018**
	20.00	16.00	50.50	**271008**

B10-N: 10-13
Key on B10-I:1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

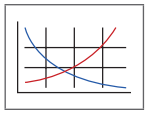
Quick Change Adapters



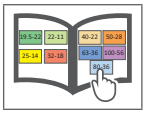
	Shank Dimensions		Quick Change Adapter								Part No.	
	Nominal Size	*D* x Square Shank	DIN 352	DIN 353	DIN 371	DIN 374	DIN 376	DIN 2182	DIN 2183	Torque Setting	1	2
ⓘ	0	0.083 x 0.098	M 1	–	M 1	–	M 3.5	1/16"	–	1.5 - 2	**233070**	**K24358**
	0	0.083 x 0.110	M 2	–	M 2	M 4	M 4	3/32"	5/32"	2 - 3	**233071**	**K24276**
	0	0.106 x 0.138	M 3	–	M 3	M 5	M 5	1/8"	–	4 - 6	**233072**	**K24277**
	0	0.118 x 0.157	M 3.5	–	M 3.5	–	–	–	–	1.5 - 2	**233073**	**K24278**
	0	0.138 x 0.177	M 4	–	M 4	M 6	M 6	5/32"	1/4"	6 - 9	**233074**	**K24279**
	0	0.193 x 0.236	M 8	–	–	M 8	M 8	–	–	16 - 21	**233075**	**K24280**
	0	0.217 x 0.276	M 10	G 1/8"	–	M 10	M 10	1/4"	3/8"	27 - 32	**233076**	**K24281**
	0	0.244 x 0.315	–	–	M 8	–	–	5/16"	7/16"	16 - 21	**233077**	**K24391**
ⓜ	0	2.10 x 2.50	M 1	–	M 1	–	M 3.5	1/16"	–	1.5 - 2	**233070**	**K24358**
	0	2.10 x 2.80	M 2	–	M 2	M 4	M 4	3/32"	5/32"	2 - 3	**233071**	**K24276**
	0	2.70 x 3.50	M 3	–	M 3	M 5	M 5	1/8"	–	4 - 6	**233072**	**K24277**
	0	3.00 x 4.00	M 3.5	–	M 3.5	–	–	–	–	1.5 - 2	**233073**	**K24278**
	0	3.40 x 4.50	M 4	–	M 4	M 6	M 6	5/32"	1/4"	6 - 9	**233074**	**K24279**
	0	4.90 x 6.00	M 8	–	–	M 8	M 8	–	–	16 - 21	**233075**	**K24280**
	0	5.50 x 7.00	M 10	G 1/8"	–	M 10	M 10	1/4"	3/8"	27 - 32	**233076**	**K24281**
	0	6.20 x 8.00	–	–	M 8	–	–	5/16"	7/16"	16 - 21	**233077**	**K24391**

B10-N: 10-13

Key on B10-I: 1

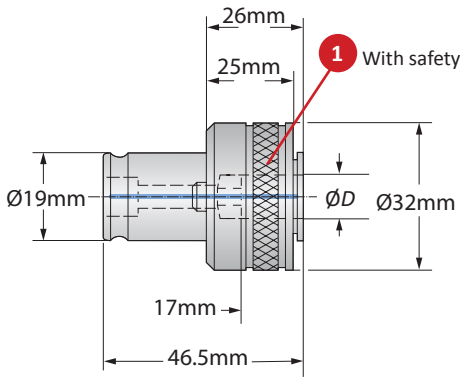


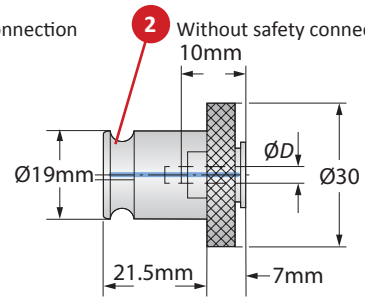
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

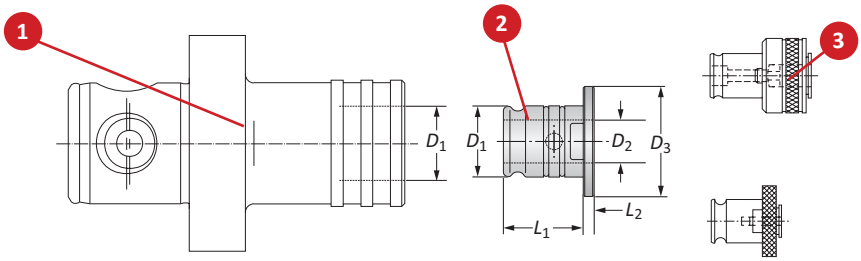
Quick Change Adapters





Quick Change Adapters

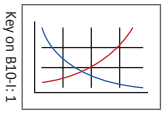
	Shank Dimensions		Quick Change Adapter								Part No.	
	Nominal Size	*D* x Square Shank	DIN 352	DIN 353	DIN 371	DIN 374	DIN 376	DIN 2182	DIN 2183	Torque Setting	1	2
	1	0.083 x 0.110	M 2	–	M 2.8	M 4	M 4	3/32"	5/32"	2 - 3	**K17847**	**K23259**
	1	0.106 x 0.138	M 3	–	M 3.5	M 5	M 5	1/8"	–	4 - 6	**233001**	**K18455**
	1	0.118 x 0.157	M 3.5	–	M 3.5	–	–	–	–	1.5 - 2	**233002**	**K22439**
	1	0.134 x 0.177	M 4	–	M 4	M 6	M 6	5/32"	1/4"	6 - 9	**233003**	**K16414**
ⓘ	1	0.193 x 0.236	M 8	–	–	M 8	M 8	–	–	16 - 21	**233004**	**K16415**
	1	0.217 x 0.276	M 10	–	–	M 10	M 10	1/4"	3/8"	27 - 32	**233005**	**K16418**
	1	0.244 x 0.315	–	G 1/8"	M 8	–	–	5/16"	7/16"	16 - 21	**233006**	**K16416**
	1	0.276 x 0.354	M 12	–	–	M 12	M 12	3/8"	1/2"	37 - 44	**233007**	**K18454**
	1	0.315 x 0.394	–	–	M 10	–	–	–	–	27 - 32	**233008**	**K16417**
	1	0.354 x 0.433	M 14	G 1/4"	–	M 14	M 14	–	9/16"	50 - 53	**233009**	**K22440**
	1	2.10 x 2.80	M 2	–	M 2.8	M 4	M 4	3/32"	5/32"	2 - 3	**K17847**	**K23259**
	1	2.70 x 3.50	M 3	–	M 3.5	M 5	M 5	1/8"	–	4 - 6	**233001**	**K18455**
	1	3.00 x 4.00	M 3.5	–	M 3.5	–	–	–	–	1.5 - 2	**233002**	**K22439**
	1	3.40 x 4.50	M 4	–	M 4	M 6	M 6	5/32"	1/4"	6 - 9	**233003**	**K16414**
ⓜ	1	4.90 x 6.00	M 8	–	–	M 8	M 8	–	–	16 - 21	**233004**	**K16415**
	1	5.50 x 7.00	M 10	–	–	M 10	M 10	1/4"	3/8"	27 - 32	**233005**	**K16418**
	1	6.20 x 8.00	–	G 1/8"	M 8	–	–	5/16"	7/16"	16 - 21	**233006**	**K16416**
	1	7.00 x 9.00	M 12	–	–	M 12	M 12	3/8"	1/2"	37 - 44	**233007**	**K18454**
	1	8.00 x 10.00	–	–	M 10	–	–	–	–	27 - 32	**233008**	**K16417**
	1	9.00 x 11.00	M 14	G 1/4"	–	M 14	M 14	–	9/16"	50 - 53	**233009**	**K22440**



Reducers for Quick Change Adapters

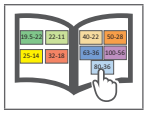
	1 Tapping Chuck		2 Quick Change Adapter		3. Reducer						
	Nominal Size	D_1	Nominal Size	D_1	D_1	D_2	D_3	L_1	L_2	Weight	Part No.
ⓘ	1	0.748	0	0.512	0.748	0.512	1.181	0.846	0.157	0.264 (lbs)	**161038**
	2	1.220	1	0.748	1.220	0.748	1.890	1.378	0.197	1.058 (lbs)	**162094**
ⓜ	1	19.00	0	13.00	19.00	13.00	30.00	21.50	4.00	0.12 (kg)	**161038**
	2	31.00	1	19.00	31.00	19.00	48.00	35.00	5.00	0.48 (kg)	**162094**

B10-N: 10-13



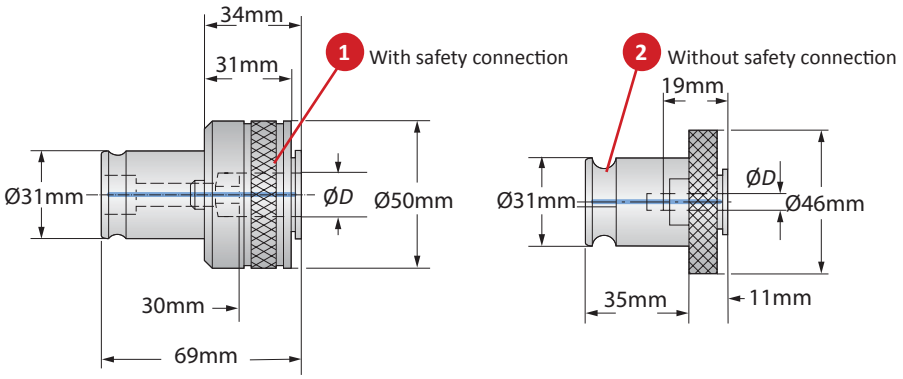
Key on B10-I:1

B10: xii-xiii



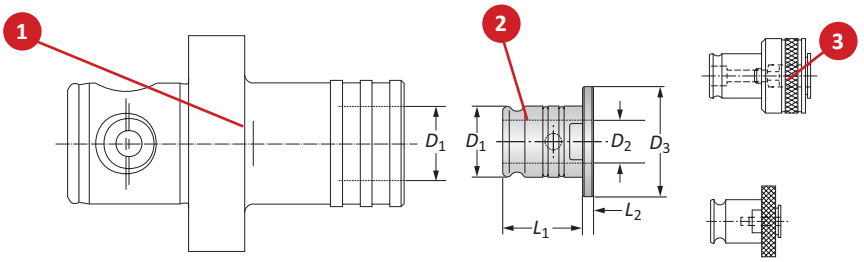
ⓘ = Imperial (in)
ⓜ = Metric (mm)

Quick Change Adapters



Quick Change Adapters

	Shank Dimensions		Quick Change Adapter								Part No.	
	Nominal Size	*D* x Square Shank	DIN 352	DIN 353	DIN 371	DIN 374	DIN 376	DIN 2182	DIN 2183	Torque Setting	1	2
	2	0.217 x 0.276	M 10	G ⅛"	–	M 10	M 10	¼"	⅜"	24 - 32	**233020**	**K15282**
	2	0.244 x 0.315	–	–	M 8	–	–	5/16"	7/16"	16 - 21	**233021**	**K15283**
	2	0.276 x 0.354	M 12	–	–	M 12	M 12	⅜"	½"	37 - 44	**233022**	**K15284**
	2	0.315 x 0.394	–	–	M 10	–	–	–	–	27 - 32	**233023**	**K18456**
ⓘ	2	0.354 x 0.433	M 14	G ¼"	–	M 14	M 14	–	9/16"	50 - 53	**233024**	**K16419**
	2	0.354 x 0.472	M 16	G ⅜"	–	M 16	M 16	–	⅝"	55 - 58	**233025**	**K15285**
	2	0.433 x 0.551	M 18	–	–	M 18	M 18	–	11/16"	85 - 90	**233026**	**K16420**
	2	0.472 x 0.630	M 20	G ½"	–	M 20	M 20	–	13/16"	110 - 115	**233027**	**K15286**
	2	0.571 x 0.709	M 24	–	–	M 24	M 24	–	15/16"	110 - 115	**233028**	**K18457**
	2	5.50 x 7.00	M 10	G ⅛"	–	M 10	M 10	¼"	⅜"	24 - 32	**233020**	**K15282**
	2	6.20 x 8.00	–	–	M 8	–	–	5/16"	7/16"	16 - 21	**233021**	**K15283**
	2	7.00 x 9.00	M 12	–	–	M 12	M 12	⅜"	½"	37 - 44	**233022**	**K15284**
	2	8.00 x 10.00	–	–	M 10	–	–	–	–	27 - 32	**233023**	**K18456**
ⓜ	2	9.00 x 11.00	M 14	G ¼"	–	M 14	M 14	–	9/16"	50 - 53	**233024**	**K16419**
	2	9.00 x 12.00	M 16	G ⅜"	–	M 16	M 16	–	⅝"	55 - 58	**233025**	**K15285**
	2	11.00 x 14.00	M 18	–	–	M 18	M 18	–	11/16"	85 - 90	**233026**	**K16420**
	2	12.00 x 16.00	M 20	G ½"	–	M 20	M 20	–	13/16"	110 - 115	**233027**	**K15286**
	2	14.50 x 18.00	M 24	–	–	M 24	M 24	–	15/16"	110 - 115	**233028**	**K18457**



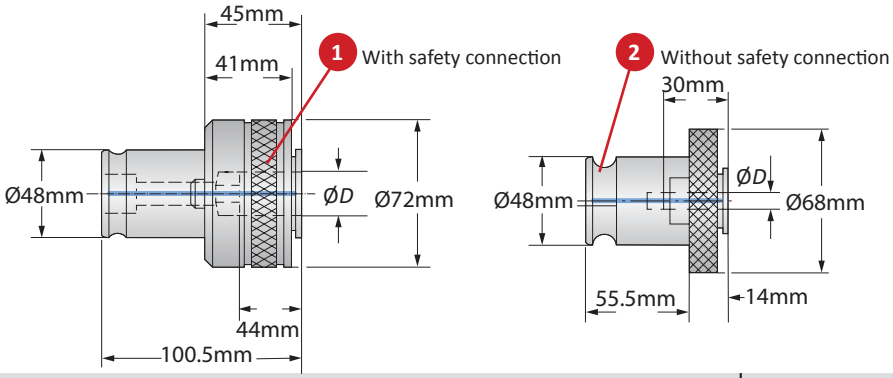
Reducers for Quick Change Adapters

	1 Tapping Chuck		2 Quick Change Adapter		3 Reducer						
	Nominal Size	D_1	Nominal Size	D_1	D_1	D_2	D_3	L_1	L_2	Weight	Part No.
ⓘ	1	0.748	0	0.512	0.748	0.512	1.181	0.846	0.157	0.264 (lbs)	**161038**
	2	1.220	1	0.748	1.220	0.748	1.890	1.378	0.197	1.058 (lbs)	**162094**
ⓜ	1	19.00	0	13.00	19.00	13.00	30.00	21.50	4.00	0.12 (kg)	**161038**
	2	31.00	1	19.00	31.00	19.00	48.00	35.00	5.00	0.48 (kg)	**162094**

B10-N: 10-13
Key on B10-I: 1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Quick Change Adapters



	Shank Dimensions		Quick Change Adapters								Part No.	
	Nominal Size	*D* x Square Shank	DIN 352	DIN 353	DIN 371	DIN 374	DIN 376	DIN 2182	DIN 2183	Torque Setting	1	2
	3	0.354 x 0.433	M 14	G ¼"	–	M 14	M 14	–	9/18"	50 - 53	**233040**	**K22434**
	3	0.354 x 0.472	M 16	G ⅜"	–	M 16	M 16	–	5/8"	55 - 58	**233041**	**K22435**
	3	0.433 x 0.551	M 18	–	–	M 18	M 18	–	11/16"	85 - 90	**233042**	**K22436**
	3	0.472 x 0.630	M 20	G ½"	–	M 20	M 20	–	13/18"	100 - 106	**233043**	**K22437**
ⓘ	3	0.571 x 0.709	M 24	–	–	M 24	M 24	–	15/16"	140 - 150	**233044**	**K16421**
	3	0.650 x 0.787	M 27	G ¾"	–	M 27	M 27	–	1"	150 - 160	**233045**	**K16422**
	3	0.709 x 0.866	M 30	G ⅞"	–	M 30	M 30	–	1 ⅛"	240 - 250	**233046**	**K16423**
	3	0.866 x 0.984	M 33	G 1"	–	M 33	M 33	–	1 ¼"	260 - 270	**233047**	**K16424**
	3	0.866 x 1.102	M 36	G 1 ⅛"	–	M 36	M 36	–	1 ⅜"	260 - 270	**233048**	**K22438**
	3	9.00 x 11.00	M 14	G ¼"	–	M 14	M 14	–	9/18"	50 - 53	**233040**	**K22434**
	3	9.00 x 12.00	M 16	G ⅜"	–	M 16	M 16	–	5/8"	55 - 58	**233041**	**K22435**
	3	11.00 x 14.00	M 18	–	–	M 18	M 18	–	11/16"	85 - 90	**233042**	**K22436**
	3	12.00 x 16.00	M 20	G ½"	–	M 20	M 20	–	13/18"	100 - 106	**233043**	**K22437**
ⓜ	3	14.50 x 18.00	M 24	–	–	M 24	M 24	–	15/16"	140 - 150	**233044**	**K16421**
	3	16.50 x 20.00	M 27	G ¾"	–	M 27	M 27	–	1"	150 - 160	**233045**	**K16422**
	3	18.00 x 22.00	M 30	G ⅞"	–	M 30	M 30	–	1 ⅛"	240 - 250	**233046**	**K16423**
	3	22.00 x 25.00	M 33	G 1"	–	M 33	M 33	–	1 ¼"	260 - 270	**233047**	**K16424**
	3	22.00 x 28.00	M 36	G 1 ⅛"	–	M 36	M 36	–	1 ⅜"	260 - 270	**233048**	**K22438**

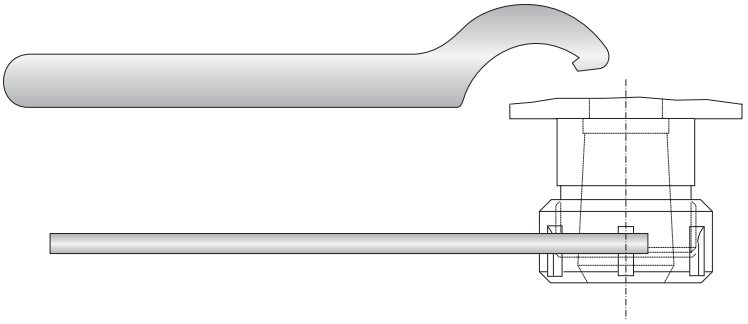
B10-N: 10-13
Key on B10-I-1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

Service Keys for Collet Systems

Service Keys for ISO 10897 (DIN 6388) Collet Chuck Systems

Service Key			
Nominal Size	Size	Type	Part No.
16	40 - 43	S	**068179**
25	58 - 62	S	**068182**
32	68 - 75	S	**115867**

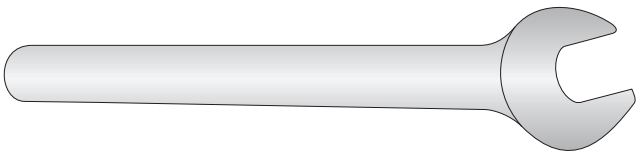


Service Keys for ISO 15488 (DIN 6499) Collet Chuck Systems

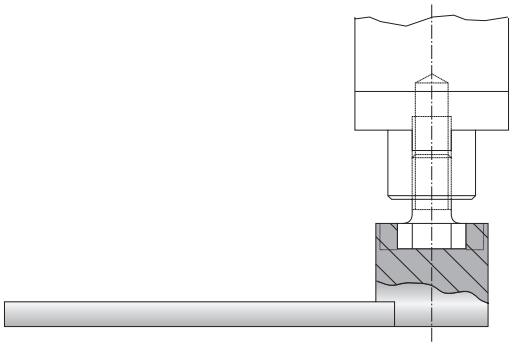
Service Key				
Nominal Size	Size	Service Key	Type	Part No.
ER 08 Mini	9.0	–	X	**415373**
ER 11 Mini	12.0	–	X	**415374**
ER 16 Mini	17.5	–	X	**415375**
ER 16	–	25	P	**215927**
ER 25	42.0	–	T	**215929**
ER 32	50.0	–	T	**215930**
ER 40	63.0	–	T	**215931**

Service Keys for Erickson Collet Chuck Systems

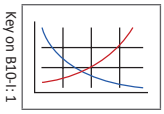
Service Key		
Service Key	Type	Part No.
13	P	**315689**
19	P	**315691**



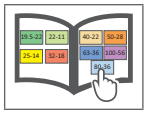
Service Keys	
Service Key	Part No.
13	**115785**
16	**115699**
22	**115660**
27	**115661**
32	**115662**
40	**115663**
60	**315637**



B10-N: 10-13



B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)

Notes

SECTION

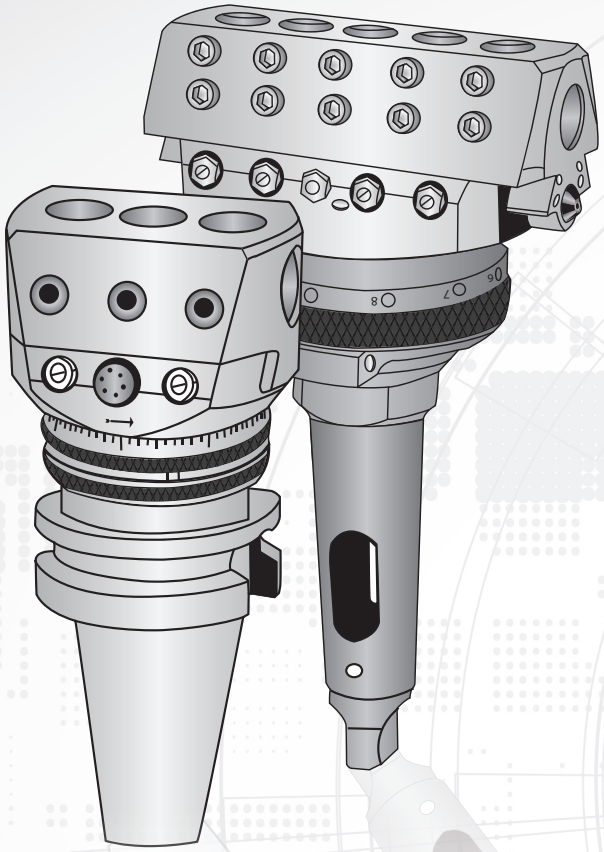
B10-J

UPA Versatile Boring Heads

Wohlhaupter™ UPA Versatile Boring Heads

UPA 3 | UPA 4 | UPA 5s6

- Diameter Range: 0.000" - 24.409" (0.00mm - 620.00mm)



Operation Facing and Boring

In 1936, the first model of the Wohlhaupter Universal Facing and Boring head was developed to launch the start of Wohlhaupter boring products. It became a staple to the boring industry.

Universal Facing and Boring heads are used on universal milling and boring machines, boring mills, and jig boring machines for machining stationary workpieces in individual and batch productions.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

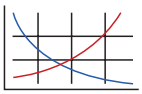
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries

Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.

Setup / Assembly Information
Detailed instructions and information regarding the corresponding part(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe drilling

Universal Versatile Boring Heads Table of Contents

Introduction

UPA Product Overview . . . . . 2 - 3

UPA 3 Boring System

UPA 3 Boring Heads and Accessories . . . . . 4 - 5

UPA 3 Shanks . . . . . 6 - 7

UPA 4 and 5s6 Boring System

UPA 4 Boring Heads and Accessories . . . . . 8 - 9

UPA 5-S 6 Boring Heads and Accessories . . . . . 10 - 11

UPA 4 and 5-S 6 Shanks 12

Technical Data and Chip Production Values 13

UPA Boring System Diagram . . . . . 14 - 15

Series	Diameter Range	
	Imperial (inch)	Metric (mm)
UPA 3	0.000 - 10.230	0.00 - 260.00
UPA 4	0.000 - 15.740	0.00 - 400.00
UPA 5s6	0.000 - 24.404	0.00 - 620.00

UPA Boring Head
FACING AND BORING

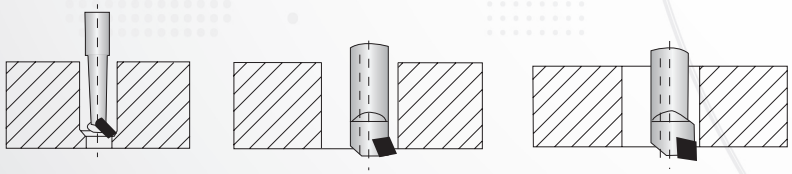
Universal Facing and Boring Heads

The versatile Wohlhaupter UPA boring heads can be used for facing, boring, and taper turning. They can also be used for right or left-handed turning.

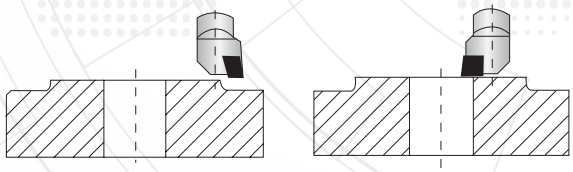
Precise and ***versatile*** boring heads.

- Diameter range: 0.000" - 24.409" (0.00mm - 620.00mm)
- Slide adjustment up to 4.410" (112.00mm)
- Can be used in a variety of operations

UNIVERSAL
FACING & BORING *Applications*



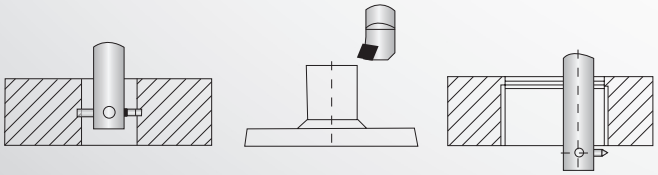
Boring with different tools



Facing

From inside outward

From outside inward



Recessing

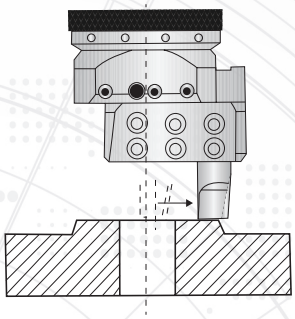
Outside Turning

Thread Cutting

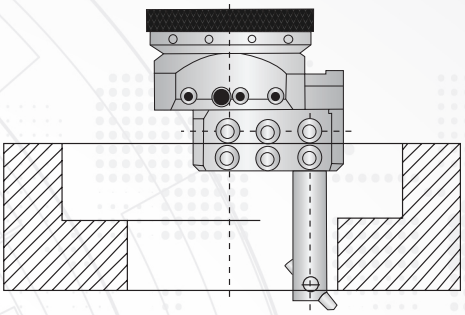
Taper Turning

UNIVERSAL

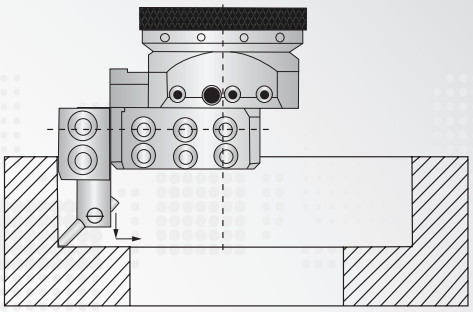
FACING & BORING *Application Examples*



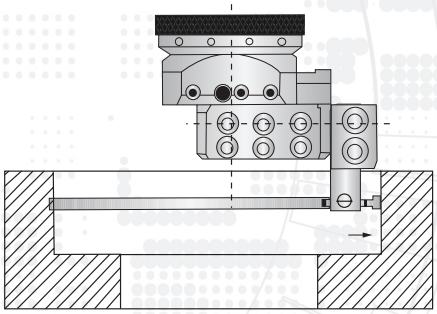
Facing with boring bar directly in slide



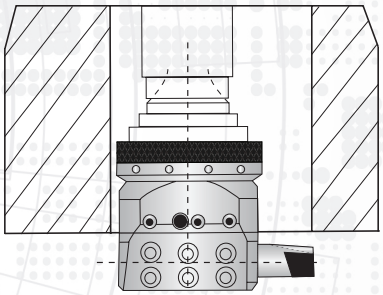
Boring with long boring bar



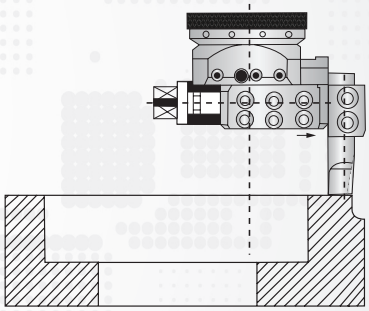
Boring and facing with short boring bar holder and a boring bar



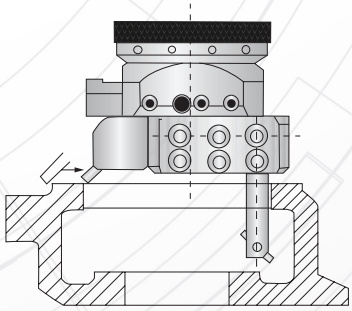
Recessing with short boring bar holder and a boring bar



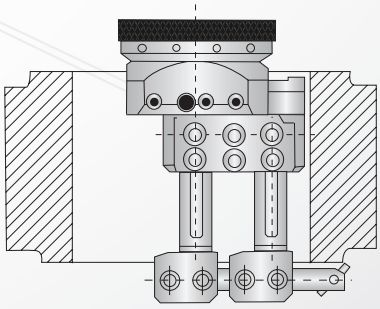
Deep hole boring with boring bar directly in slide



Large diameter facing with a long boring bar holder



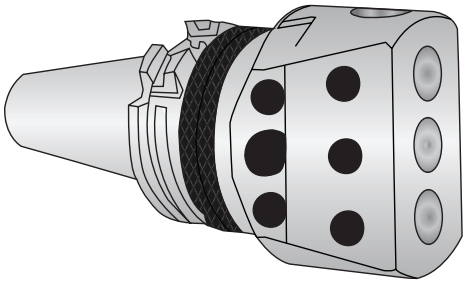
Facing in two areas with one boring bar and a boring bar holder

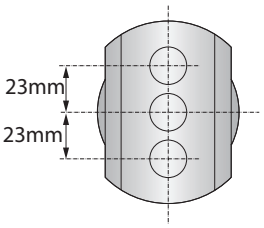


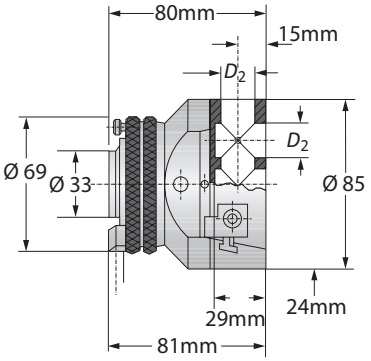
Facing the reverse side by using boring bar holders contained in attachment

UPA 3 Boring Heads and Accessories

Diameter Range: 0.000" - 10.230" (0.00mm - 260.00mm)

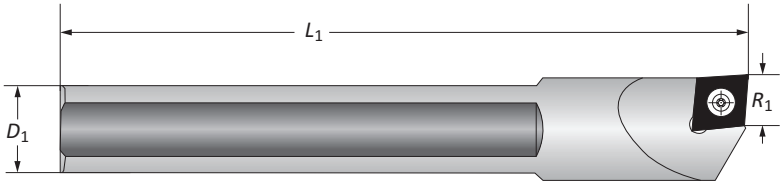






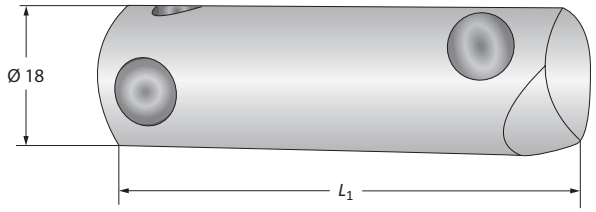
UPA 3 Boring Heads

	Boring Range	Boring Head D_2	Weight	Part No.
i	0.000 - 10.230	0.750	4.629 (lbs)	**006020**
m	0.00 - 260.00	18.00	2.10 (kg)	**005020**



UPA 3 Boring Bars

	Boring Bar D_1	L_1	R_1	Weight	Cutting Direction	Insert Form	Part No.
i	0.750	3.149	0.531	0.220 (lbs)	R	103	**0750BFBR**
	0.750	3.149	0.531	0.220 (lbs)	L	103	**0750BFBL**
m	18.00	80.00	13.50	0.10 (kg)	R	103	**081087**
	18.00	80.00	13.50	0.10 (kg)	L	103	**218088**



UPA 3 Boring Bars

	Boring Bar L_1	Boring Depth	Designation	Part No.
i	2.362	1.181	B 306	**073003**
	3.543	2.362	B 309	**073004**
	4.724	3.543	B 312	**073005**
m	60.00	30.00	B 306	**073003**
	90.00	60.00	B 309	**073004**
	120.00	90.00	B 312	**073005**

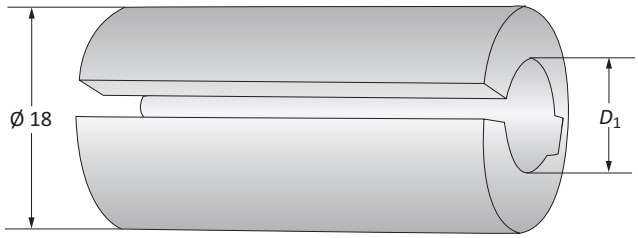
B10-N: 10-13
Key on B10-J: 1

B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

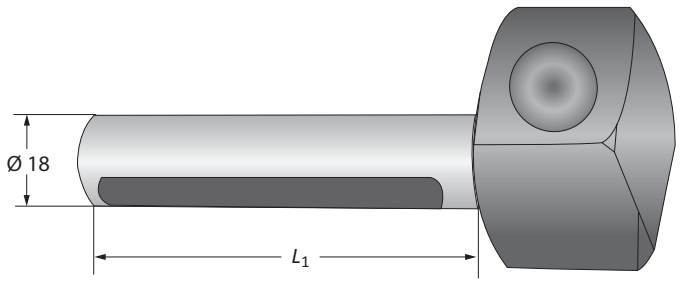
UPA 3 Accessories

Reducing Sleeves | Boring Bar Holders



UPA 3 Reducing Sleeves

	Reducing Sleeve D_1	Weight	Part No.
ⓘ	0.236	0.220 (lbs)	**072104**
	0.375	0.220 (lbs)	**072105**
	0.500	0.220 (lbs)	**072106**
	0.625	0.220 (lbs)	**072107**
ⓜ	8.00	0.10 (kg)	**071103**
	10.00	0.10 (kg)	**071104**
	12.00	0.10 (kg)	**071105**
	14.00	0.10 (kg)	**071106**



UPA 3 Boring Bar Holders

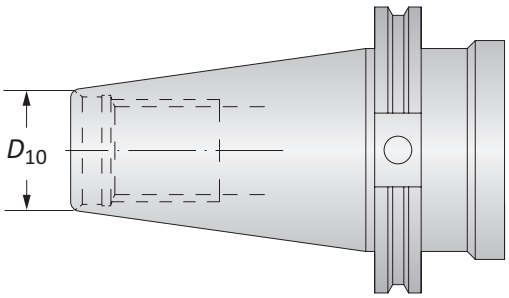
	Boring Bar Holder L_1	Working Diameter Range	Designation	Part No.
ⓘ	3.228	3.346 - 7.480	BH 308	**075001**
	4.724	6.299 - 10.236	BH 312	**075002**
ⓜ	82.00	85.00 - 190.00	BH 308	**075001**
	120.00	160.00 - 260.00	BH 312	**075002**

B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

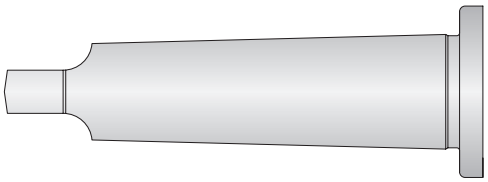
UPA 3 Master Shanks

CAT 40/50 | Morse Taper 40/50



CAT 40/50 Shanks

	Shank Style	Shank D_{10}	Shank Weight	Part No.
ⓘ	CAT 40	5/8 - 11	2.336 (lbs)	**130001T013939**
ⓘ	CAT 50	1 - 8	7.054 (lbs)	**130001T011624**
ⓜ	CAT 40	M16	1.06 (kg)	**130001T013939**
ⓜ	CAT 50	M24	3.20 (kg)	**130001T011624**



Morse Taper Shanks

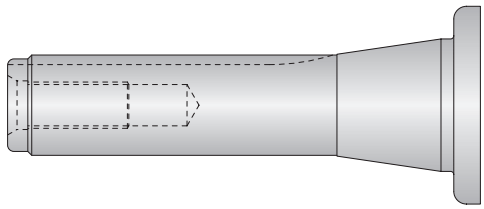
	Shank Style	Shank Weight	Part No.
ⓘ	MT 3	0.661 (lbs)	**130001T004509**
ⓘ	MT 4	1.212 (lbs)	**130001T003590**
ⓘ	MT 5	2.976 (lbs)	**130001T003920**
ⓜ	MT 3	0.30 (kg)	**130001T004509**
ⓜ	MT 4	0.55 (kg)	**130001T003590**
ⓜ	MT 5	1.35 (kg)	**130001T003920**

B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)

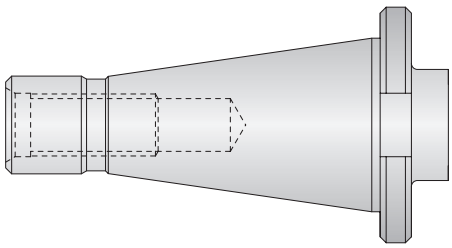
UPA 3 Master Shanks

R-8 | NMTB 40/50



R-8 Shanks

	Shank Weight	Part No.
ⓘ	1.058 (lbs)	**130001T007166**
ⓜ	0.48 (kg)	**130001T007166**



NMTB 40/50 Shanks

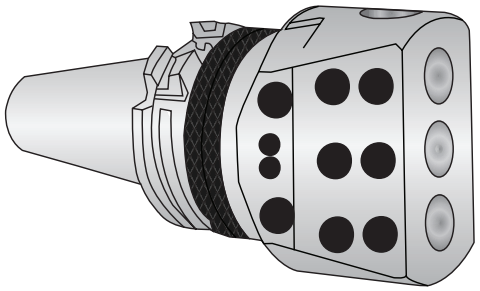
	Shank Style	Weight	Part No.
ⓘ	NMTB40	1.984 (lbs)	**130001T004498**
	NMTB50	5.798 (lbs)	**130001T004480**
ⓜ	NMTB40	0.90 (kg)	**130001T004498**
	NMTB50	2.63 (kg)	**130001T004480**

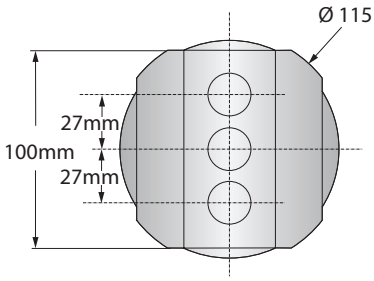
B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

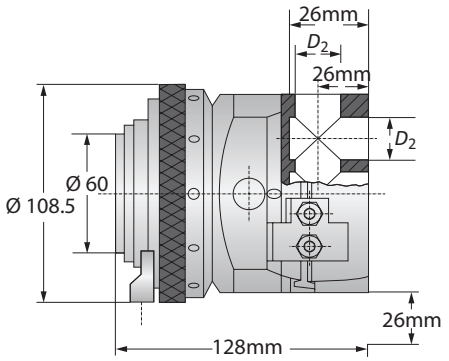
ⓘ = Imperial (in)
ⓜ = Metric (mm)

UPA 4 Boring Heads and Accessories

Diameter Range: 0.000" - 15.748" (0.00mm - 400.00mm)

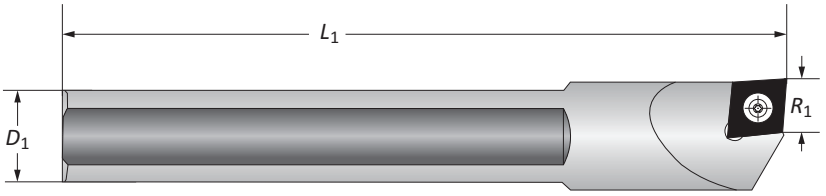






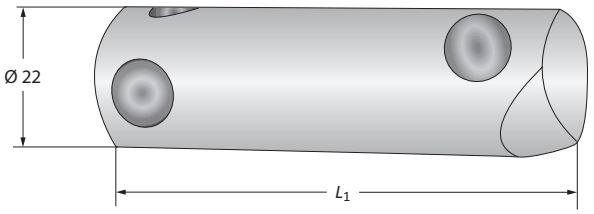
UPA 4 Boring Heads

	Boring Range	Boring Head D_2	Weight	Part No.
i	0.000 - 15.748	0.875	14.330 (lbs)	**008020**
m	0.00 - 400.00	22.00	6.50 (kg)	**007020**



UPA 4 Boring Bars

	Boring Bar D_1	L_1	R_1	Weight	Cutting Direction	Insert Form	Part No.
i	0.875	3.149	0.295	0.220 (lbs)	R	103	**0875BFBR**
	0.875	3.149	0.295	0.220 (lbs)	L	103	**0875BFBL**
m	22.00	80.00	7.50	0.10 (kg)	R	103	**081092**
	22.00	80.00	7.50	0.10 (kg)	L	103	**218089**



UPA 4 Boring Bars

	Boring Bar L_1	Boring Depth	Designation	Part No.
i	3.346	1.771	B 408	**073006**
	4.921	3.346	B 412	**073007**
	6.496	4.921	B 416	**073008**
m	85.00	45.00	B 408	**073006**
	125.00	85.00	B 412	**073007**
	165.00	125.00	B 416	**073008**

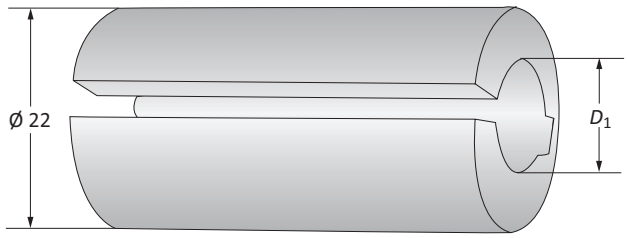
B10-N: 10-13
Key on B10-J: 1

B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

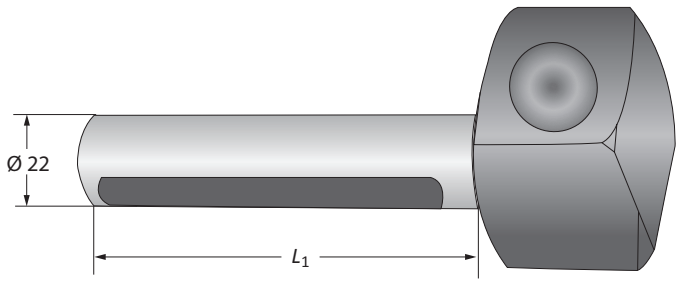
UPA 4 Accessories

Reducing Sleeves | Boring Bar Holders



UPA 4 Reducing Sleeves

	Reducing Sleeve D_1	Weight	Part No.
i	0.312	0.220 (lbs)	**072108**
	0.375	0.220 (lbs)	**072109**
	0.500	0.220 (lbs)	**072110**
	0.625	0.176 (lbs)	**072111**
	0.708	0.176 (lbs)	**072112**
m	8.00	0.10 (kg)	**071107**
	10.00	0.10 (kg)	**071108**
	12.00	0.10 (kg)	**071109**
	14.00	0.08 (kg)	**071110**
	18.00	0.08 (kg)	**071111**



UPA 4 Boring Bar Holders

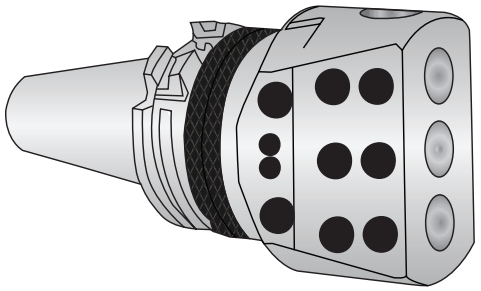
	Boring Bar Holder L_1	Working Diameter Range	Designation	Part No.
i	3.858	BH 410	4.527 - 9.448	**075003**
	7.086	BH 418	8.661 - 15.748	**075004**
m	98.00	BH 410	115.00 - 240.00	**075003**
	180.00	BH 418	220.00 - 400.00	**075004**

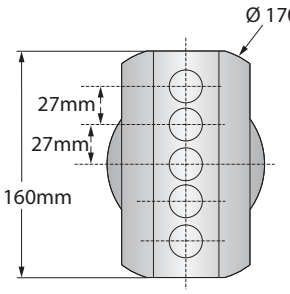
B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

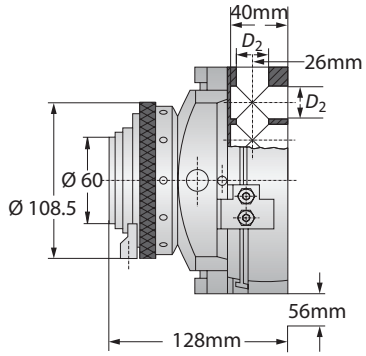
i = Imperial (in)
m = Metric (mm)

UPA 5-S 6 Boring Heads and Accessories

Diameter Range: 0.000" - 24.409" (0.00mm - 620.00mm)

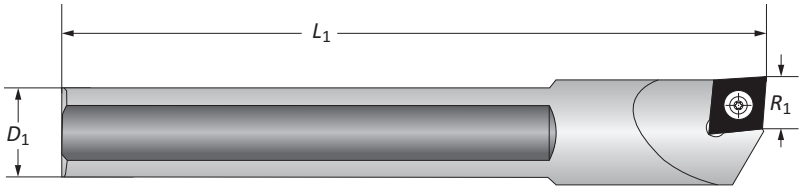






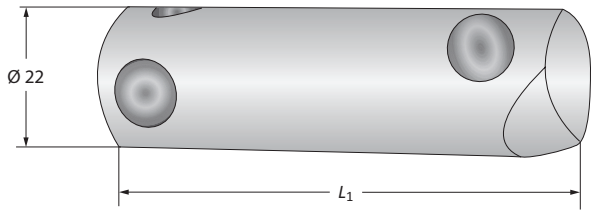
UPA 5-S 6 Boring Heads

	Boring Range	Boring Head D_2	Weight	Part No.
i	0.000 - 24.409	0.875	17.416 (lbs)	**014020**
m	0.00 - 620.00	22.00	7.90 (kg)	**013020**



UPA 5-S 6 Boring Bars

	Boring Bar D_1	L_1	R_1	Weight	Cutting Direction	Insert Form	Part No.
i	0.875	3.149	0.295	0.220 (lbs)	R	103	**0875BFBR**
	0.875	3.149	0.295	0.220 (lbs)	L	103	**0875BFBL**
m	22.00	80.00	7.50	0.10 (kg)	R	103	**081092**
	22.00	80.00	7.50	0.10 (kg)	L	103	**218089**



UPA 5-S 6 Boring Bars

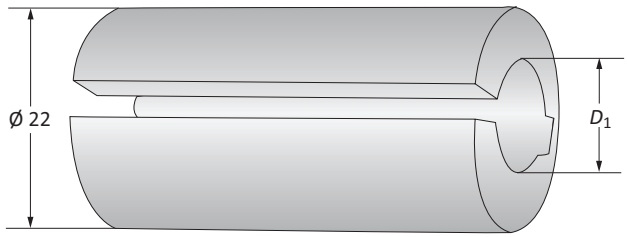
	Boring Bar L_1	Boring Depth	Designation	Part No.
i	3.346	1.771	B 408	**073006**
	4.921	3.346	B 412	**073007**
	6.496	4.921	B 416	**073008**
m	85.00	45.00	B 408	**073006**
	125.00	85.00	B 412	**073007**
	165.00	125.00	B 416	**073008**

B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

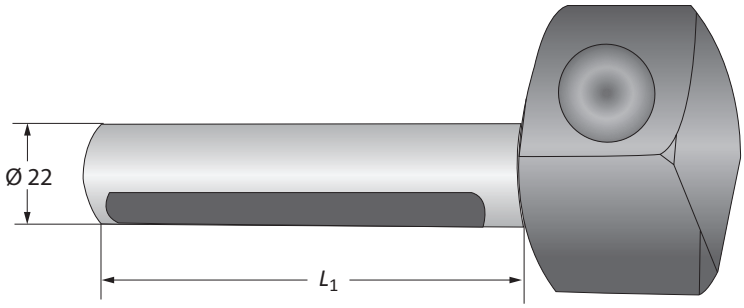
UPA 5-S 6 Accessories

Reducing Sleeves | Boring Bar Holders



UPA 5-S 6 Reducing Sleeves

	Reducing Sleeve D_1	Weight	Part No.
	0.312	0.220 (lbs)	**072108**
	0.375	0.220 (lbs)	**072109**
ⓘ	0.500	0.220 (lbs)	**072110**
	0.625	0.176 (lbs)	**072111**
	0.708	0.176 (lbs)	**072112**
	8.00	0.10 (kg)	**071107**
	10.00	0.10 (kg)	**071108**
ⓜ	12.00	0.10 (kg)	**071109**
	14.00	0.08 (kg)	**071110**
	18.00	0.08 (kg)	**071111**



UPA 5-S 6 Boring Bar Holders

	Boring Bar Holder L_1	Working Diameter Range	Designation	Part No.
ⓘ	3.858	BH 410	4.527 - 9.448	**075003**
	7.086	BH 418	8.661 - 15.748	**075004**
ⓜ	98.00	BH 410	115.00 - 240.00	**075003**
	180.00	BH 418	220.00 - 400.00	**075004**

B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

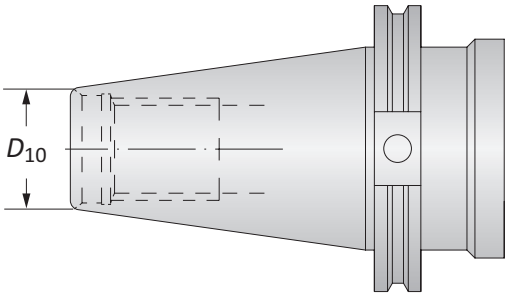
ⓘ = Imperial (in)
ⓜ = Metric (mm)

UPA 4 and 5-S 6 Master Shanks

CAT 40/50 | Morse Taper | NMTB 40/50

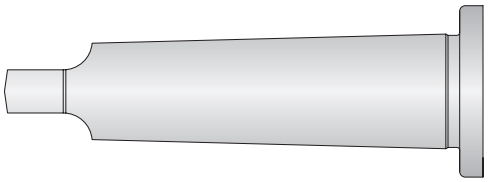
CAT 40/50 Shanks

	Shank Style	Shank D_{10}	Shank Weight	Part No.
i	CAT 40	⅝ - 11	3.196 (lbs)	**130005T013939**
i	CAT 50	1 - 8	7.054 (lbs)	**130005T011624**
m	CAT 40	M16	1.45 (kg)	**130005T013939**
m	CAT 50	M24	3.20 (kg)	**130005T011624**



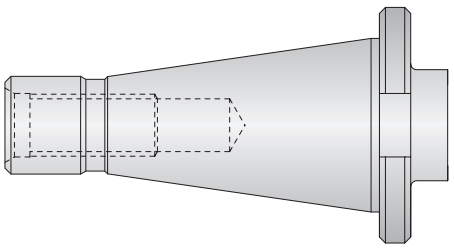
Morse Taper Shanks

	Shank Style	Shank Weight	Part No.
i	MT 4	1.895 (lbs)	**130005T003590**
i	MT 5	3.639 (lbs)	**130005T003920**
m	MT 4	0.86 (kg)	**130005T003590**
m	MT 5	1.65 (kg)	**130005T003920**



NMTB 40/50 Shanks

	Shank Style	Shank Weight	Part No.
i	NMTB40	2.866 (lbs)	**130005T004498**
i	NMTB50	6.393 (lbs)	**130005T004480**
m	NMTB40	1.30 (kg)	**130005T004498**
m	NMTB50	2.90 (kg)	**130005T004480**



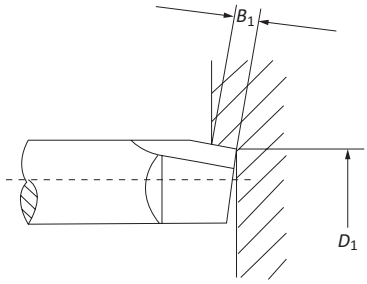
B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

i = Imperial (in)
m = Metric (mm)

Technical Information | Chip Production Values

Technical Data

	Type	UPA 3	UPA 4	UPA 5-S 6
	Working accuracy	±0.005	±0.005	±0.005
	Diameter range	25.00	35.00	45.00
	MT shank	3.00	4.00	5.00
	ISO shank	30.00	40.00	40.00
	Facing and boring range	0.00 - 260.00	0.00 - 400.00	0.00 - 620.00
	Adjustment of slide (max)	48.00	52.00	112.00
	Self activated feed of slide per revolution	0.05	0.02, 0.04, 0.06, 0.14, 0.16, 0.18	0.08, 0.10, 0.12 0.20, 0.22, 0.24
m	Fine adjustment of 1 division	0.01	0.01	0.01
	Fine adjustment of 1 revolution	1.00	0.40	0.40
	Rapid return per revolution	1.00	–	–
	Rapid return setting per revolution	–	6.00	6.00
	Largest diameter of slide	85.00	115.00	170.00
	Height of boring head without shank	75.00	128.00	128.00
	Tool locations in slide	18.00	22.00	22.00
	Max permissible revolutions	1000	600	600
	End cut off accuracy	±0.05	±0.05	±0.05

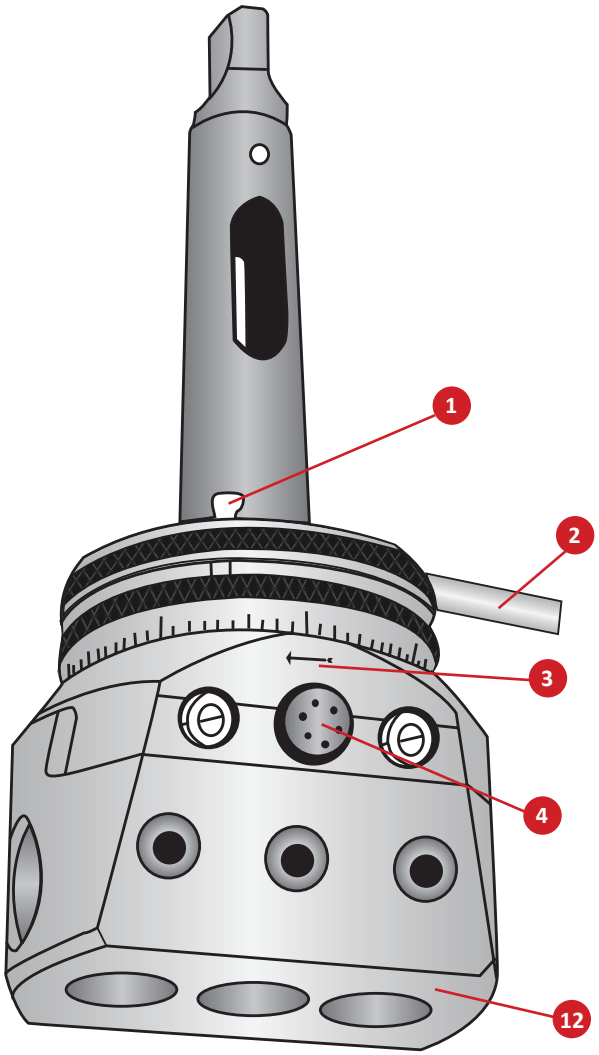


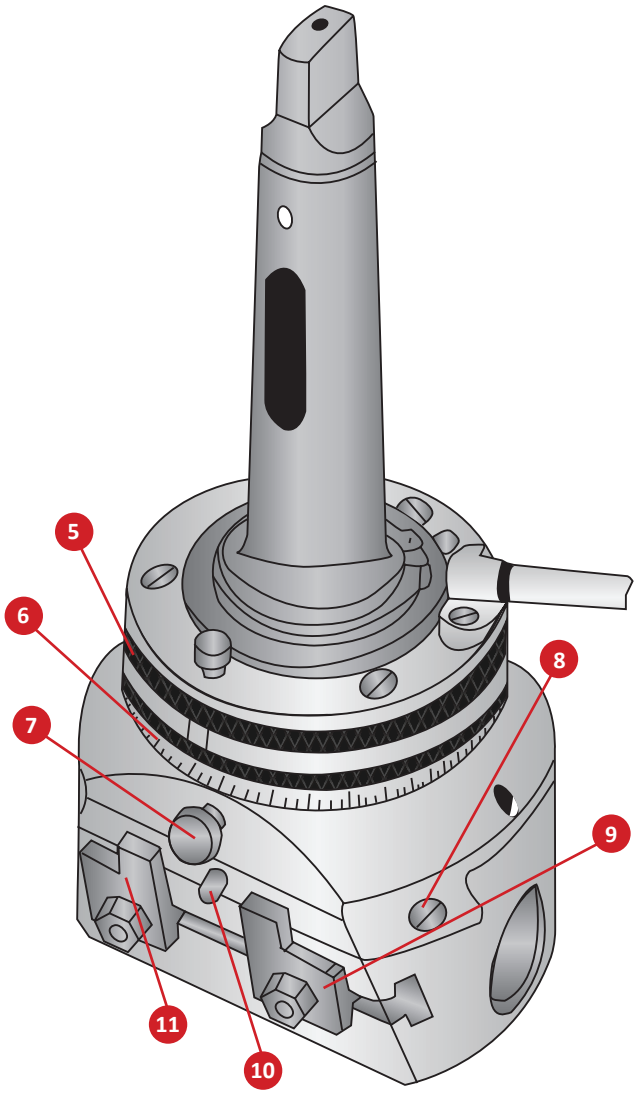
Chip Production Values

	Chip Cutting Guide	Type	UPA 3	UPA 4	UPA 5-S 6
	Max load	KW	2.50	7.00	9.50
	With slide feed	mm/rev.	0.050	0.08, 0.12, 0.24	0.08, 0.12, 0.24
	For smaller working Ø	D_1	60.00	150.00	200.00
m	Maximum width of chip	B_1	4.00	7.00, 6.00, 4.00	8.00, 7.00, 5.00
	Maximum working Ø	D_1	260.00	400.00	500.00 / 620.00
	Without reinforcement rings	B_1	2.00	2.20, 2.00, 1.50	2.50, 2.00, 1.50
	With reinforcement rings	B_1	–	4.50, 4.00, 3.00	5.00, 4.00, 3.00

B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

UPA 3 Boring Head Diagram

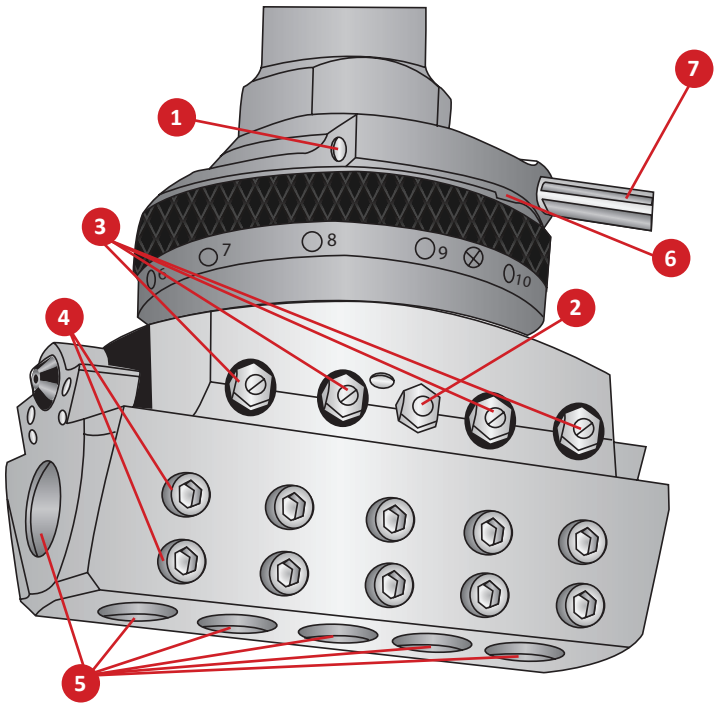


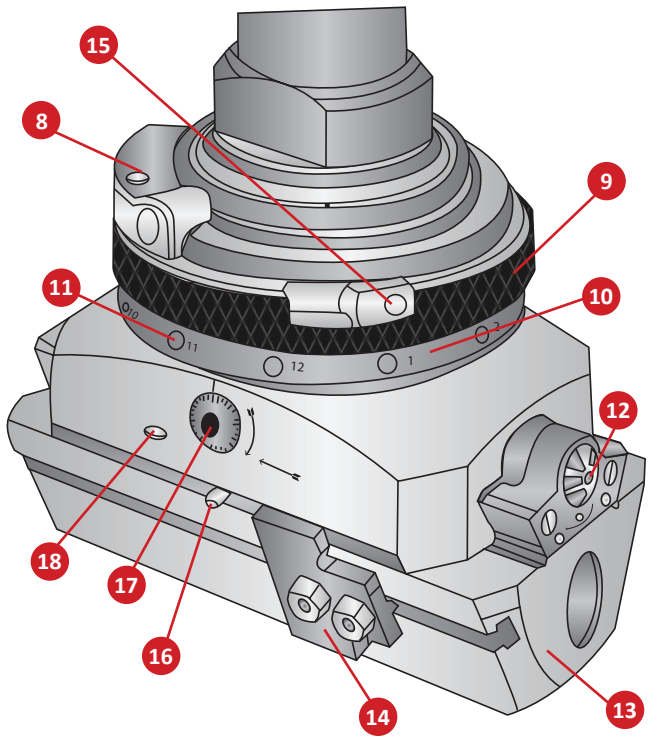


No.	Part	No.	Part
1	Button for return movement	7	Feed button
2	Stop rod	8	Regulating screw
3	Arrow	9	Stop
4	Locking screw	10	Fixed pin
5	Holding ring	11	Stop
6	Scale ring	12	Slide

B10-N: 10-13
Key on B10-J: 1
B10: xii-xiii

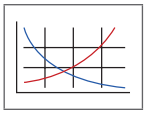
UPA 4 / 5-S 6 Boring Heads Diagram





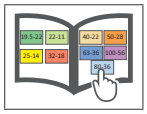
No.	Part	No.	Part
1	Regulating screw	10	Scale ring
2	Locking screw	11	Feed buttons
3	Setting screws	12	Quick setting dial
4	Fastening screws	13	Slide with tool rotation bores
5	Tool post holes	14	Stop
6	Recess	15	Release ring
7	Stop rod	16	Fixed pin
8	Retaining ring	17	Fine setting dial
9	Feed ring	18	Retaining pin

B10-N: 10-13



Key on B10-J: 1

B10: xii-xiii



Notes

Notes

SECTION

B10-K

Special Boring Solutions

Wohlhaupter™ Special Boring Solutions

Special Design Tooling

When it comes to special solutions for customers, Wohlhaupter has unique capabilities to effectively design and develop special boring tools. Our special boring tools are designed for specific machines, processes, and materials to help save you time and money.

If you have a particularly unique or difficult application, give our Application Engineering team a call.
phone: **330.343.4283** *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

Wohlhaupter™ Special Boring Solutions Table of Contents

Special Tooling Solutions

EK Goover and Lay Down Cartridge Tools 2
Anti-Vibration and Wobble Bar Tools 3
Large OD Turning Tools 4
Padded Line Boring Tool 5
DigiBore Special Boring Tools 6
Combi-Line Special Boring Tool 7

Online Tools

ToolMD 8
Boring Insert Selector 9

GROOVING TOOLS

EK GROOVER

- Create complex grooves faster and deeper than ever before
- Eliminate chatter in hard-to-reach internal forms
- The electronically-controlled insert release can be adapted to most machine tools
- Single or double grooving in one operation

ROUGH BORING TOOLS

LAY DOWN CARTRIDGE

- Increase the precision of your roughing tool while protecting your investment
- If the tool is ever damaged, simply replace a cartridge and resume making chips

SPECIAL BORING TOOLS

ANTI-VIBRATION

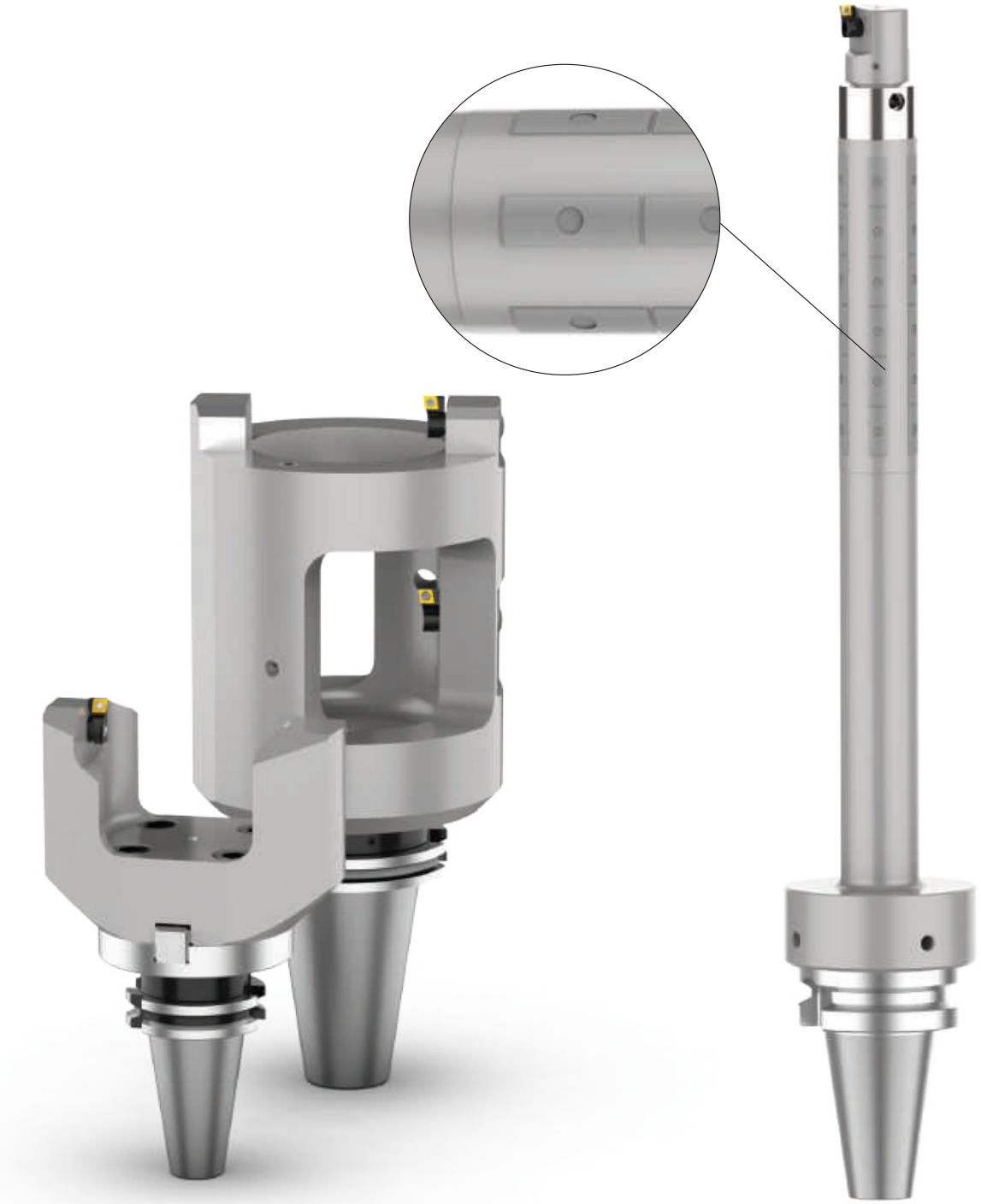
- Vibration dampening rings
- Used to reduce harmonic vibration in deeper boring applications

SPECIAL BORING TOOLS

WOBBLE BAR

- Fine adjustment tool for reverse machining
- Combined with multi-diameter roughing cartridges

Large OD Turning | Padded Line Boring Tool



SPECIAL BORING TOOLS

LARGE OD TURNING TOOLS

- Multi-step OD turning
- Drastically reduce cycle time
- Improve surface finish and feature concentricity

SPECIAL BORING TOOLS

PADDED TOOLING

- Aids in stable part processing
- Expands length to diameter capabilities
- Improves surface finish
- Pads are replaceable to extend tool life

3E[TECH] Special Tools

3E[TECH] BORING TOOL

MULTI-STEP BORING TOOL

- Easy diameter adjustments with 3E[TECH]
- One digital readout module to use on all steps

3E[TECH] BORING TOOL

LINE BORING TOOL

- One digital readout module used on all steps

DigiBore Special Boring Tools

FINISH BORING TOOLS

DIGIBORE WITH 249(248)

- Standard DigiBore head, standard 249(248) head, and special slide for precise 2-step bore
- MVS connection

FINISH BORING TOOLS

DIGIBORE SPECIAL

- Standard DigiBore boring head with OD turn and OD chamfer insert holder
- MVS connection

Combi-Line Special Boring Tool

ROUGH, FINISH, and CHAMFER BORING TOOLS

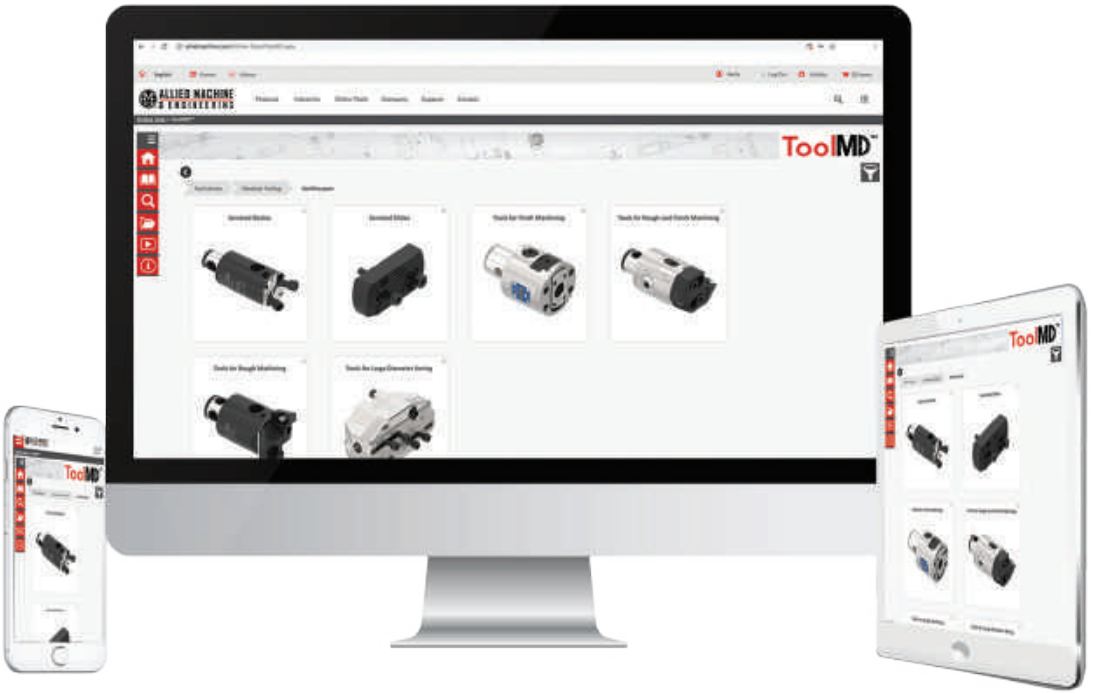
COMBI-LINE

- Standard Combi-Line tooling with added chamfer insert holder
- MVS connection

ToolMD

ToolMD™

www.toolmd.com



Design Your Own Solutions

ToolMD is a configurator for Wohlhaupter modular tooling systems that allows customers to virtually build their own solution. This online-based simulator puts the entire Wohlhaupter product line at your fingertips. It provides a digital bank of every individual part that Wohlhaupter manufactures in either inch or metric.

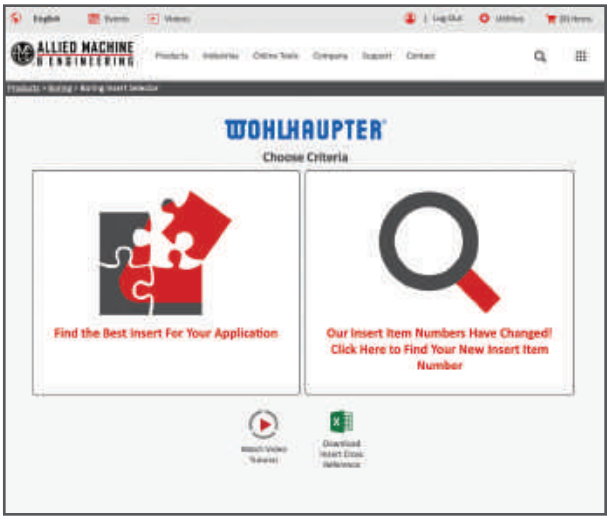
Once you select a component, you will be guided by a series of user-friendly prompts to select the next components until you have built your tooling system. Throughout the process, you can monitor the size of your custom tool and ensure what you're building matches your real-life specifications. Once a complete system is virtually assembled, the program will render the tool in either a 2D or 3D drawing to view on your device.

Designing your tools with ToolMD saves you time and allows you to instantly obtain the right tool for the job.

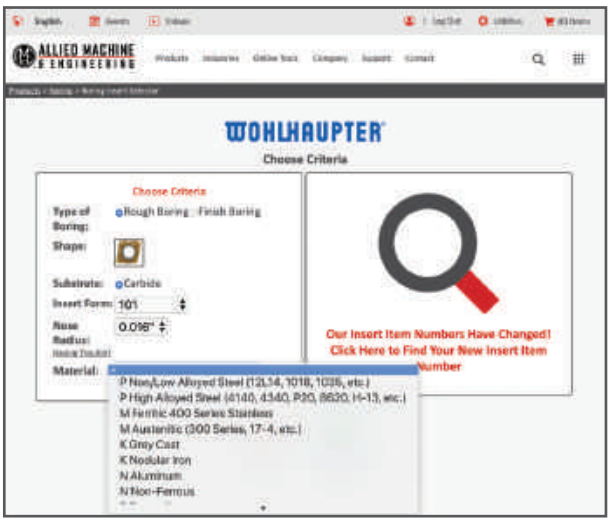
Design anytime from anywhere.
Available online 24/7.

WOHLHAUPTER® | Boring Insert Selector

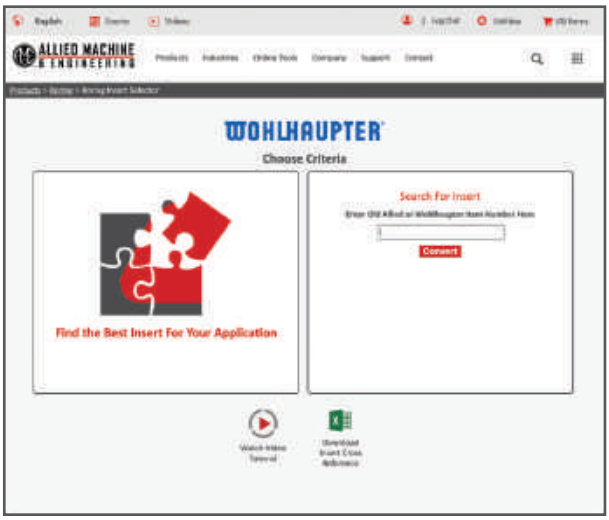
www.alliedmachine.com/bis



- Generate the correct boring insert for your application in just six easy steps



- Choose type, shape, substrate, insert form, nose radius, and workpiece material
- Order easily by adding the item to your cart



- Search for your new insert item number by entering your old item number

SECTION

B10-L

Lay Down Cartridges

Wohlhaupter™ Lay Down Cartridges

Holders for Pre-Machining | Holders for Compact Boring Bars | Short Clamp Holders | Fine Boring Holders

Robust. Powerful. Versatile. Engineered Solutions.

From pre-machining holes with heavy stock removal to finish machining with tight tolerances and excellent surface finish, Wohlhaupter's extensive range of lay down cartridges can help you achieve specific boring solutions. Wohlhaupter's lay down cartridges bring innovative concepts designed to improve productivity, reduce scrap, and reduce the cost per part.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

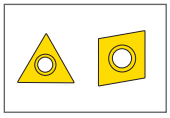
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

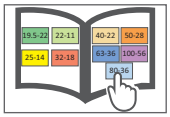
Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

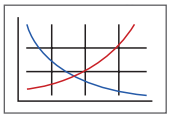
Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



Inserts
For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Lay Down Cartridges Table of Contents

Insert Holders

Pre-Machining Lay Down Cartridges . . . . . 2 - 5
Accessories 6

Compact Lay Down Cartridges . . . . . 7 - 9
Accessories 10

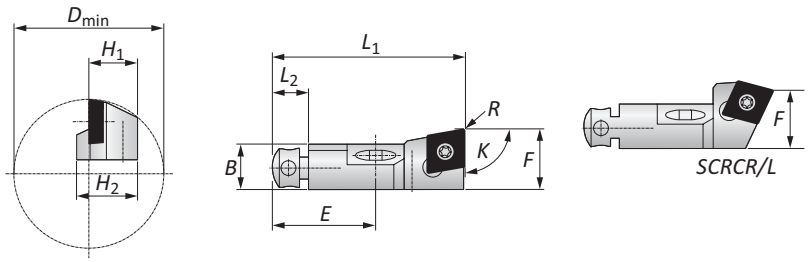
Lay Down Cartridges for Heavy Cutting . . . . . 11 - 13
Accessories 14

Fine Boring Cartridges for Pre-Processing . . . . . 15 - 16
Accessories 17

Fine Boring Lay Down Cartridges . . . . . 18 - 19
Accessories 20

Pre-Machining Lay Down Cartridges | Insert Forms 101, 103, 112, 113

Diameter Range: ≥ 0.948" (25.00mm)



Insert Form 101, 103 Insert Holders

	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	L_2	B	H_1	H_2	F	R	E	Insert Form	Part No.
i		95°	CC..0602..	0.984	SCLCR08CA-06	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343051**
		95°	CC..0602..	0.984	SCLCL08CA-08	1.295	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343052**
		90°	CC..0602..	0.984	SCFCR08CA-06	1.295	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343053**
		90°	CC..0602..	0.984	SCFCL08CA-06	1.295	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343054**
		90°	CC..09T3..	1.574	SCFCR10CA-09	1.968	0.314	0.433	0.393	0.590	0.551	0.031	0.787	103	**343055**
		90°	CC..09T3..	1.574	SCFCL10CA-09	1.968	0.314	0.433	0.393	0.590	0.551	0.031	0.787	103	**343056**
		75°	CC..0602..	0.984	SCRCR08CA-06	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343059**
		75°	CC..0602..	0.984	SCRCL08CA-06	1.295	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343060**
		75°	CC..0602..	0.984	SCKCR08CA-06	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343057**
		75°	CC..0602..	0.984	SCKCL08CA-06	1.295	0.236	0.295	0.314	0.433	0.393	0.015	0.669	101	**343058**
m		95°	CC..0602..	25.00	SCLCR08CA-06	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343051**
		95°	CC..0602..	25.00	SCLCL08CA-08	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343052**
		90°	CC..0602..	25.00	SCFCR08CA-06	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343053**
		90°	CC..0602..	25.00	SCFCL08CA-06	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343054**
		90°	CC..09T3..	40.00	SCFCR10CA-09	50.00	8.00	11.00	10.0	15.00	14.00	0.80	20.00	103	**343055**
		90°	CC..09T3..	40.00	SCFCL10CA-09	50.00	8.00	11.00	10.0	15.00	14.00	0.80	20.00	103	**343056**
		75°	CC..0602..	25.00	SCRCR08CA-06	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343059**
		75°	CC..0602..	25.00	SCRCL08CA-06	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343060**
		75°	CC..0602..	25.00	SCKCR08CA-06	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343057**
		75°	CC..0602..	25.00	SCKCL08CA-06	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	101	**343058**

Insert Form 112, 113 Insert Holders

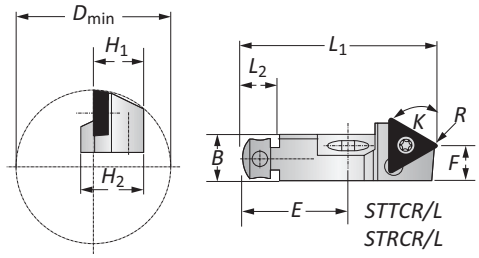
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	L_2	B	H_1	H_2	F	R	E	Insert Form	Part No.
i		75°	SC..09T3..	0.984	SSKCR08CA-06	1.968	0.314	0.433	0.393	0.590	0.551	0.031	0.787	112	**343061**
		75°	SC..09T3..	0.984	SSKCL08CA-06	1.968	0.314	0.433	0.393	0.590	0.551	0.031	0.787	112	**343062**
		75°	SC..1204..	1.968	SSKCR12CA-12	2.165	0.314	0.590	0.472	0.787	0.787	0.031	0.787	113	**343063**
		75°	SC..1204..	1.968	SSKCL12CA-12	2.165	0.314	0.590	0.472	0.787	0.787	0.031	0.787	113	**343064**
m		75°	SC..09T3..	25.00	SSKCR08CA-06	50.00	8.00	11.00	10.00	15.00	14.00	0.80	20.00	112	**343061**
		75°	SC..09T3..	25.00	SSKCL08CA-06	50.00	8.00	11.00	10.00	15.00	14.00	0.80	20.00	112	**343062**
		75°	SC..1204..	50.00	SSKCR12CA-12	55.00	8.00	15.00	12.00	20.00	20.00	0.80	20.00	113	**343063**
		75°	SC..1204..	50.00	SSKCL12CA-12	55.00	8.00	15.00	12.00	20.00	20.00	0.80	20.00	113	**343064**

B10: 10 - 13
Key on B10-L: 1
B10-F
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Pre-Machining Lay Down Cartridges | Insert Forms 73, 160, 161, 163

Diameter Range: ≥0.614" (15.60mm)



	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	L_2	B	H_1	H_2	F	R	E	Insert Form	Part No.
		95°	TC.06T1..	0.614	STLCR06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343043**
		95°	TC.06T1..	0.614	STLCR06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343044**
		93°	TC..0902..	0.984	STUCR08CA-09	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343035**
		93°	TC..0902..	0.984	STUCL08CA-09	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343036**
		90°	TC..06T1..	0.614	STFCR06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343001**
		90°	TC..06T1..	0.614	STFCR06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343002**
		90°	TC..06T1..	0.787	STFCR06CA-06	0.984	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343003**
		90°	TC..06T1..	0.787	STFCL06CA-06	0.984	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343004**
		90°	TC..0902..	0.984	STFCR08CA-09	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343005**
		90°	TC..0902..	0.984	STFCL08CA-09	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343006**
		90°	TC..1102..	1.574	STFCR10CA-11	1.968	0.314	0.433	0.393	0.590	0.551	0.015	0.787	161	**343007**
		90°	TC..1102..	1.574	STFCL10CA-11	1.968	0.314	0.433	0.393	0.590	0.551	0.015	0.787	161	**343008**
		90°	TC..16T3..	1.968	STFCR12CA-16	2.165	0.314	0.590	0.472	0.787	0.787	0.031	0.787	163	**343009**
		90°	TC..16T3..	1.968	STFCL12CA-16	2.155	0.314	0.590	0.472	0.787	0.787	0.031	0.787	163	**343010**
		90°	TC..16T3..	2.165	STFCR16CA-16	2.480	0.314	0.787	0.629	0.787	0.984	0.031	0.984	163	**343011**
		90°	TC..16T3..	2.165	STFCL16CA-16	2.480	0.314	0.787	0.629	0.787	0.984	0.031	0.984	163	**343012**
		95°	TC.06T1..	15.60	STLCR06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343043**
		95°	TC.06T1..	15.60	STLCR06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343044**
		93°	TC..0902..	25.00	STUCR08CA-09	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343035**
		93°	TC..0902..	25.00	STUCL08CA-09	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343036**
		90°	TC..06T1..	15.60	STFCR06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343001**
		90°	TC..06T1..	15.60	STFCR06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343002**
		90°	TC..06T1..	20.00	STFCR06CA-06	25.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343003**
		90°	TC..06T1..	20.00	STFCL06CA-06	25.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343004**
		90°	TC..0902..	25.00	STFCR08CA-09	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343005**
		90°	TC..0902..	25.00	STFCL08CA-09	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343006**
		90°	TC..1102..	40.00	STFCR10CA-11	50.00	8.00	11.00	10.00	15.00	14.00	0.40	20.00	161	**343007**
		90°	TC..1102..	40.00	STFCL10CA-11	50.00	8.00	11.00	10.00	15.00	14.00	0.40	20.00	161	**343008**
		90°	TC..16T3..	50.00	STFCR12CA-16	55.00	8.00	15.00	12.00	20.00	20.00	0.80	20.00	163	**343009**
		90°	TC..16T3..	50.00	STFCL12CA-16	55.00	8.00	15.00	12.00	20.00	20.00	0.80	20.00	163	**343010**
		90°	TC..16T3..	55.00	STFCR16CA-16	63.00	8.00	20.00	16.00	20.00	25.00	0.80	25.00	163	**343011**
		90°	TC..16T3..	55.00	STFCL16CA-16	63.00	8.00	20.00	16.00	20.00	25.00	0.80	25.00	163	**343012**

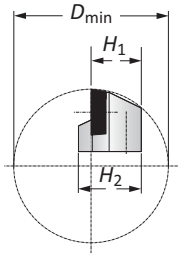
B10: 10 - 13 | B10-F | B10: xii-xiii

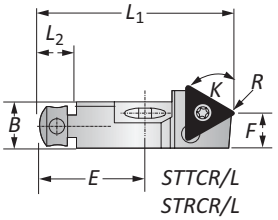
Key on B10-L: 1

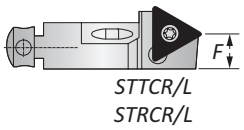
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Pre-Machining Lay Down Cartridges | Insert Forms 73, 160, 159, 161, 163

Diameter Range: ≥0.614" (15.60mm)







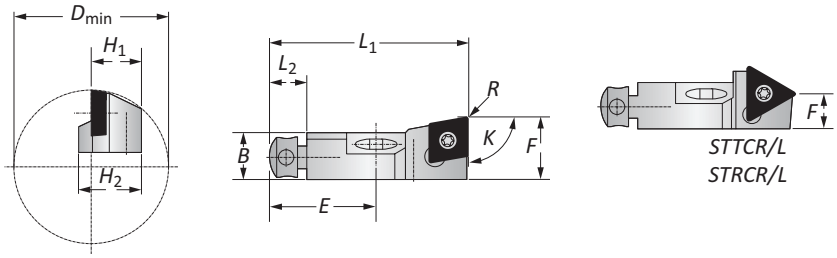
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	L_2	B	H_1	H_2	F	R	E	Insert Form	Part No.
		75°	TC..06T1..	0.614	STKCR06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343037**
		75°	TC..06T1..	0.614	STKCL06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343038**
		75°	TC..06T1..	0.787	STKCR06CA-06	0.984	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343039**
		75°	TC..06T1..	0.787	STKCL06CA-06	0.984	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343040**
		75°	TC..0902..	0.984	STKCR08CA-09	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343041**
		75°	TC..0902..	0.984	STKCL08CA-09	1.259	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343042**
		75°	TC..0902..	0.984	STKCR08CA-09	1.259	0.236	0.295	0.314	0.433	0.307	0.015	0.669	160	**343043**
		75°	TC..0902..	0.984	STKCL08CA-09	1.259	0.236	0.295	0.314	0.433	0.307	0.015	0.669	160	**343044**
ⓘ		60°	TC..06T1..	0.614	STTCR06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.145	0.007	0.472	159	**343013**
		60°	TC..06T1..	0.614	STTCL06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.145	0.007	0.472	159	**343014**
		60°	TC..06T1..	0.787	STTCR06CA-06	0.984	0.177	0.196	0.236	0.314	0.216	0.015	0.472	159	**343015**
		60°	TC..06T1..	0.787	STTCL06CA-06	0.984	0.177	0.196	0.236	0.314	0.216	0.015	0.472	159	**343016**
		60°	TC..0902..	0.984	STTCR08CA-09	1.259	0.236	0.295	0.314	0.433	0.236	0.015	0.669	160	**343017**
		60°	TC..0902..	0.984	STTCL08CA-09	1.259	0.236	0.295	0.314	0.433	0.236	0.015	0.669	160	**343018**
		60°	TC..1102..	1.575	STTCR10CA-11	1.968	0.314	0.433	0.393	0.590	0.354	0.015	0.787	161	**343019**
		60°	TC..1102..	1.575	STTCL10CA-11	1.968	0.314	0.433	0.393	0.590	0.354	0.015	0.787	161	**343020**
		60°	TC..16T3..	1.968	STTCR12CA-16	2.165	0.314	0.590	0.472	0.787	0.511	0.031	0.787	163	**343021**
		60°	TC..16T3..	1.968	STTCL12CA-16	2.165	0.314	0.590	0.472	0.787	0.511	0.031	0.787	163	**343022**
		75°	TC..06T1..	15.60	STKCR06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343037**
		75°	TC..06T1..	15.60	STKCL06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343038**
		75°	TC..06T1..	20.00	STKCR06CA-06	25.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343039**
		75°	TC..06T1..	20.00	STKCL06CA-06	25.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343040**
		75°	TC..0902..	25.00	STKCR08CA-09	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343041**
		75°	TC..0902..	25.00	STKCL08CA-09	32.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343042**
		75°	TC..0902..	25.00	STKCR08CA-09	32.00	6.00	7.50	8.00	11.00	7.80	0.40	17.00	160	**343043**
		75°	TC..0902..	25.00	STKCL08CA-09	32.00	6.00	7.50	8.00	11.00	7.80	0.40	17.00	160	**343044**
ⓜ		60°	TC..06T1..	15.60	STTCR06CA-06X7	24.50	4.50	4.50	6.00	6.00	3.70	0.20	12.00	159	**343013**
		60°	TC..06T1..	15.60	STTCL06CA-06X7	24.50	4.50	4.50	6.00	6.00	3.70	0.20	12.00	159	**343014**
		60°	TC..06T1..	20.00	STTCR06CA-06	25.00	4.50	5.00	6.00	8.00	5.50	0.40	12.00	159	**343015**
		60°	TC..06T1..	20.00	STTCL06CA-06	25.00	4.50	5.00	6.00	8.00	5.50	0.40	12.00	159	**343016**
		60°	TC..0902..	25.00	STTCR08CA-09	32.00	6.00	7.50	8.00	11.00	6.00	0.40	17.00	160	**343017**
		60°	TC..0902..	25.00	STTCL08CA-09	32.00	6.00	7.50	8.00	11.00	6.00	0.40	17.00	160	**343018**
		60°	TC..1102..	40.00	STTCR10CA-11	50.00	8.00	11.00	10.00	15.00	9.00	0.40	20.00	161	**343019**
		60°	TC..1102..	40.00	STTCL10CA-11	50.00	8.00	11.00	10.00	15.00	9.00	0.40	20.00	161	**343020**
		60°	TC..16T3..	50.00	STTCR12CA-16	55.00	8.00	15.00	12.00	20.00	13.00	0.80	20.00	163	**343021**
		60°	TC..16T3..	50.00	STTCL12CA-16	55.00	8.00	15.00	12.00	20.00	13.00	0.80	20.00	163	**343022**

B10: 10 - 13
Key on B10-L: 1
B10-F
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Pre-Machining Lay Down Cartridges | Insert Forms 73, 160, 159, 161, 163

Diameter Range: ≥0.614" (15.60mm)



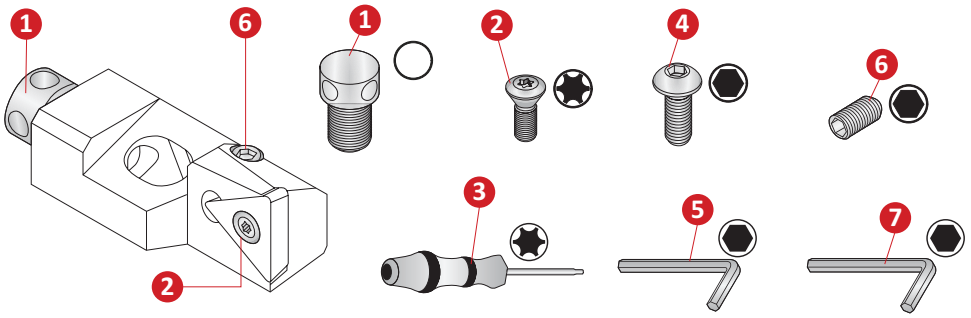
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	L_2	B	H_1	H_2	F	R	E	Insert Form	Part No.
i		60°	TC..06T1..	0.614	STWCR06CA-06X7	0.826	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343045**
		60°	TC..06T1..	0.614	STWCL06CA-06X7	0.826	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343046**
		60°	TC..06T1..	0.787	STWCR06CA-06	0.826	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343047**
		60°	TC..06T1..	0.787	STWCL06CA-06	0.826	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343048**
		60°	TC..0902..	0.787	STWCR08CA-09	1.102	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343049**
		60°	TC..0902..	0.787	STWCL08CA-09	1.102	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343050**
		45°	TC..06T1..	0.614	STSCR06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343023**
		45°	TC..06T1..	0.614	STSCL06CA-06X7	0.964	0.177	0.177	0.236	0.236	0.275	0.007	0.472	73	**343024**
		45°	TC..06T1..	0.787	STSCR06CA-06	0.826	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343025**
		45°	TC..06T1..	0.787	STSCL06CA-06	0.826	0.177	0.196	0.236	0.314	0.314	0.015	0.472	73	**343026**
		45°	TC..0902..	0.984	STSXR08CA-09	1.102	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343027**
		45°	TC..0902..	0.984	STSCL08CA-09	1.102	0.236	0.295	0.314	0.433	0.393	0.015	0.669	160	**343028**
		45°	TC..1102..	1.574	STSCR10CA-11	1.732	0.314	0.433	0.393	0.590	0.551	0.015	0.787	161	**343029**
		45°	TC..1102..	1.574	STSCL10CA-11	1.732	0.314	0.433	0.393	0.590	0.551	0.015	0.787	161	**343030**
		45°	TC..16T3..	1.968	STSCR12CA-16	1.850	0.314	0.590	0.472	0.787	0.787	0.031	0.984	163	**343031**
		45°	TC..16T3..	1.968	STSCL12CA-16	1.850	0.314	0.590	0.472	0.787	0.787	0.031	0.984	163	**343032**
m		60°	TC..06T1..	15.60	STWCR06CA-06X7	21.00	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343045**
		60°	TC..06T1..	15.60	STWCL06CA-06X7	21.00	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343046**
		60°	TC..06T1..	20.00	STWCR06CA-06	21.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343047**
		60°	TC..06T1..	20.00	STWCL06CA-06	21.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343048**
		60°	TC..0902..	20.00	STWCR08CA-09	28.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343049**
		60°	TC..0902..	20.00	STWCL08CA-09	28.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343050**
		45°	TC..06T1..	15.60	STSCR06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343023**
		45°	TC..06T1..	15.60	STSCL06CA-06X7	24.50	4.50	4.50	6.00	6.00	7.00	0.20	12.00	73	**343024**
		45°	TC..06T1..	20.00	STSCR06CA-06	21.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343025**
		45°	TC..06T1..	20.00	STSCL06CA-06	21.00	4.50	5.00	6.00	8.00	8.00	0.40	12.00	73	**343026**
		45°	TC..0902..	25.00	STSXR08CA-09	28.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343027**
		45°	TC..0902..	25.00	STSCL08CA-09	28.00	6.00	7.50	8.00	11.00	10.00	0.40	17.00	160	**343028**
		45°	TC..1102..	40.00	STSCR10CA-11	44.00	8.00	11.00	10.00	15.00	14.00	0.40	20.00	161	**343029**
		45°	TC..1102..	40.00	STSCL10CA-11	44.00	8.00	11.00	10.00	15.00	14.00	0.40	20.00	161	**343030**
		45°	TC..16T3..	50.00	STSCR12CA-16	47.00	8.00	15.00	12.00	20.00	20.00	0.80	25.00	163	**343031**
		45°	TC..16T3..	50.00	STSCL12CA-16	47.00	8.00	15.00	12.00	20.00	20.00	0.80	25.00	163	**343032**

B10: 10 - 13 | B10-F | B10: xii-xiii

Key on B10-L: 1

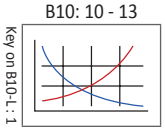
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Accessories for Pre-Machining Lay Down Cartridges



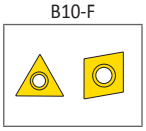
Clamping Holder Part No.		1 Barrel Screw	2 Insert Screw	3 Torx Driver	4 Holder Fixing Screw	5 Hex Driver	6 Radial Set Screw	7 Hex Driver
343001	343002	413994	415970	115537	415108	027149	215346	027148
343003	343004	419994	415970	115537	215481	027149	215346	027148
343005	343006	419995	415971	115591	215343	031149	115455	027148
343007	343008	419996	415967	115591	215643	003195	115151	027149
343009	343010	419996	415972	115664	215431	003195	126157	031148
343011	343012	419996	415972	115664	215300	005195	415993	031148
343013	343014	419994	415970	115537	415108	027149	215343	027148
343015	343016	419994	415970	115537	215481	027149	215346	027148
343017	343018	419995	415971	115591	215343	031148	115455	027148
343019	343020	419996	415967	115591	215643	003195	115151	027149
343021	343022	419996	415972	115664	215431	003195	126157	031149
343023	343024	419994	415970	115537	415108	027149	215346	027148
343025	343026	419994	415970	115537	215481	027149	215346	027148
343027	343017	419995	415971	115591	215343	031148	115455	027148
343029	343030	419996	415967	115591	215643	003195	115151	027149
343031	343032	419996	415972	115664	215431	003195	126157	031148
343033	434034	419995	415971	115591	215343	031148	115455	027148
343035	343036	419995	415971	115591	215343	031148	115455	027148
343037	343038	419994	415970	115537	415108	027149	215356	027148
343039	343040	419994	415970	115537	215481	027149	215346	027148
343041	343042	419995	415971	115591	215343	031148	115455	027148
343043	343044	419994	415970	115537	415108	027149	215346	027148
343045	343046	419994	415970	115537	415108	027149	215343	027148
343047	343048	419994	415970	115537	215481	027149	215346	027148
343049	343050	415970	415971	415108	215343	031148	215343	027148
343051	343052	419995	415967	115591	215343	031148	115455	027148
343053	343054	419995	415967	115591	215343	031148	115455	027148
343055	343056	419996	415967	115664	215643	003195	115151	027149
343057	343058	419995	415967	115591	215343	031148	115455	027148
343059	343060	419995	415967	115591	215343	031148	115455	027148
343061	343062	419995	415967	115591	215343	031148	115455	027148
343063	343064	419996	415969	215150	215431	003195	126157	031148

B10: 10 - 13

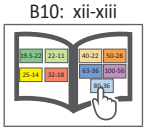


Key on B10-L: 1

B10-F



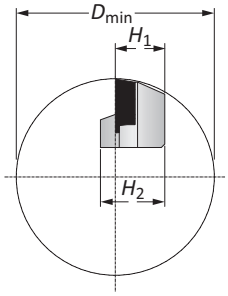
B10: xii-xiii

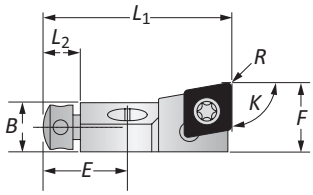


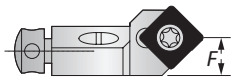
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Compact Lay Down Cartridges | Insert Forms 101, 103, 104, 105

Diameter Range: ≥0.984" (25.00mm)



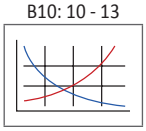




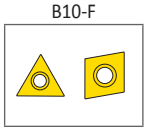
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	L_2	B	H_1	H_2	F	R Radius	E	Insert Form	Part No.
		90°	CC..0602..	0.984	SCDCR08CK-06	1.102	0.236	0.255	0.314	0.393	0.393	0.015	0.511	101	**345001**
		90°	CC..09T3..	1.574	SCFCR10CK-09	1.496	0.295	0.393	0.393	0.511	0.551	0.031	0.669	103	**345002**
		90°	CC..1204..	1.968	SCFCR12CK-12	1.771	0.314	0.551	0.472	0.629	0.787	0.031	0.787	104	**345003**
		90°	CC..1605..	2.165	SCFCE14CK-16	2.125	0.314	0.629	0.551	0.708	0.905	0.031	0.925	105	**345004**
		80°	CC..0602..	0.984	SC0CR08CK-06	1.102	0.236	0.255	0.314	0.393	0.354	0.015	0.511	101	**345014**
		80°	CC..09T3..	1.574	SC0CR10CK-09	1.496	0.295	0.393	0.393	0.511	0.492	0.031	0.669	103	**345009**
ⓘ		75°	CC..0602..	0.984	SCRCR08CK-06	1.102	0.236	0.255	0.314	0.393	0.334	0.015	0.511	101	**345013**
		75°	CC..09T3..	1.574	SCRCR10CK-09	1.496	0.295	0.393	0.393	0.511	0.460	0.031	0.669	103	**345009**
		70°	CC..0602..	0.984	SCPCR08CK-06	1.102	0.236	0.255	0.314	0.393	0.314	0.015	0.511	101	**345012**
		70°	CC..09T3..	1.574	SCPCR10CK-09	1.496	0.295	0.393	0.393	0.511	0.433	0.031	0.669	103	**345007**
		60°	CC..0602..	0.984	SCTCR08CK-06	1.102	0.236	0.255	0.314	0.393	0.275	0.015	0.511	101	**345011**
		60°	CC..09T3..	1.574	SCTCR10CK-09	1.496	0.295	0.393	0.393	0.511	0.381	0.031	0.669	103	**345006**
		45°	CC..0602..	0.984	SCSCR08CK-06	0.944	0.236	0.255	0.314	0.393	0.393	0.015	0.511	101	**345010**
		45°	CC..09T3..	1.574	SCSCR10CK-09	1.259	0.295	0.393	0.393	0.511	0.570	0.031	0.669	103	**345005**
		90°	CC..0602..	25.00	SCDCR08CK-06	28.00	6.00	6.50	8.00	10.00	10.00	0.40	13.00	101	**345001**
		90°	CC..09T3..	40.00	SCFCR10CK-09	38.00	7.50	10.00	10.00	13.00	14.00	0.80	17.00	103	**345002**
		90°	CC..1204..	50.00	SCFCR12CK-12	45.00	8.00	14.00	12.00	16.00	20.00	0.80	20.00	104	**345003**
		90°	CC..1605..	55.00	SCFCE14CK-16	54.00	8.00	16.00	14.00	18.00	23.00	0.80	23.50	105	**345004**
		80°	CC..0602..	25.00	SC0CR08CK-06	28.00	6.00	6.50	8.00	10.00	9.00	0.40	13.00	101	**345014**
		80°	CC..09T3..	40.00	SC0CR10CK-09	38.00	7.50	10.00	10.00	13.00	12.50	0.80	17.00	103	**345009**
ⓜ		75°	CC..0602..	25.00	SCRCR08CK-06	28.00	6.00	6.50	8.00	10.00	8.50	0.40	13.00	101	**345013**
		75°	CC..09T3..	40.00	SCRCR10CK-09	38.00	7.50	10.00	10.00	13.00	11.70	0.80	17.00	103	**345009**
		70°	CC..0602..	25.00	SCPCR08CK-06	28.00	6.00	6.50	8.00	10.00	8.00	0.40	13.00	101	**345012**
		70°	CC..09T3..	40.00	SCPCR10CK-09	38.00	7.50	10.00	10.00	13.00	11.00	0.80	17.00	103	**345007**
		60°	CC..0602..	25.00	SCTCR08CK-06	28.00	6.00	6.50	8.00	10.00	7.00	0.40	13.00	101	**345011**
		60°	CC..09T3..	40.00	SCTCR10CK-09	38.00	7.50	10.00	10.00	13.00	9.70	0.80	17.00	103	**345006**
		45°	CC..0602..	25.00	SCSCR08CK-06	24.00	6.00	6.50	8.00	10.00	10.00	0.40	13.00	101	**345010**
		45°	CC..09T3..	40.00	SCSCR10CK-09	32.00	7.50	10.00	10.00	13.00	14.50	0.80	17.00	103	**345005**

B10: 10 - 13

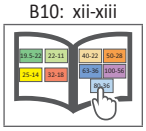
Key on B10-L: 1



B10-F



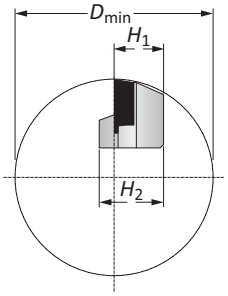
B10: xii-xiii

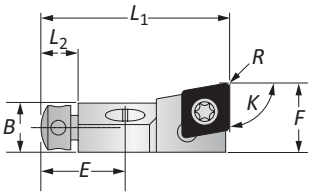


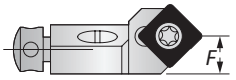
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

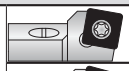
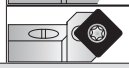
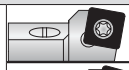
Compact Lay Down Cartridges | Insert Form 112

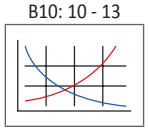
Diameter Range: ≥1.574" (40.00mm)

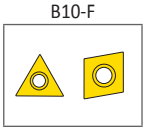


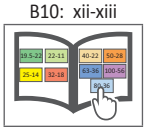




	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	L_2	B	H_1	H_2	F	R Radius	E	Insert Form	Part No.
		80°	SC..09T3..	1.574	SS0CR10CK-09	1.496	0.295	0.393	0.393	0.511	0.472	0.031	0.669	112	**345019**
		75°	SC..09T3..	1.574	SSRCR10CK-09	1.496	0.295	0.393	0.393	0.511	0.460	0.031	0.669	112	**345018**
ⓘ		70°	SC..09T3..	1.574	SSPCR10CK-09	1.496	0.295	0.393	0.393	0.511	0.433	0.031	0.669	112	**345017**
		60°	SC..09T3..	1.574	SSTCR10CK-09	1.496	0.295	0.393	0.393	0.511	0.381	0.031	0.669	112	**345016**
		45°	SC..09T3..	1.574	SSSCR10CK-09	1.260	0.295	0.393	0.393	0.511	0.551	0.031	0.669	112	**345015**
		80°	SC..09T3..	40.00	SS0CR10CK-09	38.00	7.50	10.00	10.00	13.00	12.50	0.80	17.00	112	**345019**
		75°	SC..09T3..	40.00	SSRCR10CK-09	38.00	7.50	10.00	10.00	13.00	11.70	0.80	17.00	112	**345018**
ⓜ		70°	SC..09T3..	40.00	SSPCR10CK-09	38.00	7.50	10.00	10.00	13.00	11.00	0.80	17.00	112	**345017**
		60°	SC..09T3..	40.00	SSTCR10CK-09	38.00	7.50	10.00	10.00	13.00	9.70	0.80	17.00	112	**345016**
		45°	SC..09T3..	40.00	SSSCR10CK-09	32.00	7.50	10.00	10.00	13.00	14.00	0.80	17.00	112	**345015**

B10: 10 - 13
Key on B10-L: 1


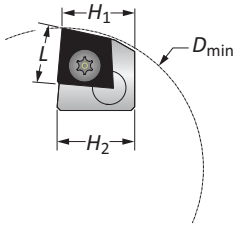
B10-F


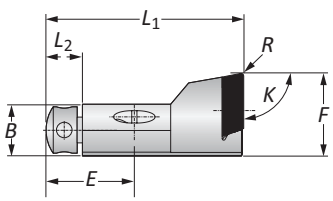
B10: xii-xiii


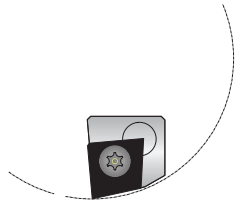
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Tangential Compact Lay Down Cartridges | Insert Forms 04, 05

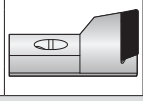
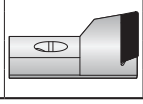
Diameter Range: ≥2.125" (54.00mm)



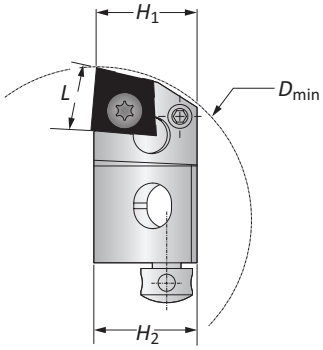


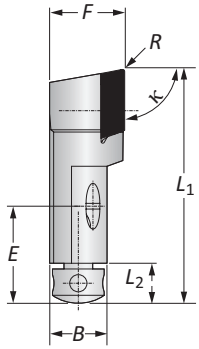


Insert Form 04, 05 Insert Holders

Holder Type	K	Dmin Boring Range	Insert Holder L1	L2	B	H1	H2	F	R Radius	E	Holder Cutting Form	L	Insert Form	Part No.
ⓘ 	90°	2.125	1.496	0.295	0.393	0.551	0.590	0.629	0.019	0.669	Right	0.413	04	**345023**
	90°	2.125	1.496	0.295	0.393	0.551	0.590	0.629	0.019	0.669	Left	0.413	04	**345025**
	90°	2.755	2.755	0.314	0.551	0.748	0.787	0.866	0.019	0.787	Right	0.570	05	**345020**
	90°	2.755	2.755	0.314	0.551	0.748	0.787	0.866	0.019	0.787	Left	0.570	05	**345022**
ⓜ 	90°	54.00	38.00	7.50	10.00	14.00	15.00	16.00	0.50	17.00	Right	10.50	04	**345023**
	90°	54.00	38.00	7.50	10.00	14.00	15.00	16.00	0.50	17.00	Left	10.50	04	**345025**
	90°	70.00	45.00	8.00	14.00	19.00	20.00	22.00	0.50	20.00	Right	14.50	05	**345020**
	90°	70.00	45.00	8.00	14.00	19.00	20.00	22.00	0.50	20.00	Left	14.50	05	**345022**

*Insert radius





Insert Form 04, 05 Radial Cutting Insert Holders

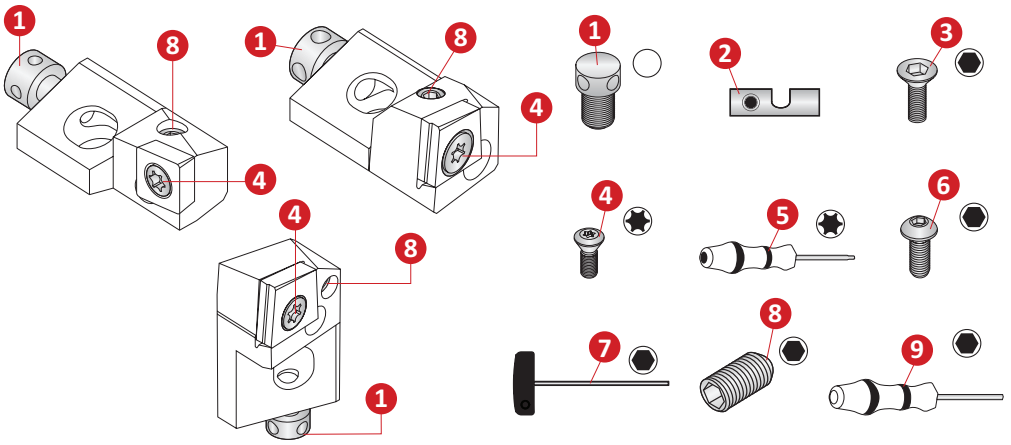
Holder Type	K	Dmin Boring Range	Insert Holder L1	L2	B	H1	H2	F	R Radius	E	Holder Cutting Form	L	Insert Form	Part No.
ⓘ	90°	2.125	1.614	0.295	0.393	0.669	0.708	0.511	0.019	0.669	Right	0.413	04	**345024**
	90°	2.755	1.968	0.314	0.551	0.826	0.866	0.669	0.019	0.787	Right	0.409	05	**345021**
ⓜ	90°	54.00	41.00	7.50	10.00	17.00	18.00	13.00	0.50	17.00	Right	10.50	04	**345024**
	90°	70.00	50.00	8.00	14.00	21.00	22.00	17.00	0.50	20.00	Right	10.40	05	**345021**

B10: 10 - 13 | B10-F | B10: xii-xiii

Key on B10-L: 1

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Compact Lay Down Cartridges Accessories



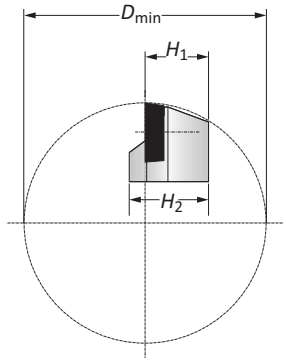
Insert Holder Part No.	1 Axial Barrel Screw	2 Shim	3 Insert Screw	4 Insert Screw	5 Torx Driver	6 Holder Fixing Screw	7 Hex Driver	8 Radial Set Screw	9 Hex Driver
345001	215742	345201	215461	115676	115590	215343	415577	114224	215472
345002	415299	345202	116433	115673	115664	215634	415164	070161	215473
345003	215250	345203	116433	415298	215150	215431	415164	215467	115575
345004	215265	345204	116433	215149	215150	315476	415165	215467	115575
345005	415299	345216	116433	115673	115664	215634	415164	070161	215473
345006	415299	345218	116433	115673	115664	215634	415164	070161	215473
345007	415299	345208	116433	115673	115664	215634	415164	070161	215473
345008	415299	345208	116433	115673	115664	215634	415164	070161	215473
345009	415299	345202	116433	115673	115664	215634	415164	070161	215473
345010	215742	345211	215461	115676	115590	215343	415577	114224	215472
345011	215742	345211	215461	115676	115590	215343	415577	114224	215472
345012	215742	345213	215461	115676	115590	215343	415577	114224	215472
345013	215742	345213	215461	115676	115590	215343	415577	114224	215472
345014	215742	345201	215461	115376	115590	215343	415577	114224	215472
345015	415299	345215	116433	115673	115664	215634	415164	070161	215473
345016	415299	345216	116433	115673	115664	215634	415164	070161	215473
345017	415299	345218	116433	115673	115664	215634	415164	070161	215473
345018	415299	345218	116433	115673	115664	215634	415164	070161	215473
345019	415299	345208	116433	115673	115664	215634	415164	070161	215473
345020	215250	345220	116433	415949	215150	315476	415165	215467	115575
345021	215250	345221	116433	415949	215150	315476	415165	215104	115575
245022	215250	345222	116433	415949	215150	315476	415165	215467	115575
345023	415299	345223	116433	415977	115664	215634	415164	415280	215473
345024	415299	345224	116433	415977	115664	215634	415164	070161	215473
345025	415299	345225	116433	415997	115664	215634	415164	415280	215473

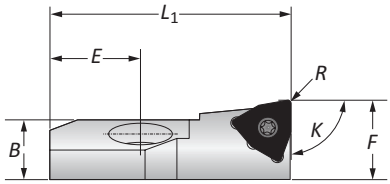
B10: 10 - 13
Key on B10-L: 1
B10-F
B10: xii-xiii

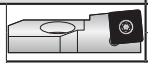
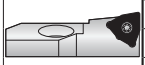
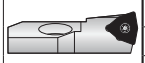
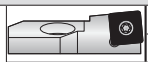
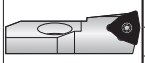
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Lay Down Cartridges for Heavy Cutting | Insert Forms 112, 113, 453, 455, 456, 457, 458, 459, 460, 461

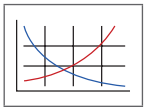
Diameter Range: ≥1.181" (30.00mm)





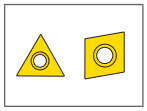
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	B	H_1	H_2	F	R Radius	E	Insert Form	Part No.
i		85°	SC..09T3..	1.574	SSYCR10CX-09	1.574	0.393	0.393	0.590	0.511	0.015	0.590	112	**344021**
		85°	SC..1204..	1.957	SSYCR12CX-12	1.732	0.511	0.472	0.787	0.708	0.031	0.551	113	**344022**
		90°	WCGX0302..	1.181	SWFCR08CX-03	0.984	0.255	0.314	0.433	0.354	0.015	0.393	453	**344001**
		90°	WCGX0302..	1.574	SWFCR10CX-05	1.574	0.393	0.393	0.590	0.511	0.015	0.590	453	**344002**
		90°	WCGX05T3..	1.574	SWFCR10CX-05HD	1.574	0.393	0.393	0.590	0.511	0.015	0.590	455	**344003**
		90°	WCGX0603..	1.968	SWFCR12CX-06	1.732	0.511	0.472	0.787	0.708	0.015	0.551	456	**344004**
		90°	WCGX06T3..	1.968	SWFCR12CX-06HD	1.732	0.511	0.472	0.787	0.708	0.015	0.551	457	**344005**
		90°	WCGX0703..	1.968	SWFCR12CK-07	1.732	0.511	0.472	0.787	0.708	0.015	0.551	458	**344006**
		90°	WCGX0704..	1.968	SWFCR12CK-07HD	1.732	0.511	0.472	0.787	0.708	0.015	0.551	459	**344007**
		90°	WCGX0904..	2.362	SWFCR16CX-09	1.732	0.708	0.629	0.826	0.905	0.015	0.669	460	**344008**
		90°	WCGX0905..	2.362	SWFCR16CX-09HD	1.732	0.708	0.629	0.826	0.905	0.015	0.669	461	**344009**
		78°	WCGX0302..	1.181	SWXCR08CX-03	0.984	0.255	0.314	0.433	0.354	0.015	0.393	453	**344010**
		78°	WCGX0503..	1.574	SWXCR10CX-05	1.574	0.393	0.393	0.590	0.511	0.015	0.590	454	**344011**
		78°	WCGX05T3..	1.574	SWXCR10CX-05HD	1.574	0.393	0.393	0.590	0.511	0.015	0.590	455	**344012**
		78°	WCGX0603..	1.968	SWXCR12CX-06	1.732	0.511	0.472	0.787	0.708	0.015	0.551	456	**344013**
		78°	WCGX06T3..	1.968	SWXCR12CX-06HD	1.732	0.511	0.472	0.787	0.708	0.015	0.551	457	**344014**
		78°	WCGX0703..	1.968	SWXCR12CX-07	1.732	0.511	0.472	0.787	0.708	0.015	0.551	458	**344015**
		78°	WCGX0704..	1.968	SWXCR12CX-07HD	1.732	0.511	0.472	0.787	0.708	0.015	0.551	459	**344016**
		78°	WCGX0904..	2.362	SWXCR16CX-09	1.968	0.708	0.629	0.826	0.905	0.015	0.669	460	**344017**
		78°	WCGX0905..	2.362	SWXCR16CX-9HD	1.968	0.708	0.629	0.826	0.905	0.015	0.669	461	**344018**
m		85°	SC..09T3..	40.00	SSYCR10CX-09	40.00	10.00	10.00	15.00	13.00	0.40	15.00	112	**344021**
		85°	SC..1204..	50.00	SSYCR12CX-12	44.00	13.00	12.00	20.00	18.00	0.80	14.00	113	**344022**
		90°	WCGX0302..	30.00	SWFCR08CX-03	25.00	6.50	8.00	11.00	9.00	0.40	10.00	453	**344001**
		90°	WCGX0302..	40.00	SWFCR10CX-05	40.00	10.00	10.00	15.00	13.00	0.40	15.00	453	**344002**
		90°	WCGX05T3..	40.00	SWFCR10CX-05HD	40.00	10.00	10.00	15.00	13.00	0.40	15.00	455	**344003**
		90°	WCGX0603..	50.00	SWFCR12CX-06	44.00	13.00	12.00	20.00	18.00	0.40	14.00	456	**344004**
		90°	WCGX06T3..	50.00	SWFCR12CX-06HD	44.00	13.00	12.00	20.00	18.00	0.40	14.00	457	**344005**
		90°	WCGX0703..	50.00	SWFCR12CK-07	44.00	13.00	12.00	20.00	18.00	0.40	14.00	458	**344006**
		90°	WCGX0704..	50.00	SWFCR12CK-07HD	44.00	13.00	12.00	20.00	18.00	0.40	14.00	459	**344007**
		90°	WCGX0904..	60.00	SWFCR16CX-09	44.00	18.00	16.00	21.00	23.00	0.40	17.00	460	**344008**
		90°	WCGX0905..	60.00	SWFCR16CX-09HD	44.00	18.00	16.00	21.00	23.00	0.40	17.00	461	**344009**
		78°	WCGX0302..	30.00	SWXCR08CX-03	25.00	6.50	8.00	11.00	9.00	0.40	10.00	453	**344010**
		78°	WCGX0503..	40.00	SWXCR10CX-05	40.00	10.00	10.00	15.00	13.00	0.40	15.00	454	**344011**
		78°	WCGX05T3..	40.00	SWXCR10CX-05HD	40.00	10.00	10.00	15.00	13.00	0.40	15.00	455	**344012**
		78°	WCGX0603..	50.00	SWXCR12CX-06	44.00	13.00	12.00	20.00	18.00	0.40	14.00	456	**344013**
		78°	WCGX06T3..	50.00	SWXCR12CX-06HD	44.00	13.00	12.00	20.00	18.00	0.40	14.00	457	**344014**
		78°	WCGX0703..	50.00	SWXCR12CX-07	44.00	13.00	12.00	20.00	18.00	0.40	14.00	458	**344015**
		78°	WCGX0704..	50.00	SWXCR12CX-07HD	44.00	13.00	12.00	20.00	18.00	0.40	14.00	459	**344016**
		78°	WCGX0904..	60.00	SWXCR16CX-09	50.00	18.00	16.00	21.00	23.00	0.40	17.00	460	**344017**
		78°	WCGX0905..	60.00	SWXCR16CX-9HD	50.00	18.00	16.00	21.00	23.00	0.40	17.00	461	**344018**

B10: 10 - 13

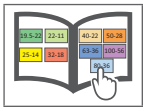


Key on B10-L: 1

B10-F



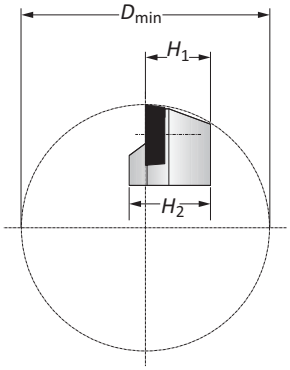
B10: xii-xiii

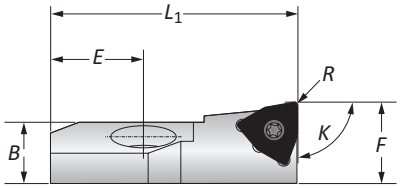


i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Lay Down Cartridges for Heavy Cutting | Insert Forms 161, 163

Diameter Range: ≥1.574" (40.00mm)

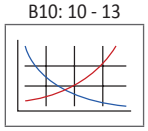




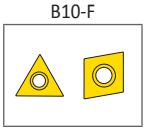
	Holder Type		K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	B	H_1	H_2	F	R Radius	E	Insert Form	Part No.
ⓘ			90°	TC..1102..	1.574	STFCR10CX-11	1.574	0.393	0.393	0.590	0.511	0.015	0.590	161	**344019**
			90°	TC..16T3..	1.968	STFCR12CX-16	1.732	0.511	0.472	0.787	0.708	0.031	0.551	163	**344020**
			90°	TC..16T3..	1.968	STGCR12CX-16	1.732	0.511	0.472	0.787	0.708	0.031	0.551	163	**344023**
ⓜ			90°	TC..1102..	40.00	STFCR10CX-11	40.00	10.00	10.00	15.00	13.00	0.40	15.00	161	**344019**
			90°	TC..16T3..	50.00	STFCR12CX-16	44.00	13.00	12.00	20.00	18.00	0.80	14.00	163	**344020**
			90°	TC..16T3..	50.00	STGCR12CX-16	44.00	13.00	12.00	20.00	18.00	0.80	14.00	163	**344023**

B10: 10 - 13

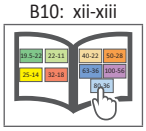
Key on B10-L: 1



B10-F



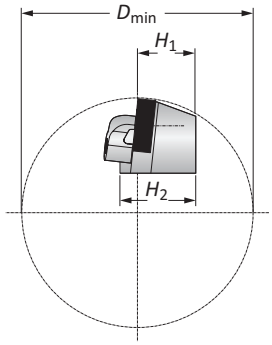
B10: xii-xiii

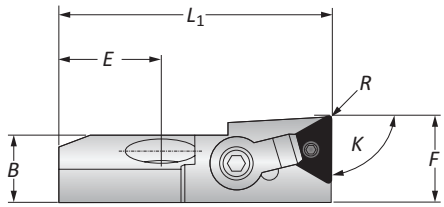


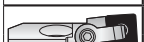
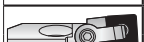
ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Lay Down Cartridges for Heavy Cutting | Insert Forms 437, 123, 170, 171, 131, 132

Diameter Range: ≥1.574" (40.00mm)

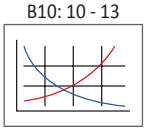




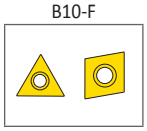
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder L_1	B	H_1	H_2	F	R Radius	E	Insert Form	Part No.
		90°	CN..09T3..	1.574	MCFNR10CX-09	1.574	0.393	0.393	0.744	0.511	0.031	0.590	437	**344028**
		90°	CN..1204..	1.968	MCFNR12CX-12	1.732	0.511	0.472	0.929	0.708	0.031	0.551	123	**344029**
ⓘ		90°	TN..1103..	1.574	MTFNR10CX-11	1.574	0.393	0.393	0.740	0.511	0.031	0.590	170	**344024**
		90°	TN..1604..	1.968	MTFNR12CX-16	1.732	0.511	0.472	0.925	0.708	0.031	0.551	171	**344025**
		85°	SN..0903..	1.574	MSYNR10CX-09	1.574	0.393	0.393	0.803	0.511	0.031	0.590	131	**344026**
		85°	SN..1204..	1.968	MSYNR12CX-12	1.732	0.511	0.472	0.929	0.708	0.031	0.551	132	**344027**
		90°	CN..09T3..	40.00	MCFNR10CX-09	40.00	10.00	10.00	18.90	13.00	0.80	15.00	437	**344028**
		90°	CN..1204..	50.00	MCFNR12CX-12	44.00	13.00	12.00	23.60	18.00	0.80	14.00	123	**344029**
ⓜ		90°	TN..1103..	40.00	MTFNR10CX-11	40.00	10.00	10.00	18.80	13.00	0.40	15.00	170	**344024**
		90°	TN..1604..	50.00	MTFNR12CX-16	44.00	13.00	12.00	23.50	18.00	0.80	14.00	171	**344025**
		85°	SN..0903..	40.00	MSYNR10CX-09	40.00	10.00	10.00	20.40	13.00	0.80	15.00	131	**344026**
		85°	SN..1204..	50.00	MSYNR12CX-12	44.00	13.00	12.00	23.60	18.00	0.80	14.00	132	**344027**

B10: 10 - 13

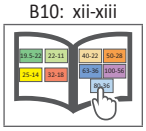
Key on B10-L: 1



B10-F

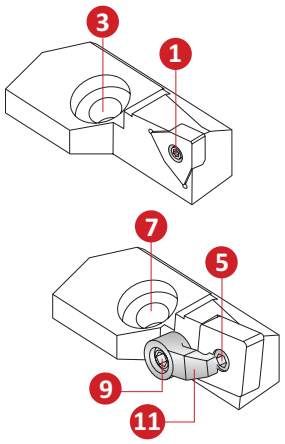


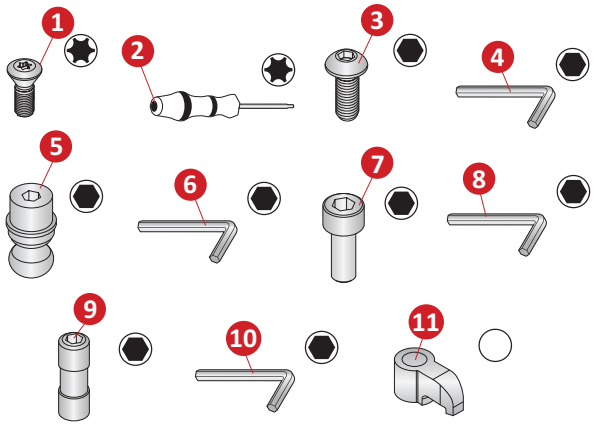
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Lay Down Cartridge for Heavy Cutting Accessories

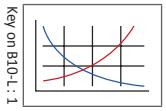




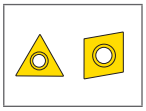
Insert Holder Part No.	1 Insert Screw	2 Torx Driver	3 Fixing Holder Screw	4 Hex Wrench
344001	**415966**	**115537**	**415997**	**051110**
344002	**415067**	**115591**	**415998**	**005195**
344003	**415967**	**115591**	**415998**	**005195**
344004	**415974**	**115664**	**415999**	**005195**
344005	**415974**	**115664**	**415999**	**005195**
344006	**415975**	**115664**	**415999**	**005195**
344007	**415975**	**115664**	**415999**	**005195**
344008	**415975**	**115664**	**515100**	**100102**
344009	**415975**	**115664**	**515100**	**100102**
344010	**415966**	**115537**	**415997**	**051110**
344011	**415967**	**115591**	**415998**	**005195**
344012	**415967**	**115591**	**415998**	**005195**
344013	**415974**	**115664**	**415999**	**005195**
344014	**415974**	**115664**	**415999**	**005195**
344015	**415975**	**115664**	**415999**	**005195**
344016	**415975**	**115664**	**415999**	**005195**
344017	**415975**	**115664**	**515100**	**100102**
344018	**415975**	**115664**	**515100**	**100102**
344019	**415967**	**115591**	**415998**	**005195**
344020	**415973**	**115664**	**415999**	**005195**
344021	**415973**	**115664**	**415998**	**005195**
344022	**415969**	**215150**	**415999**	**005195**
344023	**415973**	**115664**	**415999**	**005195**

Insert Holder Part No.	5 Insert Lock	6 Hex Wrench	7 Fixing Holder Set Screw	8 Hex Wrench	9 Top Clamp Lock	10 Hex Wrench	11 Top Clamp
344024	**515100**	**027148**	**415998**	**005195**	**515104**	**031148**	**415976**
344025	**515101**	**027149**	**415999**	**005195**	**515104**	**031148**	**515105**
344026	**515101**	**027149**	**415999**	**005195**	**515104**	**031148**	**515105**
344027	**515103**	**027149**	**415999**	**005195**	**515104**	**031148**	**515105**
344028	**515101**	**027149**	**415999**	**005195**	**515104**	**031148**	**415976**
344029	**515103**	**027149**	**415999**	**005195**	**515104**	**031148**	**515105**

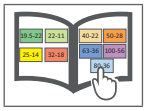
B10: 10 - 13



B10-F



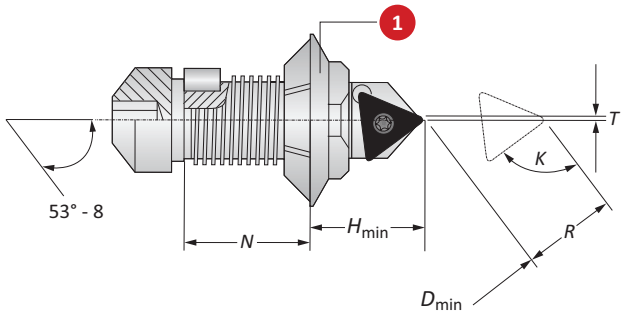
B10: xii-xiii

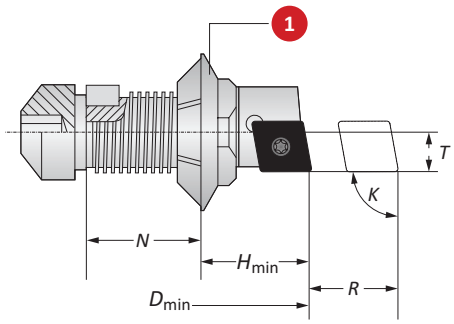


ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Fine Boring Cartridges for Pre-Processing | Insert Forms 101, 159, 160, 161, 163

Diameter Range: ≥0.625" (15.90mm)





1 Mark on scale corresponds to a diameter adjustment of 0.0007" (0.02mm)

Insert Form 101 Insert Holders

	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder R Insert Radius	Insert Holder N	Insert Holder H_{min}	Insert Holder T*	Insert Form	Part No.
i		90°	CC.0602..	0.933	R3B2C	0.157	0.468	0.437	0.007	101	**340011**
m		90°	CC.0602..	23.70	R3B2C	4.00	11.90	11.10	0.20	101	**340011**

*Maximum radial adjustment

Insert Form 101 Insert Holders

	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder R Insert Radius	Insert Holder N	Insert Holder H_{min}	Insert Holder T*	Insert Form	Part No.
i		90°	CC.0602..	1.236	R3A5C	0.015	0.625	0.437	-0.015	101	**340024**
m		90°	CC.0602..	31.40	R3A5C	0.40	15.90	11.10	-0.40	101	**340024**

*Maximum radial adjustment

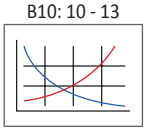
Insert Form 159, 160, 161, 163 Insert Holders

	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder R Insert Radius	Insert Holder N	Insert Holder H_{min}	Insert Holder T*	Insert Form	Part No.
i		90°	TC..06T1..	0.625	R2B2S	0.029	0.250	0.370	0.053	159	**340004**
		90°	TC..06T1..	0.716	R2B2	0.078	0.374	0.370	0.053	159	**340002**
		90°	TC..06T1..	0.822	R2A2	0.177	0.500	0.370	0.053	159	**340001**
		90°	TC..06T1..	0.905	R3B1	0.157	0.468	0.444	0.051	159	**340010**
		90°	TC..0902..	0.984	R3B2	0.157	0.468	0.531	0.031	160	**340008**
		90°	TC..0902..	1.102	R3A2	0.287	0.625	0.531	0.031	160	**340006**
		90°	TC..1102..	1.417	R5B2	0.220	0.748	0.669	0.090	161	**340014**
		90°	TC..1102..	1.614	R5A2	0.421	1.000	0.669	0.090	161	**340012**
		90°	TC..16T3..	2.283	R7A2	0.503	1.251	1.007	-0.015	163	**340017**
m		90°	TC..06T1..	15.90	R2B2S	0.75	6.35	9.40	1.35	159	**340004**
		90°	TC..06T1..	18.20	R2B2	2.00	9.50	9.40	1.35	159	**340002**
		90°	TC..06T1..	20.90	R2A2	4.50	12.70	9.40	1.35	159	**340001**
		90°	TC..06T1..	23.00	R3B1	4.00	11.90	11.30	1.32	159	**340010**
		90°	TC..0902..	25.00	R3B2	4.00	11.90	13.50	0.80	160	**340008**
		90°	TC..0902..	28.00	R3A2	7.30	15.90	13.50	0.80	160	**340006**
		90°	TC..1102..	36.00	R5B2	5.60	19.00	17.00	2.30	161	**340014**
		90°	TC..1102..	41.00	R5A2	10.70	25.40	17.00	2.30	161	**340012**
		90°	TC..16T3..	58.00	R7A2	12.80	31.80	25.60	-0.40	163	**340017**

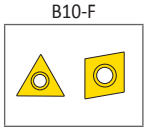
*Maximum radial adjustment

B10: 10 - 13

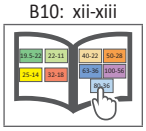
Key on B10-L: 1



B10-F



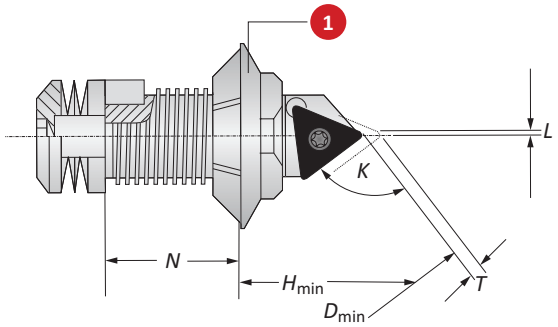
B10: xii-xiii

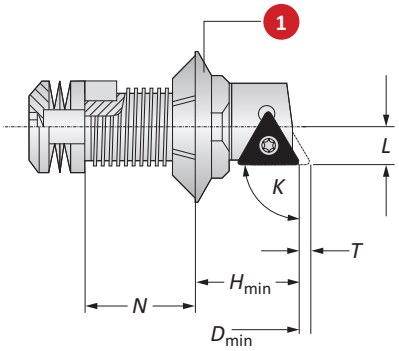


i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Fine Boring Cartridges for Pre-Processing | Insert Forms 159, 73, 161, 163, 160

Diameter Range: ≥0.732" (18.60mm)





1 Mark on scale corresponds to a diameter adjustment of 0.0007" (0.02mm)

Insert Form 159, 161, 163 Insert Holders

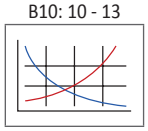
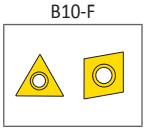
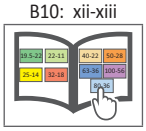
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder T	R	N	H_{min}	L*	Insert Form	Part No.
i		90°	TC..06T1..	0.732	TR2B2S	0.007	0.029	0.250	0.370	0.053	159	**340005**
		90°	TC..06T1..	0.822	TR2B2	0.007	0.078	0.374	0.370	0.053	159	**340003**
		90°	TC..0902..	1.086	TR3B2	0.011	0.157	0.468	0.531	0.031	73	**340009**
		90°	TC..0902..	1.212	TR3A2	0.011	0.287	0.625	0.531	0.031	73	**340007**
		90°	TC..1102..	1.437	TR5B2	0.015	0.220	0.748	0.669	0.090	161	**340015**
		90°	TC..1102..	1.102	TR5B2-LH	0.015	0.220	0.748	0.669	0.090	161	**340016**
		90°	TC..1102..	1.102	TR5A2	0.015	0.421	1.000	0.669	0.090	161	**340013**
		90°	TC..16T3..	2.244	TR7B2	0.023	0.314	1.000	1.007	-0.015	163	**340019**
		90°	TC..16T3..	2.421	TR7A2	0.023	0.503	1.251	1.007	-0.015	163	**340018**
		90°	TC..16T3..	3.208	TR10A2	0.027	0.905	1.874	1.248	-0.015	163	**340020**
m		90°	TC..06T1..	18.60	TR2B2S	0.20	0.75	6.35	9.40	1.35	159	**340005**
		90°	TC..06T1..	20.90	TR2B2	0.20	2.00	9.50	9.40	1.35	159	**340003**
		90°	TC..0902..	27.60	TR3B2	0.28	4.00	11.90	13.50	0.80	73	**340009**
		90°	TC..0902..	30.80	TR3A2	0.28	7.30	15.90	13.50	0.80	73	**340007**
		90°	TC..1102..	36.50	TR5B2	0.40	5.60	19.00	17.00	2.30	161	**340015**
		90°	TC..1102..	28.00	TR5B2-LH	0.40	5.60	19.00	17.00	2.30	161	**340016**
		90°	TC..1102..	28.00	TR5A2	0.40	10.70	25.40	17.00	2.30	161	**340013**
		90°	TC..16T3..	57.00	TR7B2	0.60	8.00	25.40	25.60	-0.40	163	**340019**
		90°	TC..16T3..	61.50	TR7A2	0.60	12.80	31.80	25.60	-0.40	163	**340018**
		90°	TC..16T3..	81.50	TR10A2	0.70	23.00	47.60	31.70	-0.40	163	**340020**

*Maximum radial adjustment

Insert Form 160 Insert Holders

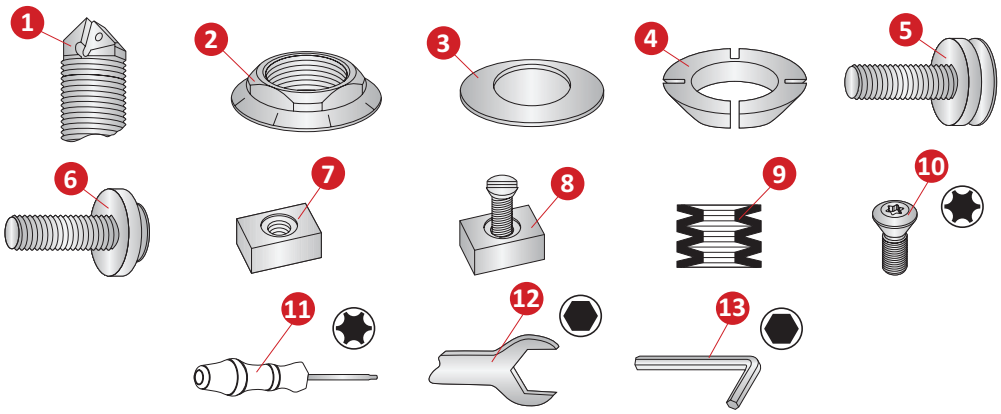
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder T	R	N	H_{min}	L*	Insert Form	Part No.
i		90°	TC..0909..	1.224	TR3B5L	0.015	0.196	0.468	0.484	0.078	160	**340025**
		90°	TC..0909..	1.381	TR3A5	0.015	0.358	0.625	0.484	0.118	160	**340022**
m		90°	TC..0909..	31.10	TR3B5L	0.40	5.00	11.90	12.30	2.00	160	**340025**
		90°	TC..0909..	35.10	TR3A5	0.40	9.10	15.90	12.30	3.00	160	**340022**

*Maximum radial adjustment

B10: 10 - 13
Key on B10-L: 1

B10-F

B10: xii-xiii


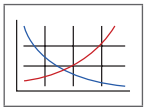
i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Fine Boring Cartridge Accessories



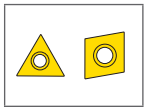
Insert Holder Part No.	1 Insert Holder	2 Adjust Dial	3	4	5	6	7	8	9	10 Insert Screw	11 Torx Driver	12 Adjust Wrench	13 Hex Wrench
340001	**340101**	–	–	–	**340155**	–	–	–	–	**415970**	**115537**	**515271**	**027149**
340002	**340102**	–	–	–	**340155**	–	–	–	–	**415970**	**115537**	**515271**	**027149**
340003	**340148**	–	–	–	**340118**	–	–	–	**340132**	**415970**	**115537**	**515271**	**027149**
340004	**340103**	–	–	–	**340150**	–	–	–	–	**415970**	**115537**	**515271**	**027149**
340006	**340105**	**340107**	**340126**	**340110**	–	**340138**	**340143**	–	–	**415971**	**115591**	**515272**	**031148**
340007	**340105**	**340107**	**340123**	**340110**	**340119**	–	**340143**	–	**340133**	**419971**	**115591**	**515272**	**031148**
340008	**340106**	**340107**	**340126**	**340110**	–	**340139**	**340143**	–	–	**415971**	**115591**	**515272**	**031148**
340009	**340106**	**340107**	**340126**	**340110**	**340120**	–	**340143**	–	**340133**	**415971**	**115591**	**515272**	**031148**
340010	**340104**	**340107**	**340126**	**340110**	–	**340137**	**340143**	–	–	**415971**	**115591**	**515272**	**031148**
340012	**340115**	**340109**	**340127**	**340111**	–	**340140**	–	**340144**	–	**415967**	**115591**	**515272**	**031195**
340013	**340115**	**340109**	**340129**	**340111**	**340121**	–	–	**340144**	**340134**	**415967**	**115591**	**515272**	**003195**
340014	**340108**	**340109**	**340127**	**340111**	–	**340141**	–	**340144**	–	**415967**	**115591**	**515272**	**003195**
340015	**340108**	**340109**	**340129**	**340111**	**340122**	–	–	**340144**	**340134**	**415967**	**115591**	**515272**	**003195**
340017	**340147**	**340150**	**340128**	**340153**	–	**340142**	–	**340145**	–	**415968**	**115664**	**515273**	**100102**
340018	**340147**	**340150**	**340130**	**340153**	**340123**	–	–	**340145**	**340135**	**415968**	**115664**	**515273**	**100102**
340019	**340149**	**340150**	**340130**	**340153**	**340124**	–	–	**340145**	**340135**	**415968**	**115664**	**515273**	**100102**
340020	**340116**	**340152**	**340131**	**340153**	**340125**	–	–	**340146**	**340136**	**515276**	**115664**	**515273**	**019195**
340022	**340113**	**340151**	**340126**	**340110**	**340119**	–	**340143**	–	**340133**	**415971**	**115591**	**515272**	**031148**
340025	**340114**	**340151**	**340126**	**340110**	**340120**	–	**340143**	–	**340133**	**415971**	**115591**	**515272**	**031148**

B10: 10 - 13

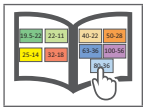


Key on B10-L: 1

B10-F



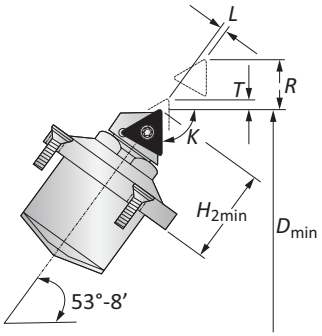
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Fine Boring Lay Down Cartridges | Insert Forms 101, 103, 73, 160, 161, 163

Diameter Range: ≥0.945" (24.00mm)



Insert Form 101, 103 Insert Holders

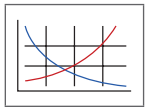
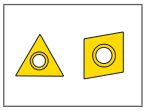
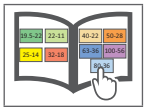
	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder T	Insert Holder R*	Insert Holder H_{2min}	Insert Holder L**	Insert Form	Part No.
i		90°	CC..0602..	1.181	MBTR/SAB2-3B2C	0.011	0.157	0.645	0.007	101	**339015**
		90°	CC..0602..	1.181	MBTR/SAB2-3B2CLH	0.011	0.157	0.645	0.007	101	**339016**
		90°	CC..0602..	1.574	MBTR/SAB3-5B2CM	0.015	0.220	0.858	0.047	101	**339019**
		90°	CC..0602..	1.574	MBTR/SAB4-7B2CLH	0.015	0.220	0.858	0.047	101	**339020**
		90°	CC..09T3..	2.283	MBTR/SAB4-7B2C	0.023	0.314	1.283	0.062	103	**339023**
		90°	CC..09T3..	2.283	MBTR/SAB4-7B2CLH	0.023	0.314	1.283	0.062	103	**339024**
m		90°	CC..0602..	30.00	MBTR/SAB2-3B2C	0.28	4.00	16.40	0.20	101	**339015**
		90°	CC..0602..	30.00	MBTR/SAB2-3B2CLH	0.28	4.00	16.40	0.20	101	**339016**
		90°	CC..0602..	40.00	MBTR/SAB3-5B2CM	0.40	5.60	21.80	1.20	101	**339019**
		90°	CC..0602..	40.00	MBTR/SAB4-7B2CLH	0.40	5.60	21.80	1.20	101	**339020**
		90°	CC..09T3..	58.00	MBTR/SAB4-7B2C	0.60	8.00	32.60	1.60	103	**339023**
		90°	CC..09T3..	58.00	MBTR/SAB4-7B2CLH	0.60	8.00	32.60	1.60	103	**339024**

*Maximum radial adjustment
**Measuring point to the tip of the insert

Insert Form 73, 160, 161, 163 Insert Holders

	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder T	Insert Holder R*	Insert Holder H_{2min}	Insert Holder L**	Insert Form	Part No.
i		75°	TC..06T1..	0.945	MBTR/SAB-2B2L	0.007	0.078	0.539	-0.059	73	**339014**
		75°	TC..06T1..	0.945	MBTR/SAB1-2B2LLH	0.007	0.078	0.539	-0.059	73	**339027**
		75°	TC..0902..	1.181	MBTR/SAB2-3B2C	0.011	0.157	0.740	0.043	160	**339017**
		75°	TC..0902..	1.181	MBTR/SAB2-3B2LLH	0.011	0.157	0.740	0.043	160	**339018**
		75°	TC..1102..	1.575	MBTR/SAB3-5B2LM	0.015	0.220	0.881	0.051	161	**339021**
		75°	TC..1102..	1.575	MBTR/SAB3-5B2LLHM	0.015	0.220	0.881	0.051	161	**339022**
		75°	TC..16T3..	2.283	MBTR/SAB4-7B2L	0.023	0.314	1.157	-0.125	163	**339025**
		75°	TC..16T3..	2.283	MBTR/SAB4-7B2LLH	0.023	0.314	1.157	-0.125	163	**339026**
m		75°	TC..06T1..	24.00	MBTR/SAB-2B2L	0.20	2.00	13.70	-1.50	73	**339014**
		75°	TC..06T1..	24.00	MBTR/SAB1-2B2LLH	0.20	2.00	13.70	-1.50	73	**339027**
		75°	TC..0902..	30.00	MBTR/SAB2-3B2C	0.28	4.00	18.80	1.10	160	**339017**
		75°	TC..0902..	30.00	MBTR/SAB2-3B2LLH	0.28	4.00	18.80	1.10	160	**339018**
		75°	TC..1102..	40.00	MBTR/SAB3-5B2LM	0.40	5.60	22.40	1.30	161	**339021**
		75°	TC..1102..	40.00	MBTR/SAB3-5B2LLHM	0.40	5.60	22.40	1.30	161	**339022**
		75°	TC..16T3..	58.00	MBTR/SAB4-7B2L	0.60	8.00	29.40	-3.20	163	**339025**
		75°	TC..16T3..	58.00	MBTR/SAB4-7B2LLH	0.60	8.00	29.40	-3.20	163	**339026**

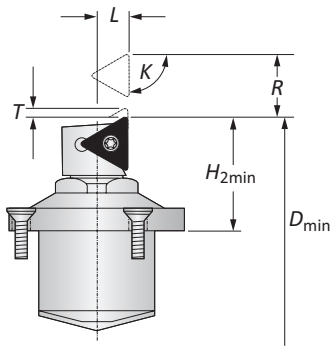
*Maximum radial adjustment
**Measuring point to the tip of the insert

B10: 10 - 13
Key on B10-L: 1

B10-F

B10: xii-xiii


i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Fine Boring Lay Down Cartridges | Insert Forms 101, 103, 73, 160, 161, 163

Diameter Range: ≥0.984" (25.00mm)



Insert Form 101, 103 Insert Holders

	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder T	R*	H_{2min}	L**	Insert Form	Part No.
i		90°	CC..0602..	1.299	MBTR/SAB2-3B5C	0.013	0.196	0.645	0.157	101	**339003**
		90°	CC..0602..	1.299	MBTR/SAB2-3B5CLH	0.013	0.196	0.645	0.157	101	**339004**
		90°	CC..0602..	1.771	MBTR/SAB3-5B5CM	0.019	0.275	0.858	0.212	101	**339007**
		90°	CC..0602..	1.771	MBTR/SAB3-5B5CLHM	0.019	0.275	0.858	0.212	101	**339008**
		90°	CC..09T3..	2.480	MBTR/SAB4-7B5C	0.029	0.393	1.236	0.250	103	**339011**
m		90°	CC..0602..	33.00	MBTR/SAB2-3B5C	0.35	5.00	16.40	4.00	101	**339003**
		90°	CC..0602..	33.00	MBTR/SAB2-3B5CLH	0.35	5.00	16.40	4.00	101	**339004**
		90°	CC..0602..	45.00	MBTR/SAB3-5B5CM	0.50	7.00	21.80	5.40	101	**339007**
		90°	CC..0602..	45.00	MBTR/SAB3-5B5CLHM	0.50	7.00	21.80	5.40	101	**339008**
		90°	CC..09T3..	63.00	MBTR/SAB4-7B5C	0.75	10.00	31.40	6.35	103	**339011**

*Maximum radial adjustment
**Measuring point to the tip of the insert

Insert Form 73, 160, 161, 163 Insert Holders

	Holder Type	K	ISO	D_{min} Boring Range	Designation	Insert Holder T	R*	H_{2min}	L**	Insert Form	Part No.
i		75°	TC..06T1..	0.984	MBTR/SAB-2B5L	0.009	0.098	0.515	0.078	73	**339001**
		75°	TC..06T1..	0.984	MBTR/SAB1-2B5LLH	0.009	0.098	0.515	0.078	73	**339002**
		75°	TC..0902..	1.299	MBTR/SAB2-3B5L	0.013	0.196	0.692	0.078	160	**339005**
		75°	TC..0902..	1.299	MBTR/SAB2-3B5LLH	0.013	0.196	0.692	0.078	160	**339006**
		75°	TC..1102..	1.771	MBTR/SAB3-5B5LM	0.019	0.275	0.866	0.125	161	**339009**
		75°	TC..1102..	1.771	MBTR/SAB3-5B5LLHM	0.019	0.275	0.866	0.125	161	**339010**
		75°	TC..16T3..	2.480	MBTR/SAB4-7B5L	0.029	0.393	1.240	0.244	163	**339012**
		75°	TC..16T3..	2.480	MBTR/SAB4-7B5LLH	0.029	0.393	1.240	0.244	163	**339013**
m		75°	TC..06T1..	25.00	MBTR/SAB-2B5L	0.25	2.50	13.10	2.00	73	**339001**
		75°	TC..06T1..	25.00	MBTR/SAB1-2B5LLH	0.25	2.50	13.10	2.00	73	**339002**
		75°	TC..0902..	33.00	MBTR/SAB2-3B5L	0.35	5.00	17.60	2.00	160	**339005**
		75°	TC..0902..	33.00	MBTR/SAB2-3B5LLH	0.35	5.00	17.60	2.00	160	**339006**
		75°	TC..1102..	45.00	MBTR/SAB3-5B5LM	0.50	7.00	22.00	3.20	161	**339009**
		75°	TC..1102..	45.00	MBTR/SAB3-5B5LLHM	0.50	7.00	22.00	3.20	161	**339010**
		75°	TC..16T3..	63.00	MBTR/SAB4-7B5L	0.75	10.00	31.50	6.20	163	**339012**
		75°	TC..16T3..	63.00	MBTR/SAB4-7B5LLH	0.75	10.00	31.50	6.20	163	**339013**

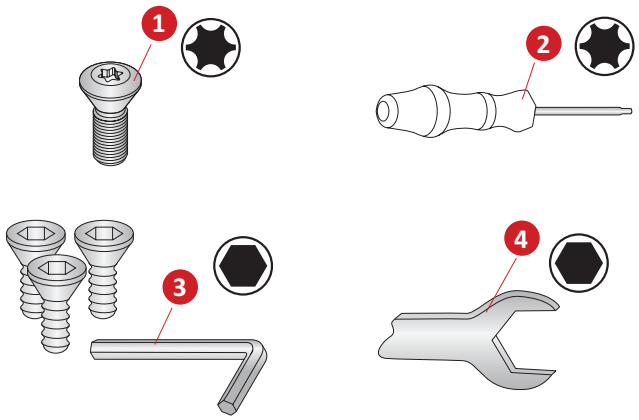
*Maximum radial adjustment
**Measuring point to the tip of the insert

B10: 10 - 13 | B10-F | B10: xii-xiii

Key on B10-L: 1

i = Imperial (in)
m = Metric (mm)
Inserts sold separately

Fine Boring Lay Down Cartridge Accessories



Insert Holder Part No.	1 Insert Screw	2 Torx Driver	3 Hex Wrench	4 Wrench
339001	**415970**	**115537**	**339101**	**515271**
339002	**415970**	**115537**	**339201**	**515271**
339003	**215967**	**115591**	**339101**	**515272**
339004	**415967**	**115591**	**339101**	**515272**
339005	**415971**	**115591**	**339101**	**515272**
339006	**415971**	**115591**	**339101**	**515272**
339007	**415967**	**115591**	**339102**	**515272**
339008	**415967**	**115591**	**339102**	**515272**
339009	**415967**	**115591**	**339102**	**515272**
339010	**415967**	**115591**	**339102**	**515272**
339011	**415968**	**115664**	**339103**	**515273**
339012	**415968**	**115664**	**339103**	**515273**
339013	**415968**	**115664**	**339103**	**515273**
339014	**415970**	**115537**	**339101**	**515271**
339015	**415967**	**115591**	**339101**	**515272**
339016	**415967**	**115591**	**339101**	**515272**
339017	**415971**	**115591**	**339101**	**515272**
339018	**415971**	**115591**	**339202**	**515272**
339019	**415967**	**115591**	**339102**	**515272**
339020	**415967**	**115591**	**339102**	**515272**
339021	**415967**	**115591**	**339102**	**515272**
339022	**415967**	**115591**	**339102**	**515272**
339023	**415968**	**115664**	**339103**	**515273**
339024	**415968**	**115664**	**339103**	**515273**
339025	**415968**	**115664**	**339103**	**515273**
339026	**415968**	**115664**	**339103**	**515273**
339027	**415970**	**115537**	**339101**	**515271**

B10: 10 - 13
Key on B10-L: 1
B10-F
B10: xii-xiii

ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Notes

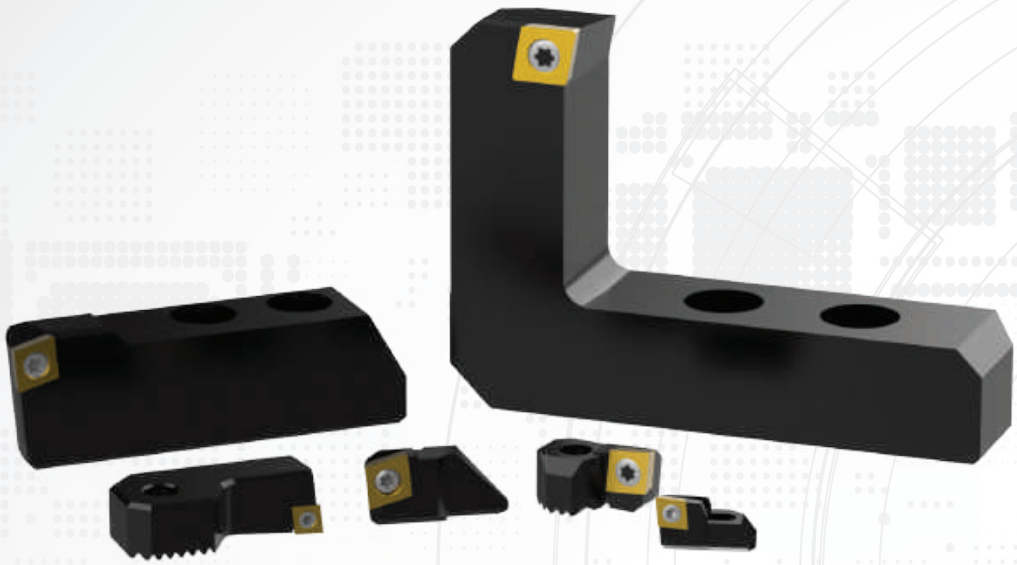
SECTION

B10-M

Semi-Standard Insert Holders

Wohlhaupter™ Semi-Standard Insert Holders

Insert Holders for Serrated Tool Bodies | Insert Holders for Outside Turning | Approach Angled Insert Holders



Insert Holders for Every Boring Application

Wohlhaupter offers a complete range of semi-standard insert holders in various sized ISO insert geometries. These holders are designed in many forms to meet specific approach angles that may be required for your applications. Please consult your Allied tooling specialist in determining what is required for your application. All designs are pre-engineered and are generally available with lead times shorter than three weeks.

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

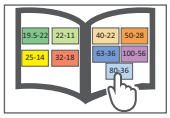
NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

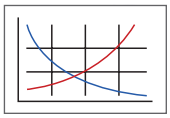
Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries

Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Semi-Standard Insert Holders Table of Contents

Semi-Standard Insert Holders

Insert Holders for Serrated Tool Bodies - Form 103, 104 . . . . . 2 - 3

Insert Holders for (350) 349 Serrated Tool Bodies - Form 104 4

Insert Holders for DigiBore - Form 101, 103 5

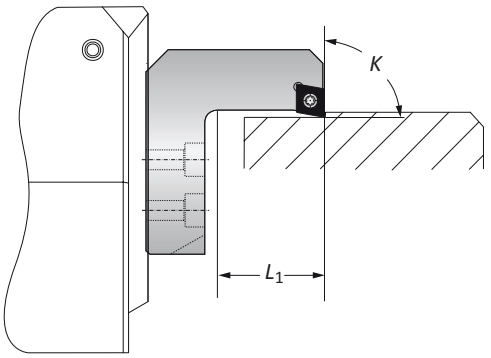
30° Angle Approach Insert Holders - Form 20 6
45° Angle Approach Insert Holders - Form 20 7
60° Angle Approach Insert Holders - Form 20 8

15° Angle Approach Insert Holders - Form 101 9
30° Angle Approach Insert Holders - Form 101 10
45° Angle Approach Insert Holders - Form 101 11
90° Angle Approach Insert Holders - Form 101 12
95° Approach Angle Insert Holders - Form 101 . . . . . 13 - 14

85° Approach Angle Insert Holders - Form 20 15
60° Approach Angle Insert Holders - Form 37 16
85° Approach Angle Insert Holders - Form 101 . . . . . 17 - 18
85° Approach Angle Insert Holders - Form 103, 104 19
95° Approach Angle Combi-Line Insert Holders - Form 101, 103 20
90° Approach Angle Combi-Line Insert Holders - Form 101, 103 21

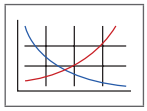
Insert Holders for Serrated Tool Bodies - Form 103, 104

Diameter Range: 1.259" - 5.708" (32.00mm - 145.00mm)



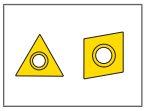
	Serrated Tool Body	Boring Range	Insert Holders L_1	Insert Holders K	Insert Form	Part No.
ⓘ	148006	1.259 - 2.165	0.905	90°	103	**K24750**
ⓘ	148007	2.559 - 3.740	2.086	90°	104	**K28701**
ⓘ	148009	3.543 - 5.708	2.086	90°	104	**K28701**
ⓜ	148006	32.00 - 55.00	23.00	90°	103	**K24750**
ⓜ	148007	65.00 - 95.00	53.00	90°	104	**K28701**
ⓜ	148009	90.00 - 145.00	53.00	90°	104	**K28701**

B10-N: 10-13

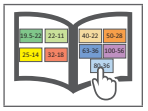


Key on B10-M: 1

B10-F



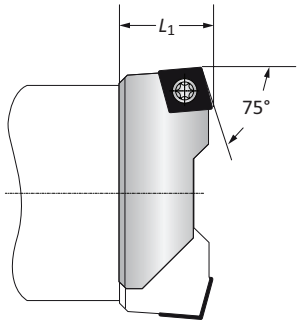
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Insert Holders for Serrated Tool Bodies - Form 103

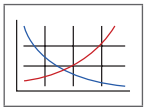
Diameter Range: 1.147" - 8.070" (36.00mm - 205.00mm)



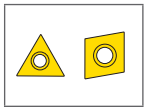
	Serrated Tool Body	Boring Range	Insert Holders L_1	Insert Form	Part No.
ⓘ	148001	1.141 - 1.456	0.629	103	**268011**
	148002	1.147 - 1.732	0.629	103	**268012**
	148003	1.692 - 2.125	0.787	103	**268013**
	148004	1.692 - 2.125	0.787	103	**268014**
	148005	2.559 - 3.267	0.787	103	**268015**
	148007	3.937 - 5.118	1.181	103	**268017**
	148007	4.921 - 6.102	1.181	103	**268018**
	148009	5.905 - 8.070	1.181	103	**268018**
ⓜ	148001	29.00 - 37.00	16.00	103	**268011**
	148002	36.00 - 44.00	16.00	103	**268012**
	148003	43.00 - 54.00	20.00	103	**268013**
	148004	53.00 - 66.00	20.00	103	**268014**
	148005	65.00 - 83.00	20.00	103	**268015**
	148007	100.00 - 130.00	30.00	103	**268017**
	148007	125.00 - 155.00	30.00	103	**268018**
	148009	150.00 - 205.00	30.00	103	**268018**

B10-N: 10-13

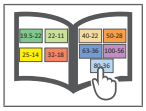
Key on B10-M:1



B10-F



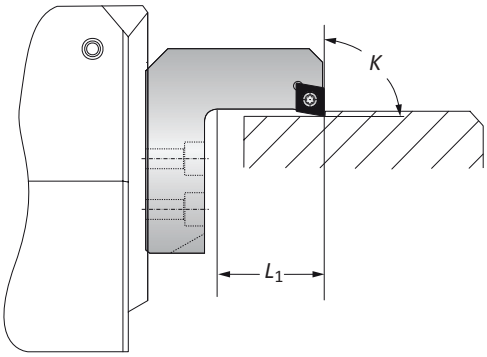
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

Insert Holders for 350 (349) Serrated Tool Bodies - Form 104

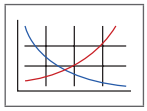
Diameter Range: 5.905" - 38.180" (150.00mm - 970.00mm)



	Serrated Tool Body	Boring Range	Insert Holders L_1	Insert Holders K	Insert Form	Part No.
	350001	5.905 - 9.055	2.086	90°	104	**K28703**
	350002	8.858 - 12.000	2.086	90°	104	**K28703**
	350003	11.810 - 14.960	2.086	90°	104	**K28703**
	350004	14.760 - 17.910	2.086	90°	104	**K28703**
	350005	16.330 - 27.360	2.086	90°	104	**K28703**
	350014*	16.330 - 27.360	2.086	90°	104	**K28703**
	350006	27.160 - 38.180	2.086	90°	104	**K28703**
ⓘ	350014*	27.160 - 38.180	2.086	90°	104	**K28703**
	350001	5.905 - 9.055	2.480	90°	104	**K31892**
	350002	8.858 - 12.000	2.480	90°	104	**K31892**
	350003	11.810 - 14.960	2.480	90°	104	**K31892**
	350004	14.760 - 17.910	2.480	90°	104	**K31892**
	350005	16.330 - 27.360	2.480	90°	104	**K31892**
	350014*	16.330 - 27.360	2.480	90°	104	**K31892**
	350006	27.160 - 38.180	2.480	90°	104	**K31892**
	350014*	27.160 - 38.180	2.480	90°	104	**K31892**
	349001	150.00 - 230.00	53.00	90°	104	**K28703**
	349002	225.00 - 305.00	53.00	90°	104	**K28703**
	349003	300.00 - 380.00	53.00	90°	104	**K28703**
	349004	375.00 - 455.00	53.00	90°	104	**K28703**
	349005	415.00 - 695.00	53.00	90°	104	**K28703**
	349014*	415.00 - 695.00	53.00	90°	104	**K28703**
	349006	690.00 - 970.00	53.00	90°	104	**K28703**
ⓜ	349014*	690.00 - 970.00	53.00	90°	104	**K28703**
	349001	150.00 - 230.00	63.00	90°	104	**K31892**
	349002	225.00 - 305.00	63.00	90°	104	**K31892**
	349003	300.00 - 380.00	63.00	90°	104	**K31892**
	349004	375.00 - 455.00	63.00	90°	104	**K31892**
	349005	415.00 - 695.00	63.00	90°	104	**K31892**
	349014*	415.00 - 695.00	63.00	90°	104	**K31892**
	349006	690.00 - 970.00	63.00	90°	104	**K31892**
	349014*	690.00 - 970.00	63.00	90°	104	**K31892**

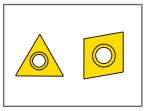
*Insert holder should only be used with the large diameter Alu-Line systems

B10-N: 10-13

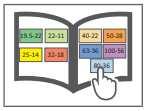


Key on B10-M: 1

B10-F



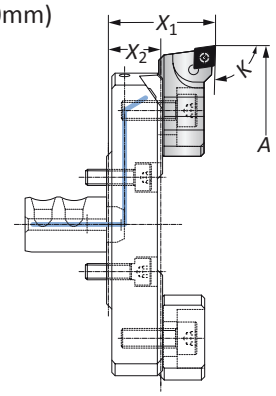
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

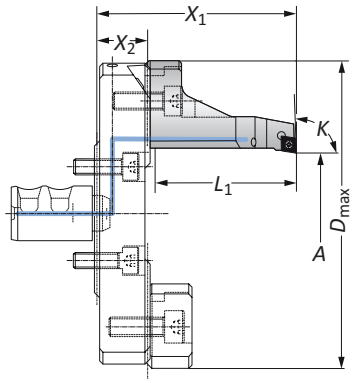
Insert Holders for DigiBore - Form 101, 103

Diameter Range: 0.078" - 4.488" (2.00mm - 114.00mm)



92° Angle Approach DigiBore Insert Holders - Form 103

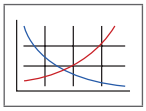
	Serrated Slide	Boring Range A	Insert Holders X_1	X_2	K	Insert Form	Part No.
	501054	2.677 - 3.779	1.279	0.629	92°	103	**502063**
	501055	3.779 - 4.881	1.279	0.629	92°	103	**502063**
ⓘ	501056	4.921 - 5.984	1.279	0.629	92°	103	**502063**
	501058	5.984 - 7.086	1.515	0.866	92°	103	**502063**
	501059	7.086 - 8.188	1.515	0.866	92°	103	**502063**
	501054	68.00 - 96.00	32.50	16.00	92°	103	**502063**
	501055	96.00 - 124.00	32.50	16.00	92°	103	**502063**
ⓜ	501056	125.00 - 152.00	32.50	16.00	92°	103	**502063**
	501058	152.00 - 180.00	38.50	22.00	92°	103	**502063**
	501059	180.00 - 208.00	38.50	22.00	92°	103	**502063**



DigiBore Outside Turning Insert Holders - Form 101

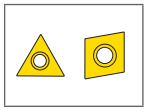
	Serrated Slide	Boring Range A	Insert Holders X_1	X_2	L_1	D_{max}	K	Insert Form	Part No.
	501055	0.078 - 1.181	2.874	0.629	2.165	3.976	92°	101	**K31523**
ⓘ	501056	1.181 - 2.283	2.874	0.629	2.165	5.078	92°	101	**K31523**
	501058	2.283 - 3.385	3.110	0.866	2.165	6.181	92°	101	**K31523**
	501059	3.385 - 4.488	3.110	0.866	2.165	7.283	92°	101	**K31523**
	501055	2.00 - 30.00	73.00	16.00	55.00	101.00	92°	101	**K31523**
ⓜ	501056	30.00 - 58.00	73.00	16.00	55.00	129.00	92°	101	**K31523**
	501058	58.00 - 86.00	79.00	22.00	55.00	157.00	92°	101	**K31523**
	501059	86.00 - 114.00	79.00	22.00	55.00	185.00	92°	101	**K31523**

B10-N: 10-13

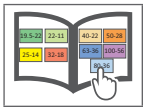


Key on B10-M:1

B10-F



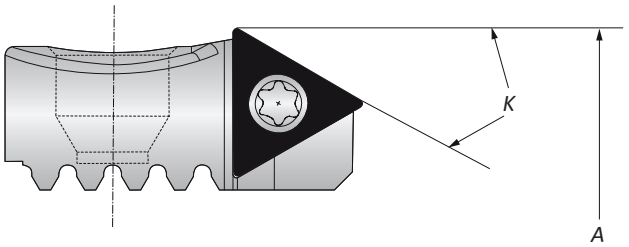
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

30° Angle Approach Insert Holders - Form 20

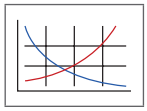
Diameter Range: 1.338" - 40.070" (34.00mm - 1018.00mm)



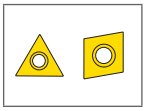
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320001	1.338 - 1.653	30°	20	**K26950**
	365033	1.535 - 2.011	30°	20	**K26950**
	320003	1.614 - 2.047	30°	20	**K26950**
	365034	1.889 - 2.500	30°	20	**K26950**
	320004	2.007 - 2.519	30°	20	**K25275**
ⓘ	365045	2.480 - 3.188	30°	20	**K25275**
	365046	3.149 - 3.976	30°	20	**K25275**
	365047	3.858 - 5.039	30°	20	**K25275**
	365048	4.842 - 6.515	30°	20	**K25275**
	365049	6.318 - 7.992	30°	20	**K25275**
	338017	3.858 - 40.070	30°	20	**K25275**
	320001	34.00 - 42.00	30°	20	**K26950**
	364033	39.00 - 51.50	30°	20	**K26950**
	320003	41.00 - 52.00	30°	20	**K26950**
	364034	48.00 - 63.50	30°	20	**K26950**
	320004	51.00 - 64.00	30°	20	**K25275**
ⓜ	364045	63.00 - 81.00	30°	20	**K25275**
	364046	80.00 - 101.00	30°	20	**K25275**
	364047	98.00 - 128.00	30°	20	**K25275**
	364048	123.00 - 165.50	30°	20	**K25275**
	364049	160.50 - 203.00	30°	20	**K25275**
	337017	98.00 - 1018.00	30°	20	**K25275**

B10-N: 10-13

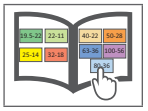
Key on B10-M: 1



B10-F



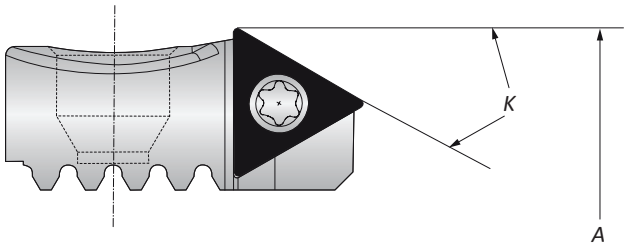
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

45° Angle Approach Insert Holders - Form 20

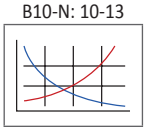
Diameter Range: 1.388" - 40.080" (98.20mm - 1018.20mm)



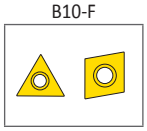
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320001	1.388 - 1.708	45°	20	**K19504**
	365003	1.588 - 2.088	45°	20	**K19504**
	320003	1.668 - 2.088	45°	20	**K19504**
	365034	1.976 - 2.596	45°	20	**K19504**
	320004	2.015 - 2.527	45°	20	**K19506**
ⓘ	365045	2.488 - 3.196	45°	20	**K19506**
	365046	3.157 - 3.984	45°	20	**K19506**
	365047	3.866 - 5.047	45°	20	**K19506**
	365048	4.850 - 6.523	45°	20	**K19506**
	365049	6.326 - 8.000	45°	20	**K19506**
	338017	3.866 - 40.080	45°	20	**K19506**
	310001	34.70 - 42.70	45°	20	**K19504**
	364003	39.70 - 52.20	45°	20	**K19504**
	310003	41.70 - 52.20	45°	20	**K19504**
	364034	49.40 - 64.90	45°	20	**K19504**
	310004	51.20 - 64.20	45°	20	**K19506**
ⓜ	364045	63.20 - 81.20	45°	20	**K19506**
	364046	80.20 - 101.20	45°	20	**K19506**
	364047	98.20 - 128.20	45°	20	**K19506**
	364048	123.20 - 165.70	45°	20	**K19506**
	364049	160.70 - 203.20	45°	20	**K19506**
	337017	98.20 - 1018.20	45°	20	**K19506**

B10-N: 10-13

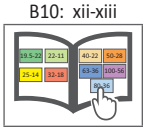
Key on B10-M:1



B10-F



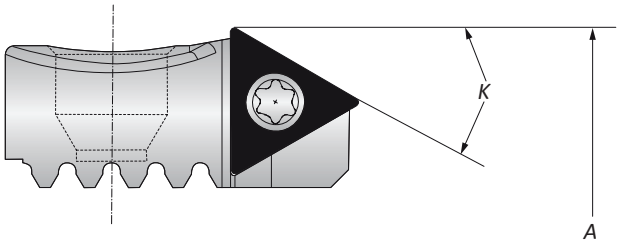
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

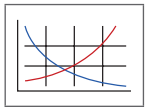
60° Angle Approach Insert Holders - Form 20

Diameter Range: 1.377" - 40.110" (35.00mm - 1019.00mm)

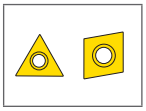


	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320001	1.377 - 1.692	60°	20	**K19505**
	365003	1.574 - 2.066	60°	20	**K19505**
	320003	1.653 - 2.086	60°	20	**K19505**
	365034	1.929 - 2.539	60°	20	**K19505**
	320004	2.047 - 2.539	60°	20	**K19507**
ⓘ	365045	2.519 - 3.228	60°	20	**K19507**
	365046	3.188 - 4.015	60°	20	**K19507**
	365047	3.897 - 5.078	60°	20	**K19507**
	365048	4.881 - 6.555	60°	20	**K19507**
	365049	6.358 - 8.031	60°	20	**K19507**
	338017	3.897 - 40.110	60°	20	**K19507**
	310001	35.00 - 43.00	60°	20	**K19505**
	364003	40.00 - 52.50	60°	20	**K19505**
	310003	42.00 - 53.00	60°	20	**K19505**
	364034	49.00 - 64.50	60°	20	**K19505**
	310004	52.00 - 65.00	60°	20	**K19507**
ⓜ	364045	64.00 - 82.00	60°	20	**K19507**
	364046	81.00 - 102.00	60°	20	**K19507**
	364047	99.00 - 129.00	60°	20	**K19507**
	364048	124.00 - 166.50	60°	20	**K19507**
	364049	161.50 - 204.00	60°	20	**K19507**
	337017	99.00 - 1019.00	60°	20	**K19507**

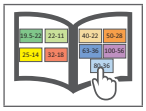
B10-N: 10-13
Key on B10-M: 1



B10-F



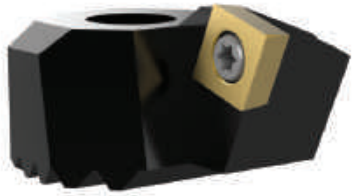
B10: xii-xiii

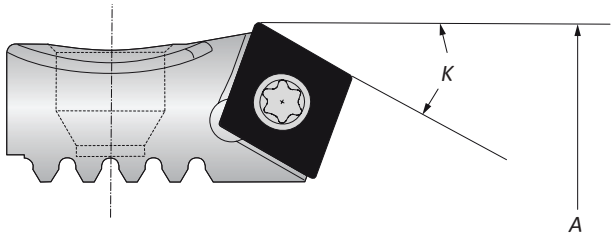


ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

15° Angle Approach Insert Holders - Form 101

Diameter Range: 1.338" - 40.090" (34.00mm - 1018.40mm)

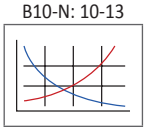




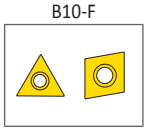
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320001	1.338 - 1.653	15°	101	**K26067**
	365033	1.535 - 2.027	15°	101	**K26067**
	320003	1.614 - 2.047	15°	101	**K26067**
	365034	1.889 - 2.500	15°	101	**K26067**
	320004	2.023 - 2.535	15°	101	**K21098**
ⓘ	365045	2.496 - 3.204	15°	101	**K21098**
	365046	3.165 - 3.992	15°	101	**K21098**
	365047	3.874 - 5.055	15°	101	**K21098**
	365048	4.858 - 6.531	15°	101	**K21098**
	365049	6.334 - 8.007	15°	101	**K21098**
	338017	3.874 - 40.090	15°	101	**K21098**
	310001	34.00 - 42.00	15°	101	**K26067**
	364033	39.00 - 51.50	15°	101	**K26067**
	310003	41.00 - 52.00	15°	101	**K26067**
	364034	48.00 - 63.50	15°	101	**K26067**
	310004	51.40 - 64.40	15°	101	**K21098**
ⓜ	364045	63.40 - 81.40	15°	101	**K21098**
	364046	80.40 - 101.40	15°	101	**K21098**
	364047	98.40 - 128.40	15°	101	**K21098**
	364048	123.40 - 165.90	15°	101	**K21098**
	364049	160.90 - 203.40	15°	101	**K21098**
	337017	738.40 - 1018.40	15°	101	**K21098**

B10-N: 10-13

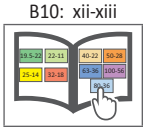
Key on B10-M:1



B10-F



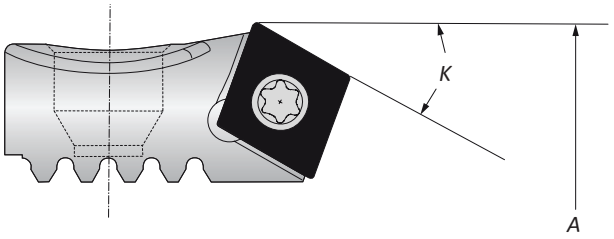
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

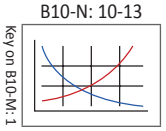
30° Angle Approach Insert Holders - Form 101

Diameter Range: 1.358" - 40.090" (34.50mm - 1018.50mm)

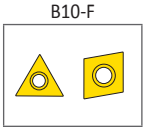


	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320001	1.358 - 1.673	30°	101	**K26800**
	365033	1.555 - 2.047	30°	101	**K26800**
	320003	1.633 - 2.066	30°	101	**K26800**
	365034	1.909 - 2.519	30°	101	**K26800**
	320004	2.027 - 2.539	30°	101	**K28540**
ⓘ	365045	2.500 - 3.208	30°	101	**K28540**
	365046	3.169 - 3.996	30°	101	**K28540**
	365047	3.877 - 5.059	30°	101	**K28540**
	365048	4.862 - 6.535	30°	101	**K28540**
	365049	6.338 - 8.011	30°	101	**K28540**
	338017	3.877 - 40.090	30°	101	**K28540**
	310001	34.50 - 42.50	30°	101	**K26800**
	364033	39.50 - 52.00	30°	101	**K26800**
	310003	41.50 - 52.50	30°	101	**K26800**
	364034	48.50 - 64.00	30°	101	**K26800**
	310004	51.50 - 64.50	30°	101	**K28540**
ⓜ	364045	63.50 - 81.50	30°	101	**K28540**
	364046	80.50 - 101.50	30°	101	**K28540**
	364047	98.50 - 128.50	30°	101	**K28540**
	364048	123.50 - 166.00	30°	101	**K28540**
	364049	161.00 - 203.50	30°	101	**K28540**
	337017	98.50 - 1018.50	30°	101	**K28540**

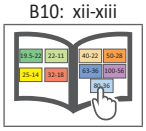
B10-N: 10-13



B10-F



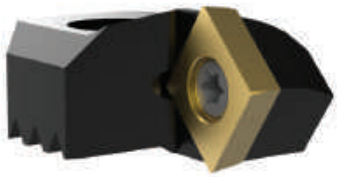
B10: xii-xiii

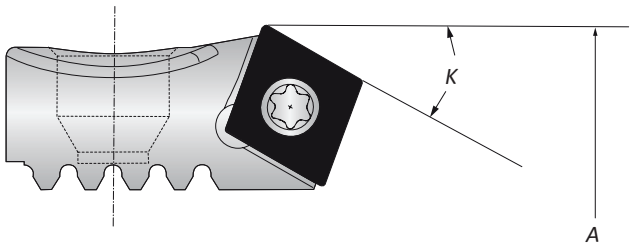


ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

45° Angle Approach Insert Holders - Form 101

Diameter Range: 1.358" - 40.090" (34.50mm - 1018.50mm)

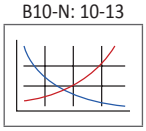




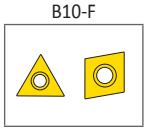
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320001	1.358 - 1.673	45°	101	**K26065**
	365033	1.555 - 2.047	45°	101	**K26065**
	320003	1.633 - 2.066	45°	101	**K26065**
	365034	1.909 - 2.519	45°	101	**K26065**
	320004	2.027 - 2.539	45°	101	**K25888**
ⓘ	365045	2.500 - 3.208	45°	101	**K25888**
	365046	3.169 - 3.996	45°	101	**K25888**
	365047	3.877 - 5.059	45°	101	**K25888**
	365048	4.862 - 6.535	45°	101	**K25888**
	365049	6.338 - 8.011	45°	101	**K25888**
	338017	3.877 - 40.090	45°	101	**K25888**
	310001	34.50 - 42.50	45°	101	**K26065**
	364033	39.50 - 52.00	45°	101	**K26065**
	310003	41.50 - 52.50	45°	101	**K26065**
	364034	48.50 - 64.00	45°	101	**K26065**
	310004	51.50 - 64.50	45°	101	**K25888**
ⓜ	364045	63.50 - 81.50	45°	101	**K25888**
	364046	80.50 - 101.50	45°	101	**K25888**
	364047	98.50 - 128.50	45°	101	**K25888**
	364048	123.50 - 166.00	45°	101	**K25888**
	364049	161.00 - 203.50	45°	101	**K25888**
	337017	98.50 - 1018.50	45°	101	**K25888**

B10-N: 10-13

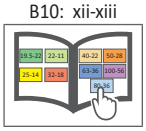
Key on B10-M:1



B10-F



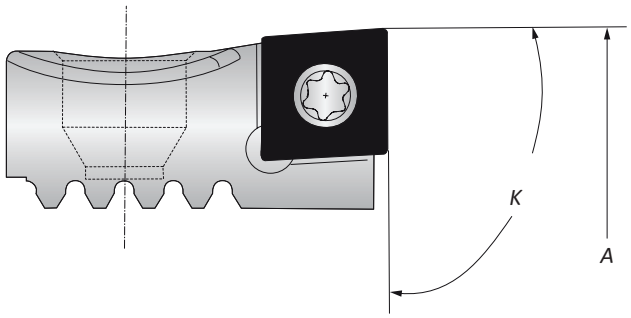
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

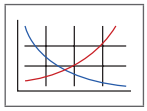
90° Angle Approach Insert Holders - Form 101

Diameter Range: 0.964" - 40.150" (24.50mm - 1020.00mm)



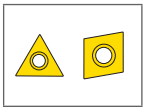
	Boring Tool	Boring Range *A*	Insert Holders *K*	Insert Form	Part No.
	365031	0.964 - 1.161	90°	101	**K32944**
	320001	1.141 - 1.456	90°	101	**K32944**
	365032	1.141 - 1.988	90°	101	**K32944**
	365033	1.496 - 1.988	90°	101	**K32822**
	320002	1.417 - 1.732	90°	101	**K25618**
	320003	1.692 - 2.125	90°	101	**K25618**
ⓘ	365034	1.968 - 2.578	90°	101	**K25618**
	320004	2.086 - 2.598	90°	101	**K30260**
	365045	2.559 - 3.267	90°	101	**K30260**
	365046	3.228 - 4.055	90°	101	**K30260**
	365047	3.937 - 5.118	90°	101	**K30260**
	365048	4.921 - 6.594	90°	101	**K30260**
	365049	6.397 - 8.070	90°	101	**K30260**
	338017	3.937 - 40.150	90°	101	**K30260**
	364031	24.50 - 29.50	90°	101	**K32944**
	310001	29.00 - 37.00	90°	101	**K32944**
	364032	29.00 - 38.50	90°	101	**K32944**
	364033	38.00 - 50.50	90°	101	**K32822**
	310002	36.00 - 44.00	90°	101	**K25618**
	310003	43.00 - 54.00	90°	101	**K25618**
ⓜ	364034	50.00 - 65.50	90°	101	**K25618**
	310004	53.00 - 66.00	90°	101	**K30260**
	364045	65.00 - 83.00	90°	101	**K30260**
	364046	82.00 - 103.00	90°	101	**K30260**
	364047	100.00 - 130.00	90°	101	**K30260**
	364048	125.00 - 167.50	90°	101	**K30260**
	364049	162.50 - 205.00	90°	101	**K30260**
	337017	100.00 - 1020.00	90°	101	**K30260**

B10-N: 10-13

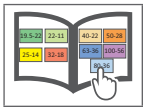


Key on B10-M: 1

B10-F



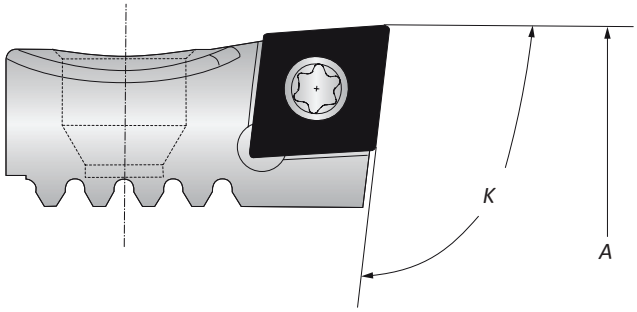
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

95° Angle Approach Insert Holders - Form 101

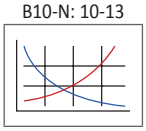
Diameter Range: 1.377" - 29.330" (35.00mm - 1020.00mm)



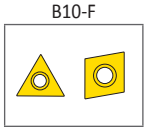
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320001	1.377 - 1.692	95°	101	**K22718**
	365033	1.574 - 2.066	95°	101	**K22718**
	320003	1.653 - 2.086	95°	101	**K22718**
	365034	1.929 - 2.539	95°	101	**K22718**
	320004	2.086 - 2.598	95°	101	**K26600**
ⓘ	365045	2.559 - 3.267	95°	101	**K26600**
	365046	3.228 - 4.055	95°	101	**K26600**
	365047	3.937 - 5.118	95°	101	**K26600**
	365048	4.921 - 6.594	95°	101	**K26600**
	365049	6.397 - 8.070	95°	101	**K26600**
	338017	3.937 - 29.330	95°	101	**K26600**
	310001	35.00 - 43.00	95°	101	**K22718**
	364033	40.00 - 52.50	95°	101	**K22718**
	310003	42.00 - 53.00	95°	101	**K22718**
	364034	49.00 - 64.50	95°	101	**K22718**
	310004	53.00 - 66.00	95°	101	**K26600**
ⓜ	364045	65.00 - 83.00	95°	101	**K26600**
	364046	82.00 - 103.00	95°	101	**K26600**
	364047	100.00 - 130.00	95°	101	**K26600**
	364048	125.00 - 167.50	95°	101	**K26600**
	364049	162.50 - 205.00	95°	101	**K26600**
	337017	100.00 - 1020.00	95°	101	**K26600**

B10-N: 10-13

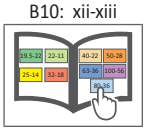
Key on B10-M:1



B10-F



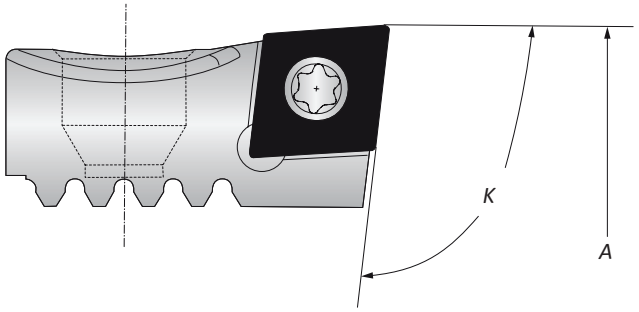
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

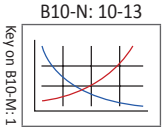
95° Angle Approach Insert Holders - Form 101

Diameter Range: 2.023" - 40.090" (51.40mm - 1018.40mm)



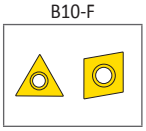
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	320004	2.023 - 2.535	95°	101	**K28029**
	365045	2.496 - 3.204	95°	101	**K28029**
	365046	3.165 - 3.992	95°	101	**K28029**
ⓘ	365047	3.874 - 5.055	95°	101	**K28029**
	365048	4.858 - 6.531	95°	101	**K28029**
	365049	6.334 - 8.007	95°	101	**K28029**
	338017	3.874 - 40.090	95°	101	**K28029**
	310004	51.40 - 64.40	95°	101	**K28029**
	364045	63.40 - 81.40	95°	101	**K28029**
	364046	80.40 - 101.40	95°	101	**K28029**
ⓜ	364047	98.40 - 128.40	95°	101	**K28029**
	364048	123.40 - 165.90	95°	101	**K28029**
	364049	160.90 - 203.40	95°	101	**K28029**
	337017	98.40 - 1018.40	95°	101	**K28029**

B10-N: 10-13

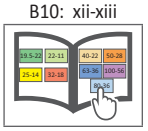


Key on B10-M: 1

B10-F



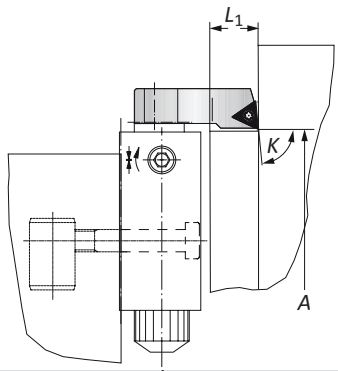
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

85° Angle Approach Insert Holders - Form 20

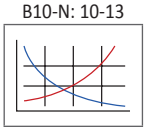
Diameter Range: 0.705" - 38.770" (18.00mm - 985.00mm)



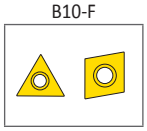
	Boring Tool	Boring Range A	Insert Holders K	Insert Holders L_1	Insert Form	Part No.
	320004	0.705 - 1.220	85°	0.708	20	**K19346**
	365045	1.176 - 1.889	85°	0.708	20	**K19346**
	365046	1.843 - 2.667	85°	0.708	20	**K19346**
ⓘ	365047	2.549 - 3.740	85°	0.708	20	**K19346**
	365048	3.529 - 5.216	85°	0.708	20	**K19346**
	365049	5.000 - 6.692	85°	0.708	20	**K19346**
	338017	2.549 - 38.770	85°	0.708	20	**K19346**
	310004	18.00 - 31.00	85°	18.00	20	**K19346**
	364045	30.00 - 48.00	85°	18.00	20	**K19346**
	364046	47.00 - 68.00	85°	18.00	20	**K19346**
ⓜ	364047	65.00 - 95.00	85°	18.00	20	**K19346**
	364048	90.00 - 132.50	85°	18.00	20	**K19346**
	364049	127.50 - 170.00	85°	18.00	20	**K19346**
	337017	65.00 - 985.00	85°	18.00	20	**K19346**

B10-N: 10-13

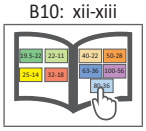
Key on B10-M:1



B10-F



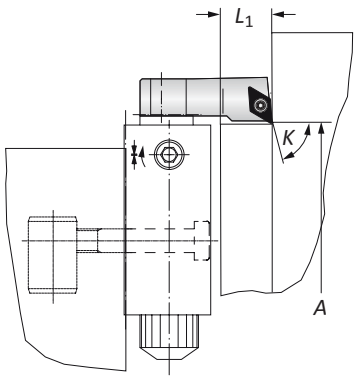
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

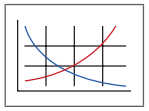
60° Angle Approach Insert Holders - Form 37

Diameter Range: 0.708" - 38.770" (18.00mm - 985.00mm)

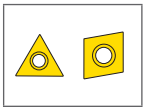


	Boring Tool	Boring Range A	Insert Holders K	Insert Holders L_1	Insert Form	Part No.
	320004	0.708 - 1.220	60°	0.944	37	**K25066**
	365045	1.181 - 1.889	60°	0.944	37	**K25066**
	365046	1.850 - 2.677	60°	0.944	37	**K25066**
ⓘ	365047	2.559 - 3.740	60°	0.944	37	**K25066**
	365048	3.543 - 5.216	60°	0.944	37	**K25066**
	365049	5.019 - 6.692	60°	0.944	37	**K25066**
	338017	2.559 - 38.770	60°	0.944	37	**K25066**
	310004	18.00 - 31.00	60°	24.00	37	**K25066**
	364045	30.00 - 48.00	60°	24.00	37	**K25066**
	364046	47.00 - 68.00	60°	24.00	37	**K25066**
ⓜ	364047	65.00 - 95.00	60°	24.00	37	**K25066**
	364048	90.00 - 132.50	60°	24.00	37	**K25066**
	364049	127.50 - 170.00	60°	24.00	37	**K25066**
	337017	65.00 - 985.00	60°	24.00	37	**K25066**

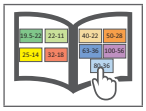
B10-N: 10-13
Key on B10-M: 1



B10-F



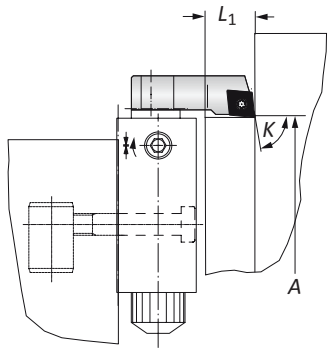
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

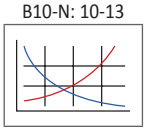
85° Angle Approach Insert Holders - Form 101

Diameter Range: 0.708" - 38.770" (18.00mm - 985.00mm)

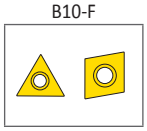


	Boring Tool	Boring Range A	Insert Holders K	Insert Holders L_1	Insert Form	Part No.
	320004	0.708 - 1.220	85°	0.708	101	**K19344**
	365045	1.181 - 1.889	85°	0.708	101	**K19344**
	365046	1.850 - 2.677	85°	0.708	101	**K19344**
ⓘ	365047	2.559 - 3.740	85°	0.708	101	**K19344**
	365048	3.543 - 5.216	85°	0.708	101	**K19344**
	365049	5.019 - 6.692	85°	0.708	101	**K19344**
	338017	2.559 - 38.770	85°	0.708	101	**K19344**
	310004	18.00 - 31.00	85°	18.00	101	**K19344**
	364045	30.00 - 48.00	85°	18.00	101	**K19344**
	364046	47.00 - 68.00	85°	18.00	101	**K19344**
ⓜ	364047	65.00 - 95.00	85°	18.00	101	**K19344**
	364048	90.00 - 132.50	85°	18.00	101	**K19344**
	364049	127.50 - 170.00	85°	18.00	101	**K19344**
	337017	65.00 - 985.00	85°	18.00	101	**K19344**

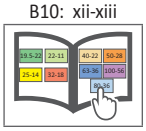
B10-N: 10-13



B10-F



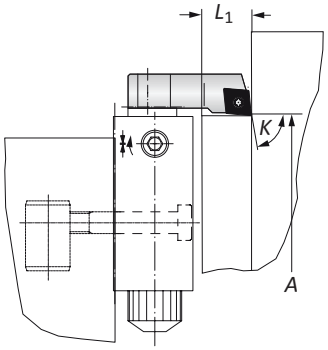
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

85° Angle Approach Insert Holders - Form 101

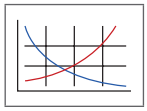
Diameter Range: 0.787" - 38.770" (18.00mm - 985.00mm)



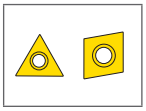
	Boring Tool	Boring Range A	Insert Holders K	Insert Holders L_1	Insert Form	Part No.
	320004	0.708 - 1.220	85°	0.866	101	**K31045**
	365045	1.181 - 1.889	85°	0.866	101	**K31045**
	365046	1.850 - 2.677	85°	0.866	101	**K31045**
ⓘ	365047	2.559 - 3.740	85°	0.866	101	**K31045**
	365048	3.543 - 5.216	85°	0.866	101	**K31045**
	365049	5.019 - 6.692	85°	0.866	101	**K31045**
	338017	2.559 - 38.770	85°	0.866	101	**K31045**
	310004	18.00 - 31.00	85°	22.00	101	**K31045**
	364045	30.00 - 48.00	85°	22.00	101	**K31045**
	364046	47.00 - 68.00	85°	22.00	101	**K31045**
ⓜ	364047	65.00 - 95.00	85°	22.00	101	**K31045**
	364048	90.00 - 132.50	85°	22.00	101	**K31045**
	364049	127.50 - 170.00	85°	22.00	101	**K31045**
	337017	65.00 - 985.00	85°	22.00	101	**K31045**

B10-N: 10-13

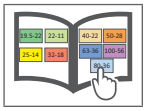
Key on B10-M: 1



B10-F



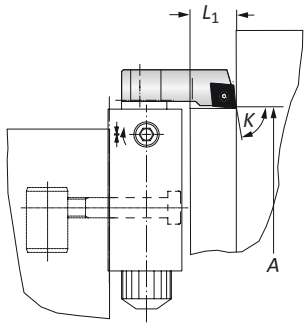
B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

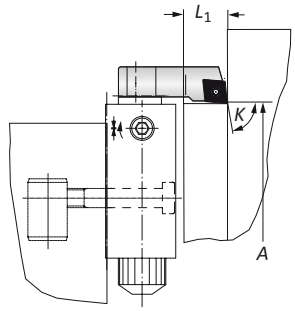
85° Angle Approach Insert Holders - Form 103, 104

Diameter Range: 0.708" - 38.770" (18.00mm - 985.00mm)



85° Angle Approach Insert Holders - Form 103

	Boring Tool	Boring Range A	Insert Holders K	L_1	Insert Form	Part No.
	320004	0.708 - 1.220	85°	0.708	103	**K19125**
	365045	1.181 - 1.889	85°	0.708	103	**K19125**
	365046	1.850 - 2.677	85°	0.708	103	**K19125**
(i)	365047	2.559 - 3.740	85°	0.708	103	**K19125**
	365048	3.543 - 5.216	85°	0.708	103	**K19125**
	365049	5.019 - 6.692	85°	0.708	103	**K19125**
	338017	2.559 - 38.770	85°	0.708	103	**K19125**
	310004	18.00 - 31.00	85°	18.00	103	**K19125**
	364045	30.00 - 48.00	85°	18.00	103	**K19125**
	364046	47.00 - 68.00	85°	18.00	103	**K19125**
(m)	364047	65.00 - 95.00	85°	18.00	103	**K19125**
	364048	90.00 - 132.50	85°	18.00	103	**K19125**
	364049	127.50 - 170.00	85°	18.00	103	**K19125**
	337017	65.00 - 985.00	85°	18.00	103	**K19125**

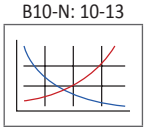


85° Angle Approach Insert Holders - Form 104

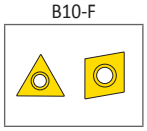
	Boring Tool	Boring Range A	Insert Holders K	L_1	Insert Form	Part No.
	320004	0.708 - 1.220	85°	1.062	104	**K31574**
	365045	1.181 - 1.889	85°	1.062	104	**K31574**
	365046	1.850 - 2.677	85°	1.062	104	**K31574**
(i)	365047	2.559 - 3.740	85°	1.062	104	**K31574**
	364048	3.543 - 5.216	85°	1.062	104	**K31574**
	364049	5.019 - 6.692	85°	1.062	104	**K31574**
	338017	2.559 - 38.770	85°	1.062	104	**K31574**
	310004	18.00 - 31.00	85°	27.00	104	**K31574**
	364045	30.00 - 48.00	85°	27.00	104	**K31574**
	364046	47.00 - 68.00	85°	27.00	104	**K31574**
(m)	364047	65.00 - 95.00	85°	27.00	104	**K31574**
	364048	90.00 - 132.50	85°	27.00	104	**K31574**
	364049	127.50 - 170.00	85°	27.00	104	**K31574**
	337017	65.00 - 985.00	85°	27.00	104	**K31574**

B10-N: 10-13

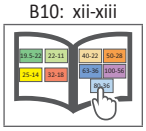
Key on B10-M:1



B10-F



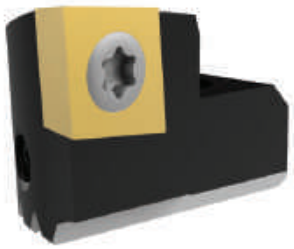
B10: xii-xiii

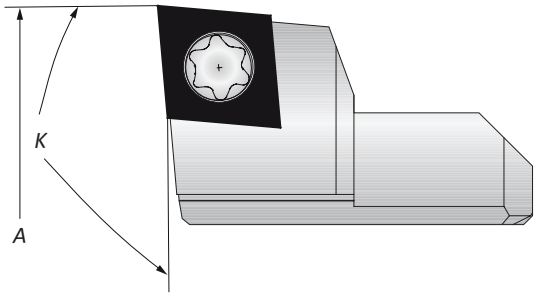


(i) = Imperial (in)
(m) = Metric (mm)
Inserts sold separately

95° Angle Approach Combi-Line Insert Holders - Form 101, 103

Diameter Range: 0.965" - 7.913" (24.51 - 29.48mm)

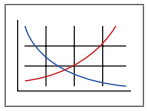




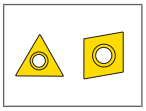
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	404003	0.965 - 1.161	95°	101	**K32618**
	404004	1.142 - 1.457	95°	103	**K31403**
	404005	1.417 - 1.732	95°	103	**K31404**
	404006	1.693 - 2.126	95°	103	**K31405**
	404007	2.087 - 2.598	95°	103	**K31406**
ⓘ	404008	2.559 - 3.268	95°	103	**K31407**
	404009	3.228 - 4.055	95°	103	**K31408**
	404010	4.016 - 5.000	95°	103	**K31632**
	404010	5.000 - 5.984	95°	103	**K31634**
	404011	5.945 - 7.913	95°	103	**K31632**
	404011	6.929 - 7.913	95°	103	**K31634**
	404003	24.51 - 29.48	95°	101	**K32618**
	404004	29.00 - 37.00	95°	103	**K31403**
	404005	35.99 - 43.99	95°	103	**K31404**
	404006	43.00 - 54.00	95°	103	**K31405**
	404007	53.00 - 65.98	95°	103	**K31406**
ⓜ	404008	64.99 - 83.00	95°	103	**K31407**
	404009	81.99 - 102.90	95°	103	**K31408**
	404010	102.00 - 127.00	95°	103	**K31632**
	404010	127.00 - 151.90	95°	103	**K31634**
	404011	151.00 - 200.90	95°	103	**K31632**
	404011	175.90 - 200.90	95°	103	**K31634**

B10-N: 10-13

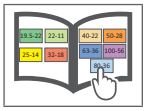
Key on B10-M: 1



B10-F



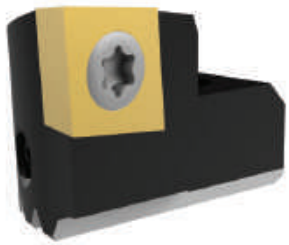
B10: xii-xiii

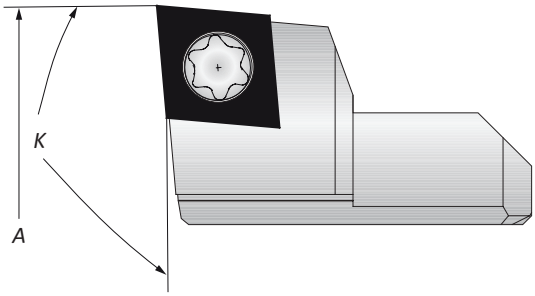


ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

90° Angle Approach Combi-Line Insert Holders - Form 101, 103

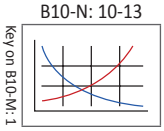
Diameter Range: 0.965" - 7.913" (24.51mm - 200.90mm)





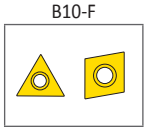
	Boring Tool	Boring Range A	Insert Holders K	Insert Form	Part No.
	404003	0.965 - 1.161	90°	101	**K32616**
	404004	1.142 - 1.457	90°	103	**K31372**
	404005	1.417 - 1.732	90°	103	**K31373**
	404006	1.693 - 2.126	90°	103	**K31374**
	404007	2.087 - 2.598	90°	103	**K31375**
ⓘ	404008	2.559 - 3.268	90°	103	**K31376**
	404009	3.228 - 4.055	90°	103	**K31377**
	404010	4.016 - 5.000	90°	103	**K31628**
	404010	5.000 - 5.984	90°	103	**K31630**
	404011	5.945 - 7.913	90°	103	**K31628**
	404011	6.929 - 7.913	90°	103	**K31630**
	404003	24.51 - 29.48	90°	101	**K32616**
	404004	29.00 - 37.00	90°	103	**K31372**
	404005	35.99 - 43.99	90°	103	**K31373**
	404006	43.00 - 54.00	90°	103	**K31374**
	404007	53.00 - 65.98	90°	103	**K31375**
ⓜ	404008	64.99 - 83.00	90°	103	**K31376**
	404009	81.99 - 102.90	90°	103	**K31377**
	404010	102.00 - 127.00	90°	103	**K31628**
	404010	127.00 - 151.90	90°	103	**K31630**
	404011	151.00 - 200.90	90°	103	**K31628**
	404011	175.90 - 200.90	90°	103	**K31630**

B10-N: 10-13

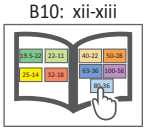


Key on B10-M:1

B10-F



B10: xii-xiii



ⓘ = Imperial (in)
ⓜ = Metric (mm)
Inserts sold separately

SECTION

B10-N

Accessories / Technical Information

Wohlhaupter™ Accessories / Technical Information

Your safety and the safety of others is very important. This catalog contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalog, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalog. Safety messages follow these words.

⚠ WARNING

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

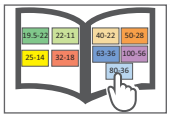
NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

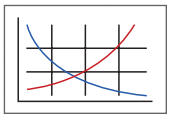
Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

Reference Icons
The following icons will appear throughout the catalog to help you navigate between products.



MVS Connection Color Guide
Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data
Speed and feed recommendations for optimum and safe boring

Accessories and Technical Information Table of Contents

Threaded Taper Pins . . . . . 2 - 3

Clamping Pieces 4

Heavy Metal Balancing Screws 5

Torque Drivers and Wrenches 6

Torque Driver and Wrench Sets 7

Technical Information

Guidelines for not Exceeding Recommended Length to Diameter Ratio 8

Calculating Tool Assembly Weight 9

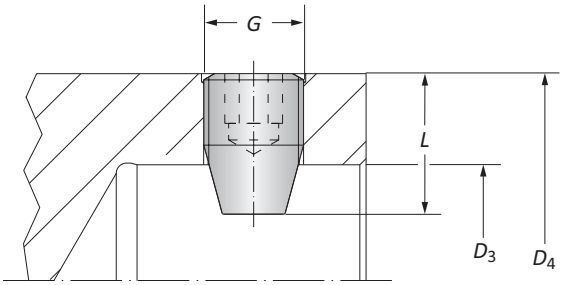
Recommended Cutting Data

Imperial . . . . . 10 - 11

Metric . . . . . 12 - 13

Accessories

Threaded Taper Pins for MVS Connections

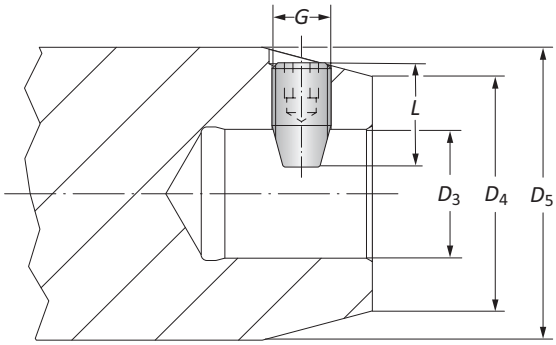


Connection D_4 | D_3	Taper Pin G	L	Service Key	Steel Part No.	Titanium Part No.
19.5 - 11	M 5 x 0.5	0.256	s2.5 / A	**115949**	–
22 - 11	M 5 x 0.5	0.327	s2.5 / A	**215375**	–
25 - 14	M 8 x 1.0	0.327	s4 / B	**132174**	–
32 - 18	M 8 x 1.0	0.409	s4 / B	**132142**	–
40 - 22	M 10 x 1.0	0.571	s5 / B	**133113**	–
50 - 28	M 12 x 1.0	0.657	s6 / B	**132145**	**415334**
63 - 36	M 16 x 1.5	0.780	s8 / B	**132146**	**415336**
100 - 56	M 24 x 2.0	1.339	s12 / B	**215470**	**415337**
19.5 - 11	M 5 x 0.5	6.50	s2.5 / A	**115949**	–
22 - 11	M 5 x 0.5	8.30	s2.5 / A	**215375**	–
25 - 14	M 8 x 1.0	8.30	s4 / B	**132174**	–
32 - 18	M 8 x 1.0	10.40	s4 / B	**132142**	–
40 - 22	M 10 x 1.0	14.50	s5 / B	**133113**	–
50 - 28	M 12 x 1.0	16.70	s6 / B	**132145**	**415334**
63 - 36	M 16 x 1.5	19.80	s8 / B	**132146**	**415336**
100 - 56	M 24 x 2.0	34.00	s12 / B	**215470**	**415337**

NOTE: Steel or titanium taper pins are used in balancing the Alu-Line tooling.

Accessories

Threaded Taper Pins for MVS Connections

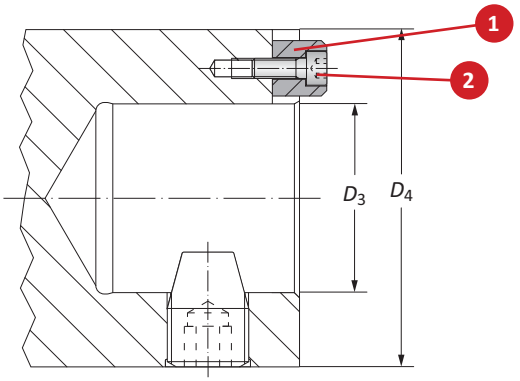


	Connection	Taper Pin				Steel	Titanium
	D_4 | D_3	G	L	D_5	Service Key	Part No.	Part No.
	22 - 11	M 5 x 0.5	0.327	1.260	s2.5 / A	**215375**	–
	22 - 11	M 5 x 0.5	0.630	1.575	s2.5 / A	**215376**	–
	22 - 11	M 5 x 0.5	0.630	1.969	s2.5 / A	**215376**	–
	22 - 11	M 5 x 0.5	0.630	2.480	s2.5 / A	**215376**	–
	25 - 14	M 8 x 1.0	0.409	1.260	s4 / B	**132142**	–
	25 - 14	M 8 x 1.0	0.409	1.417	s4 / B	**132142**	–
	32 - 18	M 8 x 1.0	0.409	1.378	s4 / B	**132142**	–
i	32 - 18	M 8 x 1.0	0.571	1.457	s4 / B	**132143**	–
	32 - 18	M 8 x 1.0	0.571	1.575	s4 / B	**132143**	–
	32 - 18	M 8 x 1.0	0.571	1.811	s4 / B	**132143**	–
	40 - 22	M 10 x 1.0	0.571	1.575	s5 / B	**133113**	–
	40 - 22	M 10 x 1.0	0.701	1.850	s5 / B	**132144**	–
	40 - 22	M 10 x 1.0	0.701	1.969	s5 / B	**132144**	–
	50 - 28	M 12 x 1.0	0.657	2.480	s6 / B	**132145**	**415334**
	63 - 36	M 16 x 1.5	0.780	3.150	s8 / B	**132146**	**415336**
	80 - 36	M 16 x 1.5	1.134	3.150	s8 / B	**132191**	**415335**
	22 - 11	M 5 x 0.5	8.30	32.00	s2.5 / A	**215375**	–
	22 - 11	M 5 x 0.5	16.00	40.00	s2.5 / A	**215376**	–
	22 - 11	M 5 x 0.5	16.00	50.00	s2.5 / A	**215376**	–
	22 - 11	M 5 x 0.5	16.00	63.00	s2.5 / A	**215376**	–
	25 - 14	M 8 x 1.0	10.40	32.00	s4 / B	**132142**	–
	25 - 14	M 8 x 1.0	10.40	36.00	s4 / B	**132142**	–
	32 - 18	M 8 x 1.0	10.40	35.00	s4 / B	**132142**	–
m	32 - 18	M 8 x 1.0	14.50	37.00	s4 / B	**132143**	–
	32 - 18	M 8 x 1.0	14.50	40.00	s4 / B	**132143**	–
	32 - 18	M 8 x 1.0	14.50	46.00	s4 / B	**132143**	–
	40 - 22	M 10 x 1.0	14.50	40.00	s5 / B	**133113**	–
	40 - 22	M 10 x 1.0	17.80	47.00	s5 / B	**132144**	–
	40 - 22	M 10 x 1.0	17.80	50.00	s5 / B	**132144**	–
	50 - 28	M 12 x 1.0	16.70	63.00	s6 / B	**132145**	**415334**
	63 - 36	M 16 x 1.5	19.80	80.00	s8 / B	**132146**	**415336**
	80 - 36	M 16 x 1.5	28.80	80.00	s8 / B	**132191**	**415335**

NOTE: Steel or titanium taper pins are used in balancing the Alu-Line tooling.

Accessories

Clamping Pieces for MVS Connection 100 - 56 | D 60 / D 40 Connections



Clamping Pieces for MVS 100 - 56

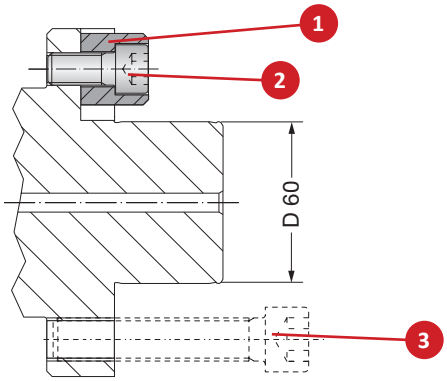
	1 Torque			2 Cap Screw		
Connection	Service Key	*D x L*	Part No.	Service Key	*D x L*	Part No.
100 - 56	–	–	**115641**	S5 / B	M 6 x 16	**115147**

Clamping Pieces for D 60 / D 40

	1 Torque
Connection	Part No.
D 60	**115643 (125mm)**
D 60	**KW31562 (110mm)**
D 40	**117143**

Clamping Pieces for D 60 / D 40

	2 Cap Screw		
Connection	Service Key	*D x L*	Part No.
D 60	s10 / B	M 12 x 25	**115237**
D 40	s5 / B	M 6 x 16	**115147**



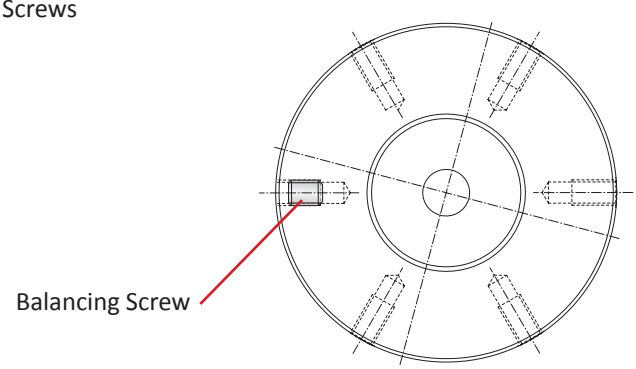
Clamping Pieces for D 60 / D 40

	3 Cap Screw		
Connection	Service Key	*D x L*	Part No.
D 60	s14 / C	M 16 x 80	**115170**[1]
D 60	s14 / C	M 16 x 55	**215189**[2]
D 40	s10 / B	M 12 x 75	**315186**[3]
D 40	s10 / B	M 12 x 50	**077104**[2]

[1] To mount boring tools above Ø7.874" (200.00mm) see section B10-F
[2] Cap screws used for mounting cutter heads to DIN 1830
[3] Ø7.874" - 26.771" (200.00mm - 680.00mm)

Accessories

Heavy Metal Balancing Screws



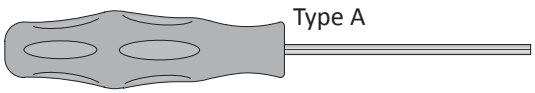
Balancing Screw		
Nominal Size	**Service Key**	**Part No.**
M 5 x 6	0.8 x 4 / K	**415573**
M 6 x 6	0.8 x 4 / K	**415284**
M 6 x 8	0.8 x 4 / K	**415341**
M 6 x 10	0.8 x 4 / K	**415283**
M 8 x 8	1.2 x 6.5 / K	**415285**
M 8 x 10	1.2 x 6.5 / K	**415286**
M 8 x 12	1.2 x 6.5 / K	**415287**

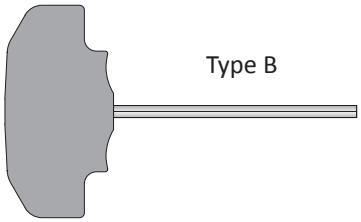
Accessories

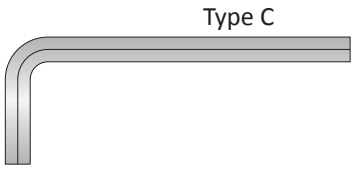
Torque Drivers | Wrenches

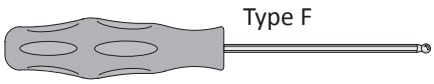
Service Keys for Insert Holders and Fixing Screws (Type A, B, C, F)

Service Key	Part No.
S1.5 / A	**215472**
s2 / A	**215473**
s2 / B	**415761**
s2.5 / A	**115575**
s2.5 / B	**415577**
s3 / A	**115630**
s3 / B	**415578**
s4 / B	**115576**
s4 / F	**315265**
s4 / B	**415164**
s5 / B	**115577**
s5 / B	**415165**
s6 / B	**115578**
s8 / B	**115579**
s8 / C	**415611**
s10 / B	**115580**
s12 / B	**215638**
s14 / C	**215639**



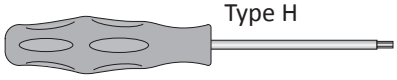






Fixed Torque Driver (Type H)

Service Key	Part No.
T6 / H	**115537**
T7 / H	**115591**
T8 / H	**115590**
T15 / H	**115664**
T20 / H	**215150**
T25 / H	**415121**

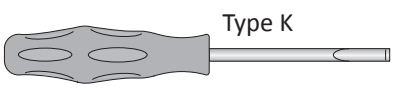


Torque Driver (Type H)

Service Key	Part No.
T6 / H	**415507**
T7 / H	**415508**
T8 / H	**415514**
T15 / H	**415510**
T20 / H	**415543**

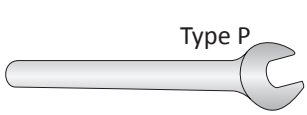
Torque Driver (Type K)

Service Key	Part No.
0.5 x 3 / K	**315322**
0.8 x 4 / K	**415579**
1.2 x 6.5 / K	**415580**



Wrench (Type P)

Service Key	Part No.
13 / P	**315689**
15 / P	**315690**
19 / P	**315691**



Accessories

Torque Driver Set | 25 Piece Wrench Set

NOTE: Torque driver set pictured

Torque Driver Set: Torx Bits, Hexagon Bits, Flat Blade Bits

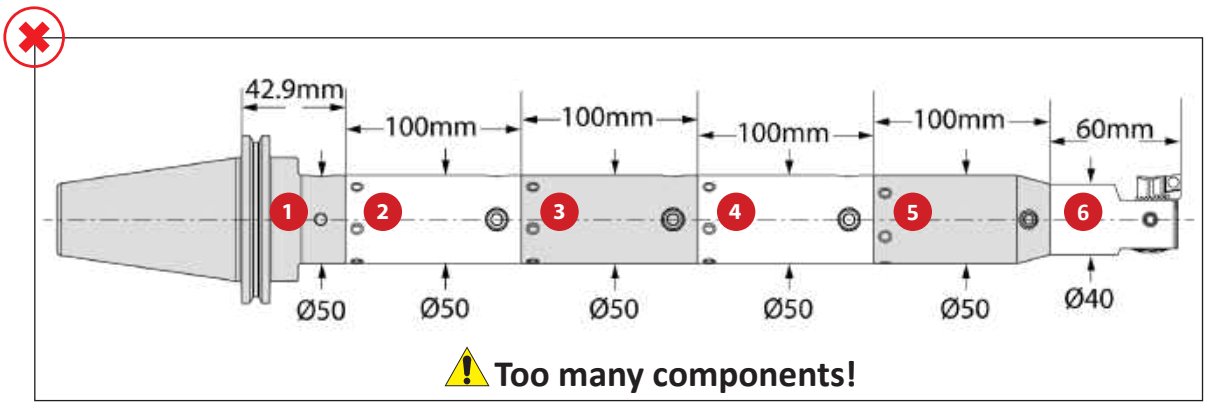
Type	Pieces	Size	Set Part No.
Torque Driver	1	0.3 - 1.2 (Nm)	**103086**
Torque Driver	1	1.2 - 3.0 (Nm)	
Torque Driver	1	4.0 - 8.0 (Nm)	
Hexagon Bit	3	T6	
Hexagon Bit	3	T7	
Hexagon Bit	3	T8	
Hexagon Bit	1	T16	
Hexagon Bit	1	T20	
Hexagon Bit	1	T25	
Flat Blade Bit	3	s2	
Flat Blade Bit	3	s2.5	
Flat Blade Bit	2	s3	
Flat Blade Bit	2	s4	
Flat Blade Bit	1	s5	
Flat Blade Bit	1	0.5 x 3.0	

25 Piece Wrench Set

Type	Size	Set Part No.
A	s1.5 / s2 / s2.5 / s3	**103025**
B	s4 / s5 / s6 / s8 / s10 / s12 / s14	
C	s7	
F	s4	
H	T6 / T7 / T8 / T15 / T20 / T25	
K	0.5 x 3	
P	s13 / s15 / s19	

Guidelines for not Exceeding Recommended Length to Diameter Ratio

To calculate, see graphics below:



NOTE: Length to diameter ratio is calculated using body diameters, not cutting diameter.
NOTE: Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)

Step 1: Find L : D by component

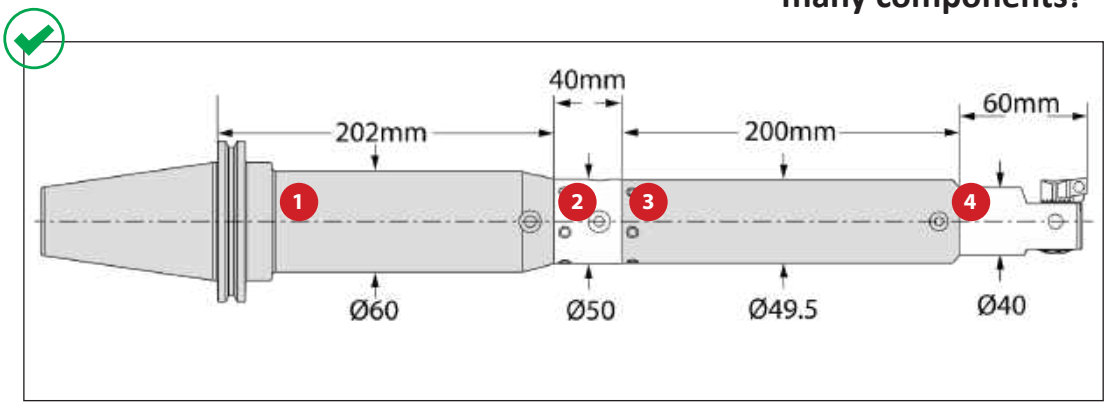
1. 0.9 = 42.9/50
2. 2.0 = 100/50
3. 2.0 = 100/50
4. 2.0 = 100/50
5. 2.0 = 100/50
6. 1.5 = 60/40

Step 2: Add each L : D Average

0.9
2.0
2.0
2.0
2.0
+ 1.5

10.4 = L : D ratio

Too long with too many components!



NOTE: Length to diameter ratio is calculated using body diameters, not cutting diameter.
NOTE: Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)

Step 1: Find L : D by component

1. 3.2 = 202/60
2. 0.8 = 40/50
3. 4.0 = 200/49.5
4. 1.5 = 60/40

Step 2: Add each L : D average

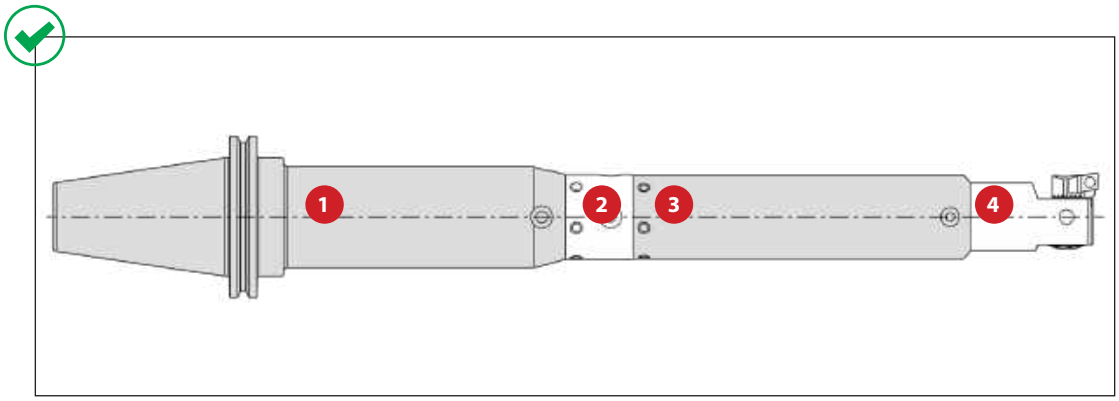
3.2
0.8
4.0
+ 1.5

9.5 = L : D ratio

WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Calculating Tool Assembly Weight

To calculate, see graphics below:



Step 1: Find weight for each component circled in the example table below

Example:

	MVS Connection	Boring Range	4 Boring Head					
	D_1 & D_2	A	X_1	X_2	L_2	D_5	Weight	Part No.
i	40 - 22	2.087 - 2.598	2.953	1.535	2.854	–	1.543 (lbs)	**320004**
m	40 - 22	53.01 - 65.98	75.00	39.00	72.50	–	0.70 (kg)	**320004**

Step 2: Calculate total assembly weight

1 6.6 kg
2 0.6 kg
3 3.5 kg
\+ 4 0.7 kg
11.4 kg

Step 3: Consult machine tool builder to ensure tool assembly weight does not exceed machine capabilities.

⚠ WARNING **Exceeding weight capacity for machine tool spindle and tool changer can cause machine damage, and/or serious injury. To prevent:**
-Consult machine tool builder for machine's weight limitations.
Factory technical assistance is also available for specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Recommended Cutting Data | Imperial (inch)

ISO	Material	(BHN) Hardness	Grade	*Speed SFM	Recommended Feed (inch / tooth) Nose Radi 0.004"	0.008"	0.016"	0.031"
P	**Free Machining Steel** 1118, 1215, 12L14, etc.	100 - 250	Carbide	525 - 975	0.001 - 0.003	0.002 - 0.005	0.004 - 0.006	0.006 - 0.009
	Low Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 275	Carbide	475 - 925	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	Medium Carbon Steel 1030, 1040, 1050, 1527, 1140, 1151, etc.	125 - 325	Carbide	475 - 825	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	Alloy Steel 4140, 5140, 8640, etc.	125 - 375	Carbide	400 - 700	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	High Strength Alloy 4340, 4330V, 300M, etc.	225 - 400	Carbide	325 - 600	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	Structural Steel A36, A285, A516, etc.	100 - 350	Carbide	475 - 925	0001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	Tool Steel H-13, H-21, A-4, 0-2, S-3, etc.	150 - 250	Carbide	325 - 600	0.001 - 0.002	0.002 - 0.003	0.003 - 0.004	0.004 - 0.006
S	**High Temp Alloy** Hastelloy B, Inconel 600, etc.	140 - 310	Carbide	100 - 225	0.001 - 0.002	0.002 - 0.003	0.003 - 0.005	0.004 - 0.006
	Titanium Alloy	140 - 310	Carbide	125 - 300	0.001 - 0.002	0.002 - 0.003	0.003 - 0.005	0.004 - 0.006
	Aerospace Alloy S82	185 - 350	Carbide	125 - 300	0.001 - 0.002	0.002 - 0.003	0.003 - 0.005	0.004 - 0.006
M	**Stainless Steel 400 Series** 416, 420, etc.	185 - 350	Carbide	300 - 525	0.001 - 0.002	0.002 - 0.004	0.003 - 0.004	0.004 - 0.006
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	Carbide	300 - 525	0.001 - 0.002	0.002 - 0.004	0.003 - 0.004	0.004 - 0.006
	Super Duplex Stainless Steel	135 - 275	Carbide	300 - 525	0.001 - 0.002	0.002 - 0.004	0.003 - 0.004	0.004 - 0.006

*Not to exceed max recommended RPM for boring head found in corresponding Wohlhaupter Operation Manual

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool Length				
Boring Type	**7xD**	**8xD**	**9xD**	**10xD**
Roughing	❖	❖	❖	❖
Finishing	0.70	0.50	0.30	❖

❖ Contact our Application Engineering department for assistance when boring these depths without NOVI^{TECH}.

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool NOVI^{TECH} Length			
Boring Type	**8xD**	**9xD**	**10xD**
Roughing	0.80	0.60	0.40
Finishing	0.90	0.70	0.50

*Not to exceed recommended RPM printed on NOVI^{TECH} module

Recommended Speed Example

If the recommended speed for a finish boring assembly under 5xD is 400 SFM, then the speed for a 10xD finish boring assembly in the same application would be 200 SFM. (400 SFM x 0.50 = 200 SFM)

5xD = 400 SFM	10xD = 200 SFM

IMPORTANT: Max spindle speed refers to maximum possible speed for individual boring head and is not a recommended parameter. Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Recommended Cutting Data | Imperial (inch)

ISO	Material	(BHN) Hardness	Grade	*Speed SFM	Recommended Feed (inch / tooth) Nose Radi 0.004"	0.008"	0.016"	0.031"
H	**Wear Plate**	400 - 600	Carbide	100 - 200	0.001 - 0.002	0.002 - 0.003	0.003 - 0.004	0.004 - 0.006
	Hardox, AR400, T-1, etc.		CBN	225 - 600	0.001 - 0.002	0.002 - 0.003	0.003 - 0.004	0.004 - 0.006
	Hardened Steel	300 - 500	Carbide	125 - 275	0.001 - 0.002	0.002 - 0.003	0.003 - 0.004	0.004 - 0.006
			CBN	225 - 600	0.001 - 0.002	0.002 - 0.003	0.003 - 0.004	0.004 - 0.006
K	**SG / Nodular Cast Iron**	120 - 320	Carbide	475 - 850	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	Grey / White Iron	180 - 320	Carbide	600 - 1050	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
			CBN	1325 - 3275	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
N	**Cast Aluminum**	30 - 180	Carbide	850 - 2800	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
			PCD	1625 - 6550	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	Wrought Aluminum	30 - 180	Carbide	675 - 1975	0.001 - 0.003	0.002 - 0.005	0.004 - 0.006	0.006 - 0.009
	Aluminum Bronze	100 - 250	Carbide	475 - 925	0.001 - 0.002	0.002 - 0.004	0.004 - 0.005	0.005 - 0.008
	Brass	100	Carbide	675 - 1975	0.001 - 0.002	0.002 - 0.004	0.003 - 0.005	0.005 - 0.008
	Copper	60	Carbide	325 - 600	0.001 - 0.002	0.002 - 0.003	0.003 - 0.004	0.004 - 0.005

*Not to exceed max recommended RPM for boring head found in corresponding Wohlhaupter operation manual

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool Length				
Boring Type	**7xD**	**8xD**	**9xD**	**10xD**
Roughing	❖	❖	❖	❖
Finishing	0.70	0.50	0.30	❖

❖ Contact our Application Engineering department for assistance when boring these depths without NOVI^{TECH}.

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool NOVI^{TECH} Length			
Boring Type	**8xD**	**9xD**	**10xD**
Roughing	0.80	0.60	0.40
Finishing	0.90	0.70	0.50

*Not to exceed recommended RPM printed on NOVI^{TECH} module

Recommended Speed Example

If the recommended speed for a finish boring assembly under 5xD is 400 SFM, then the speed for a 10xD finish boring assembly in the same application would be 200 SFM. (400 SFM x 0.50 = 200 SFM)

5xD = 400 SFM	10xD = 200 SFM

IMPORTANT: Max spindle speed refers to maximum possible speed for individual boring head and is not a recommended parameter. Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ **WARNING** **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Recommended Cutting Data | Metric (mm)

ISO	Material	(BHN) Hardness	Grade	*Speed M / Min	Recommended Feed (mm / tooth) Nose Radi 0.1mm	0.2mm	0.4mm	0.8mm
P	**Free Machining Steel** 1118, 1215, 12L14, etc.	100 - 250	Carbide	150 - 300	0.02 - 0.08	0.05 - 0.13	0.10 - 0.15	0.15 - 0.23
P	**Low Carbon Steel** 1010, 1020, 1025, 1522, 1144, etc.	85 - 275	Carbide	145 - 280	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
P	**Medium Carbon Steel** 1030, 1040, 1050, 1527, 1140, 1151, etc.	125 - 325	Carbide	145 - 280	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
P	**Alloy Steel** 4140, 5140, 8640, etc.	125 - 375	Carbide	120 - 215	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
P	**High Strength Alloy** 4340, 4330V, 300M, etc.	225 - 400	Carbide	100 - 180	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
P	**Structural Steel** A36, A285, A516, etc.	100 - 350	Carbide	145 - 280	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
P	**Tool Steel** H-13, H-21, A-4, 0-2, S-3, etc.	150 - 250	Carbide	100 - 180	0.02 - 0.05	0.05 - 0.08	0.08 - 0.10	0.10 - 0.15
S	**High Temp Alloy** Hastelloy B, Inconel 600, etc.	140 - 310	Carbide	30 - 70	0.02 - 0.05	0.05 - 0.08	0.08 - 0.13	0.10 - 0.15
S	**Titanium Alloy**	140 - 310	Carbide	40 - 90	0.02 - 0.05	0.05 - 0.08	0.08 - 0.13	0.10 - 0.15
S	**Aerospace Alloy** S82	185 - 350	Carbide	40 - 90	0.02 - 0.05	0.05 - 0.08	0.08 - 0.13	0.10 - 0.15
M	**Stainless Steel 400 Series** 416, 420, etc.	185 - 350	Carbide	90 - 160	0.02 - 0.05	0.05 - 0.10	0.08 - 0.10	0.10 - 0.15
M	**Stainless Steel 300 Series** 304, 316, 17-4PH, etc.	135 - 275	Carbide	90 - 160	0.02 - 0.05	0.05 - 0.10	0.08 - 0.10	0.10 - 0.15
M	**Super Duplex Stainless Steel**	135 - 275	Carbide	90 - 160	0.02 - 0.05	0.05 - 0.10	0.08 - 0.10	0.10 - 0.15

*Not to exceed max recommended RPM for boring head found in corresponding Wohlhaupter Operation Manual

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool Length				
Boring Type	**7xD**	**8xD**	**9xD**	**10xD**
Roughing	❖	❖	❖	❖
Finishing	0.70	0.50	0.30	❖

❖ Contact our Application Engineering department for assistance when boring these depths without NOVI^{TECH}.

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool NOVI^{TECH} Length			
Boring Type	**8xD**	**9xD**	**10xD**
Roughing	0.80	0.60	0.40
Finishing	0.90	0.70	0.50

*Not to exceed recommended RPM printed on NOVI^{TECH} module

Recommended Speed Example

If the recommended speed for a finish boring assembly under 5xD is 400 SFM, then the speed for a 10xD finish boring assembly in the same application would be 200 SFM. (400 SFM x 0.50 = 200 SFM)

5xD = 400 SFM	10xD = 200 SFM

IMPORTANT: Max spindle speed refers to maximum possible speed for individual boring head and is not a recommended parameter. Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Recommended Cutting Data | Metric (mm)

ISO	Material	(BHN) Hardness	Grade	*Speed M / Min	Recommended Feed (mm / tooth) Nose Radi 0.1mm	0.2mm	0.4mm	0.8mm
H	**Wear Plate** Hardox, AR400, T-1, etc.	400 - 600	Carbide	30 - 60	0.02 - 0.05	0.05 - 0.08	0.08 - 0.10	0.10 - 0.15
			CBN	70 - 180	0.02 - 0.05	0.05 - 0.08	0.08 - 0.10	0.10 - 0.15
	Hardened Steel	300 - 500	Carbide	40 - 80	0.02 - 0.05	0.05 - 0.08	0.08 - 0.10	0.10 - 0.15
			CBN	70 - 180	0.02 - 0.05	0.05 - 0.08	0.08 - 0.10	0.10 - 0.15
K	**SG / Nodular Cast Iron**	120 - 320	Carbide	145 - 260	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
	Grey / White Iron	180 - 320	Carbide	180 - 320	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
			CBN	400 - 1000	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
N	**Cast Aluminum**	30 - 180	Carbide	260 - 850	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
			PCD	495 - 1995	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
	Wrought Aluminum	30 - 180	Carbide	205 - 600	0.02 - 0.05	0.05 - 0.13	0.10 - 0.15	0.15 - 0.23
	Aluminum Bronze	100 - 250	Carbide	145 - 280	0.02 - 0.05	0.05 - 0.10	0.10 - 0.13	0.13 - 0.20
	Brass	100	Carbide	205 - 600	0.02 - 0.05	0.05 - 0.10	0.08 - 0.13	0.13 - 0.20
	Copper	60	Carbide	100 - 180	0.02 - 0.05	0.05 - 0.08	0.08 - 0.10	0.10 - 0.13

*Not to exceed max recommended RPM for boring head found in corresponding Wohlhaupter operation manual

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool Length				
Boring Type	**7xD**	**8xD**	**9xD**	**10xD**
Roughing	❖	❖	❖	❖
Finishing	0.70	0.50	0.30	❖

❖ Contact our Application Engineering department for assistance when boring the depths without NOVI[TECH].

Deep Hole Boring Speed Adjustment

⚠ For Dynamic Boring Tool NOVI[TECH] Length			
Boring Type	**8xD**	**9xD**	**10xD**
Roughing	0.80	0.60	0.40
Finishing	0.90	0.70	0.50

*Not to exceed recommended RPM printed on NOVI[TECH] module

Recommended Speed Example

If the recommended speed for a finish boring assembly under 5xD is 120 M/Min, then the speed for a 10xD finish boring assembly in the same application would be 60 M/Min (120 M/Min x 0.50 = 60 M/Min)

5xD = 120 M/Min	10xD = 60 M/Min

IMPORTANT: Max spindle speed refers to maximum possible speed for individual boring head and is not a recommended parameter. Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

⚠ WARNING **Tool failure can cause serious injury. To prevent:**
-Do not exceed recommended 10xD length to diameter ratio or exceed 4 total components (including shank)
-Refer to example on page B10-N: 8 for calculating length to diameter ratio
Factory technical assistance is available for your specific applications through our Application Engineering department. *ext:* **7611** | *email:* **appeng@alliedmachine.com**

Notes

Part No.	Page
0	
0750BFBL...	B10-J: 4
0750BFBR...	B10-J: 4
0875BFBL...	B10-J: 8, B10-J: 10
0875BFBR...	B10-J: 8, B10-J: 10
003195...	B10-L: 6
005020...	B10-J: 4
005195...	B10-L: 6, B10-L: 14
006020...	B10-J: 4
007020...	B10-J: 8
008020...	B10-J: 8
013020...	B10-J: 10
014020...	B10-J: 10
019183...	B10-C: 5
019195...	B10-L: 17
027148...	B10-L: 6, B10-L: 14
027149...	B10-L: 6, B10-L: 14, B10-L: 17
027154...	B10-A: 16, B10-A: 69
031141...	B10-A: 34
031148...	B10-L: 6, B10-L: 14, B10-L: 17
031149...	B10-L: 6
031195...	B10-L: 17
051110...	B10-L: 14
063106...	B10-E: 23
068048...	B10-I: 30
068052...	B10-I: 30
068112...	B10-D: 23
068115...	B10-D: 23
068168...	B10-E: 25
070153...	B10-A: 16, B10-A: 47
070161...	B10-L: 10
070333...	B10-A: 56
071003...	B10-I: 16
071004...	B10-I: 16
071005...	B10-I: 18
071006...	B10-I: 18
071013...	B10-I: 21
071014...	B10-I: 21
071016...	B10-I: 15
071017...	B10-I: 15
071019...	B10-I: 16
071020...	B10-I: 21
071022...	B10-I: 18
071028...	B10-I: 22
071029...	B10-I: 22
071031...	B10-I: 22
071032...	B10-I: 22
071033...	B10-I: 22
071034...	B10-I: 22
071045...	B10-I: 26
071047...	B10-I: 26
071048...	B10-I: 26
071049...	B10-I: 26
071052...	B10-I: 28
071053...	B10-I: 28
071103...	B10-J: 5
071107...	B10-J: 9, B10-J: 11
071140...	B10-I: 16
071141...	B10-I: 16
071142...	B10-I: 16
071143...	B10-I: 16
071144...	B10-I: 16
071145...	B10-I: 16
071146...	B10-I: 16
071147...	B10-I: 16
071148...	B10-I: 16
071149...	B10-I: 16
071150...	B10-I: 16
071151...	B10-I: 16
071152...	B10-I: 16
071153...	B10-I: 16
071154...	B10-I: 16
071155...	B10-I: 16
071156...	B10-I: 16
071157...	B10-I: 16
071158...	B10-I: 16
071159...	B10-I: 16
071160...	B10-I: 16
071161...	B10-I: 16
071162...	B10-I: 16
071163...	B10-I: 16
071164...	B10-I: 16
071165...	B10-I: 16
071166...	B10-I: 16
071167...	B10-I: 16
071168...	B10-I: 16
071169...	B10-I: 17
071170...	B10-I: 17
071171...	B10-I: 17
071172...	B10-I: 17
071173...	B10-I: 17
071174...	B10-I: 17
071175...	B10-I: 17
071176...	B10-I: 17
071177...	B10-I: 17
071178...	B10-I: 17
071179...	B10-I: 17
071180...	B10-I: 17
071181...	B10-I: 17
071182...	B10-I: 17
071183...	B10-I: 17
071184...	B10-I: 17
071185...	B10-I: 17
071186...	B10-I: 17
071187...	B10-I: 17
071188...	B10-I: 17
071189...	B10-I: 17
071190...	B10-I: 17
071191...	B10-I: 17
071192...	B10-I: 17
071193...	B10-I: 18
071194...	B10-I: 18
071195...	B10-I: 18
071196...	B10-I: 18
071197...	B10-I: 18
071198...	B10-I: 18
071199...	B10-I: 18
071200...	B10-I: 18
071201...	B10-I: 18
071202...	B10-I: 18
071203...	B10-I: 18
071204...	B10-I: 18
071205...	B10-I: 18
071206...	B10-I: 18
071207...	B10-I: 18
071208...	B10-I: 18
071209...	B10-I: 18
071210...	B10-I: 18
071211...	B10-I: 18
071212...	B10-I: 18
071213...	B10-I: 18
071214...	B10-I: 18
071215...	B10-I: 18
071216...	B10-I: 18
071217...	B10-I: 18
071218...	B10-I: 19
071219...	B10-I: 19
071220...	B10-I: 19
071221...	B10-I: 19
071222...	B10-I: 19
071223...	B10-I: 19
071224...	B10-I: 19
071225...	B10-I: 19
071226...	B10-I: 19
071227...	B10-I: 19
071228...	B10-I: 19
071229...	B10-I: 19
071230...	B10-I: 19
071231...	B10-I: 19
071232...	B10-I: 19
071233...	B10-I: 19
071234...	B10-I: 19
071235...	B10-I: 19
071236...	B10-I: 19
071237...	B10-I: 19
071238...	B10-I: 19
071239...	B10-I: 19
071240...	B10-I: 19
071241...	B10-I: 19
071242...	B10-I: 19
071243...	B10-I: 19
071244...	B10-I: 19
071245...	B10-I: 19
071246...	B10-I: 19
071247...	B10-I: 19
071248...	B10-I: 19
071249...	B10-I: 19
071250...	B10-I: 19
071251...	B10-I: 19
071252...	B10-I: 19
071253...	B10-I: 19
071254...	B10-I: 19
071255...	B10-I: 19
071256...	B10-I: 19
071257...	B10-I: 19
071258...	B10-I: 19
071304...	B10-I: 21
071305...	B10-I: 21
071306...	B10-I: 21
071307...	B10-I: 21
071308...	B10-I: 21
071309...	B10-I: 21
071310...	B10-I: 21
071311...	B10-I: 21
071312...	B10-I: 21
071313...	B10-I: 21
071355...	B10-I: 15
071356...	B10-I: 15
071357...	B10-I: 15
071358...	B10-I: 15
071359...	B10-I: 15
071360...	B10-I: 15
071361...	B10-I: 15
071362...	B10-I: 15
071363...	B10-I: 15
071364...	B10-I: 15
071365...	B10-I: 15
071368...	B10-I: 15
071369...	B10-I: 15
071370...	B10-I: 15
071371...	B10-I: 15
071372...	B10-I: 15
071373...	B10-I: 15
071374...	B10-I: 15
071375...	B10-I: 15
071376...	B10-I: 15
071377...	B10-I: 15
071378...	B10-I: 15
071379...	B10-I: 15
071380...	B10-I: 15
071381...	B10-I: 15
071382...	B10-I: 15
071383...	B10-I: 15
071384...	B10-I: 15
071385...	B10-I: 15
071416...	B10-I: 17
071417...	B10-I: 17
071418...	B10-I: 17
071419...	B10-I: 17
071420...	B10-I: 17
071421...	B10-I: 17
071422...	B10-I: 17
071423...	B10-I: 17
071424...	B10-I: 17
071427...	B10-I: 21
071428...	B10-I: 21
071429...	B10-I: 21
071430...	B10-I: 21
071431...	B10-I: 21
071432...	B10-I: 21
071433...	B10-I: 21
071542...	B10-I: 20
071543...	B10-I: 20
071544...	B10-I: 20
071545...	B10-I: 20
071546...	B10-I: 20
071547...	B10-I: 20
071548...	B10-I: 20
071549...	B10-I: 20
071550...	B10-I: 20
071551...	B10-I: 20
071552...	B10-I: 20
071553...	B10-I: 20
071554...	B10-I: 20
071555...	B10-I: 20
071556...	B10-I: 20
071557...	B10-I: 20
071558...	B10-I: 20
071559...	B10-I: 20
071560...	B10-I: 20
071561...	B10-I: 20
071562...	B10-I: 20
071563...	B10-I: 20
071564...	B10-I: 20
071565...	B10-I: 20
071566...	B10-I: 20
071567...	B10-I: 20
071568...	B10-I: 20
071569...	B10-I: 20
071570...	B10-I: 20
071571...	B10-I: 20
071572...	B10-I: 20
071573...	B10-I: 20
071574...	B10-I: 20
071575...	B10-I: 20
071576...	B10-I: 20
071577...	B10-I: 20
071578...	B10-I: 20
071579...	B10-I: 20
071580...	B10-I: 20
071581...	B10-I: 20
071582...	B10-I: 20
071583...	B10-I: 20
071584...	B10-I: 20
071586...	B10-I: 20
071612...	B10-I: 17
071613...	B10-I: 17
071614...	B10-I: 17
071621...	B10-I: 18
071622...	B10-I: 18
071625...	B10-I: 18
071626...	B10-I: 18
071627...	B10-I: 19
071628...	B10-I: 19
071633...	B10-I: 17
071665...	B10-I: 17
071666...	B10-I: 17
071667...	B10-I: 17
071668...	B10-I: 17
071669...	B10-I: 17
071670...	B10-I: 17
071671...	B10-I: 17
071672...	B10-I: 17
071673...	B10-I: 17
071674...	B10-I: 17
071675...	B10-I: 17
071676...	B10-I: 17
071677...	B10-I: 17
071678...	B10-I: 17
071679...	B10-I: 17
071680...	B10-I: 17
071681...	B10-I: 15
071684...	B10-I: 21
071685...	B10-I: 21
071686...	B10-I: 20
071687...	B10-I: 20
071688...	B10-I: 20
071689...	B10-I: 20
071690...	B10-I: 20
071691...	B10-I: 20
071692...	B10-I: 20

Part No.	Page
071693...	B10-I: 20
071700...	B10-I: 22
071701...	B10-I: 22
071702...	B10-I: 22
071703...	B10-I: 22
071704...	B10-I: 22
071705...	B10-I: 22
071706...	B10-I: 22
071707...	B10-I: 22
071708...	B10-I: 22
071709...	B10-I: 22
071710...	B10-I: 22
071711...	B10-I: 22
071712...	B10-I: 22
071713...	B10-I: 23
071714...	B10-I: 23
071715...	B10-I: 23
071716...	B10-I: 23
071717...	B10-I: 23
071718...	B10-I: 23
071719...	B10-I: 23
071720...	B10-I: 23
071721...	B10-I: 23
071722...	B10-I: 23
071723...	B10-I: 23
071724...	B10-I: 23
071725...	B10-I: 23
071743...	B10-I: 24
071744...	B10-I: 24
071745...	B10-I: 24
071746...	B10-I: 24
071747...	B10-I: 24
071748...	B10-I: 24
071749...	B10-I: 24
071750...	B10-I: 24
071751...	B10-I: 24
071752...	B10-I: 24
071753...	B10-I: 24
071754...	B10-I: 24
071755...	B10-I: 24
071756...	B10-I: 24
071757...	B10-I: 24
071758...	B10-I: 24
071761...	B10-I: 24
071762...	B10-I: 24
071763...	B10-I: 24
071764...	B10-I: 24
071765...	B10-I: 24
071766...	B10-I: 24
071767...	B10-I: 24
071768...	B10-I: 24
071769...	B10-I: 24
071770...	B10-I: 24
071771...	B10-I: 24
071772...	B10-I: 24
071773...	B10-I: 24
071774...	B10-I: 24
071775...	B10-I: 24
071776...	B10-I: 24
071777...	B10-I: 24
071778...	B10-I: 24
071779...	B10-I: 25
071780...	B10-I: 25

Part No.	Page
071781...	B10-I: 25
071782...	B10-I: 25
071783...	B10-I: 25
071784...	B10-I: 25
071785...	B10-I: 25
071786...	B10-I: 25
071787...	B10-I: 25
071788...	B10-I: 25
071789...	B10-I: 25
071790...	B10-I: 25
071791...	B10-I: 25
071792...	B10-I: 25
071793...	B10-I: 25
071794...	B10-I: 25
071795...	B10-I: 25
071796...	B10-I: 25
071797...	B10-I: 25
071798...	B10-I: 25
071799...	B10-I: 25
071800...	B10-I: 25
071801...	B10-I: 25
071826...	B10-I: 28
071827...	B10-I: 28
071828...	B10-I: 28
071829...	B10-I: 28
071830...	B10-I: 28
071831...	B10-I: 28
071832...	B10-I: 28
071833...	B10-I: 28
071834...	B10-I: 28
071835...	B10-I: 28
071836...	B10-I: 28
071837...	B10-I: 28
071901...	B10-I: 27
071902...	B10-I: 27
071903...	B10-I: 27
071904...	B10-I: 27
071912...	B10-I: 27
071913...	B10-I: 27
071914...	B10-I: 27
071915...	B10-I: 27
071916...	B10-I: 27
071917...	B10-I: 27
071918...	B10-I: 27
071919...	B10-I: 27
071920...	B10-I: 27
071921...	B10-I: 27
071922...	B10-I: 27
071923...	B10-I: 27
071924...	B10-I: 27
071925...	B10-I: 27
071926...	B10-I: 27
071927...	B10-I: 27
071928...	B10-I: 27
071929...	B10-I: 27
071930...	B10-I: 27
071931...	B10-I: 27
071932...	B10-I: 27
071933...	B10-I: 27
071934...	B10-I: 27
071935...	B10-I: 27
071936...	B10-I: 27
071937...	B10-I: 27

Part No.	Page
071938...	B10-I: 27
071939...	B10-I: 27
071940...	B10-I: 27
071941...	B10-I: 27
071986...	B10-I: 22
071987...	B10-I: 22
071988...	B10-I: 22
071989...	B10-I: 22
071990...	B10-I: 22
071991...	B10-I: 22
071992...	B10-I: 22
071993...	B10-I: 22
071994...	B10-I: 22
072104...	B10-J: 5
072105...	B10-J: 5
072106...	B10-J: 5
072107...	B10-J: 5
072108...	B10-J: 9, B10-J: 11
072109...	B10-J: 9, B10-J: 11
072110...	B10-J: 9, B10-J: 11
072111...	B10-J: 9, B10-J: 11
072112...	B10-J: 9, B10-J: 11
073003...	B10-J: 4
073004...	B10-J: 4
073005...	B10-J: 4
073006...	B10-J: 8, B10-J: 10
073007...	B10-J: 8, B10-J: 10
073008...	B10-J: 8, B10-J: 10
075001...	B10-J: 5
075002...	B10-J: 5
075003...	B10-J: 9, B10-J: 11
075004...	B10-J: 9, B10-J: 11
077104...	B10-N: 4
077110...	B10-E: 25
077128...	B10-E: 24
081041...	B10-A: 8
081042...	B10-A: 8
081043...	B10-A: 8
081044...	B10-A: 8
081045...	B10-A: 8
081046...	B10-A: 8
081047...	B10-A: 8
081048...	B10-A: 8
081049...	B10-A: 8
081050...	B10-A: 8
081053...	B10-A: 8
081055...	B10-A: 9, B10-A: 40
081087...	B10-J: 4
081092...	B10-J: 8, B10-J: 10
081306HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081307HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081307HW04...	B10-A: 7, B10-A: 29, B10-A: 39,

Part No.	Page
	B10-A: 54, B10-A: 61
081308HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081309HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081310HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081310HW04...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081311HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081312HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081313HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081313HW04...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081314HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081315HC05...	B10-A: 7, B10-A: 29, B10-A: 39,

Part No.	Page
	B10-A: 54, B10-A: 61
081316HC05...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081316HW04...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081317BN150...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081318BN150...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081319BN150...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081320BN150...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081321BN150...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081322BN150...	B10-A: 7, B10-A: 29, B10-A: 39, B10-A: 54, B10-A: 61
081323HC05...	B10-A: 7, B10-A: 39, B10-A: 54, B10-A: 61
081324HC05...	B10-A: 7, B10-A: 39, B10-A: 54, B10-A: 61
081341BN150...	B10-A: 7, B10-A: 29,

Part No.	Page
	B10-A: 39,
	B10-A: 54,
	B10-A: 61
081401HC126...	
	B10-A: 6,
	B10-A: 53
081402HC126...	
	B10-A: 6,
	B10-A: 53
081403HC126...	
	B10-A: 6,
	B10-A: 53
081404HC126...	
	B10-A: 6,
	B10-A: 53
081405HC126...	
	B10-A: 6,
	B10-A: 53
081406HC126...	
	B10-A: 6,
	B10-A: 53
081407HC126...	
	B10-A: 6,
	B10-A: 53
081408HC126...	
	B10-A: 6,
	B10-A: 53
081585...	B10-I: 20
097153...	B10-F: 16
097154...	B10-F: 16
097241...	B10-F: 23
097242...	B10-F: 23
097244...	B10-F: 23
097245...	B10-F: 23
097247...	B10-F: 23
097249...	B10-F: 23
097252...	B10-F: 34
097253...	B10-F: 36
097254...	B10-F: 36
097255...	B10-F: 36
097256...	B10-F: 36
097257...	B10-F: 36
097258...	B10-F: 36
097259...	B10-F: 36
097260...	B10-F: 36
097261...	B10-F: 36
097262...	B10-F: 36
097294...	B10-F: 36
097324...	B10-F: 23
097445...	B10-F: 20
097454...	B10-F: 14
097462...	B10-F: 24
097486...	B10-F: 15
097487...	B10-F: 17
097496...	B10-F: 20
097497...	B10-F: 20
097512...	B10-F: 18
097529...	B10-F: 20
097539...	B10-F: 34
097546...	B10-F: 16
097552...	B10-F: 15
097557...	B10-F: 15
097559...	B10-F: 28
097566...	B10-F: 34
097599...	B10-F: 16
097686...	B10-F: 17
097701...	B10-F: 16
097738...	B10-F: 23
097755...	B10-F: 14
097831...	B10-F: 41
097832...	B10-F: 19
097833...	B10-F: 19
097862...	B10-F: 20
097877...	B10-F: 17
097899...	B10-F: 20
097926...	B10-F: 20
097953...	B10-F: 18
097954...	B10-F: 32
097957...	B10-F: 20
098060...	B10-H: 15
098061...	B10-H: 15
098062...	B10-H: 15
098063...	B10-H: 15
098064...	B10-H: 15
098065...	B10-H: 15
098066...	B10-H: 15
098067...	B10-H: 15
098068...	B10-H: 15
098069...	B10-H: 15
098070...	B10-H: 15
098071...	B10-H: 15
098073...	B10-H: 15
099049...	B10-I: 29
099050...	B10-I: 29
099051...	B10-I: 29
099053...	B10-I: 29
099054...	B10-I: 29
099055...	B10-I: 29
345009...	B10-L: 7
1	
100102...	B10-L: 14,
	B10-L: 17
103025...	B10-N: 7
103045...	B10-A: 22
103046...	B10-A: 21
103047...	B10-A: 24
103048...	B10-A: 23
103049...	B10-A: 18
103050...	B10-A: 17
103051...	B10-A: 20
103052...	B10-A: 19
103061...	B10-A: 71
103062...	B10-A: 72
103063...	B10-A: 73
103064...	B10-A: 74
103065...	B10-A: 75
103066...	B10-A: 76
103080...	B10-A: 78
103081...	B10-A: 77
103086...	B10-N: 7
103088...	B10-A: 48
103089...	B10-A: 49
104045...	B10-A: 22
104046...	B10-A: 21
104047...	B10-A: 24
104048...	B10-A: 23
104049...	B10-A: 18
104050...	B10-A: 17
104051...	B10-A: 20
104052...	B10-A: 19
104061...	B10-A: 71
104062...	B10-A: 72
104063...	B10-A: 73
104064...	B10-A: 74
104065...	B10-A: 75
104066...	B10-A: 76
104080...	B10-A: 78
104081...	B10-A: 77
104088...	B10-A: 48
104089...	B10-A: 49
108109...	B10-I: 36
109109...	B10-I: 36
114112...	B10-E: 23
114113...	B10-E: 23
114114...	B10-E: 23
114115...	B10-E: 23
114224...	B10-A: 69,
	B10-L: 10
115118...	B10-E: 22,
	B10-E: 23,
	B10-E: 24
115136...	B10-A: 34, B10-B: 7
115147...	B10-A: 16,
	B10-A: 47,
	B10-I: 36, B10-N: 4
115151...	B10-L: 6
115166...	B10-A: 69
115169...	B10-I: 36
115170...	B10-E: 23,
	B10-N: 4
115180...	B10-B: 7
115185...	B10-B: 7, B10-B: 13
115186...	B10-B: 7
115192...	B10-D: 22
115196...	B10-E: 23
115237...	B10-I: 36, B10-N: 4
115249...	B10-B: 7, B10-B: 13
115280...	B10-D: 22
115288...	B10-C: 5
115307...	B10-E: 25
115329...	B10-D: 23
115341...	B10-I: 36
115342...	B10-I: 36
115343...	B10-I: 36
115344...	B10-I: 36
115345...	B10-I: 36
115346...	B10-I: 36
115347...	B10-I: 36
115348...	B10-I: 36
115376...	B10-L: 10
115407...	B10-D: 22
115455...	B10-L: 6
115505...	B10-B: 13,
	B10-B: 19
115519...	B10-B: 30,
	B10-D: 22
115531...	B10-F: 42
115535...	B10-A: 56,
	B10-A: 70,
	B10-F: 42
115537...	B10-A: 56,
	B10-A: 70,
	B10-F: 42,
	B10-L: 6, B10-L: 14,
	B10-L: 17,
	B10-L: 20, B10-N: 6
115566...	B10-I: 36
115575...	B10-L: 10, B10-N: 6
115576...	B10-A: 70,
	B10-N: 6
115577...	B10-N: 6
115578...	B10-I: 13, B10-N: 6
115579...	B10-N: 6
115580...	B10-N: 6
115590...	B10-A: 56,
	B10-A: 70,
	B10-F: 42,
	B10-L: 10, B10-N: 6
115591...	B10-A: 56,
	B10-A: 70,
	B10-F: 42,
	B10-L: 6, B10-L: 14,
	B10-L: 17,
	B10-L: 20, B10-N: 6
115630...	B10-A: 70,
	B10-N: 6
115641...	B10-N: 4
115643...	B10-I: 36, B10-N: 4
115660...	B10-I: 42
115661...	B10-I: 42
115662...	B10-I: 42
115663...	B10-I: 42
115664...	B10-F: 42,
	B10-L: 6, B10-L: 10,
	B10-L: 14,
	B10-L: 17,
	B10-L: 20, B10-N: 6
115666...	B10-D: 22
115667...	B10-D: 22
115669...	B10-E: 22,
	B10-E: 23,
	B10-E: 24,
	B10-E: 25
115672...	B10-F: 42
115673...	B10-F: 42,
	B10-L: 10
115676...	B10-A: 56,
	B10-A: 70,
	B10-F: 42,
	B10-L: 10
115680...	B10-I: 10
115681...	B10-I: 10
115682...	B10-I: 10
115683...	B10-I: 10
115684...	B10-I: 10
115685...	B10-I: 10
115686...	B10-I: 10
115687...	B10-I: 10
115696...	B10-I: 36
115697...	B10-I: 36
115699...	B10-I: 42
115707...	B10-I: 36
115708...	B10-I: 36
115709...	B10-I: 36
115725...	B10-A: 16,
	B10-A: 47
115730...	B10-B: 24,
	B10-B: 30,
	B10-D: 22
115736...	B10-E: 25
115737...	B10-E: 24,
	B10-E: 25
115771...	B10-E: 24
115785...	B10-I: 42
115802...	B10-F: 42
115834...	B10-B: 13
115929...	B10-I: 36
115930...	B10-I: 36
115932...	B10-I: 36
115933...	B10-I: 36
115934...	B10-I: 36
115936...	B10-I: 36
115949...	B10-N: 2
115985...	B10-A: 56
116152...	B10-I: 36
116433...	B10-L: 10
116550...	B10-B: 30,
	B10-D: 22
117143...	B10-N: 4
117148...	B10-D: 22
119001...	B10-G: 10,
	B10-G: 11
119002...	B10-G: 10,
	B10-G: 11
119003...	B10-G: 10,
	B10-G: 11
119004...	B10-G: 10,
	B10-G: 11
119005...	B10-G: 10,
	B10-G: 11
119006...	B10-G: 10,
	B10-G: 11
119010...	B10-G: 4, B10-G: 5
119012...	B10-G: 4, B10-G: 5
119019...	B10-G: 6, B10-G: 7
119021...	B10-G: 6, B10-G: 7
119025...	B10-G: 6, B10-G: 7
119054...	B10-G: 4, B10-G: 5
119055...	B10-G: 4, B10-G: 5
119058...	B10-G: 10,
	B10-G: 11
119059...	B10-G: 4, B10-G: 5
119060...	B10-G: 6, B10-G: 7
119061...	B10-G: 6, B10-G: 7
119064...	B10-G: 6, B10-G: 7
119065...	B10-G: 10,
	B10-G: 11
119066...	B10-G: 10,
	B10-G: 11
119067...	B10-G: 6, B10-G: 7
119069...	B10-G: 10,
	B10-G: 11
119094...	B10-G: 4, B10-G: 5
119095...	B10-G: 6, B10-G: 7
119096...	B10-G: 6, B10-G: 7

Part No.	Page
119097...	B10-G: 6, B10-G: 7
119098...	B10-G: 6, B10-G: 7
126157...	B10-D: 22, B10-L: 6
130001T003590...	B10-J: 6
130001T003920...	B10-J: 6
130001T004480...	B10-J: 7
130001T004498...	B10-J: 7
130001T004509...	B10-J: 6
130001T007166...	B10-J: 7
130001T011624...	B10-J: 6
130001T013939...	B10-J: 6
130005T003590...	B10-J: 12
130005T003920...	B10-J: 12
130005T004480...	B10-J: 12
130005T004498...	B10-J: 12
130005T011624...	B10-J: 12
130005T013939...	B10-J: 12
132022T003590...	B10-H: 13
132022T003704...	B10-H: 12
132022T003920...	B10-H: 13
132022T004256...	B10-H: 13
132022T004480...	B10-H: 11
132022T004498...	B10-H: 11
132022T007166...	B10-H: 14
132022T010299...	B10-H: 12
132022T016960...	B10-H: 8
132022T016962...	B10-H: 8
132066T003704...	B10-H: 12
132066T003920...	B10-H: 13
132066T004480...	B10-H: 11
132066T004498...	B10-H: 11
132066T010299...	B10-H: 12
132066T016960...	B10-H: 8
132066T016962...	B10-H: 8
132076T003704...	B10-H: 12
132076T004480...	B10-H: 11
132076T016962...	B10-H: 8
132088T003704...	B10-H: 12
132088T004480...	B10-H: 11
132088T016962...	B10-H: 8
132142...	B10-N: 2, B10-N: 3
132143...	B10-N: 3
132144...	B10-N: 3
132145...	B10-N: 2, B10-N: 3
132146...	B10-N: 2, B10-N: 3
132174...	B10-N: 2
132191...	B10-N: 3
133113...	B10-N: 2, B10-N: 3
136193...	B10-E: 21
137019...	B10-E: 8, B10-E: 9, B10-E: 20
137026...	B10-B: 22, B10-B: 28, B10-E: 8, B10-E: 9, B10-E: 20
137027...	B10-E: 8, B10-E: 9, B10-E: 20
140108...	B10-D: 22
140110...	B10-D: 22
140111...	B10-D: 22
140112...	B10-D: 22
140114...	B10-D: 22
140116...	B10-D: 22
140117...	B10-D: 22
140118...	B10-D: 22, B10-E: 20
140119...	B10-B: 24, B10-B: 30, B10-D: 22
140120...	B10-B: 24, B10-B: 30, B10-D: 22
140121...	B10-D: 22
143051...	B10-D: 19
143052...	B10-D: 19
143053...	B10-D: 19
143054...	B10-D: 19
143055...	B10-D: 19
143056...	B10-D: 19
143057...	B10-D: 19
143058...	B10-D: 19
145184...	B10-A: 16, B10-A: 47, B10-A: 69
148001...	B10-D: 7, B10-D: 9, B10-D: 11, B10-D: 16, B10-D: 17
148002...	B10-D: 7, B10-D: 9, B10-D: 11, B10-D: 16, B10-D: 17
148003...	B10-D: 7, B10-D: 9, B10-D: 11, B10-D: 16, B10-D: 17
148004...	B10-D: 7, B10-D: 9, B10-D: 10, B10-D: 11, B10-D: 14, B10-D: 16, B10-D: 17
148005...	B10-D: 7, B10-D: 9, B10-D: 10, B10-D: 11, B10-D: 14, B10-D: 18
148006...	B10-D: 7, B10-D: 9, B10-D: 10, B10-D: 11, B10-D: 14, B10-D: 18
148007...	B10-B: 22, B10-B: 28, B10-D: 8, B10-D: 9, B10-D: 10, B10-D: 13, B10-D: 18, B10-D: 20, B10-D: 21
148009...	B10-B: 22, B10-B: 28, B10-D: 8, B10-D: 9, B10-D: 10, B10-D: 13, B10-D: 18, B10-D: 20, B10-D: 21
148010...	B10-D: 20
148011...	B10-D: 21
148012...	B10-D: 21
148013...	B10-D: 21
148014...	B10-D: 21
148015...	B10-D: 21
148016...	B10-D: 21
148017...	B10-D: 7, B10-D: 9, B10-D: 11, B10-D: 16, B10-D: 17
148018...	B10-D: 7, B10-D: 9, B10-D: 11, B10-D: 16, B10-D: 17
148021...	B10-D: 6, B10-D: 12
148022...	B10-D: 6, B10-D: 12
148023...	B10-D: 6, B10-D: 12
148024...	B10-D: 6, B10-D: 12
148110...	B10-D: 22
148113...	B10-D: 22
148114...	B10-D: 22
149010...	B10-E: 10
149020...	B10-E: 10
149040...	B10-E: 11
149057...	B10-E: 12
149059...	B10-E: 12
149083...	B10-E: 10
149086...	B10-E: 12
149089...	B10-E: 10
149090...	B10-E: 10
149093...	B10-E: 10
149094...	B10-E: 10
149096...	B10-E: 10
149099...	B10-E: 10
151001...	B10-D: 6, B10-D: 7, B10-D: 11, B10-D: 12
151002...	B10-D: 6, B10-D: 7, B10-D: 11, B10-D: 12
151003...	B10-D: 6, B10-D: 7, B10-D: 11, B10-D: 12
151004...	B10-D: 6, B10-D: 7, B10-D: 11, B10-D: 12
151005...	B10-D: 7, B10-D: 11
151006...	B10-D: 7, B10-D: 11
151007...	B10-D: 8, B10-D: 13
151008...	B10-D: 8, B10-D: 13
151009...	B10-D: 10, B10-D: 14
151010...	B10-D: 10, B10-D: 14
151011...	B10-D: 9
151012...	B10-D: 9
151013...	B10-D: 9
151014...	B10-D: 9
151015...	B10-D: 9
151022...	B10-D: 10, B10-D: 14
151023...	B10-D: 6, B10-D: 7
151024...	B10-D: 6, B10-D: 7
151025...	B10-D: 7
151026...	B10-D: 7
151027...	B10-D: 8
151028...	B10-D: 8
151032...	B10-D: 10, B10-D: 14
151034...	B10-D: 14
151035...	B10-D: 10, B10-D: 14
151036...	B10-D: 9
151037...	B10-D: 9
151038...	B10-D: 9
151043...	B10-D: 10, B10-D: 14
151061...	B10-D: 11, B10-D: 12
151062...	B10-D: 11, B10-D: 12
151086...	B10-D: 7, B10-D: 11
151087...	B10-D: 8, B10-D: 13
151088...	B10-D: 8, B10-D: 13
151090...	B10-D: 11
151091...	B10-D: 13
151092...	B10-D: 13
151093...	B10-D: 11, B10-D: 12
151094...	B10-D: 11, B10-D: 12
151095...	B10-D: 11
151096...	B10-D: 11
151097...	B10-D: 13
151098...	B10-D: 13
160001...	B10-D: 23
160002...	B10-D: 23
160003...	B10-D: 23
160004...	B10-D: 23
160005...	B10-D: 23
160006...	B10-D: 23
160009...	B10-D: 23
160018...	B10-D: 23
160019...	B10-D: 23
161002...	B10-I: 6
161003...	B10-I: 6
161004...	B10-I: 6
161005...	B10-I: 6
161006...	B10-I: 6
161016...	B10-I: 5
161024...	B10-I: 2
161026...	B10-I: 2
161027...	B10-I: 2
161028...	B10-I: 2
161038...	B10-I: 39, B10-I: 40
161082...	B10-I: 7
161098...	B10-I: 5
161099...	B10-I: 30
162002...	B10-I: 6
162003...	B10-I: 6
162004...	B10-I: 6
162011...	B10-I: 5
162015...	B10-I: 2
162016...	B10-I: 2
162017...	B10-I: 2
162018...	B10-I: 2
162019...	B10-I: 2
162020...	B10-I: 2
162032...	B10-I: 7
162033...	B10-I: 7
162080...	B10-I: 14
162081...	B10-I: 14
162082...	B10-I: 14
162083...	B10-I: 14
162093...	B10-I: 30
162094...	B10-I: 39, B10-I: 40
162095...	B10-I: 30
166103...	B10-I: 9

Part No.	Page
166104...	B10-I: 9
166105...	B10-I: 9
198051T004480...	B10-E: 19
198054T019539...	B10-E: 18
198081T019539...	B10-E: 18
201065...	B10-E: 11
415164...	B10-N: 6
2	
201003...	B10-D: 16
201004...	B10-D: 16
201005...	B10-D: 17
201006...	B10-D: 17
201007...	B10-D: 16, B10-D: 17
201008...	B10-D: 16, B10-D: 17
201009...	B10-D: 16, B10-D: 17
201010...	B10-D: 18
201011...	B10-D: 18
201012...	B10-D: 18
201013...	B10-D: 18
201015...	B10-E: 11
201017...	B10-D: 16, B10-D: 17
201018...	B10-D: 16, B10-D: 17
201019...	B10-D: 16, B10-D: 17
201020...	B10-D: 16, B10-D: 17
201021...	B10-D: 18
201022...	B10-D: 18
201023...	B10-D: 18
201024...	B10-D: 18
201025...	B10-E: 11
201057...	B10-D: 16, B10-D: 17
201058...	B10-D: 16, B10-D: 17
201059...	B10-D: 16, B10-D: 17
201060...	B10-D: 16
201061...	B10-D: 18
201062...	B10-D: 18
201063...	B10-D: 18
201064...	B10-D: 18
201067...	B10-D: 16, B10-D: 17
201068...	B10-D: 16, B10-D: 17
201069...	B10-D: 16, B10-D: 17
201070...	B10-D: 16, B10-D: 17
201071...	B10-D: 18
201072...	B10-D: 18
201073...	B10-D: 18
201074...	B10-D: 18
201075...	B10-E: 11
201077...	B10-D: 17
201082...	B10-D: 15
201083...	B10-D: 15
201087...	B10-D: 15
201088...	B10-D: 15
201089...	B10-D: 15
208087...	B10-I: 4
209011...	B10-I: 3
209012...	B10-I: 3
209018...	B10-I: 3
209019...	B10-I: 3
209020...	B10-I: 3
209021...	B10-I: 3
209022...	B10-I: 36
209023...	B10-I: 36
209024...	B10-I: 36
209025...	B10-I: 36
209026...	B10-I: 36
209027...	B10-I: 36
209028...	B10-I: 36
209043...	B10-E: 15
209044...	B10-I: 8
209045...	B10-I: 8
209054...	B10-I: 14
209055...	B10-I: 14
209056...	B10-I: 14
209057...	B10-I: 14
209058...	B10-I: 14
209059...	B10-I: 14
209060...	B10-E: 15
209080...	B10-I: 7
209081...	B10-I: 7
209082...	B10-I: 5
209083...	B10-I: 5
209084...	B10-I: 4
209085...	B10-I: 4
209086...	B10-I: 4
209088...	B10-I: 4
209089...	B10-I: 4
209090...	B10-I: 4
209091...	B10-I: 4
209097...	B10-I: 8
209098...	B10-I: 8
209099...	B10-I: 8
210020...	B10-B: 4, B10-B: 5, B10-B: 11, B10-B: 17, B10-B: 22, B10-B: 28, B10-E: 8, B10-E: 9
210052...	B10-B: 4, B10-B: 10, B10-B: 16
210059...	B10-B: 4, B10-B: 10
210062...	B10-B: 4, B10-B: 10, B10-B: 16
210063...	B10-B: 4, B10-B: 5, B10-B: 11, B10-B: 17, B10-B: 22, B10-B: 28, B10-E: 8, B10-E: 9
210064...	B10-B: 4, B10-B: 5, B10-B: 11, B10-B: 17, B10-B: 22, B10-B: 28, B10-E: 8, B10-E: 9
210069...	B10-B: 4, B10-B: 10
211061...	B10-B: 6, B10-B: 12, B10-B: 18, B10-B: 23, B10-B: 29, B10-E: 20
211063...	B10-B: 6, B10-B: 12, B10-B: 18, B10-B: 23, B10-B: 29, B10-E: 20
211065...	B10-B: 6, B10-B: 12, B10-B: 18, B10-B: 23, B10-B: 29, B10-E: 20
214462...	B10-B: 7
215101...	B10-E: 20
215105...	B10-E: 20
215111...	B10-D: 22
215149...	B10-F: 42, B10-L: 10
215150...	B10-A: 56, B10-A: 70, B10-F: 42, B10-L: 6, B10-L: 10, B10-L: 14, B10-N: 6
215189...	B10-N: 4
215250...	B10-L: 10
215254...	B10-A: 47
215265...	B10-L: 10
215300...	B10-L: 6
215323...	B10-B: 7, B10-B: 13
215338...	B10-B: 7, B10-B: 13, B10-B: 19
215343...	B10-L: 6, B10-L: 10
215346...	B10-D: 22, B10-L: 6
215374...	B10-D: 23
215375...	B10-N: 2, B10-N: 3
215376...	B10-N: 3
215377...	B10-A: 70
215431...	B10-L: 6, B10-L: 10
215432...	B10-D: 23
215461...	B10-L: 10
215462...	B10-B: 7, B10-B: 13, B10-B: 19, B10-E: 21
215467...	B10-L: 10
215470...	B10-N: 2
215472...	B10-A: 70, B10-L: 10, B10-N: 6
215473...	B10-A: 56, B10-L: 10, B10-N: 6
215481...	B10-L: 6
215483...	B10-A: 16
215501...	B10-C: 5
215509...	B10-E: 25
215527...	B10-I: 10
215608...	B10-I: 36
215609...	B10-I: 36
215610...	B10-I: 36
215611...	B10-I: 36
215612...	B10-I: 36
215634...	B10-L: 10
215638...	B10-N: 6
215639...	B10-N: 6
215643...	B10-L: 6
215674...	B10-A: 70
215701...	B10-I: 36
215702...	B10-I: 36
215703...	B10-I: 36
215704...	B10-I: 36
215705...	B10-I: 36
215742...	B10-L: 10
215849...	B10-I: 10
215863...	B10-I: 10
215865...	B10-I: 10
215922...	B10-I: 31
215924...	B10-I: 31
215925...	B10-I: 31
215926...	B10-I: 31
215927...	B10-I: 42
215929...	B10-I: 42
215930...	B10-I: 42
215931...	B10-I: 42
215967...	B10-L: 20
218012...	B10-A: 8
218014...	B10-A: 8
218029...	B10-A: 9, B10-A: 41
218030...	B10-A: 9, B10-A: 41
218031...	B10-A: 9, B10-A: 41
218032...	B10-A: 9, B10-A: 41
218033...	B10-A: 9, B10-A: 41
218034...	B10-A: 9, B10-A: 41
218037...	B10-A: 9, B10-A: 41
218038...	B10-A: 9, B10-A: 41
218039...	B10-A: 9, B10-A: 41
218040...	B10-A: 9, B10-A: 41
218041...	B10-A: 9, B10-A: 41
218042...	B10-A: 9, B10-A: 41
218043...	B10-A: 9, B10-A: 41
218044...	B10-A: 9, B10-A: 41
218045...	B10-A: 9, B10-A: 41
218046...	B10-A: 9, B10-A: 41
218047...	B10-A: 8
218048...	B10-A: 8
218049...	B10-A: 8
218050...	B10-A: 8
218051...	B10-A: 8
218052...	B10-A: 8
218053...	B10-A: 8
218058...	B10-A: 8
218059...	B10-A: 8
218060...	B10-A: 8
218061...	B10-A: 8
218062...	B10-A: 8
218063...	B10-A: 8
218064...	B10-A: 8
218071...	B10-A: 8
218072...	B10-A: 9, B10-A: 40
218074...	B10-A: 30
218075...	B10-A: 30
218076...	B10-A: 30
218077...	B10-A: 30
218079...	B10-A: 30
218080...	B10-A: 30
218081...	B10-A: 30
218082...	B10-A: 30
218083...	B10-A: 30
218084...	B10-A: 30
218088...	B10-J: 4
218089...	B10-J: 8, B10-J: 10
219030...	B10-G: 4, B10-G: 5
219031...	B10-G: 6, B10-G: 7
219032...	B10-G: 4, B10-G: 5
219033...	B10-G: 6, B10-G: 7
219034...	B10-G: 4, B10-G: 5
219035...	B10-G: 4, B10-G: 5
219036...	B10-G: 4, B10-G: 5
219037...	B10-G: 4, B10-G: 5
219038...	B10-G: 4, B10-G: 5
219039...	B10-G: 4, B10-G: 5
219040...	B10-G: 4, B10-G: 5
219041...	B10-G: 4, B10-G: 5
219042...	B10-G: 6, B10-G: 7
219043...	B10-G: 10, B10-G: 11
219044...	B10-G: 10, B10-G: 11
219051...	B10-G: 4, B10-G: 5
219052...	B10-G: 4, B10-G: 5
219053...	B10-G: 6, B10-G: 7
219054...	B10-G: 6, B10-G: 7
219055...	B10-G: 9
219056...	B10-G: 9
219057...	B10-G: 9
219058...	B10-G: 9
219059...	B10-G: 9
219060...	B10-G: 9
219061...	B10-G: 10, B10-G: 11

Part No.	Page
219062...	B10-G: 10, B10-G: 11
219063...	B10-G: 10, B10-G: 11
219066...	B10-G: 6, B10-G: 7
219068...	B10-G: 10, B10-G: 11
219070...	B10-I: 12
219071...	B10-I: 12
219072...	B10-I: 12
219073...	B10-I: 12
219074...	B10-I: 12
219075...	B10-I: 12
219076...	B10-I: 12
219077...	B10-I: 12
219082...	B10-G: 10, B10-G: 11
219083...	B10-G: 10, B10-G: 11
219084...	B10-G: 10, B10-G: 11
219085...	B10-G: 4, B10-G: 5
219086...	B10-G: 4, B10-G: 5
219087...	B10-G: 4, B10-G: 5
219088...	B10-G: 4, B10-G: 5
219089...	B10-G: 6, B10-G: 7
219090...	B10-G: 6, B10-G: 7
219091...	B10-G: 6, B10-G: 7
219092...	B10-G: 6, B10-G: 7
219093...	B10-G: 9
219094...	B10-G: 10, B10-G: 11
219095...	B10-G: 10, B10-G: 11
219096...	B10-G: 10, B10-G: 11
219097...	B10-G: 10, B10-G: 11
219168...	B10-A: 31
219169...	B10-A: 31
219170...	B10-I: 12
219171...	B10-I: 12
219172...	B10-I: 12
219173...	B10-I: 12
219174...	B10-I: 12
219175...	B10-I: 12
219176...	B10-A: 31
219177...	B10-A: 31
219185...	B10-A: 31
226009...	B10-D: 20
226010...	B10-D: 20
226011...	B10-D: 20
226012...	B10-D: 20
226013...	B10-D: 20
226029...	B10-E: 13
227001...	B10-H: 5
227002...	B10-H: 5
227003...	B10-H: 5
227004...	B10-H: 5
227005...	B10-H: 5
227006...	B10-H: 5
227007...	B10-H: 5
227008...	B10-H: 5
227009...	B10-H: 5
227010...	B10-H: 5
227011...	B10-H: 5
227012...	B10-H: 5
227014...	B10-H: 5
228003...	B10-I: 5
228004...	B10-I: 5
228006...	B10-I: 5
228007...	B10-I: 5
228013...	B10-I: 3
228014...	B10-I: 2
228020...	B10-I: 5
228021...	B10-I: 5
228022...	B10-I: 2
228023...	B10-I: 2
228024...	B10-I: 2
228025...	B10-I: 2
228026...	B10-I: 2
228027...	B10-I: 3
228028...	B10-I: 3
228029...	B10-I: 3
228030...	B10-I: 3
228031...	B10-I: 3
231005...	B10-I: 8
231006...	B10-I: 8
231007...	B10-I: 8
233001...	B10-I: 39
233002...	B10-I: 39
233003...	B10-I: 39
233004...	B10-I: 39
233005...	B10-I: 39
233006...	B10-I: 39
233007...	B10-I: 39
233008...	B10-I: 39
233009...	B10-I: 39
233020...	B10-I: 40
233021...	B10-I: 40
233022...	B10-I: 40
233023...	B10-I: 40
233024...	B10-I: 40
233025...	B10-I: 40
233026...	B10-I: 40
233027...	B10-I: 40
233028...	B10-I: 40
233040...	B10-I: 41
233041...	B10-I: 41
233042...	B10-I: 41
233043...	B10-I: 41
233044...	B10-I: 41
233045...	B10-I: 41
233046...	B10-I: 41
233047...	B10-I: 41
233048...	B10-I: 41
233070...	B10-I: 38
233071...	B10-I: 38
233072...	B10-I: 38
233073...	B10-I: 38
233074...	B10-I: 38
233075...	B10-I: 38
233076...	B10-I: 38
233077...	B10-I: 38
235001...	B10-D: 5
235002...	B10-D: 5
235003...	B10-D: 5
235011...	B10-D: 5
235012...	B10-D: 5
235013...	B10-D: 5
235021...	B10-D: 5
235022...	B10-D: 5
235023...	B10-D: 5
235031...	B10-D: 5
235032...	B10-D: 5
235033...	B10-D: 5
236020...	B10-A: 16, B10-A: 47
236021...	B10-A: 11
236022...	B10-A: 11
236023...	B10-A: 11
236024...	B10-A: 11
236025...	B10-A: 11
236026...	B10-A: 13
236027...	B10-A: 13
236028...	B10-A: 13
236029...	B10-A: 13
236031...	B10-A: 11
236071...	B10-A: 7, B10-A: 39
236081...	B10-A: 14, B10-A: 45, B10-A: 67
236082...	B10-A: 14, B10-A: 45, B10-A: 67
236083...	B10-A: 14, B10-A: 45, B10-A: 67
236084...	B10-A: 14, B10-A: 45, B10-A: 67
236088...	B10-A: 16, B10-A: 47
236089...	B10-A: 16, B10-A: 47
236120...	B10-A: 16, B10-A: 47
245011...	B10-H: 3, B10-H: 4
245012...	B10-H: 3, B10-H: 4
245013...	B10-H: 3, B10-H: 4
245014...	B10-H: 3, B10-H: 4
245016...	B10-H: 3, B10-H: 4
246004...	B10-H: 3, B10-H: 4
246009...	B10-H: 3, B10-H: 4
246010...	B10-H: 3, B10-H: 4
246012...	B10-H: 3, B10-H: 4
246013...	B10-H: 3, B10-H: 4
246014...	B10-H: 3, B10-H: 4
246015...	B10-H: 3, B10-H: 4
246016...	B10-H: 3, B10-H: 4
246017...	B10-H: 3, B10-H: 4
246018...	B10-H: 3, B10-H: 4
246019...	B10-H: 3, B10-H: 4
246020...	B10-H: 3, B10-H: 4
246021...	B10-H: 3, B10-H: 4
246022...	B10-H: 3, B10-H: 4
246023...	B10-H: 3, B10-H: 4
248001...	B10-A: 28
248002...	B10-A: 28
248003...	B10-A: 28
248051...	B10-A: 28
248052...	B10-A: 28
248053...	B10-A: 28
248054...	B10-A: 28
248055...	B10-A: 28
248056...	B10-A: 28
248063...	B10-A: 30
248064...	B10-A: 30
248065...	B10-A: 30
248071...	B10-A: 29
248136...	B10-A: 33
248137...	B10-A: 33
248138...	B10-A: 33
248142...	B10-A: 33
248143...	B10-A: 33
248144...	B10-A: 33
248145...	B10-A: 33
248147...	B10-A: 32
248148...	B10-A: 32
248149...	B10-A: 32
249001...	B10-A: 28
249002...	B10-A: 28
249003...	B10-A: 28
251001...	B10-D: 21
251002...	B10-D: 21
251003...	B10-D: 21
251004...	B10-D: 21
251005...	B10-D: 21
251006...	B10-D: 21
251007...	B10-D: 21
251008...	B10-D: 21
251009...	B10-D: 21
251010...	B10-E: 11
251011...	B10-E: 11
252090...	B10-H: 3, B10-H: 4
252091...	B10-H: 3, B10-H: 4
258021...	B10-E: 16
258061...	B10-E: 16
258098...	B10-E: 16
259079...	B10-H: 9
259080...	B10-H: 9
259081...	B10-H: 10
259082...	B10-H: 10
259083...	B10-H: 12
259084...	B10-H: 12
264051...	B10-B: 10
264077...	B10-B: 10
268009...	B10-D: 14
268010...	B10-D: 14
268011...	B10-M: 3
268012...	B10-M: 3
268013...	B10-M: 3
268014...	B10-M: 3
268015...	B10-M: 3
268017...	B10-M: 3
268018...	B10-M: 3
268019...	B10-D: 14
268020...	B10-D: 14
268021...	B10-D: 14
268022...	B10-D: 14
268023...	B10-D: 14
271018...	B10-I: 37
271049...	B10-I: 37
271050...	B10-I: 37
271051...	B10-I: 37
271052...	B10-I: 37
271067...	B10-I: 37
271068...	B10-I: 37
271069...	B10-I: 37
271070...	B10-I: 37
271071...	B10-I: 37
271072...	B10-I: 37
271073...	B10-I: 37
271074...	B10-I: 37
271075...	B10-I: 37
271128...	B10-I: 24
271129...	B10-I: 24
271130...	B10-I: 24
271131...	B10-I: 24
271132...	B10-I: 23
271133...	B10-I: 23
271134...	B10-I: 23
271135...	B10-I: 23
271136...	B10-I: 23
271137...	B10-I: 23
271190...	B10-I: 11
271191...	B10-I: 11
271192...	B10-I: 11
271193...	B10-I: 11
271194...	B10-I: 11
271195...	B10-I: 11
271196...	B10-I: 11
271197...	B10-I: 11
271198...	B10-I: 11
271199...	B10-I: 11
271200...	B10-I: 11
271201...	B10-I: 11
271202...	B10-I: 11
271203...	B10-I: 11
271204...	B10-I: 11
271205...	B10-I: 11
271206...	B10-I: 11
271207...	B10-I: 11
271208...	B10-I: 11
271209...	B10-I: 11
271210...	B10-I: 11
271211...	B10-I: 11
275001...	B10-I: 30
275003...	B10-I: 30
275010...	B10-I: 32, B10-I: 33
275011...	B10-I: 32, B10-I: 33
275012...	B10-I: 32, B10-I: 33
275013...	B10-I: 32, B10-I: 33
275014...	B10-I: 32, B10-I: 33
275015...	B10-I: 32, B10-I: 33
275016...	B10-I: 32, B10-I: 33
275017...	B10-I: 32, B10-I: 33
275018...	B10-I: 32, B10-I: 33
275019...	B10-I: 32, B10-I: 33
275020...	B10-I: 32, B10-I: 33
275021...	B10-I: 32, B10-I: 33
275022...	B10-I: 32, B10-I: 33
275023...	B10-I: 32, B10-I: 33
275024...	B10-I: 32, B10-I: 33

Part No.	Page
275025...	B10-I: 32, B10-I: 33
275026...	B10-I: 32, B10-I: 33
275027...	B10-I: 32, B10-I: 33
275028...	B10-I: 32, B10-I: 33
275029...	B10-I: 32, B10-I: 33
275030...	B10-I: 32, B10-I: 33
275031...	B10-I: 32, B10-I: 33
275032...	B10-I: 32, B10-I: 33
275033...	B10-I: 32, B10-I: 33
275034...	B10-I: 32, B10-I: 33
275035...	B10-I: 32, B10-I: 33
275036...	B10-I: 32, B10-I: 33
275040...	B10-I: 32, B10-I: 33
275041...	B10-I: 32, B10-I: 33
275042...	B10-I: 32, B10-I: 33
275043...	B10-I: 32, B10-I: 33
275044...	B10-I: 32, B10-I: 33
275045...	B10-I: 32, B10-I: 33
275046...	B10-I: 32, B10-I: 33
275047...	B10-I: 32, B10-I: 33
275048...	B10-I: 32, B10-I: 33
275049...	B10-I: 32, B10-I: 33
275050...	B10-I: 32, B10-I: 33
275051...	B10-I: 32, B10-I: 33
275052...	B10-I: 32, B10-I: 33
275053...	B10-I: 32, B10-I: 33
275054...	B10-I: 32, B10-I: 33
275055...	B10-I: 32, B10-I: 33
275056...	B10-I: 32, B10-I: 33
275057...	B10-I: 32, B10-I: 33
275058...	B10-I: 32, B10-I: 33
275059...	B10-I: 32, B10-I: 33
275060...	B10-I: 32, B10-I: 33
275061...	B10-I: 32, B10-I: 33
275062...	B10-I: 32, B10-I: 33
275063...	B10-I: 32, B10-I: 33
275064...	B10-I: 32, B10-I: 33
275065...	B10-I: 32, B10-I: 33
275066...	B10-I: 32, B10-I: 33
275067...	B10-I: 32, B10-I: 33
275068...	B10-I: 32, B10-I: 33
275069...	B10-I: 32, B10-I: 33
275070...	B10-I: 32, B10-I: 33
275071...	B10-I: 32, B10-I: 33
275072...	B10-I: 32, B10-I: 33
275073...	B10-I: 32, B10-I: 33
275074...	B10-I: 32, B10-I: 33
275075...	B10-I: 32, B10-I: 33
275076...	B10-I: 32, B10-I: 33
275077...	B10-I: 32, B10-I: 33
275078...	B10-I: 32, B10-I: 33
275079...	B10-I: 32, B10-I: 33
275080...	B10-I: 32, B10-I: 33
275081...	B10-I: 32, B10-I: 33
275082...	B10-I: 32, B10-I: 33
275083...	B10-I: 32, B10-I: 33
275084...	B10-I: 32, B10-I: 33
276001...	B10-I: 30
276005...	B10-I: 32, B10-I: 33
276006...	B10-I: 32, B10-I: 33
276007...	B10-I: 32, B10-I: 33
276008...	B10-I: 32, B10-I: 33
276009...	B10-I: 32, B10-I: 33
276010...	B10-I: 32, B10-I: 33
276011...	B10-I: 32, B10-I: 33
276012...	B10-I: 32, B10-I: 33
276013...	B10-I: 32, B10-I: 33
276014...	B10-I: 32, B10-I: 33
276015...	B10-I: 32, B10-I: 33
276016...	B10-I: 32, B10-I: 33
276017...	B10-I: 32, B10-I: 33
276018...	B10-I: 32, B10-I: 33
276019...	B10-I: 32, B10-I: 33
276020...	B10-I: 32, B10-I: 33
276021...	B10-I: 32, B10-I: 33
276022...	B10-I: 32, B10-I: 33
276023...	B10-I: 32, B10-I: 33
276024...	B10-I: 32, B10-I: 33
276025...	B10-I: 32, B10-I: 33
276026...	B10-I: 32, B10-I: 33
276027...	B10-I: 32, B10-I: 33
276028...	B10-I: 32, B10-I: 33
276029...	B10-I: 32, B10-I: 33
276030...	B10-I: 32, B10-I: 33
276031...	B10-I: 32, B10-I: 33
276032...	B10-I: 32, B10-I: 33
276033...	B10-I: 32, B10-I: 33
276034...	B10-I: 32, B10-I: 33
276035...	B10-I: 32, B10-I: 33
276036...	B10-I: 32, B10-I: 33
276037...	B10-I: 32, B10-I: 33
276038...	B10-I: 32, B10-I: 33
276039...	B10-I: 32, B10-I: 33
276040...	B10-I: 32, B10-I: 33
276041...	B10-I: 32, B10-I: 33
276042...	B10-I: 32, B10-I: 33
276043...	B10-I: 32, B10-I: 33
276044...	B10-I: 32, B10-I: 33
276045...	B10-I: 32, B10-I: 33
276046...	B10-I: 32, B10-I: 33
276047...	B10-I: 32, B10-I: 33
276048...	B10-I: 32, B10-I: 33
276049...	B10-I: 32, B10-I: 33
276050...	B10-I: 32, B10-I: 33
276051...	B10-I: 32, B10-I: 33
276052...	B10-I: 32, B10-I: 33
276053...	B10-I: 32, B10-I: 33
276054...	B10-I: 32, B10-I: 33
276055...	B10-I: 32, B10-I: 33
276056...	B10-I: 32, B10-I: 33
276057...	B10-I: 32, B10-I: 33
276059...	B10-I: 32, B10-I: 33
276060...	B10-I: 32, B10-I: 33
276061...	B10-I: 32, B10-I: 33
276085...	B10-I: 32, B10-I: 33
277001...	B10-I: 31
277002...	B10-I: 31
277005...	B10-I: 31
277006...	B10-I: 31
277007...	B10-I: 31
277008...	B10-I: 31
277010...	B10-I: 34, B10-I: 35
277011...	B10-I: 34, B10-I: 35
277012...	B10-I: 34, B10-I: 35
277013...	B10-I: 34, B10-I: 35
277014...	B10-I: 34, B10-I: 35
277015...	B10-I: 34, B10-I: 35
277016...	B10-I: 34, B10-I: 35
277017...	B10-I: 34, B10-I: 35
277018...	B10-I: 34, B10-I: 35
277019...	B10-I: 34, B10-I: 35
277020...	B10-I: 34, B10-I: 35
277021...	B10-I: 34, B10-I: 35
277022...	B10-I: 34, B10-I: 35
277023...	B10-I: 34, B10-I: 35
277024...	B10-I: 34, B10-I: 35
277025...	B10-I: 34, B10-I: 35
277026...	B10-I: 34, B10-I: 35
277027...	B10-I: 34, B10-I: 35
277028...	B10-I: 34, B10-I: 35
277029...	B10-I: 34, B10-I: 35
277030...	B10-I: 34, B10-I: 35
277031...	B10-I: 34, B10-I: 35
277032...	B10-I: 34, B10-I: 35
277033...	B10-I: 34, B10-I: 35
277034...	B10-I: 34, B10-I: 35
277035...	B10-I: 34, B10-I: 35
277036...	B10-I: 34, B10-I: 35
277037...	B10-I: 34, B10-I: 35
277038...	B10-I: 34, B10-I: 35
277039...	B10-I: 34, B10-I: 35
277040...	B10-I: 34, B10-I: 35
277041...	B10-I: 34, B10-I: 35
277042...	B10-I: 34, B10-I: 35
277043...	B10-I: 34, B10-I: 35
277044...	B10-I: 34, B10-I: 35
277045...	B10-I: 34, B10-I: 35
277046...	B10-I: 34, B10-I: 35
277047...	B10-I: 34, B10-I: 35
277048...	B10-I: 34, B10-I: 35
277049...	B10-I: 34, B10-I: 35
277050...	B10-I: 34, B10-I: 35
277051...	B10-I: 34, B10-I: 35
277055...	B10-I: 34, B10-I: 35
277056...	B10-I: 34, B10-I: 35
277057...	B10-I: 34, B10-I: 35
277058...	B10-I: 34, B10-I: 35
277059...	B10-I: 34, B10-I: 35
277060...	B10-I: 34, B10-I: 35
277061...	B10-I: 34, B10-I: 35
277062...	B10-I: 34, B10-I: 35
277063...	B10-I: 34, B10-I: 35
277064...	B10-I: 34, B10-I: 35
277065...	B10-I: 34, B10-I: 35
277066...	B10-I: 34, B10-I: 35
277067...	B10-I: 34, B10-I: 35
277068...	B10-I: 34, B10-I: 35
277069...	B10-I: 34, B10-I: 35
277070...	B10-I: 34, B10-I: 35
277071...	B10-I: 34, B10-I: 35
277072...	B10-I: 34, B10-I: 35
277073...	B10-I: 34, B10-I: 35
277074...	B10-I: 34, B10-I: 35
277075...	B10-I: 34, B10-I: 35
277076...	B10-I: 34, B10-I: 35
277077...	B10-I: 34, B10-I: 35
277078...	B10-I: 34, B10-I: 35
277079...	B10-I: 34, B10-I: 35
277080...	B10-I: 34, B10-I: 35
277081...	B10-I: 34, B10-I: 35
277082...	B10-I: 34, B10-I: 35
277083...	B10-I: 34, B10-I: 35
277084...	B10-I: 34, B10-I: 35
277085...	B10-I: 34, B10-I: 35
277086...	B10-I: 34, B10-I: 35
277087...	B10-I: 34, B10-I: 35
277088...	B10-I: 34, B10-I: 35
277089...	B10-I: 34, B10-I: 35
278001...	B10-I: 31
278002...	B10-I: 31
278005...	B10-I: 34, B10-I: 35
278006...	B10-I: 34, B10-I: 35
278007...	B10-I: 34, B10-I: 35
278008...	B10-I: 34, B10-I: 35
278009...	B10-I: 34, B10-I: 35
278010...	B10-I: 34, B10-I: 35
278011...	B10-I: 34, B10-I: 35
278012...	B10-I: 34, B10-I: 35
278013...	B10-I: 34, B10-I: 35
278014...	B10-I: 34, B10-I: 35
278015...	B10-I: 34, B10-I: 35
278016...	B10-I: 34, B10-I: 35
278017...	B10-I: 34, B10-I: 35
278018...	B10-I: 34, B10-I: 35
278019...	B10-I: 34, B10-I: 35
278020...	B10-I: 34, B10-I: 35
278021...	B10-I: 34, B10-I: 35
278022...	B10-I: 34, B10-I: 35
278023...	B10-I: 34, B10-I: 35
278024...	B10-I: 34, B10-I: 35
278025...	B10-I: 34, B10-I: 35
278026...	B10-I: 34, B10-I: 35
278027...	B10-I: 34, B10-I: 35
278028...	B10-I: 34, B10-I: 35
278029...	B10-I: 34, B10-I: 35
278030...	B10-I: 34, B10-I: 35
278031...	B10-I: 34, B10-I: 35
278032...	B10-I: 34, B10-I: 35
278033...	B10-I: 34, B10-I: 35
278034...	B10-I: 34, B10-I: 35
278035...	B10-I: 34, B10-I: 35
278036...	B10-I: 34, B10-I: 35
278037...	B10-I: 34, B10-I: 35
278038...	B10-I: 34, B10-I: 35
278039...	B10-I: 34, B10-I: 35
278040...	B10-I: 34, B10-I: 35
278041...	B10-I: 34, B10-I: 35
278042...	B10-I: 34, B10-I: 35
278043...	B10-I: 34, B10-I: 35
278044...	B10-I: 34, B10-I: 35
278045...	B10-I: 34, B10-I: 35
278046...	B10-I: 34, B10-I: 35
278047...	B10-I: 34, B10-I: 35
278048...	B10-I: 34, B10-I: 35
278049...	B10-I: 34, B10-I: 35
278050...	B10-I: 34, B10-I: 35
278051...	B10-I: 34, B10-I: 35
297146...	B10-F: 32
297150...	B10-F: 38
297151...	B10-F: 38
297152...	B10-F: 38
297154...	B10-F: 38
297164...	B10-F: 24
297165...	B10-F: 24
297192...	B10-F: 24
297234...	B10-F: 24
297239...	B10-F: 22
297240...	B10-F: 22
297241...	B10-F: 22
297242...	B10-F: 22
297248...	B10-F: 22
297249...	B10-F: 24
297259...	B10-F: 17
297260...	B10-F: 17
297262...	B10-F: 17
297264...	B10-F: 17
297290...	B10-F: 25
297291...	B10-F: 25
297293...	B10-F: 25
297294...	B10-F: 25
297303...	B10-F: 25
297306...	B10-F: 25
297377...	B10-F: 22
297387...	B10-F: 20
297419...	B10-F: 25
297434...	B10-F: 20
297483...	B10-F: 24
297485...	B10-F: 20
297486...	B10-F: 25
297493...	B10-F: 38
297497...	B10-F: 34
297501...	B10-F: 24
297502...	B10-F: 24
297531...	B10-F: 22
297533...	B10-F: 24
297534...	B10-F: 20
297535...	B10-F: 34
297537...	B10-F: 20
297541...	B10-F: 16
297542...	B10-F: 16
297545...	B10-F: 21
297546...	B10-F: 21
297547...	B10-F: 21
297548...	B10-F: 21
297550...	B10-F: 20
297557...	B10-F: 20
297558...	B10-F: 20
297559...	B10-F: 22
297560...	B10-F: 22
297561...	B10-F: 24
297578...	B10-F: 24
297588...	B10-F: 22
297604...	B10-F: 18
297653...	B10-F: 22
297658...	B10-F: 22
297659...	B10-F: 25
297660...	B10-F: 25
297692...	B10-F: 17
297721...	B10-F: 28
297724...	B10-F: 20
297725...	B10-F: 20
297780...	B10-F: 17
297782...	B10-F: 17
297787...	B10-F: 25
297788...	B10-F: 25

Part No.	Page
297790...	B10-F: 25
297833...	B10-F: 20
297845...	B10-F: 17
297870...	B10-F: 24
297871...	B10-F: 24
297872...	B10-F: 24
297878...	B10-F: 22
297891...	B10-F: 20
297900...	B10-F: 32
297937...	B10-F: 37
297938...	B10-F: 37
297939...	B10-F: 37
297940...	B10-F: 37
297941...	B10-F: 37
297942...	B10-F: 37
297943...	B10-F: 37
297944...	B10-F: 37
297945...	B10-F: 37
297946...	B10-F: 37
297947...	B10-F: 37
297958...	B10-F: 22
297969...	B10-F: 39
297970...	B10-F: 39
297971...	B10-F: 39
297972...	B10-F: 39
297973...	B10-F: 39
297974...	B10-F: 39
297975...	B10-F: 39
297976...	B10-F: 40
297977...	B10-F: 40
297978...	B10-F: 40
297979...	B10-F: 40
297980...	B10-F: 21
297993...	B10-F: 18
297994...	B10-F: 21
297995...	B10-F: 21
297996...	B10-F: 34
297997...	B10-F: 34
299001...	B10-H: 2
299002...	B10-H: 2
299003...	B10-H: 2
299004...	B10-H: 2
299005...	B10-H: 2
299006...	B10-H: 2
299007...	B10-H: 2
299008...	B10-H: 2
299009...	B10-H: 2
3	
309001...	B10-E: 15
309041...	B10-E: 15
309043...	B10-E: 15
310001...	B10-B: 4
310003...	B10-B: 4
310004...	B10-B: 4
310005...	B10-B: 4
310006...	B10-B: 4
310007...	B10-B: 5
310008...	B10-B: 5
310009...	B10-B: 5
310010...	B10-B: 4
310020...	B10-B: 4
310070...	B10-B: 6
310071...	B10-B: 6

Part No.	Page
310074...	B10-B: 6
310075...	B10-B: 6
315015...	B10-I: 31
315016...	B10-I: 31
315017...	B10-I: 31
315018...	B10-I: 31
315155...	B10-A: 16, B10-A: 47
315156...	B10-A: 16, B10-A: 47
315186...	B10-E: 22, B10-E: 25, B10-N: 4
315248...	B10-A: 69
315265...	B10-N: 6
315278...	B10-B: 13
315279...	B10-B: 7
315322...	B10-F: 42, B10-N: 6
315324...	B10-F: 42
315403...	B10-E: 25
315415...	B10-E: 25
315476...	B10-L: 10
315629...	B10-A: 34
315631...	B10-A: 34
315637...	B10-I: 42
315684...	B10-A: 34
315687...	B10-A: 34
315689...	B10-I: 42, B10-N: 6
315690...	B10-N: 6
315691...	B10-I: 42, B10-N: 6
315801...	B10-A: 34
315943...	B10-B: 19
319002...	B10-G: 12
319003...	B10-G: 12
319004...	B10-G: 12
319005...	B10-G: 12
319006...	B10-G: 12
319007...	B10-G: 12
319008...	B10-G: 12
319009...	B10-G: 12
319010...	B10-A: 7, B10-A: 39
319012...	B10-G: 8
319013...	B10-G: 8
319014...	B10-G: 8
319015...	B10-G: 8
319016...	B10-G: 12
319017...	B10-G: 12
319018...	B10-G: 12
319019...	B10-G: 12
319021...	B10-G: 12
319022...	B10-G: 12
319023...	B10-G: 12
320001...	B10-B: 4
320003...	B10-B: 4
320004...	B10-B: 4
320005...	B10-B: 4
320006...	B10-B: 4
320007...	B10-B: 5
320008...	B10-B: 5
320009...	B10-B: 5
320010...	B10-B: 4
320020...	B10-B: 4

Part No.	Page
326035...	B10-E: 19
326062...	B10-E: 18
326080...	B10-E: 18
326081...	B10-E: 18
326082...	B10-E: 18
326083...	B10-E: 17
326084...	B10-E: 18
327001...	B10-H: 9
327002...	B10-H: 9
327003...	B10-H: 9
327004...	B10-H: 9
327005...	B10-H: 9
327006...	B10-H: 9
327007...	B10-H: 9
327010...	B10-H: 9
327011...	B10-H: 9
327012...	B10-H: 10
327013...	B10-H: 10
327016...	B10-H: 10
327017...	B10-H: 9
327018...	B10-H: 9
327019...	B10-H: 10
327020...	B10-H: 10
327021...	B10-H: 10
327022...	B10-H: 10
327023...	B10-H: 10
327024...	B10-H: 10
327025...	B10-H: 9
327026...	B10-H: 9
327027...	B10-H: 9
327028...	B10-H: 9
327033...	B10-H: 9
327034...	B10-H: 9
327035...	B10-H: 9
337017...	B10-B: 22, B10-E: 8
337105...	B10-E: 20
338011...	B10-E: 20
338012...	B10-E: 20
338037...	B10-B: 22, B10-E: 8
338076...	B10-E: 20
339001...	B10-L: 19
339002...	B10-L: 19
339003...	B10-L: 19
339004...	B10-L: 19
339005...	B10-L: 19
339006...	B10-L: 19
339007...	B10-L: 19
339008...	B10-L: 19
339009...	B10-L: 19
339010...	B10-L: 19
339011...	B10-L: 19
339012...	B10-L: 19
339013...	B10-L: 19
339014...	B10-L: 18
339015...	B10-L: 18
339016...	B10-L: 18
339017...	B10-L: 18
339018...	B10-L: 18
339019...	B10-L: 18
339020...	B10-L: 18
339021...	B10-L: 18
339022...	B10-L: 18
339023...	B10-L: 18

Part No.	Page
339024...	B10-L: 18
339025...	B10-L: 18
339026...	B10-L: 18
339027...	B10-L: 18
339101...	B10-L: 20
339102...	B10-L: 20
339103...	B10-L: 20
339201...	B10-L: 20
339202...	B10-L: 20
340001...	B10-L: 15
340002...	B10-L: 15
340003...	B10-L: 16
340004...	B10-L: 15
340005...	B10-L: 16
340006...	B10-L: 15
340007...	B10-L: 16
340008...	B10-L: 15
340009...	B10-L: 16
340010...	B10-L: 15
340011...	B10-L: 15
340012...	B10-L: 15
340013...	B10-L: 16
340014...	B10-L: 15
340015...	B10-L: 16
340016...	B10-L: 16
340017...	B10-L: 15
340018...	B10-L: 16
340019...	B10-L: 16
340020...	B10-L: 16
340022...	B10-L: 16
340024...	B10-L: 15
340025...	B10-L: 16
340101...	B10-L: 17
340102...	B10-L: 17
340103...	B10-L: 17
340104...	B10-L: 17
340105...	B10-L: 17
340106...	B10-L: 17
340107...	B10-L: 17
340108...	B10-L: 17
340109...	B10-L: 17
340110...	B10-L: 17
340111...	B10-L: 17
340113...	B10-L: 17
340114...	B10-L: 17
340115...	B10-L: 17
340116...	B10-L: 17
340118...	B10-L: 17
340119...	B10-L: 17
340120...	B10-L: 17
340121...	B10-L: 17
340122...	B10-L: 17
340123...	B10-L: 17
340124...	B10-L: 17
340125...	B10-L: 17
340126...	B10-L: 17
340127...	B10-L: 17
340128...	B10-L: 17
340129...	B10-L: 17
340130...	B10-L: 17
340131...	B10-L: 17
340132...	B10-L: 17
340133...	B10-L: 17

Part No.	Page
340134...	B10-L: 17
340135...	B10-L: 17
340136...	B10-L: 17
340137...	B10-L: 17
340138...	B10-L: 17
340139...	B10-L: 17
340140...	B10-L: 17
340141...	B10-L: 17
340142...	B10-L: 17
340143...	B10-L: 17
340144...	B10-L: 17
340145...	B10-L: 17
340146...	B10-L: 17
340147...	B10-L: 17
340148...	B10-L: 17
340149...	B10-L: 17
340150...	B10-L: 17
340151...	B10-L: 17
340152...	B10-L: 17
340153...	B10-L: 17
340155...	B10-L: 17
343001...	B10-L: 3
343002...	B10-L: 3
343003...	B10-L: 3
343004...	B10-L: 3
343005...	B10-L: 3
343006...	B10-L: 3
343007...	B10-L: 3
343008...	B10-L: 3
343009...	B10-L: 3
343010...	B10-L: 3
343011...	B10-L: 3
343012...	B10-L: 3
343013...	B10-L: 4
343014...	B10-L: 4
343015...	B10-L: 4
343016...	B10-L: 4
343017...	B10-L: 4
343018...	B10-L: 4
343019...	B10-L: 4
343020...	B10-L: 4
343021...	B10-L: 4
343022...	B10-L: 4
343023...	B10-L: 5
343024...	B10-L: 5
343025...	B10-L: 5
343026...	B10-L: 5
343027...	B10-L: 5
343028...	B10-L: 5
343029...	B10-L: 5
343030...	B10-L: 5
343031...	B10-L: 5
343032...	B10-L: 5
343035...	B10-L: 3
343036...	B10-L: 3
343037...	B10-L: 4
343038...	B10-L: 4
343039...	B10-L: 4
343040...	B10-L: 4
343041...	B10-L: 4
343042...	B10-L: 4
343043...	B10-L: 3, B10-L: 4
343044...	B10-L: 3, B10-L: 4

Part No.	Page
343045...	B10-L: 5
343046...	B10-L: 5
343047...	B10-L: 5
343048...	B10-L: 5
343049...	B10-L: 5
343050...	B10-L: 5
343051...	B10-L: 2
343052...	B10-L: 2
343053...	B10-L: 2
343054...	B10-L: 2
343055...	B10-L: 2
343056...	B10-L: 2
343057...	B10-L: 2
343058...	B10-L: 2
343059...	B10-L: 2
343060...	B10-L: 2
343061...	B10-L: 2
343062...	B10-L: 2
343063...	B10-L: 2
343064...	B10-L: 2
344001...	B10-L: 11
344002...	B10-L: 11
344003...	B10-L: 11
344004...	B10-L: 11
344005...	B10-L: 11
344006...	B10-L: 11
344007...	B10-L: 11
344008...	B10-L: 11
344009...	B10-L: 11
344010...	B10-L: 11
344011...	B10-L: 11
344012...	B10-L: 11
344013...	B10-L: 11
344014...	B10-L: 11
344015...	B10-L: 11
344016...	B10-L: 11
344017...	B10-L: 11
344018...	B10-L: 11
344019...	B10-L: 12
344020...	B10-L: 12
344021...	B10-L: 11
344022...	B10-L: 11
344023...	B10-L: 12
344024...	B10-L: 13
344025...	B10-L: 13
344026...	B10-L: 13
344027...	B10-L: 13
344028...	B10-L: 13
344029...	B10-L: 13
345001...	B10-L: 7
345002...	B10-L: 7
345003...	B10-L: 7
345004...	B10-L: 7
345005...	B10-L: 7
345006...	B10-L: 7
345007...	B10-L: 7
345009...	B10-L: 7
345010...	B10-L: 7
345011...	B10-L: 7
345012...	B10-L: 7
345013...	B10-L: 7
345014...	B10-L: 7
345015...	B10-L: 8

Part No.	Page
345016...	B10-L: 8
345017...	B10-L: 8
345018...	B10-L: 8
345019...	B10-L: 8
345020...	B10-L: 9
345021...	B10-L: 9
345022...	B10-L: 9
345023...	B10-L: 9
345024...	B10-L: 9
345025...	B10-L: 9
345201...	B10-L: 10
345202...	B10-L: 10
345203...	B10-L: 10
345204...	B10-L: 10
345208...	B10-L: 10
345211...	B10-L: 10
345213...	B10-L: 10
345215...	B10-L: 10
345216...	B10-L: 10
345218...	B10-L: 10
345220...	B10-L: 10
345221...	B10-L: 10
345222...	B10-L: 10
345223...	B10-L: 10
345224...	B10-L: 10
345225...	B10-L: 10
348007...	B10-D: 14
348009...	B10-D: 20
349005...	B10-E: 6
349006...	B10-E: 6
349009...	B10-D: 14
349010...	B10-E: 22
349011...	B10-E: 22
349012...	B10-E: 22
349013...	B10-E: 22
349014...	B10-E: 6
349015...	B10-E: 6
349016...	B10-E: 23
349017...	B10-E: 23
349021...	B10-E: 4
349022...	B10-E: 4
349023...	B10-E: 4
349024...	B10-E: 4
349031...	B10-E: 7
349032...	B10-E: 7
349033...	B10-E: 7
349034...	B10-E: 7
349035...	B10-E: 7
349036...	B10-E: 7
349037...	B10-E: 7
349038...	B10-E: 7
349043...	B10-E: 25
349046...	B10-E: 14
349051...	B10-E: 5
349052...	B10-E: 5
349053...	B10-E: 5
349054...	B10-E: 5
349201...	B10-E: 25
349202...	B10-E: 25
350005...	B10-E: 6
350006...	B10-E: 6
350014...	B10-E: 6
350015...	B10-E: 6

Part No.	Page
350021...	B10-E: 4
350022...	B10-E: 4
350023...	B10-E: 4
350024...	B10-E: 4
350031...	B10-E: 7
350032...	B10-E: 7
350033...	B10-E: 7
350034...	B10-E: 7
350035...	B10-E: 7
350036...	B10-E: 7
350037...	B10-E: 7
350038...	B10-E: 7
350051...	B10-E: 5
350052...	B10-E: 5
350053...	B10-E: 5
350054...	B10-E: 5
353001...	B10-H: 7
353002...	B10-H: 7
353003...	B10-H: 7
353004...	B10-H: 7
353005...	B10-H: 7
353006...	B10-H: 7
353007...	B10-H: 7
353008...	B10-H: 7
353009...	B10-H: 7
353010...	B10-H: 7
353011...	B10-H: 7
353012...	B10-H: 7
353013...	B10-H: 7
353014...	B10-H: 7
353015...	B10-H: 7
353016...	B10-H: 7
353017...	B10-H: 7
353018...	B10-H: 7
353019...	B10-H: 7
353020...	B10-H: 7
353021...	B10-H: 7
353022...	B10-H: 7
353023...	B10-H: 7
353024...	B10-H: 7
353025...	B10-H: 7
353060...	B10-H: 6
353061...	B10-H: 6
353062...	B10-H: 6
353063...	B10-H: 6
357001...	B10-E: 17
357002...	B10-E: 17
357003...	B10-E: 17
357004...	B10-E: 17
358015...	B10-E: 16
364030...	B10-B: 10
364031...	B10-B: 10
364032...	B10-B: 10
364033...	B10-B: 10
364034...	B10-B: 10
364045...	B10-B: 11
364046...	B10-B: 11
364047...	B10-B: 11
364048...	B10-B: 11
364049...	B10-B: 11
364077...	B10-B: 4, B10-B: 10
364138...	B10-B: 7, B10-B: 13
364139...	B10-B: 7, B10-B: 13, B10-B: 24

Part No.	Page
364260...	B10-B: 7, B10-B: 13
364270...	B10-B: 7, B10-B: 13, B10-B: 24
365030...	B10-B: 10
365031...	B10-B: 10
365032...	B10-B: 10
365033...	B10-B: 10
365034...	B10-B: 10
365045...	B10-B: 11
365046...	B10-B: 11
365047...	B10-B: 11
365048...	B10-B: 11
365049...	B10-B: 11
387112...	B10-I: 13
387113...	B10-I: 13
387114...	B10-I: 13
387115...	B10-I: 13
387116...	B10-I: 13
397110...	B10-F: 34
397118...	B10-F: 20
397133...	B10-F: 17
397146...	B10-F: 17
397164...	B10-F: 23
397165...	B10-F: 23
397166...	B10-F: 23
397167...	B10-F: 23
397168...	B10-F: 23
397179...	B10-F: 32
397191...	B10-F: 23
397192...	B10-F: 17
397207...	B10-F: 24
397235...	B10-F: 28
397237...	B10-F: 15
397242...	B10-F: 24
397244...	B10-F: 24
397245...	B10-F: 24
397246...	B10-F: 24
397249...	B10-F: 24
397250...	B10-F: 24
397251...	B10-F: 24
397252...	B10-F: 24
397257...	B10-F: 24
397260...	B10-F: 25
397261...	B10-F: 25
397262...	B10-F: 27
397269...	B10-F: 29
397270...	B10-F: 29
397271...	B10-F: 29
397272...	B10-F: 29
397273...	B10-F: 29
397274...	B10-F: 29
397276...	B10-F: 31
397277...	B10-F: 31
397278...	B10-F: 33
397279...	B10-F: 33
397280...	B10-F: 33
397281...	B10-F: 33
397282...	B10-F: 33
397283...	B10-F: 33
397284...	B10-F: 33

Part No.	Page
397285...	B10-F: 33
397286...	B10-F: 33
397287...	B10-F: 33
397301...	B10-F: 17
397352...	B10-F: 20
397354...	B10-F: 20
397355...	B10-F: 20
397356...	B10-F: 20
397357...	B10-F: 20
397407...	B10-F: 33
397439...	B10-F: 25
397585...	B10-F: 23
397586...	B10-F: 23
397587...	B10-F: 23
397588...	B10-F: 23
397589...	B10-F: 23
397590...	B10-F: 34
397593...	B10-F: 35
397594...	B10-F: 35
397595...	B10-F: 35
397604...	B10-F: 24
397605...	B10-F: 24
397608...	B10-F: 26
397610...	B10-F: 17
397611...	B10-F: 32
397614...	B10-F: 22
397627...	B10-F: 32
397628...	B10-F: 32
397632...	B10-F: 22
397640...	B10-F: 34
397654...	B10-F: 18
397662...	B10-F: 21
397663...	B10-F: 18
397666...	B10-F: 22
397672...	B10-F: 16
397673...	B10-F: 16
397674...	B10-F: 16
397675...	B10-F: 14
397676...	B10-F: 14
397683...	B10-F: 26
397688...	B10-F: 16
397689...	B10-F: 16
397702...	B10-F: 23
397703...	B10-F: 34
397704...	B10-F: 34
397705...	B10-F: 34
397709...	B10-F: 34
397710...	B10-F: 34
397737...	B10-F: 21
397738...	B10-F: 21
397739...	B10-F: 21
397740...	B10-F: 21
397741...	B10-F: 34
397742...	B10-F: 21
397746...	B10-F: 30
397747...	B10-F: 30
397748...	B10-F: 30
397749...	B10-F: 30
397750...	B10-F: 30
397756...	B10-F: 26
397757...	B10-F: 26
397758...	B10-F: 26
397759...	B10-F: 26

Part No.	Page
397763...	B10-F: 15
397764...	B10-F: 16
397765...	B10-F: 20
397766...	B10-F: 22
397767...	B10-F: 22
397768...	B10-F: 22
397769...	B10-F: 18
397770...	B10-F: 18
397771...	B10-F: 18
397772...	B10-F: 18
397777...	B10-F: 26
397778...	B10-F: 26
397779...	B10-F: 30
397780...	B10-F: 32
397781...	B10-F: 32
397782...	B10-F: 32
397783...	B10-F: 28
397784...	B10-F: 28
397785...	B10-F: 28
397786...	B10-F: 28
397787...	B10-F: 28
397788...	B10-F: 28
397799...	B10-F: 26
397800...	B10-F: 26
397801...	B10-F: 26
397802...	B10-F: 26
397803...	B10-F: 26
397804...	B10-F: 30
397805...	B10-F: 30
397806...	B10-F: 30
397807...	B10-F: 32
397808...	B10-F: 32
397809...	B10-F: 28
397810...	B10-F: 28
397811...	B10-F: 32
397812...	B10-F: 32
397813...	B10-F: 32
397814...	B10-F: 32
397815...	B10-F: 32
397816...	B10-F: 28
397817...	B10-F: 28
397818...	B10-F: 33
397840...	B10-F: 31
397841...	B10-F: 31
397842...	B10-F: 27
397843...	B10-F: 27
397844...	B10-F: 35
397849...	B10-F: 27
397850...	B10-F: 38
397851...	B10-F: 38
397852...	B10-F: 38
397853...	B10-F: 38
397854...	B10-F: 38
4	
401003...	B10-C: 4
401004...	B10-C: 4
401005...	B10-C: 4
401006...	B10-C: 4
401007...	B10-C: 4
401008...	B10-C: 4
401009...	B10-C: 4
401010...	B10-C: 4
401011...	B10-C: 4

Part No.	Page
401203...	B10-C: 5
401204...	B10-C: 5
401205...	B10-C: 5
401206...	B10-C: 5
401207...	B10-C: 5
401208...	B10-C: 5
401209...	B10-C: 5
401210...	B10-C: 5
401223...	B10-C: 5
401224...	B10-C: 5
401225...	B10-C: 5
401226...	B10-C: 5
401230...	B10-C: 5
401323...	B10-C: 5
401324...	B10-C: 5
401327...	B10-C: 5
401329...	B10-C: 5
402001...	B10-C: 4
402005...	B10-C: 4
402011...	B10-C: 4
402013...	B10-C: 4
402017...	B10-C: 4
402019...	B10-C: 4
402021...	B10-C: 4
402025...	B10-C: 4
402029...	B10-C: 4
402227...	B10-C: 5
404003...	B10-C: 4
404004...	B10-C: 4
404005...	B10-C: 4
404006...	B10-C: 4
404007...	B10-C: 4
404008...	B10-C: 4
404009...	B10-C: 4
404010...	B10-C: 4
404011...	B10-C: 4
413994...	B10-L: 6
415067...	B10-L: 14
415108...	B10-L: 6
415111...	B10-D: 22
415112...	B10-A: 69, B10-D: 22
415113...	B10-D: 22
415121...	B10-N: 6
415164...	B10-L: 10
415165...	B10-L: 10, B10-N: 6
415181...	B10-E: 24, B10-E: 25
415244...	B10-A: 16, B10-A: 34, B10-A: 47, B10-A: 69
415283...	B10-N: 5
415284...	B10-N: 5
415285...	B10-N: 5
415286...	B10-N: 5
415287...	B10-N: 5
415298...	B10-L: 10
415299...	B10-L: 10
415320...	B10-F: 42
415334...	B10-N: 2, B10-N: 3
415335...	B10-N: 3
415336...	B10-N: 2, B10-N: 3

Part No.	Page
415337...	B10-N: 2
415341...	B10-N: 5
415342...	B10-B: 6
415353...	B10-A: 70
415357...	B10-I: 30
415358...	B10-I: 30
415359...	B10-I: 30
415360...	B10-B: 6
415373...	B10-I: 42
415374...	B10-I: 42
415375...	B10-I: 42
415386...	B10-A: 69
415507...	B10-A: 56, B10-A: 70, B10-F: 42, B10-N: 6
415508...	B10-A: 56, B10-A: 70, B10-F: 42, B10-N: 6
415510...	B10-F: 42, B10-N: 6
415514...	B10-A: 56, B10-A: 70, B10-F: 42, B10-N: 6
415543...	B10-F: 42, B10-N: 6
415562...	B10-I: 10
415563...	B10-I: 10
415573...	B10-N: 5
415577...	B10-A: 56, B10-I: 13, B10-L: 10, B10-N: 6
415578...	B10-A: 56, B10-N: 6
415579...	B10-N: 6
415580...	B10-N: 6
415611...	B10-N: 6
415636...	B10-E: 25
415761...	B10-N: 6
415895...	B10-A: 56, B10-A: 70, B10-B: 19, B10-E: 21
415896...	B10-A: 56, B10-A: 70, B10-B: 19, B10-E: 21
415898...	B10-E: 25
415913...	B10-E: 25
415949...	B10-F: 42, B10-L: 10
415966...	B10-L: 14
415967...	B10-L: 6, B10-L: 14, B10-L: 17, B10-L: 20
415968...	B10-L: 17, B10-L: 20
415970...	B10-L: 6, B10-L: 17, B10-L: 20
415971...	B10-L: 6, B10-L: 17, B10-L: 20
415972...	B10-L: 6
415973...	B10-L: 14
415974...	B10-L: 14
415975...	B10-L: 14
415976...	B10-L: 14

Part No.	Page
415977...	B10-F: 42, B10-L: 10
415985...	B10-E: 21
415993...	B10-L: 6
415997...	B10-L: 10, B10-L: 14
415998...	B10-L: 14
415999...	B10-L: 14
419995...	B10-L: 6
419996...	B10-L: 6
450001...	B10-A: 38
450021...	B10-A: 42
450022...	B10-A: 42
450023...	B10-A: 43
450024...	B10-A: 43
450026...	B10-A: 40
450027...	B10-A: 40
450028...	B10-A: 40
450038...	B10-A: 40
450039...	B10-A: 40
450040...	B10-A: 42
450041...	B10-A: 43
450125...	B10-A: 43
450129...	B10-A: 6
450137...	B10-A: 12, B10-A: 15, B10-A: 44, B10-A: 46
450142...	B10-A: 16
450143...	B10-A: 16
450144...	B10-A: 16
450145...	B10-A: 16
450146...	B10-A: 16
451001...	B10-A: 38
5	
501001...	B10-A: 60
501004...	B10-A: 60
501005...	B10-A: 60
501016...	B10-A: 56, B10-A: 70, B10-B: 19, B10-E: 21
501019...	B10-A: 60
501050...	B10-A: 61
501051...	B10-A: 61
501052...	B10-A: 65
501053...	B10-A: 65
501054...	B10-A: 12, B10-A: 44, B10-A: 66
501055...	B10-A: 12, B10-A: 44, B10-A: 66
501056...	B10-A: 12, B10-A: 44, B10-A: 66
501058...	B10-A: 44, B10-A: 66
501059...	B10-A: 44, B10-A: 66
501060...	B10-A: 65
501061...	B10-A: 65
501064...	B10-A: 15, B10-A: 46, B10-A: 68

Part No.	Page
501065...	B10-A: 15, B10-A: 46, B10-A: 68
501066...	B10-A: 46, B10-A: 68
501067...	B10-A: 46, B10-A: 68
501157...	B10-A: 66, B10-A: 68
502001...	B10-A: 62
502002...	B10-A: 62
502003...	B10-A: 62
502004...	B10-A: 62
502005...	B10-A: 62
502012...	B10-A: 62
502013...	B10-A: 62
502014...	B10-A: 62
502015...	B10-A: 62
502016...	B10-A: 62
502023...	B10-A: 63
502024...	B10-A: 63
502025...	B10-A: 63
502026...	B10-A: 63
502027...	B10-A: 63
502034...	B10-A: 63
502035...	B10-A: 63
502036...	B10-A: 63
502037...	B10-A: 63
502038...	B10-A: 63
502045...	B10-A: 64
502046...	B10-A: 10, B10-A: 64
502047...	B10-A: 10, B10-A: 64
502048...	B10-A: 10, B10-A: 64
502049...	B10-A: 10, B10-A: 64
502050...	B10-A: 10, B10-A: 64
502051...	B10-A: 10, B10-A: 64
502052...	B10-A: 10
502053...	B10-A: 10
502054...	B10-A: 10
502055...	B10-A: 10
502056...	B10-A: 10
502057...	B10-A: 10
502058...	B10-A: 65
502059...	B10-A: 65
502060...	B10-A: 65
502061...	B10-A: 65
502062...	B10-A: 64
502063...	B10-M: 5
502064...	B10-A: 12, B10-A: 44, B10-A: 66
502066...	B10-A: 62
502068...	B10-A: 62
502069...	B10-A: 12, B10-A: 44,

Part No.	Page
	B10-A: 66
502070...	B10-A: 62
502071...	B10-A: 62
502072...	B10-A: 62
502073...	B10-A: 62
502074...	B10-A: 62
502075...	B10-A: 62
502076...	B10-A: 62
502077...	B10-A: 62
502078...	B10-A: 62
502079...	B10-A: 62
502080...	B10-A: 69
502081...	B10-A: 69
502082...	B10-A: 15, B10-A: 46, B10-A: 68
502088...	B10-A: 63
502089...	B10-A: 63
502090...	B10-A: 63
502091...	B10-A: 63
502092...	B10-A: 63
502093...	B10-A: 63
502094...	B10-A: 63
502095...	B10-A: 63
502096...	B10-A: 63
502097...	B10-A: 63
502165...	B10-A: 12, B10-A: 43, B10-A: 44, B10-A: 66
502183...	B10-A: 15, B10-A: 46, B10-A: 68
504001...	B10-A: 60
504003...	B10-A: 60
504004...	B10-A: 60
504019...	B10-A: 60
510001...	B10-A: 52
510114...	B10-A: 56
511001...	B10-A: 52
514003...	B10-A: 55
514004...	B10-A: 55
514015...	B10-A: 55
514016...	B10-A: 55
514029...	B10-A: 10
514030...	B10-A: 10
514031...	B10-A: 10
514032...	B10-A: 55
514033...	B10-A: 55
514034...	B10-A: 55
514035...	B10-A: 55
514201...	B10-A: 53
514202...	B10-A: 55
514203...	B10-A: 55
514210...	B10-A: 54
515100...	B10-L: 14
515101...	B10-L: 14
515103...	B10-L: 14
515104...	B10-L: 14
515105...	B10-L: 14
515166...	B10-A: 34
515178...	B10-B: 19
515271...	B10-L: 17,

Part No.	Page
	B10-L: 20
515272...	B10-L: 17, B10-L: 20
515273...	B10-L: 17, B10-L: 20
515276...	B10-L: 17
515286...	B10-A: 56
515491...	B10-A: 16
515595...	B10-B: 6
515596...	B10-B: 6
519002...	B10-G: 13
519003...	B10-G: 13
519004...	B10-G: 13
519005...	B10-G: 13
536005...	B10-A: 16
536010...	B10-A: 21, B10-A: 22, B10-A: 23, B10-A: 24
537001...	B10-B: 28, B10-E: 9
537041...	B10-E: 20
537042...	B10-E: 20
538001...	B10-B: 28, B10-E: 9
538041...	B10-E: 20
538042...	B10-E: 20
563001...	B10-A: 4
563002...	B10-A: 5
563010...	B10-A: 5, B10-A: 21, B10-A: 22, B10-A: 23, B10-A: 24
564034...	B10-B: 16
564045...	B10-B: 17
564046...	B10-B: 17
564047...	B10-B: 17
564048...	B10-B: 17
564049...	B10-B: 17
565034...	B10-B: 16
565045...	B10-B: 17
565046...	B10-B: 17
565047...	B10-B: 17
565048...	B10-B: 17
565049...	B10-B: 17
K	
K15282...	B10-I: 40
K15283...	B10-I: 40
K15284...	B10-I: 40
K15285...	B10-I: 40
K15286...	B10-I: 40
K16414...	B10-I: 39
K16415...	B10-I: 39
K16416...	B10-I: 39
K16417...	B10-I: 39
K16418...	B10-I: 39
K16419...	B10-I: 40
K16420...	B10-I: 40
K16421...	B10-I: 41
K16422...	B10-I: 41
K16423...	B10-I: 41
K16424...	B10-I: 41
K17847...	B10-I: 39
K18454...	B10-I: 39

Part No.	Page
K18455...	B10-I: 39
K18456...	B10-I: 40
K18457...	B10-I: 40
K19125...	B10-M: 19
K19344...	B10-M: 17
K19346...	B10-M: 15
K19504...	B10-M: 7
K19505...	B10-M: 8
K19506...	B10-M: 7
K19507...	B10-M: 8
K21098...	B10-M: 9
K22434...	B10-I: 41
K22435...	B10-I: 41
K22436...	B10-I: 41
K22437...	B10-I: 41
K22438...	B10-I: 41
K22439...	B10-I: 39
K22440...	B10-I: 39
K22718...	B10-M: 13
K23259...	B10-I: 39
K24276...	B10-I: 38
K24277...	B10-I: 38
K24278...	B10-I: 38
K24279...	B10-I: 38
K24280...	B10-I: 38
K24281...	B10-I: 38
K24358...	B10-I: 38
K24391...	B10-I: 38
K24750...	B10-M: 2
K25066...	B10-M: 16
K25275...	B10-M: 6
K25618...	B10-M: 12
K25888...	B10-M: 11
K26065...	B10-M: 11
K26067...	B10-M: 9
K26600...	B10-M: 13
K26800...	B10-M: 10
K26950...	B10-M: 6
K28029...	B10-M: 14
K28540...	B10-M: 10
K28701...	B10-M: 2
K28703...	B10-M: 4
K30260...	B10-M: 12
K31045...	B10-M: 18
K31372...	B10-M: 21
K31373...	B10-M: 21
K31374...	B10-M: 21
K31375...	B10-M: 21
K31376...	B10-M: 21
K31377...	B10-M: 21
K31403...	B10-M: 20
K31404...	B10-M: 20
K31405...	B10-M: 20
K31406...	B10-M: 20
K31407...	B10-M: 20
K31408...	B10-M: 20
K31523...	B10-M: 5
K31574...	B10-M: 19
K31628...	B10-M: 21
K31630...	B10-M: 21
K31632...	B10-M: 20
K31634...	B10-M: 20
K31892...	B10-M: 4

Part No.	Page
K32616...	B10-M: 21
K32618...	B10-M: 20
K32822...	B10-M: 12
K32944...	B10-M: 12
KW31562...	B10-N: 4

Notes

Notes

Notes

Guaranteed Test / Demo Application Form

Distributor PO #	

The following must be filled out completely before your test will be considered

IMPORTANT: For processing, send Purchase Order to your Allied Field Sales Engineer (FSE). Please clearly mark the paperwork as "Test Order."

Distributor Information

Company Name: _____

Contact: _____

Account Number: _____

Phone: _____

Email: _____

End User Information

Company Name: _____

Contact: _____

Industry: _____

Phone: _____

Email: _____

Current Process

List all tooling, coatings, substrates, speeds and feeds, tool life, and any problems you are experiencing

_____

_____

Test Objective

List what would make this a successful test (i.e. penetration rate, finish, tool life, hole size, etc.)

_____

_____

Application Information

Hole Diameter: _____ in/mm

Tolerance: _____

Material: _____ (4150 / A36 / Cast Iron / etc.)

Pre-existing Diameter: _____ in/mm

Depth of Cut: _____ in/mm

Hardness: _____ (BHN / Rc)

Required Finish: _____ RMS

State: _____ (Casting / Hot rolled / Forging)

Machine Information

Machine Type: _____ (Lathe / Screw machine / Machine center / etc.)

Builder: _____ (Haas, Mori Seiki, etc.)

Model #: _____

Shank Required: _____ (CAT50 / Morse taper, etc.)

Power: _____ HP/KW

Thrust: _____ lbs/N

Rigidity:
- ☐ Excellent
- ☐ Good
- ☐ Poor

Orientation:
- ☐ Vertical
- ☐ Horizontal

Tool Rotating:
- ☐ Yes
- ☐ No

Coolant Information

Coolant Delivery: _____ (Through tool / Flood)

Coolant Pressure: _____ PSI / bar

Coolant Type: _____ (Air mist, oil, synthetic, water soluble, etc.)

Coolant Volume: _____ GPM / LPM

Requested Tooling

QTY	Item Number

QTY	Item Number

ALLIED MACHINE & ENGINEERING

Allied Machine & Engineering
120 Deeds Drive
Dover, OH 44622

Telephone: (330) 343-4283
Toll Free USA & Canada: (800) 321-5537
Fax: (330) 602-3400
Email: info@alliedmachine.com

ALLIED MACHINE & ENGINEERING

Warranty Information

Allied Machine & Engineering ("Allied Machine") warrants to original equipment manufacturers, distributors, industrial and commercial users of its products for one year from the original date of sale that each new product manufactured or supplied by Allied Machine shall be free from defects in material and workmanship.

Allied Machine's sole and exclusive obligation under this warranty is limited to, at its option, without additional charge, replacing or repairing this product or issuing a credit. For this warranty to be applied, the product must be returned freight prepaid to the plant designated by an Allied Machine representative and which, upon inspection, is determined by Allied Machine to be defective in material and workmanship.

Complete information as to operating conditions, machine, setup, and the application of cutting fluid should accompany any product returned for inspection. This warranty shall not apply to any Allied Machine products which have been subjected to misuse, abuse, improper operating conditions, improper machine setup or improper application of cutting fluid or which have been repaired or altered if such repair or alteration, in the judgement of Allied Machine, would adversely affect the performance of the product.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Allied Machine shall have no liability or responsibility for any claim, whether in contract, tort or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery or use of any product sold hereunder, in excess of the cost of replacement or repair as provided herein.

Allied Machine shall not be liable in contract or in tort (including, without limitation, negligence, strict liability or otherwise) for economic losses of any kind or for any special, incidental, indirect, consequential, punitive or exemplary damages arising in any way out of the performance of, or failure to perform this agreement.

ALL PRICES, DELIVERIES, DESIGNS, AND MATERIALS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Certified IQR Management System

Allied Machine & Engineering
Registered to ISO 9001
10001329