

REAMING

PRODUCT CATALOG



ALLIED MACHINE
& ENGINEERING

www.alliedmachine.com

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 is registered
to ISO 9001:2015 by DQS



Wohlhaupter GmbH is
registered to ISO
9001:2015 by QUACERT



Allied Machine &
Engineering Co. Europe
Ltd. is registered to
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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 holmaking 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

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Dover, OH 44622
United States

Allied Machine

485 West 3rd Street
Dover, OH 44622
United States

ThreadMills USA®

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Evans, GA 30809
United States

Superion®

1285 S Patton St.
Xenia, OH 45385
United States

Europe

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93 Vantage Point
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DY6 7FR, United Kingdom

Wohlhaupter® GmbH

Maybachstrasse 4
72636 Frickenhausen
Germany

Asia

Wohlhaupter® India

B-23, 3rd Floor
B Block Community Centre
Janakpuri, New Delhi - 110058
India



LEADING HOLEMAKING SOLUTIONS WORLDWIDE

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.

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 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 patent information can be found at www.alliedmachine.com/patents

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Allied Machine & Engineering offers ALVAN® Reamers through an exclusive supply agreement with S.C.A.M.I. s.n.c.

S.C.A.M.I. is an Italian manufacturer that has been producing high-quality cutting tools for over 40 years. In addition to producing close tolerances and dimensional accuracy of machined holes, this high performance reaming product provides a lower cost per hole through its high penetration rates. This makes the ALVAN Reamer product line an ideal choice for finishing holes in a production environment. It can also prove to be an alternative to finish boring by providing more consistent hole sizes and lower cycle times.



Reaming Overview

Reamer Types

REAMER STYLES



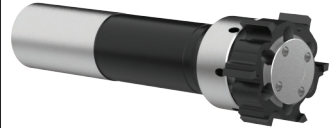
Monobloc

- Diameter range: 5.800 mm - 32.100 mm.
- Available with central or radial through coolant.
- Can be used for through or blind holes.
- Cylindrical shanks improve concentricity.
- Expandable to accommodate for wear.



Replaceable Head

- Diameter range: 9.600 mm - 80.600 mm.
- Heads are available as fixed or expanding for improved productivity.
- Straight, left-hand, or right-hand helical flutes provide solutions for both through and blind holes.
- Cylindrical or modular shanks improve concentricity.



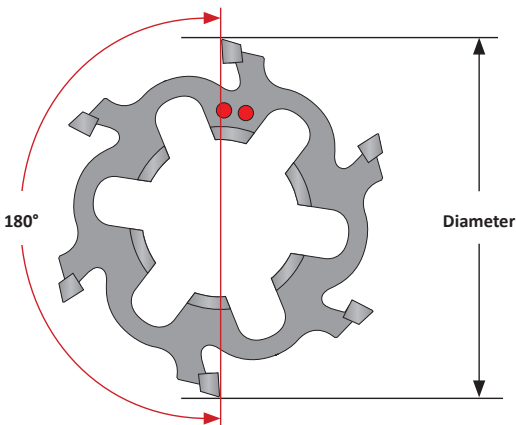
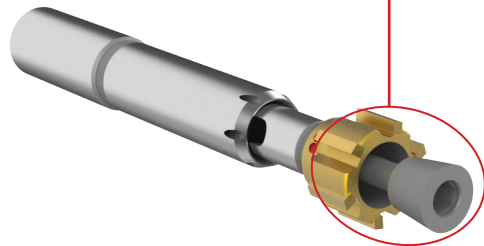
Cutting Ring

- Diameter range: 17.600 mm - 200.600 mm.
- The cutting edges are positioned asymmetrically to assure the best roundness of the hole.
- Holes with tight tolerances can be accommodated, and the expansion ensures a perfect holding of the reaming diameter.

General Reaming Notes

- If the depth is over 9xD, use a short length reamer to pilot the hole. Then finish with the longer length ⚠️.
- For blind-hole applications, always use central coolant. If in doubt, contact Allied's Application Engineering department.
- More stock allowance can be taken in softer materials. Less stock allowance should be taken in harder materials.
- A common practice is to rapid out of the cut on through holes and to breakout only 2 mm past the reaming depth.

IMPORTANT: Always use Molykote® (anti-seize applicant) on the conical seat and the threads on the central screw for assembly.



NOTE: The position of the dimples indicates which two cutting teeth are 180° opposed. Diameter measurements should be taken from these two cutting teeth.

⚠️ WARNING Tool failure can cause serious injury. To prevent:

- When using holders without support bushing, use a shorter reamer to establish an initial hole that is a minimum of 2 diameters deep.
- Do not rotate tool holders more than 50 RPM unless it is engaged with the workpiece or fixture.

Factory technical assistance is available for your specific applications through our Application Engineering department:

appeng@alliedmachine.com.

Reaming Overview

Quick Selection Guide

		50 mm					100 mm					150 mm					200 mm				
Replaceable Head	Monobloc 5.800 mm - 32.100 mm (0.2283" - 1.2638")																				
	5000 Series (expandable) 9.600 mm - 32.600 mm (0.3780" - 1.2835")																				
	7000 Series (expandable) 11.800 mm - 60.609 mm (0.4646" - 2.3862")																				
	7000 Series (fixed) 11.800 mm - 60.609 mm (0.4646" - 2.3862")																				
	9000 Series (fixed) 11.800 mm - 40.600 mm (0.4646" - 1.5984")																				
	Cutting Ring 32.600 mm - 200.600 mm (1.2835" - 7.8976")																				

► Any product line with a black arrow indicates that nonstandard diameters can be ordered by contacting Application Engineering.

Breakdown by Features

Reamer Style	Capable Tolerance	Fastest Setup	Replaceable Cutting Head	Expandable to Adjust for Wear	Recondition Available	Cylindrical Shanks	Modular Shanks	Through-Coolant Options
 Monobloc	H6			☒	☒	☒		☒
 5000 Series (expandable)	H6	☒	☒	☒		☒	☒	☒
 7000 Series (expandable)	H6		☒	☒	☒	☒	☒	☒
 7000 Series (fixed)	H7	☒	☒		☒	☒	☒	☒
 9000 Series (fixed)	H7	☒	☒			☒	☒	☒
 Cutting Ring	H6		☒	☒	☒	☒	☒	☒

For more details on how to select a reamer, see the following pages.



Reaming Overview

How The Reamers Works

How the Reamer Works

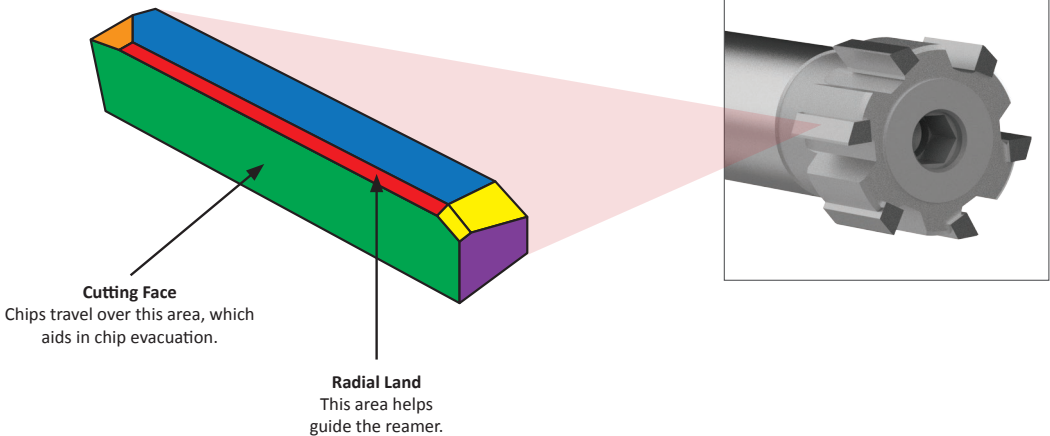
- The cut is made in the lead-in zone (3), and the chip is made on the cutting face (1). The chip is removed by coolant.
- The lead-in (3) is defined depending on the application, the workpiece material, and the stock allowance.
- The radial land (2) is important for holding a good alignment, improving the surface roughness, and giving an effect similar to burnishing. The dimension of the radial land depends on the diameter.
- The radial land (2) is manufactured to be tapered on the rear.
- Fixed reamers are manufactured at the exact tapered value. Expandable reamers must be adjusted to the exact diameter. Both are already supplied at the nominal diameter by the manufacturer.
- The undercut of the cutting edge (5) avoids retract marks on the piece when the reamer is retracted from the cut.
- The front of the cutting edge (6) does not cut; if this feature is needed, a frontal lead must be supplied.

When to Apply a Reamer

- When the requested tolerance on diameter is IT8 or less.
- When the requested finish is $1.6 \mu\text{m}$ ($63 \mu\text{in}$) Ra or greater.
- When the critical geometry characteristics of the hole are the roundness and straightness.
- When parts are being mass produced.
- When the parts are large and expensive.

Elements of the Cutting Tooth

- (1) Cutting Face
- (2) Radial Land
- (3) Lead-in / Primary Face / Secondary Face
- (4) Rear Face
- (5) Undercut of Cutting Edge
- (6) Front of Cutting Edge



Reaming Overview

Reamer Recommendation Guide

			Uninterrupted Cut					Interrupted Cut		
ISO Material		Hardness (BHN)	Lead				Substrate & Coating	Lead		Substrate & Coating
			Through Hole		Blind Hole			Through Hole	Blind Hole	
			①	②	①	②				
			Straight	Left-Hand Helical	Right-Hand Helical	Straight		Left-Hand Helical	Right-Hand Helical	
P	Free-Machining Steel 1118, 1215, 12L14, etc.	—	N, K	E	E, K	G, K	Cermet Uncoated	E	E	Carbide TiN
	Low-Carbon Steel 1010, 1020, 1522, 1144, etc.	<250	N, K	E	E, K	G, K	Cermet Uncoated	E	E	Carbide TiN
	Medium-Carbon Steel 1030, 1040, 1050, 1140, 1151, etc.	<300	N, K	E	E, K	G, K	Cermet Uncoated	E	E	Carbide TiAlN
	Alloy Steel 4140, 5140, 8640, etc.	<350	G, K	E	E, K	G, K	Cermet Uncoated	E	E	Carbide TiAlN
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	G, K	M	M, K	G, K	Carbide Alcrona	M*	M	Carbide Alcrona
	Structural Steel	—	G, K	E	E	G, K	Cermet Alcrona	E	E	Carbide Alcrona
	Tool Steel	—	K	M	M, K	K	Carbide TiAlN	M*	M*	Carbide TiAlN
S	High-Temp Alloy	—	G	M	M	G	Carbide TiAlN	M*	M*	Carbide TiAlN
	Titanium Alloys	—	T	—	—	T	Carbide T	E	E	Carbide T
M	Austenitic Stainless Steel 304, 316, etc.	—	K	M	M, K	K	Carbide Alcrona	M	M	Carbide Alcrona
	Ferritic Martensitic Stainless Steel 416, 420, 17-4PH, 15-5PH, etc.	—	N	E	K	K	Cermet or Carbide Alcrona	E	E	Carbide Alcrona
K	Ductile Cast Iron Spheroidal - GS500	<130	V	E	E	V	Carbide Alcrona	E	E	Carbide Alcrona
		130+	V	E	E	V	Cermet Alcrona	E	E	Carbide Alcrona
	Grey Cast Iron GC15 - GC20 - GC25 - GC35	—	V	E	E	V	Carbide TiAlN	E	E	Carbide TiAlN
N	Bronze Brass Copper	<300	—	E	K	K	Carbide TiN	E	E	Carbide TiN
	Aluminum	< 7% Si	V	E	E	V	Carbide Uncoated	E	E	Carbide Uncoated
		7% Si+	G	E	E	G	PCD Uncoated	E	E	PCD Uncoated

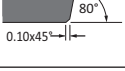
*Contact our Application Engineering department for special geometries to improve tool life.

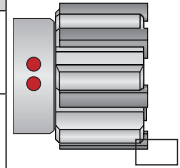


Reaming Overview

Lead-in Angle Information

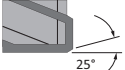
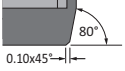
Straight Flute

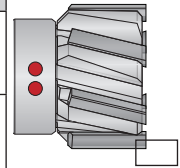
Lead-in	Angles	Chip Evacuation	Description
A			Lead-in can be used to improve finish.
F			Can be used for stock removal at the bottom of the hole. Reduce the feed by 40% of the values on the recommended cutting data pages.
G			Standard and suitable for most materials.
L			May provide improved straightness. Reduce the feed by 40% of the values on the recommended cutting data pages.
N			Ideal for through holes. It is possible to increase the feed up to 100% of the values on the recommended cutting data pages.
T			Suitable for titanium based alloys.
V			Suitable for most materials and increases tool life.
K			Excellent at breaking small chips that are easy to evacuate in blind-hole applications. Requires 50% increased feed rate, which will result in reduced tool life when compared to other leads.



Straight

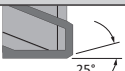
Helical Flute (Right-Hand) - Blind-hole Applications Only

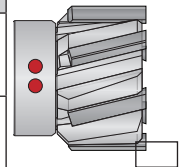
Lead-in	Angles	Chip Evacuation	Description
E			Standard and suitable for most materials.
M			May provide better penetration rates in steels over 200 BHN.
K			Excellent at breaking small chips that are easy to evacuate in blind-hole applications. Requires 50% increased feed rate, which will result in reduced tool life when compared to other leads.



Helical

Helical Flute (Left-Hand) - Through-hole Applications Only

Lead-in	Angles	Chip Evacuation	Description
E			Standard and suitable for most materials. NOTE: Through-hole applications only.
M			May provide better penetration rates in steels over 200 BHN. NOTE: Through-hole applications only.

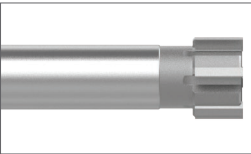


Helical

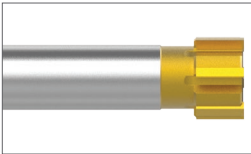
Reaming Overview

Coatings, Cutting Materials, and Dimple Indicators

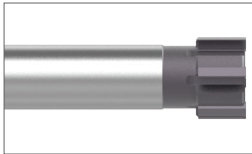
Coating Information



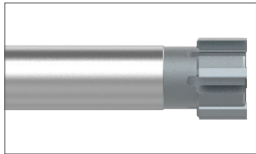
Uncoated
Ideal for nonferrous applications.



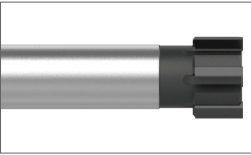
TiN (N)
Ideal for general purpose applications.



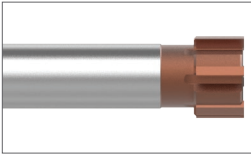
TiAlN (A)
Provides higher heat resistance to improve tool life.



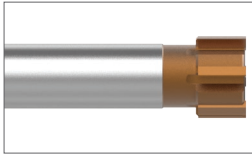
TiCN (C)
Provides improved surface finish.



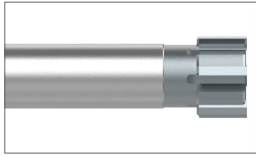
Alcrona (K)
Provides excellent wear resistance and can help increase cutting speeds.



Hardcut (H)
Ideal for cast iron and hardened steel applications.



R Coating (R)
Improved tool life in cast iron materials.



T Coating (T)
Optimized tool life in titanium and very hard materials.

Cutting Material Information

Material	Indicator	Details
Carbide	K	A fine-grain carbide suitable for all conventional reaming applications. Recommended where rigidity is not excellent and speeds must be reduced.
Cermet	S	Cermet provides high wear resistance and is recommended for abrasive and increased speed applications. Not recommended for poor rigidity or interrupted cuts.

Dimple Indicators

Material	Replaceable Head Style			
	9000 Series	7000 and 5000 Series	Monobloc Style	Cutting Ring Style
Carbide	Chamfered Profile	Two Dimples	Two Dimples	Two Dimples
				
Cermet	Sharp Edge Profile	Two Dimples with Line	Two Dimples with Line	Two Dimples with Line
				

NOTE: The dimple location also indicates which two cutting teeth are 180° opposed.

SECTION

C10-RAS

Radial Adjusting Shanks

Radial Adjusting Shanks



Radial Adjusting Shanks

- ▶ Large range of shanks for different machine types.
- ▶ Highly adjustable for improved concentricity.
- ▶ All shanks are available with through coolant.

Applicable Industries

-  Aerospace
-  Agriculture
-  Automotive
-  Defense
-  General Production
-  Heavy Equipment
-  Medical
-  Oil and Gas
-  Renewable Energy/ Energy
-  Tool, Mold, and Die

S.C.A.M.I.®

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).



Coolant-Through Option
Indicates that the product is coolant through.

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Product Overview

Cerit® System



C10



Large range of shanks for different machine types



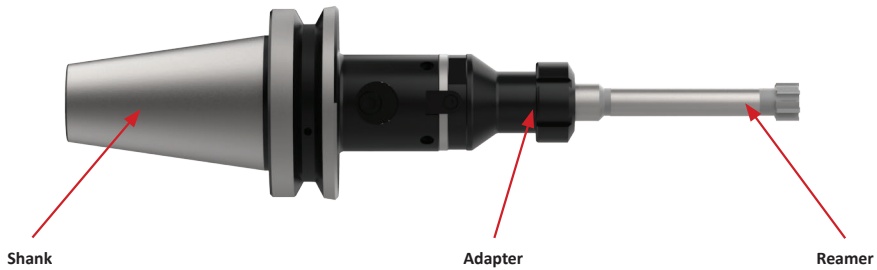
Highly adjustable for improved concentricity



All shanks are available with through coolant

All the Pieces You Need

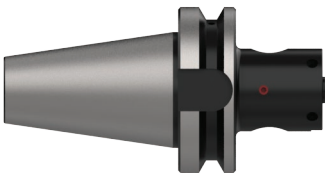
Modular System courtesy of



DIN 69871/1 B and A



HSK-A DIN 69893/1



JMTBA MAS-403
BT B and BT



Straight



Collet Chuck Adapter



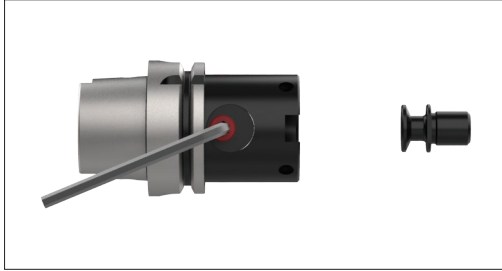
Cylindrical Shank
Adapter

Product Overview

Setup Information

Radial Adjusting Shanks and Ring Style Arbors

The following is a quick guide for setting up a radial adjusting shank and a ring style reamer. The ring reamer arbor does not contain the tang needed to connect to the shank. The tang must first be removed from the shank and then installed into the reamer arbor (demonstrated below).



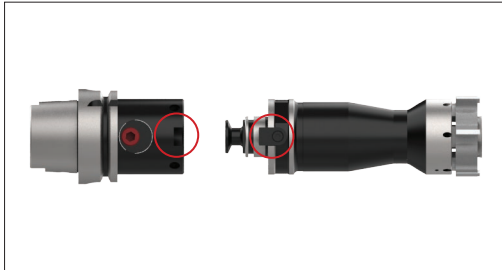
Step 1:

The tang comes installed with the shank. Loosen the clamping screw on each side and remove the tang from the shank.



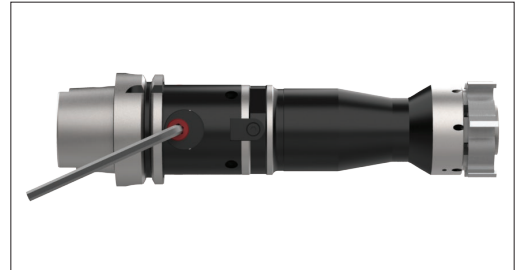
Step 2:

Thread the tang into the back end of the ring arbor. Use a bench vise and wrench to tighten.



Step 3:

Assemble the ring arbor to the shank. With the clamping screws still loosened, align the key on the arbor to the keyway on the shank.



Step 4:

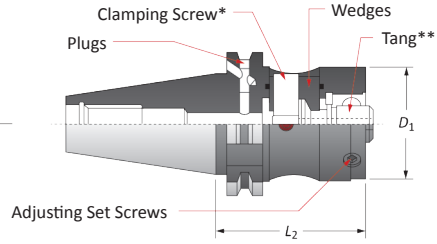
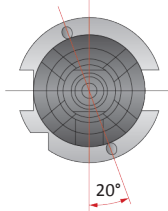
Once the ring arbor is connected with the shank, tighten the clamping screws to secure the tang back into place.



Radial Adjusting Shanks

DIN 69871-1 B and A | JMTBA MAS-403 BT B and BT

C10



Maximum radial adjustment is ± 0.20 mm (0.008") on diameter.

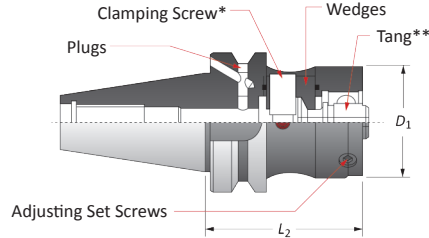
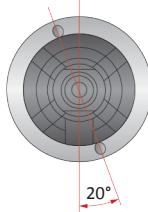
Shank				Spare Parts						
ISO Taper	D_1	L_2	Retention Knob Thread Size	Part No.	Wedges + O-Ring	Clamping Screw*	Adjusting Set Screws	Plugs	Replacement Tang**	Clamping Screw Key
40	50	65	M16 x 2	02B.40.50L.65	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	6 mm
	63	85	M16 x 2	02B.40.63L.85	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	6 mm
45	50	70	M20 x 2.5	02B.45.50L.70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	6 mm
	63	70	M20 x 2.5	02B.45.63L.70	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	6 mm
50	50	70	M24 x 3	02B.50.50L.70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	6 mm
	63	70	M24 x 3	02B.50.63L.70	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	6 mm
	80	70	M24 x 3	❖ 02B.50.80L.70	ATR18775.2.3	ATR18775.1	M8x1x20G	M5x5TG	ATT14104	6 mm

* Light torque exerted on the clamping screw transmits high axial forces, which provide stiffness and extreme accuracy to the assembly.

** Tang must be fitted to all reamer arbors and adapters prior to assembly.

❖ Could cause interference with tool changer mechanism.

NOTE: Shanks can be converted into DIN 69871/1A coolant by screwing the two plugs clockwise to the end of their stroke.



Maximum radial adjustment is ± 0.20 mm (0.008") on diameter.

Shank				Spare Parts						
BT Taper	D_1	L_2	Retention Knob Thread Size	Part No.	Wedges + O-Ring	Clamping Screw*	Adjusting Set Screws	Plugs	Replacement Tang**	Clamping Screw Key
40	50	70	M16 x 2	BTB.40.50L.70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	6 mm
	63	80	M16 x 2	BTB.40.63L.80	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	6 mm
50	50	90	M24 x 3	BTB.50.50L.90	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	6 mm
	63	90	M24 x 3	BTB.50.63L.90	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	6 mm
	80	90	M24 x 3	BTB.50.80L.90	ATR18775.2.3	ATR18775.1	M8x1x20G	M5x5TG	ATT14104	6 mm

* Light torque exerted on the clamping screw transmits high axial forces, which provide stiffness and extreme accuracy to the assembly.

** Tang must be fitted to all reamer arbors and adapters prior to assembly.

NOTE: Shanks can be converted into MAS-403 BT coolant by screwing the two plugs clockwise to the end of their stroke.

C10: 3 -4



Key on C10: 2

Modular system courtesy of 

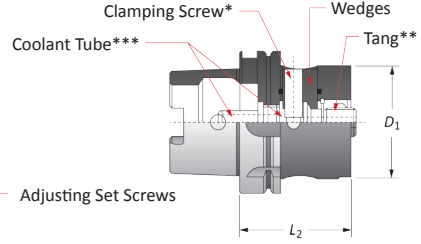
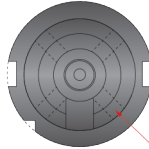
Reference Key

Symbol	Attribute
D_1	Modular shank size
L_2	Gage length



Radial Adjusting Shanks

HSK-A DIN 69893-1 | Straight

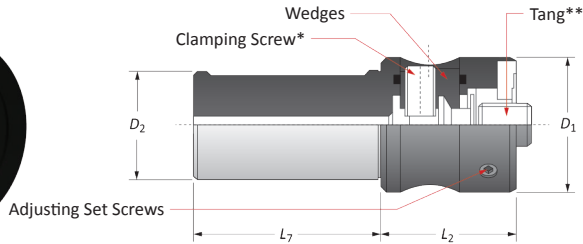


Shank			Spare Parts							
HSK	D_1	L_2	Part No.	Wedges + O-Ring	Clamping Screw*	Adjusting Set Screws	Replacement Tang**	Clamping Screw Key	Coolant Tube Key	Coolant Tube***
63	50	70	HSKA.63.50L.70	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	6 mm	ATR23856	ATT23728
	63	75	HSKA.63.63L.75	ATR.41613.4	ATR14108.1	M8x1x14G	ATT14104	6 mm	ATR23856	ATT23728
100	50	80	HSKA.100.50L.80	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	6 mm	ATR23856	ATT23656
	63	80	HSKA.100.63L.80	ATR14108.2.3	ATR14108.1	M8x1x14G	ATT14104	6 mm	ATR23856	ATT23656
	80	80	HSKA.100.80L.80	ATR18775.2.3	ATR18775.1	M8x1x20G	ATT14104	6 mm	ATR23856	ATT23656

* Light torque exerted on the clamping screw transmits high axial forces, which provide stiffness and extreme accuracy to the assembly.

** Tang must be fitted to all ring arbors and adapters prior to assembly.

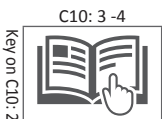
*** Coolant tube sold separately.



Shank				Spare Parts					
D_1	D_2	L_2	L_7	Part No.	Wedges + O-Ring	Clamping Screw*	Adjusting Set Screws	Replacement Tang**	Clamping Screw Key
50	25	50	70	CIL.25.50.50	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	6 mm
	32	50	70	CIL.32.50.50	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	6 mm
	40	50	70	CIL.40.50.50	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	6 mm

* Light torque exerted on the clamping screw transmits high axial forces, which provide stiffness and extreme accuracy to the assembly.

** Tang must be fitted to all ring arbors and adapters prior to assembly.



C10: 3 -4

Modular system courtesy of C-Cor.

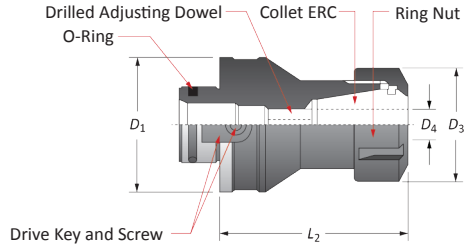
Reference Key

Symbol	Attribute
D_1	Modular shank size
D_2	Shank diameter
L_2	Gage length
L_7	Shank length



Radial Adjusting Adapters

Collet Chuck Adapters

**C10**

Collet Sleeve Size*	Adapter				Part No.	Spare Parts					
	D_1	D_3	D_4	L_2		Clamping Screw	Ring Nut	Adjusting Dowel	Drive Key	Ring Nut Wrench	Adjusting Dowel Key
ERC25	50	42	0.5 - 16 mm	70	30.50R.25.70	M4x8V	G25S	M12x16GF	TAB3924	CH25S	6 mm
ERC32	50	50	1 - 20 mm	70	30.50R.32.70	M4x8V	G32S	M16x15x18GF	TAB3924	CH32S	8 mm
ERC32	63	50	1 - 20 mm	90	30.63R.32.90	M6x12V	G32S	M12x16GF	TAB3923.1	CH32S	6 mm
ERC40	63	63	2 - 30 mm	90	30.63R.40.90	M6x12V	G40S	M20x2x20GF	TAB3923.1	CH40S	10 mm
ERC32	80	50	1 - 20 mm	90	30.80R.32.90	M6x16V	G32S	M12x16GF	TAB3923.2	CH32S	6 mm
ERC40	80	63	2 - 30 mm	90	30.80R.40.90	M6x16V	G40S	M20x2x20GF	TAB3923.2	CH40S	10 mm

*Collet sleeve not included.

C10: 3 -4



Modular system courtesy of CERAT.

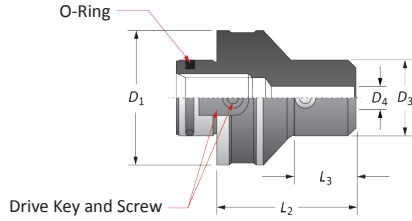
Reference Key

Symbol	Attribute
D_1	Modular shank size
D_3	Body diameter
D_4	Shank diameter
L_2	Gage length



Radial Adjusting Adapters

Cylindrical Shank Adapters



Adapter					Part No.	Spare Parts			
D_1	D_4	D_3	L_2	L_3		Drive Key	Screw	Set Screw	Set Screw Key
50	6	25	50	22.5	35.50R.06.50	TAB3924	M4x8V	M6x8G	3 mm
	8	28	50	24.5	35.50R.08.50	TAB3924	M4x8V	M8x8G	4 mm
	10	35	50	26.5	35.50R.10.50	TAB3924	M4x8V	M10x10G	5 mm
	12	42	60	38.5	35.50R.12.60	TAB3924	M4x8V	M12x12G	6 mm
	14	44	60	42	35.50R.14.60	TAB3924	M4x8V	M12x12G	6 mm
	16	48	60	40	35.50R.16.60	TAB3924	M4x8V	M14x14G	6 mm
	18	50	60	—	35.50R.18.60	TAB3924	M4x8V	M14x14G	6 mm
63	20	52	60	41	35.50R.20.60	TAB3924	M4x8V	M16x2x14G	8 mm
	8	28	60	28	35.63R.08.60	TAB3923.1	M6x12V	M8x8G	4 mm
	10	35	70	40	35.63R.10.70	TAB3923.1	M6x12V	M10x10G	5 mm
	12	42	70	42	35.63R.12.70	TAB3923.1	M6x12V	M12x12G	6 mm
	14	44	60	32	35.63R.14.60	TAB3923.1	M6x12V	M12x12G	6 mm
	16	48	70	44	35.63R.16.70	TAB3923.1	M6x12V	M14x14G	6 mm
	18	50	70	40	35.63R.18.70	TAB3923.1	M6x12V	M14x14G	6 mm
50	20	52	70	45	35.63R.20.70	TAB3923.1	M6x12V	M16x2x14G	8 mm
	25	65	80	61	40.50R.25.80	TAB3924	M4x8V	M18x2x18G	8 mm
	32	72	80	65	40.50R.32.80	TAB3924	M4x8V	M20x2x18G	10 mm
63	25	65	80	58	40.63R.25.80	TAB3923.1	M6x12V	M18x2x18G	8 mm
	32	72	80	—	40.63R.32.80	TAB3923.1	M6x12V	M20x2x18G	10 mm
80	25	65	80	50.5	40.80R.25.80	TAB3923.2	M6x12V	M18x2x18G	8 mm
	32	72	80	54	40.80R.32.80	TAB3923.2	M6x12V	M20x2x18G	10 mm

Reference Key

Symbol	Attribute
D_1	Modular shank size
D_3	Body diameter
D_4	Shank diameter
L_2	Gage length
L_3	Reference length

C10: 3 -4



Modular system courtesy of C-Cor.

SECTION

C20-MBR

Monobloc Style Reamers

MONOBLOC REAMERS

5.800 mm - 32.100 mm
(0.2283" - 1.2638")



Made for high-precision production

The monobloc reamer is an excellent replacement for solid carbide reamers because it allows for diameter expansion to accommodate for cutting edge wear. The monobloc reamer can also be repaired to new condition, which extends the life of the investment. ALVAN reamers hold tight tolerances while improving the surface finish of the hole. Our expandable option accommodates for cutting edge wear.

- ▶ Ideal for diameters under 15.00 mm (0.5906").
- ▶ Improves hole quality and surface finish.
- ▶ Expandable design accommodates for wear.

Applicable Industries

-  Aerospace
-  Agriculture
-  Automotive
-  Defense
-  General Production
-  Heavy Equipment
-  Medical
-  Oil and Gas
-  Renewable Energy/ Energy
-  Tool, Mold, and Die

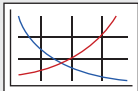
S.C.A.M.I.®

Reference Icons

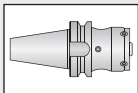
The following icons will appear throughout the catalog to help you navigate between products.



Setup / Assembly Information
Detailed instructions and information regarding the corresponding part(s).



Recommended Cutting Data
Speed and feed recommendations for optimum and safe drilling.



Modular Connection Shanks
Refers to Cerit modular shanks that can connect with reamers.



Coolant-Through Option
Indicates that the product is coolant through.

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	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.	

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Introduction Information

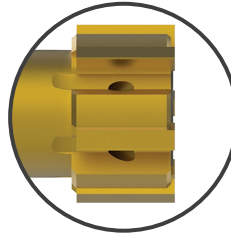
Product Overview

Monobloc Reamer Features

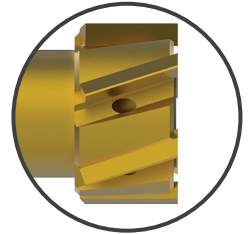
- Diameter range: 5.800 mm - 32.100 mm (0.2283" - 1.2638").
- Available with straight or left-hand helical flutes.
- Expands to accommodate for wear.
- Available with cylindrical shanks only.
- Workday lead time 15 - 25 days (quantity dependent).
- Available for recondition.



C20



Straight Flute



Left-Hand Helical Flute



Uncoated



TiN Coated



TiAlN Coated



TiCN Coated



Alcrona Coated



Hardcut Coated

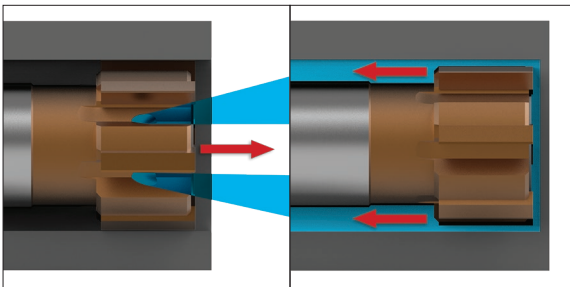


R Coated



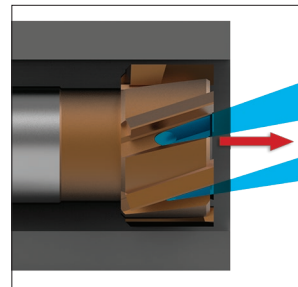
T Coated

Straight Flute - Through or Blind Holes



Use for either through-hole or blind-hole applications. The coolant flow determines the direction of the chip evacuation.

Left-Hand Helical Flute - Through Holes Only



Use when reaming through-hole applications. The cutting action of the helical flutes forces the chips forward for evacuation.



Introduction Information

Product Nomenclature

Monobloc Style Reamers

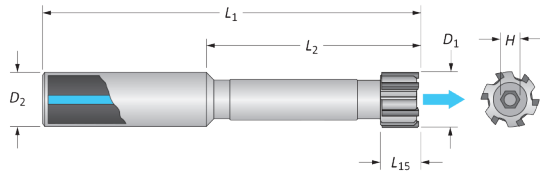
	9	3627	-	KL	E	-	06000	+	003	-	003
Diameter Unit	Shank Measure	Series		Substrate and Coating	Lead-in		Diameter				Tolerance*
Blank = Metric (mm)	Blank = Metric (mm)	2441		Cermet	E		XXXXX = X.XXXX"				4 decimal places = inch tolerance
I = Imperial (in)	9 = Imperial (in)	3620		KL = Uncoated	M		XX.XXX mm				3 decimal places = mm tolerance
		3627		KN = TiN	A						
		2431		KC = TiCN	F						
		3610		KA = TiAlN	G						
		3617		KK = Alcrona	L						
				KH = Hardcut	N						
				KR = R	T						
				KT = T	V						
				SV = Uncoated	K						
				SN = TiN							
				SC = TiCN							
				SA = TiAlN							
				SK = Alcrona							
				SH = Hardcut							
				SR = R							
				ST = T							

*The total tolerance capable is 0.005 mm (0.0002").

NOTE: If diameter and tolerance are specified in inch units, put an "I" at the beginning of the item number.

Reference Key

Symbol	Attribute
D_1	Reamer diameter
D_2	Shank diameter
L_1	Overall length
L_2	Body length
L_{15}	Cutting edge length
H	Hex key



PRODUCT DETAILS

Series Details

Series	2441	3620	3627	2431	3610	3617
Flute						
Straight	●	●		●	●	
Left-hand helical			●			●
Length						
Short	●	●	●			
Long				●	●	●
Coolant						
Radial		●	●	●	●	●
Central	●			●		

Reamer Lead-In

	T	F	N	Straight Flute					Left-hand helical	
				G	L	A	V	K	E	M
P			●	●		○		○	●	
M			○	●				○	●	
K				○			●	○	○	●
N				●			○		●	
S	●			○					●	○
H			○	●					○	●

● Best ○ Better ○ Good

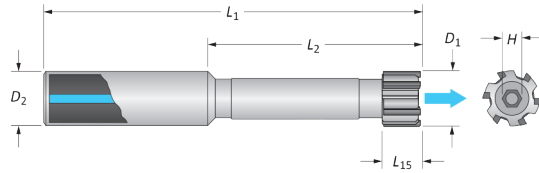
NOTE: For more detailed descriptions of cutting material, lead-ins, and coatings, please see pg. xv - xvi.



2441 Series

Short Length

C20



Series	2441	Flute	Straight	Application	Blind Holes	Coolant	Central
--------	------	-------	----------	-------------	-------------	---------	---------

Metric Shank					Inch Shank					No. of Teeth	H (mm)
Part No. 2441-XXX-D ₁ +XXXX-XXXX					Part No. 92441-XXX-D ₁ +XXXX-XXXX						
D ₁ Range	L ₁₅	L ₂	L ₁	D ₂	D ₁ Range	L ₁₅	L ₂	L ₁	D ₂		
5.800 - 6.609	8	40	80	12	0.2283 - 0.2602	0.315	1.575	3.071	0.500	4	1.5
6.610 - 7.609	8	40	80	12	0.2603 - 0.2996	0.315	1.575	3.071	0.500	4	2
7.610 - 8.609	10	40	80	12	0.2997 - 0.3389	0.394	1.575	3.071	0.500	4	2.5
8.610 - 9.609	10	50	90	12	0.3390 - 0.3783	0.394	1.969	3.465	0.500	4	2.5
9.610 - 10.609	10	50	95	12	0.3784 - 0.4177	0.394	1.969	3.740	0.500	6	3
10.610 - 11.609	10	60	105	12	0.4178 - 0.4570	0.394	1.969	3.740	0.500	6	3
11.610 - 12.609	10	60	105	12	0.4571 - 0.4964	0.394	1.969	3.740	0.500	6	3
12.610 - 13.609	10	60	105	12	0.4965 - 0.5358	0.394	1.969	3.740	0.500	6	4
13.610 - 14.609	10	70	115	12	0.5359 - 0.5752	0.394	1.969	3.740	0.500	6	4
14.610 - 15.609	10	70	115	12	0.5753 - 0.6145	0.394	1.969	3.740	0.500	6	4
15.610 - 16.609	10	80	130	16	0.6146 - 0.6539	0.394	1.969	3.937	0.625	6	4
16.610 - 17.609	10	80	130	16	0.6540 - 0.6933	0.394	1.969	3.937	0.625	6	5
17.610 - 18.609	12	90	140	16	0.6934 - 0.7326	0.472	1.969	3.937	0.625	6	5
18.610 - 19.109	12	90	150	20	0.7327 - 0.7523	0.472	2.362	4.724	0.750	6	5
19.110 - 20.109	12	100	160	20	0.7524 - 0.7917	0.472	2.362	4.724	0.750	6	5
20.110 - 21.109	12	100	160	20	0.7918 - 0.8311	0.472	2.362	4.724	0.750	6	5
21.110 - 22.109	12	100	160	20	0.8312 - 0.8704	0.472	2.362	4.724	0.750	6	6
22.110 - 23.109	12	100	160	20	0.8705 - 0.9098	0.472	2.362	4.724	0.750	6	6
23.110 - 24.109	12	100	160	20	0.9099 - 0.9492	0.472	2.362	4.724	0.750	6	6
24.110 - 25.109	12	100	160	20	0.9493 - 0.9885	0.472	2.362	4.724	0.750	6	6
25.110 - 26.109	16	110	170	25	0.9886 - 1.0279	0.472	2.953	5.315	1.000	6	6
26.110 - 27.109	16	110	170	25	1.0280 - 1.0673	0.551	2.953	5.315	1.000	6	6
27.110 - 28.109	16	110	170	25	1.0674 - 1.1067	0.551	2.953	5.315	1.000	6	8
28.110 - 29.109	16	110	170	25	1.1068 - 1.1460	0.551	2.953	5.315	1.000	6	8
29.110 - 30.109	16	110	170	25	1.1461 - 1.1854	0.551	2.953	5.315	1.000	6	8
30.110 - 31.109	16	110	170	25	1.1855 - 1.2248	0.551	2.953	5.315	1.000	6	8
31.110 - 32.100	16	110	170	25	1.2249 - 1.2638	0.551	2.953	5.315	1.000	6	8

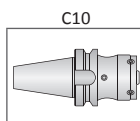
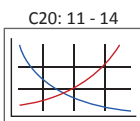
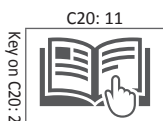
Coating and Substrate Code (Part No. 2441-XXX-D₁+XXXX-XXXX)

Grade	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	KL	KN	KC	KA	KK	KH	KR	KT
Cermet	SV	SN	SC	SA	SK	SH	SR	ST

Lead-in (Part No. 2441-XXX-D₁+XXXX-XXXX)

ISO Material	T	F	N	G	L	A	V	K
P			●	●	●	○	○	○
M			●	●	●	○	○	○
K			●	●	●	○	○	○
N			●	●	●	○	○	○
S	●		●	●	●	○	○	○
H			●	●	●	○	○	○

● Best ○ Better ○ Good



2441 - K N F - 030600 + 005 - 005

2441 Series - Metric Shank

Carbide

TiN Coating

F Lead-in

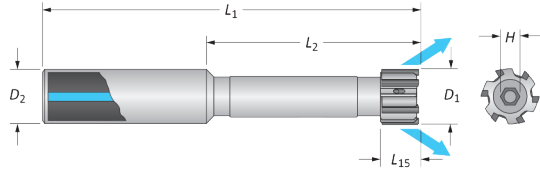
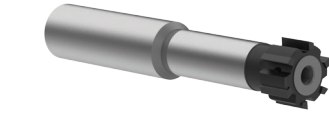
Diameter

Tolerance



3620 Series

Short Length



Series	3620	Flute	Straight	Application	Through Holes	Coolant	Radial
--------	------	-------	----------	-------------	---------------	---------	--------

Metric Shank					Inch Shank					No. of Teeth	H (mm)
Part No. 3620-XXX-D ₁ +XXXX-XXXX					Part No. 93620-XXX-D ₁ +XXXX-XXXX						
D ₁ Range	L ₁₅	L ₂	L ₁	D ₂	D ₁ Range	L ₁₅	L ₂	L ₁	D ₂		
5.800 - 6.609	8	40	78	12	0.2283 - 0.2602	0.315	1.575	3.071	0.500	4	1.5
6.610 - 7.609	8	40	78	12	0.2603 - 0.2996	0.315	1.575	3.071	0.500	4	2
7.610 - 8.609	10	40	78	12	0.2997 - 0.3389	0.394	1.575	3.071	0.500	4	2.5
8.610 - 9.609	10	50	88	12	0.3390 - 0.3783	0.394	1.969	3.465	0.500	4	2.5
9.610 - 10.609	10	50	95	12	0.3784 - 0.4177	0.394	1.969	3.740	0.500	6	3
10.610 - 11.609	10	50	95	12	0.4178 - 0.4570	0.394	1.969	3.740	0.500	6	3
11.610 - 12.609	10	50	95	12	0.4571 - 0.4964	0.394	1.969	3.740	0.500	6	3
12.610 - 13.609	10	50	95	12	0.4965 - 0.5358	0.394	1.969	3.740	0.500	6	4
13.610 - 14.609	10	50	95	12	0.5359 - 0.5752	0.394	1.969	3.740	0.500	6	4
14.610 - 15.609	10	50	95	12	0.5753 - 0.6145	0.394	1.969	3.740	0.500	6	4
15.610 - 16.609	10	50	100	16	0.6146 - 0.6539	0.394	1.969	3.937	0.625	6	4
16.610 - 17.609	10	50	100	16	0.6540 - 0.6933	0.394	1.969	3.937	0.625	6	5
17.610 - 18.609	12	50	100	16	0.6934 - 0.7326	0.472	1.969	3.937	0.625	6	5
18.610 - 19.109	12	60	120	20	0.7327 - 0.7523	0.472	2.362	4.724	0.750	6	5
19.110 - 20.109	12	60	120	20	0.7524 - 0.7917	0.472	2.362	4.724	0.750	6	5
20.110 - 21.109	12	60	120	20	0.7918 - 0.8311	0.472	2.362	4.724	0.750	6	5
21.110 - 22.109	12	60	120	20	0.8312 - 0.8704	0.472	2.362	4.724	0.750	6	6
22.110 - 23.109	12	60	120	20	0.8705 - 0.9098	0.472	2.362	4.724	0.750	6	6
23.110 - 24.109	12	60	120	20	0.9099 - 0.9492	0.472	2.362	4.724	0.750	6	6
24.110 - 25.109	12	60	120	20	0.9493 - 0.9885	0.472	2.362	4.724	0.750	6	6
25.110 - 26.109	16	70	135	25	0.9886 - 1.0279	0.472	2.953	5.315	1.000	6	6
26.110 - 27.109	16	70	135	25	1.0280 - 1.0673	0.551	2.953	5.315	1.000	6	6
27.110 - 28.109	16	70	135	25	1.0674 - 1.1067	0.551	2.953	5.315	1.000	6	8
28.110 - 29.109	16	70	135	25	1.1068 - 1.1460	0.551	2.953	5.315	1.000	6	8
29.110 - 30.109	16	70	135	25	1.1461 - 1.1854	0.551	2.953	5.315	1.000	6	8
30.110 - 31.109	16	70	135	25	1.1855 - 1.2248	0.551	2.953	5.315	1.000	6	8
31.110 - 32.100	16	70	135	25	1.2249 - 1.2638	0.551	2.953	5.315	1.000	6	8

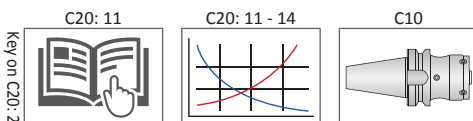
Coating and Substrate Code (Part No. 3620-XXX-D₁+XXXX-XXXX)

Grade	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	KL	KN	KC	KA	KK	KH	KR	KT
Cermet	SV	SN	SC	SA	SK	SH	SR	ST

Lead-in (Part No. 3620-XXX-D₁+XXXX-XXXX)

ISO Material	T	F	N	G	L	A	V	K
P			●	●	●	●	○	○
M			○	●	●	●	●	○
K				○	●	●	●	○
N				●	●	●	●	○
S	●			○	●	●	●	○
H			○	●	●	●	●	○

● Best ○ Better ○ Good



Key on C20: 2

3620 - K N F - 030600 + 005 - 005

3620 Series - Metric Shank

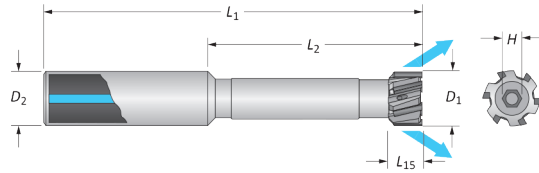
K Carbide
N TiN Coating
F Lead-in
030600 Diameter
+ 005 Tolerance
- 005 Tolerance



3627 Series

Short Length

C20



Series	3627	Flute	Helical	Application	Through Holes	Coolant	Radial
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Metric Shank					Inch Shank					No. of Teeth	H (mm)
Part No. 3627-XXX-D ₁ +XXXX-XXXX					Part No. 93627-XXX-D ₁ +XXXX-XXXX						
D ₁ Range	L ₁₅	L ₂	L ₁	D ₂	D ₁ Range	L ₁₅	L ₂	L ₁	D ₂		
5.800 - 6.609	8	40	80	12	0.2283 - 0.2602	0.315	1.575	3.150	0.500	4	1.5
6.610 - 7.609	8	40	80	12	0.2603 - 0.2996	0.315	1.575	3.150	0.500	4	2
7.610 - 8.609	10	40	80	12	0.2997 - 0.3389	0.394	1.575	3.150	0.500	4	2.5
8.610 - 9.609	10	50	90	12	0.3390 - 0.3783	0.394	1.969	3.543	0.500	4	2.5
9.610 - 10.609	10	50	95	12	0.3784 - 0.4177	0.394	1.969	3.740	0.500	6	3
10.610 - 11.609	10	60	105	12	0.4178 - 0.4570	0.394	2.362	4.134	0.500	6	3
11.610 - 12.609	10	60	105	12	0.4571 - 0.4964	0.394	2.362	4.134	0.500	6	3
12.610 - 13.609	10	60	105	12	0.4965 - 0.5358	0.394	2.362	4.134	0.500	6	4
13.610 - 14.609	10	70	115	12	0.5359 - 0.5752	0.394	2.756	4.528	0.500	6	4
14.610 - 15.609	10	70	115	12	0.5753 - 0.6145	0.394	2.756	4.528	0.500	6	4
15.610 - 16.609	10	80	130	16	0.6146 - 0.6539	0.394	3.150	5.118	0.625	6	4
16.610 - 17.609	10	80	130	16	0.6540 - 0.6933	0.394	3.150	5.118	0.625	6	5
17.610 - 18.609	12	90	140	16	0.6934 - 0.7326	0.472	3.543	5.512	0.625	6	5
18.610 - 19.109	12	90	150	20	0.7327 - 0.7523	0.472	3.543	5.906	0.750	6	5
19.110 - 20.109	12	100	160	20	0.7524 - 0.7917	0.472	3.937	6.299	0.750	6	5
20.110 - 21.109	12	100	160	20	0.7918 - 0.8311	0.472	3.937	6.299	0.750	6	5
21.110 - 22.109	12	100	160	20	0.8312 - 0.8704	0.472	3.937	6.299	0.750	6	6
22.110 - 23.109	12	100	160	20	0.8705 - 0.9098	0.472	3.937	6.299	0.750	6	6
23.110 - 24.109	12	100	160	20	0.9099 - 0.9492	0.472	3.937	6.299	0.750	6	6
24.110 - 25.109	12	100	160	20	0.9493 - 0.9885	0.472	3.937	6.299	0.750	6	6
25.110 - 26.109	16	110	170	25	0.9886 - 1.0279	0.472	4.331	6.693	1.000	6	6
26.110 - 27.109	16	110	170	25	1.0280 - 1.0673	0.551	4.331	6.693	1.000	6	6
27.110 - 28.109	16	110	170	25	1.0674 - 1.1067	0.551	4.331	6.693	1.000	6	8
28.110 - 29.109	16	110	170	25	1.1068 - 1.1460	0.551	4.331	6.693	1.000	6	8
29.110 - 30.109	16	110	170	25	1.1461 - 1.1854	0.551	4.331	6.693	1.000	6	8
30.110 - 31.109	16	110	170	25	1.1855 - 1.2248	0.551	4.331	6.693	1.000	6	8
31.110 - 32.100	16	110	170	25	1.2249 - 1.2638	0.551	4.331	6.693	1.000	6	8

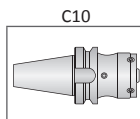
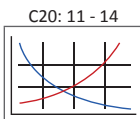
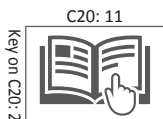
Coating and Substrate Code (Part No. 3627-XXX-D₁+XXXX-XXXX)

Grade	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	KL	KN	KC	KA	KK	KH	KR	KT
Cermet	SV	SN	SC	SA	SK	SH	SR	ST

Lead-in (Part No. 3627-XXX-D₁+XXXX-XXXX)

ISO Material	E	M
P	●	
M	●	
K	○	●
N	●	○
S	●	○
H	○	●

● Best ○ Better ○ Good



3627 - K N F - 030600 + 005 - 005

3627 Series - Metric Shank

Carbide

TiN Coating

F Lead-in

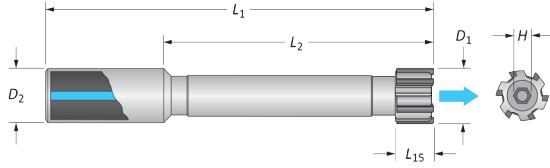
Diameter

Tolerance



2431 Series

Long Length



Series	2431	Flute	Straight	Application	Blind Holes	Coolant	Central
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Metric Shank					Inch Shank					No. of Teeth	H (mm)
Part No. 2431-XXX-D ₁ +XXXX-XXXX					Part No. 92431-XXX-D ₁ +XXXX-XXXX						
D ₁ Range	L ₁₅	L ₂	L ₁	D ₂	D ₁ Range	L ₁₅	L ₂	L ₁	D ₂		
5.800 - 6.609	8	85	123	12	0.2283 - 0.2602	0.315	3.346	4.843	0.500	4	1.5
6.610 - 7.609	8	85	123	12	0.2603 - 0.2996	0.315	3.346	4.843	0.500	4	2
7.610 - 8.609	10	85	123	12	0.2997 - 0.3389	0.394	3.346	4.843	0.500	4	2.5
8.610 - 9.609	10	85	123	12	0.3390 - 0.3783	0.394	3.346	4.843	0.500	4	2.5
9.610 - 10.609	10	115	160	12	0.3784 - 0.4177	0.394	4.528	6.299	0.500	6	3
10.610 - 11.609	10	115	160	12	0.4178 - 0.4570	0.394	4.528	6.299	0.500	6	3
11.610 - 12.609	10	115	160	12	0.4571 - 0.4964	0.394	4.528	6.299	0.500	6	3
12.610 - 13.609	10	115	160	12	0.4965 - 0.5358	0.394	4.528	6.299	0.500	6	4
13.610 - 14.609	10	115	160	12	0.5359 - 0.5752	0.394	4.528	6.299	0.500	6	4
14.610 - 15.609	10	115	160	12	0.5753 - 0.6145	0.394	4.528	6.299	0.500	6	4
15.610 - 16.609	10	130	180	16	0.6146 - 0.6539	0.394	5.118	7.087	0.625	6	4
16.610 - 17.609	10	130	180	16	0.6540 - 0.6933	0.394	5.118	7.087	0.625	6	5
17.610 - 18.609	12	130	180	16	0.6934 - 0.7326	0.472	5.118	7.087	0.625	6	5
18.610 - 19.109	12	140	200	20	0.7327 - 0.7523	0.472	5.512	7.874	0.750	6	5
19.110 - 20.109	12	140	200	20	0.7524 - 0.7917	0.472	5.512	7.874	0.750	6	5
20.110 - 21.109	12	140	200	20	0.7918 - 0.8311	0.472	5.512	7.874	0.750	6	5
21.110 - 22.109	12	140	200	20	0.8312 - 0.8704	0.472	5.512	7.874	0.750	6	6
22.110 - 23.109	12	140	200	20	0.8705 - 0.9098	0.472	5.512	7.874	0.750	6	6
23.110 - 24.109	12	140	200	20	0.9099 - 0.9492	0.472	5.512	7.874	0.750	6	6
24.110 - 25.109	12	140	200	20	0.9493 - 0.9885	0.472	5.512	7.874	0.750	6	6
25.110 - 26.109	16	150	210	25	0.9886 - 1.0279	0.472	5.906	8.268	1.000	6	6
26.110 - 27.109	16	150	210	25	1.0280 - 1.0673	0.551	5.906	8.268	1.000	6	6
27.110 - 28.109	16	150	210	25	1.0674 - 1.1067	0.551	5.906	8.268	1.000	6	8
28.110 - 29.109	16	150	210	25	1.1068 - 1.1460	0.551	5.906	8.268	1.000	6	8
29.110 - 30.109	16	150	210	25	1.1461 - 1.1854	0.551	5.906	8.268	1.000	6	8
30.110 - 31.109	16	150	210	25	1.1855 - 1.2248	0.551	5.906	8.268	1.000	6	8
31.110 - 32.100	16	150	210	25	1.2249 - 1.2638	0.551	5.906	8.268	1.000	6	8

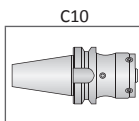
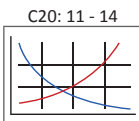
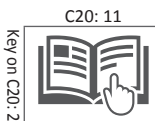
Coating and Substrate Code (Part No. 2431-XXX-D₁+XXXX-XXXX)

Grade	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	KL	KN	KC	KA	KK	KH	KR	KT
Cermet	SV	SN	SC	SA	SK	SH	SR	ST

Lead-in (Part No. 2431-XXX-D₁+XXXX-XXXX)

ISO Material	T	F	N	G	L	A	V	K
P			●	●	●	○	○	○
M			○	●	●		●	○
K				○	○		●	○
N				●	○		○	
S	●			○				
H			○	●				

● Best ○ Better ○ Good



Key on C20: 2

2431 - K N F - 030600 + 005 - 005

2441 Series - Metric Shank

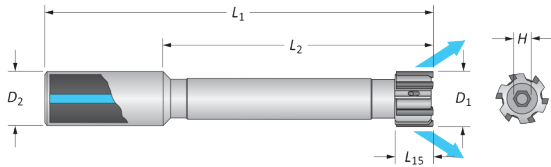
Diagram showing: Diameter (030600), F Lead-in, TiN Coating, Carbide, Tolerance (005 - 005).



3610 Series

Long Length

C20



Series	3610	Flute	Straight	Application	Through Holes	Coolant	Radial
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Metric Shank					Inch Shank					No. of Teeth	H (mm)
Part No. 3610-XXX-D ₁ +XXXX-XXXX					Part No. 93610-XXX-D ₁ +XXXX-XXXX						
D ₁ Range	L ₁₅	L ₂	L ₁	D ₂	D ₁ Range	L ₁₅	L ₂	L ₁	D ₂		
5.800 - 6.609	8	85	123	12	0.2283 - 0.2602	0.315	3.346	4.843	0.500	4	1.5
6.610 - 7.609	8	85	123	12	0.2603 - 0.2996	0.315	3.346	4.843	0.500	4	2
7.610 - 8.609	10	85	123	12	0.2997 - 0.3389	0.394	3.346	4.843	0.500	4	2.5
8.610 - 9.609	10	85	123	12	0.3390 - 0.3783	0.394	3.346	4.843	0.500	4	2.5
9.610 - 10.609	10	115	160	12	0.3784 - 0.4177	0.394	4.528	6.299	0.500	6	3
10.610 - 11.609	10	115	160	12	0.4178 - 0.4570	0.394	4.528	6.299	0.500	6	3
11.610 - 12.609	10	115	160	12	0.4571 - 0.4964	0.394	4.528	6.299	0.500	6	3
12.610 - 13.609	10	115	160	12	0.4965 - 0.5358	0.394	4.528	6.299	0.500	6	4
13.610 - 14.609	10	115	160	12	0.5359 - 0.5752	0.394	4.528	6.299	0.500	6	4
14.610 - 15.609	10	115	160	12	0.5753 - 0.6145	0.394	4.528	6.299	0.500	6	4
15.610 - 16.609	10	130	180	16	0.6146 - 0.6539	0.394	5.118	7.087	0.625	6	4
16.610 - 17.609	10	130	180	16	0.6540 - 0.6933	0.394	5.118	7.087	0.625	6	5
17.610 - 18.609	12	130	180	16	0.6934 - 0.7326	0.472	5.118	7.087	0.625	6	5
18.610 - 19.109	12	140	200	20	0.7327 - 0.7523	0.472	5.512	7.874	0.750	6	5
19.110 - 20.109	12	140	200	20	0.7524 - 0.7917	0.472	5.512	7.874	0.750	6	5
20.110 - 21.109	12	140	200	20	0.7918 - 0.8311	0.472	5.512	7.874	0.750	6	5
21.110 - 22.109	12	140	200	20	0.8312 - 0.8704	0.472	5.512	7.874	0.750	6	6
22.110 - 23.109	12	140	200	20	0.8705 - 0.9098	0.472	5.512	7.874	0.750	6	6
23.110 - 24.109	12	140	200	20	0.9099 - 0.9492	0.472	5.512	7.874	0.750	6	6
24.110 - 25.109	12	140	200	20	0.9493 - 0.9885	0.472	5.512	7.874	0.750	6	6
25.110 - 26.109	16	150	210	25	0.9886 - 1.0279	0.472	5.906	8.268	1.000	6	6
26.110 - 27.109	16	150	210	25	1.0280 - 1.0673	0.551	5.906	8.268	1.000	6	6
27.110 - 28.109	16	150	210	25	1.0674 - 1.1067	0.551	5.906	8.268	1.000	6	8
28.110 - 29.109	16	150	210	25	1.1068 - 1.1460	0.551	5.906	8.268	1.000	6	8
29.110 - 30.109	16	150	210	25	1.1461 - 1.1854	0.551	5.906	8.268	1.000	6	8
30.110 - 31.109	16	150	210	25	1.1855 - 1.2248	0.551	5.906	8.268	1.000	6	8
31.110 - 32.100	16	150	210	25	1.2249 - 1.2638	0.551	5.906	8.268	1.000	6	8

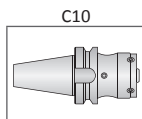
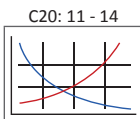
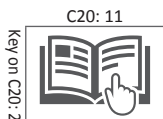
Coating and Substrate Code (Part No. 3610-XXX-D₁+XXXX-XXXX)

Grade	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	KL	KN	KC	KA	KK	KH	KR	KT
Cermet	SV	SN	SC	SA	SK	SH	SR	ST

Lead-in (Part No. 3610-XXX-D₁+XXXX-XXXX)

ISO Material	T	F	N	G	L	A	V	K
P			●	●	●	○	○	○
M			●	●	●	○	○	○
K			●	●	●	○	○	○
N			●	●	●	○	○	○
S	●		●	●	●	○	○	○
H			●	●	●	○	○	○

● Best ○ Better ○ Good



3610 - K N F - 030600 + 005 - 005

3610 Series - Metric Shank

Carbide

TiN Coating

F Lead-in

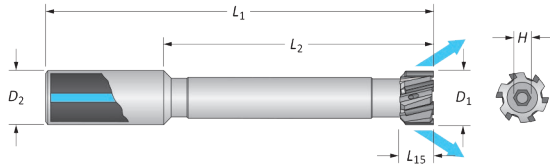
Diameter

Tolerance



3617 Series

Long Length



Series	3617	Flute	Helical	Application	Through Holes	Coolant	Radial
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Metric Shank					Inch Shank					No. of Teeth	H (mm)
Part No. 3617-XXX-D ₁ +XXXX-XXXX					Part No. 93617-XXX-D ₁ +XXXX-XXXX						
D ₁ Range	L ₁₅	L ₂	L ₁	D ₂	D ₁ Range	L ₁₅	L ₂	L ₁	D ₂		
5.800 - 6.609	8	85	123	12	0.2283 - 0.2602	0.315	3.346	4.843	0.500	4	1.5
6.610 - 7.609	8	85	123	12	0.2603 - 0.2996	0.315	3.346	4.843	0.500	4	2
7.610 - 8.609	10	85	123	12	0.2997 - 0.3389	0.394	3.346	4.843	0.500	4	2.5
8.610 - 9.609	10	85	123	12	0.3390 - 0.3783	0.394	3.346	4.843	0.500	4	2.5
9.610 - 10.609	10	115	160	12	0.3784 - 0.4177	0.394	4.528	6.299	0.500	6	3
10.610 - 11.609	10	115	160	12	0.4178 - 0.4570	0.394	4.528	6.299	0.500	6	3
11.610 - 12.609	10	115	160	12	0.4571 - 0.4964	0.394	4.528	6.299	0.500	6	3
12.610 - 13.609	10	115	160	12	0.4965 - 0.5358	0.394	4.528	6.299	0.500	6	4
13.610 - 14.609	10	115	160	12	0.5359 - 0.5752	0.394	4.528	6.299	0.500	6	4
14.610 - 15.609	10	115	160	12	0.5753 - 0.6145	0.394	4.528	6.299	0.500	6	4
15.610 - 16.609	10	130	180	16	0.6146 - 0.6539	0.394	5.118	7.087	0.625	6	4
16.610 - 17.609	10	130	180	16	0.6540 - 0.6933	0.394	5.118	7.087	0.625	6	5
17.610 - 18.609	12	130	180	16	0.6934 - 0.7326	0.472	5.118	7.087	0.625	6	5
18.610 - 19.109	12	140	200	20	0.7327 - 0.7523	0.472	5.512	7.874	0.750	6	5
19.110 - 20.109	12	140	200	20	0.7524 - 0.7917	0.472	5.512	7.874	0.750	6	5
20.110 - 21.109	12	140	200	20	0.7918 - 0.8311	0.472	5.512	7.874	0.750	6	5
21.110 - 22.109	12	140	200	20	0.8312 - 0.8704	0.472	5.512	7.874	0.750	6	6
22.110 - 23.109	12	140	200	20	0.8705 - 0.9098	0.472	5.512	7.874	0.750	6	6
23.110 - 24.109	12	140	200	20	0.9099 - 0.9492	0.472	5.512	7.874	0.750	6	6
24.110 - 25.109	12	140	200	20	0.9493 - 0.9885	0.472	5.512	7.874	0.750	6	6
25.110 - 26.109	16	150	210	25	0.9886 - 1.0279	0.472	5.906	8.268	1.000	6	6
26.110 - 27.109	16	150	210	25	1.0280 - 1.0673	0.551	5.906	8.268	1.000	6	6
27.110 - 28.109	16	150	210	25	1.0674 - 1.1067	0.551	5.906	8.268	1.000	6	8
28.110 - 29.109	16	150	210	25	1.1068 - 1.1460	0.551	5.906	8.268	1.000	6	8
29.110 - 30.109	16	150	210	25	1.1461 - 1.1854	0.551	5.906	8.268	1.000	6	8
30.110 - 31.109	16	150	210	25	1.1855 - 1.2248	0.551	5.906	8.268	1.000	6	8
31.110 - 32.100	16	150	210	25	1.2249 - 1.2638	0.551	5.906	8.268	1.000	6	8

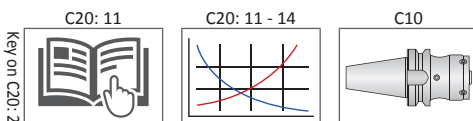
Coating and Substrate Code (Part No. 3617-XXX-D₁+XXXX-XXXX)

Grade	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	KL	KN	KC	KA	KK	KH	KR	KT
Cermet	SV	SN	SC	SA	SK	SH	SR	ST

Lead-in (Part No. 3617-XXX-D₁+XXXX-XXXX)

ISO Material	E	M
P	●	
M	●	
K	⦿	●
N	●	⦿
S	●	⦿
H	⦿	●

● Best ⦿ Better ○ Good



3617 - K N F - 030600 + 005 - 005

3617 Series - Metric Shank

Carbide

TiN Coating

F Lead-in

Diameter

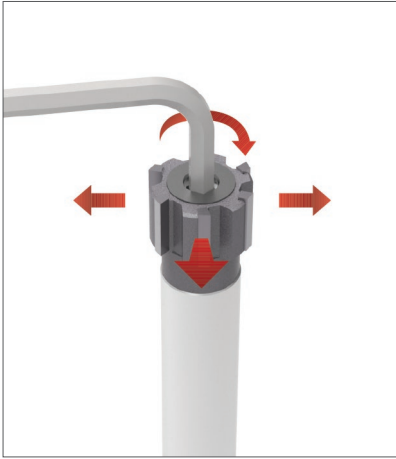
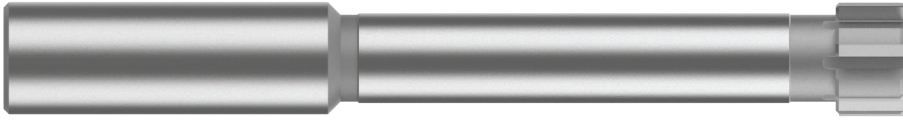
Tolerance



Setup Information



C20



Tolerance

All monobloc reamers are ground to the requested diameter and set in the middle of the hole tolerance ready for use.

Adjustment

The adjustment must be made to compensate for wear to the cutting edges when the size reaches its lower tolerance. This operation can be repeated several times until the surface finish of the hole deteriorates to an unacceptable level. Then the reamer must be reground. The maximum expansion is about 1% of the diameter.

This image shows a full page of blank graph paper. The grid consists of small, equal-sized squares formed by thin black lines. There are 20 columns and 20 rows of squares, creating a total of 400 square units. The paper is otherwise completely blank, with no margins, text, or other markings.



C20



Recommended Drilling Data | Metric (mm)

MONOBLOC

ISO	Material	Hardness (BHN)	Speed (m/min)		
			Uncoated Carbide	Coated Carbide	Cermet
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	7 - 15	60 - 80	90 - 300
		180 - 250	6 - 10	40 - 70	80 - 200
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	7 - 15	60 - 80	90 - 300
		180 - 275	6 - 10	40 - 70	80 - 200
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	7 - 15	60 - 80	90 - 300
		180 - 325	6 - 10	40 - 70	80 - 200
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	6 - 10	40 - 70	80 - 200
		180 - 375	4 - 8	30 - 50	60 - 150
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	3 - 6	15 - 30	60 - 120
	Structural Steel A36, A285, A516, etc.	125 - 180	7 - 15	60 - 80	90 - 300
M		180 - 350	6 - 10	40 - 70	80 - 200
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	7 - 15	60 - 80	90 - 300
		200 - 250	6 - 10	40 - 70	80 - 200
	Stainless Steel 400 Series 416, 420, etc.	135 - 350	4 - 10	30 - 50	60 - 150
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	4 - 10	30 - 50	60 - 150
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	15 - 30	50 - 70	—
		> 200	10 - 20	50 - 70	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	8 - 12	30 - 50	60 - 120
	Copper and Alloys, and Brass	< 500	10 - 18	100 - 200	—
	Bronze, and Bronze Phosphorous	< 180	10 - 20	80 - 160	100 - 300
S	Aluminum and Alloys	< 150	15 - 30	100 - 200	—
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	4 - 10	30 - 50	—
	Titanium Alloy	140 - 310	4 - 15	30 - 50	—

Formulas

1. $\text{RPM} = (318.47 \cdot \text{m/min}) / \text{DIA}$ where: RPM = revolutions per minute (rev/min) m/min = speed (m/min) DIA = diameter of drill (mm)	2. $\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$ where: mm/min = mm per minute (mm/min) RPM = revolutions per minute (rev/min) mm/rev = feed rate (mm/rev)
3. $\text{m/min} = \text{RPM} \cdot 0.003 \cdot \text{DIA}$ where: m/min = speed (m/min) RPM = revolutions per minute (rev/min) DIA = diameter of drill (mm)	

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Imperial (in)

MONOBLOC

ISO	Material	Hardness (BHN)	Speed (SFM)		
			Uncoated Carbide	Coated Carbide	Cermet
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	25 - 50	200 - 260	300 - 980
		180 - 250	20 - 35	130 - 230	260 - 660
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	25 - 50	200 - 260	300 - 980
		180 - 275	20 - 35	130 - 230	260 - 660
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	25 - 50	200 - 260	300 - 980
		180 - 325	20 - 35	130 - 230	260 - 660
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	20 - 35	130 - 230	260 - 660
		180 - 375	15 - 25	100 - 160	200 - 490
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	10 - 20	50 - 100	200 - 390
	Structural Steel A36, A285, A516, etc.	125 - 180	25 - 50	200 - 260	300 - 980
M		180 - 350	20 - 35	130 - 230	260 - 660
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	25 - 50	200 - 260	300 - 980
		200 - 250	20 - 35	130 - 230	260 - 660
K	Stainless Steel 400 Series 416, 420, etc.	135 - 350	15 - 25	100 - 160	200 - 490
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	15 - 25	100 - 160	200 - 490
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	50 - 100	160 - 230	—
		> 200	35 - 65	160 - 230	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	25 - 40	100 - 160	200 - 400
N	Copper and Alloys, and Brass	< 500	35 - 60	330 - 660	—
	Bronze, and Bronze Phosphorous	< 180	35 - 65	260 - 520	330 - 980
	Aluminum and Alloys	< 150	50 - 100	330 - 660	—
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	15 - 25	60 - 200	—
	Titanium Alloy	140 - 310	15 - 25	60 - 200	—

Formulas

1.	RPM	= (3.82 • SFM) / DIA
	where:	
	RPM	= revolutions per minute (rev/min)
	SFM	= speed (ft/min)
	DIA	= diameter of drill (inch)

2.	IPM	= RPM • IPR
	where:	
	IPM	= inches per minute (in/min)
	RPM	= revolutions per minute (rev/min)
	IPR	= feed rate (in/rev)

3.	SFM	= RPM • 0.262 • DIA
	where:	
	SFM	= speed (ft/min)
	RPM	= revolutions per minute (rev/min)
	DIA	= diameter of drill (inch)

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Stock Allowance and Coolant | Metric (mm)

MONOBLOC

ISO Material		Hardness (BHN)	Coolant	Recommended Stock (mm) by Reamer Diameter*							
				5.80 mm - 10.00 mm	10.01 mm - 22.00 mm	22.01 mm - 32.10 mm					
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180 180 - 250	Water Soluble / Cutting Oil	0.08 - 0.15	0.15 - 0.25	0.15 - 0.30					
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180 180 - 275									
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180 180 - 325									
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180 180 - 375									
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450									
	Structural Steel A36, A285, A516, etc.	125 - 180 180 - 350									
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200 200 - 250									
	M	Stainless Steel 400 Series 416, 420, etc.					135 - 350	Water Soluble / Cutting Oil	0.08 - 0.15	0.15 - 0.25	0.15 - 0.30
		Stainless Steel 300 Series 304, 316, 17-4PH, etc.					135 - 275				
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200 > 200	Water Soluble / Cutting Oil	0.08 - 0.15	0.15 - 0.25	0.15 - 0.30					
	Spheroidal Cast Iron (Ferritic)	260 - 320									
N	Copper and Alloys, and Brass	< 500	Water Soluble	0.08 - 0.15	0.15 - 0.25	0.15 - 0.30					
	Bronze, and Bronze Phosphorous	< 180	Water Soluble / Cutting Oil								
	Aluminum and Alloys	< 150									
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.10 - 0.20	0.15 - 0.25	0.20 - 0.40					
	Titanium Alloy	140 - 310									

*Stock value is on diameter.



Stock Allowance and Coolant | Imperial (in)

MONOBLOC							
ISO Material		Hardness (BHN)	Coolant	Recommended Stock (in) by Reamer Diameter*			
				0.2283" - 0.3940"	0.3941" - 0.7090"	0.7091" - 1.2638"	
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020	
		180 - 250					
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180					
		180 - 275					
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180					
		180 - 325					
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180					
		180 - 375					
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450					
M	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020	
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275					
	K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	Water Soluble / Cutting Oil	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020
			> 200				
Spheroidal Cast Iron (Ferritic)		260 - 320					
N	Copper and Alloys, and Brass	< 500	Water Soluble	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020	
	Bronze, and Bronze Phosphorous	< 180	Water Soluble / Cutting Oil				
	Aluminum and Alloys	< 150					
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.008 - 0.016	0.012 - 0.016	0.012 - 0.020	
	Titanium Alloy	140 - 310					

C20

*Stock value is on diameter.

SECTION

C30-RHR

Replaceable Head Reamers

REPLACEABLE HEAD REAMERS

7000, 9000, & 5000 Series



Efficient high-production performance

7000 Series

Features both expandable and fixed heads in multiple diameters within the same arbor to reduce inventory requirements.

- ▶ 11.800 mm - 60.609 mm (0.4646" - 2.3862")

9000 Series

Quick-change fixed head design for reduced downtime when assembling and indexing new heads in high-production applications.

- ▶ 11.800 mm - 40.600 mm (0.4646" - 1.5984")

5000 Series

Twist-locking expandable head design that excels in applications requiring extremely tight tolerances where minimizing operator intervention is critical.

- ▶ 9.600 mm - 32.600 mm (0.3780" - 1.2835")

Applicable Industries



Aerospace



Agriculture



Automotive



Defense



General Production



Heavy Equipment



Medical



Oil and Gas



Renewable Energy/ Energy



Tool, Mold, and Die

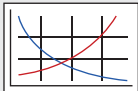
S.C.A.M.I.®

Reference Icons

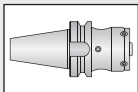
The following icons will appear throughout the catalog to help you navigate between products.



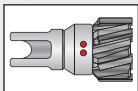
Setup / Assembly Information
Detailed instructions and information regarding the corresponding part(s).



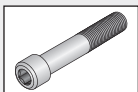
Recommended Cutting Data
Speed and feed recommendations for optimum and safe drilling.



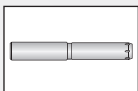
Modular Connection Shanks
Refers to Cerit modular shanks that can connect with reamers.



Replaceable Reamer Heads
Refers to the reamer head options that connect to the reamer mandrels.



Replaceable Reamer Screws
Refers to the reamer head screw options that connect the head to the reamer mandrels.



Replaceable Reamer Mandrels
Refers to the reamer mandrel options that connect with the head and screw.



Coolant-Through Option
Indicates that the product is coolant through.

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 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.

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Introduction Information

Product Overview

Expandable Heads

5000 Series



- 9.600 mm - 32.600 mm (0.3780" - 1.2835").
- Heads arrive set to finish diameter and specified tolerance.
- Twist-lock heads for precision locating of the head to the mandrel.
- Best TIR repeatability from head to head providing consistent tool wear and maximized tool life.

7000 Series



- 11.800 mm - 60.609 mm (0.4646" - 2.3862").
- Multiple diameters within the same arbor reduce inventory requirements.
- Coolant configurations for blind and through-hole applications.
- Reamer head reconditions are available upon request.
- Expands up to 1% on diameter to accommodate for wear.
- ± 0.005 mm (0.0002") tolerance capability.



Fixed Heads

7000 Series



- 11.800 mm - 60.609 mm (0.4646" - 2.3862").
- 60.610 mm - 80.600 mm (2.3863" - 3.1732") diameters available as specials by contacting Application Engineering.
- Multiple diameters within the same arbor reduce inventory requirements.
- Coolant configurations for blind and through-hole applications.
- Reamer head reconditions are available upon request.
- Nonexpanding diameter for simple on-machine replacement.
- H7 tolerance capability.

9000 Series



- 11.800 mm - 40.600 mm (0.4646" - 1.5984").
- Heads are precision ground to finish diameter.
- Quick-change heads require minimal downtime for replacement.
- Sintered carbide or cermet design provides improved rigidity in difficult applications.
- H7 tolerance capability.

Coatings

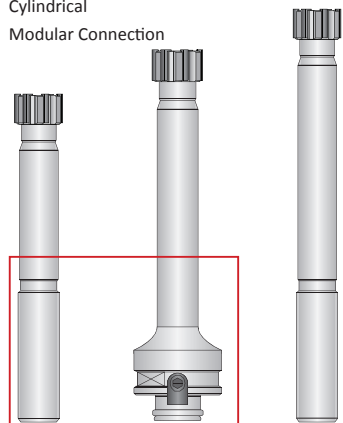
Uncoated	TiN	TiAlN	TiCN	Alcrona	Hardcut	R Coating	T Coating

Reference Key

Symbol	Attribute
D_1	Reamer head diameter
D_2	Shank diameter
L_1	Overall length
L_2	Length of cut
H	Hex key (listed with screws)

Mandrel Shanks Available:

- Cylindrical
- Modular Connection



Short Length Standard Length Long Length



Introduction Information

Product Nomenclature

7000 Series Replaceable Reamer Heads

	7400	—	KN	G	—	12000
Diameter Unit	Series		Substrate and Coating	Lead-in		Diameter
Blank = Metric (mm)	7400		Cermet	E		XXXXX = X.XXXX"
I = Imperial (in)	7405		KL = Uncoated	M		XX.XXX mm
	7600		KN = TiN	A		
	7605		KC = TiCN	G		
	7700		KA = TiAlN	L		
	7705		KK = Alcrona	N		
			KH = Hardcut	T		
			KR = R	V		
			KT = T	K		
			SV = Uncoated			
			SN = TiN			
			SC = TiCN			
			SA = TiAlN			
			SK = Alcrona			
			SH = Hardcut			
			SR = R coating			
			ST = T			



NOTE: For reconitions, put an "R" at the beginning of the item number (7000 series only).

NOTE: Contact Application Engineering about optional add-on features for 7000 series.

9000/5000 Series Replaceable Reamer Heads

	9700	—	KN	G	H	—	12000	+	000	—	018
Diameter Unit	Series		Substrate and Coating	Lead-in	Optional add-on		Diameter				Tolerance*
Blank = Metric (mm)	9400		Cermet	E	Blank = No add-on		XXXXX = X.XXXX"				4 decimal places = inch tolerance
I = Imperial (in)	9600		KL = Uncoated	M	H = Half circular face		XX.XXX mm				3 decimal places = mm tolerance
	9700		KN = TiN	A	Z = Double back taper						
	5400		KC = TiCN	F	HZ = Half circular face and double back taper						
	5401		KA = TiAlN	G							
	5600		KK = Alcrona	L							
	5700		KH = Hardcut	N							
			KR = R	T							
			KT = T	V							
			SV = Uncoated	K							
			SN = TiN								
			SC = TiCN								
			SA = TiAlN								
			SK = Alcrona								
			SH = Hardcut								
			SR = R								
			ST = T								

*The total tolerance capable for 5000 series reamers is 0.005 mm (0.0002") and H7 for 9000 series reamers.

Series Details

Series		7000 Series						5000 Series				9000 Series		
		7400	7600	7700	7405	7605	7705	5400	5401	5600	5700	9400	9600	9700
Flute	Straight	●			●			●	●			●		
	Right-hand helical		●			●				●			●	
	Left-hand helical			●			●				●			●
Head	Fixed	●	●	●								●	●	●
	Expandable				●	●	●	●	●	●	●			
Coolant	Radial (through hole)	—	—	—	—	—	—	●			●	—	—	—
	Central (blind hole)	—	—	—	—	—	—		●	●		—	—	—



7000 Series Replaceable Head Reamer

Overview

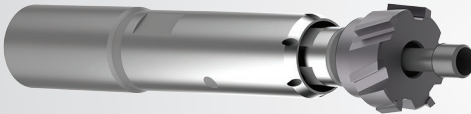
7000 SERIES

11.800 mm - 80.600 mm (0.4646" - 3.1732")

- ▶ Features both expandable and fixed diameter heads.
- ▶ Multiple diameters within the same arbor reduce inventory requirements.
- ▶ Coolant configurations for blind and through-hole applications.
- ▶ Available with brazed carbide, cermet, or PCD cutting edges.
- ▶ Reamer head reconditions are available upon request.

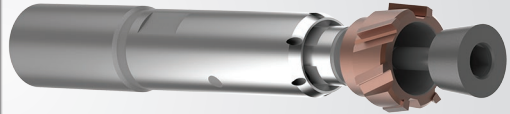


fixed head reamers



- ▶ Nonexpanding diameter for simple on-machine replacement.
- ▶ H7 tolerance capability.

expandable head reamers



- ▶ Expands to accommodate for wear.
- ▶ ± 0.005 mm (0.0002") tolerance capability.

Lead Time in Workdays

7000 Series		2 - 5 pcs	6 - 19 pcs	20+ pcs
Fixed	Coated	20	25	25
	Uncoated	15	20	20
Expandable	Coated	20	25	30
	Uncoated	15	20	25

Building Your Complete Tool

You will need all three pieces to complete your replaceable head reamer assembly. The item numbers for the screws and the mandrels are listed on their respective pages. However, there is a guide on the pages where the heads are located. You must follow the guide to build the item number for the reamer head that you need.

The complete mandrel item numbers are listed on their respective pages. You do not need to build the mandrel numbers.

1

Select Your Head



C30: 12

2

Select Your Screw



C30: 6 - 7

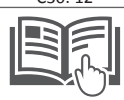
3

Select Your Mandrel

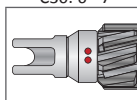
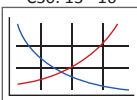


C30: 10 - 11

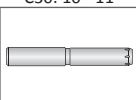
Key on C30: 2



C30: 13 - 16



C30: 8 - 9

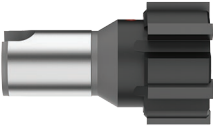
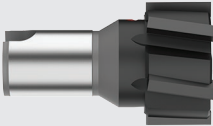
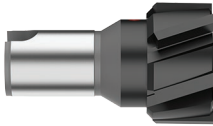
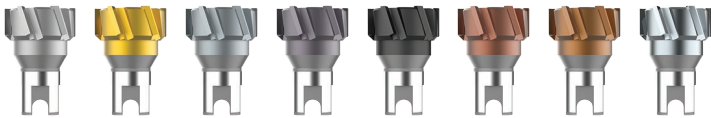




Reamer Heads

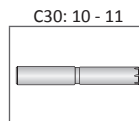
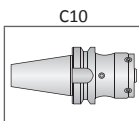
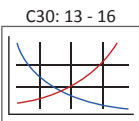
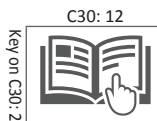
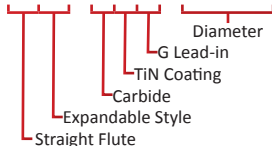
Expandable

Build Your Part No.

1 Series	7405 Series	7605 Series	7705 Series																																																																																																																
2 Flute Style Your flute style is based on your series selection (above).	Straight Flute 	Helical Flute (Right-Hand) 	Helical Flute (Left-Hand) 																																																																																																																
3 Carbide Grade and Coating Codes These are the combinations of grades and coatings you can choose from.	 <table border="1"> <thead> <tr> <th></th><th>Uncoated</th><th>TiN</th><th>TiCN</th><th>TiAlN</th><th>Alcrona</th><th>Hardcut</th><th>R Coating</th><th>T Coating</th></tr> </thead> <tbody> <tr> <td>Carbide</td><td>KL</td><td>KN</td><td>KC</td><td>KA</td><td>KK</td><td>KH</td><td>KR</td><td>KT</td></tr> <tr> <td>Cermet</td><td>SV</td><td>SN</td><td>SC</td><td>SA</td><td>SK</td><td>SH</td><td>SR</td><td>ST</td></tr> </tbody> </table>				Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating	Carbide	KL	KN	KC	KA	KK	KH	KR	KT	Cermet	SV	SN	SC	SA	SK	SH	SR	ST																																																																																					
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● Best ○ Better ○ Good

7405 - K N G - 50000



Key on C30: 2



Reamer Heads

Fixed

Build Your Part No.

1

Series

7400 Series

7600 Series

7700 Series

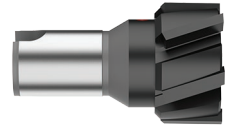
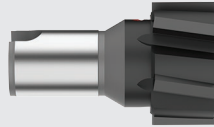
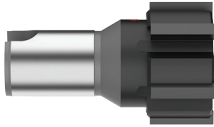
2

Flute Style

Straight Flute

Helical Flute (Right-Hand)

Helical Flute (Left-Hand)



C30

3

Carbide Grade and Coating Codes

These are the combinations of grades and coatings you can choose from.

	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	KL	KN	KC	KA	KK	KH	KR	KT
Cermet	SV	SN	SC	SA	SK	SH	SR	ST

4

Lead-in Recommendations

	T	F	N	G	L	A	V	K
P			●	●	●	○	○	
M			●	●	●	○	○	
K			●	●	●	○	○	
N			●	●	●	○	○	
S	●		●	●	●	○	○	
H		●	●	●	●	○	○	

	E	M	K
P	●	●	○
M	●	●	○
K	●	●	○
N	●	●	○
S	●	●	○
H	●	●	○

	E	M
P	●	○
M	●	○
K	●	○
N	●	○
S	●	○
H	●	○

5

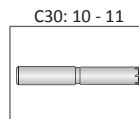
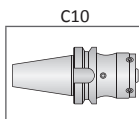
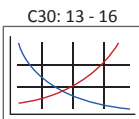
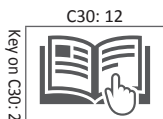
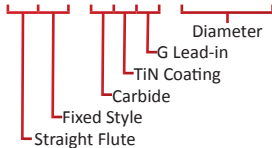
Diameter

For the diameter portion of the item number, refer to the following tables:

Metric (mm)		Imperial (in)	
D ₁ Range	Tolerance (min/max)	D ₁ Range	Tolerance (min/max)
11.800 - 18.000	+0 / +0.018	0.4646 - 0.7086	+0 / +0.0007
18.001 - 30.000	+0 / +0.021	0.7087 - 1.1810	+0 / +0.0008
30.001 - 50.000	+0 / +0.025	1.1811 - 1.9684	+0 / +0.0010
50.001 - 60.609	+0 / +0.030	1.9685 - 2.3862	+0 / +0.0012

60.610 mm - 80.600 mm (2.3863" - 3.1732") diameters are available as specials by contacting Application Engineering.

● Best ○ Better ○ Good

7400 - K N G - 50000

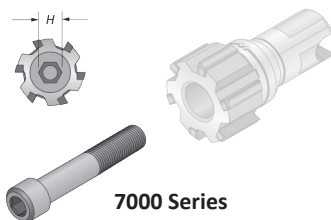
C30: 7

www.alliedmachine.com | 1.330.343.4283

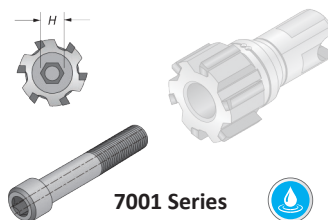


Replaceable Head Screws

Fixed



7000 Series



7001 Series



D ₁ Range*		Part No.	H (mm)
Metric (mm)	Imperial (in)		
11.800 - 14.609	0.4646 - 0.5751	7000-VI-001	2.5
14.610 - 17.609	0.5752 - 0.6932	7000-VI-002	3
17.610 - 21.609	0.6933 - 0.8507	7000-VI-003	4
21.610 - 26.609	0.8508 - 1.0475	7000-VI-004	5
26.610 - 32.609	1.0476 - 1.2838	7000-VI-005	6
32.610 - 40.609	1.2839 - 1.5987	7000-VI-006	6
40.610 - 50.609	1.5988 - 1.9924	7000-VI-007	8
50.610 - 60.609	1.9925 - 2.3862	7000-VI-008	10
60.610 - 80.600	2.3863 - 3.1732	7000-VI-009	12

D ₁ Range*		Part No.	H (mm)
Metric (mm)	Imperial (in)		
11.800 - 14.609	0.4646 - 0.5751	7001-VI-001	2.5
14.610 - 17.609	0.5752 - 0.6932	7001-VI-002	3
17.610 - 21.609	0.6933 - 0.8507	7001-VI-003	4
21.610 - 26.609	0.8508 - 1.0475	7001-VI-004	5
26.610 - 32.609	1.0476 - 1.2838	7001-VI-005	6
32.610 - 40.609	1.2839 - 1.5987	7001-VI-006	6
40.610 - 50.609	1.5988 - 1.9924	7001-VI-007	8
50.610 - 60.609	1.9925 - 2.3862	7001-VI-008	10
60.610 - 80.600	2.3863 - 3.1732	7001-VI-009	12

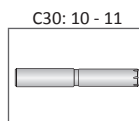
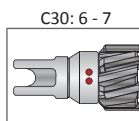
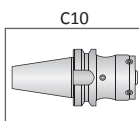
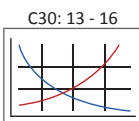
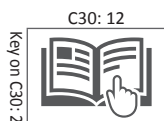
* 60.610 mm - 80.600 mm (2.3863" - 3.1732") diameter heads are available as specials by contacting Application Engineering.



C30

7000 Series Locking Screws	
Radial Coolant Only	No Coolant
7000 Series Mandrels	7001 Series Mandrels

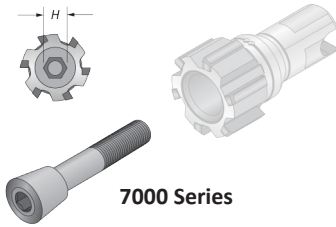
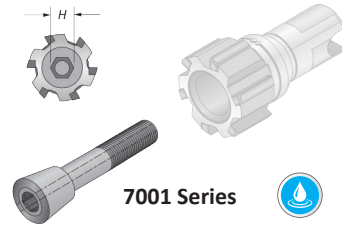
7001 Series Locking Screws	
Radial and Central Coolant	Central Coolant Only
7000 Series Mandrels	7001 Series Mandrels





Replaceable Head Screws

Expandable

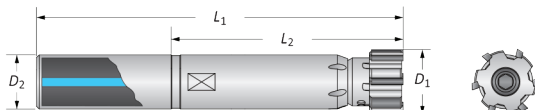
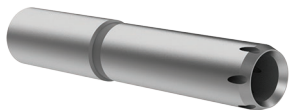
**7000 Series****7001 Series**

<i>D₁</i> Range*		Part No.	<i>H</i> (mm)
Metric (mm)	Imperial (in)		
11.800 - 12.609	0.4646 - 0.4964	7000-VI-012	3.5
12.610 - 13.609	0.4965 - 0.5357	7000-VI-013	
13.610 - 14.609	0.5358 - 0.5751	7000-VI-014	
14.610 - 15.609	0.5752 - 0.6145	7000-VI-015	4
15.610 - 16.609	0.6146 - 0.6538	7000-VI-016	
16.610 - 17.609	0.6539 - 0.6932	7000-VI-017	
17.610 - 18.609	0.6933 - 0.7326	7000-VI-018	5
18.610 - 19.609	0.7327 - 0.7719	7000-VI-019	
19.610 - 20.609	0.7720 - 0.8113	7000-VI-020	
20.610 - 21.609	0.8114 - 0.8507	7000-VI-021	6
21.610 - 22.609	0.8508 - 0.8901	7000-VI-022	
22.610 - 23.609	0.8902 - 0.9294	7000-VI-023	
23.610 - 24.609	0.9295 - 0.9688	7000-VI-024	8
24.610 - 25.609	0.9689 - 1.0082	7000-VI-025	
25.610 - 26.609	1.0083 - 1.0475	7000-VI-026	
26.610 - 27.609	1.0476 - 1.0869	7000-VI-027	10
27.610 - 28.609	1.0870 - 1.1263	7000-VI-028	
28.610 - 29.609	1.1264 - 1.1656	7000-VI-029	
29.610 - 30.609	1.1657 - 1.2050	7000-VI-030	12
30.610 - 31.609	1.2051 - 1.2444	7000-VI-031	
31.610 - 32.609	1.2445 - 1.2838	7000-VI-032	
32.610 - 33.609	1.2839 - 1.3231	7000-VI-033	14
33.610 - 34.609	1.3232 - 1.3625	7000-VI-034	
34.610 - 35.609	1.3626 - 1.4019	7000-VI-035	
35.610 - 36.609	1.4020 - 1.4412	7000-VI-036	16
36.610 - 37.609	1.4413 - 1.4806	7000-VI-037	
37.610 - 38.609	1.4807 - 1.5200	7000-VI-038	
38.610 - 39.609	1.5201 - 1.5593	7000-VI-039	18
39.610 - 40.609	1.5594 - 1.5987	7000-VI-040	
40.610 - 41.609	1.5988 - 1.6381	7000-VI-041	
41.610 - 42.609	1.6382 - 1.6775	7000-VI-042	20
42.610 - 43.609	1.6776 - 1.7168	7000-VI-043	
43.610 - 44.609	1.7169 - 1.7562	7000-VI-044	
44.610 - 45.609	1.7563 - 1.7956	7000-VI-045	22
45.610 - 46.609	1.7957 - 1.8349	7000-VI-046	
46.610 - 47.609	1.8350 - 1.8743	7000-VI-047	
47.610 - 48.609	1.8744 - 1.9137	7000-VI-048	24
48.610 - 49.609	1.9138 - 1.9530	7000-VI-049	
49.610 - 50.609	1.9531 - 1.9924	7000-VI-050	
50.610 - 51.609	1.9925 - 2.0318	7000-VI-051	26
51.610 - 52.609	2.0319 - 2.0712	7000-VI-052	
52.610 - 53.609	2.0713 - 2.1105	7000-VI-053	
53.610 - 54.609	2.1106 - 2.1499	7000-VI-054	28
54.610 - 55.609	2.1500 - 2.1893	7000-VI-055	
55.610 - 56.609	2.1894 - 2.2286	7000-VI-056	
56.610 - 57.609	2.2287 - 2.2680	7000-VI-057	30
57.610 - 58.609	2.2681 - 2.3074	7000-VI-058	
58.610 - 59.609	2.3075 - 2.3468	7000-VI-059	
59.610 - 60.609	2.3469 - 2.3862	7000-VI-060	

<i>D₁</i> Range*		Part No.	<i>H</i> (mm)
Metric (mm)	Imperial (in)		
11.800 - 12.609	0.4646 - 0.4964	7001-VI-012	3.5
12.610 - 13.609	0.4965 - 0.5357	7001-VI-013	
13.610 - 14.609	0.5358 - 0.5751	7001-VI-014	
14.610 - 15.609	0.5752 - 0.6145	7001-VI-015	4
15.610 - 16.609	0.6146 - 0.6538	7001-VI-016	
16.610 - 17.609	0.6539 - 0.6932	7001-VI-017	
17.610 - 18.609	0.6933 - 0.7326	7001-VI-018	5
18.610 - 19.609	0.7327 - 0.7719	7001-VI-019	
19.610 - 20.609	0.7720 - 0.8113	7001-VI-020	
20.610 - 21.609	0.8114 - 0.8507	7001-VI-021	6
21.610 - 22.609	0.8508 - 0.8901	7001-VI-022	
22.610 - 23.609	0.8902 - 0.9294	7001-VI-023	
23.610 - 24.609	0.9295 - 0.9688	7001-VI-024	8
24.610 - 25.609	0.9689 - 1.0082	7001-VI-025	
25.610 - 26.609	1.0083 - 1.0475	7001-VI-026	
26.610 - 27.609	1.0476 - 1.0869	7001-VI-027	10
27.610 - 28.609	1.0870 - 1.1263	7001-VI-028	
28.610 - 29.609	1.1264 - 1.1656	7001-VI-029	
29.610 - 30.609	1.1657 - 1.2050	7001-VI-030	12
30.610 - 31.609	1.2051 - 1.2444	7001-VI-031	
31.610 - 32.609	1.2445 - 1.2838	7001-VI-032	
32.610 - 33.609	1.2839 - 1.3231	7001-VI-033	14
33.610 - 34.609	1.3232 - 1.3625	7001-VI-034	
34.610 - 35.609	1.3626 - 1.4019	7001-VI-035	
35.610 - 36.609	1.4020 - 1.4412	7001-VI-036	16
36.610 - 37.609	1.4413 - 1.4806	7001-VI-037	
37.610 - 38.609	1.4807 - 1.5200	7001-VI-038	
38.610 - 39.609	1.5201 - 1.5593	7001-VI-039	18
39.610 - 40.609	1.5594 - 1.5987	7001-VI-040	
40.610 - 41.609	1.5988 - 1.6381	7001-VI-041	
41.610 - 42.609	1.6382 - 1.6775	7001-VI-042	20
42.610 - 43.609	1.6776 - 1.7168	7001-VI-043	
43.610 - 44.609	1.7169 - 1.7562	7001-VI-044	
44.610 - 45.609	1.7563 - 1.7956	7001-VI-045	22
45.610 - 46.609	1.7957 - 1.8349	7001-VI-046	
46.610 - 47.609	1.8350 - 1.8743	7001-VI-047	
47.610 - 48.609	1.8744 - 1.9137	7001-VI-048	24
48.610 - 49.609	1.9138 - 1.9530	7001-VI-049	
49.610 - 50.609	1.9531 - 1.9924	7001-VI-050	
50.610 - 51.609	1.9925 - 2.0318	7001-VI-051	26
51.610 - 52.609	2.0319 - 2.0712	7001-VI-052	
52.610 - 53.609	2.0713 - 2.1105	7001-VI-053	
53.610 - 54.609	2.1106 - 2.1499	7001-VI-054	28
54.610 - 55.609	2.1500 - 2.1893	7001-VI-055	
55.610 - 56.609	2.1894 - 2.2286	7001-VI-056	
56.610 - 57.609	2.2287 - 2.2680	7001-VI-057	30
57.610 - 58.609	2.2681 - 2.3074	7001-VI-058	
58.610 - 59.609	2.3075 - 2.3468	7001-VI-059	
59.610 - 60.609	2.3469 - 2.3862	7001-VI-060	

Mandrels

Cylindrical



Short

D ₁ Range*		Mandrel			No. of Teeth	Part No.	
Metric (mm)	Imperial (in)	L ₂ (mm)	L ₁ (mm)	D ₂ (mm)		7000 Series	7001 Series
11.800 - 14.609	0.4646 - 0.5751	50	95	12	6	7000-MC-001	7001-MC-001
14.610 - 17.609	0.5752 - 0.6932	65	113	16	6	7000-MC-002	7001-MC-002
17.610 - 21.609	0.6933 - 0.8507	75	125	20	6	7000-MC-003	7001-MC-003
21.610 - 26.609	0.8508 - 1.0475	85	135	20	6	7000-MC-004	7001-MC-004
26.610 - 32.609	1.0476 - 1.2838	105	161	25	6	7000-MC-005	7001-MC-005
32.610 - 40.609	1.2839 - 1.5987	120	180	32	6	7000-MC-006	7001-MC-006
40.610 - 45.609	1.5988 - 1.7956	120	180	32	6	7000-MC-007	7001-MC-007
45.610 - 50.609	1.7957 - 1.9924	120	180	32	8	7000-MC-075	7001-MC-075
50.610 - 60.609	1.9925 - 2.3862	120	190	32	8	7000-MC-008	7001-MC-008
60.610 - 80.600	2.3863 - 3.1732	120	180	32	8/10/12	7000-MC-009	—

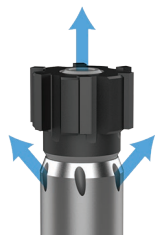


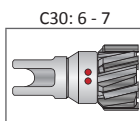
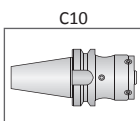
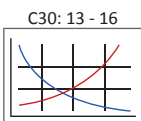
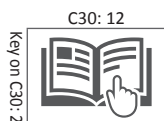
Long

D ₁ Range*		Mandrel			No. of Teeth	Part No.	
Metric (mm)	Imperial (in)	L ₂ (mm)	L ₁ (mm)	D ₂ (mm)		7000 Series	7001 Series
11.800 - 14.609	0.4646 - 0.5751	95	140	12	6	7000-ML-001	7001-ML-001
14.610 - 17.609	0.5752 - 0.6932	105	153	16	6	7000-ML-002	7001-ML-002
17.610 - 21.609	0.6933 - 0.8507	125	175	20	6	7000-ML-003	7001-ML-003
21.610 - 26.609	0.8508 - 1.0475	145	195	20	6	7000-ML-004	7001-ML-004
26.610 - 32.609	1.0476 - 1.2838	165	221	25	6	7000-ML-005	7001-ML-005
32.610 - 40.609	1.2839 - 1.5987	185	245	32	6	7000-ML-006	7001-ML-006
40.610 - 45.609	1.5988 - 1.7956	185	245	32	6	7000-ML-007	7001-ML-007
45.610 - 50.609	1.7957 - 1.9924	185	245	32	8	7000-ML-075	7001-ML-075
50.610 - 60.609	1.9925 - 2.3862	185	255	32	8	7000-ML-008	7001-ML-008
60.610 - 80.600	2.3863 - 3.1732	185	245	32	8/10/12	7000-ML-009	—

* 60.610 mm - 80.600 mm (2.3863" - 3.1732") diameter heads are available as specials by contacting Application Engineering.

7000 Series Locking Screws	
Radial Coolant Only	No Coolant
	
7000 Series Mandrels	7001 Series Mandrels

7001 Series Locking Screws	
Radial and Central Coolant	Central Coolant Only
	
7000 Series Mandrels	7001 Series Mandrels

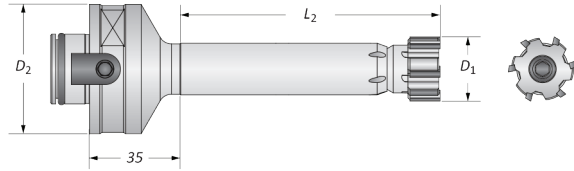
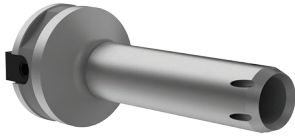


Key on C30: 2



Mandrels

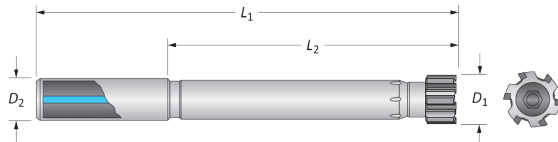
Modular Shank | AR Upper Receiver



Standard

D_1 Range*		Mandrel		No. of Teeth	Part No.	
Metric (mm)	Imperial (in)	L_2 (mm)	D_2 (mm)		7000 Series	7001 Series
11.800 - 14.609	0.4646 - 0.5751	65	50	6	7000-MM-001	7001-MM-001
14.610 - 17.609	0.5752 - 0.6932	80	50	6	7000-MM-002	7001-MM-002
17.610 - 21.609	0.6933 - 0.8507	90	50	6	7000-MM-003	7001-MM-003
21.610 - 26.609	0.8508 - 1.0475	100	50	6	7000-MM-004	7001-MM-004
26.610 - 32.609	1.0476 - 1.2838	110	50	6	7000-MM-005	7001-MM-005
32.610 - 40.609	1.2839 - 1.5987	120	50	6	7000-MM-006	7001-MM-006
40.610 - 45.609	1.5988 - 1.7956	120	50	6	7000-MM-007	7001-MM-007
45.610 - 50.609	1.7957 - 1.9924	120	50	8	7000-MM-075	7001-MM-075
50.610 - 60.609	1.9925 - 2.3862	120	50	8	7000-MM-008	7001-MM-008
60.610 - 80.600	2.3863 - 3.1732	120	63	8/10/12	7000-MM-009	—

* 60.610 mm - 80.600 mm (2.3863" - 3.1732") diameter heads are available as specials by contacting Application Engineering.



D_1		Mandrel			No. of Teeth	Part No.
Metric (mm)	Imperial (in)	L_2 (in)	L_1 (in)	D_2 (in)		
30.163	1.1875	9.65	11.65	0.75	6	7000-MC-AR10
25.400	1.0000	8.66	10.63	0.75	6	7000-MC-AR15

7000 Series Locking Screws

Radial Coolant Only



7000 Series Mandrels

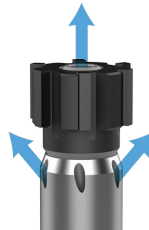
No Coolant



7001 Series Mandrels

7001 Series Locking Screws

Radial and Central Coolant

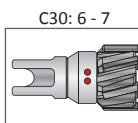
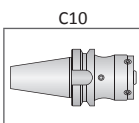
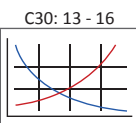
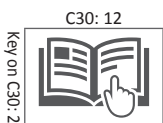


7000 Series Mandrels

Central Coolant Only

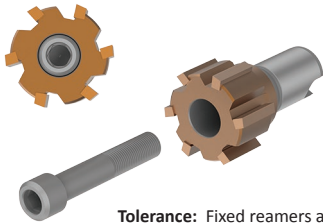


7001 Series Mandrels



Setup Information

Fixed Head Style



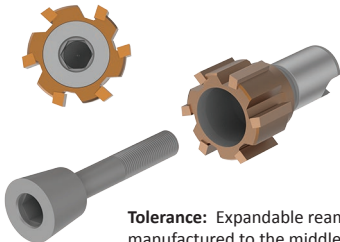
Tolerance: Fixed reamers are manufactured at 2/3 of the tolerance.

Recommended Tightening Torque

Metric		Imperial	
D ₁ Range (mm)	Torque (N-m)	D ₁ Range (inch)	Torque (in-lbs)
11.800 - 14.609	2.5	0.4646 - 0.5751	22.13
14.610 - 17.609	3.5	0.5752 - 0.6932	30.98
17.610 - 21.609	5.0	0.6933 - 0.8507	44.25
21.610 - 26.609	7.0	0.8508 - 1.0475	61.96
26.610 - 32.609	10.0	1.0476 - 1.2838	88.51
32.610 - 40.609	12.0	1.2839 - 1.5987	106.21
40.610 - 50.609	16.0	1.5988 - 1.9924	141.61
50.610 - 60.609	20.0	1.9925 - 2.3862	177.01



Expandable Head Style



Tolerance: Expandable reamers are manufactured to the middle of the tolerance.

Expanding Heads Adjustment

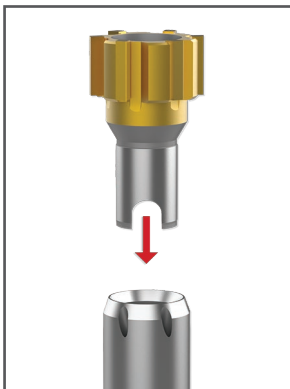
When the size reaches its lower tolerance, the head can be adjusted to compensate for wear to the cutting edges. This operation can be repeated several times until the surface finish of the hole deteriorates to an unacceptable level.

Adjustment Procedure

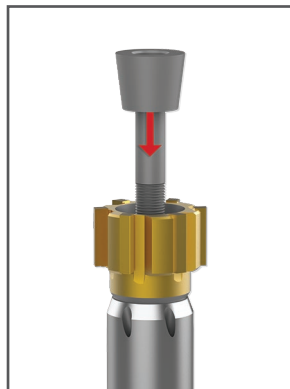
Slowly turn the right-hand threaded screw clockwise while checking the diameter setting of the reamer with a micrometer. When the required diameter is achieved, the tool is ready for use.

Replaceable Head Reamer 7000 Series Assembly

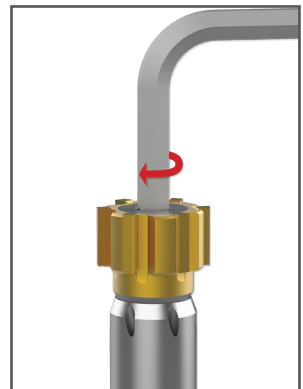
Fixed and Expandable Styles



Step 1:
Insert the replaceable reamer head into the mandrel.

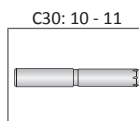
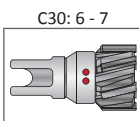
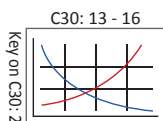


Step 2:
Insert the screw into the reamer head opening to secure it to the mandrel.



Step 3:
Tighten the screw.

NOTE: We recommend lubricating the thread and the conical surface of contact between the reamer head and the screw with antifriction MOLYKOTE® grease.





Recommended Drilling Data | Metric (mm)

7000 SERIES

ISO	Material	Hardness (BHN)	Speed (m/min)		
			Uncoated Carbide	Coated Carbide	Cermet
 C30	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	10 - 20	60 - 80	90 - 300
		180 - 250	7 - 15	40 - 70	80 - 200
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	10 - 20	60 - 80	90 - 300
		180 - 275	7 - 15	40 - 70	80 - 200
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	10 - 20	60 - 80	90 - 300
		180 - 325	7 - 15	40 - 70	80 - 200
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	6 - 10	40 - 60	50 - 60
		180 - 375	4 - 8	40 - 50	60 - 120
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	4 - 8	40 - 50	60 - 120
	Structural Steel A36, A285, A516, etc.	125 - 180	10 - 20	60 - 80	90 - 300
M		180 - 350	7 - 15	40 - 70	80 - 200
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	10 - 20	60 - 80	90 - 300
		200 - 250	7 - 15	40 - 70	80 - 200
K	Stainless Steel 400 Series 416, 420, etc.	135 - 350	6 - 10	40 - 60	50 - 60
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	6 - 10	40 - 60	50 - 60
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	20 - 40	120 - 200	—
		> 200	15 - 30	120 - 200	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	10 - 15	—	90 - 140
N	Copper and Alloys, and Brass	< 500	60 - 200	100 - 200	—
	Bronze, and Bronze Phosphorous	< 180	20 - 40	80 - 160	100 - 300
	Aluminum and Alloys	< 150	20 - 100	—	—
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	4 - 10	30 - 50	—
	Titanium Alloy	140 - 310	4 - 15	30 - 50	—

Formulas

1.	$\text{RPM} = (318.47 \cdot \text{m/min}) / \text{DIA}$ where: RPM = revolutions per minute (rev/min) m/min = speed (m/min) DIA = diameter of drill (mm)	2.	$\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$ where: mm/min = mm per minute (mm/min) RPM = revolutions per minute (rev/min) mm/rev = feed rate (mm/rev)
3.	$\text{m/min} = \text{RPM} \cdot 0.003 \cdot \text{DIA}$ where: m/min = speed (m/min) RPM = revolutions per minute (rev/min) DIA = diameter of drill (mm)		

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Metric (mm)

7000 SERIES

Recommended Feed (mm/rev) by Reamer Diameter

11.80 mm - 21.60 mm		21.61 mm - 39.60 mm		39.61 mm - 80.60 mm	
Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.20 - 0.60	0.50 - 1.00	0.30 - 0.70	0.60 - 1.20	0.40 - 0.80	0.80 - 1.60
0.20 - 0.60	0.50 - 1.00	0.30 - 0.70	0.60 - 1.20	0.40 - 0.80	0.80 - 1.60
0.20 - 0.60	0.50 - 0.60	0.30 - 0.70	0.60 - 1.20	0.40 - 0.80	0.80 - 1.60
0.20 - 0.40	—	0.30 - 0.60	—	0.40 - 0.80	—
0.30 - 0.60	0.40 - 1.00	0.30 - 0.60	0.50 - 1.20	0.30 - 0.60	0.60 - 1.50
0.30 - 0.60	—	0.40 - 1.00	—	0.40 - 1.00	—
0.20 - 0.40	—	0.30 - 0.50	—	0.40 - 0.60	—
0.20 - 0.40	—	0.30 - 0.50	—	0.40 - 0.60	—



C30



Recommended Drilling Data | Imperial (in)

7000 SERIES

ISO	Material	Hardness (BHN)	Speed (SFM)		
			Uncoated Carbide	Coated Carbide	Cermet
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	33 - 66	197 - 262	295 - 984
		180 - 250	23 - 49	131 - 230	262 - 656
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	33 - 66	197 - 262	295 - 984
		180 - 275	23 - 49	131 - 230	262 - 656
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	33 - 66	197 - 262	295 - 984
		180 - 325	23 - 49	131 - 230	262 - 656
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	20 - 33	131 - 197	164 - 197
		180 - 375	13 - 26	131 - 164	197 - 394
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	13 - 26	131 - 164	197 - 394
	Structural Steel A36, A285, A516, etc.	125 - 180	33 - 66	197 - 262	295 - 984
M		180 - 350	23 - 49	131 - 230	262 - 656
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	33 - 66	197 - 262	295 - 984
		200 - 250	23 - 49	131 - 230	262 - 656
K	Stainless Steel 400 Series 416, 420, etc.	135 - 350	20 - 33	131 - 197	164 - 197
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	20 - 33	131 - 197	164 - 197
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	66 - 131	394 - 656	—
		> 200	49 - 98	394 - 656	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	33 - 49	—	295 - 459
N	Copper and Alloys, and Brass	< 500	197 - 656	328 - 656	—
	Bronze, and Bronze Phosphorous	< 180	66 - 131	262 - 525	328 - 984
	Aluminum and Alloys	< 150	66 - 328	—	—
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	13 - 33	98 - 164	—
	Titanium Alloy	140 - 310	13 - 49	98 - 164	—

Formulas

1.	RPM	= (3.82 • SFM) / DIA
	where:	
	RPM	= revolutions per minute (rev/min)
	SFM	= speed (ft/min)
	DIA	= diameter of drill (inch)

2.	IPM	= RPM • IPR
	where:	
	IPM	= inches per minute (in/min)
	RPM	= revolutions per minute (rev/min)
	IPR	= feed rate (in/rev)

3.	SFM	= RPM • 0.262 • DIA
	where:	
	SFM	= speed (ft/min)
	RPM	= revolutions per minute (rev/min)
	DIA	= diameter of drill (inch)

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.

7000 SERIES



C30



Stock Allowance and Coolant | Metric (mm)

7000 SERIES

ISO Material		Hardness (BHN)	Coolant	Recommended Stock (mm) by Reamer Diameter*		
				11.80 mm - 21.60 mm	21.61 mm - 39.60 mm	39.61 mm - 80.60 mm
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180 180 - 250	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180 180 - 275				
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180 180 - 325				
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180 180 - 375				
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450				
	Structural Steel A36, A285, A516, etc.	125 - 180 180 - 350				
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200 200 - 250				
M	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275				
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200 > 200	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Spheroidal Cast Iron (Ferritic)	260 - 320				
	N	Copper and Alloys, and Brass	< 500			
Bronze, and Bronze Phosphorous		< 180	Water Soluble / Cutting Oil			
Aluminum and Alloys		< 150				
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Titanium Alloy	140 - 310				

*Stock value is on diameter.



Stock Allowance and Coolant | Imperial (in)

7000 SERIES							
ISO Material		Hardness (BHN)	Coolant	Recommended Stock (in) by Reamer Diameter*			
				0.4646" - 0.8504"	0.8505" - 1.5590"	1.5591" - 3.1732"	
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
		180 - 250					
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180					
		180 - 275					
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180					
		180 - 325					
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180					
		180 - 375					
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450					
M	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275					
	K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016
			> 200				
Spheroidal Cast Iron (Ferritic)		260 - 320					
N	Copper and Alloys, and Brass	< 500	Water Soluble	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Bronze, and Bronze Phosphorous	< 180	Water Soluble / Cutting Oil				
	Aluminum and Alloys	< 150					
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Titanium Alloy	140 - 310					



*Stock value is on diameter.



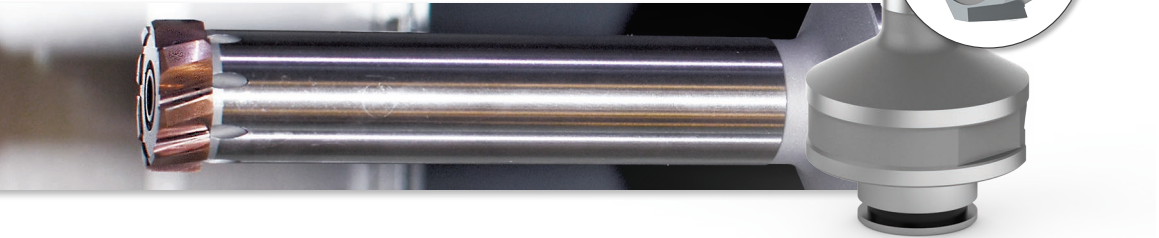
9000 Series Replaceable Head Reamer

Overview

9000 SERIES

11.800 mm - 40.600 mm (0.4646" - 1.5984")

- ▶ Features fixed diameter heads.
- ▶ Heads are precision ground to finish diameter.
- ▶ Quick-change heads require minimal downtime for replacement.
- ▶ Sintered carbide or cermet design provides improved rigidity in difficult applications.
- ▶ H7 tolerance capability.



Lead Time in Workdays

9000 Series	2 - 9 pcs	10 - 49 pcs	50 - 99 pcs	100+ pcs
Coated	20	25	30	35
Uncoated	15	20	25	30

Building Your Complete Tool

You will need all three pieces to complete your replaceable head reamer assembly. The item numbers for the screws and the mandrels are listed on their respective pages. However, there is a guide on the pages where the heads are located. You must follow the guide to build the item number for the reamer head that you need.

The complete mandrel item numbers are listed on their respective pages. You do not need to build the mandrel numbers.

1

Select Your Head

2

Select Your Screw

3

Select Your Mandrel

C30: 23

C30: 25 - 28

C30: 20

C30: 21

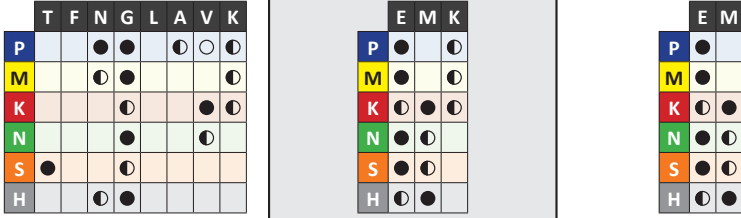
C30: 22



Reamer Heads

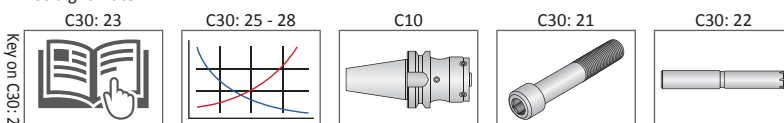
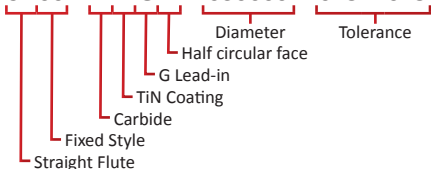
Fixed

Build Your Part No.

1 Series	9400 Series	9600 Series	9700 Series																											
2 Flute Style Your flute style is based on your series selection (above).	Straight Flute 	Helical Flute (Right-Hand) 	Helical Flute (Left-Hand) 																											
3 Carbide Grade and Coating Codes These are the combinations of grades and coatings you can choose from.	 <table border="1"> <thead> <tr> <th></th><th>Uncoated</th><th>TiN</th><th>TiCN</th><th>TiAlN</th><th>Alcrona</th><th>Hardcut</th><th>R Coating</th><th>T Coating</th></tr> </thead> <tbody> <tr> <td>Carbide</td><td>KL</td><td>KN</td><td>KC</td><td>KA</td><td>KK</td><td>KH</td><td>KR</td><td>KT</td></tr> <tr> <td>Cermet</td><td>SV</td><td>SN</td><td>SC</td><td>SA</td><td>SK</td><td>SH</td><td>SR</td><td>ST</td></tr> </tbody> </table>				Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating	Carbide	KL	KN	KC	KA	KK	KH	KR	KT	Cermet	SV	SN	SC	SA	SK	SH	SR	ST
	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating																						
Carbide	KL	KN	KC	KA	KK	KH	KR	KT																						
Cermet	SV	SN	SC	SA	SK	SH	SR	ST																						
4 Lead-in Recommendations																														
5 Optional Add-ons	<table border="1"> <thead> <tr> <th>Add-on</th><th>Indicator</th><th>Description</th></tr> </thead> <tbody> <tr> <td>Half Circular Face</td><td>H</td><td>Provides improved tool life in materials over 25 Rc.</td></tr> <tr> <td>Double Back Taper</td><td>Z</td><td>Provides improved tool life in materials over 25 Rc but should not be used in applications requiring less than a 32 Ra surface finish.</td></tr> </tbody> </table>			Add-on	Indicator	Description	Half Circular Face	H	Provides improved tool life in materials over 25 Rc.	Double Back Taper	Z	Provides improved tool life in materials over 25 Rc but should not be used in applications requiring less than a 32 Ra surface finish.																		
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5 Diameter For the diameter portion of the item number, refer to the following tables:	<table border="1"> <thead> <tr> <th colspan="2">Metric (mm)</th><th colspan="2">Imperial (in)</th></tr> <tr> <th>D₁ Range</th><th>Tolerance (min/max)</th><th>D₁ Range</th><th>Tolerance (min/max)</th></tr> </thead> <tbody> <tr> <td>11.800 - 18.000</td><td>+0 / +0.018</td><td>0.4646 - 0.7086</td><td>+0 / +0.0007</td></tr> <tr> <td>18.001 - 30.000</td><td>+0 / +0.021</td><td>0.7087 - 1.1810</td><td>+0 / +0.0008</td></tr> <tr> <td>30.001 - 40.600</td><td>+0 / +0.025</td><td>1.1811 - 1.5984</td><td>+0 / +0.0010</td></tr> </tbody> </table>			Metric (mm)		Imperial (in)		D ₁ Range	Tolerance (min/max)	D ₁ Range	Tolerance (min/max)	11.800 - 18.000	+0 / +0.018	0.4646 - 0.7086	+0 / +0.0007	18.001 - 30.000	+0 / +0.021	0.7087 - 1.1810	+0 / +0.0008	30.001 - 40.600	+0 / +0.025	1.1811 - 1.5984	+0 / +0.0010							
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● Best ○ Better ○ Good

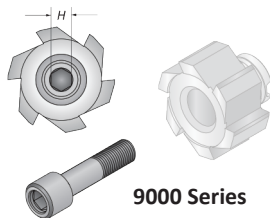
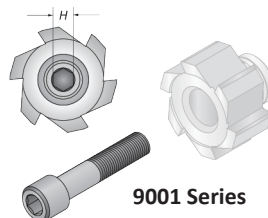
9400 – K N G H – 030600 + 025 – 025





Replaceable Head Screws

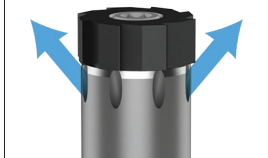
Expandable

**9000 Series****9001 Series****C30**

D_1 Range*		Part No.	H (mm)
Metric (mm)	Imperial (in)		
11.800 - 14.609	0.4646 - 0.5751	9000-VI-001	2.5
14.610 - 17.609	0.5752 - 0.6932	9000-VI-002	3
17.610 - 21.609	0.6933 - 0.8507	9000-VI-003	4
21.610 - 26.609	0.8508 - 1.0475	9000-VI-004	5
26.610 - 32.609	1.0476 - 1.2838	9000-VI-005	6
32.610 - 40.600	1.2839 - 1.5984	9000-VI-006	6

9000 Series Locking Screws

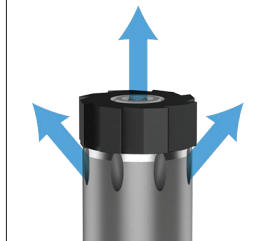
Radial Coolant Only



D_1 Range*		Part No.	H (mm)
Metric (mm)	Imperial (in)		
11.800 - 14.609	0.4646 - 0.5751	9001-VI-001	2.5
14.610 - 17.609	0.5752 - 0.6932	9001-VI-002	3
17.610 - 21.609	0.6933 - 0.8507	9001-VI-003	4
21.610 - 26.609	0.8508 - 1.0475	9001-VI-004	5
26.610 - 32.609	1.0476 - 1.2838	9001-VI-005	6
32.610 - 40.600	1.2839 - 1.5984	9001-VI-006	6

9001 Series Locking Screws

Radial and Central Coolant



C30: 23

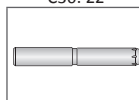
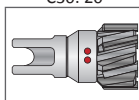
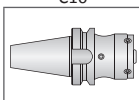
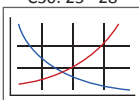
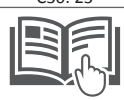
C30: 25 - 28

C10

C30: 20

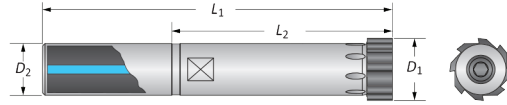
C30: 22

Key on C30: 2



Mandrels

Cylindrical



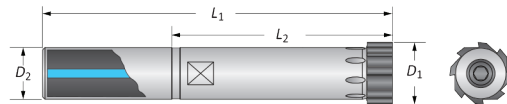
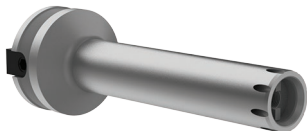
Short

D ₁ Range		Mandrel			No. of Teeth	Part No.
Metric (mm)	Imperial (in)	L ₂ (mm)	L ₁ (mm)	D ₂ (mm)		
11.800 - 14.609	0.4646 - 0.5751	50.00	95.00	12.00	6	9000-MC-001
14.610 - 17.609	0.5752 - 0.6932	65.00	113.00	16.00	6	9000-MC-002
17.610 - 21.609	0.6933 - 0.8507	75.00	125.00	20.00	6	9000-MC-003
21.610 - 26.609	0.8508 - 1.0475	85.00	135.00	20.00	8	9000-MC-004
26.610 - 32.609	1.0476 - 1.2838	105.00	161.00	25.00	8	9000-MC-005
32.610 - 36.609	1.2839 - 1.4412	120.00	180.00	32.00	10	9000-MC-006
36.610 - 40.600	1.4413 - 1.5984	120.00	180.00	32.00	10	9000-MC-007

Long

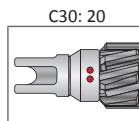
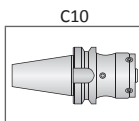
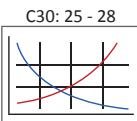
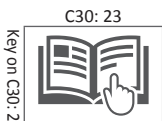
D ₁ Range		Mandrel			No. of Teeth	Part No.
Metric (mm)	Imperial (in)	L ₂ (mm)	L ₁ (mm)	D ₂ (mm)		
11.800 - 14.609	0.4646 - 0.5751	95.00	140.00	12.00	6	9000-ML-001
14.610 - 17.609	0.5752 - 0.6932	105.00	153.00	16.00	6	9000-ML-002
17.610 - 21.609	0.6933 - 0.8507	125.00	175.00	20.00	6	9000-ML-003
21.610 - 26.609	0.8508 - 1.0475	145.00	195.00	20.00	8	9000-ML-004
26.610 - 32.609	1.0476 - 1.2838	165.00	221.00	25.00	8	9000-ML-005
32.610 - 36.609	1.2839 - 1.4412	185.00	245.00	32.00	10	9000-ML-006
36.610 - 40.600	1.4413 - 1.5984	185.00	245.00	32.00	10	9000-ML-007

Modular



Long

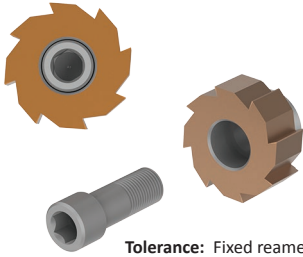
D ₁ Range		Mandrel		No. of Teeth	Part No.
Metric (mm)	Imperial (in)	L ₂ (mm)	D ₂ (mm)		
11.800 - 14.609	0.4646 - 0.5751	65.00	50.00	6	9000-MM-001
14.610 - 17.609	0.5752 - 0.6932	80.00	50.00	6	9000-MM-002
17.610 - 21.609	0.6933 - 0.8507	100.00	50.00	6	9000-MM-003
21.610 - 26.609	0.8508 - 1.0475	110.00	50.00	8	9000-MM-004
26.610 - 32.609	1.0476 - 1.2838	120.00	50.00	8	9000-MM-005
32.610 - 36.609	1.2839 - 1.4412	120.00	50.00	10	9000-MM-006
36.610 - 40.600	1.4413 - 1.5984	120.00	50.00	10	9000-MM-007





Setup Information

Fixed Head Style



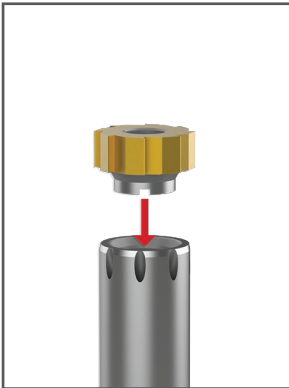
Tolerance: Fixed reamers are manufactured at 2/3 of the tolerance.

Recommended Tightening Torque

Metric		Imperial	
D_1 Range (mm)	Torque (N-m)	D_1 Range (inch)	Torque (in-lbs)
11.800 - 14.609	2.5	0.4646 - 0.5751	22.13
14.610 - 17.609	3.5	0.5752 - 0.6932	30.98
17.610 - 21.609	4.5	0.6933 - 0.8507	39.83
21.610 - 26.609	6.0	0.8508 - 1.0475	53.10
26.610 - 32.609	10.0	1.0476 - 1.2838	88.51
32.610 - 40.600	12.0	1.2839 - 1.5984	106.21

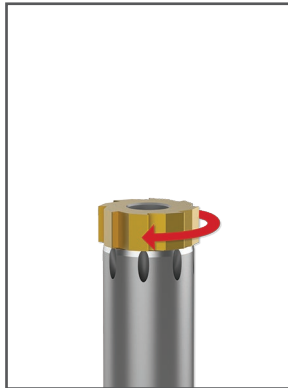
C30

Replaceable Head Reamer 9000 Series Assembly



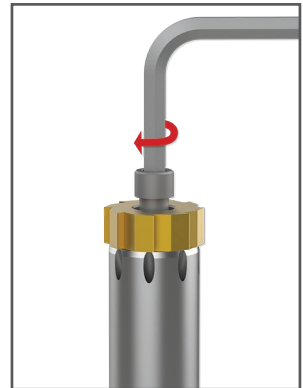
Step 1:

Carefully clean the connecting surfaces and insert the replaceable reamer head into the mandrel.



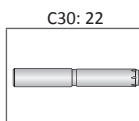
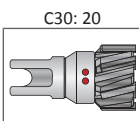
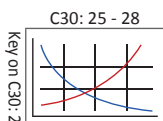
Step 2:

Screw the head in by hand clockwise until it makes contact the mandrel.



Step 3:

Tighten the screw according to the predetermined value in the table.



[illegible]



Recommended Drilling Data | Metric (mm)

9000 SERIES

ISO	Material	Hardness (BHN)	Speed (m/min)		
			Uncoated Carbide	Coated Carbide	Cermet
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	10 - 20	60 - 80	90 - 300
		180 - 250	7 - 15	40 - 70	80 - 200
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	10 - 20	60 - 80	90 - 300
		180 - 275	7 - 15	40 - 70	80 - 200
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	10 - 20	60 - 80	90 - 300
		180 - 325	7 - 15	40 - 70	80 - 200
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	6 - 10	40 - 60	50 - 60
		180 - 375	4 - 8	60 - 120	—
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	4 - 8	60 - 120	—
	Structural Steel A36, A285, A516, etc.	125 - 180	10 - 20	60 - 80	90 - 300
M		180 - 350	7 - 15	40 - 70	80 - 200
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	10 - 20	60 - 80	90 - 300
		200 - 250	7 - 15	40 - 70	80 - 200
	Stainless Steel 400 Series 416, 420, etc.	135 - 350	6 - 10	40 - 60	50 - 60
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	6 - 10	40 - 60	50 - 60
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	20 - 40	120 - 200	—
		> 200	15 - 30	120 - 200	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	10 - 15	—	90 - 140
	Copper and Alloys, and Brass	< 500	60 - 200	100 - 200	-
	Bronze, and Bronze Phosphorous	< 180	20 - 40	80 - 160	100 - 300
N	Aluminum and Alloys	< 150	20 - 100	—	—
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	6 - 10	15 - 30	—
	Titanium Alloy	140 - 310	6 - 10	15 - 30	—

Formulas

1. $\text{RPM} = (318.47 \cdot \text{m/min}) / \text{DIA}$ where: RPM = revolutions per minute (rev/min) m/min = speed (m/min) DIA = diameter of drill (mm)	2. $\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$ where: mm/min = mm per minute (mm/min) RPM = revolutions per minute (rev/min) mm/rev = feed rate (mm/rev)
3. $\text{m/min} = \text{RPM} \cdot 0.003 \cdot \text{DIA}$ where: m/min = speed (m/min) RPM = revolutions per minute (rev/min) DIA = diameter of drill (mm)	

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Metric (mm)

9000 SERIES

Recommended Feed (mm/rev) by Reamer Diameter

11.80 mm - 21.60 mm		21.61 mm - 39.60 mm		39.61 mm - 40.60 mm	
Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.60	0.50 - 1.00	0.30 - 0.80	0.60 - 1.20	0.60 - 1.00	0.70 - 1.50
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.20 - 0.60	0.50 - 1.00	0.30 - 0.70	0.60 - 1.20	0.40 - 0.80	0.80 - 1.60
0.20 - 0.60	0.50 - 1.00	0.30 - 0.70	0.60 - 1.20	0.40 - 0.80	0.80 - 1.60
0.20 - 0.60	0.50 - 1.00	0.30 - 0.70	0.60 - 1.20	0.40 - 0.80	0.80 - 1.60
0.20 - 0.40	—	0.30 - 0.60	—	0.40 - 0.80	—
0.30 - 0.60	0.40 - 1.00	0.30 - 0.60	0.50 - 1.20	0.30 - 0.60	0.60 - 1.50
0.30 - 0.60	—	0.40 - 1.00	—	0.40 - 1.00	—
0.20 - 0.40	—	0.30 - 0.50	—	0.40 - 0.60	—
0.20 - 0.40	—	0.30 - 0.50	—	0.40 - 0.60	—



C30



Recommended Drilling Data | Imperial (in)

9000 SERIES

ISO	Material	Hardness (BHN)	Speed (SFM)		
			Uncoated Carbide	Coated Carbide	Cermet
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	33 - 66	197 - 262	295 - 984
		180 - 250	23 - 49	131 - 230	262 - 656
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	33 - 66	197 - 262	295 - 984
		180 - 275	23 - 49	131 - 230	262 - 656
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	33 - 66	197 - 262	295 - 984
		180 - 325	23 - 49	131 - 230	262 - 656
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	20 - 33	131 - 197	164 - 197
		180 - 375	13 - 26	197 - 394	—
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	13 - 26	197 - 394	—
	Structural Steel A36, A285, A516, etc.	125 - 180	33 - 66	197 - 262	295 - 984
M		180 - 350	23 - 49	131 - 230	262 - 656
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	33 - 66	197 - 262	295 - 984
		200 - 250	23 - 49	131 - 230	262 - 656
	Stainless Steel 400 Series 416, 420, etc.	135 - 350	20 - 33	131 - 197	164 - 197
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	20 - 33	131 - 197	164 - 197
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	66 - 131	394 - 656	—
		> 200	49 - 98	394 - 656	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	33 - 49	—	295 - 459
	Copper and Alloys, and Brass	< 500	197 - 656	328 - 656	—
	Bronze, and Bronze Phosphorous	< 180	66 - 131	262 - 525	328 - 984
N	Aluminum and Alloys	< 150	66 - 328	—	—
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	20 - 33	49 - 98	—
	Titanium Alloy	140 - 310	20 - 33	49 - 98	—

Formulas

1.	RPM	= (3.82 • SFM) / DIA
	where:	
	RPM	= revolutions per minute (rev/min)
	SFM	= speed (ft/min)
	DIA	= diameter of drill (inch)

2.	IPM	= RPM • IPR
	where:	
	IPM	= inches per minute (in/min)
	RPM	= revolutions per minute (rev/min)
	IPR	= feed rate (in/rev)

3.	SFM	= RPM • 0.262 • DIA
	where:	
	SFM	= speed (ft/min)
	RPM	= revolutions per minute (rev/min)
	DIA	= diameter of drill (inch)

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.

9000 SERIES



C30



Stock Allowance and Coolant | Metric (mm)

9000 SERIES

ISO	Material	Hardness (BHN)	Coolant	Recommended Stock (mm) by Reamer Diameter*		
				11.80 mm - 21.60 mm	21.61 mm - 39.60 mm	39.61 mm - 40.60 mm
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180				
		180 - 275				
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180				
		180 - 325				
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180				
		180 - 375				
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450				
	Structural Steel A36, A285, A516, etc.	125 - 180				
M		180 - 350	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200				
		200 - 250				
K	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275				
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
		> 200				
N	Spheroidal Cast Iron (Ferritic)	260 - 320	Water Soluble	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Copper and Alloys, and Brass	< 500				
	Bronze, and Bronze Phosphorous	< 180				
	Aluminum and Alloys	< 150				
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Titanium Alloy	140 - 310				

*Stock value is on diameter.





Stock Allowance and Coolant | Imperial (in)

9000 SERIES							
ISO Material		Hardness (BHN)	Coolant	Recommended Stock (in) by Reamer Diameter*			
				0.4646" - 0.8504"	0.8505" - 1.5590"	1.5591" - 1.5984"	
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
		180 - 250					
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180					
		180 - 275					
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180					
		180 - 325					
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180					
		180 - 375					
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450					
M	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275					
	K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016
			> 200				
Spheroidal Cast Iron (Ferritic)		260 - 320					
N	Copper and Alloys, and Brass	< 500	Water Soluble	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Bronze, and Bronze Phosphorous	< 180	Water Soluble / Cutting Oil				
	Aluminum and Alloys	< 150					
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Titanium Alloy	140 - 310					



*Stock value is on diameter.



5000 Series Replaceable Head Reamer

Overview

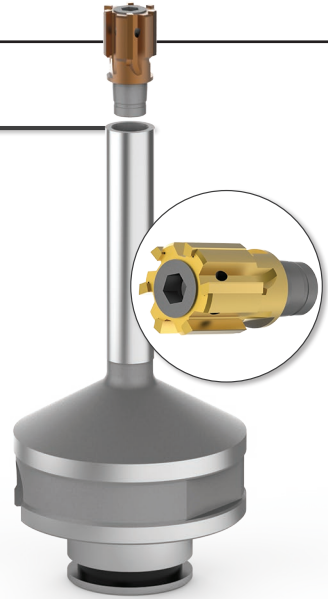
5000 SERIES

9.600 mm - 32.600 mm (0.3780" - 1.2835")

- ▶ Features expandable diameter heads.
- ▶ Heads arrive set to finish diameter and specified tolerance.
- ▶ Twist-lock heads for precision locating of the head to the mandrel.
- ▶ Best TIR repeatability from head to head providing consistent tool wear and maximized tool life.
- ▶ Available with brazed carbide or cermet cutting edges.



C30



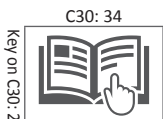
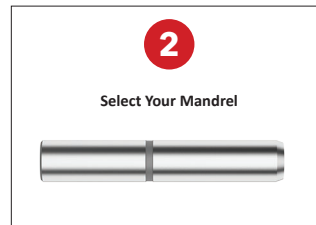
Lead Time in Workdays

5000 Series	2 - 9 pcs	10 - 49 pcs	50 - 99 pcs	100+ pcs
Coated	20	25	30	35
Uncoated	15	20	25	30

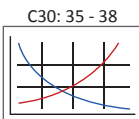
Building Your Complete Tool

You will need both pieces to complete your replaceable head reamer assembly. The complete mandrel item numbers are listed on their respective pages. However, there is a guide on the pages where the heads are located. You must follow the guide to build the item number for the reamer head that you need.

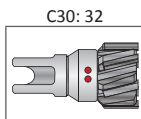
The 5000 series reamers use a twist lock on reamer head, so the screw is included with the head assembly.



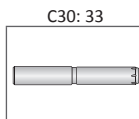
C30: 34



C30: 35 - 38



C30: 32



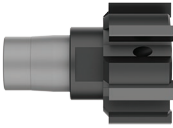
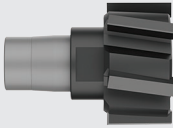
C30: 33



Reamer Heads

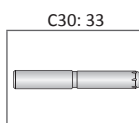
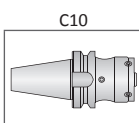
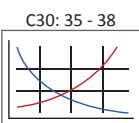
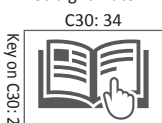
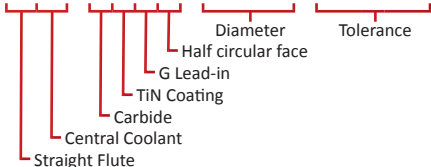
Expandable

Build Your Part No.

1 Series	5400 Series <i>Radial Coolant</i>	5401 Series <i>Central Coolant</i>	5600 Series <i>Central Coolant</i>	5700 Series <i>Radial Coolant</i>																																																																																																																
2 Flute Style Your flute style is based on your series selection (above).	Straight Flute 		Helical Flute (Right-Hand) 																																																																																																																	
3 Carbide Grade and Coating Codes These are the combinations of grades and coatings you can choose from.	 <table border="1"> <thead> <tr> <th></th> <th>Uncoated</th> <th>TiN</th> <th>TiCN</th> <th>TiAlN</th> <th>Alcrona</th> <th>Hardcut</th> <th>R Coating</th> <th>T Coating</th> </tr> </thead> <tbody> <tr> <td>Carbide</td> <td>KL</td> <td>KN</td> <td>KC</td> <td>KA</td> <td>KK</td> <td>KH</td> <td>KR</td> <td>KT</td> </tr> <tr> <td>Cermet</td> <td>SV</td> <td>SN</td> <td>SC</td> <td>SA</td> <td>SK</td> <td>SH</td> <td>SR</td> <td>ST</td> </tr> </tbody> </table>					Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating	Carbide	KL	KN	KC	KA	KK	KH	KR	KT	Cermet	SV	SN	SC	SA	SK	SH	SR	ST																																																																																					
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4 Lead-in Recommendations	<table border="1"> <thead> <tr> <th></th> <th>T</th> <th>F</th> <th>N</th> <th>G</th> <th>L</th> <th>A</th> <th>V</th> <th>K</th> </tr> </thead> <tbody> <tr> <td>P</td> <td></td> <td></td> <td>●</td> <td>●</td> <td></td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>M</td> <td></td> <td></td> <td>○</td> <td>●</td> <td></td> <td></td> <td></td> <td>○</td> </tr> <tr> <td>K</td> <td></td> <td></td> <td></td> <td>○</td> <td></td> <td></td> <td>●</td> <td>○</td> </tr> <tr> <td>N</td> <td></td> <td></td> <td></td> <td>●</td> <td></td> <td></td> <td>○</td> <td></td> </tr> <tr> <td>S</td> <td>●</td> <td></td> <td></td> <td>○</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>H</td> <td></td> <td>○</td> <td>●</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th></th> <th>E</th> <th>M</th> <th>K</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>●</td> <td></td> <td>○</td> </tr> <tr> <td>M</td> <td>●</td> <td></td> <td>○</td> </tr> <tr> <td>K</td> <td>○</td> <td>●</td> <td>○</td> </tr> <tr> <td>N</td> <td>●</td> <td>○</td> <td></td> </tr> <tr> <td>S</td> <td>●</td> <td>○</td> <td></td> </tr> <tr> <td>H</td> <td>○</td> <td>●</td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th></th> <th>E</th> <th>M</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>●</td> <td></td> </tr> <tr> <td>M</td> <td>●</td> <td></td> </tr> <tr> <td>K</td> <td>○</td> <td>●</td> </tr> <tr> <td>N</td> <td>●</td> <td>○</td> </tr> <tr> <td>S</td> <td>●</td> <td>○</td> </tr> <tr> <td>H</td> <td>○</td> <td>●</td> </tr> </tbody> </table>					T	F	N	G	L	A	V	K	P			●	●		○	○	○	M			○	●				○	K				○			●	○	N				●			○		S	●			○					H		○	●							E	M	K	P	●		○	M	●		○	K	○	●	○	N	●	○		S	●	○		H	○	●			E	M	P	●		M	●		K	○	●	N	●	○	S	●	○	H	○	●
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● Best ○ Better ○ Good

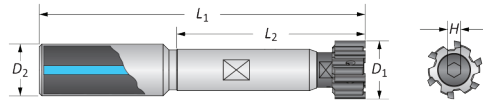
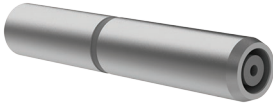
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Mandrels

Cylindrical



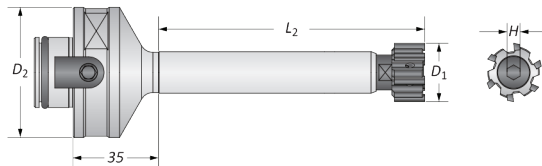
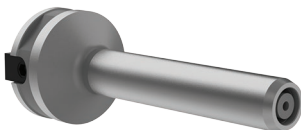
Short

D ₁ Range*		Mandrel			H	No. of Teeth	Part No.	
Metric (mm)	Imperial (in)	L ₂ (mm)	L ₁ (mm)	D ₂ (mm)	(mm)		Mandrel	Wrench
9.600 - 11.609	0.3780 - 0.4570	50.00	95.00	12.00	3	6	5000-MC-001	5000-CH-007
11.610 - 14.609	0.4571 - 0.5751	50.00	95.00	12.00	3.5	6	5000-MC-002	5000-CH-008
14.610 - 17.609	0.5752 - 0.6932	65.00	113.00	16.00	4	6	5000-MC-003	5000-CH-010
17.610 - 21.609	0.6933 - 0.8507	75.00	125.00	20.00	5	6	5000-MC-004	5000-CH-012
21.610 - 26.609	0.8508 - 1.0475	85.00	135.00	20.00	6	6	5000-MC-005	5000-CH-015
26.610 - 32.600	1.0476 - 1.2835	105.00	161.00	25.00	8	6	5000-MC-006	5000-CH-019

Long

D ₁ Range*		Mandrel			H	No. of Teeth	Part No.	
Metric (mm)	Imperial (in)	L ₂ (mm)	L ₁ (mm)	D ₂ (mm)	(mm)		Mandrel	Wrench
9.600 - 11.609	0.3780 - 0.4570	95.00	140.00	12.00	3	6	5000-ML-001	5000-CH-007
11.610 - 14.609	0.4571 - 0.5751	95.00	140.00	12.00	3.5	6	5000-ML-002	5000-CH-008
14.610 - 17.609	0.5752 - 0.6932	105.00	153.00	16.00	4	6	5000-ML-003	5000-CH-010
17.610 - 21.609	0.6933 - 0.8507	125.00	175.00	20.00	5	6	5000-ML-004	5000-CH-012
21.610 - 26.609	0.8508 - 1.0475	145.00	195.00	20.00	6	6	5000-ML-005	5000-CH-015
26.610 - 32.600	1.0476 - 1.2835	165.00	221.00	25.00	8	6	5000-ML-006	5000-CH-019

Modular



Standard

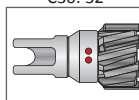
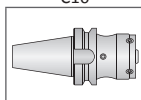
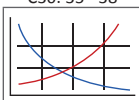
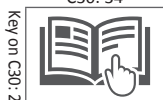
D ₁ Range*		Mandrel	H	No. of Teeth	Part No.	
Metric (mm)	Imperial (in)	L ₂ (mm)	(mm)		Mandrel	Wrench
9.600 - 11.609	0.3780 - 0.4570	65.00	3	6	5000-MM-001	5000-CH-007
11.610 - 14.609	0.4571 - 0.5751	65.00	3.5	6	5000-MM-002	5000-CH-008
14.610 - 17.609	0.5752 - 0.6932	80.00	4	6	5000-MM-003	5000-CH-010
17.610 - 21.609	0.6933 - 0.8507	100.00	5	6	5000-MM-004	5000-CH-012
21.610 - 26.609	0.8508 - 1.0475	110.00	6	6	5000-MM-005	5000-CH-015
26.610 - 32.600	1.0476 - 1.2835	120.00	8	6	5000-MM-006	5000-CH-019

C30: 34

C30: 35 - 38

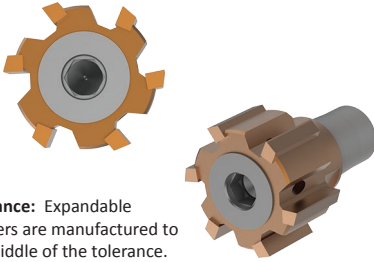
C10

C30: 32



Setup Information

Expandable Head Style



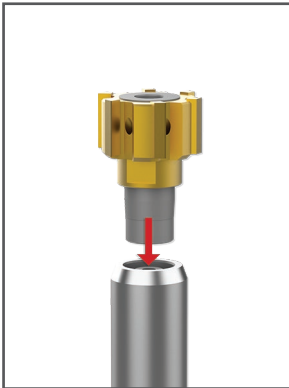
Tolerance: Expandable reamers are manufactured to the middle of the tolerance.

Expanding Heads Adjustment

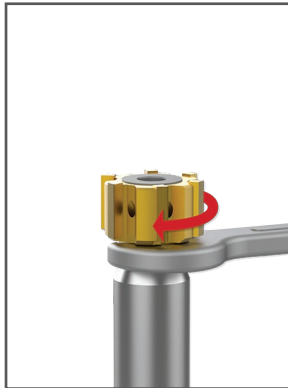
When the size reaches its lower tolerance, the head can be adjusted to compensate for wear to the cutting edges. This operation can be repeated several times until the surface finish of the hole deteriorates to an unacceptable level.



Replaceable Head Reamer 5000 Series Assembly



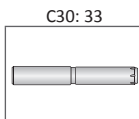
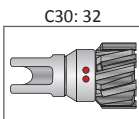
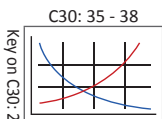
Step 1:
Carefully clean the connecting surfaces and insert the replaceable reamer head into the mandrel. Screw it in by hand clockwise.



Step 2:
Tighten the replaceable head down with a wrench until the flat surface of the head is in complete contact with the mandrel.



Step 3:
Compensate for wear by adjusting the front expansion screw while using a wrench to keep the head still.





Recommended Drilling Data | Metric (mm)

5000 SERIES

ISO	Material	Hardness (BHN)	Speed (m/min)			
			Uncoated Carbide	Coated Carbide	Coated Cermets	Uncoated Cermets
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	15 - 20	60 - 80	120 - 200	120 - 200
		180 - 250	20 - 40	80 - 100	120 - 200	120 - 200
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	15 - 20	60 - 80	120 - 200	120 - 200
		180 - 275	20 - 40	80 - 100	120 - 200	120 - 200
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	15 - 20	60 - 80	120 - 200	120 - 200
		180 - 325	20 - 40	80 - 100	120 - 200	120 - 200
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	10 - 15	60 - 80	—	100 - 150
		180 - 375	8 - 10	60 - 80	—	—
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	8 - 10	60 - 80	—	—
	Structural Steel A36, A285, A516, etc.	125 - 180	15 - 20	60 - 80	120 - 200	120 - 200
M		180 - 350	20 - 40	80 - 100	120 - 200	120 - 200
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	15 - 20	60 - 80	120 - 200	120 - 200
		200 - 250	20 - 40	80 - 100	120 - 200	120 - 200
	Stainless Steel 400 Series 416, 420, etc.	135 - 350	8 - 10	—	—	50 - 60
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	8 - 10	30 - 40	—	—
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	20 - 30	150 - 200	—	—
		> 200	15 - 20	—	100 - 200	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	15 - 20	—	100 - 120	—
	Copper and Alloys, and Brass	< 500	80 - 100	100 - 200	—	—
	Bronze, and Bronze Phosphorous	< 180	40 - 80	80 - 160	—	150 - 200
S	Aluminum and Alloys	< 150	100 - 300	100 - 300	100 - 300	100 - 300
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	5 - 7	20 - 30	—	—
	Titanium Alloy	140 - 310	10 - 15	—	—	—

Formulas

1. $RPM = (318.47 \cdot m/min) / DIA$ where: RPM = revolutions per minute (rev/min) m/min = speed (m/min) DIA = diameter of drill (mm)	2. $mm/min = RPM \cdot mm/rev$ where: mm/min = mm per minute (mm/min) RPM = revolutions per minute (rev/min) mm/rev = feed rate (mm/rev)
3. $m/min = RPM \cdot 0.003 \cdot DIA$ where: m/min = speed (m/min) RPM = revolutions per minute (rev/min) DIA = diameter of drill (mm)	

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Metric (mm)

5000 SERIES

Recommended Feed (mm/rev) by Reamer Diameter

9.61 mm - 17.60 mm		17.61 mm - 26.60 mm		26.61 mm - 32.60 mm	
Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.30 - 0.60	0.50 - 1.00	0.30 - 0.60	0.60 - 1.20	0.40 - 0.80	0.60 - 1.20
0.30 - 0.60	0.50 - 1.00	0.30 - 0.60	0.60 - 1.20	0.40 - 0.80	0.60 - 1.20
0.30 - 0.60	0.50 - 1.00	0.30 - 0.60	0.60 - 1.20	0.40 - 0.80	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.50 - 0.90	0.60 - 1.20
0.30 - 0.60	0.50 - 1.00	0.30 - 0.60	0.60 - 1.20	0.40 - 0.80	0.60 - 1.20
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00
0.25 - 0.50	0.30 - 0.60	0.30 - 0.60	0.40 - 0.80	0.40 - 0.70	0.50 - 1.00



C30



Recommended Drilling Data | Imperial (in)

5000 SERIES

ISO	Material	Hardness (BHN)	Speed (SFM)			
			Uncoated Carbide	Coated Carbide	Coated Cermets	Uncoated Cermets
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	49 - 66	197 - 262	394 - 656	394 - 656
		180 - 250	66 - 131	262 - 328	394 - 656	394 - 656
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	49 - 66	197 - 262	394 - 656	394 - 656
		180 - 275	66 - 131	262 - 328	394 - 656	394 - 656
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	49 - 66	197 - 262	394 - 656	394 - 656
		180 - 325	66 - 131	262 - 328	394 - 656	394 - 656
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	33 - 49	197 - 262	—	328 - 492
		180 - 375	26 - 33	197 - 262	—	—
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	26 - 33	197 - 262	—	—
	Structural Steel A36, A285, A516, etc.	125 - 180	49 - 66	197 - 262	394 - 656	394 - 656
M		180 - 350	66 - 131	262 - 328	394 - 656	394 - 656
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	49 - 66	197 - 262	394 - 656	394 - 656
		200 - 250	66 - 131	262 - 328	394 - 656	394 - 656
	Stainless Steel 400 Series 416, 420, etc.	135 - 350	26 - 33	—	—	164 - 197
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	26 - 33	98 - 131	—	—
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	66 - 98	492 - 656	—	—
		> 200	49 - 66	—	328 - 656	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	49 - 66	—	328 - 394	—
	Copper and Alloys, and Brass	< 500	262 - 328	328 - 656	—	—
	Bronze, and Bronze Phosphorous	< 180	131 - 262	262 - 525	—	492 - 656
N	Aluminum and Alloys	< 150	328 - 984	328 - 984	328 - 984	328 - 984
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	16 - 23	66 - 98	—	—
	Titanium Alloy	140 - 310	33 - 49	—	—	—

Formulas

1.	RPM	= (3.82 • SFM) / DIA
	where:	
	RPM	= revolutions per minute (rev/min)
	SFM	= speed (ft/min)
	DIA	= diameter of drill (inch)

2.	IPM	= RPM • IPR
	where:	
	IPM	= inches per minute (in/min)
	RPM	= revolutions per minute (rev/min)
	IPR	= feed rate (in/rev)

3.	SFM	= RPM • 0.262 • DIA
	where:	
	SFM	= speed (ft/min)
	RPM	= revolutions per minute (rev/min)
	DIA	= diameter of drill (inch)

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Imperial (in)

5000 SERIES

Recommended Feed (IPR) by Reamer Diameter					
0.3780" - 0.6932"		0.6933" - 1.0475"		1.0476" - 1.2835"	
Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.010 - 0.020	0.012 - 0.024	0.012 - 0.024	0.016 - 0.031	0.016 - 0.028	0.020 - 0.039
0.010 - 0.020	0.012 - 0.024	0.012 - 0.024	0.016 - 0.031	0.016 - 0.028	0.020 - 0.039
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.010 - 0.020	0.012 - 0.024	0.012 - 0.024	0.016 - 0.031	0.016 - 0.028	0.020 - 0.039
0.010 - 0.020	0.012 - 0.024	0.012 - 0.024	0.016 - 0.031	0.016 - 0.028	0.020 - 0.039
0.012 - 0.024	0.020 - 0.039	0.012 - 0.024	0.024 - 0.047	0.016 - 0.031	0.024 - 0.047
0.012 - 0.024	0.020 - 0.039	0.012 - 0.024	0.024 - 0.047	0.016 - 0.031	0.024 - 0.047
0.012 - 0.024	0.020 - 0.039	0.012 - 0.024	0.024 - 0.047	0.016 - 0.031	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.020 - 0.035	0.024 - 0.047
0.012 - 0.024	0.020 - 0.039	0.012 - 0.024	0.024 - 0.047	0.016 - 0.031	0.024 - 0.047
0.010 - 0.020	0.012 - 0.024	0.012 - 0.024	0.016 - 0.031	0.016 - 0.028	0.020 - 0.039
0.010 - 0.020	0.012 - 0.024	0.012 - 0.024	0.016 - 0.031	0.016 - 0.028	0.020 - 0.039



C30



Stock Allowance and Coolant | Metric (mm)

5000 SERIES

ISO	Material	Hardness (BHN)	Coolant	Recommended Stock (mm) by Reamer Diameter*		
				9.61 mm - 17.60 mm	17.61 mm - 26.60 mm	26.61 mm - 32.60 mm
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180				
		180 - 275				
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180				
		180 - 325				
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180				
		180 - 375				
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450				
	Structural Steel A36, A285, A516, etc.	125 - 180				
M		180 - 350	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200				
		200 - 250				
K	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275				
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
		> 200				
N	Spheroidal Cast Iron (Ferritic)	260 - 320	Water Soluble	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Copper and Alloys, and Brass	< 500				
	Bronze, and Bronze Phosphorous	< 180				
	Aluminum and Alloys	< 150				
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.15 - 0.25	0.20 - 0.40	0.30 - 0.40
	Titanium Alloy	140 - 310				

*Stock value is on diameter.



C30



Stock Allowance and Coolant | Imperial (in)

5000 SERIES							
ISO Material		Hardness (BHN)	Coolant	Recommended Stock (in) by Reamer Diameter*			
				0.3780" - 0.6932"	0.6933" - 1.0475"	1.5591" - 1.5984"	
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
		180 - 250					
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180					
		180 - 275					
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180					
		180 - 325					
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180					
		180 - 375					
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450					
M	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275					
	K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016
			> 200				
Spheroidal Cast Iron (Ferritic)		260 - 320					
N	Copper and Alloys, and Brass	< 500	Water Soluble	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Bronze, and Bronze Phosphorous	< 180	Water Soluble / Cutting Oil				
	Aluminum and Alloys	< 150					
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.006 - 0.010	0.008 - 0.016	0.012 - 0.016	
	Titanium Alloy	140 - 310					



*Stock value is on diameter.

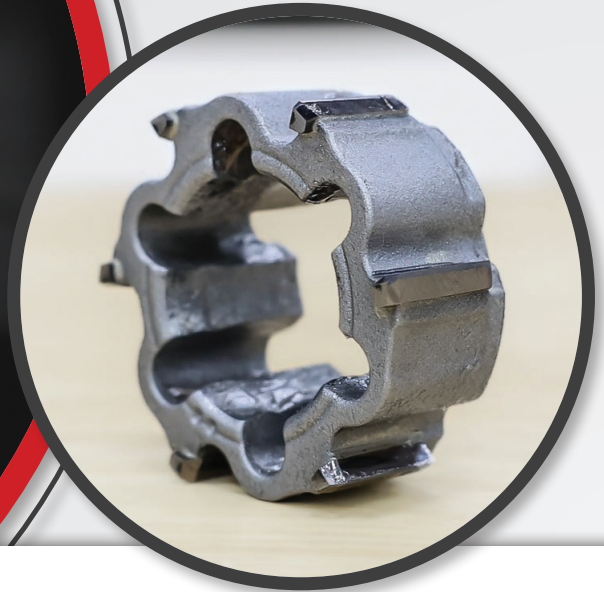
SECTION

C40-CRR

Cutting Ring Reamers

CUTTING RING REAMERS

32.600 mm - 200.600 mm
(1.2835" - 7.8976")



Hole roundness without compromise

The cutting ring style reamers are ideal for large diameter holes because they eliminate the need to replace a large solid reamer, reducing waste. The unique design allows for diameter expansion to accommodate for cutting edge wear. The cutting ring style reamer can also be repaired to new condition, which extends the life of the investment. ALVAN reamers hold tight tolerances while improving the surface finish of the hole.

- ▶ Multiple cutting edges, which are set asymmetrically to guarantee almost perfect hole geometry.
- ▶ Expandable to maintain size tolerance, which is particularly useful when repairing the cutting edges.
- ▶ Asymmetrically positioned cutting edges to assure the best roundness of the hole.

Applicable Industries

-  Aerospace
-  Agriculture
-  Automotive
-  Defense
-  General Production
-  Heavy Equipment
-  Medical
-  Oil and Gas
-  Renewable Energy/ Energy
-  Tool, Mold, and Die

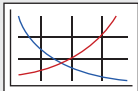
S.C.A.M.I.®

Reference Icons

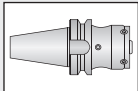
The following icons will appear throughout the catalog to help you navigate between products.



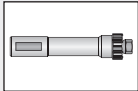
Setup / Assembly Information
Detailed instructions and information regarding the corresponding part(s).



Recommended Cutting Data
Speed and feed recommendations for optimum and safe drilling.



Modular Connection Shanks
Refers to Cerit modular shanks that can connect with reamers.



Cutting Ring Mandrels
Refers to the reamer mandrel options that connect with the cutting ring.



Cutting Rings
Refers to the available cutting ring options.



Coolant-Through Option
Indicates that the product is coolant through.

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	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.	

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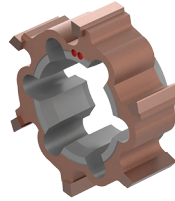


Introduction Information

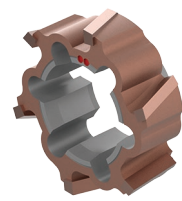
Product Overview

Cutting Ring Reamer Features

- Diameter range: 17.600 mm - 200.600 mm (0.6929" - 7.8976").
- Available with straight or left-hand helical flutes.
- Expands to accommodate for wear.
- Mandrels are available for both through holes or blind holes.
- Workday lead time 20 - 25 days.
- Available for recondition.



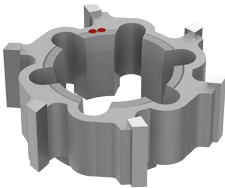
Straight Flute



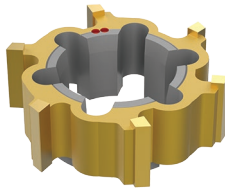
Left-Hand Helical Flute



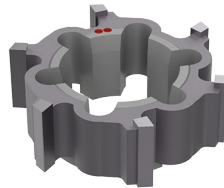
C40



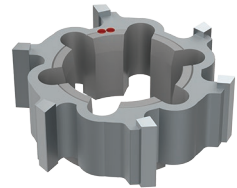
Uncoated



TiN Coated



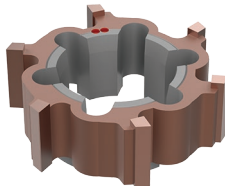
TiAlN Coated



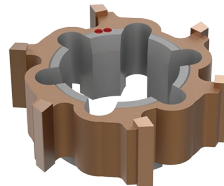
TiCN Coated



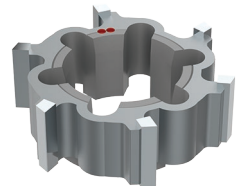
Alcrona Coated



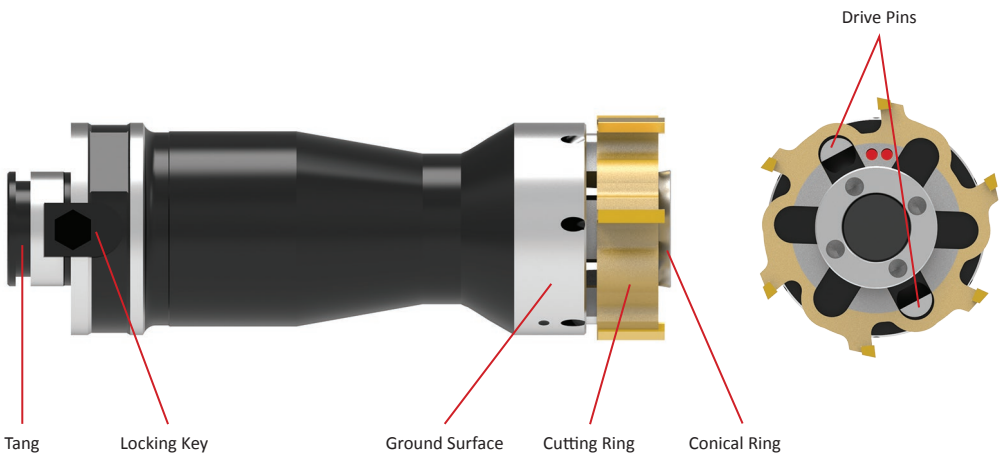
Hardcut Coated



R Coated



T Coated



Introduction Information

Product Nomenclature

Cutting Rings

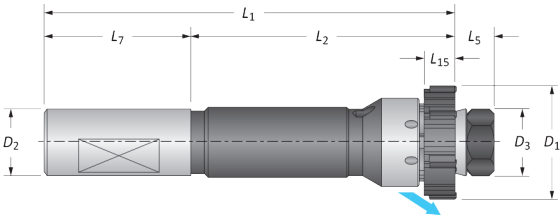
Diameter Unit	2	ANC-ST			F	-	20000	+	003	-	003
		Substrate and Coating			Lead-in		Diameter		Tolerance*		
Blank = Metric (mm) I = Imperial (in)			Carbide	Cermet	E		XXXXX = X.XXXXX" XX.XXX mm		4 decimal places = inch tolerance 3 decimal places = mm tolerance		
		Uncoated	000-KT	AVC-ST	M						
		TiN	TIN-KT	ANC-ST	A						
		TiCN	TIC-KT	ACC-ST	F						
		TiAlN	TIA-KT	AAC-ST	G						
		Alcrona	TLK-KT	ALK-ST	L						
		Hardcut	TLH-KT	ALH-ST	N						
		R coated	TLR-KT	ALR-ST	T						
		T coated	TLT-KT	ALT-ST	V						
					K						

*The total tolerance capable is 0.005 mm (0.0002").
NOTE: If diameter and tolerance are specified in inch units, put an "I" at the beginning of the item number.



Reference Key

Symbol	Attribute
D ₁	Reamer diameter
D ₂	Shank diameter
D ₃	Maximum conical ring diameter
L ₁	Overall length
L ₂	Length of cut
L ₅	Maximum overhang
L ₇	Shank length
L ₁₅	Flute length



Building Your Complete Tool

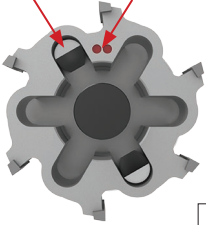
You will need both pieces to complete your ring style reamer assembly. There is a guide on the page where the rings are located. You must follow the guide to build the item number for the reamer ring that you need.
However, the complete mandrel item numbers are listed on their respective pages. You do not need to build the mandrel numbers.





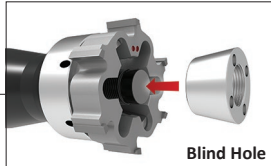
Setup Information

Drive Pin
(11:00 position) Dimples
(12:00 position)

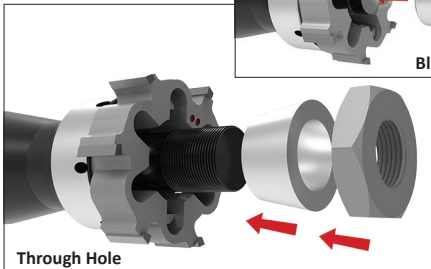


Step 1:

With the drive pins assembled, insert the cutting ring onto the mandrel. Make sure the dimples are at the 12:00 position with the drive pin at the 11:00 position.



Blind Hole



Through Hole



Adjustment Procedure

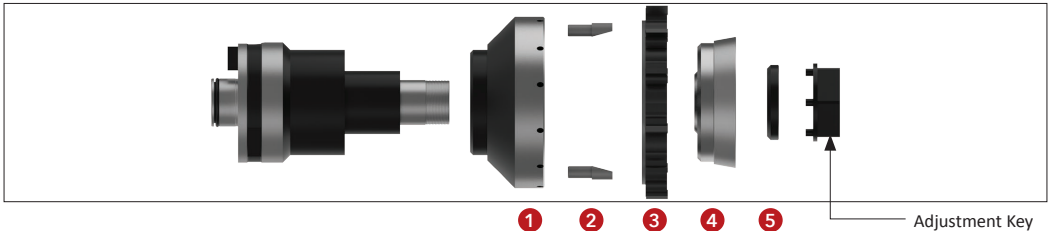
1. Turn the conical ring slowly using an adjustment key (left-hand thread). Adjustment keys are supplied with reamers from diameter 17.600 mm to 40.599 mm.
2. Check the diameter setting of the cutting ring with a micrometer.
3. When the required diameter is achieved, unscrew the conical ring until there is a click and the drive pins are in traction in the opposite direction to the cutting action of the reamer. The reamer is ready for use.

Step 2:

Insert the conical ring. Tighten the lock nut to set the desired reamer size (left-hand thread). Then loosen the lock nut slightly until it "clicks" against the drive wall.

NOTE: We recommend lubricating the thread and the conical surface of contact between the cutting ring and the conical ring with antifriction MOLYKOTE® grease.

For Diameter Range: 100.600 mm - 200.600 mm



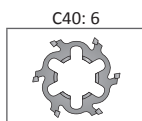
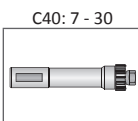
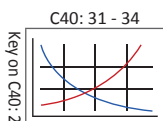
Assembly

1. With the drive pins (2) assembled, mount the flange (1) onto the mandrel. Assemble the cutting ring (3) so the slot on the left side of the dimple is mounted onto the drive pins (2). Insert the conical ring (4).
2. Screw the ring nut (5) onto the mandrel and tighten manually so the conical ring (4) makes contact with the cutting ring (3). The thread is left-handed.

NOTE: We recommend lubricating the thread and the conical surface of contact between the cutting ring and the conical ring with antifriction MOLYKOTE® grease.

Adjustment Procedure

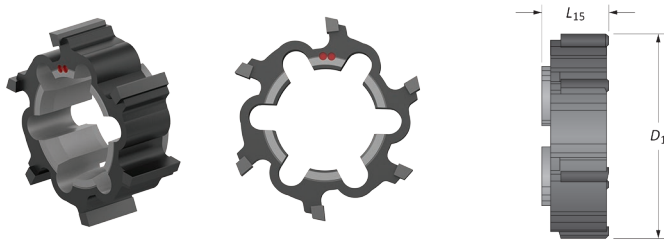
1. Turn the ring nut (5) slowly using a pin spanner.
2. Check the diameter setting of the cutting ring with a micrometer. Make sure the drive pins (2) are in traction and in the opposite direction of the cutting action of the reamer.
3. When the required diameter is achieved, the tool is ready to use.



= Metric (mm)
 = Imperial (in)

Cutting Rings

17.600 mm - 200.600 mm (0.6929" - 7.8976")



Metric (mm)

	D_1 Range	L_{15}		Number of Teeth
	Metric (mm)	Straight Flute	Helical Flute	
m	32.600 - 45.599	16.00	16.00	6
	45.600 - 79.599	18.50	18.50	6
	79.600 - 100.599	18.50	18.50	8
	100.600 - 110.599	18.50	18.50	10
	110.600 - 200.600	18.50	18.50	12



C40

Imperial (in)

	D_1 Range	L_{15}		Number of Teeth
	Imperial (inch)	Straight Flute	Helical Flute	
i	1.2835 - 1.7952	0.630	0.630	6
	1.7953 - 3.1338	0.728	0.728	6
	3.1339 - 3.9606	0.728	0.728	8
	3.9607 - 4.3543	0.728	0.728	10
	4.3544 - 7.8976	0.728	0.728	12

2ANC-ST F - 055298 + 003 - 003

Diagram showing the breakdown of the code: 2ANC-ST (Cermet with TIN Coating), F (F Lead-in), 055298 (Diameter), and + 003 - 003 (Tolerance).

Coating and Substrate Codes

Grade	Uncoated	TiN	TiCN	TiAlN	Alcrona	Hardcut	R Coating	T Coating
Carbide	2000-KT	2TIN-KT	2TIC-KT	2TIA-KT	2TLK-KT	2TLH-KT	2TLR-KT	2TLT-KT
Cermet	2AVC-ST	2ANC-ST	2ACC-ST	2AAC-ST	2ALK-ST	2ALH-ST	2ALR-ST	2ALT-ST

Reamer Lead-In

	Straight Flute								Left-hand helical	
	T	F	N	G	L	A	V	K	E	M
P			●	●		○	○	○	●	
M			○	●				○	●	
K				○			●	○	○	●
N				●			○		●	○
S	●			○					●	○
H			○	●					○	●

● Best ○ Better ○ Good

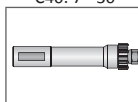
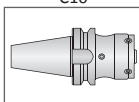
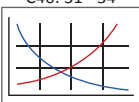
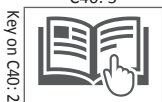
NOTE: For more detailed descriptions of cutting material, lead-ins, and coatings, please see pg. xv - xvi.

C40: 5

C40: 31 - 34

C10

C40: 7 - 30



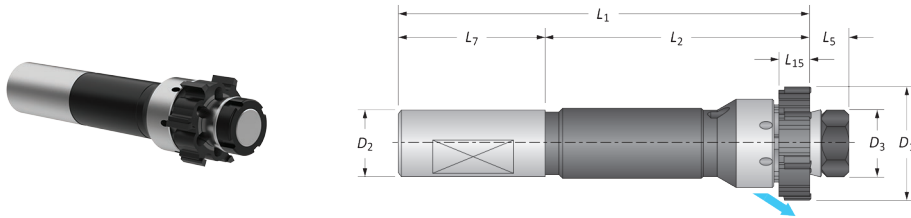
m = Metric (mm)

i = Imperial (in)



4550 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



Series	4550	Shank Type	Cylindrical	Application	Through Holes	Coolant	Radial
--------	------	------------	-------------	-------------	---------------	---------	--------

Metric (mm)

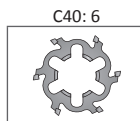
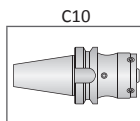
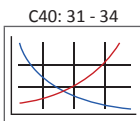
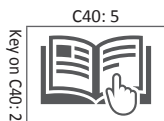
D ₁ Range	Mandrel					Shank		Teeth	Part No. (Complete Mandrel [^])	
	D ₃	L ₅	L ₁₅	L ₂	L ₁	L ₇	D ₂		With Flat	Without Flat
17.600 - 21.599	12.0	11.0	11.0	81	142.0	50	20	6	4550-MC-010*	4550A-MC-010*
21.600 - 25.599	12.0	11.0	12.0	81	142.0	50	20	6	4550-MC-020*	4550A-MC-020*
25.600 - 32.599	15.6	11.0	14.0	102	163.0	50	20	6	4550-MC-030*	4550A-MC-030*
32.600 - 40.599	22.0	14.0	16.0	102	172.0	56	25	6	4550-MC-040	4550A-MC-040
40.600 - 45.599	25.4	15.0	16.0	102	173.0	56	25	6	4550-MC-050	4550A-MC-050
45.600 - 49.599	30.0	20.5	18.5	105	185.5	60	32	6	4550-MC-060	4550A-MC-060
49.600 - 60.599	30.0	20.5	18.5	105	185.5	60	32	6	4550-MC-070	4550A-MC-070
60.600 - 70.599	40.0	24.5	18.5	105	189.5	60	32	6	4550-MC-080	4550A-MC-080
70.600 - 79.599	40.0	24.5	18.5	105	189.5	60	32	6	4550-MC-090	4550A-MC-090
79.600 - 90.599	56.0	28.5	18.5	105	203.5	70	40	8	4550-MC-100	4550A-MC-100
90.600 - 100.599	56.0	28.5	18.5	105	203.5	70	40	8	4550-MC-110	4550A-MC-110

Imperial (in)

D ₁ Range	Mandrel					Shank		Teeth	Part No. (Complete Mandrel [^])	
	D ₃	L ₅	L ₁₅	L ₂	L ₁	L ₇	D ₂		With Flat	Without Flat
0.6929 - 0.8504	0.472	0.433	0.433	3.189	5.591	1.969	0.750	6	94550-MC-010*	94550A-MC-010*
0.8505 - 1.0078	0.472	0.433	0.472	3.189	5.591	1.969	0.750	6	94550-MC-020*	94550A-MC-020*
1.0079 - 1.2834	0.614	0.433	0.551	4.016	6.417	1.969	0.750	6	94550-MC-030*	94550A-MC-030*
1.2835 - 1.5984	0.866	0.551	0.630	4.016	6.772	2.205	1.000	6	94550-MC-040	94550A-MC-040
1.5985 - 1.7952	1.000	0.591	0.630	4.016	6.811	2.205	1.000	6	94550-MC-050	94550A-MC-050
1.7953 - 1.9527	1.181	0.807	0.728	4.134	7.303	2.362	1.250	6	94550-MC-060	94550A-MC-060
1.9528 - 2.3858	1.181	0.807	0.728	4.134	7.303	2.362	1.250	6	94550-MC-070	94550A-MC-070
2.3859 - 2.7795	1.575	0.965	0.728	4.134	7.461	2.362	1.250	6	94550-MC-080	94550A-MC-080
2.7796 - 3.1338	1.575	0.965	0.728	4.134	7.461	2.362	1.250	6	94550-MC-090	94550A-MC-090
3.1339 - 3.5669	2.205	1.122	0.728	4.134	8.012	2.756	1.500	8	94550-MC-100	94550A-MC-100
3.5670 - 3.9606	2.205	1.122	0.728	4.134	8.012	2.756	1.500	8	94550-MC-110	94550A-MC-110

[^]Complete mandrel does not include cutting ring.

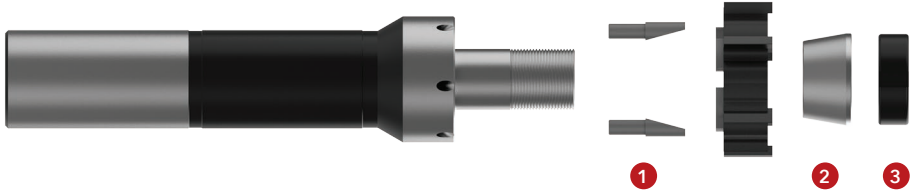
* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.





4550 Series Mandrels

Spare Parts



Metric (mm)

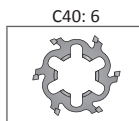
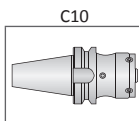
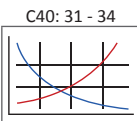
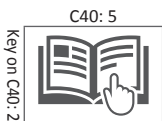
Part No. (Complete Mandrel [^])		Spare Parts				
With Flat	Without Flat	1. Drive Pins	Number of Drive Pins	2. Conical Ring	3. Nut	Wrench Size (mm)
4550-MC-010	4550A-MC-010	2000-CO-010	3	2010-AC-010	2000-DA-010	10
4550-MC-020	4550A-MC-020	2000-CO-020	3	2010-AC-010	2000-DA-010	10
4550-MC-030	4550A-MC-030	2000-CO-030	3	2010-AC-020	2000-DA-020	13
4550-MC-040	4550A-MC-040	2000-CO-040	2	2010-AC-030	2000-DA-060	19
4550-MC-050	4550A-MC-050	2000-CO-060	2	2010-AC-040	2000-DA-090	22
4550-MC-060	4550A-MC-060	2000-CO-060	2	2010-AC-050	2000-GH-880	30 ♦
4550-MC-070	4550A-MC-070	2000-CO-070	2	2010-AC-050	2000-GH-880	30 ♦
4550-MC-080	4550A-MC-080	2000-CO-080	2	2010-AC-060	2000-GH-900	40 ♦
4550-MC-090	4550A-MC-090	2000-CO-090	2	2010-AC-060	2000-GH-900	40 ♦
4550-MC-100	4550A-MC-100	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦
4550-MC-110	4550A-MC-110	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦

Imperial (in)

Part No. (Complete Mandrel [^])		Spare Parts				
With Flat	Without Flat	1. Drive Pins	Number of Drive Pins	2. Conical Ring	3. Nut	Wrench Size (mm)
94550-MC-010	94550A-MC-010	2000-CO-010	3	2010-AC-010	2000-DA-010	10
94550-MC-020	94550A-MC-020	2000-CO-020	3	2010-AC-010	2000-DA-010	10
94550-MC-030	94550A-MC-030	2000-CO-030	3	2010-AC-020	2000-DA-020	13
94550-MC-040	94550A-MC-040	2000-CO-040	2	2010-AC-030	2000-DA-060	19
94550-MC-050	94550A-MC-050	2000-CO-060	2	2010-AC-040	2000-DA-090	22
94550-MC-060	94550A-MC-060	2000-CO-060	2	2010-AC-050	2000-GH-880	30 ♦
94550-MC-070	94550A-MC-070	2000-CO-070	2	2010-AC-050	2000-GH-880	30 ♦
94550-MC-080	94550A-MC-080	2000-CO-080	2	2010-AC-060	2000-GH-900	40 ♦
94550-MC-090	94550A-MC-090	2000-CO-090	2	2010-AC-060	2000-GH-900	40 ♦
94550-MC-100	94550A-MC-100	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦
94550-MC-110	94550A-MC-110	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦

[^]Complete mandrel does not include cutting ring.

♦ Spanner wrench.



Key on C40: 2

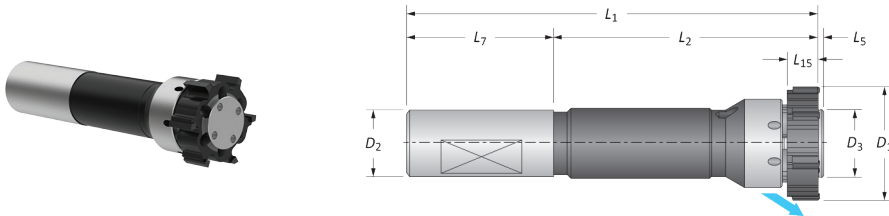
Ⓜ = Metric (mm)

Ⓢ = Imperial (in)



4555 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



Series	4555	Shank Type	Cylindrical	Application	Blind Holes	Coolant	Radial
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Metric (mm)

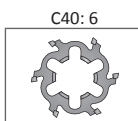
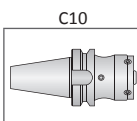
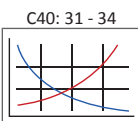
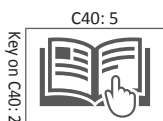
D ₁ Range	Mandrel					Shank		Teeth	Part No. (Complete Mandrel [^])	
	D ₃	L ₅	L ₁₅	L ₂	L ₁	L ₇	D ₂		With Flat	Without Flat
17.600 - 21.599	11.2	1.0	11.0	81	132.0	50	20	6	4555-MC-010*	4555A-MC-010*
21.600 - 25.599	11.2	1.0	12.0	81	132.0	50	20	6	4555-MC-020*	4555A-MC-020*
25.600 - 29.599	15.1	1.0	14.0	102	153.0	50	20	6	4555-MC-030*	4555A-MC-030*
29.600 - 32.599	15.1	1.0	14.0	102	153.0	50	20	6	4555-MC-035*	4555A-MC-035*
32.600 - 36.599	20.3	1.0	16.0	102	159.0	56	25	6	4555-MC-040	4555A-MC-040
36.600 - 40.599	20.3	1.0	16.0	102	159.0	56	25	6	4555-MC-045	4555A-MC-045
40.600 - 45.599	24.1	1.0	16.0	102	159.0	56	25	6	4555-MC-050	4555A-MC-050
45.600 - 49.599	27.9	1.5	18.5	105	166.5	60	32	6	4555-MC-060	4555A-MC-060
49.600 - 55.599	27.9	1.5	18.5	105	166.5	60	32	6	4555-MC-070	4555A-MC-070
55.600 - 60.599	27.9	1.5	18.5	105	166.5	60	32	6	4555-MC-075	4555A-MC-075
60.600 - 65.599	37.1	1.5	18.5	105	166.5	60	32	6	4555-MC-080	4555A-MC-080
65.600 - 70.599	37.1	1.5	18.5	105	166.5	60	32	6	4555-MC-085	4555A-MC-085
70.600 - 79.599	37.1	1.5	18.5	105	166.5	60	32	6	4555-MC-090	4555A-MC-090
79.600 - 90.599	53.1	1.5	18.5	105	176.5	70	40	8	4555-MC-100	4555A-MC-100
90.600 - 100.599	53.1	1.5	18.5	105	176.5	70	40	8	4555-MC-110	4555A-MC-110

Imperial (in)

D ₁ Range	Mandrel					Shank		Teeth	Part No. (Complete Mandrel [^])	
	D ₃	L ₅	L ₁₅	L ₂	L ₁	L ₇	D ₂		With Flat	Without Flat
0.6929 - 0.8504	0.441	0.039	0.433	3.189	5.197	1.969	0.750	6	94555-MC-010*	94555A-MC-010*
0.8505 - 1.0078	0.441	0.039	0.472	3.189	5.197	1.969	0.750	6	94555-MC-020*	94555A-MC-020*
1.0079 - 1.1653	0.594	0.039	0.551	4.016	6.024	1.969	0.750	6	94555-MC-030*	94555A-MC-030*
1.1654 - 1.2834	0.594	0.039	0.551	4.016	6.024	1.969	0.750	6	94555-MC-035*	94555A-MC-035*
1.2835 - 1.4409	0.799	0.039	0.630	4.016	6.260	2.205	1.000	6	94555-MC-040	94555A-MC-040
1.4410 - 1.5984	0.799	0.039	0.630	4.016	6.260	2.205	1.000	6	94555-MC-045	94555A-MC-045
1.5985 - 1.7952	0.949	0.039	0.630	4.016	6.260	2.205	1.000	6	94555-MC-050	94555A-MC-050
1.7953 - 1.9527	1.098	0.059	0.728	4.134	6.555	2.362	1.250	6	94555-MC-060	94555A-MC-060
1.9528 - 2.1889	1.098	0.059	0.728	4.134	6.555	2.362	1.250	6	94555-MC-070	94555A-MC-070
2.1890 - 2.3858	1.098	0.059	0.728	4.134	6.555	2.362	1.250	6	94555-MC-075	94555A-MC-075
2.3859 - 2.5826	1.461	0.059	0.728	4.134	6.555	2.362	1.250	6	94555-MC-080	94555A-MC-080
2.5827 - 2.7795	1.461	0.059	0.728	4.134	6.555	2.362	1.250	6	94555-MC-085	94555A-MC-085
2.7796 - 3.1338	1.461	0.059	0.728	4.134	6.555	2.362	1.250	6	94555-MC-090	94555A-MC-090
3.1339 - 3.5669	2.091	0.059	0.728	4.134	6.949	2.756	1.500	8	94555-MC-100	94555A-MC-100
3.5670 - 3.9606	2.091	0.059	0.728	4.134	6.949	2.756	1.500	8	94555-MC-110	94555A-MC-110

[^]Complete mandrel does not include cutting ring.

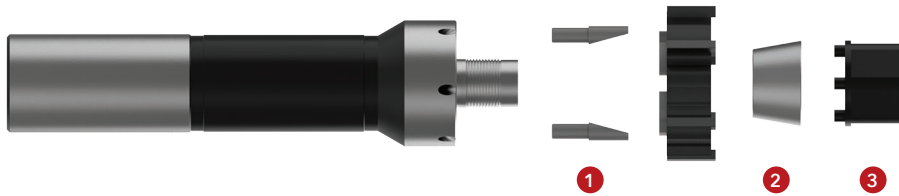
* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.





4555 Series Mandrels

Spare Parts

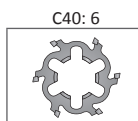
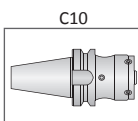
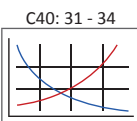
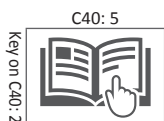


Metric (mm)

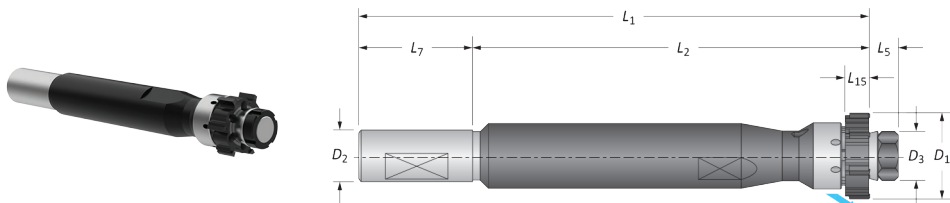
Part No. (Complete Mandrel [^])		Spare Parts					
With Flat	Without Flat	1. Drive Pins	Number of Drive Pins	Conical Ring	Conical Ring (2nd Expansion)	Conical Ring (3rd Expansion)	3. Adjusting Key
4555-MC-010	4555A-MC-010	2000-CO-010	3	4001-AC-115	4001-AC-215	—	4001-CH-015
4555-MC-020	4555A-MC-020	2000-CO-020	3	4001-AC-115	4001-AC-215	—	4001-CH-015
4555-MC-030	4555A-MC-030	2000-CO-030	3	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025
4555-MC-035	4555A-MC-035	2000-CO-040	2	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025
4555-MC-040	4555A-MC-040	2000-CO-040	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035
4555-MC-045	4555A-MC-045	2000-CO-050	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035
4555-MC-050	4555A-MC-050	2000-CO-060	2	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045
4555-MC-060	4555A-MC-060	2000-CO-060	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055
4555-MC-070	4555A-MC-070	2000-CO-070	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055
4555-MC-075	4555A-MC-075	2000-CO-080	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055
4555-MC-080	4555A-MC-080	2000-CO-080	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065
4555-MC-085	4555A-MC-085	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065
4555-MC-090	4555A-MC-090	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065
4555-MC-100	4555A-MC-100	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085
4555-MC-110	4555A-MC-110	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085

Imperial (in)

Part No. (Complete Mandrel [^])		Spare Parts					
With Flat	Without Flat	1. Drive Pins	Number of Drive Pins	Conical Ring	Conical Ring (2nd Expansion)	Conical Ring (3rd Expansion)	3. Adjusting Key
94555-MC-010	94555A-MC-010	2000-CO-010	3	4001-AC-115	4001-AC-215	—	4001-CH-015
94555-MC-020	94555A-MC-020	2000-CO-020	3	4001-AC-115	4001-AC-215	—	4001-CH-015
94555-MC-030	94555A-MC-030	2000-CO-030	3	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025
94555-MC-035	94555A-MC-035	2000-CO-040	2	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025
94555-MC-040	94555A-MC-040	2000-CO-040	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035
94555-MC-045	94555A-MC-045	2000-CO-050	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035
94555-MC-050	94555A-MC-050	2000-CO-060	2	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045
94555-MC-060	94555A-MC-060	2000-CO-060	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055
94555-MC-070	94555A-MC-070	2000-CO-070	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055
94555-MC-075	94555A-MC-075	2000-CO-080	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055
94555-MC-080	94555A-MC-080	2000-CO-080	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065
94555-MC-085	94555A-MC-085	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065
94555-MC-090	94555A-MC-090	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065
94555-MC-100	94555A-MC-100	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085
94555-MC-110	94555A-MC-110	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085

[^]Complete mandrel does not include cutting ring.

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

4500 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")

Series	4500	Shank Type	Cylindrical	Application	Through Holes	Coolant	Radial
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Metric (mm)

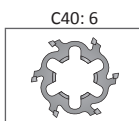
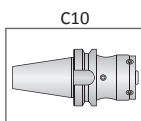
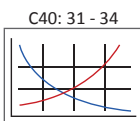
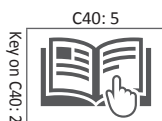
Part No. (Complete Mandrel^)	Teeth	Shank		Mandrel					D_1 Range
		D_2	L_7	L_1	L_2	L_{15}	L_5	D_3	
4500-MC-010*	6	20	50	182.0	121	11.0	11.0	12.0	17.600 - 21.599
4500A-MC-010*	6	20	50	182.0	121	11.0	11.0	12.0	21.600 - 25.599
4500-MC-020*	6	20	50	214.0	153	11.0	14.0	15.6	25.600 - 32.599
4500A-MC-020*	6	20	50	214.0	153	11.0	14.0	15.6	32.600 - 40.599
4500-MC-030*	6	25	56	249.0	179	14.0	16.0	22.0	40.600 - 45.599
4500A-MC-030*	6	25	56	249.0	179	14.0	16.0	22.0	45.600 - 49.599
4500-MC-040	6	32	60	294.5	214	20.5	18.5	30.0	49.600 - 60.599
4500A-MC-040	6	32	60	294.5	214	20.5	18.5	30.0	60.600 - 70.599
4500-MC-050	6	32	60	321.5	237	24.5	18.5	40.0	70.600 - 79.599
4500A-MC-050	6	32	60	321.5	237	24.5	18.5	40.0	79.600 - 90.599
4500-MC-060	6	40	70	343.5	245	28.5	18.5	56.0	90.600 - 100.599
4500A-MC-060	6	40	70	343.5	245	28.5	18.5	56.0	

Imperial (in)

Impeller (in)	Mandrel						Shank		Teeth	Part No. (Complete Mandrel [^])	
	D ₁ Range	D ₃	L ₅	L ₁₅	L ₂	L ₁	L ₇	D ₂		With Flat	Without Flat
0.6929 - 0.8504	0.472	0.433	0.433	4.764	7.165	1.969	0.750	6	94500-MC-010*	94500A-MC-010*	
0.8505 - 1.0078	0.472	0.433	0.472	4.764	7.165	1.969	0.750	6	94500-MC-020*	94500A-MC-020*	
1.0079 - 1.2834	0.614	0.433	0.551	6.024	8.425	1.969	0.750	6	94500-MC-030*	94500A-MC-030*	
1.2835 - 1.5984	0.866	0.551	0.630	7.047	9.803	2.205	1.000	6	94500-MC-040	94500A-MC-040	
1.5985 - 1.7952	0.866	0.551	0.630	7.047	9.803	2.205	1.000	6	94500-MC-050	94500A-MC-050	
1.7953 - 1.9527	1.000	0.591	0.630	7.913	10.709	2.205	1.000	6	94500-MC-060	94500A-MC-060	
1.9528 - 2.3858	1.181	0.807	0.728	8.425	11.594	2.362	1.250	6	94500-MC-070	94500A-MC-070	
2.3859 - 2.7795	1.575	0.965	0.728	9.331	12.657	2.362	1.250	6	94500-MC-080	94500A-MC-080	
2.7796 - 3.1338	1.575	0.965	0.728	9.331	12.657	2.362	1.250	6	94500-MC-090	94500A-MC-090	
3.1339 - 3.5669	2.205	1.122	0.728	9.646	13.524	2.756	1.500	6	94500-MC-100	94500A-MC-100	
3.5670 - 3.9606	2.205	1.122	0.728	9.646	13.524	2.756	1.500	8	94500-MC-110	94500A-MC-110	

[^]Complete mandrel does not include cutting ring.

* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.



Ⓜ = Metric (mm)

i = Imperial (in)



4500 Series Mandrels

Spare Parts



Metric (mm)

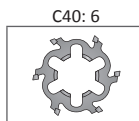
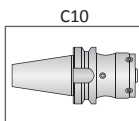
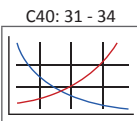
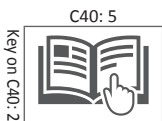
Part No. (Complete Mandrel [^])		Spare Parts				
With Flat	Without Flat	1. Drive Pins	Number of Drive Pins	2. Conical Ring	3. Nut	Wrench Size (mm)
4500-MC-010	4500A-MC-010	2000-CO-010	3	2010-AC-010	2000-DA-010	10
4500-MC-020	4500A-MC-020	2000-CO-020	3	2010-AC-010	2000-DA-010	10
4500-MC-030	4500A-MC-030	2000-CO-030	3	2010-AC-020	2000-DA-020	13
4500-MC-040	4500A-MC-040	2000-CO-040	2	2010-AC-030	2000-DA-060	19
4500-MC-050	4500A-MC-050	2000-CO-060	2	2010-AC-040	2000-DA-090	22
4500-MC-060	4500A-MC-060	2000-CO-060	2	2010-AC-050	2000-GH-880	30 ♦
4500-MC-070	4500A-MC-070	2000-CO-070	2	2010-AC-050	2000-GH-880	30 ♦
4500-MC-080	4500A-MC-080	2000-CO-080	2	2010-AC-060	2000-GH-900	40 ♦
4500-MC-090	4500A-MC-090	2000-CO-090	2	2010-AC-060	2000-GH-900	40 ♦
4500-MC-100	4500A-MC-100	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦
4500-MC-110	4500A-MC-110	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦

Imperial (in)

Part No. (Complete Mandrel [^])		Spare Parts				
With Flat	Without Flat	1. Drive Pins	Number of Drive Pins	2. Conical Ring	3. Nut	Wrench Size (mm)
94500-MC-010	94500A-MC-010	2000-CO-010	3	2010-AC-010	2000-DA-010	10
94500-MC-020	94500A-MC-020	2000-CO-020	3	2010-AC-010	2000-DA-010	10
94500-MC-030	94500A-MC-030	2000-CO-030	3	2010-AC-020	2000-DA-020	13
94500-MC-040	94500A-MC-040	2000-CO-040	2	2010-AC-030	2000-DA-060	19
94500-MC-050	94500A-MC-050	2000-CO-060	2	2010-AC-040	2000-DA-090	22
94500-MC-060	94500A-MC-060	2000-CO-060	2	2010-AC-050	2000-GH-880	30 ♦
94500-MC-070	94500A-MC-070	2000-CO-070	2	2010-AC-050	2000-GH-880	30 ♦
94500-MC-080	94500A-MC-080	2000-CO-080	2	2010-AC-060	2000-GH-900	40 ♦
94500-MC-090	94500A-MC-090	2000-CO-090	2	2010-AC-060	2000-GH-900	40 ♦
94500-MC-100	94500A-MC-100	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦
94500-MC-110	94500A-MC-110	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦

[^]Complete mandrel does not include cutting ring.

♦ Spanner wrench.



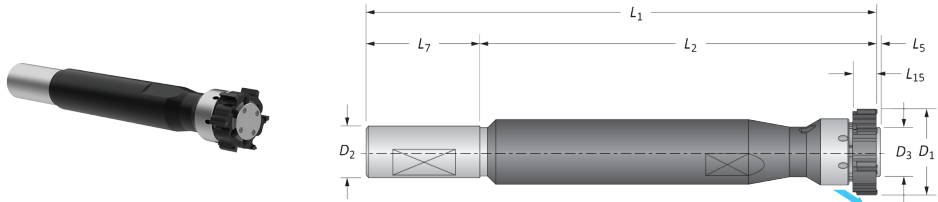
Key on C40: 2

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



4505 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



Series	4505	Shank Type	Cylindrical	Application	Blind Holes	Coolant	Radial
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Metric (mm)

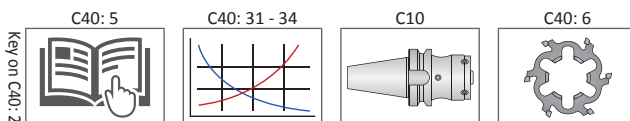
D ₁ Range	Mandrel					Shank		Teeth	Part No. (Complete Mandrel [^])	
	D ₃	L ₅	L ₁₅	L ₂	L ₁	L ₇	D ₂		With Flat	Without Flat
17.600 - 21.599	11.2	1.0	11.0	121	172.0	50	20	6	4505-MC-010*	4505A-MC-010*
21.600 - 25.599	11.2	1.0	12.0	121	172.0	50	20	6	4505-MC-020*	4505A-MC-020*
25.600 - 29.599	15.1	1.0	14.0	153	204.0	50	20	6	4505-MC-030*	4505A-MC-030*
29.600 - 32.599	15.1	1.0	14.0	153	204.0	50	20	6	4505-MC-035*	4505A-MC-035*
32.600 - 36.599	20.3	1.0	16.0	179	236.0	56	25	6	4505-MC-040	4505A-MC-040
36.600 - 40.599	20.3	1.0	16.0	179	236.0	56	25	6	4505-MC-045	4505A-MC-045
40.600 - 45.599	24.1	1.0	16.0	201	258.0	56	25	6	4505-MC-050	4505A-MC-050
45.600 - 49.599	27.9	1.5	18.5	214	275.5	60	32	6	4505-MC-060	4505A-MC-060
49.600 - 55.599	27.9	1.5	18.5	214	275.5	60	32	6	4505-MC-070	4505A-MC-070
55.600 - 60.599	27.9	1.5	18.5	214	275.5	60	32	6	4505-MC-075	4505A-MC-075
60.600 - 65.599	37.1	1.5	18.5	237	298.5	60	32	6	4505-MC-080	4505A-MC-080
65.600 - 70.599	37.1	1.5	18.5	237	298.5	60	32	6	4505-MC-085	4505A-MC-085
70.600 - 79.599	37.1	1.5	18.5	237	298.5	60	32	6	4505-MC-090	4505A-MC-090
79.600 - 90.599	53.1	1.5	18.5	245	316.5	70	40	8	4505-MC-100	4505A-MC-100
90.600 - 100.599	53.1	1.5	18.5	245	316.5	70	40	8	4505-MC-110	4505A-MC-110

Imperial (in)

D ₁ Range	Mandrel					Shank		Teeth	Part No. (Complete Mandrel [^])	
	D ₃	L ₅	L ₁₅	L ₂	L ₁	L ₇	D ₂		With Flat	Without Flat
0.6929 - 0.8504	0.441	0.039	0.433	4.764	6.772	1.969	0.750	6	94505-MC-010*	94505A-MC-010*
0.8505 - 1.0078	0.441	0.039	0.472	4.764	6.772	1.969	0.750	6	94505-MC-020*	94505A-MC-020*
1.0079 - 1.1653	0.594	0.039	0.551	6.024	8.031	1.969	0.750	6	94505-MC-030*	94505A-MC-030*
1.1654 - 1.2834	0.594	0.039	0.551	6.024	8.031	1.969	0.750	6	94505-MC-035*	94505A-MC-035*
1.2835 - 1.4409	0.799	0.039	0.630	7.047	9.291	2.205	1.000	6	94505-MC-040	94505A-MC-040
1.4410 - 1.5984	0.799	0.039	0.630	7.047	9.291	2.205	1.000	6	94505-MC-045	94505A-MC-045
1.5985 - 1.7952	0.949	0.039	0.630	7.913	10.157	2.205	1.000	6	94505-MC-050	94505A-MC-050
1.7953 - 1.9527	1.098	0.059	0.728	8.425	10.846	2.362	1.250	6	94505-MC-060	94505A-MC-060
1.9528 - 2.1889	1.098	0.059	0.728	8.425	10.846	2.362	1.250	6	94505-MC-070	94505A-MC-070
2.1890 - 2.3858	1.098	0.059	0.728	8.425	10.846	2.362	1.250	6	94505-MC-075	94505A-MC-075
2.3859 - 2.5826	1.461	0.059	0.728	9.331	11.752	2.362	1.250	6	94505-MC-080	94505A-MC-080
2.5827 - 2.7795	1.461	0.059	0.728	9.331	11.752	2.362	1.250	6	94505-MC-085	94505A-MC-085
2.7796 - 3.1338	1.461	0.059	0.728	9.331	11.752	2.362	1.250	6	94505-MC-090	94505A-MC-090
3.1339 - 3.5669	2.091	0.059	0.728	9.646	12.461	2.756	1.500	8	94505-MC-100	94505A-MC-100
3.5670 - 3.9606	2.091	0.059	0.728	9.646	12.461	2.756	1.500	8	94505-MC-110	94505A-MC-110

[^]Complete mandrel does not include cutting ring.

* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.





4505 Series Mandrels

Spare Parts

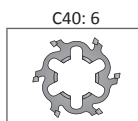
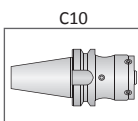
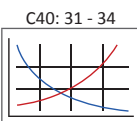
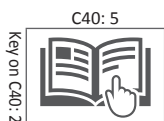


Metric (mm)

Part No. (Complete Mandrel^)		Spare Parts						
With Flat	Without Flat	1.	Number of Drive Pins	2.			3.	
		Drive Pins		Conical Ring	Conical Ring (2nd Expansion)	Conical Ring (3rd Expansion)	Adjusting Key	Wrench Size (mm)
4505-MC-010	4505A-MC-010	2000-CO-010	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
4505-MC-020	4505A-MC-020	2000-CO-020	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
4505-MC-030	4505A-MC-030	2000-CO-030	3	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
4505-MC-035	4505A-MC-035	2000-CO-040	2	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
4505-MC-040	4505A-MC-040	2000-CO-040	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
4505-MC-045	4505A-MC-045	2000-CO-050	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
4505-MC-050	4505A-MC-050	2000-CO-060	2	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	22
4505-MC-060	4505A-MC-060	2000-CO-060	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
4505-MC-070	4505A-MC-070	2000-CO-070	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
4505-MC-075	4505A-MC-075	2000-CO-080	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
4505-MC-080	4505A-MC-080	2000-CO-080	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
4505-MC-085	4505A-MC-085	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
4505-MC-090	4505A-MC-090	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
4505-MC-100	4505A-MC-100	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46
4505-MC-110	4505A-MC-110	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46

Imperial (in)

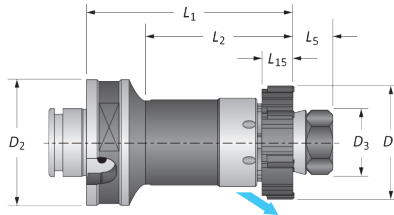
Part No. (Complete Mandrel^)		Spare Parts						
With Flat	Without Flat	1. Drive Pins	Number of Drive Pins	2.			3.	
				Conical Ring	Conical Ring (2nd Expansion)	Conical Ring (3rd Expansion)	Adjusting Key	Wrench Size (mm)
94505-MC-010	94505A-MC-010	2000-CO-010	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
94505-MC-020	94505A-MC-020	2000-CO-020	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
94505-MC-030	94505A-MC-030	2000-CO-030	3	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
94505-MC-035	94505A-MC-035	2000-CO-040	2	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
94505-MC-040	94505A-MC-040	2000-CO-040	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
94505-MC-045	94505A-MC-045	2000-CO-050	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
94505-MC-050	94505A-MC-050	2000-CO-060	2	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	22
94505-MC-060	94505A-MC-060	2000-CO-060	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
94505-MC-070	94505A-MC-070	2000-CO-070	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
94505-MC-075	94505A-MC-075	2000-CO-080	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
94505-MC-080	94505A-MC-080	2000-CO-080	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
94505-MC-085	94505A-MC-085	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
94505-MC-090	94505A-MC-090	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
94505-MC-100	94505A-MC-100	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46
94505-MC-110	94505A-MC-110	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46

[^]Complete mandrel does not include cutting ring.

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



4330 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



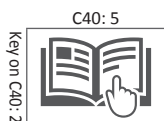
Series	4330	Shank Type	Modular	Application	Through Holes	Coolant	Radial
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Metric (mm)

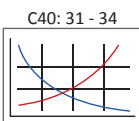
D ₁ Range		Mandrel					Shank	Teeth	Part No.
Metric (mm)	Imperial (inch)	D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂		(Complete Mandrel [^])
17.600 - 21.599	0.6929 - 0.8504	12.0	11.0	11.0	55	75	50	6	4330-MC-010*
21.600 - 25.599	0.8505 - 1.0078	12.0	11.0	12.0	55	75	50	6	4330-MC-020*
25.600 - 32.599	1.0079 - 1.2834	15.6	11.0	14.0	60	80	50	6	4330-MC-030*
32.600 - 40.599	1.2835 - 1.5984	22.0	14.0	16.0	60	80	50	6	4330-MC-040
40.600 - 45.599	1.5985 - 1.7952	25.4	15.0	16.0	60	80	50	6	4330-MC-050
45.600 - 49.599	1.7953 - 1.9527	30.0	20.5	18.5	60	80	50	6	4330-MC-060
49.600 - 60.599	1.9528 - 2.3858	30.0	20.5	18.5	60	80	50	6	4330-MC-070
60.600 - 70.599	2.3859 - 2.7795	40.0	24.5	18.5	65	90	63	6	4330-MC-080
70.600 - 79.599	2.7796 - 3.1338	40.0	24.5	18.5	65	90	63	6	4330-MC-090
79.600 - 90.599	3.1339 - 3.5669	56.0	28.5	18.5	65	90	63	8	4330-MC-100
90.600 - 100.599	3.5670 - 3.9606	56.0	28.5	18.5	65	90	63	8	4330-MC-110

[^]Complete mandrel does not include cutting ring.

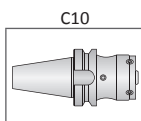
* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.



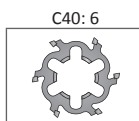
C40: 5



C40: 31 - 34



C10



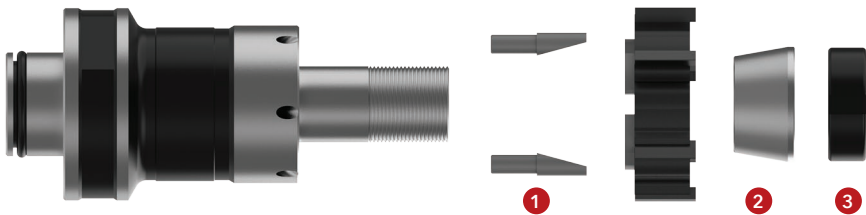
C40: 6

Key on C40: 2

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

4330 Series Mandrels

Spare Parts



Metric (mm)

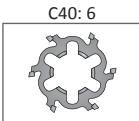
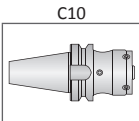
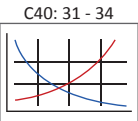
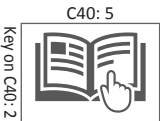
Part No. (Complete Mandrel [^])	Spare Parts				
	1. Drive Pins	Number of Drive Pins	2. Conical Ring	3. Nut	Wrench Size (mm)
4330-MC-010	2000-CO-010	3	2010-AC-010	2000-DA-010	10
4330-MC-020	2000-CO-020	3	2010-AC-010	2000-DA-010	10
4330-MC-030	2000-CO-030	3	2010-AC-020	2000-DA-020	13
4330-MC-040	2000-CO-040	2	2010-AC-030	2000-DA-060	19
4330-MC-050	2000-CO-060	2	2010-AC-040	2000-DA-090	22
4330-MC-060	2000-CO-060	2	2010-AC-050	2000-GH-880	30 ♦
4330-MC-070	2000-CO-070	2	2010-AC-050	2000-GH-880	30 ♦
4330-MC-080	2000-CO-080	2	2010-AC-060	2000-GH-900	40 ♦
4330-MC-090	2000-CO-090	2	2010-AC-060	2000-GH-900	40 ♦
4330-MC-100	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦
4330-MC-110	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦

[^]Complete mandrel does not include cutting ring.

♦ Spanner wrench.



C40

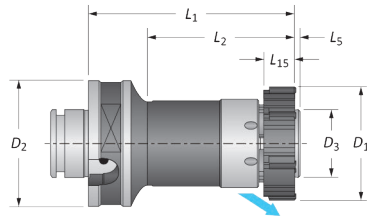


 = Metric (mm)
 = Imperial (in)



4335 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



Series	4335	Shank Type	Modular	Application	Blind Holes	Coolant	Radial
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Metric (mm)

D ₁ Range			Mandrel					Shank	Teeth	Part No. (Complete Mandrel [^])
Metric (mm)	Imperial (inch)		D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂		
17.600 - 21.599	0.6929 - 0.8504		11.2	1.0	11.0	55	75	50	6	4335-MC-010*
21.600 - 25.599	0.8505 - 1.0078		11.2	1.0	12.0	55	75	50	6	4335-MC-020*
25.600 - 29.599	1.0079 - 1.1653		15.1	1.0	14.0	60	80	50	6	4335-MC-030*
29.600 - 32.599	1.1654 - 1.2834		15.1	1.0	14.0	60	80	50	6	4335-MC-035*
32.600 - 36.599	1.2835 - 1.4409		20.3	1.0	16.0	60	80	50	6	4335-MC-040
36.600 - 40.599	1.4410 - 1.5984		20.3	1.0	16.0	60	80	50	6	4335-MC-045
40.600 - 45.599	1.5985 - 1.7952		24.1	1.0	16.0	60	80	50	6	4335-MC-050
45.600 - 49.599	1.7953 - 1.9527		27.9	1.5	18.5	60	80	50	6	4335-MC-060
49.600 - 55.599	1.9528 - 2.1889		27.9	1.5	18.5	60	80	50	6	4335-MC-070
55.600 - 60.599	2.1890 - 2.3858		27.9	1.5	18.5	60	80	50	6	4335-MC-075
60.600 - 65.599	2.3859 - 2.5826		37.1	1.5	18.5	65	90	63	6	4335-MC-080
65.600 - 70.599	2.5827 - 2.7795		37.1	1.5	18.5	65	90	63	6	4335-MC-085
70.600 - 79.599	2.7796 - 3.1338		37.1	1.5	18.5	65	90	63	6	4335-MC-090
79.600 - 90.599	3.1339 - 3.5669		53.1	1.5	18.5	65	90	63	8	4335-MC-100
90.600 - 100.599	3.5670 - 3.9606		53.1	1.5	18.5	65	90	63	8	4335-MC-110

[^]Complete mandrel does not include cutting ring.

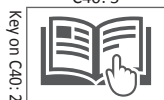
* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.



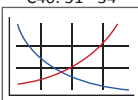
C40

m

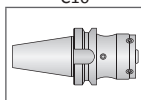
C40: 5



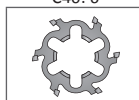
C40: 31 - 34



C10



C40: 6

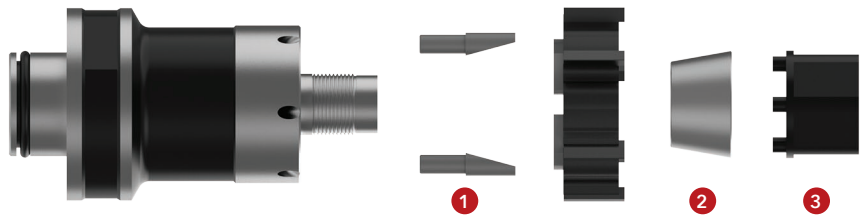


m = Metric (mm)
i = Imperial (in)



4335 Series Mandrels

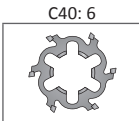
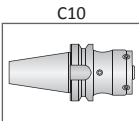
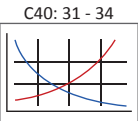
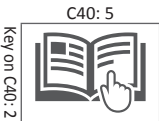
Spare Parts



Metric (mm)

Part No. (Complete Mandrel [^])	Spare Parts							
	1. Drive Pins	Number of Drive Pins	2. Conical Ring	Conical Ring (2nd Expansion)	Conical Ring (3rd Expansion)	3. Adjusting Key	Wrench Size (mm)	
4335-MC-010	2000-CO-010	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10	 C40
4335-MC-020	2000-CO-020	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10	
4335-MC-030	2000-CO-030	3	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13	
4335-MC-035	2000-CO-040	2	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13	
4335-MC-040	2000-CO-040	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18	
4335-MC-045	2000-CO-050	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18	
4335-MC-050	2000-CO-060	2	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	22	
4335-MC-060	2000-CO-060	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26	
4335-MC-070	2000-CO-070	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26	
4335-MC-075	2000-CO-080	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26	
4335-MC-080	2000-CO-080	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34	
4335-MC-085	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34	
4335-MC-090	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34	
4335-MC-100	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46	
4335-MC-110	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46	

[^]Complete mandrel does not include cutting ring.



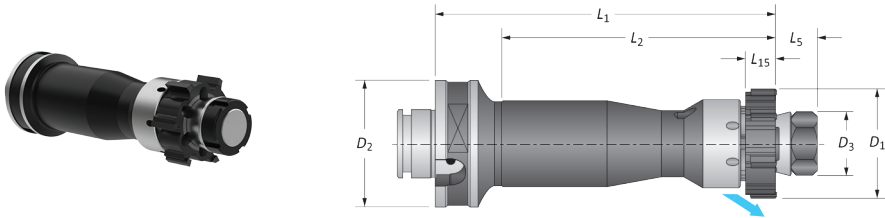
Key on C40: 2

 = Metric (mm)
 = Imperial (in)



4350 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



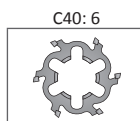
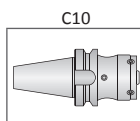
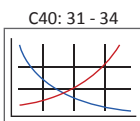
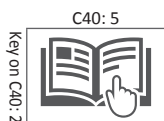
Series	4350	Shank Type	Modular	Application	Through Holes	Coolant	Radial
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Metric (mm)

D ₁ Range			Mandrel					Shank	Teeth	Part No. (Complete Mandrel [^])
Metric (mm)	Imperial (inch)		D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂		
17.600 - 21.599	0.6929 - 0.8504		12.0	11.0	11.0	81	116	50	6	4350-MC-010*
21.600 - 25.599	0.8505 - 1.0078		12.0	11.0	12.0	81	116	50	6	4350-MC-020*
25.600 - 32.599	1.0079 - 1.2834		15.6	11.0	14.0	102	137	50	6	4350-MC-030*
32.600 - 40.599	1.2835 - 1.5984		22.0	14.0	16.0	102	137	50	6	4350-MC-040
40.600 - 45.599	1.5985 - 1.7952		25.4	15.0	16.0	102	137	50	6	4350-MC-050
45.600 - 49.599	1.7953 - 1.9527		30.0	20.5	18.5	105	140	50	6	4350-MC-060
49.600 - 60.599	1.9528 - 2.3858		30.0	20.5	18.5	105	140	50	6	4350-MC-070
60.600 - 70.599	2.3859 - 2.7795		40.0	24.5	18.5	105	140	63	6	4350-MC-080
70.600 - 79.599	2.7796 - 3.1338		40.0	24.5	18.5	105	140	63	6	4350-MC-090
79.600 - 90.599	3.1339 - 3.5669		56.0	28.5	18.5	105	140	63	8	4350-MC-100
90.600 - 100.599	3.5670 - 3.9606		56.0	28.5	18.5	105	140	63	8	4350-MC-110

[^]Complete mandrel does not include cutting ring.

* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.

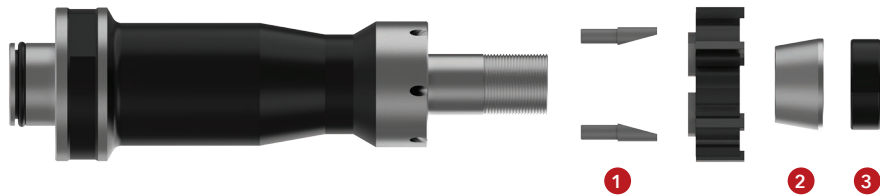


Key on C40: 2

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

4350 Series Mandrels

Spare Parts



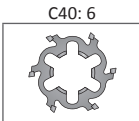
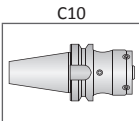
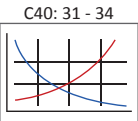
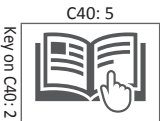
Metric (mm)

Part No. (Complete Mandrel [^])	Spare Parts				
	1. Drive Pins	Number of Drive Pins	2. Conical Ring	3. Nut	Wrench Size (mm)
4350-MC-010	2000-CO-010	3	2010-AC-010	2000-DA-010	10
4350-MC-020	2000-CO-020	3	2010-AC-010	2000-DA-010	10
4350-MC-030	2000-CO-030	3	2010-AC-020	2000-DA-020	13
4350-MC-040	2000-CO-040	2	2010-AC-030	2000-DA-060	19
4350-MC-050	2000-CO-060	2	2010-AC-040	2000-DA-090	22
<i>m</i> 4350-MC-060	2000-CO-060	2	2010-AC-050	2000-GH-880	30 ♦
4350-MC-070	2000-CO-070	2	2010-AC-050	2000-GH-880	30 ♦
4350-MC-080	2000-CO-080	2	2010-AC-060	2000-GH-900	40 ♦
4350-MC-090	2000-CO-090	2	2010-AC-060	2000-GH-900	40 ♦
4350-MC-100	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦
4350-MC-110	2000-CO-090	2	2010-AC-070	2000-GH-920	56 ♦

[^]Complete mandrel does not include cutting ring.
♦ Spanner wrench.



C40



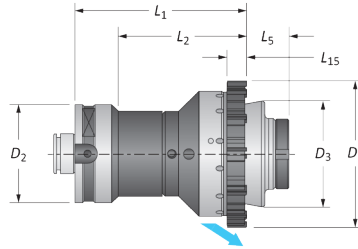
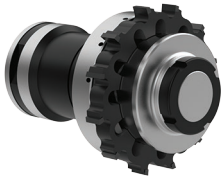
Key on C40: 2

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



4350 Series Mandrels

100.600 mm - 200.600 mm (3.9606" - 7.8976")



Series	4350	Shank Type	Modular	Application	Through Holes	Coolant	Radial
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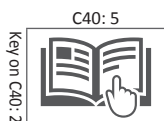
Metric (mm)

D ₁ Range		Mandrel						Shank	Teeth	Part No.
Metric (mm)	Imperial (inch)	D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂			(Complete Mandrel [^])
100.600 - 110.599	3.9606 - 4.3543	73.8	35.5	18.5	—	140	80	10		4350-MC-120
110.600 - 115.599	4.3544 - 4.5511	80.8	35.5	18.5	—	140	80	12		4350-MC-130
115.600 - 120.599	4.5512 - 4.7480	86.8	35.5	18.5	—	140	80	12		4350-MC-140
120.600 - 125.599	4.7481 - 4.9448	86.8	35.5	18.5	—	140	80	12		4350-MC-150
125.600 - 132.599	4.9449 - 5.2204	90.8	35.5	18.5	—	140	80	12		4350-MC-160
132.600 - 139.599	5.2205 - 5.4960	90.8	35.5	18.5	—	140	80	12		4350-MC-170
139.600 - 145.599	5.4961 - 5.7322	102.8	35.5	18.5	—	140	80	12		4350-MC-180
145.600 - 155.599	5.7323 - 6.1259	107.8	35.5	18.5	—	140	80	12		4350-MC-190
155.600 - 165.599	6.1260 - 6.5196	107.8	48.5	18.5	—	140	80	12		4350-MC-200
165.600 - 175.599	6.5197 - 6.9133	117.8	48.5	18.5	—	140	80	12		4350-MC-210
175.600 - 185.599	6.9134 - 7.3070	127.8	48.5	18.5	—	140	80	12		4350-MC-220
185.600 - 195.599	7.3071 - 7.7007	137.8	48.5	18.5	—	140	80	12		4350-MC-230
195.600 - 200.600	7.7008 - 7.8976	145.8	48.5	18.5	—	140	80	12		4350-MC-240

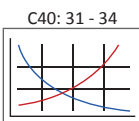
[^]Complete mandrel does not include cutting ring.

C40

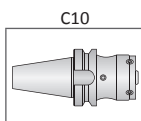
m



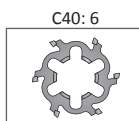
C40: 5



C40: 31 - 34



C10

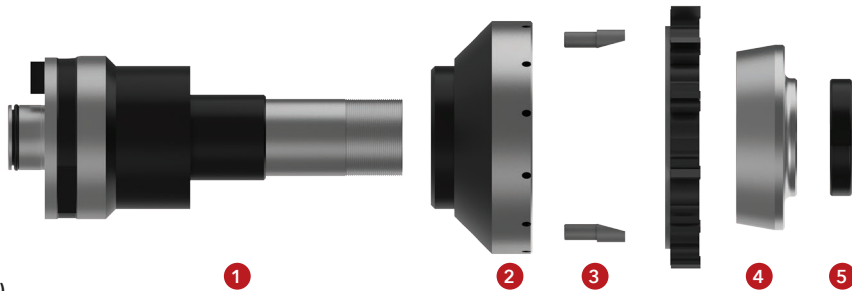


C40: 6

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

4350 Series Mandrels

Spare Parts



Metric (mm)

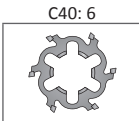
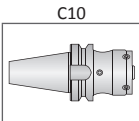
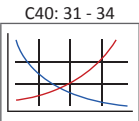
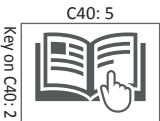
Part No. (Complete Mandrel [^])	Spare Parts						
	1. Mandrel	2. Flange	3. Drive Pins	Number of Drive Pins	4. Conical Ring	5. Nut	Wrench Size (mm)
4350-MC-120	4350-MA-120	4355-FL-035	2000-CO-090	2	2060-BU-010	2000-GH-095	58 ♦
4350-MC-130	4350-MA-120	4355-FL-045	2000-CO-090	2	2060-BU-020	2000-GH-095	58 ♦
4350-MC-140	4350-MA-120	4355-FL-055	2000-CO-090	2	2060-BU-030	2000-GH-095	58 ♦
4350-MC-150	4350-MA-120	4355-FL-065	2000-CO-090	2	2060-BU-030	2000-GH-095	58 ♦
4350-MC-160	4350-MA-120	4355-FL-075	2000-CO-100	2	2060-BU-040	2000-GH-095	58 ♦
4350-MC-170	4350-MA-120	4355-FL-085	2000-CO-100	2	2060-BU-040	2000-GH-095	58 ♦
4350-MC-180	4350-MA-120	4355-FL-095	2000-CO-100	2	2060-BU-050	2000-GH-095	58 ♦
4350-MC-190	4350-MA-120	4355-FL-105	2000-CO-110	2	2060-BU-060	2000-GH-095	58 ♦
4350-MC-200	4350-MA-200	4355-FL-115	2000-CO-110	2	2060-BU-070	2000-GH-120	90 ♦
4350-MC-210	4350-MA-200	4355-FL-125	2000-CO-110	2	2060-BU-080	2000-GH-120	90 ♦
4350-MC-220	4350-MA-200	4355-FL-135	2000-CO-120	2	2060-BU-090	2000-GH-120	90 ♦
4350-MC-230	4350-MA-200	4355-FL-145	2000-CO-120	2	2060-BU-100	2000-GH-120	90 ♦
4350-MC-240	4350-MA-200	4355-FL-155	2000-CO-120	2	2060-BU-110	2000-GH-120	90 ♦

[^]Complete mandrel does not include cutting ring.

♦ Spanner wrench.



C40



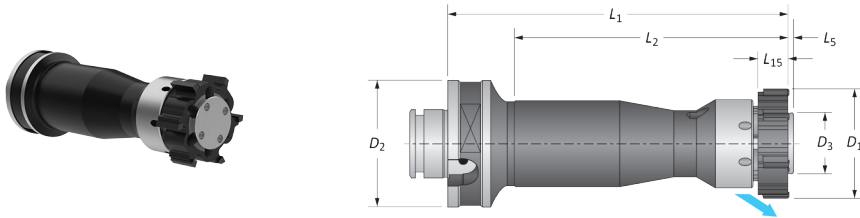
Key on C40: 2

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



4355 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



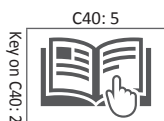
Series	4355	Shank Type	Modular	Application	Blind Holes	Coolant	Radial
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Metric (mm)

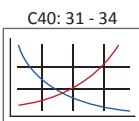
D ₁ Range			Mandrel					Shank	Teeth	Part No. (Complete Mandrel [^])
Metric (mm)	Imperial (inch)		D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂		
17.600 - 21.599	0.6929 - 0.8504		11.2	1.0	11.0	81	116	50	6	4355-MC-010*
21.600 - 25.599	0.8505 - 1.0078		11.2	1.0	12.0	81	116	50	6	4355-MC-020*
25.600 - 29.599	1.0079 - 1.1653		15.1	1.0	14.0	102	137	50	6	4355-MC-030*
29.600 - 32.599	1.1654 - 1.2834		15.1	1.0	14.0	102	137	50	6	4355-MC-035*
32.600 - 36.599	1.2835 - 1.4409		20.3	1.0	16.0	102	137	50	6	4355-MC-040
36.600 - 40.599	1.4410 - 1.5984		20.3	1.0	16.0	102	137	50	6	4355-MC-045
40.600 - 45.599	1.5985 - 1.7952		24.1	1.0	16.0	102	137	50	6	4355-MC-050
45.600 - 49.599	1.7953 - 1.9527		27.9	1.5	18.5	105	140	50	6	4355-MC-060
49.600 - 55.599	1.9528 - 2.1889		27.9	1.5	18.5	105	140	50	6	4355-MC-070
55.600 - 60.599	2.1890 - 2.3858		27.9	1.5	18.5	105	140	50	6	4355-MC-075
60.600 - 65.599	2.3859 - 2.5826		37.1	1.5	18.5	105	140	63	6	4355-MC-080
65.600 - 70.599	2.5827 - 2.7795		37.1	1.5	18.5	105	140	63	6	4355-MC-085
70.600 - 79.599	2.7796 - 3.1338		37.1	1.5	18.5	105	140	63	6	4355-MC-090
79.600 - 90.599	3.1339 - 3.5669		53.1	1.5	18.5	105	140	63	8	4355-MC-100
90.600 - 100.599	3.5670 - 3.9606		53.1	1.5	18.5	105	140	63	8	4355-MC-110

[^]Complete mandrel does not include cutting ring.

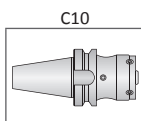
* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.



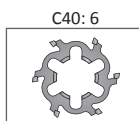
C40: 5



C40: 31 - 34



C10



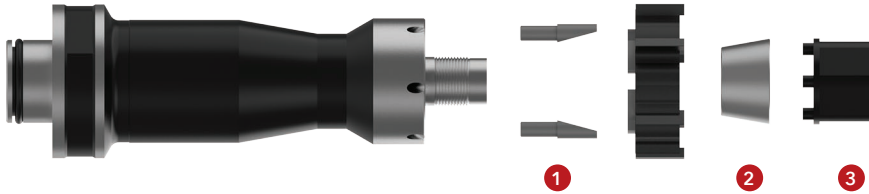
C40: 6

= Metric (mm)
 = Imperial (in)



4355 Series Mandrels

Spare Parts



Metric (mm)

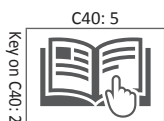
Part No. (Complete Mandrel [^])		Spare Parts						
		1.		2.			3.	
		Drive Pins	Number of Drive Pins	Conical Ring	Conical Ring (2nd Expansion)	Conical Ring (3rd Expansion)	Adjusting Key	Wrench Size (mm)
	4355-MC-010	2000-CO-010	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
	4355-MC-020	2000-CO-020	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
	4355-MC-030	2000-CO-030	3	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
	4355-MC-035	2000-CO-040	2	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
	4355-MC-040	2000-CO-040	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
	4355-MC-045	2000-CO-050	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
	4355-MC-050	2000-CO-060	2	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	22
Ⓜ	4355-MC-060	2000-CO-060	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
	4355-MC-070	2000-CO-070	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
	4355-MC-075	2000-CO-080	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
	4355-MC-080	2000-CO-080	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
	4355-MC-085	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
	4355-MC-090	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
	4355-MC-100	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46
	4355-MC-110	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46

[^]Complete mandrel does not include cutting ring.

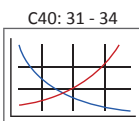
◆ Spanner wrench.



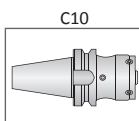
C40



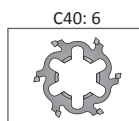
C40: 5



C40: 31 - 34



C10



C40: 6

Key on C40: 2

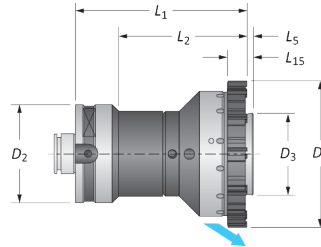
m = Metric (mm)

i = Imperial (in)



4355 Series Mandrels

100.600 mm - 200.600 mm (3.9606" - 7.8976")



Series	4355	Shank Type	Modular	Application	Blind Holes	Coolant	Radial
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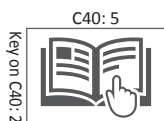
Metric (mm)

D ₁ Range		Mandrel					Shank	Teeth	Part No. (Complete Mandrel [^])
Metric (mm)	Imperial (inch)	D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂		
100.600 - 110.599	3.9606 - 4.3543	70.3	1.5	18.5	—	140	80	10	4355-MC-120
110.600 - 115.599	4.3544 - 4.5511	76.3	1.5	18.5	—	140	80	12	4355-MC-130
115.600 - 120.599	4.5512 - 4.7480	83.3	1.5	18.5	—	140	80	12	4355-MC-140
120.600 - 125.599	4.7481 - 4.9448	87.3	1.5	18.5	—	140	80	12	4355-MC-150
125.600 - 132.599	4.9449 - 5.2204	87.3	1.5	18.5	—	140	80	12	4355-MC-160
132.600 - 139.599	5.2205 - 5.4960	87.3	1.5	18.5	—	140	80	12	4355-MC-170
139.600 - 145.599	5.4961 - 5.7322	99.3	1.5	18.5	—	140	80	12	4355-MC-180
145.600 - 155.599	5.7323 - 6.1259	104.3	1.5	18.5	—	140	80	12	4355-MC-190
155.600 - 165.599	6.1260 - 6.5196	104.3	1.5	18.5	—	140	80	12	4355-MC-200
165.600 - 175.599	6.5197 - 6.9133	114.3	1.5	18.5	—	140	80	12	4355-MC-210
175.600 - 185.599	6.9134 - 7.3070	124.3	1.5	18.5	—	140	80	12	4355-MC-220
185.600 - 195.599	7.3071 - 7.7007	134.3	1.5	18.5	—	140	80	12	4355-MC-230
195.600 - 200.600	7.7008 - 7.8976	142.3	1.5	18.5	—	140	80	12	4355-MC-240

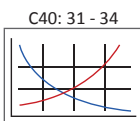
[^]Complete mandrel does not include cutting ring.

C40

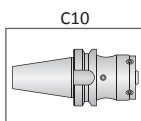
m



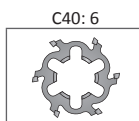
C40: 5



C40: 31 - 34



C10



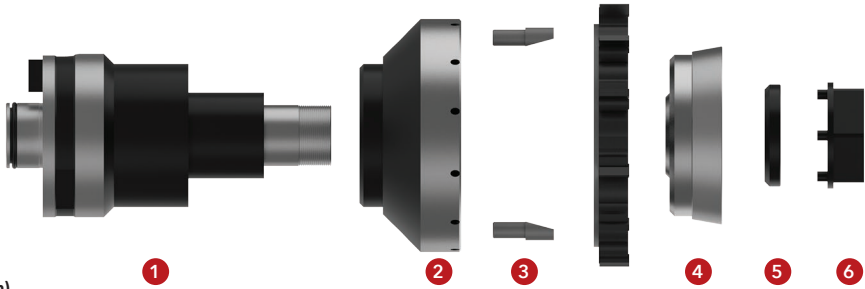
C40: 6

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



4355 Series Mandrels

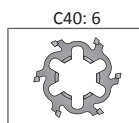
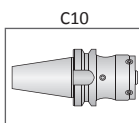
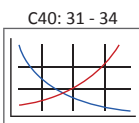
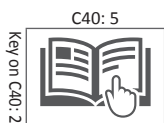
Spare Parts



Metric (mm)

Part No. (Complete Mandrel [^])	Spare Parts							
	1. Mandrel	2. Flange	3. Drive Pins	Number of Drive Pins	4. Conical Ring	5. Nut	6. Adjusting Key	Wrench Size (mm)
4355-MC-120	4355-MA-120	4355-FL-035	2000-CO-090	2	4001-AC-116	4001-GH-035	4001-CH-135	46
4355-MC-130	4355-MA-120	4355-FL-045	2000-CO-090	2	4001-AC-126	4001-GH-035	4001-CH-135	46
4355-MC-140	4355-MA-120	4355-FL-055	2000-CO-090	2	4001-AC-136	4001-GH-035	4001-CH-135	46
4355-MC-150	4355-MA-120	4355-FL-065	2000-CO-090	2	4001-AC-136	4001-GH-035	4001-CH-135	46
4355-MC-160	4355-MA-120	4355-FL-075	2000-CO-100	2	4001-AC-146	4001-GH-035	4001-CH-135	46
4355-MC-170	4355-MA-120	4355-FL-085	2000-CO-100	2	4001-AC-146	4001-GH-035	4001-CH-135	46
4355-MC-180	4355-MA-120	4355-FL-095	2000-CO-100	2	4001-AC-156	4001-GH-035	4001-CH-135	46
4355-MC-190	4355-MA-120	4355-FL-105	2000-CO-110	2	4001-AC-166	4001-GH-035	4001-CH-135	46
4355-MC-200	4355-MA-200	4355-FL-115	2000-CO-110	2	4001-AC-176	4001-GH-115	4001-CH-115	46
4355-MC-210	4355-MA-200	4355-FL-125	2000-CO-110	2	4001-AC-186	4001-GH-115	4001-CH-115	46
4355-MC-220	4355-MA-200	4355-FL-135	2000-CO-120	2	4001-AC-196	4001-GH-115	4001-CH-115	46
4355-MC-230	4355-MA-200	4355-FL-145	2000-CO-120	2	4001-AC-117	4001-GH-115	4001-CH-115	46
4355-MC-240	4355-MA-200	4355-FL-155	2000-CO-120	2	4001-AC-127	4001-GH-115	4001-CH-115	46

[^]Complete mandrel does not include cutting ring.



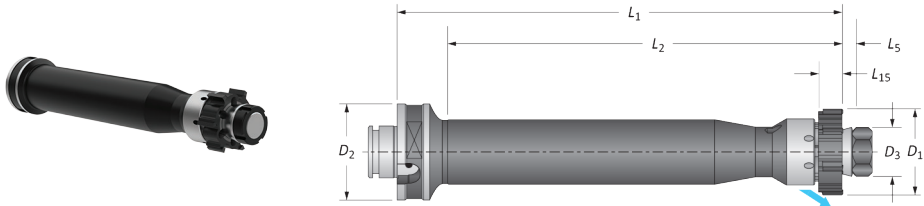
Key on C40: 2

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



4300 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



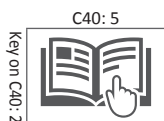
Series	4300	Shank Type	Modular	Application	Through Holes	Coolant	Radial
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Metric (mm)

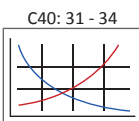
D ₁ Range			Mandrel					Shank	Teeth	Part No. (Complete Mandrel [^])
Metric (mm)	Imperial (inch)		D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂		
17.600 - 21.599	0.6929 - 0.8504		12.0	11.0	11.0	121	156	50	6	4300-MC-010*
21.600 - 25.599	0.8505 - 1.0078		12.0	11.0	12.0	121	156	50	6	4300-MC-020*
25.600 - 32.599	1.0079 - 1.2834		15.6	11.0	14.0	153	188	50	6	4300-MC-030*
32.600 - 40.599	1.2835 - 1.5984		22.0	14.0	16.0	179	214	50	6	4300-MC-040
40.600 - 45.599	1.5985 - 1.7952		25.4	15.0	16.0	201	236	50	6	4300-MC-050
45.600 - 49.599	1.7953 - 1.9527		30.0	20.5	18.5	214	249	50	6	4300-MC-060
49.600 - 60.599	1.9528 - 2.3858		30.0	20.5	18.5	214	249	50	6	4300-MC-070
60.600 - 70.599	2.3859 - 2.7795		40.0	24.5	18.5	237	272	63	6	4300-MC-080
70.600 - 79.599	2.7796 - 3.1338		40.0	24.5	18.5	237	272	63	6	4300-MC-090
79.600 - 90.599	3.1339 - 3.5669		56.0	28.5	18.5	245	280	63	8	4300-MC-100
90.600 - 100.599	3.5670 - 3.9606		56.0	28.5	18.5	245	280	63	8	4300-MC-110

[^]Complete mandrel does not include cutting ring.

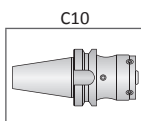
* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.



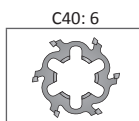
C40: 5



C40: 31 - 34



C10



C40: 6

Key on C40: 2

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

4300 Series Mandrels

Spare Parts



Metric (mm)

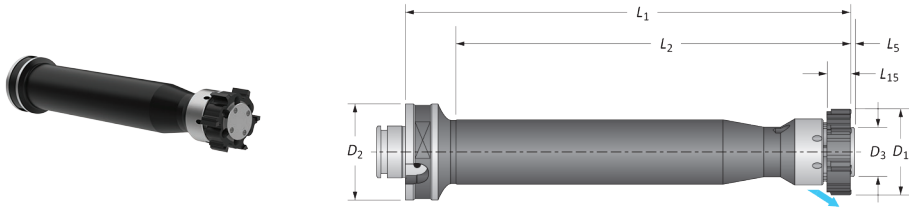
Part No. (Complete Mandrel [^])	Spare Parts				
	1. Drive Pins	Number of Drive Pins	2. Conical Ring	3. Nut	Wrench Size (mm)
4300-MC-010	2000-CO-010	3	2010-AC-010	2000-DA-010	10
4300-MC-020	2000-CO-020	3	2010-AC-010	2000-DA-010	10
4300-MC-030	2000-CO-030	3	2010-AC-020	2000-DA-020	13
4300-MC-040	2000-CO-040	2	2010-AC-030	2000-DA-060	19
4300-MC-050	2000-CO-060	2	2010-AC-040	2000-DA-090	22
4300-MC-060	2000-CO-060	2	2010-AC-050	2000-GH-880	30
4300-MC-070	2000-CO-070	2	2010-AC-050	2000-GH-880	30
4300-MC-080	2000-CO-080	2	2010-AC-060	2000-GH-900	40
4300-MC-090	2000-CO-090	2	2010-AC-060	2000-GH-900	40
4300-MC-100	2000-CO-090	2	2010-AC-070	2000-GH-920	56
4300-MC-110	2000-CO-090	2	2010-AC-070	2000-GH-920	56

[^]Complete mandrel does not include cutting ring.



4305 Series Mandrels

17.600 mm - 100.599 mm (0.6929" - 3.9606")



Series	4305	Shank Type	Modular	Application	Blind Holes	Coolant	Radial
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Metric (mm)

D ₁ Range			Mandrel					Shank	Teeth	Part No. (Complete Mandrel [^])
Metric (mm)	Imperial (inch)		D ₃	L ₅	L ₁₅	L ₂	L ₁	D ₂		
17.600 - 21.599	0.6929 - 0.8504		11.2	1.0	11.0	121	156	50	6	4305-MC-010*
21.600 - 25.599	0.8505 - 1.0078		11.2	1.0	12.0	121	156	50	6	4305-MC-020*
25.600 - 29.599	1.0079 - 1.1653		15.1	1.0	14.0	153	188	50	6	4305-MC-030*
29.600 - 32.599	1.1654 - 1.2834		15.1	1.0	14.0	153	188	50	6	4305-MC-035*
32.600 - 36.599	1.2835 - 1.4409		20.3	1.0	16.0	179	214	50	6	4305-MC-040
36.600 - 40.599	1.4410 - 1.5984		20.3	1.0	16.0	179	214	50	6	4305-MC-045
40.600 - 45.599	1.5985 - 1.7952		24.1	1.0	16.0	201	236	50	6	4305-MC-050
45.600 - 49.599	1.7953 - 1.9527		27.9	1.5	18.5	214	249	50	6	4305-MC-060
49.600 - 55.599	1.9528 - 2.1889		27.9	1.5	18.5	214	249	50	6	4305-MC-070
55.600 - 60.599	2.1890 - 2.3858		27.9	1.5	18.5	214	249	50	6	4305-MC-075
60.600 - 65.599	2.3859 - 2.5826		37.1	1.0	18.5	237	272	63	6	4305-MC-080
65.600 - 70.599	2.5827 - 2.7795		37.1	1.0	18.5	237	272	63	6	4305-MC-085
70.600 - 79.599	2.7796 - 3.1338		37.1	1.0	18.5	237	272	63	6	4305-MC-090
79.600 - 90.599	3.1339 - 3.5669		53.1	1.5	18.5	245	280	63	8	4305-MC-100
90.600 - 100.599	3.5670 - 3.9606		53.1	1.5	18.5	245	280	63	8	4305-MC-110

[^]Complete mandrel does not include cutting ring.

* 17.600 mm - 32.599 mm (0.6929" - 1.2834") diameter cutting rings are available as specials by contacting Application Engineering.



C40

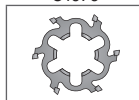
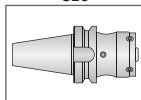
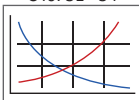
m

C40: 5

C40: 31 - 34

C10

C40: 6



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

4305 Series Mandrels

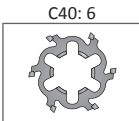
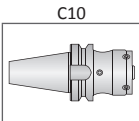
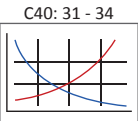
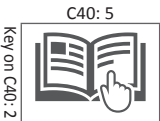
Spare Parts



Metric (mm)

Part No. (Complete Mandrel^)		Spare Parts						
		1.		2.			3.	
		Drive Pins	Number of Drive Pins	Conical Ring	Conical Ring (2nd Expansion)	Conical Ring (3rd Expansion)	Adjusting Key	Wrench Size (mm)
III	4305-MC-010	2000-CO-010	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
	4305-MC-020	2000-CO-020	3	4001-AC-115	4001-AC-215	—	4001-CH-015	10
	4305-MC-030	2000-CO-030	3	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
	4305-MC-035	2000-CO-040	2	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	13
	4305-MC-040	2000-CO-040	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
	4305-MC-045	2000-CO-050	2	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	18
	4305-MC-050	2000-CO-060	2	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	22
	4305-MC-060	2000-CO-060	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
	4305-MC-070	2000-CO-070	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
	4305-MC-075	2000-CO-080	2	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	26
	4305-MC-080	2000-CO-080	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
	4305-MC-085	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
	4305-MC-090	2000-CO-090	2	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	34
	4305-MC-100	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46
	4305-MC-110	2000-CO-090	2	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	46

[^]Complete mandrel does not include cutting ring.



Key on C40: 2

 = Metric (mm)
 = Imperial (in)



Recommended Drilling Data | Metric (mm)

CUTTING RINGS

ISO	Material	Hardness (BHN)	Speed (m/min)		
			Uncoated Carbide	Coated Carbide	Cermet
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	7 - 15	60 - 80	90 - 300
		180 - 250	6 - 10	40 - 70	80 - 200
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	7 - 15	60 - 80	90 - 300
		180 - 275	6 - 10	40 - 70	80 - 200
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	7 - 15	60 - 80	90 - 300
		180 - 325	6 - 10	40 - 70	80 - 200
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	6 - 10	40 - 70	80 - 200
		180 - 375	4 - 8	30 - 50	60 - 150
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	3 - 6	15 - 30	60 - 120
	Structural Steel A36, A285, A516, etc.	125 - 180	7 - 15	60 - 80	90 - 300
M		180 - 350	6 - 10	40 - 70	80 - 200
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	7 - 15	60 - 80	90 - 300
		200 - 250	6 - 10	40 - 70	80 - 200
	Stainless Steel 400 Series 416, 420, etc.	135 - 350	4 - 8	30 - 50	60 - 150
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	4 - 8	30 - 50	60 - 150
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	15 - 30	50 - 70	—
		> 200	10 - 20	50 - 70	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	8 - 12	30 - 50	60 - 120
	Copper and Alloys, and Brass	< 500	10 - 18	100 - 200	—
	Bronze, and Bronze Phosphorous	< 180	10 - 20	80 - 160	100 - 300
N	Aluminum and Alloys	< 150	15 - 30	100 - 200	—
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	4 - 8	30 - 50	—
	Titanium Alloy	140 - 310	4 - 8	30 - 50	—

Formulas

1. $\text{RPM} = (318.47 \cdot \text{m/min}) / \text{DIA}$ where: RPM = revolutions per minute (rev/min) m/min = speed (m/min) DIA = diameter of drill (mm)	2. $\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$ where: mm/min = mm per minute (mm/min) RPM = revolutions per minute (rev/min) mm/rev = feed rate (mm/rev)
3. $\text{m/min} = \text{RPM} \cdot 0.003 \cdot \text{DIA}$ where: m/min = speed (m/min) RPM = revolutions per minute (rev/min) DIA = diameter of drill (mm)	

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Metric (mm)

CUTTING RINGS

Recommended Feed (mm/rev) by Reamer Diameter					
17.60 mm - 40.00 mm		40.01 mm - 80.00 mm		80.01 mm - 200.00 mm	
Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M
0.50 - 0.80	0.60 - 1.20	0.50 - 1.00	0.80 - 1.60	0.80 - 1.50	1.00 - 2.20
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.50 - 0.80	0.60 - 1.20	0.50 - 1.00	0.80 - 1.60	0.80 - 1.50	1.00 - 2.20
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.50 - 0.80	0.60 - 1.20	0.50 - 1.00	0.80 - 1.60	0.80 - 1.50	1.00 - 2.20
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.50 - 0.80	0.60 - 1.20	0.50 - 1.00	0.80 - 1.60	0.80 - 1.50	1.00 - 2.20
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.30 - 0.60	0.40 - 0.80	0.40 - 0.80	0.50 - 1.00	0.60 - 1.00	0.70 - 1.40
0.50 - 0.80	0.60 - 1.20	0.50 - 1.00	0.80 - 1.60	0.80 - 1.50	1.00 - 2.20
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.50 - 0.80	0.60 - 1.20	0.50 - 1.00	0.80 - 1.60	0.80 - 1.50	1.00 - 2.20
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.40 - 0.70	0.40 - 1.00	0.50 - 0.80	0.60 - 1.40	0.80 - 1.20	1.00 - 2.00
0.40 - 1.00	0.60 - 1.50	0.60 - 1.30	0.80 - 1.60	0.80 - 1.70	1.00 - 2.25
0.40 - 1.00	0.60 - 1.50	0.60 - 1.30	0.80 - 1.60	0.80 - 1.70	1.00 - 2.25
0.40 - 1.00	0.60 - 1.50	0.60 - 1.30	0.80 - 1.60	0.80 - 1.70	1.00 - 2.25
0.50 - 0.80	—	0.60 - 1.00	—	0.80 - 1.40	—
0.30 - 0.60	—	0.40 - 0.80	—	0.60 - 1.00	—
0.50 - 0.80	—	0.60 - 1.00	—	0.80 - 1.40	—
0.30 - 0.50	—	0.40 - 0.60	—	0.50 - 0.70	—
0.30 - 0.50	—	0.40 - 0.60	—	0.50 - 0.70	—



C40



Recommended Drilling Data | Imperial (in)

CUTTING RINGS

ISO	Material	Hardness (BHN)	Speed (SFM)		
			Uncoated Carbide	Coated Carbide	Cermet
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	25 - 50	200 - 260	300 - 980
		180 - 250	20 - 35	130 - 230	260 - 660
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180	25 - 50	200 - 260	300 - 980
		180 - 275	20 - 35	130 - 230	260 - 660
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180	25 - 50	200 - 260	300 - 980
		180 - 325	20 - 35	130 - 230	260 - 660
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180	20 - 35	130 - 230	260 - 660
		180 - 375	15 - 25	100 - 160	200 - 490
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450	10 - 20	50 - 100	200 - 390
	Structural Steel A36, A285, A516, etc.	125 - 180	25 - 50	200 - 260	300 - 980
M		180 - 350	20 - 35	130 - 230	260 - 660
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200	25 - 50	200 - 260	300 - 980
		200 - 250	20 - 35	130 - 230	260 - 660
	Stainless Steel 400 Series 416, 420, etc.	135 - 350	15 - 25	100 - 160	200 - 490
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275	15 - 25	100 - 160	200 - 490
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	50 - 100	160 - 230	—
		> 200	35 - 65	160 - 230	—
	Spheroidal Cast Iron (Ferritic)	260 - 320	25 - 40	100 - 160	200 - 400
	Copper and Alloys, and Brass	< 500	35 - 60	330 - 660	—
	Bronze, and Bronze Phosphorous	< 180	35 - 65	260 - 520	330 - 980
S	Aluminum and Alloys	< 150	50 - 100	330 - 660	—
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	15 - 25	60 - 200	—
	Titanium Alloy	140 - 310	15 - 25	60 - 200	—

Formulas

1.	RPM	= (3.82 • SFM) / DIA
	where:	
	RPM	= revolutions per minute (rev/min)
	SFM	= speed (ft/min)
	DIA	= diameter of drill (inch)

2.	IPM	= RPM • IPR
	where:	
	IPM	= inches per minute (in/min)
	RPM	= revolutions per minute (rev/min)
	IPR	= feed rate (in/rev)

3.	SFM	= RPM • 0.262 • DIA
	where:	
	SFM	= speed (ft/min)
	RPM	= revolutions per minute (rev/min)
	DIA	= diameter of drill (inch)

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Imperial (in)

CUTTING RINGS

Recommended Feed (IPR) by Reamer Diameter					
0.6929" - 1.5750"		1.5751" - 3.1500"		3.1501" - 7.8972"	
Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M	Lead A, G	Lead E, N, M
0.020 - 0.031	0.024 - 0.047	0.020 - 0.039	0.031 - 0.063	0.031 - 0.059	0.039 - 0.087
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.020 - 0.031	0.024 - 0.047	0.020 - 0.039	0.031 - 0.063	0.031 - 0.059	0.039 - 0.087
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.020 - 0.031	0.024 - 0.047	0.020 - 0.039	0.031 - 0.063	0.031 - 0.059	0.039 - 0.087
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.020 - 0.031	0.024 - 0.047	0.020 - 0.039	0.031 - 0.063	0.031 - 0.059	0.039 - 0.087
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.012 - 0.024	0.016 - 0.031	0.016 - 0.031	0.020 - 0.039	0.024 - 0.039	0.028 - 0.055
0.020 - 0.031	0.024 - 0.047	0.020 - 0.039	0.031 - 0.063	0.031 - 0.059	0.039 - 0.087
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.020 - 0.031	0.024 - 0.047	0.020 - 0.039	0.031 - 0.063	0.031 - 0.059	0.039 - 0.087
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.016 - 0.028	0.016 - 0.039	0.020 - 0.031	0.024 - 0.055	0.031 - 0.047	0.039 - 0.079
0.016 - 0.039	0.024 - 0.059	0.024 - 0.051	0.031 - 0.063	0.031 - 0.067	0.039 - 0.088
0.016 - 0.039	0.024 - 0.059	0.024 - 0.051	0.031 - 0.063	0.031 - 0.067	0.039 - 0.088
0.016 - 0.039	0.024 - 0.059	0.024 - 0.051	0.031 - 0.063	0.031 - 0.067	0.039 - 0.088
0.020 - 0.031	—	0.024 - 0.039	—	0.031 - 0.055	—
0.012 - 0.024	—	0.016 - 0.031	—	0.024 - 0.039	—
0.020 - 0.031	—	0.024 - 0.039	—	0.031 - 0.055	—
0.012 - 0.020	—	0.016 - 0.024	—	0.020 - 0.028	—
0.012 - 0.020	—	0.016 - 0.024	—	0.020 - 0.028	—





Stock Allowance and Coolant | Metric (mm)

CUTTING RINGS

ISO	Material	Hardness (BHN)	Coolant	Recommended Stock (mm) by Reamer Diameter*		
				17.60 mm - 40.00 mm	40.01 mm - 80.00 mm	80.01 mm - 200.00 mm
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.15 - 0.30	0.20 - 0.40	0.25 - 0.50
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180				
		180 - 250				
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180				
		180 - 325				
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180				
		180 - 375				
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450				
	Structural Steel A36, A285, A516, etc.	125 - 180				
M		180 - 350	Water Soluble / Cutting Oil	0.15 - 0.30	0.20 - 0.40	0.25 - 0.50
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200				
		200 - 250				
	Stainless Steel 400 Series 416, 420, etc.	135 - 350				
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275				
	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200				
		> 200				
	Spheroidal Cast Iron (Ferritic)	260 - 320				
	Copper and Alloys, and Brass	< 500				
N	Bronze, and Bronze Phosphorous	< 180	Water Soluble / Cutting Oil	0.15 - 0.30	0.20 - 0.40	0.25 - 0.50
	Aluminum and Alloys	< 150				
	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310				
S	Titanium Alloy	140 - 310	Water Soluble / Cutting Oil	0.20 - 0.40	0.30 - 0.40	0.30 - 0.50

*Stock value is on diameter.



Stock Allowance and Coolant | Imperial (in)

CUTTING RINGS						
ISO Material		Hardness (BHN)	Coolant	Recommended Stock (in) by Reamer Diameter*		
				0.6929" - 1.5750"	1.5751" - 3.1500"	3.1501" - 7.8972"
P	Free-Machining Steel 1118, 1215, 12L14, etc.	100 - 180	Water Soluble / Cutting Oil	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020
		180 - 250				
	Low-Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 180				
	180 - 275					
	Medium-Carbon Steel 1030, 1040, 1050, 1527, 1140, etc.	125 - 180				
	180 - 325					
	Alloy Steel 4140, 5140, 8640, etc.	125 - 180				
	180 - 375					
	High-Strength Alloy 4340, 4330V, 300M, etc.	240 - 450				
Structural Steel A36, A285, A516, etc.	125 - 180					
	180 - 350					
	Tool Steel H-13, H-21, A-4, S-3, etc.	150 - 200				
		200 - 250				
M	Stainless Steel 400 Series 416, 420, etc.	135 - 350	Water Soluble / Cutting Oil	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020
	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 275				
K	Grey and Ductile Cast Iron, Spheroidal Cast Iron (Pearlitic)	< 200	Water Soluble / Cutting Oil	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020
		> 200				
	Spheroidal Cast Iron (Ferritic)	260 - 320				
N	Copper and Alloys, and Brass	< 500	Water Soluble	0.006 - 0.012	0.008 - 0.016	0.010 - 0.020
	Bronze, and Bronze Phosphorous	< 180	Water Soluble / Cutting Oil			
	Aluminum and Alloys	< 150				
S	High-Temp Alloy Hastelloy® B, Inconel® 600, etc.	140 - 310	Water Soluble / Cutting Oil	0.008 - 0.016	0.012 - 0.016	0.012 - 0.020
	Titanium Alloy	140 - 310				



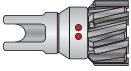
C40

*Stock value is on diameter.



Reconditioning Service

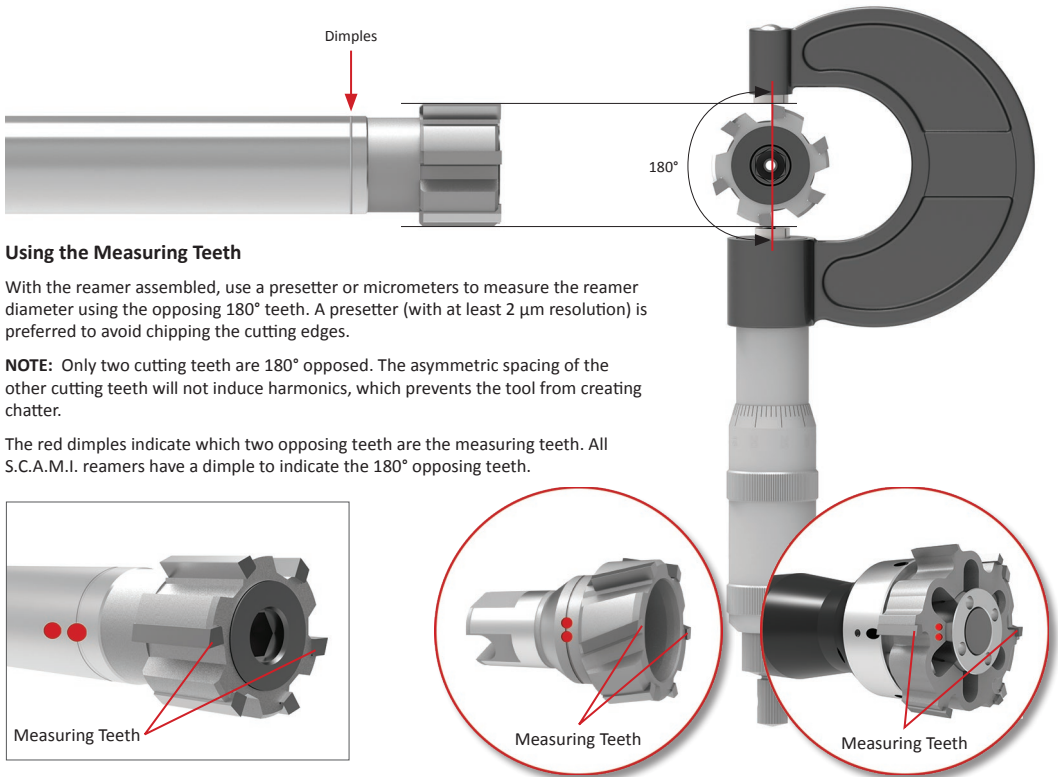
All ALVAN reamers can be reconditioned to help reduce your overall tooling costs. This service is provided through Allied Machine & Engineering by utilizing the expertise of S.C.A.M.I. We will process the tools with a 25-35 workday lead time, depending on the style, the date we receive the tools, and the purchase order.

Reamer Style	Lead Time (workdays)	Part No.	Reconditioned Part No.
 Replaceable Head*	25	I7405-SVG-10000	RI7405SVG10000
 Monobloc	35	AL3620I04853	AL3620I04853 RP1
 Cutting Ring	35	AL2TIAI05820	AL2TIAI05820 RP1

*Only 7000 series heads are eligible for reconditioning.



Diameter Measurement



Using the Measuring Teeth

With the reamer assembled, use a presetter or micrometers to measure the reamer diameter using the opposing 180° teeth. A presetter (with at least 2 μm resolution) is preferred to avoid chipping the cutting edges.

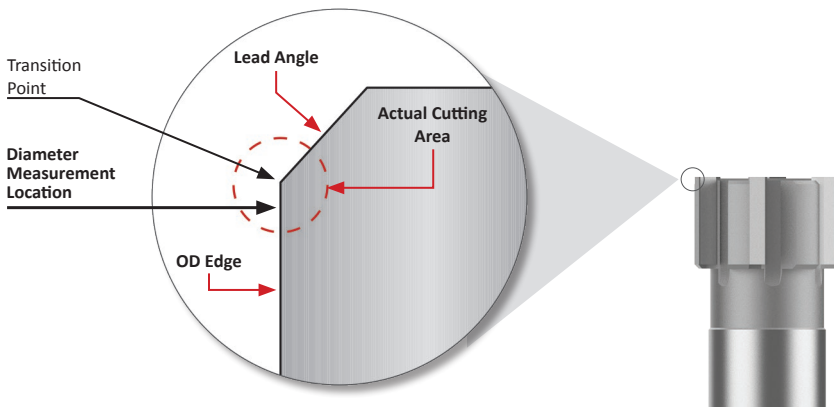
NOTE: Only two cutting teeth are 180° opposed. The asymmetric spacing of the other cutting teeth will not induce harmonics, which prevents the tool from creating chatter.

The red dimples indicate which two opposing teeth are the measuring teeth. All S.C.A.M.I. reamers have a dimple to indicate the 180° opposing teeth.

Where to Take the Measurement

When measuring the diameter, take the measurement from the area of the cutting tooth just below the transition from the lead angle to the OD edge. See the illustration below.

The back side of the OD edge has a back taper. This is why measuring from the location just below the lead angle/OD edge transition point results in the most accurate measurement (before the taper begins).





TIR Measurement

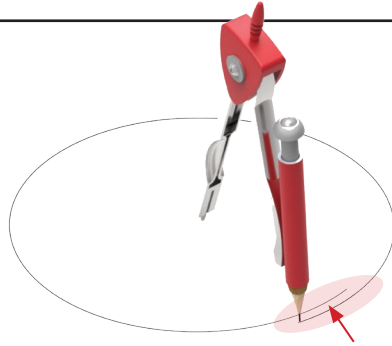
What is TIR?

Total indicator runout (TIR) refers to the distance to which the reamer is cutting off-center. In an ideal situation, the tool would begin in the exact center of the hole, and it would then rotate and cut in a perfect circle. This would result in a TIR of 0.

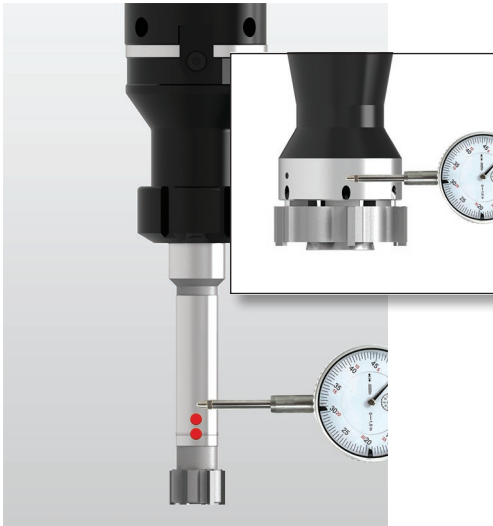
Because a perfect TIR of 0 is not practical, the goal is to maintain a TIR as close to 0 as possible. The closer the TIR is to 0, the better the reamer will perform.

Allied Machine recommends a TIR of $< 0.013 \text{ mm}$ ($0.0005''$).

Think of attempting to draw a perfect circle with a drafting compass, but the pencil runs slightly outside the point where the circle began because the center point shifted during the pencil's path. This slight area of overlap would be the TIR.



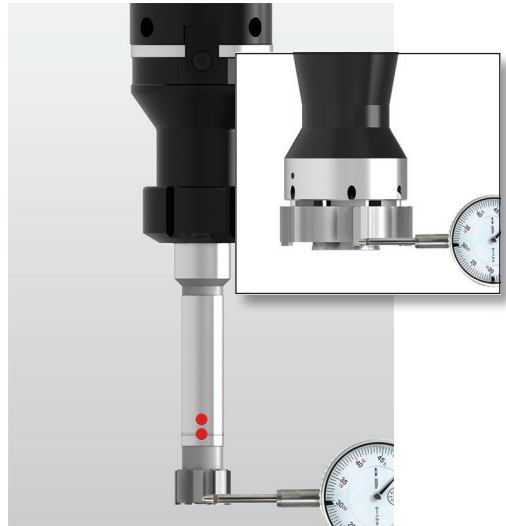
TIR: How far from center the tool will move during its path.



Step 1:

Check the TIR first on the mandrel (or ground) area of the reamer. Center the indicator in line with the dimple.

Measure the TIR by rotating the tool until the indicator reaches the highest value.



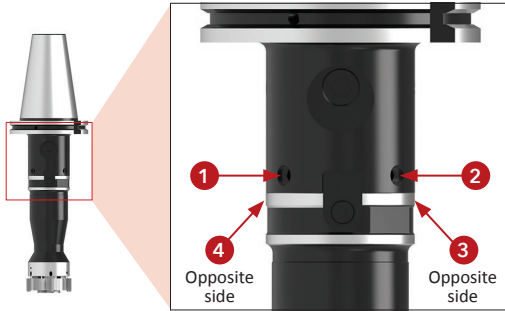
Step 2:

Next, check the TIR on the cutting teeth of the reamer.

NOTE: Rotate the tool counterclockwise to avoid chipping the cutting teeth with the indicator.



TIR Adjustment



Step 1:

Place the tool into the machine spindle. Make contact with the four radial adjustment screws in a concentric fashion (this results in equal pressure surrounding the tool).

Tighten #1, then #3, followed by #2 and #4.



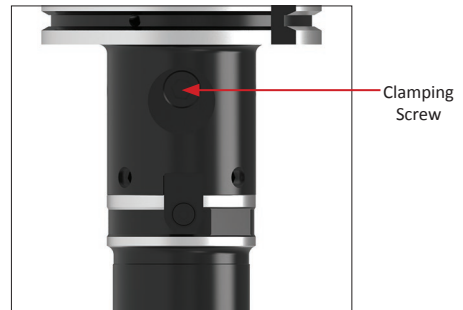
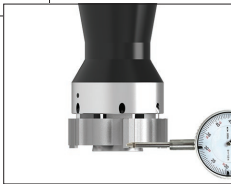
Step 2:

Swipe the dial indicator around the ground portion of the arbor near the coolant outlet holes to verify the TIR.

The TIR should be within 0.013 mm (0.0005") (as close to 0 as possible). This will ensure the TIR check on the cutting teeth will be more true. It also means the arbor is running true to the shank.

Step 3:

Once the TIR is checked on the arbor, check the TIR on the cutting teeth. Rotate the tool counterclockwise to avoid chipping the cutting teeth.

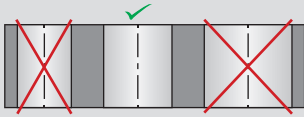


Step 4:

Tighten down the central clamping screws. During the tightening, the tool body will shift slightly. Repeat the TIR check on the cutting teeth and adjust as necessary.

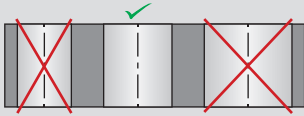


Troubleshooting Guide



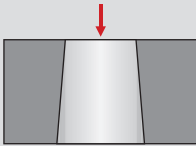
Oversized Hole

- Reamer is running eccentric to the center of the machine spindle. ▶ Use modular system with radial adjustment.
- Excessive misalignment causing reamer to cut on back taper. ▶ Fix the misalignment.
- Material buildup on cutting edges. ▶ Replace the coolant or change the cutting speed.
- Reamer diameter is too large. ▶ Use smaller reamer or regrind existing reamer.



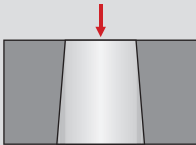
Undersized Hole

- The reamer diameter is too small. ▶ Use larger reamer.
- The reamer diameter is worn. ▶ Expand, regrind, or replace the reamer.
- The coolant is not suitable. ▶ Replace the coolant.
- Stock allowance is too small. ▶ Increase the stock allowance.
- The cutting speed is too low. ▶ Increase the cutting speed.



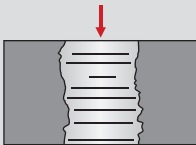
Tapered Hole

- Excessive misalignment. ▶ Correct the misalignment.



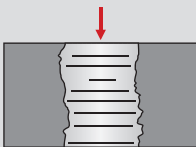
Burr at Hole Entry

- Excessive misalignment. ▶ Correct the misalignment.



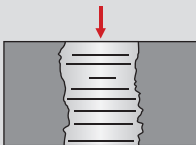
Hole is Not Straight

- Concentricity and alignment error between the workpiece and the tool. ▶ Correct the misalignment and use the modular system with radial adjustment.
- Asymmetrical cutting or angled surfaces. ▶ Create a chamfer on the lead-in.



Poor Hole Finish

- One cutting edge is chipped. ▶ Regrind the reamer.
- The lead-in is irregular. ▶ Regrind the reamer.
- Back taper on the cutting edge is too great. ▶ Regrind the reamer.
- Excessive misalignment. ▶ Correct the misalignment or use the modular system.
- Cutting data is not correct. ▶ Verify the cutting data.
- Poor chip evacuation. ▶ Verify the coolant volume and pressure or use through-tool coolant.



Reamer Creates Excessive Torque Loading

- Back taper on the cutting edge is too small. ▶ Regrind the reamer.
- The radially ground land is too wide. ▶ Regrind the reamer.
- The coolant is not suitable. ▶ Replace the coolant.

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.)
Preexisting 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	
Rigidity: _____ ☐ Excellent ☐ Good ☐ Poor	Orientation: _____ ☐ Vertical ☐ Horizontal	Tool Rotating: _____ ☐ Yes ☐ No
		Thrust: _____ lbs/N

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



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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.

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