



ALLIED MACHINE & ENGINEERING CORP

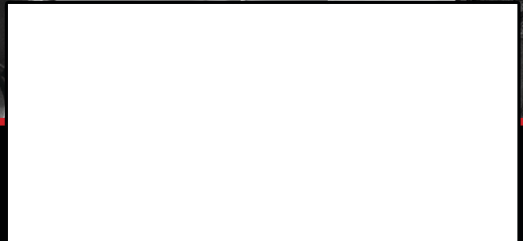


ALVAN[®] Reamers Catalog

www.alliedmachine.com



Represented by:





ALLIED MACHINE & ENGINEERING CORP

Our focus on product excellence, service to the customer, respect for the individual and competitive advantage enables us to deliver outstanding results in a diverse range of manufacturing, production and process engineering industries.

As a result, Allied Machine high performance tooling is helping countless businesses around the world to produce better products with greater accuracy, increased speed and higher quality.

Precision, performance and productivity are core features of Allied Machine tooling. Our commitment to innovation in all aspects of holmaking technology means we continually set new industry standards in production efficiency, tool life and manufacturing cost improvements.

This product catalog provides detailed information on products in a comprehensive, easy to use, and informative single source reference guide. However, we recognize that every company's needs are unique, which is why our customer service and technical support teams are always available to provide help and advice, should you need it.

Whatever your need, Allied Machine & Engineering Corp. delivers high performance tooling on the cutting edge.

 **WARNING**

Tool failure during use can cause serious injury. Follow safety precautions and instructions that accompany machinery and all tools.

Wear safety glasses and appropriate safety equipment at all times when machinery is operating.



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

Allied Machine & Engineering Corp. is pleased to offer 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, making it 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.

Visit our website at www.alliedmachine.com for additional information about all Allied products, or contact our Application Engineering Department for technical assistance.

Table of Contents

S.C.A.M.I. Reconditioning Service	Page 4
Replaceable Head Reamers	Pages 5-15
Replaceable Head Speeds & Feeds	Pages 16 - 17
Replaceable Head Set-Up Information	Page 18
Monobloc Reamers	Pages 19 - 29
ALVAN Reamer Troubleshooting Guide	Page 30
Cutting Rings	Pages 31 - 47
Cutting Rings Speeds & Feeds	Pages 48-55
Monobloc and Cutting Ring Instructions	Page 56
ALVAN Accessories	Page 59 - 65
ALVAN Reamer Troubleshooting Guide	Page 66
Warranty	Page 67

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Toll Free USA & Canada: (800) 223-5140
International Country Code: 01
Website Address: www.alliedmachine.com
Email Address: info@alliedmachine.com



S.C.A.M.I. Reconditioning Service

All ALVAN® Reamers can be reconditioned to help reduce your overall tooling costs. This service is provided through Allied Machine & Engineering Corp. by utilizing the expertise of S.C.A.M.I.

Please ship any reamer, safely packaged, with a purchase order to the address shown below.

Item numbers for reconditioning will be as shown in the example below:

Monobloc (35 work days)

New item number: AL3620I04853
Reconditioned item number: AL3620I04853RP1

Ring (35 work days)

New item number: AL2TIAI05820
Reconditioned item number: AL2TIAI05820RP1

New Replaceable Head (25 work days)

New item number: I7405-SVG-10000
Reconditioned item number: R I7405SVG10000

We will process the tools with a 25 - 35 work day lead time, depending on style, from the date we receive the tools and purchase order.

Please ship all tools with purchase order to:

Allied Machine & Engineering Corp.
Attn: Regrind Department
120 Deeds Drive
Dover, OH 44622
USA

Replaceable Heads



CONTENTS

Reference	6
Lead Angle Descriptions	7
Replaceable Head Item Descriptions	8
Recommended Lead Angles	9
Short Length Cylindrical Shanks	10-11
Long Length Cylindrical Shanks	12-13
Standard Length Modular Shanks	14-15
Speeds & Feeds	16-17
Set-up Information	18

Features & Benefits

- Fixed diameter heads allow for on-machine replacement, significantly reducing set-up time
- Quick delivery on uncoated fixed diameter heads as fast as 10 days
- Replaceable design allows for multiple diameters within the same arbor, reducing inventory requirements
- Several leads provide tailored solution for each application
- H7 tolerance capable on fixed diameter heads



**ALLIED MACHINE
& ENGINEERING CORP**



ALVAN® Replaceable Head Reamers

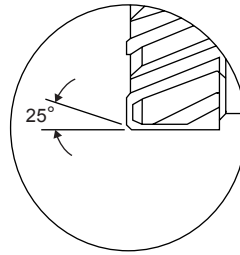
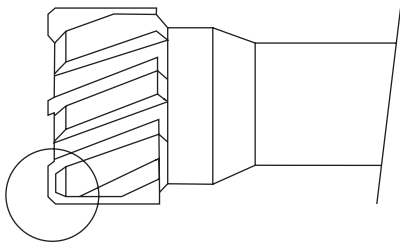
Reference Page

I	7700	-	K	N	G	-	18000
Unit of Measure	Head Style		Substrate	Coating	Lead		Diameter
I - Inch	7700 - Fixed Helical Flute		K - Carbide	L - Uncoated Carbide	G T		Inch - X.XXXX
Blank - Metric	7705 - Expandable Helical Flute		S - Cermet	V - Uncoated Cermet	A F		Metric - XX.XXX
	7400 - Fixed Straight Flute			N - TiN	N M		
	7405 - Expandable Straight Flute			C - TiCN	L E		
				A - TiAlN	V X		
					J Y		
					W		

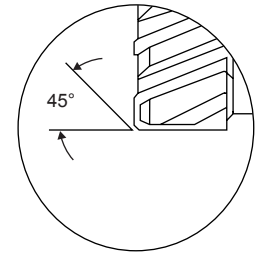
R	I	7700	K	N	G	18000
Reconditioned	Unit of Measure	Head Style	Substrate	Coating	Lead	Diameter
R	I - Inch	7700 - Fixed Helical Flute	K - Carbide	L - Uncoated Carbide	G T	Inch - X.XXXX
	Blank - Metric	7705 - Expandable Helical Flute	S - Cermet	V - Uncoated Cermet	A F	Metric - XX.XXX
		7400 - Fixed Straight Flute		N - TiN	N M	
		7405 - Expandable Straight Flute		C - TiCN	L E	
				A - TiAlN	V X	
				J Y		
				W		



Left Hand Helical Flute Leads

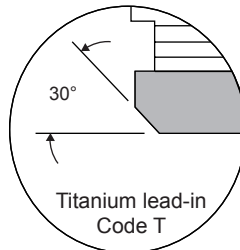
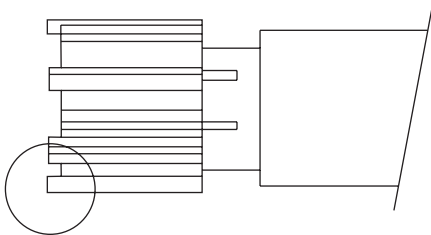


“E” lead-in (left hand helical flutes) is standard and suitable for most materials (only through hole)

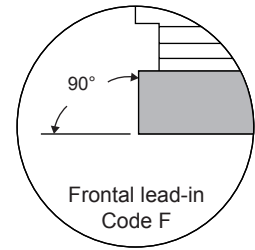


“M” lead-in (left hand helical flutes) may provide better penetration rates in steels over 200 BHN (only through hole)

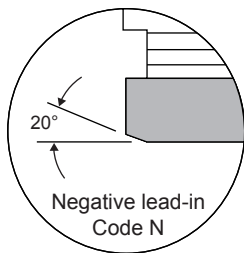
Straight Flute Leads



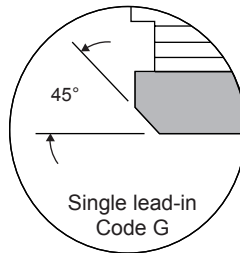
“T” lead-in is suitable for titanium based alloys



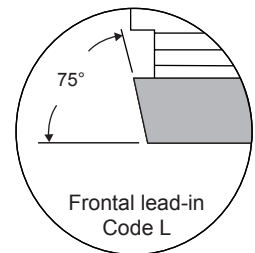
“F” lead-in can be used for stock removal at the bottom of the hole. Reduce the feed by 40% of the values on pages 16-17 (“Y” lead with chipbreaker)



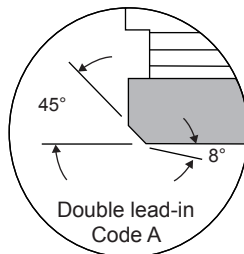
“N” lead-in is ideal for through holes. It is possible to increase the feed up to 100% of the values on pages 16-17



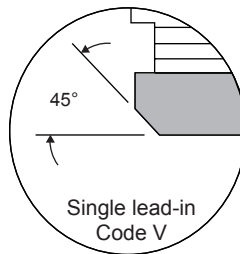
“G” lead-in is standard and suitable for most materials (“X” lead with chipbreaker)



“L” lead-in may provide improved straightness. Reduce the feed by 40% of the values on pages 16-17 (“W” lead with chipbreaker)



“A” lead-in can be used to improve finish



“V” lead-in is suitable for most materials and increases tool life (“J” lead with chipbreaker)

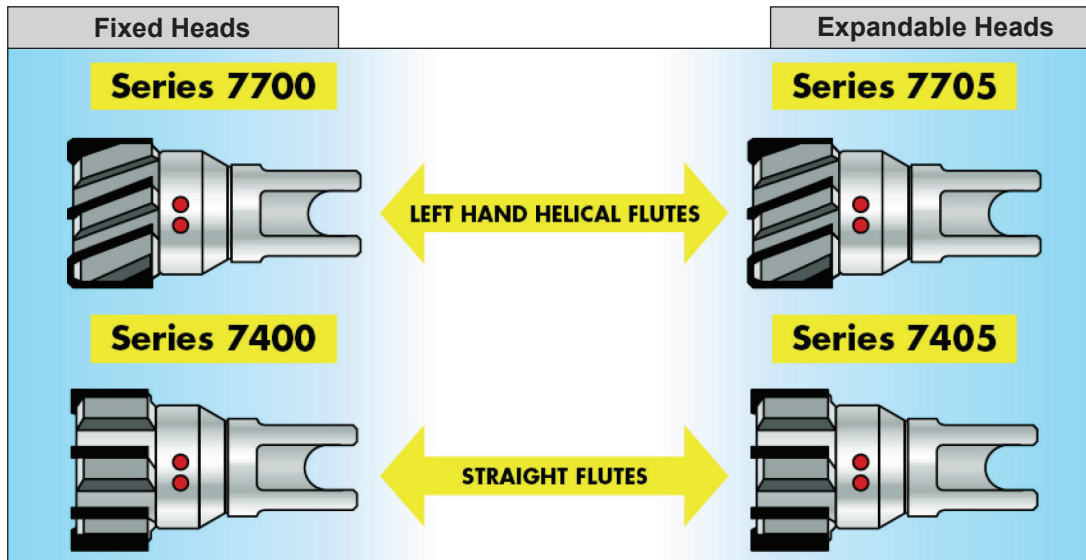


ALVAN[®] Replaceable Head Reamers

0.4656" - 2.3858" (11,80 - 60,60 mm)

Fixed Heads (7700/7400) H7 tolerance		
Diameter in(mm)	Tolerance in(mm)	
	Minimum	Maximum
0.4646" - 0.7086" (11,800 - 18,000)	+0" (+0)	+0.0007" (+0,018)
0.7087" - 1.1811" (18,001 - 30,000)	+0" (+0)	+0.0008" (+0,021)
1.1812" - 1.9685" (30,001 - 50,000)	+0" (+0)	+0.0010" (+0,025)
1.9686" - 2.3858" (50,001 - 60,600)	+0" (+0)	+0.0012" (+0,030)

Expandable Heads (7705/7405)		
Diameter in(mm)	Tolerance in(mm)	
	Minimum	Maximum
0.4646" - 0.7086" (11,800 - 18,000)	-0.0002" (-0,005)	+0.0002" (+0,005)
0.7087" - 1.1811" (18,001 - 30,000)	-0.0002" (-0,005)	+0.0002" (+0,005)
1.1812" - 1.5748" (30,001 - 40,000)	-0.0002" (-0,005)	+0.0002" (+0,005)
1.5749" - 1.9685" (40,001 - 50,000)	-0.0002" (-0,005)	+0.0002" (+0,005)
1.9686" - 2.3858" (50,001 - 60,600)	-0.0002" (-0,005)	+0.0002" (+0,005)



Code	Description
xxxx - KLx - Ø	Carbide cutting edges K05/K10
xxxx - KNx - Ø	Carbide cutting edges K05/K10 TIN-coated
xxxx - KCx - Ø	Carbide cutting edges K05/K10 TiCN-coated
xxxx - KAx - Ø	Carbide cutting edges K05/K10 TiAlN-coated
xxxx - SVx - Ø	Cermet cutting edges P10/P15
xxxx - SNx - Ø	Cermet cutting edges P10/P15 TIN-coated
xxxx - SCx - Ø	Cermet cutting edges P10/P15 TiCN-coated
xxxx - SAx - Ø	Cermet cutting edges P10/P15 TiAlN-coated



ALVAN® Replaceable Head Reamers

Recommended Lead Angles



Material	Material Hardness BHN	Lead Angle*
Iron and Mild Steel (C<0.2%)	125	G-A-E
Mild Steel (C 0.2 - 0.3%)	150	N-A-E
Mild Steel (C 0.3 - 0.4%)	200	N-A-E
Mild Steel (C 0.4 - 0.5%)	225	N-A-E
Alloy Steel	≤ 225	G-N-A-E
Alloy Steel	270	G-N-E
Alloy Steel	300	G-N-M
Alloy Steel	> 300	G-N-M
Stainless and Refractory Steel	from 125 to 270	G-N-M
Grey, Spheroidal and Malleable Cast Iron	from 150 to 320	G-N-E
Titanium and Titanium Alloy		T-E
Tempered Steel	48 - 64 Rc	G-N-M
Pure Copper		G-N-E
Electrolytic Copper		G-N-E
Brass / Bronze		G-N-E
Aluminum Alloy < 10% Si		G-A-E
Aluminum Alloy > 10% Si		G-E
Magnesium Alloy		G-A-E
Thermoplastic Material		G-E
Thermosetting Resins		G-E
Stiffened Synthetic Material		G-E

* Negative lead-in “N” can be used on a large range of materials. Please contact our Application Engineering Department. See page 7 for lead angle details.

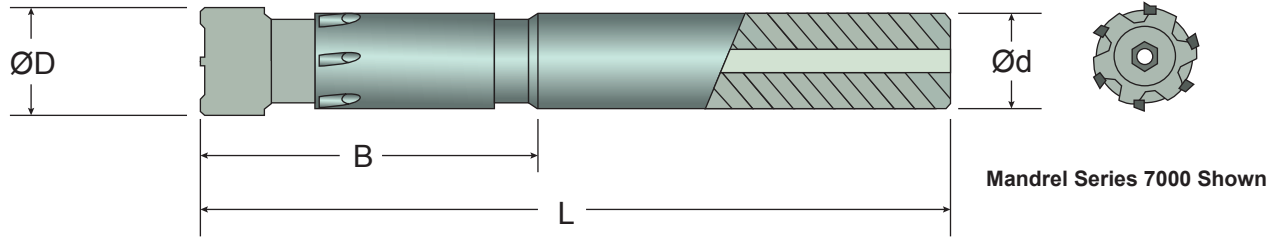
Do not use negative lead-in on blind holes.



ALVAN® Replaceable Head Reamers

Short Length

Cylindrical Shank



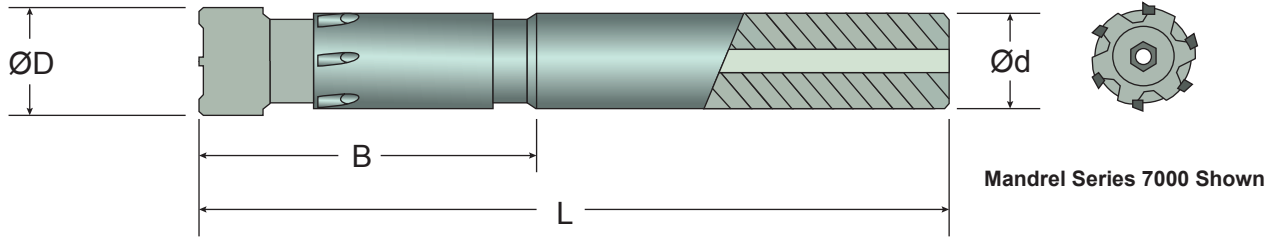
MANDREL CODE WITHOUT HEAD & SCREW		Ø D		B MM	L MM	Ød ^{h6} MM	LOCKING SCREW FIXED HEADS		LOCKING SCREW EXPANDING HEADS	
Series 7000	Series 7001	IN	MM				Series 7000	Series 7001	Series 7000	Series 7001
7000-MC-001	7001-MC-001	0.4646 - 0.4964	11,800 - 12,609	50	95	12	7000-VI-001	7001-VI-001	7000-VI-012	7001-VI-012
		0.4965 - 0.5357	12,610 - 13,609						7000-VI-013	7001-VI-013
		0.5358 - 0.5751	13,610 - 14,609						7000-VI-014	7001-VI-014
7000-MC-002	7001-MC-002	0.5752 - 0.6145	14,610 - 15,609	65	113	16	7000-VI-002	7001-VI-002	7000-VI-015	7001-VI-015
		0.6146 - 0.6538	15,610 - 16,609						7000-VI-016	7001-VI-016
		0.6539 - 0.6932	16,610 - 17,609						7000-VI-017	7001-VI-017
7000-MC-003	7001-MC-003	0.6933 - 0.7326	17,610 - 18,609	75	125	20	7000-VI-003	7001-VI-003	7000-VI-018	7001-VI-018
		0.7327 - 0.7719	18,610 - 19,609						7000-VI-019	7001-VI-019
		0.7720 - 0.8113	19,610 - 20,609						7000-VI-020	7001-VI-020
		0.8114 - 0.8507	20,610 - 21,609						7000-VI-021	7001-VI-021
7000-MC-004	7001-MC-004	0.8508 - 0.8901	21,610 - 22,609	85	135	20	7000-VI-004	7001-VI-004	7000-VI-022	7001-VI-022
		0.8902 - 0.9294	22,610 - 23,609						7000-VI-023	7001-VI-023
		0.9295 - 0.9688	23,610 - 24,609						7000-VI-024	7001-VI-024
		0.9689 - 1.0082	24,610 - 25,609						7000-VI-025	7001-VI-025
		1.0083 - 1.0475	25,610 - 26,609						7000-VI-026	7001-VI-026
7000-MC-005	7001-MC-005	1.0476 - 1.0869	26,610 - 27,609	105	161	25	7000-VI-005	7001-VI-005	7000-VI-027	7001-VI-027
		1.0870 - 1.1263	27,610 - 28,609						7000-VI-028	7001-VI-028
		1.1264 - 1.1656	28,610 - 29,609						7000-VI-029	7001-VI-029
		1.1657 - 1.2050	29,610 - 30,609						7000-VI-030	7001-VI-030
		1.2051 - 1.2444	30,610 - 31,609						7000-VI-031	7001-VI-031
		1.2445 - 1.2838	31,610 - 32,609						7000-VI-032	7001-VI-032
7000-MC-006	7001-MC-006	1.2839 - 1.3231	32,610 - 33,609	120	180	32	7000-VI-006	7001-VI-006	7000-VI-033	7001-VI-033
		1.3232 - 1.3625	33,610 - 34,609						7000-VI-034	7001-VI-034
		1.3626 - 1.4019	34,610 - 35,609						7000-VI-035	7001-VI-035
		1.4020 - 1.4412	35,610 - 36,609						7000-VI-036	7001-VI-036
		1.4413 - 1.4806	36,610 - 37,609						7000-VI-037	7001-VI-037
		1.4807 - 1.5200	37,610 - 38,609						7000-VI-038	7001-VI-038
		1.5201 - 1.5593	38,610 - 39,609						7000-VI-039	7001-VI-039
		1.5594 - 1.5987	39,610 - 40,609						7000-VI-040	7001-VI-040
7000-MC-007	7001-MC-007	1.5988 - 1.6381	40,610 - 41,609	120	180	32	7000-VI-007	7001-VI-007	7000-VI-041	7001-VI-041
		1.6382 - 1.6775	41,610 - 42,609						7000-VI-042	7001-VI-042
		1.6776 - 1.7168	42,610 - 43,609						7000-VI-043	7001-VI-043
		1.7169 - 1.7562	43,610 - 44,609						7000-VI-044	7001-VI-044
		1.7563 - 1.7956	44,610 - 45,609						7000-VI-045	7001-VI-045

- Stocked
- Non-Stocked

ALVAN® Replaceable Head Reamers

Short Length

Cylindrical Shank



MANDREL CODE WITHOUT HEAD & SCREW		Ø D		B MM	L MM	Ød ^{h6} MM	LOCKING SCREW FIXED HEADS		LOCKING SCREW EXPANDING HEADS	
Series 7000	Series 7001	IN	MM				Series 7000	Series 7001	Series 7000	Series 7001
7000-MC-007	7001-MC-007	1.7957 - 1.8349	45,610 - 46,609	120	180	32	7000-VI-007	7001-VI-007	7000-VI-046	7001-VI-046
		1.8350 - 1.8743	46,610 - 47,609						7000-VI-047	7001-VI-047
		1.8744 - 1.9137	47,610 - 48,609						7000-VI-048	7001-VI-048
		1.9138 - 1.9530	48,610 - 49,609						7000-VI-049	7001-VI-049
		1.9531 - 1.9924	49,610 - 50,609						7000-VI-050	7001-VI-050
7000-MC-008	7001-MC-008	1.9925 - 2.0318	50,610 - 51,609	120	190	40	7000-VI-008	7001-VI-008	7000-VI-051	7001-VI-051
		2.0319 - 2.0712	51,610 - 52,609						7000-VI-052	7001-VI-052
		2.0713 - 2.1105	52,610 - 53,609						7000-VI-053	7001-VI-053
		2.1106 - 2.1499	53,610 - 54,609						7000-VI-054	7001-VI-054
		2.1500 - 2.1893	54,610 - 55,609						7000-VI-055	7001-VI-055
		2.1894 - 2.2286	55,610 - 56,609						7000-VI-056	7001-VI-056
		2.2287 - 2.2680	56,610 - 57,609						7000-VI-057	7001-VI-057
		2.2681 - 2.3074	57,610 - 58,609						7000-VI-058	7001-VI-058
		2.3075 - 2.3468	58,610 - 59,609						7000-VI-059	7001-VI-059
		2.3469 - 2.3858	59,610 - 60,609						7000-VI-060	7001-VI-060

- Stocked
- Non-Stocked

Application Recommendation:

Radial coolant is recommended for a through hole application.
 Central coolant is recommended for a blind hole application.

Coolant Configurations:

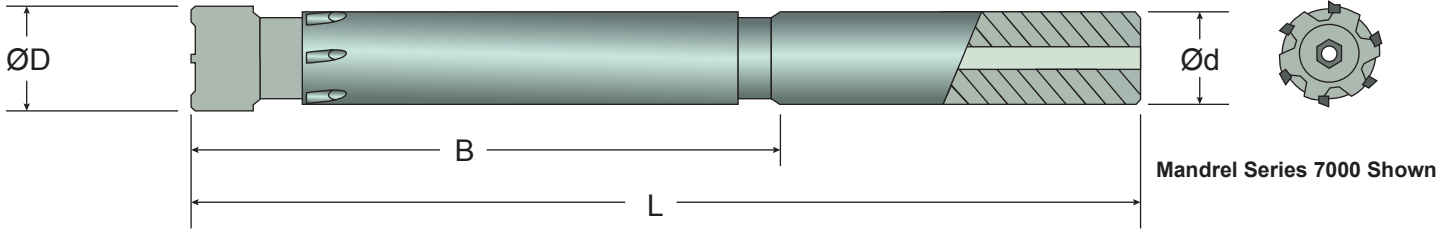
Radial Only 	Central & Radial 	No Coolant 	Central Only
Mandrel: Series 7000 Locking Screw: Series 7000	Mandrel: Series 7000 Locking Screw: Series 7001	Mandrel: Series 7001 Locking Screw: Series 7000	Mandrel: Series 7001 Locking Screw: Series 7001



ALVAN® Replaceable Head Reamers

Long Length

Cylindrical Shank



MANDREL CODE WITHOUT HEAD & SCREW		Ø D		B MM	L MM	Ød ^{h6} MM	LOCKING SCREW FIXED HEADS		LOCKING SCREW EXPANDING HEADS	
Series 7000	Series 7001	IN	MM				Series 7000	Series 7001	Series 7000	Series 7001
7000-ML-001	7001-ML-001	0.4646 - 0.4964 0.4965 - 0.5357 0.5358 - 0.5751	11,800 - 12,609 12,610 - 13,609 13,610 - 14,609	95	140	12	7000-VI-001	7001-VI-001	7000-VI-012 7000-VI-013 7000-VI-014	7001-VI-012 7001-VI-013 7001-VI-014
7000-ML-002	7001-ML-002	0.5752 - 0.6145 0.6146 - 0.6538 0.6539 - 0.6932	14,610 - 15,609 15,610 - 16,609 16,610 - 17,609	105	153	16	7000-VI-002	7001-VI-002	7000-VI-015 7000-VI-016 7000-VI-017	7001-VI-015 7001-VI-016 7001-VI-017
7000-ML-003	7001-ML-003	0.6933 - 0.7326 0.7327 - 0.7719 0.7720 - 0.8113 0.8114 - 0.8507	17,610 - 18,609 18,610 - 19,609 19,610 - 20,609 20,610 - 21,609	125	175	20	7000-VI-003	7001-VI-003	7000-VI-018 7000-VI-019 7000-VI-020 7000-VI-021	7001-VI-018 7001-VI-019 7001-VI-020 7001-VI-021
7000-ML-004	7001-ML-004	0.8508 - 0.8901 0.8902 - 0.9294 0.9295 - 0.9688 0.9689 - 1.0082 1.0083 - 1.0475	21,610 - 22,609 22,610 - 23,609 23,610 - 24,609 24,610 - 25,609 25,610 - 26,609	145	195	20	7000-VI-004	7001-VI-004	7000-VI-022 7000-VI-023 7000-VI-024 7000-VI-025 7000-VI-026	7001-VI-022 7001-VI-023 7001-VI-024 7001-VI-025 7001-VI-026
7000-ML-005	7001-ML-005	1.0476 - 1.0869 1.0870 - 1.1263 1.1264 - 1.1656 1.1657 - 1.2050 1.2051 - 1.2444 1.2445 - 1.2838	26,610 - 27,609 27,610 - 28,609 28,610 - 29,609 29,610 - 30,609 30,610 - 31,609 31,610 - 32,609	165	221	25	7000-VI-005	7001-VI-005	7000-VI-027 7000-VI-028 7000-VI-029 7000-VI-030 7000-VI-031 7000-VI-032	7001-VI-027 7001-VI-028 7001-VI-029 7001-VI-030 7001-VI-031 7001-VI-032
7000-ML-006	7001-ML-006	1.2839 - 1.3231 1.3232 - 1.3625 1.3626 - 1.4019 1.4020 - 1.4412 1.4413 - 1.4806 1.4807 - 1.5200 1.5201 - 1.5593 1.5594 - 1.5987	32,610 - 33,609 33,610 - 34,609 34,610 - 35,609 35,610 - 36,609 36,610 - 37,609 37,610 - 38,609 38,610 - 39,609 39,610 - 40,609	185	245	32	7000-VI-006	7001-VI-006	7000-VI-033 7000-VI-034 7000-VI-035 7000-VI-036 7000-VI-037 7000-VI-038 7000-VI-039 7000-VI-040	7001-VI-033 7001-VI-034 7001-VI-035 7001-VI-036 7001-VI-037 7001-VI-038 7001-VI-039 7001-VI-040
7000-ML-007	7001-ML-007	1.5988 - 1.6381 1.6382 - 1.6775 1.6776 - 1.7168 1.7169 - 1.7562 1.7563 - 1.7956	40,610 - 41,609 41,610 - 42,609 42,610 - 43,609 43,610 - 44,609 44,610 - 45,609	185	245	32	7000-VI-007	7001-VI-007	7000-VI-041 7000-VI-042 7000-VI-043 7000-VI-044 7000-VI-045	7001-VI-041 7001-VI-042 7001-VI-043 7001-VI-044 7001-VI-045

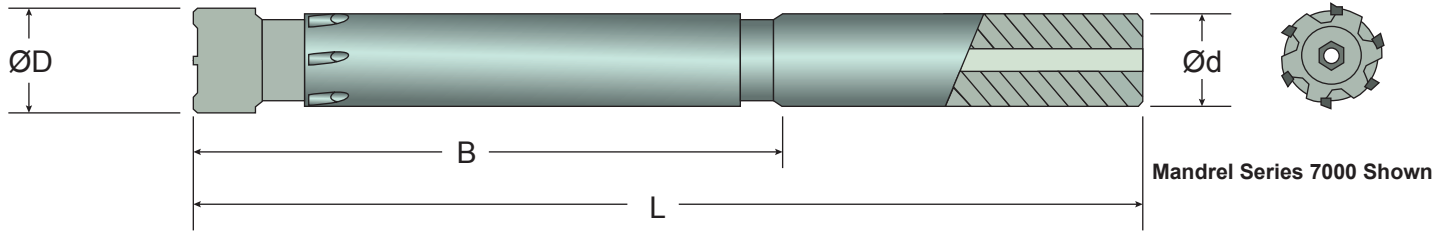
Stocked

Non-Stocked

ALVAN® Replaceable Head Reamers

Long Length

Cylindrical Shank



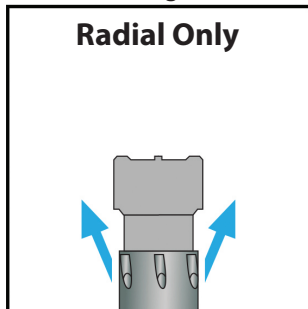
MANDREL CODE WITHOUT HEAD & SCREW		Ø D		B MM	L MM	Ød ^{h6} MM	LOCKING SCREW FIXED HEADS		LOCKING SCREW EXPANDING HEADS	
Series 7000	Series 7001	IN	MM				Series 7000	Series 7001	Series 7000	Series 7001
7000-ML-007	7001-ML-007	1.7957 - 1.8349	45,610 - 46,609	185	245	32	7000-VI-007	7001-VI-007	7000-VI-046	7001-VI-046
		1.8350 - 1.8743	46,610 - 47,609						7000-VI-047	7001-VI-047
		1.8744 - 1.9137	47,610 - 48,609						7000-VI-048	7001-VI-048
		1.9138 - 1.9530	48,610 - 49,609						7000-VI-049	7001-VI-049
		1.9531 - 1.9924	49,610 - 50,609						7000-VI-050	7001-VI-050
7000-ML-008	7001-ML-008	1.9925 - 2.0318	50,610 - 51,609	185	255	40	7000-VI-008	7001-VI-008	7000-VI-051	7001-VI-051
		2.0319 - 2.0712	51,610 - 52,609						7000-VI-052	7001-VI-052
		2.0713 - 2.1105	52,610 - 53,609						7000-VI-053	7001-VI-053
		2.1106 - 2.1499	53,610 - 54,609						7000-VI-054	7001-VI-054
		2.1500 - 2.1893	54,610 - 55,609						7000-VI-055	7001-VI-055
		2.1894 - 2.2286	55,610 - 56,609						7000-VI-056	7001-VI-056
		2.2287 - 2.2680	56,610 - 57,609						7000-VI-057	7001-VI-057
		2.2681 - 2.3074	57,610 - 58,609						7000-VI-058	7001-VI-058
		2.3075 - 2.3468	58,610 - 59,609						7000-VI-059	7001-VI-059
		2.3469 - 2.3858	59,610 - 60,609						7000-VI-060	7001-VI-060

- Stocked
- Non-Stocked

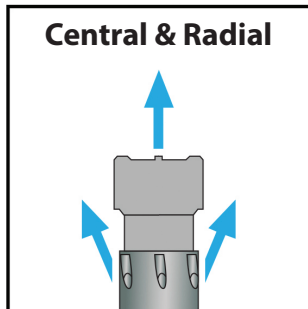
Application Recommendation:

Radial coolant is recommended for a through hole application.
 Central coolant is recommended for a blind hole application.

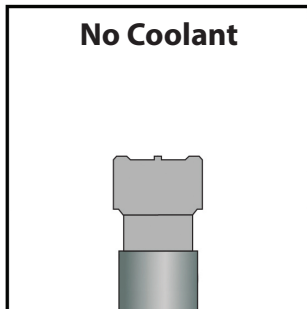
Coolant Configurations:



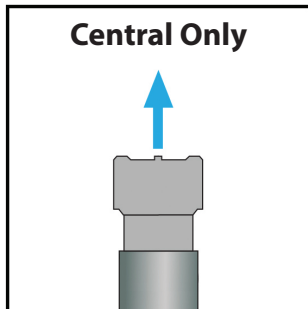
Mandrel: Series 7000
Locking Screw: Series 7000



Mandrel: Series 7000
Locking Screw: Series 7001



Mandrel: Series 7001
Locking Screw: Series 7000



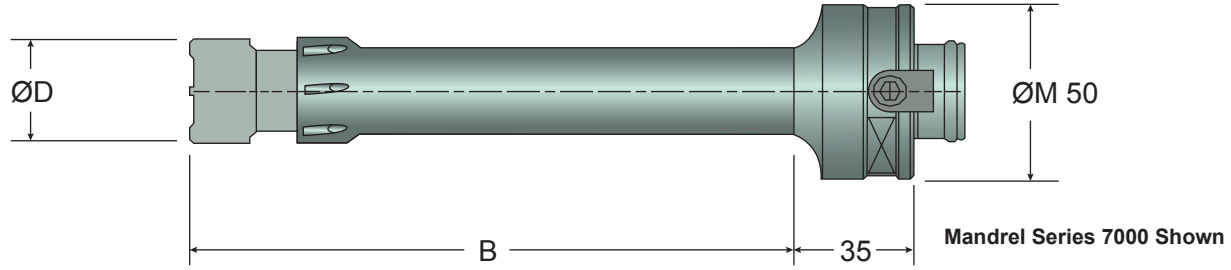
Mandrel: Series 7001
Locking Screw: Series 7001



ALVAN® Replaceable Head Reamers

Standard Length

Modular Shank

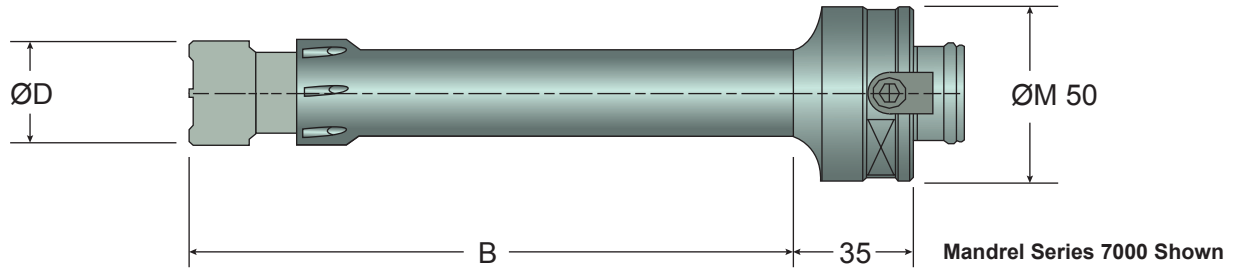


MANDREL CODE WITHOUT HEAD & SCREW		Ø D		B MM	LOCKING SCREW FIXED HEADS		LOCKING SCREW EXPANDING HEADS	
Series 7000	Series 7001	IN	MM		Series 7000	Series 7001	Series 7000	Series 7001
7000-MM-001	7001-MM-001	0.4646 - 0.4964	11,800 - 12,609	65	7000-VI-001	7001-VI-001	7000-VI-012	7001-VI-012
		0.4965 - 0.5357	12,610 - 13,609				7000-VI-013	7001-VI-013
		0.5358 - 0.5751	13,610 - 14,609				7000-VI-014	7001-VI-014
7000-MM-002	7001-MM-002	0.5752 - 0.6145	14,610 - 15,609	80	7000-VI-002	7001-VI-002	7000-VI-015	7001-VI-015
		0.6146 - 0.6538	15,610 - 16,609				7000-VI-016	7001-VI-016
		0.6539 - 0.6932	16,610 - 17,609				7000-VI-017	7001-VI-017
7000-MM-003	7001-MM-003	0.6933 - 0.7326	17,610 - 18,609	90	7000-VI-003	7001-VI-003	7000-VI-018	7001-VI-018
		0.7327 - 0.7719	18,610 - 19,609				7000-VI-019	7001-VI-019
		0.7720 - 0.8113	19,610 - 20,609				7000-VI-020	7001-VI-020
		0.8114 - 0.8507	20,610 - 21,609				7000-VI-021	7001-VI-021
7000-MM-004	7001-MM-004	0.8508 - 0.8901	21,610 - 22,609	100	7000-VI-004	7001-VI-004	7000-VI-022	7001-VI-022
		0.8902 - 0.9294	22,610 - 23,609				7000-VI-023	7001-VI-023
		0.9295 - 0.9688	23,610 - 24,609				7000-VI-024	7001-VI-024
		0.9689 - 1.0082	24,610 - 25,609				7000-VI-025	7001-VI-025
		1.0083 - 1.0475	25,610 - 26,609				7000-VI-026	7001-VI-026
7000-MM-005	7001-MM-005	1.0476 - 1.0869	26,610 - 27,609	110	7000-VI-005	7001-VI-005	7000-VI-027	7001-VI-027
		1.0870 - 1.1263	27,610 - 28,609				7000-VI-028	7001-VI-028
		1.1264 - 1.1656	28,610 - 29,609				7000-VI-029	7001-VI-029
		1.1657 - 1.2050	29,610 - 30,609				7000-VI-030	7001-VI-030
		1.2051 - 1.2444	30,610 - 31,609				7000-VI-031	7001-VI-031
		1.2445 - 1.2838	31,610 - 32,609				7000-VI-032	7001-VI-032
7000-MM-006	7001-MM-006	1.2839 - 1.3231	32,610 - 33,609	120	7000-VI-006	7001-VI-006	7000-VI-033	7001-VI-033
		1.3232 - 1.3625	33,610 - 34,609				7000-VI-034	7001-VI-034
		1.3626 - 1.4019	34,610 - 35,609				7000-VI-035	7001-VI-035
		1.4020 - 1.4412	35,610 - 36,609				7000-VI-036	7001-VI-036
		1.4413 - 1.4806	36,610 - 37,609				7000-VI-037	7001-VI-037
		1.4807 - 1.5200	37,610 - 38,609				7000-VI-038	7001-VI-038
		1.5201 - 1.5593	38,610 - 39,609				7000-VI-039	7001-VI-039
		1.5594 - 1.5987	39,610 - 40,609				7000-VI-040	7001-VI-040
7000-MM-007	7001-MM-007	1.5988 - 1.6381	40,610 - 41,609	120	7000-VI-007	7001-VI-007	7000-VI-041	7001-VI-041
		1.6382 - 1.6775	41,610 - 42,609				7000-VI-042	7001-VI-042
		1.6776 - 1.7168	42,610 - 43,609				7000-VI-043	7001-VI-043
		1.7169 - 1.7562	43,610 - 44,609				7000-VI-044	7001-VI-044
		1.7563 - 1.7956	44,610 - 45,609				7000-VI-045	7001-VI-045

- Stocked
- Non-Stocked

ALVAN® Replaceable Head Reamers Standard Length

Modular Shank



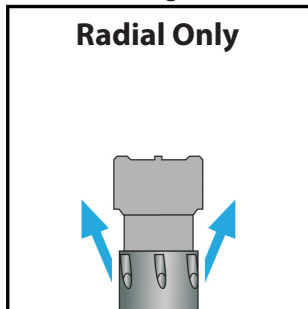
MANDREL CODE WITHOUT HEAD & SCREW		Ø D		B MM	LOCKING SCREW FIXED HEADS		LOCKING SCREW EXPANDING HEADS	
Series 7000	Series 7001	IN	MM		Series 7000	Series 7001	Series 7000	Series 7001
7000-MM-007	7001-MM-007	1.7957 - 1.8349	45,610 - 46,609	120	7000-VI-007	7001-VI-007	7000-VI-046	7001-VI-046
		1.8350 - 1.8743	46,610 - 47,609				7000-VI-047	7001-VI-047
		1.8744 - 1.9137	47,610 - 48,609				7000-VI-048	7001-VI-048
		1.9138 - 1.9530	48,610 - 49,609				7000-VI-049	7001-VI-049
		1.9531 - 1.9924	49,610 - 50,609				7000-VI-050	7001-VI-050
7000-MM-008	7001-MM-008	1.9925 - 2.0318	50,610 - 51,609	120	7000-VI-008	7001-VI-008	7000-VI-051	7001-VI-051
		2.0319 - 2.0712	51,610 - 52,609				7000-VI-052	7001-VI-052
		2.0713 - 2.1105	52,610 - 53,609				7000-VI-053	7001-VI-053
		2.1106 - 2.1499	53,610 - 54,609				7000-VI-054	7001-VI-054
		2.1500 - 2.1893	54,610 - 55,609				7000-VI-055	7001-VI-055
		2.1894 - 2.2286	55,610 - 56,609				7000-VI-056	7001-VI-056
		2.2287 - 2.2680	56,610 - 57,609				7000-VI-057	7001-VI-057
		2.2681 - 2.3074	57,610 - 58,609				7000-VI-058	7001-VI-058
		2.3075 - 2.3468	58,610 - 59,609				7000-VI-059	7001-VI-059
		2.3469 - 2.3858	59,610 - 60,600				7000-VI-060	7001-VI-060

- Stocked
- Non-Stocked

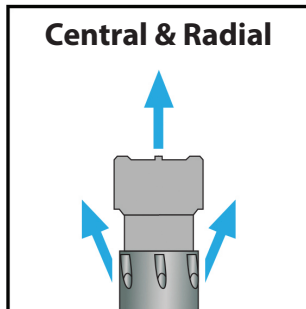
Application Recommendation:

Radial coolant is recommended for a through hole application.
Central coolant is recommended for a blind hole application.

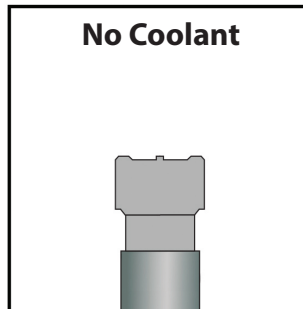
Coolant Configurations:



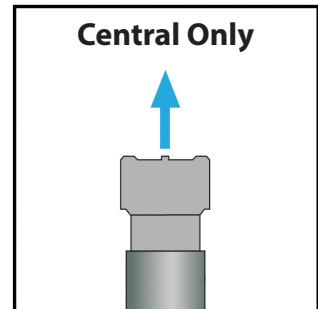
Mandrel: Series 7000
Locking Screw: Series 7000



Mandrel: Series 7000
Locking Screw: Series 7001



Mandrel: Series 7001
Locking Screw: Series 7000



Mandrel: Series 7001
Locking Screw: Series 7001



ALVAN® Replaceable Head Reamers

Recommended Speeds & Feeds

Inch

Material	Material Hardness (BHN)	Reamer Ø (inch)	Stock Allowance (inch)	Carbide Speed (SFM)	Coated Carbide Speed (SFM)	Cermet Speed (SFM)	Lead-in (A,G,L*,F*) Feed (IPR)	Lead-in (E,N,M) Feed (IPR)
Mild Steel Free Machining Steel Low Alloyed Structural Steel	Up to 180	0.4646 - 0.8504	0.006 - 0.010	35 - 65	200 - 260	300 - 980	0.010 - 0.024	0.020 - 0.024
		0.8505 - 1.5590	0.008 - 0.016				0.012 - 0.032	0.024 - 0.048
		1.5591 - 2.3858	0.012 - 0.016				0.024 - 0.040	0.028 - 0.059
Alloy Steel Stainless Steel	120 - 300	0.4646 - 0.8504	0.006 - 0.010	20 - 35	100 - 160	200 - 490	0.012 - 0.024	0.016 - 0.032
		0.8505 - 1.5590	0.008 - 0.016				0.016 - 0.032	0.020 - 0.040
		1.5591 - 2.3858	0.012 - 0.016				0.020 - 0.035	0.024 - 0.048
High Strength Alloy Steel with Manganese	240 - 450	0.4646 - 0.8504	0.006 - 0.010	13 - 36	50 - 100	200 - 390	0.010 - 0.020	0.012 - 0.024
		0.8505 - 1.5590	0.008 - 0.016				0.012 - 0.024	0.016 - 0.032
		1.5591 - 2.3858	0.012 - 0.016				0.016 - 0.028	0.020 - 0.040
Titanium and Alloys**	-	0.4646 - 0.8504 0.8505 - 1.5590 1.5591 - 2.3858	0.006 - 0.010 0.008 - 0.016 0.012 - 0.016	20 - 50	60 - 200	-	0.008 - 0.016 0.012 - 0.020 0.016 - 0.024	-
Stainless Steel	120 - 300	0.4646 - 0.8504 0.8505 - 1.5590 1.5591 - 2.3858	0.006 - 0.010 0.008 - 0.016 0.012 - 0.016	20 - 35	100 - 160	200 - 490	0.012 - 0.024 0.016 - 0.032 0.020 - 0.035	0.016 - 0.032 0.020 - 0.040 0.024 - 0.048
Grey Cast Iron Spheroidal Cast Iron (pearlitic) Malleable Cast Iron	Up to 200	0.4646 - 0.8504 0.8505 - 1.5590 1.5591 - 2.3858	0.006 - 0.010 0.008 - 0.016 0.012 - 0.016	65 - 130	160 - 230	-	0.008 - 0.024 0.012 - 0.028 0.024 - 0.050	0.020 - 0.040 0.024 - 0.048 0.032 - 0.063
	Greater than 180			50 - 100				
Spheroidal Cast Iron (ferritic)	Up to 200	0.4646 - 0.8504 0.8505 - 1.5590 1.5591 - 2.3858	0.006 - 0.010 0.008 - 0.016 0.012 - 0.016	35 - 50	100 - 160	200 - 400	0.008 - 0.024 0.012 - 0.028 0.016 - 0.032	0.020 - 0.024 0.024 - 0.048 0.032 - 0.063
Copper and Alloys Brass	Up to 500	0.4646 - 0.8504 0.8505 - 1.5590 1.5591 - 2.3858	0.006 - 0.010 0.008 - 0.016 0.012 - 0.016	200 - 660	330 - 660	-	0.008 - 0.024 0.012 - 0.028 0.016 - 0.032	-
Bronze Bronze Phosphorous	Up to 180	0.4646 - 0.8504 0.8505 - 1.5590 1.5591 - 2.3858	0.006 - 0.010 0.008 - 0.016 0.012 - 0.016	65 - 130	260 - 520	330 - 980	0.012 - 0.024	0.016 - 0.040 0.020 - 0.048 0.024 - 0.060
Aluminum and Alloys	Up to 150	0.4646 - 0.8504 0.8505 - 1.5590 1.5591 - 2.3858	0.006 - 0.010 0.008 - 0.016 0.012 - 0.016	65 - 660	-	-	0.012 - 0.024 0.016 - 0.040 0.016 - 0.040	-

* Reduce feed rates by 40% when using "L" and "F" lead-in

** Use "T" lead for Titanium based Alloys

Formulas: $IPM = RPM \cdot IPR$

$SFM = RPM \cdot 0.262 \cdot DIA$

$RPM = SFM \cdot 3.82 / DIA$

The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



ALVAN® Replaceable Head Reamers

Recommended Speeds & Feeds

Metric



Material	Material Hardness (BHN)	Reamer Ø (mm)	Stock Allowance (mm)	Carbide Speed (M/min)	Coated Carbide Speed (M/min)	Cermet Speed (M/min)	Lead-in (A, G, L*, F*) Feed (mm/rev)	Lead-in (E, N, M) Feed (mm/rev)
Mild Steel Free Machining Steel	Up to 180	11,80 - 21,60	0,15 - 0,25	10 - 20	60 - 80	90 - 300	0,25 - 0,60	0,50 - 0,60
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,80	0,60 - 1,20
Low Alloyed Structural Steel	Greater than 180	11,80 - 21,60	0,15 - 0,25	7 - 15	40 - 70	80 - 200	0,30 - 0,60	0,40 - 0,80
		21,61 - 39,60	0,20 - 0,40				0,40 - 0,80	0,50 - 1,00
Alloy Steel	120 - 300	11,80 - 21,60	0,15 - 0,25	6 - 10	30 - 50	60 - 150	0,30 - 0,60	0,40 - 0,80
		21,61 - 39,60	0,20 - 0,40				0,40 - 0,80	0,50 - 1,00
Stainless Steel	120 - 300	11,80 - 21,60	0,15 - 0,25	6 - 10	30 - 50	60 - 150	0,30 - 0,60	0,40 - 0,80
		21,61 - 39,60	0,20 - 0,40				0,40 - 0,80	0,50 - 1,00
High Strength Alloy Steel with Manganese	240 - 450	11,80 - 21,60	0,15 - 0,25	4 - 8	15 - 30	60 - 120	0,25 - 0,50	0,30 - 0,60
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,60	0,40 - 0,80
Titanium and Alloys**	-	11,80 - 21,60	0,15 - 0,25	6 - 15	20 - 60	-	0,20 - 0,40	-
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,50	-
Stainless Steel	120 - 300	11,80 - 21,60	0,15 - 0,25	6 - 10	30 - 50	60 - 150	0,30 - 0,60	0,40 - 0,80
		21,61 - 39,60	0,20 - 0,40				0,40 - 0,80	0,50 - 1,00
Grey Cast Iron Spheroidal Cast Iron (pearlitic) Malleable Cast Iron	Up to 200	11,80 - 21,60	0,15 - 0,25	20 - 40	50 - 70	-	0,20 - 0,60	0,50 - 1,00
	Greater than 180	21,61 - 39,60	0,20 - 0,40	15 - 30			0,30 - 0,70	0,60 - 1,20
Spheroidal Cast Iron (ferritic)	Up to 200	11,80 - 21,60	0,15 - 0,25	10 - 15	30 - 50	60 - 120	0,20 - 0,60	0,50 - 0,60
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,70	0,60 - 1,20
Copper and Alloys Brass	Up to 500	11,80 - 21,60	0,15 - 0,25	60 - 200	100 - 200	-	0,20 - 0,60	-
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,70	-
Bronze Bronze Phosphorous	Up to 180	11,80 - 21,60	0,15 - 0,25	20 - 40	80 - 160	100 - 300	0,30 - 0,60	0,40 - 1,00
		21,61 - 39,60	0,20 - 0,40				0,40 - 0,80	0,50 - 1,20
Aluminum and Alloys	Up to 150	11,80 - 21,60	0,15 - 0,25	20 - 200	-	-	0,30 - 0,60	-
		21,61 - 39,60	0,20 - 0,40				0,40 - 1,00	-
		11,80 - 21,60	0,15 - 0,25				0,40 - 1,00	-
		21,61 - 39,60	0,20 - 0,40				0,40 - 1,00	-

* Reduce feed rates by 40% when using "L" and "F" lead-in

** Use "T" lead for Titanium based Alloys

Formulas: mm/min = RPM • mm/rev

M/min = RPM • 0.003 • DIA

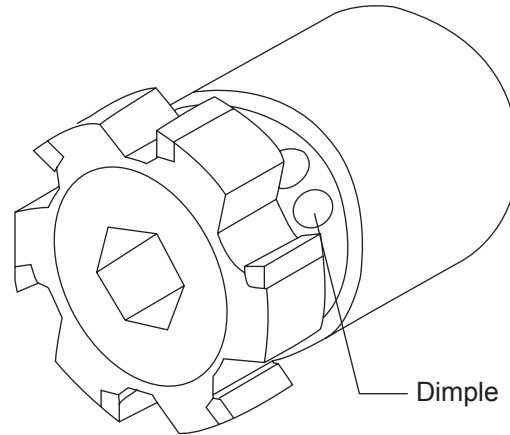
mm/min = RPM • mm/rev

The speeds and feeds listed above are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



ALVAN® Replaceable Head Reamers

Set-up Information



1) Diameter Measurement

The diameter of the heads is measured with a micrometer. To avoid chipping of the cutting edges, we recommend the use of a comparator with at least 2 μ m resolution. The cutting edges are an asymmetric design with only two cutting edges exactly 180° opposed to allow setting. These are marked with a colored dimple (see diagram above). Measurement must be taken from the front of the cutting edges only.

2) 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.

Recommended Tightening Torque for Fixed Head Reamer (7400 / 7700)	
Diameter in(mm)	Torque in-lbs(N-m)
0.465" - 0.575" (11,80 - 14,60)	22.1 (2.5)
0.575" - 0.693" (14,61 - 17,60)	33.6 (3.5)
0.693" - 0.850" (17,61 - 21,60)	44.3 (5.0)
0.851" - 1.047" (21,61 - 26,60)	62.0 (7.0)
1.048" - 1.283" (26,61 - 32,60)	88.5 (10.0)
1.284" - 1.598" (32,61 - 40,60)	106.2 (12.0)
1.599" - 1.992" (40,61 - 50,60)	141.6 (16.0)
1.993" - 2.386" (50,61 - 60,60)	177.0 (20.0)

Monobloc Reamers



CONTENTS

Monobloc Item Descriptions	20
Lead Angle Descriptions	21
Short Length Straight Flute	22-23
Long Length Straight Flute	24-25
Tempered Guide Straight Flute	26-27
Short Length Helical Flute	28
Long Length Helical Flute	29
Troubleshooting Information	30

Features & Benefits

- Diameter range from 0.2283" - 1.2638" (5,80mm - 32,10mm)
- Expandable design allows for up to 1% adjustment of diameter
- Capable of holding extremely tight hole tolerance (0.0002" (0,005mm))
- Available coated and uncoated with Carbide, Cermet, PCD, and CBN cutting edges
- Several leads provide tailored solutions for each application



**ALLIED MACHINE
& ENGINEERING CORP**



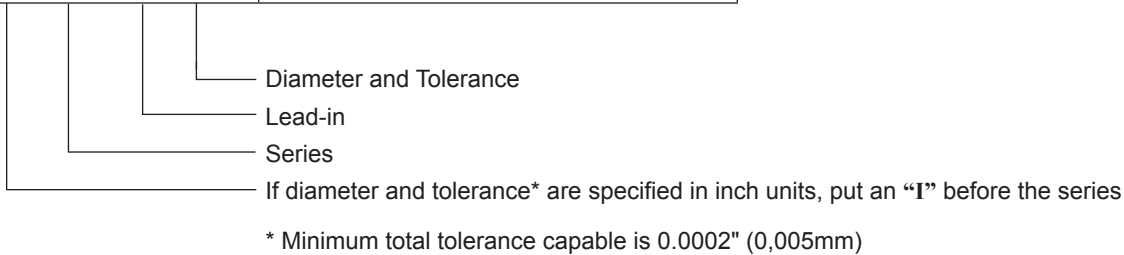
ALVAN® Monobloc Item Descriptions

Expandable Reamers are available with the following cutting edges:

- Carbide – Standard speed reaming
- Coated Carbide – High speed reaming
- Cermet – High speed reaming

CODE	DESCRIPTION
xxxxx - ALx - Ø	Uncoated K10 Carbide Cutting Edges
xxxxx - TNx - Ø	TiN Coated K10 Carbide Cutting Edges
xxxxx - TCx - Ø	TiCN Coated K10 Carbide Cutting Edges
xxxxx - TAX - Ø	TiAlN Coated K10 Carbide Cutting Edges
xxxxx - KLx - Ø	Uncoated K01 Carbide Cutting Edges
xxxxx - KNx - Ø	TiN Coated K01 Carbide Cutting Edges
xxxxx - KCx - Ø	TiCN Coated K01 Carbide Cutting Edges
xxxxx - KAx - Ø	TiAlN Coated K01 Carbide Cutting Edges
xxxxx - AVx - Ø	Uncoated P05 Cermet Cutting Edges
xxxxx - VNx - Ø	TiN Coated P05 Cermet Cutting Edges
xxxxx - VCx - Ø	TiCN Coated P05 Cermet Cutting Edges
xxxxx - VAx - Ø	TiAlN Coated P05 Cermet Cutting Edges
xxxxx - SVx - Ø	Uncoated P01 Cermet Cutting Edges
xxxxx - SNx - Ø	TiN Coated P01 Cermet Cutting Edges
xxxxx - SCx - Ø	TiCN Coated P01 Cermet Cutting Edges
xxxxx - SAx - Ø	TiAlN Coated P01 Cermet Cutting Edges

- **K01 Carbide is more wear resistant than K10 Carbide and may provide improved tool life in abrasive materials**
- **P01 Cermet is more wear resistant than P05 Cermet and may provide improved tool life in abrasive materials**



Ordering Examples:

For reaming a .6250" (+.0000", -.0005") diameter hole using an expanding reamer series 2441 with TiN coated K01 carbide cutting edges and negative lead in, use the following code:

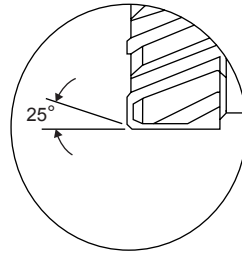
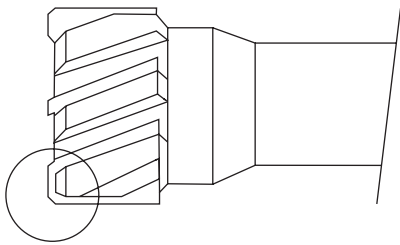
I2441-KNN-006250+0000-0005

For reaming an 8mm (+0,006mm, -0,000mm) diameter hole using an expanding reamer series 93620 with uncoated P01 cermet cutting edges and 45° lead, use the following code:

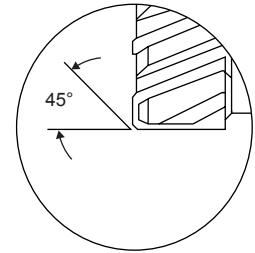
93620-SVG-008000+006-000



Left Hand Helical Flute Leads

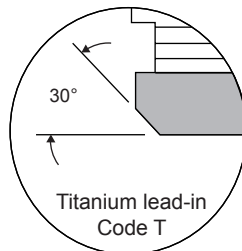
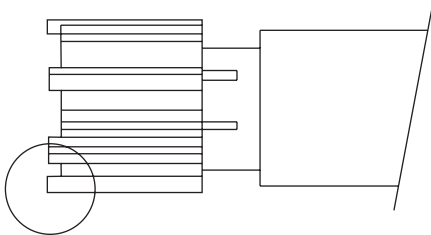


“E” lead-in (left hand helical flutes) is standard and suitable for most materials (only through hole)

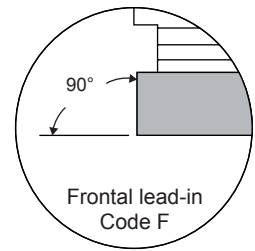


“M” lead-in (left hand helical flutes) may provide better penetration rates in steels over 200 BHN (only through hole)

Straight Flute Leads



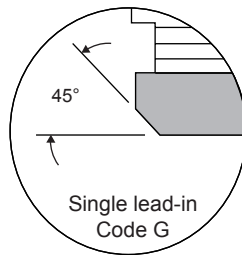
“T” lead-in is suitable for titanium based alloys



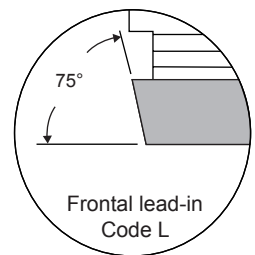
“F” lead-in can be used for stock removal at the bottom of the hole. Reduce the feed by 40% of the values on pages 48-55 (“Y” lead with chipbreaker)



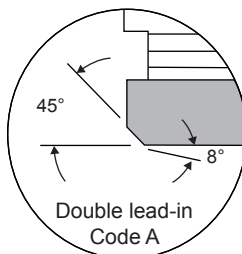
“N” lead-in is ideal for through holes. It is possible to increase the feed up to 100% of the values on pages 48-55



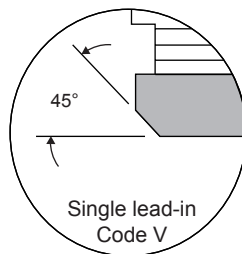
“G” lead-in is standard and suitable for most materials (“X” lead with chipbreaker)



“L” lead-in may provide improved straightness. Reduce the feed by 40% of the values on pages 48-55 (“W” lead with chipbreaker)



“A” lead-in can be used to improve finish



“V” lead-in is suitable for most materials and increases tool life (“J” lead with chipbreaker)

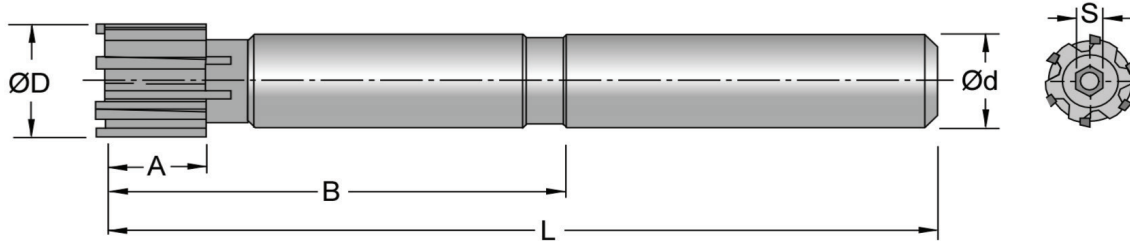


ALVAN® Monobloc Reamers

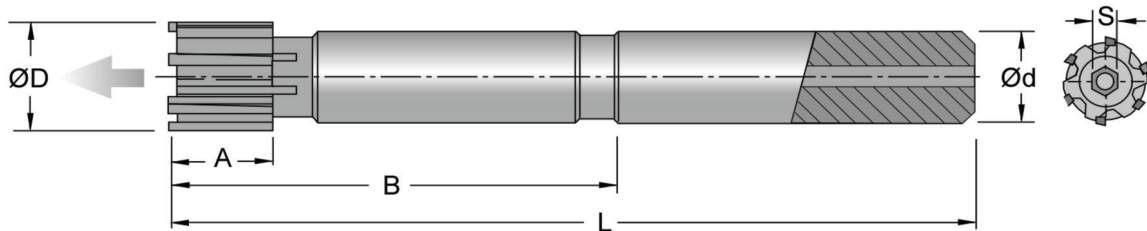
Short Length

Straight Flute

NO COOLANT **Inch Shank - Series 92440** **Metric Shank - Series 2440**



CENTRAL COOLANT - BLIND HOLES **Inch Shank - Series 92441** **Metric Shank - Series 2441**



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 92440 and 92441	Series 2440 and 2441	Number of Teeth	Hex Key S (mm)
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		
0.2283 - 0.2598	0.315	1.575	3.150	0.500	12	4	2
0.2599 - 0.2992	0.315	1.575	3.150	0.500	12	4	2
0.2993 - 0.3386	0.394	1.575	3.150	0.500	12	4	2,5
0.3387 - 0.3780	0.394	1.969	3.543	0.500	12	4	2,5
0.3781 - 0.4173	0.394	1.969	3.740	0.500	12	6	3
0.4174 - 0.4567	0.394	2.362	4.134	0.500	12	6	3
0.4568 - 0.4961	0.394	2.362	4.134	0.500	12	6	3
0.4962 - 0.5354	0.394	2.362	4.134	0.500	12	6	4
0.5355 - 0.5748	0.394	2.362	4.528	0.500	12	6	4
0.5749 - 0.6142	0.394	2.362	4.528	0.500	12	6	4
0.6143 - 0.6535	0.394	3.150	5.118	0.625	16	6	4
0.6536 - 0.6929	0.394	3.150	5.118	0.625	16	6	5
0.6930 - 0.7323	0.472	3.543	5.512	0.625	16	6	5
0.7324 - 0.7520	0.472	3.543	5.906	0.750	20	6	5
0.7521 - 0.7913	0.472	3.937	6.229	0.750	20	6	5
0.7914 - 0.8307	0.472	3.937	6.229	0.750	20	6	5
0.8308 - 0.8701	0.472	3.937	6.229	0.750	20	6	6
0.8702 - 0.9094	0.472	3.937	6.229	0.750	20	6	6
0.9095 - 0.9488	0.472	3.937	6.229	0.750	20	6	6
0.9489 - 0.9882	0.472	3.937	6.229	0.750	20	6	6
0.9883 - 1.0276	0.472	4.331	6.693	1.000	25	6	6
1.0277 - 1.0669	0.551	4.331	6.693	1.000	25	6	6
1.0670 - 1.1063	0.551	4.331	6.693	1.000	25	6	8
1.1064 - 1.1457	0.551	4.331	6.693	1.000	25	6	8
1.1458 - 1.1850	0.551	4.331	6.693	1.000	25	6	8
1.1851 - 1.2244	0.551	4.331	6.693	1.000	25	6	8
1.2245 - 1.2638	0.551	4.331	6.693	1.000	25	6	8

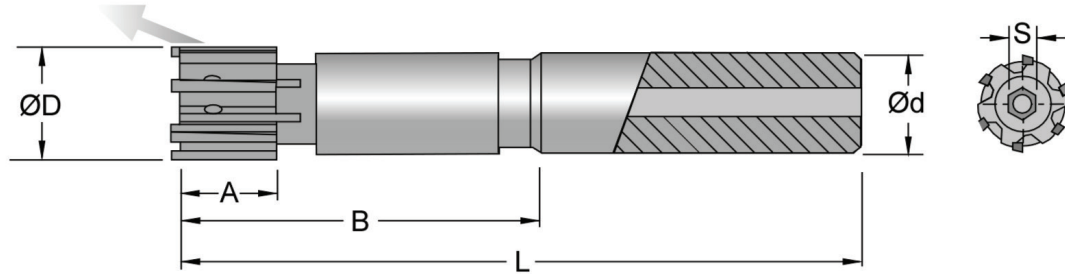
ALVAN® Monobloc Reamers

Short Length

Straight Flute



RADIAL COOLANT - THROUGH HOLES Inch Shank - Series 93620 Metric Shank - Series 3620



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 93620	Series 3620	Number of Teeth	Hex Key S (mm)
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		
0.2283 - 0.2598	0.315	1.575	3.071	0.500	12	4	2
0.2599 - 0.2992	0.315	1.575	3.071	0.500	12	4	2
0.2993 - 0.3386	0.394	1.575	3.071	0.500	12	4	2,5
0.3387 - 0.3780	0.394	1.969	3.465	0.500	12	4	2,5
0.3781 - 0.4173	0.394	1.969	3.740	0.500	12	6	3
0.4174 - 0.4567	0.394	1.969	3.740	0.500	12	6	3
0.4568 - 0.4961	0.394	1.969	3.740	0.500	12	6	3
0.4962 - 0.5354	0.394	1.969	3.740	0.500	12	6	4
0.5355 - 0.5748	0.394	1.969	3.740	0.500	12	6	4
0.5749 - 0.6142	0.394	1.969	3.740	0.500	12	6	4
0.6143 - 0.6535	0.394	1.969	3.937	0.625	16	6	4
0.6536 - 0.6929	0.394	1.969	3.937	0.625	16	6	5
0.6930 - 0.7323	0.472	1.969	3.937	0.625	16	6	5
0.7324 - 0.7520	0.472	2.362	4.724	0.750	20	6	5
0.7521 - 0.7913	0.472	2.362	4.724	0.750	20	6	5
0.7914 - 0.8307	0.472	2.362	4.724	0.750	20	6	5
0.8308 - 0.8701	0.472	2.362	4.724	0.750	20	6	6
0.8702 - 0.9094	0.472	2.362	4.724	0.750	20	6	6
0.9095 - 0.9488	0.472	2.362	4.724	0.750	20	6	6
0.9489 - 0.9882	0.472	2.362	4.724	0.750	20	6	6
0.9883 - 1.0276	0.472	2.953	5.315	1.000	25	6	6
1.0277 - 1.0669	0.551	2.953	5.315	1.000	25	6	6
1.0670 - 1.1063	0.551	2.953	5.315	1.000	25	6	8
1.1064 - 1.1457	0.551	2.953	5.315	1.000	25	6	8
1.1458 - 1.1850	0.551	2.953	5.315	1.000	25	6	8
1.1851 - 1.2244	0.551	2.953	5.315	1.000	25	6	8
1.2245 - 1.2638	0.551	2.953	5.315	1.000	25	6	8

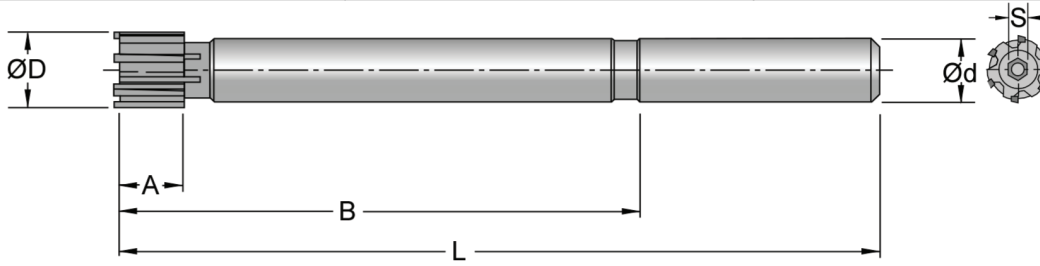


ALVAN® Monobloc Reamers

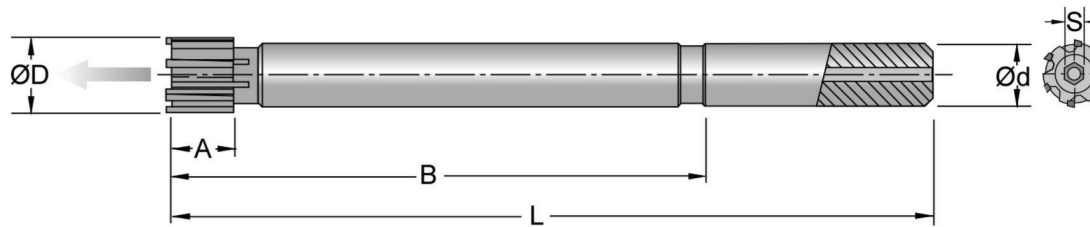
Long Length

Straight Flute

NO COOLANT **Inch Shank - Series 92430** **Metric Shank - Series 2430**



CENTRAL COOLANT - BLIND HOLES **Inch Shank - Series 92431** **Metric Shank - Series 2431**



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 92430 and 92431	Series 2430 and 2431	Number of Teeth	Hex Key
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		S (mm)
0.2283 - 0.2598	0.315	3.346	4.843	0.500	12	4	2
0.2599 - 0.2992	0.315	3.346	4.843	0.500	12	4	2
0.2993 - 0.3386	0.394	3.346	4.843	0.500	12	4	2,5
0.3387 - 0.3780	0.394	3.346	4.843	0.500	12	4	2,5
0.3781 - 0.4173	0.394	4.528	6.299	0.500	12	6	3
0.4174 - 0.4567	0.394	4.528	6.299	0.500	12	6	3
0.4568 - 0.4961	0.394	4.528	6.299	0.500	12	6	3
0.4962 - 0.5354	0.394	4.528	6.299	0.500	12	6	4
0.5355 - 0.5748	0.394	4.528	6.299	0.500	12	6	4
0.5749 - 0.6142	0.394	4.528	6.299	0.500	12	6	4
0.6143 - 0.6535	0.394	5.118	7.087	0.625	16	6	4
0.6536 - 0.6929	0.394	5.118	7.087	0.625	16	6	5
0.6930 - 0.7323	0.472	5.118	7.087	0.625	16	6	5
0.7324 - 0.7520	0.472	5.512	7.874	0.750	20	6	5
0.7521 - 0.7913	0.472	5.512	7.874	0.750	20	6	5
0.7914 - 0.8307	0.472	5.512	7.874	0.750	20	6	5
0.8308 - 0.8701	0.472	5.512	7.874	0.750	20	6	6
0.8702 - 0.9094	0.472	5.512	7.874	0.750	20	6	6
0.9095 - 0.9488	0.472	5.512	7.874	0.750	20	6	6
0.9489 - 0.9882	0.472	5.512	7.874	0.750	20	6	6
0.9883 - 1.0276	0.472	5.906	8.268	1.000	25	6	6
1.0277 - 1.0669	0.551	5.906	8.268	1.000	25	6	6
1.0670 - 1.1063	0.551	5.906	8.268	1.000	25	6	8
1.1064 - 1.1457	0.551	5.906	8.268	1.000	25	6	8
1.1458 - 1.1850	0.551	5.906	8.268	1.000	25	6	8
1.1851 - 1.2244	0.551	5.906	8.268	1.000	25	6	8
1.2245 - 1.2638	0.551	5.906	8.268	1.000	25	6	8

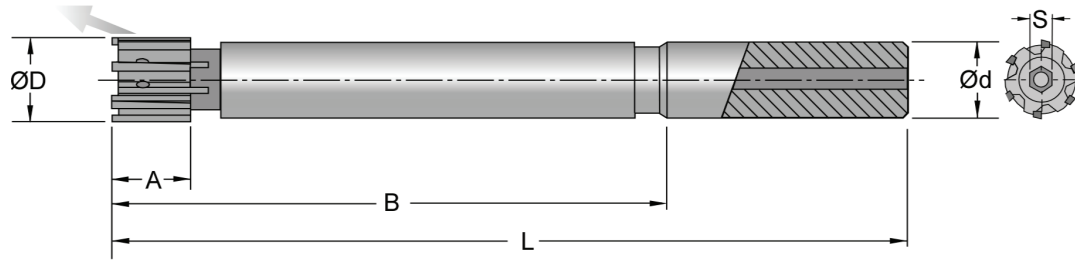
ALVAN® Monobloc Reamers

Long Length

Straight Flute



RADIAL COOLANT - THROUGH HOLES Inch Shank - Series 93610 Metric Shank - Series 3610



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 93610	Series 3610	Number of Teeth	Hex Key S (mm)
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		
0.2283 - 0.2598	0.315	3.346	4.843	0.500	12	4	2
0.2599 - 0.2992	0.315	3.346	4.843	0.500	12	4	2
0.2993 - 0.3386	0.394	3.346	4.843	0.500	12	4	2,5
0.3387 - 0.3780	0.394	3.346	4.843	0.500	12	4	2,5
0.3781 - 0.4173	0.394	4.528	6.299	0.500	12	6	3
0.4174 - 0.4567	0.394	4.528	6.299	0.500	12	6	3
0.4568 - 0.4961	0.394	4.528	6.299	0.500	12	6	3
0.4962 - 0.5354	0.394	4.528	6.299	0.500	12	6	4
0.5355 - 0.5748	0.394	4.528	6.299	0.500	12	6	4
0.5749 - 0.6142	0.394	4.528	6.299	0.500	12	6	4
0.6143 - 0.6535	0.394	5.118	7.087	0.625	16	6	4
0.6536 - 0.6929	0.394	5.118	7.087	0.625	16	6	5
0.6930 - 0.7323	0.472	5.118	7.087	0.625	16	6	5
0.7324 - 0.7520	0.472	5.512	7.874	0.750	20	6	5
0.7521 - 0.7913	0.472	5.512	7.874	0.750	20	6	5
0.7914 - 0.8307	0.472	5.512	7.874	0.750	20	6	5
0.8308 - 0.8701	0.472	5.512	7.874	0.750	20	6	6
0.8702 - 0.9094	0.472	5.512	7.874	0.750	20	6	6
0.9095 - 0.9488	0.472	5.512	7.874	0.750	20	6	6
0.9489 - 0.9882	0.472	5.512	7.874	0.750	20	6	6
0.9883 - 1.0276	0.472	5.906	8.268	1.000	25	6	6
1.0277 - 1.0669	0.551	5.906	8.268	1.000	25	6	6
1.0670 - 1.1063	0.551	5.906	8.268	1.000	25	6	8
1.1064 - 1.1457	0.551	5.906	8.268	1.000	25	6	8
1.1458 - 1.1850	0.551	5.906	8.268	1.000	25	6	8
1.1851 - 1.2244	0.551	5.906	8.268	1.000	25	6	8
1.2245 - 1.2638	0.551	5.906	8.268	1.000	25	6	8

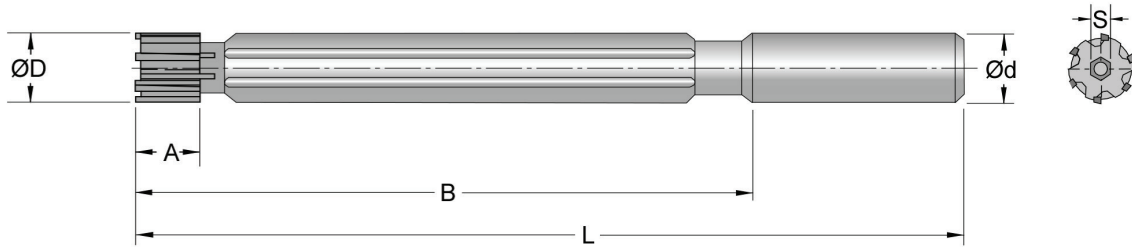


ALVAN® Monobloc Reamers

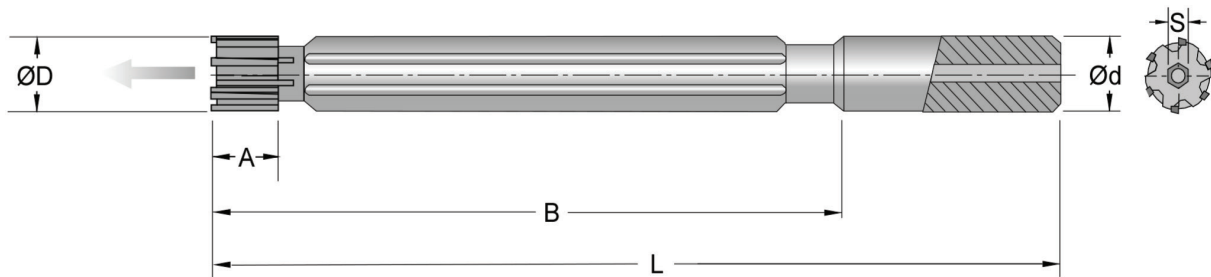
Tempered Guide

Straight Flute

NO COOLANT Inch Shank - Series 92490 Metric Shank - Series 2490



CENTRAL COOLANT - BLIND HOLES Inch Shank - Series 92491 Metric Shank - Series 2491



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 92490 and 92491	Series 2490 and 2491	Number of Teeth	Hex Key S (mm)
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		
0.2283 - 0.2598	0.315	2.913	3.937	0.500	12	4	2
0.2599 - 0.2992	0.315	2.913	3.937	0.500	12	4	2
0.2993 - 0.3386	0.394	3.622	4.724	0.500	12	4	2,5
0.3387 - 0.3780	0.394	3.622	4.724	0.500	12	4	2,5
0.3781 - 0.4173	0.394	4.252	5.512	0.500	12	6	3
0.4174 - 0.4567	0.394	4.252	5.512	0.500	12	6	3
0.4568 - 0.4961	0.394	4.331	5.906	0.500	12	6	3
0.4962 - 0.5354	0.394	4.528	6.299	0.500	12	6	4
0.5355 - 0.5748	0.394	4.921	6.693	0.500	12	6	4
0.5749 - 0.6142	0.394	5.118	6.890	0.500	12	6	4
0.6143 - 0.6535	0.394	5.118	7.087	0.625	16	6	4
0.6536 - 0.6929	0.394	5.512	7.480	0.625	16	6	5
0.6930 - 0.7323	0.472	5.709	7.677	0.625	16	6	5
0.7324 - 0.7520	0.472	5.906	8.071	0.750	20	6	5
0.7521 - 0.7913	0.472	5.906	8.071	0.750	20	6	5
0.7914 - 0.8307	0.472	6.102	8.268	0.750	20	6	5

The diameter of the guide area is 0.0004" - 0.0006" below the reamer diameter.

Tempered guide tools are capable of speeds up to 130 SFM.

Tool recommended with carbide substrate only.

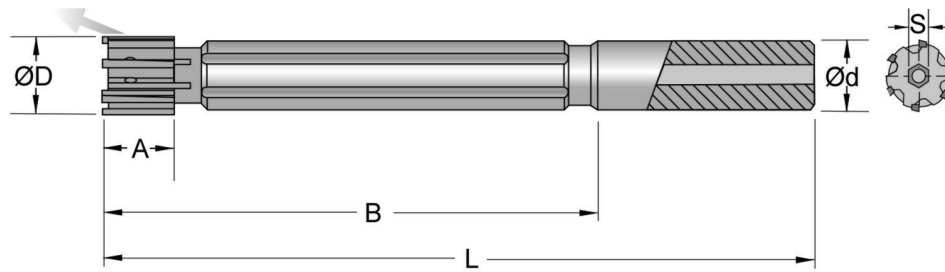
ALVAN® Monobloc Reamers

Tempered Guide

Straight Flute



RADIAL COOLANT - THROUGH HOLES Inch Shank - Series 93690 Metric Shank - Series 3690



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 93690	Series 3690	Number of Teeth	Hex Key
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		S (mm)
0.2283 - 0.2598	0.315	3.346	4.843	0.500	12	4	2
0.2599 - 0.2992	0.315	3.346	4.843	0.500	12	4	2
0.2993 - 0.3386	0.394	3.346	4.843	0.500	12	4	2,5
0.3387 - 0.3780	0.394	3.346	4.843	0.500	12	4	2,5
0.3781 - 0.4173	0.394	4.528	6.299	0.500	12	6	3
0.4174 - 0.4567	0.394	4.528	6.299	0.500	12	6	3
0.4568 - 0.4961	0.394	4.528	6.299	0.500	12	6	3
0.4962 - 0.5354	0.394	4.528	6.299	0.500	12	6	4
0.5355 - 0.5748	0.394	4.528	6.299	0.500	12	6	4
0.5749 - 0.6142	0.394	4.528	6.299	0.500	12	6	4
0.6143 - 0.6535	0.394	5.118	7.087	0.625	16	6	4
0.6536 - 0.6929	0.394	5.118	7.087	0.625	16	6	5
0.6930 - 0.7323	0.472	5.118	7.087	0.625	16	6	5
0.7324 - 0.7520	0.472	5.512	7.874	0.750	20	6	5
0.7521 - 0.7913	0.472	5.512	7.874	0.750	20	6	5
0.7914 - 0.8307	0.472	5.512	7.874	0.750	20	6	5
0.8308 - 0.8701	0.472	5.512	7.874	0.750	20	6	6
0.8702 - 0.9094	0.472	5.512	7.874	0.750	20	6	6
0.9095 - 0.9488	0.472	5.512	7.874	0.750	20	6	6
0.9489 - 0.9882	0.472	5.512	7.874	0.750	20	6	6
0.9883 - 1.0276	0.472	5.906	8.268	1.000	25	6	6
1.0277 - 1.0669	0.551	5.906	8.268	1.000	25	6	6
1.0670 - 1.1063	0.551	5.906	8.268	1.000	25	6	8
1.1064 - 1.1457	0.551	5.906	8.268	1.000	25	6	8
1.1458 - 1.1850	0.551	5.906	8.268	1.000	25	6	8
1.1851 - 1.2244	0.551	5.906	8.268	1.000	25	6	8
1.2245 - 1.2638	0.551	5.906	8.268	1.000	25	6	8

The diameter of the guide area is 0.0004" - 0.0006" below the reamer diameter.

Tempered guide tools are capable of speeds up to 130 SFM.

Tool recommended with carbide substrate only.

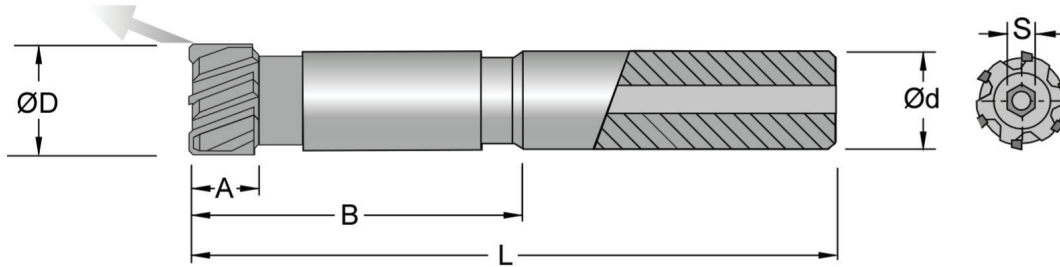


ALVAN® Monobloc Reamers

Short Length

Helical Flute

RADIAL COOLANT - THROUGH HOLES Inch Shank - Series 93627 Metric Shank - Series 3627



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 93627	Series 3627	Number of Teeth	Hex Key S (mm)
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		
0.2283 - 0.2598	0.315	1.575	3.150	0.500	12	4	2
0.2599 - 0.2992	0.315	1.575	3.150	0.500	12	4	2
0.2993 - 0.3386	0.394	1.575	3.150	0.500	12	4	2,5
0.3387 - 0.3780	0.394	1.969	3.543	0.500	12	4	2,5
0.3781 - 0.4173	0.394	1.969	3.740	0.500	12	6	3
0.4174 - 0.4567	0.394	2.362	4.134	0.500	12	6	3
0.4568 - 0.4961	0.394	2.362	4.134	0.500	12	6	3
0.4962 - 0.5354	0.394	2.362	4.134	0.500	12	6	4
0.5355 - 0.5748	0.394	2.756	4.528	0.500	12	6	4
0.5749 - 0.6142	0.394	2.756	4.528	0.500	12	6	4
0.6143 - 0.6535	0.394	3.150	5.118	0.625	16	6	4
0.6536 - 0.6929	0.394	3.150	5.118	0.625	16	6	5
0.6930 - 0.7323	0.472	3.543	5.512	0.625	16	6	5
0.7324 - 0.7520	0.472	3.543	5.906	0.750	20	6	5
0.7521 - 0.7913	0.472	3.937	6.299	0.750	20	6	5
0.7914 - 0.8307	0.472	3.937	6.299	0.750	20	6	5
0.8308 - 0.8701	0.472	3.937	6.299	0.750	20	6	6
0.8702 - 0.9094	0.472	3.937	6.299	0.750	20	6	6
0.9095 - 0.9488	0.472	3.937	6.299	0.750	20	6	6
0.9489 - 0.9882	0.472	3.937	6.299	0.750	20	6	6
0.9883 - 1.0276	0.472	4.331	6.693	1.000	25	6	6
1.0277 - 1.0669	0.551	4.331	6.693	1.000	25	6	6
1.0670 - 1.1063	0.551	4.331	6.693	1.000	25	6	8
1.1064 - 1.1457	0.551	4.331	6.693	1.000	25	6	8
1.1458 - 1.1850	0.551	4.331	6.693	1.000	25	6	8
1.1851 - 1.2244	0.551	4.331	6.693	1.000	25	6	8
1.2245 - 1.2638	0.551	4.331	6.693	1.000	25	6	8

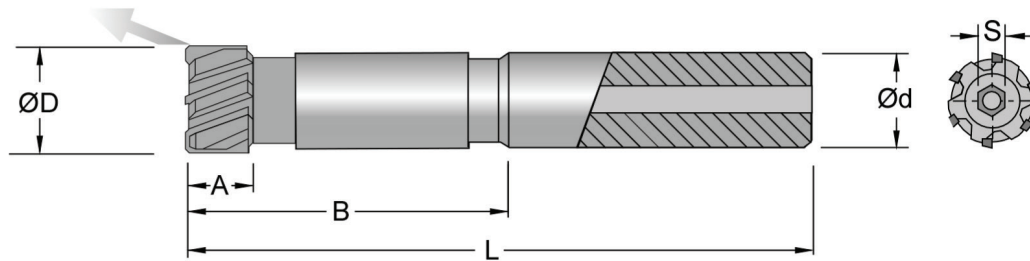
ALVAN® Monobloc Reamers

Long Length

Helical Flute



RADIAL COOLANT - THROUGH HOLES Inch Shank - Series 93617 Metric Shank - Series 3617



ØD (inch)	A (inch)	B (inch)	L (inch)	Series 93617	Series 3617	Number of Teeth	Hex Key S (mm)
				Ød ^{h7} (inch)	Ød ^{h7} (mm)		
0.2283 - 0.2598	0.315	3.346	4.843	0.500	12	4	2
0.2599 - 0.2992	0.315	3.346	4.843	0.500	12	4	2
0.2993 - 0.3386	0.394	3.346	4.843	0.500	12	4	2,5
0.3387 - 0.3780	0.394	3.346	4.843	0.500	12	4	2,5
0.3781 - 0.4173	0.394	4.528	6.299	0.500	12	6	3
0.4174 - 0.4567	0.394	4.528	6.299	0.500	12	6	3
0.4568 - 0.4961	0.394	4.528	6.299	0.500	12	6	3
0.4962 - 0.5354	0.394	4.528	6.299	0.500	12	6	4
0.5355 - 0.5748	0.394	4.528	6.299	0.500	12	6	4
0.5749 - 0.6142	0.394	4.528	6.299	0.500	12	6	4
0.6143 - 0.6535	0.394	5.118	7.087	0.625	16	6	4
0.6536 - 0.6929	0.394	5.118	7.087	0.625	16	6	5
0.6930 - 0.7323	0.472	5.118	7.087	0.625	16	6	5
0.7324 - 0.7520	0.472	5.512	7.874	0.750	20	6	5
0.7521 - 0.7913	0.472	5.512	7.874	0.750	20	6	5
0.7914 - 0.8307	0.472	5.512	7.874	0.750	20	6	5
0.8308 - 0.8701	0.472	5.512	7.874	0.750	20	6	6
0.8702 - 0.9094	0.472	5.512	7.874	0.750	20	6	6
0.9095 - 0.9488	0.472	5.512	7.874	0.750	20	6	6
0.9489 - 0.9882	0.472	5.512	7.874	0.750	20	6	6
0.9883 - 1.0276	0.472	5.906	8.268	1.000	25	6	6
1.0277 - 1.0669	0.551	5.906	8.268	1.000	25	6	6
1.0670 - 1.1063	0.551	5.906	8.268	1.000	25	6	8
1.1064 - 1.1457	0.551	5.906	8.268	1.000	25	6	8
1.1458 - 1.1850	0.551	5.906	8.268	1.000	25	6	8
1.1851 - 1.2244	0.551	5.906	8.268	1.000	25	6	8
1.2245 - 1.2638	0.551	5.906	8.268	1.000	25	6	8



ALVAN® Reamers

Troubleshooting Guide

Problem	Possible Cause	Possible Solution
Oversize hole	<ul style="list-style-type: none"> a.) The reamer is running eccentric to the center of the machine spindle b.) Excessive misalignment causing reamer to cut on back taper c.) Material build up on cutting edges d.) The reamer diameter is too large 	<ul style="list-style-type: none"> a.) Use the modular system with radial adjustment b.) Rectify misalignment c.) Replace the coolant or change the cutting speed d.) Use smaller reamer or regrind existing one
Undersize hole	<ul style="list-style-type: none"> a.) The reamer diameter is too small b.) The reamer diameter is worn c.) The coolant is not suitable d.) Stock allowance is too small e.) The cutting speed is too low 	<ul style="list-style-type: none"> a.) Use larger reamer b.) Expand, regrind or replace the reamer c.) Replace the coolant d.) Increase the stock allowance e.) Increase the cutting speed
Tapered hole	<ul style="list-style-type: none"> a.) Excessive misalignment 	<ul style="list-style-type: none"> a.) Correct misalignment
Burr at the entry of the hole	<ul style="list-style-type: none"> a.) Excessive misalignment 	<ul style="list-style-type: none"> a.) Correct misalignment
The hole is not straight	<ul style="list-style-type: none"> a.) Concentricity and alignment error between the workpiece and the tool b.) Asymmetrical cutting or angled surfaces 	<ul style="list-style-type: none"> a.) Correct misalignment and use the modular system with radial adjustment b.) Create a chamfer on the lead-in
Poor hole finish	<ul style="list-style-type: none"> a.) One cutting edge is chipped b.) The lead-in is irregular c.) Back taper on the cutting edge is too great d.) Excessive misalignment e.) Cutting data not correct f.) Poor chip evacuation 	<ul style="list-style-type: none"> a.) Regrind the reamer b.) Regrind the reamer c.) Regrind the reamer d.) Correct misalignment or use the modular system e.) Verify cutting data f.) Verify coolant volume and pressure or use through tool coolant
The reamer creates excessive torque loading	<ul style="list-style-type: none"> a.) Back taper on the cutting edge is too small b.) The radially ground land is too wide c.) The coolant is not suitable 	<ul style="list-style-type: none"> a.) Regrind the reamer b.) Regrind the reamer c.) Replace the coolant

Cutting Rings



CONTENTS

Cutting Ring Item Descriptions	32
Lead Angle Descriptions	33
Short Length Rear Adjusting	34-37
Short Length Front Adjusting	38-41
Extra Short Length Modular Shank	42-43
Short Length Modular Shank	44-45
Long Length Modular Shank	46-47
Speeds & Feeds	48-55
Instructions	56

Features & Benefits

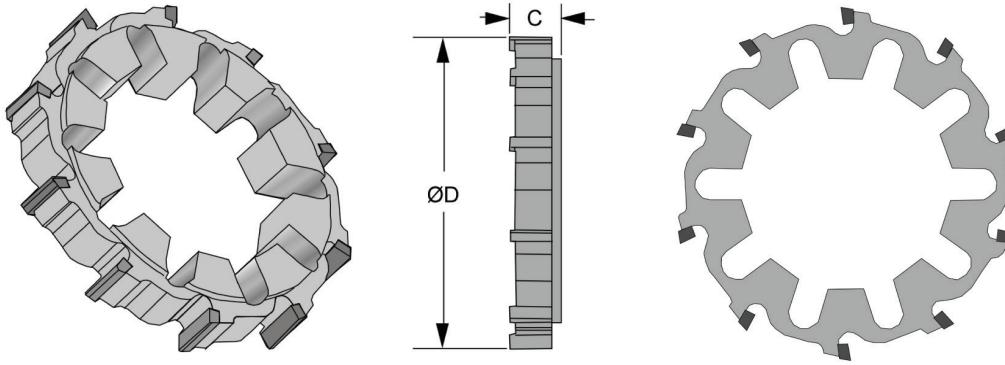
- Diameter range from 0.6929" - 7.8975" (17,60mm - 200,60mm)
- Expandable design allows for up to 4% adjustment of diameter
- Capable of holding extremely tight hole tolerance (0.0002" (0,005mm))
- Available coated and uncoated with Carbide, Cermet, PCD, and CBN cutting edges
- Several leads provide tailored solutions for each application



**ALLIED MACHINE
& ENGINEERING CORP**



ALVAN® Cutting Ring Item Descriptions



ØD (inch)	ØD (mm)	C (inch)	Number of Teeth
0.6929 - 0.8503	17,600 - 21,599	0.433	6
0.8504 - 1.0078	21,600 - 25,599	0.472	6
1.0079 - 1.2834	25,600 - 32,599	0.551	6
1.2835 - 1.7952	32,600 - 45,599	0.630	6
1.7953 - 3.1338	45,600 - 79,599	0.728	6
3.1339 - 3.9605	79,600 - 100,599	0.728	8
3.9606 - 4.3542	100,600 - 110,599	0.728	10
4.3543 - 7.8975	110,600 - 200,600	0.728	12

ALVAN® Cutting Rings are compatible with all ring arbors shown on pages 34 - 47

CODE	DESCRIPTION
2000 - CTx - Ø	Uncoated K10 Carbide Cutting Edges
2TIN - CTx - Ø	TiN Coated K10 Carbide Cutting Edges
2TIC - CTx - Ø	TiCN Coated K10 Carbide Cutting Edges
2TIA - CTx - Ø	TiAlN Coated K10 Carbide Cutting Edges
2000 - KTx - Ø	Uncoated K01 Carbide Cutting Edges
2TIN - KTx - Ø	TiN Coated K01 Carbide Cutting Edges
2TIC - KTx - Ø	TiCN Coated K01 Carbide Cutting Edges
2TIA - KTx - Ø	TiAlN Coated K01 Carbide Cutting Edges
2AVC - CTx - Ø	Uncoated P05 Cermet Cutting Edges
2ANC - CTx - Ø	TiN Coated P05 Cermet Cutting Edges
2ACC - CTx - Ø	TiCN Coated P05 Cermet Cutting Edges
2AAC - CTx - Ø	TiAlN Coated P05 Cermet Cutting Edges
2AVC - STx - Ø	Uncoated P01 Cermet Cutting Edges
2ANC - STx - Ø	TiN Coated P01 Cermet Cutting Edges
2ACC - STx - Ø	TiCN Coated P01 Cermet Cutting Edges
2AAC - STx - Ø	TiAlN Coated P01 Cermet Cutting Edges

- **K01 Carbide is more wear resistant than K10 Carbide and may provide improved tool life in abrasive materials**
- **P01 Cermet is more wear resistant than P05 Cermet and may provide improved tool life in abrasive materials**

Ordering Examples:

For reaming a .7500" (+.0000 - .0005") diameter hole using a cutting ring with TiN coated K01 carbide cutting edges and negative lead, use the following code:

I2TIN-KTN-007500+0000-0005

For reaming a 20,5mm (+0,008mm - 0,000mm) diameter hole using a cutting ring with uncoated P01 cermet and 45° lead, use the following code:

2AVC-STG-020500+008-000

— Diameter and Tolerance

— Lead-in

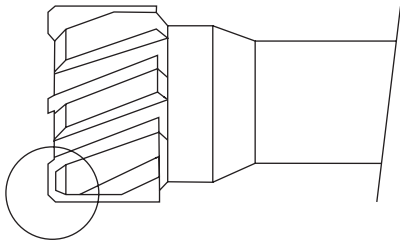
— Series

— If diameter and tolerance are specified in inch units, put an "I" before the series

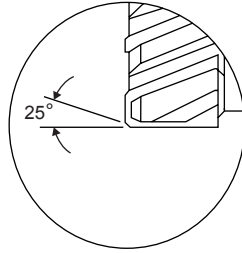
Minimum total tolerance capable is 0.0002" (0,005mm)



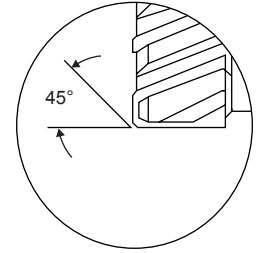
Left Hand Helical Flute Leads



Left hand helical flute cutting rings from diameter 1.2835" to 7.8972"

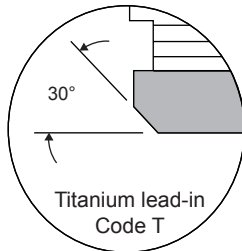
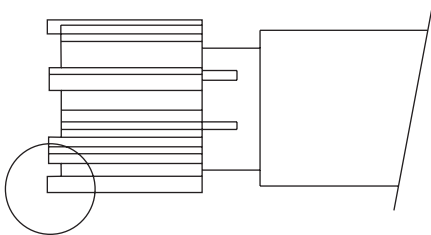


"E" lead-in (left hand helical flutes) is standard and suitable for most materials (only through hole)

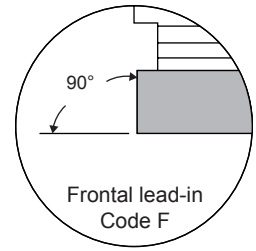


"M" lead-in (left hand helical flutes) may provide better penetration rates in steels over 200 BHN (only through hole)

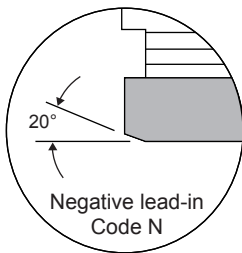
Straight Flute Leads



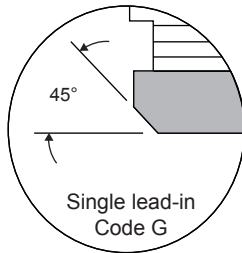
"T" lead-in is suitable for titanium based alloys



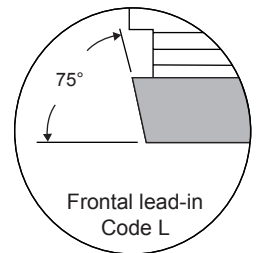
"F" lead-in can be used for stock removal at the bottom of the hole. Reduce the feed by 40% of the values on pages 48-55 ("Y" lead with chipbreaker)



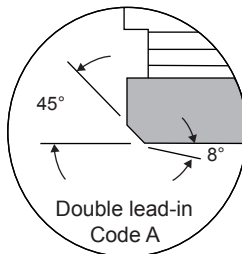
"N" lead-in is ideal for through holes. It is possible to increase the feed up to 100% of the values on pages 48-55



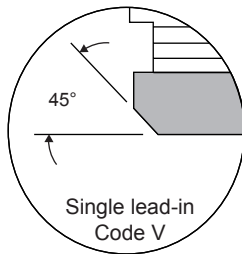
"G" lead-in is standard and suitable for most materials ("X" lead with chipbreaker)



"L" lead-in may provide improved straightness. Reduce the feed by 40% of the values on pages 48-55 ("W" lead with chipbreaker)



"A" lead-in can be used to improve finish



"V" lead-in is suitable for most materials and increases tool life ("J" lead with chipbreaker)

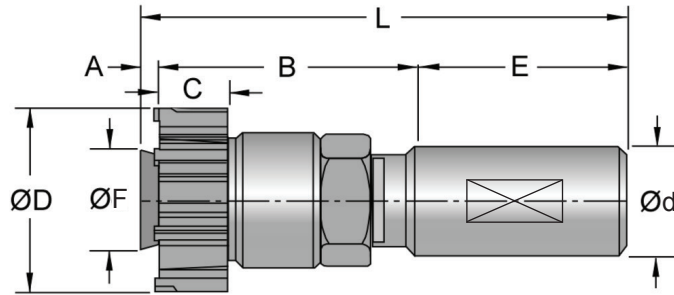


ALVAN® Ring Arbors

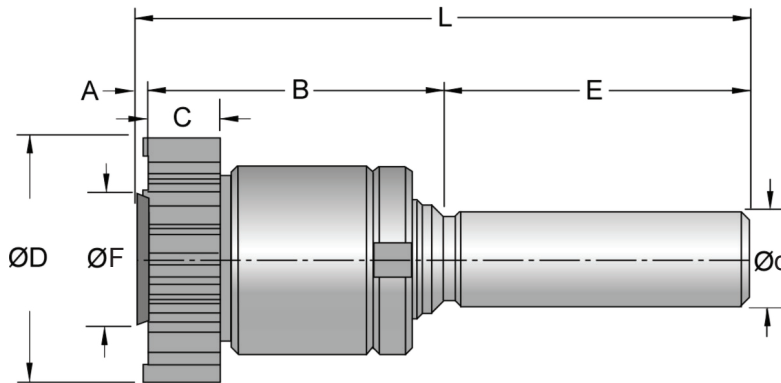
Short Length

Rear Adjusting

NO COOLANT - THROUGH HOLES **Inch Shank - Series 92530** **Metric Shank - Series 2530**



ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 92530	Series 2530	Number of Teeth
							Ød ^{h7} (inch)	Ød ^{h7} (mm)	
0.6929 - 0.8503	0.472	0.118	2.008	0.433	1.575	3.583	0.625	16	6
0.8504 - 1.0078	0.472	0.118	2.008	0.472	1.575	3.583	0.625	16	6
1.0079 - 1.2834	0.622	0.138	2.008	0.551	1.575	3.583	0.750	20	6
1.2835 - 1.5983	0.843	0.177	2.008	0.630	1.575	3.583	0.750	20	6
1.5984 - 1.7952	1.004	0.177	2.165	0.630	1.417	3.583	1.000	25	6



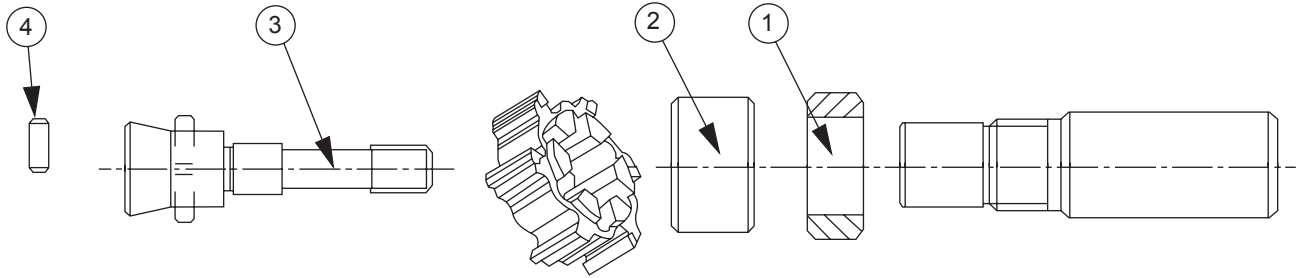
ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 92530	Series 2530	Number of Teeth
							Ød ^{h7} (inch)	Ød ^{h7} (mm)	
1.7953 - 2.3857	1.181	0.295	2.441	0.728	2.559	5.000	0.750	20	6
2.3858 - 3.1338	1.575	0.413	2.835	0.728	2.559	5.394	1.000	25	6
3.1339 - 3.9602	2.244	0.492	3.346	0.728	2.559	5.906	1.500	40	8

Arbors can be made with or without a Shank Flat.

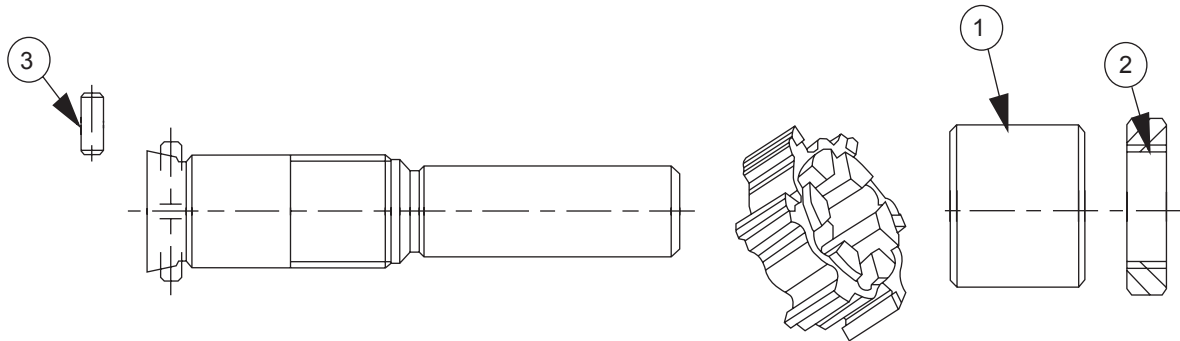
ALVAN® Ring Arbors Spare Parts



NO COOLANT - THROUGH HOLES	Inch Shank - Series 92530	Metric Shank - Series 2530
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ØD (inch)	Series 92530 Inch Shank	Series 2530 Metric Shank	Nut 1	Bushing 2	Conical Screw wth Drive Pin 3	Conical Screw with Drive Pin Second Expansion 3	Drive Pin 4
	Complete Mandrel without Cutting Ring	Complete Mandrel without Cutting Ring					
0.6929 - 0.8503	92531-MC-010	2531-MC-010	2501-DA-010	2501-BU-010	2501-VI-016	2501-VI-019	2501-CO-010
0.8504 - 1.0078	92531-MC-020	2531-MC-020	2501-DA-020	2501-BU-020	2501-VI-026	2501-VI-029	2501-CO-020
1.0079 - 1.2834	92531-MC-030	2531-MC-030	2501-DA-030	2501-BU-030	2501-VI-036	2501-VI-039	2501-CO-030
1.2835 - 1.5983	92531-MC-040	2531-MC-040	2501-DA-040	2501-BU-040	2501-VI-046	2501-VI-049	2501-CO-040
1.5984 - 1.7952	92531-MC-050	2531-MC-050	2501-DA-050	2501-BU-050	2501-VI-056	2501-VI-059	2501-CO-050



ØD (inch)	Series 92530 Inch Shank	Series 2530 Metric Shank	Bushing 1	Ring Nut 2	Drive Pin 3
	Complete Mandrel without Cutting Ring	Complete Mandrel without Cutting Ring			
1.7953 - 2.3857	92530-MC-060	2530-MC-060	2500-BU-060	2500-GH-060	2500-CO-060
2.3858 - 3.1338	92530-MC-070	2530-MC-070	2500-BU-070	2500-GH-070	2500-CO-070
3.1339 - 3.9602	92530-MC-080	2530-MC-080	2500-BU-080	2500-GH-080	2500-CO-080

Arbors can be made with or without a Shank Flat.

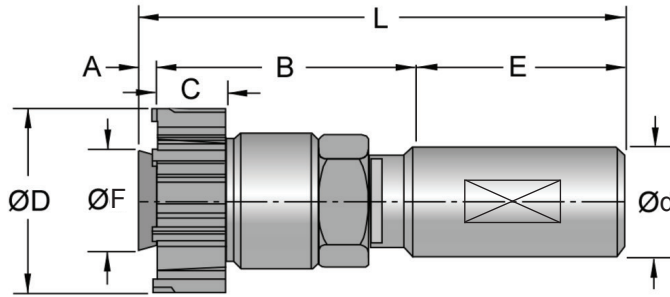


ALVAN® Ring Arbors

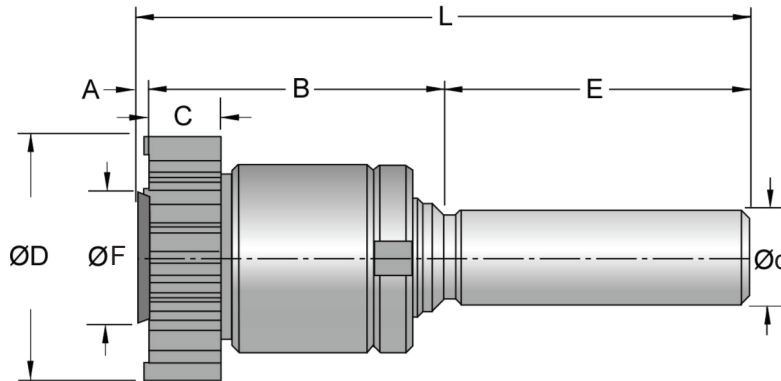
Short Length

Rear Adjusting

NO COOLANT - BLIND HOLES	Inch Shank - Series 92535	Metric Shank - Series 2535
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ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 92530	Series 2530	Number of Teeth
							Ød ^{h7} (inch)	Ød ^{h7} (mm)	
0.6929 - 0.8503	0.441	0.039	2.008	0.433	1.575	3.583	0.625	16	6
0.8504 - 1.0078	0.441	0.039	2.008	0.472	1.575	3.583	0.625	16	6
1.0079 - 1.2834	0.598	0.039	2.008	0.551	1.575	3.583	0.750	20	6
1.2835 - 1.5983	0.799	0.039	2.008	0.630	1.575	3.583	0.750	20	6
1.5984 - 1.7952	0.949	0.039	2.165	0.630	1.417	3.583	1.000	25	6



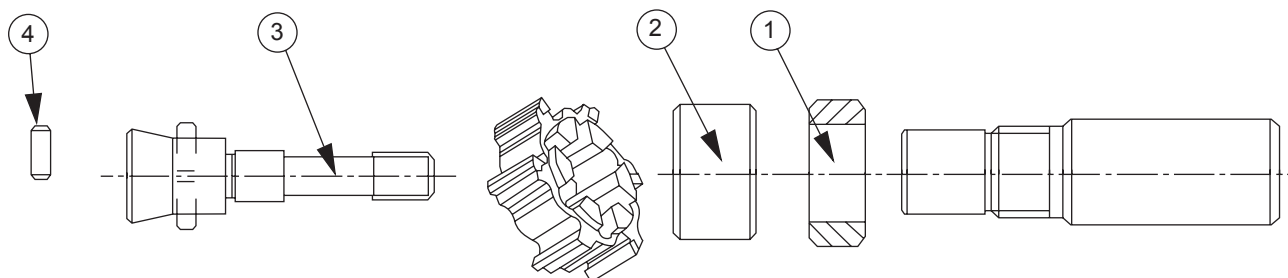
ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 92535	Series 2535	Number of Teeth
							Ød ^{h7} (inch)	Ød ^{h7} (mm)	
1.7953 - 2.3857	1.094	0.059	2.441	0.728	2.559	5.000	0.750	20	6
2.3858 - 3.1338	1.457	0.059	2.835	0.728	2.559	5.394	1.000	25	6
3.1339 - 3.9602	2.094	0.059	3.346	0.728	2.559	5.906	1.500	40	8

Arbors can be made with or without a Shank Flat.

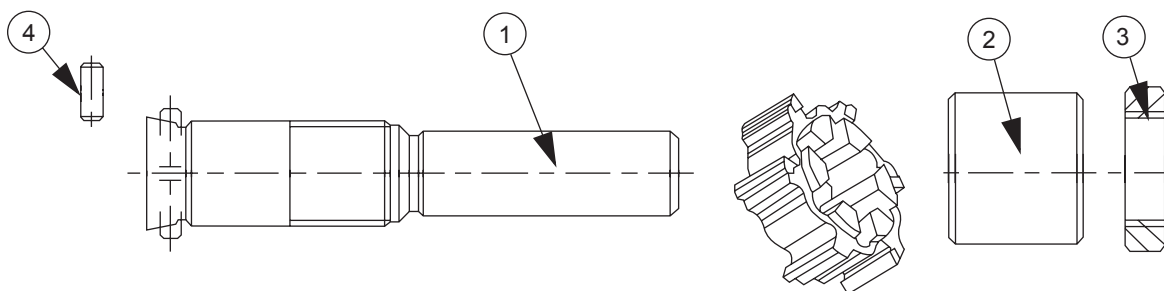
ALVAN® Ring Arbors Spare Parts



NO COOLANT - BLIND HOLES	Inch Shank - Series 92535	Metric Shank - Series 2535
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ØD (inch)	Series 92530 Inch Shank	Series 2530 Metric Shank	Nut 1	Bushing 2	Conical Screw with Drive Pin 3	Conical Screw with Drive Pin Second Expansion 3	Drive Pin 4
	Complete Mandrel without Cutting Ring	Complete Mandrel without Cutting Ring					
0.6929 - 0.8503	92531-MC-015	2531-MC-015	2501-DA-010	2501-BU-010	2501-VI-017	2501-VI-018	2501-CO-010
0.8504 - 1.0078	92531-MC-025	2531-MC-025	2501-DA-020	2501-BU-020	2501-VI-027	2501-VI-028	2501-CO-020
1.0079 - 1.2834	92531-MC-035	2531-MC-035	2501-DA-030	2501-BU-030	2501-VI-037	2501-VI-038	2501-CO-030
1.2835 - 1.5983	92531-MC-045	2531-MC-045	2501-DA-040	2501-BU-040	2501-VI-047	2501-VI-048	2501-CO-040
1.5984 - 1.7952	92531-MC-055	2531-MC-055	2501-DA-050	2501-BU-050	2501-VI-057	2501-VI-058	2501-CO-050



ØD (inch)	Series 92530 Inch Shank		Series 2530 Metric Shank		Bushing 2	Ring Nut 3	Drive Pin 4
	Complete Mandrel without Cutting Ring	Mandrel Second Expansion 1	Complete Mandrel without Cutting Ring	Mandrel Second Expansion 1			
1.7953 - 2.3857	92530-MC-065	92530-MA-066	2530-MC-065	2530-MA-066	2500-BU-060	2500-GH-060	2500-CO-060
2.3858 - 3.1338	92530-MC-075	92530-MA-076	2530-MC-075	2530-MA-076	2500-BU-070	2500-GH-070	2500-CO-070
3.1339 - 3.9602	92530-MC-085	92530-MA-086	2530-MC-085	2530-MA-086	2500-BU-080	2500-GH-080	2500-CO-080

Arbors can be made with or without a Shank Flat.

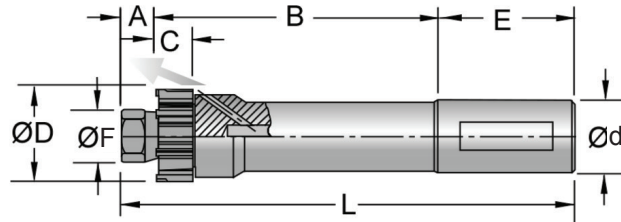


ALVAN® Ring Arbors

Short Length

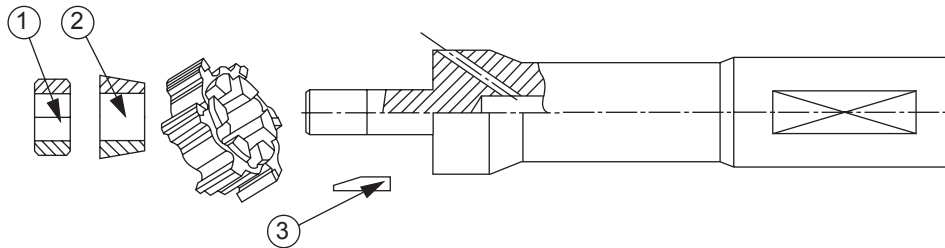
Front Adjusting

RADIAL COOLANT - THROUGH HOLES	Inch Shank - Series 94550	Metric Shank - Series 4550
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ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 94550	Series 4550	Number of Teeth
							Ød ^{h7} (inch)	Ød ^{h7} (mm)	
0.6929 - 0.8503	0.472	0.433	3.189	0.433	1.969	5.591	0.750	20	6
0.8504 - 1.0078	0.472	0.433	3.189	0.472	1.969	5.591	0.750	20	6
1.0079 - 1.2834	0.614	0.433	4.016	0.551	1.969	6.417	0.750	20	6
1.2835 - 1.5983	0.866	0.551	4.016	0.630	2.205	6.772	1.000	25	6
1.5984 - 1.7952	1.000	0.591	4.016	0.630	2.205	6.811	1.000	25	6
1.7953 - 2.3857	1.181	0.807	4.134	0.728	2.362	7.303	1.250	32	6
2.3858 - 3.1338	1.575	0.965	4.134	0.728	2.362	7.461	1.250	32	6
3.1339 - 3.9602	2.205	1.122	4.134	0.728	2.756	8.012	1.500	40	6

SPARE PARTS



ØD (inch)	Series 94550 Inch Shank	Series 4550 Metric Shank	Nut	Conical Ring	Drive Pin
	Complete Mandrel without Cutting Ring	Complete Mandrel without Cutting Ring	1	2	3
0.6929 - 0.8503	94550-MC-010	4550-MC-010	2000-DA-010	2010-AC-010	2000-CO-010
0.8504 - 1.0078	94550-MC-020	4550-MC-020	2000-DA-010	2010-AC-010	2000-CO-020
1.0079 - 1.1653	94550-MC-030	4550-MC-030	2000-DA-020	2010-AC-020	2000-CO-030
1.2835 - 1.4408	94550-MC-040	4550-MC-040	2000-DA-060	2010-AC-030	2000-CO-040
1.5984 - 1.7952	94550-MC-050	4550-MC-050	2000-DA-090	2010-AC-040	2000-CO-060
1.7953 - 1.9527	94550-MC-060	4550-MC-060	2000-GH-880	2010-AC-050	2000-CO-060
1.9528 - 2.3857	94550-MC-070	4550-MC-070	2000-GH-880	2010-AC-050	2000-CO-070
2.3858 - 2.7794	94550-MC-080	4550-MC-080	2000-GH-900	2010-AC-060	2000-CO-080
2.7795 - 3.1338	94550-MC-090	4550-MC-090	2000-GH-900	2010-AC-060	2000-CO-090
3.1339 - 3.5668	94550-MC-100	4550-MC-100	2000-GH-920	2010-AC-070	2000-CO-090
3.5669 - 3.9602	94550-MC-110	4550-MC-110	2000-GH-920	2010-AC-070	2000-CO-090

Arbors can be made with or without a Shank Flat.

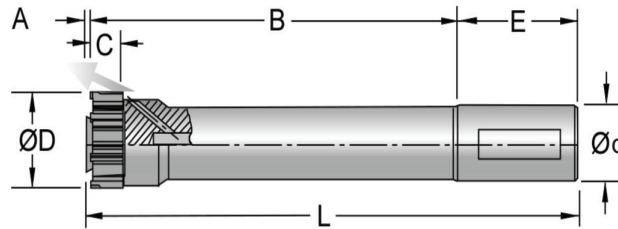
ALVAN® Ring Arbors

Short Length

Front Adjusting

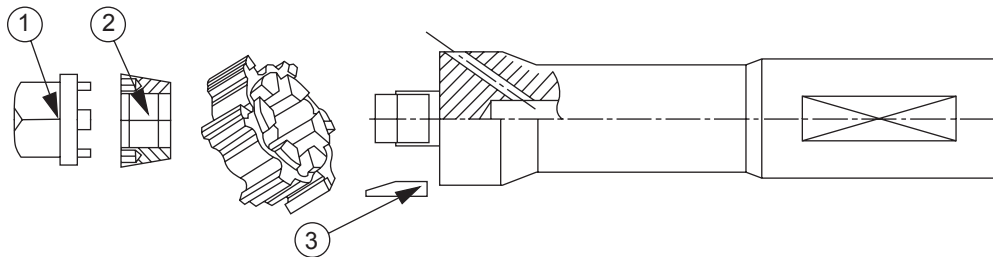


RADIAL COOLANT - BLIND HOLES	Inch Shank - Series 94555	Metric Shank - Series 4555
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ØFD (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 94555	Series 4555	Number of Teeth
						Ød ^{h7} (inch)	Ød ^{h7} (mm)	
0.6929 - 0.8503	0.039	3.189	0.433	1.969	5.197	0.750	20	6
0.8504 - 1.0078	0.039	3.189	0.472	1.969	5.197	0.750	20	6
1.0079 - 1.2834	0.039	4.016	0.551	1.969	6.024	0.750	20	6
1.2835 - 1.5983	0.039	4.016	0.630	2.205	6.260	1.000	25	6
1.5984 - 1.7952	0.039	4.016	0.630	2.205	6.260	1.000	25	6
1.7953 - 2.3857	0.059	4.134	0.728	2.362	6.555	1.250	32	6
2.3858 - 3.1338	0.059	4.134	0.728	2.362	6.555	1.250	32	6
3.1339 - 3.9602	0.059	4.134	0.728	2.756	6.949	1.500	40	8

SPARE PARTS



ØD (inch)	Series 94550 Inch Shank	Series 4550 Metric Shank	Adjusting Key 1	Conical Ring 2	Conical Ring Second Expansion 2	Conical Ring Third Expansion 2	Drive Pin 3
	Complete Mandrel without Cutting Ring	Complete Mandrel without Cutting Ring					
0.6929 - 0.8503	94555-MC-010	4555-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-010
0.8504 - 1.0078	94555-MC-020	4555-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-020
1.0079 - 1.1653	94555-MC-030	4555-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-030
1.1654 - 1.2834	94555-MC-035	4555-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-040
1.2835 - 1.4408	94555-MC-040	4555-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-040
1.4409 - 1.5983	94555-MC-045	4555-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-050
1.5984 - 1.7952	94555-MC-050	4555-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	2000-CO-060
1.7953 - 1.9527	94555-MC-060	4555-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-060
1.9528 - 2.1889	94555-MC-070	4555-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-070
2.1890 - 2.3857	94555-MC-075	4555-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-080
2.3858 - 2.5826	94555-MC-080	4555-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-080
2.5827 - 2.7794	94555-MC-085	4555-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
2.7795 - 3.1338	94555-MC-090	4555-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
3.1339 - 3.5668	94555-MC-100	4555-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090
3.5669 - 3.9602	94555-MC-110	4555-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090

Arbors can be made with or without a Shank Flat.



ALVAN® Ring Arbors

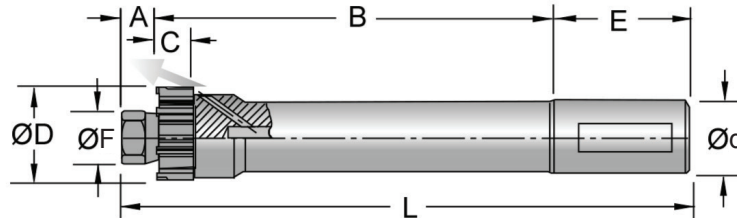
Long Length

Front Adjusting

RADIAL COOLANT - THROUGH HOLES

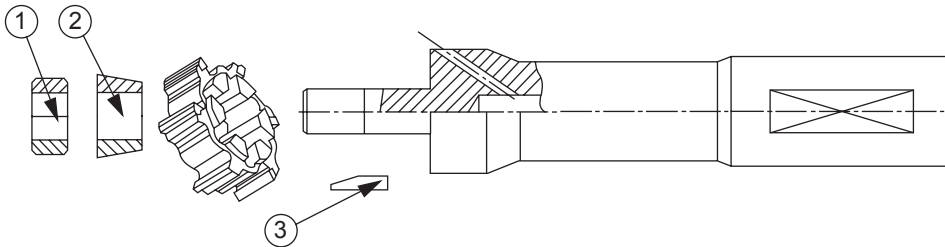
Inch Shank - Series 94500

Metric Shank - Series 4500



ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 94500	Series 4500	Number of Teeth
							Ød ^{h7} (inch)	Ød ^{h7} (mm)	
0.6929 - 0.8503	0.472	0.433	4.764	0.433	1.969	7.165	0.750	20	6
0.8504 - 1.0078	0.472	0.433	4.764	0.472	1.969	7.165	0.750	20	6
1.0079 - 1.2834	0.614	0.433	6.024	0.551	1.969	8.425	0.750	20	6
1.2835 - 1.5983	0.866	0.551	7.047	0.630	2.205	9.803	1.000	25	6
1.5984 - 1.7952	1.000	0.591	7.913	0.630	2.205	10.709	1.000	25	6
1.7953 - 2.3857	1.181	0.807	8.425	0.728	2.362	11.594	1.250	32	6
2.3858 - 3.1338	1.575	0.965	9.331	0.728	2.362	12.657	1.250	32	6
3.1339 - 3.9602	2.205	1.122	9.646	0.728	2.756	13.524	1.500	40	8

SPARE PARTS



ØD (inch)	Series 94500 Inch Shank	Series 4500 Metric Shank	Nut 1	Conical Ring 2	Drive Pin 3
	Complete Mandrel without Cutting Ring	Complete Mandrel without Cutting Ring			
0.6929 - 0.8503	94500-MC-010	4500-MC-010	2000-DA-010	2010-AC-010	2000-CO-010
0.8504 - 1.0078	94500-MC-020	4500-MC-020	2000-DA-010	2010-AC-010	2000-CO-020
1.0079 - 1.1653	94500-MC-030	4500-MC-030	2000-DA-020	2010-AC-020	2000-CO-030
1.2835 - 1.4408	94500-MC-040	4500-MC-040	2000-DA-060	2010-AC-030	2000-CO-040
1.5984 - 1.7952	94500-MC-050	4500-MC-050	2000-DA-090	2010-AC-040	2000-CO-060
1.7953 - 1.9527	94500-MC-060	4500-MC-060	2000-GH-880	2010-AC-050	2000-CO-060
1.9528 - 2.3857	94500-MC-070	4500-MC-070	2000-GH-880	2010-AC-050	2000-CO-070
2.3858 - 2.7794	94500-MC-080	4500-MC-080	2000-GH-900	2010-AC-060	2000-CO-080
2.7795 - 3.1338	94500-MC-090	4500-MC-090	2000-GH-900	2010-AC-060	2000-CO-090
3.1339 - 3.5668	94500-MC-100	4500-MC-100	2000-GH-920	2010-AC-070	2000-CO-090
3.5669 - 3.9602	94500-MC-110	4500-MC-110	2000-GH-920	2010-AC-070	2000-CO-090

Arbors can be made with or without a Shank Flat.

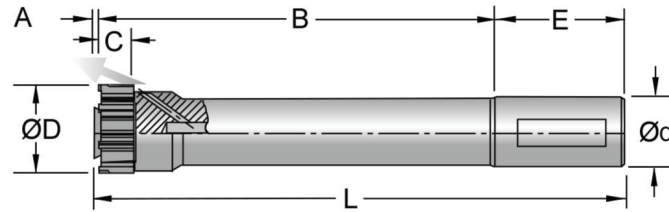
ALVAN® Ring Arbors

Long Length

Front Adjusting

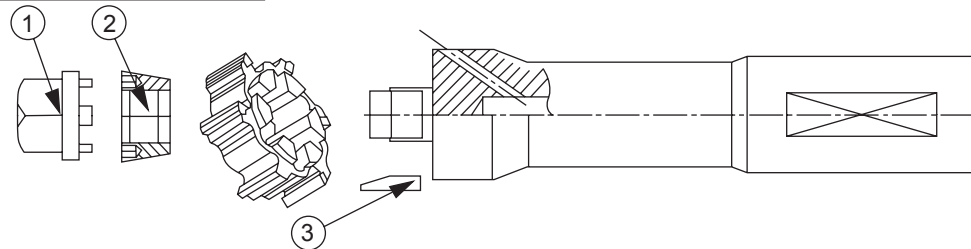


RADIAL COOLANT - BLIND HOLES	Inch Shank - Series 94505	Metric Shank - Series 4505
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ØD (inch)	A (inch)	B (inch)	C (inch)	E (inch)	L (inch)	Series 94505	Series 4505	Number of Teeth
						Ød ^{h7} (inch)	Ød ^{h7} (mm)	
0.6929 - 0.8503	0.039	4.764	0.433	1.969	6.772	0.750	20	6
0.8504 - 1.0078	0.039	4.764	0.472	1.969	6.772	0.750	20	6
1.0079 - 1.2834	0.039	6.024	0.551	1.969	8.031	0.750	20	6
1.2835 - 1.5983	0.039	7.047	0.630	2.205	9.291	1.000	25	6
1.5984 - 1.7952	0.039	7.913	0.630	2.205	10.157	1.000	25	6
1.7953 - 2.3857	0.059	8.425	0.728	2.362	10.846	1.250	32	6
2.3858 - 3.1338	0.059	9.331	0.728	2.362	11.752	1.250	32	6
3.1339 - 3.9602	0.059	9.646	0.728	2.756	12.461	1.500	40	8

SPARE PARTS



ØD (inch)	Series 94505 Inch Shank	Series 4505 Metric Shank	Adjusting Key 1	Conical Ring 2	Conical Ring Second Expansion 2	Conical Ring Third Expansion 2	Drive Pin 3
	Complete Mandrel without Cutting Ring	Complete Mandrel without Cutting Ring					
0.6929 - 0.8503	94505-MC-010	4505-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-010
0.8504 - 1.0078	94505-MC-020	4505-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-020
1.0079 - 1.1653	94505-MC-030	4505-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-030
1.1654 - 1.2834	94505-MC-035	4505-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-040
1.2835 - 1.4408	94505-MC-040	4505-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-040
1.4409 - 1.5983	94505-MC-045	4505-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-050
1.5984 - 1.7952	94505-MC-050	4505-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	2000-CO-060
1.7953 - 1.9527	94505-MC-060	4505-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-060
1.9528 - 2.1889	94505-MC-070	4505-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-070
2.1890 - 2.3857	94505-MC-075	4505-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-080
2.3858 - 2.5826	94505-MC-080	4505-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-080
2.5827 - 2.7794	94505-MC-085	4505-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
2.7795 - 3.1338	94505-MC-090	4505-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
3.1339 - 3.5668	94505-MC-100	4505-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090
3.5669 - 3.9602	94505-MC-110	4505-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090

Arbors can be made with or without a Shank Flat.



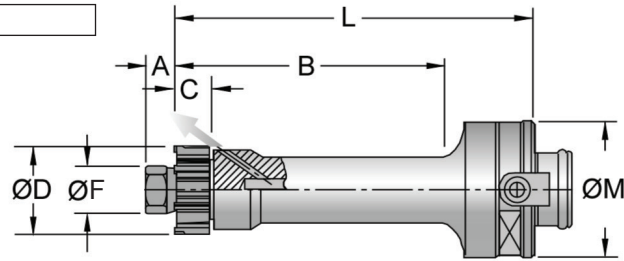
ALVAN® Ring Arbors

Extra Short Length

Modular Shank

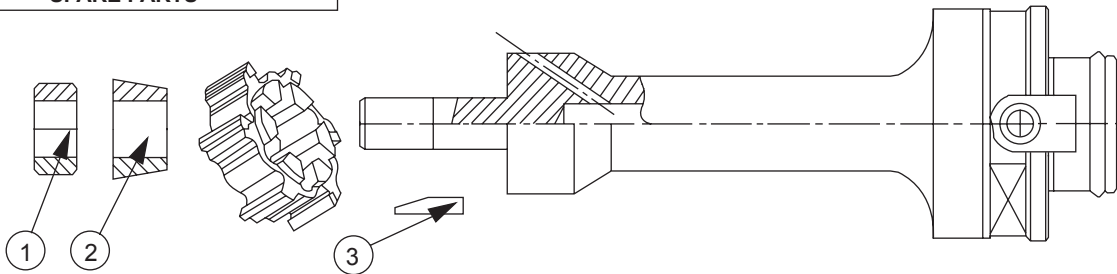
RADIAL COOLANT - THROUGH HOLES

Series 4330



ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	L (inch)	Modular Shank ØM	Number of Teeth
0.6929 - 0.8503	0.472	0.433	2.165	0.433	2.953	50	6
0.8504 - 1.0078	0.472	0.433	2.165	0.472	2.953	50	6
1.0079 - 1.2834	0.614	0.433	2.362	0.551	3.150	50	6
1.2835 - 1.5983	0.866	0.551	2.362	0.630	3.150	50	6
1.5984 - 1.7952	1.000	0.591	2.362	0.630	3.150	50	6
1.7953 - 2.3857	1.181	0.807	2.362	0.728	3.150	50	6
2.3858 - 3.1338	1.575	0.965	2.559	0.728	3.543	63	6
3.1339 - 3.9602	2.205	1.122	2.559	0.728	3.543	63	8

SPARE PARTS



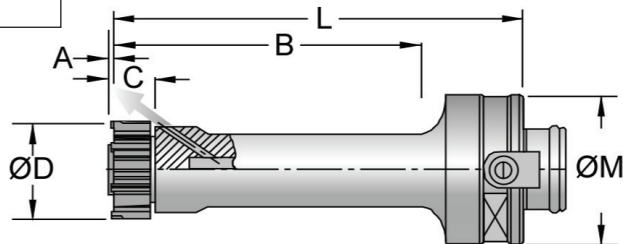
ØD (inch)	Complete Mandrel without Cutting Ring	Nut 1	Conical Ring 2	Drive Pin 3
0.6929 - 0.8503	4330-MC-010	2000-DA-010	2010-AC-010	2000-CO-010
0.8504 - 1.0078	4330-MC-020	2000-DA-010	2010-AC-010	2000-CO-020
1.0079 - 1.1653	4330-MC-030	2000-DA-020	2010-AC-020	2000-CO-030
1.2835 - 1.4408	4330-MC-040	2000-DA-060	2010-AC-030	2000-CO-040
1.5984 - 1.7952	4330-MC-050	2000-DA-090	2010-AC-040	2000-CO-060
1.7953 - 1.9527	4330-MC-060	2000-GH-880	2010-AC-050	2000-CO-060
1.9528 - 2.3857	4330-MC-070	2000-GH-880	2010-AC-050	2000-CO-070
2.3858 - 2.7794	4330-MC-080	2000-GH-900	2010-AC-060	2000-CO-080
2.7795 - 3.1338	4330-MC-090	2000-GH-900	2010-AC-060	2000-CO-090
3.1339 - 3.5668	4330-MC-100	2000-GH-920	2010-AC-070	2000-CO-090
3.5669 - 3.9602	4330-MC-110	2000-GH-920	2010-AC-070	2000-CO-090

ALVAN® Ring Arbors Extra Short Length Modular Shank



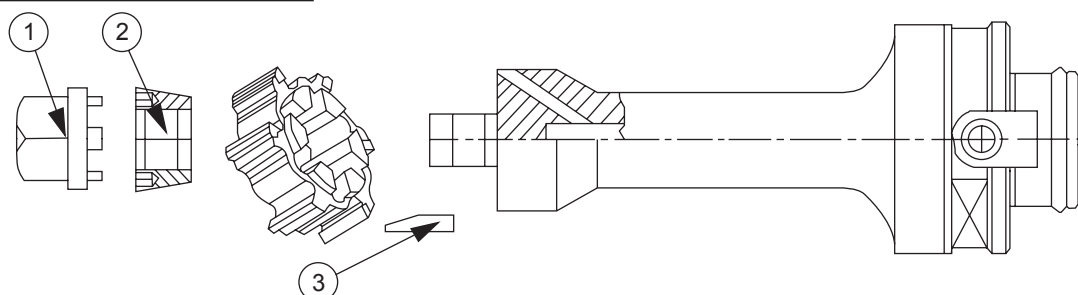
RADIAL COOLANT - BLIND HOLES

Series 4335



ØD (inch)	A (inch)	B (inch)	C (inch)	L (inch)	Modular Shank ØM	Number of Teeth
0.6929 - 0.8503	0.039	2.165	0.433	2.953	50	6
0.8504 - 1.0078	0.039	2.165	0.472	2.953	50	6
1.0079 - 1.2834	0.039	2.362	0.551	3.150	50	6
1.2835 - 1.5983	0.039	2.362	0.630	3.150	50	6
1.5984 - 1.7952	0.039	2.362	0.630	3.150	50	6
1.7953 - 2.3857	0.059	2.362	0.728	3.150	50	6
2.3858 - 3.1338	0.059	2.559	0.728	3.543	63	6
3.1339 - 3.9602	0.059	2.559	0.728	3.543	63	8

SPARE PARTS



ØD (inch)	Complete Mandrel without Cutting Ring	Adjusting Key	Conical Ring	Conical Ring Second Expansion	Conical Ring Third Expansion	Drive Pin
		1	2	2	2	3
0.6929 - 0.8503	4335-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-010
0.8504 - 1.0078	4335-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-020
1.0079 - 1.1653	4335-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-030
1.1654 - 1.2834	4335-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-040
1.2835 - 1.4408	4335-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-040
1.4409 - 1.5983	4335-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-050
1.5984 - 1.7952	4335-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	2000-CO-060
1.7953 - 1.9527	4335-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-060
1.9528 - 2.1889	4335-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-070
2.1890 - 2.3857	4335-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-080
2.3858 - 2.5826	4335-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-080
2.5827 - 2.7794	4335-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
2.7795 - 3.1338	4335-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
3.1339 - 3.5668	4335-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090
3.5669 - 3.9602	4335-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090



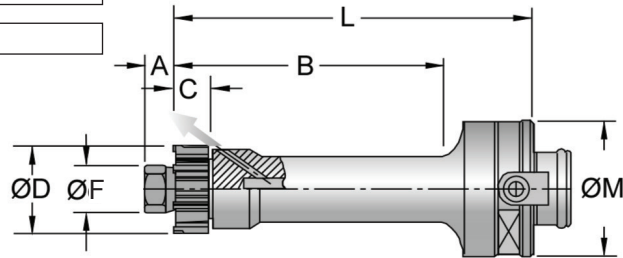
ALVAN® Ring Arbors

Short Length

Modular Shank

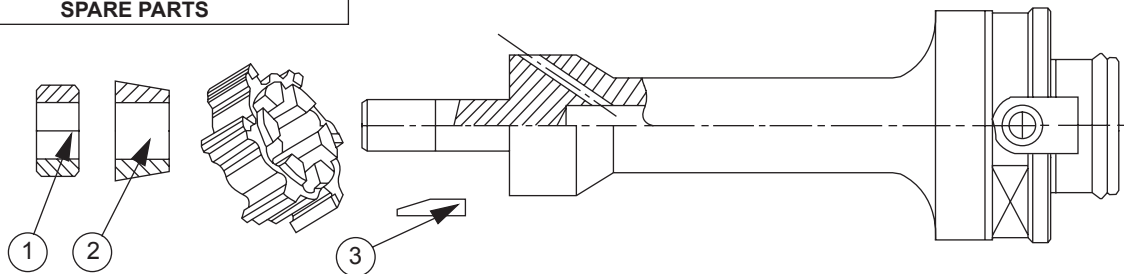
RADIAL COOLANT - THROUGH HOLES

Series 4350



ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	L (inch)	Modular Shank ØM	Number of Teeth
0.6929 - 0.8503	0.472	0.433	3.189	0.433	4.567	50	6
0.8504 - 1.0078	0.472	0.433	3.189	0.472	4.567	50	6
1.0079 - 1.2834	0.614	0.433	4.016	0.551	5.394	50	6
1.2835 - 1.5983	0.866	0.551	4.016	0.630	5.394	50	6
1.5984 - 1.7952	1.000	0.591	4.016	0.630	5.394	50	6
1.7953 - 2.3857	1.181	0.807	4.134	0.728	5.512	50	6
2.3858 - 3.1338	1.575	0.965	4.134	0.728	5.512	63	6
3.1339 - 3.9602	2.205	1.122	4.134	0.728	5.512	63	8
3.9606 - 4.3542	2.906	1.398	4.134	0.728	5.512	80	10
4.3543 - 4.5511	3.181	1.398	4.134	0.728	5.512	80	12
4.5512 - 4.9448	3.417	1.398	4.134	0.728	5.512	80	12
4.9449 - 5.4960	3.575	1.398	4.134	0.728	5.512	80	12
5.4961 - 5.7322	4.047	1.398	4.134	0.728	5.512	80	12
5.7323 - 6.1259	4.244	1.398	4.134	0.728	5.512	80	12
6.1260 - 6.5196	4.244	1.909	4.134	0.728	5.512	80	12
6.5197 - 6.9133	4.638	1.909	4.134	0.728	5.512	80	12
6.9134 - 7.3070	5.031	1.909	4.134	0.728	5.512	80	12
7.3071 - 7.7007	5.425	1.909	4.134	0.728	5.512	80	12
7.7008 - 7.8972	5.740	1.909	4.134	0.728	5.512	80	12

SPARE PARTS



0.6929 through 4.3542				
ØD (inch)	Complete Mandrel without Cutting Ring	Nut 1	Conical Ring 2	Drive Pin 3
0.6929 - 0.8503	4350-MC-010	2000-DA-010	2010-AC-010	2000-CO-010
0.8504 - 1.0078	4350-MC-020	2000-DA-010	2010-AC-010	2000-CO-020
1.0079 - 1.2834	4350-MC-030	2000-DA-020	2010-AC-020	2000-CO-030
1.2835 - 1.5983	4350-MC-040	2000-DA-060	2010-AC-030	2000-CO-040
1.5984 - 1.7952	4350-MC-050	2000-DA-090	2010-AC-040	2000-CO-060
1.7953 - 1.9527	4350-MC-060	2000-GH-880	2010-AC-050	2000-CO-060
1.9528 - 2.3857	4350-MC-070	2000-GH-880	2010-AC-050	2000-CO-070
2.3858 - 2.7794	4350-MC-080	2000-GH-900	2010-AC-060	2000-CO-080
2.7795 - 3.1338	4350-MC-090	2000-GH-900	2010-AC-060	2000-CO-090
3.1339 - 3.5668	4350-MC-100	2000-GH-920	2010-AC-070	2000-CO-090
3.5669 - 3.9602	4350-MC-110	2000-GH-920	2010-AC-070	2000-CO-090
3.9606 - 4.3542	4350-MC-120	2000-GH-095	2060-BU-010	2000-CO-090

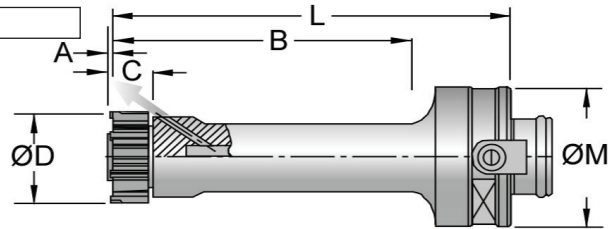
4.3543 through 7.8972				
ØD (inch)	Complete Mandrel without Cutting Ring	Nut 1	Conical Ring 2	Drive Pin 3
4.3543 - 4.5511	4350-MC-130	2000-GH-095	2060-BU-020	2000-CO-090
4.5512 - 4.7479	4350-MC-140	2000-GH-095	2060-BU-030	2000-CO-090
4.7480 - 4.9448	4350-MC-150	2000-GH-095	2060-BU-030	2000-CO-090
4.9449 - 5.2204	4350-MC-160	2000-GH-095	2060-BU-040	2000-CO-100
5.2205 - 5.4960	4350-MC-170	2000-GH-095	2060-BU-040	2000-CO-100
5.4961 - 5.7322	4350-MC-180	2000-GH-095	2060-BU-050	2000-CO-100
5.7323 - 6.1259	4350-MC-190	2000-GH-095	2060-BU-060	2000-CO-110
6.1260 - 6.5196	4350-MC-200	2000-GH-120	2060-BU-070	2000-CO-110
6.5197 - 6.9133	4350-MC-210	2000-GH-120	2060-BU-080	2000-CO-110
6.9134 - 7.3070	4350-MC-220	2000-GH-120	2060-BU-090	2000-CO-120
7.3071 - 7.7007	4350-MC-230	2000-GH-120	2060-BU-100	2000-CO-120
7.7008 - 7.8972	4350-MC-240	2000-GH-120	2060-BU-110	2000-CO-120

ALVAN® Ring Arbors Short Length Modular Shank



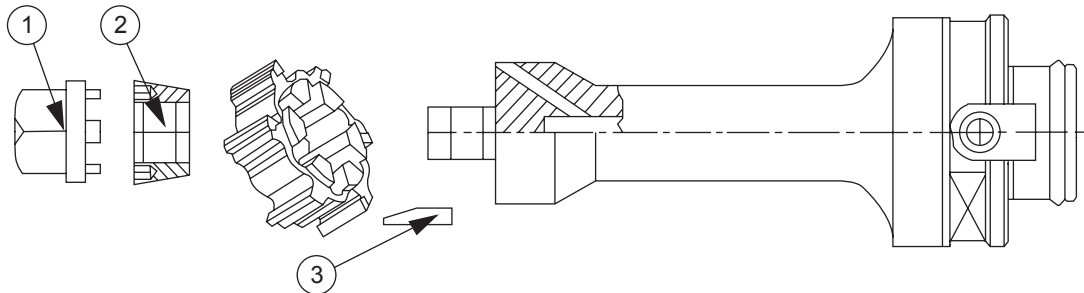
RADIAL COOLANT - BLIND HOLES

Series 4355



ØD (inch)	A (inch)	B (inch)	C (inch)	L (inch)	Modular Shank ØM	Number of Teeth
0.6929 - 0.8503	0.039	3.189	0.433	4.567	50	6
0.8504 - 1.0078	0.039	3.189	0.472	4.567	50	6
1.0079 - 1.2834	0.039	4.016	0.551	5.394	50	6
1.2835 - 1.5983	0.039	4.016	0.630	5.394	50	6
1.5984 - 1.7952	0.039	4.016	0.630	5.394	50	6
1.7953 - 2.3857	0.059	4.134	0.728	5.512	50	6
2.3858 - 3.1338	0.059	4.134	0.728	5.512	63	6
3.1339 - 3.9602	0.059	4.134	0.728	5.512	63	8

SPARE PARTS



ØD (inch)	Complete Mandrel without Cutting Ring	Adjusting Key	Conical Ring	Conical Ring Second Expansion	Conical Ring Third Expansion	Drive Pin
		1	2	2	2	3
0.6929 - 0.8503	4355-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-010
0.8504 - 1.0078	4355-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-020
1.0079 - 1.1653	4355-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-030
1.1654 - 1.2834	4355-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-040
1.2835 - 1.4408	4355-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-040
1.4409 - 1.5983	4355-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-050
1.5984 - 1.7952	4355-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	2000-CO-060
1.7953 - 1.9527	4355-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-060
1.9528 - 2.1889	4355-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-070
2.1890 - 2.3857	4355-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-080
2.3858 - 2.5826	4355-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-080
2.5827 - 2.7794	4355-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
2.7795 - 3.1338	4355-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090
3.1339 - 3.5668	4355-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090
3.5669 - 3.9602	4355-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	2000-CO-090

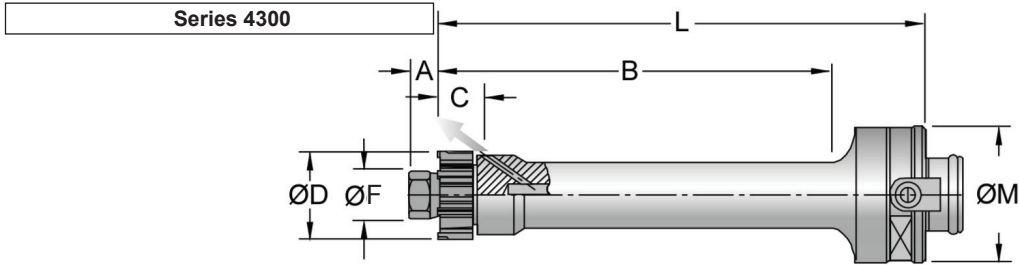


ALVAN® Ring Arbors

Long Length

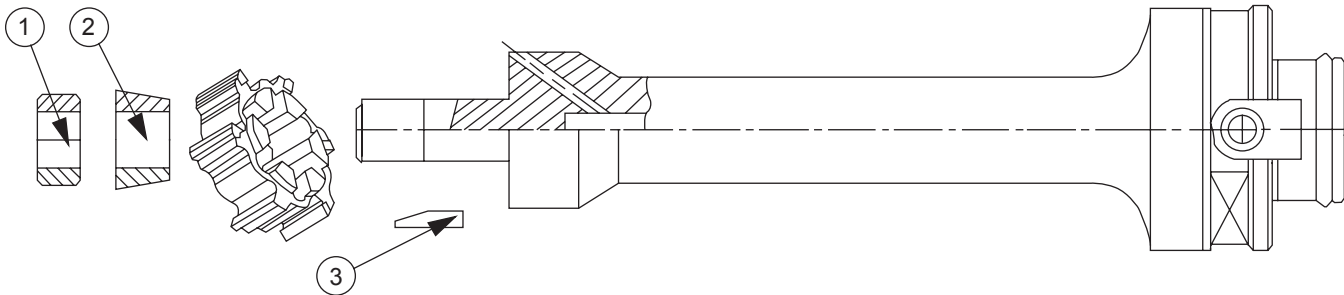
Modular Shank

RADIAL COOLANT - THROUGH HOLES



ØD (inch)	ØF (inch)	A (inch)	B (inch)	C (inch)	L (inch)	Modular Shank ØM	Number of Teeth
0.6929 - 0.8503	0.472	0.433	4.764	0.433	6.142	50	6
0.8504 - 1.0078	0.472	0.433	4.764	0.472	6.142	50	6
1.0079 - 1.2834	0.614	0.433	6.024	0.551	7.402	50	6
1.2835 - 1.5983	0.866	0.551	7.047	0.630	8.425	50	6
1.5984 - 1.7952	1.000	0.591	7.913	0.630	9.291	50	6
1.7953 - 2.3857	1.181	0.807	8.425	0.728	9.803	50	6

SPARE PARTS



ØD (inch)	Complete Mandrel without Cutting Ring	Nut	Conical Ring	Drive Pin
		1	2	3
0.6929 - 0.8503	4300-MC-010	2000-DA-010	2010-AC-010	2000-CO-010
0.8504 - 1.0078	4300-MC-020	2000-DA-010	2010-AC-010	2000-CO-020
1.0079 - 1.2834	4300-MC-030	2000-DA-020	2010-AC-020	2000-CO-030
1.2835 - 1.5983	4300-MC-040	2000-DA-060	2010-AC-030	2000-CO-040
1.5984 - 1.7952	4300-MC-050	2000-DA-090	2010-AC-040	2000-CO-060
1.7953 - 1.9527	4300-MC-060	2000-GH-880	2010-AC-050	2000-CO-060
1.9528 - 2.3857	4300-MC-070	2000-GH-880	2010-AC-050	2000-CO-070

ALVAN® Ring Arbors

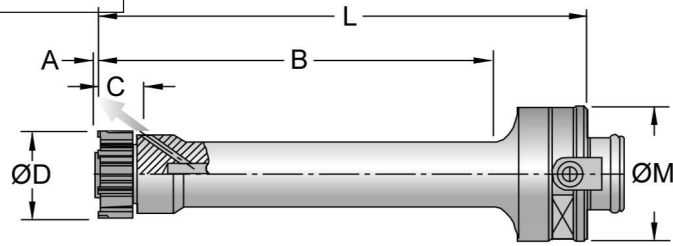
Long Length

Modular Shank



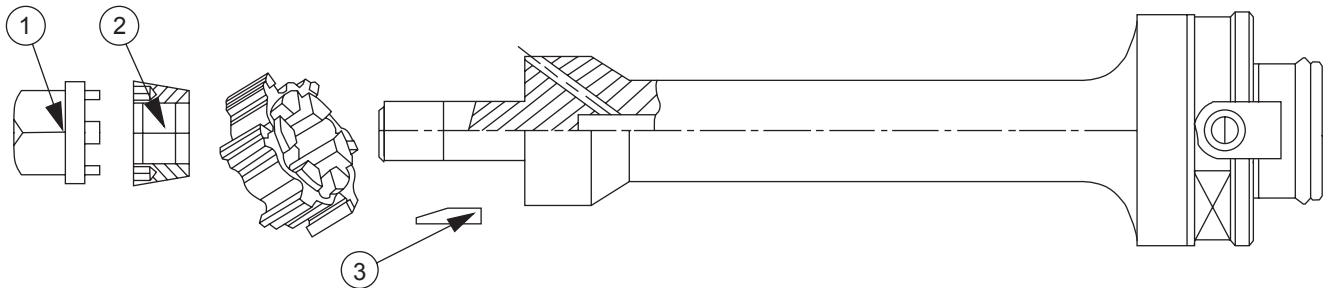
RADIAL COOLANT - BLIND HOLES

Series 4305



ØD (inch)	A (inch)	B (inch)	C (inch)	L (inch)	Modular Shank ØM	Number of Teeth
0.6929 - 0.8503	0.039	4.764	0.433	6.142	50	6
0.8504 - 1.0078	0.039	4.764	0.472	6.142	50	6
1.0079 - 1.2834	0.039	6.024	0.551	7.402	50	6
1.2835 - 1.5983	0.039	7.047	0.630	8.425	50	6
1.5984 - 1.7952	0.039	7.913	0.630	9.291	50	6
1.7953 - 2.3857	0.059	8.425	0.728	9.803	50	6

SPARE PARTS



ØD (inch)	Complete Mandrel without Cutting Ring	Adjusting Key 1	Conical Ring 2	Conical Ring Second Expansion 2	Conical Ring Third Expansion 2	Drive Pin 3
0.6929 - 0.8503	4305-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-010
0.8504 - 1.0078	4305-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-020
1.0079 - 1.1653	4305-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-030
1.1654 - 1.2834	4305-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-040
1.2835 - 1.4408	4305-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-040
1.4409 - 1.5983	4305-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-050
1.5984 - 1.7952	4305-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	2000-CO-060
1.7953 - 1.9527	4305-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-060
1.9528 - 2.1889	4305-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-070
2.1890 - 2.3857	4305-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-080



Recommended Speeds & Feeds

Inch Conventional Reaming

Uncoated Carbide

Material	Material Hardness (BHN)	Reamer Ø (inch)	Stock Allowance on Ø (inch)	Surface Speed (SFM)	Feed (IPR)	Coolant Type
Mild Steel Unalloyed Low Alloyed Structural Steel	Up to 150	Up to 0.394	0.004 - 0.008	23 - 49	0.006 - 0.012	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.010 - 0.020	
		0.866 - 1.575	0.008 - 0.016		0.012 - 0.031	
		1.575 - 1.969	0.012 - 0.016		0.024 - 0.039	
		1.969 - 2.756	0.014 - 0.020		0.024 - 0.047	
		2.756 - 3.937	0.016 - 0.020		0.031 - 0.059	
	Greater than 150	Up to 0.394	0.004 - 0.008	20 - 33	0.004 - 0.012	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.008 - 0.016	
		0.866 - 1.575	0.008 - 0.016		0.012 - 0.024	
		1.575 - 1.969	0.012 - 0.016		0.024 - 0.039	
		1.969 - 2.756	0.014 - 0.020		0.024 - 0.047	
		2.756 - 3.937	0.016 - 0.020		0.031 - 0.059	
Alloy Steel Stainless Steel	Up to 300	Up to 0.394	0.004 - 0.008	13 - 26	0.004 - 0.012	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.008 - 0.016	
		0.866 - 1.575	0.008 - 0.016		0.012 - 0.024	
		1.575 - 1.969	0.012 - 0.016		0.024 - 0.039	
		1.969 - 2.756	0.014 - 0.020		0.024 - 0.047	
		2.756 - 3.937	0.016 - 0.020		0.031 - 0.059	
High Strength Alloy Steel Steel with Manganese	240 to 450	Up to 0.394	0.004 - 0.008	10 - 20	0.004 - 0.008	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.006 - 0.016	
		0.866 - 1.575	0.008 - 0.016		0.012 - 0.020	
		1.575 - 1.969	0.012 - 0.016		0.012 - 0.028	
		1.969 - 2.756	0.014 - 0.020		0.016 - 0.031	
		2.756 - 3.937	0.016 - 0.020		0.020 - 0.039	
Titanium and Alloys	-	Up to 0.394	0.004 - 0.008	16 - 26	0.006 - 0.012	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.008 - 0.016	
		0.866 - 1.575	0.008 - 0.016		0.012 - 0.020	
		1.575 - 1.969	0.012 - 0.016		0.016 - 0.024	
		1.969 - 2.756	0.014 - 0.020		0.024 - 0.031	
		2.756 - 3.937	0.016 - 0.020		0.031 - 0.047	

Formulas: IPM = RPM • IPR

SFM = RPM • 0.262 • DIA

RPM = SFM • 3.82 / DIA

The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.

Recommended Speeds & Feeds Inch Conventional Reaming (continued)



Uncoated Carbide

Material	Material Hardness (BHN)	Reamer Ø (inch)	Stock Allowance on Ø (inch)	Surface Speed (SFM)	Feed (IPR)	Coolant Type
Stainless Steel	Up to 300	Up to 0.394	0.004 - 0.008	13 - 26	0.004 - 0.012	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.008 - 0.016	
		0.866 - 1.575	0.008 - 0.016		0.012 - 0.024	
		1.575 - 1.969	0.012 - 0.016		0.024 - 0.039	
		1.969 - 2.756	0.014 - 0.020		0.024 - 0.047	
		2.756 - 3.937	0.016 - 0.020		0.031 - 0.059	
Grey Cast Iron Spheroidal Cast Iron (Pearlitic) Malleable Cast Iron	Up to 200	Up to 0.394	0.004 - 0.008	49 - 98	0.008 - 0.020	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.016 - 0.024	
		0.866 - 1.575	0.008 - 0.016		0.024 - 0.047	
	Greater than 200	1.575 - 1.969	0.012 - 0.016	33 - 66	0.030 - 0.059	
		1.969 - 2.756	0.014 - 0.020		0.031 - 0.063	
2.756 - 3.937	0.016 - 0.020	0.039 - 0.071				
Spheroidal Cast Iron (Ferritic)	Up to 200	Up to 0.394	0.004 - 0.008	26 - 39	0.006 - 0.012	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.016 - 0.024	
		0.866 - 1.575	0.008 - 0.016		0.020 - 0.039	
		1.575 - 1.969	0.012 - 0.016		0.030 - 0.059	
		1.969 - 2.756	0.014 - 0.020		0.031 - 0.063	
		2.756 - 3.937	0.016 - 0.020		0.039 - 0.071	
Copper and Alloys Brass	Up to 150	Up to 0.394	0.004 - 0.008	33 - 59	0.006 - 0.016	Water Soluble
		0.394 - 0.866	0.006 - 0.010		0.008 - 0.024	
		0.866 - 1.575	0.008 - 0.016		0.010 - 0.035	
		1.575 - 1.969	0.012 - 0.016		0.016 - 0.043	
		1.969 - 2.756	0.014 - 0.020		0.020 - 0.047	
		2.756 - 3.937	0.016 - 0.020		0.024 - 0.059	
Bronze Bronze Phosphorus	Up to 180	Up to 0.394	0.004 - 0.008	33 - 66	0.006 - 0.016	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.010 - 0.024	
		0.866 - 1.575	0.008 - 0.016		0.020 - 0.031	
		1.575 - 1.969	0.012 - 0.016		0.024 - 0.039	
		1.969 - 2.756	0.014 - 0.020		0.028 - 0.043	
		2.756 - 3.937	0.016 - 0.020		0.031 - 0.047	
Aluminum and Light Alloys	Up to 150	Up to 0.394	0.004 - 0.008	49 - 98	0.008 - 0.012	Water Soluble Cutting Oil
		0.394 - 0.866	0.006 - 0.010		0.012 - 0.024	
		0.866 - 1.575	0.008 - 0.016		0.016 - 0.039	
		1.575 - 1.969	0.012 - 0.016		0.030 - 0.059	
		1.969 - 2.756	0.014 - 0.020		0.031 - 0.063	
		2.756 - 3.937	0.016 - 0.020		0.035 - 0.071	
Synthetic Materials	-	Up to 0.394	0.004 - 0.008	49 - 98	0.008 - 0.020	Compressed Air Dry Water Soluble
		0.394 - 0.866	0.006 - 0.010		0.016 - 0.020	
		0.866 - 1.575	0.008 - 0.016		0.020 - 0.055	
		1.575 - 1.969	0.012 - 0.016		0.031 - 0.059	
		1.969 - 2.756	0.014 - 0.020		0.035 - 0.063	
		2.756 - 3.937	0.016 - 0.020		0.039 - 0.071	

Formulas: $IPM = RPM \cdot IPR$ $SFM = RPM \cdot 0.262 \cdot DIA$ $RPM = SFM \cdot 3.82 / DIA$
 The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



Recommended Speeds & Feeds

Inch High Speed Reaming

Coated Carbide and Cermet

Material	Material Hardness (BHN)	Reamer Ø (inch)	Stock Allowance on Ø (inch)	TiN-TiCN-TiAlN Coated Carbide	Cermet	Lead-in A, G	Lead-in E, N, M
				Surface Speed (SFM)	Surface Speed (SFM)	Feed (IPR)	Feed (IPR)
Mild Steel Unalloyed Low Alloyed Structural Steel	Up to 150	Up to 0.394	0.003 - 0.006	200 - 260	300 - 980	0.008 - 0.016	0.012 - 0.024
		0.394 - 0.709	0.006 - 0.010			0.016 - 0.024	0.016 - 0.039
		0.709 - 1.575	0.006 - 0.012			0.020 - 0.031	0.024 - 0.047
		1.575 - 3.150	0.008 - 0.016			0.020 - 0.039	0.031 - 0.063
	Greater than 150	Over 3.150	0.010 - 0.020	130 - 230	260 - 660	0.031 - 0.059	0.039 - 0.087
		Up to 0.394	0.003 - 0.006			0.008 - 0.016	0.012 - 0.020
		0.394 - 0.709	0.006 - 0.010			0.012 - 0.024	0.012 - 0.031
		0.709 - 1.575	0.006 - 0.012			0.016 - 0.028	0.016 - 0.039
Alloy Steel Stainless Steel	Up to 300	1.575 - 3.150	0.008 - 0.016	100 - 160	200 - 490	0.020 - 0.031	0.024 - 0.055
		Over 3.150	0.010 - 0.020			0.031 - 0.047	0.039 - 0.079
		Up to 0.394	0.003 - 0.006			0.008 - 0.016	0.012 - 0.024
		0.394 - 0.709	0.006 - 0.010			0.012 - 0.024	0.012 - 0.031
High Strength Alloy Steel Steel with Manganese	240 to 450	0.709 - 1.575	0.006 - 0.012	50 - 100	200 - 390	0.016 - 0.031	0.020 - 0.039
		Over 3.150	0.010 - 0.020			0.024 - 0.039	0.028 - 0.055
		Up to 0.394	0.003 - 0.006			0.006 - 0.012	0.008 - 0.016
		0.394 - 0.709	0.006 - 0.010			0.008 - 0.020	0.012 - 0.024
		0.709 - 1.575	0.006 - 0.012			0.012 - 0.024	0.016 - 0.031
Titanium and Alloys	-	1.575 - 3.150	0.012 - 0.016	60 - 200	-	0.016 - 0.031	0.020 - 0.039
		Over 3.150	0.012 - 0.020			0.024 - 0.039	0.028 - 0.055
		Up to 0.394	0.004 - 0.008			0.006 - 0.012	0.008 - 0.016
		0.394 - 0.709	0.006 - 0.010			0.008 - 0.016	0.012 - 0.024
		0.709 - 1.575	0.008 - 0.016			0.012 - 0.024	0.016 - 0.024

Formulas: $IPM = RPM \cdot IPR$ $SFM = RPM \cdot 0.262 \cdot DIA$ $RPM = SFM \cdot 3.82 / DIA$

The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.

Recommended Speeds & Feeds

Inch High Speed Reaming (continued)



Coated Carbide and Cermet

Material	Material Hardness (BHN)	Reamer Ø (inch)	Stock Allowance on Ø (inch)	TiN-TiCN-TiAlN Coated Carbide	Cermet	Lead-in A, G	Lead-in E, N, M
				Surface Speed (SFM)	Surface Speed (SFM)	Feed (IPR)	Feed (IPR)
Stainless Steel	Up to 300	Up to 0.394	0.003 - 0.006	100 - 160	200 - 490	0.008 - 0.016	0.012 - 0.020
		0.394 - 0.709	0.006 - 0.010			0.012 - 0.024	0.012 - 0.031
		0.709 - 1.575	0.006 - 0.012			0.016 - 0.028	0.016 - 0.039
		1.575 - 3.150	0.008 - 0.016			0.020 - 0.031	0.024 - 0.055
		Over 3.150	0.010 - 0.020			0.031 - 0.047	0.039 - 0.079
Grey Cast Iron	-	Up to 0.394	0.003 - 0.006	160 - 230	-	0.008 - 0.016	0.012 - 0.024
Spheroidal Cast Iron (Pearlitic)		0.394 - 0.709	0.006 - 0.010			0.014 - 0.024	0.020 - 0.031
Malleable Cast Iron		0.709 - 1.575	0.006 - 0.012			0.016 - 0.039	0.024 - 0.059
		1.575 - 3.150	0.008 - 0.016			0.024 - 0.051	0.031 - 0.063
		Over 3.150	0.010 - 0.020			0.031 - 0.067	0.039 - 0.088
Spheroidal Cast Iron (Ferritic)	Up to 200	Up to 0.394	0.003 - 0.006	100 - 160	200 - 400	0.008 - 0.016	0.012 - 0.024
		0.394 - 0.709	0.006 - 0.010			0.014 - 0.024	0.020 - 0.031
		0.709 - 1.575	0.006 - 0.012			0.016 - 0.039	0.024 - 0.059
		1.575 - 3.150	0.008 - 0.016			0.024 - 0.051	0.031 - 0.063
		Over 3.150	0.010 - 0.020			0.031 - 0.067	0.039 - 0.088
Copper and Alloys	Up to 150	Up to 0.394	0.003 - 0.006	330 - 660	-	0.008 - 0.016	-
Brass		0.394 - 0.709	0.006 - 0.010			0.016 - 0.028	
		0.709 - 1.575	0.006 - 0.012			0.020 - 0.031	
		1.575 - 3.150	0.008 - 0.016			0.024 - 0.039	
		Over 3.150	0.010 - 0.020			0.031 - 0.055	
Bronze	Up to 180	Up to 0.394	0.003 - 0.006	260 - 520	330 - 980	0.006 - 0.012	-
Bronze Phosphorus		0.394 - 0.709	0.006 - 0.010			0.008 - 0.016	
		0.709 - 1.575	0.006 - 0.012			0.012 - 0.024	
		1.575 - 3.150	0.008 - 0.016			0.016 - 0.031	
		Over 3.150	0.010 - 0.020			0.024 - 0.039	
Aluminum	Up to 150	Up to 0.394	0.003 - 0.006	330 - 660	-	0.008 - 0.016	-
		0.394 - 0.709	0.006 - 0.010			0.016 - 0.024	
		0.709 - 1.575	0.006 - 0.012			0.020 - 0.031	
		1.575 - 3.150	0.008 - 0.016			0.024 - 0.039	
		Over 3.150	0.010 - 0.020			0.031 - 0.055	

Formulas: IPM = RPM • IPR

SFM = RPM • 0.262 • DIA

RPM = SFM • 3.82 / DIA

The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



Recommended Speeds & Feeds

Metric Conventional Reaming

Uncoated Carbide

Material	Material Hardness (BHN)	Reamer Ø (mm)	Stock Allowance on Ø (mm)	Surface Speed (M/min)	Feed (mm/rev)	Coolant Type
Mild Steel Unalloyed Low Alloyed Structural Steel	Up to 150	Up to 10	0,10 - 0,20	7 - 15	0,15 - 0,30	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,25 - 0,50	
		22 - 40	0,20 - 0,40		0,30 - 0,80	
		40 - 50	0,30 - 0,40		0,60 - 1,00	
		50 - 70	0,35 - 0,50		0,60 - 1,20	
		70 - 100	0,40 - 0,50		0,80 - 1,50	
	Greater than 150	Up to 10	0,10 - 0,20	6 - 10	0,10 - 0,30	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,20 - 0,40	
		22 - 40	0,20 - 0,40		0,30 - 0,60	
		40 - 50	0,30 - 0,40		0,40 - 0,80	
		50 - 70	0,35 - 0,50		0,50 - 0,90	
		70 - 100	0,40 - 0,50		0,60 - 1,20	
Alloy Steel Stainless Steel	Up to 300	Up to 10	0,10 - 0,20	4 - 8	0,10 - 0,30	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,20 - 0,40	
		22 - 40	0,20 - 0,40		0,30 - 0,60	
		40 - 50	0,30 - 0,40		0,40 - 0,80	
		50 - 70	0,35 - 0,50		0,50 - 0,90	
		70 - 100	0,40 - 0,50		0,60 - 1,20	
High Strength Alloy Steel Steel with Manganese	240 to 450	Up to 10	0,10 - 0,20	3 - 6	0,10 - 0,20	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,15 - 0,40	
		22 - 40	0,20 - 0,40		0,30 - 0,50	
		40 - 50	0,30 - 0,40		0,30 - 0,70	
		50 - 70	0,35 - 0,50		0,40 - 0,80	
		70 - 100	0,40 - 0,50		0,50 - 1,00	
Titanium and Alloys	-	Up to 10	0,10 - 0,20	5 - 8	0,15 - 0,30	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,20 - 0,40	
		22 - 40	0,20 - 0,40		0,30 - 0,50	
		40 - 50	0,30 - 0,40		0,40 - 0,60	
		50 - 70	0,35 - 0,50		0,60 - 0,80	
		70 - 100	0,40 - 0,50		0,80 - 1,20	

Formulas: $\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$

$\text{M/min} = \text{RPM} \cdot 0.003 \cdot \text{DIA}$

$\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$

The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



Recommended Speeds & Feeds

Metric Conventional Reaming (continued)



Uncoated Carbide

Material	Material Hardness (BHN)	Reamer Ø (mm)	Stock Allowance on Ø (mm)	Surface Speed (M/min)	Feed (mm/rev)	Coolant Type
Stainless Steel	Up to 300	Up to 10	0,10 - 0,20	4 - 8	0,10 - 0,30	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,20 - 0,40	
		22 - 40	0,20 - 0,40		0,30 - 0,60	
		40 - 50	0,30 - 0,40		0,40 - 0,80	
		50 - 70	0,35 - 0,50		0,50 - 0,90	
		70 - 100	0,40 - 0,50		0,60 - 1,20	
Grey Cast Iron Spheroidal Cast Iron (Pearlitic)	Up to 200	Up to 10	0,10 - 0,20	15 - 30	0,20 - 0,50	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,40 - 0,60	
	Greater than 200	22 - 40	0,20 - 0,40	10 - 20	0,60 - 1,20	
		40 - 50	0,30 - 0,40		0,75 - 1,50	
Spheroidal Cast Iron (Ferritic)	Up to 200	Up to 10	0,10 - 0,20	8 - 12	0,15 - 0,30	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,40 - 0,60	
		22 - 40	0,20 - 0,40		0,50 - 1,00	
		40 - 50	0,30 - 0,40		0,75 - 1,50	
		50 - 70	0,35 - 0,50		0,80 - 1,60	
		70 - 100	0,40 - 0,50		1,00 - 1,80	
Copper and Alloys Brass	Up to 150	Up to 10	0,10 - 0,20	10 - 18	0,15 - 0,40	Water Soluble
		10 - 22	0,15 - 0,25		0,20 - 0,60	
		22 - 40	0,20 - 0,40		0,25 - 0,90	
		40 - 50	0,30 - 0,40		0,40 - 1,10	
		50 - 70	0,35 - 0,50		0,50 - 1,20	
		70 - 100	0,40 - 0,50		0,60 - 1,50	
Bronze Bronze Phosphorus	Up to 180	Up to 10	0,10 - 0,20	10 - 20	0,15 - 0,40	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,25 - 0,60	
		22 - 40	0,20 - 0,40		0,50 - 0,80	
		40 - 50	0,30 - 0,40		0,60 - 1,00	
		50 - 70	0,35 - 0,50		0,70 - 1,10	
		70 - 100	0,40 - 0,50		0,80 - 1,20	
Aluminum and Light Alloys	Up to 150	Up to 10	0,10 - 0,20	15 - 30	0,20 - 0,40	Water Soluble Cutting Oil
		10 - 22	0,15 - 0,25		0,30 - 0,60	
		22 - 40	0,20 - 0,40		0,40 - 1,00	
		40 - 50	0,30 - 0,40		0,75 - 1,50	
		50 - 70	0,35 - 0,50		0,80 - 1,60	
		70 - 100	0,40 - 0,50		0,90 - 1,80	
Synthetic Materials	-	Up to 10	0,10 - 0,20	15 - 30	0,20 - 0,50	Compressed Air Dry Water Soluble
		10 - 22	0,15 - 0,25		0,40 - 0,80	
		22 - 40	0,20 - 0,40		0,50 - 1,40	
		40 - 50	0,30 - 0,40		0,80 - 1,50	
		50 - 70	0,35 - 0,50		0,90 - 1,60	
		70 - 100	0,40 - 0,50		1,00 - 1,80	

Formulas: mm/min = RPM • mm/rev

M/min = RPM • 0.003 • DIA

mm/min = RPM • mm/rev

The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



Recommended Speeds & Feeds

Metric High Speed Reaming

Coated Carbide and Cermet

Material	Material Hardness (BHN)	Reamer Ø (mm)	Stock Allowance on Ø (mm)	TiN-TiCN-TiAlN Coated Carbide	Cermet	Lead-in A, G	Lead-in E, N, M
				Surface Speed (M/min)	Surface Speed (M/min)	Feed (mm/rev)	Feed (mm/rev)
Mild Steel Unalloyed Low Alloyed Structural Steel	Up to 150	Up to 10	0,08 - 0,15	60 - 80	90 - 300	0,20 - 0,40	0,30 - 0,60
		10 - 18	0,15 - 0,25			0,40 - 0,60	0,40 - 1,00
		18 - 40	0,15 - 0,30			0,50 - 0,80	0,60 - 1,20
		40 - 80	0,20 - 0,40			0,50 - 1,00	0,80 - 1,60
		Over 80	0,25 - 0,50			0,80 - 1,50	1,00 - 2,20
	Greater than 150	Up to 10	0,08 - 0,15	40 - 70	80 - 200	0,20 - 0,40	0,30 - 0,50
		10 - 18	0,15 - 0,25			0,30 - 0,60	0,30 - 0,80
		18 - 40	0,15 - 0,30			0,40 - 0,70	0,40 - 1,00
		40 - 80	0,20 - 0,40			0,50 - 0,80	0,60 - 1,40
		Over 80	0,25 - 0,50			0,80 - 1,20	1,00 - 2,00
Alloy Steel Stainless Steel	Up to 300	Up to 10	0,08 - 0,15	30 - 50	60 - 150	0,20 - 0,40	0,30 - 0,50
		10 - 18	0,15 - 0,25			0,30 - 0,60	0,30 - 0,80
		18 - 40	0,15 - 0,30			0,40 - 0,70	0,40 - 1,00
		40 - 80	0,20 - 0,40			0,50 - 0,80	0,60 - 1,40
		Over 80	0,25 - 0,50			0,80 - 1,20	1,00 - 2,00
High Strength Alloy Steel Steel with Manganese	240 to 450	Up to 10	0,08 - 0,15	15 - 30	60 - 120	0,15 - 0,30	0,20 - 0,40
		10 - 18	0,15 - 0,25			0,20 - 0,50	0,30 - 0,60
		18 - 40	0,15 - 0,30			0,30 - 0,60	0,40 - 0,80
		40 - 80	0,20 - 0,40			0,40 - 0,80	0,50 - 1,00
		Over 80	0,25 - 0,50			0,60 - 1,00	0,70 - 1,40
Titanium and Alloys	-	Up to 10	0,10 - 0,20	20 - 60	-	0,15 - 0,30	-
		10 - 18	0,15 - 0,25			0,20 - 0,40	
		18 - 40	0,20 - 0,40			0,30 - 0,50	
		40 - 80	0,30 - 0,40			0,40 - 0,60	
		Over 80	0,30 - 0,50			0,50 - 0,70	

Formulas: mm/min = RPM • mm/rev

M/min = RPM • 0.003 • DIA

mm/min = RPM • mm/rev

The speeds and feeds listed above and on the next page are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



Recommended Speeds & Feeds

Metric High Speed Reaming (continued)



Coated Carbide and Cermet

Material	Material Hardness (BHN)	Reamer Ø (mm)	Stock Allowance on Ø (mm)	TiN-TiCN-TiAlN Coated Carbide	Cermet	Lead-in A, G	Lead-in E, N, M
				Surface Speed (M/min)	Surface Speed (M/min)	Feed (mm/rev)	Feed (mm/rev)
Alloy Steel Stainless Steel	Up to 300	Up to 10	0,08 - 0,15	30 - 50	60 - 150	0,20 - 0,40	0,30 - 0,50
		10 - 18	0,15 - 0,25			0,30 - 0,60	0,30 - 0,80
		18 - 40	0,15 - 0,30			0,40 - 0,70	0,40 - 1,00
		40 - 80	0,20 - 0,40			0,50 - 0,80	0,60 - 1,40
		Over 80	0,25 - 0,50			0,80 - 1,20	1,00 - 2,00
Grey Cast Iron Spheroidal Cast Iron (Pearlitic) Malleable Cast Iron	-	Up to 10	0,08 - 0,15	50 - 70	-	0,20 - 0,40	0,30 - 0,60
		10 - 18	0,15 - 0,25			0,35 - 0,60	0,50 - 0,80
		18 - 40	0,15 - 0,30			0,40 - 1,00	0,60 - 1,50
		40 - 80	0,20 - 0,40			0,60 - 1,30	0,80 - 1,60
		Over 80	0,25 - 0,50			0,80 - 1,70	1,00 - 2,25
Spheroidal Cast Iron (Ferritic)	Up to 200	Up to 10	0,08 - 0,15	30 - 50	60 - 120	0,20 - 0,40	0,30 - 0,60
		10 - 18	0,15 - 0,25			0,35 - 0,60	0,50 - 0,80
		18 - 40	0,15 - 0,30			0,40 - 1,00	0,60 - 1,50
		40 - 80	0,20 - 0,40			0,60 - 1,30	0,80 - 1,60
		Over 80	0,25 - 0,50			0,80 - 1,70	1,00 - 2,25
Copper and Alloys Brass	Up to 150	Up to 10	0,08 - 0,15	100 - 200	-	0,20 - 0,40	-
		10 - 18	0,15 - 0,25			0,40 - 0,70	
		18 - 40	0,15 - 0,30			0,50 - 0,80	
		40 - 80	0,20 - 0,40			0,60 - 1,00	
		Over 80	0,25 - 0,50			0,80 - 1,40	
Bronze Bronze Phosphorus	Up to 180	Up to 10	0,08 - 0,15	80 - 160	100 - 300	0,15 - 0,30	-
		10 - 18	0,15 - 0,25			0,20 - 0,40	
		18 - 40	0,15 - 0,30			0,30 - 0,60	
		40 - 80	0,20 - 0,40			0,40 - 0,80	
		Over 80	0,25 - 0,50			0,60 - 1,00	
Aluminum	Up to 150	Up to 10	0,08 - 0,15	100 - 200	-	0,20 - 0,40	-
		10 - 18	0,15 - 0,25			0,40 - 0,70	
		18 - 40	0,15 - 0,30			0,50 - 0,80	
		40 - 80	0,20 - 0,40			0,60 - 1,00	
		Over 80	0,25 - 0,50			0,80 - 1,40	

Formulas: $\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$

$\text{M/min} = \text{RPM} \cdot 0.003 \cdot \text{DIA}$

$\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$

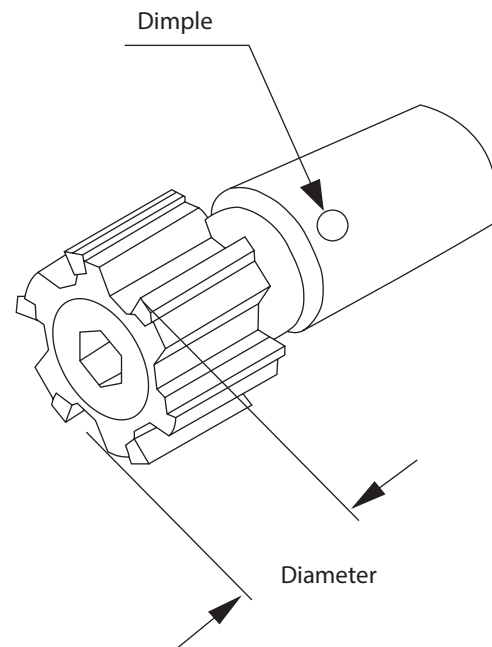
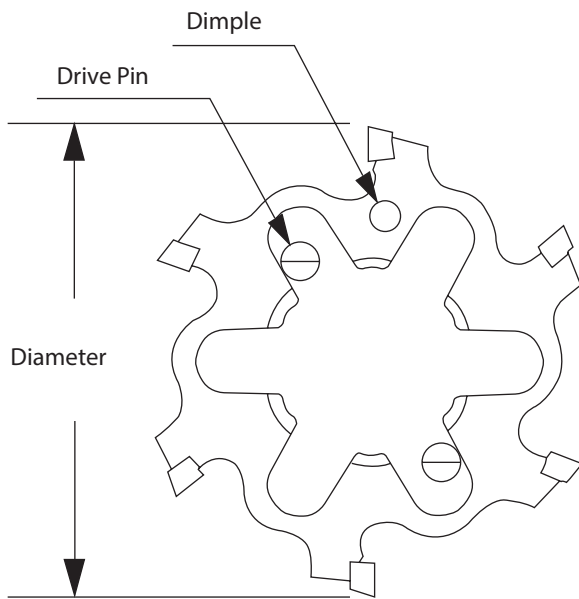
The speeds and feeds listed above are considered a general starting point for all applications. Factory technical assistance is also available for your specific application through our Application Engineering Team.



Instructions

Diameter Measure

- The diameter of the reamers and of the cutting rings are measured with a micrometer.
- We recommend the use of a comparator style micrometer with at least a $2\mu\text{m}$ resolution to avoid micro chipping of the cutting edges.
- The reamers are marked with a dimple (see diagram below).
- The cutting edges are asymmetric with only two cutting edges that are exactly 180° . Opposed diameter measurement can only be taken across those two cutting edges.
- Measurement must be taken from the front of the cutting edges only.



Tolerance

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

Assembly

- 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 for the monobloc reamers and about 4% of the diameter for the cutting rings.

Accessories



CONTENTS

DIN 69871/1B & A Modular Shanks	60
JMTBA MAS-403 BT B & BT Modular Shanks . . .	61
HSK-A DIN 69893/1 Shanks	62
Straight Shanks	63
Collet Chuck Adapters	64
Cylindrical Shank Adapters	65
Troubleshooting Guide	66

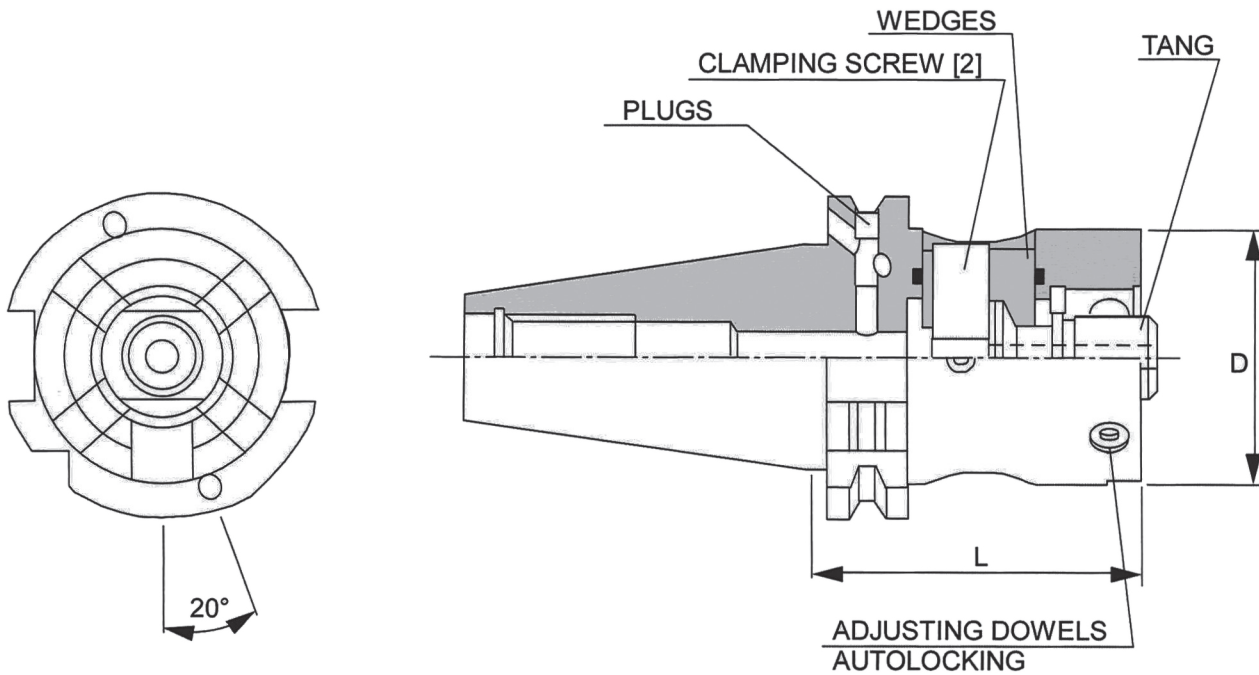


**ALLIED MACHINE
& ENGINEERING CORP**



ALVAN® Modular Shanks DIN 69871/1B & A

with lateral clamping and radial adjustment



Item Number	ISO Taper	Modular Shank D	L (inch)	Retention Knob Thread Size	Replacement Tang
02B.40.50L.65	40	50	2.559	M16 x 2	ATT14103
02B.40.63L.85	40	63	3.346	M16 x 2	ATT14104
02B.45.50L.70	45	50	2.756	M20 x 2.5	ATT14103
02B.45.63L.70	45	63	2.756	M20 x 2.5	ATT14104
02B.50.50L.70	50	50	2.756	M24 x 3	ATT14103
02B.50.63L.70	50	63	2.756	M24 x 3	ATT14104
**02B.50.80L.70	50	80	2.756	M24 x 3	ATT14104

**Could cause interference with tool changer mechanism

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

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

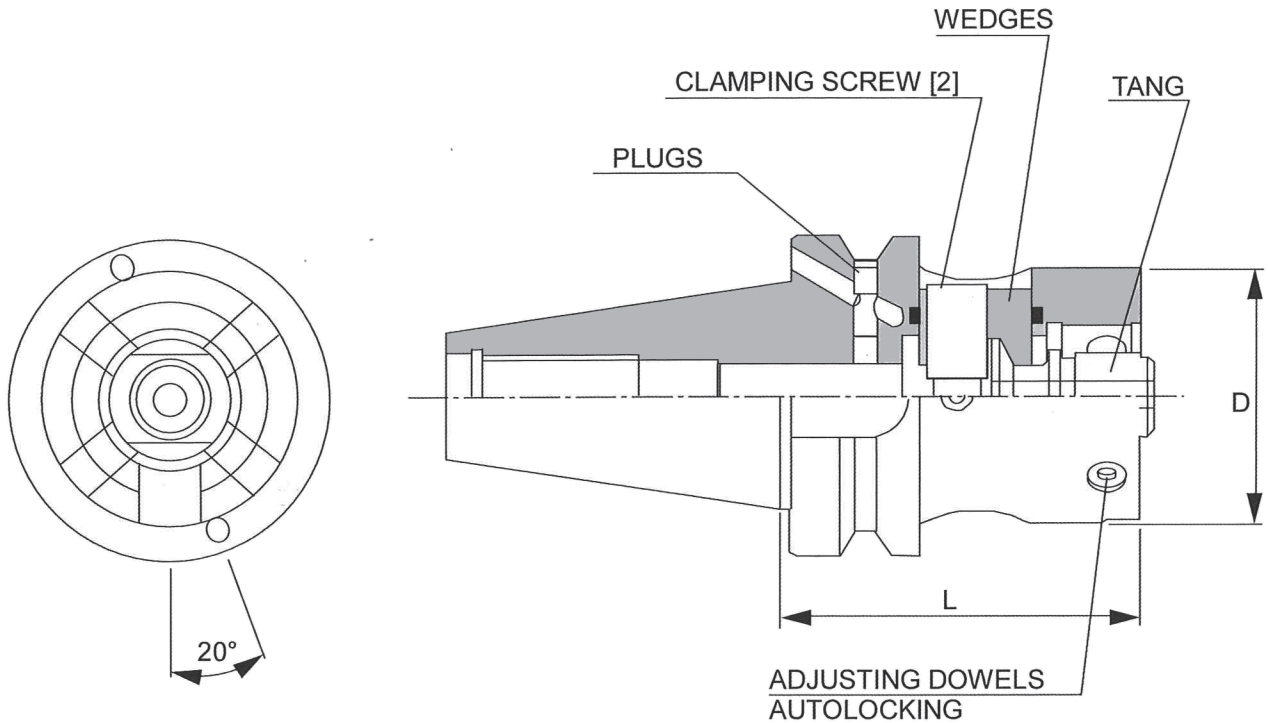
Tang must be fitted to all ring arbors and adapters prior to assembly.

Maximum radial adjustment is ± 0.008 inch (0,20 mm) on diameter.

ALVAN® Modular Shanks

JMTBA MAS-403 BT B & BT

with lateral clamping and radial adjustment



Item Number	ISO Taper	Modular Shank D	L (inch)	Retention Knob Thread Size	Replacement Tang
BTB.40.50L.70	40	50	2.756	M16 x 2	ATT14103
BTB.40.63L.80	40	63	3.150	M16 x 2	ATT14104
BTB.50.50L.90	50	50	3.543	M24 x 3	ATT14103
BTB.50.63L.90	50	63	3.543	M24 x 3	ATT14104
BTB.50.80L.90	50	80	3.543	M24 x 3	ATT14104

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

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

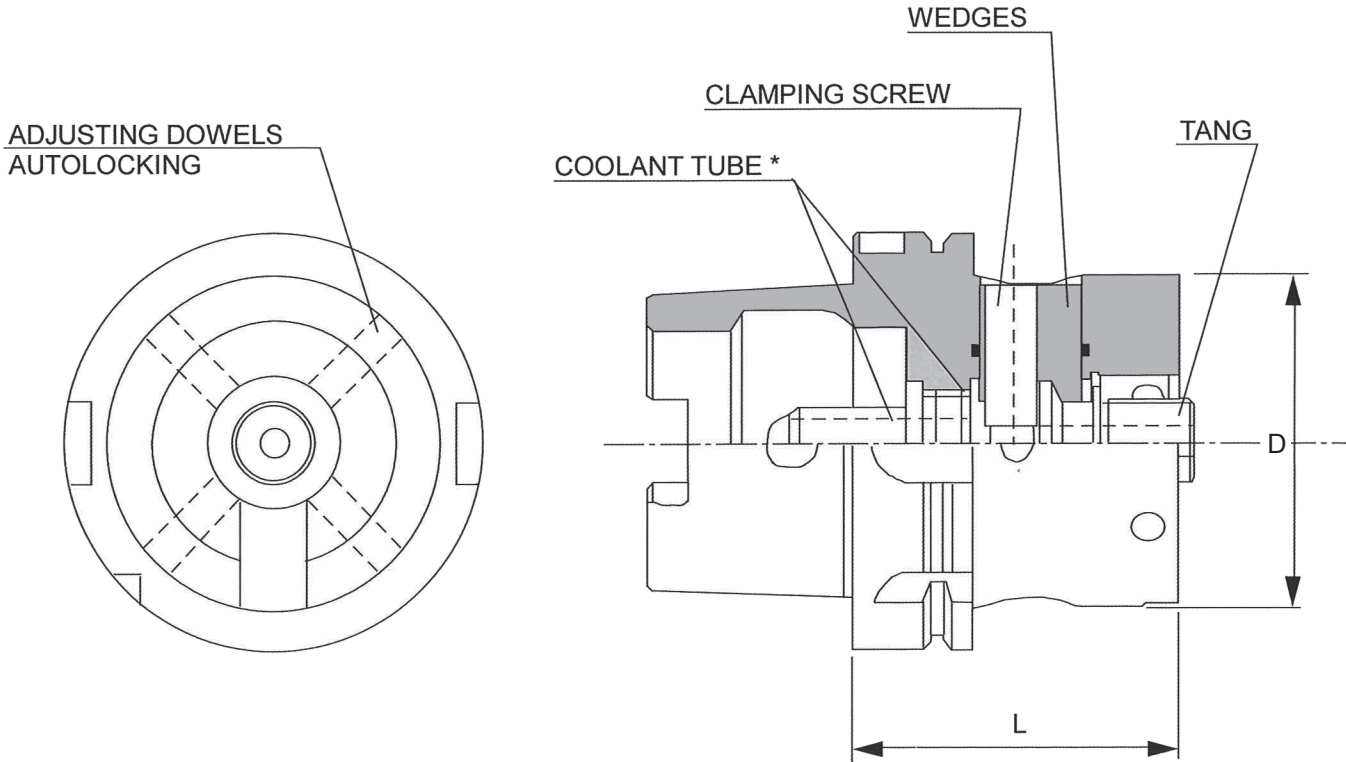
Tang must be fitted to all ring arbors and adapters prior to assembly.

Maximum radial adjustment is ± 0.008 inch (0,20 mm) on diameter.



ALVAN® Modular System HSK-A DIN 69893/1 Shanks

with lateral clamping and radial adjustment



Item Number	ISO Taper	Modular Shank D	L (inch)	Accessories	
				Coolant Tube*	Replacement Tang
HSKA.63.50L.70	63	50	2.756	ATT23728	ATT14103
HSKA.63.63L.75	63	63	2.953	ATT23728	ATT14104
HSKA.100.50L.80	100	50	3.150	ATT23656	ATT14103
HSKA.100.63L.80	100	63	3.150	ATT23656	ATT14104
HSKA.100.80L.80	100	80	3.150	ATT23656	ATT14104

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

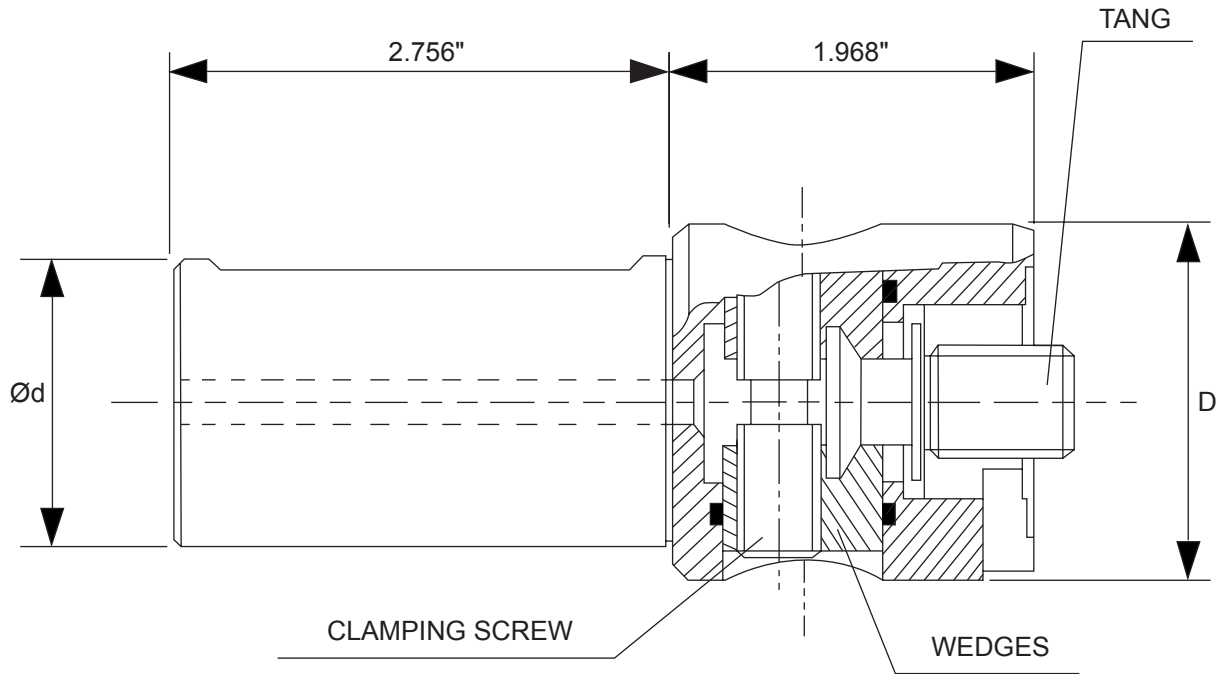
Tang must be fitted to all ring arbors and adapters prior to assembly.

Maximum radial adjustment is ± 0.008 inch (0,20 mm) on diameter.

* Coolant tubes supplied separately

ALVAN® Modular System Straight Shanks

with lateral clamping and radial adjustment



Item Number	d (mm)	Modular Shank D	Replacement Tang
CIL.25.50.50	25	50	ATT14103
CIL.32.50.50	32	50	ATT14103
CIL.40.50.50	40	50	ATT14103

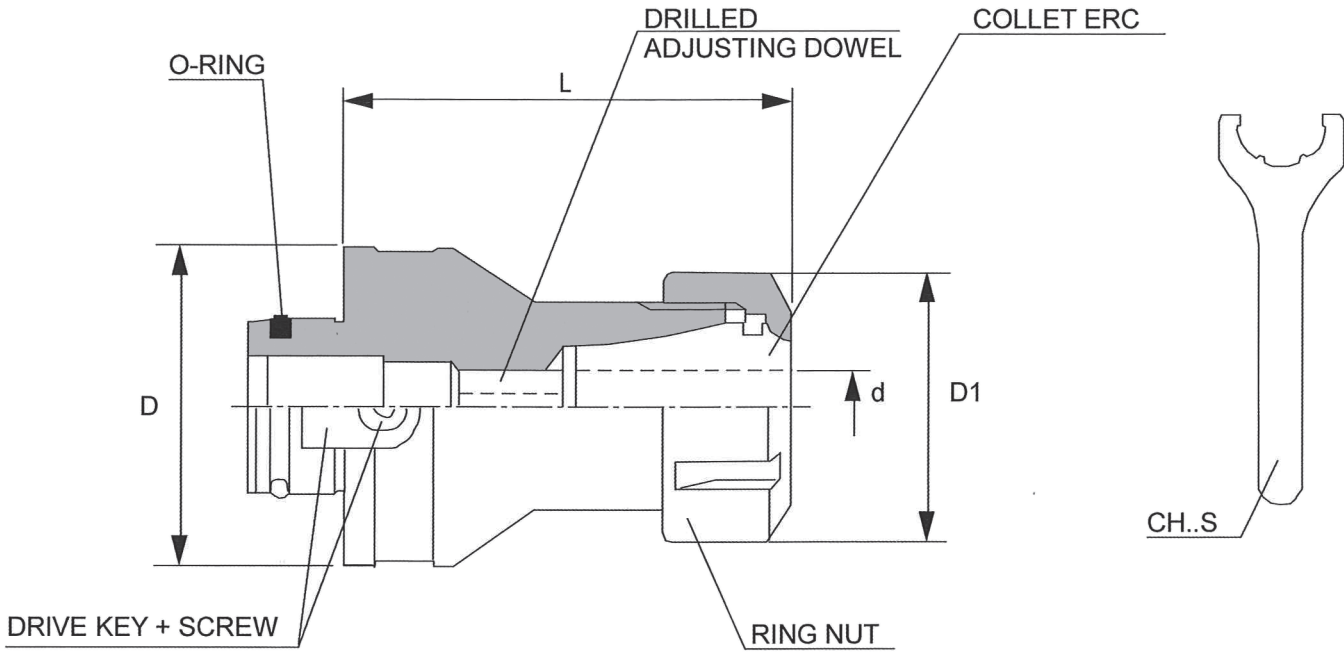
NOTES: Light torque exerted on the clamping screw transmits high axial forces, which provides stiffness and extreme accuracy to the assembly.

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

Maximum radial adjustment is ± 0.008 inch (0,20 mm) on diameter.



ALVAN® Modular System Collet Chuck Adapters

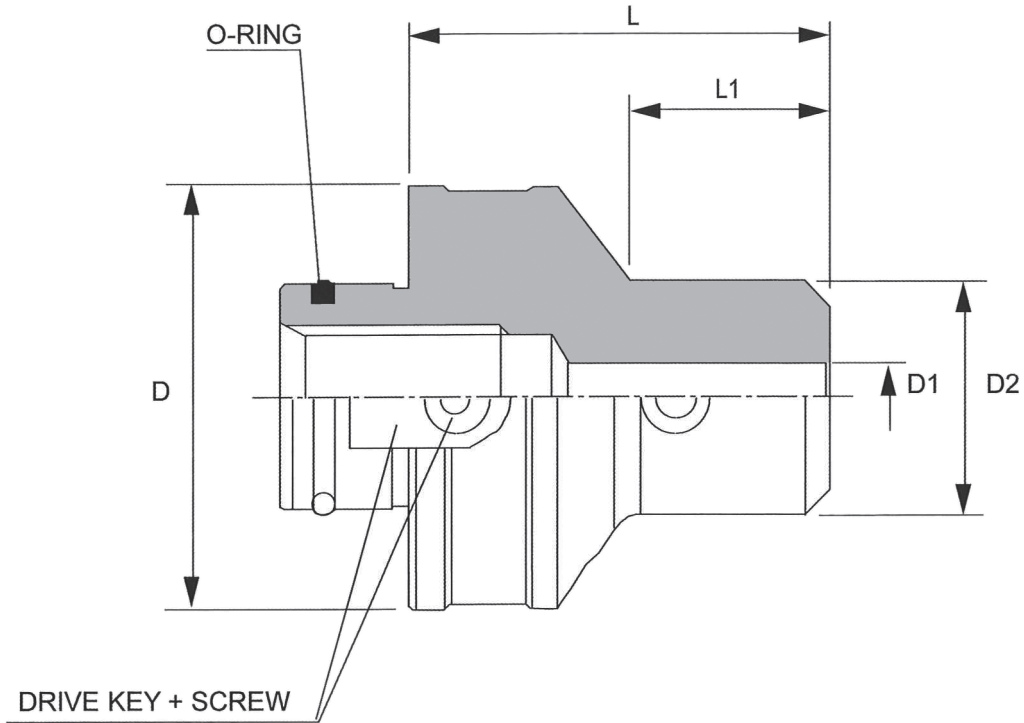


Item Number	Modular Shank D	Collet Reducer	d (inch)	D1 (inch)	L (inch)	Accessories
						Wrench*
30.50R.25.70	50	ERC25	0.0197 - 0.6299	1.654	2.756	CH25S
30.50R.32.70	50	ERC32	0.0394 - 0.7874	1.969	2.756	CH32S
30.63R.32.90	63	ERC32	0.0394 - 0.7874	1.969	3.543	CH32S
30.63R.40.90	63	ERC40	0.0787 - 1.1811	2.480	3.543	CH40S
30.80R.32.90	80	ERC32	0.0394 - 0.7874	1.969	3.543	CH32S
30.80R.40.90	80	ERC40	0.0787 - 1.1811	2.480	3.543	CH40S

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

* Wrench supplied separately. Collet Reducer not included.

ALVAN® Modular System Cylindrical Shank Adapters



Item Number	Modular Shank D	D1 (inch)	D2 (inch)	L (inch)	L1 (inch)
35.50R.06.50	50	0.2362	0.984	1.969	0.886
35.50R.08.50	50	0.3150	1.102	1.969	0.965
35.50R.10.50	50	0.3937	1.378	1.969	1.043
35.50R.12.60	50	0.4724	1.654	2.362	1.516
35.50R.14.60	50	0.5512	1.732	2.362	1.654
35.50R.16.60	50	0.6299	1.890	2.362	1.575
35.50R.18.60	50	0.7087	1.969	2.362	-
35.50R.20.60	50	0.7874	2.047	2.362	1.614
35.63R.08.60	50	0.3150	1.102	2.362	1.102
35.63R.10.70	63	0.3937	1.378	2.756	1.575
35.63R.12.70	63	0.4724	1.654	2.756	1.654
35.63R.14.60	63	0.5512	1.732	2.756	1.260
35.63R.16.70	63	0.6299	1.890	2.756	1.732
35.63R.18.70	63	0.7087	1.969	2.756	1.575
35.63R.20.70	63	0.7874	2.047	2.756	1.772
40.50R.25.80	50	0.9843	2.559	3.150	2.402
40.50R.32.80	50	1.2598	2.835	3.150	2.559
40.63R.25.80	63	0.9843	2.559	3.150	2.283
40.63R.32.80	63	1.2598	2.835	3.150	-
40.80R.25.80	80	0.9843	2.559	3.150	1.988
40.80R.32.80	80	1.2598	2.835	3.150	2.126

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



ALVAN® Reamers

Troubleshooting Guide

Problem	Possible Cause	Possible Solution
Oversize hole	<ul style="list-style-type: none"> a.) The reamer is running eccentric to the center of the machine spindle b.) Excessive misalignment causing reamer to cut on back taper c.) Material build up on cutting edges d.) The reamer diameter is too large 	<ul style="list-style-type: none"> a.) Use the modular system with radial adjustment b.) Rectify misalignment c.) Replace the coolant or change the cutting speed d.) Use smaller reamer or regrind existing one
Undersize hole	<ul style="list-style-type: none"> a.) The reamer diameter is too small b.) The reamer diameter is worn c.) The coolant is not suitable d.) Stock allowance is too small e.) The cutting speed is too low 	<ul style="list-style-type: none"> a.) Use larger reamer b.) Expand, regrind or replace the reamer c.) Replace the coolant d.) Increase the stock allowance e.) Increase the cutting speed
Tapered hole	<ul style="list-style-type: none"> a.) Excessive misalignment 	<ul style="list-style-type: none"> a.) Correct misalignment
Burr at the entry of the hole	<ul style="list-style-type: none"> a.) Excessive misalignment 	<ul style="list-style-type: none"> a.) Correct misalignment
The hole is not straight	<ul style="list-style-type: none"> a.) Concentricity and alignment error between the workpiece and the tool b.) Asymmetrical cutting or angled surfaces 	<ul style="list-style-type: none"> a.) Correct misalignment and use the modular system with radial adjustment b.) Create a chamfer on the lead-in
Poor hole finish	<ul style="list-style-type: none"> a.) One cutting edge is chipped b.) The lead-in is irregular c.) Back taper on the cutting edge is too great d.) Excessive misalignment e.) Cutting data is not correct f.) Poor chip evacuation 	<ul style="list-style-type: none"> a.) Regrind the reamer b.) Regrind the reamer c.) Regrind the reamer d.) Correct misalignment or use the modular system e.) Verify cutting data f.) Verify coolant volume and pressure or use through tool coolant
The reamer creates excessive torque loading	<ul style="list-style-type: none"> a.) Back taper on the cutting edge is too small b.) The radially ground land is too wide c.) The coolant is not suitable 	<ul style="list-style-type: none"> a.) Regrind the reamer b.) Regrind the reamer c.) Replace the coolant

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Complete information as to operating conditions, machine, set-up, and application of cutting fluid should accompany any product returned for inspection. The provisions of this warranty shall not apply to any Allied products which have been subjected to misuse, improper operating conditions, machine set-up or application of cutting fluid or which have been repaired or altered if such repair or alteration in the judgment of Allied would adversely affect performance of the product.

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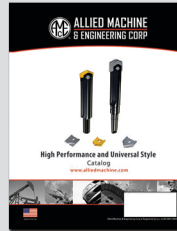
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