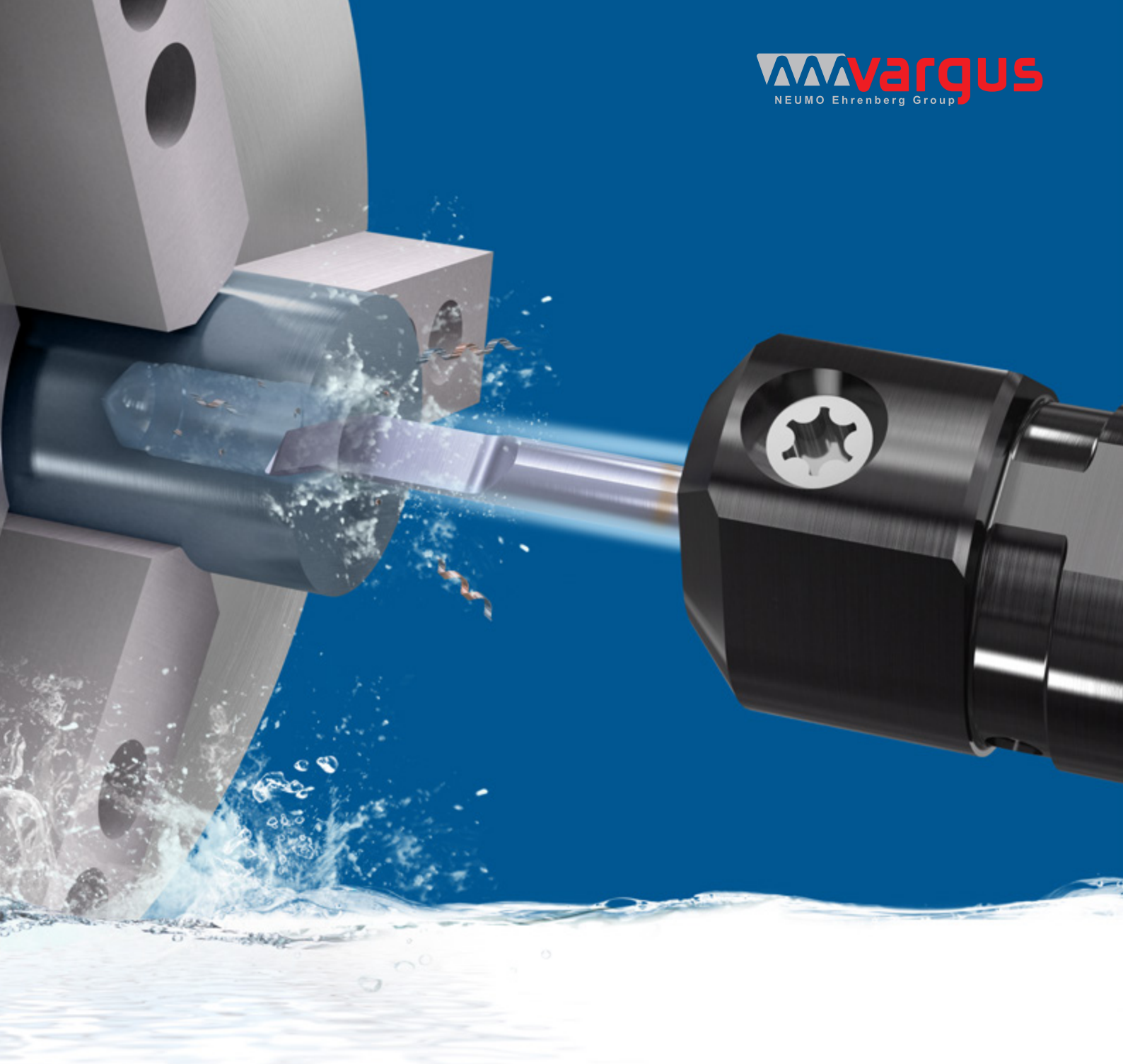
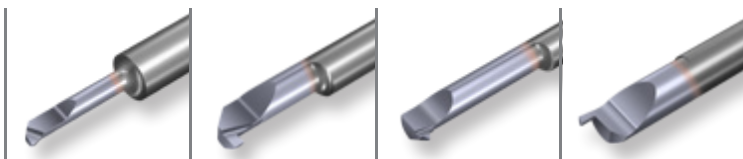




microscope

Micro Tools for Small Bores



METRIC

microscope

Micro Tools for Small Bores

The **Microscope** line offers new and improved solutions for micro boring, grooving, chamfering and threading in bores as small as 1.0 mm.

The **Microscope** line offers a large and extended range of single-ended inserts and a full range of toolholders with a simple clamping system.

Improved Coolant Thru

Two coolant holes for effective chip removal and cooling of cutting edge

Simple Clamping System

Simple and fool-proof. The new clamping system uses one large screw to secure the insert in the holder

Slanted Insert Design

Provides exact radial insert location for high repeatability

Stopper Pin

Provides precise cutting edge height and perfect axial location

VTX **NEW**

Excellent for Boring applications in medium-to-high cutting speeds and in dry conditions. Multi-layered AlTiN PVD coated, general purpose grade for prevention of peeling and chipping.

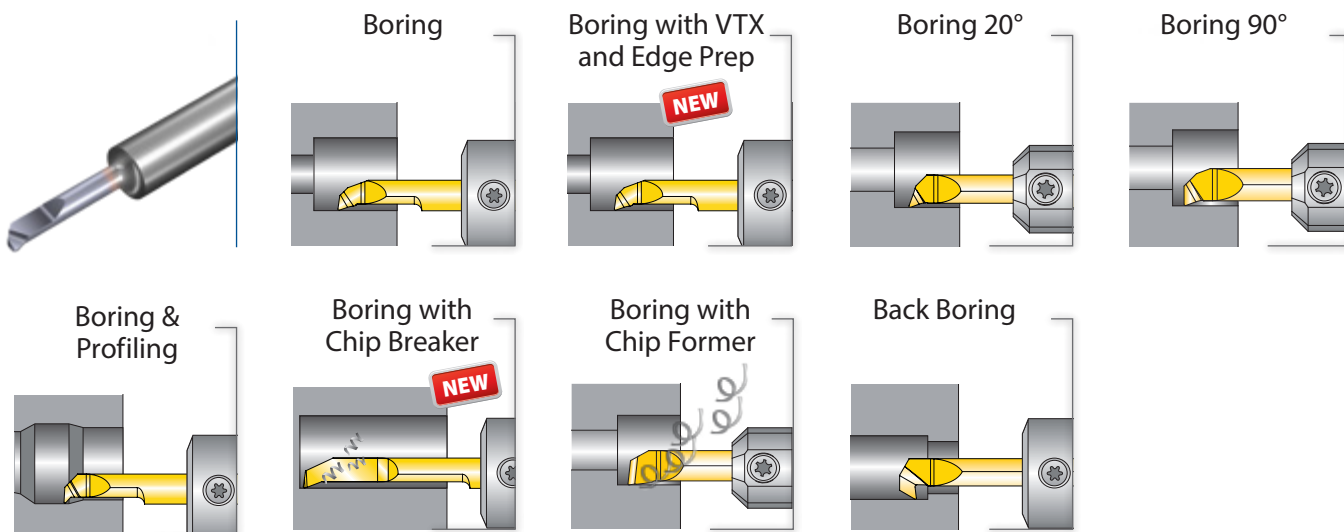
VBX

Excellent for all applications and outstanding wear resistance in low-to-medium cutting speeds, combined with good fracture toughness. TiCN PVD coated.

Applications

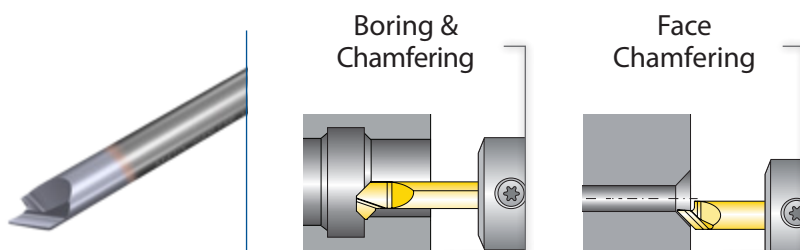
Boring

Pages 6-13



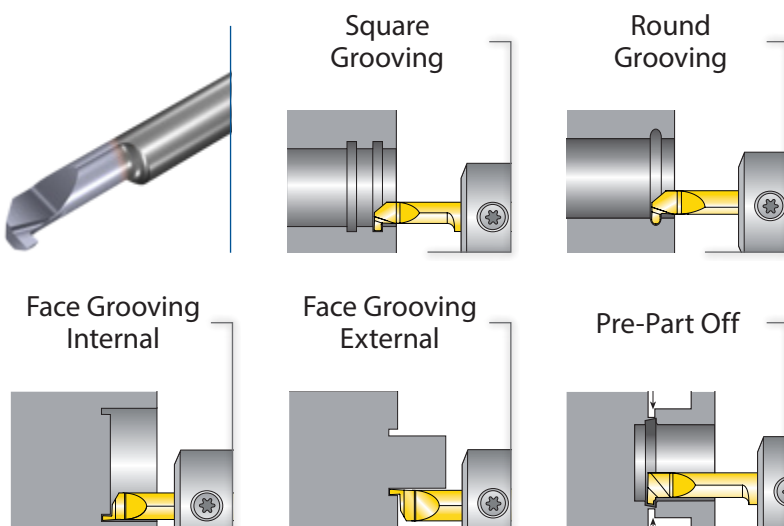
Chamfering

Pages 14-15



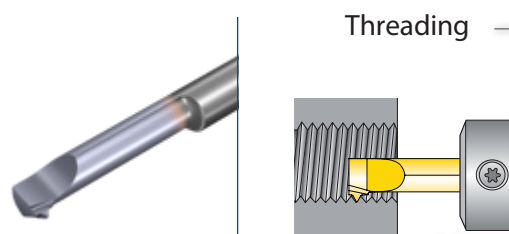
Grooving

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Threading

Pages 21-23



microscope

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microscope Ordering Code System

microscope Insert Ordering Code

Boring:	M	4	42	BC	R05	-	L10	R	VBX
	1	2	3	4	5	6	7	8	9

Grooving:	M	5	52	GS	W100	-	L10	R	VBX
	1	2	3	4	5	6	7	8	9

Threading:	M	5	42	TH	0.5	ISO	L16	R/L	VBX
	1	2	3	4	5	6	7	8	9

1 - Product Line M - Microscope	4 - Application Type BC Boring BE Boring with Edge Prep B20 Boring 20° B90 Boring 90° CL Boring & Profiling BCB Boring with Chip Breaker BCF Boring with Chip Former BB Back Boring CH4545 Boring & Chamfering 45° CH45 Face Chamfering 45° GS Square Grooving GR Round Grooving FG Face Grooving Internal FP Face Grooving External PP Pre-Part Off TH Threading	5 - Boring Nose Radius 0.05, 0.1, 0.15, 0.2 (mm) 5 - Grooving Width 079 - 318 (mm) 5 - Threading Pitch Full Profile - Pitch Range mm tpi 0.5 - 1.5 28-18 Partial Profile - Pitch Range mm tpi A 0.5 - 1.5 A 48-16 F 0.5 - 1.0 F 48-24 6 - Threading Standard A60 - Partial Profile 60° A55 - Partial Profile 55° ISO - ISO Metric UN - American UN NPT - NPT W - Whitworth for BSW, BSP 7 - Maximum Length of Cut (mm) L10 - 10mm, L15 - 15mm... 8 - RH or LH R - RH L - LH 9 - Carbide Grade VBX, VTX
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microscope Toolholders Ordering Code

MH	C	22	-	7	-	4F
1	2	3		4		5

1 - Product Line MH - Microscope Round Holder MHS - Microscope Holder with Square Shank MHD - Microscope with Drop Head	2 - Cooling C or D - Coolant Thru	3 - Shank Size (mm) 10, 12, 16, 20	4 - Bore Size (mm) 4, 5, 6, 7	5 - 4 Flats 4F - Four Flats None - Two Flats
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Boring with Chip Breaker

NEW

Internal

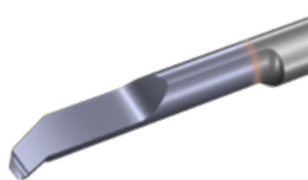
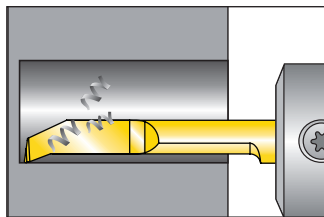
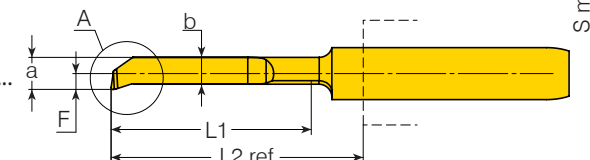
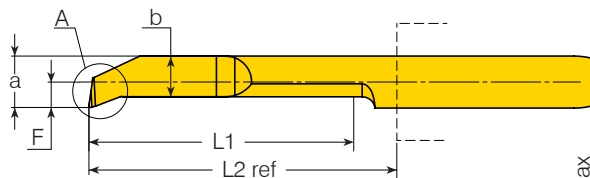
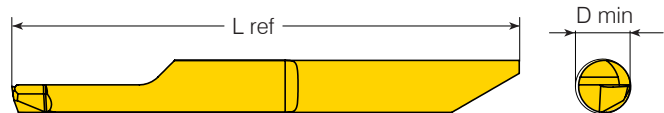
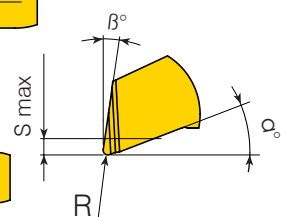


Figure 1: M...

Figure 2: MC...



DETAIL A



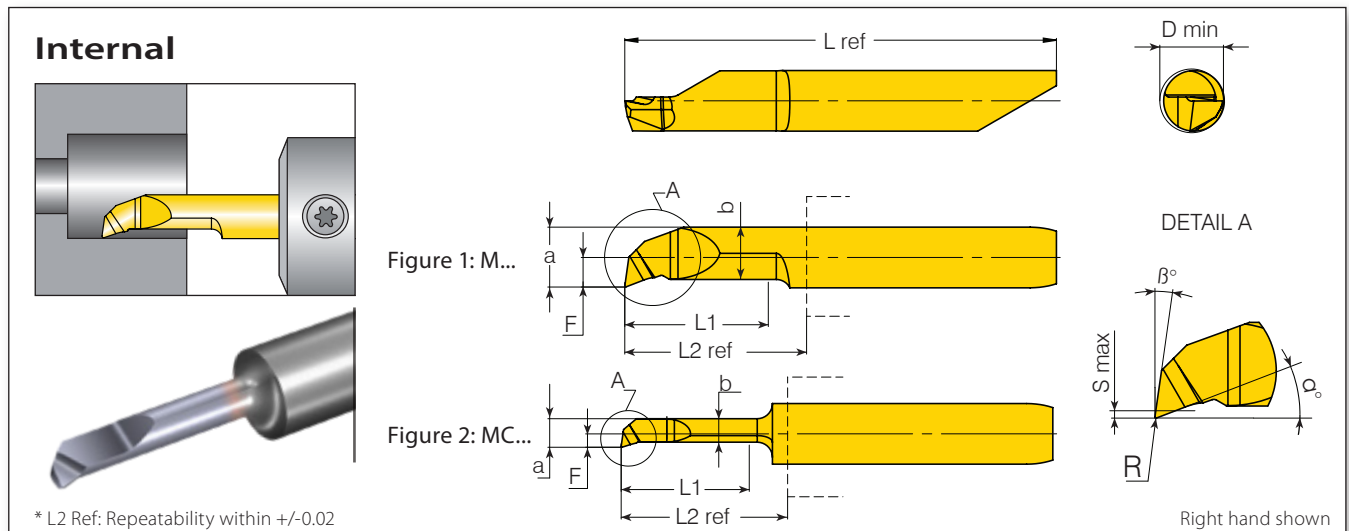
Right hand shown

* L2 Ref: Repeatability within +/-0.02

Shank Dia.	Min. Bore Dia.	Ordering Code					Dimensions mm								
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref			
4.0	2.2	MC422BCBR10L14RVBX	14	0.1	1.04	0.2	2.04	1.76	18	8	18.2	35.2			
	2.7	MC427BCBR15L15RVBX	15	0.15	1.22		2.47	2.06			18.2	35.2			
		MC427BCBR05L15RVBX		0.05	1.22		2.47	2.06			18.2	35.2			
	3.2	MC432BCBR05L15R VBX		0.05	1.43		2.90	2.45			18.2	35.2			
		MC432BCBR15L15RVBX		0.15	1.43		2.90	2.45			18.2	35.2			
		MC432BCBR05L20R VBX	20	0.05	1.43		2.90	2.45			22.8	39.8			
		MC432BCBR15L20RVBX		0.15	1.43		2.90	2.45			22.8	39.8			
	3.7	MC437BCBR15L15RVBX	15	0.15	1.77		3.47	3.05			18.2	35.2			
		MC437BCBR15L20RVBX	20	0.15	1.77		3.47	3.05			22.8	39.8			
	4.2	M442BCBR05L15R VBX	15	0.05	1.95		0.3	3.95			3.13	21	18.2	35.2	
		M442BCBR15L15RVBX		0.15	1.95	3.95		3.13	18.2		35.2				
		M442BCBR05L20RVBX	20	0.05	1.95	3.95		3.13	22.8		39.8				
		M442BCBR15L20RVBX		0.15	1.95	3.95		3.13	22.8		39.8				
5.0	5.2	M552BCBR20L20RVBX	25	0.2	2.44	0.5		4.94	4.04		22		23.15	46	
	M552BCBR20L25RVBX	2.44			4.94			4.04	28.15				51		
6.0	6.2	M662BCBR20L30RVBX	30		2.93			5.93	4.73				32.3	56	
	M662BCBR20L35RVBX	35	2.93		5.93			4.73	37.3				61		
7.0	7.2	M772BCBR20L40RVBX	40		3.44		6.94	5.74	41.4				66		
	M772BCBR20L45RVBX	45	3.44		6.94		5.74	46.4	71						

VTX grade tools are available upon request.

All tools are available in LH upon request.



Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm									
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	2.2	MC422BCR10L14RVTX	14	0.1	1.04	0.2	2.04	1.76	17.7	8	18.2	35.2
	2.7	MC427BCR15L15RVTX	15	0.15	1.23		2.48	2.06	17.5		18.2	35.2
	3.2	MC427BCR05L16RVTX	16	0.05	1.22		2.47	2.06	17.5		18.2	35.2
		MC432BCR05L16R VTX	16	0.05	1.43		2.9	2.45	17.5		18.2	35.2
		MC432BCR15L16RVTX	16	0.15	1.44		2.87	2.5	17.5		18.2	35.2
		MC432BCR05L20R VTX	16	0.05	1.43		2.9	2.45	17.5		22.8	39.8
	3.7	MC432BCR15L20RVTX	20	0.15	1.4	0.3	2.87	2.45	17.5		22.8	39.8
		MC437BCR15L15RVTX	15	0.15	1.74		3.44	3.05	17.5		18.2	35.2
		MC437BCR15L20RVTX	20	0.15	1.74		3.44	3.05	17.5		22.8	39.8
		M442BCR05L16R VTX	16	0.05	1.95		3.95	3.45	21		18.2	35.2
	4.2	M442BCR15L16RVTX	16	0.15	1.93		3.93	3.13	19		18.2	35.2
		M442BCR05L21RVTX	21	0.05	1.95		3.95	3.45	21		22.8	39.8
5.0	5.2	M442BCR15L21RVTX	21	0.15	1.93	0.5	3.93	3.13	19		22.8	39.8
		M552BCR20L21RVTX	21	0.2	2.44		4.94	4.04	21		23.15	46
6.0	6.2	M552BCR20L26RVTX	26	0.2	2.44		4.94	4.04	21		28.15	51
		M662BCR20L30RVTX	30	0.2	2.93		5.93	4.73	22		32.3	56
7.0	7.2	M662BCR20L35RVTX	35	0.2	2.93		5.93	4.73	22		37.3	61
		M772BCR20L40RVTX	40	0.2	3.44		6.94	5.74	22		41.4	66
		M772BCR20L45RVTX	45	0.2	3.44		6.94	5.74	22		46.4	71

All tools are available in LH upon request.

Boring with VTX and Edge Prep

Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm									
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	2.2	MC422BER10L14RVTX	14	0.1	1.04	0.2	2.04	1.76	17.7	8	18.2	35.2
	2.7	MC427BER15L15RVTX	15	0.15	1.23		2.48	2.06	17.5		18.2	35.2
	3.2	MC427BER05L16RVTX	16	0.05	1.22		2.47	2.06	17.5		18.2	35.2
		MC432BER05L16R VTX	16	0.05	1.43		2.9	2.45	17.5		18.2	35.2
		MC432BER15L16RVTX	16	0.15	1.44		2.87	2.5	17.5		18.2	35.2
		MC432BER05L20R VTX	16	0.05	1.43		2.9	2.45	17.5		22.8	39.8
	3.7	MC432BER15L20RVTX	20	0.15	1.4	0.3	2.87	2.45	17.5		22.8	39.8
		MC437BER15L15RVTX	15	0.15	1.74		3.44	3.05	17.5		18.2	35.2
		MC437BER15L20RVTX	20	0.15	1.74		3.44	3.05	17.5		22.8	39.8
		M442BER05L16R VTX	16	0.05	1.95		3.95	3.45	21		18.2	35.2
	4.2	M442BER15L16RVTX	16	0.15	1.93		3.93	3.13	19		18.2	35.2
		M442BER05L21RVTX	21	0.05	1.95		3.95	3.45	21		22.8	39.8
5.0	5.2	M442BER15L21RVTX	21	0.15	1.93	0.5	3.93	3.13	19		22.8	39.8
		M552BER20L21RVTX	21	0.2	2.44		4.94	4.04	21		23.15	46
6.0	6.2	M552BER20L26RVTX	26	0.2	2.44		4.94	4.04	21		28.15	51
		M662BER20L30RVTX	30	0.2	2.93		5.93	4.73	22		32.3	56
7.0	7.2	M662BER20L35RVTX	35	0.2	2.93		5.93	4.73	22		37.3	61
		M772BER20L40RVTX	40	0.2	3.44		6.94	5.74	22		41.4	66
		M772BER20L45RVTX	45	0.2	3.44		6.94	5.74	22		46.4	71

All tools are available in LH upon request.

Boring with VBX

Internal

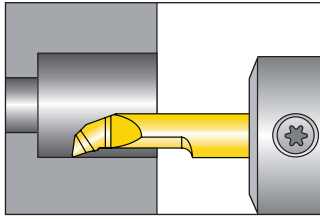


Figure 1: M...

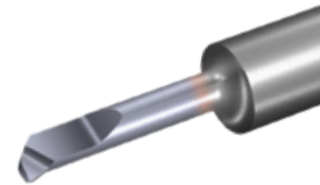
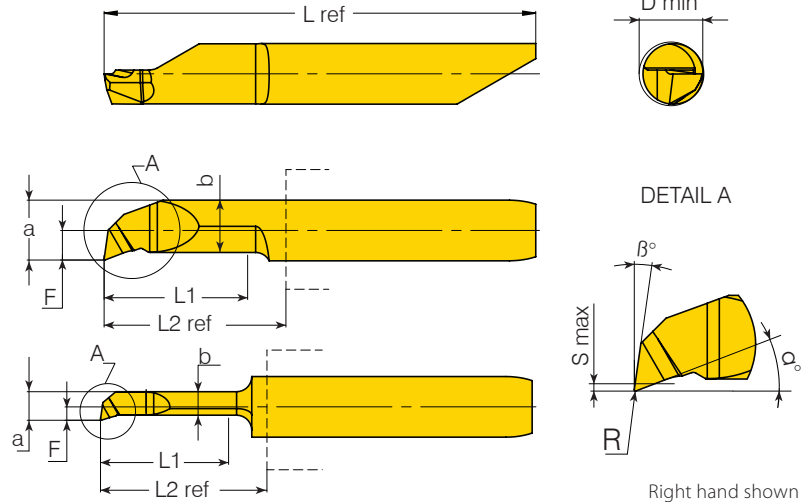


Figure 2: MC...



* L2 Ref: Repeatability within +/-0.02

Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm									
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	1.0	MC410BCR05L04R/LVBX	4.0	0.05	0.48	0.1	0.96	0.71	16.4	8	8.8	25.75
		MC410BCR10L04R/LVBX	4.0	0.1	0.48	0.1	0.96	0.71	17		8.8	25.75
		MC410BCR05L06R/LVBX	6.0	0.05	0.48	0.15	0.96	0.71	16.4		8.8	25.75
		MC410BCR10L06R/LVBX	6.0	0.1	0.48	0.15	0.96	0.81	17		8.8	25.75
	1.5	MC415BCR10L09R/LVBX	9.0	0.1	0.74	0.15	1.45	1.22	16		11.5	28.5
	1.7	MC417BCR05L06R/LVBX	6.0	0.05	0.62	0.2	1.43	1.02	16		11.5	28.5
		MC417BCR10L06R/LVBX	6.0	0.1	0.77		1.58	1.18	16		11.5	28.5
		MC417BCR05L09R/LVBX	9.0	0.05	0.62		1.43	1.04	16		11.5	28.5
		MC417BCR10L09R/LVBX	9.0	0.1	0.82		1.63	1.3	16		11.5	28.5
	1.9	MC419BCR05L6RVBX **	6.0	0.05	0.72	0.2	1.62	1.2	16		11.5	28.5
		MC419BCR05L9RVBX **	9.0	0.05	0.72		1.62	1.2	16		11.5	28.5
	2.2	MC422BCR05L06R/LVBX	6.0	0.05	0.88		1.88	1.55	17.7		11.5	28.5
		MC422BCR10L06R/LVBX	6.0	0.1	0.93		1.93	1.55	17.7		11.5	28.5
		MC422BCR05L09R/LVBX	9.0	0.05	0.88		1.88	1.55	17.7		11.5	28.5
		MC422BCR10L09R/LVBX	9.0	0.1	1.04		2.06	1.76	17.7		11.5	28.5
		MC422BCR10L14R/LVBX	14.0	0.1	1.04		2.04	1.76	17.7		18.2	35.2
	2.7	MC427BCR05L10R/LVBX	10.0	0.05	1.22		2.47	2.06	17.5		11.5	28.5
		MC427BCR15L10R/LVBX	10.0	0.15	1.19		2.41	2.06	17.5		11.5	28.5
		MC427BCR15L15R/LVBX	15.0	0.15	1.23		2.48	2.06	17.5		18.2	35.2
		MC427BCR05L16R/LVBX	16.0	0.05	1.22		2.47	2.06	17.5		18.2	35.2
		MC430BCR05L16R/LVBX	16.0	0.05	1.33		2.7	2.25	17.5		18.2	35.2
	3.0	MC430BCR15L20R/LVBX	20.0	0.15	1.36		2.7	2.36	17.5		22.8	39.8
		MC430BCR05L26RVBX **	26.0	0.05	1.36	0.2	2.7	2.25	17.5	8	28.7	45.7
	3.2	MC432BCR05L10R/LVBX	10.0	0.05	1.43		2.9	2.45	17.5		11.5	28.5
		MC432BCR15L10R/LVBX	10.0	0.15	1.44		2.9	2.5	17.5		11.5	28.5
		MC432BCR05L16R/LVBX	16.0	0.05	1.43		2.9	2.45	17.5		18.2	35.2
		MC432BCR15L16R/LVBX	16.0	0.15	1.44		2.87	2.5	17.5		18.2	35.2
		MC432BCR05L20R/LVBX	20.0	0.05	1.43		2.9	2.45	17.5		22.8	39.8
		MC432BCR15L20R/LVBX	20.0	0.15	1.4		2.87	2.45	17.5		22.8	39.8
	3.7	MC437BCR05L10RVBX **	10.0	0.05	1.78		3.48	3.05	17.5		11.5	28.5
		MC437BCR15L10R/LVBX	10.0	0.15	1.74		3.44	3.05	17.5		11.5	28.5
		MC437BCR15L15R/LVBX	15.0	0.15	1.74		3.44	3.05	17.5		18.2	35.2
		MC437BCR15L20R/LVBX	20.0	0.15	1.74		3.44	3.05	17.5		22.8	39.8
		MC437BCR05L26RVBX **	26.0	0.05	1.78		3.48	3.05	17.5		28.7	45.7

** LH available upon request.

VTX grade tools are available upon request.

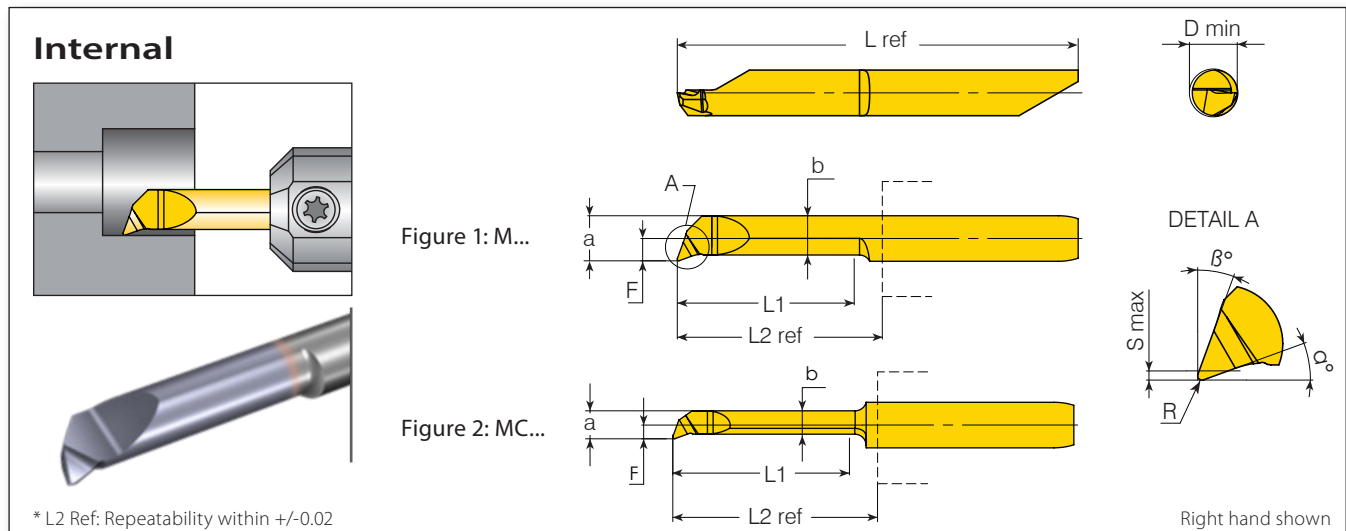
Boring with VBX (con't)

Shank Dia.	Min. Bore Dia.	Ordering Code					Dimensions mm					
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	4.2	M442BCR05L10RVBX **	10.0	0.05	1.95	0.3	3.95	3.45	21	8	11.5	28.5
		MS442BCR15L10R/LVBX	10.0	0.15	1.93		3.93	3.13	19		11.5	28.5
		M442BCR05L16R/LVBX	16.0	0.05	1.95		3.95	3.45	21		18.2	35.2
		MS442BCR15L16R/LVBX	16.0	0.15	1.93		3.93	3.13	19		18.2	35.2
		M442BCR05L21R/LVBX	21.0	0.05	1.95		3.95	3.45	21		22.8	39.8
		MS442BCR15L21R/LVBX	21.0	0.15	1.93		3.93	3.13	19		22.8	39.8
		M442BCR05L26R/LVBX	26.0	0.05	1.95		3.95	3.45	21		28.7	45.7
		MS442BCR15L26R/LVBX	26.0	0.15	1.93		3.93	3.13	19		28.7	45.7
		M442BCR05L30RVBX **	30.0	0.05	1.95		3.95	3.45	21		33.7	50.7
5.0	5.2	M552BCR20L10R/LVBX	10.0	0.20	2.44	0.5	4.94	4.04	21	8	12.15	35
		M552BCR20L16R/LVBX	16.0	0.20	2.44		4.94	4.04			18.15	41
		M552BCR05L20RVBX **	20.0	0.05	2.43		4.93	4.24			23.15	46
		M552BCR20L21R/LVBX	21.0	0.20	2.44		4.94	4.04			23.15	46
		M552BCR20L26R/LVBX	26.0	0.20	2.44		4.94	4.04			28.15	51
		M552BCR05L30RVBX **	30.0	0.05	2.42		4.92	4.24			32.15	55
		M552BCR20L30R/LVBX	30.0		2.44		4.94	4.04			32.15	55
		M552BCR20L35R/LVBX	35.0		2.44		4.94	4.04			37.15	60
6.0	6.2	M662BCR20L16R/LVBX	16.0	0.20	2.93	0.5	5.93	4.73	22	8	18.3	42
		M662BCR20L21R/LVBX	21.0								23.3	47
		M662BCR20L26R/LVBX	26.0								28.3	52
		M662BCR20L30R/LVBX	30.0								32.3	56
		M662BCR20L35R/LVBX	35.0								37.3	61
		M662BCR20L40R/LVBX	40.0								42.3	66
7.0	7.2	M772BCR20L15RVBX **	15.0	0.20	3.44	0.5	6.94	5.74	22	8	16.4	41
		M772BCR20L25R/LVBX	25.0								26.4	51
		M772BCR20L35R/LVBX	35.0								36.4	61
		M772BCR20L40R/LVBX	40.0								41.4	66
		M772BCR20L45R/LVBX	45.0								46.4	71
		M772BCR20L50R/LVBX	50.0								51.4	76

** LH available upon request.

VTX grade tools are available upon request.

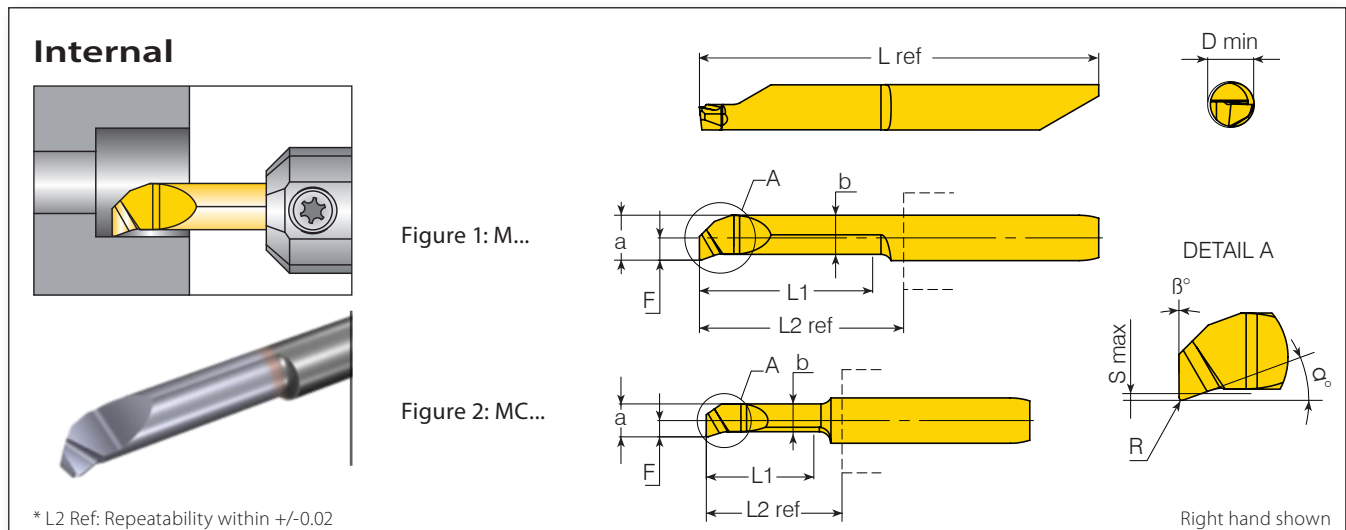
Boring 20°



Shank Dia.	Min. Bore Dia.	Ordering Code					Dimensions mm					
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	2.2	MC422B20R10L09RVBX	9.0	0.1	0.95	0.2	1.95	1.55	20	20	11.5	28.5
	2.7	MC427B20R15L10RVBX	10.0	0.15	1.2		2.45	2.05			18.2	35.2
		MC427B20R15L16RVBX	16.0			11.5					28.5	
	3.2	MC432B20R15L10RVBX	10.0		1.45	2.95	2.55	18.2			35.2	
		MC432B20R15L16RVBX	16.0					22.8			39.8	
	4.2	M442B20R15L16RVBX	16.0		1.95	0.3	3.95	3.45				
M442B20R15L21RVBX			21.0									

! All tools are available in LH upon request.
! VTX grade tools are available upon request.

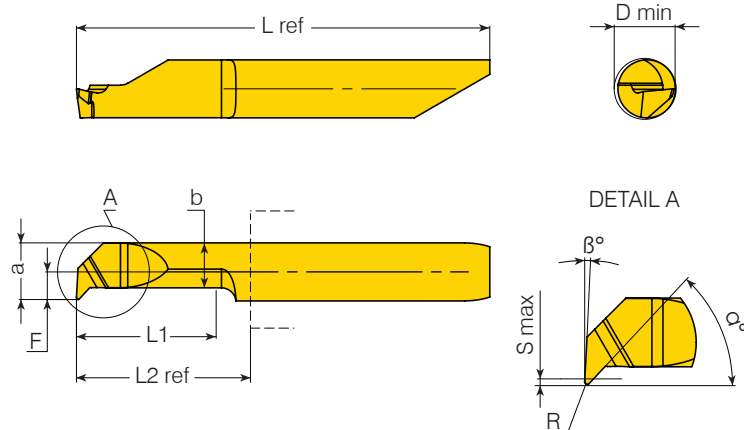
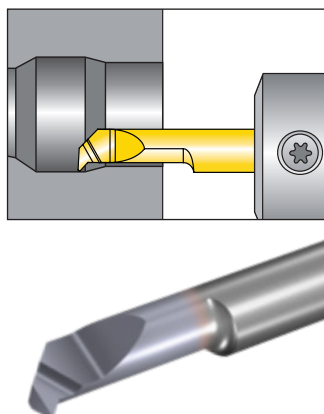
Boring 90°



Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm									
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	3.2	MC432B90R15L10R/LVBX	10.0	0.15	1.43	0.2	2.90	2.45	18	0	11.5	25.8
	4.2	M442B90R15L16R/LVBX	16.0		1.95	0.3	3.95	3.45			18.2	35.2
5.0	5.2	M552B90R20L10R/LVBX	10.0	0.2	2.44	0.5	4.94	4.2	20		12.15	35
		M552B90R20L16R/LVBX	16.0								18.15	41
		M552B90R20L21R/LVBX	21.0								23.15	46

! VTX grade tools are available upon request.

Internal



* L2 Ref: Repeatability within +/-0.02

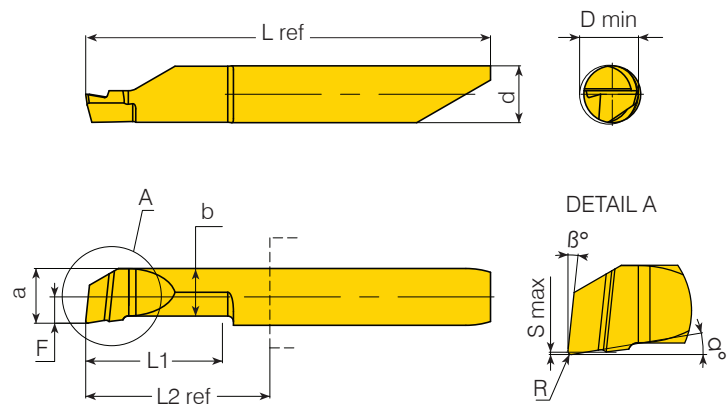
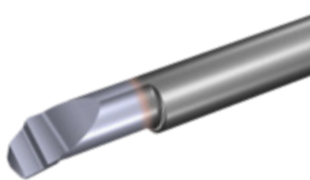
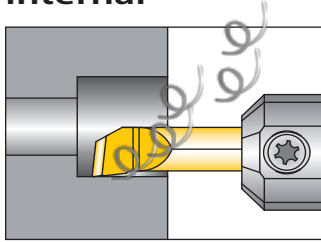
Right hand shown

Shank Dia.	Min. Bore Dia.	Ordering Code					Dimensions mm					
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	4.2	MS442CLR15L10R/LVBX	10	0.15	1.9	0.7	3.9	3.1	47	3	11.5	28.5
		MS442CLR15L16R/LVBX	16								18.2	35.2
		MS442CLR15L21R/LVBX	21								22.8	39.8
5.0	5.2	M552CLR20L16R/LVBX	16	0.2	2.4	0.95	4.9	3.8	49		18.15	41
		M552CLR20L25R/LVBX	25								28.15	51
6.0	6.2	M662CLR20L16R/LVBX	16		2.78	1.75	5.78	3.9			49	18.3
		M662CLR20L21R/LVBX	21							23.3		47
		M662CLR20L30R/LVBX	30							32.3		56

VTX grade tools are available upon request.

Boring with Chip Former

Internal



* L2 Ref: Repeatability within +/-0.02

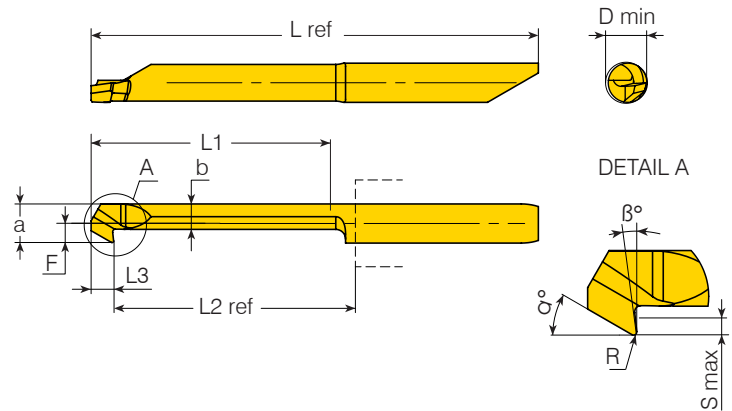
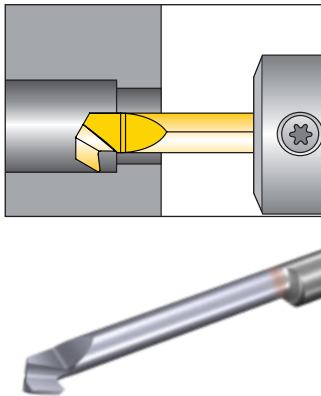
Right hand shown

Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm									
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L ref
4.0	4.2	MS442BCFR15L10R/LVBX	10.0	0.15	1.85	0.05	3.85	3.35	9.4	6	11.5	28.5
		MS442BCFR15L15R/LVBX	15.0								18.2	35.2
		MS442BCFR15L20R/LVBX	20.0								22.8	39.8
5.0	5.2	M552BCFR20L10RVBX	10.0	0.2	2.35	0.05	4.85	4.25	9.4	6	12.15	35
		M552BCFR20L15RVBX	15.0								18.15	41
		M552BCFR20L20R/LVBX	20.0								23.15	46
		M552BCFR20L25RVBX	25.0								28.15	51
		M552BCFR20L30RVBX	30.0								32.15	55
6.0	6.2	M662BCFR20L15RVBX	15.0	0.2	2.85	0.05	5.85	5.1	9.4	6	18.3	42
		M662BCFR20L20R/LVBX	20.0								23.3	47
		M662BCFR20L25RVBX	25.0								28.3	52
		M662BCFR20L30RVBX	30.0								32.3	56
		M662BCFR20L35RVBX	35.0								37.3	61
7.0	7.2	M772BCFR20L15RVBX	15.0	0.2	3.4	0.05	6.9	6.1	9.4	6	16.4	41
		M772BCFR20L20RVBX	20.0								26.4	51
		M772BCFR20L25RVBX	25.0								26.4	51
		M772BCFR20L30RVBX	30.0								36.4	61
		M772BCFR20L35R/LVBX	35.0								36.4	61
		M772BCFR20L40RVBX	40.0								41.4	66

! All tools are available in LH upon request.

! VTX grade tools are available upon request.

Internal



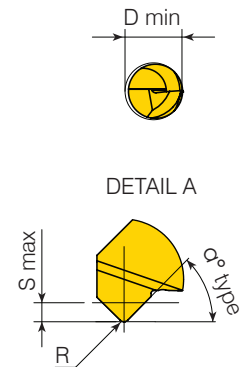
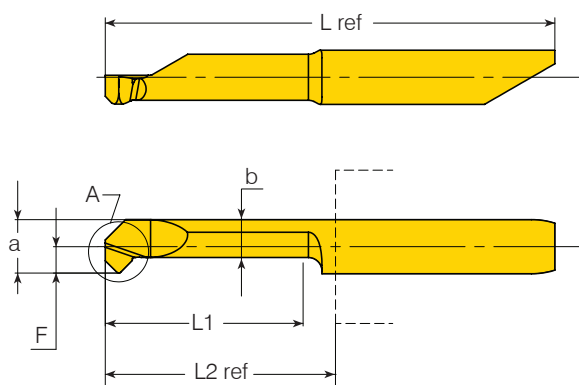
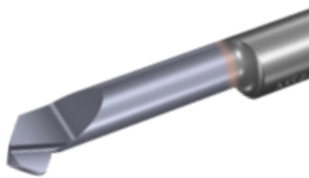
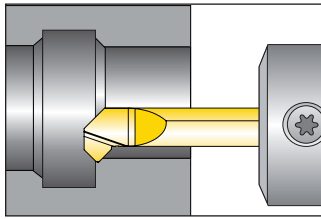
* L2 Ref: Repeatability within +/-0.03

Right hand shown

Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm										
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	β°	L2 ref*	L3	L ref
4.0	4.2	M442BBR15L25R/LVBX	25.0	0.15	1.95	0.8	3.95	2.6	30	6	26.4	2.30	45.7
5.0	5.2	M552BBR15L30R/LVBX	30.0		2.45	1.0	4.95	3.8		7	29.85		55.0
6.0	6.2	M662BBR15L30R/LVBX			2.95	1.8	5.95	4.0			29.8	2.45	56.0
7.0	7.2	M772BBR15L30R/LVBX			3.45	2.5	6.95	4.3			34		61.0

Boring & Chamfering 45°

Internal



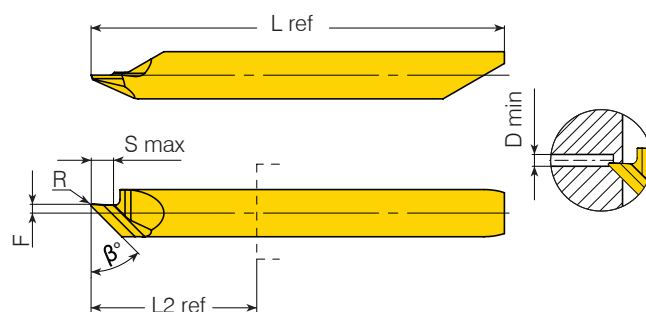
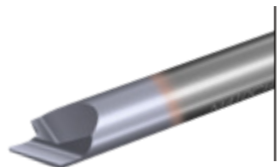
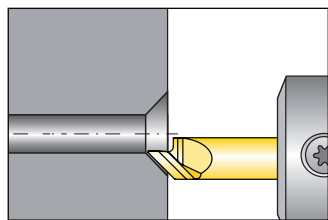
* L2 Ref: Repeatability within +/-0.02

Right hand shown

Shank Dia.	Min. Bore Dia.	Ordering Code				Dimensions mm					
d (mm)	D min. (mm)	RH/LH	L1	R	F	S max	a	b	α°	L2 ref*	L ref
4.0	4.2	MS442CH4545L15R/LVBX	15.0	0.2	1.95	0.7	3.95	2.8	45	18.4	35.4
5.0	5.2	M552CH4545L15R/LVBX	15.0		2.45		4.95	3.7		18.35	41.2
		M552CH4545L20R/LVBX	20.0							23.35	46.2
6.0	6.2	M662CH4545L20R/LVBX	20.0		2.95		5.95	4.0		23.5	47.2
		M662CH4545L25R/LVBX	25.0							28.5	52.2
7.0	7.2	M772CH4545L20R/LVBX	20.0		3.45		6.95	4.25		26.6	51.2
		M772CH4545L40R/LVBX	40.0							41.6	66.2

Face Chamfering 45°

Internal

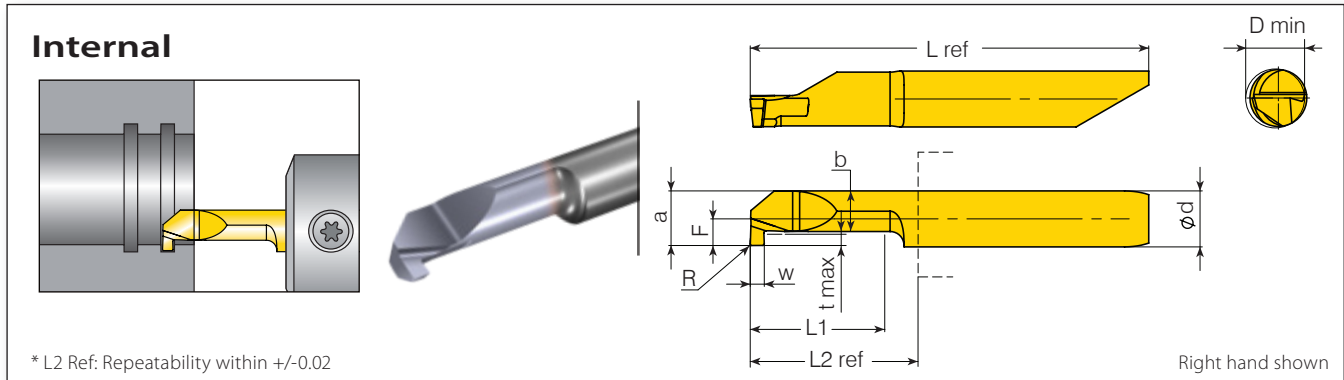


* L2 Ref: Repeatability within +/-0.02

Right hand shown

Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm					
d (mm)	D min. (mm)	RH/LH	R	F	S max	β°	L2 ref*	L ref
4.0	1.0	M410CH45L15RVBX	0.1	0.75	2.4	45	18.2	35.2
		M410CH45L15LVBX						

Square Grooving



Shank Dia.	Min. Bore Dia.	Ordering Code				Dimensions mm								
d (mm)	D min. (mm)	RH/LH	W +/- 0.025	t max	L1	F	R	a	b	L2 ref*	L ref			
4.0	4.2	MS442GSW079L10R/LVBX	0.79	0.8	10	1.96	0.1	3.96	2.9	11.5	28.5			
		MS442GSW100L10R/LVBX	1.00			1.9		3.90						
		MS442GSW079L15R/LVBX	0.79		15	1.96		3.96		18.2	35.2			
		MS442GSW100L15R/LVBX	1.00			1.9		3.90						
		MS442GSW100L20R/LVBX	1.00		20	1.9		3.90		22.8	39.8			
		MS442GSW079L25R/LVBX	0.79		25	1.96		3.96		28.7	45.7			
5.0	5.2	M552GSW100L10R/LVBX	1.00	1	10	2.4	0.1	4.9	3.7	12.15	35			
		M552GSW150L10R/VBX **	1.50											
		M552GSW200L10R/VBX **	2.00		15					2.4	4.9	3.7	18.15	41
		M552GSW100L15R/LVBX	1.00											
		M552GSW150L15R/LVBX	1.50											
		M552GSW200L15R/VBX **	2.00											
		M552GSW100L20R/LVBX	1.00											
		M552GSW150L20R/LVBX	1.50		20					23.15	46			
		M552GSW200L20R/VBX	2.00											
6.0	6.2	M662GSW079L10R/VBX **	0.79	1.8	10	2.96	0.1	5.96	4.0	12.3	36			
		M662GSW100L10R/LVBX	1.00			2.9		5.9						
		M662GSW117L10R/VBX **	1.17			2.96		5.96						
		M662GSW150L10R/VBX **	1.50			2.9		5.9						
		M662GSW157L10R/VBX **	1.57			2.96		5.96						
		M662GSW198L10R/VBX **	1.98			2.9		5.9						
		M662GSW200L10R/LVBX	2.00			2.96		5.96						
		M662GSW079L15R/VBX **	0.79		15	2.96		5.96		18.3	42			
		M662GSW100L15R/LVBX	1.00			2.9		5.9						
		M662GSW117L15R/VBX **	1.17			2.96		5.96						
		M662GSW150L15R/LVBX	1.50			2.9		5.9						
		M662GSW157L15R/VBX **	1.57			2.96		5.96						
		M662GSW198L15R/VBX **	1.98			2.9		5.9						
		M662GSW200L15R/LVBX	2.00		20	2.9		5.9		23.3	47			
		M662GSW100L20R/LVBX	1.00											
		M662GSW150L20R/LVBX	1.50											
		M662GSW200L20R/LVBX	2.00		25	2.96		5.96		28.3	52			
		M662GSW079L25R/VBX **	0.79											
		M662GSW117L25R/VBX **	1.17											
		M662GSW157L25R/VBX **	1.57											
		M662GSW198L25R/VBX **	1.98		30	2.9		5.9		32.3	56			
		M662GSW100L30R/LVBX	1.00											
		M662GSW150L30R/LVBX	1.50											
		M662GSW200L30R/LVBX	2.00											
		M662GSW079L35R/VBX **	0.79		35	2.96		5.96		37.3	61			
		M662GSW117L35R/VBX **	1.17											
		M662GSW157L35R/VBX **	1.57											

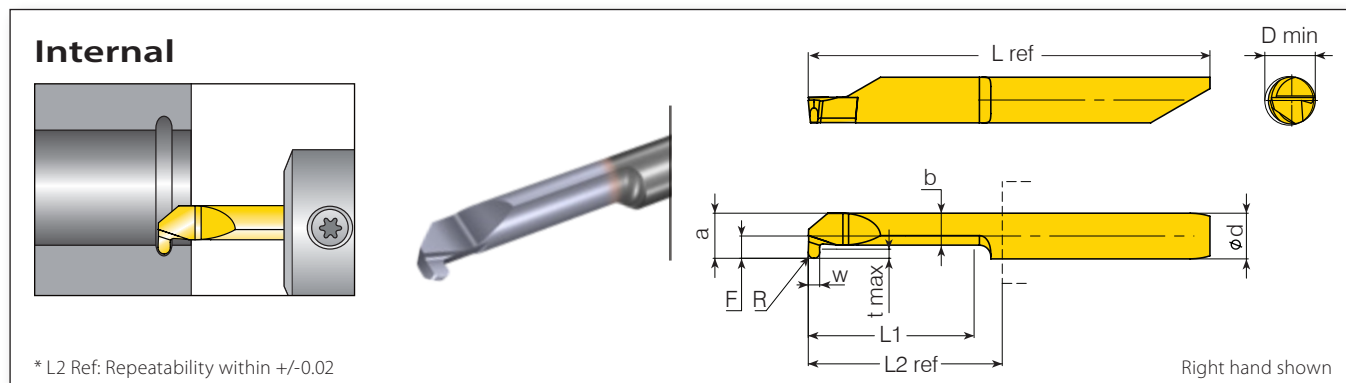
Square Grooving (con't)

Shank Dia.	Min. Bore Dia.	Ordering Code	Dimensions mm								
d (mm)	D min. (mm)	RH/LH	W +/- 0.025	t max	L1	F	R	a	b	L2 ref*	L ref
7.0	7.2	M772GSW079L10RVBX **	0.79	2.5	10	3.46	0.1	6.96	4.1	11.4	36
		M772GSW100L10R/LVBX	1.00			3.4		6.9			
		M772GSW150L10R/LVBX	1.50								
		M772GSW200L10R/LVBX	2.00								
		M772GSW079L15RVBX **	0.79		15	3.46		6.96		16.4	41
		M772GSW100L15RVBX **	1.00			3.4		6.9			
		M772GSW117L15RVBX **	1.17			3.46		6.96			
		M772GSW150L15R/LVBX	1.50			3.4		6.9			
		M772GSW157L15RVBX **	1.57			3.46		6.96			
		M772GSW198L15RVBX **	1.98			3.4		6.9			
		M772GSW200L15R/LVBX	2.00								
		M772GSW079L20RVBX **	0.79		20	3.46		6.96		26.4	51
		M772GSW117L20RVBX **	1.17								
		M772GSW157L20RVBX **	1.57								
		M772GSW198L20RVBX **	1.98								
		M772GSW100L25RVBX **	1.00		25	3.4		6.9		36.4	61
		M772GSW150L25R/LVBX	1.50								
		M772GSW200L25R/LVBX	2.00		35						
		M772GSW100L35RVBX **	1.00								
		M772GSW150L35R/LVBX	1.50								
		M772GSW200L35R/LVBX	2.00								

** LH available upon request.

VTX grade tools are available upon request.

Round Grooving

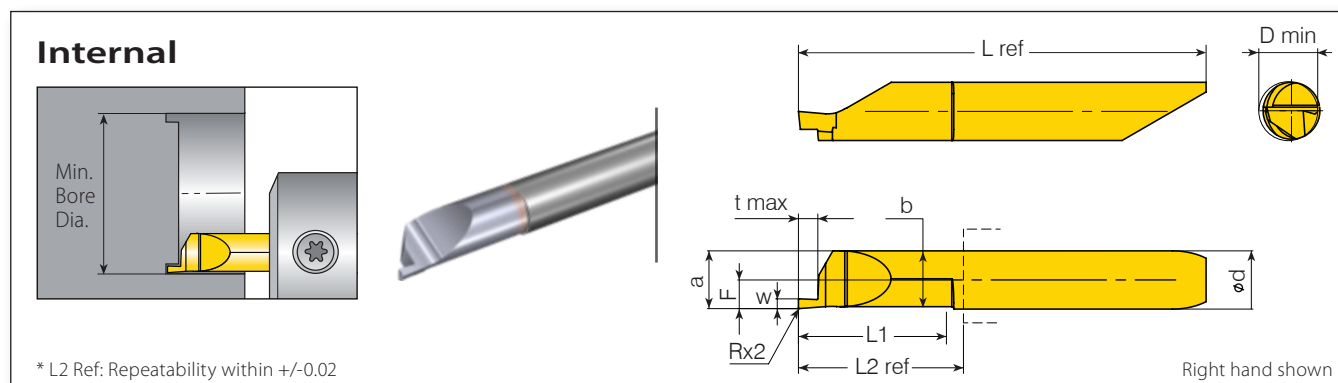


Shank Dia.	Min. Bore Dia.	Ordering Code				Dimensions mm					
d (mm)	D min. (mm)	RH/LH	W +/- 0.025	t max	L1	F	R	a	b	L2 ref*	L ref
4.0	4.2	MS442GRR050L15R/LVBX	1.0	0.8	15	1.95	0.5	3.95	2.8	18.2	35.2
5.0	5.2	M552GRR050L20R/LVBX	1.0	1	20	2.45		0.75	4.95	3.7	23.15
		M552GRR075L20R/LVBX	1.5								
		M552GRR100L20RVBX **	2.0								
6.0	6.2	M662GRR050L25R/LVBX	1.0	1.8	25	2.95	0.75	5.95	4	28.3	52
		M662GRR075L25R/LVBX	1.5								
		M662GRR100L25R/LVBX	2.0								
7.0	7.2	M772GRR100L30RVBX **	2.0	2.5	30	3.45	1	6.95	4.1	36.4	61

** LH available upon request.

VTX grade tools are available upon request.

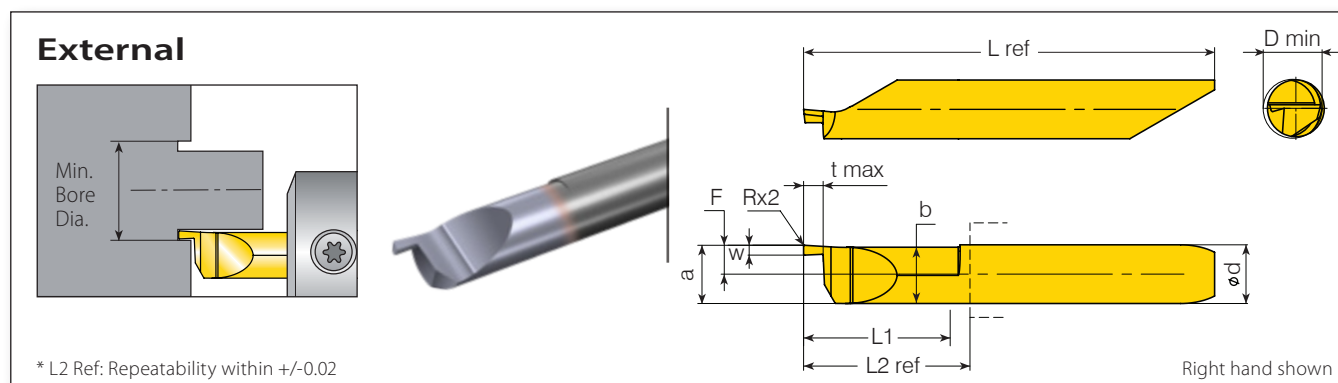
Face Grooving Internal



Shank Dia.	Min. Bore Dia.	Ordering Code				Dimensions mm					
d (mm)	D min. (mm)	RH/LH	W +/- 0.025	t max	L1	F	R	a	b	L2 ref*	L ref
6.0	6.2	M662FGW10L15R/LVBX	1.00	2.0	15	2.95	0.10	5.95	5.75	18.3	42.0
		M662FGW117L15R/LVBX	1.17				0.15				
		M662FGW15L15R/LVBX	1.50				0.10				
		M662FGW157L15R/LVBX	1.57	0.15							
		M662FGW198L15R/LVBX	1.98	0.15							
		M662FGW20L15R/LVBX	2.00	0.10							
		M662FGW239L15R/LVBX	2.39	0.15							
		M662FGW25L15R/LVBX	2.50	0.10							
		M662FGW30L15R/LVBX	3.00	0.10							
		M662FGW318L15R/LVBX	3.18	6.0			0.15				

VTX grade tools are available upon request.

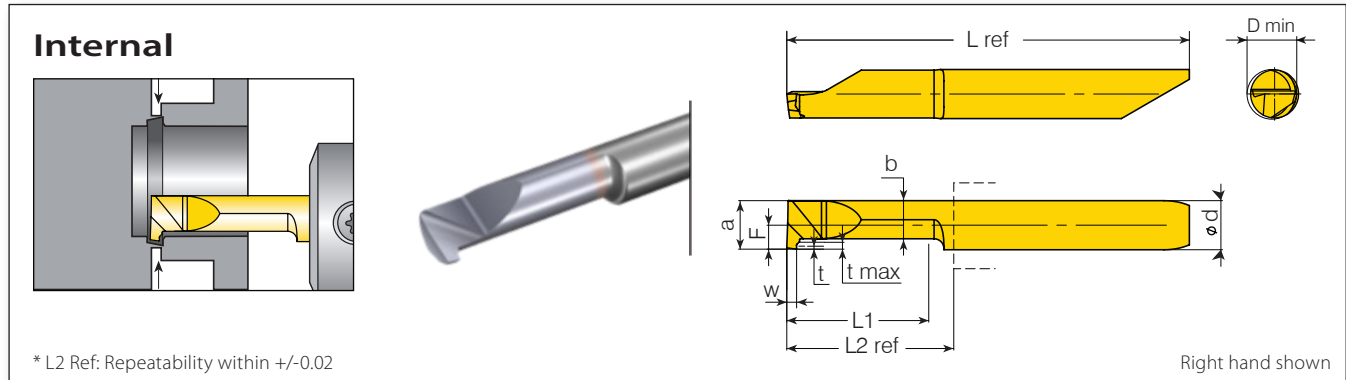
Face Grooving External



Shank Dia.	Min. Bore Dia.	Ordering Code				Dimensions mm					
d (mm)	D min. (mm)	RH/LH	W +/- 0.025	t max	L1	F	R	a	b	L2 ref*	L ref
6.0	6.2	M662FPW10L15R/LVBX	1.00	2.0	15	2.95	0.10	5.95	5.75	18.3	42
		M662FPW117L15R/LVBX	1.17				0.15				
		M662FPW15L15R/LVBX	1.50				0.10				
		M662FPW157L15R/LVBX	1.57	3.0			0.15				
		M662FPW198L15R/LVBX	1.98				0.15				
		M662FPW20L15R/LVBX	2.00				0.10				
		M662FPW239L15R/LVBX	2.39	5.0			0.15				
		M662FPW25L15R/LVBX	2.50				0.10				
		M662FPW30L15R/LVBX	3.00				0.10				
		M662FPW318L15R/LVBX	3.18	6.0			0.15				

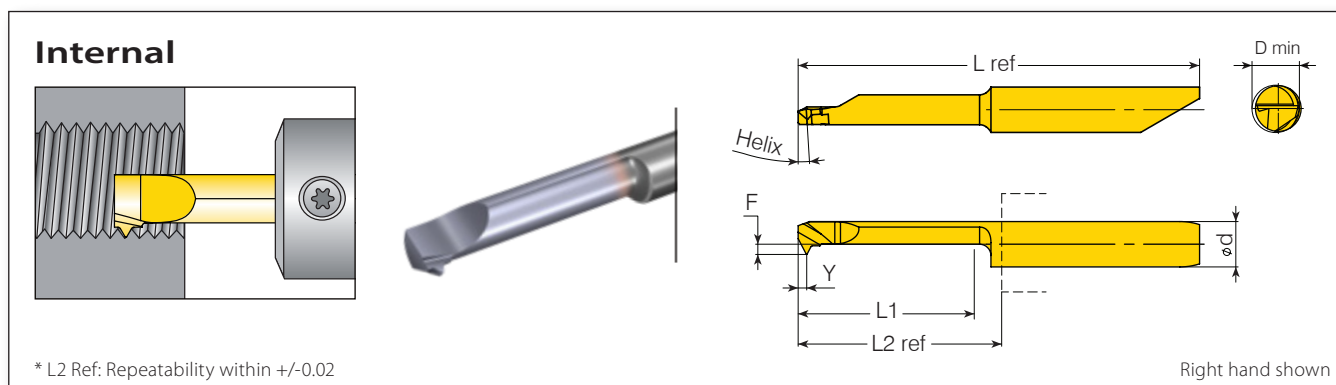
VTX grade tools are available upon request.

Pre-Part Off

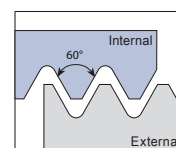


Shank Dia.	Min. Bore Dia.	Ordering Code				Dimensions mm					
d (mm)	D min. (mm)	RH/LH	W +/- 0.025	t max	L1	F	t	a	b	L2 ref*	L ref
5.0	5.2	M552PPW100L15R/LVBX	1.0	0.7	15	2.44	0.3	4.94	3.88	18.15	41
		M552PPW100L20R/LVBX			20					23.15	46
		M552PPW100L25R/LVBX			25					28.15	51
		M552PPW100L30RVBX **			30					32.15	55

** LH available upon request.



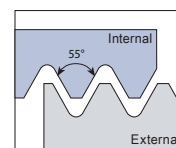
Partial Profile 60°



Shank Dia.	Min. Bore Dia.	Ordering Code	Pitch		Dimensions mm					
d (mm)	D min. (mm)	RH/LH	mm	tpi	Helix	L1	F	Y	L2 ref*	L ref
4.0	3.2	MS429THF60L16R/LVBX	0.5-1.0	48-24	3.5	16	0.9	0.9	18.4	35.4
	4.2	MS439THF60L16R/LVBX	0.5-1.0	48-24			1.9			
6.0	6.2	M659THA60L16R/LVBX	0.5-1.5	48-16			2.9		18.5	42.2

VTX grade tools are available upon request.

Partial Profile 55°

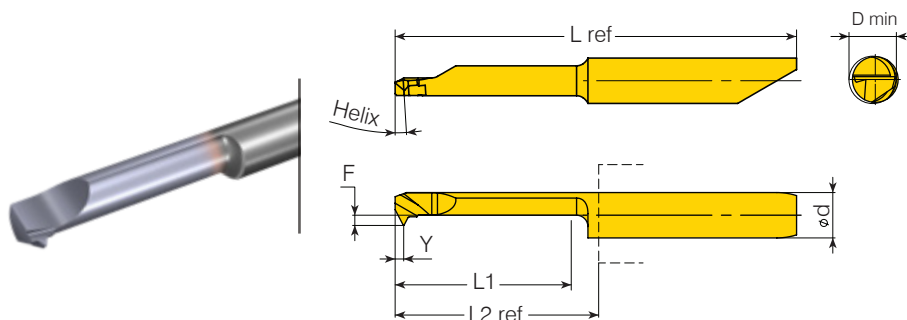
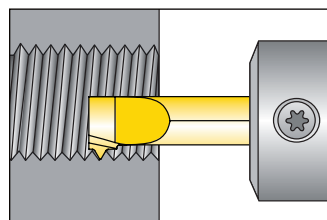


Shank Dia.	Min. Bore Dia.	Ordering Code	Pitch		Dimensions mm					
d (mm)	D min. (mm)	RH/LH	mm	tpi	Helix	L1	F	Y	L2 ref*	L ref
4.0	3.2	MS429THF55L16R/LVBX	0.5-1.0	48-24	3.5	16	0.9	0.75	18.4	35.4
	4.2	MS439THF55L16R/LVBX	0.5-1.0	48-24			1.9			
6.0	6.2	M659THA55L16R/LVBX	0.5-1.5	48-16			2.9	0.9	18.5	42.2

VTX grade tools are available upon request.

Threading

Internal

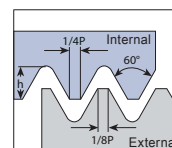


* L2 Ref: Repeatability within +/-0.02

Right hand shown

ISO Metric

Defined by: R262 (DIN 13)
Tolerance Class: 6g/6H

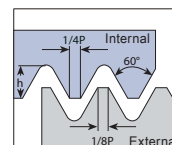


Thread	Shank Dia. d (mm)	Min. Bore Dia. D min. (mm)	Ordering Code	Pitch mm	Helix °	L1	F	Y	h (min)	L2 ref*	L ref
M4x0.5	4.0	3.4	MS429TH0.50ISOL16R/LVBX	0.50	3.5	16	0.9	0.4	0.29	18.4	35.4
M5x0.5		4.4	MS439TH0.50ISOL16R/LVBX	0.50			1.9	0.4	0.29		
M4x0.7		3.2	MS429TH0.70ISOL16R/LVBX	0.70			0.9	0.6	0.41		
M5x0.8		4.0	MS429TH0.80ISOL16R/LVBX	0.80			0.9	0.6	0.46		
M6x1.0		4.8	MS439TH1.00ISOL16R/LVBX	1.00			1.9	0.7	0.58		
M5.5x0.5	5.0	4.9	M542TH0.50ISOL16R/LVBX	0.50			1.7	0.4	0.29	18.35	41.2
M5.5x0.75		4.6	M542TH0.75ISOL16R/LVBX	0.75			1.7	0.6	0.43		
M7x1.0		5.8	M549TH1.00ISOL16R/LVBX	1.00			2.4	0.7	0.58		
M6x0.5	6.0	5.4	M649TH0.50ISOL16R/LVBX	0.50			1.9	0.4	0.29	18.5	42.2
M6.5x0.75		5.6	M649TH0.75ISOL16R/LVBX	0.75			1.9	0.6	0.43		
M7.5x1.0		6.3	M659TH1.00ISOL16R/LVBX	1.00			2.9	0.7	0.58		
M8x1.25		6.5	M659TH1.25ISOL16R/LVBX	1.25			2.9	0.9	0.72		
M10x1.5		8.3	M659TH1.50ISOL16R/LVBX	1.50	3		2.9	1.0	0.87		

VTX grade tools are available upon request.

American UN

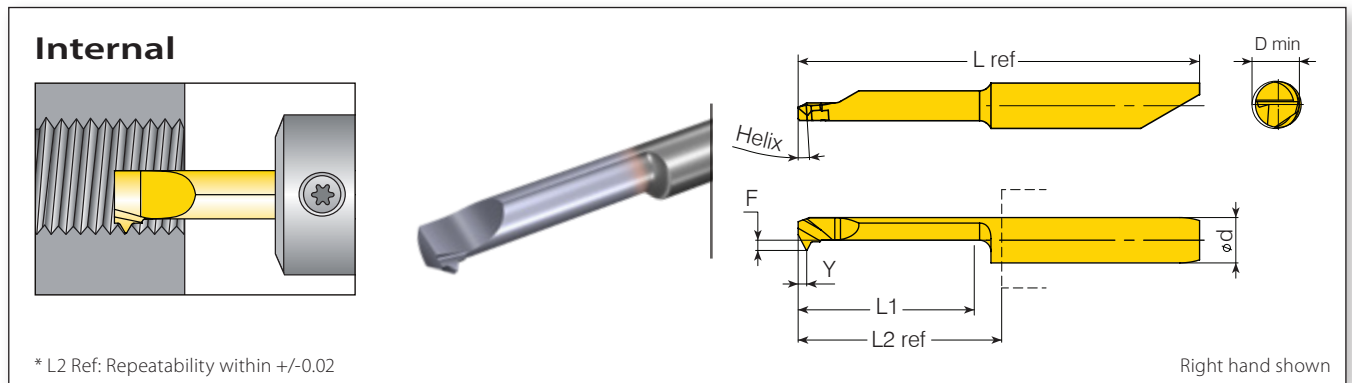
Defined by: ANSI B1.1:74
Tolerance Class: 2A/2B



Thread	Shank Dia. d (mm)	Min. Bore Dia. D min. (mm)	Ordering Code	Pitch tpi	Helix °	L1	F	Y	h (min)	L2 ref*	L ref
No.8-32UNC	4.0	3.3	MS429TH32UNL16R/LVBX	32	3.5	16	0.92	0.6	0.46	18.4	35.4
No.10-28UNS		3.6	MS429TH28UNL16R/LVBX	28			0.92	0.65	0.52		
1/4"-27UNS	5.0	5.3	M549TH27UNL16RVBX **	27			2.4	0.75	0.54	18.35	41.2
1/4"-24UNS		5.1	M542TH24UNL16RVBX **	24			1.7	0.75	0.61		
1/4"-20UNC		4.6	M542TH20UNL16RVBX **	20			1.7	0.9	0.73		
5/16"-18UNC	6.0	6.3	M659TH18UNL16RVBX **	18			2.9	1.05	0.81	18.5	42.2
3/8"-16UNC		7.7	M659TH16UNL16RVBX **	16			2.9	1	0.92		

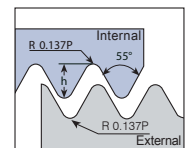
** LH available upon request.

VTX grade tools are available upon request.



Whitworth for BSW, BSP

Defined by: B.S.84:1956, DIN 259,
ISO228/1:1982
Tolerance Class: Medium Class A



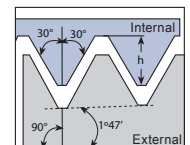
Thread	Shank Dia. d (mm)	Min. Bore Dia. D min. (mm)	Ordering Code	Pitch tpi	Helix °	L1	F	Y	h (min)	L2 ref*	L ref
1/16"-28BSP	6.0	6.5	M659TH28WL16RVBX **	28	3.5	16	2.9	0.65	0.58	18.5	42.2
1/4"-19BSP	6.0	11.4	M659TH19WL16RVBX **	19	3.5	16	2.9	0.95	0.86	18.5	42.2

** LH available upon request.

VTX grade tools are available upon request.

NPT

Defined by: USAS B2.1:1968
Tolerance Class: Standard NPT

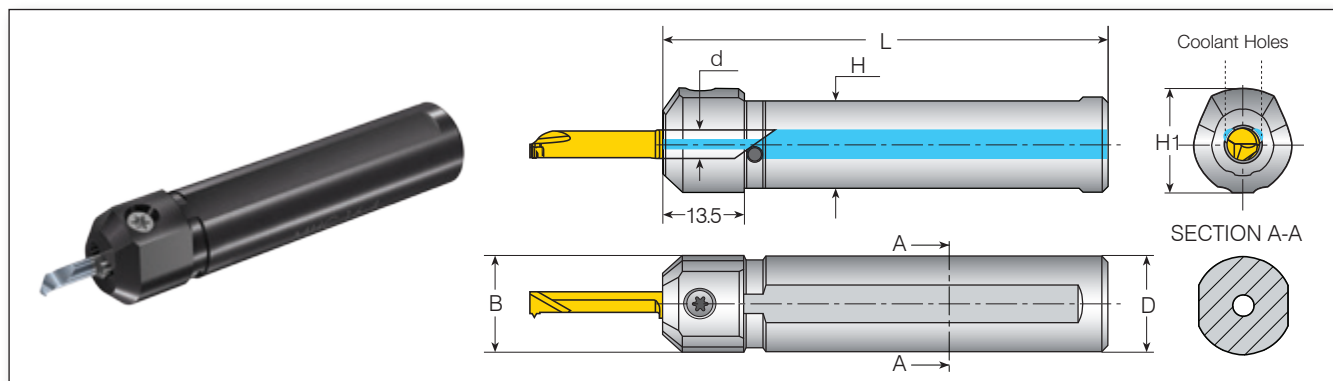


Thread	Shank Dia. d (mm)	Min. Bore Dia. D min. (mm)	Ordering Code	Pitch tpi	Helix °	L1	F	Y	h (min)	L2 ref*	L ref
1/16"-27NPT	6.0	6.1	M659TH27NPTL16RVBX **	27	3.5	16	2.9	0.75	0.66	18.5	42.2
1/4"-18NPT	6.0	10.7	M659TH18NPTL16R/LVBX	18	3.5	16	2.9	1	1.01	18.5	42.2
1/2"-14NPT	6.0	17	M659TH14NPTL16RVBX **	14	3.5	16	2.9	1.05	1.33	18.5	42.2

** LH available upon request.

VTX grade tools are available upon request.

Toolholders - Round Shank - 2 Flats



Metric Holders

Micro Insert Dia.	Ordering Code	Dimensions mm					
d (mm)		D=B	H1	H	L	Clamping Screw	Key
4.0	MHC 10-4	10.0	14.0	8.8	65.0	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*
	MHC 12-4	12.0	16.0	10.8	70.0		
	MHC 16-4	16.0	17.6	14.8	75.0		
	MHC 20-4	20.0	22.0	18.8	84.0		
5.0	MHC 10-5	10.0	14.0	8.8	65.0		
	MHC 12-5	12.0	16.0	10.8	70.0		
	MHC 16-5	16.0	18.6	14.8	75.0		
	MHC 20-5	20.0	22.0	18.8	84.0		
6.0	MHC 12-6	12.0	16.0	10.8	70.0		
	MHC 16-6	16.0	18.6	14.8	75.0		
	MHC 20-6	20.0	22.0	18.8	84.0		
7.0	MHC 16-7	16.0	18.6	14.8	75.0		
	MHC 20-7	20.0	22.0	18.8	84.0		

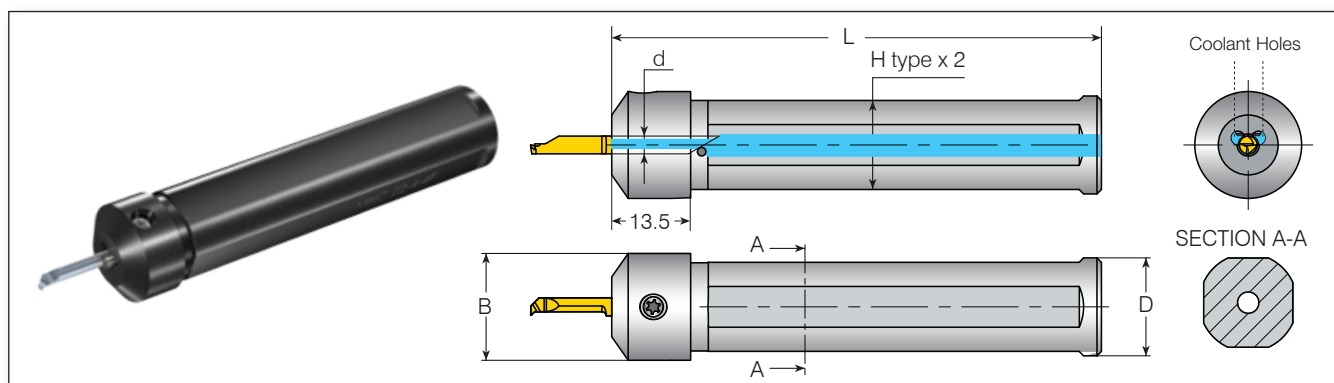
*Torx+ screw and key are now available for improved clamping.

Inch Holders

Micro Insert Dia.	Ordering Code	Dimensions mm / inch					Spare Parts	
d (mm / inch)		D	B	H1	H	L	 Clamping Screw	 Key
4.0 / .157	MHC 0500-4	12.700 / .500	12.7 / .500	16.4 / .644	10.0 / .394	70.0 / 2.76	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*
	MHC 0625-4	15.875 / .625	16.2 / .638	18.6 / .732	14.0 / .551	75.0 / 2.95		
	MHC 0750-4	19.050 / .750	21.0 / .827	21.0 / .827	18.0 / .709	90.0 / 3.54		
5.0 / .197	MHC 0500-5	12.700 / .500	12.7 / .500	16.4 / .644	10.0 / .394	70.0 / 2.76		
	MHC 0625-5	15.875 / .625	16.2 / .638	18.6 / .732	14.0 / .551	75.0 / 2.95		
	MHC 0750-5	19.050 / .750	21.0 / .827	21.0 / .827	18.0 / .709	90.0 / 3.54		
6.0 / .236	MHC 0500-6	12.700 / .500	12.7 / .500	16.4 / .644	10.0 / .394	70.0 / 2.76		
	MHC 0625-6	15.875 / .625	16.2 / .638	18.6 / .732	14.0 / .551	75.0 / 2.95		
	MHC 0750-6	19.050 / .750	21.0 / .827	21.0 / .827	18.0 / .709	90.0 / 3.54		
7.0 / .276	MHC 0625-7	15.875 / .625	16.2 / .638	18.6 / .732	14.0 / .551	75.0 / 2.95		
	MHC 0750-7	19.050 / .750	21.0 / .827	21.0 / .827	18.0 / .709	90.0 / 3.54		

*Torx+ screw and key are now available for improved clamping.

Toolholders - Round Shank - 4 Flats



Metric Holders

Spare Parts

Main Dimensions						Spare Parts		
Micro Insert Dia.	Ordering Code	Dimensions mm						
d (mm)		D	B	H	L	Clamping Screw	Key	
4.0	MHC20-4-4F	20.0	22.0	18.8	83.5	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*	
	MHC22-4-4F	22.0	24.0	20.0	110			
	MHC23-4-4F	23.0	25.0	21.0				
	MHC25-4-4F	25.0	27.0	23.0				
	MHC28-4-4F	28.0	30.0	26.0				
5.0	MHC20-5-4F	20.0	22.0	18.8	83.5			
	MHC22-5-4F	22.0	24.0	20.0	110			
	MHC23-5-4F	23.0	25.0	21.0				
	MHC25-5-4F	25.0	27.0	23.0				
	MHC28-5-4F	28.0	30.0	26.0				
6.0	MHC20-6-4F	20.0	22.0	18.8	83.5			110
	MHC22-6-4F	22.0	24.0	20.0				
	MHC23-6-4F	23.0	25.0	21.0				
	MHC25-6-4F	25.0	27.0	23.0				
	MHC28-6-4F	28.0	30.0	26.0				
7.0	MHC22-7-4F	22.0	24.0	20.0				
	MHC23-7-4F	23.0	25.0	21.0				
	MHC25-7-4F	25.0	27.0	23.0				
	MHC28-7-4F	28.0	30.0	26.0				

* Torx+ screw and key are now available for improved clamping.

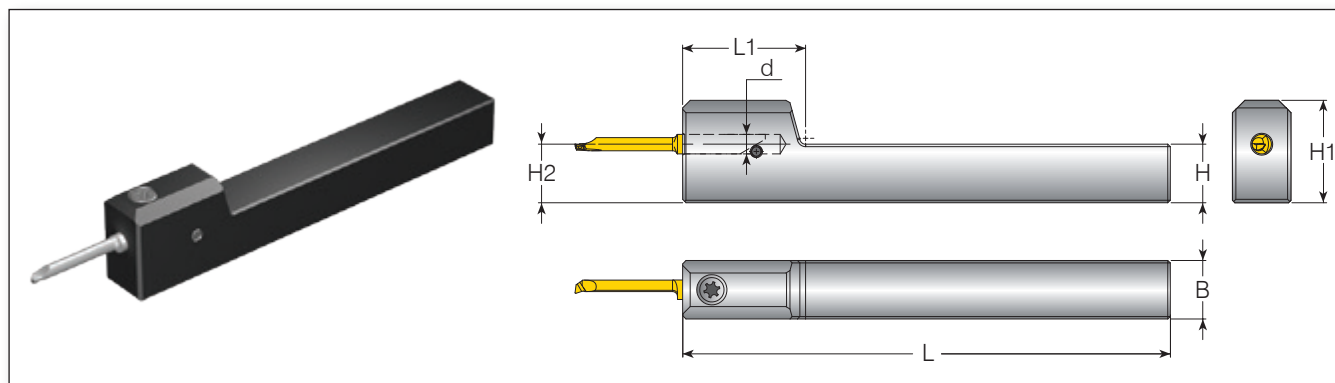
Inch Holders

Spare Parts

Micro Insert Dia.	Ordering Code	Dimensions mm / inch					
d (mm / inch)		D	B	H	L	Clamping Screw	Key
4.0 / .157	MHC0875-4-4F	22.2 / .875	23.5 / .925	20.83 / .82	84.0 / 3.29	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*
	MHC1000-4-4F	25.4 / 1.000	27.0 / 1.063	22.86 / .90	110.0 / 4.33		
5.0 / .197	MHC0875-5-4F	22.2 / .875	23.5 / .925	20.83 / .82	84.0 / 3.29		
	MHC1000-5-4F	25.4 / 1.000	27.0 / 1.063	22.86 / .90	110.0 / 4.33		
6.0 / .236	MHC1000-6-4F	25.4 / 1.000	27.0 / 1.063	22.86 / .90	110.0 / 4.33		

* Torx+ screw and key are now available for improved clamping.

Toolholders - Microscope Holder with Square Shank



Metric Holders

Metric Holders						Spare Parts	
Micro Insert Dia.	Ordering Code	Dimensions mm					
d (mm)		H=H2=B	H1	L	L1	Clamping Screw	Key
4.0	MHS 1010-4	10.0	19.0	100.0	25.0	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*
5.0	MHS 1010-5	10.0	19.5	100.0	25.0		
4.0	MHS 1212-4	12.0	21.0	100.0	25.0		
5.0	MHS 1212-5	12.0	21.5	100.0	27.0		
6.0	MHS 1212-6	12.0	22.0	100.0	27.0		

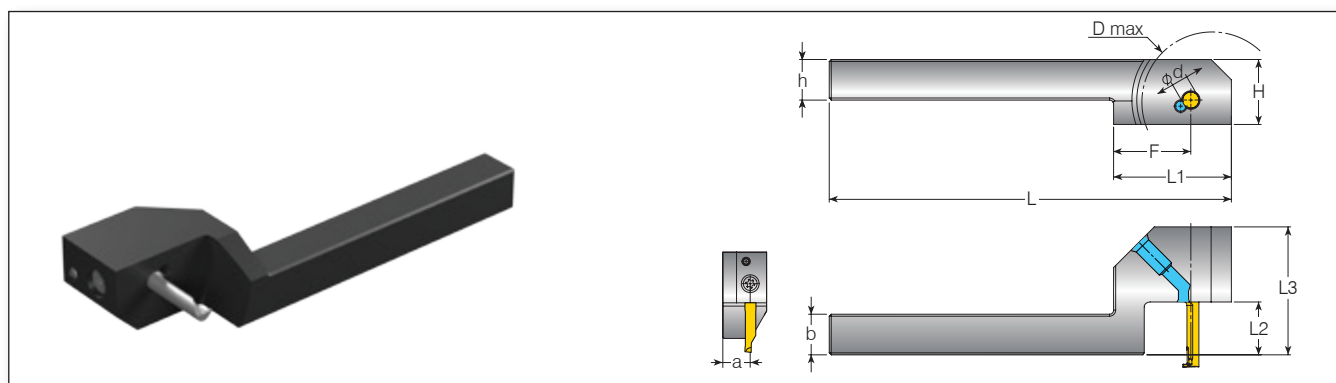
* Torx+ screw and key are now available for improved clamping.

Inch Holders

Inch Holders						Spare Parts	
Micro Insert Dia.	Ordering Code	Dimensions mm / inch					
d (mm / inch)		H=H2=B	H1	L	L1	Clamping Screw	Key
4.0 / .157	MHS 0500-4	12.7 / .500	21.0 / .827	101.6 / 4.00	25.0 / .984	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*
	MHS 0625-4	15.9 / .625	25.0 / .984	127.0 / 5.00	25.0 / .984		
5.0 / .197	MHS 0500-5	12.7 / .500	21.5 / .846	101.6 / 4.00	27.0 / 1.063		
	MHS 0625-5	15.9 / .625	25.5 / 1.004	127.0 / 5.00	35.0 / 1.377		
6.0 / .236	MHS 0500-6	12.7 / .500	22.0 / .866	101.6 / 4.00	27.0 / 1.063		
	MHS 0625-6	15.9 / .625	26.0 / 1.024	127.0 / 5.00	35.0 / 1.377		
7.0 / .276	MHS 0625-7	15.9 / .625	26.5 / 1.043	127.0 / 5.00	35.0 / 1.377		

* Torx+ screw and key are now available for improved clamping.

Toolholders - Microscope Holder with Drop Head



Metric Holders

Spare Parts

										Spare Parts							
Micro Insert Dia.	Ordering Code		Dimensions mm														
d (mm)		a=b=h	L3	H	L	L1	F	D max	L2	Clamping Screw	Key						
4.0	MHD 1010-4 L0500	10.0	31.5	16.0	99.0	29.0	19.0	26.0	13.0	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*						
5.0	MHD 1010-5 L0800		48.0						23.0								
6.0	MHD 1010-6 L1000		53.0						28.0								
4.0	MHD 1212-4 L0700	12.0	36.5	18.0					99.0			29.0	19.0	26.0	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*	
5.0	MHD 1212-5 L0800		48.0														23.0
6.0	MHD 1212-6 L1000		53.0														28.0

* Torx+ screw and key are now available for improved clamping.

Inch Holders

Spare Parts

Micro Holders										Spare Parts				
Micro Insert Dia.	Ordering Code	Dimensions mm / inch												
d (mm / inch)		a=b=h	L3	H	L	L1	F	D max	L2	Clamping Screw	Key			
4.0 / .157	MHD 0375-4 L0700	10.0 / .375	36.5 / 1.437	16.0 / .630	99.0 / 3.898	29.0 / 1.142	19.0 / .748	26.0 / 1.024	18.0 / .709	SL7DT15 or SL7DBT15IP*	KT15 or F15IP*			
5.0 / .197	MHD 0375-5 L0800		48.0 / 1.890						23.0 / .906					
6.0 / .236	MHD 0375-6 L0800		53.0 / 2.087						23.0 / .906					
4.0 / .157	MHD 0500-4 L0700	36.5 / 1.437	19.0 / .748						18.0 / .709					
5.0 / .197	MHD 0500-5 L0800	48.0 / 1.890							23.0 / .906					
6.0 / .236	MHD 0500-6 L1000	53.0 / 2.087							28.0 / 1.102					

* Torx+ screw and key are now available for improved clamping.

Boring Technical Data

Boring and Profiling in Finishing Operations – Recommended Depth of Cut [a_p max. (mm)] and feed rate f [mm/rev]

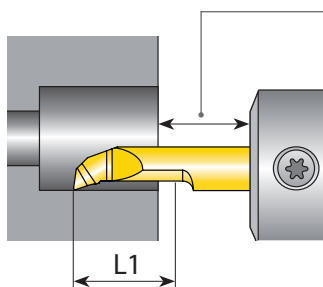
High Alloy Steel, 330 HB, 2100 Kc [N/mm ²]			
D min.	Vmax mm ²	a_p max. (mm)	f mm/rev
1 mm - 1.7 mm	0.0012	0.08	0.015
1.8 mm - 2.7mm	0.0017	0.10	0.017
2.8 mm - 3.2 mm	0.0031	0.18	0.017
3.3 mm - 3.7 mm	0.0040	0.22	0.018
3.8 mm - 4.2 mm	0.0050	0.25	0.020
4.3 mm - 5.2 mm	0.0084	0.30	0.028
5.2 mm - 6.2 mm	0.0150	0.30	0.050
6.3 mm - 7.2 mm	0.0210	0.35	0.060

Austenitic Stainless Steel, 200 HB, 2600 Kc [N/mm ²]			
D min.	Vmax mm ²	a_p max. (mm)	f mm/rev
1 mm - 1.7 mm	0.0009	0.06	0.015
1.8 mm - 2.7mm	0.0015	0.10	0.015
2.8 mm - 3.2 mm	0.0018	0.12	0.015
3.3 mm - 3.7 mm	0.0023	0.15	0.015
3.8 mm - 4.2 mm	0.0027	0.18	0.015
4.3 mm - 5.2 mm	0.0030	0.20	0.015
5.2 mm - 6.2 mm	0.0050	0.20	0.025
6.3 mm - 7.2 mm	0.0063	0.25	0.025

Machining Recommendation

- $V_{max} = \text{Feed mm/rev} \times a_p \text{ (mm)}$
- Exceeding the V_{max} value may cause corner excessive wear and breakage
Recommendations listed are for average roughness of 0.5 (Ra)
- Lower Hardness and Lower Kc enable to increase the value of V_{max} , for higher metal removal
- Recommendations listed are for medium L1. Increase V_{max} value by using shorter L1 tools

When encountering chip flow evacuation problems, it is recommended to increase the distance between the work piece and sleeve.

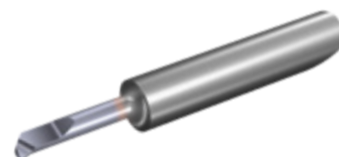


Boring Technical Data

Recommended VBX* Cutting Speeds Vc [m/min]

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc[m/min] (Coated)
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	80-150
	2		Medium Carbon (C=0.25-0.55%)	150	80-130
	3		High Carbon (C=0.55-0.85%)	170	70-110
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	70-110
	5		Hardened	275	70-100
	6		Hardened	350	70-100
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	80-120
	8		Hardened	325	70-110
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	80-110
	10		High Alloy (alloying elements >5%)	225	80-110
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	80-100
	12		Hardened	330	70-110
	13	Stainless Steel Austenitic	Austenitic	180	80-110
	14		Super Austenitic	200	80-110
	15	Stainless Steel Cast Ferritic	Non Hardened	200	40-60
	16		Hardened	330	30-50
	17	Stainless Steel Cast Austenitic	Austenitic	200	40-60
	18		Hardened	330	30-50
K Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	80-110
	29		Pearlitic (long chips)	230	80-110
	30	Grey Cast Iron	Low Tensile Strength	180	80-110
	31		High Tensile Strength	260	80-110
	32	Nodular SG Iron	Ferritic	160	80-110
	33		Pearlitic	260	80-110
N_(K) Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60	100-300
	35		Aged	100	100-150
	36	Aluminium Alloys	Cast	75	100-150
	37		Cast & Aged	90	60-100
	38	Aluminium Alloys	Cast Si 13-22%	130	100-150
	39	Copper and Copper Alloys	Brass	90	60-100
	40		Bronze and non leaded Copper	100	60-100
S_(M) Heat Resistant Material	19	High Temperature Alloys	Annealed (Iron based)	200	25-45
	20		Aged (Iron based)	280	20-30
	21		Annealed (Nickel or Cobalt based)	250	15-20
	22		Aged (Nickel or Cobalt based)	350	10-15
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	60-100
	24		α+β Alloys	1050Rm	40-50
H_(K) Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	20-45
	26			51-55HRc	20-40

Carbide Grade



VBX - TiCN PVD coated
VTX - TiAlN PVD coated

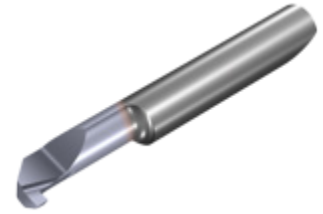
* For **VTX Grade**, increase speed by 20%.

Grooving Technical Data

Recommended VBX Cutting Speeds Vc [m/min] and Feed f [mm/rev]

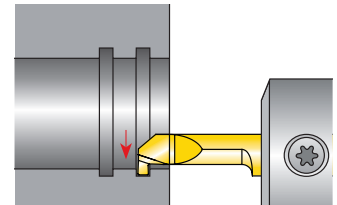
Material Group	Vargus No.	Material	Hardness Brinell HB	Vc[m/min] (Coated)	Feed f [mm/rev]
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	50-120
	2		Medium Carbon (C=0.25-0.55%)	150	40-100
	3		High Carbon (C=0.55-0.85%)	170	30-80
	4	Low Alloy Steel (alloying elements ≤5%)	Non Hardened	180	50-70
	5		Hardened	275	40-60
	6		Hardened	350	30-50
	7	High Alloy Steel (alloying elements >5%)	Annealed	200	30-50
	8		Hardened	325	25-40
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	30-50
	10		High Alloy (alloying elements >5%)	225	25-40
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	60-100
	12		Hardened	330	40-60
	13	Stainless Steel Austenitic	Austenitic	180	50-90
	14		Super Austenitic	200	40-60
	15	Stainless Steel Cast Ferritic	Non Hardened	200	40-60
	16		Hardened	330	30-50
	17	Stainless Steel Cast Austenitic	Austenitic	200	40-60
	18		Hardened	330	30-50
K Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	50-70
	29		Pearlitic (long chips)	230	50-70
	30	Grey Cast Iron	Low Tensile Strength	180	50-70
	31		High Tensile Strength	260	40-60
	32	Nodular SG Iron	Ferritic	160	50-70
	33		Pearlitic	260	60-80
N(k) Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60	100-300
	35		Aged	100	100-150
	36	Aluminium Alloys	Cast	75	100-150
	37		Cast & Aged	90	60-100
	38	Aluminium Alloys	Cast Si 13-22%	130	100-150
	39	Copper and Copper Alloys	Brass	90	60-100
	40		Bronze and non leaded Copper	100	60-100
S(M) Heat Resistant Material	19	High Temperature Alloys	Annealed (Iron based)	200	25-45
	20		Aged (Iron based)	280	20-30
	21		Annealed (Nickel or Cobalt based)	250	15-20
	22		Aged (Nickel or Cobalt based)	350	10-15
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	60-100
	24		α+β Alloys	1050Rm	40-50
H(k) Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	20-40
	26		Hardened & Tempered	51-55HRc	20-35

Carbide Grade



VBX - General use carbide grade for Microscope inserts. TiCN PVD coated

Machining Recommendation



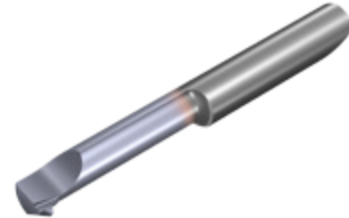
Machine the groove in one motion instead of intervals.

Threading Technical Data

Recommended VBX Cutting Speeds Vc [m/min]

Material Group	Vargus No.	Material	Hardness Brinell HB	Vc[m/min] (Coated)
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125
	2		Medium Carbon (C=0.25-0.55%)	150
	3		High Carbon (C=0.55-0.85%)	170
	4	Low Alloy Steel (alloying elements ≤5%)	Non Hardened	180
	5		Hardened	275
	6		Hardened	350
	7	High Alloy Steel (alloying elements >5%)	Annealed	200
	8		Hardened	325
	9	Cast Steel	Low Alloy (alloying elements <5%)	200
	10		High Alloy (alloying elements >5%)	225
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200
	12		Hardened	330
	13	Stainless Steel Austenitic	Austenitic	180
	14		Super Austenitic	200
	15	Stainless Steel Cast Ferritic	Non Hardened	200
	16		Hardened	330
	17	Stainless Steel Cast Austenitic	Austenitic	200
	18		Hardened	330
K Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130
	29		Pearlitic (long chips)	230
	30	Grey Cast Iron	Low Tensile Strength	180
	31		High Tensile Strength	260
	32	Nodular SG Iron	Ferritic	160
	33		Pearlitic	260
N(K) Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60
	35		Aged	100
	36	Aluminium Alloys	Cast	75
	37		Cast & Aged	90
	38	Aluminium Alloys	Cast Si 13-22%	130
	39	Copper and Copper Alloys	Brass	90
	40		Bronze and non leaded Copper	100
S(M) Heat Resistant Material	19	High Temperature Alloys	Annealed (Iron based)	200
	20		Aged (Iron based)	280
	21		Annealed (Nickel or Cobalt based)	250
	22		Aged (Nickel or Cobalt based)	350
	23	Titanium Alloys	Pure 99.5 Ti	400Rm
	24		α+β Alloys	1050Rm
H(K) Hardened Material	25	Extra Hard Steel	45-50HRC	20-40
	26		51-55HRC	20-40

Carbide Grade

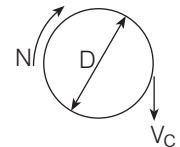


VBX - General use carbide grade for Microscope inserts.
TiCN PVD coated

Calculation of N [RPM]

$$N = \frac{1000 \times V_c}{\pi \times D}$$

$$V_c = \frac{N \times \pi \times D}{1000}$$



N - Revolution Per Minute [RPM]
V_c - Cutting Speed [m/mm]
D - Workpiece Diameter [mm]

Number of Passes for Threading

Pitch	mm	0.50	0.75	1.00	1.25	1.50	1.75	2.00
tpi		48	32	24	20	16	14	12
No. of Passes (Microscope)		6-9	6-11	6-12	8-14	9-15	11-18	11-18



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