BLOOD®

ROTATING GENIUS

CUTTING TOOLS CATALOG 2017

THINK CARBIDE, THINK BLOOD...

DENKEN HARTMETALL, DENKEN BLOOD...

Robin Precision Products Pvt. Ltd. plays an important role by generous contribution towards CSR (Corporate Social Responsibility).

We at GIDC Lodhika Indl. Assn., run **Emergency Service Centre** in the name of **Robin Seva Sadan** which houses Fire Station and well equipped Ambulance Van to serve Indl. Estate and nearby rural areas.

Our founder Chairman - **Ramesh Vora** is seen welcoming the then Hon'ble Cabinet Minister Mr. Saurabh Patel (Govt. of Gujarat) at the Inaugural Ceremony on 10th Dec. 2010.

CORPORATE SOCIAL RESPONSIBILITY

Core Purpose:

"To improve productivity by providing optimum tooling solutions"

Core Values:

- Business Ethics
- Teamwork
- Customer Focus
- Quick Management Action
- Innovation
- Safety

Mission Statement:

We at **Robin Precision Products Pvt. Ltd.** strive hard to offer better quality tools at very attractive prices.

Our mission is to create optimum tooling solutions that help our valued customers meet their CNC Tooling challenges-no matter how demanding those challenges may be.

To do this, we focus our every resource necessary to :

- Understand the customer's needs.
- Design & develop tooling that matches the customer's requirement for speed, precision and tool life.
- Deliver tools on schedule every time.
- Follow-up after the sale to ensure Customer Satisfaction.

Core Desire: Step by step to the top

www.bloodtools.com

History

The founder Chairman of our Group Companies, Mr. Ramesh Vora, after pursuing degree of B.E. Mechanical in 1979 he began his career in partnership with a Metal Cutting Tool Mfg, unit. After 3 yrs, in 1982 he started his own Company, M/s. Standard Tools for mfg. Metal Cutting tools with latest machinery & Heat Treatment shop, at Rajkot. After seeing business opportunities in other fields of engineering, he promoted M/s. Robin Engineering Co. in 1991 to capture Textile Machinery Spindles & Spares Market.

After more than 25 years of experience in the precision engineering field, in 2006 with team of qualified family members, he made up his mind to manufacture a world class product in a newly established hi-tech plant & machinery namely M/s. Robin Precision Products Pvt. Ltd.

From the Desk of Directors

Ramesh Vora
CMD

So far Metal Cutting Tools is concerned, future demand would be more and more stringent and specific. Our future depends on how far we can satisfy the demand.

Samir Vora
Director - Sales & Mktg.

BLOOD® has always been the answer to today's metal cutting challenges. Quality is never something people want less of. And that is where our strength lies. This is how we turn our vision into reality.

Ravi Vora
Director

We have no problem with low-priced competitors because that's what they think their product is worth of. Since our values are stronger than Carbide, we are ready to tackle any challenges that may come across.

Rishi Vora
Director

We do more than simply make tools, by helping our valued customers achieve higher productivity. When you look for cutting tool, you are looking for a better solution. And that is a role we are already comfortable with.

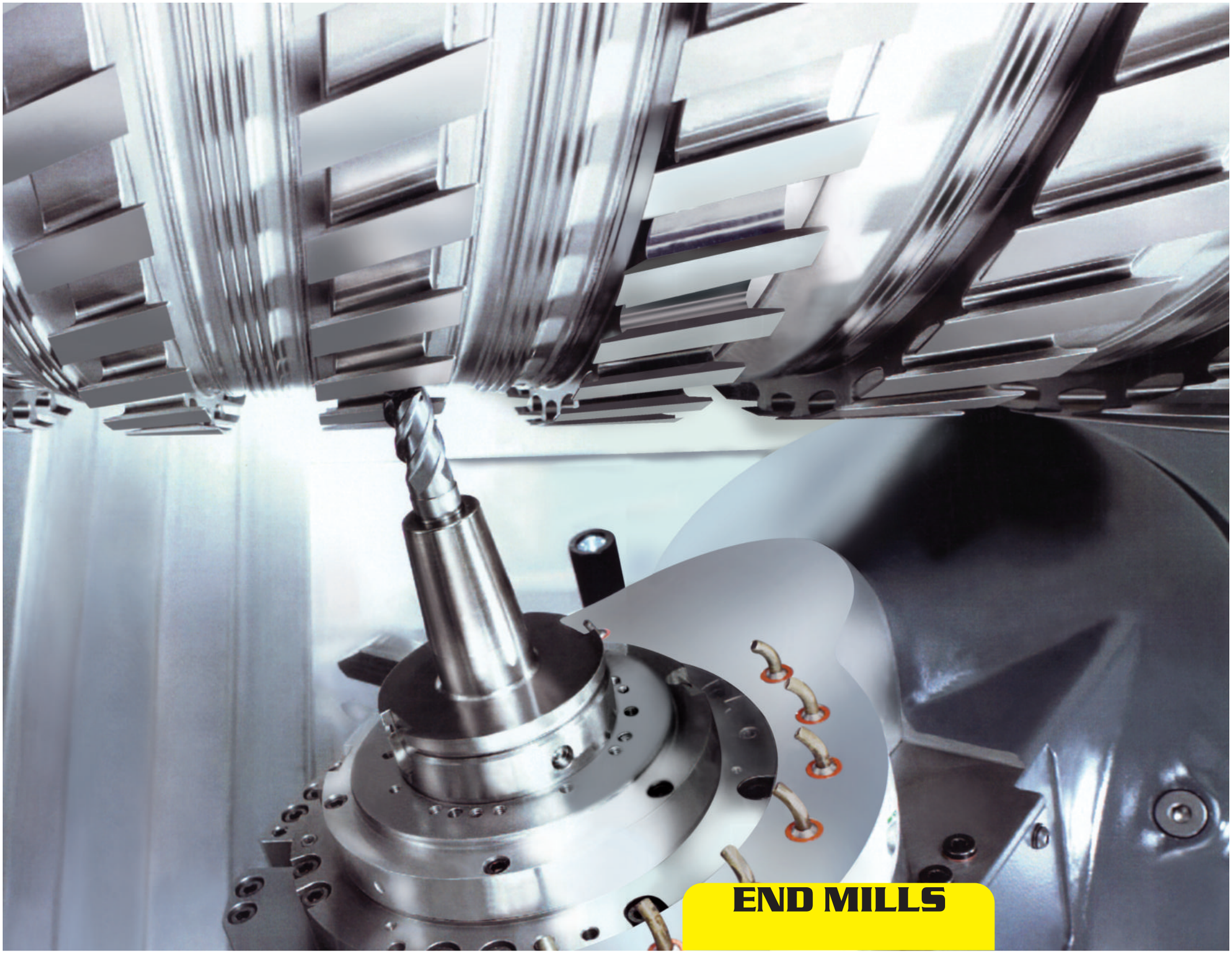
CONTENTS

ICON GUIDE

1	Endface Type	Square End 	Ballnose 	Corner Radius 	Chamfer 	90° 	118° 	140° 
2	Helix Angle	Helix  5°	Helix  7°	Helix  30°	Variable Helix  35° 38°	Helix  45°	Helix  55°	
3	No. of Flutes	Flutes Z = 1	Flutes Z = 2	Flutes Z = 3	Flutes Z = 4	Flutes Z = 5	Flutes Z = 6	
4	Material Series	Series Regular	Series B+ve	Series HM	Series NF			
5	Work Material Hardness	HRC Regular ⩽ 28	HRC B+ve ⩽ 48	HRC HM ⩽ 60				
6	Coating	Coating Duro Coat	Coating Tuff Coat	Coating Ultra Coat	Coating Hiper Coat			
7	Tool Length Series	Tool Length S	Tool Length R	Tool Length L	Tool Length X	L x D 2	L x D 3	L x D 5
8	Tolerance	Shank Dia h6	Mill Dia e8	Drill Dia m7	Reamer Dia H7			
9	Standard	Standard DIN 6537	Standard DIN 333 A	Standard BS 328				

TOOL SELECTION CHART

Material	MS, CI, EN-8, & all Non-Hardened Steel	SS, High Carbon Steel, EN-9, EN-21, High Alloy Steel, Case Hardened Steel	Tool Steel, Hot Die Steel, OHNS, EN-31, P20, all Hardened Steel	Aluminium, Brass, Copper and all Non-Ferrous Material
Hardness	upto 20-28 HRC	upto 40-48 HRC	upto 55-60 HRC	NA
Series Code	Regular	B+ve	HM	NF
Coating	Duro Coat	Tuff Coat	Tuff Coat	Ultra Coat
Item Code	**ESB4 060 R**	**ESB4 060 R B+ve**	**ESD4 060 R HM**	**ESC3 060 R NF**


END MILLS

NOMENCLATURE FOR SOLID CARBIDE CUTTING TOOLS

E	S	B	4	0	6	0	R	B+VE	
1	2	3	4	5			7	8	
D	Y	B	3	0	6	8	TC		
1	2	3	4	5			7		
C	D	X	A	3	1	5	0	8	0
1		2	3	5			6		

1. TOOL TYPE

E = End Mill
F = Rougher
D = High Performance Drill
SD = Step Drill
R = Reamer
C = Center Drill
DM = Drill Mill
HM = Hole Mill
GRB = Ground Rod Blank

2. END SHAPE

End Mill End Shape	Drill Point Angle
S = Square End	X = 118^0
B = Ball Nose	Y = 140^0
R = Corner Radius	Z = Other than X & Y
F = Rougher	

3. HELIX ANGLE

A = 10^0 - 20^0
B = 20^0 - 30^0
C = 30^0 - 45^0
D = 50^0 - 60^0

4. FLUTES

END MILL No. of Flutes	DRILL Flute Length
1 = Single Flute	2 = 2 x D
2 = Two Flute	3 = 3 x D
3 = Three Flute	5 = 5 x D
4 = Four Flute	8 = 8 x D
6 = Six Flute	S = Stub

5. CUTTING DIA

END MILL	DRILL	CENTER DRILL
060 = 6 mm	032 = 3.2 mm	160 = 1.6 mm
080 = 8 mm	100 = 10.0 mm	250 = 2.5 mm
100 = 10 mm	125 = 12.5 mm	630 = 6.3 mm

6. SHANK DIA

CENTER DRILL
040 = 4.0 mm
063 = 6.3 mm
160 = 16.0 mm

7. SERIES

S = Stub	TC = Through Coolant
R = Regular	STN = Stub Taper Neck
L = Long	LN = Long Neck
X = Extra Long	TN = Taper Neck
XL = Extreme Long	

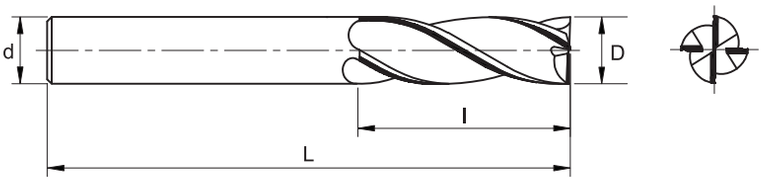
8. MATERIAL SERIES

20 - 28 HRC = R
40 - 48 HRC = B+ve
55 - 60 HRC = HM
Non-Ferrous Matl. = NF

SOLID CARBIDE SQUARE ENDMILLS
REGULAR SERIES

Square End	Series	Helix	Flutes	HRC
	Regular	 30°	Z = 4	Regular ⩽ 28

Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	R	h6	e8



ESB4 R

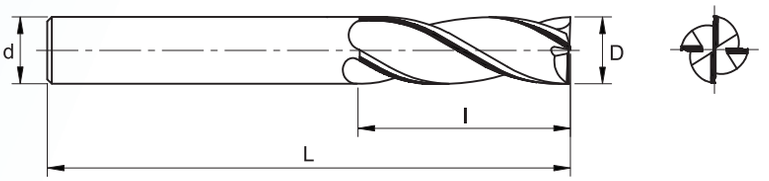
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESB4 010 R	1.0	3	4	39
ESB4 015 R	1.5	3	5	39
ESB4 020 R	2.0	3	8	39
ESB4 025 R	2.5	3	8	39
ESB4 030 R	3	3	10	39
ESB4 040 R	4	4	14	51
ESB4 050 R	5	5	16	51
ESB4 060 R	6	6	19	64
ESB4 080 R	8	8	21	64
ESB4 100 R	10	10	25	70
ESB4 120 R	12	12	25	76
ESB4 140 R	14	14	30	89
ESB4 160 R	16	16	32	89
ESB4 180 R	18	18	35	101
ESB4 200 R	20	20	38	101
ESB4 250 R	25	25	38	101

- ESB2 Series (2 Flutes) available on request
- Intermediate sizes, Weldon Flat available on request

SOLID CARBIDE SQUARE ENDMILLS LONG SERIES

Square End	Series	Helix	Flutes	HRC
	Regular	30°	Z = 4	Regular ⩽ 28

Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	L	h6	e8



ESB4 L

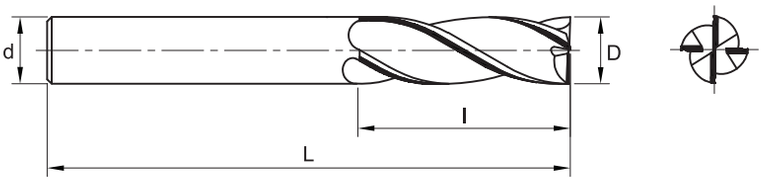
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESB4 030 L	3	3	19	57
ESB4 040 L	4	4	19	57
ESB4 050 L	5	5	25	64
ESB4 060 L	6	6	28	76
ESB4 080 L	8	8	29	76
ESB4 100 L	10	10	32	76
ESB4 120 L	12	12	51	102
ESB4 140 L	14	14	57	127
ESB4 160 L	16	16	57	127
ESB4 180 L	18	18	57	127
ESB4 200 L	20	20	57	127

- ESB2 Series (2 Flutes) available on request
- Intermediate sizes, Weldon Flat available on request

SOLID CARBIDE SQUARE ENDMILLS
EXTRA LONG SERIES

Square End	Series	Helix	Flutes	HRC
	Regular	30°	Z = 4	Regular ⩽ 28

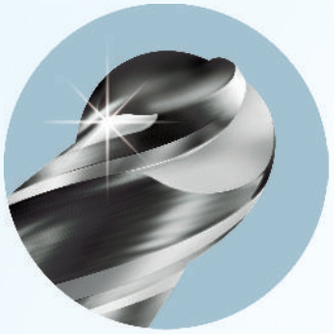
Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	X	h6	e8



ESB4 X

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESB4 030 X	3	3	25	76
ESB4 040 X	4	4	28	76
ESB4 050 X	5	5	32	76
ESB4 060 X	6	6	39	102
ESB4 080 X	8	8	42	102
ESB4 100 X	10	10	45	102
ESB4 120 X	12	12	76	153
ESB4 140 X	14	14	76	153
ESB4 160 X	16	16	76	153
ESB4 180 X	18	18	76	153
ESB4 200 X	20	20	76	153

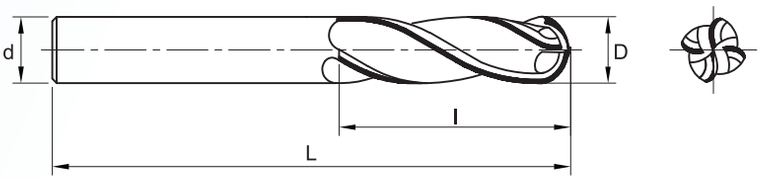
- ESB2 Series (2 Flutes) available on request
- Intermediate sizes, Weldon Flat available on request



SOLID CARBIDE BALL-NOSE ENDMILLS
REGULAR SERIES

Ballnose	Series	Helix	Flutes	HRC
	Regular	 30°	Z = 4	Regular ⩽ 28

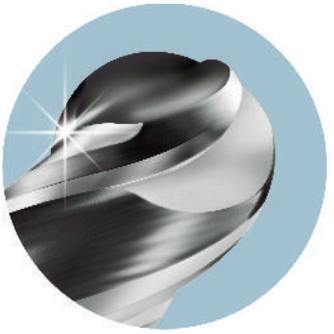
Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	R	h6	e8



EBB4 R

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
EBB4 010 R	1.0	3	4	39
EBB4 015 R	1.5	3	5	39
EBB4 020 R	2.0	3	8	39
EBB4 025 R	2.5	3	8	39
EBB4 030 R	3	3	10	39
EBB4 040 R	4	4	14	51
EBB4 050 R	5	5	16	51
EBB4 060 R	6	6	19	64
EBB4 080 R	8	8	21	64
EBB4 100 R	10	10	25	70
EBB4 120 R	12	12	25	76
EBB4 140 R	14	14	30	89
EBB4 160 R	16	16	32	89
EBB4 180 R	18	18	35	101
EBB4 200 R	20	20	38	101
EBB4 250 R	25	25	38	101

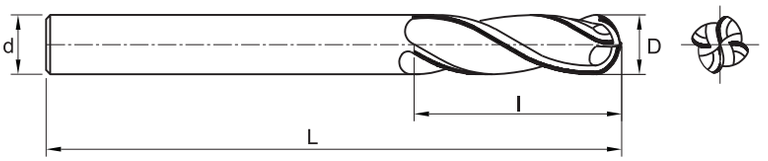
• EBB2 Series (2 Flutes) available on request
Intermediate sizes, Weldon Flat available on request



SOLID CARBIDE BALL-NOSE ENDMILLS
LONG SERIES

Ballnose	Series	Helix	Flutes	HRC
	Regular	 30°	Z = 4	Regular ⩽ 28

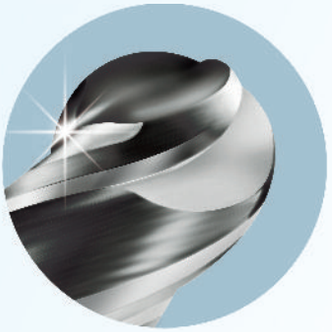
Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	L	h6	e8



EBB4 L

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
EBB4 030 L	3	3	19	57
EBB4 040 L	4	4	19	57
EBB4 050 L	5	5	25	64
EBB4 060 L	6	6	28	76
EBB4 080 L	8	8	29	76
EBB4 100 L	10	10	32	76
EBB4 120 L	12	12	51	102
EBB4 140 L	14	14	57	127
EBB4 160 L	16	16	57	127
EBB4 180 L	18	18	57	127
EBB4 200 L	20	20	57	127

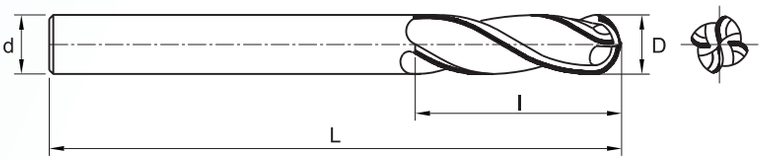
- EBB2 Series (2 Flutes) available on request
- Intermediate sizes, Weldon Flat available on request



SOLID CARBIDE BALL-NOSE ENDMILLS
EXTRA LONG SERIES

Ballnose	Series	Helix	Flutes	HRC
	Regular	30°	Z = 4	Regular ⩽ 28

Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	X	h6	e8



EBB4 X

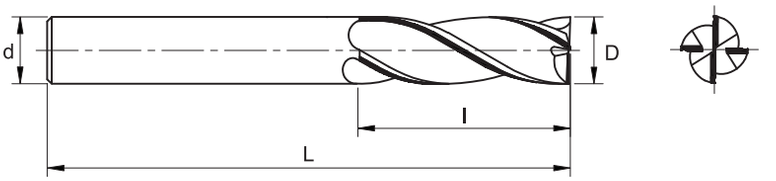
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
EBB4 030 X	3	3	25	76
EBB4 040 X	4	4	28	76
EBB4 050 X	5	5	32	76
EBB4 060 X	6	6	39	102
EBB4 080 X	8	8	42	102
EBB4 100 X	10	10	45	102
EBB4 120 X	12	12	76	153
EBB4 140 X	14	14	76	153
EBB4 160 X	16	16	76	153
EBB4 180 X	18	18	76	153
EBB4 200 X	20	20	76	153

- EBB2 Series (2 Flutes) available on request
- Intermediate sizes, Weldon Flat available on request

SOLID CARBIDE SQUARE ENDMILLS
B+ve SERIES

Square End	Series	Helix	Flutes	HRC
	B+ve	 30°	Z = 4	B+ve ⩽ 48

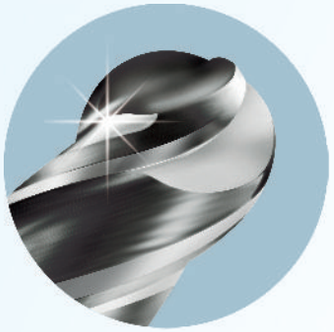
Coating	Tool Length	Shank Dia	Mill Dia
Tuff Coat	R	h6	e8



ESB4 R B+ve

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESB4 010 R B+ve	1.0	3	4	39
ESB4 015 R B+ve	1.5	3	5	39
ESB4 020 R B+ve	2.0	3	8	39
ESB4 025 R B+ve	2.5	3	8	39
ESB4 030 R B+ve	3	3	10	39
ESB4 040 R B+ve	4	4	14	51
ESB4 050 R B+ve	5	5	16	51
ESB4 060 R B+ve	6	6	19	64
ESB4 080 R B+ve	8	8	21	64
ESB4 100 R B+ve	10	10	25	70
ESB4 120 R B+ve	12	12	25	76
ESB4 140 R B+ve	14	14	30	89
ESB4 160 R B+ve	16	16	32	89
ESB4 180 R B+ve	18	18	35	101
ESB4 200 R B+ve	20	20	38	101
ESB4 250 R B+ve	25	25	38	101

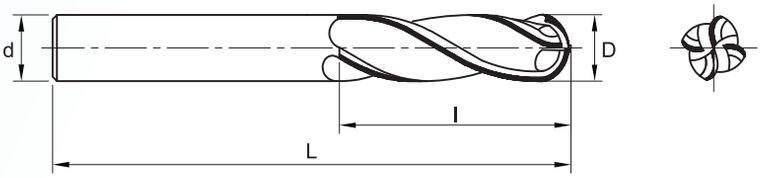
- ESB2 Series (2 Flutes) available on request
- Long & Extra Long Series available on request
- Intermediate sizes, Weldon Flat available on request



SOLID CARBIDE BALL-NOSE ENDMILLS
B+ve SERIES

Ballnose	Series	Helix	Flutes	HRC
	B+ve	 30°	Z = 4	B+ve ⩽ 48

Coating	Tool Length	Shank Dia	Mill Dia
Tuff Coat	R	h6	e8



EBB4 R B+ve

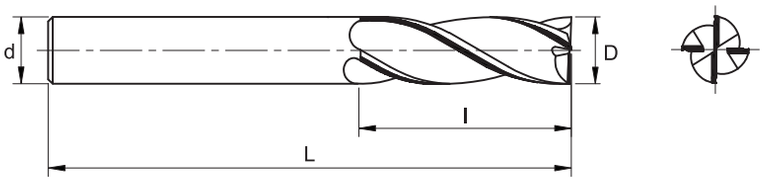
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
EBB4 010 R B+ve	1.0	3	4	39
EBB4 015 R B+ve	1.5	3	5	39
EBB4 020 R B+ve	2.0	3	8	39
EBB4 025 R B+ve	2.5	3	8	39
EBB4 030 R B+ve	3	3	10	39
EBB4 040 R B+ve	4	4	14	51
EBB4 050 R B+ve	5	5	16	51
EBB4 060 R B+ve	6	6	19	64
EBB4 080 R B+ve	8	8	21	64
EBB4 100 R B+ve	10	10	25	70
EBB4 120 R B+ve	12	12	25	76
EBB4 140 R B+ve	14	14	30	89
EBB4 160 R B+ve	16	16	32	89
EBB4 180 R B+ve	18	18	35	101
EBB4 200 R B+ve	20	20	38	101
EBB4 250 R B+ve	25	25	38	101

- EBB2 Series (2 Flutes) available on request
- Long & Extra Long Series available on request
- Intermediate sizes, Weldon Flat available on request

SOLID CARBIDE SQUARE ENDMILLS
HM SERIES

Square End	Series	Variable Helix	Flutes	HRC
	HM	35° 38°	Z = 4	HM ⩽ 60

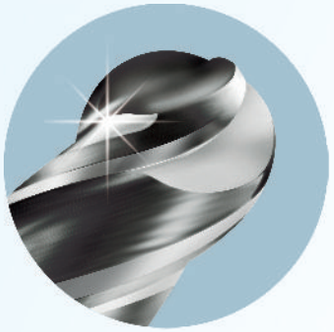
Coating	Tool Length	Shank Dia	Mill Dia
Tuff Coat	R	h6	e8



ESD4 R HM

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESD4 060 R HM	6	6	19	64
ESD4 080 R HM	8	8	21	64
ESD4 100 R HM	10	10	25	70
ESD4 120 R HM	12	12	25	76
ESD4 140 R HM	14	14	30	89
ESD4 160 R HM	16	16	32	89
ESD4 180 R HM	18	18	35	101
ESD4 200 R HM	20	20	38	101
ESD4 250 R HM	25	25	38	101

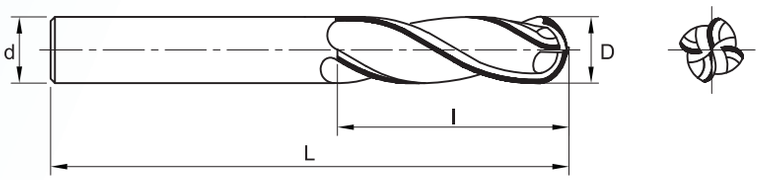
- ESD2 Series (2 Flutes) available on request
- Long & Extra Long Series available on request
- Intermediate sizes, Weldon Flat available on request



SOLID CARBIDE BALL-NOSE ENDMILLS
HM SERIES

Ballnose	Series	Variable Helix	Flutes	HRC
	HM	35° 38°	Z = 4	HM ⩽ 60

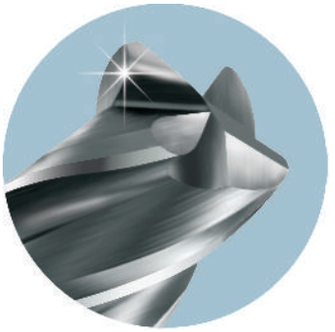
Coating	Tool Length	Shank Dia	Mill Dia
Tuff Coat	R	h6	e8



EBB4 R HM

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
EBB4 060 R HM	6	6	19	64
EBB4 080 R HM	8	8	21	64
EBB4 100 R HM	10	10	25	70
EBB4 120 R HM	12	12	25	76
EBB4 140 R HM	14	14	30	89
EBB4 160 R HM	16	16	32	89
EBB4 180 R HM	18	18	35	101
EBB4 200 R HM	20	20	38	101
EBB4 250 R HM	25	25	38	101

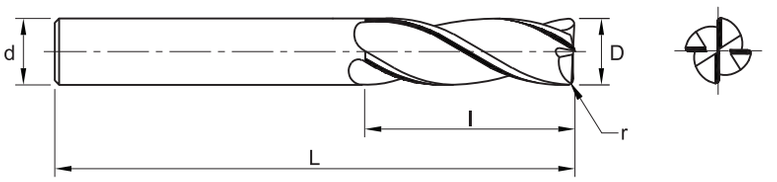
- EBB2 Series (2 Flutes) available on request
- Long & Extra Long Series available on request
- Intermediate sizes, Weldon Flat available on request



SOLID CARBIDE ENDMILLS
CORNER RADIUS

Corner Radius	Series	Helix	Flutes	HRC
	Regular	30°	Z = 4	Regular ⩽ 28

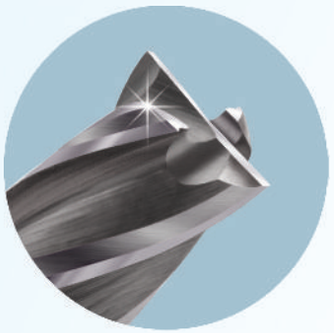
Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	R	h6	e8



ER B4

ITEM CODE	MILL DIA D	RADIUS R	SHANK DIA d	CEL l	OAL L
ER05 B4 030	3	0.5	3	10	39
ER10 B4 030	3	1.0	3	10	39
ER05 B4 040	4	0.5	4	14	51
ER10 B4 040	4	1.0	4	14	51
ER05 B4 050	5	0.5	5	16	51
ER10 B4 050	5	1.0	5	16	51
ER05 B4 060	6	0.5	6	19	64
ER10 B4 060	6	1	6	19	64
ER15 B4 060	6	1.5	6	19	64
ER05 B4 080	8	0.5	8	21	64
ER10 B4 080	8	1	8	21	64
ER20 B4 080	8	2	8	21	64
ER05 B4 100	10	0.5	10	25	70
ER10 B4 100	10	1	10	25	70
ER20 B4 100	10	2	10	25	70
ER25 B4 100	10	2.5	10	25	70
ER05 B4 120	12	0.5	12	25	76
ER10 B4 120	12	1	12	25	76
ER20 B4 120	12	2	12	25	76
ER30 B4 120	12	3	12	25	76
ER10 B4 160	16	1	16	32	89
ER20 B4 160	16	2	16	32	89
ER30 B4 160	16	3	16	32	89
ER10 B4 200	20	1	20	38	101
ER20 B4 200	20	2	20	38	101
ER30 B4 200	20	3	20	38	101

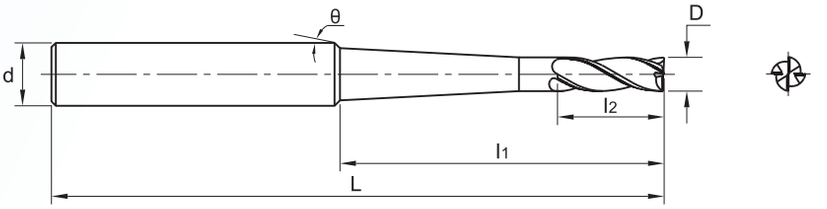
- ER B2 Series (2 Flutes) available on request
- B+ve Series available on request



SOLID CARBIDE TAPER NECK ENDMILLS
TN SERIES

Square End	Series	Series	Helix	Flutes
	Regular	B+ve	 30°	Z = 4

HRC	Coating	Shank Dia	Mill Dia
B+ve ⩽ 48	Tuff Coat	h6	e8



ESB4 TN

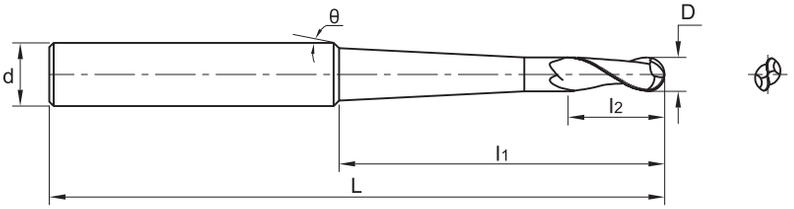
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l_2	RELIEVE LENGTH l_1	OAL L	ANGLE θ
ESB4 020 TN B+ve	Ø 2	Ø 4	4	23	60	3^0
ESB4 030 TN B+ve	Ø 3	Ø 6	6	35	75	3^0
ESB4 040 TN B+ve	Ø 4	Ø 6	8	27	75	3^0
ESB4 050 TN B+ve	Ø 5	Ø 8	10	49	100	2^0
ESB4 060 TN B+ve	Ø 6	Ø 8	12	51	100	1.5^0
ESB4 080 TN B+ve	Ø 8	Ø 10	14	53	100	1.5^0

- ESB2 Series (2 Flutes) available on request
- Non B+ve Series available on request

SOLID CARBIDE TAPER NECK ENDMILLS
TN SERIES

Ballnose	Series	Series	Helix	Flutes
	Regular	B+ve	 30°	Z = 2

HRC	Coating	Shank Dia	Mill Dia
B+ve ⩽ 48	Tuff Coat	h6	e8



EBB2 TN

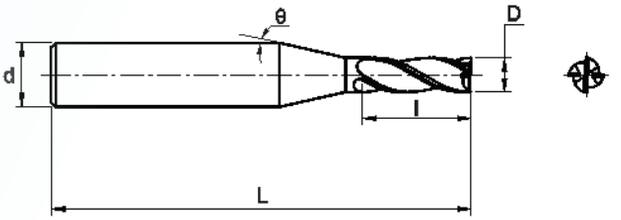
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l_2	RELIEVE LENGTH l_1	OAL L	ANGLE θ
EBB2 020 TN B+ve	Ø 2	Ø 4	4	23	60	2.5^0
EBB2 030 TN B+ve	Ø 3	Ø 6	6	40	75	2.5^0
EBB2 040 TN B+ve	Ø 4	Ø 6	8	37	75	2^0
EBB2 050 TN B+ve	Ø 5	Ø 8	10	49	100	2^0
EBB2 060 TN B+ve	Ø 6	Ø 8	12	51	100	1.5^0
EBB2 080 TN B+ve	Ø 8	Ø 10	14	53	100	1.5^0

- EBB4 Series (4 Flutes) available on request
- Non B+ve Series available on request

SOLID CARBIDE STUB TAPER NECK ENDMILLS
STN SERIES

Square End	Series	Series	Helix	Flutes
	Regular	B+ve	 30°	Z = 4

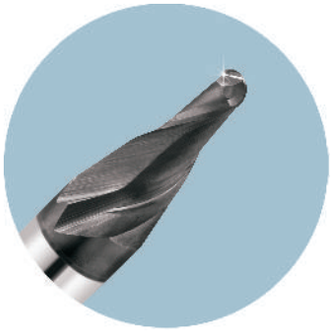
HRC	Coating	Tool Length	Shank Dia	Mill Dia
B+ve ⩽ 48	Duro Coat	S	h6	e8



ESB4 STN

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L	ANGLE θ
ESB4 020 STN	2	4	4	50	6^0
ESB4 030 STN	3	6	6	50	8.5^0
ESB4 040 STN	4	6	8	50	5^0
ESB4 050 STN	5	8	10	75	5^0
ESB4 060 STN	6	8	12	75	3^0

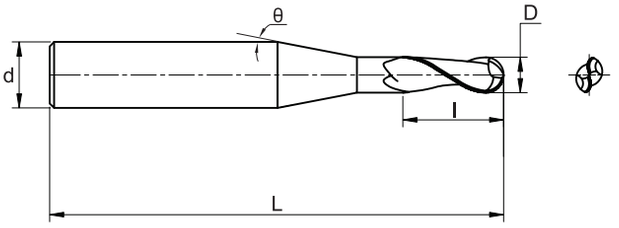
- ESB2 Series (2 Flutes) available on request
- B+ve Series available on request



SOLID CARBIDE STUB TAPER NECK ENDMILLS
STN SERIES

Ballnose	Series	Series	Helix	Flutes
	Regular	B+ve	30°	Z = 2

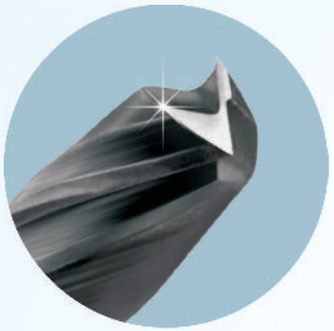
HRC	Coating	Tool Length	Shank Dia	Mill Dia
B+ve ⩽ 48	Duro Coat	S	h6	e8



EBB2 STN

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L	ANGLE θ
EBB2 020 STN	2	4	4	50	6^0
EBB2 030 STN	3	6	6	50	8.5^0
EBB2 040 STN	4	6	8	50	5^0
EBB2 050 STN	5	8	10	75	5^0
EBB2 060 STN	6	8	12	75	3^0

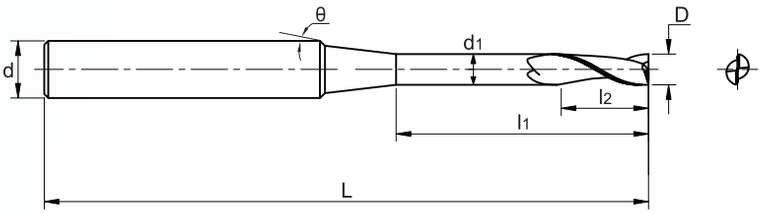
- EBB4 Series (4 Flutes) available on request
- B+ve Series available on request



SOLID CARBIDE LONG NECK ENDMILLS
LN SERIES

Square End	Series	Series	Helix	Flutes	HRC
	Regular	B+ve	 30°	Z = 2	B+ve ⩽ 48

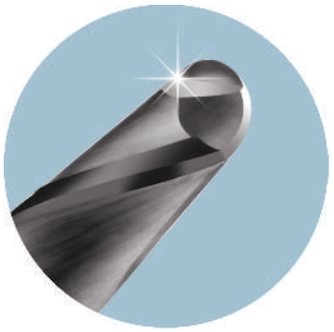
Coating	Tool Length	Tool Length	Tool Length	Shank Dia	Mill Dia
Duro Coat	R	L	X	h6	e8



ESB2 LN

ITEM CODE	MILL DIA D	RELIEVE LENGTH l_1	RELIEVE DIA d_1	SHANK DIA d	CEL l_2	OAL L	ANGLE θ
ESB2 010 LN R	1.0	6	0.95	4	2	45	15^0
ESB2 010 LN L	1.0	10	0.95	4	2	45	15^0
ESB2 010 LN X	1.0	14	0.95	4	2	50	15^0
ESB2 015 LN R	1.5	8	1.45	4	3	45	15^0
ESB2 015 LN L	1.5	12	1.45	4	3	45	15^0
ESB2 015 LN X	1.5	16	1.45	4	3	50	15^0
ESB2 020 LN R	2.0	12	1.95	4	4	45	10^0
ESB2 020 LN L	2.0	16	1.95	4	4	50	10^0
ESB2 020 LN X	2.0	20	1.95	4	4	55	10^0
ESB2 030 LN R	3.0	16	2.90	6	5	55	10^0
ESB2 030 LN L	3.0	20	2.90	6	5	60	10^0
ESB2 030 LN X	3.0	25	2.90	6	5	64	10^0

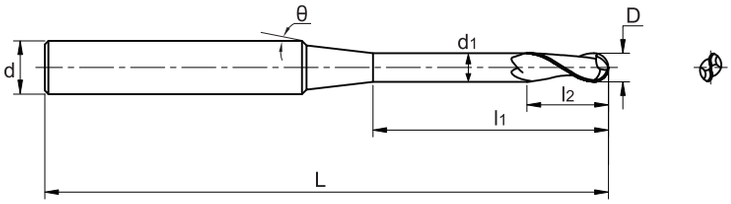
- ESB4 Series (4 Flutes) available on request
- B+ve Series available on request



SOLID CARBIDE LONG NECK ENDMILLS
LN SERIES

Ballnose	Series	Series	Helix	Flutes	HRC
	Regular	B+ve	 30°	Z = 2	B+ve ⩽ 48

Coating	Tool Length	Tool Length	Tool Length	Shank Dia	Mill Dia
Duro Coat	R	L	X	h6	e8



EBB2 LN

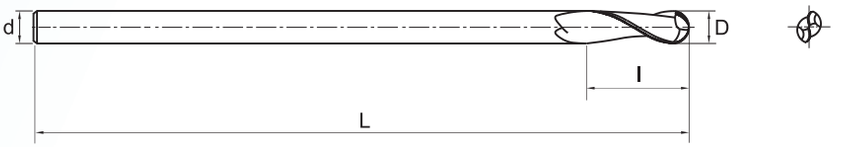
ITEM CODE	MILL DIA D	RELIEVE LENGTH l_1	RELIEVE DIA d_1	SHANK DIA d	CEL l_2	OAL L	ANGLE θ
EBB2 010 LN R	1.0	6	0.95	4	2	45	15^0
EBB2 010 LN L	1.0	10	0.95	4	2	45	15^0
EBB2 010 LN X	1.0	14	0.95	4	2	50	15^0
EBB2 015 LN R	1.5	8	1.45	4	3	45	15^0
EBB2 015 LN L	1.5	12	1.45	4	3	45	15^0
EBB2 015 LN X	1.5	16	1.45	4	3	50	15^0
EBB2 020 LN R	2.0	12	1.95	4	4	45	10^0
EBB2 020 LN L	2.0	16	1.95	4	4	50	10^0
EBB2 020 LN X	2.0	20	1.95	4	4	55	10^0
EBB2 030 LN R	3.0	16	2.90	6	5	55	10^0
EBB2 030 LN L	3.0	20	2.90	6	5	60	10^0
EBB2 030 LN X	3.0	25	2.90	6	5	64	10^0

- EBB4 Series (4 Flutes) available on request
- B+ve Series available on request

SOLID CARBIDE SHORT FLUTE LONG REACH ENDMILLS

Ballnose	Series	Series	Helix	Flutes
	Regular	B+ve	30°	Z = 2

HRC	Coating	Shank Dia	Mill Dia
B+ve ≤ 48	Duro Coat	h6	e8



EBB2S L

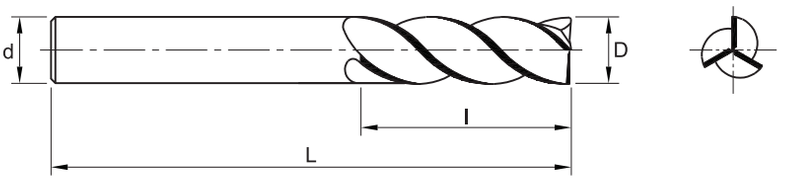
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
EBB2S 060 L	6	6	12	100
EBB2S 080 L	8	8	14	100
EBB2S 100 L	10	10	18	100
EBB2S 120 L	12	12	22	150

- EBB4 Series (4 Flutes) available on request
- B+ve Series available on request

SOLID CARBIDE ENDMILLS
NF SERIES - REGULAR

Square End	Series	Helix	Flutes
	NF	45°	Z = 3

Coating	Tool Length	Shank Dia	Mill Dia
Ultra Coat	R	h6	e8



ESC3 R

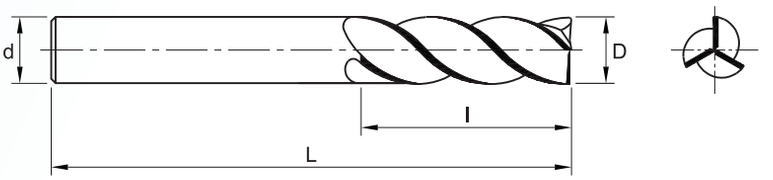
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESC3 030 R NF	3	3	9	50
ESC3 040 R NF	4	4	12	50
ESC3 050 R NF	5	5	15	50
ESC3 060 R NF	6	6	18	50
ESC3 080 R NF	8	8	20	60
ESC3 100 R NF	10	10	25	70
ESC3 120 R NF	12	12	25	75
ESC3 160 R NF	16	16	32	80
ESC3 200 R NF	20	20	45	100

• Coating available on request

SOLID CARBIDE ENDMILLS
NF SERIES - LONG

Square End	Series	Helix	Flutes
	NF	 45°	Z = 3

Coating	Tool Length	Shank Dia	Mill Dia
Ultra Coat	L	h6	e8

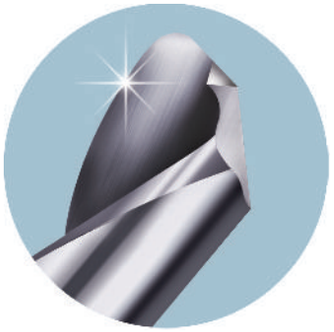


ESC3 L

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESC3 030 L NF	3	3	12	60
ESC3 040 L NF	4	4	16	60
ESC3 050 L NF	5	5	20	60
ESC3 060 L NF	6	6	25	75
ESC3 080 L NF	8	8	32	75
ESC3 100 L NF	10	10	45	100
ESC3 120 L NF	12	12	45	100
ESC3 160 L NF	16	16	65	150
ESC3 200 L NF	20	20	75	150

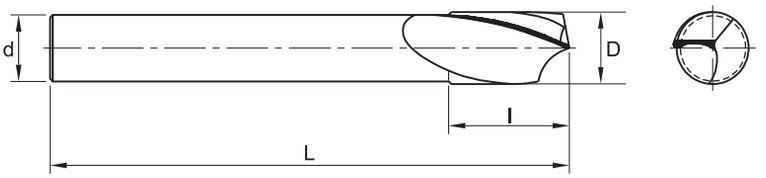
• Coating available on request

SOLID CARBIDE SINGLE LIP TOOL



Corner Radius	Series	Helix	Flutes	HRC
	NF	 30°	Z = 1	Regular ⩽ 28

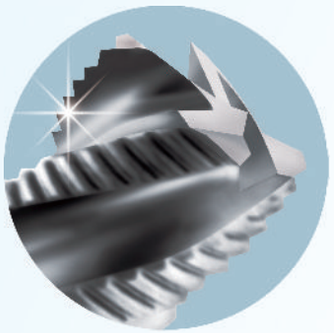
Coating	Tool Length	Tool Length	Shank Dia	Mill Dia
Ultra Coat	R	L	h6	e8



ESB1

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESB1 0306 L NF	3	6	4	50
ESB1 0406 L NF	4	6	6	60
ESB1 0506 L NF	5	6	8	60
ESB1 0606 L NF	6	6	9	75
ESB1 0706 L NF	7	6	10	75
ESB1 0908 L NF	9	8	12	75
ESB1 1110 R NF	11	10	14	75
ESB1 1110 L NF	11	10	14	100
ESB1 1312 R NF	13	12	16	75
ESB1 1312 L NF	13	12	16	100
ESB1 1514 R NF	15	14	18	75
ESB1 1514 L NF	15	14	18	100
ESB1 1716 R NF	17	16	20	75
ESB1 1716 L NF	17	16	20	100

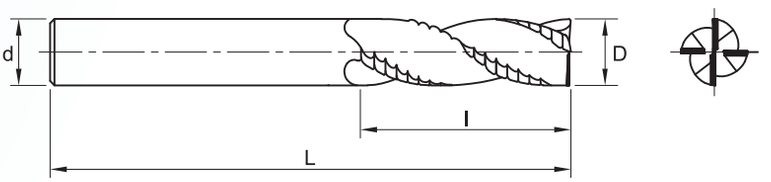
- Coating available on request



SOLID CARBIDE ROUGHER
REGULAR SERIES

Chamfer	Series	Series	Series	Helix	Flutes
	Regular	B+ve	HM	38°	Z = 4

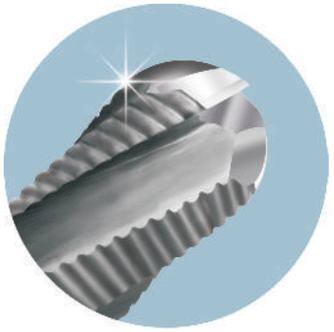
HRC	Coating	Tool Length	Shank Dia	Mill Dia
HM ≤ 48	Duro Coat	R	h6	e8



FSC4 R

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
FSC4 050 R	5	5	16	51
FSC4 060 R	6	6	19	64
FSC4 080 R	8	8	21	64
FSC4 100 R	10	10	25	70
FSC4 120 R	12	12	25	76
FSC4 140 R	14	14	30	89
FSC4 160 R	16	16	32	89
FSC4 180 R	18	18	35	101
FSC4 200 R	20	20	38	101

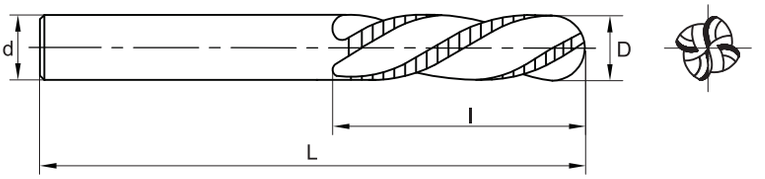
• B+ve Series available on request



SOLID CARBIDE BALLNOSE ROUGHER
REGULAR SERIES

Ballnose	Series	Series	Series	Helix	Flutes
	Regular	B+ve	HM	 20°	Z = 4

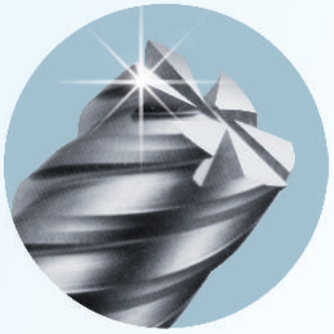
HRC	Coating	Tool Length	Shank Dia	Mill Dia
HM ≤ 48	Duro Coat	R	h6	e8



FBB4 R

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
FBB4 050 R	5	5	16	51
FBB4 060 R	6	6	19	64
FBB4 080 R	8	8	21	64
FBB4 100 R	10	10	25	70
FBB4 120 R	12	12	25	76
FBB4 140 R	14	14	30	89
FBB4 160 R	16	16	32	89
FBB4 180 R	18	18	35	101
FBB4 200 R	20	20	38	101

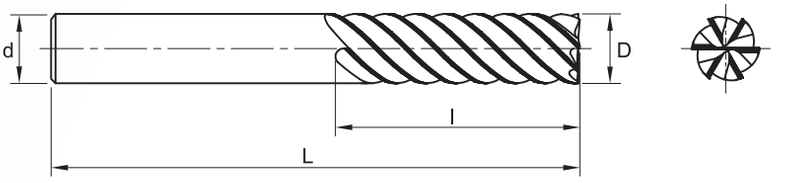
• B+ve Series available on request



SOLID CARBIDE FINISHER ENDMILLS

Chamfer	Series	Series	Helix	Flutes
	Regular	B+ve	 55°	Z = 6

HRC	Coating	Tool Length	Shank Dia	Mill Dia
HM ⩽ 48	Duro Coat	R	h6	e8



ESD6 R

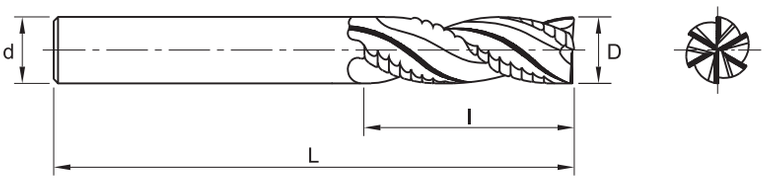
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
ESD6 080 R	8	8	21	64
ESD6 100 R	10	10	25	70
ESD6 120 R	12	12	25	76
ESD6 160 R	16	16	32	89
ESD6 200 R	20	20	38	102

• B+ve Series available on request

SOLID CARBIDE COMBO MILL

Chamfer	Series	Series	Helix	Flutes
	Regular	B+ve	 35°	Z = 6

HRC	Coating	Tool Length	Shank Dia	Mill Dia
HM ⩽ 60	Tuff Coat	R	h6	e8

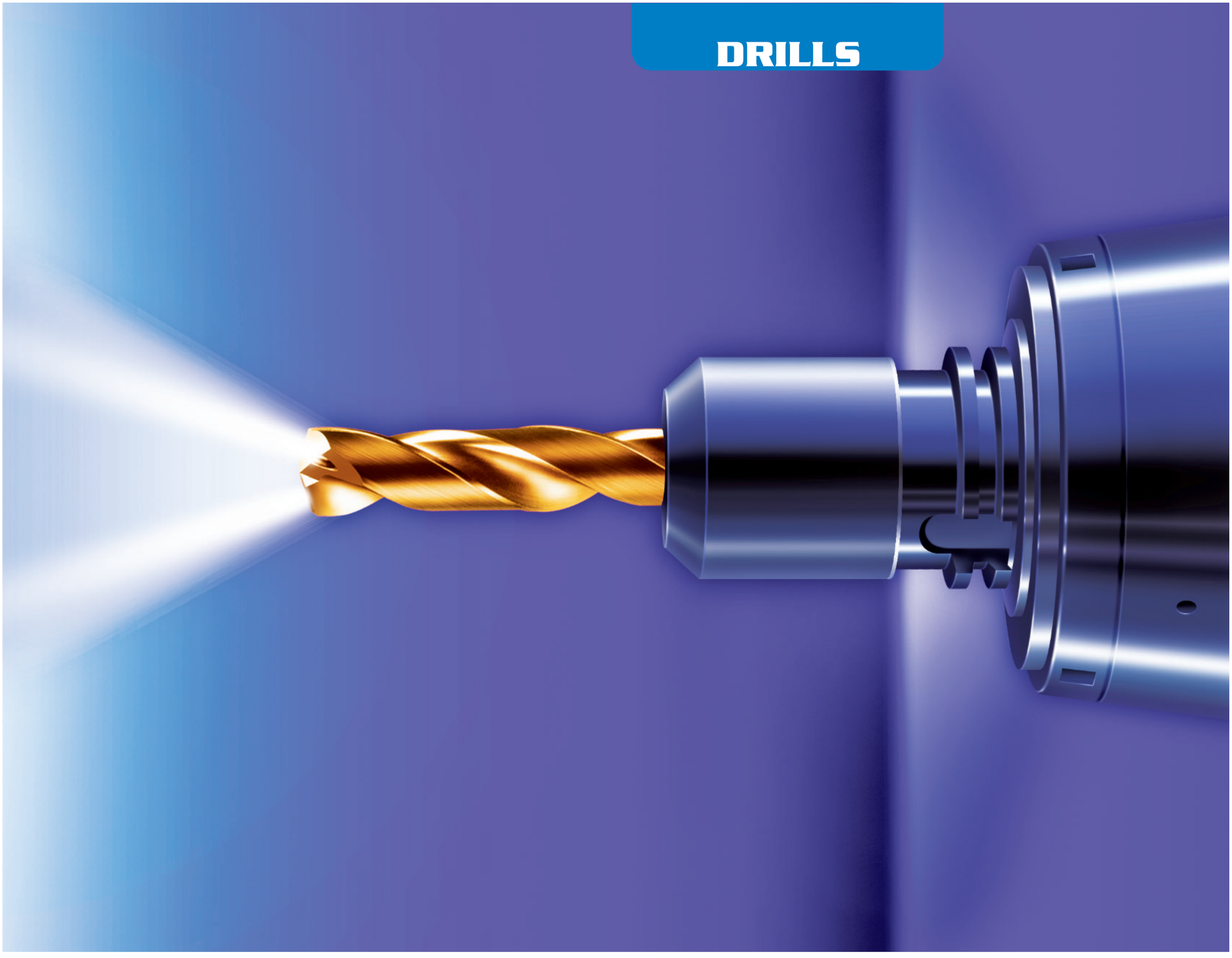


EFC6

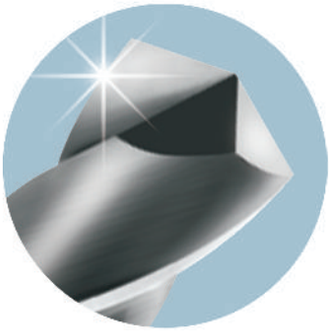
ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
EFC6 080	8	8	21	64
EFC6 100	10	10	25	70
EFC6 120	12	12	25	76
EFC6 140	14	14	30	89
EFC6 160	16	16	32	89
EFC6 180	18	18	35	101
EFC6 200	20	20	38	101

• B+ve Series available on request

DRILLS

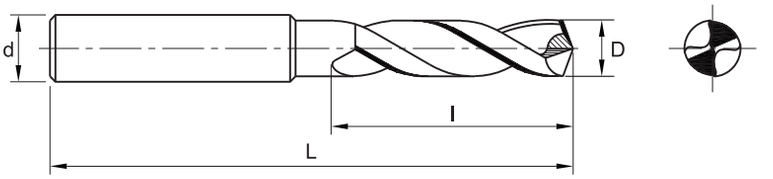


SOLID CARBIDE HIGH PERFORMANCE DRILLS



140°	Helix	HRC	Coating
	 30°	B+ve ⩽ 48	Duro Coat

L x D	Shank Dia	Drill Dia	Standard
3	h6	m7	DIN 6537

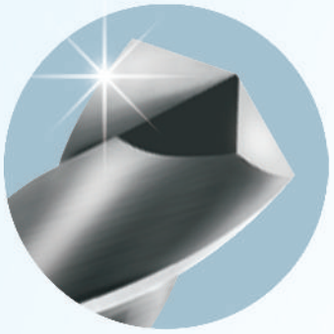


DYB3

ITEM CODE	DRILL DIA D	SHANK DIA d	FL l	OAL L
DYB3 015 ~ 019	Ø 1.5 ~ 1.9	4	9	58
DYB3 020 ~ 023	Ø 2.0 ~ 2.3	4	13	58
DYB3 024 ~ 029	Ø 2.4 ~ 2.9	4	17	58
DYB3 030 ~ 037	Ø 3.0 ~ 3.7	6	20	62
DYB3 038 ~ 047	Ø 3.8 ~ 4.7	6	24	66
DYB3 048 ~ 060	Ø 4.8 ~ 6.0	6	28	66
DYB3 061 ~ 070	Ø 6.1 ~ 7.0	8	34	79
DYB3 071 ~ 080	Ø 7.1 ~ 8.0	8	41	79
DYB3 081 ~ 090	Ø 8.1 ~ 9.0	10	47	89
DYB3 091 ~ 100	Ø 9.1 ~ 10.0	10	47	89
DYB3 101 ~ 110	Ø 10.1 ~ 11.0	12	55	102
DYB3 111 ~ 120	Ø 11.1 ~ 12.0	12	55	102
DYB3 121 ~ 140	Ø 12.1 ~ 14.0	14	60	107
DYB3 141 ~ 160	Ø 14.1 ~ 16.0	16	65	115
DYB3 161 ~ 180	Ø 16.1 ~ 18.0	18	73	123
DYB3 181 ~ 200	Ø 18.1 ~ 20.0	20	79	131

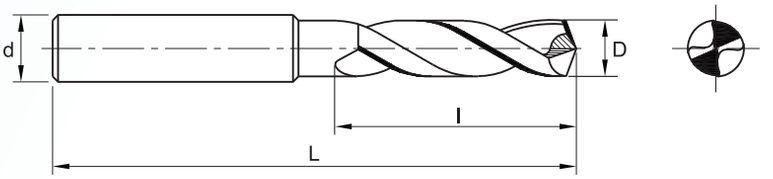
- Every intermediate decimal size drill readily available in stock
- For HRC >60, use Tuff Coat
- Ordering Code for Dia 6.8 mm 3xD Drill: DYB3 068

SOLID CARBIDE HIGH PERFORMANCE DRILLS



140°	Helix	HRC	Coating
	 30°	B+ve ⩽ 48	Duro Coat

L x D	Shank Dia	Drill Dia	Standard
5	h6	m7	DIN 6537



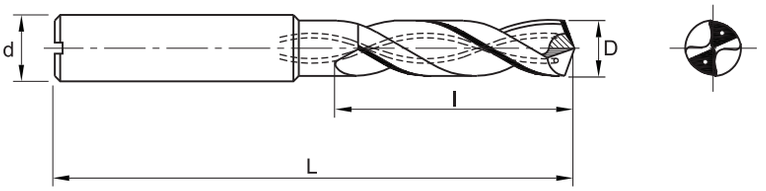
DYB5

ITEM CODE	DRILL DIA D	SHANK DIA d	FL l	OAL L
DYB5 030 ~ 037	Ø 3.0 ~ 3.7	6	28	66
DYB5 038 ~ 047	Ø 3.8 ~ 4.7	6	36	74
DYB5 048 ~ 060	Ø 4.8 ~ 6.0	6	44	82
DYB5 061 ~ 070	Ø 6.1 ~ 7.0	8	53	91
DYB5 071 ~ 080	Ø 7.1 ~ 8.0	8	53	91
DYB5 081 ~ 090	Ø 8.1 ~ 9.0	10	61	103
DYB5 091 ~ 100	Ø 9.1 ~ 10.0	10	61	103
DYB5 101 ~ 110	Ø 10.1 ~ 11.0	12	71	118
DYB5 111 ~ 120	Ø 11.1 ~ 12.0	12	71	118
DYB5 121 ~ 140	Ø 12.1 ~ 14.0	14	77	124
DYB5 141 ~ 160	Ø 14.1 ~ 16.0	16	83	133
DYB5 161 ~ 180	Ø 16.1 ~ 18.0	18	93	143
DYB5 181 ~ 200	Ø 18.1 ~ 20.0	20	101	153

- Every intermediate decimal size drill readily available in stock
- For HRC >60, use Tuff Coat
- Ordering Code for Dia 6.8 mm 5xD Drill: DYB5 068

SOLID CARBIDE THROUGH COOLANT HIGH PERFORMANCE DRILLS

140°	Helix	HRC	Coating
	 30°	HM ⩽ 60	Hiper Coat
L x D	**Shank Dia**	**Drill Dia**	**Standard**
3	h6	m7	DIN 6537



DYB3 TC

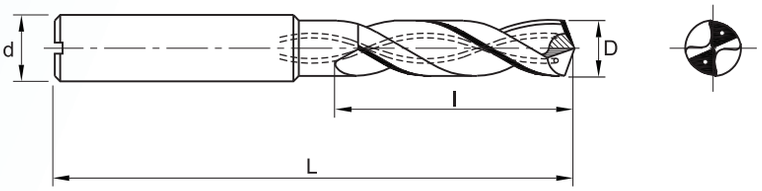
ITEM CODE	DRILL DIA D	SHANK DIA d	FL l	OAL L
DYB3 038 ~ 047 TC	Ø 3.8 ~ 4.7	6	24	66
DYB3 048 ~ 060 TC	Ø 4.8 ~ 6.0	6	28	66
DYB3 061 ~ 070 TC	Ø 6.1 ~ 7.0	8	34	79
DYB3 071 ~ 080 TC	Ø 7.1 ~ 8.0	8	41	79
DYB3 081 ~ 090 TC	Ø 8.1 ~ 9.0	10	47	89
DYB3 091 ~ 100 TC	Ø 9.1 ~ 10.0	10	47	89
DYB3 101 ~ 110 TC	Ø 10.1 ~ 11.0	12	55	102
DYB3 111 ~ 120 TC	Ø 11.1 ~ 12.0	12	55	102
DYB3 121 ~ 140 TC	Ø 12.1 ~ 14.0	14	60	107
DYB3 141 ~ 160 TC	Ø 14.1 ~ 16.0	16	65	115
DYB3 161 ~ 180 TC	Ø 16.1 ~ 18.0	18	73	123
DYB3 181 ~ 200 TC	Ø 18.1 ~ 20.0	20	79	131

- Every intermediate decimal size drill readily available in stock
- Ordering Code for Dia 6.8 mm 3xD Through Coolant Drill: DYB3 068 TC

SOLID CARBIDE THROUGH COOLANT HIGH PERFORMANCE DRILLS

140°	Helix	HRC	Coating
	 30°	HM ⩽ 60	Hiper Coat

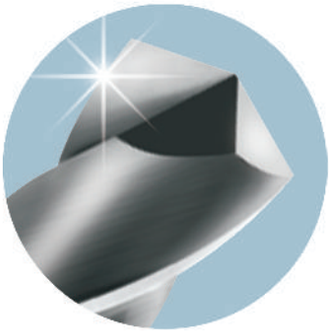
L x D	Shank Dia	Drill Dia	Standard
5	h6	m7	DIN 6537



DYB5 TC

ITEM CODE	DRILL DIA D	SHANK DIA d	FL l	OAL L
DYB5 038 ~ 047 TC	Ø 3.8 ~ 4.7	6	36	74
DYB5 048 ~ 060 TC	Ø 4.8 ~ 6.0	6	44	82
DYB5 061 ~ 070 TC	Ø 6.1 ~ 7.0	8	53	91
DYB5 071 ~ 080 TC	Ø 7.1 ~ 8.0	8	53	91
DYB5 081 ~ 090 TC	Ø 8.1 ~ 9.0	10	61	103
DYB5 091 ~ 100 TC	Ø 9.1 ~ 10.0	10	61	103
DYB5 101 ~ 110 TC	Ø 10.1 ~ 11.0	12	71	118
DYB5 111 ~ 120 TC	Ø 11.1 ~ 12.0	12	71	118
DYB5 121 ~ 140 TC	Ø 12.1 ~ 14.0	14	77	124
DYB5 141 ~ 160 TC	Ø 14.1 ~ 16.0	16	83	133
DYB5 161 ~ 180 TC	Ø 16.1 ~ 18.0	18	93	143
DYB5 181 ~ 200 TC	Ø 18.1 ~ 20.0	20	101	153

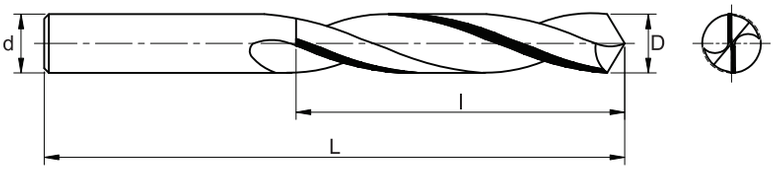
- Every intermediate decimal size drill readily available in stock
- Ordering Code for Dia 6.8 mm 5xD Through Coolant Drill: DYB5 068 TC



SOLID CARBIDE HIGH PERFORMANCE STUB DRILLS

140°	Helix	HRC	Coating
	 30°	B+ve ⩽ 48	Duro Coat

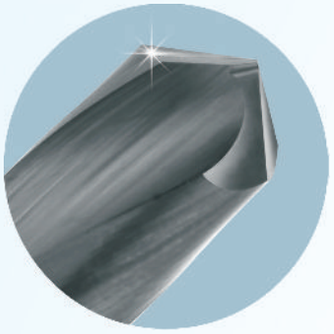
L x D	Shank Dia	Drill Dia
S	h6	m7



DYBS

ITEM CODE	DRILL DIA D	SHANK DIA d	FL l	OAL L
DYBS 030	3	3	16	46
DYBS 033	3.3	3.3	18	49
DYBS 035	3.5	3.5	20	52
DYBS 040	4	4	22	55
DYBS 045	4.5	4.5	24	58
DYBS 050	5	5	24	62
DYBS 060	6	6	28	64
DYBS 065	6.5	6.5	31	70
DYBS 068	6.8	6.8	34	74
DYBS 070	7	7	34	74
DYBS 080	8	8	37	79
DYBS 085	8.5	8.5	37	79
DYBS 090	9	9	40	80
DYBS 095	9.5	9.5	40	80
DYBS 100	10	10	43	82
DYBS 102	10.2	10.2	43	82
DYBS 105	10.5	10.5	43	82
DYBS 110	11	11	55	102
DYBS 120	12	12	55	102
DYBS 125	12.5	12.5	60	107
DYBS 130	13	13	60	107
DYBS 140	14	14	60	107

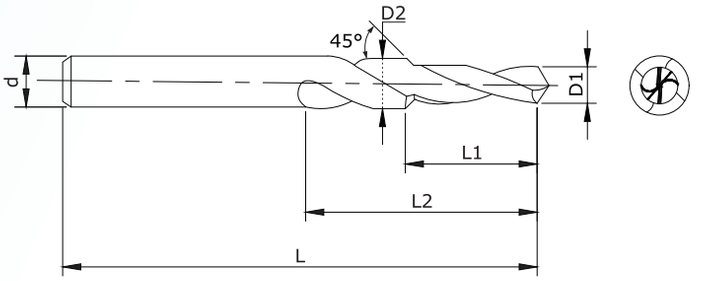
- Every intermediate decimal size drill readily available in stock
- For HRC >60, use Tuff Coat
- Ordering Code for Dia 6.8 mm Stub Drill: DYBS 068



SOLID CARBIDE HIGH PERFORMANCE STEP DRILLS

140°	Helix	HRC	Coating
	 30°	B+ve ⩽ 48	Duro Coat

L x D	Shank Dia	Drill Dia
2 & 3	h6	m7



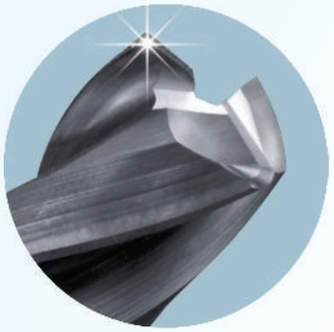
LxD 2

ITEM CODE	THREAD	DRILL DIA D1	DRILL DIA D2	SHANK DIA d	FL L1	FL L2	OAL L	CHAMFER
SD2 042 060	M5	4.2	6.0	6.0	12.5	25.0	66	45°
SD2 051 080	M6	5.1	8.0	8.0	14.5	30.0	79	45°
SD2 068 100	M8	6.8	10.0	10.0	16.5	32.0	89	45°
SD2 086 120	M10	8.6	12.0	12.0	20.5	35.0	102	45°
SD2 102 140	M12	10.2	14.0	14.0	22.5	40.0	107	45°
SD2 120 160	M14	12.0	16.0	16.0	26.5	45.0	115	45°
SD2 140 180	M16	14.0	18.0	18.0	30.5	50.0	123	45°

LxD 3

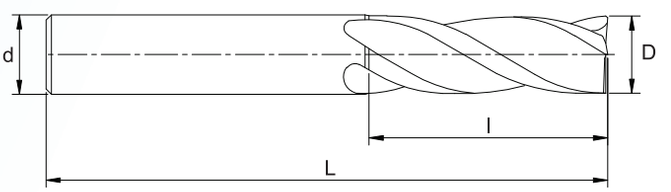
ITEM CODE	THREAD	DRILL DIA D1	DRILL DIA D2	SHANK DIA d	FL L1	FL L2	OAL L	CHAMFER
SD3 042 060	M5	4.2	6.0	6.0	16.5	30.0	66	45°
SD3 051 080	M6	5.1	8.0	8.0	20.5	40.0	79	45°
SD3 068 100	M8	6.8	10.0	10.0	23.5	45.0	89	45°
SD3 086 120	M10	8.6	12.0	12.0	29.5	55.0	102	45°
SD3 102 140	M12	10.2	14.0	14.0	35.5	65.0	107	45°
SD3 120 160	M14	12.0	16.0	16.0	40.5	70.0	115	45°
SD3 140 180	M16	14.0	18.0	18.0	45.5	75.0	123	45°

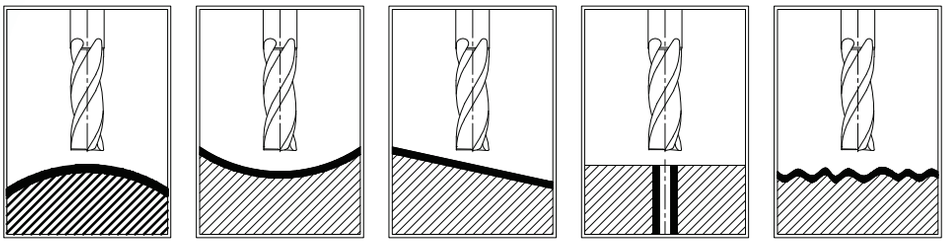
SOLID CARBIDE HOLE MILL



Square End	Series	Helix	Flutes	HRC
	Regular	30°	Z = 3	B+ve ⩽ 48

Coating	Tool Length	Shank Dia	Drill Dia
Duro Coat	R	h6	m7



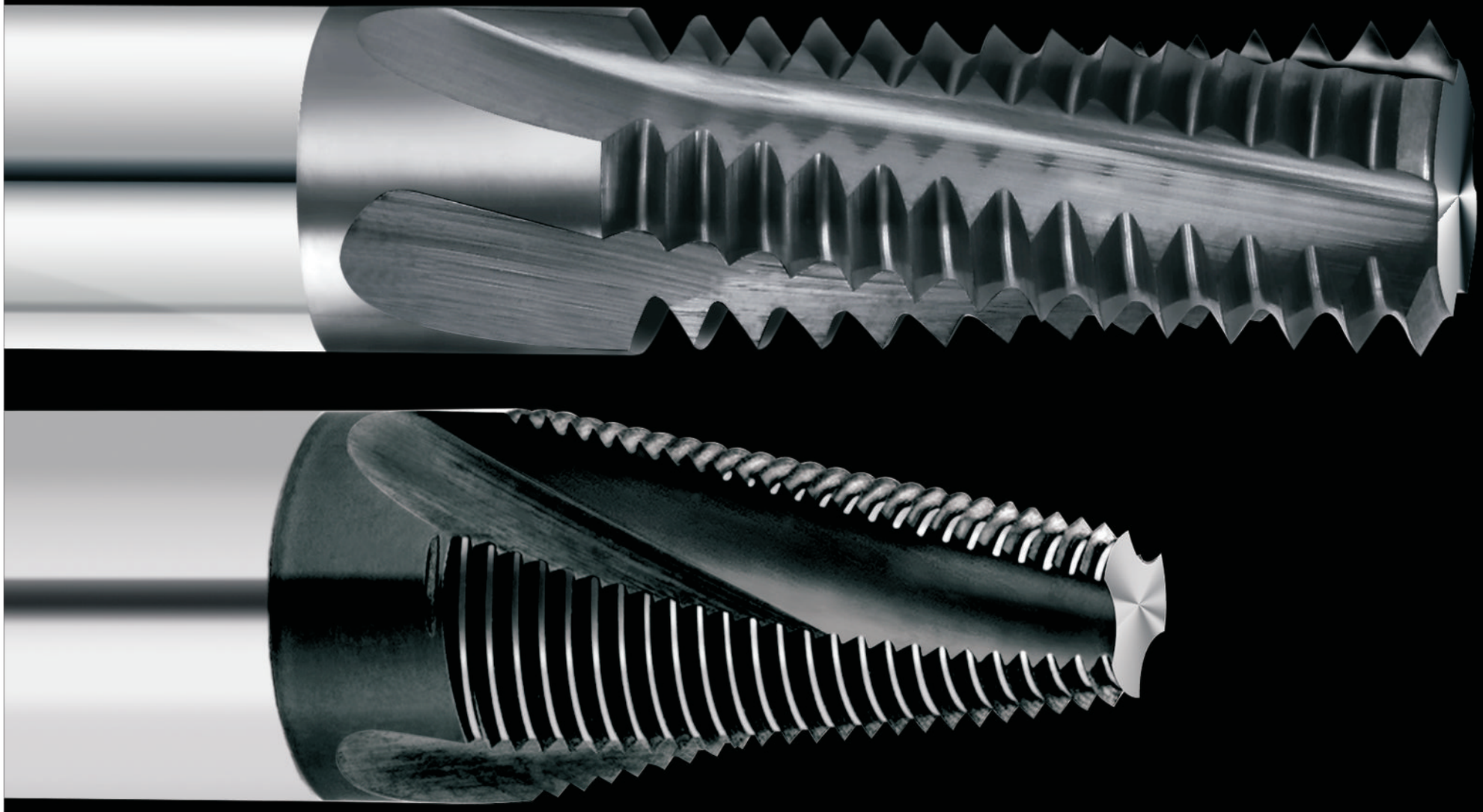


HM3

ITEM CODE	DRILL DIA D	SHANK DIA d	FL l	OAL L
HM3 030	3	6	14	62
HM3 040	4	6	17	62
HM3 050	5	6	20	62
HM3 060	6	6	20	62
HM3 070	7	8	24	75
HM3 080	8	8	29	75
HM3 085	8.5	10	35	80
HM3 100	10	10	35	80
HM3 105	10.5	12	40	102
HM3 120	12	12	40	102
HM3 125	12.5	14	43	107
HM3 140	14	14	43	107
HM3 145	14.5	16	45	110
HM3 160	16	16	45	110

- Intermediate size Hole Mill available on request
- For HRC >60, use Tuff Coat

THREAD MILLS



NOMENCLATURE FOR SOLID CARBIDE THREADMILL

TM	I	08	125	3	H	I	080	065	R	-	ISO
1	2	3	4	5	6	7	8	9	10		11

1. TOOL TYPE

Threadmill

2. COOLANT TYPE

I = Internal Coolant

E = External Coolant

3. STD THREAD

M3	M6
M4	M8
M5	M10

* Only for ISO

4. PITCH

Full Profile - Pitch Range	
mm	tpi
0.25 - 6.0	80 - 4.5

Partial Profile - Pitch Range		
	mm	tpi
TA	0.5 - 0.8	32 - 56
TB	0.5 - 1.0	24 - 56
TC	1.0 - 1.50	16 - 24
TD	1.0 - 1.75	14 - 24
TF	0.5 - 1.25	20 - 48

5. FLUTES

2 = Two Flute

3 = Three Flute

5 = Five Flute

6. HELIX

H = Helical

S = Straight

7. TYPE OF TOOL

I = Internal

E = External

I = Internal

8. SHANK DIA

060 = 6.00 mm

080 = 8.00 mm

100 = 10.0 mm

9. CUTTING DIAMETER

048 = 4.80 mm

065 = 6.50 mm

082 = 8.20 mm

10. OVERALL LENGTH

S = Stub

R = Regular

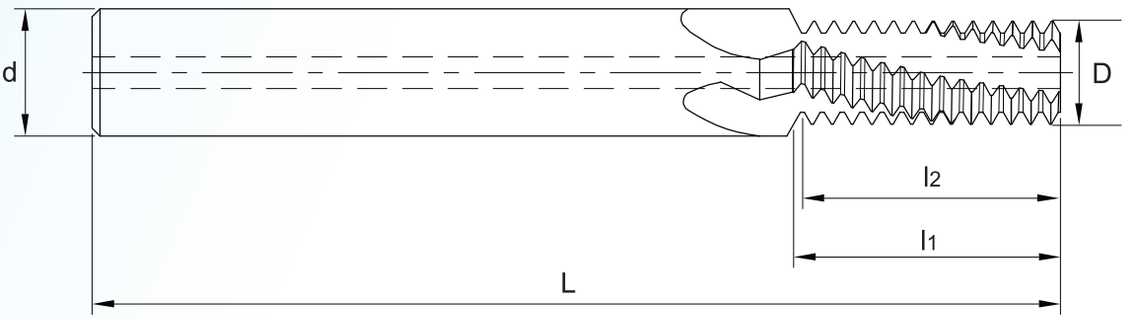
11. THREAD TYPE

ISO = ISO Metric	T55 = Taper 55°	BSPT = BSPT
UN = American UN	NPT = NPT	T60 = Taper 60°
BSP = BSP	NPTF = NPTF	BSW = BSW

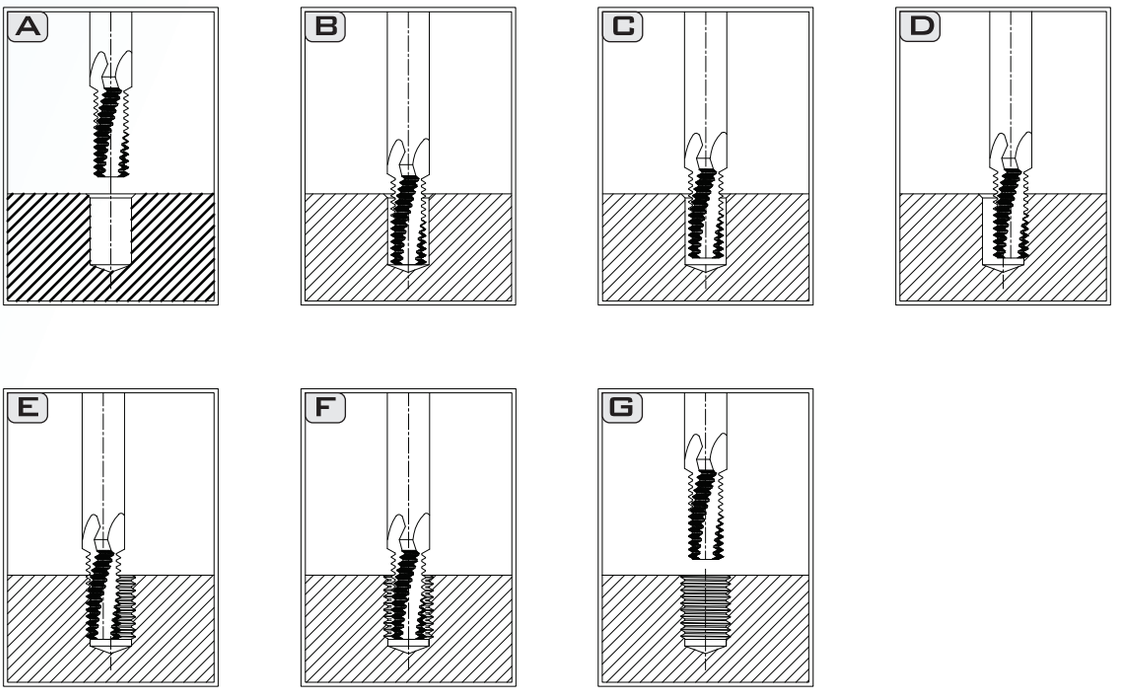
THREAD MILL APPLICATION

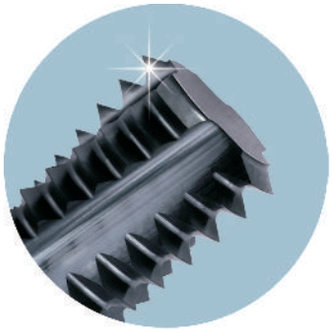
WORK SEQUENCE

A	Approach
B	Drilling and chamfering
C	Withdraw
D	Radial setting to nominal thread diameter through entry loop
E	Forward feed by pitch with simultaneous interpolation of tool around the central thread axis threading cycle
F	Radial movement back to the bore centre through exit loop
G	Exit bore



CALCULATION OF ACTUAL DIAMETER

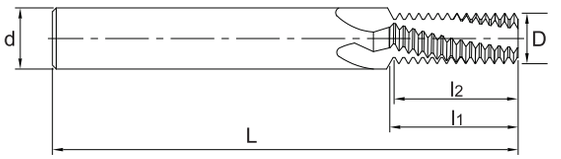




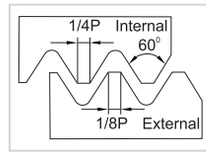
HELICAL INTERNAL COOLANT THREAD MILLS
STUB SERIES

Series	Flutes	Flutes	Helix
B+ve	Z = 3	Z = 4	14°

HRC	Coating	Shank Dia	Tool Length
B+ve ⩽ 48	Tuff Coat	h6	S



Internal



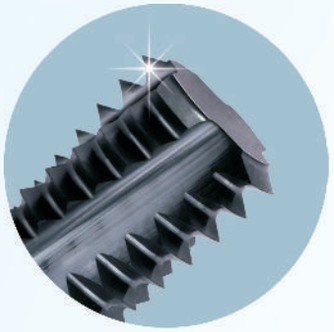
Defined by: R262 (DIN 13)
Tolerance class: 6H

THREAD MILLS

ISO METRIC

ITEM CODE	Thread		Pitch	Dimensions (mm)					No. of Flutes	Drill Dia
Internal	M Coarse	M Fine	mm	d	D	l_2	l_1	L	z	mm
TMI/E.03.050.3HI.040024.S-ISO	M3 x 0.5	M3.5- M16 x 0.5	0.5	4	2.4	4.5	4.7	45	3	2.5
TMI/E.04.070.3HI.040314.S-ISO	M4 x 0.7		0.7	4	3.14	6.3	6.6	45	3	3.3
TMI/E.05.080.3HI.040039.S-ISO	M5 x 0.8		0.8	4	3.9	7.2	7.6	45	3	4.2
TMI/E.06.100.3HI.060048.S-ISO	M6 x 1.0	M8- M40 x 1.0	1.0	6	4.8	9.0	9.5	57	3	5.0
TMI/E.08.125.3HI.080065.S-ISO	M8 x 1.25		1.25	8	6.5	12.5	13.1	61	3	6.8
TMI/E.10.150.3HI.100082.S-ISO	M10 x 1.5	M12- M48 x 1.5	1.5	10	8.2	15.0	15.7	73	3	8.5
TMI/E.12.175.4HI.100099.S-ISO	M12 x 1.75		1.75	10	9.9	17.5	18.4	73	4	10.2
TMI/E.14.200.4HI.120116.S-ISO	M14 x 2.0	M17- M80 x 2.0	2.0	12	11.6	20.0	21.0	73	4	12.0
TMI/E.16.200.4HI.140136.S-ISO	M16 x 2.0	M17- M80 x 2.1	2.0	14	13.6	24.0	25.0	92	4	14.0

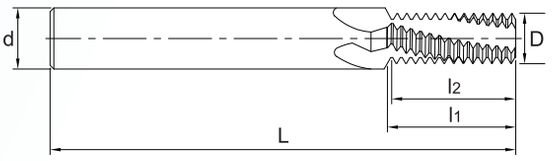
- For HRC >60, use Tuff Coat
- For Through Coolant Threadmill, Item Code will be TMI
- For Non-Through Coolant Threadmill, Item Code will be TME



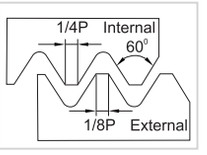
HELICAL INTERNAL COOLANT THREAD MILLS REGULAR SERIES

Series	Flutes	Flutes	Helix
B+ve	Z = 3	Z = 4	14°

HRC	Coating	Shank Dia	Tool Length
B+ve ⩽ 48	Tuff Coat	h6	R



Internal

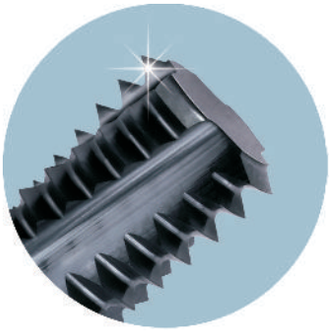


Defined by: R262 (DIN 13)
Tolerance class: 6H

ISO METRIC

ITEM CODE	Thread		Pitch	Dimensions (mm)					No. of Flutes	Drill Dia
Internal	M Coarse	M Fine	mm	d	D	l_2	l_1	L	z	mm
TMI/E.03.050.3HI.040024.R-ISO	M3x0.5	M3.5-M16x0.5	0.5	4	2.4	6.0	6.2	45	3	2.5
TMI/E.04.050.3HI.040032.R-ISO		M4x0.5	0.5	4	3.2	8.0	8.2	45	3	3.5
TMI/E.05.050.3HI.060042.R-ISO		M5x0.5	0.5	6	4.2	10.0	10.2	57	3	4.5
TMI/E.04.070.3HI.040031.R-ISO	M4x0.7		0.7	4	3.15	8.4	8.7	45	3	3.3
TMI/E.06.075.3HI.060050.R-ISO		M6x0.75	0.75	6	5.0	12.0	12.4	57	3	5.3
TMI/E.05.080.3HI.040039.R-ISO	M5x0.8		0.8	4	3.9	10.4	10.8	45	3	4.2
TMI/E.06.100.3HI.060048.R-ISO	M6x1.0	M8-M40x1.0	1.0	6	4.8	12.0	12.5	57	3	5.0
TMI/E.08.100.3HI.080067.R-ISO		M8x1.0	1.0	8	6.7	16.0	16.5	61	3	7.0
TMI/E.10.100.3HI.100087.R-ISO		M10x1.0	1.0	10	8.7	20.0	20.5	73	3	9.0
TMI/E.12.100.4HI.120107.R-ISO		M12x1.0	1.0	12	10.7	24.0	24.5	73	4	11.0
TMI/E.08.125.3HI.080065.R-ISO	M8x1.25		1.25	8	6.5	16.2	16.9	61	3	6.8
TMI/E.10.125.3HI.100085.R-ISO		M10x1.25	1.25	10	8.5	20.0	20.6	73	3	8.8
TMI/E.10.150.3HI.100082.R-ISO	M10x1.5	M12-M48x1.5	1.5	10	8.2	19.5	20.2	73	3	8.5
TMI/E.12.150.4HI.100099.R-ISO		M12x1.5	1.5	10	9.9	24.0	24.7	73	4	10.5
TMI/E.14.150.4HI.120119.R-ISO		M14x1.5	1.5	12	11.9	28.5	29.2	80	4	12.5
TMI/E.16.150.4HI.140139.R-ISO		M16x1.5	1.5	14	13.9	31.5	32.2	92	4	14.5
TMI/E.12.175.4HI.100099.R-ISO	M12x1.75		1.75	10	9.9	24.5	25.4	73	4	10.2
TMI/E.14.200.4HI.120116.R-ISO	M14x2.0	M17-M80x2.0	2.0	12	11.6	28.0	29.0	80	4	12.0
TMI/E.16.200.4HI.140136.R-ISO	M16x2.0	M17-M80x2.0	2.0	14	13.6	32.0	33.0	92	4	14.0
TMI/E.18.250.4HI.160148.R-ISO	M18x2.5		2.5	16	14.8	35.0	36.0	92	4	15.5
TMI/E.20.250.4HI.180171.R-ISO	M20x2.5		2.5	18	17.1	40.0	41.2	102	4	17.5
TMI/E.24.300.4HI.200199.R-ISO	M24x3.0		3.0	20	19.9	48.0	49.5	102	4	21.0

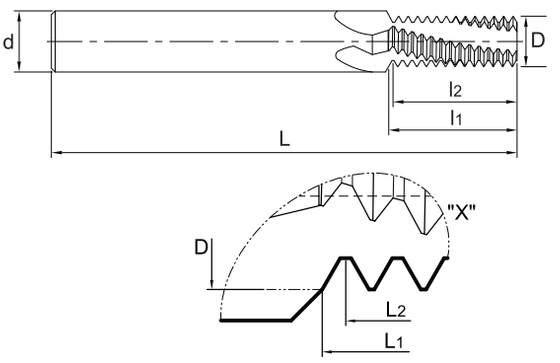
- For HRC >60, use Tuff Coat
- For Through Coolant Threadmill, Item Code will be TMI
- For Non-Through Coolant Threadmill, Item Code will be TME



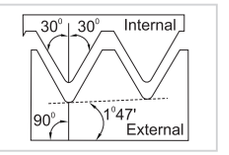
HELICAL INTERNAL COOLANT THREAD MILLS
NPT SERIES

Series	Flutes	Flutes	Helix
B+ve	Z = 3	Z = 4	14°

HRC	Coating	Shank Dia
HM ⩽ 48	Tuff Coat	h6



External - Internal



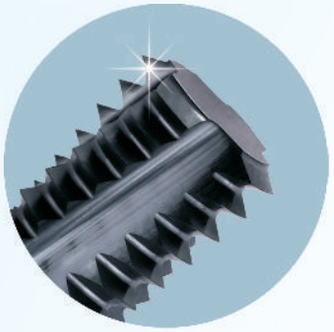
Defined by: USAS B2.1 : 1968
Tolerance class: Standard NPT

THREAD MILLS

NPT

ITEM CODE	Thread	Pitch	Dimensions (mm)					No. of Flutes	Drill Dia
Internal / External		mm	d	D	l_2	l_1	L	z	mm
TMI/E.27.3HI.06059-NPT	1/16"x27	27	6	5.9	9.4	9.9	57	3	6.3
TMI/E.27.3HI.08765-NPT	1/8"x27	27	8	7.65	9.4	9.9	61	3	8.5
TMI/E.18.3HI.10099-NPT	1/4 "x18	18	10	9.9	14.1	14.8	73	3	11.1
TMI/E.18.4HI.121115-NPT	3/8"x18	18	12	11.15	14.1	14.8	73	4	14.5
TMI/E.14.4HI.161425-NPT	1/2", 3/4'x14	14	16	14.25	18.1	19.0	92	4	17.7
TMI/E.115.4HI.20196-NPT	1", 1 1/4", 1 1/2", 2"x11.5	11.5	20	19.6	22.1	23.2	102	4	29
TMI/E.08.4HI.20196-NPT	2 1/2", 3"x8	8	20	19.6	31.7	33.3	102	4	66.5

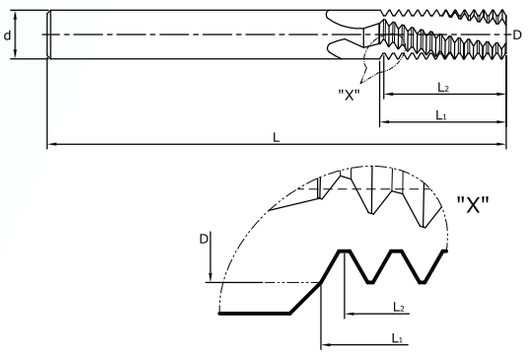
- For HRC >60, use Tuff Coat
- For Through Coolant Threadmill, Item Code will be TMI
- For Non-Through Coolant Threadmill, Item Code will be TME
- For TMI/E.14.4HI.161425-NPT, Drill Dia = 17.7, 23 mm
- For TMI/E.115.4HI.20196-NPT, Drill Dia = 29, 37.7, 44, 56 mm
- For TMI/E.08.4HI.20196-NPT, Drill Dia = 66.5, 82.1 mm



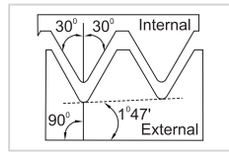
HELICAL INTERNAL COOLANT THREAD MILLS
NPTF SERIES

Series	Flutes	Flutes	Helix
B+ve	Z = 3	Z = 4	14°

HRC	Coating	Shank Dia
HM ⩽ 48	Tuff Coat	h6



External - Internal

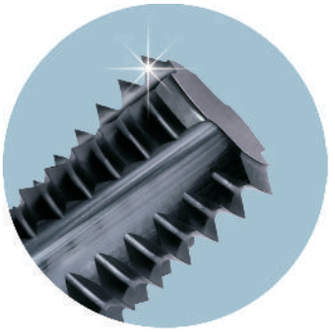


Defined by: ANSI 1.20.3-1976
Tolerance class: Standard NPTF

NPTF

ITEM CODE	Thread	Pitch	Dimensions (mm)					No. of Flutes	Drill Dia
Internal / External		mm	d	D	l_2	l_1	L	z	mm
TMI/E.27.3HI.06059-NPTF	1/16"x27	27	6	5.9	9.4	9.9	57	3	6.3
TMI/E.27.3HI.08765-NPTF	1/8"x27	27	8	7.65	9.4	9.9	61	3	8.5
TMI/E.18.3HI.10099-NPTF	1/4"x18	18	10	9.9	14.1	14.8	73	3	11.1
TMI/E.18.4HI.121115-NPTF	3/8"x18	18	12	11.15	14.1	14.8	73	4	14.5
TMI/E.14.4HI.161425-NPTF	1/2", 3/4"x14	14	16	14.25	18.1	19.0	92	4	17.7
TMI/E.115.4HI.20196-NPTF	1", 1 1/4", 1 1/2", 2"x11.5	11.5	20	19.6	22.1	23.2	102	4	29
TMI/E.08.4HI.20196-NPTF	2 1/2", 3"x8	8	20	19.6	31.7	33.3	102	4	66.5

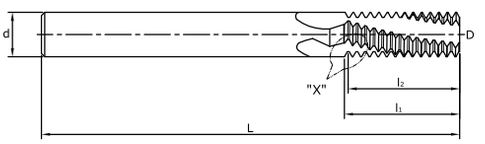
- UN, BSP, Whitworth Standards available on request
- For HRC >60, use Tuff Coat
- For Through Coolant Threadmill, Item Code will be TMI
- For Non-Through Coolant Threadmill, Item Code will be TME
- For TMI/E.14.4HI.161425-NPTF, Drill Dia = 17.7, 23 mm
- For TMI/E.115.4HI.20196-NPTF, Drill Dia = 29, 37.7, 44, 56 mm
- For TMI/E.08.4HI.20196-NPTF, Drill Dia = 66.5, 82.1 mm



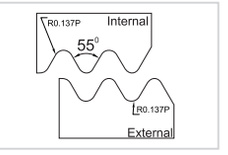
HELICAL INTERNAL COOLANT THREAD MILLS
BSP SERIES

Series	Flutes	Flutes	Flutes
B+ve	Z = 3	Z = 4	Z = 5

HRC	Coating	Shank Dia	Helix
HM ⩽ 60	Tuff Coat	h6	14°



External - Internal

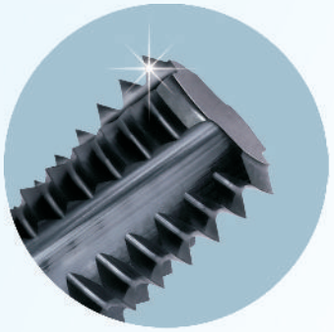


THREAD MILLS

BSP

ITEM CODE	Thread	Pitch	Dimensions (mm)					No. of Flutes	Drill Dia
Internal / External		mm	d	D	l_2	l_1	L	z	mm
TMI/E.28.3HI.06058-BSP	1/16"x28, 1/8"x28	28	6	5.8	16.3	16.8	57	3	6.7
TMI/E.28.3HI.08077-BSP	1/8"x28	28	8	7.7	20	20.5	63	3	8.7
TMI/E.19.4HI.100099-BSP	1/4"x19, 3/8"x19,	19	10	9.9	26.7	27.2	73	4	11.8
TMI/E.19.4HI.160134-BSP	3/8"x19,	19	16	13.4	33.4	33.9	92	4	15.2
TMI/E.14.5HI.160157-BSP	1/2", 3/4"x14	14	16	15.7	43.5	44.0	92	5	19
TMI/E.11.5HI.200199-BSP	1", 1 1/2", 2, 2 1/2" x11	11	20	19.9	41.6	42.1	104	5	30.7

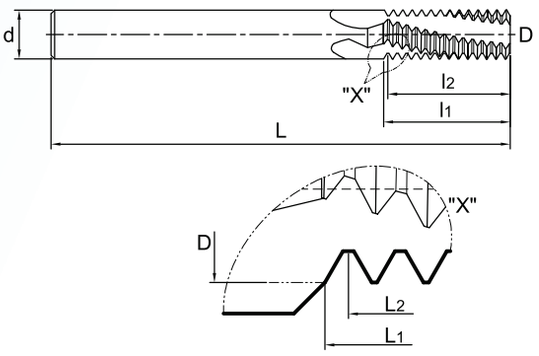
- UN, BSP, Whitworth Standards available on request
- For HRC >60, use Tuff Coat
- For Through Coolant Threadmill, Item Code will be TMI
- For Non-Through Coolant Threadmill, Item Code will be TME

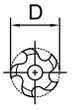


HELICAL INTERNAL COOLANT THREAD MILLS BSPT SERIES

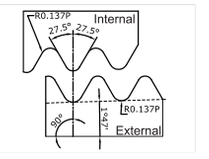
Series	Flutes	Flutes	Flutes
B+ve	Z = 3	Z = 4	Z = 5

HRC	Coating	Shank Dia	Helix
HM ⩽ 60	Tuff Coat	h6	14°





External - Internal



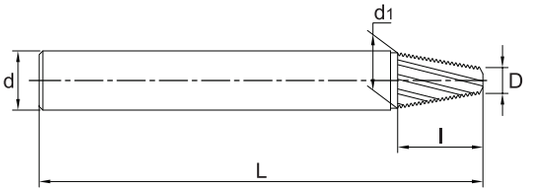
BSPT

ITEM CODE	Thread	Pitch	Dimensions (mm)					No. of Flutes	Drill Dia
Internal / External		mm	d	D	L_2	L_1	L	z	mm
TMI/E.28.3HI.060058-BSPT	1/16"x28	28	6	5.8	16.3	16.8	57	3	6.7
TMI/E.28.3HI.080077-BSPT	1/8"x28	28	8	7.7	20	20.5	63	3	8.7
TMI/E.19.4HI.100099-BSPT	1/4"x19	19	10	9.9	26.7	27.2	73	4	11.5
TMI/E.19.4HI.160134-BSPT	3/8"x19	19	16	13.4	33.4	33.9	92	4	15.2
TMI/E.14.5HI.160157-BSPT	1/2", 3/4"x14	14	16	15.7	43.5	44.0	92	5	19
TMI/E.11.5HI.200199-BSPT	1", 1 1/2", 2, 2 1/2", x11	11	20	19.9	41.6	42.1	104	5	30.7

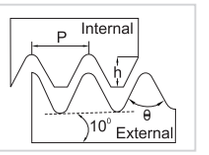
- UN, BSP, Whitworth Standards available on request
- For HRC >60, use Tuff Coat
- For Through Coolant Threadmill, Item Code will be TMI
- For Non-Through Coolant Threadmill, Item Code will be TME

TAPER THREAD MILLS
SURGICAL APPLICATION

Series	Flutes	HRC	Coating	Shank Dia	Helix
B+ve	Z = 3	B+ve ⩽ 48	Tuff Coat	h6	14°



External - Internal

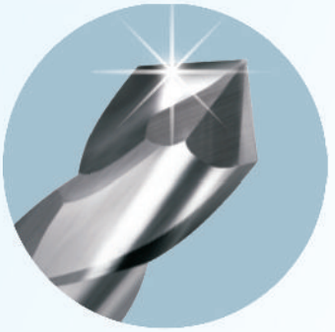


THREAD MILLS

ISO METRIC

ITEM CODE	Taper	Pitch	Thread Angle	Dimensions (mm)						No. of Flutes
	θ	P mm		h	d	d1	D	L	l	z
TME.040.3HI.060032.T60	20°	0.4	60°	0.20	6	5.9	3.2	58	8	3
TME.050.3HI.060029.T60	20°	0.5	60°	0.25	6	5.9	2.9	58	9	3
TME.030.3HI.030015.T55	20°	0.3	55°	0.18	3	2.9	1.5	39	4	3
TME.040.3HI.060025.T55	20°	0.4	55°	0.30	6	5.9	2.5	58	10	3
TME.050.3HI.060029.T55	20°	0.5	55°	0.35	6	5.9	2.9	58	9	3
TME.060.3HI.060038.T55	20°	0.6	55°	0.45	6	5.9	3.8	58	6.5	3

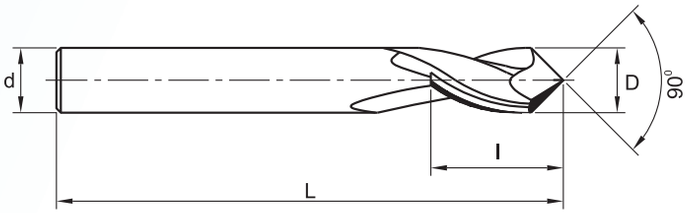
- For HRC >60, use Tuff Coat

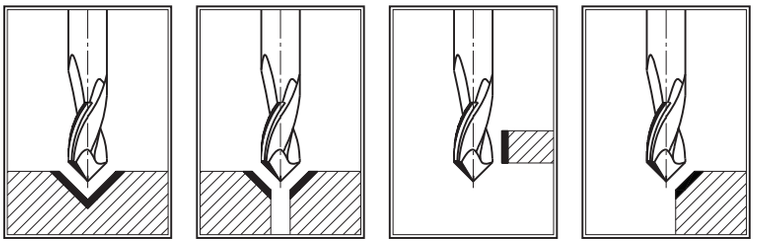


SOLID CARBIDE MULTI FUNCTIONAL DRILL MILL

90°	Series	Helix	Flutes	HRC
	B+ve	 30°	Z = 2	B+ve ⩽ 28

Coating	Tool Length	Shank Dia	Mill Dia
Duro Coat	R	h6	e8



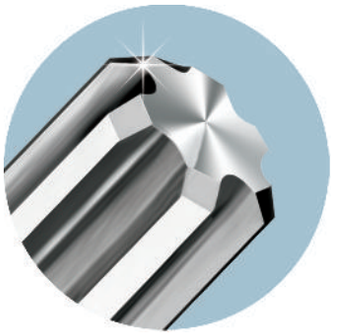


DMZB

ITEM CODE	MILL DIA D	SHANK DIA d	CEL l	OAL L
DMZB 040	4	4	8	50
DMZB 050	5	5	10	50
DMZB 060	6	6	12	60
DMZB 080	8	8	16	65
DMZB 100	10	10	18	70
DMZB 120	12	12	20	70
DMZB 140	14	14	24	80
DMZB 160	16	16	26	80

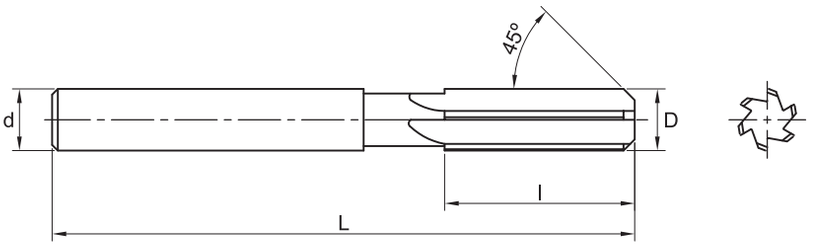
- Intermediate sizes, Weldon Flat available on request

SOLID CARBIDE REAMERS



Series	Helix	Flutes	Flutes
Regular	7°	Z = 4	Z = 6

HRC	Shank Dia	Reamer Dia
B+ve ⩽ 48	h6	H7

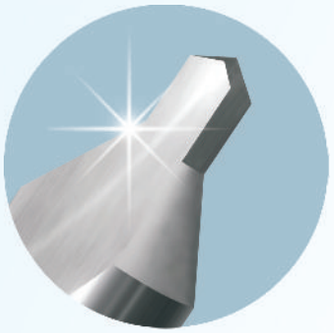


RC

ITEM CODE	TOOL DIA D	SHANK DIA d	CEL l	OAL L	No. of Flute Z
RC4 0304 S	3	4	15	60	4
RC4 0404 S	4	4	18	60	4
RC4 0506 S	5	6	20	60	4
RC4 0606 S	6	6	25	75	6
RC6 0708 S	7	8	30	75	6
RC6 0808 S	8	8	30	75	6
RC6 0910 S	9	10	35	100	6
RC6 1010 S	10	10	35	100	6
RC6 1112 S	11	12	40	100	6
RC6 1212 S	12	12	40	100	6

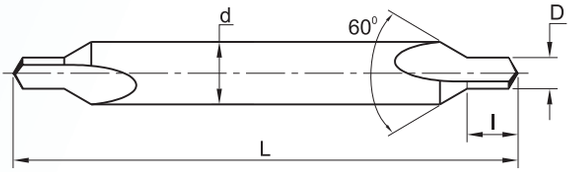
- Intermediate sizes, RH / LH available on request

SOLID CARBIDE CENTER DRILLS



118°	Series	Helix	Flutes	HRC
	Regular	 5°	Z = 2	B+ve ⩽ 48

Shank Dia	Drill Dia	Standard	Standard
h6	m7	DIN 333 A	BS 328



METRIC — DIN 333 A Standard

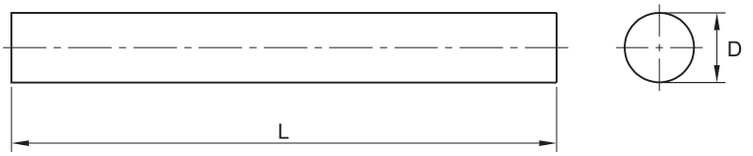
ITEM CODE	PILOT DIA D	BODY DIA d	CEL l	OAL L
CDXA 160 040	1.6	4	2.4	35
CDXA 200 050	2	5	2.9	40
CDXA 250 063	2.5	6.3	3.6	45
CDXA 315 080	3.15	8	4.4	50
CDXA 400 100	4	10	5.6	56
CDXA 500 125	5	12.5	6.9	63
CDXA 630 160	6.3	16	8.6	71

INCH — BS 328 Standard

ITEM CODE	PILOT DIA D	BODY DIA d	CEL l	OAL L
CBXA 062 187	1/16"	3/16"	3/32"	1-3/4"
CBXA 093 250	3/32"	1/4"	5/32"	2"
CBXA 125 312	1/8"	5/16"	3/16"	2-1/4"
CBXA 187 437	3/16"	7/16"	9/32"	2-1/2"
CBXA 250 625	1/4"	5/8"	3/8"	3"

SOLID CARBIDE GROUND BLANKS

HRC	HRC B+ve	Shank Dia
⩽ 28	⩽ 48	h6



GRB M — METRIC SERIES

ITEM CODE	DIA D	LENGTH L
GRB 030 M	3	100
GRB 040 M	4	100
GRB 050 M	5	100
GRB 060 M	6	100
GRB 080 M	8	100
GRB 100 M	10	100
GRB 120 M	12	100
GRB 140 M	14	100
GRB 160 M	16	100
GRB 180 M	18	100
GRB 200 M	20	100

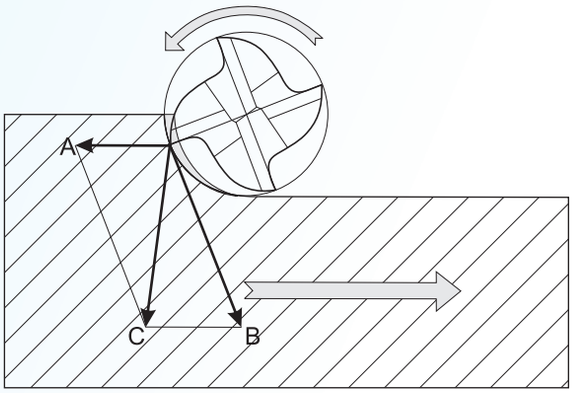
GRB I — INCH SERIES

ITEM CODE	DIA D	LENGTH L
GRB 125 I	1/8"	4"
GRB 187 I	3/16"	4"
GRB 250 I	1/4"	4"
GRB 312 I	5/16"	4"
GRB 375 I	3/8"	4"
GRB 500 I	1/2"	4"
GRB 562 I	9/16"	4"
GRB 625 I	5/8"	4"
GRB 750 I	3/4"	4"

TECHNICAL DATA

CLIMB MILLING

Cutter rotation and work feed have the same direction. The cutter machines the material at the maximum chip thickness and leaves it at the minimum.

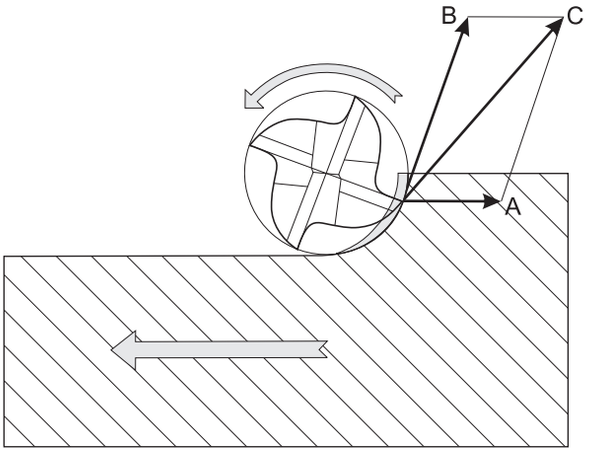


Main Features :

- less vibrations
- good surface quality
- longer life of cutting edges
- higher cutting speed

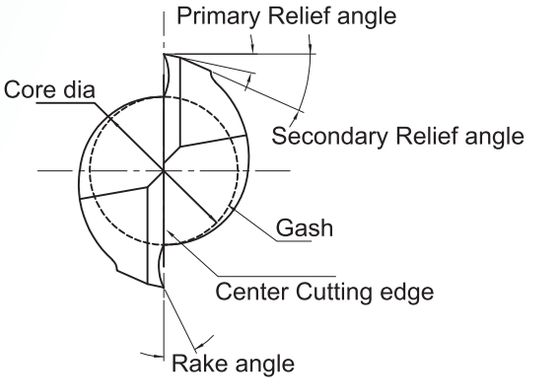
UP MILLING

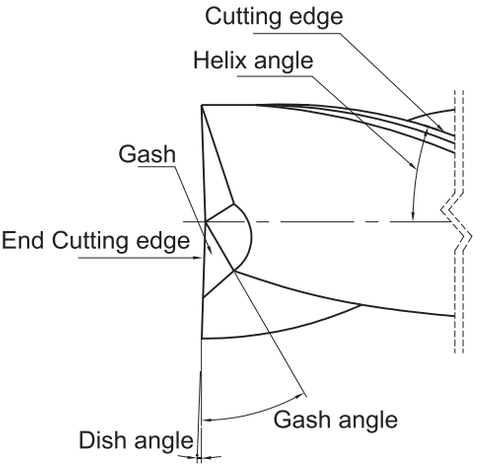
Cutter rotation and work feed have opposite directions. The material is cut at the minimum thickness and left at the maximum.

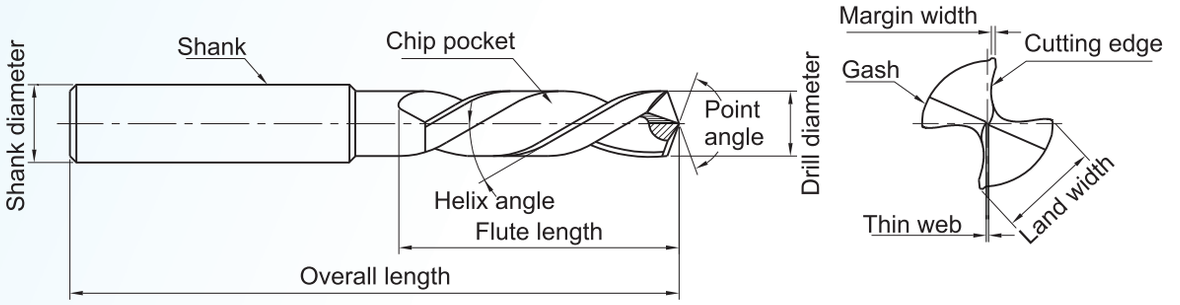


Main Features :

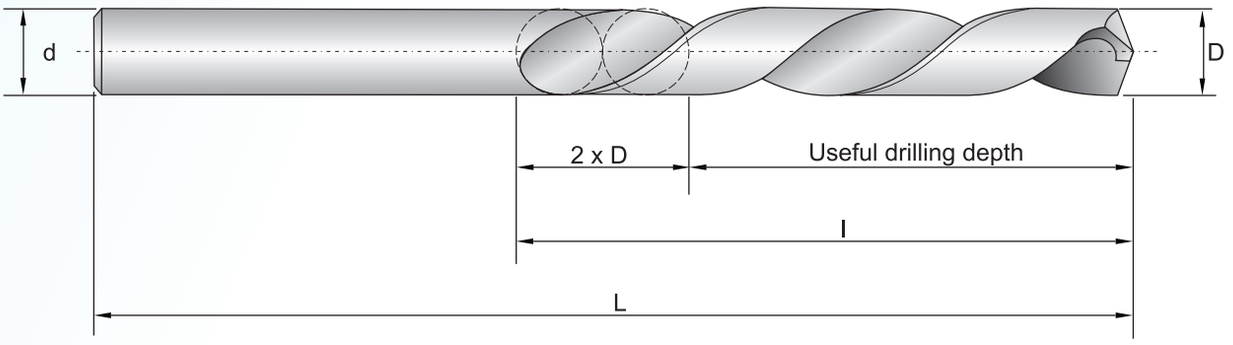
- more vibrations due to increased shear stress
- shorter life of cutter due to higher wear of cutting edges in the first working length
- the vertical shearing stress component tends to detach the work from the table





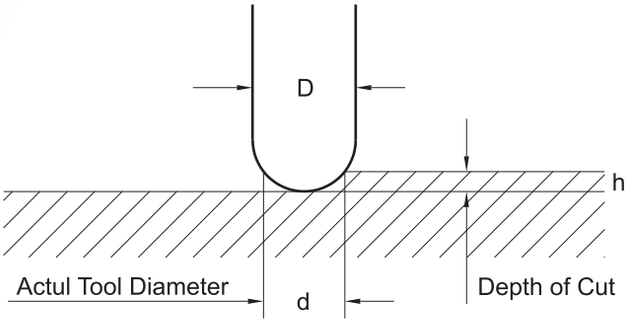


USEFUL DRILLING DEPTH



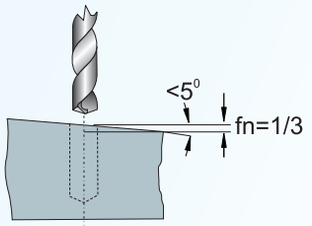
For a good chip evacuation, the best useful drilling depth is calculated by subtracting twice the size of the diameter (D) from the length of the drill flute (l)

CALCULATION OF ACTUAL DIAMETER OF BALL NOSE END MILL

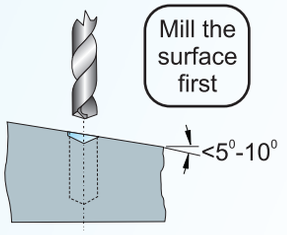


$$d=2\sqrt{h\,(D-h)}$$

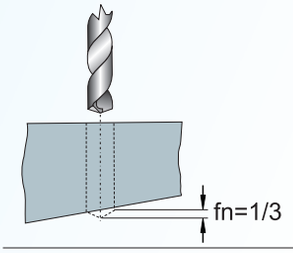
INSTRUCTIONS AND SUGGESTIONS FOR MACHINING WITH CARBIDE DRILLS



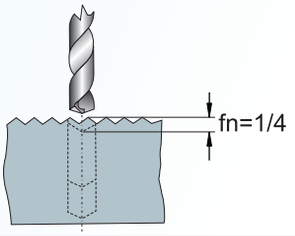
- For drilling surfaces that are tilted up to a maximum of 5^0, reduce the feed rate fn to 1/3 as long as the drill is machining the tilted surface



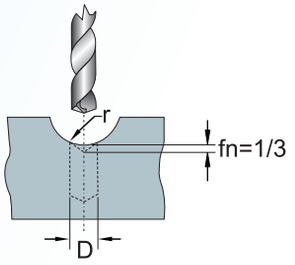
- For drilling surfaces that are tilted up to 10^0, it is first necessary to perform a centering operation
- Surface tilted by more than 10^0 must first be milled



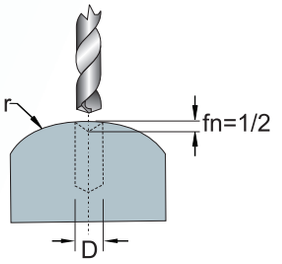
- For through bores on tilted surfaces, reduce the feed rate to 1/3 during the exit phase



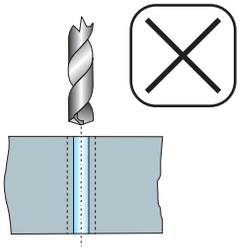
- For drilling irregular surfaces, reduce the feed rate to 1/4 as long as the drill is entering the material



- Drilling concave surfaces is possible only if the radius r is greater than 15 x D. Reduce the feed rate to 1/3 as long as the drill is entering the material



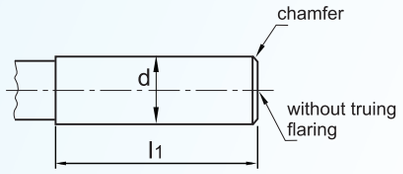
- Drilling convex surfaces is possible only if the radius r is greater than 4 x D. Reduce the feed rate to 1/2 as long as the drill is entering the material



- It is not possible to enlarge existing bores

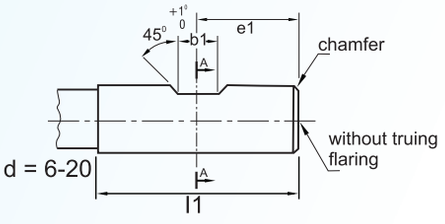
CYLINDRICAL SHANK
DIN 6535

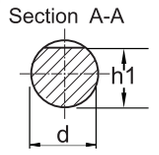
FORM HA

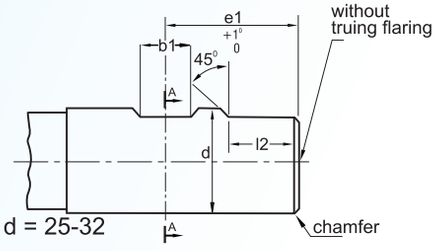


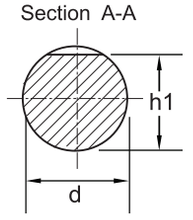
d h6	l1 +2 0	d h6	l1 +2 0
2	28	12	45
3		14	
4		16	48
5		18	
6	36	20	50
8		25	56
10	40	32	60

FORM HB (WELDON)



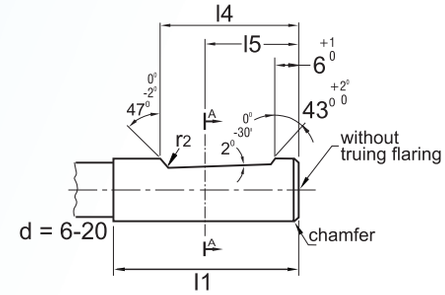


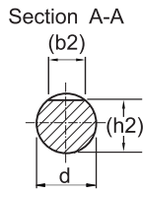


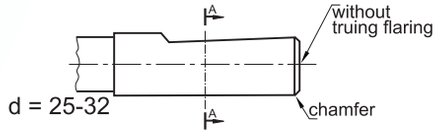


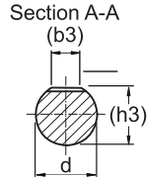
d h6	b1 +0.05 0	e1 0 -1	h1 h11	l1 +2 0	l2 +1 0
6	4.2	18.0	5.1	36	-
8	5.5		6.9		
10	7.0	20.0	8.5	40	
12	8.0	22.5	10.4	45	
14			12.7		
16	10.0	24.0	14.2	48	
18			16.2		
20	11.0	25.0	18.2	50	
25	12.0	32.0	23.0	56	17
32	14.0	36.0	30.0	60	19

FORM HE (WHISTLE-NOTCH)









d h6	(b2) ≈	(b3)	h2 h11	(h3)	l1 +2 0	l4 0 -1	l5	r2 mm
6	4.3	-	5.1	-	36	25	18	1.2
8	5.5	-	6.9	-				
10	7.1	-	8.5	-	40	28	20	
12	8.2	-	10.4	-	45	33	22.5	
14	8.1	-	12.7	-				
16	10.1	-	14.2	-	48	36	24	1.6
18	10.8	-	16.2	-				
20	11.4	-	18.2	-	50	38	25	
25	13.6	9.3	23.0	24.1	56	44	32	
32	15.5	9.9	30.0	31.2	60	48	35	

FORMULA

Cutting speed	$Vc = \frac{\pi \times D \times n}{1000}$
Spindle speed	$n = \frac{Vc \times 1000}{\pi \times D}$
Feed per tooth	$fz = \frac{Vf}{n \times z}$
Table feed	$Vf = fz \times n \times z$
Feed per revolution	$f = fz \times z$

SYMBOLS

D (mm)	Tool diameter
Vc (m/min)	Cutting speed
fz (mm)	Feed per tooth
n (rpm)	Spindle speed
Vf (mm/min)	Table feed
z	No. of teeth

TOOL PARAMETERS

ENDMILL

Cutting Speed	$Vc = \frac{\pi DN}{1000}$ mt/min
Table Feed	Vf = N x fz x z mm/min

CUTTING SPEED (Vc) TABLE

Material Code	Material Group	HRC	Vc
R	Cast Iron, MS, EN-8	28~30	60~70
B+ve	High Carbon Steel, EN-9, EN-21	40~42	50~60
HM	Tool Steel, P20, Die Steel, OHNS, EN-31, Stainless Steel	58~60	35~45
NF	Aluminium, Brass, Copper	NA	70~80

TABLE FEED (Fz) CHART

Dia of Endmill	Fz (Feed per Tooth)
Ø1 ~ Ø2	0.008 ~ 0.010
Ø2 ~ Ø3	0.010 ~ 0.012
Ø3 ~ Ø4	0.012 ~ 0.015
Ø4 ~ Ø6	0.015 ~ 0.025
Ø6 ~ Ø8	0.025 ~ 0.035
Ø8 ~ Ø10	0.035 ~ 0.050
Ø10 ~ Ø12	0.050 ~ 0.060
Ø12 ~ Ø16	0.060 ~ 0.070
Ø16 ~ Ø20	0.070 ~ 0.080
Ø20 ~ Ø25	0.080 ~ 0.100

TOOL PARAMETERS

ROUGHER

Cutting Speed	$Vc = \frac{\pi DN}{1000}$ mt/min
Table Feed	Vf = N x fz x z mm/min

CUTTING SPEED (Vc) TABLE

Material Code	Material Group	HRC	Vc
R	Cast Iron, MS, EN-Series	28~35	130~160
B+ve	Stainless Steel	22~35	40~60
B+ve	High Carbon Steel, Inconel, Hot Die Steel, OHNS, P20, Titanium	35~65	35~70

TABLE FEED (Fz) CHART

Dia of Rougher	Fz (Feed per Tooth)
Ø5 ~ Ø6	0.030 ~ 0.050
Ø6 ~ Ø8	0.035 ~ 0.060
Ø8 ~ Ø10	0.045 ~ 0.075
Ø10 ~ Ø12	0.060 ~ 0.085
Ø12 ~ Ø16	0.080 ~ 0.100
Ø16 ~ Ø20	0.085 ~ 0.110
Ø20 ~ Ø25	0.090 ~ 0.140

TROUBLESHOOTING GUIDE FOR END MILL PROBLEMS

Problem	Cause	Solution
Breakage	Feed too fast	Slow down feed
	Too high stock removal	Decrease feed per tooth
	Too long flute length or overall length	Hold shank deeper, use shorter endmill
	Too much wear	Regrind at earlier stage
Wear	Speed too fast	Slow down speed
	Hard work material	Use higher grade tool material and coating
	Biting chips	Change feed and speed. Change chip size or clear chips with coolant or air pressure
	Improper feed and speed (too slow)	Increase feed and speed. Try down-cut
	Improper cutting angle	Change to correct cutting angle
	Too small primary relief angle	Change to larger relief angle
Short tool life (dull teeth)	Too much cutting friction	Regrind at earlier stage
	Tough work material	Use premium tool material
	Improper cutting angle	Change to correct cutting angle and primary relief angle
Chipping	Feed too fast	Slow down to proper feed
	Feed too fast on first cut	Slow down on first bite
	Not enough rigidity of machine, tool and holder	Change to rigid machine tool or holder
	Loose hold (tool)	Correct to tight hold
	Loose hold (workpiece)	Correct to tight hold
	Lack of rigidity	Use shortest endmill available, hold shank deeper, try down cut
	Teeth too sharp	Decrease primary relief and cutting angle
Chip packing	Too high stock removal rate	Adjust feed or speed
	Not enough chip space	Use less endmill flutes
	Not enough coolant	Use air pressure
Burrs	Too much wear on primary relief	Regrind at earlier stage
	Incorrect condition	Correct milling condition
	Improper cutting angle	Change to correct cutting angle
No perpendicularity on side	Feed too fast	Slow down to correct speed
	Excessive cutting	Decrease depth and width of cut
	Length of flutes or overall length too long	Use proper length of tool, hold shank deeper
	Too less flutes	Use multi flute endmills
No dimensional accuracy	Excessive cutting	Decrease depth and width of cut
	Lack of accuracy (machine and holder)	Repair machine or holder
	Not enough rigidity (machine and holder)	Change machine, holder or cutting conditions
	Too less flutes	Use multi flutes endmills
Chattering	Feed and speed too fast	Correct feed and speed
	Not enough rigidity (machine and holder)	Use better machine or tool holder or change conditions
	Too great relief angle	Decrease relief angle, make margin
	Loose hold of workpiece	Hold workpiece tightly
	Cutting too deep	Decrease depth of cut
	Too long flute or overall length	Hold shank deeper, use shorter endmill or try down cut
Rough surface finish	Feed too fast	Slow down to correct speed
	Slow speed	Apply higher speed
	Too much wear	Regrind at earlier stage
	Chip biting	Decrease stock removal
	No end tooth concavity	Grind concave angle on end teeth

TOOL PARAMETERS

DRILL

Cutting Speed	$Vc = \frac{\pi DN}{1000}$ mt/min
Table Feed	Vf = N x f mm/min

CUTTING SPEED (Vc) TABLE

Material Code	Material Group	HRC	Vc
A	Cast Iron, Aluminium	25~28	80~90
B	EN Series, Mild Steel	30~35	70~80
C	High-hardened Steel	50~60	20~30
D	Stainless Steel	20~25	30~40

Feed per Revolution (f) Chart

Dia of Drill	f (Feed per Revolution)
Ø2 ~ Ø4	0.020 ~ 0.030
Ø4 ~ Ø6	0.030 ~ 0.050
Ø6 ~ Ø8	0.060 ~ 0.080
Ø8 ~ Ø10	0.080 ~ 0.100
Ø10 ~ Ø12	0.100 ~ 0.120
Ø12 ~ Ø16	0.120 ~ 0.150

TOOL PARAMETERS

REAMER

Cutting Speed	$Vc = \frac{\pi DN}{1000}$ mt/min
Table Feed	Vf = N x Fz x z mm/min

CUTTING SPEED (Vc) TABLE

Material Code	Material Group	Vc
A	Cast Iron	50 ~ 60
B	Mild Steel, EN-8	40 ~ 50
C	Stainless Steel	25 ~ 40
D	Aluminium	90 ~ 110
E	High Hardened Steel	10 ~ 20

Feed per Revolution (f) Chart

Dia of Reamer	f (Feed per Revolution)
Ø2 ~ Ø4	0.060 ~ 0.100
Ø4 ~ Ø6	0.100 ~ 0.120
Ø6 ~ Ø8	0.120 ~ 0.150
Ø8 ~ Ø10	0.150 ~ 0.180
Ø10 ~ Ø12	0.180 ~ 0.200
Ø12 ~ Ø16	0.200 ~ 0.250
Ø16 ~ Ø20	0.250 ~ 0.400

RECOMMENDED PARAMETERS

THREAD MILL

Material Group		Material		Hardness Brinell HB	Cutting Speed V_c m/min	Feed f mm/tooth
P	1	Unalloyed steel	Low carbon (C=0.1-0.25%)	125	50 - 200	0.025 - 0.3
	2	Low alloy steel (alloying elements ≤ 5%)	Non hardened	180	50 - 150	0.02 - 0.22
	3		Hardened	275	40 - 150	0.01 - 0.15
M	4	Stainless steel	Non hardened	200	50 - 120	0.01 - 0.13
	5		Austenitic	180	50 - 120	0.01 - 0.12
	6	Stainless steel Cast ferritic	Hardened	330	50 - 90	0.01 - 0.1
K	7	Malleable	Ferritic (short chips)	130	50 - 70	0.01 - 015
	8	Grey cast iron	Low tensile strength	180	60 - 140	0.01 - 0.13
	9		High tensile strength	260	35 - 100	0.01 - 012
	10	Nodular SG iron	Pearlitic	260	35 - 80	0.01 - 0.12
N	11	Aluminium alloys	Cast	75	80 - 160	0.03 - 0.36
	12		Cast & aged	90	100 - 200	0.1 - 0.3
	13	Copper and copper alloys	Brass	90	160 - 250	0.04 - 0.43
	14		Bronze and non leaded copper	10	120 - 200	0.03 - 0.36
S	15	High temperature alloys	Annealed (Nickel or Cobalt based)	250	15 - 35	0.005 - 0.06
	16	Titanium alloys	Pure 99.5 Ti	400 Rm	35 - 70	0.006 - 0.07
H	17	Extra hard steel	Hardened & tempered	45-50 HRc	15 - 45	0.004 - 0.04
	18			51-55 HRc	15 - 30	0.004 - 0.04

RPM Conversion Table

Dia mm	Cutting Speed m / min													
	20	30	40	50	60	70	80	90	100	120	140	150	180	200
1.0	6370	9550	12740	15920	19110	22290	25480	28660	31850	38220	44590	47770	57320	63690
1.2	5310	7960	10620	13270	15920	18580	21230	23890	26540	31850	37150	39810	47770	53080
1.5	4250	6370	8490	10620	12740	14860	16990	19110	21230	25480	29720	31850	38220	42460
1.8	3540	5310	7080	8850	10620	12380	14150	15920	17690	21230	24770	26540	31850	35390
2.0	3180	4780	6370	7960	9550	11150	12740	14330	15920	19110	22290	23890	28660	31850
2.2	2900	4340	5790	7240	8690	10130	11580	13030	14480	17370	20270	21710	26060	28950
2.5	2550	3820	5100	6370	7640	8920	10190	11460	12740	15290	17830	19110	22930	25480
2.8	2270	3410	4550	5690	6820	7960	9100	10240	11370	13650	15920	17060	20470	22750
3.0	2120	3180	4250	5310	6370	7430	8490	9550	10620	12740	14860	15920	19110	21230
3.5	1820	2730	3640	4550	5460	6370	7280	8190	9100	10920	12740	13650	16380	18200
4.0	1590	2390	3180	3980	4780	5570	6370	7170	7960	9550	11150	11940	14330	15920
4.5	1420	2120	2830	3540	4250	4950	5660	6370	7080	8490	9910	10620	12740	14150
5.0	1270	1910	2550	3180	3820	4460	5100	5730	6370	7640	8920	9550	11460	12740
5.5	1160	1740	2320	2900	3470	4050	4630	5210	5790	6950	8110	8690	10420	11580
6.0	1060	1590	2120	2650	3180	3720	4250	4780	5310	6370	7430	7960	9550	10620
6.5	980	1470	1960	2450	2940	3430	3920	4410	4900	5880	6860	7350	8820	9800
7.0	910	1360	1820	2270	2730	3180	3640	4090	4550	5460	6370	6820	8190	9100
7.5	850	1270	1700	2120	2550	2970	3400	3820	4250	5100	5940	6370	7640	8490
8.0	800	1190	1590	1990	2390	2790	3180	3580	3980	4780	5570	5970	7170	7960
8.5	750	1120	1500	1870	2250	2620	3000	3370	3750	4500	5250	5620	6740	7490
9.0	710	1060	1420	1770	2120	2480	2830	3180	3540	4250	4950	5310	6370	7080
9.5	670	1010	1340	1680	2010	2350	2680	3020	3350	4020	4690	5030	6030	6700
10	640	960	1270	1590	1910	2230	2550	2870	3180	3820	4460	4780	5730	6370
11	580	870	1160	1450	1740	2030	2320	2610	2900	3470	4050	4340	5210	5790
12	530	800	1060	1330	1590	1860	2120	2390	2650	3180	3720	3980	4780	5310
13	490	730	980	1220	1470	1710	1960	2200	2450	2940	3430	3670	4410	4900
14	450	680	910	1140	1360	1590	1820	2050	2270	2730	3180	3410	4090	4550
15	420	640	850	1060	1270	1490	1700	1910	2120	2550	2970	3180	3820	4250
16	400	600	800	1000	1190	1390	1590	1790	1990	2390	2790	2990	3580	3980
17	370	560	750	940	1120	1310	1500	1690	1870	2250	2620	2810	3370	3750
18	350	530	710	880	1060	1240	1420	1590	1770	2120	2480	2650	3180	3540
19	340	500	670	840	1010	1170	1340	1510	1680	2010	2350	2510	3020	3350
20	320	480	640	800	960	1110	1270	1430	1590	1910	2230	2390	2870	3180
21	300	450	610	760	910	1060	1210	1360	1520	1820	2120	2270	2730	3030
22	290	430	580	720	870	1010	1160	1300	1450	1740	2030	2170	2610	2900
23	280	420	550	690	830	970	1110	1250	1380	1660	1940	2080	2490	2770
24	270	400	530	660	800	930	1060	1190	1330	1590	1860	1990	2390	2650
25	250	380	510	640	760	890	1020	1150	1270	1530	1780	1910	2290	2550

ISO Tolerance Measure Table (mm)

Dia (mm	< 3	3-6	6-10	10-18	18-30	30-50	50-65	65-80
e 7	-14	-20	-25	-32	-40	-50	-60	-60
	-24	-32	-40	-50	-61	-75	-90	-90
e 8	-14	-20	-25	-32	-40	-50	-60	-60
	-28	-38	-47	-59	-73	-89	-106	-106
e 9	-14	-20	-25	-32	-40	-50	-60	-60
	-39	-50	-61	-75	-92	-112	-134	-134
h 5	0	0	0	0	0	0	0	0
	-4	-5	-6	-8	-9	-11	-13	-13
h 6	0	0	0	0	0	0	0	0
	-6	-8	-9	-11	-13	-16	-19	-19
h 7	0	0	0	0	0	0	0	0
	-10	-12	-15	-18	-21	-25	-30	-30
h 8	0	0	0	0	0	0	0	0
	-14	-18	-22	-27	-33	-39	-46	-46
h 9	0	0	0	0	0	0	0	0
	-25	-30	-36	-43	-52	-62	-74	-74
h 10	0	0	0	0	00	0	0	0
	-40	-48	-58	-70	-84	-100	-120	-120
h 11	0	0	0	0	0	0	0	0
	-60	-75	-90	-110	-130	-160	-190	-190
h 16	0	0	0	0	0	0	0	0
	-600	-750	-900	-1100	-1300	-1600	-1900	-1900
js 14	+125	+150	+180	+215	+260	+310	+370	+370
	-125	-150	-180	-215	-260	-310	-370	-370
js 16	+300	+375	+450	+550	+650	+800	+950	+950
	-300	-375	-450	-550	-650	-800	-950	-950
k 11	+60	+75	+90	+110	+130	+160	+190	+190
	0	0	0	0	0	0	0	0
k 12	+100	+120	+150	+180	+210	+250	+300	+300
	0	0	0	0	0	0	0	0
m 6	+8	+12	+15	+18	+21	+25	+30	+30
	+2	+4	+6	+7	+8	+9	+11	+11
m 7	+12	+16	+21	+25	+29	+34	+41	+41
	+2	+4	+6	+7	+8	+9	+11	+11
z 9	+51	+65	+78	+103	+140	+198	+246	+284
	+26	+35	+42	+60	+88	+136	+172	+210
H 5	+4	+5	+6	+8	+9	+11	+13	+13
	0	0	0	0	0	0	0	0
H 6	+6	+8	+9	+11	+13	+16	+19	+19
	0	0	0	0	0	0	0	0
H 7	+10	+12	+15	+18	+21	+25	+30	+30
	0	0	0	0	0	0	0	0
H 8	+14	+18	+22	+27	+33	+39	+46	+46
	0	0	0	0	0	0	0	0
H 9	+25	+30	+36	+43	+52	+62	+74	+74
	0	0	0	0	0	0	0	0
H 10	+40	+48	+58	+70	+84	+100	+120	+120
	0	0	0	0	0	0	0	0
H 11	+60	+75	+90	+110	+130	+160	+190	190
	0	0	0	0	0	0	0	0
P 6	-6	-9	-12	-15	-18	-21	-26	-26
	-12	-17	-21	-26	-31	-37	-45	-45
P 7	-6	-8	-9	-11	-14	-17	-21	-21
	-16	-20	-24	-29	-35	-42	-51	-51
P 9	-6	-12	-15	-18	-22	-26	-32	-32
	-31	-42	-51	-61	-74	-88	-106	-106

Hardness Conversion Table

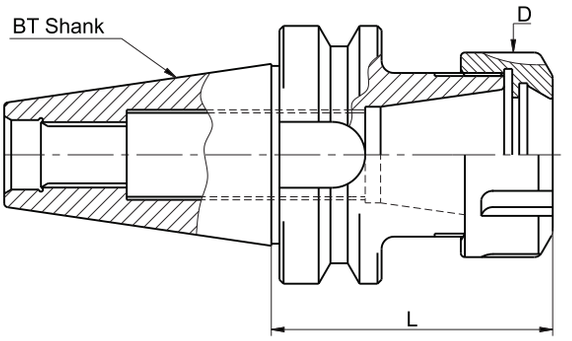
HRC	HB	HV10	N/mm²
	71	75	240
	76	80	255
	81	85	270
	86	90	285
	90	95	305
	95	100	320
	100	105	335
	105	110	350
	109	115	370
	114	120	385
	119	125	400
	124	130	415
	128	135	430
	133	140	450
	138	145	465
	143	150	480
	147	155	495
	152	160	510
	157	165	530
	162	170	545
	166	175	560
	171	180	575
	176	185	595
	181	190	610
	185	195	625
	190	200	640
	195	205	660
	199	210	675
	204	215	690
	209	220	705
	214	225	720
	219	230	740
	223	235	755
	228	240	770
	233	245	785
22	238	250	800
23	242	255	820
24	247	260	835
25	255	268	860
26	258	272	870
27	266	280	900

HRC	HB	HV10	N/mm²
28	273	287	920
29	278	293	940
30	287	302	970
31	295	310	995
32	301	317	1020
33	311	327	1050
34	319	336	1080
35	328	345	1110
36	337	355	1140
37	346	364	1170
38	354	373	1200
39	363	282	1230
40	372	392	1260
41	383	403	1300
42	393	413	1330
43	402	423	1360
44	413	434	1400
45	424	446	1440
46	435	458	1480
47	449	473	1530
48	460	484	1570
49	472	497	1620
50	488	514	1680
51	501	527	1730
52	517	544	1790
53	532	560	1845
54	549	578	1910
55	567	596	1980
56	584	615	2050
57	607	639	2140
58	622	655	
59		675	
60		698	
61		720	
62		745	
63		773	
64		800	
65		829	
66		864	
67		900	
68		940	

Our Team Blood believes in utilizing the most sophisticated equipments which enable us to produce a world class products **BLOOD** - Rotating Genius.


CNC TOOLINGS

ER COLLET CHUCK
BT TAPER



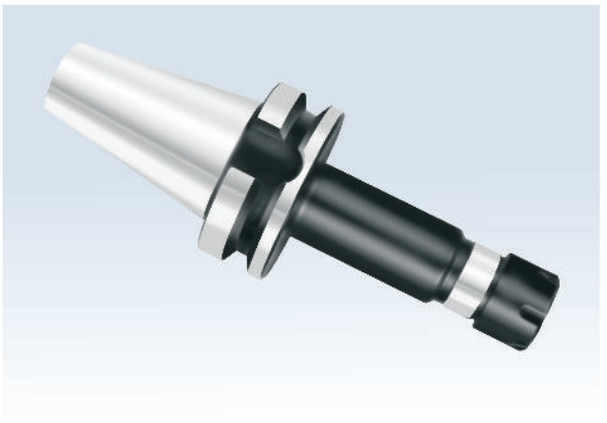
MAS 403 Standard

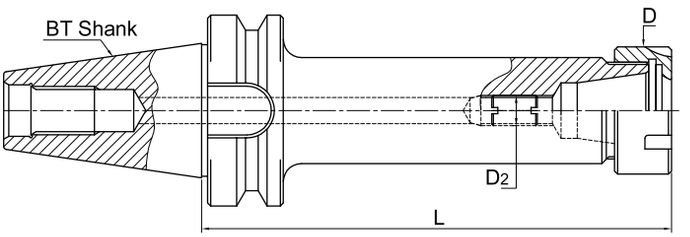
ITEM CODE	COLLET	D	L
CHE / BT30 / ER16-060	ER 16	28	60
CHE / BT30 / ER20-060	ER 20	34	60
CHE / BT30 / ER25-060	ER 25	42	60
CHE / BT30 / ER32-060	ER 32	50	60
CHE / BT40 / ER16-060	ER 16	28	60
CHE / BT40 / ER16-100	ER 16	28	100
CHE / BT40 / ER16-150	ER 16	28	150
CHE / BT40 / ER20-060	ER 20	34	60
CHE / BT40 / ER20-100	ER 20	34	100
CHE / BT40 / ER20-150	ER 20	34	150
CHE / BT40 / ER25-060	ER 25	42	60
CHE / BT40 / ER25-100	ER 25	42	100
CHE / BT40 / ER25-150	ER 25	42	150
CHE / BT40 / ER32-070	ER 32	50	70
CHE / BT40 / ER32-100	ER 32	50	100
CHE / BT40 / ER32-150	ER 32	50	150
CHE / BT40 / ER32-200	ER 32	50	200
CHE / BT40 / ER40-080	ER 40	63	80

ITEM CODE	COLLET	D	L
CHE / BT40 / ER40-100	ER 40	63	100
CHE / BT40 / ER40-150	ER 40	63	150
CHE / BT40 / ER50-100	ER 50	78	100
CHE / BT50 / ER16-100	ER 16	28	100
CHE / BT50 / ER20-080	ER 20	34	80
CHE / BT50 / ER20-100	ER 20	34	100
CHE / BT50 / ER20-150	ER 20	34	150
CHE / BT50 / ER25-080	ER 25	42	80
CHE / BT50 / ER25-100	ER 25	42	100
CHE / BT50 / ER25-160	ER 25	42	160
CHE / BT50 / ER32-080	ER 32	50	80
CHE / BT50 / ER32-100	ER 32	50	100
CHE / BT50 / ER32-160	ER 32	50	160
CHE / BT50 / ER40-080	ER 40	63	80
CHE / BT50 / ER32-200	ER 32	63	200
CHE / BT50 / ER40-100	ER 40	63	100
CHE / BT50 / ER40-160	ER 40	63	160
CHE / BT50 / ER50-100	ER 50	78	100

- Max. Runout of the Internal Taper w.r.t. External Taper: 0.005 mm
- All Holders are in AT-3 Class

ER COLLET CHUCK - MINI NUT
BT TAPER



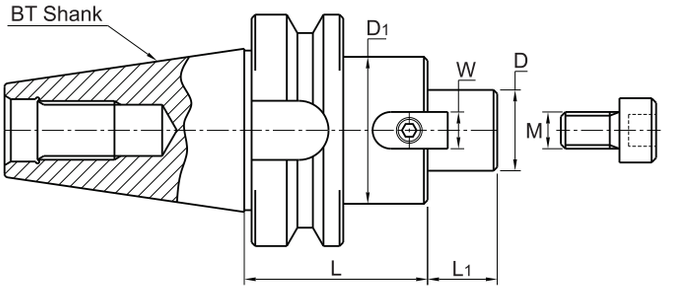


MAS 403 Standard

ITEM CODE	COLLET	D	L
CHE / BT40 / ERM16-100	ER 16	22	100
CHE / BT40 / ERM16-160	ER 16	22	160
CHE / BT40 / ERM20-100	ER 20	28	100
CHE / BT40 / ERM20-160	ER 20	28	160
CHE / BT40 / ERM25-100	ER 25	35	100
CHE / BT40 / ERM25-160	ER 25	35	160

- Max. Runout of the Internal Taper w.r.t. External Taper: 0.005 mm
- All Holders are in AT-3 Class

FACE MILL ARBOR
BT TAPER



MAS 403 Standard

ITEM CODE	D	D1	L	L1	M	W
FMA / BT30 / 16-050	16	32	50	17	M 8	08
FMA / BT30 / 22-050	22	40	50	19	M 10	10
FMA / BT30 / 27-060	27	48	60	21	M 12	12
FMA / BT40 / 16-050	16	32	50	17	M 8	08
FMA / BT40 / 16-100	16	32	100	17	M 8	08
FMA / BT40 / 16-150	16	40	150	19	M 10	10
FMA / BT40 / 22-050	22	40	50	19	M 10	10
FMA / BT40 / 22-100	22	40	100	19	M 10	10
FMA / BT40 / 22-160	22	40	160	19	M 10	10
FMA / BT40 / 27-060	27	48	60	21	M 12	12
FMA / BT40 / 27-120	27	48	120	21	M 12	12
FMA / BT40 / 27-160	27	48	160	21	M 12	12
FMA / BT40 / 32-070	32	58	70	24	M 16	14
FMA / BT40 / 32-120	32	58	120	24	M 16	14
FMA / BT40 / 32-160	32	58	160	24	M 16	14
FMA / BT40 / 40-070	40	68	70	27	M 20	16

ITEM CODE	D	D1	L	L1	M	W
FMA / BT50 / 16-060	16	32	60	17	M 8	08
FMA / BT50 / 16-100	16	32	100	17	M 8	08
FMA / BT50 / 16-150	16	32	150	17	M 8	08
FMA / BT50 / 22-060	22	40	60	19	M 10	10
FMA / BT50 / 22-100	22	40	100	19	M 10	10
FMA / BT50 / 22-150	22	40	150	19	M 10	10
FMA / BT50 / 27-060	27	48	60	21	M 12	12
FMA / BT50 / 27-100	27	48	100	21	M 12	12
FMA / BT50 / 27-160	27	48	160	21	M 12	12
FMA / BT50 / 32-070	32	58	70	24	M 16	14
FMA / BT50 / 32-100	32	58	100	24	M 16	14
FMA / BT50 / 32-160	32	58	160	24	M 16	14
FMA / BT50 / 40-070	40	68	70	27	M 20	16
FMA / BT50 / 40-100	40	68	100	27	M 20	16
FMA / BT50 / 40-160	40	68	160	27	M 20	16

- All Holders are in AT-3 Class

SIDE LOCK ADAPTOR
BT TAPER

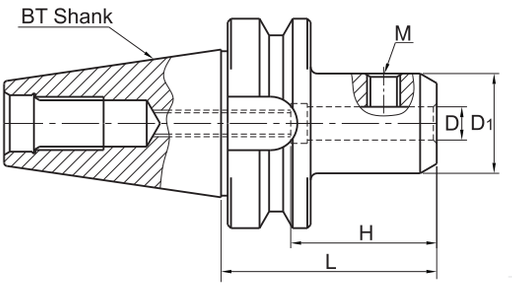


Fig.-1

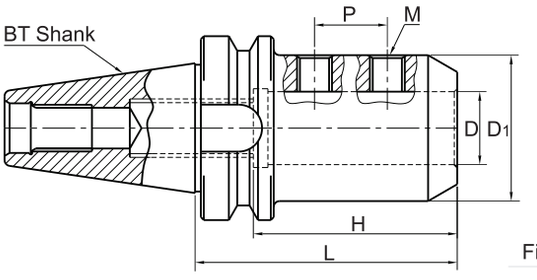


Fig.-2

MAS 403 Standard

ITEM CODE	D_1	D	L	H	M	P	Fig.
SLA / BT30 / 06-65	20	06	65	40	M 6	--	1
SLA / BT30 / 08-65	24	08	65	40	M 8	--	1
SLA / BT30 / 10-65	30	10	65	44	M 10	--	1
SLA / BT30 / 12-65	35	12	65	44	M 10	--	1
SLA / BT30 / 16-65	40	16	65	52	M 10	--	1
SLA / BT30 / 20-90	50	20	90	70	M 10	20	2
SLA / BT30 / 25-90	50	25	90	70	M 10	25	2
SLA / BT40 / 06-65	20	06	65	40	M 6	--	1
SLA / BT40 / 08-65	24	08	65	40	M 8	--	1
SLA / BT40 / 10-65	30	10	65	44	M 10	--	1
SLA / BT40 / 12-65	35	12	65	44	M 10	--	1
SLA / BT40 / 16-65	40	16	65	52	M 10	--	1
SLA / BT40 / 20-90	50	20	90	70	M 10	20	2
SLA / BT40 / 25-90	50	25	90	70	M 12	25	2
SLA / BT40 / 32-90	60	32	90	70	M 12	28	2
SLA / BT40 / 40-90	70	40	90	70	M 12	28	2
SLA / BT50 / 06-70	20	06	70	40	M 6	--	1
SLA / BT50 / 08-70	24	08	70	40	M 8	--	1
SLA / BT50 / 10-70	30	10	70	44	M 10	--	1
SLA / BT50 / 12-70	35	12	70	44	M 10	--	1
SLA / BT50 / 16-70	40	16	70	52	M 10	--	1
SLA / BT50 / 20-100	50	20	100	70	M 10	20	2
SLA / BT50 / 25-100	50	25	100	70	M 12	25	2
SLA / BT50 / 32-100	60	32	100	70	M 12	28	2
SLA / BT50 / 40-100	70	40	100	70	M 12	28	2

- All Holders are in AT-3 Class

MORSE TAPER ADAPTOR
BT TAPER

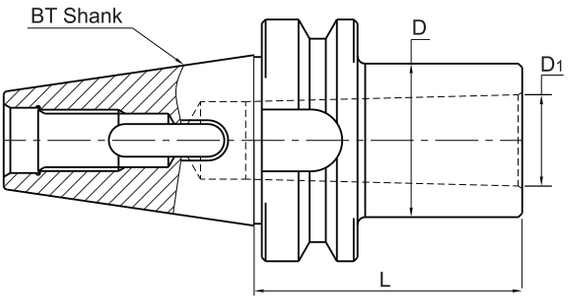


Fig.-1

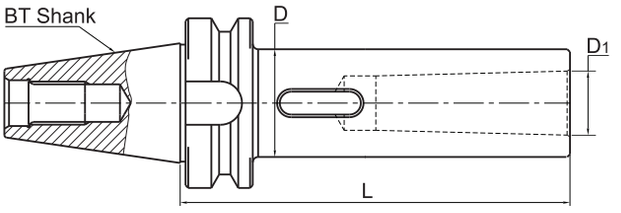


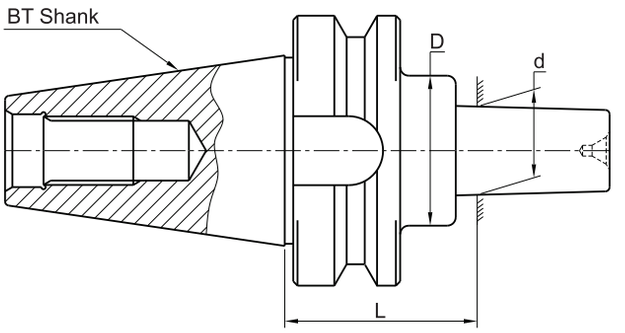
Fig.-2

MAS 403 Standard

ITEM CODE	MORSE TAPER	L	D	D1	Fig. No.
MTA / BT30 / 1-050	1	50	25	12.065	01
MTA / BT30 / 1-110	1	110	25	12.065	02
MTA / BT30 / 2-060	2	60	32	17.780	01
MTA / BT30 / 2-120	2	120	32	17.780	02
MTA / BT30 / 3-070	3	70	40	23.825	01
MTA / BT30 / 3-140	3	140	40	23.825	02
MTA / BT40 / 1-045	1	45	25	12.065	01
MTA / BT40 / 1-110	1	110	25	12.065	02
MTA / BT40 / 2-050	2	50	32	17.780	01
MTA / BT40 / 2-125	2	125	32	17.780	02
MTA / BT40 / 3-070	3	70	40	23.825	01
MTA / BT40 / 3-140	3	140	40	23.825	02
MTA / BT40 / 4-095	4	95	48	31.267	01
MTA / BT40 / 4-170	4	170	48	31.267	02
MTA / BT50 / 1-045	1	45	25	12.065	01
MTA / BT50 / 1-120	1	120	25	12.065	02
MTA / BT50 / 2-060	2	60	32	17.780	01
MTA / BT50 / 2-140	2	140	32	17.780	02
MTA / BT50 / 3-065	3	65	40	23.825	01
MTA / BT50 / 3-150	3	150	40	23.825	02
MTA / BT50 / 4-090	4	90	48	31.267	01
MTA / BT50 / 4-180	4	180	48	31.267	02

- All Holders are in AT-3 Class

DRILL CHUCK ARBOR
BT TAPER

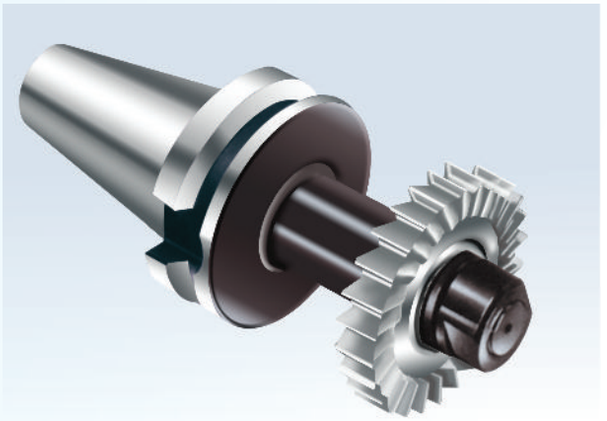


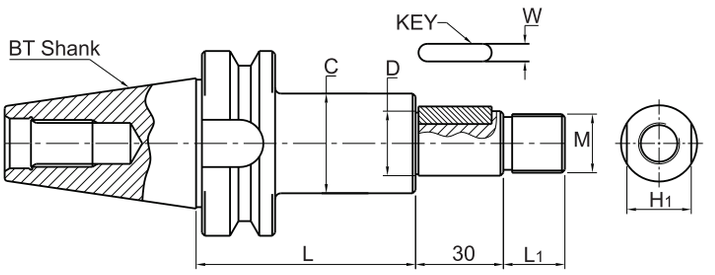
MAS 403 Standard

ITEM CODE	DRILL CHUCK TAPER	D	d	L	DRILL CHUCK SIZE
DCA / BT30 / JT2-045	JT 2	30	14.2	45	3/8"
DCA / BT30 / JT2-090	JT 2	30	14.2	90	3/8"
DCA / BT30 / JT6-045	JT 6	30	17.2	45	1/2"
DCA / BT30 / JT6-090	JT 6	30	17.2	90	1/2"
DCA / BT30 / B12-045	B 12	30	12.1	45	3/8"
DCA / BT30 / B12-090	B 12	30	12.1	90	3/8"
DCA / BT30 / B16-045	B 16	30	15.8	45	5/8"
DCA / BT30 / B16-090	B 16	30	15.8	90	5/8"
DCA / BT40 / JT2-045	JT 2	30	14.2	45	3/8"
DCA / BT40 / JT2-090	JT 2	30	14.2	90	3/8"
DCA / BT40 / JT3-045	JT 3	30	20.6	45	3/4"
DCA / BT40 / JT3-090	JT 3	30	20.6	90	3/4"
DCA / BT40 / JT6-045	JT 6	30	17.2	45	1/2"
DCA / BT40 / JT6-090	JT 6	30	17.2	90	1/2"
DCA / BT40 / B12-045	B 12	30	12.1	45	3/8"
DCA / BT40 / B12-090	B 12	30	12.1	90	3/8"
DCA / BT40 / B16-045	B 16	30	15.8	45	5/8"
DCA / BT40 / B16-090	B 16	30	15.8	90	5/8"
DCA / BT50 / JT2-055	JT 2	30	14.2	55	5/8"
DCA / BT50 / JT2-090	JT 2	30	14.2	90	3/8"
DCA / BT50 / JT3-055	JT 3	30	20.6	55	3/4"
DCA / BT50 / JT3-090	JT 3	30	20.6	90	3/4"
DCA / BT50 / JT6-055	JT 6	30	17.2	55	1/2"
DCA / BT50 / JT6-090	JT 6	30	17.2	90	1/2"
DCA / BT50 / B12-055	B 12	30	12.1	55	3/8"
DCA / BT50 / B12-090	B 12	30	12.1	90	3/8"
DCA / BT50 / B16-055	B 16	30	15.8	55	5/8"
DCA / BT50 / B16-090	B 16	30	15.8	90	5/8"

- All Holders are in AT-3 Class

SIDE CUTTER ARBOR
BT TAPER

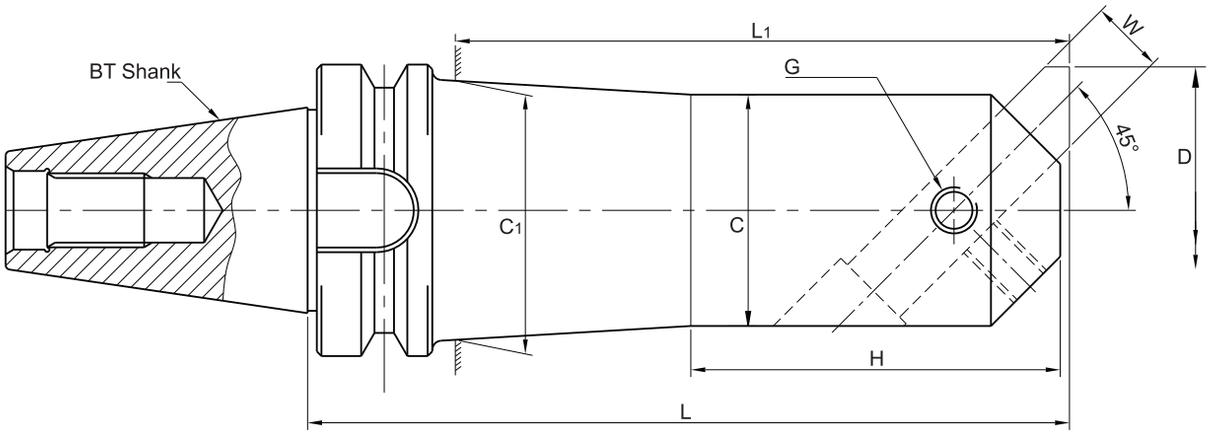




MAS 403 Standard

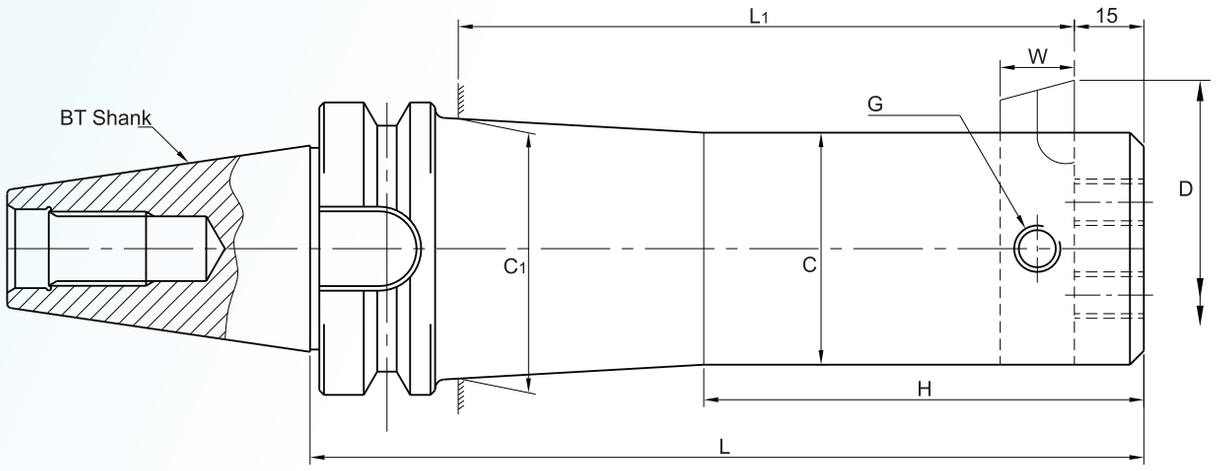
ITEM CODE	D	L	L_1	M	C	W	H_1
SCA / BT30 / 13-060	13	60	15	M 12 x 1.25	20	--	17
SCA / BT30 / 16-060	16	60	16	M 14 x 1.5	26	4	22
SCA / BT30 / 22-060	22	60	21	M 20 x 1.5	34	6	30
SCA / BT40 / 13-060	13	60	15	M 12 x 1.25	20	--	17
SCA / BT40 / 13-090	13	90	15	M 12 x 1.25	20	--	17
SCA / BT40 / 16-075	16	75	16	M 14 x 1.5	26	4	22
SCA / BT40 / 16-105	16	105	16	M 14 x 1.5	26	4	22
SCA / BT40 / 22-075	22	75	21	M 20 x 1.5	34	6	30
SCA / BT40 / 22-120	22	120	21	M 20 x 1.5	34	6	30
SCA / BT40 / 27-075	27	75	25	M 24 x 2.0	40	7	32
SCA / BT40 / 27-120	27	120	25	M 24 x 2.0	40	7	32
SCA / BT40 / 32-090	32	90	30	M 30 x 2.0	46	8	41
SCA / BT50 / 13-075	13	75	15	M 12 x 1.25	20	--	17
SCA / BT50 / 13-105	13	105	15	M 12 x 1.25	20	--	17
SCA / BT50 / 16-075	16	75	16	M 14 x 1.5	26	4	22
SCA / BT50 / 16-110	16	110	16	M 14 x 1.5	26	4	22
SCA / BT50 / 22-080	22	80	21	M 20 x 1.5	34	6	30
SCA / BT50 / 22-115	22	115	21	M 20 x 1.5	34	6	30
SCA / BT50 / 27-080	27	80	25	M 24 x 2.0	40	7	32
SCA / BT50 / 27-115	27	115	25	M 24 x 2.0	40	7	32
SCA / BT50 / 32-090	32	90	30	M 30 x 2.0	46	8	41
SCA / BT50 / 32-125	32	125	30	M 30 x 2.0	46	8	41
SCA / BT50 / 40-090	40	90	36	M 36 x 3.0	55	10	46
SCA / BT50 / 40-125	40	125	36	M 36 x 3.0	55	10	46

BORING BAR HOLDER - BSA



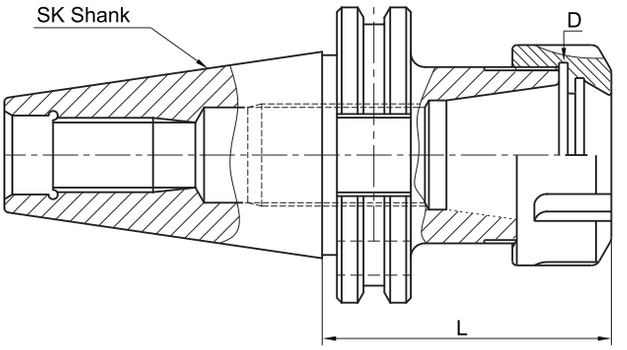
ITEM CODE	D		L	L1	C	C1	H	W	G
	Min.	Max.							
BT30 / BSA25-120	25	38	120	95	20	22	35	8	M 6
BT30 / BSA30-135	30	42	135	110	24	26	40	8	M 6
BT30 / BSA38-150	38	52	150	125	30	33	50	10	M 8
BT30 / BSA42-150	42	56	150	125	34	37	60	10	M 8
BT40 / BSA25-135	25	38	135	103	20	22	35	8	M 6
BT40 / BSA30-165	30	42	165	133	24	26	40	8	M 6
BT40 / BSA38-180	38	52	180	148	30	33	50	10	M 8
BT40 / BSA42-210	42	56	210	178	34	37	60	10	M 8
BT40 / BSA50-165	50	65	165	133	40	44	65	12	M 10
BT40 / BSA50-215	50	65	210	178	40	44	65	12	M 10
BT40 / BSA62-165	62	90	165	133	50	56	80	16	M 10
BT40 / BSA62-225	62	90	225	193	50	56	80	16	M 10
BT50 / BSA25-135	25	38	135	92	20	22	35	8	M 6
BT50 / BSA30-165	30	42	165	122	24	26	40	8	M 6
BT50 / BSA38-180	38	52	180	137	30	33	50	10	M 8
BT50 / BSA42-210	42	56	210	167	34	37	60	10	M 8
BT50 / BSA50-180	50	65	180	137	40	44	65	12	M 10
BT50 / BSA50-240	50	65	240	197	40	44	65	12	M 10
BT50 / BSA62-195	62	90	195	152	50	56	80	16	M 10
BT50 / BSA62-270	62	90	270	227	50	56	80	16	M 10
BT50 / BSA72-195	72	110	195	152	60	66	95	20	M 10
BT50 / BSA72-285	72	110	285	242	60	66	95	20	M 10
BT50 / BSA90-210	90	125	210	167	75	80	110	20	M 12
BT50 / BSA90-300	90	125	300	257	75	80	110	20	M 12

BORING BAR HOLDER - BSB



ITEM CODE	D		L	L1	C	C1	H	W	G
	Min.	Max.							
BT30 / BSB25-120	25	52	135	95	20	22	50	8	M 8
BT30 / BSB38-150	38	70	165	125	30	32	70	10	M 10
BT30 / BSB50-150	50	90	165	--	40	44	85	12	M 12
BT40 / BSB25-135	25	52	150	103	20	22	50	8	M 8
BT40 / BSB38-180	38	70	195	148	30	3	70	10	M 10
BT40 / BSB50-165	50	90	180	133	40	44	85	12	M 10
BT40 / BSB50-210	50	90	225	178	40	44	85	12	M 10
BT40 / BSB62-165	62	115	180	133	50	56	95	16	M 10
BT40 / BSB62-225	62	115	240	193	50	56	95	16	M 10
BT40 / BSB72-165	72	135	180	--	60	--	--	20	M 10
BT40 / BSB72-225	72	135	240	--	60	--	--	20	M 10
BT50 / BSB25-135	25	52	150	92	20	22	50	8	M 8
BT50 / BSB38-180	38	70	195	137	30	32	70	10	M 10
BT50 / BSB50-180	50	90	195	137	40	44	85	12	M 10
BT50 / BSB50-240	50	90	255	197	40	44	85	12	M 10
BT50 / BSB62-195	62	115	210	152	50	56	95	16	M 10
BT50 / BSB62-270	62	115	285	227	50	56	95	16	M 10
BT50 / BSB72-195	72	135	210	152	60	66	110	20	M 10
BT50 / BSB72-285	72	135	300	242	60	66	110	20	M 10
BT50 / BSB90-210	90	150	225	167	75	80	130	20	M 12
BT50 / BSB90-300	90	150	315	257	75	80	130	20	M 12
BT50 / BSB105-195	105	190	210	--	90	--	--	25	M 12
BT50 / BSB105-285	105	190	300	--	90	94	150	25	M 12

ER COLLET CHUCK
SK TAPER



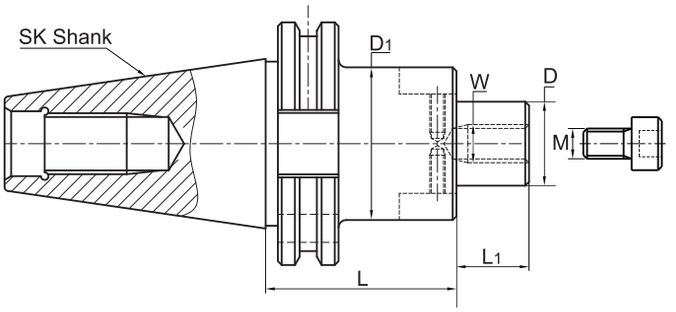
DIN 69871 Standard

ITEM CODE	COLLET	D	L
CHE / SK30 / ER16-060	ER 16	28	60
CHE / SK30 / ER20-060	ER 20	34	60
CHE / SK30 / ER25-060	ER 25	42	60
CHE / SK30 / ER32-060	ER 32	50	60
CHE / SK40 / ER16-060	ER 16	28	60
CHE / SK40 / ER16-100	ER 16	28	100
CHE / SK40 / ER20-060	ER 20	34	60
CHE / SK40 / ER20-100	ER 20	34	100
CHE / SK40 / ER20-150	ER 20	34	150
CHE / SK40 / ER25-060	ER 25	42	60
CHE / SK40 / ER25-100	ER 25	42	100
CHE / SK40 / ER25-150	ER 25	42	150
CHE / SK40 / ER32-070	ER 32	50	70
CHE / SK40 / ER32-100	ER 32	50	10
CHE / SK40 / ER32-150	ER 32	50	150
CHE / SK40 / ER40-080	ER 40	63	80
CHE / SK40 / ER40-100	ER 40	63	100

ITEM CODE	COLLET	D	L
CHE / SK40 / ER40-150	ER 40	63	150
CHE / SK50 / ER16-100	ER 16	28	100
CHE / SK50 / ER20-080	ER 20	34	80
CHE / SK50 / ER20-100	ER 20	34	100
CHE / SK50 / ER20-150	ER 20	34	150
CHE / SK50 / ER25-080	ER 25	42	80
CHE / SK50 / ER25-100	ER 25	42	100
CHE / SK50 / ER25-160	ER 25	42	160
CHE / SK50 / ER32-080	ER 32	50	80
CHE / SK50 / ER32-100	ER 32	50	100
CHE / SK50 / ER32-160	ER 32	50	160
CHE / SK50 / ER40-080	ER 40	63	80
CHE / SK50 / ER40-100	ER 40	63	100
CHE / SK50 / ER40-160	ER 40	63	160
CHE / SK50 / ER50-100	ER 50	78	100
CHE / SK50 / ER50-160	ER 50	78	160

- Max. Runout of the Internal Taper w.r.t. External Taper: 0.005 mm
- All Holders are in AT-3 Class

FACE MILL ARBOR
SK TAPER



DIN 69871 Standard

ITEM CODE	D	D1	L	L1	M	W
FMA / SK30 / 16-050	16	32	50	17	M 8	08
FMA / SK30 / 22-050	22	40	50	19	M 10	10
FMA / SK30 / 27-060	27	48	60	21	M 12	12
FMA / SK40 / 16-050	16	32	50	17	M 8	08
FMA / SK40 / 16-100	16	32	100	17	M 8	08
FMA / SK40 / 16-150	16	40	150	19	M 10	10
FMA / SK40 / 22-050	22	40	50	19	M 10	10
FMA / SK40 / 22-100	22	40	100	19	M 10	10
FMA / SK40 / 22-160	22	40	160	19	M 10	10
FMA / SK40 / 27-060	27	48	60	21	M 12	12
FMA / SK40 / 27-120	27	48	120	21	M 12	12
FMA / SK40 / 27-160	27	48	160	21	M 12	12
FMA / SK40 / 32-070	32	58	70	24	M 16	14
FMA / SK40 / 32-120	32	58	120	24	M 16	14
FMA / SK40 / 32-160	32	58	160	24	M 16	14
FMA / SK40 / 40-070	40	68	70	27	M 20	16

ITEM CODE	D	D1	L	L1	M	W
FMA / SK50 / 16-060	16	32	60	17	M 8	08
FMA / SK50 / 16-100	16	32	100	17	M 8	08
FMA / SK50 / 16-150	16	32	150	17	M 8	08
FMA / SK50 / 22-060	22	40	60	19	M 10	10
FMA / SK50 / 22-100	22	40	100	19	M 10	10
FMA / SK50 / 22-150	22	40	150	19	M 10	10
FMA / SK50 / 27-060	27	48	60	21	M 12	12
FMA / SK50 / 27-100	27	48	100	21	M 12	12
FMA / SK50 / 27-160	27	48	160	21	M 12	12
FMA / SK50 / 32-070	32	58	70	24	M 16	14
FMA / SK50 / 32-100	32	58	100	24	M 16	14
FMA / SK50 / 32-160	32	58	160	24	M 16	14
FMA / SK50 / 40-070	40	68	70	27	M 20	16
FMA / SK50 / 40-100	40	68	100	27	M 20	16
FMA / SK50 / 40-160	40	68	160	27	M 20	16

• All Holders are in AT-3 Class

SIDE LOCK ADAPTOR
SK TAPER

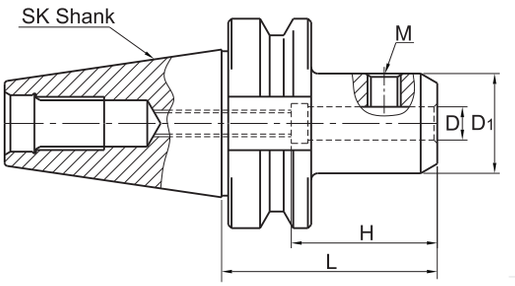


Fig.-1

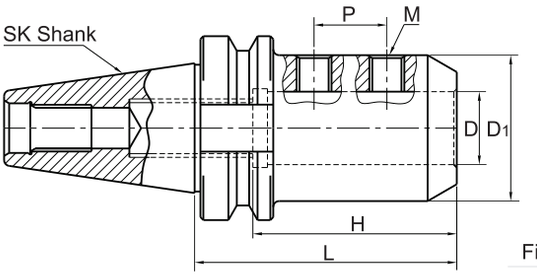


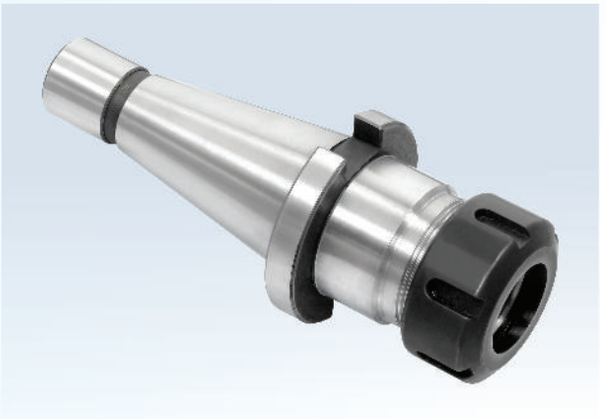
Fig.-2

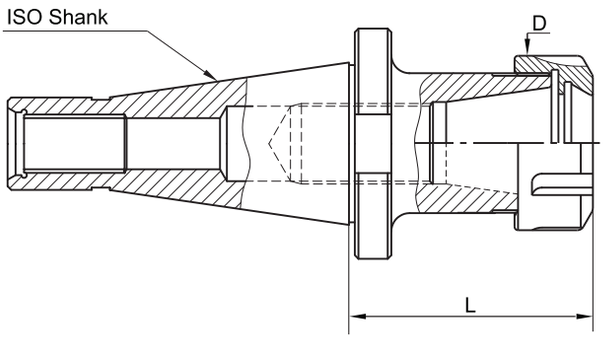
DIN 69871 Standard

ITEM CODE	D1	D	L	H	M	P	Fig. No.
SLA / SK30 / 10-065	30	10	65	44	M 10	--	1
SLA / SK30 / 12-065	35	12	65	44	M 10	--	1
SLA / SK30 / 16-065	40	16	65	52	M 10	--	1
SLA / SK30 / 20-090	50	20	90	70	M 10	20	2
SLA / SK30 / 25-090	50	25	90	70	M 10	25	2
SLA / SK40 / 08-065	24	08	65	40	M 8	--	1
SLA / SK40 / 10-065	30	10	65	44	M 10	--	1
SLA / SK40 / 12-065	35	12	65	44	M 10	--	1
SLA / SK40 / 16-065	40	16	65	52	M 10	--	1
SLA / SK40 / 20-090	50	20	90	70	M 10	20	2
SLA / SK40 / 25-090	50	25	90	70	M 12	25	2
SLA / SK40 / 32-090	60	32	90	70	M 12	28	2
SLA / SK40 / 40-090	70	40	90	70	M 12	28	2
SLA / SK50 / 10-070	30	10	70	44	M 10	--	1
SLA / SK50 / 12-070	35	12	70	44	M 10	--	1
SLA / SK50 / 16-070	40	16	70	52	M 10	--	1
SLA / SK50 / 20-100	50	20	100	70	M 10	20	2
SLA / SK50 / 25-100	50	25	100	70	M 12	25	2
SLA / SK50 / 32-100	60	32	100	70	M 12	28	2
SLA / SK50 / 40-100	70	40	100	70	M 12	28	2

• All Holders are in AT-3 Class

ER COLLET CHUCK
ISO TAPER





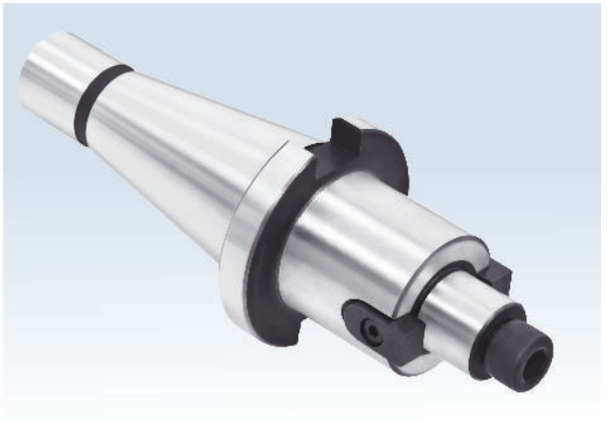
DIN 2080 Standard

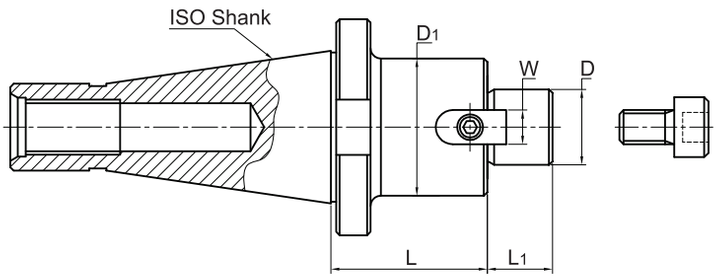
ITEM CODE	COLLET	D	L
CHE / ISO30 / ER16-060	ER 16	28	60
CHE / ISO30 / ER20-060	ER 20	34	60
CHE / ISO30 / ER25-060	ER 25	42	60
CHE / ISO30 / ER32-060	ER 32	50	60
CHE / ISO40 / ER16-060	ER 16	28	60
CHE / ISO40 / ER16-100	ER 16	28	100
CHE / ISO40 / ER20-060	ER 20	34	60
CHE / ISO40 / ER20-100	ER 20	34	100
CHE / ISO40 / ER20-150	ER 20	34	150
CHE / ISO40 / ER25-060	ER 25	42	60
CHE / ISO40 / ER25-100	ER 25	42	100
CHE / ISO40 / ER25-150	ER 25	42	150
CHE / ISO40 / ER32-070	ER 32	50	70
CHE / ISO40 / ER32-100	ER 32	50	100
CHE / ISO40 / ER32-150	ER 32	50	150
CHE / ISO40 / ER32-200	ER 32	50	200
CHE / ISO40 / ER40-080	ER 40	63	80

ITEM CODE	COLLET	D	L
CHE / ISO40 / ER40-100	ER 40	63	100
CHE / ISO40 / ER40-150	ER 40	63	150
CHE / ISO50 / ER16-100	ER 16	28	100
CHE / ISO50 / ER20-080	ER 20	34	80
CHE / ISO50 / ER20-100	ER 20	34	100
CHE / ISO50 / ER20-150	ER 20	34	150
CHE / ISO50 / ER25-080	ER 25	42	80
CHE / ISO50 / ER25-100	ER 25	42	100
CHE / ISO50 / ER25-160	ER 25	42	160
CHE / ISO50 / ER32-080	ER 32	50	80
CHE / ISO50 / ER32-100	ER 32	50	100
CHE / ISO50 / ER32-160	ER 32	50	160
CHE / ISO50 / ER40-080	ER 40	63	80
CHE / ISO50 / ER40-100	ER 40	63	100
CHE / ISO50 / ER40-160	ER 40	63	160
CHE / ISO50 / ER50-100	ER 50	78	100

- Max. Runout of the Internal Taper w.r.t. External Taper: 0.005 mm
- All Holders are in AT-3 Class

FACE MILL ARBOR
ISO TAPER





ITEM CODE	D	D1	L	L1	M	W
FMA / ISO30 / 16-050	16	32	50	17	M 8	08
FMA / ISO30 / 22-050	22	40	50	19	M 10	10
FMA / ISO30 / 27-060	27	48	60	21	M 12	12
FMA / ISO40 / 16-050	16	32	50	17	M 8	08
FMA / ISO40 / 16-100	16	32	100	17	M 8	08
FMA / ISO40 / 16-150	16	40	150	19	M 10	10
FMA / ISO40 / 22-050	22	40	50	19	M 10	10
FMA / ISO40 / 22-100	22	40	100	19	M 10	10
FMA / ISO40 / 22-160	22	40	160	19	M 10	10
FMA / ISO40 / 27-060	27	48	60	21	M 12	12
FMA / ISO40 / 27-120	27	48	120	21	M 12	12
FMA / ISO40 / 27-160	27	48	160	21	M 12	12
FMA / ISO40 / 32-070	32	58	70	24	M 16	14
FMA / ISO40 / 32-120	32	58	120	24	M 16	14
FMA / ISO40 / 32-160	32	58	160	24	M 16	14
FMA / ISO40 / 40-070	40	68	70	27	M 20	16

ITEM CODE	D	D1	L	L1	M	W
FMA / ISO50 / 16-060	16	32	60	17	M 8	08
FMA / ISO50 / 16-100	16	32	100	17	M 8	08
FMA / ISO50 / 16-150	16	32	150	17	M 8	08
FMA / ISO50 / 22-060	22	40	60	19	M 10	10
FMA / ISO50 / 22-100	22	40	100	19	M 10	10
FMA / ISO50 / 22-150	22	40	150	19	M 10	10
FMA / ISO50 / 27-060	27	48	60	21	M 12	12
FMA / ISO50 / 27-100	27	48	100	21	M 12	12
FMA / ISO50 / 27-160	27	48	160	21	M 12	12
FMA / ISO50 / 32-070	32	58	70	24	M 16	14
FMA / ISO50 / 32-100	32	58	100	24	M 16	14
FMA / ISO50 / 32-160	32	58	160	24	M 16	14
FMA / ISO50 / 40-070	40	68	70	27	M 20	16
FMA / ISO50 / 40-100	40	68	100	27	M 20	16
FMA / ISO50 / 40-160	40	68	160	27	M 20	16

- All Holders are in AT-3 Class

SIDE LOCK ADAPTOR
ISO TAPER

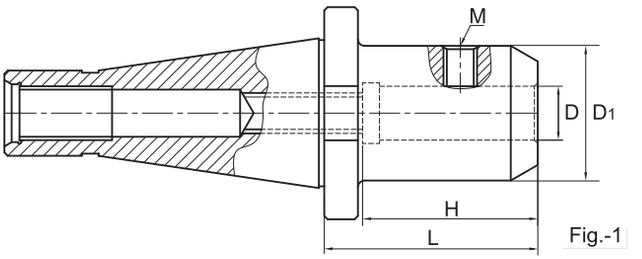


Fig.-1

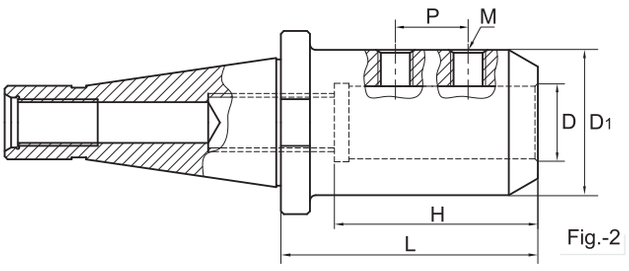


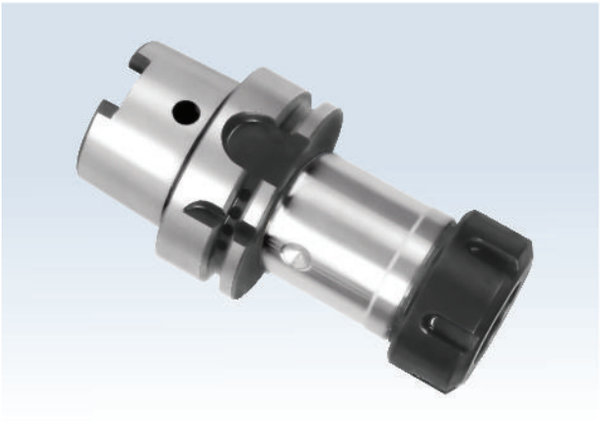
Fig.-2

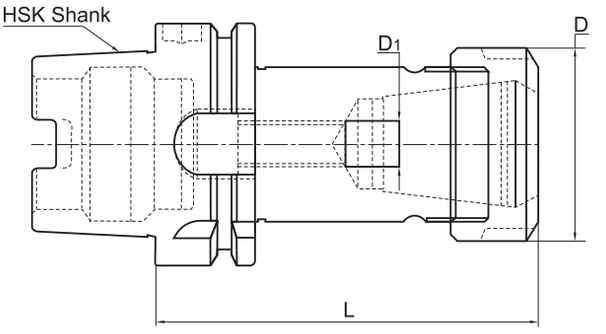
DIN 2080 Standard

ITEM CODE	D_1	D	L	H	M	P	Fig.
SLA / ISO30 / 10-065	30	10	65	44	M 10	--	1
SLA / ISO30 / 12-065	35	12	65	44	M 10	--	1
SLA / ISO30 / 16-065	40	16	65	52	M 10	--	1
SLA / ISO30 / 20-090	50	20	90	70	M 10	20	2
SLA / ISO30 / 25-090	50	25	90	70	M 10	25	2
SLA / ISO40 / 08-065	24	08	65	40	M 8	--	1
SLA / ISO40 / 10-065	30	10	65	44	M 10	--	1
SLA / ISO40 / 12-065	35	12	65	44	M 10	--	1
SLA / ISO40 / 16-065	40	16	65	52	M 10	--	1
SLA / ISO40 / 20-090	50	20	90	70	M 10	20	2
SLA / ISO40 / 25-090	50	25	90	70	M 12	25	2
SLA / ISO40 / 32-090	60	32	90	70	M 12	28	2
SLA / ISO40 / 40-090	70	40	90	70	M 12	28	2
SLA / ISO50 / 10-070	30	10	70	44	M 10	--	1
SLA / ISO50 / 12-070	35	12	70	44	M 10	--	1
SLA / ISO50 / 16-070	40	16	70	52	M 10	--	1
SLA / ISO50 / 20-100	50	20	100	70	M 10	20	2
SLA / ISO50 / 25-100	50	25	100	70	M 12	25	2
SLA / ISO50 / 32-100	60	32	100	70	M 12	28	2
SLA / ISO50 / 40-100	70	40	100	70	M 12	28	2

- All Holders are in AT-3 Class

COLLET CHUCK
HSK TAPER



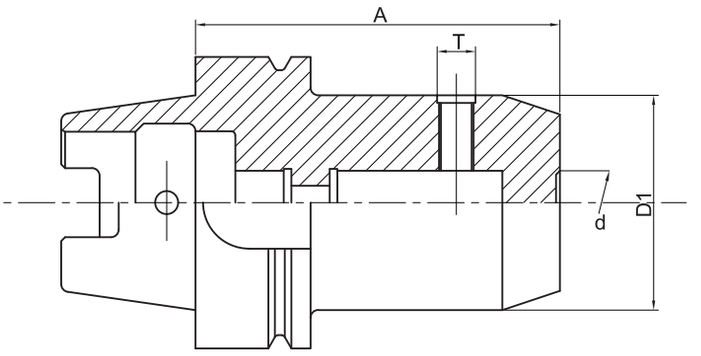


DIN 69893 Standard

ITEM CODE	Clamping Capacity	D	L	D1
CHE / HSK - A50 / ER16-060	0.5 - 10	28.00	60	M10 x 1
CHE / HSK - A50 / ER16-100	0.5 - 10	34.00	70	M10 x 1
CHE / HSK - A50 / ER20-100	1.0 - 13	34.00	100	M10 x 1
CHE / HSK - A50 / ER25-070	1.0 - 16	42.00	70	M18 x 1
CHE / HSK - A50 / ER25-100	1.0 - 16	42.00	100	M18 x 1
CHE / HSK - A50 / ER32-080	2.0 - 20	50.00	80	M22 x 1.5
CHE / HSK - A50 / ER32-100	2.0 - 20	50.00	100	M22 x 1.5
CHE / HSK - A50 / ER40-080	3.0 - 26	63.00	80	M30 x 1.5
CHE / HSK - A63 / ER16-100	0.5 - 10	28.00	100	M10 x 1
CHE / HSK - A63 / ER16-160	0.5 - 10	28.00	160	M10 x 1
CHE / HSK - A63 / ER20-100	1.0 - 13	34.00	100	M10 x 1
CHE / HSK - A63 / ER20-160	1.0 - 13	34.00	160	M10 x 1
CHE / HSK - A63 / ER25-100	1.0 - 16	42.00	100	M18 x 1
CHE / HSK - A63 / ER25-160	1.0 - 16	42.00	160	M22 x 1.5
CHE / HSK - A63 / ER32-100	2.0 - 20	50.00	100	M22 x 1.5
CHE / HSK - A63 / ER32-160	2.0 - 20	50.00	160	M22 x 1.5
CHE / HSK - A63 / ER40-120	3.0 - 26	63.00	120	M30 x 1.5
CHE / HSK - A63 / ER40-160	3.0 - 26	63.00	160	M30 x 1.5
CHE / HSK - A100 / ER25-100	1.0 - 16	42.00	100	M18 x 1
CHE / HSK - A100 / ER25-160	1.0 - 16	42.00	160	M18 x 1
CHE / HSK - A100 / ER32-100	2.0 - 20	50.00	100	M22 x 1.5
CHE / HSK - A100 / ER32-160	2.0 - 20	50.00	160	M22 x 1.5
CHE / HSK - A100 / ER40-120	3.0 - 26	63.00	120	M30 x 1.5
CHE / HSK - A100 / ER40-160	3.0 - 26	63.00	160	M30 x 1.5

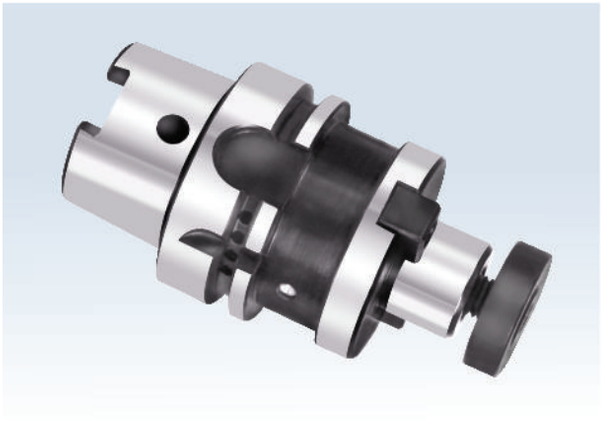
• All Holders are in AT-3 Class

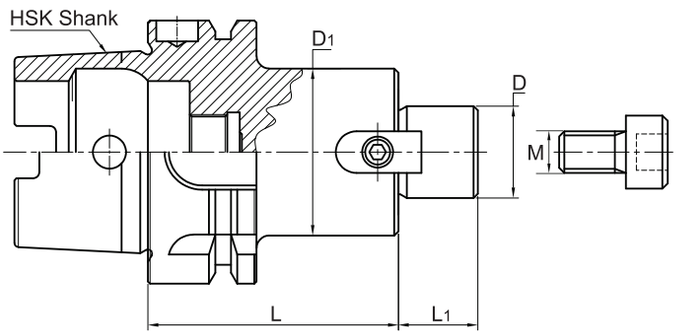
SIDE LOCK ADAPTOR
HSK TAPER



ITEM CODE	HSK-A	d	D1	A	T
SLA / HSK50 / 10-065	50	10	35	65	M10
SLA / HSK50 / 12-080	50	12	42	80	M12
SLA / HSK50 / 16-080	50	16	48	80	M12
SLA / HSK50 / 20-080	50	20	52	80	M16
SLA / HSK50 / 25-110	50	25	65	110	M16
SLA / HSK50 / 32-110	50	32	72	110	M16
SLA / HSK63 / 10-065	63	10	35	65	M10
SLA / HSK63 / 12-080	63	12	42	80	M12
SLA / HSK63 / 16-080	63	16	48	80	M12
SLA / HSK63 / 20-080	63	20	52	80	M16
SLA / HSK63 / 25-110	63	25	65	110	M16
SLA / HSK63 / 32-110	63	32	72	110	M16
SLA / HSK63 / 40-120	63	40	80	120	M16
SLA / HSK100 / 10-080	100	10	35	80	M10
SLA / HSK100 / 12-080	100	12	42	80	M12
SLA / HSK100 / 16-100	100	16	48	100	M12
SLA / HSK100 / 20-100	100	20	52	100	M16
SLA / HSK100 / 25-100	100	25	65	100	M16
SLA / HSK100 / 32-100	100	32	72	100	M16
SLA / HSK100 / 40-120	100	40	80	120	M16
SLA / HSK100 / 50-130	100	50	100	130	M16

FACE MILL ARBOR
HSK TAPER





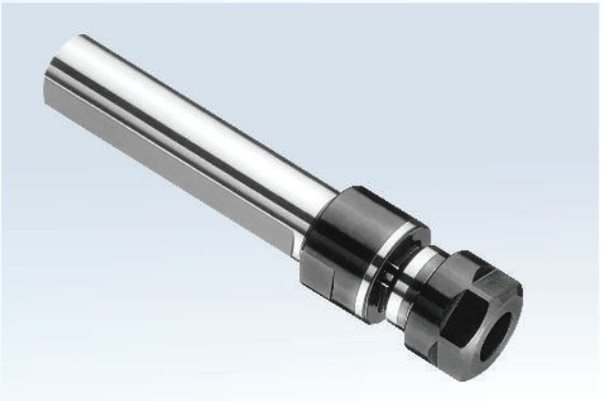
DIN 69893 Standard

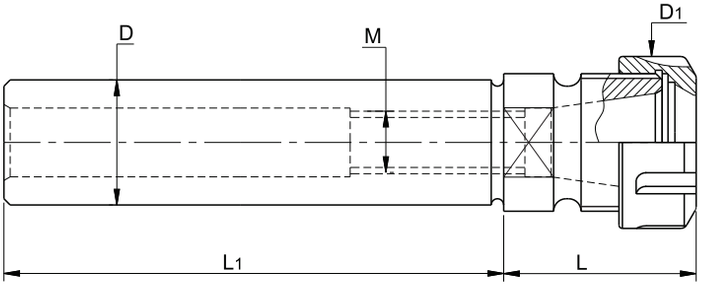
ITEM CODE	D	D1	L	L1
FMA / HSK / 16-050	16	32	50	17
FMA / HSK / 22-050	22	40	50	19
FMA / HSK / 27-060	27	48	60	21
FMA / HSK / 16-050	16	32	50	17
FMA / HSK / 16-100	16	32	100	17
FMA / HSK / 16-150	16	40	150	19
FMA / HSK / 22-050	22	40	50	19
FMA / HSK / 22-100	22	40	100	19
FMA / HSK / 22-160	22	40	160	19
FMA / HSK / 27-060	27	48	60	21
FMA / HSK / 27-120	27	48	120	21
FMA / HSK / 27-160	27	48	160	21
FMA / HSK / 32-070	32	58	70	24
FMA / HSK / 32-120	32	58	120	24
FMA / HSK / 32-160	32	58	160	24
FMA / HSK / 40-070	40	68	70	27

ITEM CODE	D	D1	L	L1
FMA / HSK / 16-060	16	32	60	17
FMA / HSK / 16-100	16	32	100	17
FMA / HSK / 16-150	16	32	150	17
FMA / HSK / 22-060	22	40	60	19
FMA / HSK / 22-100	22	40	100	19
FMA / HSK / 22-150	22	40	150	19
FMA / HSK / 27-060	27	48	60	21
FMA / HSK / 27-100	27	48	100	21
FMA / HSK / 27-160	27	48	160	21
FMA / HSK / 32-070	32	58	70	24
FMA / HSK / 32-100	32	58	100	24
FMA / HSK / 32-160	32	58	160	24
FMA / HSK / 40-070	40	68	70	27
FMA / HSK / 40-100	40	68	100	27
FMA / HSK / 40-160	40	68	160	27

- All Holders are in AT-3 Class

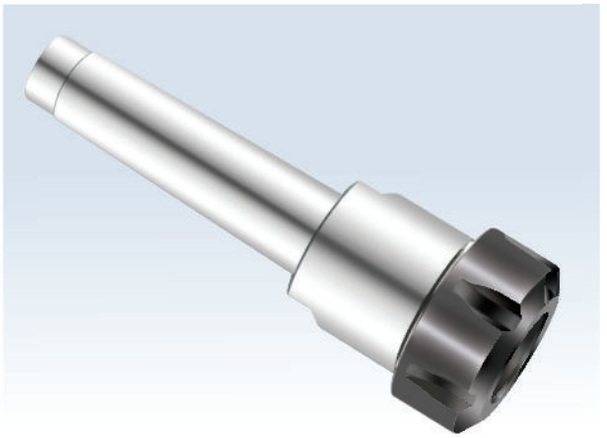
BABY COLLET CHUCK

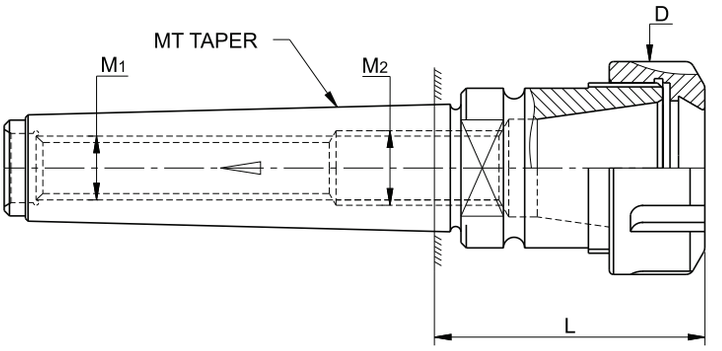




ITEM CODE	D	L	L1	D1	M	CLAMPING RANGE
CYL16 / ER11-060	16	30	60	19	M6 x 1	2.0-7.0
CYL16 / ER11-100	16	30	100	19	M6 x 1	2.0-7.0
CYL20 / ER11-060	20	30	60	19	M6 x 1	2.0-7.0
CYL20 / ER11-100	20	30	100	19	M6 x 1	2.0-7.0
CYL10 / ER16-060	10	35	60	28	-	2.0-10.0
CYL12 / ER16-060	12	35	60	28	-	2.0-10.0
CYL16 / ER16-060	16	35	60	28	M8 x 1.25	2.0-10.0
CYL20 / ER16-060	20	35	60	28	M10 x 1.5	2.0-10.0
CYL20 / ER16-100	20	35	100	28	M10 x 1.5	2.0-10.0
CYL20 / ER16-150	20	35	150	28	M10 x 1.5	2.0-10.0
CYL16 / ER20-060	16	45	60	34	M10 x 1.5	2.0-13.0
CYL16 / ER20-100	16	45	100	34	M10 x 1.5	2.0-13.0
CYL20 / ER20-060	20	45	60	34	M12 x 1.75	2.0-13.0
CYL20 / ER20-100	20	45	100	34	M12 x 1.75	2.0-13.0
CYL16 / ER25-060	16	50	60	42	M10 x 1.5	2.0-16.0
CYL16 / ER25-100	16	50	100	42	M10 x 1.5	2.0-16.0
CYL20 / ER25-060	20	50	60	42	M12 x 1.75	2.0-16.0
CYL20 / ER25-100	20	50	100	42	M12 x 1.75	2.0-16.0
CYL25 / ER25-060	25	50	60	42	M18 x 1.5	2.0-16.0
CYL25 / ER25-100	25	50	100	42	M18 x 1.5	2.0-16.0
CYL32 / ER25-060	32	50	60	42	M18 x 1.5	2.0-16.0
CYL32 / ER25-100	32	50	100	42	M18 x 1.5	2.0-16.0
CYL20 / ER32-060	20	60	60	50	M12 x 1.75	2.0-20.0
CYL20 / ER32-100	20	60	100	50	M12 x 1.75	2.0-20.0
CYL25 / ER32-060	25	60	60	50	M18 x 1.5	2.0-20.0
CYL25 / ER32-100	25	60	100	50	M18 x 1.5	2.0-20.0
CYL32 / ER32-060	32	60	60	50	M22 x 1.5	2.0-20.0
CYL32 / ER32-100	32	60	100	50	M22 x 1.5	2.0-20.0
CYL25 / ER40-100	25	60	100	63	M18 x 1.5	3.0-25.0
CYL32 / ER40-100	32	60	100	63	M22 X 1.5	3.0-25.0
CYL40 / ER40-100	40	60	100	63	M28 X 1.5	3.0-25.0

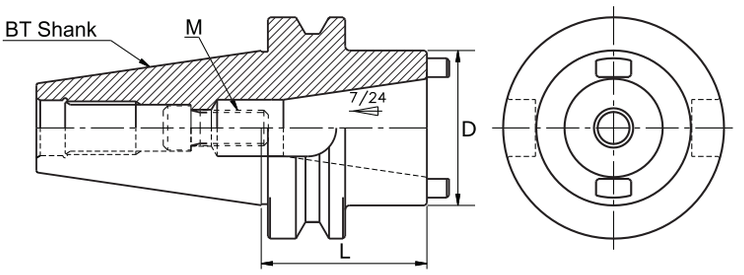
MT - ER COLLET CHUCK





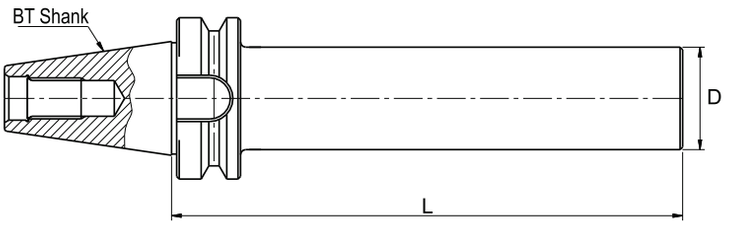
ITEM CODE	MORSE TAPER	D	L	M_1	M_2	CLAMPING RANGE
MT1 / ER11-025	1	19	25	M6	M 6 x 1.0	2.0-7.0
MT1 / ER16-045	1	28	45	M6	M 6 x 1.0	2.0-10.0
MT2 / ER16-045	2	28	45	M10	M10 x 1.5	2.0-10.0
MT2 / ER20-050	2	34	50	M10	M10 x 1.5	2.0-13.0
MT2 / ER25-055	2	42	55	M10	M10 x 1.5	2.0-16.0
MT2 / ER32-060	2	50	60	M10	M12 x 1.75	2.0-20.0
MT3 / ER16-045	3	28	45	M12	M10 x 1.5	2.0-10.0
MT3 / ER20-050	3	34	50	M12	M12 x 1.75	2.0-13.0
MT3 / ER25-055	3	42	55	M12	M12 x 1.75	2.0-16.0
MT3 / ER32-070	3	50	70	M12	M12 x 1.75	2.0-20.0
MT3 / ER40-080	3	63	80	M12	M12 x 1.75	3.0-26.0
MT4 / ER25-055	4	42	55	M16	M16 x 2.0	2.0-16.0
MT4 / ER32-060	4	50	60	M16	M16 x 2.0	2.0-20.0
MT4 / ER40-080	4	63	80	M16	M16 x 2.0	3.0-26.0
MT4 / ER50-105	4	78	105	M16	M16 x 2.0	10.0-34.0
MT5 / ER40-080	5	63	80	M20	M20 x 2.5	3.0-26.0
MT5 / ER50-100	5	78	100	M20	M20 x 2.5	10.0-34.0

REDUCTION SLEEVE



ITEM CODE	OUTER	INNER	D	L	M
RS / BT40 / ISO30-50	BT 40	BT / ISO 30	48	50	M 12
RS / BT50 / ISO40-75	BT 50	BT / ISO 40	70	75	M 16

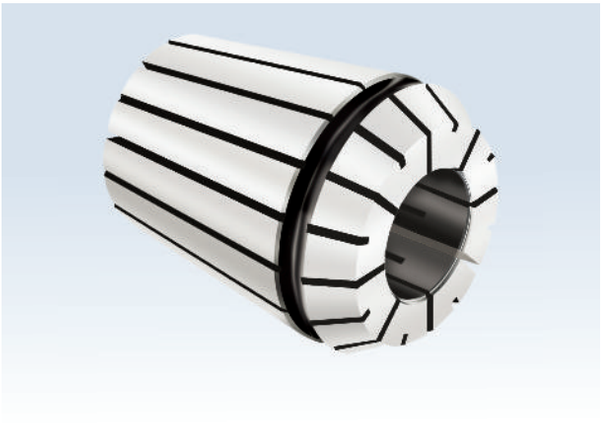
TEST MANDREL



ITEM CODE	D	L
TM / BT30 / 30-250	30	250
TM / BT40 / 40-300	40	300
TM / BT50 / 50-350	50	350

- SK and HSK taper available on request.

ER COLLET



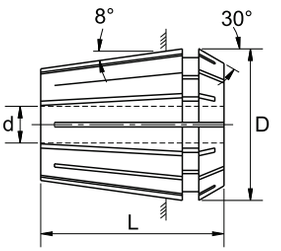


Fig.-1

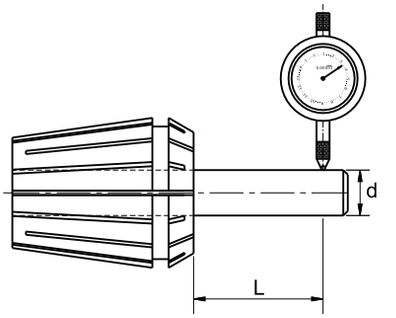
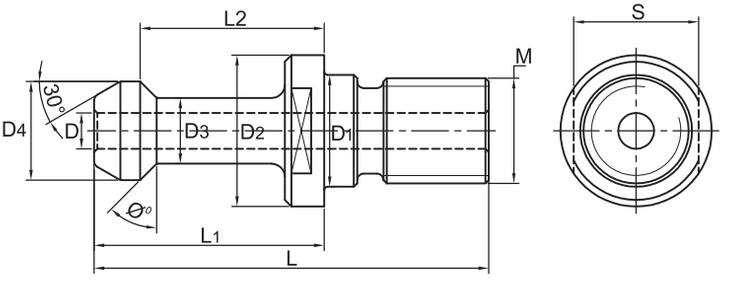


Fig.-2

ITEM CODE	Bore d		EXPANSION RANGE	TOTAL PCS./SET	D	L	AS PER DIN 6499		
	From	To					L	d	R/O (mm)
ER 08	0.5	5.0	0.5	09	9	13.5	10	1.5-3.0	0.015
ER 11	0.5	7.0	0.5	13	12	18	16	3.0-6.0	0.015
ER 16	1.0	10.0	1.0	10	17	27	25	6.0-10.0	0.015
ER 20	1.0	13.0	1.0	12	21	31	40	10.0-18.0	0.020
ER 25	1.0	16.0	1.0	15	26	35	50	18.0-26.0	0.020
ER 32	2.0	20.0	1.0	18	33	40	60	26.0-34.0	0.020
ER 40	3.0	26.0	1.0	23	41	46			
ER 50	10.0	34.0	2.0	12	51	60			

PULL STUD

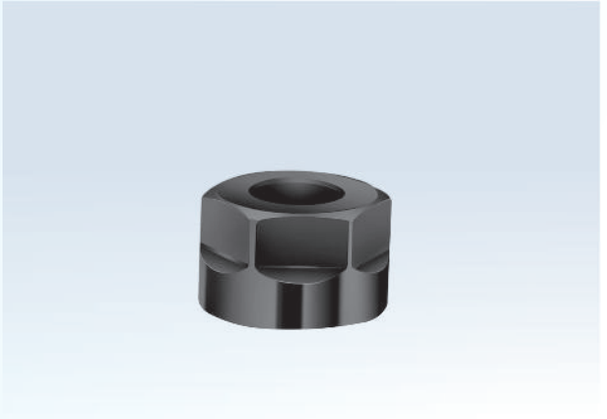


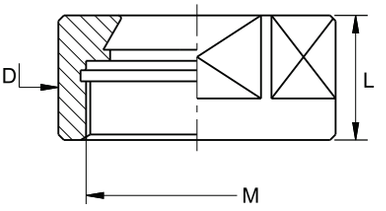
ITEM CODE	TAPER	D_1	D_2	D_3	D_4	L	L_1	L_2	S	M	Ø	D
PS / BT30 / 30	BT 30	12.5	16.5	7	11	43	23	18	13	M12 x 1.75	30^0	3
PS / BT30 / 45	BT 30	12.5	16.5	7	11	43	23	18	13	M12 x 1.75	45^0	3
PS / BT40 / 30	BT 40	17	23	10	15	60	35	28	19	M16 x 2	30^0	7
PS / BT40 / 45	BT 40	17	23	10	15	60	35	28	19	M16 x 2	45^0	7
PS / BT50 / 30	BT 50	25	38	17	23	85	45	35	30	M24 x 3	30^0	11.5
PS / BT50 / 45	BT 50	25	38	17	23	85	45	35	30	M24 x 3	45^0	11.5

• SK & Special Pull Stud available on request.

ER NUT

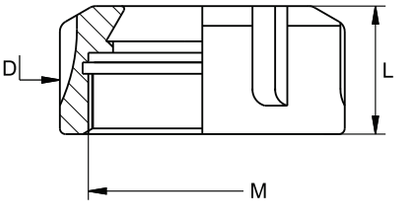
HEXAGONAL NUT





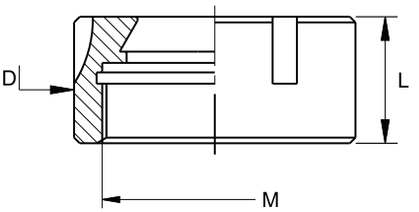
ITEM CODE	D	L	M	SUITABLE SPANNER
ERN / 11H	19	11.3	M 14 x 0.75	ERUM / 11
ERN / 16H	28	17.5	M 22 x 1.5	ERUM / 16
ERN / 20H	34	19.0	M 25 x 1.5	ERUM / 20

STANDARD ER NUT



ITEM CODE	D	L	M	SUITABLE SPANNER
ERN / 20S	34	19.0	M 25 x 1.5	E 20
ERN / 25S	42	20.0	M 32 x 1.5	E 25
ERN / 32S	50	22.5	M 40 x 1.5	E 32
ERN / 40S	63	25.5	M 50 x 1.5	E 40
ERN / 50S	78	35.5	M 64 x 2.0	E 50

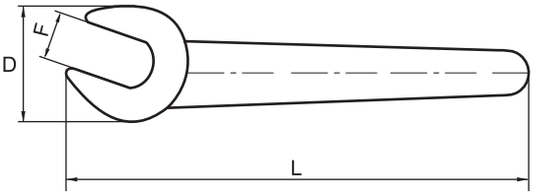
MINI ER NUT



ITEM CODE	D	L	M	SUITABLE SPANNER
ERN / 08M	12	10.8	M10 x 0.75	ERM 8
ERN / 11M	16	11.3	M13 x 0.75	ERM 11
ERN / 16M	22	17.0	M19 x 1.0	ERM 16
ERN / 20M	28	19.0	M24 x 1.0	ERM 20
ERN / 25M	35	20.0	M30 x 1.0	ERM 25

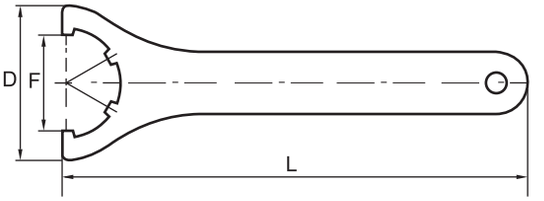
SPANNER

TYPE : ERUM



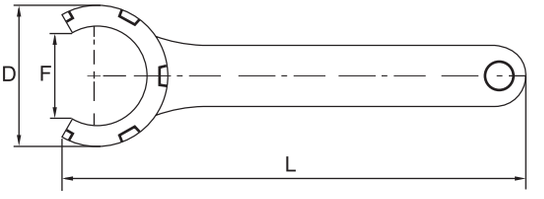
ITEM CODE	D	L	F	SUITABLE FOR NUT
ERUM / 11	40	120	17	ERN/11H
ERUM / 16	53	140	25	ERN/16H
ERUM / 20	60	160	30	ERN/20H

TYPE : E



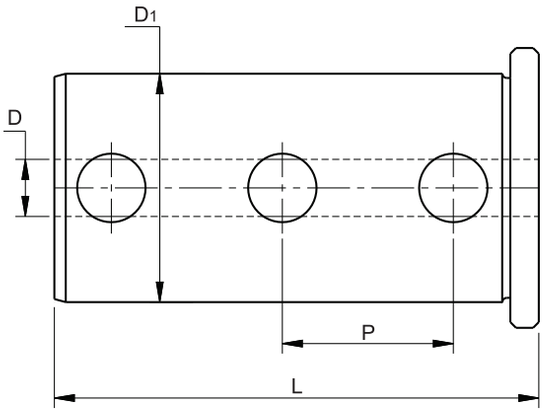
ITEM CODE	D	L	F	SUITABLE FOR NUT
E 20	55	180	30	ERN/20S
E 25	65	206	37	ERN/25S
E 32	75	253	46.5	ERN/32S
E 40	90	289	58	ERN/40S
E 50	110	351	74	ERN/50S

TYPE : ERM



ITEM CODE	D	L	F	SUITABLE FOR NUT
ERM 8	13	75	8	ERN/08M
ERM 11	17	95	11.5	ERN/11M
ERM 16	22.5	117	15	ERN/16M
ERM 20	28.5	129	19.5	ERN/20M
ERM 25	36	143	25	ERN/25M

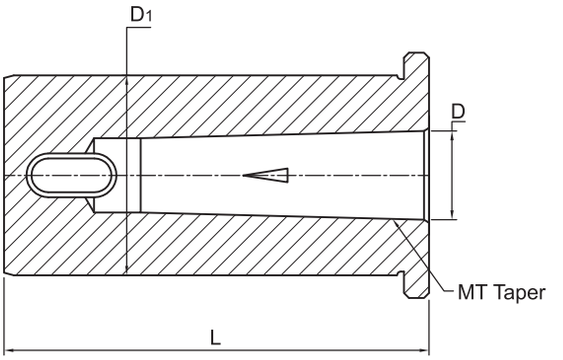
TURRET SLEEVE



ITEM CODE	D	P	D1	L
TS / JYT 40-06	06	30	40	85
TS / JYT 40-08	08	30	40	85
TS / JYT 40-10	10	30	40	85
TS / JYT 40-12	12	30	40	85
TS / JYT 40-16	16	30	40	85
TS / JYT 40-20	20	30	40	85
TS / JYT 40-25	25	30	40	85
TS / JYT 40-32	32	30	40	85
TS / PGT 40-06	06	32	40	90
TS / PGT 40-08	08	32	40	90
TS / PGT 40-10	10	32	40	90
TS / PGT 40-12	12	32	40	90
TS / PGT 40-16	16	32	40	90
TS / PGT 40-20	20	32	40	90
TS / PGT 40-25	25	32	40	90
TS / PGT 40-32	32	32	40	90

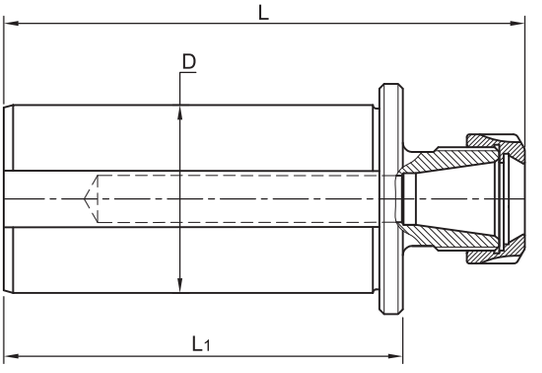
• Ø32 mm (OD) TS available on request.

MT TURRET SLEEVE



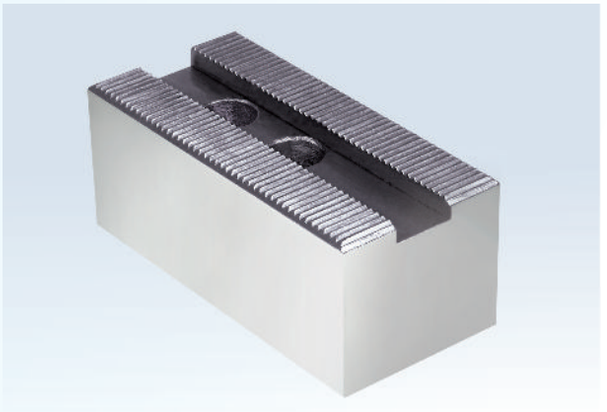
ITEM CODE	D	D1	L
TS / JYT / 40- MT 1	12.065	40	80
TS / JYT / 40- MT 2	17.780	40	80
TS / JYT / 40- MT 3	23.825	40	80
TS / PGT / 40- MT 1	12.065	40	80
TS / PGT / 40- MT 2	17.780	40	80
TS / PGT / 40- MT 3	23.825	40	80

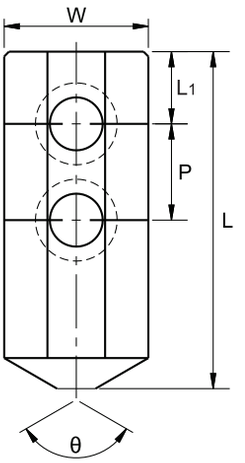
TS ER TURRET SLEEVE

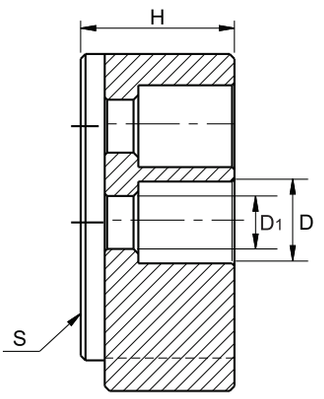


ITEM CODE	D	ER	L1	L
TS 32 / ER 11	32	11	75	100
TS 32 / ER 16	32	16	75	100
TS 32 / ER 20	32	20	75	105
TS 32 / ER 25	32	25	75	105
TS 32 / ER 32	32	32	75	105
TS 40 / ER 11	40	11	85	110
TS 40 / ER 16	40	16	85	110
TS 40 / ER 20	40	20	85	115
TS 40 / ER 25	40	25	85	115
TS 40 / ER 32	40	32	85	115

SOFT JAW







ITEM CODE	L	L1	D1	D	P	W	H	S	θ
SJ / G / 135-090	55	12.5	11	17.0	18.5	28	30	1/16" x 90^0	90^0
SJ / G / 135-120	55	12.5	11	17.0	18.5	28	30	1/16" x 90 ^{0}	120^0
SJ / G / 165-090	75	20	11	17.5	19	35	30	1/16" x 90^0	90^0
SJ / G / 165-120	75	20	11	17.5	19	35	30	1/16" x 90^0	120^0
SJ / G / 200-090	70	15	14	20	19	35	40	1/16" x 90^0	90^0
SJ / G / 200-120	70	15	14	20	19	35	40	1/16" x 90^0	120^0
SJ / G / 250-090	120	35	18	26	25	45	50	1/16" x 90^0	90^0
SJ / G / 250-120	120	35	18	26	25	45	50	1/16" x 90^0	120^0
SJ / G / 315-090	120	35	18	26	25	50	50	1/16" x 90^0	90^0
SJ / G / 315-120	120	35	18	26	25	50	50	1/16" x 90^0	120^0
SJ / A / 135-090	55	10	8.5	13.5	15	25	30	1/16" x 90^0	90^0
SJ / A / 135-120	55	10	8.5	13.5	15	25	30	1/16" x 90^0	90^0
SJ / A / 165-090	70	15	11	17	20	30	32	1/16" x 90^0	90^0
SJ / A / 165-120	70	15	11	17	20	30	32	1/16" x 90^0	120^0
SJ / A / 200-090	95	24	13	19	25	35	38	1/16" x 90^0	90^0
SJ / A / 200-120	95	24	13	19	25	35	38	1/16" x 90^0	120^0
SJ / A / 250-090	110	30	13	19	30	40	42	1/16" x 90^0	90^0
SJ / A / 250-120	110	30	13	19	30	40	42	1/16" x 90^0	120^0
SJ / A / 315-090	129	38	15	23	30	50	50	1/16" x 90^0	90^0
SJ / A / 315-120	129	38	15	23	30	50	50	1/16" x 90^0	120^0

- Serration 1.5 x 60^0 available on request.

MORSE TAPER DRILL CHUCK

ITEM CODE	RANGE
MT 2/ DC 08	1 ~ 08
MT 3/ DC 16	1 ~ 16
MT 4/ DC 16	1 ~ 16

PARALLEL SHANK DRILL CHUCK

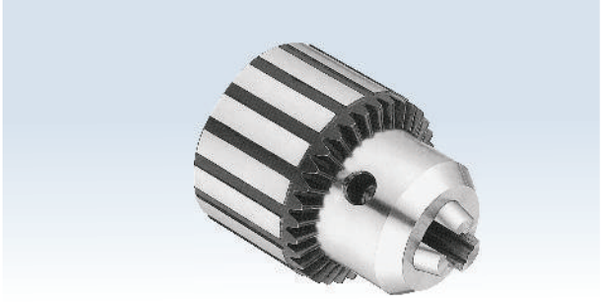
ITEM CODE	RANGE
PSD / 25-16	1~16

KEYLESS DRILL CHUCK (KLD)

ITEM CODE	RANGE	TAPER
KLD / 06 / H-B	0.5 ~ 6	B 12
KLD / 06 / H-J	0.5 ~ 6	JT 1
KLD / 10 / H-J	1 ~ 10	JT 2
KLD / 13 / L-J	1 ~ 13	JT 6
KLD / 13 / H-B	1 ~ 13	B 16
KLD / 13 / H-J	1 ~ 13	JT 6
KLD / 16 / H-J	1 ~ 16	JT 6

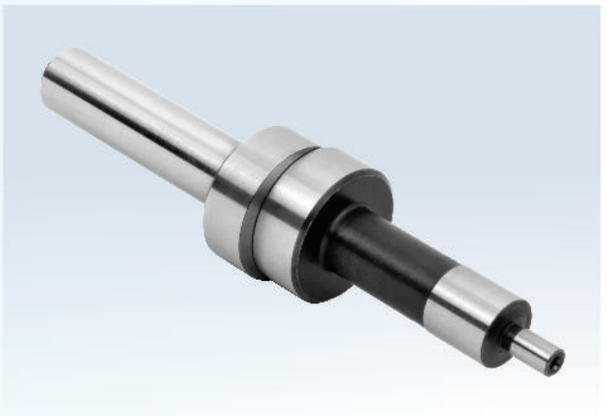
- Attractive spanners available for 0 ~ 13 KLD.

KEY TYPE DRILL CHUCK (KD)



ITEM CODE	D	TAPER
KD / 10	1~10	JT2
KD / 13	1~13	JT6

EDGE FINDER



ITEM CODE	TIP DIA
EF/M - 04.090	Ø4
EF/M - 10.090	Ø10
EF/E - 120	Ø10

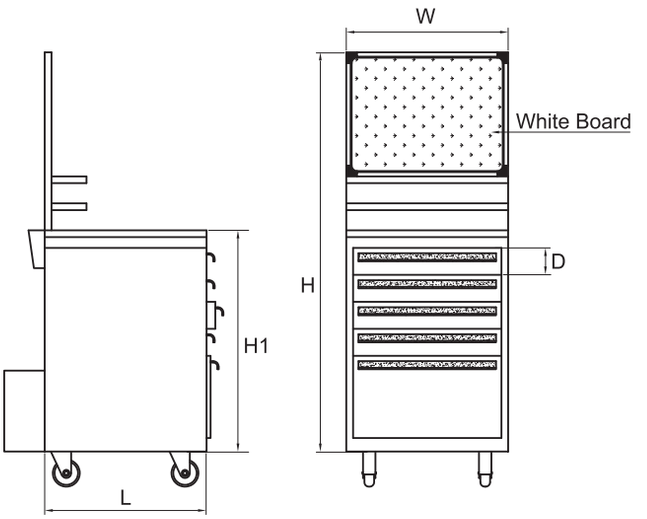
- Electronic Edge Finder available on request

LOCKING DEVICE

ITEM CODE	TAPER
LD / BT 30	BT 30
LD / BT 40	BT 40
LD / BT 50	BT 50

- SK / HSK Taper available on request.

TOOL TROLLEY



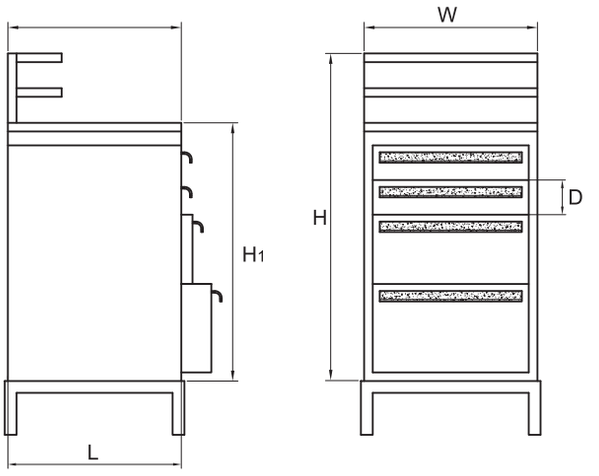
Item Code : TT / BT40 / 25-1566

DIMENSIONS (mm)	H	H_1	W	D
Overall	1480	820	600	600

DIMENSIONS (mm)	L	W	D
Drawer 1	520	520	82
Drawer 2	520	520	82
Drawer 3	520	520	82
Drawer 4	520	520	82
Drawer 5	520	520	254
Top Surface	600	600	25
Rear Pocket 1	560	150	300
Rear Pocket 2	560	60	120
Whiteboard Trays x 2	600	150	25

FEATURES :	
Whiteboard: 600 x 540 mm	
No. of Drawers	5 nos.
Bottom Drawers for BT-40 Holders	25 nos.
Rear Pockets	2 nos.
* Table-top with Rubber-mat surface	
* Casters with brakes	
* All 5 drawers with common Lock & Key	
Heavy-duty Casters: Ø100 x 35 mm with brakes	
Sheet Thickness: 18 SWG (1.22 mm)	
* Overall Height is without Casters	

TOOL TROLLEY



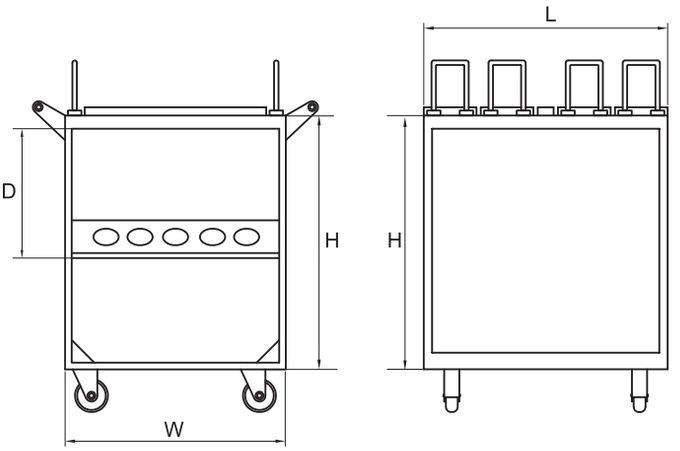
Item Code : TT / SC / 1055

DIMENSIONS (mm)	H	H_1	W	D
Overall	1010	810	500	500

DIMENSIONS (mm)	L	W	D
Drawer 1	406	406	76
Drawer 2	406	406	76
Drawer 3	406	406	171
Drawer 4	406	406	254
Top Surface	500	500	25
Top Trays x 2	500	100	25

FEATURES :	
No. of drawers (2 small + 2 large)	4 nos.
Top 2 drawers with adjustable pockets	
Table-top with Rubber-mat surface	
Sheet Thickness: 18 SWG (1.22 mm)	
Table-top with Rubber-mat surface	
Sheet Thickness: 18 SWG (1.22 mm)	

TOOL TROLLEY

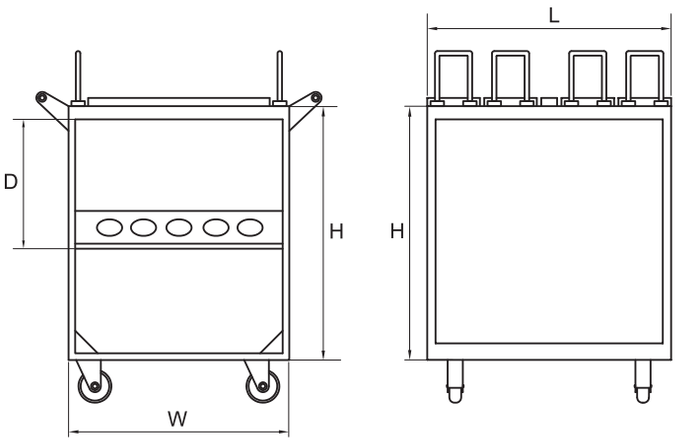


Item Code : TT / BT40 / 40-875

DIMENSIONS (mm)	L	W	D
Overall	760	670	470

FEATURES :	
No. of BT-40 Holder's stand	
First Level Stand (5x4)	20nos.
Second Level Stand (5x4)	20 nos.
Heavy-duty Casters: Ø125 x 30 mm with brakes	
Sheet Thickness: 14 SWG (2.03 mm)	
* Overall Height is without Casters	

TOOL TROLLEY



Item Code : TT / BT50 / 40-877

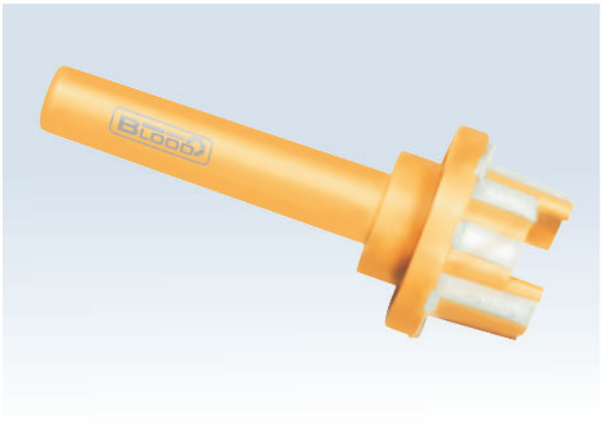
DIMENSIONS (mm)	L	W	D
Overall	760	670	670

FEATURES :	
No. of BT-50 Holder's stand	
First Level Stand (5x4)	20 nos.
Second Level Stand (5x4)	20 nos.
Heavy-duty Casters: Ø125 x 30 mm with brakes	
Sheet Thickness: 14 SWG (2.03 mm)	
* Overall Height is without Casters	

SPINDLE TAPER CLEANER

BT Series

ITEM CODE	SPINDLE TAPER
STC/BT30	BT 30
STC/BT40	BT 40
STC/BT50	BT 50



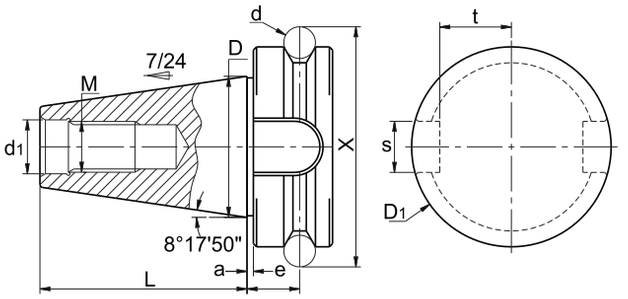
HSK Series

ITEM CODE	SPINDLE TAPER
STC/HSK050	HSK 50
STC/HSK063	HSK 63
STC/HSK100	HSK 100

FEATURES

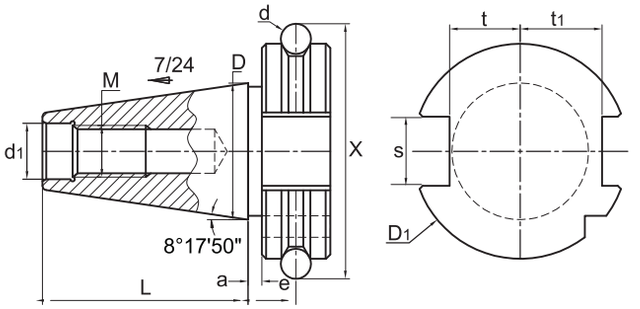
- Quick & easy cleaning.
- Taper cleaning pads are made of special grade cotton material and body is made of durable plastic.
- Remove contaminants to improve T.I.R. (Total Indicated Runout)
- Cleans metal chips & lub-oil in no time.

BT SHANK
MAS 403



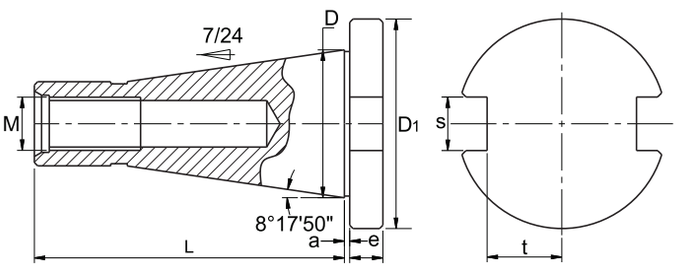
TAPER	D	L	D1	d1	a	e	d	t	S	X	M
BT 30	31.75	48.4	46	12.5	2	13.6	08	16.3	16.1	56.14	M 12
BT 35	38.1	56.5	53	13	2	13	10	19.3	14.1	65.679	M 12
BT 40	44.45	65.4	63	17	2	16.6	10	22.6	16.1	75.679	M 16
BT 45	57.15	82.8	85	21	3	21.2	12	29.1	19.3	100.215	M 20
BT 50	69.85	101.8	100	25	3	23.2	15	35.4	25.7	119.02	M 24

SK SHANK
DIN 69871



TAPER	D	L	D1	d1	a	e	d	t	t1	S	X	M
SK 30	31.75	47.8	50	13	3.2	11.1	7	16.4	19	16.1	59.3	M12
SK 40	44.45	68.4	63.55	17	3.2	11.1	7	22.8	25	16.1	72.43	M16
SK 45	57.15	82.7	82.55	21	3.2	11.1	7	29.1	31.3	19.3	91.35	M20
SK 50	69.85	101.75	97.5	25	3.2	11.1	7	35.5	37.7	25.7	107.25	M 24

ISO SHANK
DIN 2080



TAPER	D	L	D1	a	e	t	S	M
ISO 30	31.75	68.4	50	1.6	8	16.2	16.1	M 12
ISO 40	44.45	93.4	63	1.6	10	22.5	16.1	M 16
ISO 45	57.15	106.8	80	3.2	12	29	19.3	M 20

Our Company

We at **Robin Precision Products Pvt. Ltd.** are heading to produce a world class product- Solid Carbide Cutting Tools & CNC Toolings in a high tech plant spread over 11,000 Sq. Meter area. **We feel proud to be the first manufacturers of Solid Carbide Cutting Tools in Gujarat.** We are committed to provide our products & services that meet the highest industry standards, the most demanding machining parameters & the customer satisfaction.

Under the company's policy of constant R & D, we have dedicated ourselves to pursue a new level of Technology, Quality & Logistic Management.

Our TEAM BLOOD believes in utilizing the most sophisticated equipments which enable us to produce a world class product **BLOOD** - Rotating Genius.

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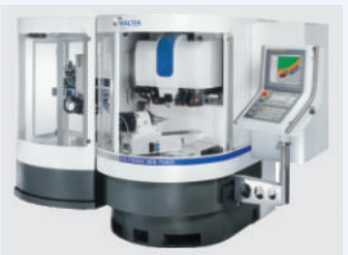

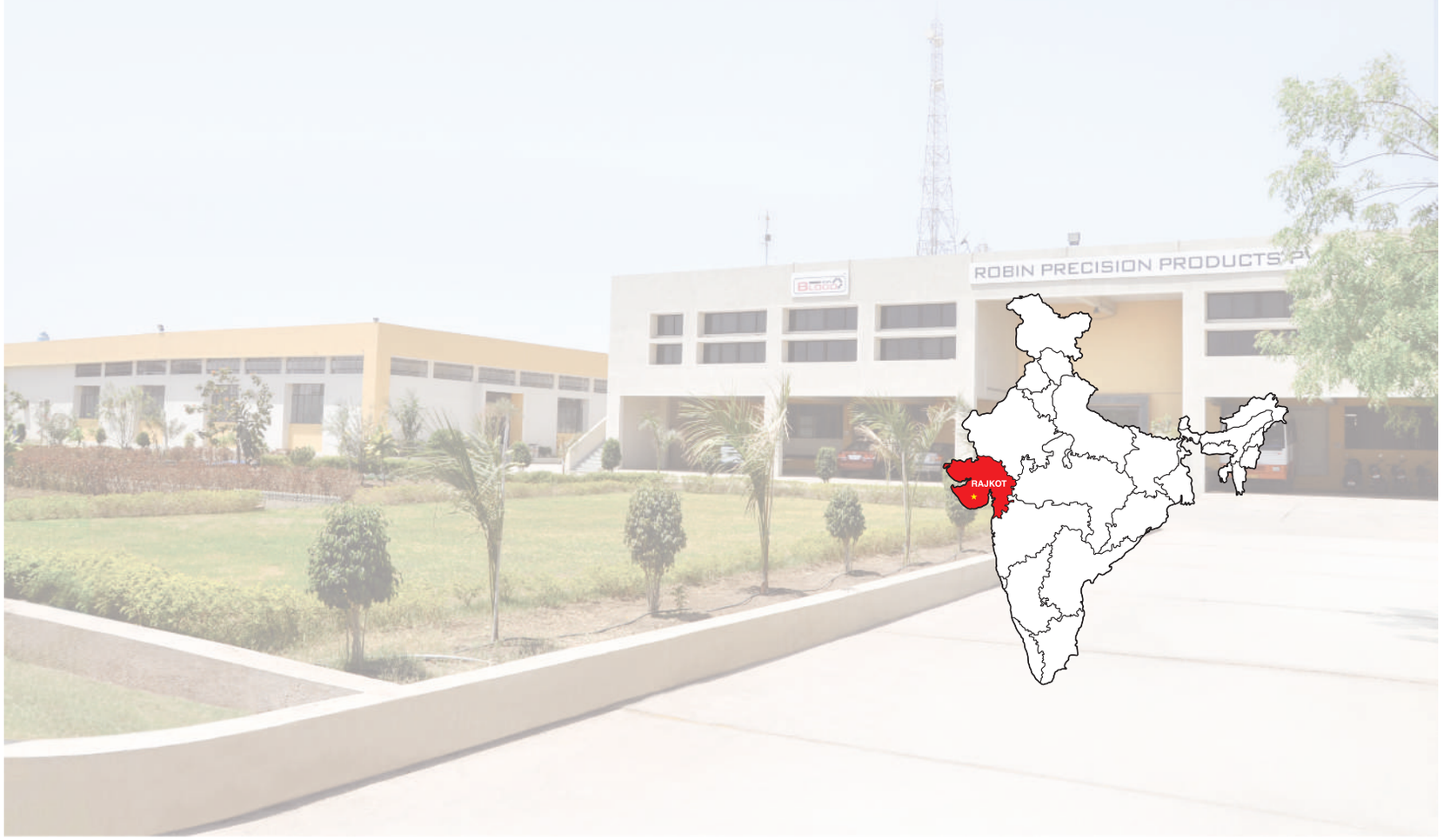

NOTES

QUALITY STATEMENT

- Promoters with high business ethics
- Best quality carbide rods from Europe
- World class brand new plant & machinery
- Hi-tech tool measuring equipment
- Stringent in-process inspection
- Qualified & trained work-force
- Pleasant & spacious work atmosphere

An ISO 9001 : 2015 CERTIFIED COMPANY

OUR OTHER PRODUCTS...

INSERTS & HOLDERS

THINK CARBIDE, THINK BLOOD...

An ISO 9001: 2015
CERTIFIED COMPANY

ROBIN PRECISION PRODUCTS PVT. LTD.

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