



# TM Solid

## Solid Carbide Thread Milling Tools

METRIC

# TM Solid Carbide Program



## Miniature Threads MilliPro

MilliPro &  
MilliPro EL  
From M1.6x0.35 (1-72UNF)

MilliPro HD  
Up to 62 HRC

MilliPro Dental  
From M1.0x0.25 (0-80UNF)

TMDR  
From M3x0.5 (4-40UNC)



## Long Thread Deep Threading

Full Profile



Partial Profile

Up to 3XDo

## Normal Use Straight Flutes

Taper  
For Bone Plate Applications  
From Pitch 0.3-0.6mm



From M4.5x0.75 (No.8-36UNF)

## Heavy Duty Helicool

HC

HCN

MultiFlute



From M3x0.5 (No.10-32UNF)

## Radial Coolant Helicool-R (HCR)



From M6x1.0

## Helicool and Chamfer Helicool-C (HCC)



From M6x1.0

## Economical Tool Helical

Taper  
For Bone Plate Applications  
From Pitch 0.3-0.6mm



From M3x0.5 (No.8-36UNF)

## Drill, Thread and Chamfer HTC



From M6x1.0



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# Vardex Ordering Code System

## ■ TM Solid Carbide

HC		10	082	L15	-	I	1.50	ISO	TM		VTH
1	2	3	4	5		6	7	8	9	10	11

1 - Line	2 - No. of Teeth	3 - Shank Dia.	4 - Cutting Dia.	5 - Tool Cutting Length	6 - Type of Tool
HC - Helicool HCN - Helicool with relief neck HCR - Helicool R HCC - Helicool C H - Helical S - Straight Flutes D - Deep Threading or MilliPro DD - Dental TDC - TMDR with coolant TD - TMDR without coolant	1T - 1 Tooth 3T - 3 Teeth (MilliPro) 2L - 2 Teeth LH (MilliPro HD)	03 - 3.0 mm 04 - 4.0 06 - 6.0 08 - 8.0 10 - 10.0 12 - 12.0 14 - 14.0 16 - 16.0 18 - 18.0 20 - 20.0	0.7 - 19.9 mm	Up to 3Do	E - External I - Internal EI - External + Internal

7 - 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

8 - Standard	
60 - Partial Profile 60°	BSF - Whitworth Fine
ISO - ISO Metric	BSPT - BSPT
UN - American UN	NPT - NPT
UNC - UN Coarse	ANPT - ANPT
UNF - UN Fine	NPTF - NPTF
UNEF - UN Extra Fine	NPS - NPS
UNJ - UNJ	PG - PG
MJ - MJ	TP60 - Taper 60°
BSW - Whitworth Coarse	TP55 - Taper 55°
BSP - BSP	

9 - System
TM
TML - Extra Long

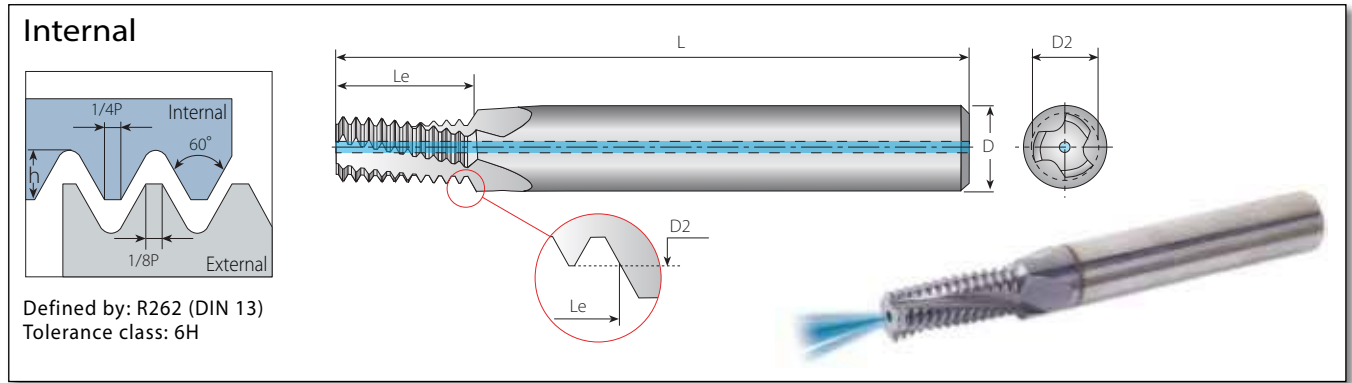
11 - Carbide Grade
VTS
VTH

10 - No. of Flutes
3-7 Flutes

## ■ HTC Thriller

HTC	M6	1.0	2D	VTN
1	2	3	4	5

1 - Line	2 - Thread Diameter	3 - Pitch	4 - Thread Length	5 - Carbide Grade
HTC - Thriller	M6 - M12	1 - 1.75mm	2D 2.5D	VTN VTS



## Helical Flutes with Thru-Hole Coolant

1.5 x Do ( $Le \leq 1.5 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	Le	Z	Zt	mm
M3x0.5	M3.5-M16x0.5	0.5	HC04024L04-I0.50ISOTM...	4	2.40	45	4.7	3	9	2.5
M4x0.7		0.7	HC04031L06-I0.70ISOTM...	4	3.15	45	6.6	3	9	3.3
M5x0.8		0.8	HC04039L07-I0.80ISOTM...	4	3.90	45	7.6	3	9	4.2
M6x1.0	M8-M40x1.0	1.0	HC06048L09-I1.00ISOTM...	6	4.80	57	9.5	3	9	5.0
M8x1.25		1.25	HC08065L13-I1.25ISOTM...	8	6.50	61	13.1	3	10	6.8
M10x1.5	M12-M48x1.5	1.5	HC10082L15-I1.50ISOTM...	10	8.20	73	15.7	3	10	8.5
M12x1.75		1.75	HC10099L18-I1.75ISOTM...	10	9.90	73	18.4	4	10	10.2
M14x2.0	M17-M80x2.0	2.0	HC12116L21-I2.00ISOTM...	12	11.60	73	21.0	4	10	12.0
M16x2.0	M17-M80x2.0	2.0	HC14136L25-I2.00ISOTM...	14	13.60	92	25.0	4	12	14.0

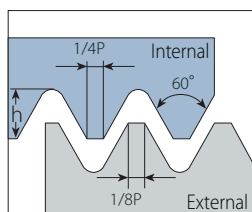
## Helical Flutes with Thru-Hole Coolant

2 x Do ( $Le \leq 2 \times \text{Thread Diameter}$ )

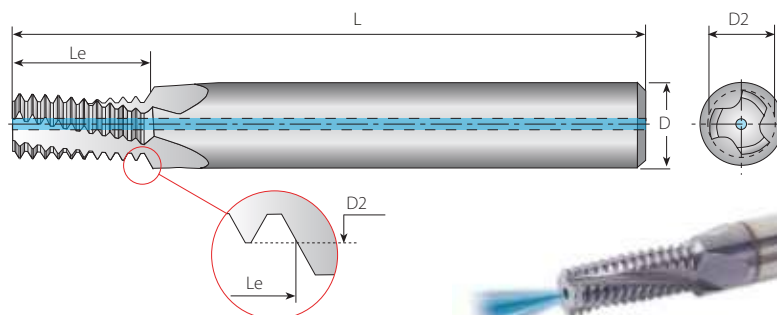
Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	Le	Z	Zt	mm
M3x0.5	M3.5-M16x0.5	0.5	HC04024L06-I0.50ISOTM...	4	2.40	45	6.2	3	12	2.5
	M4x0.5	0.5	HC04032L08-I0.50ISOTM...	4	3.20	45	8.2	3	16	3.5
	M5x0.5	0.5	HC06042L10-I0.50ISOTM...	6	4.20	57	10.2	3	20	4.5
M4x0.7		0.7	HC04031L08-I0.70ISOTM...	4	3.15	45	8.7	3	12	3.3
	M6x0.75	0.75	HC06050L12-I0.75ISOTM...	6	5.00	57	12.4	3	16	5.3
M5x0.8		0.8	HC04039L10-I0.80ISOTM...	4	3.90	45	10.8	3	13	4.2
M6x1.0	M8-M40x1.0	1.0	HC06048L12-I1.00ISOTM...	6	4.80	57	12.5	3	12	5.0
	M8x1.0	1.0	HC08067L16-I1.00ISOTM...	8	6.70	61	16.5	3	16	7.0
	M10x1.0	1.0	HC10087L20-I1.00ISOTM...	10	8.70	73	20.5	3	20	9.0
	M12x1.0	1.0	HC12107L24-I1.00ISOTM...	12	10.70	73	24.5	4	24	11.0
M8x1.25		1.25	HC08065L16-I1.25ISOTM...	8	6.50	61	16.9	3	13	6.8
	M10x1.25	1.25	HC10085L20-I1.25ISOTM...	10	8.50	73	20.6	3	16	8.8
M10x1.5	M12-M48x1.5	1.5	HC10082L20-I1.50ISOTM...	10	8.20	73	20.2	3	13	8.5
	M12x1.5	1.5	HC10099L24-I1.50ISOTM...	10	9.90	73	24.7	4	16	10.5
	M14x1.5	1.5	HC12119L29-I1.50ISOTM...	12	11.90	80	29.2	4	19	12.5
	M16x1.5	1.5	HC14139L32-I1.50ISOTM...	14	13.90	92	32.2	4	21	14.5
M12x1.75		1.75	HC10099L25-I1.75ISOTM...	10	9.90	73	25.4	4	14	10.2
M14x2.0	M17-M80x2.0	2.0	HC12116L29-I2.00ISOTM...	12	11.60	80	29.0	4	14	12.0
M16x2.0	M17-M80x2.0	2.0	HC14136L33-I2.00ISOTM...	14	13.60	92	33.0	4	16	14.0
M18x2.5		2.5	HC16148L36-I2.50ISOTM...	16	14.80	92	36.2	4	14	15.5
M20x2.5		2.5	HC18171L41-I2.50ISOTM...	18	17.10	102	41.2	4	16	17.5
M24x3.0		3.0	HC20199L49-I3.00ISOTM...	20	19.90	102	49.5	4	16	21.0

\* Bore diameter applies to smallest thread dia.

### Internal



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



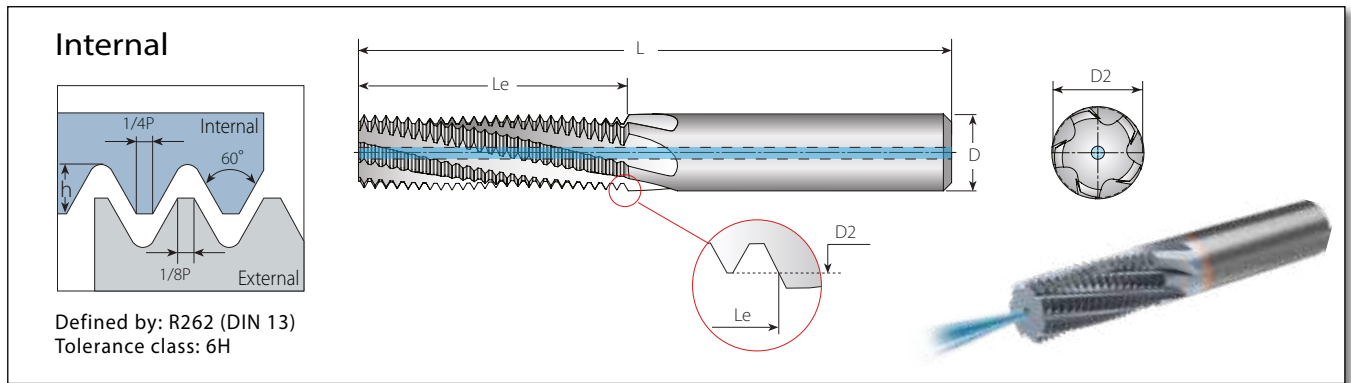
### Helical Flutes with Thru-Hole Coolant

3 x Do (Le ≤ 3.0 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	Le**	Z	Zt	mm
M3x0.5	M3.5-M16x0.5	0.5	HC04024L09-I0.50ISOTM...	4	2.40	45	9.25	3	18	2.5
M4x0.7		0.7	HC04031L12-I0.70ISOTM...	4	3.15	47	12.95	3	18	3.3
M5x0.8		0.8	HC04039L15-I0.80ISOTM...	4	3.90	50	15.60	3	19	4.2
M6x1.0	M8-M40x1.0	1.0	HC06048L18-I1.00ISOTM...	6	4.80	60	18.50	3	18	5.0
M8x1.25		1.25	HC08065L25-I1.25ISOTM...	8	6.50	66	25.63	3	20	6.8
M10x1.5	M12-M48x1.5	1.5	HC10082L30-I1.50ISOTM...	10	8.20	75	30.75	3	20	8.5
M12x1.75		1.75	HC10099L36-I1.75ISOTM...	10	9.90	86	37.63	4	21	10.2
M16x2.0	M17-M80x2.0	2.0	HC14136L48-I2.00ISOTM...	14	13.60	108	49.00	4	24	14.0

\*\* Above solid carbide tools (Le=3xDo) are suitable for light machining only. Reduce feed by 30%.

\* Bore diameter applies to smallest thread dia.



## Helical Flutes with Thru-Hole Coolant

2 x Do ( $Le \leq 2 \times \text{Thread Diameter}$ )

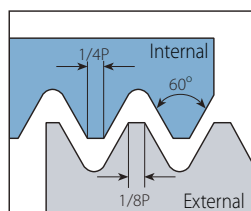
Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	Le	Z	Zt	mm
M3x0.5	M3.5-M16x0.5	0.5	HC04024L06-I0.50ISOTM5...	4	2.40	45	6.2	5	12	2.5
	M4x0.5	0.5	HC04032L08-I0.50ISOTM6...	4	3.20	45	8.2	6	16	3.5
	M4x0.7	0.7	HC04031L08-I0.70ISOTM5...	4	3.15	45	8.7	5	12	3.3
	M6x0.75	0.75	HC06050L12-I0.75ISOTM6...	6	5.00	57	12.4	6	16	5.3
	M5x0.8	0.8	HC04039L10-I0.80ISOTM6...	4	3.90	45	10.8	6	13	4.2
	M6x1.0	1.0	HC06048L12-I1.00ISOTM6...	6	4.80	57	12.5	6	12	5.0
	M8x1.25	1.25	HC08065L16-I1.25ISOTM6...	8	6.50	61	16.9	6	13	6.8
	M10x1.5	1.5	HC10082L20-I1.50ISOTM7...	10	8.20	73	20.2	7	13	8.5
	M12x1.75	1.75	HC10099L25-I1.75ISOTM7...	10	9.90	73	25.4	7	14	10.2
	M14x2.0	2.0	HC12116L29-I2.00ISOTM6...	12	11.60	80	29.0	6	14	12.0
	M16x2.0	2.0	HC14136L33-I2.00ISOTM7...	14	13.60	92	33.0	7	16	14.0

## Helical Flutes with Thru-Hole Coolant

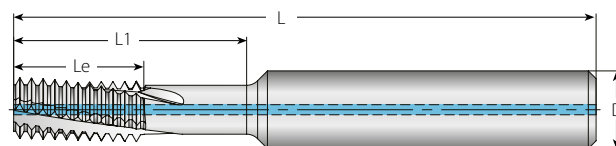
3x Do ( $Le \leq 3 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	Le	Z	Zt	mm
M3x0.5	M3.5-M16x0.5	0.5	HC04024L09-I0.50ISOTM4...	4	2.40	45	9.3	4	18	2.5
	M4x0.5	0.5	HC04032L12-I0.50ISOTM5...	4	3.20	45	12.2	5	24	3.5
	M4x0.7	0.7	HC04031L12-I0.70ISOTM4...	4	3.15	47	13.0	4	18	3.3
	M6x0.75	0.75	HC06050L18-I0.75ISOTM5...	6	5.00	60	18.4	5	24	5.3
	M5x0.8	0.8	HC04039L15-I0.80ISOTM5...	4	3.90	50	15.6	5	19	4.2
	M6x1.0	1.0	HC06048L18-I1.00ISOTM5...	6	4.80	60	18.5	5	18	5.0
	M8x1.25	1.25	HC08065L25-I1.25ISOTM5...	8	6.50	66	25.7	5	20	6.8
	M10x1.5	1.5	HC10082L30-I1.50ISOTM5...	10	8.20	75	30.8	5	20	8.5
	M12x1.75	1.75	HC10099L36-I1.75ISOTM5...	10	9.90	86	37.7	5	21	10.2
	M14x2.0	2.0	HC12116L42-I2.00ISOTM5...	12	11.60	102	43.0	5	21	12.0
	M16x2.0	2.0	HC14136L48-I2.00ISOTM5...	14	13.60	108	49.0	5	24	14.0

## Internal



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



## Helical Flutes with Relief Neck

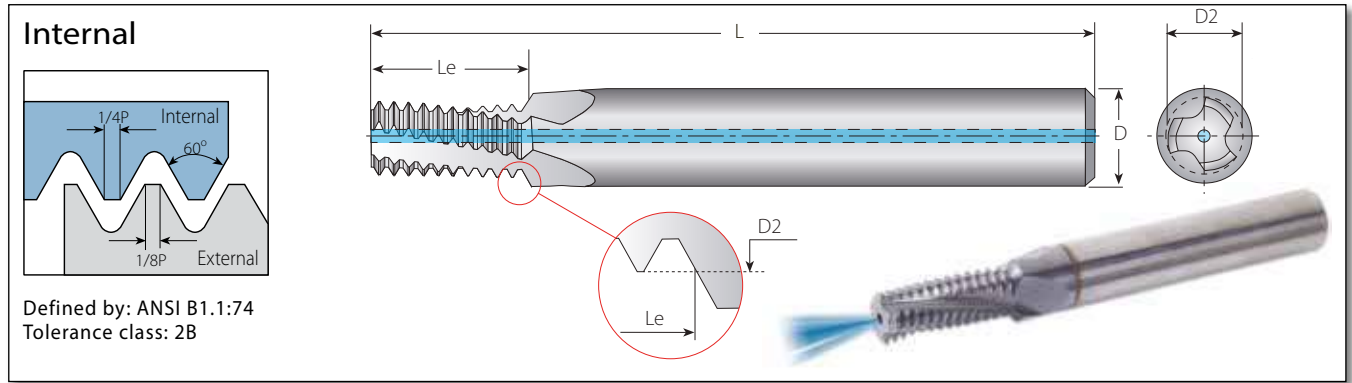
3 x Do ( $L1 \leq 3.0 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm					No. of Flutes	Teeth	Bore Dia.*
Coarse	Fine	mm	Internal	D	D2	L	Le	L1	Z	Zt	mm
M3x0.5	M3.5-M16x0.5	0.5	HCN04024L09-I0.50ISOTM...	4	2.40	45	5.0	9	3	10	2.5
M4x0.7		0.7	HCN04031L12-I0.70ISOTM...	4	3.15	47	7.0	12	3	10	3.3
M5x0.8		0.8	HCN04039L15-I0.80ISOTM...	4	3.90	50	8.8	15	3	11	4.2
M6x1.0	M8-M40x1.0	1.0	HCN06048L18-I1.00ISOTM...	6	4.80	60	10.0	18	3	10	5.0
	M8-M40x1.0	1.0	HCN08067L24-I1.00ISOTM...	8	6.70	66	13.0	24	4	13	7.0
	M10-M40x1.0	1.0	HCN10087L30-I1.00ISOTM...	10	8.70	75	17.0	30	4	17	9.0
M8x1.25		1.25	HCN08065L24-I1.25ISOTM...	8	6.50	66	13.75	24	3	11	6.8
M10x1.5	M12-M48x1.5	1.5	HCN10082L30-I1.50ISOTM...	10	8.20	75	16.5	30	3	11	8.5
	M12-M48x1.5	1.5	HCN10099L36-I1.50ISOTM...	10	9.90	86	19.5	36	4	13	10.5
	M14-M48x1.5	1.5	HCN12119L42-I1.50ISOTM...	12	11.90	92	22.5	42	4	15	12.5
	M16-M48x1.5	1.5	HCN14139L48-I1.50ISOTM...	14	13.90	102	25.5	48	5	17	14.5
M12x1.75		1.75	HCN10099L36-I1.75ISOTM...	10	9.90	86	19.25	36	4	11	10.2
M14x2.0	M17-M80x2.0	2.0	HCN12116L42-I2.00ISOTM...	12	11.60	92	24.0	42	4	12	12.0
M16x2.0	M17-M80x2.0	2.0	HCN14136L48-I2.00ISOTM...	14	13.60	102	26.0	48	4	13	14.0



## American UN

## Helicool



### Helical Flutes with Thru-Hole Coolant

1.5 x Do (Le ≤ 1.5 x Thread Diameter)

Thread			Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	UNEF	TPI	Internal	D	D2	L	Le	Z	Zt	mm
No.10-24	5/16", 3/8"x24	9/16"-11/16"x24	24	HC04035L07-I24UNCTM...	4	3.58	45	7.9	3	7	3.8
No.12-24	5/16", 3/8"x24	9/16"-11/16"x24	24	HC06041L08-I24UNCTM...	6	4.15	57	9.0	3	8	4.5
1/4"x20	7/16", 1/2"x20	3/4"-1"x20	20	HC06048L09-I20UNCTM...	6	4.88	57	9.5	3	7	5.2
5/16"x18	9/16", 5/8"x18	11/16"-1 1/16" x18	18	HC08061L11-I18UNCTM...	8	6.15	61	12.0	3	8	6.5
3/8"x16	3/4"x16		16	HC08076L15-I16UNCTM...	8	7.65	61	15.1	3	9	8.0
7/16"x14	7/8"x14		14	HC10090L17-I14UNCTM...	10	9.00	73	17.2	3	9	9.3
1/2"x13			13	HC12104L20-I13UNCTM...	12	10.35	73	20.5	4	10	10.8
9/16"x12	1"-1 1/2"x12		12	HC12118L22-I12UNCTM...	12	11.80	73	22.2	4	10	12.3

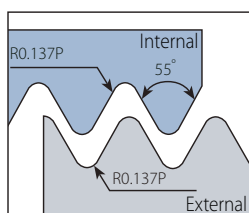
### Helical Flutes with Thru-Hole Coolant

2 x Do (Le ≤ 2 x Thread Diameter)

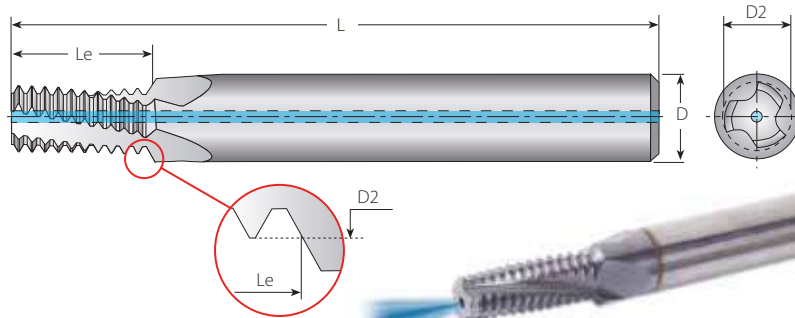
Thread			Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	UNEF	TPI	Internal	D	D2	L	Le	Z	Zt	mm
No.10-32	No.12-3/8"x32		32	HC04038L09-I32UNFTM...	4	3.80	45	9.9	3	12	4.0
	No.12-3/8"x32		32	HC06044L11-I32UNEFTM...	6	4.40	57	11.5	3	14	4.7
No.12, 1/4"x28	7/16", 1/2"x28		28	HC06043L11-I28UNFTM...	6	4.30	57	11.3	3	12	4.6
1/4"x28	7/16", 1/2"x28		28	HC06052L13-I28UNFTM...	6	5.15	57	13.1	3	14	5.5
	7/16", 1/2"x28		28	HC10099L22-I28UNEFTM...	10	9.90	73	22.2	3	24	10.2
No.10-24	5/16", 3/8"x24	9/16"-11/16"x24	24	HC04035L10-I24UNCTM...	4	3.58	45	10.0	3	9	3.8
No.12-24	5/16", 3/8"x24	9/16"-11/16"x24	24	HC06041L11-I24UNCTM...	6	4.15	57	11.1	3	10	4.5
	5/16", 3/8"x24	9/16"-11/16"x24	24	HC08066L16-I24UNFTM...	8	6.68	61	16.4	3	15	6.8
	3/8"x24	9/16"-11/16"x24	24	HC10082L19-I24UNFTM...	10	8.20	73	19.6	3	18	8.5
		9/16"-11/16"x24	24	HC14129L29-I24UNEFTM...	14	12.90	92	29.1	4	27	13.2
1/4"x20	7/16", 1/2"x20	3/4"-1"x20	20	HC06048L13-I20UNCTM...	6	4.88	57	13.3	3	10	5.2
	7/16", 1/2"x20	3/4"-1"x20	20	HC10096L22-I20UNFTM...	10	9.60	73	22.2	3	17	9.8
	1/2"x20	3/4"-1"x20	20	HC12111L26-I20UNFTM...	12	11.10	80	26.0	4	20	11.5
		3/4"-1"x20	20	HC18174L38-I20UNEFTM...	18	17.40	102	38.7	4	30	17.8
5/16"x18	9/16", 5/8"x18	11/16"-1 1/16"x18	18	HC08061L16-I18UNCTM...	8	6.15	61	16.2	3	11	6.5
	9/16", 5/8"x18	11/16"-1 1/16"x18	18	HC14125L28-I18UNFTM...	14	12.50	92	28.9	4	20	12.8
	5/8"x18	11/16"-1 1/16"x18	18	HC16141L31-I18UNFTM...	16	14.10	92	31.7	4	22	14.5
3/8"x16	3/4"x16		16	HC08076L19-I16UNCTM...	8	7.65	61	19.8	3	12	8.0
	3/4"x16		16	HC18170L38-I16UNFTM...	18	17.00	102	38.8	4	24	17.5
7/16"x14	7/8"x14		14	HC10090L22-I14UNCTM...	10	9.00	73	22.7	3	12	9.3
	7/8"x14		14	HC20199L44-I14UNFTM...	20	19.90	102	44.4	4	24	20.5
1/2"x13			13	HC12104L26-I13UNCTM...	12	10.35	80	26.4	4	13	10.8
9/16"x12	1"-1 1/2"x12		12	HC12118L28-I12UNCTM...	12	11.80	80	28.6	4	13	12.3
	1"-1 1/2"x12		12	HC20199L51-I12UNFTM...	20	19.90	102	51.9	4	24	23.5
5/8"x11			11	HC14131L33-I11UNCTM...	14	13.10	92	33.5	4	14	13.5
3/4"x10			10	HC16159L39-I10UNCTM...	16	15.90	92	39.4	4	15	16.5
7/8"x9			9	HC20190L46-I9UNCTM...	20	19.00	102	46.6	4	16	19.5
1"x8			8	HC20199L52-I8UNCTM...	20	19.90	102	52.4	4	16	22.0

\* Bore diameter applies to smallest thread dia.

## External / Internal



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



## Helical Flutes with Thru-Hole Coolant

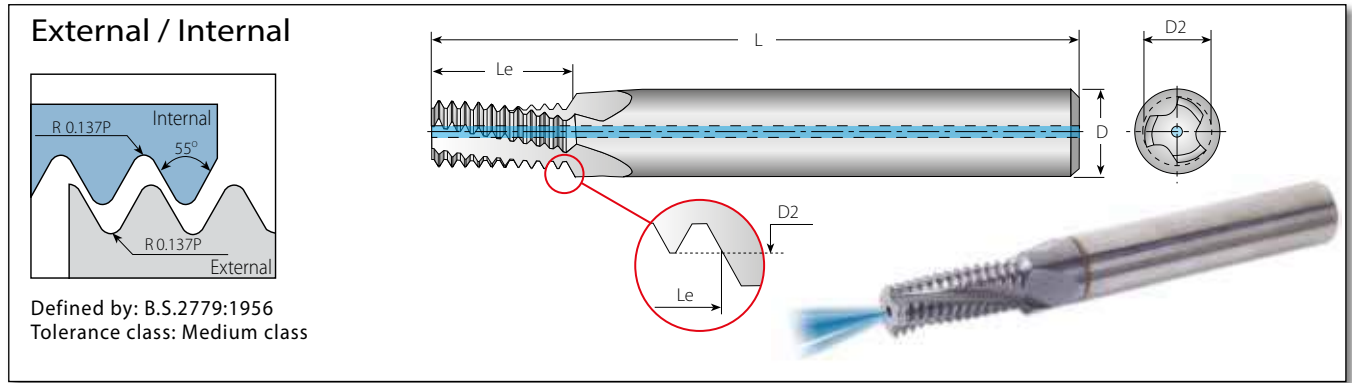
2 x Do ( $Le \leq 2 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
BSW	BSF	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
	1/4"x26	26	HC06050L13-EI26BSFTM...	6	5.00	57	13.2	3	13	5.3
	5/16"x22	22	HC08063L16-EI22BSFTM...	8	6.35	61	16.7	3	14	6.7
1/4"x20	3/8"x20	20	HC06044L13-EI20BSWTM...	6	4.45	57	13.3	3	10	5.0
	3/8"x20	20	HC08076L19-EI20BSFTM...	8	7.65	61	19.7	3	15	8.2
5/16"x18	7/16"x18	18	HC06058L16-EI18BSWTM...	6	5.85	57	16.2	3	11	6.5
	7/16"x18	18	HC10092L23-EI18BSFTM...	10	9.20	73	23.3	3	16	9.7
3/8"x16	1/2", 9/16"x16	16	HC08072L19-EI16BSWTM...	8	7.20	61	19.8	3	12	7.9
	1/2", 9/16"x16	16	HC12105L26-EI16BSFTM...	12	10.50	80	26.2	4	16	11.1
	9/16"x16	16	HC14122L29-EI16BSFTM...	14	12.15	92	29.4	4	18	12.6
7/16"x14	5/8", 11/16"x14	14	HC10085L22-EI14BSWTM...	10	8.50	73	22.7	3	12	9.2
	5/8", 11/16"x14	14	HC14134L31-EI14BSFTM...	14	13.40	92	31.7	4	17	14.0
	11/16"x14	14	HC16150L35-EI14BSFTM...	16	15.00	92	35.4	4	19	15.6
1/2"x12	3/4"x12	12	HC10096L26-EI12BSWTM...	10	9.65	73	26.5	3	12	10.5
9/16"x12	3/4"x12	12	HC12113L28-EI12BSWTM...	12	11.25	80	28.6	4	13	12.1
	3/4"x12	12	HC18162L39-EI12BSFTM...	18	16.20	102	39.2	4	18	16.8
5/8"x11	7/8"x11	11	HC14126L33-EI11BSWTM...	14	12.60	92	33.5	4	14	13.4
11/16"x11		11	HC16142L35-EI11BSWTM...	16	14.20	92	35.8	4	15	15.0

\* Bore diameter applies to smallest thread dia.

## BSP (G)

## Helicool



### Helical Flutes with Thru-Hole Coolant

**1.5 x Do ( $Le \leq 1.5 \times \text{Thread Diameter}$ )**

Thread	Pitch	Ordering Code	Dimensions mm			No. of Flutes	Teeth	Bore Dia.*	
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16", 1/8"x28	28	HC08064L12-EI28BSPTM...	8	6.40	61	12.2	3	13	6.7
1/8"x28	28	HC10082L15-EI28BSPTM...	10	8.20	73	15.0	3	16	8.7
1/4", 3/8"x19	19	HC12110L20-EI19BSPTM...	12	11.00	80	20.7	4	15	11.8
3/8"x19	19	HC16145L26-EI19BSPTM...	16	14.50	92	26.1	4	19	15.2
1"-4"x11	11	HC20199L42-EI11BSPTM...	20	19.90	102	42.7	4	18	30.7

### Helical Flutes with Thru-Hole Coolant

**2 x Do ( $Le \leq 2 \times \text{Thread Diameter}$ )**

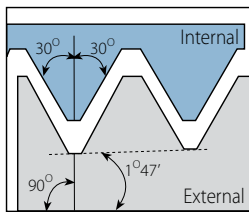
Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16", 1/8"x28	28	HC08064L15-EI28BSPTM...	8	6.40	61	15.9	3	17	6.7
1/8"x28	28	HC10082L19-EI28BSPTM...	10	8.20	73	19.5	3	21	8.7
1/4", 3/8"x19	19	HC12110L27-EI19BSPTM...	12	11.00	80	27.4	4	20	11.8
3/8"x19	19	HC16145L34-EI19BSPTM...	16	14.50	92	34.1	4	25	15.2
1/2"-7/8"x14	14	HC18179L42-EI14BSPTM...	18	17.90	102	42.6	4	23	19.0

\* Bore diameter applies to smallest thread dia.

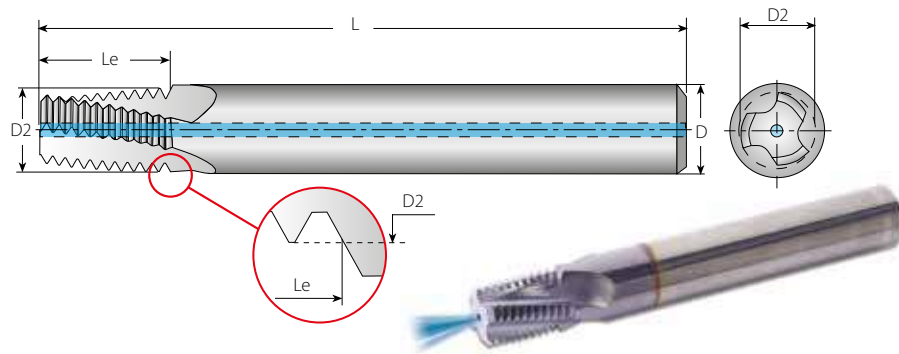
## NPT

## Helicool

### External / Internal



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



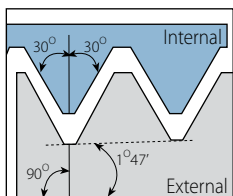
### Helical Flutes with Thru-Hole Coolant

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16"x27	27	HC06059L09-EI27NPT-TM...	6	5.90	57	9.9	3	10	6.3
1/8"x27	27	HC08076L09-EI27NPT-TM...	8	7.65	61	9.9	3	10	8.5
1/4"x18	18	HC10099L14-EI18NPT-TM...	10	9.90	73	14.8	3	10	11.1
3/8"x18	18	HC12111L14-EI18NPT-TM...	12	11.15	73	14.8	4	10	14.5
1/2", 3/4"x14	14	HC16142L19-EI14NPT-TM...	16	14.25	92	19.0	4	10	17.7, 23.0
1", 1 1/4", 1 1/2", 2"x11.5	11.5	HC20196L23-EI11.5NPT-TM...	20	19.60	102	23.2	4	10	29.0, 37.7, 44.0, 56.0
2 1/2", 3"x8	8	HC20196L33-EI8NPT-TM...	20	19.60	102	33.3	4	10	66.5, 82.1

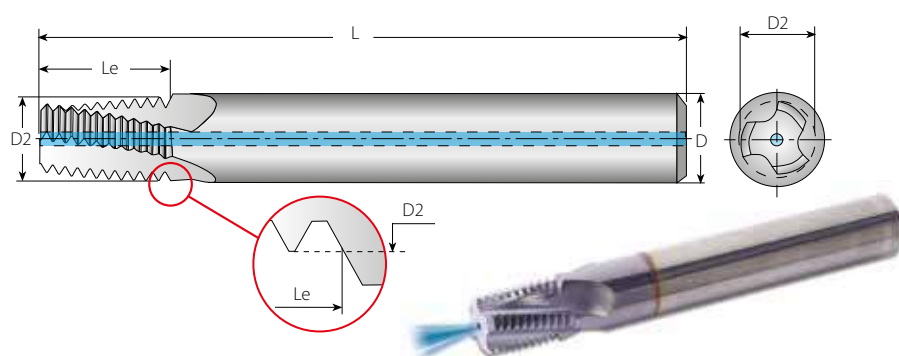
## ANPT

## Helicool

### External / Internal



Defined by: MIL-P-7105B  
Tolerance class: Standard ANPT



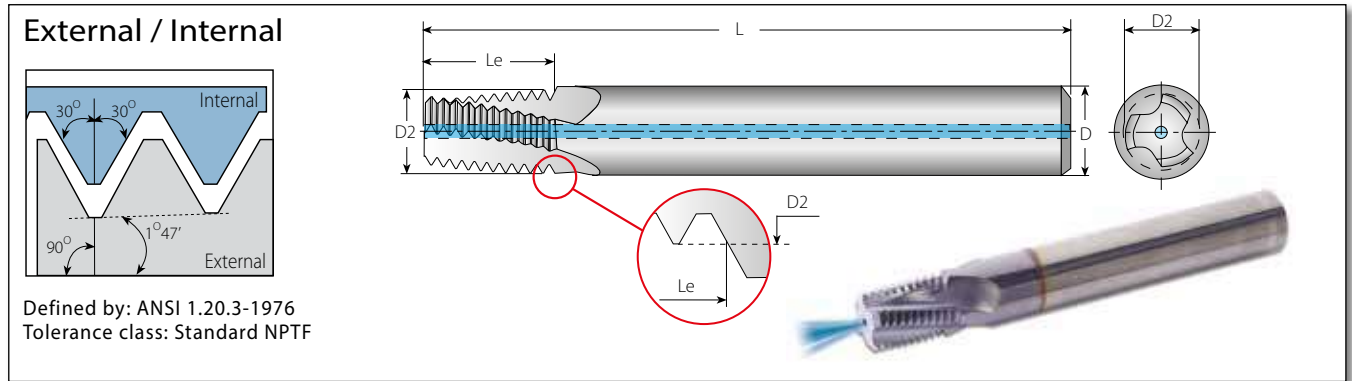
### Helical Flutes with Thru-Hole Coolant

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/4", 3/8"x18	18	HC10099L14-EI18ANPT-TM...	10	9.90	73	14.8	3	10	11.1 / 14.5
1/2", 3/4"x14	14	HC14139L19-EI14ANPT-TM...	14	13.90	92	19.0	4	10	17.7 / 23.0

\* Bore diameter applies to smallest thread dia.

## NPTF

## Helicool

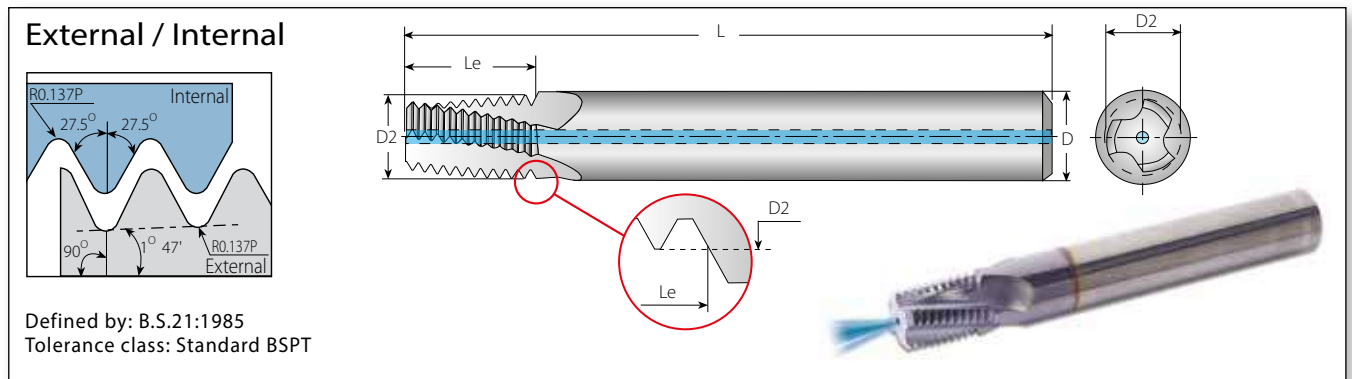


### Helical Flutes with Thru-Hole Coolant

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16"x27	27	HC06059L09-EI27NPTFTM...	6	5.90	57	9.9	3	10	6.3
1/8"x27	27	HC08076L09-EI27NPTFTM...	8	7.65	61	9.9	3	10	8.4
1/4"x18	18	HC10099L14-EI18NPTFTM...	10	9.90	73	14.8	3	10	11.1
3/8"x18	18	HC12111L14-EI18NPTFTM...	12	11.15	73	14.8	4	10	14.7
1/2", 3/4"x14	14	HC16142L19-EI14NPTFTM...	16	14.25	92	19.0	4	10	17.9, 23.4
1", 1 1/4", 1 1/2", 2"x11.5	11.5	HC20196L23-EI11.5NPTFTM...	20	19.60	102	23.2	4	10	29.0, 37.7, 43.7, 55.6
2 1/2", 3"x8	8	HC20196L33-EI8NPTFTM...	20	19.60	102	33.3	4	10	66.3, 82.1

## BSPT

## Helicool



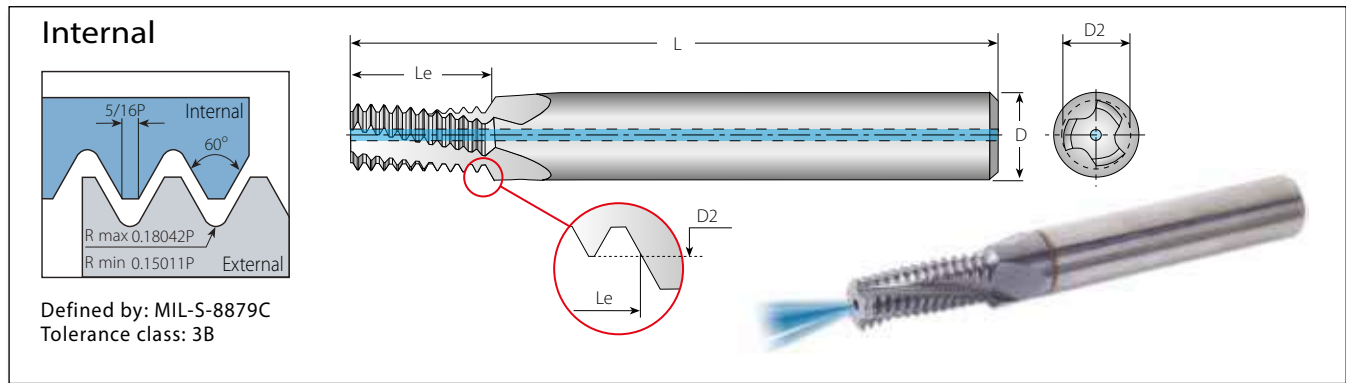
### Helical Flutes with Thru-Hole Coolant

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16"x28	28	HC06059L10-EI28BSPT-TM...	6	5.90	57	10.2	3	11	6.7
1/8"x28	28	HC08076L10-EI28BSPT-TM...	8	7.65	61	10.2	3	11	8.7
1/4"x19	19	HC10099L15-EI19BSPT-TM...	10	9.90	73	15.4	4	11	11.8
3/8"x19	19	HC12111L15-EI19BSPT-TM...	12	11.15	73	15.4	4	11	15.2
1/2", 3/4"x14	14	HC16142L22-EI14BSPT-TM...	16	14.25	92	22.7	4	12	19.0
1", 1 1/2", 2", 2 1/2"x11	11	HC20196L28-EI11BSPT-TM...	20	19.60	102	28.9	4	12	30.7

\* Bore diameter applies to smallest thread dia.

## UNJ

## Helicool



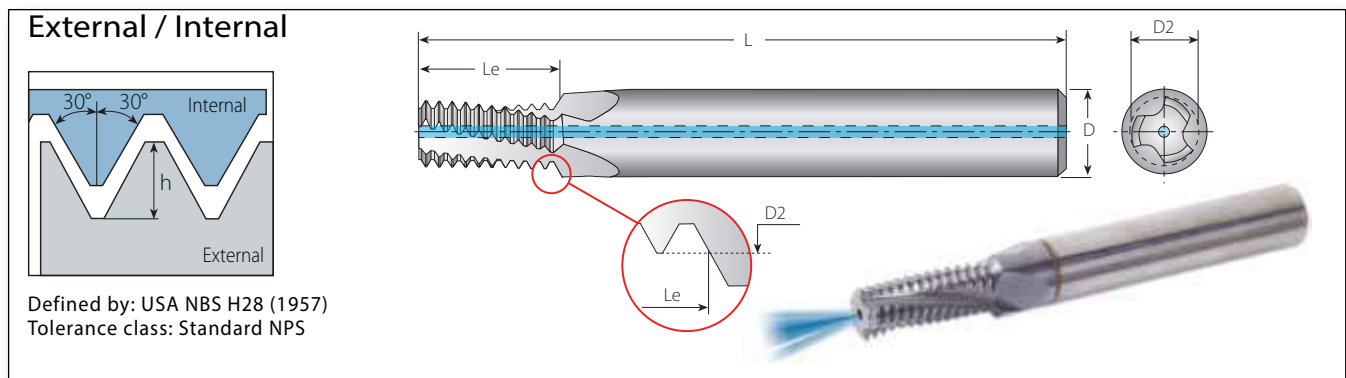
### Helical Flutes with Thru-Hole Coolant

2 x Do (Le ≤ 2 x Thread Diameter)

Thread				Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNJC	UNJF	UNJEF	UNJ	TPI	Internal	D	D2	L	Le	Z	Zt	mm
0.138" (#6)	0.190" (#10)	0.216" (#12)	0.4375 (7/16")	32	HC04027L07-I32UNJTM...	4	2.70	45	7.5	3	9	2.8
-	0.250" (1/4")	0.4375" (7/16")	0.5625" (9/16")	28	HC06054L13-I28UNJTM...	6	5.40	57	13.1	3	14	5.6
0.190" (#10)	0.3125" (5/16")	0.5625" (9/16")	-	24	HC04037L09-I24UNJTM...	4	3.70	45	10.0	3	9	4.0
-	0.3125" (5/16")	0.5625" (9/16")	-	24	HC08067L15-I24UNJTM...	8	6.70	61	16.4	3	15	7.0
0.250" (1/4")	0.4375" (7/16")	0.750" (3/4")	0.3125" (5/16")	20	HC06050L12-I20UNJTM...	6	5.00	57	13.3	3	10	5.3
-	0.4375" (7/16")	0.750" (3/4")	0.5625" (9/16")	20	HC10096L21-I20UNJTM...	10	9.60	73	22.2	4	17	10.0
0.3125" (5/16")	0.5625" (9/16")	1.0625" (1 1/16")	-	18	HC08064L15-I18UNJTM...	8	6.40	61	16.2	3	11	6.75
0.375" (3/8")	0.750" (3/4")	-	0.4375" (7/16")	16	HC08077L19-I16UNJTM...	8	7.70	61	19.8	3	12	8.1
0.4375" (7/16")	0.875" (7/8")	-	-	14	HC10092L21-I14UNJTM...	10	9.20	73	22.7	4	12	9.5
0.500" (1/2")	-	-	-	13	HC10099L25-I13UNJTM...	10	9.90	73	26.4	4	13	11.0

## NPS

## Helicool



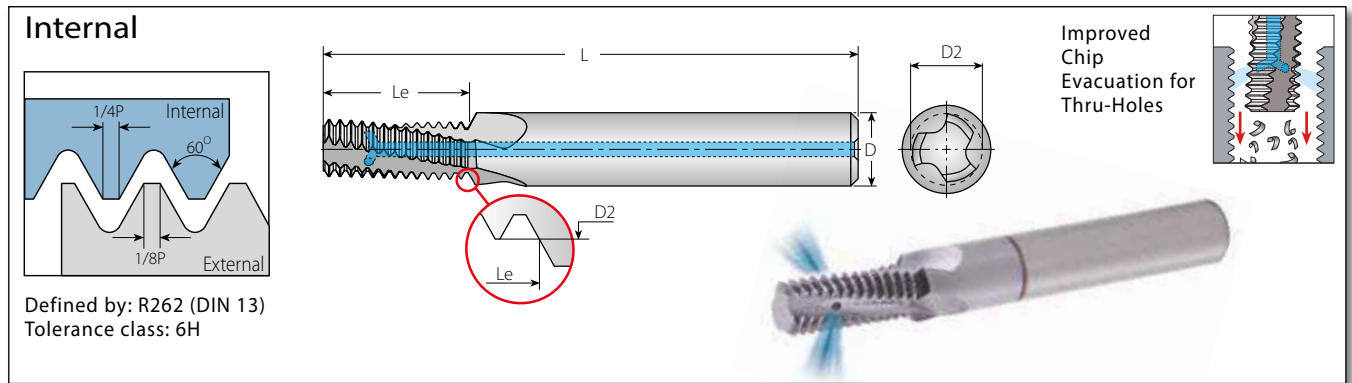
### Helical Flutes with Thru-Hole Coolant

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/8"	27	HC08076L09-EI27NPSTM...	8	7.65	61	9.9	3	10	8.5
1/4"	18	HC10099L14-EI18NPSTM...	10	9.90	73	14.8	3	10	11.1
3/8"	18	HC12111L14-EI18NPSTM...	12	11.15	73	14.8	4	10	14.5
1/2", 3/4"	14	HC16142L18-EI14NPSTM...	16	14.25	92	19.0	4	10	17.7; 23.0
1", 2"	11.5	HC20196L22-EI11.5NPSTM...	20	19.60	102	23.2	4	10	29.0; 56.0

\* Bore diameter applies to smallest thread dia.

## ISO Metric

## Helicool-R (HCR)



### Helicool-R (HCR)

#### Helical Flutes with Radial Cooling

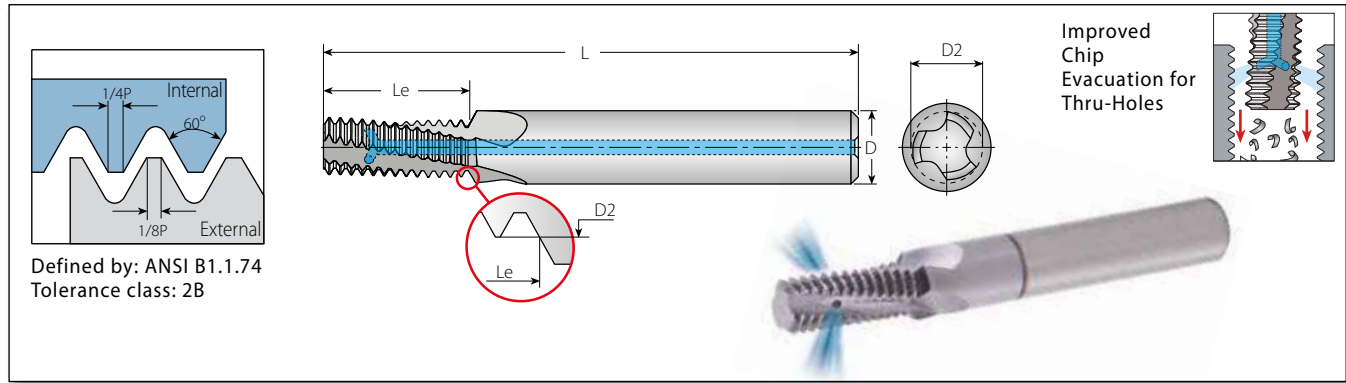
**2 x Do (Le ≤ 2 x Thread Diameter)**

Thread		Pitch	Ordering Code	Dimensions mm				Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	Le	Z	Zt	mm
M6x1.0	M8-M40x1.0	1.0	HCR06048L12-I1.00ISOTM...	6	4.8	57	12.5	3	12	5.0
	M10x1.0	1.0	HCR10087L20-I1.00ISOTM...	10	8.7	73	20.5	3	20	9.0
	M12x1.0	1.0	HCR12107L24-I1.00ISOTM...	12	10.7	73	24.5	4	24	11.0
M8x1.25		1.25	HCR08065L16-I1.25ISOTM...	8	6.5	64	16.9	3	13	6.8
M10x1.5	M12-M48x1.5	1.5	HCR10082L20-I1.50ISOTM...	10	8.2	73	20.3	3	13	8.5
	M12x1.5	1.5	HCR10099L24-I1.50ISOTM...	10	9.9	73	24.8	4	16	10.5
	M14x1.5	1.5	HCR12119L29-I1.50ISOTM...	12	11.9	84	29.3	4	19	12.5
	M16x1.5	1.5	HCR14139L32-I1.50ISOTM...	14	13.9	84	32.3	4	21	14.5
M12x1.75		1.75	HCR10099L25-I1.75ISOTM...	10	9.9	73	25.4	4	14	10.2
M14x2.0	M17-M80x2.0	2.0	HCR12116L29-I2.00ISOTM...	12	11.6	80	29.0	4	14	12.0
M16x2.0	M17-M80x2.0	2.0	HCR14136L33-I2.00ISOTM...	14	13.6	92	33.0	4	16	14.0
M20x2.5		2.5	HCR18171L41-I2.50ISOTM...	18	17.1	102	41.2	4	16	17.5

\* Bore diameter applies to smallest thread dia.

## American UN

## Helicool-R (HCR)



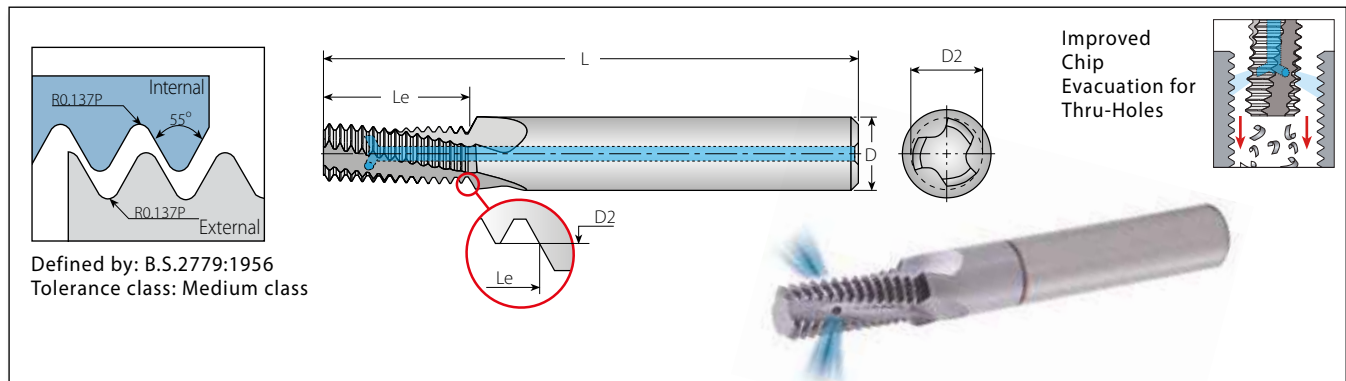
## Helicool-R (HCR)

2 x Do (Le ≤ 2 x Thread Diameter)

Thread			Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	UNEF	TPI	Internal	D	D2	L	Le	Z	Zt	mm
	1/4"x28	7/16", 1/2"x28	28	HCR06052L13-I28UNFTM...	6	5.15	57	13.1	3	14	5.5
	5/16", 3/8"x24	9/16"-11/16"x24	24	HCR08066L16-I24UNFTM...	8	6.68	61	16.4	3	15	6.8
	3/8"x24	9/16"-11/16"x24	24	HCR10082L19-I24UNFTM...	10	8.20	73	19.6	3	18	8.5
1/4"x20	7/16", 1/2"x20	3/4"-1"x20	20	HCR06048L13-I20UNCTM...	6	4.88	57	13.3	3	10	5.2
	7/16", 1/2"x20	3/4"-1"x20	20	HCR10096L22-I20UNFTM...	10	9.60	73	22.2	3	17	9.8
5/16"x18	9/16", 5/8"x18	11/16"-1 11/16"x18	18	HCR08061L16-I18UNCTM...	8	6.15	61	16.2	3	11	6.5
3/8"x16	3/4"x16		16	HCR08076L19-I16UNCTM...	8	7.65	61	19.8	3	12	8.0
7/16"x14	7/8"x14		14	HCR10090L22-I14UNCTM...	10	9.00	73	22.7	3	12	9.3
1/2"x13			13	HCR12104L26-I13UNCTM...	12	10.35	80	26.4	4	13	10.8
9/16"x12	1"-1 1/2"x12		12	HCR12118L28-I12UNCTM...	12	11.80	80	28.6	4	13	12.3
5/8"x11			11	HCR14131L33-I11UNCTM...	14	13.10	92	33.5	4	14	13.5
3/4"x10			10	HCR16159L39-I10UNCTM...	16	15.90	92	39.4	4	15	16.5
1"x8			8	HCR20199L52-I8UNCTM...	20	19.90	102	52.4	4	16	22.0

## BSP (G)

## Helicool-R (HCR)



## Helicool-R (HCR)

2 x Do (Le ≤ 2 x Thread Diameter)

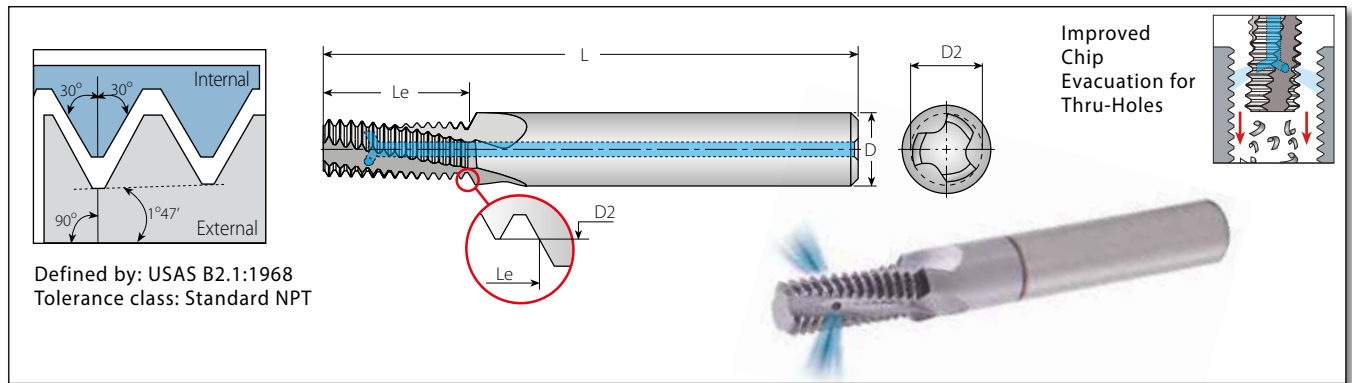
Thread		Pitch	Ordering Code	Dimensions mm			No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	Internal	D	D2	L	Le	Z	Zt	mm
1/8"x28	28	HCR10082L19-EI28BSPTM...	10	8.20	73	19.5	3	21	8.7
1/4", 3/8"x19	19	HCR12110L27-EI19BSPTM...	12	11.00	80	27.4	4	20	11.8
1/2"-7/8"x14	14	HCR18179L42-EI14BSPTM...	18	17.90	102	42.6	4	23	19.0

\* Bore diameter applies to smallest thread dia.



## NPT

## Helicool-R (HCR)

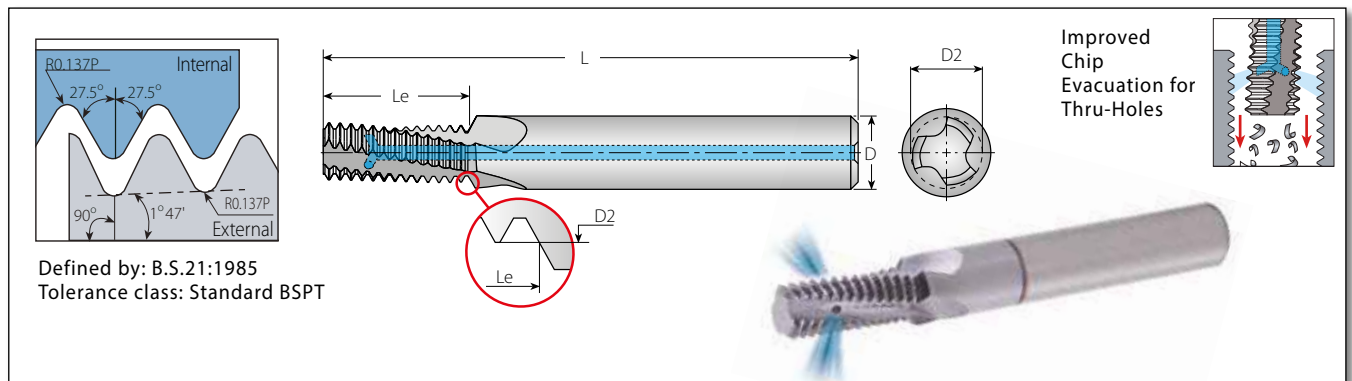


## Helicool-R (HCR)

Thread	Pitch	Ordering Code	Dimensions mm			No. of Flutes	Teeth	Bore Dia.*	
Standard	TPI	Internal	D	D2	L	Le	Z	Zt	mm
1/16"x27	27	HCR06059L09-EI27NPT-TM...	6	5.90	57	9.9	3	10	6.3
1/8"x27	27	HCR08076L09-EI27NPT-TM...	8	7.65	61	9.9	3	10	8.5
1/4"x18	18	HCR10099L14-EI18NPT-TM...	10	9.90	73	14.8	3	10	11.1
3/8"x18	18	HCR12111L14-EI18NPT-TM...	12	11.15	73	14.8	4	10	14.5
1/2", 3/4"x14	14	HCR16142L19-EI14NPT-TM...	16	14.25	92	19.0	4	10	17.7, 23.0
1", 1 1/4", 1 1/2", 2"x11.5	11.5	HCR20196L23-EI11.5NPT-TM...	20	19.60	102	23.2	4	10	29.0, 37.7, 44.0, 56.0

## BSPT

## Helicool-R (HCR)

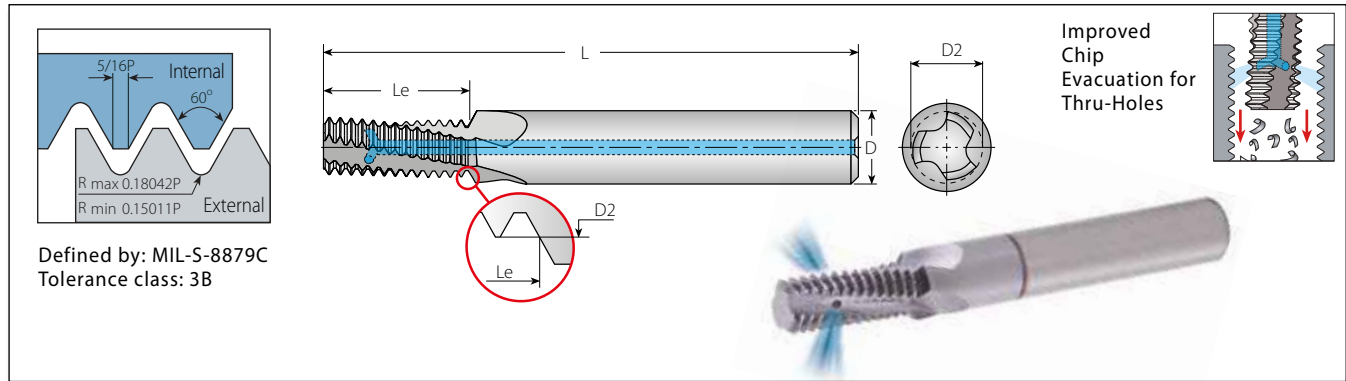


## Helicool-R (HCR)

Thread	Pitch	Ordering Code	Dimensions mm			No. of Flutes	Teeth	Bore Dia.*	
Standard	TPI	Internal	D	D2	L	Le	Z	Zt	mm
1/8"x28	28	HCR08076L10-EI28BSPT-TM...	8	7.65	61	10.2	3	11	8.7
1/4"x19	19	HCR10099L15-EI19BSPT-TM...	10	9.90	73	15.4	3	11	11.8
3/8"x19	19	HCR12111L15-EI19BSPT-TM...	12	11.15	73	15.4	4	11	15.2
1/2", 3/4"x14	14	HCR16142L22-EI14BSPT-TM...	16	14.25	92	22.7	4	12	19.0

## UNJ

## Helicool-R (HCR)



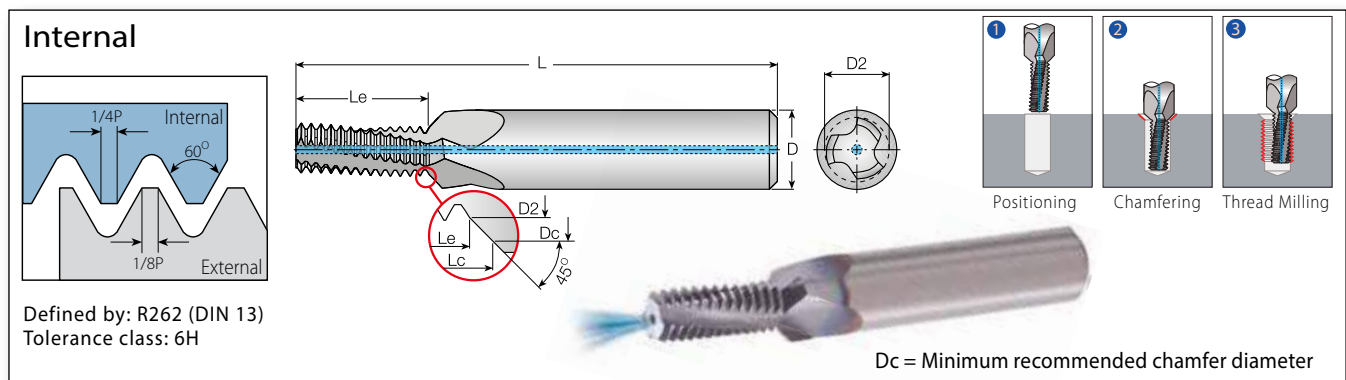
## Helicool-R (HCR)

2 x Do (Le ≤ 2 x Thread Diameter)

Thread				Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNJC	UNJF	UNJEF	UNJ	TPI	Internal	D	D2	L	Le	Z	Zt	mm
-	0.250"(1/4")	0.4375"(7/16")	0.5625"(9/16")	28	HCR06054L13-I28UNJTM...	6	5.40	57	13.1	3	14	5.6
-	0.3125"(5/16")	0.5625"(9/16")	-	24	HCR08067L15-I24UNJTM...	8	6.70	61	16.4	3	15	7.0
-	0.4375"(7/16")	0.750"(3/4")	0.5625"(9/16")	20	HCR10096L21-I20UNJTM...	10	9.60	73	22.2	4	17	10.0
0.3125"(5/16")	0.5625"(9/16")	1.0625"(1 1/16")	-	18	HCR08064L15-I18UNJTM...	8	6.40	61	16.2	3	11	6.75
0.375"(3/8")	0.750"(3/4")	-	0.4375"(7/16")	16	HCR08077L19-I16UNJTM...	8	7.70	61	19.8	3	12	8.1

## ISO Metric

## Helicool-C (HCC)



## Helicool-C (HCC)

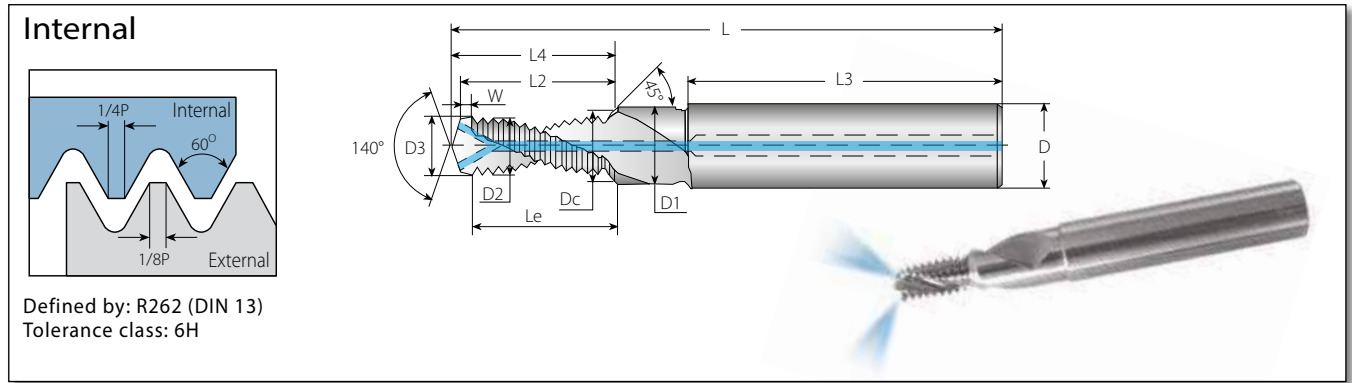
### Helical Flutes with Axial Coolant - Thru & Chamfer

2 x Do (Le ≤ 2 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm						No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	Dc	L	Le	Lc	Z	Zt	mm
M6x1.0	M8-M40x1.0	1.0	HCC08048L12-I1.00ISOTM...	8	4.8	6.3	61	12.5	13.3	3	12	5.0
	M10x1.0	1.0	HCC12087L20-I1.00ISOTM...	12	8.7	10.3	73	20.5	21.3	3	20	9.0
	M12x1.0	1.0	HCC14107L24-I1.00ISOTM...	14	10.7	12.3	80	24.5	25.3	4	24	11.0
M8x1.25		1.25	HCC10065L16-I1.25ISOTM...	10	6.5	8.3	73	16.9	17.8	3	13	6.8
M10x1.5	M12-M48x1.5	1.5	HCC12082L20-I1.50ISOTM...	12	8.2	10.3	80	20.3	21.3	3	13	8.5
	M12x1.5	1.5	HCC14099L24-I1.50ISOTM...	14	9.9	12.3	80	24.8	26.0	4	16	10.5
	M14x1.5	1.5	HCC16119L29-I1.50ISOTM...	16	11.9	14.3	92	29.3	30.5	4	19	12.5
	M16x1.5	1.5	HCC18139L32-I1.50ISOTM...	18	13.9	16.3	92	32.3	33.5	4	21	14.5
M12x1.75		1.75	HCC14099L25-I1.75ISOTM...	14	9.9	12.3	80	25.4	26.6	4	14	10.2

## ISO Metric

## HTC (Thriller)

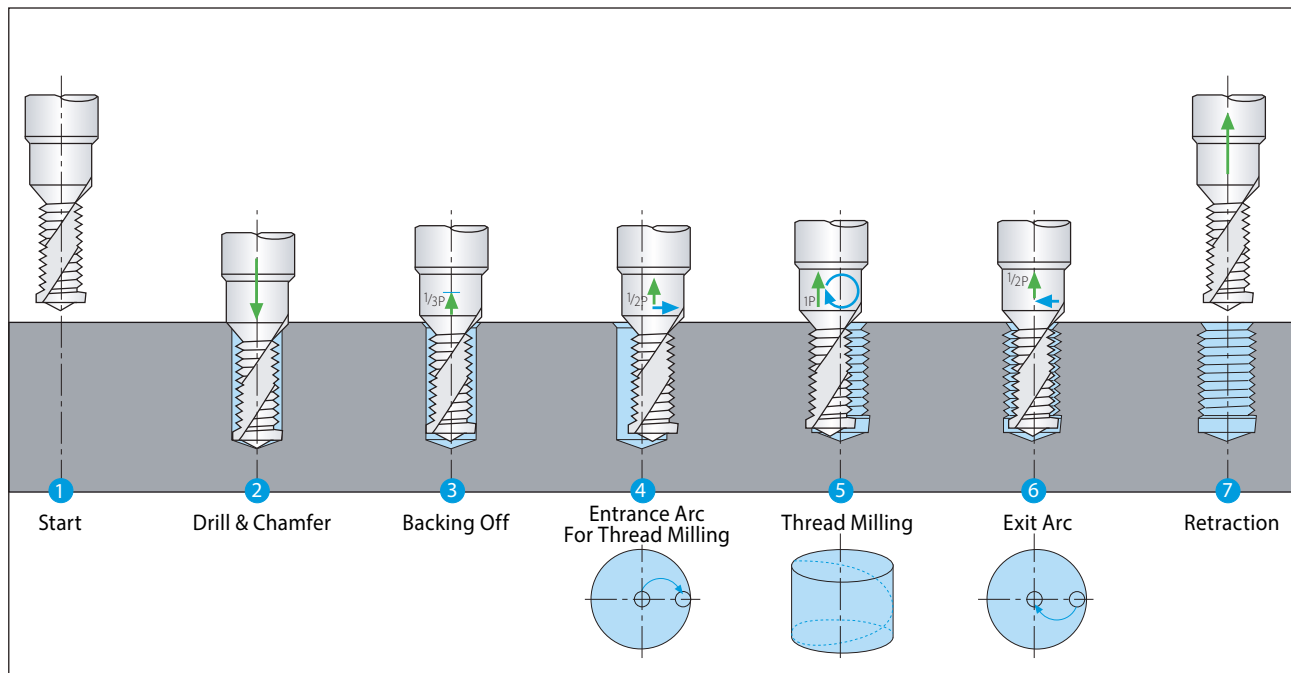


## HTC (Thriller)

### Drill, Chamfer & Thread with Coolant-Thru

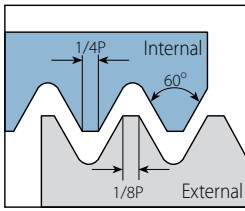
Thread	Ordering Code	Pitch	Dimensions mm											No. of Flutes	Teeth
ISO 2xD0 Coarse	Internal	mm	L	L4	L2	L3	W	Le	D3	D	D1	Dc	D2	Z	Zt
M6x1.0	HTCM6x1.0x2D...	1.00	62.0	14.5	13.7	36	1.0	12.7	5.0	8	6.6	6.3	4.85	2	11
M8x1.25	HTCM8x1.25x2D...	1.25	74.0	18.2	17.1	40	1.3	15.8	6.8	10	9.0	8.3	6.45	2	11
M10x1.5	HTCM10x1.5x2D...	1.50	79.0	23.4	22.1	45	1.5	20.6	8.5	12	11.0	10.3	8.08	2	12
M12x1.75	HTCM12x1.75x2D...	1.75	89.0	27.1	25.5	45	1.5	24.0	10.3	14	13.5	12.3	9.74	2	12
ISO 2.5xD0 Coarse															
M6x1.0	HTCM6x1.0x2.5D...	1.00	62.0	16.5	15.7	36	1.0	14.7	5.0	8	6.6	6.3	4.85	2	13
M8x1.25	HTCM8x1.25x2.5D...	1.25	74.0	23.2	22.1	40	1.3	20.8	6.8	10	9.0	8.3	6.45	2	15
M10x1.5	HTCM10x1.5x2.5D...	1.50	79.0	27.9	26.6	45	1.5	25.1	8.5	12	11.0	10.3	8.08	2	15

## HTC - Thriller Operating Cycle



HTC line is suitable for Aluminium and Cast Iron machining only.

## External / Internal



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



## Helical Flutes - External

2 x Do (Le ≤ 2 x Thread Diameter)

Thread	Pitch	Ordering Code	Dimensions mm			No. of Flutes	Teeth
M Coarse	mm	External	D	D2	L	Le	Zt
M3x0.5	0.5	H04039L06-E0.5ISOTM...	4	3.9	45	6.0	12
M4.5x0.75	0.75	H04039L09-E0.75ISOTM...	4	3.9	45	9.0	12
M6x1.0	1.0	H04039L12-E1.0ISOTM...	4	3.9	45	12.0	12
M8x1.25	1.25	H06059L16-E1.25ISOTM...	6	5.9	57	16.25	13
M10x1.5	1.5	H08079L21-E1.5ISOTM...	8	7.9	63	21.0	14
M14x2.0	2.0	H10099L28-E2.0ISOTM...	10	9.9	73	28.0	14

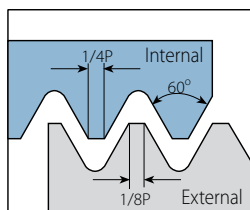
## Helical Flutes - Internal

2 x Do (Le ≤ 2 x Thread Diameter)

Thread	Pitch	Ordering Code	Dimensions mm			No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	Internal	D	D2	L	Le	Zt	mm
M3x0.5	M3.5-M16x0.5	H04022L06-I0.5ISOTM...	4	2.2	45	6.0	12	2.5
	M4x0.5	H04030L08-I0.5ISOTM...	4	3.0	45	8.0	16	3.5
	M5x0.5	H04039L10-I0.5ISOTM...	4	3.9	45	10.0	20	4.5
M4x0.7		H04028L08-I0.7ISOTM...	4	2.8	45	8.4	12	3.3
	M6x0.75	H04039L12-I0.75ISOTM...	4	3.9	45	12.0	16	5.3
M5x0.8		H04035L10-I0.8ISOTM...	4	3.5	45	10.4	13	4.2
M6x1.0	M8-M40x1.0	H04039L12-I1.0ISOTM...	4	3.9	45	12.0	12	5.0
	M8x1.0	H06059L16-I1.0ISOTM...	6	5.9	57	16.0	16	7.0
	M10x1.0	H08079L20-I1.0ISOTM...	8	7.9	63	20.0	20	9.0
	M12x1.0	H10099L24-I1.0ISOTM...	10	9.9	73	24.0	24	11.0
M8x1.25		H06058L16-I1.25ISOTM...	6	5.8	57	16.25	13	6.8
	M10x1.25	H08077L20-I1.25ISOTM...	8	7.7	63	20.0	16	8.8
M10x1.5	M12-M48x1.5	H08077L21-I1.5ISOTM...	8	7.7	63	21.0	14	8.5
	M12x1.5	H10094L24-I1.5ISOTM...	10	9.4	73	24.0	16	10.5
	M14x1.5	H12112L28-I1.5ISOTM...	12	11.2	83	28.5	19	12.5
	M16x1.5	H12119L33-I1.5ISOTM...	12	11.9	83	33.0	22	14.5
M12x1.75		H10087L24-I1.75ISOTM...	10	8.7	73	24.5	14	10.2
M14x2.0	M17-M80x2.0	H10099L28-I2.0ISOTM...	10	9.9	73	28.0	14	12.0
M16x2.0	M17-M80x2.0	H12119L32-I2.0ISOTM...	12	11.9	83	32.0	16	14.0
M18-M22x2.5		H16139L40-I2.5ISOTM...	16	13.9	92	40.0	16	15.5
M24x3.0		H16159L42-I3.0ISOTM...	16	15.9	92	42.0	14	21.0

\* Bore diameter applies to smallest thread dia.

## External / Internal



Defined by: ANSI B1.1.74  
Tolerance class: 2A/2B



## Helical Flutes - External

2 x Do (Le ≤ 2 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth
UNC	UNF	TPI	External	D	D2	L	Le	Z	Zt
No.8-32		32	H04039L09-E32UNCTM...	4	3.9	45	8.7	3	11
	No.12-28	28	H04039L12-E28UNFTM...	4	3.9	45	11.8	3	13
No.12-24		24	H04039L12-E24UNCTM...	4	3.9	45	11.6	3	11
1/4"x20		20	H04039L13-E20UNCTM...	4	3.9	45	12.7	3	10
5/16"x18		18	H06059L17-E18UNCTM...	6	5.9	57	16.9	3	12
3/8"x16		16	H08079L19-E16UNCTM...	8	7.9	63	19.1	3	12
9/16"x12		12	H12119L30-E12UNCTM...	12	11.9	83	29.6	4	14

## Helical Flutes - Internal

2 x Do (Le ≤ 2 x Thread Diameter)

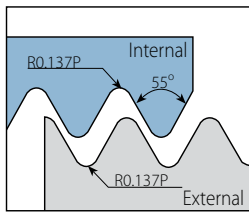
Thread			Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	UNEF	TPI	Internal	D	D2	L	Le	Z	Zt	mm
No.8-36			36	H04030L09-I36UNFTM...	4	3.0	45	8.5	3	12	3.5
No.10-32	No.12-3/8"x32		32	H04033L11-I32UNFTM...	4	3.3	45	11.1	3	14	4.0
No.12-28, 1/4"x28	7/16", 1/2"x28		28	H04038L12-I28UNFTM...	4	3.8	45	11.8	3	13	4.6
1/4"x28	7/16", 1/2"x28		28	H06046L13-I28UNFTM...	6	4.6	57	12.7	3	14	5.5
	7/16", 1/2"x28		28	H10092L23-I28UNEFTM...	10	9.2	73	22.7	4	25	10.2
No.10-24	5/16", 3/8"x24	9/16"-11/16"x24	24	H04029L11-I24UNCTM...	4	2.9	45	10.6	3	10	3.8
No.12-24	5/16", 3/8"x24	9/16"-11/16"x24	24	H04035L12-I24UNCTM...	4	3.5	45	11.6	3	11	4.5
	5/16", 3/8"x24	9/16"-11/16"x24	24	H06057L16-I24UNFTM...	6	5.7	57	15.9	3	15	6.8
	3/8"x24	9/16"-11/16"x24	24	H08074L19-I24UNFTM...	8	7.4	63	19.1	3	18	8.5
		9/16"-11/16"x24	24	H12119L29-I24UNEFTM...	12	11.9	83	28.6	4	27	13.2
1/4"x20	7/16", 1/2"x20	3/4"-1"x20	20	H04039L13-I20UNCTM...	4	3.9	45	12.7	3	10	5.2
	7/16", 1/2"x20	3/4"-1"x20	20	H10085L23-I20UNFTM...	10	8.5	73	22.9	4	18	9.8
	1/2"x20	3/4"-1"x20	20	H10099L26-I20UNFTM...	10	9.9	73	25.4	4	20	11.5
		3/4"-1"x20	20	H16159L38-I20UNEFTM...	16	15.9	92	38.1	5	30	17.8
5/16"x18	9/16", 5/8"x18	11/16"-1 1/16"x18	18	H06052L17-I18UNCTM...	6	5.2	57	16.9	3	12	6.5
	9/16", 5/8"x18	11/16"-1 1/16"x18	18	H12113L30-I18UNFTM...	12	11.3	83	29.6	4	21	12.8
	5/8"x18	11/16"-1 1/16"x18	18	H12119L33-I18UNFTM...	12	11.9	83	32.5	4	23	14.5
3/8"x16	3/4"x16		16	H08067L19-I16UNCTM...	8	6.7	63	19.1	3	12	8.0
	3/4"x16		16	H16159L38-I16UNFTM...	16	15.9	92	38.1	4	24	17.5
7/16"x14	7/8"x14		14	H08076L24-I14UNCTM...	8	7.6	63	23.6	4	13	9.3
	7/8"x14		14	H20187L44-I14UNFTM...	20	18.7	104	44.4	4	24	20.5
1/2"x13			13	H10089L26-I13UNCTM...	10	8.9	73	25.4	4	13	10.8
9/16"x12	1"-1 1/2"x12		12	H12103L30-I12UNCTM...	12	10.3	83	29.6	4	14	12.3
	1"-1 1/2"x12		12	H20199L51-I12UNFTM...	20	19.9	104	50.8	5	24	23.5
5/8"x11			11	H12110L32-I11UNCTM...	12	11.0	83	32.3	4	14	13.5
3/4"x10			10	H16135L38-I10UNCTM...	16	13.5	92	38.1	5	15	16.5
7/8"x9			9	H16152L45-I9UNCTM...	16	15.2	92	45.2	4	16	19.5
1"x8			8	H20170L51-I8UNCTM...	20	17.0	104	50.8	4	16	22.0

\* Bore diameter applies to smallest thread dia.

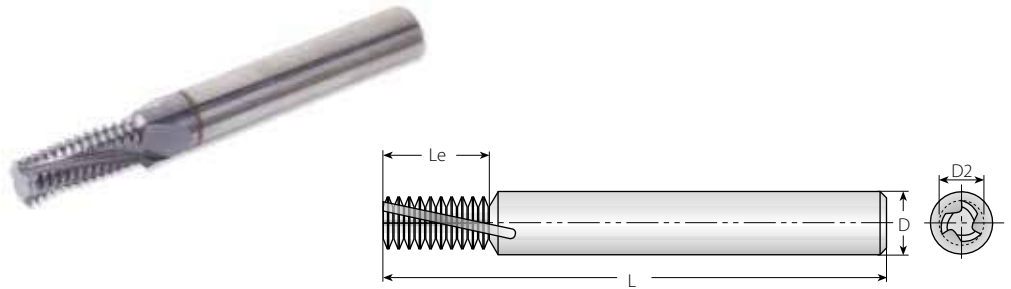
## BSP (G)

## Helical

### External / Internal



Defined by: B.S.2779:1956  
Tolerance class: Medium class



### Helical Flutes

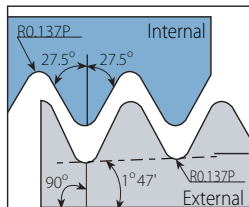
$2 \times D_o$  ( $Le \leq 2 \times \text{Thread Diameter}$ )

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16"x28, 1/8"x28	28	H06058L16-EI28BSPTM...	6	5.8	57	16.3	3	18	6.7
1/8"x28	28	H08077L20-EI28BSPTM...	8	7.7	63	20.0	3	22	8.7
1/4"x19, 3/8"x19	19	H10099L27-EI19BSPTM...	10	9.9	73	26.7	4	20	11.8
3/8"x19	19	H16134L33-EI19BSPTM...	16	13.4	92	33.4	4	25	15.2
1/2", 3/4"x14	14	H16157L44-EI14BSPTM...	16	15.7	92	43.5	5	24	19.0
1", 1 1/2", 2", 2 1/2"x11	11	H20199L42-EI11BSPTM...	20	19.9	104	41.6	5	18	30.7

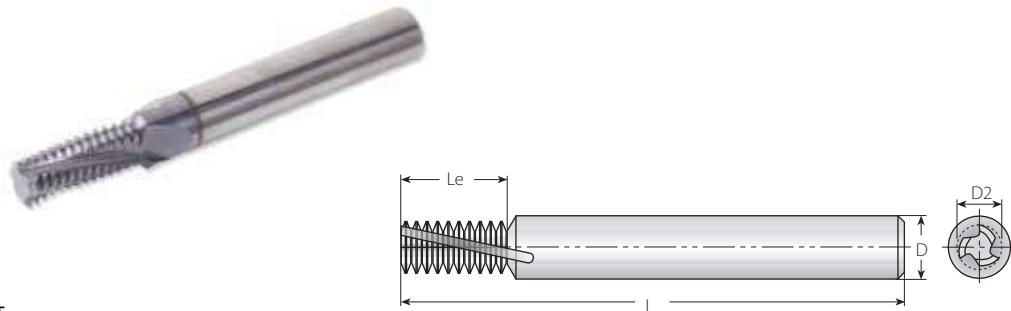
## BSPT

## Helical

### External / Internal



Defined by: B.S.21:1985  
Tolerance class: Standard BSPT



### Helical Flutes

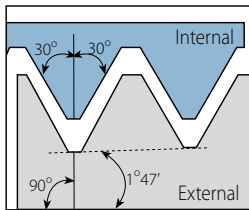
Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16"x28	28	H06058L16-EI28BSPT-TM...	6	5.8	57	16.3	3	18	6.7
1/8"x28	28	H08077L20-EI28BSPT-TM...	8	7.7	63	20.0	3	22	8.7
1/4"x19	19	H10099L27-EI19BSPT-TM...	10	9.9	73	26.7	4	20	11.8
3/8"x19	19	H16134L33-EI19BSPT-TM...	16	13.4	92	33.4	4	25	15.2
1/2", 3/4"x14	14	H16157L44-EI14BSPT-TM...	16	15.7	92	43.5	5	24	19.0
1", 1 1/2", 2", 2 1/2"x11	11	H20199L42-EI11BSPT-TM...	20	19.9	104	41.6	5	18	30.7

\* Bore diameter applies to smallest thread dia.

## NPT

## Helical

### External / Internal



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

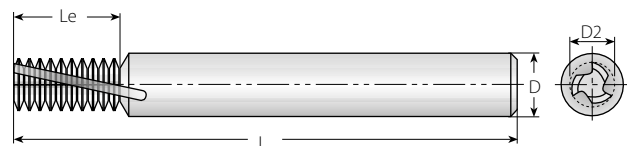
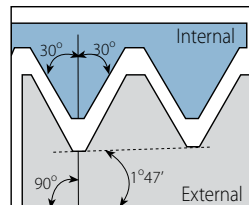
### Helical Flutes

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16"x27	27	H06053L09-EI27NPT-TM...	6	5.3	57	9.4	3	10	6.3
1/8"x27	27	H08075L09-EI27NPT-TM...	8	7.5	63	9.4	4	10	8.5
1/4"x18	18	H10094L14-EI18NPT-TM...	10	9.4	73	14.1	4	10	11.1
3/8"x18	18	H12119L14-EI18NPT-TM...	12	11.9	83	14.1	4	10	14.5
1/2", 3/4"x14	14	H16155L25-EI14NPT-TM...	16	15.5	92	25.4	5	14	17.7, 23.0
1"-2"x11.5	11.5	H20199L33-EI11.5NPT-TM...	20	19.9	104	33.1	5	15	29.0-56.0
2 1/2", 3"x8	8	H20199L38-EI8NPT-TM...	20	19.9	104	38.1	4	12	66.5

## NPTF

## Helical

### External / Internal



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

### Helical Flutes

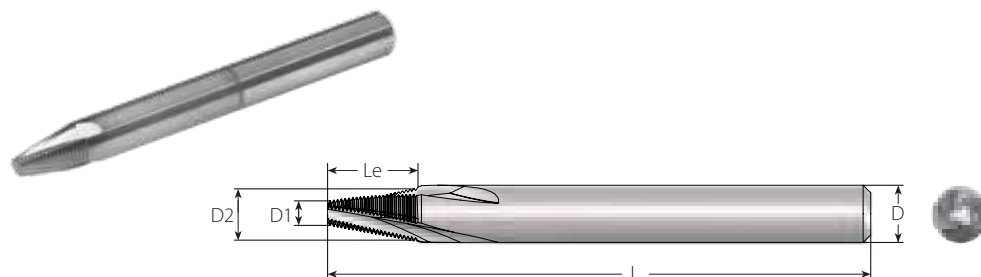
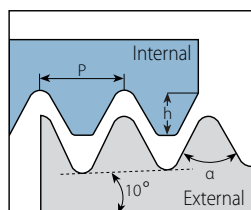
Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
Standard	TPI	External / Internal	D	D2	L	Le	Z	Zt	mm
1/16"x27	27	H06053L09-EI27NPTFTM...	6	5.3	57	9.4	3	10	6.3
1/8"x27	27	H08075L09-EI27NPTFTM...	8	7.5	63	9.4	4	10	8.4
1/4"x18	18	H10094L14-EI18NPTFTM...	10	9.4	73	14.1	4	10	11.1
3/8"x18	18	H12119L14-EI18NPTFTM...	12	11.9	83	14.1	4	10	14.7
1/2", 3/4"x14	14	H16155L25-EI14NPTFTM...	16	15.5	92	25.4	5	14	17.9, 23.4
1"-2"x11.5	11.5	H20199L33-EI11.5NPTFTM...	20	19.9	104	33.1	5	15	29.4-56.2
2 1/2", 3"x8	8	H20199L38-EI8NPTFTM...	20	19.9	104	38.1	4	12	67.0

\* Bore diameter applies to smallest thread dia.

## Tap 60°, Tap 55°

## Helical

### Internal



### Helical Flutes - Taper 60° - TM Solid Helical Flutes for Bone Plate Applications

Pitch mm	Ordering Code	Taper	Thread Angle $\alpha$	Profile Height h	Dimensions mm					No. of Flutes Z	Teeth Zt
	Internal				D	D2	D1	L	Le		
0.4	H06059L080-I0.4TAP60TM...	20°	60°	0.20	6	5.9	3.2	57	8.0	3	20
0.5	H06059L090-I0.5TAP60TM...	20°	60°	0.25	6	5.9	2.9	57	9.0	3	18

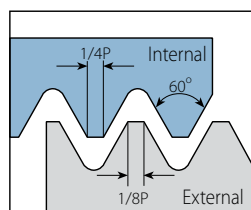
### Helical Flutes - Taper 55° - TM Solid Helical Flutes for Bone Plate Applications

Pitch mm	Ordering Code	Taper	Thread Angle $\alpha$	Profile Height h	Dimensions mm					No. of Flutes Z	Teeth Zt
	Internal				D	D2	D1	L	Le		
0.3	H03028L039-I0.3TAP55TM...	20°	55°	0.18	3	2.8	1.5	38	3.9	3	13
0.35	H04039L063-I0.35TAP55TM...	20°	55°	0.20	4	3.9	1.8	45	6.3	3	18
0.4	H06059L100-I0.4TAP55TM...	20°	55°	0.29	6	5.9	2.5	57	10.0	3	25
0.5	H06059L090-I0.5TAP55TM...	20°	55°	0.33	6	5.9	2.9	57	9.0	3	18
0.6	H06059L066-I0.6TAP55TM...	20°	55°	0.47	6	5.9	3.8	57	6.6	3	11

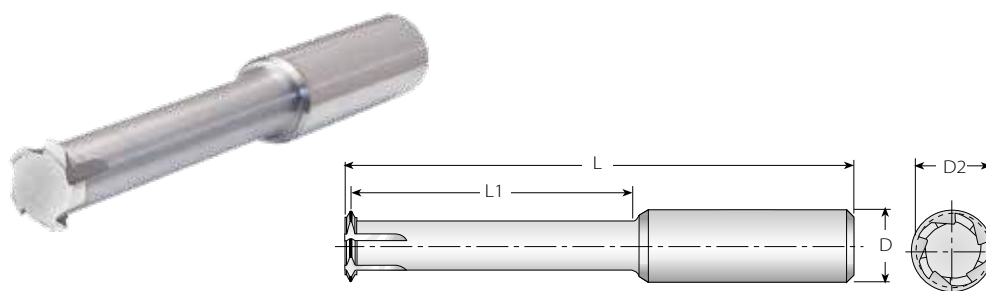
## ISO Metric

## Deep Threading

### Internal



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



### Deep Threading - Long Tools for Deep Holes

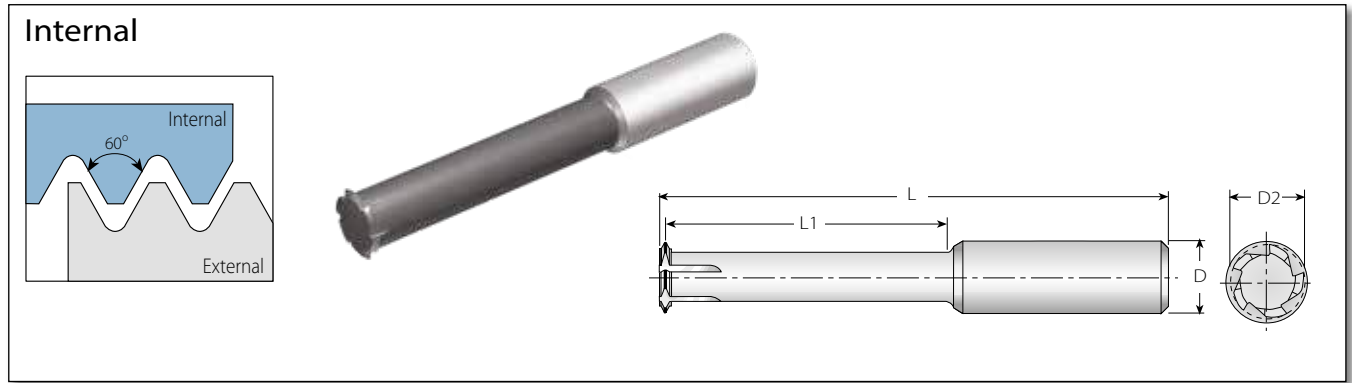
3 x Do (L1 ≤ 3 x Thread Diameter)

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.
M Coarse	mm	Internal	D	D2	L	L1	Z	Zt	mm
M6x1	1.0	D1T08041-I1.0ISOTM...	8	4.1	63	19	3	1	5.0
M8x1.25	1.25	D1T10058-I1.25ISOTM...	10	5.8	73	26	3	1	6.8
M10x1.5	1.50	D1T10077-I1.50ISOTM...	10	7.7	73	32	3	1	8.5
M12x1.5	1.50	D1T12094-I1.50ISOTM...	12	9.4	83	38	4	1	10.5
M12x1.75	1.75	D1T12087-I1.75ISOTM...	12	8.7	83	38	4	1	10.2
M14x2	2.0	D1T16102-I2.0ISOTM...	16	10.2	92	44	4	1	12.0
M16x2	2.0	D1T16122-I2.0ISOTM...	16	12.2	100	50	4	1	14.0
M18x2.5	2.50	D1T16129-I2.5ISOTM...	16	12.9	108	57	5	1	15.5
M20x2.5	2.50	D1T16148-I2.5ISOTM...	16	14.8	114	63	5	1	17.5



## Partial Profile 60°

## Deep Threading

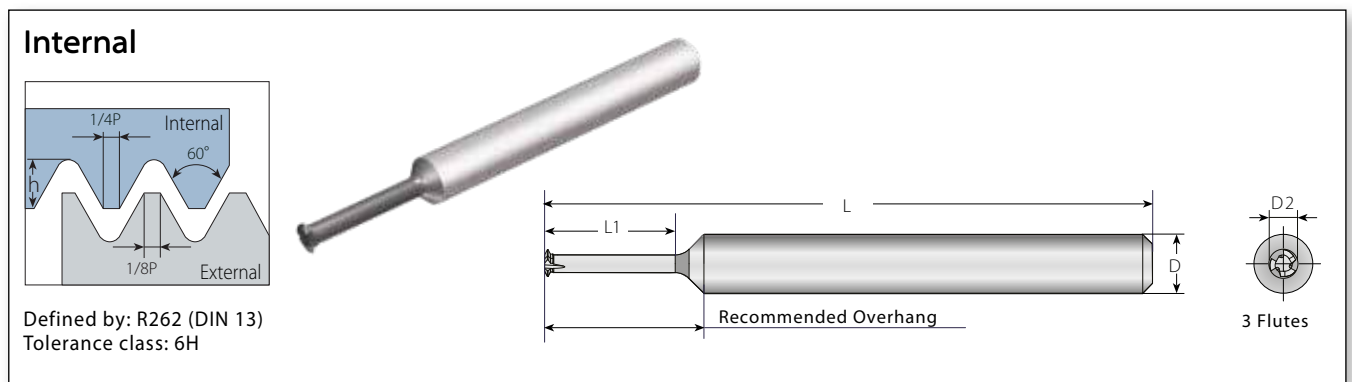


### Deep Threading - Long Tools for Deep Holes

		Min. Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth
M Coarse	M Fine	UN, UNS, UNF, UNEF	mm TPI	Internal	D	D2	L	L1	Z	Zt
M5x0.8	M5x0.5, M5x0.75	No.10-56UNS, No.10-48UNS, No.10-40UNS, No.10-36UNS, No.10-32UNF	0.5-0.8 32-56	D1T04390L160-ITA60TM...	4	3.90	45	16	4	1
M6x1.0	M6x0.5, M6x0.75	No.12-56UNS, No.12-48UNS, 1/4-40UNS, 1/4-36UNS, 1/4-32UNEF, 1/4-28UNF, 1/4-27UNS, 1/4-24UNS	0.5-1.0 24-56	D1T06485L200-ITB60TM...	6	4.85	51	20	5	1
M8x1.25	M7x0.5, M7x0.75, M7.5x1.0	5/16-48UNS, 5/16-40UNS, 5/16-36UNS, 5/16-32UNEF, 5/16-28UN, 5/16-27UNS, 5/16-24UNS, 5/16-20UN	0.5-1.25 20-48	D1T06590L250-ITF60TM...	6	5.90	64	25	5	1
-	M10.5x0.5, M11x0.75, M11x1.0	7/16-32UN, 7/16-28UNEF, 7/16-27UNS, 7/16-24UNS	0.5-1.0 24-56	D1T10990L350-ITB60TM...	10	9.90	73	35	6	1
M10x1.5	M10x1.0, M10x1.25	3/8-24UNF, 3/8-20UN, 7/16-18UNS, 7/16-16UN	1.0-1.50 16-24	D1T08790L320-ITC60TM...	8	7.90	63	32	6	1
M12x1.75	M12x1.0, M12x1.25, M12x1.5	1/2-24UNS, 1/2-20UNS, 1/2-18UNS, 1/2-16UNS, 1/2-14UNS	1.0-1.75 14-24	D1T10990L380-ITD60TM...	10	9.90	73	38	6	1
-	M13.5x1.0, M14x1.25, M14x1.5	9/16-24UNEF	1.0-1.75 14-24	D1T12119L450-ITD60TM...	12	11.90	83	45	6	1

## ISO Metric

## MilliPro D1T



### MilliPro D1T - Miniature Thread Mills

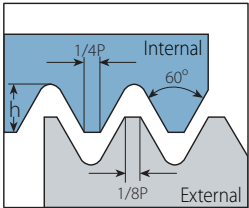
3xDo (L1 ≤ 3 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	mm
M1.0x0.25	M1.4x0.25	0.25	D1T03007L031-I0.25ISOTM...	3	0.70	31	3.1	3	1	0.75
M1.2x0.25	M1.4x0.25	0.25	D1T03009L038-I0.25ISOTM...	3	0.90	31	3.8	3	1	0.95
M1.4x0.3	-	0.30	D1T03011L044-I0.30ISOTM...	3	1.05	31	4.4	3	1	1.15
M1.6x0.35	-	0.35	D1T03012L050-I0.35ISOTM...	3	1.20	31	5.0	3	1	1.30
M1.8x0.35	M2.0x0.35	0.35	D1T03014L056-I0.35ISOTM...	3	1.40	31	5.6	3	1	1.50
M2.0x0.4	-	0.40	D1T03015L062-I0.40ISOTM...	3	1.50	31	6.2	3	1	1.65
M2.5x0.45	-	0.45	D1T03019L077-I0.45ISOTM...	3	1.95	31	7.7	3	1	2.10

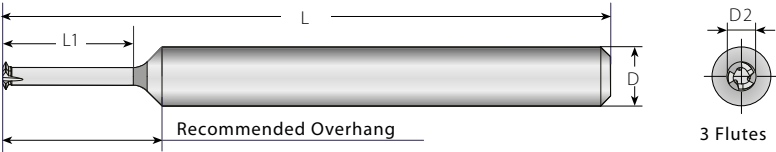

American UN

MilliPro D1T

Internal



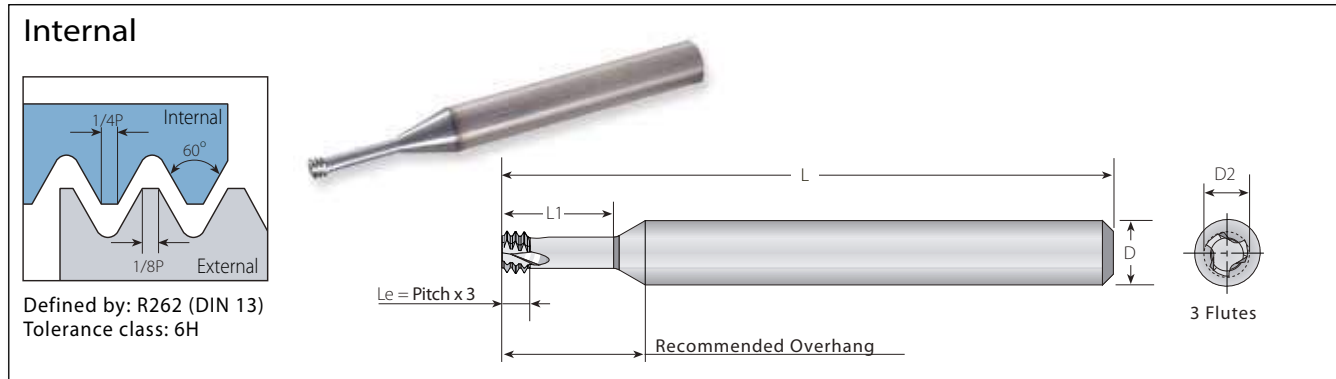
Defined by: ANSI B1.1:74  
Tolerance class: 2B



MilliPro D1T - Miniature Thread Mills

3xDo (L1≤3 x Thread Diameter)

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.
UNF	TPI	Internal	D	D2	L	L1	Z	Zt	mm
0-80	80	D1T03011L046-I80UNTM...	3	1.15	31	4.6	3	1	1.30
1-72	72	D1T03014L065-I72UNTM...	3	1.45	31	6.5	3	1	1.60



### MilliPro - Miniature Thread Mills

2 x Do ( $L_1 \leq 2 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	mm
M1.6x0.35		0.35	D3T03012L034-I0.35ISOTM...	3	1.20	30	3.4	3	3	1.25
M2x0.4		0.4	D3T06015L042-I0.4ISOTM...	6	1.55	57	4.2	3	3	1.6
M2.2x0.45		0.45	D3T06016L046-I0.45ISOTM...	6	1.65	57	4.6	3	3	1.75
M2.5x0.45		0.45	D3T06019L052-I0.45ISOTM...	6	1.95	57	5.2	3	3	2.05
M3x0.5	M3.5-M16x0.5	0.5	D3T06024L062-I0.5ISOTM...	6	2.40	57	6.2	3	3	2.5
M3.5x0.6		0.6	D3T06027L073-I0.6ISOTM...	6	2.75	57	7.3	3	3	2.9
M4x0.7		0.7	D3T06031L083-I0.7ISOTM...	6	3.15	57	8.3	3	3	3.3
M5x0.8		0.8	D3T06040L104-I0.8ISOTM...	6	4.05	57	10.4	3	3	4.2
M6x1.0	M8-M40x1.0	1.0	D3T06048L125-I1.0ISOTM...	6	4.80	57	12.5	3	3	5.0
M8x1.25		1.25	D3T08065L166-I1.25ISOTM...	8	6.50	63	16.6	3	3	6.8
M10x1.5	M12-M48x1.50	1.50	D3T10082L208-I1.50ISOTM...	10	8.20	73	20.8	3	3	8.5
M12x1.75		1.75	D3T10099L250-I1.75ISOTM...	10	9.90	73	25.0	3	3	10.3
M16x2.0		2.0	D3T12119L330-I2.0ISOTM...	12	11.90	83	33.0	3	3	14.0
M20x2.5		2.50	D3T16159L413-I2.5ISOTM...	16	15.90	92	41.3	3	3	17.5

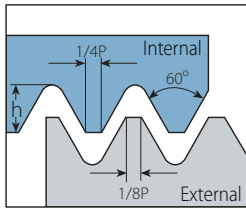
### MilliPro - Miniature Thread Mills

3 x Do ( $L_1 \leq 3 \times \text{Thread Diameter}$ )

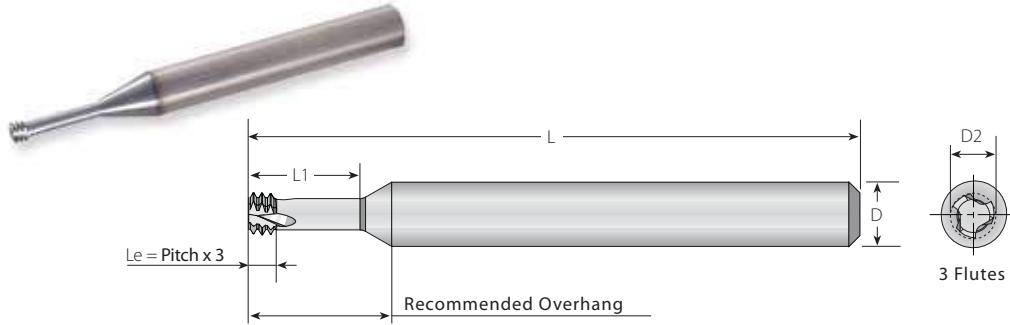
Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	mm
M1.6X0.35		0.35	D3T03012L050-I0.35ISOTM...	3	1.20	30	5.0	3	3	1.25
M2x0.4		0.4	D3T03015L062-I0.4ISOTM...	3	1.55	30	6.2	3	3	1.6
M2X0.4		0.4	D3T06015L062-I0.4ISOTM...	6	1.55	57	6.2	3	3	1.6
M2.5x0.45		0.45	D3T03019L077-I0.45ISOTM...	3	1.95	30	7.7	3	3	2.05
M2.5x0.45		0.45	D3T06019L077-I0.45ISOTM...	6	1.95	57	7.7	3	3	2.05
M3X0.5	M3.5-M16x0.5	0.5	D3T03024L092-I0.5ISOTM...	3	2.40	30	9.2	3	3	2.5
M3x0.5	M3.5-M16x0.5	0.5	D3T06024L092-I0.5ISOTM...	6	2.40	57	9.2	3	3	2.5
M4x0.7		0.7	D3T06031L123-I0.7ISOTM...	6	3.15	57	12.3	3	3	3.3
M5x0.8		0.8	D3T06040L154-I0.8ISOTM...	6	4.05	57	15.4	3	3	4.2
M6x1.0	M8-M40x1.0	1.00	D3T06048L185-I1.0ISOTM...	6	4.80	57	18.5	3	3	5.0
M8x1.25		1.25	D3T08065L246-I1.25ISOTM...	8	6.50	63	24.6	3	3	6.8

\* Bore diameter applies to smallest thread dia.

Internal



Defined by: ANSI B1.1:74  
Tolerance class: 2B



MilliPro - Miniature Thread Mills

2 x Do (L1 ≤ 2 x Thread Diameter)

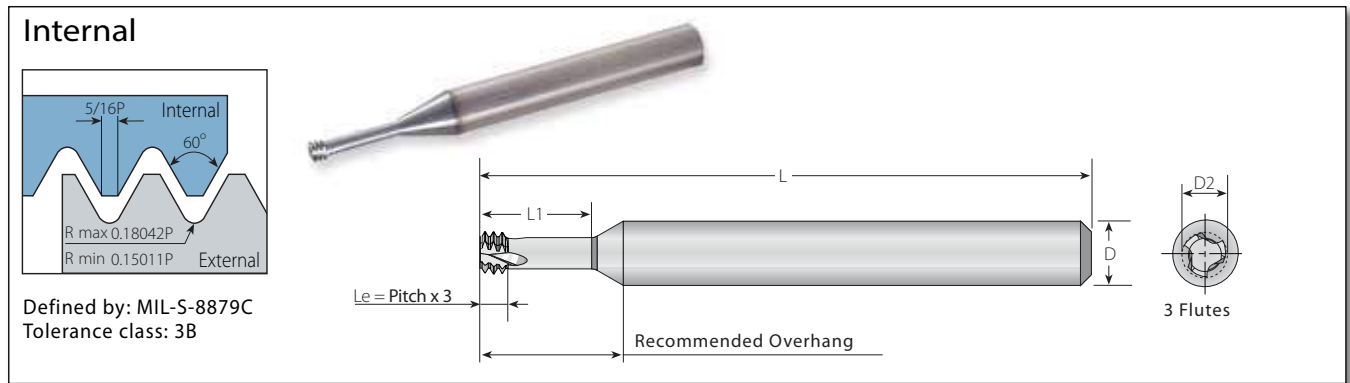
Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	TPI	Internal	D	D2	L	L1	Z	Zt	mm
	No.1-72	72	D3T06014L039-I72UNTM...	6	1.45	57	3.9	3	3	1.6
No.1-64	No.2-64	64	D3T06014L042-I64UNTM...	6	1.40	57	4.2	3	3	1.5
No.2-56	No.3-56	56	D3T06016L050-I56UNTM...	6	1.65	57	5.0	3	3	1.8
No.3-48	No.4-48	48	D3T06019L060-I48UNTM...	6	1.90	57	6.0	3	3	2.1
No.4, No.5-40	No.6-40	40	D3T06021L060-I40UNTM...	6	2.10	57	6.0	3	3	2.3
No.5-40	No.6-40	40	D3T06024L072-I40UNTM...	6	2.45	57	7.2	3	3	2.6
	No.8-36	36	D3T06033L087-I36UNTM...	6	3.30	57	8.7	3	3	3.5
No.6, No.8-32	No.10-32	32	D3T06025L074-I32UNTM...	6	2.55	57	7.4	3	3	2.8
No.8-32	No.10-32	32	D3T06032L100-I32UNTM...	6	3.20	57	10.0	3	3	3.5
	No.10-32	32	D3T06038L103-I32UNTM...	6	3.80	57	10.3	3	3	4.0
	1/4"x28	28	D3T06052L132-I28UNTM...	6	5.25	57	13.2	3	3	5.5
No.10-24	5/16"x24	24	D3T06035L102-I24UNTM...	6	3.58	57	10.2	3	3	3.9
	5/16"x24	24	D3T08066L165-I24UNTM...	8	6.68	63	16.5	3	3	6.9
1/4"x20	7/16"x20	20	D3T06048L134-I20UNTM...	6	4.88	57	13.4	3	3	5.2
	7/16"x20	20	D3T10095L230-I20UNTM...	10	9.55	73	23.0	3	3	9.9
5/16"x18		18	D3T08061L169-I18UNTM...	8	6.15	63	16.9	3	3	6.6
3/8"x16		16	D3T08067L191-I16UNTM...	8	6.70	63	19.1	3	3	8.0
7/16"x14		14	D3T10090L233-I14UNTM...	10	9.00	73	23.3	3	3	9.4

MilliPro - Miniature Thread Mills

3 x Do (L1 ≤ 3 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	TPI	Internal	D	D2	L	L1	Z	Zt	mm
	No.1-72	72	D3T03014L057-I72UNTM...	3	1.45	30	5.75	3	3	1.6
	No.1-72	72	D3T06014L057-I72UNTM...	6	1.45	57	5.75	3	3	1.6
No.2-56	No.3-56	56	D3T03016L070-I56UNTM...	3	1.65	30	7.0	3	3	1.8
No.4, No.5-40	No.6-40	40	D3T03021L090-I40UNTM...	3	2.10	30	9.0	3	3	2.3
No.4, No.5-40	No.6-40	40	D3T06021L090-I40UNTM...	6	2.10	57	9.0	3	3	2.3
No.5-40	No.6-40	40	D3T06024L100-I40UNTM...	6	2.45	57	10.0	3	3	2.6
No.6, No.8-32	No.10-32	32	D3T03025L110-I32UNTM...	3	2.55	30	11.0	3	3	2.8
No.6, No.8-32	No.10-32	32	D3T06025L110-I32UNTM...	6	2.55	57	11.0	3	3	2.8
No.8-32	No.10-32	32	D3T06032L130-I32UNTM...	6	3.20	57	13.0	3	3	3.4
	No.10-32	32	D3T06038L150-I32UNTM...	6	3.80	57	15.1	3	3	4.0
No.12-28	1/4"x28	28	D3T06044L170-I28UNTM...	6	4.40	57	17.0	3	3	4.7
	1/4"x28	28	D3T06052L196-I28UNTM...	6	5.25	57	19.6	3	3	5.5
	5/16"x24	24	D3T08066L245-I24UNTM...	8	6.68	63	24.5	3	3	6.9
1/4"x20	7/16"x20	20	D3T06048L198-I20UNTM...	6	4.88	57	19.8	3	3	5.1
5/16"x18		18	D3T08061L239-I18UNTM...	8	6.15	63	24.0	3	3	6.6

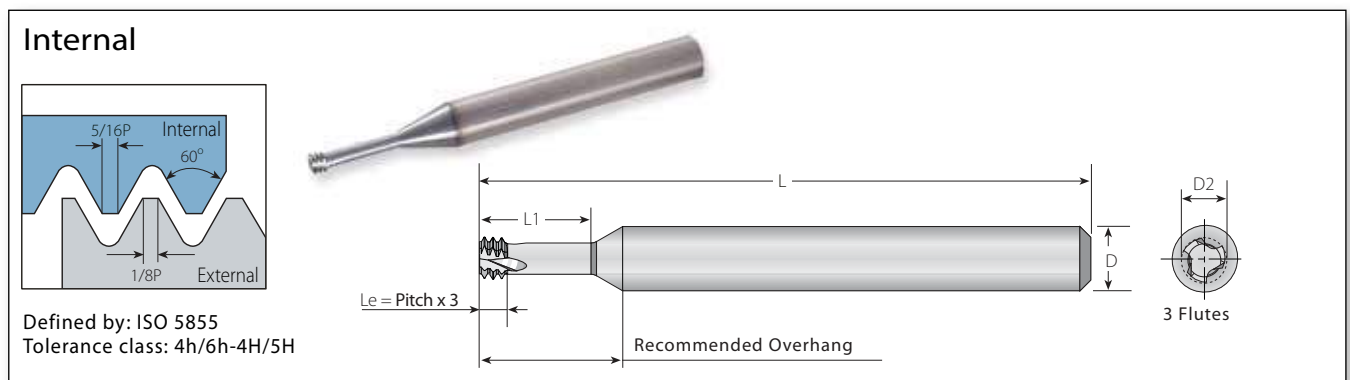
\* Bore diameter applies to smallest thread dia.



### MilliPro - Miniature Thread Mills

3 x Do ( $L1 \leq 3 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNJC	UNJF	TPI	Internal	D	D2	L	L1	Z	Zt	mm
0.138" (#6)	0.190" (#10)	32	D3T06027L110-I32UNJTM...	6	2.70	57	11.0	3	3	2.8
	0.250" (1/4")	28	D3T06054L195-I28UNJTM...	6	5.40	57	19.5	3	3	5.6
0.190" (#10)		24	D3T06037L149-I24UNJTM...	6	3.70	57	14.9	3	3	4.0
	0.3125" (5/16")	24	D3T08067L241-I24UNJTM...	8	6.70	63	24.1	3	3	7.0
0.250" (1/4")		20	D3T06050L195-I20UNJTM...	6	5.00	57	19.5	3	3	5.3
	0.4375" (7/16")	20	D3T10096L335-I20UNJTM...	10	9.60	73	33.5	3	3	10.0
0.3125" (5/16")	0.5625" (9/16")	18	D3T08064L241-I18UNJTM...	8	6.40	63	24.1	3	3	6.75
0.375" (3/8")	0.750" (3/4")	16	D3T08077L290-I16UNJTM...	8	7.70	63	29.0	3	3	8.1
0.4375" (7/16")	0.875" (7/8")	14	D3T10092L335-I14UNJTM...	10	9.20	73	33.5	3	3	9.5
0.500" (1/2")		13	D3T10099L385-I13UNJTM...	10	9.90	73	38.5	3	3	11.0



### MilliPro - Miniature Thread Mills

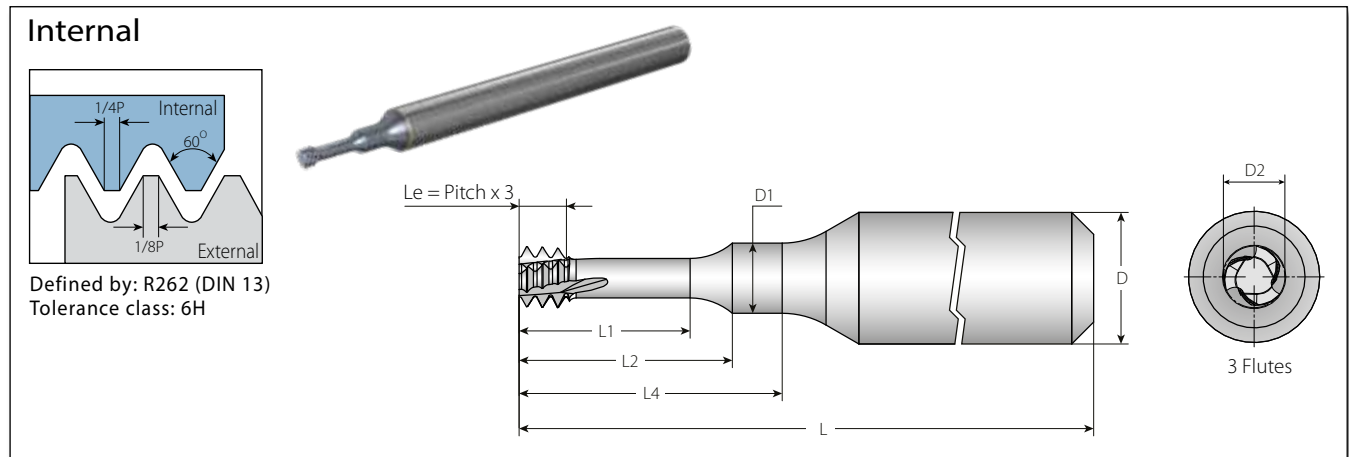
3 x Do ( $L1 \leq 3 \times \text{Thread Diameter}$ )

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.
Standard	mm	Internal	D	D2	L	L1	Z	Zt	mm
MJ3x0.5	0.5	D3T06024L092-I0.5MJTM...	6	2.40	57	9.2	3	3	2.6
MJ3.5x0.6	0.6	D3T06028L110-I0.6MJTM...	6	2.85	57	11.0	3	3	3.0
MJ4x0.7	0.7	D3T06031L123-I0.7MJTM...	6	3.15	57	12.3	3	3	3.4
MJ5x0.8	0.8	D3T06040L154-I0.8MJTM...	6	4.05	57	15.4	3	3	4.3
MJ6x1.0	1.0	D3T06048L185-I1.0MJTM...	6	4.80	57	18.5	3	3	5.1
MJ8x1.25	1.25	D3T08065L246-I1.25MJTM...	8	6.50	63	24.6	3	3	6.9
MJ10x1.5	1.50	D3T10082L308-I1.50MJTM...	10	8.20	73	30.8	3	3	8.7
MJ12x1.75	1.75	D3T10099L370-I1.75MJTM...	10	9.90	73	37.0	3	3	10.4
MJ14x2	2.0	D3T12119L425-I2.0MJTM...	12	11.90	83	42.5	3	3	12.25

\* Bore diameter applies to smallest thread dia.

## ISO Metric

## MilliPro Dental



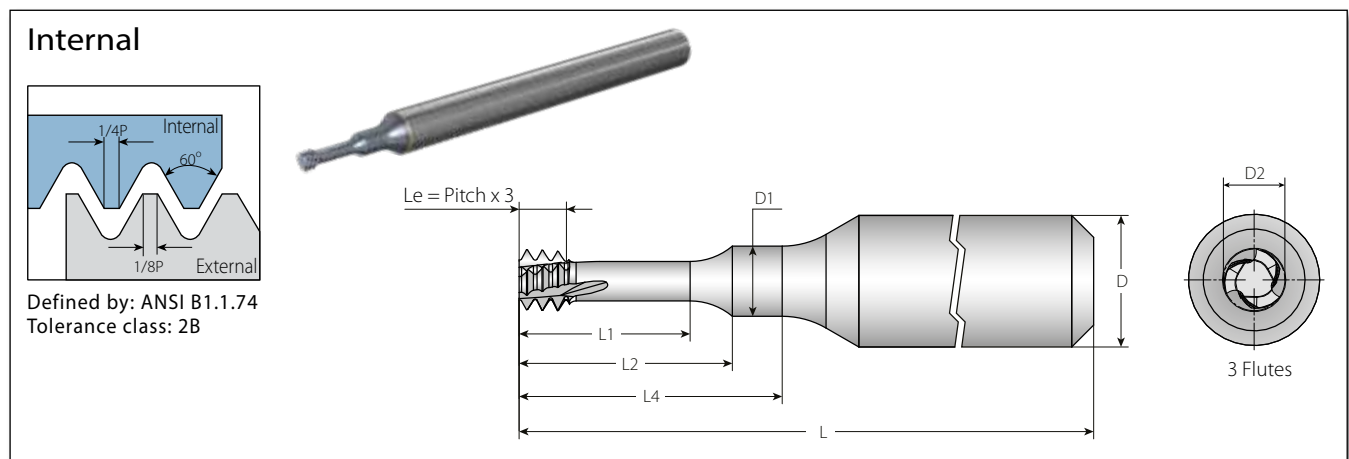
### MilliPro Dental - Miniature Thread Mills for Dental Implants

3 x Do (L4 ≥ 3 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm							No. of Flutes	Teeth	Bore Dia.
M Coarse	M Fine	mm	Internal	D	D2	L	L1	L2	L4	D1	Z	Zt	mm
M1.2x0.25	M1.4x0.25	0.25	DD3T03009L043-I0.25ISOTM...	3	0.90	39	2.5	3.3	4.3	0.95	3	3	0.97
M1.4x0.30		0.3	DD3T03011L050-I0.30ISOTM...		1.05		2.8	3.5	5.0	1.05			1.12
M1.6x0.35	M1.8x0.35	0.35	DD3T03012L058-I0.35ISOTM...		1.20		3.3	4.2	5.9	1.25			1.27
M1.8x0.35	M2.0x0.35	0.35	DD3T03014L065-I0.35ISOTM...		1.40		3.8	4.7	6.6	1.45			1.47
M2.0x0.4		0.4	DD3T03015L067-I0.40ISOTM...		1.54		3.9	4.9	6.7	1.70			1.63
M2.5x0.45		0.45	DD3T03019L082-I0.45ISOTM...		1.96		4.8	5.8	8.2	2.00			2.08

## American UN

## MilliPro Dental



### MilliPro Dental - Miniature Thread Mills for Dental Implants

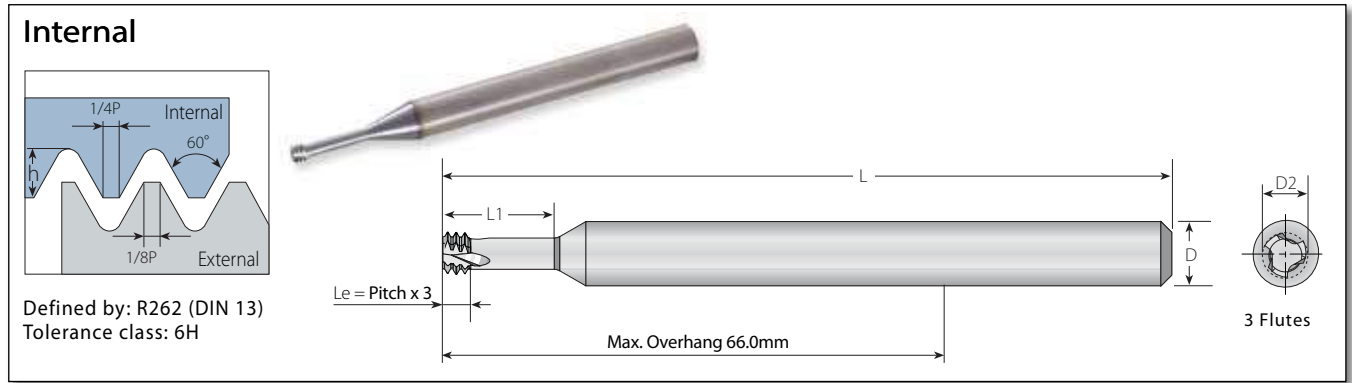
3xDo (L4 ≥ 3 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm							No. of Flutes	Teeth	Bore Dia.
UNF	TPI		Internal	D	D2	L	L1	L2	L4	D1	Z	Zt	mm
0-80UN	80		DD3T03011L052-I80UNTM...	3	1.16	39	2.8	3.6	5.0	1.15	3	3	1.27
1-72UN	72		DD3T03014L065-I72UNTM...		1.44		3.9	4.9	6.5	1.60			1.56

\* The MilliPro DD3T Dental was specially designed for machining Titanium and Stainless Steel in high RPM.

## ISO Metric

## MilliPro EL



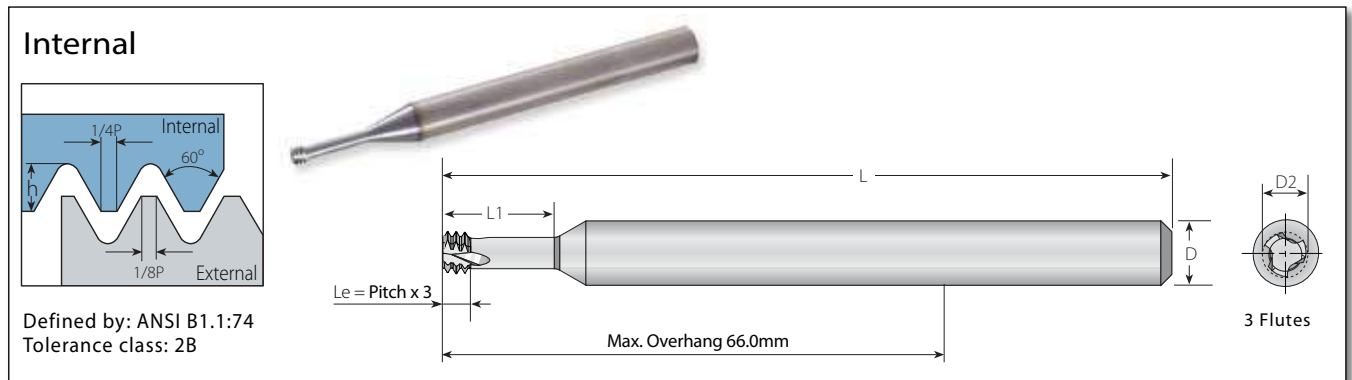
### MilliPro EL Miniature Thread Mills , Extra Long Tools

$2 \times D_o$  ( $L1 \leq 2 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	mm
M2x0.4		0.4	D3T06015L042-I0.4ISOTML...	6	1.55	100	4.2	3	3	1.6
M2.5x0.45		0.45	D3T06019L052-I0.45ISOTML...	6	1.95	100	5.2	3	3	2.05
M3x0.5	M3.5-M16x0.5	0.5	D3T06024L062-I0.5ISOTML...	6	2.40	100	6.2	3	3	2.5

## American UN

## MilliPro EL



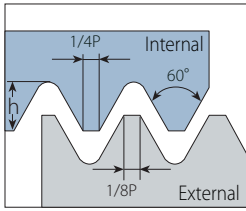
### MilliPro EL Miniature Thread Mills, Extra Long Tools

$2 \times D_o$  ( $L1 \leq 2 \times \text{Thread Diameter}$ )

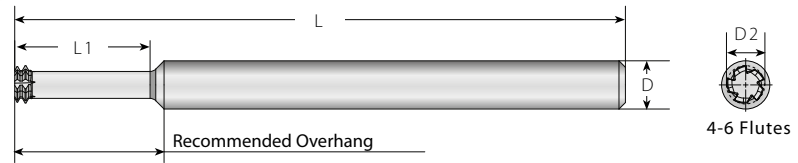
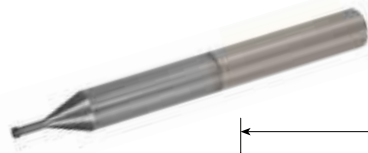
Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	TPI	Internal	D	D2	L	L1	Z	Zt	mm
No.2-56	No.3-56	56	D3T06016L050-I56UNTML...	6	1.65	100	5.0	3	3	1.8
No.4, No.5-40	No.6-40	40	D3T06021L060-I40UNTML...	6	2.10	100	6.0	3	3	2.3
No.6, No.8-32	No.10-32	32	D3T06025L074-I32UNTML...	6	2.55	100	7.4	3	3	2.8
No.8-32	No.10-32	32	D3T06032L100-I32UNTML...	6	3.20	100	10.0	3	3	3.4

\* Bore diameter applies to smallest thread dia.

## Internal



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



Left Hand Tool

## MilliPro HD

## Miniature Thread Mills for Hard Materials Up to 62HRc

2 x Do ( $L1 \leq 2 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	mm
M2x0.4		0.4	S2L06015L042-I0.4ISOTM...	6	1.55	76	4.60	4	2	1.6
M2.2x0.45		0.45	S2L06016L046-I0.45ISOTM...	6	1.65	76	5.05	4	2	1.8
M2.5x0.45		0.45	S2L06019L052-I0.45ISOTM...	6	1.95	76	5.65	4	2	2.05
M3x0.5	M3.5-M16x0.5	0.5	S2L06024L062-I0.5ISOTM...	6	2.40	76	6.75	4	2	2.55
M3.5x0.6		0.6	S2L06027L073-I0.6ISOTM...	6	2.75	76	7.90	4	2	2.95
M4x0.7		0.7	S2L06031L083-I0.7ISOTM...	6	3.15	76	9.05	4	2	3.35
M5x0.8		0.8	S2L06040L104-I0.8ISOTM...	6	4.05	76	11.20	4	2	4.3
M6x1.0	M8-M40x1.0	1.0	S2L06048L125-I1.0ISOTM...	6	4.80	76	13.50	5	2	5.1
M8x1.25		1.25	S2L08065L166-I1.25ISOTM...	8	6.50	80	17.85	5	2	6.8
M10x1.5	M12-M48x1.50	1.50	S2L08079L208-I1.50ISOTM...	8	7.90	80	22.30	6	2	8.6
M12x1.75		1.75	S2L10099L250-I1.75ISOTM...	10	9.90	101	26.75	6	2	10.4

## MilliPro HD

## Miniature Thread Mills for Hard Materials Up to 62HRc

3 x Do ( $L1 \leq 3 \times \text{Thread Diameter}$ )

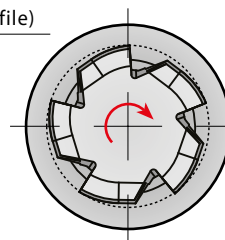
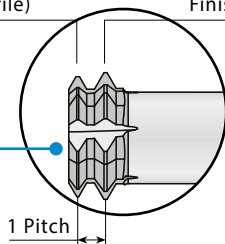
Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	mm
M2x0.4		0.4	S2L06015L062-I0.4ISOTM...	6	1.55	76	6.60	4	2	1.6
M2.5x0.45		0.45	S2L06019L077-I0.45ISOTM...	6	1.95	76	8.15	4	2	2.05
M3x0.5	M3.5-M16x0.5	0.5	S2L06024L092-I0.5ISOTM...	6	2.40	76	9.75	4	2	2.55
M4x0.7		0.7	S2L06031L123-I0.7ISOTM...	6	3.15	76	13.05	4	2	3.35
M5x0.8		0.8	S2L06040L154-I0.8ISOTM...	6	4.05	76	16.20	4	2	4.3
M6x1.0	M8-M40x1.0	1.0	S2L06048L185-I1.0ISOTM...	6	4.80	76	19.50	5	2	5.1
M8x1.25		1.25	S2L08065L246-I1.25ISOTM...	8	6.50	80	25.85	5	2	6.8

Roughing (Partial Profile)

Finish (Full Profile)

Two cutting teeth: Partial Profile for leading tooth followed by Full Profile for finishing.

The work direction should be from the top to the bottom (Climb Milling).



MilliPro HD Tools are left handed. For CNC use M04 code.

\* Bore diameter applies to smallest thread dia.



**Internal**

Defined by: ANSI B1.1:74  
Tolerance class: 2B

Recommended Overhang

4-6 Flutes

**Left Hand Tool**

## MilliPro HD

### Miniature Thread Mills for Hard Materials Up to 62HRc

2 x Do ( $L1 \leq 2 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	TPI	Internal	D	D2	L	L1	Z	Zt	mm
No.2-56	No.3-56	56	S2L06016L050-I56UNTM...	6	1.65	76	5.45	4	2	1.80
No.3-48	No.4-48	48	S2L06019L060-I48UNTM...	6	1.90	76	6.53	4	2	2.10
No.4-40, No.5-40	No.6-40	40	S2L06021L060-I40UNTM...	6	2.10	76	6.64	4	2	2.35
No.5-40	No.6-40	40	S2L06024L072-I40UNTM...	6	2.45	76	7.84	4	2	2.65
	No.8-36	36	S2L06033L087-I36UNTM...	6	3.30	76	9.41	4	2	3.55
No.6-32, No.8-32	No.10-32	32	S2L06025L074-I32UNTM...	6	2.55	76	8.20	4	2	2.85
No.8-32	No.10-32	32	S2L06032L100-I32UNTM...	6	3.20	76	10.79	4	2	3.50
	No.10-32	32	S2L06037L100-I32UNTM...	6	3.70	76	10.80	4	2	4.17
	1/4"x28	28	S2L06052L132-I28UNTM...	6	5.25	76	14.11	5	2	5.55
No.10-24	5/16"x24	24	S2L06035L102-I24UNTM...	6	3.58	76	11.26	4	2	3.90
	5/16"x24	24	S2L08066L165-I24UNTM...	8	6.68	80	17.56	5	2	7.00
1/4"-20	7/16"x20	20	S2L06048L134-I20UNTM...	6	4.88	76	14.67	5	2	5.20
	7/16"x20	20	S2L10095L230-I20UNTM...	10	9.55	101	24.27	6	2	9.90
5/16"x18		18	S2L08061L160-I18UNTM...	8	6.15	80	18.17	4	2	6.50
3/8"x16		16	S2L08076L197-I16UNTM...	8	7.65	80	21.29	5	2	8.00
7/16"x14		14	S2L10090L233-I14UNTM...	10	9.00	101	25.11	6	2	9.50
1/2"x13		13	S2L10099L256-I13UNTM...	10	9.90	101	27.55	6	2	10.90

## MilliPro HD

### Miniature Thread Mills for Hard Materials Up to 62HRc

3 x Do ( $L1 \leq 3 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	Bore Dia.*
UNC	UNF	TPI	Internal	D	D2	L	L1	Z	Zt	mm
No.4-40, No.5-40	No.6-40	40	S2L06021L090-I40UNTM...	6	2.10	76	9.64	4	2	2.35
No.5-40	No.6-40	40	S2L06024L100-I40UNTM...	6	2.45	76	10.64	4	2	2.65
No.6-32, No.8-32	No.10-32	32	S2L06025L110-I32UNTM...	6	2.55	76	11.79	4	2	2.85
No.8-32	No.10-32	32	S2L06032L130-I32UNTM...	6	3.20	76	13.79	4	2	3.50
	1/4"x28	28	S2L06052L196-I28UNTM...	6	5.25	76	20.51	5	2	5.55
	5/16"x24	24	S2L08066L245-I24UNTM...	8	6.68	80	25.56	5	2	7.00
1/4"x20	7/16"x20	20	S2L06048L198-I20UNTM...	6	4.88	76	21.07	5	2	5.20
5/16"x18		18	S2L08061L240-I18UNTM...	8	6.15	80	26.17	4	2	6.50
7/16"x14		14	S2L10090L335-I14UNTM...	10	9.00	101	35.31	6	2	9.50

**Roughing (Partial Profile)**

Two cutting teeth: Partial Profile for leading tooth followed by Full Profile for finishing.

The work direction should be from the top to the bottom (Climb Milling).

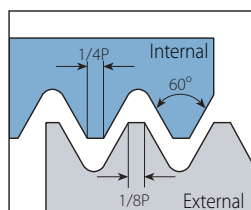
1 Pitch

**Finish (Full Profile)**

MilliPro HD Tools are left handed. For CNC use M04 code.

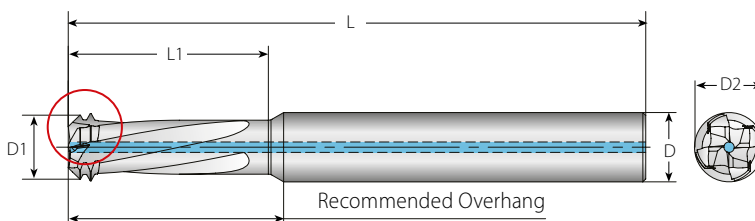
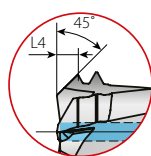
\* Bore diameter applies to smallest thread dia.

## Internal



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

Coolant available only when specified



Left Hand Tool

## TMDR - Drilling, Thread Milling &amp; Chamfering

2 x Do ( $L1 \leq 2 \times \text{Thread Diameter}$ )

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth		
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	L4*	D1
<b>Without coolant</b>											
M3x0.5	M4x0.5	0.50	TD-2L06024L070-I0.50ISO...	6	2.40	58	7.0	3	2	0.40	2.08
M4x0.7		0.70	TD-2L06032L092-I0.70ISO...	6	3.20	58	9.2	3	2	0.57	2.88
M5x0.8		0.80	TD-2L06039L115-I0.80ISO...	6	3.90	58	11.5	3	2	0.70	3.51
M6-M7x1.0	M8-M9x1.0	1.00	TD-2L06047L140-I1.00ISO...	6	4.70	58	14.0	3	2	0.79	4.16
<b>With coolant</b>											
M6-M7x1.0	M8-M9x1.0	1.00	TDC2L08047L140-I1.00ISO...	8	4.70	64	14.0	3	2	0.79	4.16
M8x1.25	M9-M11x1.25	1.25	TDC2L08061L180-I1.25ISO...	8	6.10	64	18.0	4	2	0.90	5.57
M10x1.5	M11-M14x1.5	1.50	TDC2L08078L230-I1.50ISO...	8	7.80	64	23.0	4	2	1.12	7.24
M12x1.75		1.75	TDC2L10090L260-I1.75ISO...	10	9.00	80	26.0	4	2	1.20	8.35
M16x2.0	M17-M23x2.0	2.00	TDC2L12118L350-I2.00ISO...	12	11.80	100	35.0	4	2	2.00	11.13
M18-M22x2.50		2.50	TDC2L16150L446-I2.5ISO...	16	15.00	135	44.6	4	2	2.25	14.08

## TMDR - Drilling, Thread Milling &amp; Chamfering

2.5 x Do ( $L1 \leq 2.5 \times \text{Thread Diameter}$ )

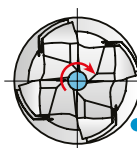
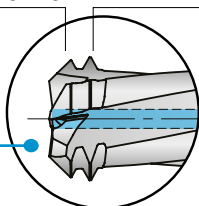
Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth		
M Coarse	M Fine	mm	Internal	D	D2	L	L1	Z	Zt	L4*	D1
<b>Without coolant</b>											
M3x0.5	M4x0.5	0.50	TD-2L06024L085-I0.50ISO...	6	2.40	58	8.5	3	2	0.40	2.08
M4x0.7		0.70	TD-2L06032L112-I0.70ISO...	6	3.20	58	11.2	3	2	0.57	2.88
M5x0.8		0.80	TD-2L06039L144-I0.80ISO...	6	3.90	58	14.4	3	2	0.70	3.51
M6-M7x1.0	M8-M9x1.0	1.00	TD-2L06047L170-I1.00ISO...	6	4.70	58	17.0	3	2	0.79	4.16
<b>With coolant</b>											
M6-M7x1.0	M8-M9x1.0	1.00	TDC2L08047L170-I1.00ISO...	8	4.70	64	17.0	3	2	0.79	4.16
M8x1.25	M9-M11x1.25	1.25	TDC2L08061L220-I1.25ISO...	8	6.10	64	22.0	4	2	0.90	5.57
M10x1.5	M11-M14x1.5	1.50	TDC2L08078L280-I1.50ISO...	8	7.80	64	28.0	4	2	1.12	7.24
M12x1.75		1.75	TDC2L10090L320-I1.75ISO...	10	9.00	80	32.0	4	2	1.20	8.35
M16x2.0	M17-M23x2.0	2.00	TDC2L12118L430-I2.00ISO...	12	11.80	100	43.0	4	2	2.00	11.13
M18-M22x2.50		2.50	TDC2L16150L546-I2.5ISO...	16	15.00	135	54.6	4	2	2.25	14.08
M24x3.0		3.00	TDC2L18178L650-I3.0ISO...	18	17.8	135	65.0	4	2	2.50	16.90

1st Tooth: Partial Profile (Roughing)

2nd Tooth: Full Profile (Finish)

Two cutting teeth: Partial Profile for leading tooth followed by Full Profile for finishing.

The work direction should be from the outside inwards (Climb Milling).



TMDR Tools are left handed.  
For CNC use M04 code.

\* Please use the VARGUS GENius™ for Chamfer recommendations

### Internal

Defined by: ANSI B1.1:74  
Tolerance class: 2B  
Coolant available only when specified

Recommended Overhang

## TMDR - Drilling, Thread Milling & Chamfering

2 x Do (L1 ≤ 2 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth			
UNC	UNF	UN	TPI	Internal	D	D2	L	L1	Z	Zt	L4*	D1
<b>Without coolant</b>												
No.4-40, No.5-40	No.6-40		40	TD-2L06021L072-I40UNC...	6	2.10	58	7.2	3	2	0.38	1.76
No.6-32, No.8-32			32	TD-2L06026L086-I32UNC...	6	2.60	58	8.6	3	2	0.45	2.21
No.8-32	No.10-32		32	TD-2L06030L100-I32UNC...	6	3.00	58	10.0	3	2	0.60	2.62
	1/4"x28	5/16"x28	28	TD-2L06050L144-I28UNF...	6	5.00	58	14.4	3	2	0.69	4.58
No.10-24, No.12-24			24	TD-2L06035L114-I24UNC...	6	3.50	58	11.4	3	2	0.80	3.18
1/4"x20		5/16"x20	20	TD-2L06048L145-I20UNC...	6	4.80	58	14.5	3	2	0.80	4.29
<b>With coolant</b>												
	1/4"x28	5/16"x28	28	TDC2L08050L144-I28UNF...	8	5.00	64	14.4	3	2	0.69	4.58
	5/16"x24, 3/8"x24		24	TDC2L08065L176-I24UNF...	8	6.50	64	17.6	3	2	0.85	6.02
1/4"x20		5/16"x20	20	TDC2L08048L145-I20UNC...	8	4.80	64	14.5	3	2	0.80	4.29

## TMDR - Drilling, Thread Milling & Chamfering

2.5 x Do (L1 ≤ 2.5 x Thread Diameter)

Thread		Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth			
UNC	UNF	UN	TPI	Internal	D	D2	L	L1	Z	Zt	L4*	D1
<b>Without coolant</b>												
No.4-40, No.5-40	No.6-40		40	TD-2L06021L088-I40UNC...	6	2.10	58	8.8	3	2	0.38	1.76
No.6-32, No.8-32			32	TD-2L06026L105-I32UNC...	6	2.60	58	10.5	3	2	0.45	2.21
No.8-32	No.10-32		32	TD-2L06030L122-I32UNC...	6	3.00	58	12.2	3	2	0.60	2.62
	1/4"x28	5/16"x28	28	TD-2L06050L178-I28UNF...	6	5.00	58	17.8	3	2	0.69	4.58
1/4"x20		5/16"x20	20	TD-2L06048L180-I20UNC...	6	4.80	58	18.0	3	2	0.80	4.29
<b>With coolant</b>												
	1/4"x28	5/16"x28	28	TDC2L08050L178-I28UNF...	8	5.00	64	17.8	3	2	0.69	4.58
	5/16"x24, 3/8"x24		24	TDC2L08065L218-I24UNF...	8	6.50	64	21.8	3	2	0.85	6.02
1/4"x20		5/16"x20	20	TDC2L08048L180-I20UNC...	8	4.80	64	18.0	3	2	0.80	4.29
3/8"x16		7/16"x16	16	TDC2L08067L260-I16UNC...	8	6.70	64	26.0	4	2	1.10	6.18

1st Tooth: Partial Profile (Roughing)

2nd Tooth: Full Profile (Finish)

Two cutting teeth: Partial Profile for leading tooth followed by Full Profile for finishing.

The work direction should be from the outside inwards (Climb Milling).

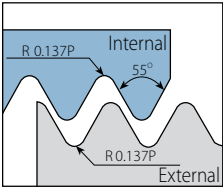
**TMDR Tools are left handed.**  
For CNC use M04 code.

\* Please use the VARGUS GENius™ for Chamfer recommendations

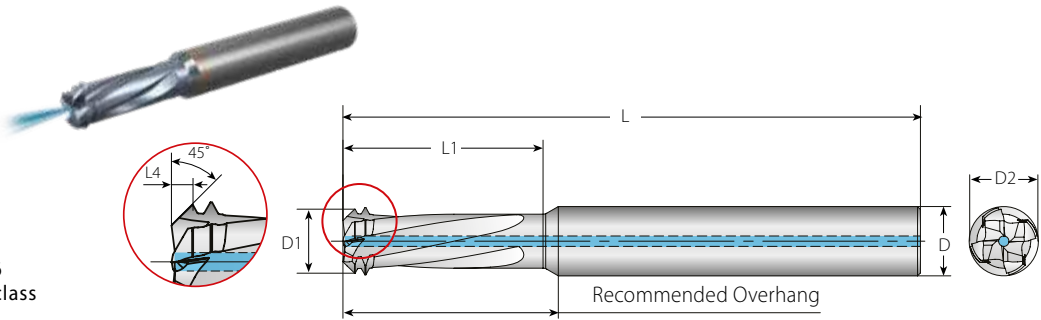
## BSP (G)

**TMDR**

**Internal**



Defined by: B.S.2779:1956  
Tolerance class: Medium class



**Left Hand Tool**

## TMDR - Drilling, Thread Milling & Chamfering

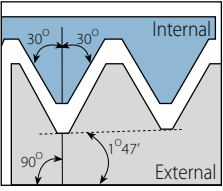
$2 \times D_o$  ( $L1 \leq 2 \times \text{Thread Diameter}$ )

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth		
Standard	TPI	Internal	D	D2	L	L1	Z	Zt	L4*	D1
<b>With Coolant</b>										
1/16"x28	28	TDC2L08059L175-I28BSP...	8	5.9	64	17.5	4	2	0.60	5.50
1/8"x28	28	TDC2L08078L230-I28BSP...	8	7.8	64	23.0	4	2	0.60	7.28
1/4"x19	19	TDC2L12105L320-I19BSP...	12	10.5	80	32.0	4	2	0.80	10.00
3/8"x19	19	TDC2L14126L380-I19BSP...	14	12.6	100	38.0	4	2	0.80	12.04
1/2"x14	14	TDC2L16158L456-I14BSP...	16	15.8	135	45.6	4	2	1.27	15.16

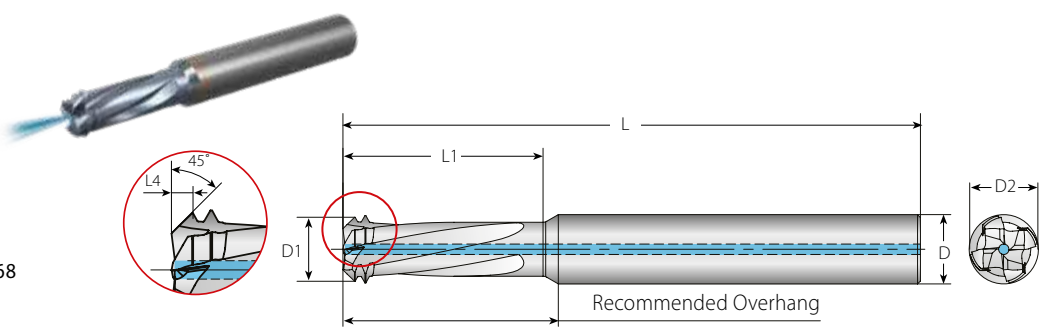
## NPT

**TMDR**

**Internal**



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

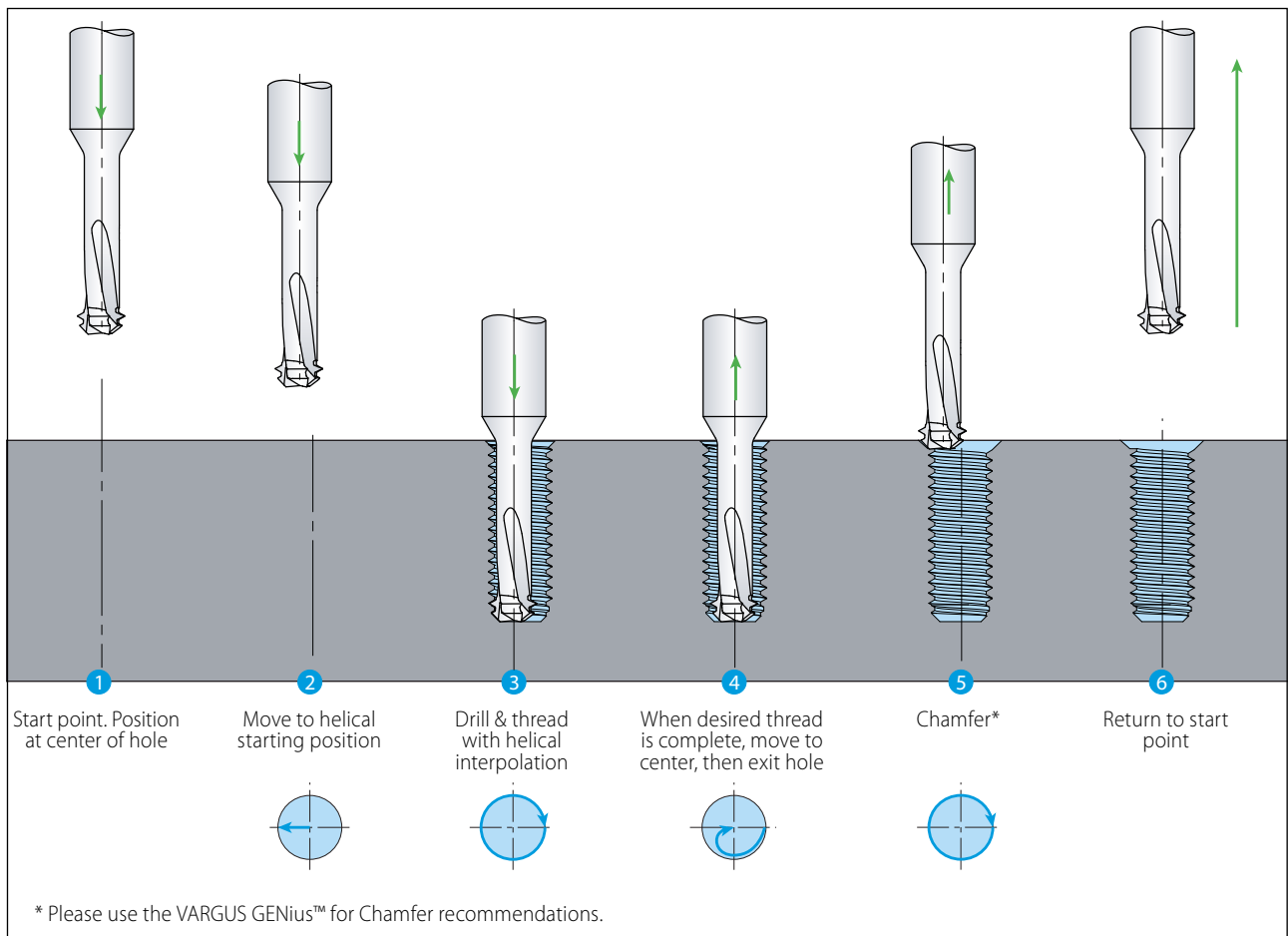


**Left Hand Tool**

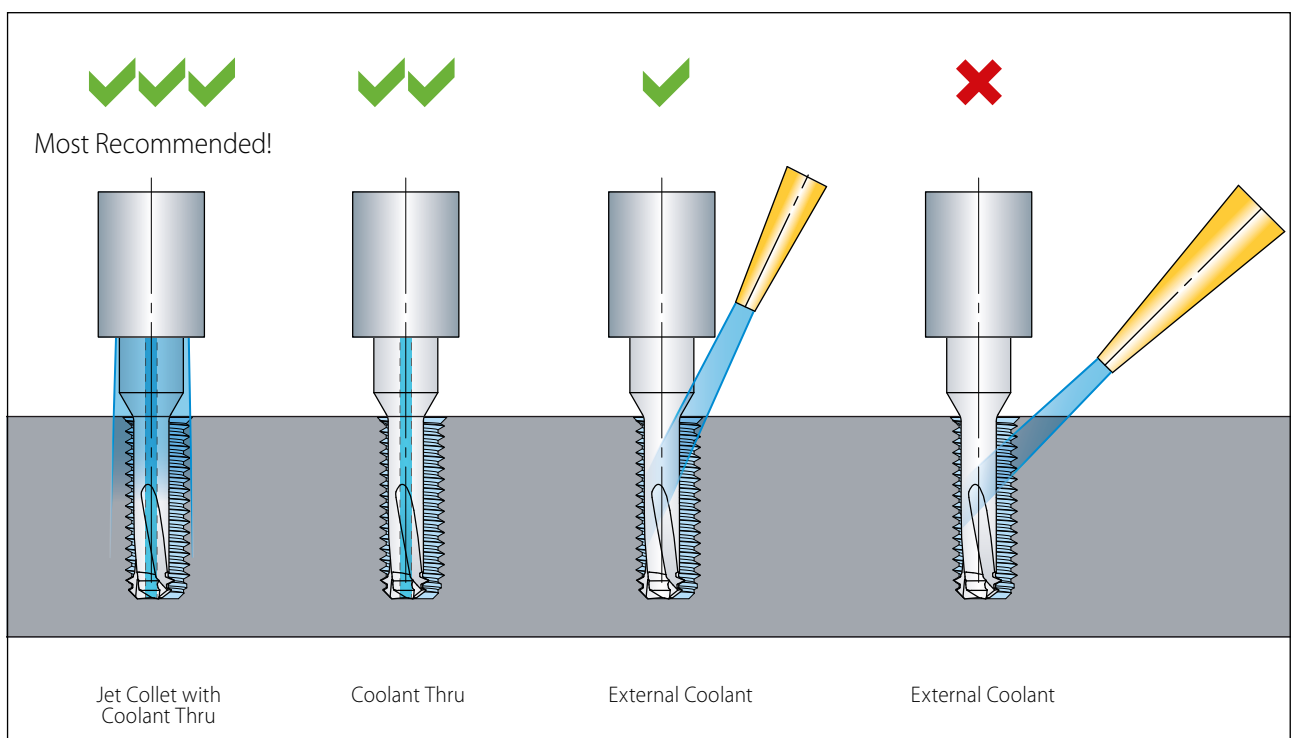
## TMDR - Drilling, Thread Milling & Chamfering

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth		
Standard	TPI	Internal	D	D2	L	L1	Z	Zt	L4*	D1
<b>With Coolant</b>										
1/16"x27	27	TDC2L08056L112-I27NPT...	8	5.6	64	11.2	4	2	0.60	5.07
1/8"x27	27	TDC2L08075L112-I27NPT...	8	7.5	64	11.2	4	2	0.60	6.97
1/4"x18	18	TDC2L10094L164-I18NPT...	10	9.4	80	16.4	4	2	1.00	8.67
3/8"x18	18	TDC2L12119L164-I18NPT...	12	11.9	100	16.4	4	2	1.00	11.19
1/2"x14	14	TDC2L16153L286-I14NPT...	16	15.3	100	28.6	6	2	1.50	14.41

\* Please use the VARGUS GENIUS™ for Chamfer recommendations



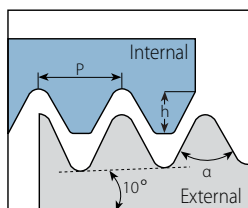
## TMDR - Coolant Use for Best Chip Evacuation



## Tap 60°, Tap 55°

## Straight

### Internal



### Straight Flutes - Taper 60°

#### TM Solid Straight Flutes for Bone Plate Applications

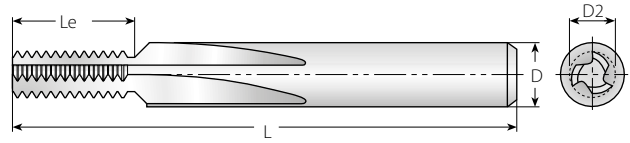
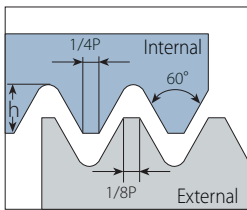
Pitch	Ordering Code	Taper	Thread Angle	Profile Height	Dimensions mm					No. of Flutes	Teeth
mm	Internal		$\alpha$	h	D	D2	D1	L	Le	Z	Zt
0.4	S06059L080-I0.4TAP60TM...	20°	60°	0.20	6	5.9	3.2	57	8.0	3	20
0.5	S06059L090-I0.5TAP60TM...	20°	60°	0.25	6	5.9	2.9	57	9.0	3	18

### Straight Flutes - Taper 55°

#### TM Solid Straight Flutes for Bone Plate Applications

Pitch	Ordering Code	Taper	Thread Angle	Profile Height	Dimensions mm					No. of Flutes	Teeth
mm	Internal		$\alpha$	h	D	D2	D1	L	Le	Z	Zt
0.3	S03028L039-I0.3TAP55TM...	20°	55°	0.18	3	2.8	1.5	38	3.9	3	13
0.35	S04039L063-I0.35TAP55TM...	20°	55°	0.20	4	3.9	1.8	45	6.3	3	18
0.4	S06059L100-I0.4TAP55TM...	20°	55°	0.29	6	5.9	2.5	57	10.0	3	25
0.5	S06059L090-I0.5TAP55TM...	20°	55°	0.33	6	5.9	2.9	57	9.0	3	18
0.6	S06059L066-I0.6TAP55TM...	20°	55°	0.47	6	5.9	3.8	57	6.6	3	11

External / Internal



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

Straight Flutes - External

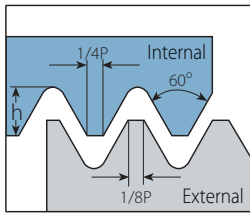
Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	mm	External	D	D2	L	Le	Z	Zt	h mm
M3	0.50	S06059-E0.5ISOTM...	6	5.90	57	15.0	3	30	0.31
M4.5	0.75	S08079-E0.75ISOTM...	8	7.90	63	19.5	3, 5 *	26	0.46
M6	1.00	S10099-E1.0ISOTM...	10	9.90	72	24.0	5	24	0.61
M10	1.50	S12119-E1.5ISOTM...	12	11.90	83	30.0	5	20	0.92
M14	2.00	S12119-E2.0ISOTM...	12	11.90	83	30.0	5	15	1.23
M24	3.00	S16159-E3.0ISOTM...	16	15.90	92	36.0	5	12	1.84
M36	4.00	S16159-E4.0ISOTM...	16	15.90	92	40.0	5	10	2.45
M64	6.00	S20199-E6.0ISOTM...	20	19.90	104	36.0	5	6	3.68

Straight Flutes - Internal

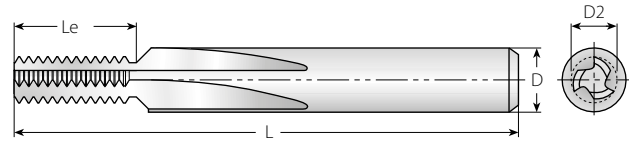
Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	mm	Internal	D	D2	L	Le	Z	Zt	h mm
M4.5	0.75	S04030-I0.75ISOTM...	4	3.00	42	6.7	3	9	0.43
M8	0.75	S06059-I0.75ISOTM...	6	5.90	57	15.0	3	20	0.43
M5	0.80	S04036-I0.8ISOTM...	4	3.60	42	8.0	3	10	0.46
M6	1.00	S06040-I1.0ISOTM...	6	4.00	57	9.0	3	9	0.58
M12	1.00	S08079-I1.0ISOTM...	8	7.90	63	20.0	3, 5 *	20	0.58
M8	1.25	S06050-I1.25ISOTM...	6	5.00	57	12.5	3	10	0.72
M10	1.50	S06059-I1.5ISOTM...	6	5.90	57	15.0	3	10	0.87
M14	1.50	S10099-I1.5ISOTM...	10	9.90	72	24.0	5	16	0.87
M18	1.50	S12119-I1.5ISOTM...	12	11.90	83	30.0	5	20	0.87
M12	1.75	S08079-I1.75ISOTM...	8	7.90	63	19.2	3, 5 *	11	1.01
M16	2.00	S10099-I2.0ISOTM...	10	9.90	72	24.0	5	12	1.15
M18	2.00	S12119-I2.0ISOTM...	12	11.90	83	30.0	5	15	1.15
M20	2.50	S12119-I2.5ISOTM...	12	11.90	83	30.0	5	12	1.44
M24	3.00	S16159-I3.0ISOTM...	16	15.90	92	36.0	5	12	1.73
M30	3.50	S16159-I3.5ISOTM...	16	15.90	92	38.5	5	11	2.02
M36	4.00	S16159-I4.0ISOTM...	16	15.90	92	40.0	5	10	2.31
M48	5.00	S20199-I5.0ISOTM...	20	19.90	104	40.0	5	8	2.89
M64	6.00	S20199-I6.0ISOTM...	20	19.90	104	36.0	5	6	3.46

\* Available in 3 and 5 flutes. Add 3 or 5 to the ordering code (TM3.../TM5...).

## External / Internal



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



## Straight Flutes - External

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	External	D	D2	L	Le	Z	Zt	h mm
No.6	32	S06059-E32UNTM...	6	5.90	57	14.3	3	18	0.49
No.12	28	S08079-E28UNTM...	8	7.90	63	19.9	3, 5*	22	0.56
1/4"	20	S10099-E20UNTM...	10	9.90	72	22.9	5	18	0.78
5/16"	18	S10099-E18UNTM...	10	9.90	72	24.0	5	17	0.87
3/8"	16	S12119-E16UNTM...	12	11.90	83	28.6	5	18	0.97
9/16"	12	S12119-E12UNTM...	12	11.90	83	29.6	5	14	1.30
1"	8	S16159-E8UNTM...	16	15.90	92	38.1	5	12	1.95
1 3/8"	6	S20199-E6UNTM...	20	19.90	104	38.1	5	9	2.60

## Straight Flutes - Internal

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	Internal	D	D2	L	Le	Z	Zt	h mm
No.8	36	S04030-I36UNTM...	4	3.00	42	6.3	3	9	0.41
No.8	32	S04030-I32UNTM...	4	3.00	42	6.3	3	8	0.46
5/16"	32	S06059-I32UNTM...	6	5.90	57	14.3	3	18	0.46
No.12	28	S04036-I28UNTM...	4	3.60	42	8.2	3	9	0.52
7/16"	28	S08079-I28UNTM...	8	7.90	63	19.9	3, 5*	22	0.52
No.12	24	S06040-I24UNTM...	6	4.00	57	8.5	3	8	0.61
1/4"	20	S06040-I20UNTM...	6	4.00	57	10.2	3	8	0.73
9/16"	20	S10099-I20UNTM...	10	9.90	72	22.9	5	18	0.73
5/16"	18	S06050-I18UNTM...	6	5.00	57	12.7	3	9	0.81
9/16"	18	S10099-I18UNTM...	10	9.90	72	24.0	5	17	0.81
3/8"	16	S06059-I16UNTM...	6	5.90	57	14.3	3	9	0.92
3/4"	16	S12119-I16UNTM...	12	11.90	83	28.6	5	18	0.92
7/16"	14	S08079-I14UNTM...	8	7.90	63	18.1	3, 5*	10	1.05
1/2"	13	S08079-I13UNTM...	8	7.90	63	19.5	3, 5*	10	1.13
9/16"	12	S10099-I12UNTM...	10	9.90	72	23.3	5	11	1.22
1"	12	S12119-I12UNTM...	12	11.90	83	29.6	5	14	1.22
5/8"	11	S10099-I11UNTM...	10	9.90	72	23.1	5	10	1.33
3/4"	10	S12119-I10UNTM...	12	11.90	83	27.9	5	11	1.47
7/8"	9	S16159-I9UNTM...	16	15.90	92	33.3	5	12	1.63
1"	8	S16159-I8UNTM...	16	15.90	92	38.1	5	12	1.83
1 1/8"	7	S16159-I7UNTM...	16	15.90	92	36.3	5	10	2.09
1 3/8"	6	S20199-I6UNTM...	20	19.90	104	38.1	5	9	2.44
1 3/4"	5	S20199-I5UNTM...	20	19.90	104	40.6	5	8	2.93
2"	4.5	S20199-I4.5UNTM...	20	19.90	104	39.5	5	7	3.26

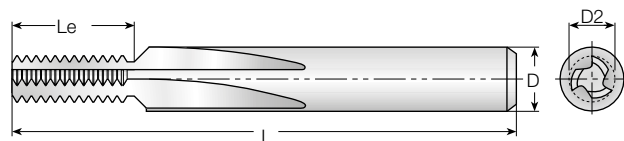
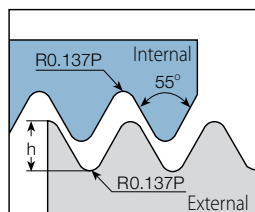
\* Available in 3 and 5 flutes. Add 3 or 5 to the ordering code (TM3.../TM5...).



## BSW

## Straight

### External / Internal



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

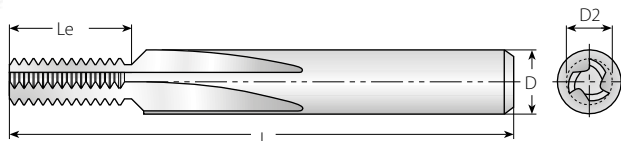
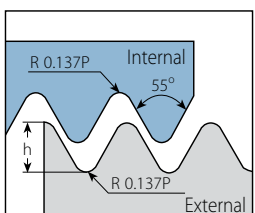
### Straight Flutes

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	External / Internal	D	D2	L	Le	Z	Zt	h mm
1/4"	20	S06040-EI20BSWTM...	6	4.00	57	10.16	3	8	0.81
5/16"	18	S06050-EI18BSWTM...	6	5.00	57	11.29	3	8	0.90
3/8"	16	S06059-EI16BSWTM...	6	5.90	57	14.29	3	9	1.02
7/16"	14	S08079-EI14BSWTM...	8	7.90	63	18.14	3, 5*	10	1.16
1/2"	12	S08079-EI12BSWTM...	8	7.90	63	19.05	3, 5*	9	1.36
5/8"	11	S10099-EI11BSWTM...	10	9.90	72	23.09	5	10	1.48
3/4"	10	S12119-EI10BSWTM...	12	11.90	83	27.94	5	11	1.63
7/8"	9	S12119-EI9BSWTM...	12	11.90	83	28.22	5	10	1.81
1"	8	S16159-EI8BSWTM...	16	15.90	92	38.10	5	12	2.03
1 1/8"	7	S16159-EI7BSWTM...	16	15.90	92	36.29	5	10	2.32
1 3/8"	6	S16159-EI6BSWTM...	16	15.90	92	38.10	5	9	2.71
1 5/8"	5	S20199-EI5BSWTM...	20	19.90	104	40.64	5	8	3.25
1 7/8"	4.5	S20199-EI4.5BSWTM...	20	19.90	104	39.51	5	7	3.61

## BSP

## Straight

### External / Internal



Defined by: B.S.2779:1956  
Tolerance class: Medium class

### Straight Flutes

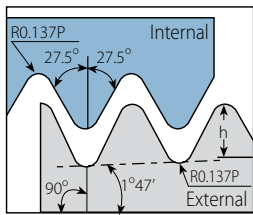
Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	External / Internal	D	D2	L	Le	Z	Zt	h mm
1/16"	28	S06059-EI28BSPTM...	6	5.90	57	14.51	3	16	0.58
1/4"	19	S08079-EI19BSPTM...	8	7.90	63	18.72	3, 5*	14	0.86
1/2"	14	S12119-EI14BSPTM...	12	11.90	83	29.03	5	16	1.16
1"	11	S16159-EI11BSPTM...	16	15.90	92	34.64	5	15	1.48

\* Available in 3 and 5 flutes. Add 3 or 5 to the ordering code (TM3.../TM5...).

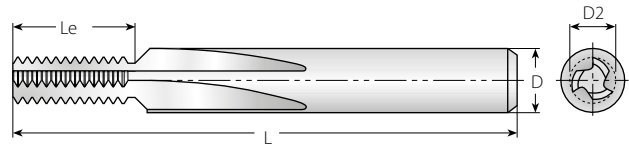
## BSPT

## Straight

### External / Internal



Defined by: B.S.21:1985  
Tolerance class: Standard BSPT



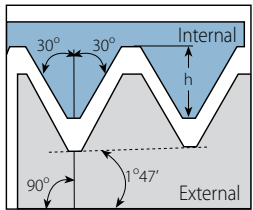
### Straight Flutes

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	External / Internal	D	D2	L	Le	Z	Zt	h mm
1/16"	28	S06059-EI28BSPT-TM...	6	5.90	57	9.98	3	11	0.58
1/4"	19	S08079-EI19BSPT-TM...	8	7.90	63	14.71	3, 5*	11	0.86
1/2"	14	S12119-EI14BSPT-TM...	12	11.90	83	19.96	5	11	1.16
1"	11	S16159-EI11BSPT-TM...	16	15.90	92	39.25	5	17	1.48

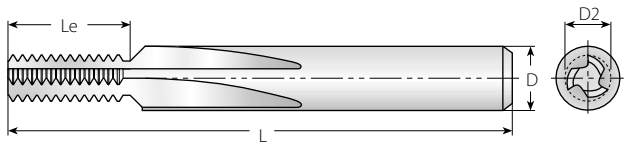
## NPT

## Straight

### External / Internal



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



### Straight Flutes

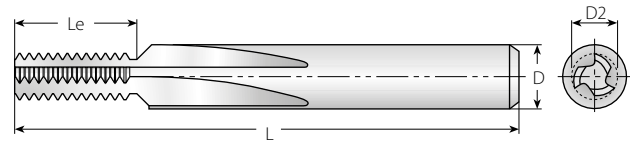
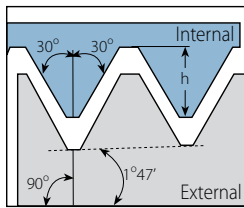
Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	External / Internal	D	D2	L	Le	Z	Zt	h mm
1/16"	27	S06059-EI27NPT-TM...	6	5.90	57	9.41	3	10	0.66
1/4"	18	S08079-EI18NPT-TM...	8	7.90	63	14.11	3, 5*	10	1.01
1/2"	14	S12119-EI14NPT-TM...	12	11.90	83	19.96	5	11	1.33
1"	11.5	S16159-EI11.5NPT-TM...	16	15.90	92	26.51	5	12	1.64
2 1/2"	8	S16159-EI8NPT-TM...	16	15.90	92	38.10	5	12	2.42

\* Available in 3 and 5 flutes. Add 3 or 5 to the ordering code (TM3.../TM5...).

## ANPT

## Straight

### External / Internal



Defined by: MIL-P-7105B  
Tolerance class: Standard ANPT

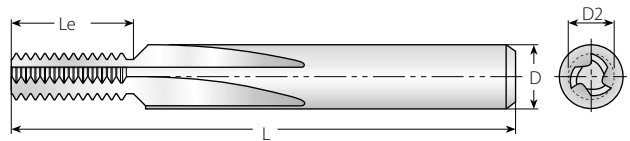
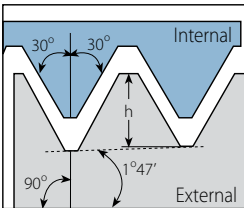
### Straight Flutes

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	External / Internal	D	D2	L	Le	Z	Zt	h mm
1/4"	18	S08079-EI18ANPT-TM...	8	7.90	63	14.11	5	10	1.10
1/2"	14	S12119-EI14ANPT-TM...	12	11.90	83	19.96	5	11	1.42

## NPTF

## Straight

### External / Internal

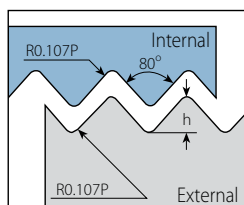


Defined by: ANSI 1.20.3-1976  
Tolerance class: Standard NPTF

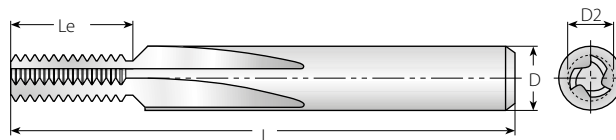
### Straight Flutes

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
Min. Dia.	TPI	External / Internal	D	D2	L	Le	Z	Zt	h mm
1/16"	27	S06059-EI27NPTFTM...	6	5.90	57	9.41	3	10	0.64
1/4"	18	S08079-EI18NPTFTM...	8	7.90	63	14.11	3, 5*	10	1.0
1/2"	14	S12119-EI14NPTFTM...	12	11.90	83	19.96	5	11	1.35
1"	11.5	S16159-EI11.5NPTFTM...	16	15.90	92	26.51	5	12	1.63
2 1/2"	8	S16159-EI8NPTFTM...	16	15.90	92	38.10	5	12	2.38

## External / Internal



Defined by: DIN 40430  
Tolerance class: Standard



## Straight Flutes

Thread	Pitch	Ordering Code	Dimensions mm				No. of Flutes	Teeth	
	TPI	External / Internal	D	D2	L	Le	Z	Zt	h mm
Pg7	20	S08079-EI20PGTM...	8	7.90	63	19.05	3, 5*	15	0.61
Pg9, 11, 13.5, 16	18	S10099-EI18PGTM...	10	9.90	72	23.99	5	17	0.67
Pg21, 29, 36, 42, 48	16	S12119-EI16PGTM...	12	11.90	83	28.58	5	18	0.76

\* Available in 3 and 5 flutes. Add 3 or 5 to the ordering code (TM3.../TM5...).

## Grades and Their Applications



### VTH



### VTS



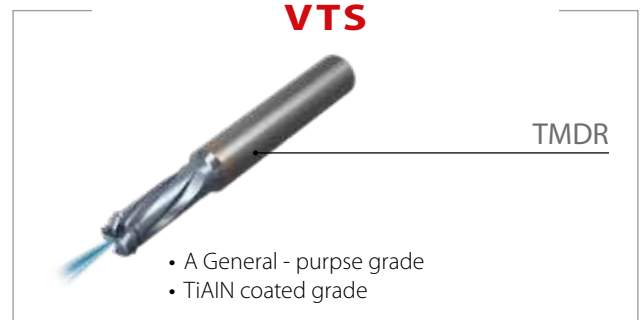
### VTS



### VTN



### VTS



## Recommended Cutting Speeds Vc [m/min] and Feed f [mm/tooth]

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]			Feed [mm/tooth]				
					Helicool, HCR, HCC, Helical, Sraight, Deep Threading			Helical	Straight	Deep Threading	Helicool HCC HCR	MilliPro, MilliPro Dental
					VTH	VTS	VTH					
<b>P</b> Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	80-250	50-180	60-120	0.03-0.08	0.03-0.08	0.10-0.35	0.03-0.08	0.02-0.16
	2		Medium Carbon (C=0.25-0.55%)	150	80-230	50-140	60-120	0.03-0.08	0.03-0.08	0.08-0.30	0.03-0.08	0.02-0.16
	3		High Carbon (C=0.55-0.85%)	170	80-200	50-120	60-90	0.03-0.08	0.03-0.06	0.08-0.30	0.03-0.08	0.02-0.16
	4	Low Alloy Steel (alloying elements ≤5%)	Non Hardened	180	60-180	60-170	60-90	0.03-0.08	0.03-0.07	0.08-0.30	0.03-0.08	0.02-0.16
	5		Hardened	275	60-170	60-160	50-80	0.03-0.07	0.03-0.07	0.08-0.30	0.03-0.07	0.02-0.07
	6		Hardened	350	60-160	60-150	50-80	0.02-0.05	0.02-0.04	0.05-0.15	0.02-0.06	0.02-0.03
	7	High Alloy Steel (alloying elements >5%)	Annealed	200	40-100	40-90	50-80	0.03-0.07	0.03-0.07	0.10-0.24	0.03-0.07	0.02-0.09
	8		Hardened	325	30-80	30-70	50-80	0.02-0.04	0.02-0.05	0.05-0.15	0.03-0.06	0.02-0.03
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	80-250	70-200	70-90	0.03-0.08	0.03-0.06	0.08-0.30	0.03-0.07	0.02-0.16
	10		High Alloy (alloying elements >5%)	225	60-170	60-150	60-80	0.03-0.05	0.03-0.06	0.05-0.15	0.03-0.07	0.02-0.03
<b>M</b> Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	60-150	50-140	60-90	0.04-0.07	0.02-0.05	0.11-0.35	0.03-0.08	0.02-0.16
	12		Hardened	330	60-120	50-110	50-80	0.02-0.06	0.01-0.03	0.05-0.24	0.03-0.06	0.02-0.03
	13	Stainless Steel Austenitic	Austenitic	180	60-140	60-130	60-90	0.03-0.08	0.02-0.05	0.11-0.35	0.03-0.08	0.02-0.16
	14		Super Austenitic	200	60-130	50-120	50-80	0.03-0.08	0.02-0.05	0.11-0.35	0.03-0.06	0.02-0.16
	15	Stainless Steel Cast Ferritic	Non Hardened	200	60-160	50-150	60-90	0.03-0.08	0.02-0.05	0.11-0.35	0.03-0.06	0.02-0.16
	16		Hardened	330	60-110	50-100	50-80	0.02-0.05	0.02-0.03	0.10-0.24	0.02-0.05	0.02-0.03
	17	Stainless Steel Cast Austenitic	Austenitic	200	60-150	50-140	60-90	0.03-0.08	0.02-0.06	0.11-0.35	0.02-0.05	0.02-0.16
	18		Hardened	330	60-100	50-90	50-80	0.02-0.05	0.01-0.03	0.10-0.24	0.02-0.04	0.02-0.03
<b>K</b> Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	60-70	60-150	50-80	0.03-0.08	0.03-0.08	0.05-0.15	0.03-0.08	0.02-0.03
	29		Pearlitic (long chips)	230	60-150	80-100	60-90	0.03-0.08	0.03-0.06	0.10-0.24	0.03-0.07	0.02-0.12
	30	Grey Cast Iron	Low Tensile Strength	180	70-160	50-140	70-100	0.03-0.08	0.03-0.06	0.09-0.25	0.03-0.07	0.02-0.16
	31		High Tensile Strength	260	40-120	40-110	60-90	0.02-0.06	0.02-0.05	0.10-0.24	0.03-0.07	0.02-0.12
	32	Nodular Sg Iron	Ferritic	160	40-110	40-100	70-100	0.03-0.08	0.03-0.07	0.09-0.25	0.03-0.08	0.02-0.16
	33		Pearlitic	260	40-100	40-90	60-90	0.02-0.06	0.02-0.05	0.10-0.24	0.03-0.07	0.02-0.12
<b>N</b> Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60	200-300	150-250	60-250	0.05-0.12	0.05-0.15	0.12-0.40	0.04-0.1	0.03-0.15
	35		Aged	100	150-250	100-220	60-150	0.05-0.12	0.03-0.1	0.10-0.32	0.03-0.1	0.03-0.16
	36	Aluminium Alloys	Cast	75	100-200	80-150	60-250	0.05-0.12	0.05-0.15	0.10-0.32	0.03-0.1	0.03-0.16
	37		Cast & Aged	90	120-220	90-160	60-150	0.05-0.12	0.03-0.1	0.10-0.30	0.06-0.12	0.02-0.16
	38	Aluminium Alloys	Cast Si 13-22%	130	200-300	150-250	250	0.05-0.12	0.05-0.15	0.10-0.32	0.05-0.12	0.03-0.15
	39	Copper and Copper Alloys	Brass	90	200-300	150-250	60-250	0.06-0.13	0.05-0.15	0.12-0.40	0.05-0.12	0.03-0.16
<b>S</b> Heat Resistant Material	40		Bronze And Non Leaded Copper	100	150-250	100-220	60-150	0.05-0.12	0.03-0.1	0.10-0.32	0.05-0.12	0.03-0.15
	19	High Temperature Alloys	Annealed (iron based)	200	30-60	30-50	60	0.03-0.07	0.02-0.04	0.11-0.35	0.03-0.7	0.02-0.16
	20		Aged (iron based)	280	20-50	20-40	50	0.02-0.04	0.01-0.03	0.05-0.15	0.03-0.06	0.02-0.03
	21		Annealed (nickel or cobalt based)	250	15-35	15-30	35	0.02-0.04	0.01-0.03	0.05-0.15	0.03-0.06	0.02-0.03
	22		Aged (nickel or cobalt based)	350	15-30	15-25	30	0.02-0.04	0.01-0.03	0.05-0.15	0.02-0.05	0.02-0.03
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	40-80	30-70	30-50	0.02-0.04	0.01-0.03	0.10-0.24	0.02-0.05	0.02-0.07
	24		α+β Alloys	1050Rm	20-50	20-45	25-35	0.02-0.04	0.01-0.02	0.10-0.24	0.02-0.04	0.02-0.07
<b>H</b> Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRC	15-45	15-35	45	0.02-0.03	0.02	0.03-0.06	0.02-0.03	-
	26			51-55HRC	15-40	15-30	30	0.02-0.03	0.01	0.03-0.06	0.02-0.03	-

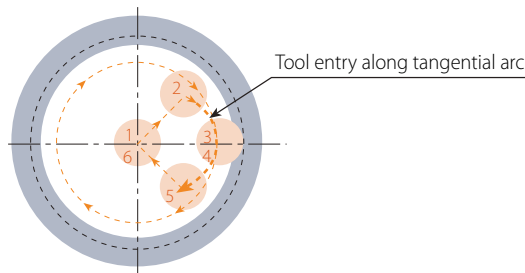
### Recommendation:

At tool entry, set the Feed f [mm/tooth] to 70% lower than the threading Feed.

### Example:

Threading Feed: 0.3[mm/tooth]

Tool entry Feed: 0.09[mm/tooth]



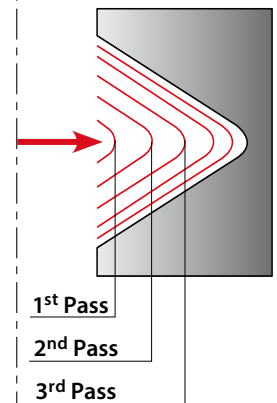
## Efficient Multi-passes Machining Method

Due to the high volume of chips, thinner chips are required. This is achieved by radial multi-pass machining, which reduces the accumulation of chips, and thereby enables higher speeds and feed rates.

### Recommended No. of Passes According to Pitch

Pitch TPI	48	32	24	20	16	14	12	10	8
Pitch mm	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00
No. of Passes	2-3	2-3	3-4	4-5	5-6	5-6	6-7	7-8	7-9

## MultiFlute



Conventional milling with multiple passes is required.  
For machining recommendations, use the Vargus GENius.

### Recommended Cutting Speeds $V_c$ [m/min] and Feed $f$ [mm/tooth]

					2xDo Tools				3xDo Tools			
Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	Feed f [mm/tooth] by Cutter Dia. = D2			Vc [m/min]	Feed f [mm/tooth] by Cutter Dia. = D2		
					VTH	2.4-4.0	4.0-9.0	>9.0	VTH	2.4-4.0	4.0-9.0	>9.0
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	145-185	0.05-0.08	0.09-0.14	0.11-0.17	70-110	0.03-0.05	0.07-0.10	0.08-0.13
	2		Medium Carbon (C=0.25-0.55%)	150	135-175	0.05-0.08	0.09-0.14	0.11-0.17	70-110	0.03-0.05	0.07-0.10	0.08-0.13
	3		High Carbon (C=0.55-0.85%)	170	120-160	0.05-0.08	0.09-0.14	0.11-0.17	65-105	0.03-0.05	0.07-0.10	0.08-0.13
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	100-140	0.05-0.08	0.09-0.14	0.11-0.17	65-105	0.03-0.05	0.07-0.10	0.08-0.13
	5		Hardened	275	95-135	0.05-0.08	0.09-0.14	0.11-0.17	65-105	0.03-0.05	0.07-0.10	0.08-0.13
	6		Hardened	350	90-130	0.04-0.06	0.06-0.10	0.08-0.11	60-100	0.03-0.05	0.05-0.08	0.07-0.10
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	50-90	0.05-0.08	0.09-0.14	0.11-0.17	50-90	0.03-0.05	0.07-0.10	0.08-0.13
	8		Hardened	325	40-80	0.04-0.06	0.06-0.10	0.08-0.11	40-80	0.03-0.05	0.05-0.08	0.07-0.10
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	145-185	0.05-0.08	0.09-0.14	0.11-0.17	70-110	0.03-0.05	0.07-0.10	0.08-0.13
	10		High Alloy (alloying elements >5%)	225	95-135	0.04-0.06	0.06-0.10	0.08-0.11	65-105	0.03-0.05	0.05-0.08	0.07-0.10
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	85-125	0.04-0.06	0.06-0.10	0.08-0.11	60-100	0.03-0.05	0.05-0.08	0.07-0.10
	12		Hardened	330	70-110	0.04-0.06	0.06-0.10	0.08-0.11	60-100	0.03-0.05	0.05-0.08	0.07-0.10
	13	Stainless Steel Austenitic	Austenitic	180	80-120	0.05-0.08	0.09-0.14	0.11-0.17	60-100	0.03-0.05	0.07-0.10	0.08-0.13
	14		Super Austenitic	200	75-115	0.05-0.08	0.09-0.14	0.11-0.17	60-100	0.03-0.05	0.07-0.10	0.08-0.13
	15	Stainless Steel Cast Ferritic	Non Hardened	200	90-130	0.05-0.08	0.09-0.14	0.11-0.17	60-100	0.03-0.05	0.07-0.10	0.08-0.13
	16		Hardened	330	65-105	0.04-0.06	0.06-0.10	0.08-0.11	60-100	0.03-0.05	0.05-0.08	0.07-0.10
	17	Stainless Steel Cast Austenitic	Austenitic	200	85-125	0.05-0.08	0.09-0.14	0.11-0.17	60-100	0.03-0.05	0.07-0.10	0.08-0.13
	18		Hardened	330	60-100	0.04-0.06	0.06-0.10	0.08-0.11	60-100	0.03-0.05	0.05-0.08	0.07-0.10
K Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	60-70	0.05-0.08	0.09-0.14	0.11-0.17	60-100	0.03-0.05	0.07-0.10	0.08-0.13
	29		Pearlitic (long chips)	230	85-125	0.05-0.08	0.09-0.14	0.11-0.17	60-100	0.03-0.05	0.07-0.10	0.08-0.13
	30	Grey Cast Iron	Low Tensile Strength	180	95-135	0.05-0.08	0.09-0.14	0.11-0.17	65-105	0.03-0.05	0.07-0.10	0.08-0.13
	31		High Tensile Strength	260	60-100	0.04-0.06	0.06-0.10	0.08-0.11	70-110	0.03-0.05	0.05-0.08	0.07-0.10
	32	Nodular Sg Iron	Ferritic	160	55-95	0.05-0.08	0.09-0.14	0.11-0.17	40-80	0.03-0.05	0.07-0.10	0.08-0.13
	33		Pearlitic	260	50-90	0.04-0.06	0.06-0.10	0.08-0.11	40-80	0.03-0.05	0.05-0.08	0.07-0.10
N Non-Ferrous Metals	34	Aluminum Alloys Wrought	Non Aging	60	200-300	0.06-0.10	0.11-0.17	0.16-0.19	70-110	0.06-0.09	0.11-0.16	0.13-0.20
	35		Aged	100	150-250	0.06-0.10	0.11-0.17	0.16-0.19	70-110	0.06-0.09	0.11-0.16	0.13-0.20
	36	Aluminum Alloys	Cast	75	100-200	0.06-0.10	0.11-0.17	0.16-0.19	70-110	0.06-0.09	0.11-0.16	0.13-0.20
	37		Cast & Aged	90	120-220	0.06-0.10	0.11-0.17	0.16-0.19	70-110	0.06-0.09	0.11-0.16	0.13-0.20
	38	Aluminum Alloys	Cast Si 13-22%	130	200-300	0.06-0.10	0.11-0.17	0.16-0.19	70-110	0.06-0.09	0.11-0.16	0.13-0.20
	39	Copper and Copper Alloys	Brass	90	200-300	0.06-0.10	0.11-0.17	0.16-0.19	70-110	0.06-0.09	0.11-0.16	0.13-0.20
	40		Bronze And Non Leaded Copper	100	150-250	0.06-0.10	0.11-0.17	0.16-0.19	70-110	0.06-0.09	0.11-0.16	0.13-0.20

# Recommended Cutting Speeds Vc [m/min] and Feed f [mm/tooth]

**HCN**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc(m/min)	Feed [mm/tooth]
					HCN	
					VTH	
<b>P</b> Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	50-180	0.03-0.08
	2		Medium Carbon (C=0.25-0.55%)	150	50-140	0.03-0.08
	3		High Carbon (C=0.55-0.85%)	170	50-120	0.03-0.06
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	60-170	0.03-0.07
	5		Hardened	275	60-160	0.03-0.07
	6		Hardened	350	60-150	0.02-0.04
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	40-90	0.03-0.07
	8		Hardened	325	30-70	0.02-0.05
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	70-200	0.03-0.06
	10		High Alloy (alloying elements >5%)	225	60-150	0.03-0.06
<b>M</b> Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	50-140	0.02-0.05
	12		Hardened	330	50-110	0.01-0.03
	13	Stainless Steel Austenitic	Austenitic	180	60-130	0.02-0.05
	14		Super Austenitic	200	50-120	0.02-0.05
	15	Stainless Steel Cast Ferritic	Non Hardened	200	50-150	0.02-0.05
	16		Hardened	330	50-100	0.02-0.03
	17	Stainless Steel Cast Austenitic	Austenitic	200	50-140	0.02-0.06
	18		Hardened	330	50-90	0.01-0.03
<b>K</b> Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	60-150	0.03-0.08
	29		Pearlitic (long chips)	230	80-100	0.03-0.06
	30	Grey Cast Iron	Low Tensile Strength	180	50-140	0.03-0.06
	31		High Tensile Strength	260	40-110	0.02-0.05
	32	Nodular Sg Iron	Ferritic	160	40-100	0.03-0.07
	33		Pearlitic	260	40-90	0.02-0.05
<b>N</b> Non-Ferrous Metals	34	Aluminum Alloys Wrought	Non Aging	60	150-250	0.05-0.15
	35		Aged	100	100-220	0.03-0.1
	36	Aluminum Alloys	Cast	75	80-150	0.05-0.15
	37		Cast & Aged	90	90-160	0.03-0.1
	38	Aluminum Alloys	Cast Si 13-22%	130	150-250	0.05-0.15
	39	Copper and Copper Alloys	Brass	90	150-250	0.05-0.15
	40		Bronze And Non Leaded Copper	100	100-220	0.03-0.1
<b>S</b> Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	30-50	0.02-0.04
	20		Aged (iron based)	280	20-40	0.01-0.03
	21		Annealed (nickel or cobalt based)	250	15-30	0.01-0.03
	22		Aged (nickel or cobalt based)	350	15-25	0.01-0.03
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	30-70	0.01-0.03
	24		α+β Alloys	1050Rm	20-45	0.01-0.02
<b>H</b> Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	-	-
	26			51-55HRc	-	-



# Recommended Cutting Speeds Vc [m/min] and Feed f [mm/tooth]

**TMDR**

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc(m/min)	Feed [mm/tooth]
					TMDR	
					VTS	
<b>P</b> Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	60-120	0.02-0.12
	2		Medium Carbon (C=0.25-0.55%)	150	60-120	0.02-0.12
	3		High Carbon (C=0.55-0.85%)	170	60-90	0.02-0.12
	4	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	60-90	0.02-0.12
	5		Hardened	275	50-80	0.02-0.05
	6		Hardened	350	50-80	0.02-0.03
	7	High Alloy Steel (alloying elements>5%)	Annealed	200	50-80	0.02-0.07
	8		Hardened	325	50-80	0.02-0.03
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	70-90	0.02-0.12
	10		High Alloy (alloying elements >5%)	225	60-80	0.02-0.03
<b>M</b> Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	60-90	0.02-0.12
	12		Hardened	330	50-80	0.02-0.03
	13	Stainless Steel Austenitic	Austenitic	180	60-90	0.02-0.12
	14		Super Austenitic	200	50-80	0.02-0.12
	15	Stainless Steel Cast Ferritic	Non Hardened	200	60-90	0.02-0.12
	16		Hardened	330	50-80	0.02-0.03
	17	Stainless Steel Cast Austenitic	Austenitic	200	60-90	0.02-0.12
	18		Hardened	330	50-80	0.02-0.03
<b>K</b> Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	50-80	0.02-0.03
	29		Pearlitic (long chips)	230	60-90	0.02-0.09
	30	Grey Cast Iron	Low Tensile Strength	180	70-100	0.02-0.12
	31		High Tensile Strength	260	60-90	0.02-0.09
	32	Nodular Sg Iron	Ferritic	160	70-100	0.02-0.12
	33		Pearlitic	260	60-90	0.02-0.09
<b>N</b> Non-Ferrous Metals	34	Aluminum Alloys Wrought	Non Aging	60	60-250	0.03-0.11
	35		Aged	100	60-150	0.03-0.12
	36	Aluminum Alloys	Cast	75	60-250	0.03-0.12
	37		Cast & Aged	90	60-150	0.02-0.12
	38	Aluminum Alloys	Cast Si 13-22%	130	250	0.03-0.11
	39	Copper and Copper Alloys	Brass	90	60-250	0.03-0.12
	40		Bronze And Non Leaded Copper	100	60-150	0.03-0.11
<b>S</b> Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	60	0.02-0.12
	20		Aged (iron based)	280	50	0.02-0.03
	21		Annealed (nickel or cobalt based)	250	35	0.02-0.03
	22		Aged (nickel or cobalt based)	350	30	0.02-0.03
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	30-50	0.02-0.05
	24		α+β Alloys	1050Rm	25-35	0.02-0.05
<b>H</b> Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	-	-
	26			51-55HRc	-	-

## MilliPro HD

### Cutting Speeds Vc [m/min] and Feed f [mm/tooth]

Material Group	Vargus No.	Material		Hardness Brinell HB	Vc [m/min]	Feed f [mm/tooth] by Cutting Dia.=D2				
					VTH	1.5-2.5	2.5-5	5-7	7-9	9-11
<b>P</b> Steel	6	Low Alloy Steel (alloying elements≤5%)	Hardened	350	25-160	0.04	0.05	0.06	0.07	0.08
	8	High Alloy Steel (alloying elements>5%)	Hardened	325	25-180					
<b>M</b> Stainless Steel	12	Stainless Steel Ferritic	Hardened	330	25-120	0.04	0.05	0.06	0.07	0.08
	16	Stainless Steel Cast Ferritic	Hardened	330	25-110					
	18	Stainless Steel Cast Austenitic	Hardened	330	25-100					
<b>K</b> Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	25-160	0.05	0.06	0.07	0.08	0.1
	29		Pearlitic (long chips)	230	25-150	0.04	0.05	0.06	0.07	0.08
	30	Grey Cast Iron	Low Tensile Strength	180	25-130	0.05	0.06	0.07	0.08	0.1
	31		High Tensile Strength	260	25-100	0.04	0.05	0.06	0.07	0.08
	32	Nodular Sg Iron	Ferritic	160	25-125	0.04	0.05	0.06	0.07	0.09
	33		Pearlitic	260	25-90	0.03	0.04	0.05	0.06	0.07
<b>S</b> Heat Resistant Material	21	High Temperature Alloys	Annealed (nickel or cobalt based)	250	15-35	0.03	0.04	0.05	0.06	0.07
	22		Aged (nickel or cobalt based)	350	15-30					
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	25-70					
	24		α+β alloys	1050Rm	25-50					
<b>H</b> Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRC	25-70	0.04	0.05	0.06	0.07	0.08
	26			51-55HRC	25-60	0.03	0.04	0.05	0.06	0.07
	27			56-62HRC	25-50	0.02	0.03	0.04	0.05	0.06

## HTC Recommended Grades, Cutting Speed and Feed

Material Group	Material		Hardness Brinell HB	Strength (N-mm <sup>2</sup> )	Vc[m/min]		fb[mm/rev]		fz[mm/tooth]	
					VTN	VTS	≤6mm	≤12mm	≤6mm	≤12mm
<b>K</b> Cast Iron	Cast Iron	Grey Cast Iron	≤150	≤500	50-80	80-120	0.10-0.15	0.15-0.22	0.02-0.05	0.05-0.10
		Grey Cast Iron, Heat Treated	150-300	500-1000	50-80	80-120	0.10-0.15	0.15-0.22	0.02-0.05	0.05-0.10
		Spher. Graph. Cast Iron	≤200	≤700	50-80	80-120	0.10-0.15	0.15-0.22	0.02-0.05	0.05-0.10
<b>N</b> Non-Ferrous Metals	Copper	Short Chips, Brass, Bronze, Red Brass	≤200	≤700	100-300	—	0.06-0.10	0.10-0.30	0.03-0.06	0.06-0.10
		Aluminium, Magnesium Non-Alloy	≤100	≤350	100-400	100-400	0.10-0.25	0.25-0.30	0.03-0.06	0.06-0.10
		Aluminium, Wrought Alloy, Breaking Strain (A5) < 14%	≤180	≤600	100-400	100-400	0.10-0.25	0.25-0.30	0.03-0.06	0.06-0.10
	Aluminium/Magnesium	Aluminium, Wrought Alloy, Breaking Strain (A5) ≥ 14%	≤180	≤600	100-400	100-400	0.03-0.06	0.06-0.12	0.03-0.06	0.06-0.10
		Aluminium, Cast Alloy, Si<10%	≤180	≤600	100-300	100-400	0.10-0.25	0.25-0.30	0.03-0.06	0.06-0.10
		Aluminium, Cast Alloy, Si≥10%	≤180	≤600	—	100-300	0.10-0.25	0.25-0.30	0.03-0.06	0.06-0.10
<b>K</b>	Plastic	Thermo Plastics	—	—	60-120	60-120	0.10-0.25	0.25-0.30	0.03-0.06	0.06-0.10
		Thermosetting Plastic	—	—	60-100	60-100	0.10-0.25	0.25-0.30	0.03-0.06	0.06-0.10
		Fibre Reinforced Plastic	—	—	40-60	60-80	0.10-0.15	0.15-0.22	0.02-0.05	0.05-0.10

Vc - Cutting Speed [m/min]

fb (Drilling) - Feed per Revolution [mm/rev]

fz (Threading) - Feed per Tooth [mm/tooth]

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