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mimatic®

Tool Systems

SolidCUT

2017

Extensive range of solid carbide thread milling cutters.

- **Spiral-grooved grooves**
- **Soft cut**
- **Excellent surface qualities**
- **Also for thin-walled workpieces**
- **A tool for right- and left-hand threads**

Thread Milling

mimatic® Tool Systems

Systems for Circular Thread Milling

PolyMILL

The affordable system with high performance allows **threading** and/or **circlip grooving** in high precision. The polygonal connection of insert and milling body improves the efficiency and precision of the process significantly:

- **Longer tool life**
- **Higher machining volume**
- **Higher feed rates**
- **Shorter processing times**
- **High stability**
- **High security at interrupted cutting**

TriMILL

Affordable and flexible system for short processing times and long tool lifes.

- **Deep, true to gauge threads**
- **Accurate free-form contours**
- **Accurate grooving**

Bottom threads can be cut almost to the bottom without undercuts. By using the same pitches, the storage and acquisition costs decrease also.

TrioCUT

Smooth cutting and **low cutting pressure** results in high surface quality and long tool lifes. A **conical position of insert pocket** guarantees stability of the tool shaft. Further advantages are the **radially back ground thread profile**, extremely high wedge angle, a more stable cutting edge as well as a positive rake angle. The optimum application area are fine threads and/or very short thread lengths.

- **Thread milling with undercut**
- **Thread milling**
- **Drill thread milling**

SolidCUT

Extensive range of solid carbide thread milling cutters.

- **Spiral-grooved grooves**
- **Soft cut**
- **Excellent surface qualities**
- **Also for thin-walled workpieces**
- **A tool for right- and left-hand threads**

14,5 15 21 26

Multi tooth thread milling cutters, ideal for short thread lengths and very rigid clamping of workpiece and cutter.

mimaticSTC

Sectional thread milling for high-quality large threads from M24.

STC-1 with 10 edges
Biggest advantage for any long threads from M24: A shorter process time compared to cutters with inserts and easier assembly.

STC-2 and STC-3
Depending on the thread length (pitch, material) much faster than STC-1.

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Symbols

Type designation

Steel shaft without clamping surface

Steel shaft with Weldon clamping surface

Solid carbide shaft without clamping surface

Solid carbide shaft with Weldon clamping surface

Cutter with tightening thread

Smallest necessary bore-diameter

Internal coolant supply

Number of inserts

Thread standard

Thread with undercut (Trio-Cut)

for right- and left hand internal thread
<u>for left hand thread</u> modify your NC-program!

for right- and left hand external thread
<u>for left hand thread</u> modify your NC-program!

Full form thread milling

Partial form thread milling

Point angle

Thread standard

Short Descriptions

Alpha (α)	Point angle of milling insert
A	Groove width
A_1	Basic width in the Groove
B_{f6}	Insert holder width of axial grooving tool
B_{H7}	Groove width of axial grooving tool
B_W	Tool width of axial grooving tool
C	Chamfer width
D	Cutting diameter
d_1	Milling body diameter (front)
d_2	Large diameter of milling body
d_{g6}	Fitting face diameter of threaded milling tool
D_{h6}	Shaft diameter of milling body (Arbor)
D_P	Flight circle of insert
D_R	Nominal diameter of concave radius insert
E	Width blank insert
F	Width of trailing chamfer
H_P	Insert height
H_S	Slider height (Axial grooving tool)
L	Lenght of milling tool
L_1	Clamping lenght of milling tool
L_G	Usable thread length at the multi-tooth thread milling
L_{HA}	Holder lenght
L_{P1}	Insert height of milling body – edge
L_{P2}	Insert height of edge – interfering contour
L_{PF}	Lenght of fitting face
L_S	Shaft lenght – clamping lenght (Depth)
M	Thread size
P	Pitch
R	Radius (general / common)

Formula for Tool Lengths

$$L_{WKZ} = L_{GK} + L_1 + L_{P1} (+L_{P2})$$

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Table of Content

	Type	Thread range	Page
Metric Internal Thread (M, Full form, 60°)	Fixed dimension	M3 - M20	55
	with chamfer	M5 - M20	55
Metric Internal Fine Thread (MF, Full form, 60°)	Fixed dimension	M5 - M20	56
	Universal	M10 - >M27	56
	with chamfer	M8 - M20	57
Whitworth Pipe Thread (G, Full form, 55°)	Fixed dimension	1/8" - 1/2"	57
	Universal	1/4" - >1"	58
	with chamfer	1/16" - 5/8"	58
British Standard Whitworth Thread (BSW, Full form, 55°)	Fixed dimension	5/16" - 5/8"	59
British Standard Fine Thread (BSF, Full form, 55°)	Fixed dimension	5/16" - 5/8"	59
Unified National Coarse Thread (UNC, Full form, 60°)	Fixed dimension	1/4" - 1/2"	60
	with chamfer	1/4" - 3/4"	60
Unified National Fine Thread (UNF, Full form, 60°)	Fixed dimension	1/4" - 1/2"	61
	with chamfer	1/4" - 3/4"	61
NPT Thread (NPT, Full form, 60°, Cone 1:16)	Fixed dimension	1/16" - 3/4"	62
	with chamfer	1/16" - 3/4"	62
Technical Data	Information about circular thread milling		63
	Cutting data reference values		188

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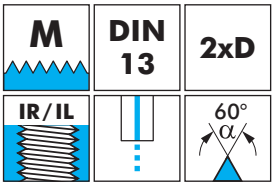
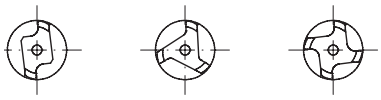
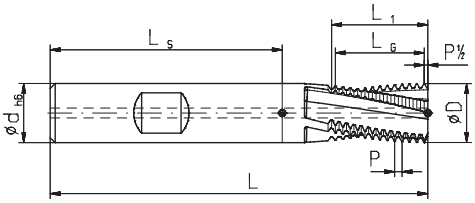
SolidCUT Solid Carbide Circular Thread Milling Cutter

- **Fixed dimension type**
- **Cutting Data see page 188**

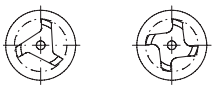






Thread	P mm	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
M3	0,5	2,4	42	7,0	6,5	14	4	2		168192		
M4	0,7	3,15	55	9,8	9,1	14	6	3		168195	168196	168197
M5	0,8	4,0	55	12,0	11,2	15	6	3		168198	168199	168200
M6	1,0	4,8	55	14,0	13	14	6	3		168201	168202	168203
M8	1,25	5,95	60	18,75	17,5	15	6	3	✓	168204	168205	168206
M10	1,5	7,95	70	22,5	21	15	8	3	✓	168207	168208	168209
M12	1,75	9,9	75	28,0	26,25	16	10	4	✓	168210	168211	168212
M14	2,0	11,6	85	32,0	30	16	12	4	✓	168213	168214	168215
M16	2,0	12,0	85	36,0	34	18	12	4	✓	168216	168217	168218
M18	2,5	14,0	90	42,5	40	17	14	4	✓	168219	168220	168221
M20	2,5	16,0	90	42,5	40	17	16	4	✓	168222	168223	168224

- **Chamfer type**
- **Cutting Data see page 188**



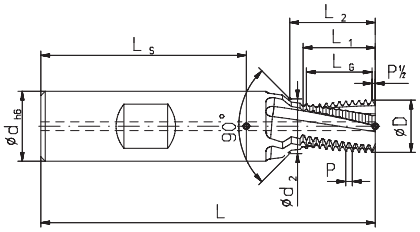
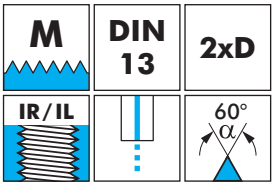


Figure 1:
Chamfer on the shank



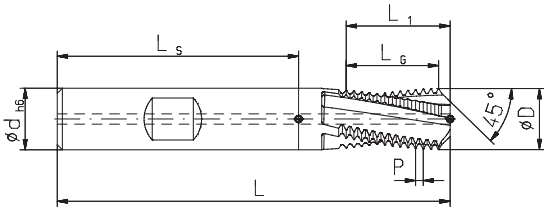


Figure 2:
Chamfer on the face

Thread	P mm	D±0,02 mm	L mm	L1 mm	L2 mm	LG mm	Number of teeth	d h6 mm	d2 mm	Number of edges	Internal coolant	Fig.	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB
M4	0,7	3,15	55	9,80	11,03	9,1	14	6	4,3	3		1	186833 NEW	186834 NEW
M5	0,8	4,00	62	12,70	13,35	11,2	15	8	5,3	3		1	171556	171565
M6	1,0	4,80	62	14,00	15,55	13	14	8	6,3	3		1	171557	171566
M8	1,25	6,50	74	18,75	20,60	17,5	15	10	8,3	3	✓	1	171558	171567
M10	1,5	7,95	80	22,50	24,80	21	15	10	10,3	3	✓	1	171559	171568
M12	1,75	9,90	90	28,00	30,60	26,25	16	14	12,3	4	✓	1	171560	171569
M14	2,0	11,60	100	32,00	34,85	30	16	16	14,3	4	✓	1	171561	171570
M16	2,0	11,95	90	37,60		34	18	12		4	✓	2	171562	171571
M18	2,5	13,95	110	37,50	41,40	40	17	20	18,3	4	✓	1	171563	171572
M20	2,5	15,95	100	44,00		40	17	16		4	✓	2	171564	171573

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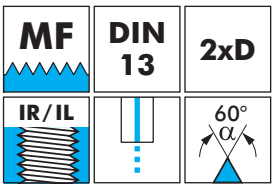
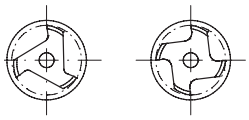
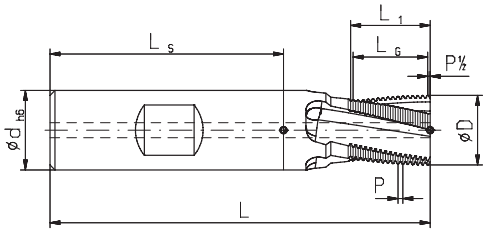
SolidCUT Solid Carbide Circular Thread Milling Cutter

- **Fixed dimension type**
- **Cutting Data see page 188**

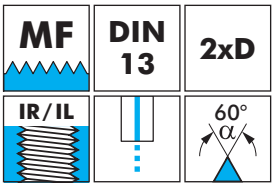


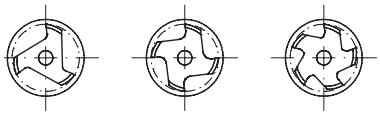


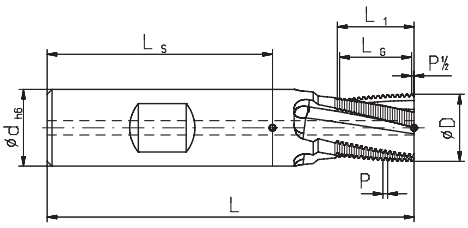


Thread	P mm	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
M5x0,5	0,5	4,0	55	11,5	11	23	6	3		168225	168226	168227
M6x0,75	0,75	4,8	55	14,25	13,5	19	6	3		168228	168229	168230
M8x1	1,0	5,95	60	19,0	18	19	6	3	✓	168231	168232	168233
M10x1,25	1,25	7,95	70	21,5	20	17	8	3	✓	168234	168235	168236
M12x1	1,0	9,9	75	27,0	26	27	10	4	✓	168237	168238	168239
M12x1,25	1,25	9,9	75	27,5	26,25	22	10	4	✓	168240	168241	168242
M12x1,5	1,5	9,9	75	27,0	25,5	18	10	4	✓	168243	168244	168245
M14x1	1,0	11,6	85	31,0	30	31	12	4	✓	168246	168247	168248
M14x1,5	1,5	11,6	85	31,5	30	21	12	4	✓	168249	168250	168251
M16x1,5	1,5	11,95	85	34,5	33	23	12	4	✓	168252	168253	168254
M18x1,5	1,5	13,95	90	42,0	40,5	28	14	4	✓	168255	168256	168257
M20x1,5	1,5	15,95	90	42,0	40,5	28	16	4	✓	168258	168259	168260

- **Universal type**
- **Cutting Data see page 188**







Thread from	P mm	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
> M10	0,5	7,95	70	12	11,5	24	8	3	✓	170779	170780	170781
> M11	0,75	7,95	70	12	11,25	16	8	3	✓	170782	170783	170784
> M12	1,0	9,95	75	16	15	16	10	4	✓	170785	170786	170787
> M14	1,0	11,95	85	20	19	20	12	4	✓	170791	170792	170793
> M18	1,0	15,95	90	25	24	25	16	5	✓	170800	170801	170802
> M22	1,0	19,95	110	32	31	32	20	5	✓	170812	170813	170814
> M14	1,5	9,95	75	16	15	11	10	4	✓	170788	170789	170790
> M16	1,5	11,95	85	20	19,5	14	12	4	✓	170794	170795	170796
> M20	1,5	15,95	90	25	24	17	16	5	✓	170803	170804	170805
> M24	1,5	19,95	110	32	31,5	22	20	5	✓	170815	170816	170817
> M16	2,0	11,95	85	20	18	10	12	4	✓	170797	170798	170799
> M20	2,0	15,95	90	25	24	13	16	5	✓	170806	170807	170808
> M24	2,0	19,95	110	32	30	16	20	5	✓	170818	170819	170820
> M24	3,0	15,95	90	25	24	9	16	5	✓	170809	170810	170811
> M27	3,0	19,95	110	32	30	11	20	5	✓	170821	170822	170823

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SolidCUT Solid Carbide Circular Thread Milling Cutter

- **Universal type**
- **Cutting Data see page 188**

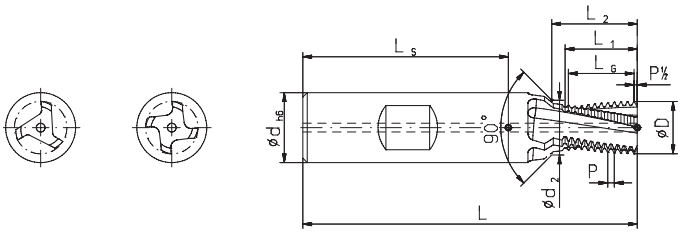


Figure 1:
Chamfer on the shank

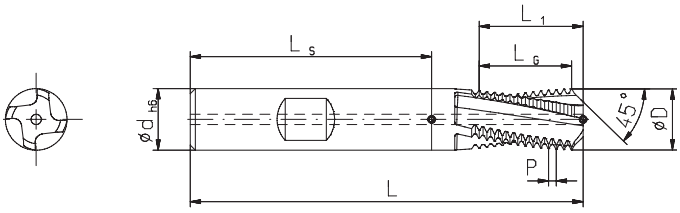
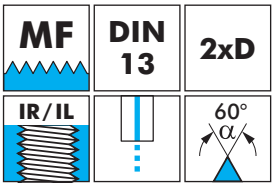
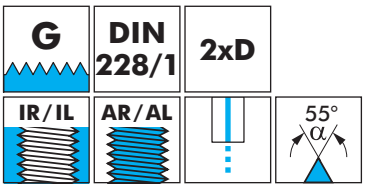


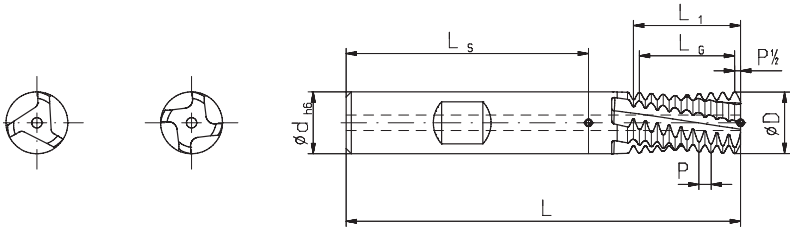
Figure 2:
Chamfer on the face



Thread	P mm	D±0,02 mm	L mm	L1 mm	L2 mm	LG mm	Number of teeth	d h6 mm	d2 mm	Number of edges	Internal coolant	Fig.	Order No. TINAMATIC DIN 6535 Form HA	Order No. TINAMATIC DIN 6535 Form HB
M8x1	1,0	5,95	74	19	21	18	19	10	8,3	3	✓	1	171574	172376
M10x1	1,0	8,0	80	22	23,95	21	22	12	10,3	3	✓	1	171575	172377
M10x1,25	1,25	7,95	80	22,5	24,6	21,25	18	12	10,3	3	✓	1	171576	172378
M12x1	1,0	9,9	90	27	29	26	27	14	12,3	4	✓	1	171577	172379
M12x1,25	1,25	9,9	90	27,5	29,6	26,25	22	14	12,3	4	✓	1	171578	172380
M12x1,5	1,5	9,9	90	27	29,25	25,5	18	14	12,3	4	✓	1	171579	172381
M14x1	1,0	11,6	100	31	33,15	30	31	16	14,3	4	✓	1	171580	172382
M14x1,5	1,5	11,6	100	31,5	33,9	30	21	16	14,3	4	✓	1	171581	172383
M16x1,5	1,5	11,95	90	36,05		33	23	12		4	✓	2	171582	172384
M18x1,5	1,5	14,0	110	39	42,2	37,5	26	20	18,3	4	✓	1	171583	172385
M20x1,5	1,5	15,95	100	45,05		42	29	16		4	✓	2	171584	172386

- **Fixed dimension type**
- **Cutting Data see page 188**





Thread	P mm	Pitch/"	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	Order No. TINAMATIC DIN 6535 Form HB	Order No. TINAMATIC DIN 6535 Form HE
G 1/8"	0,907	28	7,95	70	20,8	20,86	24	8	3	✓	168371	168372	168373
G 1/4"	1,337	19	9,9	75	28,0	26,74	21	10	4	✓	168374	168375	168376
G 3/8"	1,337	19	13,95	90	41,45	40,11	31	14	4	✓	168377	168378	168379
G 1/2"	1,814	14	15,95	90	43,5	41,72	24	16	4	✓	168380	168381	168382

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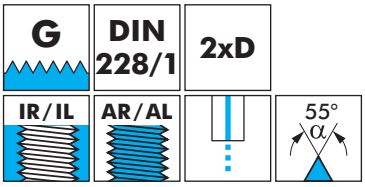
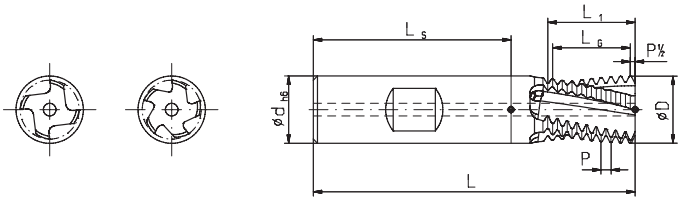
SolidCUT Solid Carbide Circular Thread Milling Cutter

- **Universal type**
- **Cutting Data see page 188**





Thread from	P mm	Pitch/"	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	Order No. TINAMATIC DIN 6535 Form HB
G 1/4 - 3/8"	1,337	19	9,95	75	16,0	14,71	12	10	4	✓	186224	187865
G 1/2 - 7/8"	1,814	14	15,95	90	25,4	23,58	14	16	5	✓	186225	187866
> G 1"	2,309	11	19,95	110	32,3	30,02	14	20	5	✓	183759	177967

- **Chamfer type**
- **Cutting Data see page 188**

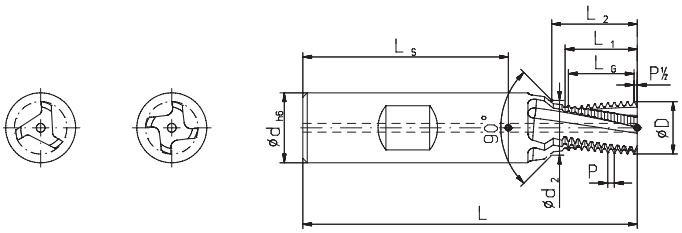
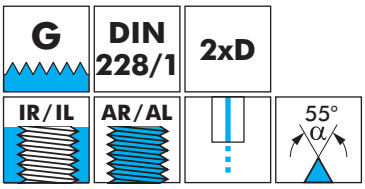


Figure 1:
Chamfer on the shank



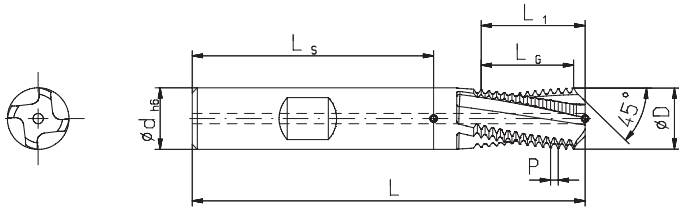


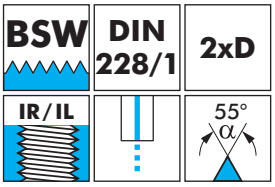
Figure 2:
Chamfer on the face

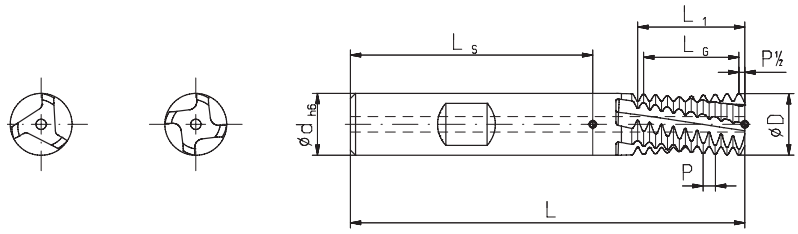
Thread	P mm	Pitch/"	D±0,02 mm	L mm	L1 mm	L2 mm	LG mm	Number of teeth	d h6 mm	d2 mm	Number of edges	Fig.	Order No. TINAMATIC DIN 6535 Form HA	Order No. TINAMATIC DIN 6535 Form HB
G 1/16"	0,907	28	6	74	16,3	18,1	15,42	18	10	8,0	3	1	171585	172387
G 1/8"	0,907	28	7,95	80	21,8	23,5	20,86	24	12	10,0	3	1	171586	172388
G 1/4"	1,337	19	9,9	100	28,0	30,8	26,74	21	16	13,5	4	1	171587	172389
G 3/8"	1,337	19	13,95	90	37,5		34,76	27	14		4	2	171588	172390
G 1/2"	1,814	14	15,95	100	46,75		43,54	25	16		4	2	171589	172391
G 5/8"	1,814	14	17,95	110	41,0		47,16	27	18		4	2	171590	172392

mimatic® Tool Systems

SolidCUT Solid Carbide Circular Thread Milling Cutter

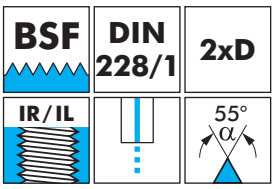
- **Fixed dimension type**
- **Cutting Data see page 188**

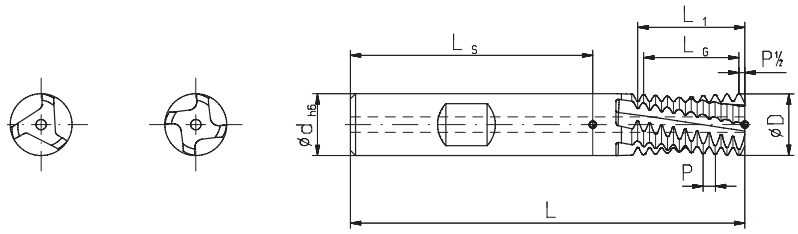




Thread	P mm	Pitch/"	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
5/16"	1,411	18	6,0	60	19,75	18,34	14	6	3	✓	168383	168384	168385
3/8"	1,588	16	5,95	60	20,60	19,06	13	6	3	✓	168386	168387	168388
7/16"	1,814	14	7,95	70	23,60	21,77	13	8	3	✓	168389	168390	168391
1/2"	2,117	12	7,95	70	23,30	21,17	11	8	3	✓	168392	168393	168394
5/8"	2,309	11	9,90	75	30,00	27,71	13	10	4	✓	168395	168396	168397

- **Fixed dimension type**
- **Cutting Data see page 188**



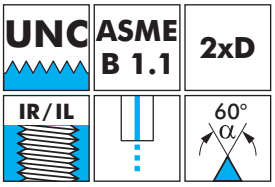


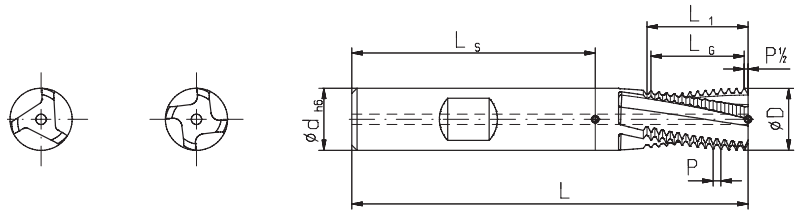
Thread	P mm	Pitch/"	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
5/16"	1,155	22	5,95	60	19,6	18,48	17	6	3	✓	168398	168399	168400
3/8"	1,270	20	5,95	60	19,0	17,78	15	6	3	✓	168401	168402	168403
7/16"	1,411	18	7,95	70	22,6	21,17	16	8	3	✓	168404	168405	168406
1/2"	1,588	16	7,95	70	23,8	22,23	15	8	3	✓	168407	168408	168409
5/8"	1,814	14	9,90	75	29,0	27,21	16	10	4	✓	168410	168411	168412

mimatic® Tool Systems

SolidCUT Solid Carbide Circular Thread Milling Cutter

- **Fixed dimension type**
- **Cutting Data see page 188**





Thread	P mm	Pitch/"	D ±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
1/4"-20	1,270	20	4,8	55	14	12,7	11	6	3		168413	168414	168415
5/16"-18	1,411	18	5,95	60	19,7	18,34	14	6	3	✓	168416	168417	168418
3/8"-16	1,588	16	7,95	70	23,8	22,23	15	8	3	✓	168419	168420	168421
7/16"-14	1,814	14	7,95	70	23,6	21,77	13	8	3	✓	168422	168423	168424
1/2"-13	1,954	13	9,9	75	29,3	27,36	15	10	4	✓	168425	168426	168427

- **Chamfer type**
- **Cutting Data see page 188**

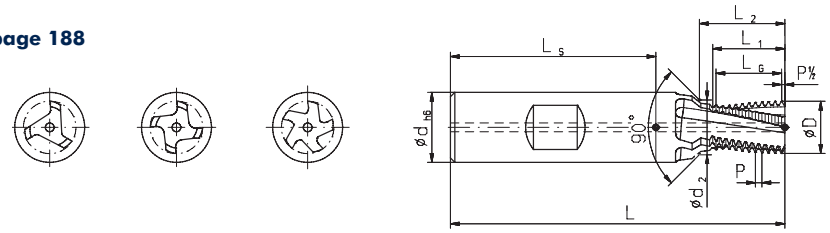
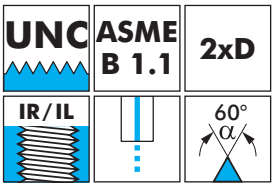


Figure 1:
Chamfer on the shank



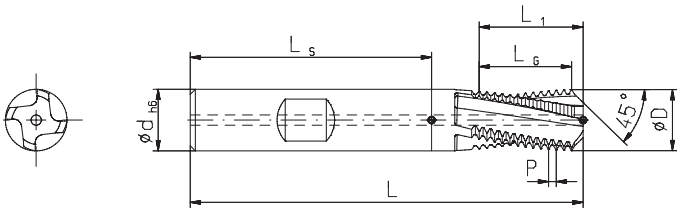


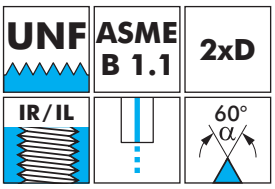
Figure 2:
Chamfer on the face

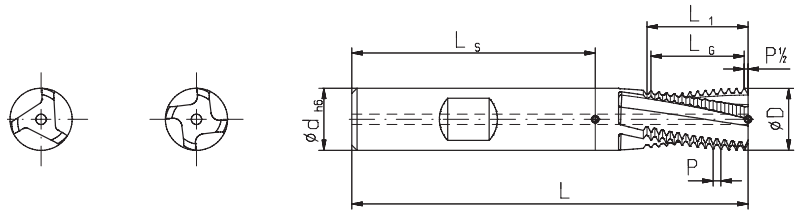
Thread	P mm	Pitch/"	D ±0,02 mm	L mm	L1 mm	L2 mm	LG mm	Number of teeth	d h6 mm	d2 mm	Number of edges	Internal coolant	Fig.	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB
1/4"-20	1,270	20	4,8	62	14,0	15,73	12,7	11	8	6,65	3		1	171591	172393
5/16"-18	1,411	18	5,95	74	19,7	21,9	18,34	14	10	8,25	3	✓	1	171592	172394
3/8"-16	1,588	16	7,95	80	23,8	25,85	22,23	15	12	9,83	3	✓	1	171593	172395
7/16"-14	1,814	14	7,95	90	23,6	26,5	21,77	13	14	11,43	3	✓	1	171594	172396
1/2"-13	1,954	13	9,9	90	29,3	32,1	27,36	15	14	13	4	✓	1	171595	172397
9/16"-12	2,117	12	11,8	100	33,9	36,6	31,76	16	16	14,61	4	✓	1	171596	172398
5/8"-11	2,309	11	12,7	90	38,4		34,63	16	14		4	✓	2	171597	172399
3/4"-10	2,540	10	15,2	110	40,6	44,3	38,1	16	20	19,35	5	✓	1	171598	172400

mimatic® Tool Systems

SolidCUT Solid Carbide Circular Thread Milling Cutter

- **Fixed dimension type**
- **Cutting Data see page 188**





Thread	P mm	Pitch/"	D ±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
1/4"-28	0,907	28	4,8	55	14,5	13,61	16	6	3		168428	168429	168430
5/16"-24	1,058	24	5,95	60	19,0	17,99	18	6	3	✓	168431	168432	168433
3/8"-24	1,058	24	7,95	70	22,2	21,16	21	8	3	✓	168434	168435	168436
7/16"-20	1,270	20	7,95	70	22,8	21,59	18	8	3	✓	168437	168438	168439
1/2"-20	1,270	20	9,9	75	27,9	26,67	22	10	4	✓	168440	168441	168442

- **Chamfer type**
- **Cutting Data see page 188**

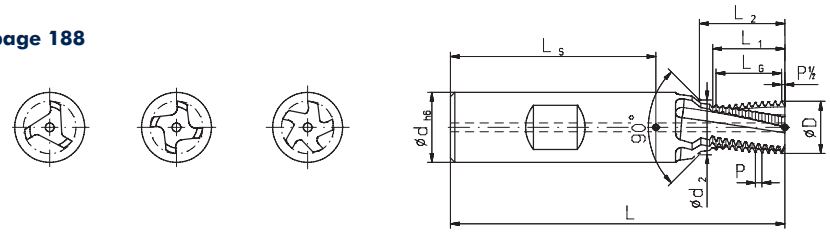
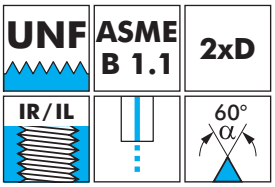


Figure 1:
Chamfer on the shank



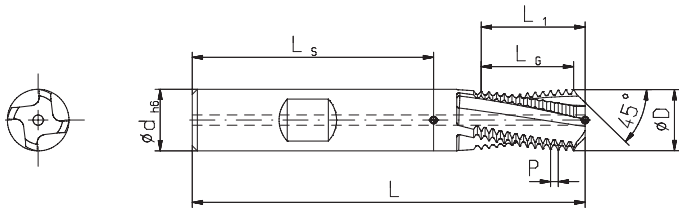


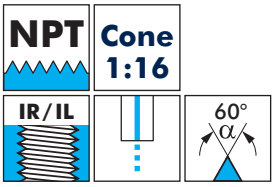
Figure 2:
Chamfer on the face

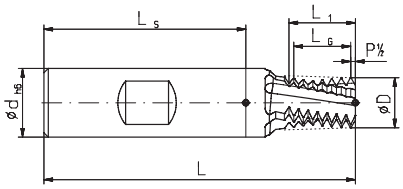
Thread	P mm	Pitch/"	D ±0,02 mm	L mm	L1 mm	L2 mm	LG mm	Number of teeth	d h6 mm	d2 mm	Number of edges	Internal coolant	Fig.	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB
1/4"-28	0,907	28	4,8	62	14,5	16,2	13,61	16	8	6,65	3		1	171599	172401
5/16"-24	1,058	24	5,95	74	19,0	21	17,99	18	10	8,25	3	✓	1	171600	172402
3/8"-24	1,058	24	7,6	80	22,2	23	21,16	21	12	9,83	3	✓	1	171601	172403
7/16"-20	1,270	20	7,95	90	22,8	25,5	21,59	18	14	11,4	3	✓	1	171602	172404
1/2"-20	1,270	20	9,9	90	27,9	30,43	26,67	22	14	13	4	✓	1	171603	172405
9/16"-18	1,411	18	12	100	31,0	33,35	29,63	22	16	14,61	4	✓	1	171604	172406
5/8"-18	1,411	18	13,5	90	36,8		33,86	25	14		4	✓	2	171605	172407
3/4"-16	1,588	16	17	110	39,7	42	38,11	25	20	19,35	5	✓	1	171606	172408

mimatic® Tool Systems

SolidCUT Solid Carbide Circular Thread Milling Cutter

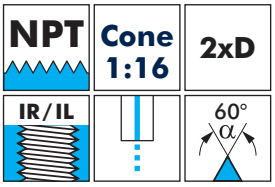
- **Fixed dimension type**
- **Cutting Data see page 188**

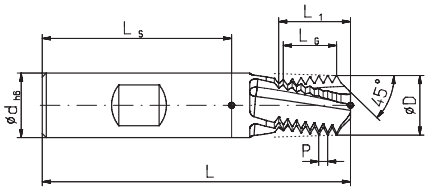




Thread	P mm	Pitch/"	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB	DIN 6535 Form HE
1/16"	0,941	27	5,8	70	11,3	10,35	12	8	3	✓	170752	170753	170754
1/8"	0,941	27	7,6	75	11,3	10,35	12	10	3	✓	170755	170756	170757
1/4"	1,411	18	10,1	90	15,5	14,11	11	14	3	✓	170758	170759	170760
3/8"	1,411	18	12,8	90	16,7	14,11	11	16	4	✓	170761	170762	170763
1/2"	1,814	14	16,0	110	21,35	18,14	11	20	5	✓	170764	170765	170766
3/4"	1,814	14	18,5	110	19,95	18,14	11	20	5	✓	170767	170768	170769

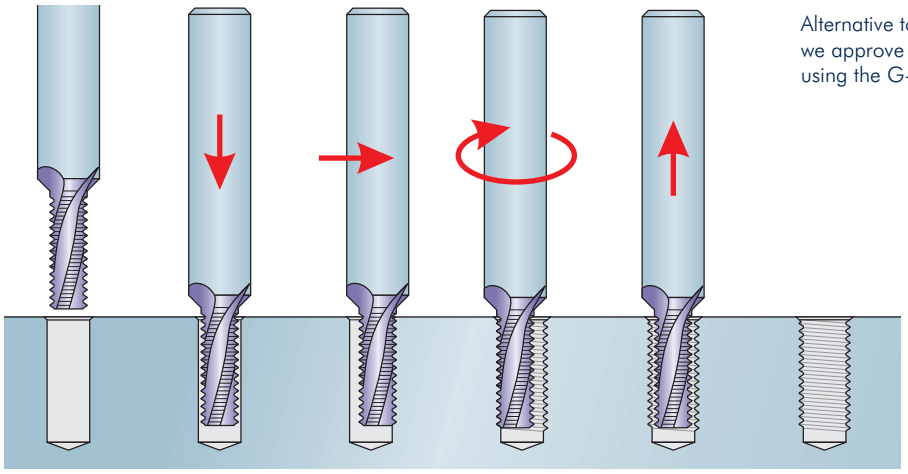
- **Chamfer type**
- **Cutting Data see page 188**





Thread	P mm	Pitch/"	D±0,02 mm	L mm	L1 mm	LG mm	Number of teeth	d h6 mm	Number of edges	Internal coolant	Order No. TINAMATIC DIN 6535 Form HA	DIN 6535 Form HB
1/4"	1,411	18	10,1	90	18,2	14,11	11	14	3	✓	171609	172411
3/8"	1,411	18	12,8	90	18,2	14,11	11	16	4	✓	171610	172412
1/2"	1,814	14	16,0	110	22,8	18,14	11	20	5	✓	171611	172413
3/4"	1,814	14	18,5	110	23,0	18,14	11	20	5	✓	171612	172414

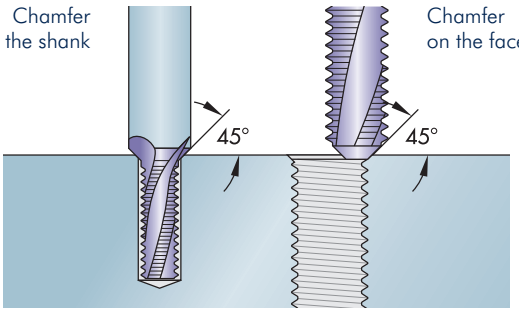
Machining Sequence



Alternative to the radial infeed we approve In- and Outloops by using the G-functions.

Starting position | Insertion on thread depth | Radial setting to nominal thread diameter (Start-up loop) | Circular thread milling | Radial back-setting to bore center and reverse stroke (Move out loop) | Thread is ready

Types with chamfer



More information to circular thread milling see page 197

mimatic® Tool Systems

Cutting Data Reference Values

		Material	Strength	PolyREAM		SolidCUT			
				TINAMATIC	Measurement at Ø 0,2 mm	TINAMATIC	Ø 2,4 - 3,15	Ø 4	Ø 4,8 - 16
				Vc (m/min.)	fz mm	Vc (m/min.)	fz mm	fz mm	fz mm
A	1.1	General construction steel	< 800 N/mm²	180-200	0,20-0,25	80-250	0,03-0,04	0,03-0,06	0,05-0,15
	1.2	Free cutting steel	< 800 N/mm²	180-200	0,20-0,25	80-250	0,03-0,04	0,03-0,06	0,05-0,15
	1.3	Unalloyed cementation steel	< 800 N/mm²	180-200	0,20-0,25	80-250	0,03-0,04	0,03-0,06	0,05-0,15
	1.4	Alloyed cementation steels	< 1000 N/mm²	160-180	0,15-0,20	60-120	0,01-0,02	0,01-0,03	0,05-0,10
	1.5	Unalloyed heat-treatable steel	< 850 N/mm²	180-200	0,20-0,25	60-120	0,01-0,02	0,01-0,03	0,05-0,10
	1.6	Unalloyed heat-treatable steel	< 1000 N/mm²	160-180	0,15-0,20	60-120	0,01-0,02	0,01-0,03	0,05-0,10
	1.7	Alloyed heat-treatable steel	< 800 N/mm²	180-200	0,20-0,25	80-200	0,03-0,04	0,03-0,06	0,05-0,10
	1.8	Alloyed heat-treatable steel	< 1300 N/mm²	140-160	0,12-0,18	40-100	0,01-0,02	0,03-0,05	0,04-0,06
	1.9	Cast Steel	< 850 N/mm²	180-200	0,20-0,25	60-120	0,01-0,02	0,04-0,07	0,05-0,10
	1.10	Nitriding steel	< 1000 N/mm²	160-180	0,15-0,20	60-120	0,01-0,02	0,04-0,07	0,05-0,10
	1.11	Nitriding steel	< 1200 N/mm²	150-170	0,15-0,20	40-100	0,01-0,02	0,03-0,05	0,04-0,06
	1.12	Ball bearing steel	< 1200 N/mm²	150-170	0,15-0,20	40-100	0,01-0,02	0,03-0,05	0,04-0,06
	1.13	Spring steel	< 1200 N/mm²	150-170	0,15-0,20	40-100	0,01-0,02	0,03-0,05	0,04-0,06
	1.14	Rapid steel	< 1300 N/mm²	140-160	0,12-0,18	40-100	0,01-0,02	0,03-0,05	0,04-0,06
	1.15	Cold work tool steel	< 1300 N/mm²	140-160	0,12-0,18	40-100	0,01-0,02	0,03-0,05	0,04-0,06
	1.16	Hot work tool steel	< 1300 N/mm²	140-160	0,12-0,18	40-100	0,01-0,02	0,03-0,05	0,04-0,06
R	2.1	Stainless steel, sulphured	< 850 N/mm²	180-200	0,20-0,25	50-150	0,03-0,04	0,03-0,04	0,05-0,12
	2.2	Stainless steel, ferritic	< 750 N/mm²	180-200	0,20-0,25	50-150	0,03-0,04	0,03-0,04	0,05-0,12
	2.3	Stainless steel, martensitic	< 900 N/mm²	160-180	0,15-0,20	50-150	0,03-0,04	0,03-0,04	0,05-0,12
	2.4	Stainless steel, ferritic/martensitic	<1100 N/mm²	150-170	0,15-0,20	50-150	0,03-0,04	0,03-0,04	0,05-0,12
	2.5	Stainless steel, austenitic/ferritic	< 850 N/mm²	180-200	0,20-0,25	50-150	0,03-0,04	0,03-0,04	0,05-0,12
	2.6	Stainless steel, austenitic	< 750 N/mm²	180-200	0,20-0,25	50-150	0,03-0,04	0,03-0,04	0,05-0,12
	2.7	Heat-resisting steel	< 1100 N/mm²	150-170	0,15-0,20	50-150	0,03-0,04	0,03-0,04	0,05-0,12
F	3.1	Flake-graphite cast iron	100-350 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
	3.2	Flake-graphite cast iron	300-1000 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
	3.3	Spheroidal graphite cast iron	300-500 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
	3.4	Spheroidal graphite cast iron	550-800 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
	3.5	Whiteheart malleable cast iron	350-450 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
	3.6	Whiteheart malleable cast iron	500-650 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
	3.7	Blackheart malleable cast iron	350-450 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
	3.8	Blackheart malleable cast iron	500-700 N/mm²	200-220	0,20-0,25	100-200	0,03-0,07	0,03-0,07	0,04-0,08
N	4.1	Aluminium (unalloyed, low alloyed)	< 350 N/mm²	350-400	0,20-0,25	250-500	0,05-0,07	0,05-0,07	0,06-0,12
	4.2	Aluminium alloys < 0,5% Si	< 500 N/mm²	300-400	0,20-0,25	250-500	0,05-0,07	0,05-0,07	0,06-0,12
	4.3	Aluminium alloys 0,5-10% Si	< 400 N/mm²			250-500	0,05-0,07	0,05-0,07	0,06-0,12
	4.4	Aluminium alloys 10-15% Si	< 400 N/mm²			250-500	0,05-0,07	0,05-0,07	0,06-0,12
	4.5	Aluminium alloys > 15% Si	< 400 N/mm²			180-250	0,05-0,07	0,05-0,07	0,06-0,12
	4.6	Cooper (unalloyed, low alloyed)	< 350 N/mm²	350-400	0,20-0,25	250-300	0,05-0,07	0,05-0,07	0,06-0,08
	4.7	Copper wrought alloys	< 700 N/mm²						
	4.8	Cooper special alloys	< 200 HB						
	4.9	Cooper special alloys	< 300 HB						
	4.10	Cooper special alloys	> 300 HB						
	4.11	Brass, short-chipping, Bronze, Red brass	< 600 N/mm²	200-300	0,20,0,25	250-300	0,05-0,07	0,05-0,07	0,06-0,08
	4.12	Brass, long-chipping	< 600 N/mm²						
	4.13	Thermoplastic				350-450	0,08-0,1	0,08-0,1	0,1-0,12
	4.14	Thermosetting plastic				300-400	0,08-0,1	0,08-0,1	0,1-0,12
	4.15	Fibre-reinforced plastics				180-200	0,02-0,04	0,02-0,04	0,03-0,04
	4.16	Magnesium and magnesium alloys	< 850 N/mm²						
	4.17	Graphite							
	4.18	Wolfram and wolfram alloys							
	4.19	Molybdenum and molybdenum alloys							
S	5.1	Pure nickel							
	5.2	Nickel alloys		180-200	0,20-0,25				
	5.3	Nickel alloys	< 850 N/mm²	180-200	0,20-0,25	60-80	0,02-0,04	0,02-0,04	0,03-0,04
	5.4	Nickel-chrome alloys							
	5.5	Nickel- and cobalt alloys	< 1300 N/mm²						
	5.6	Nickel- and cobalt alloys	< 1300 N/mm²						
	5.7	High temperature alloys	< 1300 N/mm²						
	5.8	Nickel-cobalt-(chrome-) alloys	< 1400 N/mm²						
	5.9	Pure Titanium	< 900 N/mm²						
	5.10	Titanium alloys	< 700 N/mm²	140-160	0,15-0,20				
	5.11	Titanium alloys	< 1200 N/mm²	120-140	0,12-0,18	50-80	0,01-0,03	0,01-0,03	0,01-0,03
H	6.1	Hardened steel	< 45 HRc	80-100	0,04-0,06	40-60		0,03-0,05	0,03-0,05
	6.2		46-55 HRc	70-90	0,04-0,06	40-50		0,03-0,05	0,03-0,05
	6.3		56-60 HRc	60-80	0,03-0,05	30-40		0,02-0,04	0,02-0,04
	6.4		61-65 HRc	50-70	0,03-0,05				
	6.5		65-70 HRc	40-60	0,02-0,04				

* The indicated feed values apply only with circular bringing in loop. During linear bringing in movement the feed motion amounts to max. 30%

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Calculation Formula for the Circular Milling

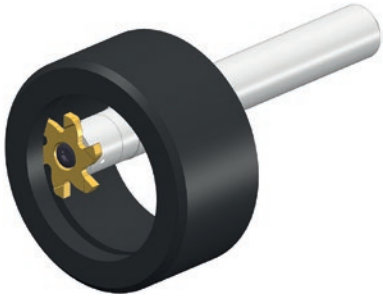
$$v_c = \frac{d \cdot \pi \cdot n}{1000}$$

$$n = \frac{v_c \cdot 1000}{d \cdot \pi}$$

$$v_{f2} = f_z \cdot z \cdot n$$

Calculating the feed rate of the cutting center path (Outer contour)

$$v_{f3} = \frac{v_{f2} \cdot \left[2 \cdot \left(\frac{D}{2} - a_r + \frac{d}{2}\right)\right]}{D - (2 \cdot a_r)}$$



Calculating the feed rate of the cutting center path (Inner contour)

$$v_{f3} = \frac{v_{f2} \cdot \left[2 \cdot \left(\frac{D}{2} + a_r - \frac{d}{2}\right)\right]}{D + (2 \cdot a_r)}$$

Plunge in feed „Plunge in the arc“

$$v_f = v_{f3}$$

Calculation of the middle chip thickness

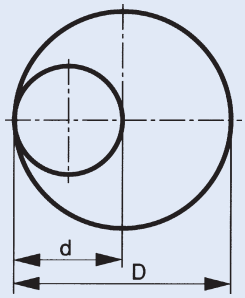
$$h_m = \frac{f_z}{\sqrt{\frac{d}{a_r}}}$$

$$f_z = h_m \cdot \sqrt{\frac{d}{a_r}}$$

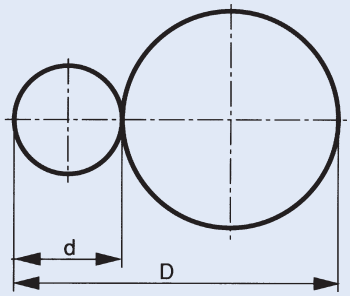
n	(rpm)	Spindle speed
v_c	(m/min)	Cutting speed
d	(mm)	Cutter diameter
D	(mm)	Shaft or bore diameter
v_f	(mm/min)	Plunge feed
v_{f2}	(mm/min)	Effective feed speed
v_{f3}	(mm/min)	Programmed feed speed (Cutter center track)
f_z	(mm)	Feed per insert
z	—	Number of inserts
a_r	(mm)	Chip depth, radial
h_m	(mm)	Middle chip thickness

Information about Circular Milling

Internal milling



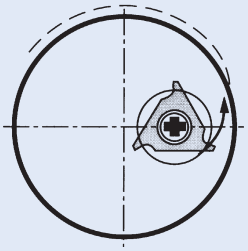
External milling



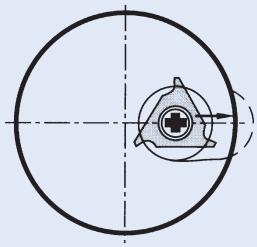
The best diameter relation is reached if the bore diameter to the cutter diameter is 2:1.

Climb milling is recommended.

Plunge in with a circle

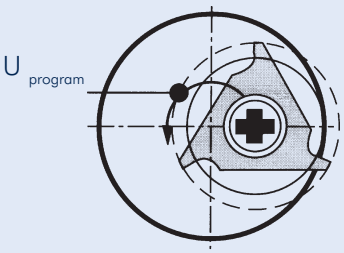


Straight plunge in

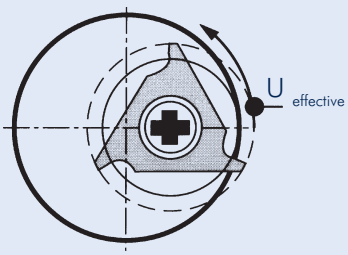


If possible, always plunge in with a circle. If plunging in straight, only use 1/3 of the feed. After having reached the plunge depth, move with full speed.

Programmed feed regarding to cutter center



Effective feed regarding to cutter O.D.

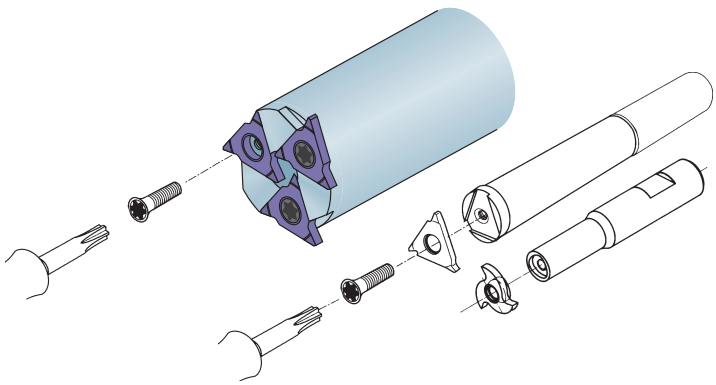


Always check the real feed speed at cutter O.D.

Assembling Instructions

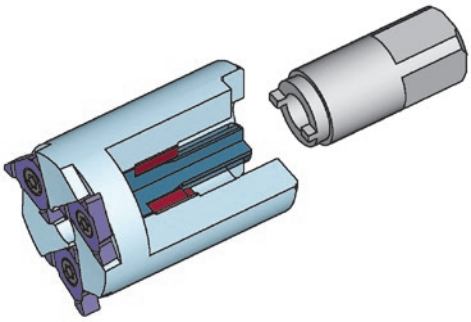
Changing Inserts

Clamp cutter before changing insert. Loosen insert screw. Remove used insert and clean the insert pocket before clamping new insert.
Please use the appropriate TIP hex key for the tighening of the inserts.



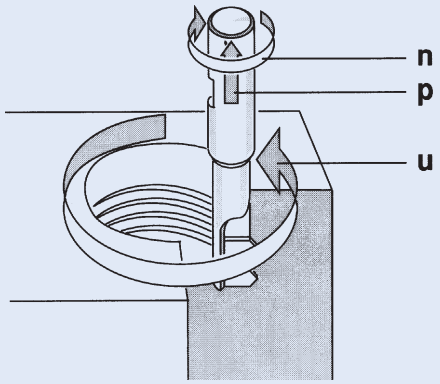
Changing Clamping Screws

Only for circular milling cutter no. 123464

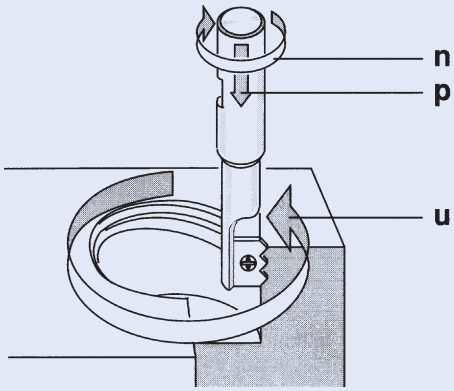


Information about Circular Thread Milling

Internal Thread

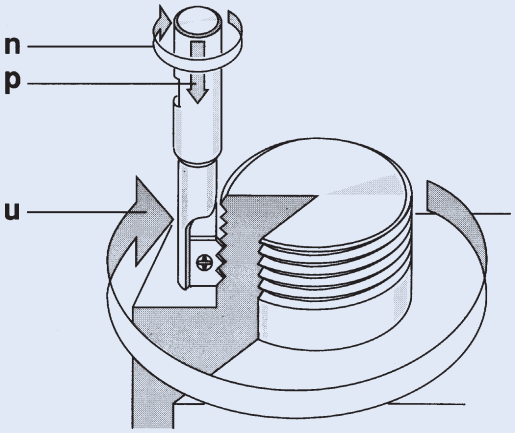


Right-hand Thread (climb milling)
Left-hand Thread (up-cut milling)

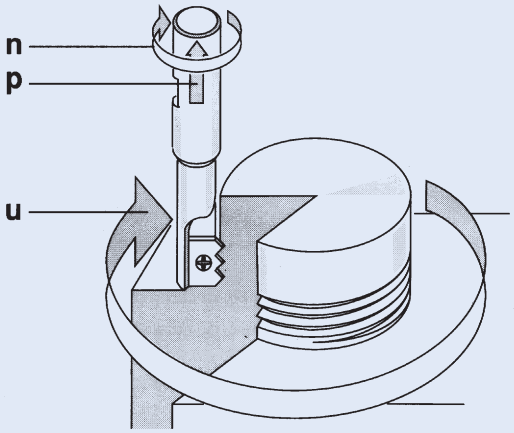


Left-hand Thread (climb milling)
Right-hand Thread (up-cut milling)

External Thread



Right-hand Thread (climb milling)
Left-hand Thread (up-cut milling)



Left-hand Thread (climb milling)
Right-hand Thread (up-cut milling)

n = Rotation direction to the right
p = Feed direction axial (1 revol. per pitch)
u = Feed direction radial

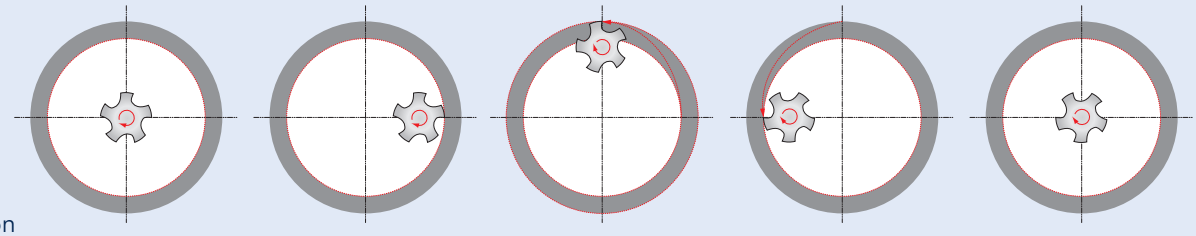
Always try to use climb milling process. If the thread is longer than insert length, cut in two steps. If you plunge in with a circle, please watch your axial feed (depending on pitch).

mimatic® Tool Systems

Plunge-in Ramps
Effect of In- and Outward Movements

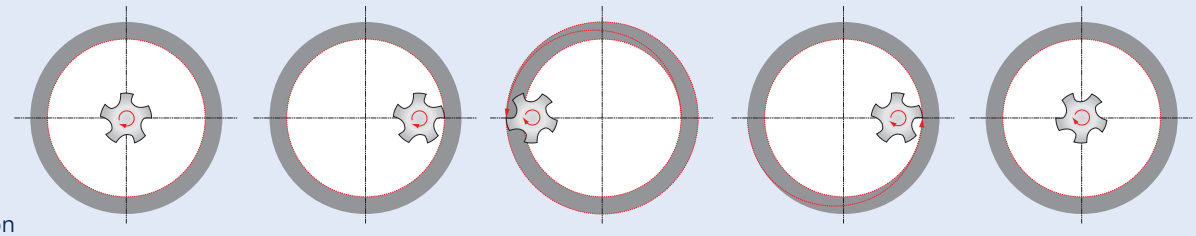
- 90° plunge-in
- 180° plunge-in
- Straight plunge-in

a	Plunge-in and -out	Processing time	Surface quality	Tool life
	90°	+ +	+ +	+



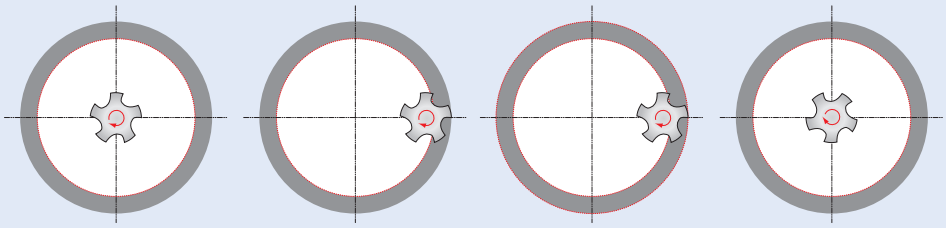
⚠ Always recommended whenever possible.

a	Plunge-in and -out	Processing time	Surface quality	Tool life
	180°	+	+ + +	+ + +



⚠ To be used for large tool diameters in relation to the core diameter, e.g. for all STC tools.

a	Plunge-in and -out	Processing time	Surface quality	Tool life
	straight	+ + +	– – –	– – –



⚠ Not recommended. When straight plunge-in, use only 1/3 of feed. After reaching the depth of grooving, give full feed.