



HARTNER

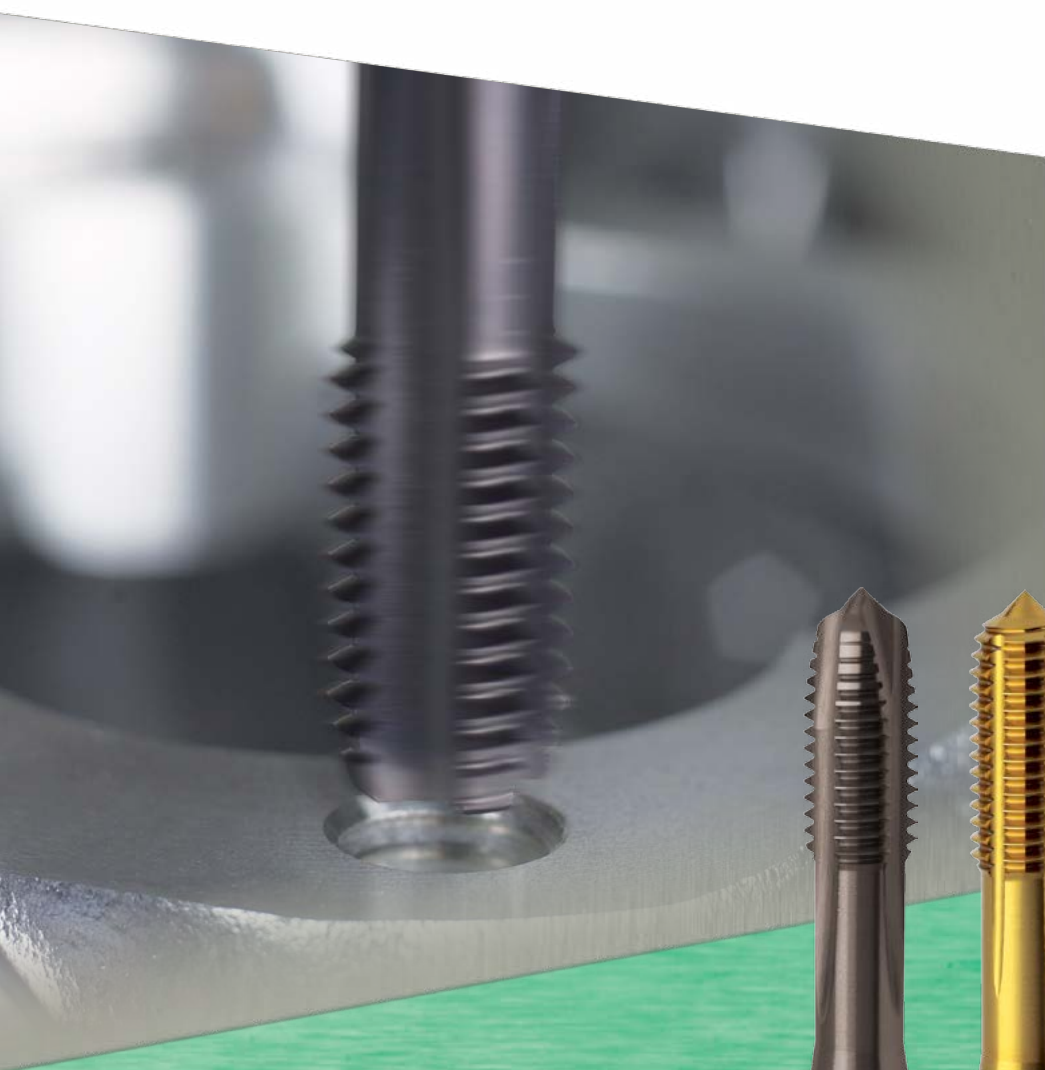
Precision Cutting Tools

NEW

Threading Tools

New complete programme for
universal thread production

2014





HARTNER

Precision Cutting Tools

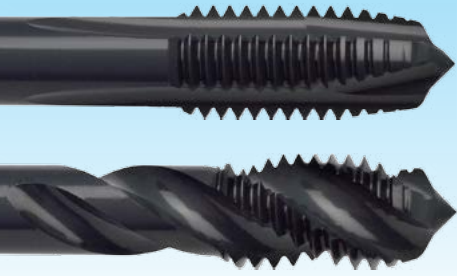
HARTNER THREADING TOOLS



For the production of internal threads tapping is still the most efficient process.

The comprehensive complete programme for the production of threads offers a suitable precision tool for every material and for every machining task.

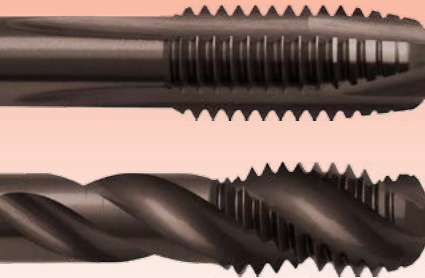
Reduce tooling costs and increase productivity: With Hartner taps users achieve a consistent productivity increase for metal machining thanks to an optimal coordination of tool material, geometry and coating.



TG 100 U

BASICLine machine taps

BASICLine



TG 100 T

TOPLine machine taps

TOPLine



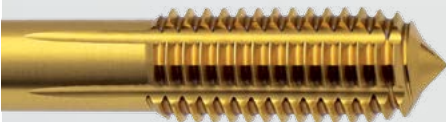
TG 100 GG

Taps for the machining of cast material



TG 300 T

High-Performance taps
for the machining of cast material



Fluteless taps

BASICLine



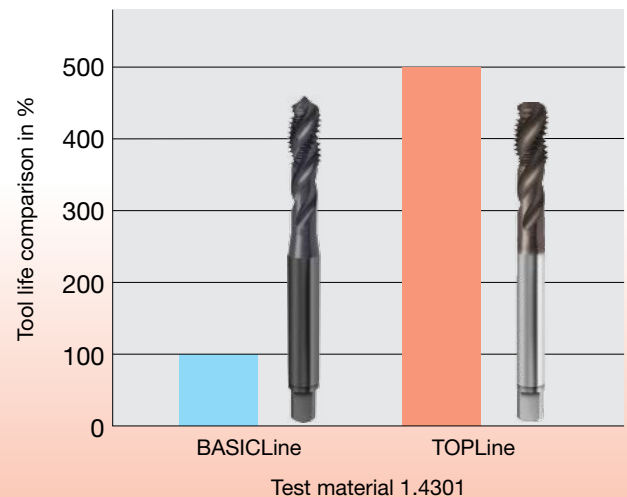
TG 100 U

- universal tap for machining general, high-tensile and stainless steels
- outstanding economic efficiency thanks to a remarkable price-performance-ratio for small batch sizes

TOPLine

TG 100 T

- high-performance tap for demanding machining tasks in general, high-tensile and stainless steels
- optimised cutting edge geometry for optimal chip evacuation
- ultra-smooth TiAlN-coating and improved chip flow geometry for effective wear protection and maximum tool life as well as exceptional thread quality



THE POWER PERFORMERS

TG 100 GG

- tap for the machining of cast materials and short-chipping non-ferrous metals
- cast iron geometry with nitrided surface finish for economical machining
- a remarkable price-performance-ratio for small batch sizes



TG 300 T

- high-performance tap with a wide application range for demanding machining tasks in all cast materials, general and high-tensile steels and aluminium cast alloys
- straight-fluted cutting edge geometry for increased rigidity and to produce short chips
- the combination of the HSS-E-PM tool material, TiCN-coating and internal cooling ensures a high wear resistance and provides a process reliable maximum tool life

FORMING



FLUTELESS TAPS

- fluteless taps for chip-free threading of through and blind holes
- oil grooves ensure optimal coolant supply
- high wear resistance in most materials thanks to TiN-coating and special geometry
- the forming process increases the tensile strength in the thread area of the component



HARTNER

Cutting Taps and Fluteless Taps according to DIN-standard

Hole type									
Tool material			HSS-E					HSS-E-PM	HSS-E
Type/form			TG 100 U/B	TG 100 T/B	TG 100 U/C	TG 100 T/C	TG 100 GG/C	TG 300 T/C	N/C
Surface finish									
			BASICLine	TOPLine	BASICLine	TOPLine			
Thread type	Tolerance zone	Dimensions to DIN 2184-1	Order no. Ø-range Programme on page						
M	ISO 2 6H	DIN 371	80700 M2 — M10 page 14	80800 M2 — M10 page 16	80730 M2 — M10 page 15	80830 M2 — M10 page 17			
							80750 M3 — M10 page 18	80850 M5 — M10 page 19	80900 M3 — M10 page 45
	6HX	DIN 376	80700 M12 — M36 page 14	80800 M12 — M30 page 16	80730 M12 — M36 page 15	80830 M12 — M30 page 17			
							80750 M12 — M30 page 18	80850 M12 — M39 page 19	80900 M12 — M39 page 45
	6HX								
MF	ISO 2 6H	DIN 374	80701 M4x0,5 — M42x1,5 page 22	80801 M3x0,35 — M36x2 page 24	80731 M4x0,5 — M30x2 page 23	80831 M6x0,75 — M24x1,5 page 25			
	6HX						80751 M4x0,5 — M30x1,5 page 26	80851 M6x0,75 — M16x1,5 page 27	80901 M6x0,75 — M24x1,5 page 47
UNC	2B	~ DIN 371	80702 Nr.4-40 — 3/8-16 page 30	80802 Nr.4-40 — 3/8-16 page 32	80732 Nr.2-56 — 3/8-16 page 31	80832 Nr.4-40 — 3/8-16 page 33	80752 Nr.4-40 — 3/8-16 page 34		80902* Nr.4-40 — 3/8-16 page 49
	2B	~ DIN 376	80702 7/16-14 — 1-8 page 30	80802 7/16-14 — 1-8 page 32	80732 7/16-14 — 7/8-9 page 31	80832 7/16-14 — 7/8-9 page 33	80752 7/16-14 — 1-8 page 34		80902* 7/16-14 — 1-8 page 49
UNF	2B	~ DIN 374	80703 Nr.4-48 — 1-12 page 35	80803 Nr.4-48 — 1-12 page 37	80733 Nr.3-56 — 1-12 page 36	80833 Nr.10-32 — 1-12 page 38	80753 Nr.4-48 — 1-12 page 39		80903* Nr.4-48 — 3/4-16 page 50
G	-	DIN 5156	80704 G 1/8 — G 2 page 40	80804 G 1/8 — G 1 page 42	80734 G 1/16 — G 2 page 41	80834 G 1/16 — G 1 page 43	80754 G 1/16 — G 2 page 44		80904 G 1/16 — G 3/4 page 51

*Tolerance zone 2BX

bright

steam tempered

nitrided

TiN

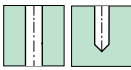
TiAlN

TiCN



HARTNER

Cutting Taps and Fluteless Taps according to JIS-standard

			Hole type			
			Tool material	HSS-E		
			Type/form	TG 100 U/B	TG 100 U/C	N/C
			Surface finish			
			 			
			  			
Thread type	Tolerance zone	Dimensions to	Order no. Ø-range Programme on page			
M	Class 1 OH	JIS B 4430	80780 M2 – M20 page 20	80790 M2 – M20 page 21		
	Class 2 RH				80980 M4 – M20 page 46	
MF	Class 1 OH	JIS B 4430	80781 M6x0,75 – M20x1,5 page 28	80791 M6x0,75 – M20x1,5 page 29		
	Class 2 RH				80981 M6x0,75 – M20x1,5 page 48	



for through holes



for blind holes

Machine taps

Standard	Type	Form	Tolerance	Tool material	Surface	Hole type	d1	Order no.	Discount group	Standard range, page
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Machine taps for ISO metric threads

	DIN 371 / DIN 376	TG 100 U	B	ISO2/6H	HSS-E			M 2 - M36	80700	156	14
	DIN 371 / DIN 376	TG 100 U	C	ISO2/6H	HSS-E			M 2 - M36	80730	156	15
	DIN 371 / DIN 376	TG 100 T	B	ISO2/6H	HSS-E			M 2 - M30	80800	103	16
	DIN 371 / DIN 376	TG 100 T	C	6HX	HSS-E			M 2 - M30	80830	103	17
	DIN 371 / DIN 376	TG 100 GG	C	6HX	HSS-E			M 3 - M30	80750	103	18
	DIN 371 / DIN 376	TG 300 T	C	6HX	HSS-E / HSS-E-PM			M 5 - M39	80850	103	19
	JIS B 4430	TG 100 U	B	Class 1/OH	HSS-E			M 2 - M20	80780	103	20
	JIS B 4430	TG 100 U	C	Class 1/OH	HSS-E			M 2 - M20	80790	103	21

Machine taps for ISO metric fine threads

	DIN 374	TG 100 U	B	ISO2/6H	HSS-E			M 4 X0,5 - M42 X1,5	80701	156	22
	DIN 374	TG 100 U	C	ISO2/6H	HSS-E			M 4 X0,5 - M30 X2	80731	156	23
	DIN 374	TG 100 T	B	ISO2/6H	HSS-E			M 3 X0,35 - M36 X2	80801	103	24
	DIN 374	TG 100 T	C	6HX	HSS-E			M 6 X0,75 - M24 X1,5	80831	103	25

 bright
  steam tempered
  nitrided
  TiN
  TiAlN
  TiCN

Machine taps

Standard	Type	Form	Tolerance	Tool material	Surface	Hole type	d1	Order no.	Discount group	Standard range, page
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Machine taps for ISO metric fine threads

	DIN 374	TG 100 GG	C	6HX	HSS-E			M 4 X0,5 - M30 X1,5	80751	103	26
	DIN 374	TG 300 T	C	6HX	HSS-E-PM			M 6 X0,75 - M16 X1,5	80851	103	27
	JIS B 4430	TG 100 U	B	Class 1/OH	HSS-E			M 6 X0,75 - M20 X1,5	80781	103	28
	JIS B 4430	TG 100 U	C	Class 1/OH	HSS-E			M 6 X0,75 - M20 X1,5	80791	103	29

Machine taps for UNC-threads

	~DIN 371 / ~DIN 376	TG 100 U	B	2B	HSS-E			NR. 4 -40 - 1 - 8	80702	156	30
	~DIN 371 / ~DIN 376	TG 100 U	C	2B	HSS-E			NR. 2 -56 - 7/8 - 9	80732	156	31
	~DIN 371 / ~DIN 376	TG 100 T	B	2B	HSS-E			NR. 4 -40 - 1 - 8	80802	103	32
	~DIN 371 / ~DIN 376	TG 100 T	C	2B	HSS-E			NR. 4 -40 - 7/8 - 9	80832	103	33
	~DIN 371 / ~DIN 376	TG 100 GG	C	2B	HSS-E			NR. 4 -40 - 1 - 8	80752	103	34

Machine taps for UNF-threads

	~DIN 374	TG 100 U	B	2B	HSS-E			NR. 4 -48 - 1 -12	80703	156	35
	~DIN 374	TG 100 U	C	2B	HSS-E			NR. 3 -56 - 1 -12	80733	156	36

 bright
  steam tempered
  nitrided
  TiN
  TiAlN
  TiCN

Machine taps

Standard	Type	Form	Tolerance	Tool material	Surface	Hole type	d1	Order no.	Discount group	Standard range, page
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Machine taps for UNF-threads

	~DIN 374	TG 100 T	B	2B	HSS-E			NR. 4 -48 - 1 -12	80803	103	37
	~DIN 374	TG 100 T	C	2B	HSS-E			NR.10 -32 - 1 -12	80833	103	38
	~DIN 374	TG 100 GG	C	2B	HSS-E			NR. 4 -48 - 1 -12	80753	103	39

Machine taps for BSP-threads

	DIN 5156	TG 100 U	B		HSS-E			G 1/8 - G2	80704	156	40
	DIN 5156	TG 100 U	C		HSS-E			G 1/16 - G2	80734	156	41
	DIN 5156	TG 100 T	B		HSS-E			G 1/8 - G1	80804	103	42
	DIN 5156	TG 100 T	C		HSS-E			G 1/16 - G1	80834	103	43
	DIN 5156	TG 100 GG	C		HSS-E			G 1/16 - G2	80754	103	44



HARTNER

Fluteless taps with oil grooves

Standard	Type	Form	Tolerance	Tool material	Surface	Hole type	d1	Order no.	Discount group	Standard range, page
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Fluteless machine taps for ISO metric threads

										
~DIN 371 / ~DIN 376	N	C	6HX	HSS-E			M 3 - M39	80900	103	45
										
JIS B 4430	N	C	Class 2/RH	HSS-E			M 4 - M20	80980	103	46

Fluteless machine taps for ISO metric fine threads

										
~DIN 374	N	C	6HX	HSS-E			M 6 X0,75 - M24 X1,5	80901	103	47
										
JIS B 4430	N	C	Class 2/RH	HSS-E			M 6 X0,75 - M20 X1,5	80981	103	48

Fluteless machine taps for UNC-threads

										
~DIN 371 / ~DIN 376	N	C	2BX	HSS-E			NR. 4 -40 - 3/4 -10	80902	103	49

Fluteless machine taps for UNF-threads

										
~DIN 371 / ~DIN 374	N	C	2BX	HSS-E			NR. 4 -48 - 3/4 -16	80903	103	50

Fluteless machine taps for BSP-threads

										
DIN 2189	N	C		HSS-E			G 1/16 - G 3/4	80904	103	51

 bright

 steam tempered

 nitrided

 TIN

 TIAlN

 TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80700



Through hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard DIN 371 / DIN 376

DIN 2184-1

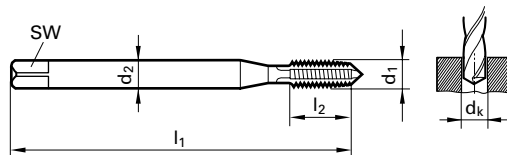
Tool material **HSS-E**

Surface

Form B

Tolerance ISO2/6H

Discount group 156



d1	P	d2	SW	dk	l1	l2	Availability
mm	mm	mm		mm	mm	mm	
M 2	0.40	2.800	2.10	1.600	45.00	8.00	●
M 3	0.50	3.500	2.70	2.500	56.00	10.00	●
M 4	0.70	4.500	3.40	3.300	63.00	12.00	●
M 5	0.80	6.000	4.90	4.200	70.00	14.00	●
M 6	1.00	6.000	4.90	5.000	80.00	16.00	●
M 8	1.25	8.000	6.20	6.800	90.00	17.00	●
M10	1.50	10.000	8.00	8.500	100.00	20.00	●
M12	1.75	9.000	7.00	10.200	110.00	24.00	●
M14	2.00	11.000	9.00	12.000	110.00	26.00	●
M16	2.00	12.000	9.00	14.000	110.00	26.00	●
M18	2.50	14.000	11.00	15.500	125.00	30.00	●
M20	2.50	16.000	12.00	17.500	140.00	32.00	●
M22	2.50	18.000	14.50	19.500	140.00	32.00	●
M24	3.00	18.000	14.50	21.000	160.00	36.00	●
M27	3.00	20.000	16.00	24.000	160.00	36.00	●
M30	3.50	22.000	18.00	26.500	180.00	40.00	●
M36	4.00	28.000	22.00	32.000	200.00	50.00	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80730



Blind hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard DIN 371 / DIN 376

DIN 2184-1

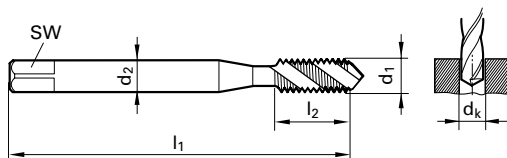
Tool material **HSS-E**

Surface

Form C

Tolerance ISO2/6H

Discount group 156



d1	P	d2	SW	dk	l1	l2	Availability
mm	mm	mm		mm	mm	mm	
M 2	0.40	2.800	2.10	1.600	45.00	4.50	●
M 3	0.50	3.500	2.70	2.500	56.00	6.00	●
M 4	0.70	4.500	3.40	3.300	63.00	7.50	●
M 5	0.80	6.000	4.90	4.200	70.00	8.50	●
M 6	1.00	6.000	4.90	5.000	80.00	11.00	●
M 8	1.25	8.000	6.20	6.800	90.00	14.00	●
M10	1.50	10.000	8.00	8.500	100.00	16.00	●
M12	1.75	9.000	7.00	10.200	110.00	18.50	●
M14	2.00	11.000	9.00	12.000	110.00	20.00	●
M16	2.00	12.000	9.00	14.000	110.00	20.00	●
M20	2.50	16.000	12.00	17.500	140.00	25.00	●
M22	2.50	18.000	14.50	19.500	140.00	27.00	●
M24	3.00	18.000	14.50	21.000	160.00	30.00	●
M27	3.00	20.000	16.00	24.000	160.00	30.00	●
M30	3.50	22.000	18.00	26.500	180.00	35.00	●
M36	4.00	28.000	22.00	32.000	200.00	40.00	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80800



Through hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type **TG 100 T**

Standard DIN 371 / DIN 376

DIN 2184-1

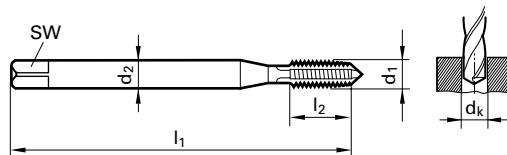
Tool material **HSS-E**

Surface **A**

Form B

Tolerance ISO2/6H

Discount group 103



d1	P	d2	SW	dk	l1	l2	Availability
mm	mm	mm		mm	mm	mm	
M 2	0.40	2.800	2.10	1.600	45.00	8.00	●
M 2,5	0.45	2.800	2.10	2.050	50.00	9.00	●
M 3	0.50	3.500	2.70	2.500	56.00	10.00	●
M 3,5	0.60	4.000	3.00	2.900	56.00	12.00	●
M 4	0.70	4.500	3.40	3.300	63.00	12.00	●
M 5	0.80	6.000	4.90	4.200	70.00	14.00	●
M 6	1.00	6.000	4.90	5.000	80.00	16.00	●
M 8	1.25	8.000	6.20	6.800	90.00	17.00	●
M10	1.50	10.000	8.00	8.500	100.00	20.00	●
M12	1.75	9.000	7.00	10.200	110.00	24.00	●
M14	2.00	11.000	9.00	12.000	110.00	26.00	●
M16	2.00	12.000	9.00	14.000	110.00	26.00	●
M18	2.50	14.000	11.00	15.500	125.00	30.00	●
M20	2.50	16.000	12.00	17.500	140.00	32.00	●
M24	3.00	18.000	14.50	21.000	160.00	36.00	●
M27	3.00	20.000	16.00	24.000	160.00	36.00	●
M30	3.50	22.000	18.00	26.500	180.00	40.00	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80830



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type **TG 100 T**

Standard DIN 371 / DIN 376

DIN 2184-1

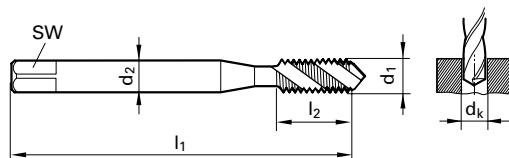
Tool material **HSS-E**

Surface **A**

Form C

Tolerance 6HX

Discount group 103



d1	P	d2	SW	dk	l1	l2	Availability
mm	mm	mm		mm	mm	mm	
M 2	0.40	2.800	2.10	1.600	45.00	4.50	●
M 3	0.50	3.500	2.70	2.500	56.00	6.00	●
M 4	0.70	4.500	3.40	3.300	63.00	7.50	●
M 5	0.80	6.000	4.90	4.200	70.00	8.50	●
M 6	1.00	6.000	4.90	5.000	80.00	11.00	●
M 8	1.25	8.000	6.20	6.800	90.00	14.00	●
M10	1.50	10.000	8.00	8.500	100.00	16.00	●
M12	1.75	9.000	7.00	10.200	110.00	18.50	●
M14	2.00	11.000	9.00	12.000	110.00	20.00	●
M16	2.00	12.000	9.00	14.000	110.00	20.00	●
M18	2.50	14.000	11.00	15.500	125.00	25.00	●
M20	2.50	16.000	12.00	17.500	140.00	25.00	●
M24	3.00	18.000	14.50	21.000	160.00	30.00	●
M30	3.50	22.000	18.00	26.500	180.00	35.00	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80750



**Through hole/
blind hole**

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type TG 100 GG

Standard DIN 371 / DIN 376

DIN 2184-1

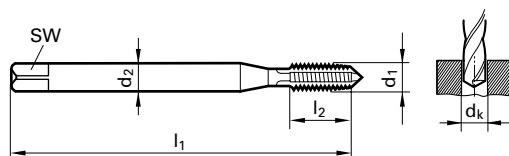
Tool material **HSS-E**

Surface ●

Form C

Tolerance 6HX

Discount group 103



d1	P	d2	SW	dk	l1	l2	Availability
M 3	0.50	3.500	2.70	2.500	56.00	10.00	●
M 3,5	0.60	4.000	3.00	2.900	56.00	12.00	●
M 4	0.70	4.500	3.40	3.300	63.00	12.00	●
M 5	0.80	6.000	4.90	4.200	70.00	14.00	●
M 6	1.00	6.000	4.90	5.000	80.00	16.00	●
M 8	1.25	8.000	6.20	6.800	90.00	17.00	●
M10	1.50	10.000	8.00	8.500	100.00	20.00	●
M12	1.75	9.000	7.00	10.200	110.00	24.00	●
M14	2.00	11.000	9.00	12.000	110.00	26.00	●
M16	2.00	12.000	9.00	14.000	110.00	26.00	●
M18	2.50	14.000	11.00	15.500	125.00	30.00	●
M20	2.50	16.000	12.00	17.500	140.00	32.00	●
M22	2.50	18.000	14.50	19.500	140.00	32.00	●
M24	3.00	18.000	14.50	21.000	160.00	36.00	●
M27	3.00	20.000	16.00	24.000	160.00	36.00	●
M30	3.50	22.000	18.00	26.500	180.00	40.00	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80850



Through hole/
blind hole

Taps with internal cooling for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with spheroidal graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals for maximum tool life. In addition, excellent suitability for creating short chips in common and high tensile steels.

From thread size $\geq$ M16 taps type TG 300 T are no longer manufactured in HSS-E-PM but HSS-E.

Type **TG 300 T**

Standard DIN 371 / DIN 376

DIN 2184-1

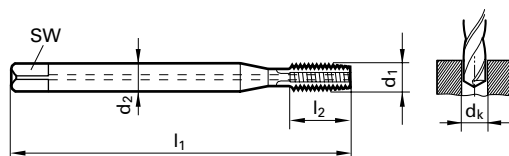
Tool material **HSS-E / HSS-E-PM**

Surface **C**

Form C

Tolerance 6HX

Discount group 103



d1	P	d2	SW	dk	l1	l2	Availability
mm	mm	mm		mm	mm	mm	
M 5	0.80	6.000	4.90	4.200	70.00	14.00	●
M 6	1.00	6.000	4.90	5.000	80.00	16.00	●
M 8	1.25	8.000	6.20	6.800	90.00	17.00	●
M10	1.50	10.000	8.00	8.500	100.00	20.00	●
M12	1.75	9.000	7.00	10.200	110.00	24.00	●
M14	2.00	11.000	9.00	12.000	110.00	26.00	●
M16	2.00	12.000	9.00	14.000	110.00	20.00	●
M20	2.50	16.000	12.00	17.500	140.00	25.00	●
M24	3.00	18.000	14.50	21.000	160.00	30.00	●
M27	3.00	20.000	16.00	24.000	160.00	30.00	●
M30	3.50	22.000	18.00	26.500	180.00	35.00	●
M33	3.50	25.000	20.00	29.500	180.00	35.00	●
M36	4.00	28.000	22.00	32.000	200.00	40.00	●
M39	4.00	32.000	24.00	35.000	200.00	40.00	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80780



Through hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard JIS B 4430

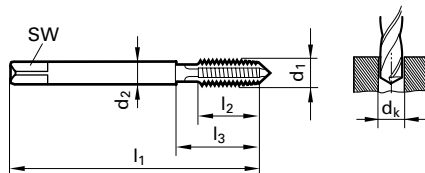
Tool material **HSS-E**

Surface ○

Form B

Tolerance Class 1/OH

Discount group 103



d1	P	Tolerance	d2	SW	dk	l1	l2	l3	Availability
mm	mm		mm	mm	mm	mm	mm	mm	
M 2	0.40	OH2	3.000	2.50	1.600	40.00	8.00	15.00	●
M 2,5	0.45	OH2	3.000	2.50	2.050	44.00	9.00	16.00	●
M 3	0.50	OH2	4.000	3.20	2.500	46.00	10.00	19.00	●
M 4	0.70	OH2	5.000	4.00	3.300	52.00	12.00	20.00	●
M 5	0.80	OH2	5.500	4.50	4.200	60.00	14.00	24.00	●
M 6	1.00	OH2	6.000	4.50	5.000	62.00	16.00	29.00	●
M 8	1.25	OH2	6.200	5.00	6.800	70.00	17.00	37.00	●
M10	1.50	OH2	7.000	5.50	8.500	75.00	20.00	41.00	●
M12	1.75	OH3	8.500	6.50	10.200	82.00	24.00	48.00	●
M14	2.00	OH3	10.500	8.00	12.000	88.00	26.00	48.00	●
M16	2.00	OH3	12.500	10.00	14.000	95.00	26.00	52.00	●
M18	2.50	OH4	14.000	11.00	15.500	100.00	30.00	55.00	●
M20	2.50	OH4	15.000	12.00	17.500	105.00	32.00	58.00	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric threads

Order no. 80790



Blind hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard JIS B 4430

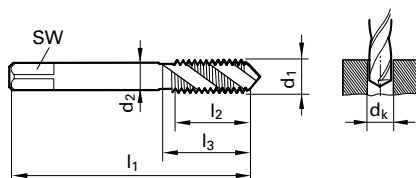
Tool material **HSS-E**

Surface ○

Form C

Tolerance Class 1/OH

Discount group 103



d1	P	Tolerance	d2	SW	dk	l1	l2	l3	Availability
mm	mm		mm	mm	mm	mm	mm	mm	
M 2	0.40	OH2	3.000	2.50	1.600	40.00	4.50	15.00	●
M 2,5	0.45	OH2	3.000	2.50	2.050	44.00	5.00	16.00	●
M 3	0.50	OH2	4.000	3.20	2.500	46.00	6.00	19.00	●
M 4	0.70	OH2	5.000	4.00	3.300	52.00	7.50	20.00	●
M 5	0.80	OH2	5.500	4.50	4.200	60.00	8.50	24.00	●
M 6	1.00	OH2	6.000	4.50	5.000	62.00	11.00	29.00	●
M 8	1.25	OH2	6.200	5.00	6.800	70.00	14.00	37.00	●
M10	1.50	OH2	7.000	5.50	8.500	75.00	16.00	41.00	●
M12	1.75	OH3	8.500	6.50	10.200	82.00	18.50	48.00	●
M14	2.00	OH3	10.500	8.00	12.000	88.00	20.00	48.00	●
M16	2.00	OH3	12.500	10.00	14.000	95.00	20.00	52.00	●
M18	2.50	OH4	14.000	11.00	15.500	100.00	25.00	55.00	●
M20	2.50	OH4	15.000	12.00	17.500	105.00	25.00	58.00	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80701



Through hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICline

Type **TG 100 U**

Standard DIN 374

DIN 2184-1

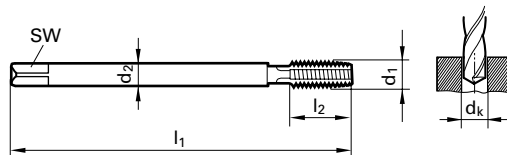
Tool material **HSS-E**

Surface

Form B

Tolerance ISO2/6H

Discount group 156



d1 XP	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
M 4 X0,5	2.800	2.10	3.500	63.00	8.00	4.003	●
M 5 X0,5	3.500	2.70	4.500	70.00	10.00	5.003	●
M 6 X0,75	4.500	3.40	5.200	80.00	13.00	6.004	●
M 8 X0,75	6.000	4.90	7.200	80.00	14.00	8.004	●
M 8 X1	6.000	4.90	7.000	90.00	17.00	8.005	●
M10 X1	7.000	5.50	9.000	90.00	17.00	10.005	●
M12 X1	9.000	7.00	11.000	100.00	20.00	12.005	●
M12 X1,5	9.000	7.00	10.500	100.00	20.00	12.007	●
M14 X1,5	11.000	9.00	12.500	100.00	20.00	14.007	●
M16 X1,5	12.000	9.00	14.500	100.00	22.00	16.007	●
M18 X1,5	14.000	11.00	16.500	110.00	25.00	18.007	●
M20 X1,5	16.000	12.00	18.500	125.00	25.00	20.007	●
M22 X1,5	18.000	14.50	20.500	125.00	25.00	22.007	●
M24 X1,5	18.000	14.50	22.500	140.00	28.00	24.007	●
M24 X2	18.000	14.50	22.000	140.00	28.00	24.008	●
M26 X1,5	18.000	14.50	24.500	140.00	28.00	26.007	●
M27 X1,5	20.000	16.00	25.500	140.00	28.00	27.007	●
M27 X2	20.000	16.00	25.000	140.00	28.00	27.008	●
M28 X1,5	20.000	16.00	26.500	140.00	28.00	28.007	●
M30 X1,5	22.000	18.00	28.500	150.00	28.00	30.007	●
M30 X2	22.000	18.00	28.000	150.00	28.00	30.008	●
M32 X1,5	22.000	18.00	30.500	150.00	28.00	32.007	●
M36 X1,5	28.000	22.00	34.500	170.00	30.00	36.007	●
M42 X1,5	32.000	24.00	40.500	170.00	30.00	42.007	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80731



Blind hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICline

Type **TG 100 U**

Standard DIN 374

DIN 2184-1

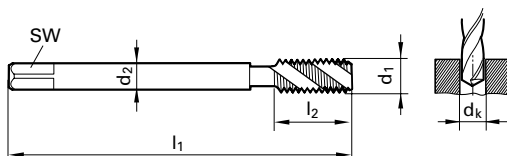
Tool material **HSS-E**

Surface

Form C

Tolerance ISO2/6H

Discount group 156



d1 XP	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
M 4 X0,5	2.800	2.10	3.500	63.00	5.00	4.003	●
M 5 X0,5	3.500	2.70	4.500	70.00	5.00	5.003	●
M 6 X0,75	4.500	3.40	5.200	80.00	8.00	6.004	●
M 8 X1	6.000	4.90	7.000	90.00	11.00	8.005	●
M10 X1	7.000	5.50	9.000	90.00	11.00	10.005	●
M10 X1,25	7.000	5.50	8.800	100.00	14.00	10.006	●
M12 X1	9.000	7.00	11.000	100.00	11.00	12.005	●
M12 X1,25	9.000	7.00	10.800	100.00	16.00	12.006	●
M12 X1,5	9.000	7.00	10.500	100.00	16.00	12.007	●
M14 X1	11.000	9.00	13.000	100.00	11.00	14.005	●
M14 X1,25	11.000	9.00	12.800	100.00	15.00	14.006	●
M14 X1,5	11.000	9.00	12.500	100.00	15.00	14.007	●
M16 X1	12.000	9.00	15.000	100.00	11.00	16.005	●
M16 X1,5	12.000	9.00	14.500	100.00	15.00	16.007	●
M18 X1	14.000	11.00	17.000	110.00	12.00	18.005	●
M18 X1,5	14.000	11.00	16.500	110.00	16.00	18.007	●
M20 X1,5	16.000	12.00	18.500	125.00	16.00	20.007	●
M22 X1,5	18.000	14.50	20.500	125.00	16.00	22.007	●
M24 X2	18.000	14.50	22.000	140.00	22.00	24.008	●
M26 X1,5	18.000	14.50	24.500	140.00	20.00	26.007	●
M27 X1,5	20.000	16.00	25.500	140.00	20.00	27.007	●
M27 X2	20.000	16.00	25.000	140.00	28.00	27.008	●
M28 X1,5	20.000	16.00	26.500	140.00	20.00	28.007	●
M30 X1,5	22.000	18.00	28.500	150.00	20.00	30.007	●
M30 X2	22.000	18.00	28.000	150.00	20.00	30.008	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80801



Through hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type TG 100 T

Standard DIN 374

DIN 2184-1

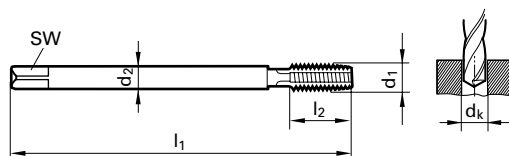
Tool material HSS-E

Surface A

Form B

Tolerance ISO2/6H

Discount group 103



d1 XP	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
M 3 X0,35	2.200		2.650	56.00	7.00	3.002	●
M 4 X0,5	2.800	2.10	3.500	63.00	8.00	4.003	●
M 5 X0,5	3.500	2.70	4.500	70.00	10.00	5.003	●
M 6 X0,5	4.500	3.40	5.500	80.00	13.00	6.003	●
M 6 X0,75	4.500	3.40	5.200	80.00	13.00	6.004	●
M 8 X0,75	6.000	4.90	7.200	80.00	14.00	8.004	●
M 8 X1	6.000	4.90	7.000	90.00	17.00	8.005	●
M10 X1	7.000	5.50	9.000	90.00	17.00	10.005	●
M10 X1,25	7.000	5.50	8.800	100.00	20.00	10.006	●
M12 X1	9.000	7.00	11.000	100.00	20.00	12.005	●
M12 X1,25	9.000	7.00	10.800	100.00	20.00	12.006	●
M12 X1,5	9.000	7.00	10.500	100.00	20.00	12.007	●
M14 X1,5	11.000	9.00	12.500	100.00	20.00	14.007	●
M16 X1,5	12.000	9.00	14.500	100.00	22.00	16.007	●
M18 X1,5	14.000	11.00	16.500	110.00	25.00	18.007	●
M20 X1,5	16.000	12.00	18.500	125.00	25.00	20.007	●
M24 X1,5	18.000	14.50	22.500	140.00	28.00	24.007	●
M24 X2	18.000	14.50	22.000	140.00	28.00	24.008	●
M36 X2	28.000	22.00	34.000	170.00	30.00	36.008	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80831



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type TG 100 T

Standard DIN 374

DIN 2184-1

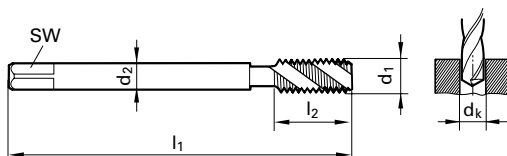
Tool material HSS-E

Surface **A**

Form C

Tolerance 6HX

Discount group 103



d1 XP	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
M 6 X0,75	4.500	3.40	5.200	80.00	8.00	6.004	●
M 8 X0,75	6.000	4.90	7.200	80.00	8.00	8.004	●
M 8 X1	6.000	4.90	7.000	90.00	11.00	8.005	●
M10 X1	7.000	5.50	9.000	90.00	11.00	10.005	●
M10 X1,25	7.000	5.50	8.800	100.00	14.00	10.006	●
M12 X1	9.000	7.00	11.000	100.00	11.00	12.005	●
M12 X1,25	9.000	7.00	10.800	100.00	16.00	12.006	●
M12 X1,5	9.000	7.00	10.500	100.00	16.00	12.007	●
M14 X1,5	11.000	9.00	12.500	100.00	15.00	14.007	●
M16 X1,5	12.000	9.00	14.500	100.00	15.00	16.007	●
M18 X1,5	14.000	11.00	16.500	110.00	16.00	18.007	●
M20 X1,5	16.000	12.00	18.500	125.00	16.00	20.007	●
M24 X1,5	18.000	14.50	22.500	140.00	16.00	24.007	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80751



Through hole/
blind hole

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type **TG 100 GG**

Standard DIN 374

DIN 2184-1

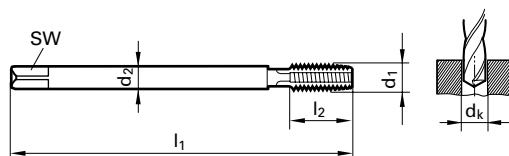
Tool material **HSS-E**

Surface ●

Form C

Tolerance 6HX

Discount group 103



d1 XP	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
M 4 X0,5	2.800	2.10	3.500	63.00	8.00	4.003	●
M 5 X0,5	3.500	2.70	4.500	70.00	10.00	5.003	●
M 6 X0,75	4.500	3.40	5.200	80.00	13.00	6.004	●
M 8 X0,75	6.000	4.90	7.200	80.00	14.00	8.004	●
M 8 X1	6.000	4.90	7.000	90.00	17.00	8.005	●
M10 X1	7.000	5.50	9.000	90.00	17.00	10.005	●
M12 X1	9.000	7.00	11.000	100.00	20.00	12.005	●
M12 X1,5	9.000	7.00	10.500	100.00	20.00	12.007	●
M14 X1,5	11.000	9.00	12.500	100.00	20.00	14.007	●
M16 X1,5	12.000	9.00	14.500	100.00	22.00	16.007	●
M18 X1,5	14.000	11.00	16.500	110.00	25.00	18.007	●
M20 X1,5	16.000	12.00	18.500	125.00	25.00	20.007	●
M22 X1,5	18.000	14.50	20.500	125.00	25.00	22.007	●
M24 X1,5	18.000	14.50	22.500	140.00	28.00	24.007	●
M27 X1,5	20.000	16.00	25.500	140.00	28.00	27.007	●
M30 X1,5	22.000	18.00	28.500	150.00	28.00	30.007	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80851



Through hole/
blind hole

Taps with internal cooling for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with spheroidal graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals for maximum tool life. In addition, excellent suitability for creating short chips in common and high tensile steels.

Type **TG 300 T**

Standard DIN 374

DIN 2184-1

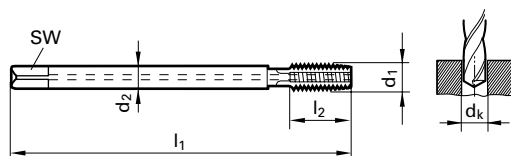
Tool material **HSS-E-PM**

Surface **C**

Form C

Tolerance 6HX

Discount group 103



d1 XP	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
M 6 X0,75	4.500	3.40	5.200	80.00	13.00	6.004	●
M 8 X0,75	6.000	4.90	7.200	80.00	14.00	8.004	●
M 8 X1	6.000	4.90	7.000	90.00	17.00	8.005	●
M10 X1	7.000	5.50	9.000	90.00	17.00	10.005	●
M10 X1,25	7.000	5.50	8.800	100.00	20.00	10.006	●
M12 X1	9.000	7.00	11.000	100.00	20.00	12.005	●
M12 X1,25	9.000	7.00	10.800	100.00	20.00	12.006	●
M12 X1,5	9.000	7.00	10.500	100.00	20.00	12.007	●
M14 X1,5	11.000	9.00	12.500	100.00	20.00	14.007	●
M16 X1,5	12.000	9.00	14.500	100.00	22.00	16.007	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80781



Through hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard JIS B 4430

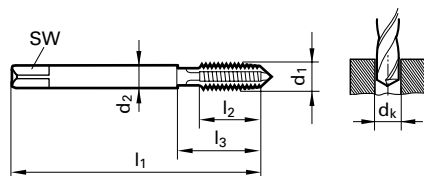
Tool material **HSS-E**

Surface ○

Form B

Tolerance Class 1/OH

Discount group 103



d1 XP	Tolerance	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l3 mm	Code no. mm
M 6 X0,75	OH2	6.000	4.50	5.200	62.00	13.00	30.00	6.004
M 8 X1	OH2	6.200	5.00	7.000	70.00	16.00	35.00	8.005
M10 X1	OH2	7.000	5.50	9.000	70.00	16.00	35.00	10.005
M10 X1,25	OH2	7.000	5.50	8.800	75.00	20.00	39.00	10.006
M12 X1	OH2	8.500	6.50	11.000	70.00	20.00	40.00	12.005
M12 X1,25	OH2	8.500	6.50	10.800	80.00	20.00	40.00	12.006
M12 X1,5	OH2	8.500	6.50	10.500	82.00	20.00	40.00	12.007
M14 X1,5	OH2	10.500	8.00	12.500	88.00	20.00	40.00	14.007
M16 X1,5	OH2	12.500	10.00	14.500	95.00	22.00	44.00	16.007
M20 X1,5	OH2	15.000	12.00	18.500	95.00	25.00	44.00	20.007

Availability



○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for ISO metric fine threads

Order no. 80791



Blind hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard JIS B 4430

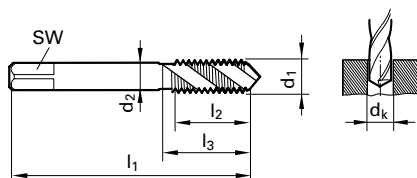
Tool material **HSS-E**

Surface ○

Form C

Tolerance Class 1/OH

Discount group 103



d1 XP	Tolerance	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l3 mm	Code no. mm
M 6 X0,75	OH2	6.000	4.50	5.200	62.00	8.00	30.00	6.004
M 8 X1	OH2	6.200	5.00	7.000	70.00	11.00	35.00	8.005
M10 X1	OH2	7.000	5.50	9.000	70.00	11.00	35.00	10.005
M10 X1,25	OH2	7.000	5.50	8.800	75.00	14.00	39.00	10.006
M12 X1	OH2	8.500	6.50	11.000	70.00	11.00	40.00	12.005
M12 X1,25	OH2	8.500	6.50	10.800	80.00	16.00	40.00	12.006
M12 X1,5	OH2	8.500	6.50	10.500	82.00	16.00	40.00	12.007
M14 X1,5	OH2	10.500	8.00	12.500	88.00	15.00	40.00	14.007
M16 X1,5	OH2	12.500	10.00	14.500	95.00	15.00	44.00	16.007
M20 X1,5	OH2	15.000	12.00	18.500	95.00	16.00	44.00	20.007

Availability



○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for UNC-threads

Order no. 80702



Through hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

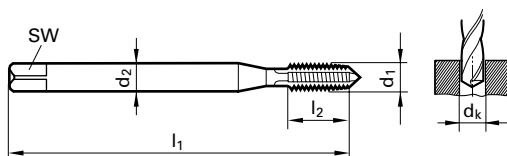
Tool material **HSS-E**

Surface

Form B

Tolerance 2B

Discount group 156



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -40	3.500	2.70	2.350	56.00	11.00	2.845	●
NR. 6 -32	4.000	3.00	2.850	56.00	12.00	3.505	●
NR. 8 -32	4.500	3.40	3.500	63.00	13.00	4.166	●
NR.10 -24	6.000	4.90	3.900	70.00	14.00	4.826	●
1/4" -20	7.000	5.50	5.100	80.00	16.00	6.350	●
5/16" -18	8.000	6.20	6.600	90.00	18.00	7.938	●
3/8" -16	10.000	8.00	8.000	100.00	20.00	9.525	●
7/16" -14	8.000	6.20	9.400	100.00	22.00	11.113	●
1/2" -13	9.000	7.00	10.800	110.00	25.00	12.700	●
5/8" -11	12.000	9.00	13.500	110.00	30.00	15.875	●
3/4" -10	14.000	11.00	16.500	125.00	33.00	19.050	●
7/8" - 9	18.000	14.50	19.500	140.00	35.00	22.225	●
1" - 8	18.000	14.50	22.250	160.00	38.00	25.400	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for UNC-threads

Order no. 80732



Blind hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

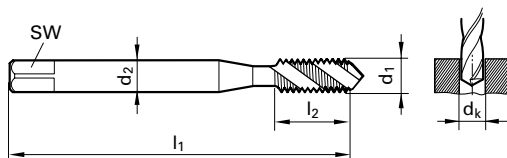
Tool material **HSS-E**

Surface

Form C

Tolerance 2B

Discount group 156



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 2 -56	2.800	2.10	1.850	45.00	5.00	2.184	●
NR. 4 -40	3.500	2.70	2.350	56.00	7.00	2.845	●
NR. 6 -32	4.000	3.00	2.850	56.00	8.00	3.505	●
NR. 8 -32	4.500	3.40	3.500	63.00	8.00	4.166	●
NR.10 -24	6.000	4.90	3.900	70.00	11.00	4.826	●
1/4" -20	7.000	5.50	5.100	80.00	13.00	6.350	●
5/16" -18	8.000	6.20	6.600	90.00	14.00	7.938	●
3/8" -16	10.000	8.00	8.000	100.00	16.00	9.525	●
7/16" -14	8.000	6.20	9.400	100.00	18.00	11.113	●
1/2" -13	9.000	7.00	10.800	110.00	20.00	12.700	●
9/16" -12	11.000	9.00	12.200	110.00	21.00	14.288	●
5/8" -11	12.000	9.00	13.500	110.00	24.00	15.875	●
3/4" -10	14.000	11.00	16.500	125.00	25.00	19.050	●
7/8" - 9	18.000	14.50	19.500	140.00	28.00	22.225	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for UNC-threads

Order no. 80802



Through hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type **TG 100 T**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

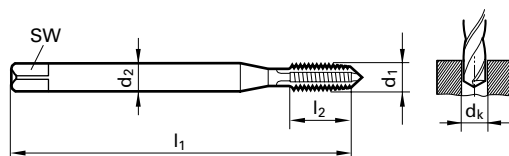
Tool material **HSS-E**

Surface **A**

Form B

Tolerance 2B

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -40	3.500	2.70	2.350	56.00	11.00	2.845	●
NR. 6 -32	4.000	3.00	2.850	56.00	12.00	3.505	●
NR. 8 -32	4.500	3.40	3.500	63.00	13.00	4.166	●
NR.10 -24	6.000	4.90	3.900	70.00	14.00	4.826	●
1/4" -20	7.000	5.50	5.100	80.00	16.00	6.350	●
5/16" -18	8.000	6.20	6.600	90.00	18.00	7.938	●
3/8" -16	10.000	8.00	8.000	100.00	20.00	9.525	●
7/16" -14	8.000	6.20	9.400	100.00	22.00	11.113	●
1/2" -13	9.000	7.00	10.800	110.00	25.00	12.700	●
9/16" -12	11.000	9.00	12.200	110.00	30.00	14.288	●
5/8" -11	12.000	9.00	13.500	110.00	30.00	15.875	●
3/4" -10	14.000	11.00	16.500	125.00	33.00	19.050	●
7/8" - 9	18.000	14.50	19.500	140.00	35.00	22.225	●
1" - 8	18.000	14.50	22.250	160.00	38.00	25.400	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for UNC-threads

Order no. 80832



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type **TG 100 T**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

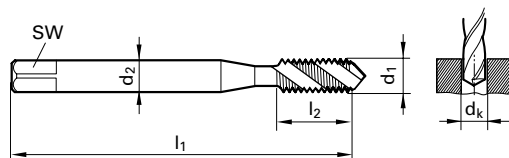
Tool material **HSS-E**

Surface **A**

Form C

Tolerance 2B

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -40	3.500	2.70	2.350	56.00	7.00	2.845	●
NR. 6 -32	4.000	3.00	2.850	56.00	8.00	3.505	●
NR. 8 -32	4.500	3.40	3.500	63.00	8.00	4.166	●
NR.10 -24	6.000	4.90	3.900	70.00	11.00	4.826	●
1/4" -20	7.000	5.50	5.100	80.00	13.00	6.350	●
5/16" -18	8.000	6.20	6.600	90.00	14.00	7.938	●
3/8" -16	10.000	8.00	8.000	100.00	16.00	9.525	●
7/16" -14	8.000	6.20	9.400	100.00	18.00	11.113	●
1/2" -13	9.000	7.00	10.800	110.00	20.00	12.700	●
9/16" -12	11.000	9.00	12.200	110.00	21.00	14.288	●
5/8" -11	12.000	9.00	13.500	110.00	24.00	15.875	●
3/4" -10	14.000	11.00	16.500	125.00	25.00	19.050	●
7/8" -9	18.000	14.50	19.500	140.00	28.00	22.225	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for UNC-threads

Order no. 80752



Durchgangs-/
Sacklochgewinde

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type **TG 100 GG**

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

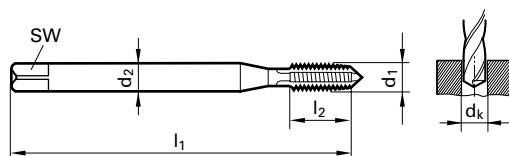
Tool material **HSS-E**

Surface ●

Form C

Tolerance 2B

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -40	3.500	2.70	2.350	56.00	11.00	2.845	●
NR. 6 -32	4.000	3.00	2.850	56.00	12.00	3.505	●
NR. 8 -32	4.500	3.40	3.500	63.00	13.00	4.166	●
NR.10 -24	6.000	4.90	3.900	70.00	14.00	4.826	●
1/4" -20	7.000	5.50	5.100	80.00	16.00	6.350	●
5/16" -18	8.000	6.20	6.600	90.00	18.00	7.938	●
3/8" -16	10.000	8.00	8.000	100.00	20.00	9.525	●
7/16" -14	8.000	6.20	9.400	100.00	22.00	11.113	●
1/2" -13	9.000	7.00	10.800	110.00	25.00	12.700	●
9/16" -12	11.000	9.00	12.200	110.00	30.00	14.288	●
5/8" -11	12.000	9.00	13.500	110.00	30.00	15.875	●
3/4" -10	14.000	11.00	16.500	125.00	33.00	19.050	●
7/8" - 9	18.000	14.50	19.500	140.00	35.00	22.225	●
1" - 8	18.000	14.50	22.250	160.00	38.00	25.400	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for UNF-threads

Order no. 80703



Through hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard ~DIN 374

DIN 2184-1

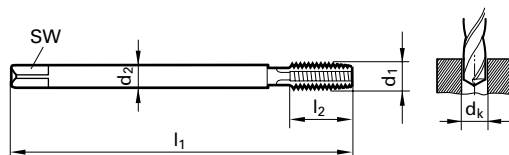
Tool material **HSS-E**

Surface

Form B

Tolerance 2B

Discount group 156



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -48	2.200		2.400	56.00	10.00	2.845	●
NR. 6 -40	2.500	2.10	2.950	56.00	11.00	3.505	●
NR.10 -32	3.500	2.70	4.100	70.00	14.00	4.826	●
1/4" -28	4.500	3.40	5.500	80.00	16.00	6.350	●
3/8" -24	7.000	5.50	8.500	90.00	18.00	9.525	●
5/8" -18	12.000	9.00	14.500	100.00	22.00	15.875	●
7/8" -14	18.000	14.50	20.400	125.00	25.00	22.225	●
1" -12	18.000	14.50	23.250	140.00	28.00	25.400	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for UNF-threads

Order no. 80733



Blind hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard ~DIN 374

DIN 2184-1

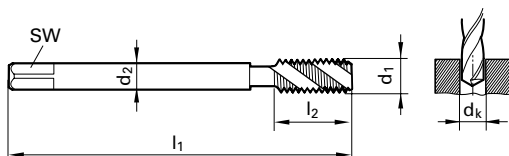
Tool material **HSS-E**

Surface

Form C

Tolerance 2B

Discount group 156



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 3 -56	1.800		2.150	50.00	5.00	2.515	●
NR. 4 -48	2.200		2.400	56.00	6.00	2.845	●
NR. 6 -40	2.500	2.10	2.950	56.00	6.50	3.505	●
NR. 8 -36	2.800	2.10	3.500	63.00	7.00	4.166	●
NR.10 -32	3.500	2.70	4.100	70.00	8.50	4.826	●
1/4" -28	4.500	3.40	5.500	80.00	9.00	6.350	●
3/8" -24	7.000	5.50	8.500	90.00	11.00	9.525	●
7/16" -20	8.000	6.20	9.900	100.00	13.00	11.113	●
1/2" -20	9.000	7.00	11.500	100.00	13.00	12.700	●
5/8" -18	12.000	9.00	14.500	100.00	15.00	15.875	●
7/8" -14	18.000	14.50	20.400	125.00	19.00	22.225	●
1" -12	18.000	14.50	23.250	140.00	22.00	25.400	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for UNF-threads

Order no. 80803



Through hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type **TG 100 T**

Standard ~DIN 374

DIN 2184-1

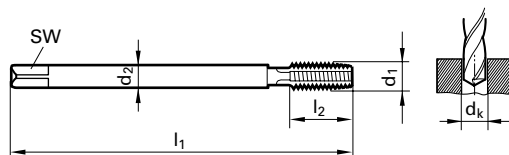
Tool material **HSS-E**

Surface **A**

Form B

Tolerance 2B

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -48	2.200		2.400	56.00	10.00	2.845	●
NR. 6 -40	2.500	2.10	2.950	56.00	11.00	3.505	●
NR. 8 -36	2.800	2.10	3.500	63.00	12.00	4.166	●
NR.10 -32	3.500	2.70	4.100	70.00	14.00	4.826	●
1/4" -28	4.500	3.40	5.500	80.00	16.00	6.350	●
5/16" -24	6.000	4.90	6.900	90.00	18.00	7.938	●
3/8" -24	7.000	5.50	8.500	90.00	18.00	9.525	●
7/16" -20	8.000	6.20	9.900	90.00	18.00	11.113	●
5/8" -18	12.000	9.00	14.500	100.00	22.00	15.875	●
7/8" -14	18.000	14.50	20.400	125.00	25.00	22.225	●
1" -12	18.000	14.50	23.250	140.00	28.00	25.400	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for UNF-threads

Order no. 80833



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type **TG 100 T**

Standard ~DIN 374

DIN 2184-1

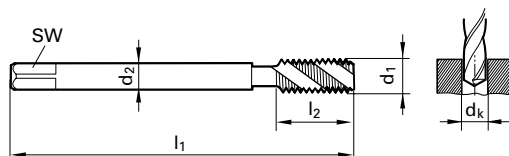
Tool material **HSS-E**

Surface **A**

Form C

Tolerance 2B

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR.10 -32	3.500	2.70	4.100	70.00	8.50	4.826	●
NR.12 -28	4.000	3.00	4.600	80.00	9.00	5.486	●
1/4" -28	4.500	3.40	5.500	80.00	9.00	6.350	●
5/16" -24	6.000	4.90	6.900	90.00	11.00	7.938	●
3/8" -24	7.000	5.50	8.500	90.00	11.00	9.525	●
7/16" -20	8.000	6.20	9.900	100.00	13.00	11.113	●
1/2" -20	9.000	7.00	11.500	100.00	13.00	12.700	●
5/8" -18	12.000	9.00	14.500	100.00	15.00	15.875	●
7/8" -14	18.000	14.50	20.400	125.00	19.00	22.225	●
1" -12	18.000	14.50	23.250	140.00	22.00	25.400	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for UNF-threads

Order no. 80753



**Through hole/
blind hole**

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type TG 100 GG

Standard ~DIN 374

DIN 2184-1

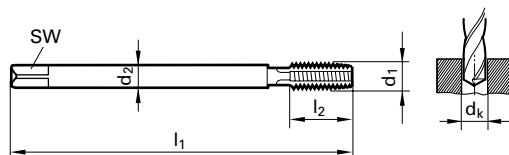
Tool material HSS-E

Surface ●

Form C

Tolerance 2B

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -48	2.200		2.400	56.00	10.00	2.845	●
NR. 6 -40	2.500	2.10	2.950	56.00	11.00	3.505	●
NR. 8 -36	2.800	2.10	3.500	63.00	12.00	4.166	●
NR.10 -32	3.500	2.70	4.100	70.00	14.00	4.826	●
1/4" -28	4.500	3.40	5.500	80.00	16.00	6.350	●
5/16" -24	6.000	4.90	6.900	90.00	18.00	7.938	●
3/8" -24	7.000	5.50	8.500	90.00	18.00	9.525	●
7/16" -20	8.000	6.20	9.900	100.00	22.00	11.113	●
1/2" -20	9.000	7.00	11.500	100.00	20.00	12.700	●
9/16" -18	11.000	9.00	12.900	100.00	22.00	14.288	●
3/4" -16	14.000	11.00	17.500	110.00	25.00	19.050	●
7/8" -14	18.000	14.50	20.400	125.00	25.00	22.225	●
1" -12	18.000	14.50	23.250	140.00	28.00	25.400	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Machine taps for BSP-threads

Order no. 80704



Through hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard DIN 5156

DIN 2184-1

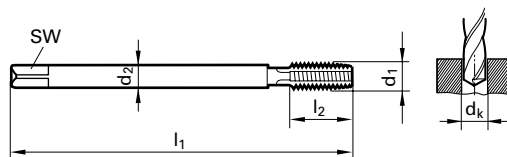
Tool material **HSS-E**

Surface

Form B

Tolerance

Discount group 156



d1	P	d2	SW	dk	l1	l2	Code no.	Availability
G/inch	mm	mm	mm	mm	mm	mm		
G 1/8	28.00	7.000	5.50	8.800	90.00	18.00	9.728	●
G 1/4	19.00	11.000	9.00	11.800	100.00	20.00	13.157	●
G 3/8	19.00	12.000	9.00	15.250	100.00	22.00	16.662	●
G 1/2	14.00	16.000	12.00	19.000	125.00	25.00	20.955	●
G 3/4	14.00	20.000	16.00	24.500	140.00	28.00	26.441	●
G1	11.00	25.000	20.00	30.750	160.00	30.00	33.249	●
G1 1/4	11.00	32.000	24.00	39.500	170.00	30.00	41.910	●
G1 1/2	11.00	36.000	29.00	45.250	190.00	32.00	47.803	●
G2	11.00	45.000	35.00	57.000	220.00	40.00	59.614	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for BSP-threads

Order no. 80734



Blind hole

Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

BASICLine

Type **TG 100 U**

Standard DIN 5156

DIN 2184-1

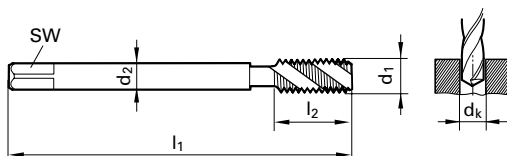
Tool material **HSS-E**

Surface

Form C

Tolerance

Discount group 156



d1	P	d2	SW	dk	l1	l2	Code no.	Availability
G/inch	mm	mm	mm	mm	mm	mm		
G 1/16	28.00	6.000	4.90	6.800	90.00	11.00	7.723	●
G 1/8	28.00	7.000	5.50	8.800	90.00	11.00	9.728	●
G 1/4	19.00	11.000	9.00	11.800	100.00	14.00	13.157	●
G 3/8	19.00	12.000	9.00	15.250	100.00	14.00	16.662	●
G 1/2	14.00	16.000	12.00	19.000	125.00	18.00	20.955	●
G 3/4	14.00	20.000	16.00	24.500	140.00	20.00	26.441	●
G1	11.00	25.000	20.00	30.750	160.00	24.00	33.249	●
G1 1/4	11.00	32.000	24.00	39.500	170.00	25.00	41.910	●
G1 1/2	11.00	36.000	29.00	45.250	190.00	27.00	47.803	●
G2	11.00	45.000	35.00	57.000	220.00	32.00	59.614	●

bright

steam tempered

nitrided

TiN

TiAlN

TiCN



HARTNER

Machine taps for BSP-threads

Order no. 80804



Through hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type **TG 100 T**

Standard DIN 5156

DIN 2184-1

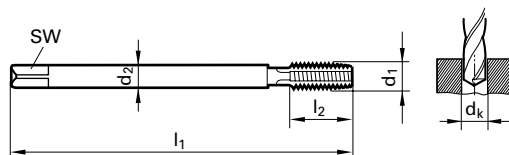
Tool material **HSS-E**

Surface **A**

Form B

Tolerance

Discount group 103



d1	P	d2	SW	dk	l1	l2	Code no.	Availability
G/inch	mm	mm	mm	mm	mm	mm		
G 1/8	28.00	7.000	5.50	8.800	90.00	18.00	9.728	●
G 1/4	19.00	11.000	9.00	11.800	100.00	20.00	13.157	●
G 3/8	19.00	12.000	9.00	15.250	100.00	22.00	16.662	●
G 1/2	14.00	16.000	12.00	19.000	125.00	25.00	20.955	●
G 5/8	14.00	18.000	14.50	21.000	125.00	25.00	22.911	●
G 3/4	14.00	20.000	16.00	24.500	140.00	28.00	26.441	●
G 7/8	14.00	22.000	18.00	28.250	150.00	28.00	30.201	●
G1	11.00	25.000	20.00	30.750	160.00	30.00	33.249	●

○ bright

● steam tempered

● nitrided

● T TiN

● A TiAlN

● C TiCN



HARTNER

Machine taps for BSP-threads

Order no. 80834



Blind hole

High Performance Taps for universal application in materials < 1000 N/mm² such as common structural steels, free cutting steels, case-hardening steels, unalloyed heat-treatable steels, nitriding steels, stainless and acid resistant-steels as well as aluminium and aluminium-alloys.

TOPLine

Type TG 100 T

Standard DIN 5156

DIN 2184-1

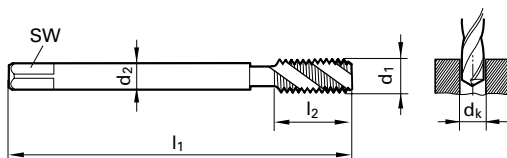
Tool material HSS-E

Surface **A**

Form C

Tolerance

Discount group 103



d1	P	d2	SW	dk	l1	l2	Code no.	Availability
G/inch	mm	mm	mm	mm	mm	mm		
G 1/16	28.00	6.000	4.90	6.800	90.00	11.00	7.723	●
G 1/8	28.00	7.000	5.50	8.800	90.00	11.00	9.728	●
G 1/4	19.00	11.000	9.00	11.800	100.00	14.00	13.157	●
G 3/8	19.00	12.000	9.00	15.250	100.00	14.00	16.662	●
G 1/2	14.00	16.000	12.00	19.000	125.00	18.00	20.955	●
G 5/8	14.00	18.000	14.50	21.000	125.00	18.00	22.911	●
G 3/4	14.00	20.000	16.00	24.500	140.00	20.00	26.441	●
G 7/8	14.00	22.000	18.00	28.250	150.00	22.00	30.201	●
G 1	11.00	25.000	20.00	30.750	160.00	24.00	33.249	●

○ bright

● steam tempered

● nitrided

T TiN

A TiAlN

C TiCN



HARTNER

Machine taps for BSP-threads

Order no. 80754



Through hole/
blind hole

Taps for cast materials such as cast iron, spheroidal graphite and malleable cast iron, cast iron with vermicular graphite, aluminium cast alloys > 7% Si, magnesium alloys as well as other short-chipping non-ferrous metals.

Type **TG 100 GG**

Standard DIN 5156

DIN 2184-1

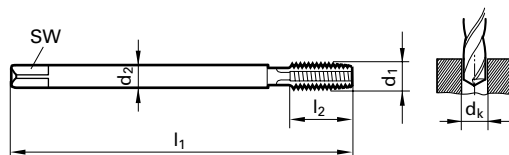
Tool material **HSS-E**

Surface ●

Form C

Tolerance

Discount group 103



d1	P	d2	SW	dk	l1	l2	Code no.	Availability
G/inch	mm	mm	mm	mm	mm	mm		
G 1/16	28.00	6.000	4.90	6.800	90.00	18.00	7.723	●
G 1/8	28.00	7.000	5.50	8.800	90.00	18.00	9.728	●
G 1/4	19.00	11.000	9.00	11.800	100.00	20.00	13.157	●
G 3/8	19.00	12.000	9.00	15.250	100.00	22.00	16.662	●
G 1/2	14.00	16.000	12.00	19.000	125.00	25.00	20.955	●
G 5/8	14.00	18.000	14.50	21.000	125.00	25.00	22.911	●
G 3/4	14.00	20.000	16.00	24.500	140.00	28.00	26.441	●
G 7/8	14.00	22.000	18.00	28.250	150.00	28.00	30.201	●
G1	11.00	25.000	20.00	30.750	160.00	30.00	33.249	●
G1 1/8	11.00	28.000	22.00	35.500	170.00	30.00	37.897	●
G1 1/4	11.00	32.000	24.00	39.500	170.00	30.00	41.910	●
G1 3/8	11.00	36.000	29.00	41.750	180.00	32.00	44.323	●
G1 1/2	11.00	36.000	29.00	45.250	190.00	32.00	47.803	●
G1 3/4	11.00	40.000	32.00	51.000	190.00	40.00	53.746	●
G2	11.00	45.000	35.00	57.000	220.00	40.00	59.614	●

○ bright

● steam tempered

● nitrided

● TiN

● TiAlN

● TiCN



HARTNER

Fluteless machine taps for ISO metric threads

Order no. 80900



Through hole/
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm², stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard ~DIN 371 / ~DIN 376

DIN 2174

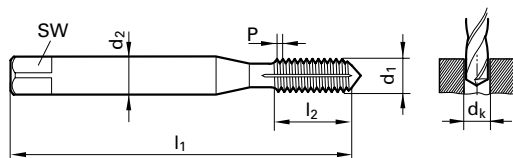
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 6HX

Discount group 103



d1	P	d2	SW	dk	l1	l2	Availability
mm	mm	mm		mm	mm	mm	
M 3	0.50	3.500	2.70	2.800	56.00	10.00	●
M 3,5	0.60	4.000	3.00	3.250	56.00	12.00	●
M 4	0.70	4.500	3.40	3.700	63.00	12.00	●
M 5	0.80	6.000	4.90	4.650	70.00	14.00	●
M 6	1.00	4.500	3.40	5.550	80.00	16.00	●
M 8	1.25	6.000	4.90	7.400	90.00	17.00	●
M10	1.50	7.000	5.50	9.300	100.00	20.00	●
M12	1.75	9.000	7.00	11.200	110.00	24.00	●
M14	2.00	11.000	9.00	13.100	110.00	26.00	●
M16	2.00	12.000	9.00	15.100	110.00	26.00	●
M18	2.50	14.000	11.00	16.900	125.00	30.00	●
M20	2.50	16.000	12.00	18.900	140.00	32.00	●
M22	2.50	18.000	14.50	20.900	140.00	27.00	●
M24	3.00	18.000	14.50	22.700	160.00	30.00	●
M27	3.00	20.000	16.00	25.700	160.00	30.00	●
M30	3.50	22.000	18.00	28.500	180.00	35.00	●
M33	3.50	25.000	20.00	31.500	180.00	35.00	●
M36	4.00	28.000	22.00	34.300	200.00	40.00	●
M39	4.00	32.000	24.00	37.300	200.00	40.00	●

○ bright

● steam tempered

● nitrided

T TiN

A TiAlN

C TiCN



HARTNER

Fluteless machine taps for ISO metric threads

Order no. 80980



**Through hole/
blind hole**

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm², stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type N

Standard JIS B 4430

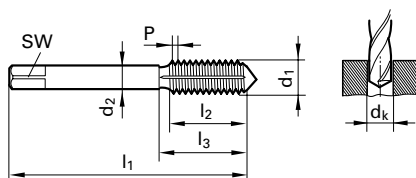
Tool material **HSS-E**

Surface **T**

Form C

Tolerance Class 2/RH

Discount group 103



d1	P	Tolerance	d2	SW	dk	l1	l2	l3	Availability
M 4	0.70	RH6	5.000	4.00	3.700	52.00	12.00	20.00	●
M 5	0.80	RH6	5.500	4.50	4.650	60.00	14.00	24.00	●
M 6	1.00	RH7	6.000	4.50	5.550	62.00	16.00	29.00	●
M 8	1.25	RH7	6.200	5.00	7.400	70.00	17.00	37.00	●
M10	1.50	RH7	7.000	5.50	9.300	75.00	20.00	41.00	●
M12	1.75	RH8	8.500	6.50	11.200	82.00	24.00	48.00	●
M16	2.00	RH10	12.500	10.00	15.100	95.00	26.00	52.00	●
M20	2.50	RH11	15.000	12.00	18.900	105.00	32.00	58.00	●

○ bright

● steam tempered

● nitrided

T TiN

A TiAlN

C TiCN



HARTNER

Fluteless machine taps for ISO metric fine threads

Order no. 80901



Through hole/
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm², stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard ~DIN 374

DIN 2174

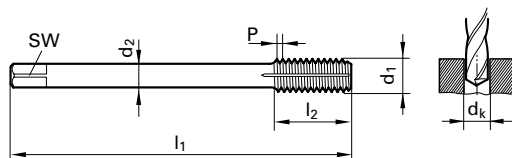
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 6HX

Discount group 103



d1 XP	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
M 6 X0,75	4.500	3.40	5.650	80.00	13.00	6.004	●
M 8 X0,75	6.000	4.90	7.650	80.00	14.00	8.004	●
M 8 X1	6.000	4.90	7.550	90.00	17.00	8.005	●
M10 X1	7.000	5.50	9.550	90.00	17.00	10.005	●
M10 X1,25	7.000	5.50	9.400	100.00	20.00	10.006	●
M12 X1	9.000	7.00	11.550	100.00	20.00	12.005	●
M12 X1,25	9.000	7.00	11.400	100.00	20.00	12.006	●
M12 X1,5	9.000	7.00	11.300	100.00	20.00	12.007	●
M14 X1	11.000	9.00	13.550	100.00	20.00	14.005	●
M14 X1,5	11.000	9.00	13.300	100.00	20.00	14.007	●
M16 X1	12.000	9.00	15.550	100.00	22.00	16.005	●
M16 X1,5	12.000	9.00	15.300	100.00	22.00	16.007	●
M18 X1	14.000	11.00	17.550	110.00	25.00	18.005	●
M18 X1,5	14.000	11.00	17.300	110.00	25.00	18.007	●
M20 X1	16.000	12.00	19.550	125.00	25.00	20.005	●
M20 X1,5	16.000	12.00	19.300	125.00	25.00	20.007	●
M22 X1,5	18.000	14.50	21.300	125.00	25.00	22.007	●
M24 X1,5	18.000	14.50	23.300	140.00	28.00	24.007	●

○ bright

● steam tempered

● nitrided

● T TiN

● A TiAlN

● C TiCN



HARTNER

Fluteless machine taps for ISO metric fine threads

Order no. 80981



Through hole/
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm², stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard JIS B 4430

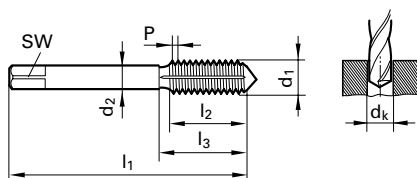
Tool material **HSS-E**

Surface **T**

Form **C**

Tolerance Class 2/RH

Discount group 103



d1 XP	Tolerance	d2 mm	SW mm	dk mm	l1 mm	l2 mm	l3 mm	Code no. mm
M 6 X0,75	RH6	6.000	4.50	5.650	62.00	13.00	30.00	6.004
M 8 X1	RH7	6.200	5.00	7.550	70.00	16.00	35.00	8.005
M10 X1	RH7	7.000	5.50	9.550	70.00	16.00	35.00	10.005
M10 X1,25	RH7	7.000	5.50	9.400	75.00	20.00	39.00	10.006
M12 X1	RH7	8.500	6.50	11.550	70.00	20.00	40.00	12.005
M12 X1,25	RH7	8.500	6.50	11.400	80.00	20.00	40.00	12.006
M12 X1,5	RH7	8.500	6.50	11.300	82.00	20.00	40.00	12.007
M14 X1,5	RH9	10.500	8.00	13.300	88.00	20.00	40.00	14.007
M16 X1,5	RH9	12.500	10.00	15.300	95.00	22.00	44.00	16.007
M20 X1,5	RH10	15.000	12.00	19.300	95.00	25.00	44.00	20.007

Availability



○ bright

● steam tempered

● nitrided

T TiN

A TiAlN

C TiCN



HARTNER

Fluteless machine taps for UNC-threads

Order no. 80902



**Through hole/
blind hole**

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm², stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type N

Standard ~DIN 371 / ~DIN 376

DIN 2184-1

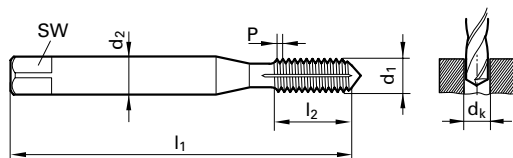
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 2BX

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -40	3.500	2.70	2.550	56.00	11.00	2.845	●
NR. 5 -40	3.500	2.70	2.900	56.00	11.00	3.175	●
NR. 6 -32	4.000	3.00	3.150	56.00	12.00	3.505	●
NR. 8 -32	4.500	3.40	3.800	63.00	13.00	4.166	●
NR.10 -24	6.000	4.90	4.350	70.00	14.00	4.826	●
NR.12 -24	6.000	4.90	5.000	80.00	16.00	5.486	●
1/4" -20	7.000	5.50	5.750	80.00	16.00	6.350	●
5/16" -18	8.000	6.20	7.300	90.00	18.00	7.938	●
3/8" -16	10.000	8.00	8.800	100.00	20.00	9.525	●
7/16" -14	8.000	6.20	10.300	100.00	22.00	11.113	●
1/2" -13	9.000	7.00	11.800	110.00	25.00	12.700	●
9/16" -12	11.000	9.00	13.300	110.00	30.00	14.288	●
5/8" -11	12.000	9.00	14.800	110.00	30.00	15.875	●
3/4" -10	14.000	11.00	17.900	125.00	33.00	19.050	●

○ bright

● steam tempered

● nitrided

T TiN

A TiAlN

C TiCN



HARTNER

Fluteless machine taps for UNF-threads

Order no. 80903



Through hole/
blind hole

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm², stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Type **N**

Standard ~DIN 371 / ~DIN 374

DIN 2184-1

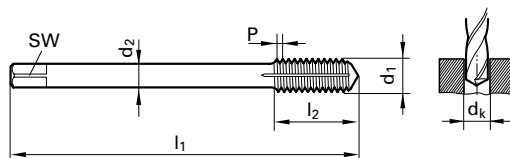
Tool material **HSS-E**

Surface **T**

Form C

Tolerance 2BX

Discount group 103



d1 - P	d2 mm	SW	dk mm	l1 mm	l2 mm	Code no.	Availability
NR. 4 -48	3.500	2.70	2.600	56.00	10.00	2.845	●
NR. 5 -44	3.500	2.70	2.900	56.00	10.00	3.175	●
NR. 6 -40	4.000	3.00	3.200	56.00	11.00	3.505	●
NR. 8 -36	4.500	3.40	3.850	63.00	12.00	4.166	●
NR.10 -32	6.000	4.90	4.450	70.00	14.00	4.826	●
NR.12 -28	6.000	4.90	5.100	80.00	16.00	5.486	●
1/4" -28	7.000	5.50	5.950	80.00	16.00	6.350	●
5/16" -24	8.000	6.20	7.450	90.00	18.00	7.938	●
3/8" -24	10.000	8.00	9.050	90.00	18.00	9.525	●
7/16" -20	8.000	6.20	10.550	100.00	22.00	11.113	●
1/2" -20	9.000	7.00	12.100	100.00	20.00	12.700	●
9/16" -18	11.000	9.00	13.650	100.00	22.00	14.288	●
5/8" -18	12.000	9.00	15.250	100.00	22.00	15.875	●
3/4" -16	14.000	11.00	18.350	110.00	25.00	19.050	●

○ bright

● steam tempered

● nitrided

T TiN

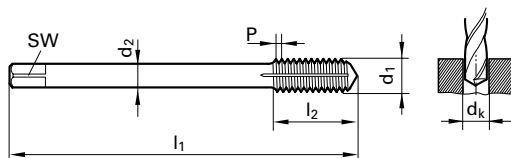
A TiAlN

C TiCN

**Order no. 80904**

For the machining of materials with good cold forming properties and minimum 10% elongation such as unalloyed steels up to 1000 N/mm², stainless, acid- and heat-resistant steels and long-chipping aluminium-alloys.

Discount group 103



d1	P	d2	SW	dk	l1	l2	Code no.	Availability
	G/inch	mm		mm	mm	mm		
G 1/16	28.00	6.000	4.90	7.300	90.00	18.00	7.723	●
G 1/8	28.00	7.000	5.50	9.300	90.00	18.00	9.728	●
G 1/4	19.00	11.000	9.00	12.500	100.00	20.00	13.157	●
G 3/8	19.00	12.000	9.00	16.000	100.00	22.00	16.662	●
G 1/2	14.00	16.000	12.00	20.000	125.00	25.00	20.955	●
G 3/4	14.00	20.000	16.00	25.500	140.00	28.00	26.441	●

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DIN characteristic features

Master standards for dimensions to DIN 2184

The standard DIN 2184 stipulates the major dimensions for taps and fluteless taps required for the thread production with nominal diameter $d_1 > 0.9 \dots 113 \text{ mm}$. Part 1 is the master standard for dimensions for a long tool design, part 2 the master standard for dimensions for the short tool design. According to the nominal diameter range and dependent on

the pitch, the number of teeth and the ratio total length these master standards include: the max. thread length, the shank designs “reinforced shank” and “reduced shank“. A detailed illustration of shank designs and characteristic features can be found on the following page.

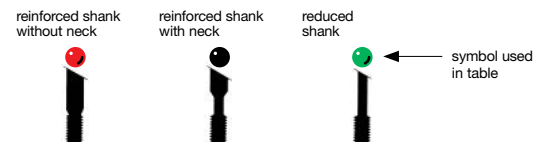
Taps

DIN 2184-1			DIN 2184-2			
Machine taps, long			Hand taps and machine taps			
ISO metric thread	ISO metric fine thread		ISO metric thread	ISO metric fine thread		
DIN 371	DIN 371		DIN 352	DIN 2181		
DIN 376	DIN 374					
UNC-/BSW* thread	UNF thread	G thread	UNC/BSW thread	UNF thread	G thread	Pg thread
~DIN 371	~DIN 371	DIN 5156	~DIN 352	~DIN 2181	DIN 5157	DIN 40 432
~DIN 376	~DIN 374					

Fluteless taps

DIN 2184-1				
DIN 2174		DIN 2184-1		
ISO metric thread	ISO metric fine thread	UNC thread	UNF thread	G thread
previously DIN 371 DIN 376	previously DIN 371 DIN 374	previously ~DIN 371 ~DIN 376	previously ~DIN 371 ~DIN 374	previously DIN 5156

Shank designs for thread cutting tools



Thread type	DIN		contained in the master standards	Nominal diameter ranges mm			
	Taps	Fluteless taps		0.9 ... 2.6	>2.6 ... 6.35	>6.35 ... 10.0	>10.0
M/MJ ISO metric threads	DIN 371		2184-1	●	●	●	—
	DIN 376		2184-1	●	●	●	●
	DIN 352		2184-2	●	●	●	●
	DIN 2174		2184-1	●	●	●	●
MF/MJF ISO metric fine threads	DIN 371		2184-1	●	●	●	—
	DIN 374		2184-1	—	●	●	●
	DIN 2181		2184-2	●	●	●	●
	DIN 2174		2184-1	●	●	●	●
UNC/UNJC/BSW threads	~DIN 371		2184-1	●	●	●	—
	~DIN 376		2184-1	●	●	●	●
	~DIN 352		2184-2	●	●	●	●
UNF/UNJF threads	~DIN 371		2184-1	●	●	●	—
	~DIN 374		2184-1	—	●	●	●
	~DIN 2181		2184-2	●	●	●	●
G threads	DIN 5156		2184-1	—	●	●	●
	DIN 5157		2184-2	—	●	●	●
Pg threads	DIN 40 432		2184-2	—	—	—	●



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DIN characteristic features

Master standards for dimensions to DIN 2184-1

Ø nom. mm	Shank designs mm			Metric pitch mm	Total length mm	Max. thread length mm
	Reinforced shank		Reduced shank			
from...to	Ø	Effective length	Ø			
0.9...1.20	2.5	5.5	–	≤0.20	40	5.5
1.20...1.40	2.5	7.0	–	≤0.35	40	7.0
1.40...1.80	2.5	8.0	–	≤0.35	40	8.0
1.80...2.00	2.8	8.0	–	≤0.40	45	8.0
2.00...2.30	2.8	9.0	–	≤0.40	45	9.0
2.30...2.60	2.8	9.0	–	≤0.50	50	9.0
2.60...3.20	3.5	18	2.2	≤0.45	56	8.0
2.60...3.20	3.5	18	2.2	0.50...0.60	56	11.0
3.20...3.55	4.0	20	2.5	≤0.50	56	9.0
3.20...3.55	4.0	20	2.5	0.60...0.80	56	12.0
3.55...4.20	4.5	21	2.8	≤0.50	63	10.0
3.55...4.20	4.5	21	2.8	0.60...0.80	63	13.0
4.20...4.55	6.0	25	3.5	≤0.60	70	12.0
4.20...4.55	6.0	25	3.5	0.70...0.80	70	16.0
4.55...5.00	6.0	25	3.5	≤0.75	70	12.0
4.55...5.00	6.0	25	3.5	0.80...1.00	70	16.0
5.00...5.60	6.0	30	4.0	≤0.75	80	12.0
5.00...5.60	6.0	30	4.0	0.80...1.00	80	17.0
5.60...6.10	6.0	30	4.5	≤0.80	80	14.0
5.60...6.10	6.0	30	4.5	1.0	80	19.0
6.10...6.40	7.0	30	4.5	≤0.80	80	14.0
6.10...6.40	7.0	30	4.5	1.00...1.25	80	19.0
6.40...7.00	7.0	30	5.5	≤0.80	80	14.0
6.40...7.00	7.0	30	5.5	1.00...1.25	80	19.0
7.00...8.00	8.0	30	6.0	≤0.80	80	18.0
7.00...8.00	8.0	35	6.0	1.00...1.50	90	22.0
8.00...9.00	9.0	30	7.0	≤0.80	90	18.0
8.00...9.00	9.0	35	7.0	1.00...1.50	90	22.0
9.00...10.15	10.0	35	7.0	≤1.00	90	20.0
9.00...10.15	10.0	39	7.0	1.25...1.50	100	24.0
10.15...11.15	–	–	8.0	0.25...1.00	90	20.0
10.15...11.15	–	–	8.0	1.25...1.75	100	24.0
11.15...12.80	–	–	9.0	0.25...1.50	100	22.0
11.15...12.80	–	–	9.0	1.75...2.00	110	28.0
12.80...14.35	–	–	11.0	0.25...1.50	100	22.0
12.80...14.35	–	–	11.0	1.75...2.00	110	30.0
14.35...17.10	–	–	12.0	0.25...1.50	100	22.0
14.35...17.10	–	–	12.0	1.75...2.00	110	32.0
17.10...19.10	–	–	14.0	0.25...1.50	110	25.0
17.10...19.10	–	–	14.0	1.75...2.50	125	34.0
19.10...21.15	–	–	16.0	0.25...1.75	125	25.0
19.10...21.15	–	–	16.0	2.00...2.50	140	34.0
21.15...23.00	–	–	18.0	0.25...1.75	125	25.0
21.15...23.00	–	–	18.0	2.00...2.50	140	34.0
23.00...26.00	–	–	18.0	0.25...2.00	140	28.0
23.00...26.00	–	–	18.0	2.50...3.00	160	38.0
26.00...28.15	–	–	20.0	0.25...2.00	140	28.0
26.00...28.15	–	–	20.0	2.50...3.00	160	38.0
28.15...30.20	–	–	22.0	0.25...2.00	150	28.0
28.15...30.20	–	–	22.0	2.50...3.50	180	45.0
30.20...32.00	–	–	22.0	0.25...2.00	150	28.0
30.20...32.00	–	–	22.0	2.50...3.50	180	50.0
32.00...33.30	–	–	25.0	0.25...2.00	160	30.0
32.00...33.30	–	–	25.0	2.50...3.50	180	50.0
33.30...38.20	–	–	28.0	0.25...2.00	170	30.0
33.30...38.20	–	–	28.0	2.50...4.50	200	56.0
38.20...42.00	–	–	32.0	0.25...2.00	170	30.0
38.20...42.00	–	–	32.0	2.50...4.50	200	60.0
42.00...45.00	–	–	36.0	0.25...2.00	180	32.0
42.00...45.00	–	–	36.0	2.50...3.00	200	50.0
42.00...45.00	–	–	36.0	3.50...5.00	220	69.0
45.00...50.00	–	–	36.0	0.25...2.00	190	82.0
45.00...50.00	–	–	36.0	2.50...3.00	225	50.0
45.00...50.00	–	–	36.0	3.50...5.00	250	70.0



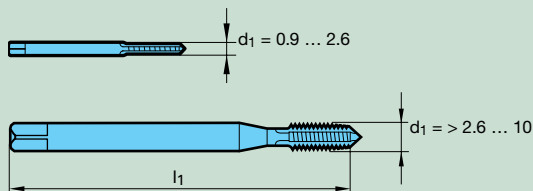
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DIN characteristic features

Characteristic features of the individual standards

DIN 371

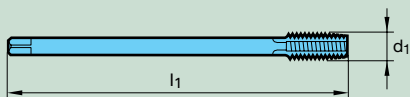
in the master standard
DIN 2184-1



Standard for machine taps with reinforced shank for standard ISO metric threads and ISO metric fine threads. Long design. Shank design in accordance with diameter ranges shown opposite (mm).

DIN 376

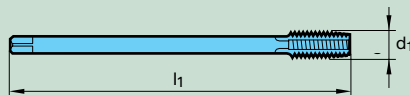
in the master standard
DIN 2184-1



Standard for machine taps with reduced shank for standard ISO metric threads. Long design. Diameter range $d_1 = 1.6 \dots 68 \text{ mm}$ ($\leq \text{Ø M3}$, shank without square)

DIN 374

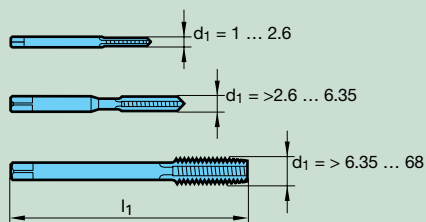
in the master standard
DIN 2184-1



Standard for machine taps with reduced shank for ISO metric fine threads. Long design. Diameter range $d_1 = 3 \dots 52 \text{ mm}$

DIN 352

in the master standard
DIN 2184-2



Standard for hand and machine taps for standard ISO metric threads. Short design. Shank design in accordance with diameter ranges shown opposite (mm).



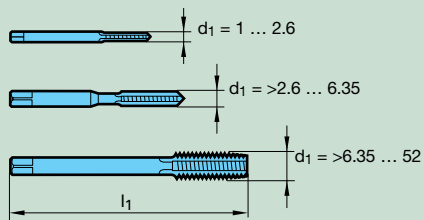
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DIN characteristic features

Characteristic features of the individual standards

DIN 2181

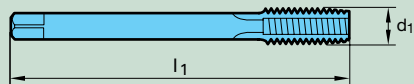
in the master standard
DIN 2184-2



Standard for hand and machine taps for standard ISO metric threads. Short design. Shank design in accordance with diameter ranges shown opposite (mm).

DIN 5156

in the master standard
DIN 2184-1



Standard for machine taps for BSP threads to DIN ISO 228 and for BSW threads to DIN 2999. Long design.

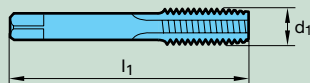
Diameter ranges:

BSP threads G 1/16" ... G 4"

BSW threads W 1/16" ... W 4"

DIN 5157

in the master standard
DIN 2184-2



Standard for machine taps for BSP threads to DIN ISO 228 and for BSW threads to DIN EN 10 226-1. Short design.

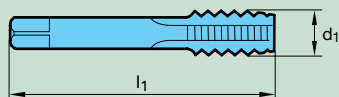
Diameter ranges:

BSP threads G 1/16" ... G 4"

BSW threads W 1/16" ... W 4"

DIN 40 432

in the master standard
DIN 2184-2



Standard for machine taps for steel armoured conduit threads to DIN 40 430. Short design.

Diameter range:

Pg 7 (12.5 mm) ... Pg 48 (59.3 mm)

Will be replaced by DIN 374 ISO 3 6G.



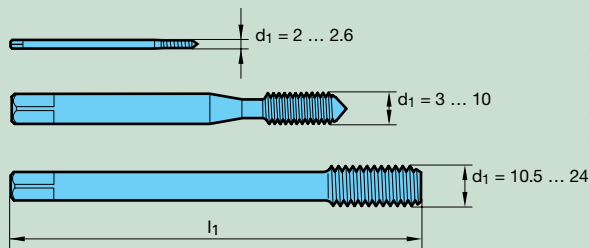
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DIN characteristic features

Characteristic features of the individual standards

DIN 2174

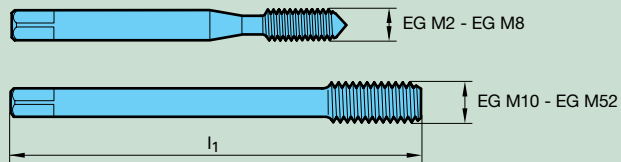
in the master standard
DIN 2184-1



Standard for fluteless taps for standard ISO metric threads and ISO metric fine threads. Long design. Shank design in accordance with diameter ranges shown opposite (mm).

DIN 40 435

in the master standard
DIN 2184-1



Standard for machine taps for tapped holes (EG) for wire thread inserts as in DIN 8140 for ISO metric threads. Standard thread tapped holes EG M2 to EG M52 and fine thread tapped holes EG M8 x1 to EG M48 x 3

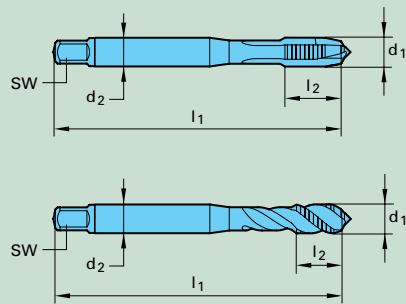


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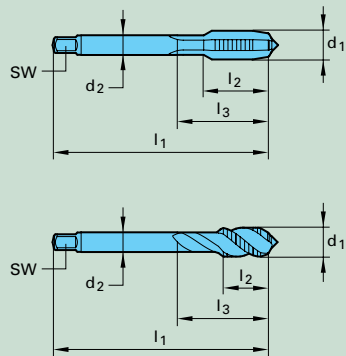
Comparison of Standards

DIN - International Standards

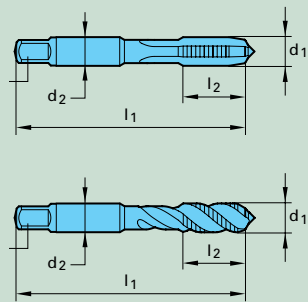
DIN 2184-1 DIN 2184-2



JIS B 4430 Japan Industrial Standard

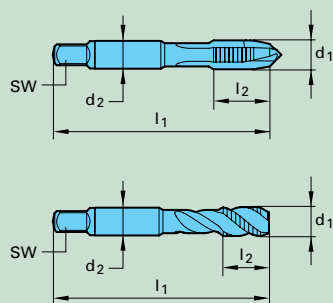


ISO 529



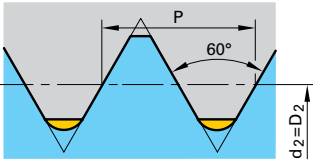
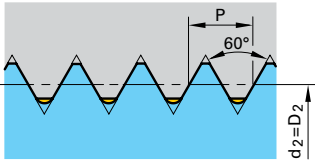
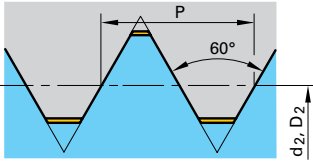
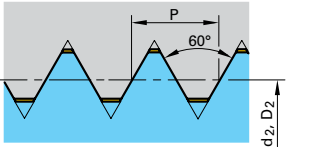
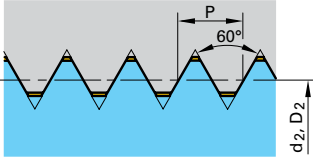
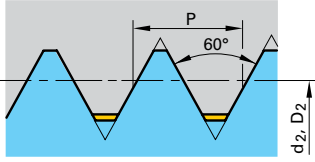
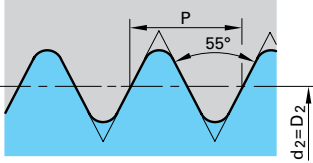
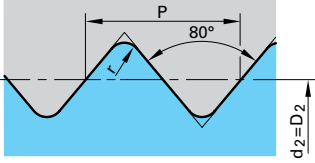
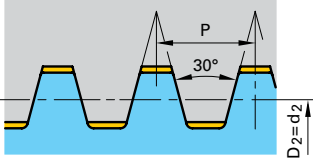
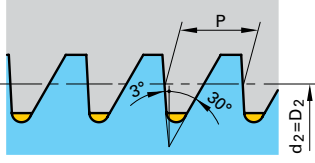
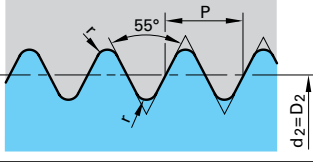
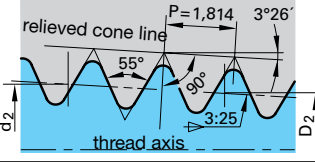
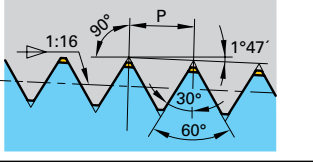
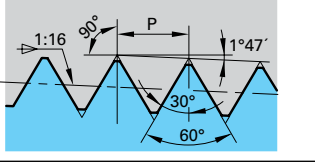
ASME B94.9

The American Society of
Mechanical Engineers





The characteristics of different thread types

Geometry drawing	Standard	Application	Geometry drawing	Standard	Application
M ISO-metric thread			MF ISO-metric fine thread		
	DIN 13-1	General standard thread		DIN 13-2 to DIN 13-11	General fine thread
UNC Unified National Coarse Thread			UNF Unified National Fine Thread		
	ASME B1.1	General UN standard thread		ASME B1.1 ISO-metric trapezoidal thread	General UN Fine Thread
UNEF Unified National Extra Fine Thread			UNS Unified Special Thread		
	ASME B1.1	General UN Extra Fine Thread		ASME B1.1	General UN Special Thread
G Cylindrical Pipe Thread without thread sealing connections			PG steel conduit thread		
	DIN EN ISO 228-1	Threads for pipes, pipe connections and fittings		DIN 40430 cylindrical round thread	electrical engineering
TR ISO-metric trapezoidal thread			S metric saw thread		
	DIN 103	General, draw collets, rolling stock		DIN 513	when absorbing uni-directional forces
W Cylindrical Whitworth Thread			W Whitworth Taper Thread		
	DIN 477	Side connector and accessories for gas bottle valves		DIN 477	Threaded connection in gas cylinder bottles for valves
NPT American Standard Pipe Threads tapered for sealing			NPTF American Standard Pipe Thread tapered for dry sealing		
	ANSI/ASME B1.20.1	pipe threads and fittings		ANSI B1.20.3	pipe threads and fittings



The characteristics of different thread types

Geometry drawing	Standard	Application	Geometry drawing	Standard	Application
BSW cylindrical Whitworth thread			BSF Whitworth fine thread cylindrical		
	B.S. 84 British Standard	Threads for pipes, pipe connections and fittings		B.S. 84 British Standard Fine	Threads for pipes, pipe connections and fittings
BSP pipe thread cylindrical (identical to G)			BSPT pipe thread tapered (identical to Rc)		
	B.S. 93 British Standard	Threads for pipes, pipe connections and fittings		B.S. 93 British Standard	Internal thread for pipe threads and fittings
R Whitworth pie thread tapered external thread			Rp Whitworth pipe thread cylindrical internal thread		
	DIN EN 10226-1 (based on ISO 7-1) replace- ment for DIN 2999-1	External thread for pipe threads and fittings (for in the thread sealing connections)		DIN EN 10226-1 (based on ISO 7-1) Replace- ment for DIN 2999-1	Internal thread for pipe threads and fittings (for in the thread sealing connections)
Rc Whitworth pipe thread tapered internal thread			RD cylindrical round thread		
	DIN ISO 10226-2 (hardly used in Europe, replaceable with pipe threads to ISO 7-1)	Internal thread for pipe threads and fittings (for in the thread sealing connections)		DIN 405	General, load hook, mining, food industry
MJ thread metric thread			UNJ inch thread		
	DIN ISO 5855-1	For the aerospace industry		ISO 3161	For the aerospace industry
Vg valve thread			MSG lock nut thread		
	DIN 7756	Valves for car tyres manifold block		Hartner standard	Self-locking thread transmission housing etc.
MFS					
	DIN 8141	Interference fits in Aluminium-cast alloys			

external thread
 internal thread
 play



Tapping size holes for thread cutting

Std. ISO metric threads DIN 13					ISO metric fine threads DIN 13										UNC threads ASME B1.1				
nom. Ø	pitch P	tapping size hole Ø	core diameter of int. thread 6H*		nom. x Ø	pitch P	tapping size hole Ø	core diameter of int. thread 6H		nom. x Ø	pitch P	tapping size hole Ø	core diameter of int. thread 6H		nom. Ø	threads	tapping size hole Ø	core diameter of int. thread 2B	
	mm	DIN 336 mm	min. mm	max. mm		mm	DIN 336 mm	min. mm	max. mm		mm	DIN 336 mm	min. mm	max. mm		per inch	DIN 336 mm	min. mm	max. mm
M 1	0.25	0.75	0.729	0.785	M 2.5 x 0.35		2.15	2.121	2.221	M 22 x 1.00		21.00	20.917	21.153	Nr. 1 - 64		1.55	1.425	1.580
M 1.1	0.25	0.85	0.829	0.885	M 3.0 x 0.35		2.65	2.621	2.721	M 22 x 1.50		20.50	20.376	20.676	Nr. 2 - 56		1.85	1.694	1.872
M 1.2	0.25	0.95	0.929	0.985	M 3.5 x 0.35		3.15	3.121	3.221	M 22 x 2.00		20.00	19.835	20.210	Nr. 3 - 48		2.10	1.941	2.146
M 1.4	0.30	1.10	1.075	1.142	M 4.0 x 0.50		3.50	3.459	3.599	M 24 x 1.00		23.00	22.917	23.153	Nr. 4 - 40		2.35	2.157	2.385
M 1.6	0.35	1.25	1.221	1.321	M 4.5 x 0.50		4.00	3.959	4.099	M 24 x 1.50		22.50	22.376	22.676	Nr. 5 - 40		2.65	2.487	2.698
M 1.8	0.35	1.45	1.421	1.521	M 5.0 x 0.50		4.50	4.459	4.599	M 24 x 2.00		22.00	21.835	22.210	Nr. 6 - 32		2.85	2.642	2.896
M 2	0.40	1.60	1.567	1.679	M 5.5 x 0.50		5.00	4.959	5.099	M 25 x 1.00		24.00	23.917	24.153	Nr. 8 - 32		3.50	3.302	3.531
M 2.2	0.45	1.75	1.713	1.838	M 6.0 x 0.75		5.20	5.188	5.378	M 25 x 1.50		23.50	23.376	23.676	Nr. 10 - 24		3.90	3.683	3.937
M 2.5	0.45	2.05	2.013	2.138	M 7.0 x 0.75		6.20	6.188	6.378	M 25 x 2.00		23.00	22.835	23.210	Nr. 12 - 24		4.50	4.343	4.597
M 3	0.50	2.50	2.459	2.599	M 8.0 x 0.50		7.50	7.459	7.599	M 27 x 1.00		26.00	25.917	26.153	1/4 - 20		5.10	4.978	5.258
M 3.5	0.60	2.90	2.850	3.010	M 8.0 x 0.75		7.20	7.188	7.378	M 27 x 1.50		25.50	25.376	25.676	5/16 - 18		6.60	6.401	6.731
M 4	0.70	3.30	3.242	3.422	M 8.0 x 1.00		7.00	6.917	7.153	M 27 x 2.00		25.00	24.835	25.210	3/8 - 16		8.00	7.798	8.153
M 4.5	0.75	3.70	3.688	3.878	M 9.0 x 0.75		8.20	8.188	8.378	M 28 x 1.00		27.00	26.917	27.153	7/16 - 14		9.40	9.144	9.550
M 5	0.80	4.20	4.134	4.334	M 9.0 x 1.00		8.00	7.917	8.153	M 28 x 1.50		26.50	26.376	26.676	1/2 - 13		10.80	10.592	11.024
M 6	1.00	5.00	4.917	5.153	M 10 x 0.75		9.20	9.188	9.378	M 28 x 2.00		26.00	25.835	26.210	9/16 - 12		12.20	11.989	12.446
M 7	1.00	6.00	5.917	6.153	M 10 x 1.00		9.00	8.917	9.153	M 30 x 1.00		29.00	28.917	29.153	5/8 - 11		13.50	13.386	13.868
M 8	1.25	6.80	6.647	6.912	M 10 x 1.25		8.80	8.647	8.912	M 30 x 1.50		28.50	28.376	28.676	3/4 - 10		16.50	16.307	16.840
M 9	1.25	7.80	7.647	7.912	M 11 x 0.75		10.20	10.188	10.378	M 30 x 2.00		28.00	27.835	28.210	7/8 - 9		19.50	19.177	19.761
M 10	1.50	8.50	8.376	8.676	M 11 x 1.00		10.00	9.917	10.153	M 30 x 3.00		27.00	26.752	27.252	1 - 8		22.25	21.971	22.606
M 11	1.50	9.50	9.376	9.676	M 12 x 1.00		11.00	10.917	11.153	M 32 x 1.50		30.50	30.376	30.676	1 1/8 - 7		25.00	24.638	25.349
M 12	1.75	10.20	10.106	10.441	M 12 x 1.25		10.80	10.647	10.912	M 32 x 2.00		30.00	29.835	30.210	1 1/4 - 7		28.00	27.813	28.524
M 14	2.00	12.00	11.835	12.210	M 12 x 1.50		10.50	10.376	10.676	M 33 x 1.50		31.50	31.376	31.676	1 3/8 - 6		30.75	30.353	31.115
M 16	2.00	14.00	13.835	14.210	M 14 x 1.00		13.00	12.917	13.153	M 33 x 2.00		31.00	30.835	31.210	1 1/2 - 6		34.00	33.528	34.290
M 18	2.50	15.50	15.294	15.744	M 14 x 1.25		12.80	12.647	12.912	M 33 x 3.00		30.00	29.752	30.252	1 3/4 - 5		39.50	38.938	39.802
M 20	2.50	17.50	17.294	17.744	M 14 x 1.50		12.50	12.376	12.676	M 35 x 1.50		33.50	33.376	33.676	2 - 4.5		45.00	44.679	45.593
M 22	2.50	19.50	19.294	19.744	M 15 x 1.00		14.00	13.917	14.153	M 36 x 1.50		34.50	34.376	34.676					
M 24	3.00	21.00	20.752	21.252	M 15 x 1.50		13.50	13.376	13.676										
M 27	3.00	24.00	23.752	24.252	M 16 x 1.00		15.00	14.917	15.153										
M 30	3.50	26.50	26.211	26.771	M 16 x 1.25		14.80	14.647	14.912										
M 33	3.50	29.50	29.211	29.771	M 16 x 1.50		14.50	14.376	14.676										
M 36	4.00	32.00	31.670	32.270	M 17 x 1.00		16.00	15.917	16.153										
M 39	4.00	35.00	34.670	35.270	M 17 x 1.50		15.50	15.376	15.676										
M 42	4.50	37.50	37.129	37.799	M 18 x 1.00		17.00	16.917	17.153										
M 45	4.50	40.50	40.129	40.799	M 18 x 1.50		16.50	16.376	16.676										
M 48	5.00	43.00	42.587	43.297	M 20 x 1.00		19.00	18.917	19.153										
M 52	5.00	47.00	46.587	47.297	M 20 x 1.50		18.50	18.376	18.676										
M 56	5.50	50.50	50.046	50.796	M 20 x 2.00		18.00	17.835	18.210										

* M 1.1 up to M 1.4 tapping size hole of int. thread 5H

MJ threads DIN ISO 5855						UNC threads ISO 3161					UNF threads ISO 3161				
nom. Ø	x	pitch P	tapping size hole Ø	core diameter of int. thread 5H*		nom. Ø	threads	tapping size hole Ø	core diameter of int. thread 3B		nom. Ø	threads	tapping size hole Ø	core diameter of int. thread 3B	
		mm	DIN 336 mm	min. mm	max. mm		per inch	DIN 336 mm	min. mm	max. mm		per inch	DIN 336 mm	min. mm	max. mm
MJ 3	x	0.50	2.60	2.513	2.653	Nr. 6	- 32	2.85	2.733	2.939	Nr. 6	- 40	3.00	2.888	3.053
MJ 4	x	0.70	3.40	3.318	3.498	Nr. 8	- 32	3.55	3.393	3.599	Nr. 8	- 36	3.60	3.480	3.663
MJ 5	x	0.80	4.30	4.221	4.421	Nr. 10	- 24	4.00	3.795	4.064	Nr. 10	- 32	4.20	4.054	4.255
MJ 6	x	0.50	5.55	5.513	5.625	Nr. 12	- 24	4.60	4.455	4.704	Nr. 12	- 28	4.75	4.602	4.816
MJ 6	x	0.75	5.35	5.269	5.419	1/4	- 20	5.30	5.113	5.387	1/4	- 28	5.60	5.466	5.662
MJ 6	x	1.00	5.10	5.026	5.216	5/16	- 18	6.75	6.563	6.833	5/16	- 24	7.00	6.906	7.109
MJ 8	x	0.50	7.55	7.513	7.625	3/8	- 16	8.20	7.978	8.255	3/8	- 24	8.60	8.494	8.679
MJ 8	x	0.75	7.35	7.269	7.419	7/16	- 14	9.60	9.346	9.639	7/16	- 20	10.00	9.876	10.084
MJ 8	x	1.00	7.10	7.026	7.216	1/2	- 13	11.00	10.798	11.095	1/2	- 20	11.60	11.463	11.661
MJ 8	x	1.25	6.90	6.782	6.994	9/16	- 12	12.40	12.228	12.482	9/16	- 18	13.00	12.913	13.122
MJ 10	x	1.00	9.10	9.026	9.216	5/8	- 11	13.80	13.627	13.904	5/8	- 18	14.60	14.501	14.702
MJ 10	x	1.25	8.90	8.782	8.994	* MJ3 x 0.50 up to MJ 5 x 0.80 tapping size hole of int. thread 6H									
MJ 10	x	1.50	8.60	8.539	8.775										
MJ 12	x	1.75	10.40	10.295	10.560										
MJ 16	x	2.00	14.20	14.051	14.351										

* MJ3 x 0.50 up to MJ 5 x 0.80 tapping size hole of int. thread 6H



Tapping size holes for thread cutting

UNF threads ASME B1.1					BSW (Whitworth) threads BS84					(Whitworth) threads (DIN-ISO 228-1)					Steel armoured conduit threads to DIN 40430						
nom. threads Ø		tapping size hole Ø	core diameter of int. thread 2B		nom. threads Ø		tapping size hole Ø	core diameter of int. thread		nom. threads Ø		tapping size hole Ø	core diameter of int. thread		nom. threads Ø		tapping size hole Ø	core diameter of int. thread			
per inch		DIN 336 mm	min. mm	max. mm	inch		per inch	DIN 336 mm	min. mm	max. mm	inch		per inch	DIN 336 mm	min. mm	max. mm	per inch		DIN 336 mm	min. mm	max. mm
Nr. 1 - 72		1.55	1.473	1.610	W 1/16	60	1.20	1.045	1.230	G 1/16	28	6.80	6.561	6.843	Pg 7	20	11.40	11.280	11.430		
Nr. 2 - 64		1.85	1.755	1.910	W 3/32	48	1.80	1.704	1.912	G 1/8	28	8.80	8.566	8.848	Pg 9	18	14.00	13.860	14.010		
Nr. 3 - 56		2.15	2.024	2.197	W 1/8	40	2.50	2.362	2.591	G 1/4	19	11.80	11.445	11.890	Pg 11	18	17.30	17.260	17.410		
Nr. 4 - 48		2.40	2.271	2.459	W 5/32	32	3.20	2.952	3.214	G 3/8	19	15.25	14.950	15.395	Pg 13.5	18	19.00	19.060	19.210		
Nr. 5 - 44		2.70	2.550	2.741	W 3/16	24	3.60	3.407	3.745	G 1/2	14	19.00	18.631	19.172	Pg 16	18	21.30	21.160	21.310		
Nr. 6 - 40		2.95	2.819	3.023	W 7/32	24	4.50	4.201	4.539	G 5/8	14	21.00	20.587	21.128	Pg 21	16	26.90	26.780	27.030		
Nr. 8 - 36		3.50	3.404	3.607	W 1/4	20	5.10	4.724	5.156	G 3/4	14	24.50	24.117	24.658	Pg 29	16	35.50	35.480	35.730		
Nr. 10 - 32		4.10	3.962	4.166	W 5/16	18	6.50	6.130	6.590	G 7/8	14	28.25	27.877	28.418	Pg 36	16	45.50	45.480	45.730		
Nr. 12 - 28		4.60	4.496	4.724	W 3/8	16	7.90	7.492	7.987	G 1	11	30.75	30.291	30.931	Pg 42	16	52.50	52.480	52.730		
1/4 - 28		5.50	5.359	5.588	W 7/16	14	9.20	8.789	9.330	G 1 1/8	11	35.50	34.939	35.579	Pg 48	16	57.80	57.780	58.030		
5/16 - 24		6.90	6.782	7.036	W 1/2	12	10.50	9.989	10.591	G 1 1/4	11	39.50	38.952	39.592							
3/8 - 24		8.50	8.382	8.636	W 9/16	12	12.00	11.577	12.179	G 1 1/2	11	45.25	44.845	45.485							
7/16 - 20		9.90	9.728	10.033	W 5/8	11	13.50	12.918	13.558	G 1 3/4	11	51.00	50.788	51.428							
1/2 - 20		11.50	11.328	11.608	W 3/4	10	16.25	15.797	16.483	G 2	11	57.00	56.656	57.296							
9/16 - 18		12.90	12.751	13.081	W 7/8	9	19.25	18.611	19.353												
5/8 - 18		14.50	14.351	14.681	W 1	8	22.00	21.334	22.147												
3/4 - 16		17.50	17.323	17.678	W 1 1/8	7	24.50	23.928	24.832												
7/8 - 14		20.40	20.269	20.650	W 1 1/4	7	27.75	27.103	28.007												
1 - 12		23.25	23.114	23.571	W 1 3/8	6	30.50	29.504	30.528												
1 1/8 - 12		26.50	26.289	26.746	W 1 1/2	6	33.50	32.679	33.703												
1 1/4 - 12		29.50	29.464	29.921	W 1 5/8	5	35.50	34.769	35.963												
1 3/8 - 12		32.75	32.639	33.096	W 1 3/4	5	39.00	37.944	39.138												
1 1/2 - 12		36.00	35.814	36.271	W 2	4.5	44.50	43.571	44.877												

NPT ANSI B 2.1 American tapered pipe thread 1:16						
Version A (avoid if possible)	Version B	nom. threads Ø	tapp. size hole Ø cylindrical (A) d ₁	tapp. size hole Ø conical (B) D ₁	cutting depth ET mm	cutting depth BT (min) mm
		1/16 - 27	6.15	6.39	9.29	10.7
		1/8 - 27	8.40	8.74	9.32	10.8
		1/4 - 18	11.10	11.36	13.52	15.6
		3/8 - 18	14.30	14.80	13.83	16.0
		1/2 - 14	17.90	18.32	18.07	20.8
		3/4 - 14	23.30	23.67	18.55	21.3
		1 - 11.5	29.00	29.69	22.29	25.6
		1 1/4 - 11.5	37.70	38.45	22.80	26.1
		1 1/2 - 11.5	43.70	44.52	22.80	26.1
		2 - 11.5	55.60	56.56	23.20	26.5
		2 1/2 - 8	66.30	67.62	31.75	36.3
		3 - 8	82.30	83.52	33.74	38.5

Metric/metric fine EG-threads (EG M14 x 1.25) for wire thread inserts DIN 8140					UNC (UNC-STI) EG-threads for wire thread inserts ASME B18.29.1					UNF (UNF-STI) EG-threads for wire thread inserts ASME B18.29.1				
nom. Ø	x pitch P	tapping size hole Ø	core diameter of int. thread		nom. Ø	threads	tapping size hole Ø	core diameter of int. thread		nom. Ø	threads	tapping size hole Ø	core diameter of int. thread	
			min. mm	max. mm				min. mm	max. mm				min. mm	max. mm
EG M 4	0.70	4.20	4.152	4.292	EG Nr. 6	- 32	3.80	3.678	3.879	EG Nr. 6	- 40	3.70	3.644	3.818
EG M 5	0.80	5.25	5.174	5.334	EG Nr. 8	- 32	4.40	4.338	4.524	EG Nr. 8	- 36	4.40	4.321	4.498
EG M 6	1.00	6.30	6.217	6.407	EG Nr. 10	- 24	5.20	5.055	5.283	EG Nr. 10	- 32	5.10	4.999	5.184
EG M 8	1.25	8.40	8.271	8.483	EG Nr. 12	- 24	5.80	5.715	5.944	EG Nr. 12	- 28	5.70	5.682	5.809
EG M10	1.50	10.50	10.324	10.560	EG 1/4	- 20	6.70	6.624	6.868	EG 1/4	- 28	6.60	6.546	6.721
EG M12	1.75	12.50	12.379	12.644	EG 5/16	- 18	8.40	8.242	8.489	EG 5/16	- 24	8.25	8.166	8.352
EG M14 x 1.25	14.40		14.271	14.483	EG 3/8	- 16	10.00	9.868	10.127	EG 3/8	- 24	9.80	9.754	9.931
EG M16	2.00	16.50	16.433	16.733	EG 7/16	- 14	11.60	11.506	11.783	EG 7/16	- 20	11.50	11.389	11.585
					EG 1/2	- 13	13.30	13.122	13.393	EG 1/2	- 20	13.10	12.974	13.172
					EG 9/16	- 12	14.90	14.747	15.032	EG 9/16	- 18	14.70	14.592	14.798
					EG 5/8	- 11	16.50	16.375	16.673	EG 5/8	- 18	16.25	16.180	16.386



Recommended tapping size holes for thread forming

Std. ISO metric threads DIN 13						ISO metric fine threads DIN 13														
nom. Ø	pitch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*		nom. x Ø	pitch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*		nom. x Ø	pitch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*	
mm	mm	mm	min. mm	max. mm	min. mm	max. mm	mm	mm	mm	min. mm	max. mm	min. mm	max. mm	mm	mm	mm	min. mm	max. mm	min. mm	max. mm
M 2	0.40	1.85	1.84	1.88	1.567	1.679	M 2.5 x 0.35	2.35	2.35	2.38	2.121	2.221	M 17 x 1.00	16.55	16.52	16.62	15.917	16.217		
M 2.2	0.45	2.00	2.01	2.05	1.713	1.838	M 3 x 0.35	2.85	2.85	2.88	2.621	2.721	M 17 x 1.50	16.30	16.26	16.38	15.376	15.751		
M 2.5	0.45	2.30	2.28	2.32	2.013	2.138	M 4 x 0.35	3.85	3.85	3.88	3.621	3.721	M 18 x 1.00	17.55	17.52	17.62	16.917	17.217		
M 3	0.50	2.80	2.78	2.85	2.459	2.639	M 4 x 0.50	3.80	3.78	3.83	3.459	3.639	M 18 x 1.50	17.30	17.26	17.38	16.376	16.751		
M 3.5	0.60	3.25	3.23	3.30	2.850	3.050	M 5 x 0.50	4.80	4.78	4.83	4.459	4.639	M 18 x 2.00	17.10	17.05	17.20	15.835	16.310		
M 4	0.70	3.70	3.68	3.76	3.242	3.466	M 5.5 x 0.50	5.30	5.28	5.33	4.959	5.139	M 20 x 1.00	19.55	19.52	19.62	18.917	19.217		
M 4.5	0.75	4.20					M 6 x 0.75	5.65	5.62	5.70	5.188	5.424	M 20 x 1.50	19.30	19.26	19.38	18.376	19.751		
M 5	0.80	4.65	4.62	4.71	4.134	4.384	M 7 x 0.75	6.65	6.62	6.70	6.188	6.424	M 24 x 1.00	23.55	23.52	23.62	22.917	23.217		
M 6	1.00	5.55	5.52	5.62	4.917	5.217	M 8 x 0.75	7.65	7.62	7.70	7.188	7.424	M 24 x 1.50	23.30	23.26	23.38	22.376	22.751		
M 7	1.00	6.55	6.52	6.62	5.917	6.217	M 8 x 1.00	7.55	7.52	7.62	6.917	7.217	M 24 x 2.00	23.10	23.05	23.20	21.835	22.310		
M 8	1.25	7.40	7.36	7.47	6.647	6.982	M 9 x 0.75	8.65	8.62	8.70	8.188	8.424	M 27 x 1.50	26.30	26.26	26.38	25.376	25.751		
M 9	1.25	8.40	8.36	8.47	7.647	7.982	M 9 x 1.00	8.55	8.52	8.62	7.917	8.217	M 30 x 1.50	29.30	29.26	29.38	28.376	28.751		
M 10	1.50	9.30	9.26	9.38	8.376	8.751	M 10 x 0.75	9.65	9.62	9.70	9.188	9.424	M 33 x 1.50	32.30	32.26	32.38	31.376	31.751		
M 11	1.50	10.30	10.26	10.38	9.376	9.751	M 10 x 1.00	9.55	9.52	9.62	8.917	9.217	M 36 x 1.50	35.30	35.26	35.38	34.376	34.751		
M 12	1.75	11.20	11.15	11.29	10.106	10.531	M 10 x 1.25	9.40	9.36	9.47	8.647	8.982	M 39 x 1.50	38.30	38.26	38.38	37.376	37.751		
M 14	2.00	13.10	13.05	13.20	11.835	12.310	M 11 x 0.75	10.65	10.62	10.70	10.188	10.424	M 42 x 1.50	41.30	41.26	41.38	40.376	40.751		
M 16	2.00	15.10	15.05	15.20	13.835	14.310	M 11 x 1.00	10.55	10.52	10.62	9.917	10.217								
M 18	2.50	16.90	16.83	17.02	15.294	15.854	M 12 x 1.00	11.55	11.52	11.62	10.917	11.217								
M 20	2.50	18.90	18.83	19.02	17.294	17.854	M 12 x 1.25	11.40	11.36	11.47	10.647	10.982								
M 22	2.50	20.90	20.83	21.02	19.294	19.854	M 12 x 1.50	11.30	11.26	11.38	10.376	10.751								
M 24	3.00	22.70	22.62	22.80	20.752	21.382	M 14 x 1.00	13.55	13.52	13.62	12.917	13.217								
M 27	3.00	25.70	25.62	25.80	23.752	24.382	M 14 x 1.25	13.40	13.36	13.47	12.647	12.982								
M 30	3.50	28.50	28.40	28.60	26.211	26.921	M 14 x 1.50	13.30	13.26	13.38	12.376	12.751								
M 33	3.50	31.50	31.40	31.60	29.211	29.921	M 15 x 1.00	14.55	14.52	14.62	13.917	14.217								
M 36	4.00	34.30	34.17	34.40	31.670	32.420	M 15 x 1.50	14.30	14.26	14.38	13.376	13.751								
M 39	4.00	37.30	37.17	37.40	34.670	35.420	M 16 x 1.00	15.55	15.52	15.62	14.917	15.217								
M 42	4.50	40.10	39.95	40.20	37.129	37.979	M 16 x 1.50	15.30	15.26	15.38	14.376	14.751								

* M 2 up to M 2.5 tapping size hole of int. thread 6H

* M 2.5 x 0.35 up to M 4 x 0.35 tapping size hole of int. thread 6H

Tapping size hole diameter tolerance zone for thread forming (to DIN 13, section 50)

Due to the tensile strength it is not necessary to adhere to the tapping size hole diameter tolerance class 6H; tolerance class 7H satisfies the requirement that the flank coverage of external and internal threads should not fall below 0.32 x P. In addition, formed threads generally possess a higher tensile strength in comparison to cut threads thanks to an uninterrupted grain flow and subsequent work hardening.



Recommended tapping size holes for thread forming

UNC threads ASME B1.1						
nom. Ø	threads per inch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 2B	
		mm	min. mm	max. mm	min. mm	max. mm
Nr. 1 - 64		1.68	1.67	1.70	1.425	1.580
Nr. 2 - 56		1.98	1.97	2.01	1.694	1.872
Nr. 3 - 48		2.28	2.27	2.32	1.941	2.146
Nr. 4 - 40		2.55	2.54	2.59	2.157	2.385
Nr. 5 - 40		2.90	2.89	2.94	2.487	2.698
Nr. 6 - 32		3.15	3.14	3.19	2.642	2.896
Nr. 8 - 32		3.80	3.78	3.82	3.302	3.531
Nr. 10 - 24		4.35	4.33	4.39	3.683	3.937
Nr. 12 - 24		5.00	4.97	5.03	4.343	4.597
1/4 - 20		5.75	5.72	5.80	4.978	5.258
5/16 - 18		7.30	7.26	7.37	6.401	6.731
3/8 - 16		8.80	8.77	8.88	7.798	8.153
7/16 - 14		10.30	10.27	10.37	9.144	9.550
1/2 - 13		11.80	11.77	11.88	10.592	11.024
9/16 - 12		13.30	13.28	13.39	11.989	12.446
5/8 - 11		14.80	14.78	14.90	13.386	13.868
3/4 - 10		17.90	17.85	17.97	16.307	16.840
7/8 - 9		21.00	20.95	21.10	19.177	19.761
1 - 8		24.00	23.95	24.12	21.971	22.606

UNF threads ASME B1.1						
nom. Ø	threads per inch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 2B	
		mm	min. mm	max. mm	min. mm	max. mm
Nr. 1 - 72		1.70	1.69	1.72	1.473	1.610
Nr. 2 - 64		2.00	1.99	2.03	1.755	1.910
Nr. 3 - 56		2.30	2.29	2.34	2.024	2.197
Nr. 4 - 48		2.60	2.59	2.63	2.271	2.459
Nr. 5 - 44		2.90	2.89	2.93	2.550	2.741
Nr. 6 - 40		3.20	3.19	3.24	2.819	3.023
Nr. 8 - 36		3.85	3.83	3.88	3.404	3.607
Nr. 10 - 32		4.45	4.43	4.49	3.962	4.166
Nr. 12 - 28		5.10	5.07	5.13	4.496	4.724
1/4 - 28		5.95	5.92	5.99	5.359	5.588
5/16 - 24		7.45	7.42	7.50	6.782	7.036
3/8 - 24		9.05	9.02	9.10	8.838	8.636
7/16 - 20		10.55	10.48	10.58	9.728	10.033
1/2 - 20		12.10	12.08	12.18	11.328	11.608
9/16 - 18		13.65	13.61	13.72	12.751	13.081
5/8 - 18		15.25	15.21	15.32	14.351	14.681
3/4 - 16		18.35	18.30	18.41	17.323	17.678
7/8 - 14		21.40	21.35	21.49	20.269	20.650
1 - 12		24.45	24.40	24.54	23.114	23.571

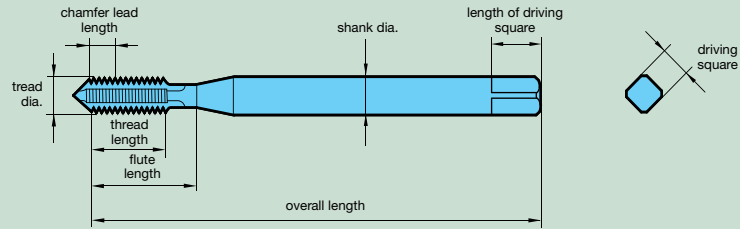
(Whitworth) threads DIN EN ISO 228-1						
nom. Ø	threads per inch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread	
		mm	min. mm	max. mm	min. mm	max. mm
G 1/16 28		7.30	7.28	7.35	6.561	6.843
G 1/8 28		9.30	9.28	9.35	8.566	8.848
G 1/4 19		12.50	12.48	12.55	11.445	11.890
G 3/8 19		16.00	15.98	16.05	14.950	15.395
G 1/2 14		20.00	19.98	20.12	18.631	19.172
G 5/8 14		22.00	21.98	22.12	20.587	21.128
G 3/4 14		25.50	25.48	25.62	24.117	24.658
G 7/8 14		29.25	29.23	29.37	27.877	28.418
G 1 11		32.00	31.98	32.15	30.291	30.931
G 1 1/4 11		40.75	40.70	40.85	38.952	39.592



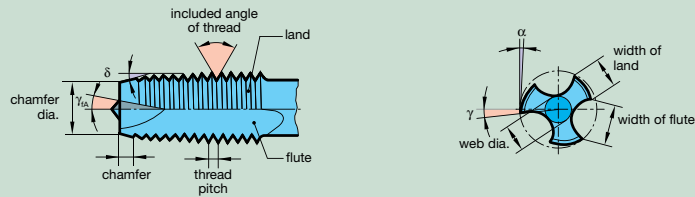
HARTNER

General information for tapping

Definitions and angles, centres and flute forms



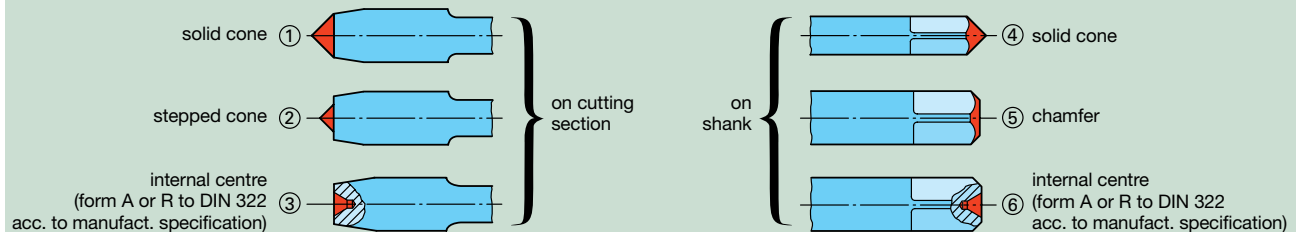
δ = try square
 γ_{fA} = spiral point angle
 α = clearance angle
 γ = rake angle



Flute forms

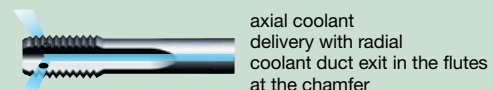


Types of centres (standard, to DIN 2197/DIN 2175)



Thread dia. range mm	Centre on cutting section		Centre on shank
	with chamfer forms A, C, D, E	with chamfer form B	
≤ 4.2	①	①	④ ⑤ ⑥
> 4.2 ... 5.6	① ②	①	④ ⑤ ⑥
> 5.6 ... 10.0	① ② ③	① ② ③	④ ⑤ ⑥
> 10.0	③	③	⑥

Coolant duct geometries





General information for tapping

Chamfer forms, selection and application

When cutting internal threads, all the machining is carried out by the cutting teeth of the chamfer. Therefore, a decision on the best type of chamfer form has to be carefully made as both tool life and quality of thread are thereby greatly affected.

Generally speaking, the form and length of chamfer depend on the type of hole to be tapped. The tapping of through holes does not normally give rise to any difficulties whereas the production of blind holes can create certain problems associated with the need to evacuate swarf in the reverse direction to the feed, i.e. up to the flutes of the tap and then cut off such swarf when the tap is reversed out of the hole.

The length of chamfer is determined by taking into account various conflicting factors. To avoid overloading, premature bluntness and oversize threads the number of chamfer cutting threads must not be kept too low. A too long chamfer lead, however, increases the torque and thus the danger of breakage. The spiral point with form B ensures a chip removal always in the direction of feed.



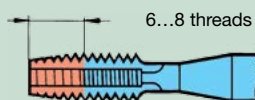
through hole



blind hole

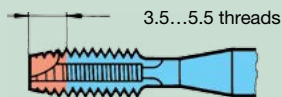
Chamfer forms to DIN 2197

Form A



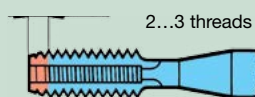
long, 6 - 8 threads
for short
through holes

Form B



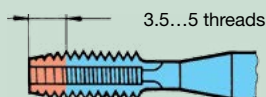
medium, 3.5 - 5.5 threads,
with spiral point,
for all through holes
and deep tapping holes in medium
and long-chipping materials

Form C



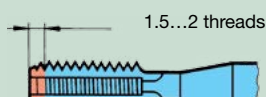
short, 2 - 3 threads
for blind holes
and generally for
aluminium, grey cast iron
and brass

Form D



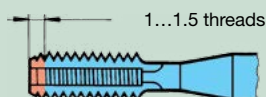
medium, 3.5 - 5 threads
for short
through holes

Form E



very short, 1.5-2 threads,
for blind holes with
little run-out depth.

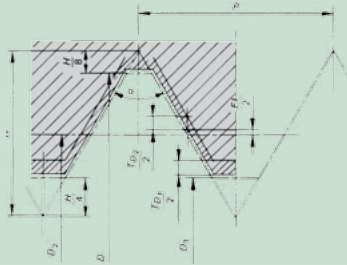
Form F



extremely short, 1-1.5 threads,
for blind holes with
little run-out depth.
Avoid use if possible.



Taps for ISO metric threads DIN EN 22857 (extract)



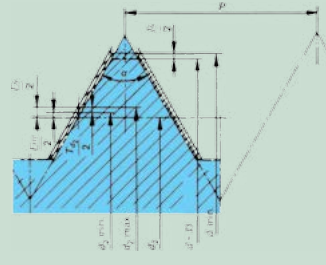
Profile of the nut thread

Basic profile:

major diameter
nom. dia. of tapping size hole
basic pitch diameter
pitch of diameter
included angle of thread
height of peak to peak
thread profile
basic deviation of pitch, zero
with tolerance zone H, positive
with tolerance zone G

Tolerances:

tolerance on tapping size hole dia
tolerance on tap pitch dia.



Profile of the tap

Basic profile:

major diameter
d min. permissible min. tap major dia.
minimum clearance on major diameter
basic pitch diameter
minimum tap pitch diameter
maximum tap pitch diameter
upper deviation of pitch diameter
lower deviation of pitch diameter

Tolerance:

tolerance on tap pitch diameter

With the aim of unifying threads on an international basis, the ISO thread was brought out and has in the meantime been accepted by all concerned. Nowadays the ISO metric thread is the most common type. As you can see, our tap program demonstrates this fact in the clearest possible way.

We recommend the application of taps in accordance with the adjacent table:

Tolerance qualities (figure identification)

Tolerance qualities of external threads are defined by figures 3 to 9, those of nut threads by figures 4 to 8. 3 stands for the narrowest and 9 for the widest tolerance.

Tolerance positions (letter identification)

ISO metric internal threads are identified by capital letters A to H, ISO metric external threads by small letters a to h. Tolerance zones A to G have positive and a to g negative basic pitch deviations in contrast to the tolerance zones H and h which commence at zero. Generally, tolerance zones H and g are used. For threads destined for surface treatment tolerance zones G and e are applied.

When manufacturing ISO-external threads the deviations that are determined for the major diameter with regard to the tolerance zones a to g have to be taken into account.

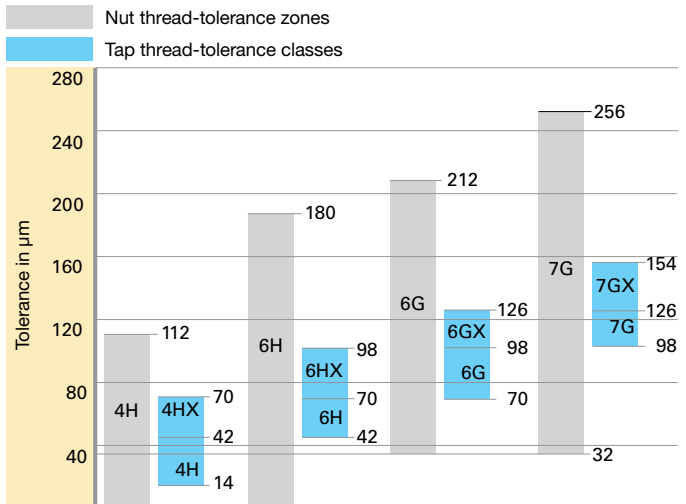
Tolerance zones (nut thread)/

Tolerance classes (tap thread)

Quality and position of tolerance determine the tolerance zone, which is identified by the appropriate figures and letters.

The abbreviation for the tolerance class of tap corresponds to the tolerance zone of the internal thread for which the tap is used in most cases. Therefore, it is not identical with the tolerance zone of the cut nut thread in every application. Taps with deviating tolerances according to DIN 802 part 1 will be given additional marking "X" (6 HX, 6 GX).

Tolerance zone / tolerance class allocation



DIN EN 22857		Tolerance zone of internal thread to be cut				DIN 802 part 1 (withdrawn)	
Application class of tap						Tolerance class of tap	
Designation*	Reference						
Class 1	ISO 1	4H	5H				
Class 2	ISO 2			6H			
Class 3	ISO 3				6G		
-	-					7G	

* The tolerance of the 3 application classes is calculated in accordance to the following data dependent on one tolerance unit t the value of which corresponds to the value of the basic pitch diameter TD2 in tolerance class 5 of the nut thread (polished to a pitch of 0.2 mm):
t = t_{D2} Tolerance class 5 of nut thread

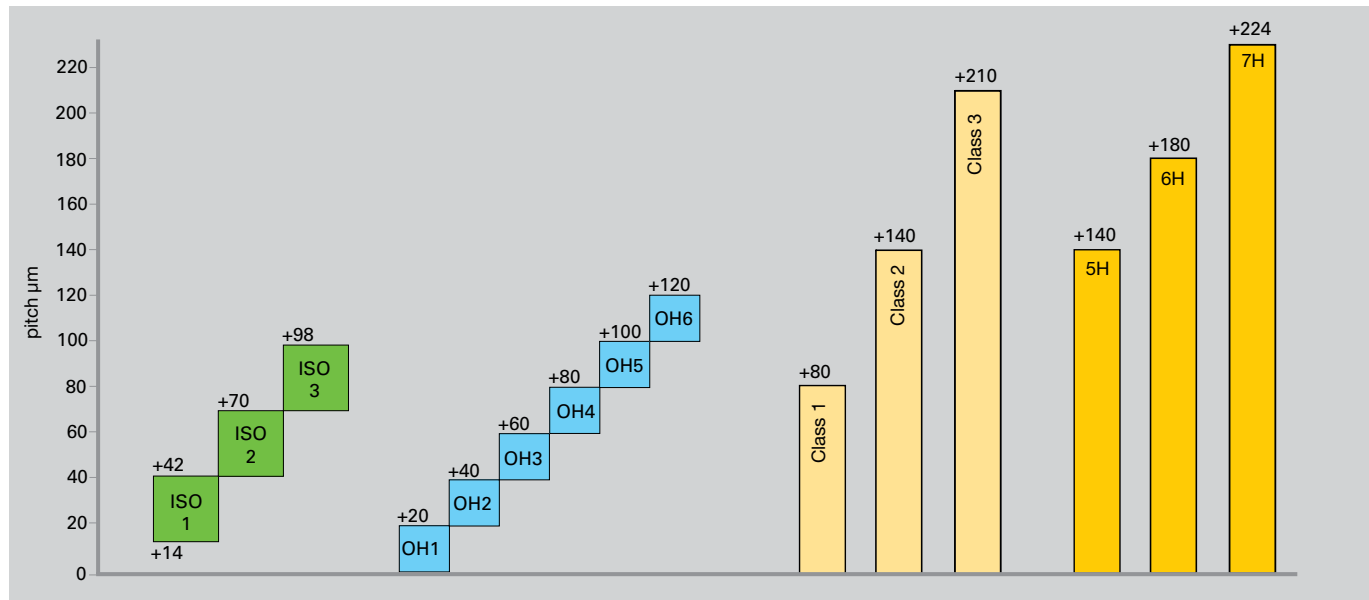


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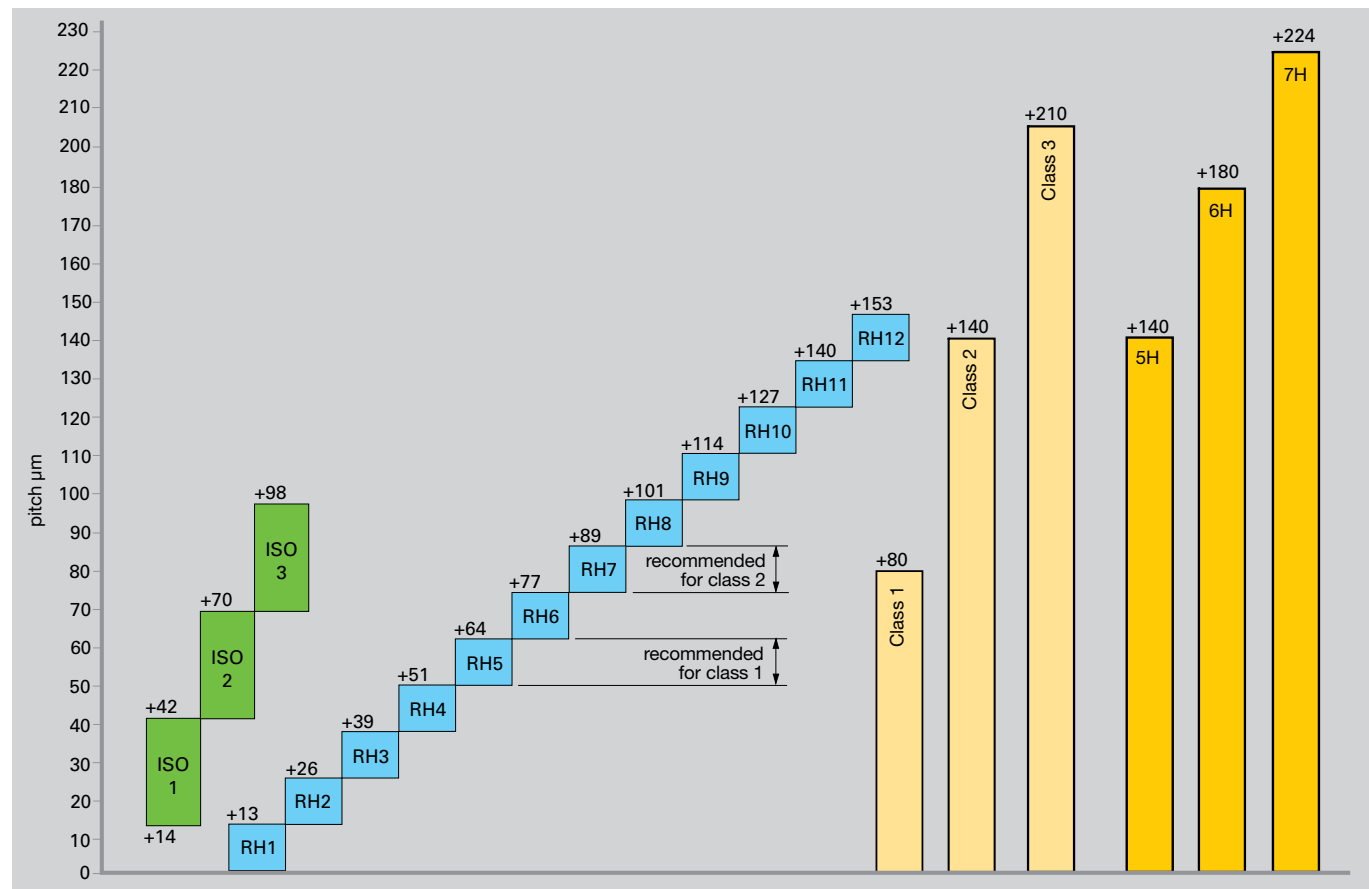
General information for tapping

JIS-Taps

OH limits for JIS-taps



RH limits for JIS fluteless taps



upper limit: $0.0127 \times n$
lower limit: $0.0127 \times n - 0.0127$
unit: mm / n = RH number



Taps for ISO metric threads DIN EN 22857 (extract)

Thread clearances and fits

Fits between internal and external threads are separated by a diagonal stroke, as for example 6H/6g (internal/external thread). The fit has to be selected in conjunction with the appropriate thread connection.

The tolerance zones of the tolerance classes fine, medium and coarse are allocated to three screw-in lengths short (S), normal (N) and long (L). Generally, the following rules apply for selecting a tolerance class:

Fine tolerance zone (S):

For precision threads, when only a small variation in the fit is permitted.

Medium tolerance zone (N):

General application

Coarse tolerance zone (L):

There are no special precision requirements and in cases where production difficulties may occur, e.g. thread production in hot-rolled rods, deep blind holes or plastic components.

Screw-in lengths

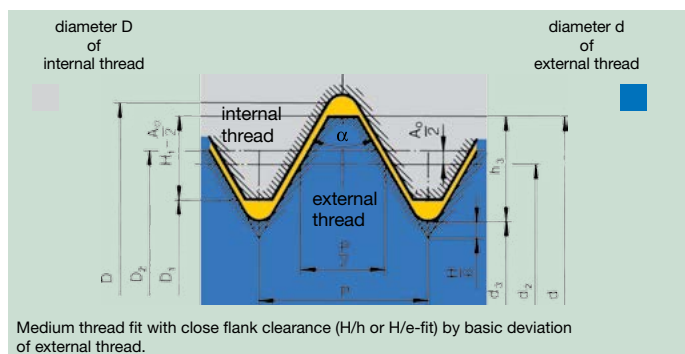
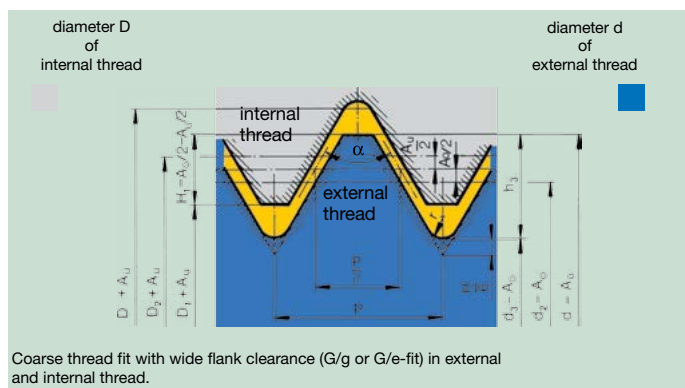
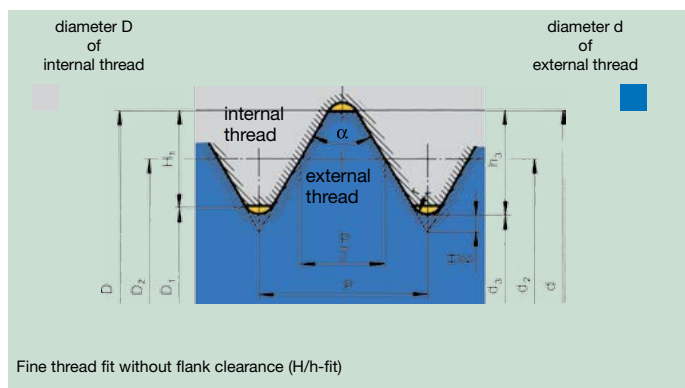
The quality of thread connection is also affected by the screw-in length. The ISO tolerance system was, especially as regards the pitch diameter, divided into three groups, i.e.

S	(Short)	= short screw-in length
N	(Normal)	= normal screw-in length
L	(Long)	= long screw-in length

The following fit should be selected for normal screw-in length N:

To ensure a tighter fit of thread connections, we recommend for short screw-in lengths a narrower fit. As far as long screw-in lengths are concerned, fits with a larger tolerance must be used to compensate for pitch deviations.

Thread fits with varying flank clearance



Explanation of symbols

D	=	Ø nom. of internal thread
D ₁	=	Tapping size hole Ø of internal thread
D ₂	=	Basic pitch Ø of internal thread
d	=	Ø nom. of external thread
d ₂	=	Basic pitch Ø of external thread
d ₃	=	Tapping size hole Ø of external thread
P	=	Pitch
α	=	Included angle of thread
H	=	Height of peak to peak thread profile
A ₀	=	Upper tolerance limit
A _u	=	Lower tolerance limit

Application problems with new taps

Problem	Possible causes	Solution
1 Thread produced is too large 	■ incorrect tap, tap geometry not suitable for the application ■ tapping size hole too small ■ alignment error of tapping size hole or position ■ machine spindle axially restricted ■ cold welding at the flank of the tap ■ lead of tap unsatisfactory due to insufficient thread depth ■ cutting speed too high ■ lubrication or coolant supply insufficient ■ tolerance specification on tap does not correspond to specifications on drawing and/or thread gauge	■ apply correct tap for the material to be machined ■ observe tapping size hole table in the technical section. Note different tapping size hole diameters for fluteless taps. ■ - check for correct tool clamping ■ - apply floating tap holder ■ - check core drill ■ - use mechanical feed ■ - apply tension/compression tap chuck ■ - apply new tap ■ - apply coated tap ■ - optimise lubrication ■ - tap with forced feed ■ - apply tap with modified lead ■ - reduce cutting speed ■ - improve lubrication ■ ensure sufficient and suitable coolant supply and check concentration ■ apply correct tap for required tolerances
2 Thread axially miscut 	■ spiral-fluted taps, corresponding to our design, are applied with too much pressure for initial tapping ■ initial tapping pressure too low for taps with spiral point corresponding to our form "B"	■ with spiral-fluted taps only light pressure required for initial tapping. The tap should immediately be applied within the tension/compression range ■ taps with spiral point or left hand spiral require higher axial pressure. Ensure tap operates within the tension/compression range
3 Thread produced is too small 	■ tolerance specification on tap does not correspond to specifications on drawing and/or thread gauge ■ incorrect tap ■ tap does not cut accurately (thread plug gauge) ■ machine spindle is axially too rigid	■ apply correct tap for required tolerance ■ apply correct tap for the material to be machined ■ avoid strong axial forces during the cutting process ■ apply tension/compression chuck

Application problems with new taps

Problem	Possible causes	Solution
4 Thread surface not according to requirements 	■ cutting edge geometry not suitable for the application ■ cutting speed too high ■ insufficient coolant (concentration and supply) ■ chip congestion ■ tapping size hole too small ■ with tough, hard materials loading on tool too much or pitch too steep ■ built-up edge ■ cold welding	■ apply "correct" tap for the material to be machined ■ - reduce cutting speed ■ - optimise lubrication ■ ensure suitable coolant and sufficient volume ■ apply suitable tap type ■ observe tapping size hole diameter specifications to DIN 336 or respective standards. Observe table for fluteless taps ■ apply hand tap sets ■ apply coated tap ■ improve coolant supply
5 Tool life insufficient	■ surface hardening of tapping size hole ■ reasons listed under: "thread surface not according to requirements" ■ chip congestion	■ - check drill (cutting edge) for wear ■ - heat or surface treatment following thread production ■ reasons listed under: thread surface "not according to requirements" ■ apply correct tap
6 Tool breakage during advance or return 	■ tapping size hole too small ■ teeth of chamfer lead overloaded ■ tap hits bottom of tapping size hole ■ - lack of or incorrect chamfer of tapping size hole ■ - positional or angle error of tapping size hole ■ - tool hardness not suitable for the application ■ - cutting edge geometry not suitable for the application	■ observe tapping size hole dia. acc. to DIN 336 or respective standards ■ - longer chamfer lead (blind or through hole) ■ - increase no. of teeth of chamfer lead by increasing no. of flutes ■ - apply tap sets ■ - check hole depth ■ - apply tension/compression tap chuck ■ - correct chamfer angle of tapping size hole ■ - ensure correct tool clamping ■ - apply floating tap holder ■ - check core drill ■ apply suitable tap for the individual application

Application problems with reground taps

Problem	Possible causes	Solution
7 Thread produced is too large	- burrs - cutting edge geometry (chamfer lead, rake-, chamfer-, spiral point angle) not retained	- remove burrs - observe technical specifications when regrinding. - observe regrinding instruction
8 Thread produced is too small	- worn section has not been reground correctly - tap too small due to no. of regrinds	- regrind again or apply new tool. - observe max. regrinding limits. - max. regrinding limit reached. - apply new tap
9 Thread produced not according to requirements	- burrs - cutting edge geometry (chamfer lead, rake-, chamfer-, spiral point angle) not retained - peak-to-valley height of the reground tap too large - cold welding at the flanks	- remove burrs - observe technical specifications when regrinding. - observe regrinding instruction - regrind again or apply new tool. - observe max. regrinding limits. - remove cold welding marks
10 Tool life insufficient	- cutting edge geometry (chamfer lead, rake-, chamfer-, spiral point angle) not retained - loss of tap hardness due to heat development during the regrinding process - loss of coating	- regrind again or apply new tool. - observe max. regrinding limits. - check quality of grinding wheel - check coolant supply - recoat - check coating of the material to be machined

General information thread forming

Fluteless taps are used for the forming of internal threads without chip removal. In contrast to conventional tapping where material is cut from the workpiece, thread forming is a pressure deformation process without chip removal for the production of internal threads. During the process the material is cold formed without interrupting the grain flow.

According to DIN 8583, thread forming is described as “pressing the thread into the workpiece with a tool possessing a spiral working area”. The spiral threaded, polygonal portion of the fluteless tap is “screwed” into the pre-drilled workpiece with an appropriate constant feed rate equal to the thread pitch. Hereby the thread profile is pressed gradually via the forming lead into the material of the workpiece so to speak. Subsequently, the pressure in the deformation zone exceeds the compression limit, the workpiece becomes ductile and is deformed. The material yields radially, “flows” along the thread profile in the unoccupied base of the tool and forms the minor diameter of the nut thread. The flow process creates the process specific form pockets (claws).

The tapping size hole diameter is heavily dependent on the formability of the material, the workpiece geometry and the required effective depth of the thread. In comparison to conventional tapping, a larger diameter tapping size hole should be selected. With a larger diameter tapping size hole the load on the tool is reduced whilst increasing the tool life. Thanks to the uninterrupted grain flow, the loading capacity of the thread remains sufficient with a 50% effective thread depth.

The partially formed crests of the thread with decreasing effective thread depth are a typical characteristic of threads

produced by the thread forming process. With the flanks of the thread fully formed, they have no influence on the tensile strength of the thread. If necessary, the required deformation level of the thread should be determined by performing a test.

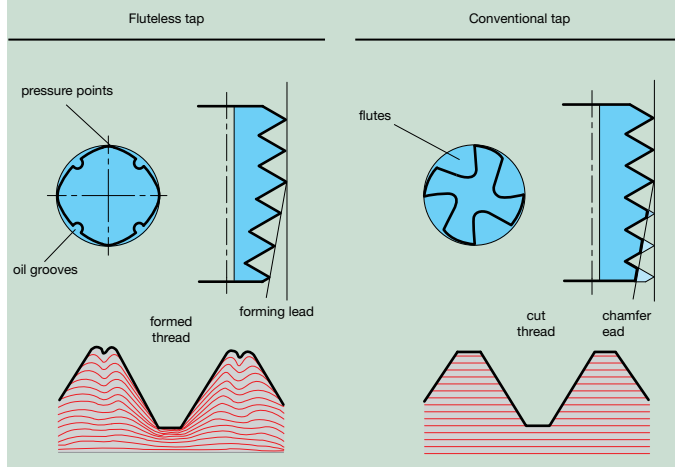
Lubrication is of significant importance. The lubrication prevents material from building up on the thread flanks and ensures that the necessary torque for the forming process is not too high. Therefore, under no circumstances should there ever be a break-down in lubrication! Preference should be given to lubricants such as cooling agents or oils containing graphite such as those used in rolling processes. Always follow the rule: “The better the lubrication the easier the thread forming process!”

It offers the following advantages:

- no chip formation.
- one tool for the production of threads in through and blind holes.
- application in wide range of materials.
- no cutting errors.
- pitch and angle of thread errors that can occur with thread cutting are eliminated.
- internal threads produced by thread forming possess a higher tensile strength particularly at the thread flanks thanks to the so-called “uninterrupted grain flow” and the cold forming process.
- the surface of the thread is improved.
- fluteless taps can be applied at higher speeds because the formability of many materials increases with the forming speed. This does not have a negative effect on the tool life.
- reduced danger of breakage through rigid design.

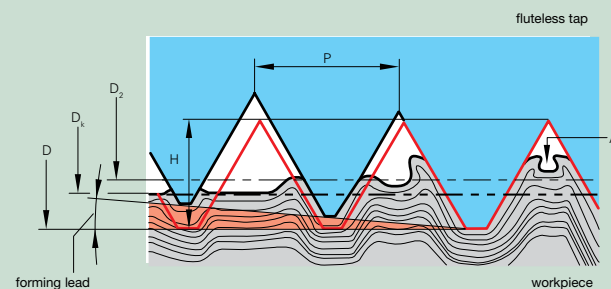
Process

The production of internal threads without chip removal (thread forming) in comparison to conventional tapping



Flow characteristics of the material during thread forming and the deformation process

D = nom.-Ø
D₂ = flank-Ø
D_k = hole-Ø
H = profile height
P = pitch
A = form pocket (claw)
— finished nut thread





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General information thread forming

Conventional fluteless taps, produced by a grinding process only, show traces of microscopic, very fine grinding marks on the surface of the tool. This also applies to the threaded portion of the tool required to perform the thread forming operation.

This surface topography (structure) has a negative effect on the friction between the tool and the material to be re-formed as well as on the herewith associated heat development, on the necessary torque and last but not least on the wear of the pressure points of the fluteless tap. In addition, the "grinding marks" encourage the build-up of the material to be re-formed in the thread flanks of the fluteless tap. This is also called cold welding.

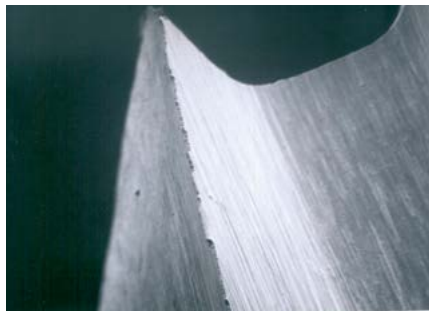
Thanks to a special process to improve the surface topography (structure), Hartner's new fluteless taps no longer possess these "grinding marks". This has been confirmed in research and tool life studies in varying materials under production conditions.

For the user, a longer tool life and increased cutting speeds are the benefits of this special process. The tool life can be increased considerably depending on the material to be machined and the application conditions. A 100% increase in tool life is not unusual.

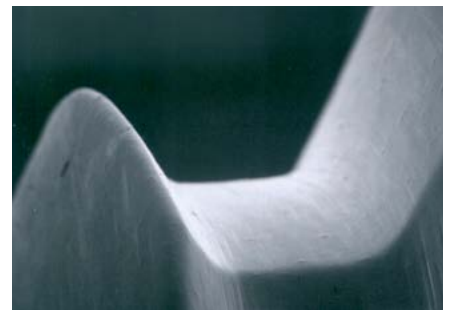
The improved surface topography is not only of benefit to tools with bright finish. Particularly coated tools also benefit from the new process. Outer contour and forming lead greatly determine the performance of the fluteless tap. Numerous tests have shown that

fluteless taps with optimal pressure point geometry and quantity achieve increased tool life and dimensional accuracy.

Further improvements in quality are achieved when the fluteless tap is produced completely in one setting and with one grinding wheel - set-up with a special roll. Pitch errors between the thread crests and former lead transition area do not occur as with the conventional grinding process.

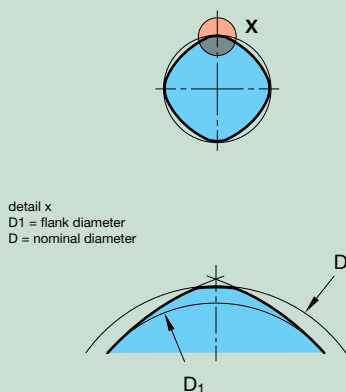


Surface of a conventional fluteless tap

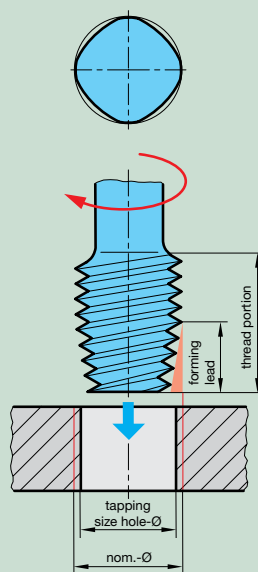


Optimised surface of a Hartner Profile fluteless tap

Cross section of fluteless tap



The principle



Types of tapping size hole

with fluteless taps without oil grooves
for thread depth $\leq 1 \times D$



for thread depth $\geq 1 \times D$



with fluteless taps with oil grooves
for all thread depths

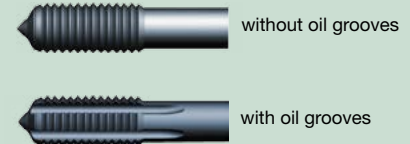
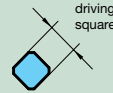
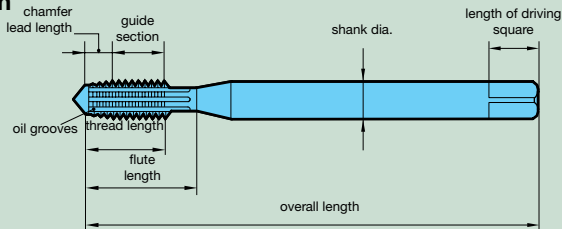




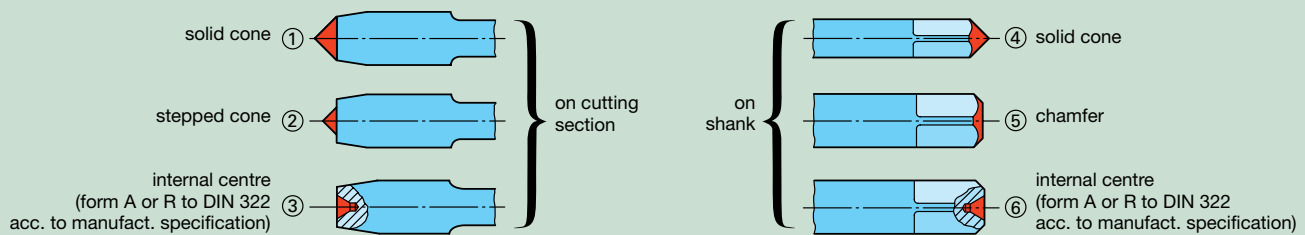
General information thread forming

Definitions, angles, centres, thread tolerances and fits

Thread portion



Types of centres (standard, to DIN 2197/DIN 2175)



Thread dia. range mm	Centre on cutting section		Centre on shank
	with chamfer forms A, C, D, E	with chamfer form B	
≤ 5.6	①	①	④ ⑤ ⑥
> 5.6 ... 12.8	① ② ③	① ② ③	④ ⑤ ⑥
> 12.8	③	③	⑥

Thread tolerances and fits

Fits between internal and external threads are separated by a diagonal stroke, as for example 6H/6g (internal/external thread). The fit has to be selected in conjunction with the appropriate thread connection.

The tolerance zones of the tolerance classes fine, medium and coarse are allocated to three screw-in lengths short S), normal (N) and long (L). Generally, the following rules apply for selecting a tolerance class:

Fine tolerance zone (S):

For precision threads, when only a small variation in the fit is permitted.

Screw-in lengths

The quality of thread connection is also affected by the screw-in length. The ISO tolerance system was, especially as regards the pitch diameter, divided into three groups, i.e.

S (Short)	= short screw-in length
N (Normal)	= normal screw-in length
L (Long)	= long screw-in length

Medium tolerance zone (N):

General application

Coarse tolerance zone (L):

There are no special precision requirements and in cases where production difficulties may occur, e.g. thread production in hot-rolled rods, deep blind holes or plastic components.

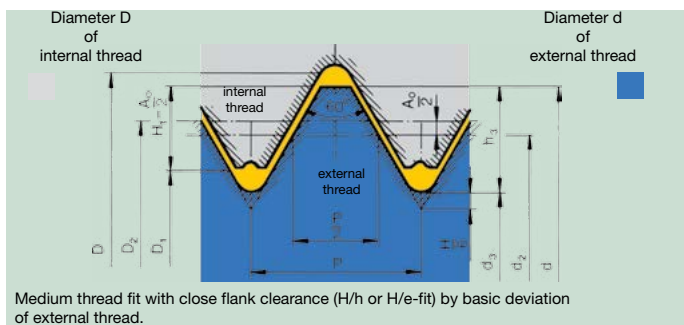
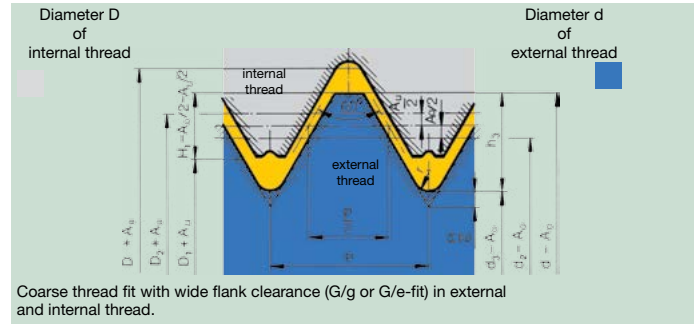
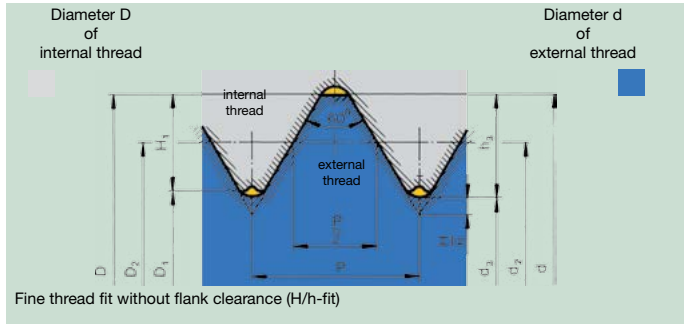
The following fit should be selected for normal screw-in length N:

To ensure a tighter fit of thread connections, we recommend for short screw-in lengths a narrower fit.

General information thread forming

Definitions, angles, centres, thread tolerances and fits

Thread fit with varying flank clearance



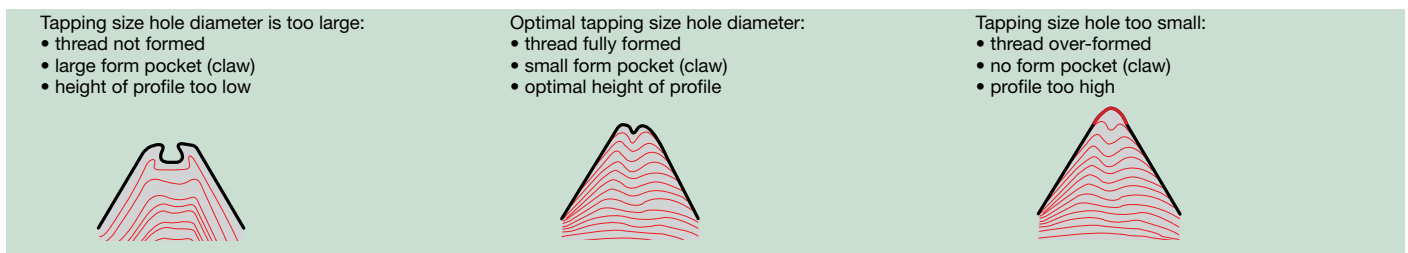
Explanation of symbols

D	= major diameter of internal thread
D1	= nominal diameter of tapping size hole
D2	= effective diameter of internal thread
d	= major diameter of external thread
d2	= effective diameter of external thread
d3	= root diameter of external thread
P	= pitch
s	= pitch angle
H	= peak to valley height of thread profile
Ao	= positive tolerance
Au	= negative tolerance

Tapping size hole diameter

With fluteless tapping, the tapping size hole diameter influences the distinction of the formed thread. A too small tapping size hole diameter results in an over-forming of the thread which must definitely be prevented because this can lead to tool

breakage. A too large tapping size hole is acceptable with certain tolerances because formed threads have a sufficient loading capacity from a 50% bearing depth.



Cooling lubricants with fluteless taps

With fluteless taps the main task of the coolant is lubrication. The better the lubrication with the maximum concentration, the longer the tool life.

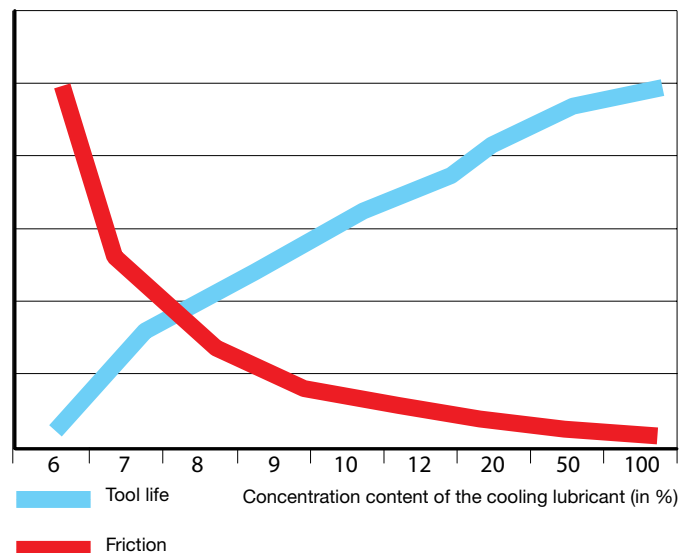
There are two different types of lubricant:

Oil based lubricants

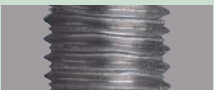
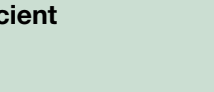
These are mineral oils with the best lubricating characteristics. They reduce friction and achieve optimal life.

Soluble lubricants

These soluble lubricants are a concentrate thinned to an emulsion prior to the use with water. The concentration must not be below 6%. A content more than 12% is ideal in order to achieve a long life thanks to a good lubrication effect.



Application problems with new fluteless taps

Problem	Possible causes	Solution
1 Thread produced is too large 	- Insufficient tool clamping - Fluteless tap with short cutting portion	- Apply synchro chuck - Apply fluteless tap with long cutting portion
2 Thread produced is too small 	Tapping size hole diameter too large	Select correct tapping size hole diameter according to table
3 Thread overformed 	Tapping size hole diameter too small	Select correct tapping size hole diameter according to table
4 Thread surface not according to requirements 	- Cold welding on the tool - Lubricant with too little oil content	- Increase oil content in lubricant or apply neat oil - Increase oil content in lubricant or apply neat oil
5 Tool life insufficient 	- Lubricant with too little oil content - Tapping size hole diameter too small - Cutting speed too high - Lubricant soiled	- Increase oil content in lubricant or apply neat oil - Select correct tapping size hole diameter according to table - Adjust cutting speed - Check filtration

Application problems with new fluteless taps

Problem	Possible causes	Solution
6 Tool breakage 	■ Lubricant with too little oil content ■ Tapping size hole diameter too small ■ Incorrect tool clamping	■ Increase oil content in lubricant or apply neat oil ■ Select correct tapping size hole diameter according to table ■ Check tool clamping



Application recommendations

	Material group	Material examples Figures in bold = material no. to DIN EN 10 027
General steels $\leq 1000 \text{ N/mm}^2$	common structural steels	1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0425 P265GH 1.0050 E295, 1.0070 E360, 1.8937 P500NH
	free-cutting steels	1.0718 11SMnPb30, 1.0736 11SMn37 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20
	unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C45E 1.0601 C60, 1.1221 C60E
	unalloyed case hard. steels	1.0301 C10, 1.1121 C10E
Stainless and acid-resistant steels	stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18 9
	stainless steels, austenitic	1.4301 X5CrNi18-10, 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17 12 2
High tensile steels $800-1200 \text{ N/mm}^2$	stainless steels, martensitic	1.4057 X20CrNi17-2, 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18 2
	alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4
	alloyed case hard. steels	1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5
	nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7
	tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4
	high speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3
Cast materials	cast iron	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)
	spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)
Brass	brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2
	brass, long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5
Long-chipping Al-alloys $\leq 6\% \text{ Si}$	aluminium and Al-alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1
	Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5
Aluminium and Al-alloys $\geq 6\% \text{ Si}$	Al cast alloys $\leq 10\% \text{ Si}$	3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9
	Al cast alloys $> 10\% \text{ Si}$	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg



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Application recommendations



Tensile strength N/mm ²	Hardness	TG 100 U		TG 100 T		TG 100 GG		TG 300 T (application with IC)		Fluteless Taps	
			v _c (m/min)		v _c (m/min)		v _c (m/min)		v _c (m/min)		v _c (m/min)
≤500		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
>500-850		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≤850		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
850-1000		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≤700		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
700-850		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
850-1000		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≤750		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≤850		OO	6-10	OOO	6-15	x	-	OO	6-10	OOO	4-8
≤850		OO	6-10	OOO	6-15	x	-	OO	6-10	OOO	4-8
≤850		OO	6-10	OOO	6-15	x	-	OO	6-10	OOO	4-8
850-1000		OO	6-10	OOO	6-12	x	-	OOO	10-20	OOO	6-12
1000-1200		OO	6-10	OOO	6-12	x	-	OOO	10-20	OOO	6-12
850-1000		OO	6-10	OOO	6-12	x	-	OOO	10-20	OOO	6-12
1000-1200		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≥850-1000		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
1000-1200		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≤850		OO	6-10	OOO	6-12	x	-	OOO	10-20	OOO	6-12
850-1000		OO	6-10	OOO	6-12	x	-	OOO	10-20	OOO	6-12
≥650-1000		OO	6-10	OOO	6-12	x	-	OOO	10-20	OOO	6-12
	< 350 HB	O	15-20	O	15-20	OOO	15-20	OOO	15-30	x	-
	≤240 HB	O	10-20	O	10-20	OOO	15-20	OOO	15-25	O	15-20
	< 350 HB	O	15-20	O	15-20	OOO	15-20	OOO	15-30	O	15-20
≤600		x	-	x	-	OOO	15-20	OOO	15-30	OO	10-15
≤600		x	-	x	-	OOO	15-20	OOO	15-30	OO	10-15
≤400		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≤450		OOO	10-20	OOO	10-20	x	-	OOO	15-25	OOO	10-20
≤600		OO	10-20	OO	10-20	OOO	15-20	OOO	20-40	OOO	10-20
≤600		OO	10-20	OO	10-20	OOO	15-20	OOO	20-40	x	-

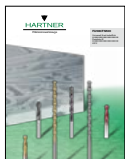
OOO optimal

OO good suitable

O suitable

x not suitable

Our programme:



FU 500/FN500



Gun Drills



INOX Drills



Multiplex



Micro Precision Drills



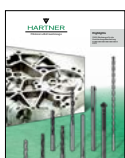
Multiplex HPC



TS-Drills



Standard Range



Highlights



TM Vending Machines



Solid Carbide
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