Cutting tools

Catalogue | 21 edition

Fabryka Narzędzi **FANAR S.A.**

Fabryka Narzędzi FANAR S.A.

is a leading manufacturer of cutting tools for metalworking

For many years, we focus on innovation, quality and continous development. Our knowledge and experience, which is supported by **newest technology and modern stock of machine tools** allow us to offer innovative products meeting highest quality requirements. We are trusted supplier in the country and abroad. We are cooperating with the world's biggest producers of such industries as: automotive, aerospace, medical, home appliances and many others.

A wide range of products supported by service, technical advice, and IT new solutions in customer service ensure a high level of customer satisfaction.

We are manufacturer with global reach

Our tools are distributed to more than **40 countries**. More and more recognizable brand of manufacturer of the highest quality products allows for further international expansion. Looking for **the highest quality cutting tools** take advantage of our global distribution network. The current list of official distributors available on the **www.fanar.pl**.

TECHNICAL INFORMATION

Groups of high performance tools and their application:

Linia MASTER — **MASTERTAP**, **MASTERMILL** and **MASTERDRILL** are characterized by highest performance. These tools are manufactured using state-of-art. technology and materials. They can be used in a wide range of materials.

Linia X — The **800X** Taps, **X-MILL** Mills and **X-DRILL** Drill Bits contain the highest number of tool variants to suiit almost anyapplication. Multifunctional tools for use on both conventional machine tools and modern CNC machines.

800 — For structural, free machining and low alloy steels with the tensile strength of Rm ≤ 800 Mpa.

FAN-1200 — For tool and difficult to process steels with the tensile strength of 800 MPa ≤ Rm ≤ 1200 MPa, and for heat treated steels up to 38 HRC.

1400-HT — For machining hard and abrasive materials such as steel with tensile strenght from 1200 to 1400 Mpa and aluminum with high silicon content.

INOX — For high alloy steel, stainless and acid resistant steels with a tensile strength of Rm ≤ 1000 Mpa.

GG — For processing of grey and nodular cast iron.

GAL — For cast aluminum alloys with the Si content of max 12%.

AL — For aluminum alloys and non ferrous metals.

HRC — For materials, which have been hardened. The number next to the symbol indicates the maximum hardness of the material to be processed, in the HRC scale.

S-NC — For synchronized tapping on CNC machines with the "rigid tapping" function for a wide range of materials with the high cutting speeds.

Ms — For brass and short chip bronze.

WGN — Forming taps for machining materials with limited ductility.

For more information visit
our website **WWW.FANAR.PL**

Annealed	A
Tempered	QT
Hardened and tempered	HT
Precipitation hardened	PH

	Mark	Price	Availability
In catalogue	●	in pricelist	on stock
	○	in pricelist	on request
	-	-	not available
Not in catalogue	standard index special index	on request	on request

Cutting speed Vc (m/min)

10-15	Recommended tool
10-15	Permitted use of the tool
	Manual processing

Hole type

- Throught
- Blind

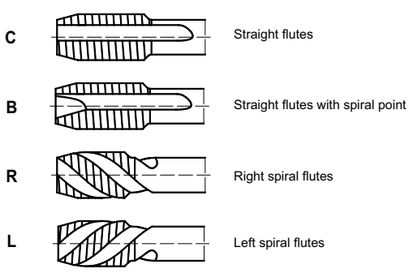
Coating

HL	TiAlN + WC/C	**TC**	TiN + TiCN	**TB**	TiB_2
TN2	TiAlN + TiN	**AT**	AlTiN	**TS**	TiAlSiN

Coolant

E	Emulsion	**O**	Oil	**P**	Threading paste	**MQL**	Minimum Quantity Lubrication

Flutes execution



The speed values below are approximate.
The speed should be adjust experimentally.

MATERIAL GROUP					Rm	HB	HRC	kc	MATERIAL EXAMPLE	MATERIAL NUMBER	TYPE OF CHIPS		MATERIAL GROUP
Steel													
P	P1	Non-alloyed steel	Free cutting steel	A	750	220		2500	11SMnPb30 / 10SPb20 / 35S20 / 11SMn37	1.0718 / 1.0722 / 1.0726 / 1.0736	short	P1	P
	P2		C ≤ 0,55 %	A	650	190	-	2500	S235JR / S275JR / C22 / C45	1.0038 / 1.0044 / 1.0402 / 1.0503	long	P2	
	P3		C > 0,55 %	A	650	190	-	2500	C55 / C60 / C60E	1.0535 / 1.0601 / 1.1221	long	P3	
	P4		C ≤ 0,55 %	QT	700	210	-	2500	C25E / C53G / G18Mo5 / 16Mo5	1.1158 / 1.1213 / 1.5422 / 1.5423	long	P4	
	P5		C > 0,55 %	QT	1000	300	32	2600	C55 / C55E / C60E	1.0535 / 1.1203 / 1.1221	long	P5	
	P6	Low-alloyed steel		A	600	175	-	2300	36Mn5 / 107CrV3 / 100Cr6 / 20NiCrMo2-2 / 41Cr4	1.1167 / 1.2210 / 1.3505 / 1.6523 / 1.7035	long	P6	
	P7			QT	1000	300	32	2600	34Cr4 / 25CrMo4 / 42CrMo4 / Weldox 700 / Weldox 900	1.7033 / 1.7218 / 1.7225	long	P7	
	P8			QT	1200	380	41	3000	36NiCr6 / 34CrNiMo6 / 55Cr3 / 51CrV4	1.5710 / 1.6582 / 1.7176 / 1.8159	long	P8	
	P9			QT	1400	420	45	3600	55Si7 / 60SiCr7 / 55NiCrMoV6 / 40CrMoV13-9	1.0904 / 1.0961 / 1.2713 / 1.8523	long	P9	
	P10	High-alloyed steel and high-alloyed tool steel		A	700	210	-	2500	X210Cr12 / X100CrMoV5-1 / HS6-5-2-5 / HS6-5-2	1.2080 / 1.2363 / 1.3243 / 1.3343	middle	P10	
	P11			A	1000	300	32	2600	HS6-5-2-5 / HS18-1-2-5 / HS 10-2-5-8 / HS 6-5-3-8	1.3243 / 1.3255 / 1.3253 / 1.3294	middle	P11	
	P12			HT	1400	420	45	3600	X30WCrV9-3	1.2581	middle	P12	
	P13	Stainless steel	Ferritic/martensitic	A	700	210	-	3200	X6Cr13 / X12Cr13 / X14CrMoS17 / X6CrMo17-1	1.4000 / 1.4006 / 1.4104 / 1.4113	long	P13	
	P14		Martensitic	QT	1100	330	34	3200	X12Cr13 / GX20Cr14 / X19CrNi17-2 / X45CrSi9-3-1	1.4006 / 1.4027 / 1.4057 / 1.4718	long	P14	
Stainless steel													
M	M1	Stainless steel	Austenitic		700	210	-	3200	X5CrNi18-10 / X5CrNiMo17-12-2 / X2CrNiMo18-14-3 / X12NiCrSi36-16	1.4301 / 1.4401 / 1.4435 ,1.4864	long	M1	M
	M2		Austenitic	PH	1000	300	32	3200	X9CrNi18-8 / X53CrMnNiN21-9	1.4310 / 1.4871	long	M2	
	M3		Duplex		800	240	23	4000	X2CrNiN23-4 / X2CrNiMoN17-13-3 / X2CrNiMoN22-5-3 / X2CrNiMoCuN25-6-3	1.4362 / 1.4429 / 1.4462 / 1.4507	long	M3	
Cast iron													
K	K1	Grey cast iron(GJL)			400	120	-	1600	EN-GJL-100 / EN-GJL-200 / EN-GJL-300 / EN-GJL-400	0.6010 / 0.6020 / 0.6030 / 0.6040	very short	K1	K
	K2	Cast iron with vermicular graphite (GJV) CGI			550	160	-	2500	EN-GJV-300 / EN-GJV-400 / EN-GJV-500 / EN-GJV-550	-	short/middle	K2	
	K3	Malleable cast iron (GJMW / GJMB)			500	150	-	2700	EN-GJMW-300-26 / EN-GJMB-350-10 / EN-GJMB-450-6	0.8035 / 0.8135 / 0.8145	short/middle	K3	
	K4	Malleable cast iron (GJMB)			800	240	-	2700	EN-GJMB-550-4 / EN-GJMB-700-2 / EN-GJMB-800-1	0.8155 / 0.8170 / 0.8180	short/middle	K4	
	K5	Cast iron with spheroidal graphite (GJS)			700	210	-	2400	EN-GJS-400-15 / EN-GJS-500-7 / EN-GJS-700-2	0.7040 / 0.7050 / 0.7070	short/middle	K5	
	K6	Cast iron with spheroidal graphite (GJS) ADI			1400	420	45	3600	EN-GJS-800-8 / EN-GJS-1200-2 / EN-GJS-1400-1	-	short/middle	K6	
Non-ferrous metals													
N	N1	Aluminium wrought alloys			200	-	-	680	ENAW-Al99.5 / ENAW-AlSi1MgMn (PA4) / ENAW-AlMg0.7Si (PA38) / ENAW-AlMg3 (PA11)	3.0255 / 3.2315 / 3.3206 / 3.3535	long	N1	N
	N2			PH	500	152	-	680	ENAW-AlCu6BiPb / ENAW-AlCu4MgSi(A) (PA6) / ENAW-AlZn5.5MgCu (Pa9) / ENAW-AlMg4.5Mn0.7 (PA13)	3.1655 / 3.1325 / 3.4365 / 3.3547	long	N2	
	N3	Cast aluminium alloys	Si ≤ 12%		250	75	-	680	ENAC-AlSi12 / ENAC-AlSi12(Fe) / ENAC-AlSi12(Cu) / ENAC-AlMg5	3.2581 / 3.2582 / 3.2583 / 3.3561	short/middle	N3	
	N4		Si ≤ 12%	PH	300	90	-	680	ENAC-AlCu4MgTi / ENAC-AlSi7Mg0.3 / ENAC-AlSi9Mg / ENAC-AlSi10Mg(a)	3.1371 / 3.2371 / 3.2373 / 3.2381	short/middle	N4	
	N5		Si> 12 %		450	130	-	680	ENAC-AlSi17Cu4Mg	-	short	N5	
	N6	Magnesium alloys			250	70	-	750	EN-MAMgMn1 / EN-MCMgRE3Zn2Zr / EN-MCMgRE2Ag2Zr / EN-MCMgAl4Si	3.5101 / 3.5103 / 3.3506 / 3.5470	short	N6	
	N7	Copper and copper alloys	Pure, Non-alloyed		350	100	-	1100	Cu-OF / Cu-DHP / CuZn35Mn2Al1Fe1-C / CuAl10Ni5Fe4	2.0040 / 2.0090 / 2.0592 / 2.0966	extra long	N7	
	N8		Cu-alloys, long-chipping		600	180	-	1900	CuZn37 (M63) / CuAl10Ni5Fe4 / CuSn8P	2.0321 / 2.0966 / 2.1030	long	N8	
	N9		Cu-alloys, short-chipping		400	120	-	1900	CuZn40Pb2 (M58)(MO58) / CuSn7Zn4Pb7-C / CuSn5Zn5Pb5-C / CuSn10Pb10-C	2.0402 / 2.1090 / 2.1096 / 2.1176	short	N9	
	N10		High-strength,		1000	300	32	1400	AMPCO 8 / AMPCO 21 / AMPCO M4	-	long	N10	
Superalloys and titanium													
S	S1	Heat-resistant alloys	Fe-based	A	675	200	-	4000	Incoloy 909 / Multimet 155 / X10NiCrAlTi3220 (Incoly 800) / X40CoCrNi2020	1.4876 / 1.4977	long	S1	S
	S2			PH	950	280	29	4000	Incoloy A-286 / Unitemp 212	-	long	S2	
	S3		Ni / Co base	A	850	250	25	4000	Incoloy 864 / Nimocast 713	-	long	S3	
	S4			PH	1200	350	38	4000	Inconel 718 / Nimonic 80A	-	long	S4	
	S5			C	1100	320	34	4000	GMR 235* / Jessop G81*	-	long	S5	
	S6	Titanium alloys	Pure titanium		675	200	-	4000	Ti 99.8 / TiCu2	3.7025 / 3.7124	extra long	S6	
	S7		α and β alloys		1250	375	40	4000	Ti-6Al-4V / Ti-6Al-2Mo-2Cr / Ti-6Al-6Mo-4Zr-2Sn	3.7165	short/middle	S7	
	S8		β alloys		1400	410	44	4000	Ti-10V-2Fe-3Al / Ti-13V-11Cr-3Al	-	short/middle	S8	
Hard materials													
H	H1	Hardened steel		HT			50	4100	Weldox 1100 / Weldox 1300 / Hardox 500	-	short	H1	H
	H2			HT			55	4700	Hardox 550 / Hardox 600 / Armox 600 T	-	short	H2	
	H3			HT			60	5000	Hardox Extreme	-	short	H3	
	H4	Hardened and tempered cast iron		HT			55	4700	GX260NiCr42 / GX330NiCr42 / GX300CrMoNi15-2-1	0.9620 / 0.9625 / 0.9640	short	H4	

MASTERTAP						800X			800			FAN-I200		Name
B-HL	B-IKR-HL	C-R45-HL	C-R45-IK-HL	E-R45-HL	E-R45-IK-HL	C-TN2	B-TN2	C-R40-TN2	C	B	C-R40	B-TS	C-R40-TS	
														
17 / 18	17 / 18	17 / 18	17 / 18	17 / 18	17 / 18	19 / 20	19 / 20 / 23	21 / 22 / 23	24 / 25	24 / 25 / 28	26 / 27 / 28	29	29	M
40 / 41	40 / 41	40 / 41	40 / 41	40 / 41	40 / 41	42 / 43 / 44	42 / 43 / 44	42 / 43 / 44	45 / 46 / 47	45 / 46 / 47	45 / 46 / 47	48 / 49	48 / 49	MF
63		63					64	64		65	65			UNC
67		67					68	68		69	69			UNF
							71	71		72	72			UNEF
														UNJC
														UNJF
75		75				76	76	76	77	77	77			G
									81					Rp
									81					RC
									82					NPT
									83					NPTF
									84					NPSF
										85	85			BSW
														BSF
86				86										EG M
87				87										EG UNC
88				88										EG UNF
														Tr
HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM	Material
B/4-5P	B/4-5P	C/2-3P	C/2-3P	E/1,5-2P	E/1,5-2P	C/2-3P	B/4-5P	C/2-3P	C/2-3P	B/4-5P	C/2-3P	B/4-5P	C/2-3P	Chamfer
< 3xD	< 3xD	< 2,5xD	< 2,5xD	< 2,5xD	< 2,5xD	< 1,5xD	< 3xD	< 2,5xD	< 1,5xD	< 3xD	< 2,5xD	< 3xD	< 2,5xD	Hole type
E/O/P	E/O/MQL	E/O/P	E/O/MQL	E/O/P	E/O/MQL	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	Coolant
Vc (m/min)														
10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P1
10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P2
10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P3
10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P4
10-40	20-50	10-40	20-50	10-40	20-50	5-20	5-20	5-20				5-20	5-20	P5
10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P6
10-40	20-50	10-40	20-50	10-40	20-50	5-20	5-20	5-20				5-20	5-20	P7
10-40	20-50	10-40	20-50	10-40	20-50							5-20	5-20	P8
5-15[1)]	5-15[1)]													P9
10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P10
10-40	20-50	10-40	20-50	10-40	20-50							5-20	5-20	P11
5-15[1)]	5-15[1)]													P12
5-15	5-25	5-15	5-25	5-15	5-25	5-15	5-15	5-15				5-15	5-15	P13
5-15	5-25	5-15	5-25	5-15	5-25	5-15	5-15	5-15				5-15	5-15	P14
5-15	5-25	5-15	5-25	5-15	5-25	5-15	5-15	5-15	5-10	5-10	5-10			M1
5-15	5-25	5-15	5-25	5-15	5-25	5-15	5-15	5-15	5-10	5-10	5-10	5-10	5-10	M2
5-15	5-25	5-15	5-25	5-15	5-25	5-15	5-15	5-15	5-10	5-10	5-10	5-10	5-10	M3
10-30	10-50	10-30	10-50	10-30	10-50	5-15	5-15		5-15	5-15		5-15	5-15	K1
10-30	10-50	10-30	10-50	10-30	10-50	5-15	5-15		5-15	5-15		5-15	5-15	K2
10-30	10-50	10-30	10-50	10-30	10-50	10-25	10-25	10-25	5-15	5-15	5-15	10-25	10-25	K3
10-30	10-50	10-30	10-50	10-30	10-50	10-25	10-25	10-25	5-15	5-15	5-15	10-25	10-25	K4
10-30	10-50	10-30	10-50	10-30	10-50	10-25	10-25	10-25	5-15	5-15	5-15	10-25	10-25	K5
5-15[1)]	5-15[1)]	5-15[1)]	5-15[1)]	5-15[1)]	5-15[1)]									K6
10-30	10-50	10-30	10-50	10-30	10-50									N1
10-30	10-50	10-30	10-50	10-30	10-50									N2
10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30	10-20	10-25	10-25	10-25	10-30	10-30	N3
10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30	10-20	10-25	10-25	10-25	10-30	10-30	N4
10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30	10-20	5-20	5-20	10-25	10-30	10-30	N5
10-30	10-50	10-30	10-50	10-30	10-50									N6
10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30	10-30	5-20	5-20	5-20	10-30	10-30	N7
10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30	10-30	5-20	5-20	5-20	10-30	10-30	N8
10-30	10-50	10-30	10-50	10-30	10-50									N9
5-25	5-25	5-25	5-25	5-25	5-25							10-30	10-30	N10
1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]									S1
1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]									S2
														S3
														S4
														S5
1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]	1-8[1)]									S6
														S7
														S8
														H1
														H2
														H3
														H4

Page

Name	I400-HT			INOX				GG					GAL	
	C-TS	B-TS	C-R15-TS	B	B-HL	C-R40	C-R40-HL	C-TS	C-IK-TS	E-TS	E-IK-TS	E-IKR-TS	C-R15-TS	E-R15-IK-TS
														
M	29	29	29	30 / 31	30 / 31	30 / 31	30 / 31	32	32	32	32	32	32	32
MF	48 / 49	48 / 49	48 / 49	50 / 51 / 52	50 / 51 / 52	50 / 51 / 52	50 / 51 / 52	53 / 54	53 / 54	53 / 54	53 / 54	53 / 54	53 / 54	53 / 54
UNC														
UNF														
UNEF														
UNJC		73	73											
UNJF		74	74											
G														
Rp														
Page RC														
NPT														
NPTF														
NPSF														
BSW														
BSF														
EG M														
EG UNC														
EG UNF														
Tr														
Material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Chamfer	C/2-3P	B/4-5P	C/2-3P	B/4-5P	B/4-5P	C/2-3P	C/2-3P	C/2-3P	C/2-3P	E/1,5-2P	E/1,5-2P	E/1,5-2P	C/2-3P	E/1,5-2P
Hole type	< 1,5xD	< 2,5xD	< 1,5xD	< 3xD	< 3xD	< 2,5xD	< 2,5xD	< 2xD	< 2,5xD	< 2xD	< 2,5xD	< 2,5xD	< 2,5xD	< 2,5xD
Coolant	E/O/P	E/O	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O	E/O/MQL	E/O	E/O/MQL	E/O/MQL	E/O/P	E/O/MQL
	Vc (m/min)													
P1														
P2														
P3														
P4														
P5	5-20	5-20	5-20											
P6														
P7	5-20	5-20	5-20											
P8	5-20	5-20	5-20											
P9	1-5	1-10	1-10											
P10														
P11	5-20	5-20	5-20											
P12	1-5	1-10	1-10											
P13														
P14														
M1				5-15	5-25	5-15	5-25							
M2	5-10	5-10	5-10	5-15	5-25	5-15	5-25							
M3	1-8	1-8	1-8	5-10	5-10	5-10	5-10							
K1	10-20	10-20	10-20					20-60	20-60	20-60	20-60	20-60		
K2								15-30	15-30	15-30	15-30	15-30		
K3	10-20	10-20	10-20					15-30	15-30	15-30	15-30	15-30		
K4	10-20	10-20	10-20					15-30	15-30	15-30	15-30	15-30		
K5	10-20	10-20	10-20					15-30	15-30	15-30	15-30	15-30		
K6	1-5	1-10	1-10					5-10	5-10	5-10	5-10	5-10		
N1														
N2														
N3			10-30										10-30	10-50
N4			10-30										10-30	10-50
N5			10-30										10-30	10-50
N6														
N7														
N8														
N9														
N10														
S1														
S2														
S3														
S4														
S5														
S6														
S7														
S8														
H1														
H2														
H3														
H4														

	HRC60				S-NC			DIN-352	Ms	NUTAP	NGMF	NGST	KOMBI	BIT	Name
	C-HM-TC	C-IK-HM-TC	D-HM-TC	D-IK-HM-TC	B-TC	C-R45-TC	C-R45-IK-TC					TRAPEZOIDAL			
															
	33	33	33	33	34	34	34	35		36	37		38	39	M
					55 / 56	55 / 56	55 / 56	57 / 58 / 59		60	61 / 62				MF
								66							UNC
								70							UNF
															UNEF
															UNJC
															UNJF
								79	78		80				G
															Rp
															RC
															NPT
															NPTF
															NPSF
															BSW
															BSF
															EG M
															EG UNC
															EG UNF
												89			Tr
	VHM	VHM	VHM	VHM	HSSE-PM	HSSE-PM	HSSE-PM	HSS	HSSE	HSSE	HSS	HSS	HSS	HSS	Material
	C/2-3P	C/2-3P	D/3,5-5P	D/3,5-5P	B/4-5P	C/2-3P	C/2-3P	~3P	F/1P	12P	12P	24P	D/4P	D/4P	Chamfer
	 < 1,5xD	 < 1,5xD	 < 1,5xD	 < 1,5xD	 < 2,5xD	 < 3xD	 < 3xD	 < 1,5xD	 < 2xD	 < 1,5xD	 < 1,5xD	 < 2xD	 < 1,5xD	 < 1,5xD	Hole type
	E/O/P	E/O/MQL	E/O/P	E/O/MQL	E/O/P	E/O/P	E/O/MQL	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	Coolant
					10-50	10-50	20-60	5-20		5-20	5-20	5-20	5-15	5-15	P1
					10-50	10-50	20-60	5-20		5-20	5-20	5-20	5-15	5-15	P2
					10-50	10-50	20-60	5-20		5-20	5-20	5-20	5-15	5-15	P3
					10-50	10-50	20-60	5-20		5-20	5-20	5-20	5-15	5-15	P4
					10-50	10-50	20-60			5-15					P5
					10-50	10-50	20-60	5-20		5-20	5-20	5-20	5-15	5-15	P6
					10-50	10-50	20-60			5-15					P7
					10-50	10-50	20-60			5-10					P8
					5-15[1)]										P9
					10-50	10-50	20-60	5-20		5-20	5-20	5-20	5-15	5-15	P10
					10-50	10-50	20-60			5-15					P11
					5-15[1)]										P12
					5-20	5-20	5-30								P13
					5-15	5-15	5-25								P14
					5-20	5-20	5-30								M1
					5-15	5-15	5-25								M2
					5-20	5-20	5-30								M3
					10-40	10-40	10-60				6-15	6-15			K1
					10-40	10-40	10-60								K2
					10-40	10-40	10-60								K3
					10-40	10-40	10-60								K4
					10-40	10-40	10-60								K5
					5-15[1)]	5-15[1)]	5-15[1)]								K6
					10-40	10-40	10-60								N1
					10-40	10-40	10-60								N2
					10-40	10-40	10-60								N3
					10-40	10-40	10-60								N4
					10-40	10-40	10-60								N5
					10-40	10-40	10-60								N6
					10-40	10-40	10-60								N7
					10-40	10-40	10-60								N8
					10-40	10-40	10-60		10-25		6-15	6-15	6-15	6-15	N9
					5-25	5-25	5-30								N10
					1-8[1)]	1-8[1)]	1-8[1)]								S1
					1-8[1)]	1-8[1)]	1-8[1)]								S2
															S3
															S4
															S5
					1-8[1)]	1-8[1)]	1-8[1)]								S6
															S7
															S8
	1-4	1-4	1-4	1-4											H1
	1-4	1-4	1-4	1-4											H2
	1-4	1-4	1-4	1-4											H3
	1-4	1-4	1-4	1-4											H4

Page

P

M

K

N

S

H

Name	WGN								HRC	
	C-TN2	C-SR-TN2	C-SR-TC	E-SR-TC	E-SR-IK-TC	E-SR-IKR-TC				
										 Thread mills for small holes
M	93	93	93	93	93	93	101	102	103	104
MF		94	94				101	102	103	104
UNC		95								
UNF		96								
UNEF										
G		97								
Material	PM/HSSE	PM/HSSE	PM/HSSE	PM/HSSE	PM/HSSE	PM/HSSE	VHM	VHM	VHM	VHM
Chamfer	C/2-3P	C/2-3P	C/2-3P	E/1,5-2P	E/1,5-2P	E/1,5-2P	-	-	-	-
Hole type	< 3xD	< 3xD	< 3xD	< 3xD	< 3xD	< 3xD				
Coolant	E/O	E/O	E/O	E/O	E/O/MQL	E/O/MQL	E/O	E/O	E/O	E/O
P	P1	10-30	10-30	10-30	10-30	15-50	15-50	100-150	100-150		50-90
	P2	10-30	10-30	10-30	10-30	15-50	15-50	100-150	100-150		50-90
	P3	10-30	10-30	10-30	10-30	15-50	15-50	100-150	100-150		50-90
	P4	10-30	10-30	10-30	10-30	15-50	15-50	100-150	100-150		50-90
	P5	10-25	10-25	10-25	10-25	10-30	10-30	100-150	100-150		45-60
	P6	10-30	10-30	10-30	10-30	15-50	15-50	85-120	85-120		50-90
	P7	10-25	10-25	10-25	10-25	10-30	10-30	85-120	85-120		45-60
	P8							85-120	85-120		40-55
	P9							85-120	85-120		40-55
	P10	10-30	10-30	10-30	10-30	15-50	15-50	70-100	70-100	70-100	50-90
	P11			10-25	10-25	10-30	10-30	70-100	70-100	70-100	45-60
	P12							70-100	70-100	70-100	40-55
	P13			10-25	10-25	10-30	10-30	60-90	60-90	60-90	50-90
	P14							60-90	60-90	60-90	40-55
M	M1	10-25	10-25	10-25	10-25	10-25	10-25	60-90	60-90	60-90	35-50
	M2	10-25	10-25	10-25	10-25	10-25	10-25	60-90	60-90	60-90	35-50
	M3			10-25	10-25	10-25	10-25	50-70	50-70	50-70	35-50
K	K1							70-150	70-150		40-60
	K2							70-150	70-150		40-60
	K3							70-150	70-150		40-60
	K4							70-150	70-150		40-60
	K5							70-150	70-150		40-60
	K6										40-60
N	N1	20-40	20-40	20-60	20-60	20-60	20-60	150-220	150-220		60-180
	N2	20-40	20-40	20-60	20-60	20-60	20-60	150-220	150-220		60-180
	N3	20-40	20-40	20-60	20-60	20-60	20-60	150-220	150-220		60-180
	N4			20-60	20-60	20-60	20-60	150-220	150-220		60-180
	N5			20-60	20-60	20-60	20-60	100-180	100-180		60-180
	N6							100-180	100-180		
	N7	20-40	20-40	20-60	20-60	20-60	20-60	100-180	100-180		60-180
	N8	20-40	20-40	20-60	20-60	20-60	20-60	100-180	100-180		60-180
	N9							100-180	100-180		
	N10							100-180	100-180		
S	S1									20-40	25-40
	S2									20-40	25-40
	S3									20-40	25-40
	S4									20-40	25-40
	S5									20-40	25-40
	S6									30-50	25-40
	S7									30-50	25-40
	S8									30-50	25-40
H	H1									55-70	
	H2									40-60	
	H3									35-50	
	H4										

			INOX		HRC40	Name
	KPL/2	KPL/3	KPL/3-P	KPL/3-P-TN2	KPL/3-P-TS	
						
	107 / 108 / 109	107 / 108 / 109	110	111	112	M
	113 / 114 / 115				116	MF
		117				UNC
	118					UNF
	119		120		121	G
		122				BSW
	123					BSF
	HSS	HSS	HSSE	HSSE	HSSE-PM	Material
	C/2-3P	C/2-3P	C/2-3P	C/2-3P	C/2-3P	Chamfer
	< 2,5xD	< 2,5xD	< 2,5xD	< 2,5xD	< 1,5xD	Hole type
	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	Coolant
P	✋	✋	✋	✋		P1
P	✋	✋	✋	✋		P2
P	✋	✋	✋	✋		P3
P	✋	✋	✋	✋		P4
P					✋	P5
P	✋	✋	✋	✋		P6
P					✋	P7
P					✋	P8
P					✋	P9
P	✋	✋	✋	✋		P10
P					✋	P11
P						P12
P			✋	✋		P13
P			✋	✋		P14
M			✋	✋		M1
M			✋	✋		M2
M			✋	✋		M3
K						K1
K						K2
K						K3
K						K4
K						K5
K						K6
N						N1
N						N2
N						N3
N						N4
N						N5
N						N6
N						N7
N						N8
N						N9
N						N10
S						S1
S						S2
S						S3
S						S4
S						S5
S						S6
S						S7
S						S8
H						H1
H						H2
H						H3
H						H4

Name	800	800 SPN	Ms	INOX
				
M	127	127	127	127
MF	128 / 129 / 130	128 / 129 / 130	128 / 129 / 130	128 / 129 / 130
UNC	131			
UNF	132			
G	133	133	133	133
R	134			
BSW	135			
BSF	136			
NPT	137			
Execution		SPN - spiral point	Lapped; special geometry	Lapped; special geometry
Material	HSS	HSS	HSS	HSSE
Chamfer	1,75P	1,75P	1,25P	2,25P
Coolant	E/O/P	E/O/P	E/O/P	E/O/P
P P1	4-8	4-8		4-8
P2	3-6	3-6		3-6
P3	3-6	3-6		3-6
P4	2-5	2-5		3-6
P5	2-5	2-5		3-6
P6				
P7				
P8				
P9				
P10	1-3	1-3		1-5
P11				1-5
P12				
P13				2-6
P14				2-6
M M1				2-6
M2				2-6
M3				
K K1			5-8	
K2			5-8	
K3			5-8	
K4			2-5	
K5			2-5	
K6				
N N1				
N2				
N3	10-20	10-20		10-20
N4	10-20	10-20		10-20
N5				5-15
N6				1-5
N7	7-12	7-12	10-15	10-15
N8	10-15	10-15	12-18	10-15
N9			20-30	15-25
N10			6-10	8-12
S S1				
S2				
S3				
S4				
S5				
S6				
S7				
S8				
H H1				
H2				
H3				
H4				

	MASTERDRILL			X-DRILL				HRC		AL		INOX		
														
	DIN-6537 3xD	DIN-6537 5xD	DIN-6537 8xD	DIN-6537 3xD	DIN-6537 5xD	DIN-6537	DIN-6539	DIN-6537 3xD	DIN-6537 5xD	DIN-6537 5xD	DIN-6537 5xD	DIN-338	DIN-338	**Norm**
	m7	m7	m7	m7	m7	m7	h7	m7	m7	m7	m7	h8	h8	**Tolerance**
	141 - 143	144 - 146	147 - 149	141 - 143	144 - 146	160 - 161	159	150 - 152	153 - 155	156 - 158	156 - 158	162 - 164	162 - 164	**Page number**
	λ35°÷40° δ140°	λ35°÷40° δ140°	λ35°÷40° δ140°	λ35°÷40° δ140°	λ35°÷40° δ140°	λ35°÷40° δ140°	λ35°÷40° δ118°	λ35°÷40° δ140°	λ35°÷40° δ140°	λ15° δ130°	λ15° δ130°	λ36° δ130°	λ36° δ130°	**Geometry**
	IK	IK	IK					IK	IK	IK	IK			**External coolant**
	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	HSSE	HSSE	**Material**
	AT	AT	AT	AT	AT	AT		TS	TS		TB		TN2	**Coating**
	3÷20	3÷20	3÷20	3÷20	3÷20	2,35÷14	0,75÷2,9	3÷20	3÷20	3÷20	3÷20	1÷16	1÷16	**Range of diameter**
	110 c	100 c	50 c	70 c	60 c	70 a	55 a					35 c	40 c	P1
	110 c	100 c	50 c	70 c	60 c	70 a	55 a					28 b	32 b	P2
	100 c	90 c	50 c	70 c	60 c	70 a	55 a					28 b	32 b	P3
	110 c	100 c	40 b	50 b	45 b	50 a	40 a					18 b	21 b	P4
	100 c	90 c	40 b	50 b	45 b	50 a	40 a					18 b	21 b	P5
	95 c	85 c	40 b	50 b	45 b	50 a	40 a					18 b	21 b	P6
	85 c	75 c	30 b	40 b	35 b	40 a	30 a							P7
	65 c	55 c	30 b	40 b	35 b	40 a	30 a							P8
	65 c	55 c	25 b	30 b	30 b	30 a	25 a							P9
	60 c	50 c	40 b	50 b	45 b	50 a	40 a					18 b	21 b	P10
	55 c	45 c	30 b	40 b	35 b	40 a	30 a							P11
	55 c	45 c	25 b	30 b	30 b	30 a	25 a							P12
	60 c	50 c	40 b	50 b	45 b	50 a	40 a					13 b	15 b	P13
	60 c	50 c	40 b	50 b	45 b	50 a	40 a					13 b	15 b	P14
	60 b	50 b	25 b	30 b	30 b	30 a	25 a					10 b	12 b	M1
	60 b	50 b												M2
	60 b	50 b	25 b	30 b	30 b	30 a	25 a							M3
	120 d	110 d	80 d	100 d	90 d	100 b	80 b					35 d	40 d	K1
	95 d	85 d												K2
	120 d	110 d	60 d	80 d	70 d	80 b	60 b							K3
	100 d	90 d	60 d	80 d	70 d	80 b	60 b							K4
	85 d	75 d	50 d	65 d	60 d	65 b	50 b							K5
	85 d	75 d	50 d	65 d	60 d	65 b	50 b							K6
	250 e	220 e	160 e	200 e	180 e	200 b	160 b			250 e	250 e	37 d	43 d	N1
	250 e	220 e	160 e	200 e	180 e	200 b	160 b			250 e	250 e	37 d	43 d	N2
	250 e	220 e	160 e	200 e	180 e	200 b	160 b			250 e	250 e	27 c	31 c	N3
	250 e	220 e	160 e	200 e	180 e	200 b	160 b			250 e	250 e	27 c	31 c	N4
	200 e	180 e	130 e	160 e	150 e	160 a	125 a			200 e	200 e	32 d	37 d	N5
	200 e	180 e								150 d	150 d			N6
	120 c	110 d	80 c	100 c	90 c	100 b	80 b			200 c	200 c	38 c	44 c	N7
	150 c	135 c	100 c	120 c	110 c	120 b	100 b			200 c	200 c	41 b	47 b	N8
	150 c	135 c	100 c	120 c	110 c	120 b	100 b			200 c	200 c	41 b	47 b	N9
	150 c	135 c								200 c	200 c			N10
	25 a	22 a	15 a	20 a	18 a	20 a	16 a					9 b	10 b	S1
	25 a	22 a	15 a	20 a	18 a	20 a	16 a					9 b	10 b	S2
	25 a	22 a												S3
	25 a	22 a												S4
	25 a	22 a												S5
	60 b	50 b	30 b	40 b	35 b	40 a	30 a					24 b	28 b	S6
	60 b	50 b	25 b	30 b	30 b	30 a	25 a					12 a	14 a	S7
	60 b	50 b	25 b	30 b	30 b	30 a	25 a					12 a	14 a	S8
								40 b	40 b					H1
								35 b	35 b					H2
								30 b	30 b					H3
								35 b	35 b					H4

The table contains recommended cutting speeds Vc in m/min and the symbols of feed groups on next page

	WST	WDG	Center drills			Deburring tools		Countersinks				Taper reamers
										Deburring tool PF	with solid pilot	
	 Multistage drill	 Drills to romove broken taps										
Norm			NC	NC	DIN-333 A / B / R / EL	DIN-6537L	DIN-6537L	DIN-335	DIN-335		DIN-373	
Tolerance												
Page number	165	166	167	167	168 - 171	172	172	174	174	176	177	178
Geometry			δ90°	δ120°		δ60°	δ90°	δ90°	δ90°	δ30 / 45 / 60°		
External coolant												
Material	HSS	VHM	HSSE	HSSE	HSSE / HSS / VHM	VHM	VHM	HSSE	VHM		HSS	HSS
Coating	- / TN2	AT	TN2	TN2	TN2 / AT	AT	AT	- / TN2 / TC	AT	-	-	-
Range of diameter		2,5÷10,2	3÷16	2,5÷10,2	0,8÷10	4÷20	4÷20					

TABLE OF RECOMMENDED FEED MM/REV FOR DRILLS

Group	Drill diameter											
	∅ 1	∅ 2	∅ 3	∅ 4	∅ 5	∅ 6	∅8	∅10	∅12	∅14	∅16	∅20
a	0,015	0,030	0,038	0,047	0,053	0,060	0,075	0,090	0,100	0,120	0,127	0,160
b	0,020	0,050	0,070	0,085	0,100	0,120	0,150	0,180	0,200	0,230	0,250	0,270
c	0,023	0,080	0,100	0,130	0,150	0,180	0,250	0,270	0,280	0,300	0,330	0,370
d	0,030	0,100	0,160	0,180	0,220	0,240	0,300	0,370	0,400	0,450	0,480	0,500
e	0,035	0,120	0,200	0,250	0,270	0,300	0,350	0,450	0,470	0,500	0,530	0,550
f	0,050	0,150	0,220	0,250	0,320	0,400	0,490	0,620	0,650	0,720	0,850	0,900
g	0,070	0,160	0,250	0,270	0,360	0,470	0,620	0,830	0,900	0,950	1,100	1,200
h	0,090	0,200	0,270	0,300	0,400	0,520	0,750	1,000	1,100	1,200	1,300	1,350

The symbols of feed groups are given in the drills selection table by the recommended cutting speed

	MASTERMILL				X-MILL								
	440N	R440N	B440N	645	230	230L	B230	B230L	345	R345	440S	R440S	
													
	Z=4	Z=4	Z=4	Z=6	Z=2	Z=2	Z=2	Z=2	Z=3	Z=3	Z=4	Z=4	Number of flutes
	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	Tool material
	TS	TS	TS	TS	AT	AT	AT	AT	AT	AT	AT	AT	Coating
													Corner type
	181	181	182	183	184	185	186	187	188	188	189	189	Page
	●	●	●	●	●	●	●	●	●	●	●	●	P1
	●	●	●	●	●	●	●	●	●	●	●	●	P2
	●	●	●	●	●	●	●	●	●	●	●	●	P3
	●	●	●	●	●	●	●	●	●	●	●	●	P4
	●	●	●	●	●	●	●	●	●	●	●	●	P5
	●	●	●	●	●	●	●	●	●	●	●	●	P6
	●	●	●	●	●	●	●	●	●	●	●	●	P7
	●	●	●	●	●	●	●	●	●	●	●	●	P8
	●	●	●	●	●	●	●	●	●	●	●	●	P9
	●	●	●	●	●	●	●	●	●	●	●	●	P10
	●	●	●	●	●	●	●	●	●	●	●	●	P11
	●	●	●	●	●	●	●	●	●	●	●	●	P12
	●	●	●	●	●	●	●	●	●	●	●	●	P13
	●	●	●	●	●	●	●	●	●	●	●	●	P14
	●	●	●	●					○	○	○	○	M1
	●	●	●	●					○	○	○	○	M2
	●	●	●	●					○	○	○	○	M3
	●	●	●	●	●	●	●	●	●	●	●	●	K1
	●	●	●	●	●	●	●	●	●	●	●	●	K2
	●	●	●	●	●	●	●	●	●	●	●	●	K3
	●	●	●	●	●	●	●	●	●	●	●	●	K4
	●	●	●	●	●	●	●	●	●	●	●	●	K5
	●	●	●	●	●	●	●	●	●	●	●	●	K6
	○	○	○	○					○	○	○	○	N1
	○	○	○	○					○	○	○	○	N2
	○	○	○	○					○	○	○	○	N3
	○	○	○	○					○	○	○	○	N4
	○	○	○	○					○	○	○	○	N5
													N6
	○	○	○	○	○	○	○	○	○	○	○	○	N7
	○	○	○	○	○	○	○	○	○	○	○	○	N8
	○	○	○	○	○	○	○	○	○	○	○	○	N9
	○	○	○	○					○	○	○	○	N10
	●	●	●	●					○	○	○	○	S1
	●	●	●	●					○	○	○	○	S2
	●	●	●	●					○	○	○	○	S3
	●	●	●	●					○	○	○	○	S4
	●	●	●	●					○	○	○	○	S5
	●	●	●	●					○	○	○	○	S6
	●	●	●	●					○	○	○	○	S7
	●	●	●	●					○	○	○	○	S8
	○	○	○	○									H1
													H2
													H3
													H4

	X-MILL									ZGR	
	440N	R440N	440NL	R440NL	430L	R430L	B440	540	R540	420	540N
											
Number of flutes	Z=4	Z=4	Z=4	Z=4	Z=4	Z=4	Z=4	Z=5	Z=5	Z=3-4	Z=4-6
Tool material	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM
Coating	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	TS
Corner type											
Page	190 - 191	190 - 191	192	192	193	193	194	195	195	196	197
P1	●	●	●	●	●	●	●	●	●	●	●
P2	●	●	●	●	●	●	●	●	●	●	●
P3	●	●	●	●	●	●	●	●	●	●	●
P4	●	●	●	●	●	●	●	●	●	●	●
P5	●	●	●	●	●	●	●	●	●	●	●
P6	●	●	●	●	●	●	●	●	●	●	●
P7	●	●	●	●	●	●	●	●	●	●	●
P8	●	●	●	●	●	●	●	●	●	●	●
P9	●	●	●	●	●	●	●	●	●	●	●
P10	●	●	●	●	●	●	●	●	●	●	●
P11	●	●	●	●	●	●	●	●	●	●	●
P12	●	●	●	●	●	●	●	●	●	●	●
P13	●	●	●	●	●	●	●	●	●	●	●
P14	●	●	●	●	●	●	●	●	●	●	●
M1	○	○	○	○			○	○	○	○	○
M2	○	○	○	○			○	○	○	○	○
M3	○	○	○	○			○	○	○	○	○
K1	●	●	●	●	●	●	●	●	●	○	○
K2	●	●	●	●	●	●	●	●	●	○	○
K3	●	●	●	●	●	●	●	●	●	○	○
K4	●	●	●	●	●	●	●	●	●	○	○
K5	●	●	●	●	●	●	●	●	●	○	○
K6	●	●	●	●	●	●	●	●	●	○	○
N1	○	○	○	○			○	○	○		
N2	○	○	○	○			○	○	○		
N3	○	○	○	○			○	○	○		
N4	○	○	○	○			○	○	○		
N5	○	○	○	○			○	○	○		
N6											
N7	○	○	○	○	○	○	○	○	○		
N8	○	○	○	○	○	○	○	○	○		
N9	○	○	○	○	○	○	○	○	○		
N10	○	○	○	○			○	○	○		
S1	○	○	○	○			○	○	○		
S2	○	○	○	○			○	○	○		
S3	○	○	○	○			○	○	○		
S4	○	○	○	○			○	○	○		
S5	○	○	○	○			○	○	○		
S6	○	○	○	○			○	○	○		
S7	○	○	○	○			○	○	○		
S8	○	○	○	○			○	○	○		
H1										●	●
H2										○	○
H3											
H4										○	○

	HRC			AL										MultiCUT		
	HFM 200	B415N	R645	130	245	R245	B245	345	R345	345NL	B345NL	445	R338		Conical	
																
	Z=2	Z=4	Z=6	Z=1	Z=2	Z=2	Z=2	Z=3	Z=3	Z=3	Z=3	Z=4	Z=3	Z=2	Z=4	Number of flutes
	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	VHM	Tool material
	AD	TS	TS	PVD	PVD / TB	PVD / TB	TB	PVD / TB	PVD / TB	TB	TB	PVD	TB	AT	TS	Coating
																Corner type
	198	199	200	201	202 - 203	202 - 203	204	205 - 208	205 - 208	209	210	211	212	213	214	Page
	○													●	●	P1
	○													●	●	P2
	○													●	●	P3
	○													●	●	P4
	●													●	●	P5
	○													●	●	P6
	●													●	●	P7
	●													●	●	P8
	●													●	●	P9
	○													●	●	P10
	●													●	●	P11
	●													●	●	P12
	○													●	●	P13
	●													●	●	P14
														●	○	M1
														●	○	M2
														●	○	M3
	●													●	●	K1
	●													●	●	K2
	●													●	●	K3
	●													●	●	K4
	●													●	●	K5
	●													●	●	K6
				●	●	●	●	●	●	●	●	●	●	●	○	N1
				●	●	●	●	●	●	●	●	●	●	●	○	N2
				●	●	●	●	●	●	●	●	●	●	●	○	N3
				●	●	●	●	●	●	●	●	●	●	●	○	N4
				●	●	●	●	●	●	●	●	●	●	●	○	N5
																N6
				●	●	●	●	●	●	●	●	●	●	●	○	N7
				●	●	●	●	●	●	●	●	●	●	●	○	N8
				●	●	●	●	●	●	●	●	●	●	●	○	N9
				●	●	●	●	●	●	●	●	●	●	●	○	N10
														○	○	S1
														○	○	S2
														○	○	S3
														○	○	S4
														○	○	S5
														○	○	S6
														○	○	S7
														○	○	S8
	●	●	●													H1
	○	●	●													H2
		●	●													H3
	○	●	●													H4

Group of products **2**

Page number **3**

			MasterTAP						800X			800			FAN-I200		Name
			B-HL	B-IKR-HL	C-R45-HL	C-R45-IK-HL	E-R45-HL	E-R45-IK-HL	C-TN	B-TN	C-R40-TN	C	B	C-R40	B-TC	C-R60-TC	
			15 / 16	15 / 16	15 / 16	15 / 16	15 / 16	15 / 16	17 / 18	17 / 18	17 / 18	19 / 20	19 / 20 / 23	21 / 22 / 23	24	24	M
			35 / 36	35 / 36	35 / 36	35 / 36	35 / 36	35 / 36	37 / 39	37 / 39	37 / 39	38 / 41	38 / 41 / 42	38 / 41 / 42	43 / 44	43 / 44	MF
			58		58					59	59		60	60			UNC
			62		62					63	63		64	64			UNF
																	UN-8
										66	66		67	67			UNEF
			68		68				69	69	69	70	70	70			G
												74					Rp
													74				Rc
												75					NPT
												76					NPTF
												77					NPSF
													78				BSW
																	BSF
			79				79										EG M
			80				80										EG UNC
			81				81										EG UNF
																	Pg
																	Tr
			HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	Material
			Bl/4-5	Bl/4-5	C/2-3	C/2-3	E/1,5-2	E/1,5-2	C/2-3	Bl/4-5	C/2-3	C/2-3	Bl/4-5	C/2-3	Bl/4-5	C/2-3	Chamfer
			< 3xD	< 3xD	< 2,5xD	< 2,5xD	< 2,5xD	< 2,5xD	< 1,5xD	< 3xD	< 2,5xD	< 1,5xD	> 3xD	< 2,5xD	< 3xD	< 2,5xD	Hole type
			E/O/P	E/O/MQL	E/O/P	E/O/MQL	E/O/P	E/O/MQL	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	E/O/P	Coolant
P	P1	Stal	Stal automatowa		10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P1
	P2	Stal węglowa	C ≤ 0,55 % wyżarzona		10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P2
	P3		C > 0,55 % wyżarzona		10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P3
	P4		C ≤ 0,55 % ulepszana cieplnie		10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P4
	P5		C > 0,55 % ulepszana cieplnie		10-40	20-50	10-40	20-50	10-40	20-50	5-20	5-20	5-20				5-20	5-20	P5
	P6	Stal niskostopowa			10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P6
	P7				10-40	20-50	10-40	20-50	10-40	20-50	5-20	5-20	5-20				5-20	5-20	P7
	P8				10-40	20-50	10-40	20-50	10-40	20-50							5-20	5-20	P8
	P9				5-15[1]	5-15[1]													P9
	P10	Stal wysokostopowa i wysokostopowa stal narzędziowa			10-40	20-50	10-40	20-50	10-40	20-50	10-35	10-35	10-35	5-20	5-20	5-20	10-35	10-35	P10
	P11				10-40	20-50	10-40	20-50	10-40	20-50							5-20	5-20	P11
	P12				5-15[1]	5-15[1]													P12
	P13	Stal nierdzewna	Ferrytyczna/Martenz.		5-15	5-25	5-15	5-25	5-15	5-15	5-15						5-15	5-15	P13
	P14		Martenzytyczna		5-15	5-25	5-15	5-25	5-15	5-15	5-15						5-15	5-15	P14
M		**Stal nierdzewna**																	
	M1	Stal nierdzewna	Austenityczna		5-15	5-25	5-15	5-25	5-15	5-15	5-15								M1
	M2		Austenityczna		5-15	5-25	5-15	5-25	5-15	5-15	5-15						5-10	5-10	M2
	M3		Duplex		5-15	5-25	5-15	5-25	5-15	5-15	5-15						5-10	5-10	M3
K		**Żeliwo**																	
	K1	Żeliwo szare (GJL)			10-30	10-50	10-30	10-50	10-30	10-50	5-15	5-15		5-15	5-15		5-15	5-15	K1
	K2	Żeliwo wermikularne (GJV) CGI			10-30	10-50	10-30	10-50	10-30	10-50	5-15	5-15		5-15	5-15		5-15	5-15	K2
	K3	Żeliwo ciągliwe (GJMW / GJMB)			10-30	10-50	10-30	10-50	10-30	10-50	10-25	10-25	10-25	5-15	5-15	5-15	10-25	10-25	K3
	K4	Żeliwo ciągliwe (GJMB)			10-30	10-50	10-30	10-50	10-30	10-50	10-25	10-25	10-25	5-15	5-15	5-15	10-25	10-25	K4
	K5	Żeliwo sferoidalne (GJS)			10-30	10-50	10-30	10-50	10-30	10-50	10-25	10-25	10-25	5-15	5-15	5-15	10-25	10-25	K5
	K6	Żeliwo sferoidalne (GJS) ADI			5-15[1]	5-15[1]	5-15[1]	5-15[1]	5-15[1]	5-15[1]									K6
N		**Metale nieżelazne**																	
	N1	Stopy aluminium o obróbki plastycznej			10-30	10-50	10-30	10-50	10-30	10-50									N1
	N2				10-30	10-50	10-30	10-50	10-30	10-50									N2
	N3		Si ≤ 12%		10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30		10-25	10-25		10-30	10-30	N3
	N4	Stopy aluminium odlewnicze	Si > 12%		10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30		10-25	10-25		10-30	10-30	N4
	N5				10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30		5-20	5-20		10-30	10-30	N5
	N6	Stopy magnezu			10-30	10-50	10-30	10-50	10-30	10-50									N6
	N7	Miedź i jej stopy	Czysta miedź, niestopowa		10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30	10-30	5-20	5-20	5-20	10-30	10-30	N7
	N8		Stopy miedzi długowórowe		10-30	10-50	10-30	10-50	10-30	10-50	10-30	10-30	10-30	5-20	5-20	5-20	10-30	10-30	N8
	N9		Stopy miedzi krótkowórowe (mosiądz, brąz)		10-30	10-50	10-30	10-50	10-30	10-50									N9
	N10		Wysoka wytrzymałość		5-25	5-25	5-25	5-25	5-25	5-25							10-30	10-30	N10
S		**Stopy żaroodporne i stopy tytanu**																	
	S1	Stopy żaroodporne	Na bazie Fe		1-8[1]	1-8[1]	1-8[1]	1-8[1]	1-8[1]	1-8[1]									S1
	S2				1-8[1]	1-8[1]	1-8[1]	1-8[1]	1-8[1]	1-8[1]									S2
	S3		Na bazie Ni/Co																S3
	S4																		S4
	S5																		S5
	S6	Stopy tytanu	Czysty tytan		1-8[1]	1-8[1]	1-8[1]	1-8[1]	1-8[1]	1-8[1]									S6
	S7		Stopy α- i β																S7
	S8		Stopy β																S8
H		**Materiały twarde**																	
	H1	Stal hartowana																	H1
	H2																		H2
	H3																		H3
	H4	Żeliwo utwardzone i hartowane																	H4

1 Workpiece material

M	Ød_1	P	l_1	l_2	l_2 R40 R45	l_3	Ød_2	a		INDEX	C4-121101	C4-111101	C4-111102	C4-211101	C4-111103	C4-111104
Tolerancja											ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G
M3	0,50	56	10	-	18	3,5	2,7	2,50		0030	●	●	●	●	●	○
M3,5	0,60	56	12	-	20	4,0	3,0	2,90		0035	○	○	●			
M4	0,70	63	12	-	21	4,5	3,4	3,30		0040	●	●	●	●	●	○
M4,5	0,75	70	14	-	25	6,0	4,9	3,80		0045	○	○	●			
M5	0,80	70	14	-	25	6,0	4,9	4,20		0050	●	●	●	●	●	○
M6	1,00	80	18	-	30	6,0	4,9	5,00		0060	●	●	●	●	●	○
M7	1,00	80	18	-	30	7,0	5,5	6,00		0070	○	○	●			
M8	1,25	90	20	-	35	8,0	6,2	6,80		0080	●	●	●			
M9	1,25	90	20	-	35	9,0	7,0	7,80		0090	○	○	●			
M10	1,50	100	20	-	39	10,0	8,0	8,50		0100	●	●	●			

5 Thread size

6 Index and name

Tool execution **4**

Gwint metryczny DIN-13

		800					
		C	C-LH	B	B-LH	B	B
Rodzaj Materiału obrabianego		P K N	P K N	P K N	P K N	P K N	P K N
Typ otworu		< 1,5d	< 1,5d	< 3d	< 3d	< 3d	< 3d
Materiał		HSSE	HSSE	HSSE	HSSE	HSSE	HSSE
Rodzaj powłoki							
Nakrój		C / 2-3P	C / 2-3P	B / 4-5P	B / 4-5P	B / 4-5P	B / 4-5P
		DIN-371					
Tolerancja		ISO1(4H)		ISO1(4H)			
M1	0,25	●		●			
M1,1	0,25	●		●			
M1,2	0,25	●		●			
M1,4	0,30	●		●			

M	Ød_1	P	l_1	l_2	l_2 R40 R45	l_3	Ød_2	a		INDEX	C4-121101	C4-111101
											DIN-371	
Tolerancja											ISO2 (6H)	ISO2 (6H)
M1,6	0,35	40	8	-	-	2,5	2,1	1,25		0016	●	●
M1,7	0,35	40	8	-	-	2,5	2,1	1,35		0017	●	●
M1,8	0,35	40	8	-	-	2,5	2,1	1,45		0018	●	●
M2	0,40	45	10	-	-	2,8	2,1	1,60		0020	●	●
M2,2	0,45	45	10	-	-	2,8	2,1	1,75		0022	●	●
M2,3	0,40	45	10	-	-	2,8	2,1	1,90		0023	●	●
M2,5	0,45	50	9	-	-	2,8	2,1	2,05		0025	●	●
M2,6	0,45	50	9	-	-	2,8	2,1	2,15		0026	●	●

M4,5	0,75	70	14	-	25	6,0	4,9	3,80	0045	○		○				
M5	0,80	70	14	-	25	6,0	4,9	4,20	0050	●	●	●	●	●	●	
M6	1,00	80	18	-	30	6,0	4,9	5,00	0060	●	●	●	●	●	●	
M7	1,00	80	18	-	30	7,0	5,5	6,00	0070	○		●				
M8	1,25	90	20	-	35	8,0	6,2	6,80	0080	●	●	●	●	●	●	
M9	1,25	90	20	-	35	9,0	7,0	7,80	0090	○		○				
M10	1,50	100	20	-	39	10,0	8,0	8,50	0100	●	●	●	●	●	●	

ISO	Vc (m/min)					
P	5-35	5-20	5-20	5-20	5-20	
M	5-15	-	-	-	-	-
K	10-25	5-15	5-15	5-15	5-15	
N	10-35	5-25	5-25	5-25	5-25	
S						

Cutting speed **7**

HOW TO SELECT THE PRODUCT?

1. In the selection table locate the workpiece material
2. Select execution of tool
3. Find the page number in the catalog for the selected type of thread
4. Find the tool execution on specified page
5. Select the correct thread size
6. Make an index and name e.g.
   C2-221101-0080
   Tap 800 M8-6H DIN-371 C LH HSSE
7. Read recommended cutting data

CONTENTS

MACHINE TAPS

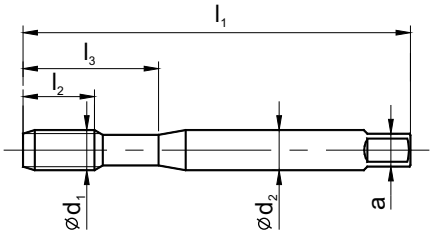
MACHINE TAPS

ISO Metric coarse thread ISO DIN-13

HSSE PM

HL

DIN 371



MASTERTAP

	B-HL	B-IKR-HL	C-R45-HL	C-R45-IK-HL	E-R45-HL	E-R45-IK-HL
						
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 3d	< 3d	< 2,5d	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	HL	HL	HL	HL	HL	HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P

M Ød1	P	l1	l2	l2 R45	l3	Ød2	a	d	Norm	DIN-371					
									Tol.	ISO1(4H)		ISO1(4H)			
									INDEX	C4-118M02		C4-528M02			
M1	0,25	40	6	6	13	2,5	2,1	0,75	0010	●		●			
M1,1	0,25	40	6	6	13	2,5	2,1	0,85	0011	●		●			
M1,2	0,25	40	6	6	13	2,5	2,1	0,95	0012	●		●			
M1,4	0,30	40	8	8	13	2,5	2,1	1,10	0014	●		●			

M Ød1	P	l1	l2	l2 R45	l3	Ød2	a	d	Norm	DIN-371					
									Tol.	ISO2 (6H)		ISO2 (6H)			
									INDEX	C4-118M01		C4-528M01			
M1,6	0,35	40	8	8	13	2,5	2,1	1,25	0016	●		●			
M1,7	0,35	40	8	8	13	2,5	2,1	1,35	0017	●		●			
M1,8	0,35	40	8	8	13	2,5	2,1	1,45	0018	●		●			
M2	0,40	45	10	10	13	2,8	2,1	1,60	0020	●		●			
M2,2	0,45	45	10	10	13	2,8	2,1	1,75	0022	●		●			
M2,3	0,40	45	10	10	13	2,8	2,1	1,90	0023	●		●			
M2,5	0,45	50	9	5	14	2,8	2,1	2,05	0025	●		●			
M2,6	0,45	50	9	5	14	2,8	2,1	2,15	0026	●		●			

M Ød1	P	l1	l2	l2 R45	l3	Ød2	a	d	Norm	DIN-371					
									Tol.	6HX	6HX	6HX	6HX	6HX	6HX
									INDEX	C4-118M01	C4-118M61	C4-528M01	C4-528M51	C4-718M01	C4-718M51
M3	0,50	56	5	5	18	3,5	2,7	2,50	0030	●	-	●	-	●	-
M3,5	0,60	56	6	6	20	4,0	3,0	2,90	0035	●	-	●	-	●	-
M4	0,70	63	7	7	21	4,5	3,4	3,30	0040	●	-	●	-	●	-
M4,5	0,75	70	7,5	7,5	25	6,0	4,9	3,80	0045	●	-	●	-	●	-
M5	0,80	70	8	8	25	6,0	4,9	4,20	0050	●	●	●	●	●	○
M6	1,00	80	10	10	30	6,0	4,9	5,00	0060	●	●	●	●	●	○
M7	1,00	80	10	10	30	7,0	5,5	6,00	0070	●	○	○	○	○	○
M8	1,25	90	13	13	35	8,0	6,2	6,80	0080	●	●	●	●	●	○
M9	1,25	90	13	13	35	9,0	7,0	7,80	0090	○	○	○	○	○	○
M10	1,50	100	15	15	39	10,0	8,0	8,50	0100	●	●	●	●	●	○

● **Available from stock**

○ **On request**

ISO	Vc (m/min)					
P	5-40	5-50	5-40	5-50	5-40	5-50
M	5-15	5-25	5-15	5-25	5-15	5-25
K	10-30	10-50	10-30	10-50	10-30	10-50
N	10-30	10-50	10-30	10-50	10-30	10-50
S	1-8	1-8	1-8	1-8	1-8	1-8

Example of order
C4-118M01-0100
Tap MasterTAP M10-6HX DIN-371 B HSSE-PM HL

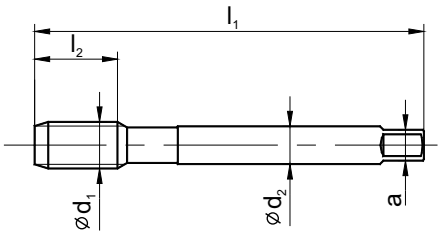
1

ISO Metric coarse thread ISO DIN-13

HSSE PM

HL

DIN 376



MASTERTAP

	B-HL	B-IKR-HL	C-R45-HL	C-R45-IK-HL	E-R45-HL	E-R45-IK-HL
						
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 3d	< 3d	< 2,5d	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	HL	HL	HL	HL	HL	HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P

M ød1	P	l1	l2	l3	ød2	a	d	Norm	DIN-376					
								Tol.	6HX	6HX	6HX	6HX	6HX	6HX
								INDEX	D4-118M01	D4-118M61	D4-528M01	D4-528M51	D4-718M01	D4-718M51
M8	1,25	90	15	-	6,0	4,9	6,80	0080	●	○	●	○	○	○
M10	1,50	100	17	-	7,0	5,5	8,50	0100	●	○	●	○	○	○
M12	1,75	110	18	-	9,0	7,0	10,20	0120	●	●	●	●	●	○
M14	2,00	110	20	-	11,0	9,0	12,00	0140	●	●	●	●	●	○
M16	2,00	110	20	-	12,0	9,0	14,00	0160	●	●	●	●	●	○
M18	2,50	125	25	-	14,0	11,0	15,50	0180	●	○	●	○	○	○
M20	2,50	140	25	-	16,0	12,0	17,50	0200	●	○	●	○	○	○
M22	2,50	140	25	-	18,0	14,5	19,50	0220	●	○	●	○	○	○
M24	3,00	160	30	-	18,0	14,5	21,00	0240	●	○	●	○	○	○
M27	3,00	160	30	-	20,0	16,0	24,00	0270	●	○	●	○	○	○
M30	3,50	180	35	-	22,0	18,0	26,50	0300	●	○	●	○	○	○
M33	3,50	180	35	-	25,0	20,0	29,50	0330	●	○	●	○	○	○
M36	4,00	200	40	-	28,0	22,0	32,00	0360	●	○	●	○	○	○

ISO	Vc (m/min)					
P	5-40	5-50	5-40	5-50	5-40	5-50
M	5-15	5-25	5-15	5-25	5-15	5-25
K	10-30	10-50	10-30	10-50	10-30	10-50
N	10-30	10-50	10-30	10-50	10-30	10-50
S	1-8	1-8	1-8	1-8	1-8	1-8

MASTERTAP

Example of order
D4-118M01-0120
Tap MasterTAP M12-6H DIN-376 B HSSE-PM HL

● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13

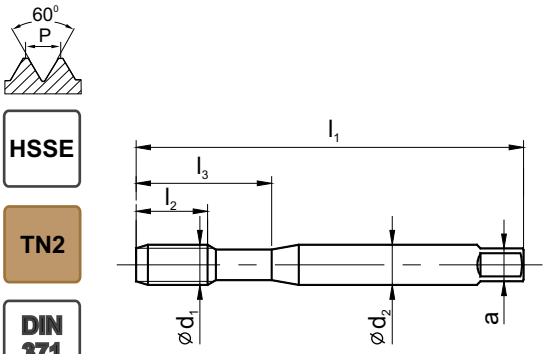
800X

	C	C-LH	B	B-LH	B	B
						
		LH		LH	6G	7G
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d	< 3d	< 3d	< 3d	< 3d
Quality of material	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2	TN2	TN2	TN2
Chamfer	C / 2-3P	C / 2-3P	B / 4-5P	B / 4-5P	B / 4-5P	B / 4-5P

HSSE

TN2

DIN 371



M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371		DIN-371				
									Tol.	ISO1(4H)		ISO1(4H)				
									INDEX	C4-123X02		C4-113X02				
M1	0,25	40	6	-	13	2,5	2,1	0,75	0010	●		●				
M1,1	0,25	40	6	-	13	2,5	2,1	0,85	0011	●		●				
M1,2	0,25	40	6	-	13	2,5	2,1	0,95	0012	●		●				
M1,4	0,30	40	7	-	13	2,5	2,1	1,10	0014	●		●				

M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371		DIN-371				
									Tol.	ISO2 (6H)		ISO2 (6H)				
									INDEX	C4-123X01		C4-113X01				
M1,6	0,35	40	8	-	13	2,5	2,1	1,25	0016	●		●				
M1,7	0,35	40	8	-	13	2,5	2,1	1,35	0017	●		●				
M1,8	0,35	40	8	-	13	2,5	2,1	1,45	0018	●		●				
M2	0,40	45	10	-	13	2,8	2,1	1,60	0020	●		●				
M2,2	0,45	45	10	-	13	2,8	2,1	1,75	0022	●		●				
M2,3	0,40	45	10	-	13	2,8	2,1	1,90	0023	●		●				
M2,5	0,45	50	9	-	14	2,8	2,1	2,05	0025	●		●				
M2,6	0,45	50	9	-	14	2,8	2,1	2,15	0026	●		●				

M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371					
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G
									INDEX	C2-123X01	C2-223X01	C2-113X01	C2-213X01	C2-113X03	C2-113X04
M3	0,50	56	10	-	18	3,5	2,7	2,50	0030	●	●	●	●	●	○
M3,5	0,60	56	12	-	20	4,0	3,0	2,90	0035	●	○	●	○	○	○
M4	0,70	63	12	-	21	4,5	3,4	3,30	0040	●	●	●	●	●	○
M4,5	0,75	70	14	-	25	6,0	4,9	3,80	0045	●	○	●	○	○	○
M5	0,80	70	14	-	25	6,0	4,9	4,20	0050	●	●	●	●	●	○
M6	1,00	80	18	-	30	6,0	4,9	5,00	0060	●	●	●	●	●	○
M7	1,00	80	18	-	30	7,0	5,5	6,00	0070	●	○	●	○	○	○
M8	1,25	90	20	-	35	8,0	6,2	6,80	0080	●	●	●	●	●	○
M9	1,25	90	20	-	35	9,0	7,0	7,80	0090	●	○	●	○	○	○
M10	1,50	100	20	-	39	10,0	8,0	8,50	0100	●	●	●	●	●	○

ISO	Vc (m/min)					
P	5-35	5-35	5-35	5-35	5-35	5-35
M	5-15	5-15	5-15	5-15	5-15	5-15
K	5-25	5-25	5-25	5-25	5-25	5-25
N	10-30	10-30	10-30	10-30	10-30	10-30
S	-	-	-	-	-	-

● **Available from stock**
○ **On request**

Example of order
C4-121X01-0100
Tap 800X M10-6H DIN-371 C HSSE Tn2

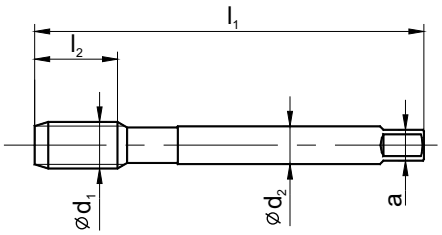
1

ISO Metric coarse thread ISO DIN-13

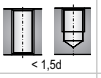
HSSE

TN2

DIN 376



800X

	C	C-LH	B	B-LH	B	B
						
		LH		LH	6G	7G
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 1,5d	 < 1,5d	 < 3d	 < 3d	 < 3d	 < 3d
Quality of material	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2	TN2	TN2	TN2
Chamfer	C / 2-3P	C / 2-3P	B / 4-5P	B / 4-5P	B / 4-5P	B / 4-5P

M ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norm	DIN-376					
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G
									INDEX	D2-123X01	D2-223X01	D2-113X01	D2-213X01	D2-113X03	D2-113X04
M3	0,50	56	11	-	-	2,2	1,8	2,50	0030	●	○	●	○	○	○
M4	0,70	63	12	-	-	2,8	2,1	3,30	0040	●	○	●	○	○	○
M5	0,80	70	14	-	-	3,5	2,7	4,20	0050	●	○	●	○	○	○
M6	1,00	80	18	-	-	4,5	3,4	5,00	0060	●	○	●	○	○	○
M8	1,25	90	20	-	-	6,0	4,9	6,80	0080	●	○	●	○	○	○
M10	1,50	100	20	-	-	7,0	5,5	8,50	0100	●	○	●	○	○	○
M12	1,75	110	24	-	-	9,0	7,0	10,20	0120	●	●	●	●	●	○
M14	2,00	110	25	-	-	11,0	9,0	12,00	0140	●	○	●	○	○	○
M16	2,00	110	32	-	-	12,0	9,0	14,00	0160	●	●	●	●	●	○
M18	2,50	125	32	-	-	14,0	11,0	15,50	0180	●	○	●	○	○	○
M20	2,50	140	32	-	-	16,0	12,0	17,50	0200	●	●	●	●	●	○
M22	2,50	140	32	-	-	18,0	14,5	19,50	0220	●	○	●	○	○	○
M24	3,00	160	38	-	-	18,0	14,5	21,00	0240	●	●	●	●	○	○
M27	3,00	160	38	-	-	20,0	16,0	24,00	0270	●	○	●	○	○	○
M30	3,50	180	45	-	-	22,0	18,0	26,50	0300	●	○	●	○	○	○
M33	3,50	180	45	-	-	25,0	20,0	29,50	0330	●	○	●	○	○	○
M36	4,00	200	50	-	-	28,0	22,0	32,00	0360	●	○	●	○	○	○
M39	4,00	200	50	-	-	32,0	24,0	35,00	0390	●	○	●	○	○	○
M42	4,50	200	60	-	-	32,0	24,0	37,50	0420	●	○	●	○	○	○
M45	4,50	220	60	-	-	36,0	29,0	40,50	0450	●	○	●	○	○	○
M48	5,00	250	65	-	-	36,0	29,0	43,00	0480	●	○	●	○	○	○
M52	5,00	250	65	-	-	40,0	32,0	47,00	0520	●	○	●	○	○	○

ISO	Vc (m/min)					
P	5-35	5-35	5-35	5-35	5-35	5-35
M	5-15	5-15	5-15	5-15	5-15	5-15
K	5-25	5-25	5-25	5-25	5-25	5-25
N	10-30	10-30	10-30	10-30	10-30	10-30
S	-	-	-	-	-	-

800X

Example of order
D2-221X01-0120
Tap 800X M12-6H DIN-376 C LH HSSE Tn2

● **Available from stock**
○ **On request**

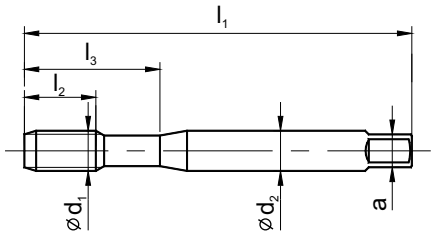
ISO Metric coarse thread ISO DIN-13

800X

HSSE

TN2

DIN 371



	C-R40	C-LH-L40	C-R40	C-R40
		 LH	 6G	 7G
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2	TN2
Chamfer	C / 2-3P	C / 2-3P	C / 2-3P	C / 2-3P

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371						
									Tol.	ISO1(4H)						
									INDEX	C4-513X02						
M1	0,25	40	-	6	13	2,5	2,1	0,75	0010	●						
M1,1	0,25	40	-	6	13	2,5	2,1	0,85	0011	●						
M1,2	0,25	40	-	6	13	2,5	2,1	0,95	0012	●						
M1,4	0,30	40	-	8	13	2,5	2,1	1,10	0014	●						

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371						
									Tol.	ISO2 (6H)						
									INDEX	C4-513X01						
M1,6	0,35	40	-	8	13	2,5	2,1	1,25	0016	●						
M1,7	0,35	40	-	8	13	2,5	2,1	1,35	0017	●						
M1,8	0,35	40	-	8	13	2,5	2,1	1,45	0018	●						
M2	0,40	45	-	10	13	2,8	2,1	1,60	0020	●						
M2,2	0,45	45	-	10	13	2,8	2,1	1,75	0022	●						
M2,3	0,40	45	-	10	13	2,8	2,1	1,90	0023	●						
M2,5	0,45	50	-	5	14	2,8	2,1	2,05	0025	●						
M2,6	0,45	50	-	5	14	2,8	2,1	2,15	0026	●						

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371						
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G			
									INDEX	C2-513X01	C2-593X01	C2-513X03	C2-513X04			
M3	0,50	56	-	5	18	3,5	2,7	2,50	0030	●	●	●	○			
M3,5	0,60	56	-	6	20	4,0	3,0	2,90	0035	●	○	○	○			
M4	0,70	63	-	7	21	4,5	3,4	3,30	0040	●	●	●	○			
M4,5	0,75	70	-	7,5	25	6,0	4,9	3,80	0045	●	○	○	○			
M5	0,80	70	-	8	25	6,0	4,9	4,20	0050	●	●	●	○			
M6	1,00	80	-	10	30	6,0	4,9	5,00	0060	●	●	●	○			
M7	1,00	80	-	10	30	7,0	5,5	6,00	0070	●	○	○	○			
M8	1,25	90	-	13	35	8,0	6,2	6,80	0080	●	●	●	○			
M9	1,25	90	-	13	35	9,0	7,0	7,80	0090	●	○	○	○			
M10	1,50	100	-	15	39	10,0	8,0	8,50	0100	●	●	●	○			

ISO	Vc (m/min)						
P	5-35	5-35	5-35	5-35			
M	5-15	5-15	5-15	5-15			
K	5-25	5-25	5-25	5-25			
N	10-30	10-30	10-30	10-30			
S	-	-	-	-			

● **Available from stock**

○ **On request**

Example of order
C4-511X02-0010
Tap 800X M1-4H DIN-371 C R40 HSSE-PM Tn2

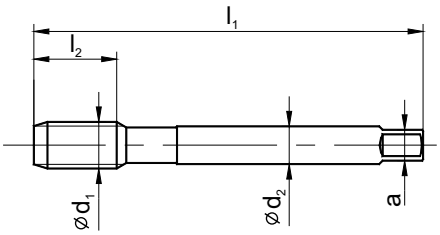
1

ISO Metric coarse thread ISO DIN-13

HSSE

TN2

DIN 376



800X

	C-R40	C-LH-L40	C-R40	C-R40
		 LH	 6G	 7G
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2	TN2
Chamfer	C / 2-3P	C / 2-3P	C / 2-3P	C / 2-3P

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-376			
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G
									INDEX	D2-513X01	D2-593X01	D2-513X03	D2-513X04
M3	0,50	56	-	5	-	2,2	1,8	2,50	0030	●	○	○	○
M4	0,70	63	-	8	-	2,8	2,1	3,30	0040	●	○	○	○
M5	0,80	70	-	10	-	3,5	2,7	4,20	0050	●	○	○	○
M6	1,00	80	-	12	-	4,5	3,4	5,00	0060	●	○	○	○
M8	1,25	90	-	15	-	6,0	4,9	6,80	0080	●	○	○	○
M10	1,50	100	-	17	-	7,0	5,5	8,50	0100	●	○	○	○
M12	1,75	110	-	18	-	9,0	7,0	10,20	0120	●	●	●	○
M14	2,00	110	-	20	-	11,0	9,0	12,00	0140	●	○	○	○
M16	2,00	110	-	20	-	12,0	9,0	14,00	0160	●	●	●	○
M18	2,50	125	-	25	-	14,0	11,0	15,50	0180	●	○	○	○
M20	2,50	140	-	25	-	16,0	12,0	17,50	0200	●	●	●	○
M22	2,50	140	-	25	-	18,0	14,5	19,50	0220	●	○	○	○
M24	3,00	160	-	30	-	18,0	14,5	21,00	0240	●	●	○	○
M27	3,00	160	-	30	-	20,0	16,0	24,00	0270	●	○	○	○
M30	3,50	180	-	35	-	22,0	18,0	26,50	0300	●	○	○	○
M33	3,50	180	-	35	-	25,0	20,0	29,50	0330	●	○	○	○
M36	4,00	200	-	40	-	28,0	22,0	32,00	0360	●	○	○	○
M39	4,00	200	-	40	-	32,0	24,0	35,00	0390	●	○	○	○
M42	4,50	200	-	45	-	32,0	24,0	37,50	0420	●	○	○	○
M45	4,50	220	-	45	-	36,0	29,0	40,50	0450	●	○	○	○
M48	5,00	250	-	50	-	36,0	29,0	43,00	0480	●	○	○	○
M52	5,00	250	-	50	-	40,0	32,0	47,00	0520	●	○	○	○

ISO	Vc (m/min)			
P	5-35	5-35	5-35	5-35
M	5-15	5-15	5-15	5-15
K	5-25	5-25	5-25	5-25
N	10-30	10-30	10-30	10-30
S	-	-	-	-

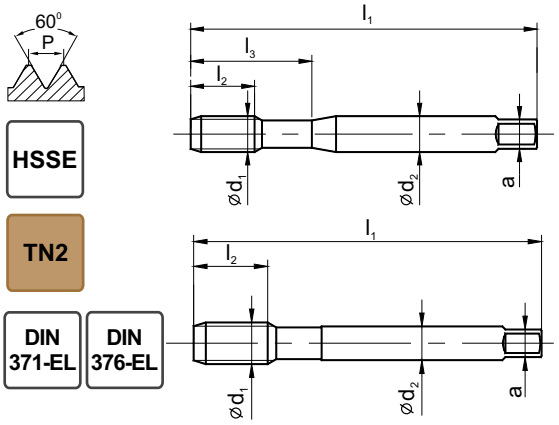
Example of order
D2-511X01-0030
Tap 800X M3-6H DIN-376 C R40 HSSE Tn2

● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13

800X

	B	C-R40
		

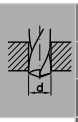


HSSE

TN2

DIN 371-EL | DIN 376-EL

Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE
Coating	TN2	TN2
Chamfer	B / 4-5P	C / 2-3P

M $\varnothing d_1$	P	l_1	l_2	l_2 R40	l_3	$\varnothing d_2$	a		Norm	DIN-371-EL	
									Tol.	ISO2 (6H)	ISO2 (6H)
									INDEX	C2-113X21	C2-513X21
M3	0,50	100	10	5	18	3,5	2,7	2,50	0030	●	●
M3,5	0,60	100	12	6	20	4,0	3,0	2,90	0035	○	○
M4	0,70	125	12	7	21	4,5	3,4	3,30	0040	●	●
M5	0,80	140	14	8	25	6,0	4,9	4,20	0050	●	●
M6	1,00	160	18	10	30	6,0	4,9	5,00	0060	●	●

M $\varnothing d_1$	P	l_1	l_2	l_2 R40	l_3	$\varnothing d_2$	a		Norm	DIN-376-EL	
									Tol.	ISO2 (6H)	
									INDEX	D2-113X21	D2-513X21
M8	1,25	180	20	15	-	6,0	4,9	6,80	0080	●	●
M10	1,50	200	20	17	-	7,0	5,5	8,50	0100	●	●
M12	1,75	220	24	18	-	9,0	7,0	10,20	0120	●	●
M14	2,00	220	25	20	-	11,0	9,0	12,00	0140	○	○
M16	2,00	220	32	20	-	12,0	9,0	14,00	0160	●	●
M20	2,50	250	32	25	-	16,0	12,0	17,50	0200	○	○

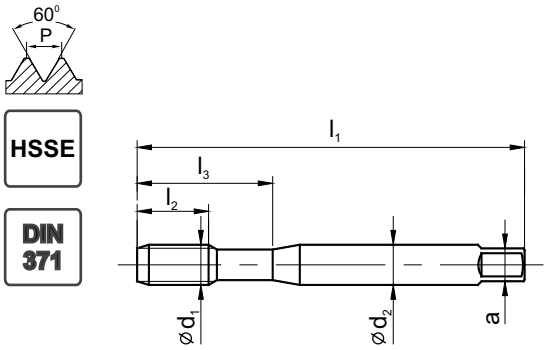
ISO	Vc (m/min)	
P	5-35	5-35
M	5-15	5-15
K	5-25	5-25
N	10-30	10-30
S	-	-

Example of order
C2-111X21-0030
Tap 800X M3-6H DIN-371 EL C HSSE Tn2

● **Available from stock**
○ **On request**

1

ISO Metric coarse thread ISO DIN-13



800

	C	C-LH	B	B-LH	B	B
						
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d	< 3d	< 3d	< 3d	< 3d
Quality of material	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE
Coating						
Chamfer	C / 2-3P	C / 2-3P	B / 4-5P	B / 4-5P	B / 4-5P	B / 4-5P

M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371						
									Tol.	ISO1(4H)		ISO1(4H)				
									INDEX	C4-121102		C4-111102				
M1	0,25	40	6	-	13	2,5	2,1	0,75	0010	●		●				
M1,1	0,25	40	6	-	13	2,5	2,1	0,85	0011	●		●				
M1,2	0,25	40	6	-	13	2,5	2,1	0,95	0012	●		●				
M1,4	0,30	40	7	-	13	2,5	2,1	1,10	0014	●		●				

M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371						
									Tol.	ISO2 (6H)		ISO2 (6H)				
									INDEX	C4-121101		C4-111101				
M1,6	0,35	40	8	-	13	2,5	2,1	1,25	0016	●		●				
M1,7	0,35	40	8	-	13	2,5	2,1	1,35	0017	●		●				
M1,8	0,35	40	8	-	13	2,5	2,1	1,45	0018	●		●				
M2	0,40	45	10	-	13	2,8	2,1	1,60	0020	●		●				
M2,2	0,45	45	10	-	13	2,8	2,1	1,75	0022	●		●				
M2,3	0,40	45	10	-	13	2,8	2,1	1,90	0023	●		●				
M2,5	0,45	50	9	-	14	2,8	2,1	2,05	0025	●		●				
M2,6	0,45	50	9	-	14	2,8	2,1	2,15	0026	●		●				

M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371					
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G
									INDEX	C2-121101	C2-221101	C2-111101	C2-211101	C2-111103	C2-111104
M3	0,50	56	10	-	18	3,5	2,7	2,50	0030	●	●	●	●	●	○
M3,5	0,60	56	12	-	20	4,0	3,0	2,90	0035	●	○	●	○	○	○
M4	0,70	63	12	-	21	4,5	3,4	3,30	0040	●	●	●	●	●	○
M4,5	0,75	70	14	-	25	6,0	4,9	3,80	0045	●	○	●	○	○	○
M5	0,80	70	14	-	25	6,0	4,9	4,20	0050	●	●	●	●	●	○
M6	1,00	80	18	-	30	6,0	4,9	5,00	0060	●	●	●	●	●	○
M7	1,00	80	18	-	30	7,0	5,5	6,00	0070	●	○	●	○	○	○
M8	1,25	90	20	-	35	8,0	6,2	6,80	0080	●	●	●	●	●	○
M9	1,25	90	20	-	35	9,0	7,0	7,80	0090	●	○	●	○	○	○
M10	1,50	100	20	-	39	10,0	8,0	8,50	0100	●	●	●	●	●	○

ISO	Vc (m/min)					
P	5-20	5-20	5-20	5-20	5-20	5-20
M	5-10	5-10	5-10	5-10	5-10	5-10
K	5-15	5-15	5-15	5-15	5-15	5-15
N	5-25	5-25	5-25	5-25	5-25	5-25
S	-	-	-	-	-	-

● **Available from stock**

○ **On request**

Example of order
C4-121101-0100
Tap 800 M10-6H DIN-371 C HSSE

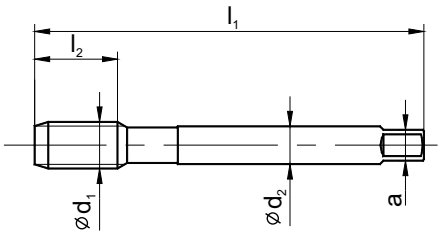
ISO Metric coarse thread ISO DIN-13

800

	C	C-LH	B	B-LH	B	B
						
		LH		LH	6G	7G
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d	< 3d	< 3d	< 3d	< 3d
Quality of material	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE
Coating						
Chamfer	C / 2-3P	C / 2-3P	B / 4-5P	B / 4-5P	B / 4-5P	B / 4-5P

HSSE

DIN 376



M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-376					
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G
									INDEX	D2-121101	D2-221101	D2-111101	D2-211101	D2-111103	D2-111104
M3	0,50	56	11	-	-	2,2	1,8	2,50	0030	●	○	●	○	○	○
M4	0,70	63	12	-	-	2,8	2,1	3,30	0040	●	○	●	○	○	○
M5	0,80	70	14	-	-	3,5	2,7	4,20	0050	●	○	●	○	○	○
M6	1,00	80	18	-	-	4,5	3,4	5,00	0060	●	○	●	○	○	○
M8	1,25	90	20	-	-	6,0	4,9	6,80	0080	●	○	●	○	○	○
M10	1,50	100	20	-	-	7,0	5,5	8,50	0100	●	○	●	○	○	○
M12	1,75	110	24	-	-	9,0	7,0	10,20	0120	●	●	●	●	●	○
M14	2,00	110	25	-	-	11,0	9,0	12,00	0140	●	○	●	○	○	○
M16	2,00	110	32	-	-	12,0	9,0	14,00	0160	●	●	●	●	●	○
M18	2,50	125	32	-	-	14,0	11,0	15,50	0180	●	○	●	○	○	○
M20	2,50	140	32	-	-	16,0	12,0	17,50	0200	●	●	●	●	●	○
M22	2,50	140	32	-	-	18,0	14,5	19,50	0220	●	○	●	○	○	○
M24	3,00	160	38	-	-	18,0	14,5	21,00	0240	●	●	●	●	○	○
M27	3,00	160	38	-	-	20,0	16,0	24,00	0270	●	○	●	○	○	○
M30	3,50	180	45	-	-	22,0	18,0	26,50	0300	●	○	●	○	○	○
M33	3,50	180	45	-	-	25,0	20,0	29,50	0330	●	○	●	○	○	○
M36	4,00	200	50	-	-	28,0	22,0	32,00	0360	●	○	●	○	○	○
M39	4,00	200	50	-	-	32,0	24,0	35,00	0390	●	○	●	○	○	○
M42	4,50	200	60	-	-	32,0	24,0	37,50	0420	●	○	●	○	○	○
M45	4,50	220	60	-	-	36,0	29,0	40,50	0450	●	○	●	○	○	○
M48	5,00	250	65	-	-	36,0	29,0	43,00	0480	●	○	●	○	○	○
M52	5,00	250	65	-	-	40,0	32,0	47,00	0520	●	○	●	○	○	○

ISO	Vc (m/min)					
P	5-35	5-20	5-20	5-20	5-20	5-20
M	5-10	5-10	5-10	5-10	5-10	5-10
K	10-25	5-15	5-15	5-15	5-15	5-15
N	10-35	5-25	5-25	5-25	5-25	5-25
S	-	-	-	-	-	-

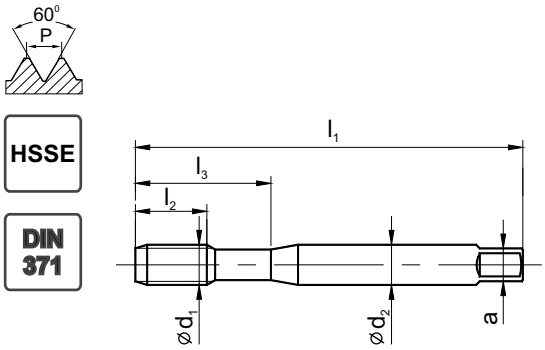
Example of order
D2-221101-0120
Tap 800 M12-6H DIN-376 C LH HSSE

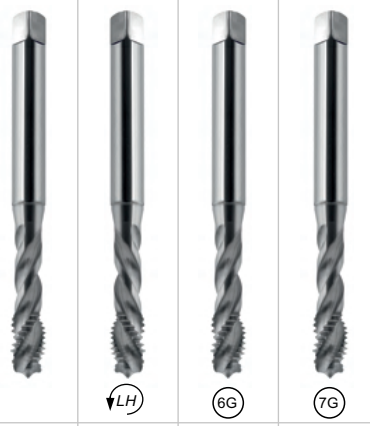
● **Available from stock**
○ **On request**

1

ISO Metric coarse thread ISO DIN-13

800





	C-R40	C-LH-L40	C-R40	C-R40			
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H			
Hole type	< 2,5d	< 2,5d	< 2,5d	< 2,5d			
Quality of material	HSSE	HSSE	HSSE	HSSE			
Coating							
Chamfer	C / 2-3P	C / 2-3P	C / 2-3P	C / 2-3P			

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371						
									Tol.	ISO1(4H)						
									INDEX	C4-511102						
M1	0,25	40	-	6	13	2,5	2,1	0,75	0010	●						
M1,1	0,25	40	-	6	13	2,5	2,1	0,85	0011	●						
M1,2	0,25	40	-	6	13	2,5	2,1	0,95	0012	●						
M1,4	0,30	40	-	8	13	2,5	2,1	1,10	0014	●						

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371						
									Tol.	ISO2 (6H)						
									INDEX	C4-511101						
M1,6	0,35	40	-	8	13	2,5	2,1	1,25	0016	●						
M1,7	0,35	40	-	8	13	2,5	2,1	1,35	0017	●						
M1,8	0,35	40	-	8	13	2,5	2,1	1,45	0018	●						
M2	0,40	45	-	10	13	2,8	2,1	1,60	0020	●						
M2,2	0,45	45	-	10	13	2,8	2,1	1,75	0022	●						
M2,3	0,40	45	-	10	13	2,8	2,1	1,90	0023	●						
M2,5	0,45	50	-	5	14	2,8	2,1	2,05	0025	●						
M2,6	0,45	50	-	5	14	2,8	2,1	2,15	0026	●						

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371						
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G			
									INDEX	C2-511101	C2-591101	C2-511103	C2-511104			
M3	0,50	56	-	5	18	3,5	2,7	2,50	0030	●	●	●	○			
M3,5	0,60	56	-	6	20	4,0	3,0	2,90	0035	●	○	○	○			
M4	0,70	63	-	7	21	4,5	3,4	3,30	0040	●	●	●	○			
M4,5	0,75	70	-	7,5	25	6,0	4,9	3,80	0045	●	○	○	○			
M5	0,80	70	-	8	25	6,0	4,9	4,20	0050	●	●	●	○			
M6	1,00	80	-	10	30	6,0	4,9	5,00	0060	●	●	●	○			
M7	1,00	80	-	10	30	7,0	5,5	6,00	0070	●	○	○	○			
M8	1,25	90	-	13	35	8,0	6,2	6,80	0080	●	●	●	○			
M9	1,25	90	-	13	35	9,0	7,0	7,80	0090	●	○	○	○			
M10	1,50	100	-	15	39	10,0	8,0	8,50	0100	●	●	●	○			

ISO	Vc (m/min)						
P	5-20	5-20	5-20	5-20			
M	5-10	5-10	5-10	5-10			
K	5-15	5-15	5-15	5-15			
N	5-25	5-25	5-25	5-25			
S	-	-	-	-			

● **Available from stock**
○ **On request**

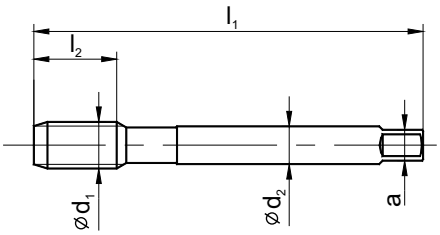
Example of order
C4-511102-0010
Tap 800 M1-4H DIN-371 C R40 HSSE-PM

ISO Metric coarse thread ISO DIN-13

800

HSSE

DIN 376



	C-R40	C-LH-L40	C-R40	C-R40			
		 (LH)	 (6G)	 (7G)			
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H			
Hole type	 < 2,5d	 < 2,5d	 < 2,5d	 < 2,5d			
Quality of material	HSSE	HSSE	HSSE	HSSE			
Coating							
Chamfer	C / 2-3P	C / 2-3P	C / 2-3P	C / 2-3P			

M Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-376						
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO3 (6G)	7G			
									INDEX	D2-511101	D2-591101	D2-511103	D2-511104			
M3	0,50	56	-	5	-	2,2	1,8	2,50	0030	●	○	○	○			
M4	0,70	63	-	8	-	2,8	2,1	3,30	0040	●	○	○	○			
M5	0,80	70	-	10	-	3,5	2,7	4,20	0050	●	○	○	○			
M6	1,00	80	-	12	-	4,5	3,4	5,00	0060	●	○	○	○			
M8	1,25	90	-	15	-	6,0	4,9	6,80	0080	●	○	○	○			
M10	1,50	100	-	17	-	7,0	5,5	8,50	0100	●	○	○	○			
M12	1,75	110	-	18	-	9,0	7,0	10,20	0120	●	●	●	○			
M14	2,00	110	-	20	-	11,0	9,0	12,00	0140	●	○	○	○			
M16	2,00	110	-	20	-	12,0	9,0	14,00	0160	●	●	●	○			
M18	2,50	125	-	25	-	14,0	11,0	15,50	0180	●	○	○	○			
M20	2,50	140	-	25	-	16,0	12,0	17,50	0200	●	●	●	○			
M22	2,50	140	-	25	-	18,0	14,5	19,50	0220	●	○	○	○			
M24	3,00	160	-	30	-	18,0	14,5	21,00	0240	●	●	○	○			
M27	3,00	160	-	30	-	20,0	16,0	24,00	0270	●	○	○	○			
M30	3,50	180	-	35	-	22,0	18,0	26,50	0300	●	○	○	○			
M33	3,50	180	-	35	-	25,0	20,0	29,50	0330	●	○	○	○			
M36	4,00	200	-	40	-	28,0	22,0	32,00	0360	●	○	○	○			
M39	4,00	200	-	40	-	32,0	24,0	35,00	0390	●	○	○	○			
M42	4,50	200	-	45	-	32,0	24,0	37,50	0420	●	○	○	○			
M45	4,50	220	-	45	-	36,0	29,0	40,50	0450	●	○	○	○			
M48	5,00	250	-	50	-	36,0	29,0	43,00	0480	●	○	○	○			
M52	5,00	250	-	50	-	40,0	32,0	47,00	0520	●	○	○	○			

ISO	Vc (m/min)						
P	5-20	5-20	5-20	5-20			
M	5-10	5-10	5-10	5-10			
K	5-15	5-15	5-15	5-15			
N	5-25	5-25	5-25	5-25			
S	-	-	-	-			

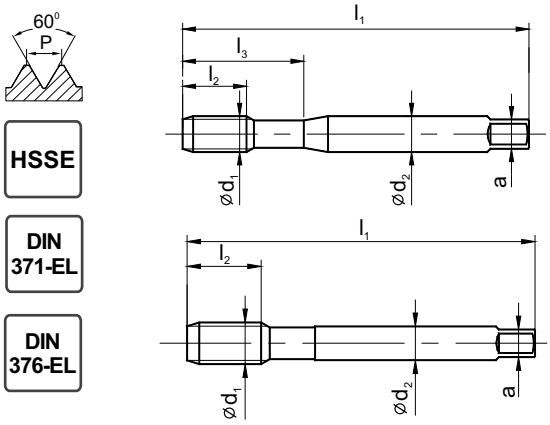
Example of order
D2-511101-0030
Tap 800 M3-6H DIN-376 C R40 HSSE

● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13

800

	B	C-R40



Material groups	P M K N S H	P M K N S H
Hole type	< 3d	< 2,5d
Quality of material	HSSE	HSSE
Coating		
Chamfer	B / 4-5P	C / 2-3P

M Ød1	P	l_1	l_2	l_2 R40	l_3	Ød2	a	d	Norm	DIN-371-EL	
									Tol.	ISO2 (6H)	ISO2 (6H)
									INDEX	C2-111121	C2-511121
M3	0,50	100	10	5	18	3,5	2,7	2,50	0030	●	●
M3,5	0,60	100	12	6	20	4,0	3,0	2,90	0035	○	○
M4	0,70	125	12	7	21	4,5	3,4	3,30	0040	●	●
M5	0,80	140	14	8	25	6,0	4,9	4,20	0050	●	●
M6	1,00	160	18	10	30	6,0	4,9	5,00	0060	●	●

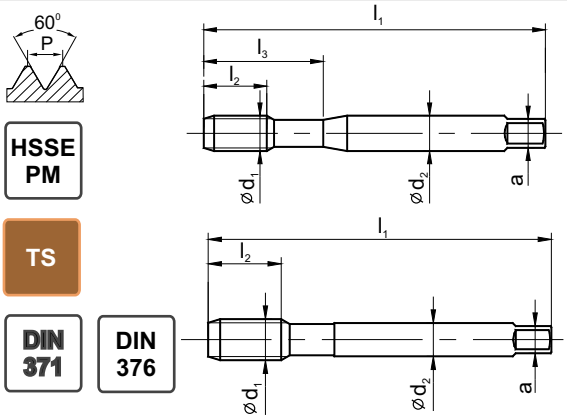
M Ød1	P	l_1	l_2	l_2 R40	l_3	Ød2	a	d	Norm	DIN-376-EL	
									Tol.	ISO2 (6H)	
									INDEX	D2-111121	D2-511121
M8	1,25	180	20	15	-	6,0	4,9	6,80	0080	●	●
M10	1,50	200	20	17	-	7,0	5,5	8,50	0100	●	●
M12	1,75	220	24	18	-	9,0	7,0	10,20	0120	●	●
M14	2,00	220	25	20	-	11,0	9,0	12,00	0140	○	○
M16	2,00	220	32	20	-	12,0	9,0	14,00	0160	●	●
M20	2,50	250	-	25	-	16,0	12,0	17,50	0200	○	○

ISO	Vc (m/min)	
P	5-20	5-20
M	5-10	5-10
K	5-15	5-15
N	5-25	5-25
S	-	-

Example of order
C2-111121-0030
Tap 800 M3-6H DIN-371 EL C HSSE

● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13



HSSE PM

TS

DIN 371

DIN 376

	FAN-1200		I400-HT		
	B-TS	C-R40-TS	C-TS	B-TS	C-R15-TS
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 3d	< 2,5d	< 1,5d	< 2,5d	< 1,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	TS	TS	TS	TS	TS
Chamfer	B / 4-5P	C / 2-3P	C / 2-3P	B / 4-5P	C / 2-3P

M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371				
									Tol.	ISO2 (6H)	ISO2 (6H)	6HX	6HX	6HX
									INDEX	C4-115001	C4-565001	C4-12G901	C4-11G901	C4-50G901
M 3	0,50	56	10	5	18	3,5	2,7	2,50	0030	●	●	●	●	●
M 4	0,70	63	12	7	21	4,5	3,4	3,30	0040	●	●	●	●	●
M 5	0,80	70	14	8	25	6,0	4,9	4,20	0050	●	●	●	●	●
M 6	1,00	80	18	10	30	6,0	4,9	5,00	0060	●	●	●	●	●
M 8	1,25	90	20	13	35	8,0	6,2	6,80	0080	●	●	●	●	●
M10	1,50	100	20	15	39	10,0	8,0	8,50	0100	●	●	●	●	●

M ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-376				
									Tol.	ISO2 (6H)	ISO2 (6H)	6HX	6HX	6HX
									INDEX	D4-115001	D4-565001	D4-12G901	D4-11G901	D4-50G901
M8	1,25	90	20	15	-	6,0	4,9	6,80	0080	●	●	●	●	●
M10	1,50	100	20	17	-	7,0	5,5	8,50	0100	●	●	●	●	●
M12	1,75	110	24	18	-	9,0	7,0	10,20	0120	●	●	●	●	●
M14	2,00	110	25	20	-	11,0	9,0	12,00	0140	●	●	●	●	●
M16	2,00	110	32	20	-	12,0	9,0	14,00	0160	●	●	●	●	●
M18	2,50	125	32	25	-	14,0	11,0	15,50	0180	●	●	○	○	○
M20	2,50	140	32	25	-	16,0	12,0	17,50	0200	●	●	●	●	●
M22	2,50	140	32	25	-	18,0	14,5	19,50	0220	●	●	○	○	○
M24	3,00	160	38	30	-	18,0	14,5	21,00	0240	●	●	●	●	●
M27	3,00	160	38	30	-	20,0	16,0	24,00	0270	●	●	○	○	○
M30	3,50	180	45	35	-	22,0	18,0	26,50	0300	●	●	○	○	○
M33	3,50	180	45	35	-	25,0	20,0	29,50	0330	●	●	○	○	○
M36	4,00	200	50	40	-	28,0	22,0	32,00	0360	●	●	○	○	○

ISO	Vc (m/min)				
P	5-35	5-35	1-20	1-20	1-20
M	5-15	5-10	1-10	1-10	1-10
K	5-25	5-25	1-20	1-20	1-20
N	10-30	10-30	10-20	10-20	10-20
S	-	-	-	-	-

Example of order
C4-115001-0030
Tap FAN-1200 M3-6H DIN-371 B HSSE-PM TS

● **Available from stock**
○ **On request**

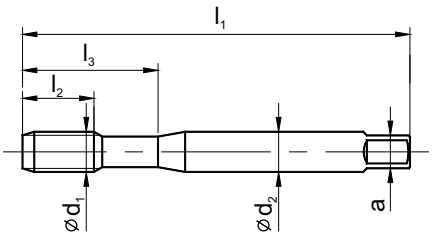
1

ISO Metric coarse thread ISO DIN-13

HSSE

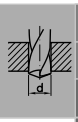
HL

DIN 371



INOX

	B	B-HL	C-R40	C-R40-HL
				
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 3d	 < 3d	 < 2,5d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE	HSSE
Coating		HL		HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P

M ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a		Norm	DIN-371						
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)			
									INDEX	C2-111801	C2-118801	C2-511801	C2-518801			
M3	0,50	56	10	5	18	3,5	2,7	2,50	0030	●	●	●	●			
M4	0,70	63	12	7	21	4,5	3,4	3,30	0040	●	●	●	●			
M5	0,80	70	14	8	25	6,0	4,9	4,20	0050	●	●	●	●			
M6	1,00	80	18	10	30	6,0	4,9	5,00	0060	●	●	●	●			
M8	1,25	90	20	13	35	8,0	6,2	6,80	0080	●	●	●	●			
M10	1,50	100	20	15	39	10,0	8,0	8,50	0100	●	●	●	●			

ISO	Vc (m/min)						
P	-	-	-	-			
M	5-15	5-15	5-15	5-15			
K	-	-	-	-			
N	-	-	-	-			
S	-	-	-	-			

Example of order
C2-111801-0080
Tap INOX M8-6H DIN-371 B HSSE

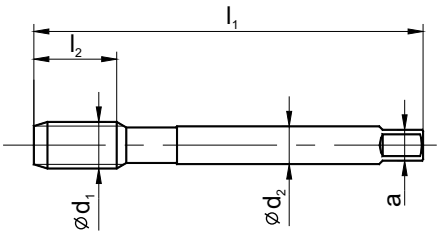
● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13

HSSE

HL

DIN 376



INOX

	B	B-HL	C-R40	C-R40-HL
				
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 3d	 < 3d	 < 2,5d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE	HSSE
Coating	-	HL	-	HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P

M ∅d_1	P	l_1	l_2	$l_{2\ R40}$	l_3	∅d_2	a		Norm	DIN-376						
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)			
									INDEX	D2-111801	D2-118801	D2-511801	D2-518801			
M8	1,25	90	20	15	-	6,0	4,9	6,80	0080	●	●	●	●			
M10	1,50	100	20	17	-	7,0	5,5	8,50	0100	●	●	●	●			
M12	1,75	110	24	18	-	9,0	7,0	10,20	0120	●	●	●	●			
M14	2,00	110	25	20	-	11,0	9,0	12,00	0140	●	●	●	●			
M16	2,00	110	32	20	-	12,0	9,0	14,00	0160	●	●	●	●			
M18	2,50	125	32	25	-	14,0	11,0	15,50	0180	●	●	●	●			
M20	2,50	140	32	25	-	16,0	12,0	17,50	0200	●	●	●	●			
M22	2,50	140	32	25	-	18,0	14,5	19,50	0220	●	●	●	●			
M24	3,00	160	38	30	-	18,0	14,5	21,00	0240	●	●	●	●			
M27	3,00	160	38	30	-	20,0	16,0	24,00	0270	●	○	●	○			
M30	3,50	180	45	35	-	22,0	18,0	26,50	0300	●	○	●	○			
M33	3,50	180	45	35	-	25,0	20,0	29,50	0330	●	○	●	○			
M36	4,00	200	50	40	-	28,0	22,0	32,00	0360	●	○	●	○			

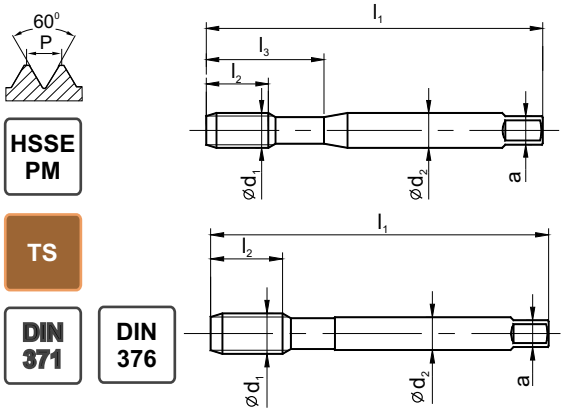
ISO	Vc (m/min)						
P	-	-	-	-			
M	5-15	5-15	5-15	5-15			
K	-	-	-	-			
N	-	-	-	-			
S	-	-	-	-			

Example of order
D2-111801-0080
Tap INOX M8-6H DIN-376 B HSSE

● **Available from stock**
○ **On request**

1

ISO Metric coarse thread ISO DIN-13



HSSE PM

TS

DIN 371

DIN 376

	GG					GAL	
	C-TS	C-IK-TS	E-TS	E-IK-TS	E-IKR-TS	C-R15-TS	E-R15-IK-TS
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 2d	< 2,5d	< 2d	< 2,5d	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	TS	TS	TS	TS	TS	TS	TS
Chamfer	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P	E / 1,5-2P	C / 2-3P	E / 1,5-2P

M ød1	P	l1	l2	l3	ød2	a	d	Norm	DIN-371						
								Tol.	6HX	6HX	6HX	6HX	6HX	6HX	6HX
								INDEX	C2-125501	C4-125551	C2-145501	C4-145551	C4-145561	C2-505601	C4-655651
M 3	0,50	56	10	18	3,5	2,7	2,50	0030	●	-	○	-	-	●	-
M 4	0,70	63	12	21	4,5	3,4	3,30	0040	●	-	●	-	-	●	-
M 5	0,80	70	14	25	6,0	4,9	4,20	0050	●	●	●	●	●	●	○
M 6	1,00	80	18	30	6,0	4,9	5,00	0060	●	●	●	●	●	●	○
M 7	1,00	80	18	30	7,0	5,5	6,00	0070	○	○	○	○	○	○	○
M 8	1,25	90	20	35	8,0	6,2	6,80	0080	●	●	●	●	●	●	○
M 9	1,25	90	20	35	9,0	7,0	7,80	0090	○	○	○	○	○	○	○
M10	1,50	100	20	39	10,0	8,0	8,50	0100	●	●	●	●	●	●	○

M ød1	P	l1	l2	l3	ød2	a	d	Norm	DIN-376						
								Tol.	6HX	6HX	6HX	6HX	6HX	6HX	6HX
								INDEX	D2-125501	D4-125551	D2-145501	D4-145551	D4-145561	D2-505601	D4-655651
M6	1,00	80	18	-	4,5	3,4	5,00	0060	●	○	●	○	○	●	○
M8	1,25	90	20	-	6,0	4,9	6,80	0080	●	●	●	●	○	●	○
M10	1,50	100	20	-	7,0	5,5	8,50	0100	●	●	●	●	○	●	○
M12	1,75	110	24	-	9,0	7,0	10,20	0120	●	●	●	●	●	●	●
M14	2,00	110	25	-	11,0	9,0	12,00	0140	●	○	○	○	○	●	○
M16	2,00	110	32	-	12,0	9,0	14,00	0160	●	●	○	●	●	●	●
M18	2,50	125	32	-	14,0	11,0	15,50	0180	●	○	○	○	○	●	○
M20	2,50	140	32	-	16,0	12,0	17,50	0200	●	○	○	○	○	●	○

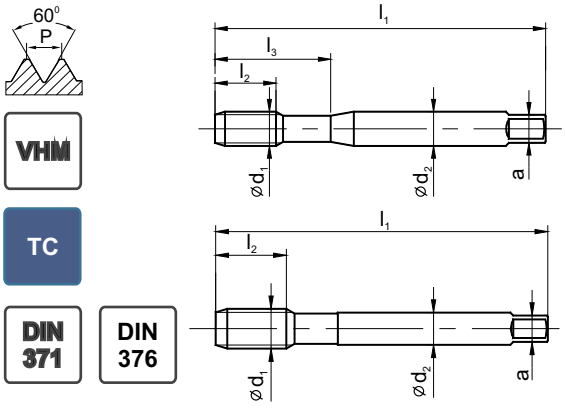
ISO	Vc (m/min)						
P	-	-	-	-	-	-	-
M	-	-	-	-	-	-	-
K	1-60	5-60	1-60	5-60	5-60	-	-
N	-	-	-	-	-	10-30	10-30
S	-	-	-	-	-	-	-

Example of order
C2-125501-0030
Tap GG M3-6HX DIN-371 C HSSE-PM TS

● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13

HRC60



	C-HM-TC	C-IK-HM-TC	D-HM-TC	D-IK-HM-TC
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d	< 1,5d	< 1,5d
Quality of material	VHM	VHM	VHM	VHM
Coating	TC	TC	TC	TC
Chamfer	C / 2-3P	C / 2-3P	D / 4-5P	D / 4-5P

M ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-371			
								Tol.	6HX			
								INDEX	C9-125F01	C9-125F51	C9-135F01	C9-135F51
M3	0,50	56	5	18	3,5	2,7	2,50	0030	●	-	●	-
M4	0,70	63	7	21	4,5	3,4	3,30	0040	●	-	●	-
M5	0,80	70	8	25	6,0	4,9	4,20	0050	●	-	●	-
M6	1,00	80	10	30	6,0	4,9	5,00	0060	●	●	●	●
M8	1,25	90	13	35	8,0	6,2	6,80	0080	●	●	●	●
M10	1,50	100	15	39	10,0	8,0	8,50	0100	●	●	●	●

M ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-376			
								Tol.	6HX			
								INDEX	D9-125F01	D9-125F51	D9-135F01	D9-135F51
M12	1,75	110	18	-	9,0	7,0	10,20	0120	●	●	●	●
M14	2,00	110	20	-	11,0	9,0	12,00	0140	●	●	●	●
M16	2,00	110	20	-	12,0	9,0	14,00	0160	●	●	●	●

ISO	Vc (m/min)			
P	-	-	-	-
M	-	-	-	-
K	-	-	-	-
N	-	-	-	-
S	-	-	-	-
H	1-4	1-4	1-4	1-4

Example of order
C9-125F01-0030
Tap HRC60 M3-6HX DIN-371 C VHM TC

● **Available from stock**
○ **On request**

1

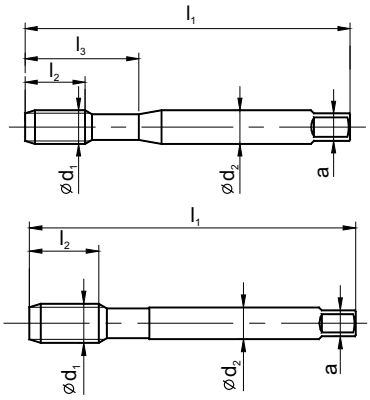
ISO Metric coarse thread ISO DIN-13

HSSE PM

TC

DIN 371

DIN 376



S-NC

	B-TC	C-R45-TC	C-R45-IK-TC
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 3d	 < 3d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM
Coating	TC	TC	TC
Chamfer	B / 4-5P	C / 2-3P	C / 2-3P

M ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-371		
								Tol.	6HX	6HX	6HX
								INDEX	C4-115301	C4-525301	C4-525351
M3	0,50	56	5	18	3,5	2,7	2,50	0030	●	●	-
M4	0,70	63	7	21	4,5	3,4	3,30	0040	●	●	-
M5	0,80	70	8	25	6,0	4,9	4,20	0050	●	●	●
M6	1,00	80	10	30	6,0	4,9	5,00	0060	●	●	●
M8	1,25	90	13	35	8,0	6,2	6,80	0080	●	●	●
M10	1,50	100	15	39	10,0	8,0	8,50	0100	●	●	●

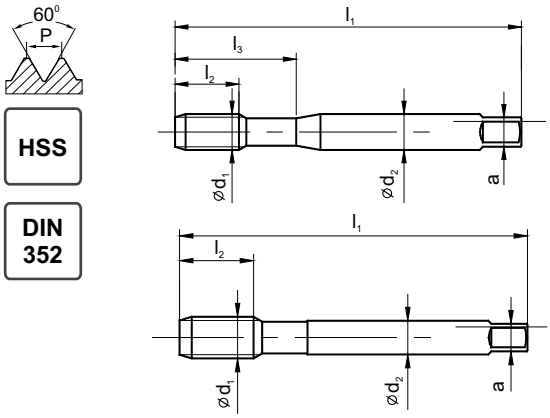
M ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-376		
								Tol.	6HX	6HX	6HX
								INDEX	D4-115301	D4-525301	D4-525351
M12	1,75	110	18	-	9,0	7,0	10,20	0120	●	●	●
M14	2,00	110	20	-	11,0	9,0	12,00	0140	●	●	●
M16	2,00	110	20	-	12,0	9,0	14,00	0160	●	●	●

ISO	Vc (m/min)		
P	5-50	5-50	5-60
M	5-20	5-20	5-30
K	10-40	10-40	10-60
N	10-40	10-40	10-60
S	1-8	1-8	1-8

Example of order
C4-115301-0030
Tap S-NC M3-6HX DIN-371 B HSSE-PM TC

● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13



HSS

DIN 352

		LH
Material groups	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d
Quality of material	HSS	HSS
Coating		
Chamfer	~3P	~3P

M ød1	P	l1	l2	l3	ød2	a	d	Norm	DIN-352	
								Tol.	ISO2 (6H)	ISO2 (6H)
								INDEX	E1-131001	E1-231001
M3	0,50	40	11	18,0	3,5	2,7	2,5	0030	●	○
M3,5	0,60	45	13	21,0	4,0	3,0	2,9	0035	●	○
M4	0,70	45	13	21,0	4,5	3,4	3,3	0040	●	○
M4,5	0,75	50	16	25,0	6,0	4,9	3,7	0045	○	○
M5	0,80	52	16	26,0	6,0	4,9	4,2	0050	●	○
M6	1,00	56	18	27,0	6,0	4,9	5,0	0060	●	○
M7	1,00	56	18	-	6,0	4,9	6,0	0070	○	○
M8	1,25	63	20	-	6,0	4,9	6,8	0080	●	○
M9	1,25	63	20	-	7,0	5,5	7,8	0090	○	○
M10	1,50	70	22	-	7,0	5,5	8,5	0100	●	○
M11	1,50	70	22	-	8,0	6,2	9,5	0110	○	○
M12	1,75	80	24	-	9,0	7,0	10,2	0120	●	○
M14	2,00	80	26	-	11,0	9,0	12,0	0140	●	○
M16	2,00	80	27	-	12,0	9,0	14,0	0160	●	○
M18	2,50	95	30	-	14,0	11,0	15,5	0180	●	○
M20	2,50	95	32	-	16,0	12,0	17,5	0200	●	○
M22	2,50	100	32	-	18,0	14,5	19,5	0220	●	○
M24	3,00	110	34	-	18,0	14,5	21,0	0240	●	○
M27	3,00	110	36	-	20,0	16,0	24,0	0270	●	○
M30	3,50	125	40	-	22,0	18,0	26,5	0300	●	○
M33	3,50	125	40	-	25,0	20,0	29,5	0330	○	○
M36	4,00	150	50	-	28,0	22,0	32,0	0360	●	○
M39	4,00	150	50	-	32,0	24,0	35,0	0390	○	○
M42	4,50	150	56	-	32,0	24,0	37,5	0420	●	○
M45	4,50	160	58	-	36,0	29,0	40,5	0450	○	○
M48	5,00	180	65	-	36,0	29,0	43,0	0480	○	○
M52	5,00	180	65	-	40,0	32,0	47,0	0520	○	○
M56	5,50	180	70	-	40,0	32,0	50,5	0560	○	○
M60	5,50	200	70	-	45,0	35,0	54,5	0600	○	○
M64	6,00	220	75	-	50,0	39,0	58,0	0640	○	○
M68	6,00	220	75	-	50,0	39,0	62,0	0680	○	○

● **Available from stock**

○ **On request**

ISO	Vc (m/min)	
P	5-20	5-20
M	-	-
K	-	-
N	-	-
S	-	-

Example of order
E1-131001-0060
Tap M6-6H DIN-352 HSS

1

ISO Metric coarse thread ISO DIN-13

NUT-TAP

HSSE

TS

	lutowane	skręcane			
					
Material groups	P M K N S H	P M K N S H			
Hole type	 < 1,5d	 < 1,5d			
Quality of material	HSSE	HSSE			
Coating	TS	TS			
Chamfer	12P	12P			

M $\varnothing d_1$	P	Overall dimensions			On request				
M12	1,75	On request	10,2		o	o			
M14	2,00		12,0		o	o			
M16	2,00		14,0		o	o			
M18	2,50		15,5		o	o			
M20	2,50		17,5		o	o			
M22	2,50		19,5		o	o			
M24	3,00		21,0		o	o			
M27	3,00		24,0		o	o			
M30	3,50		26,5		o	o			
M33	3,50		29,5		o	o			
M36	4,00		32,0		o	o			

ISO	Vc (m/min)				
P	5-20	5-20			
M	-	-			
K	-	-			
N	-	-			
S	-	-			

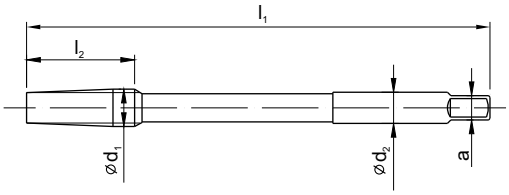
Example of order
NUT-TAP M24-ISO2 HSSE TS

● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13

NGMf

HSS



	NGMf	NGMf LH
Material groups	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d
Quality of material	HSS	HSS
Coating		
Chamfer	12P	12P

M Ød1	P	l1	l2	Ød2	a	d	Norm	NGMf	
							Tol.	ISO2 (6H)	ISO2 (6H)
							INDEX	F1-151001	F1-251001
M3	0,5	70	10	2,24	1,8	2,50	0030	○	○
M4	0,70	90	14	2,8	2,24	3,30	0040	●	●
M4,5	0,75	100	16	3,15	2,5	3,80	0045	○	○
M5	0,80	110	16	3,55	2,8	4,20	0050	●	●
M6	1,00	120	20	4,5	3,55	5,00	0060	●	●
M7	1,00	120	20	5,6	4,5	6,00	0070	○	○
M8	1,25	140	25	6,3	5,0	6,80	0080	●	●
M10	1,50	160	30	8,0	6,3	8,50	0100	●	●
M12	1,75	180	36	9,0	7,1	10,20	0120	●	●
M14	2,00	180	40	10,0	8,0	12,00	0140	●	○
M16	2,00	200	40	12,5	10,0	14,00	0160	●	●
M18	2,50	200	50	14,0	11,2	15,50	0180	●	○
M20	2,50	220	50	16,0	12,5	17,50	0200	●	●
M22	2,50	220	50	18,0	14,0	19,50	0220	●	○
M24	3,00	250	60	18,0	14,0	21,00	0240	●	●
M27	3,00	250	60	20,0	16,0	24,00	0270	●	○
M30	3,50	280	70	22,4	18,0	26,50	0300	●	●
M33	3,50	280	70	25,0	20,0	29,50	0330	●	●
M36	4,00	320	80	28,0	22,4	32,00	0360	●	●

ISO	Vc (m/min)	
P	5-20	5-20
M	-	-
K	6-15	6-15
N	6-15	6-15
S	-	-

Example of order
F1-151001-0040
Tap M4-6H NGMf HSS

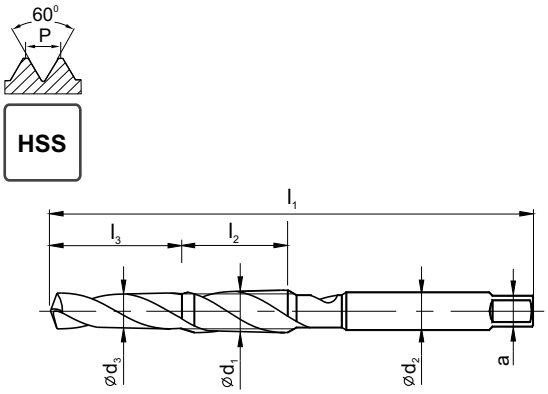
● **Available from stock**
○ **On request**

1

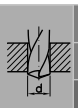
ISO Metric coarse thread ISO DIN-13

KOMBI

D-R30



Material groups	P M K N S H
Hole type	
Quality of material	HSS
Coating	-
Chamfer	D/4P

M ∅d_1	P	l_1	l_2	l_3	∅d_2	a		Norm	KOMBI
								Tol.	ISO2 (6H)
								INDEX	G1-051001
M 3	0,50	56	11	16	3	2,4	2,5	0030	●
M 4	0,70	63	14	18	4	3,0	3,3	0040	●
M 5	0,80	71	18	20	5	3,8	4,2	0050	●
M 6	1,00	80	22	22	6	4,9	5,0	0060	●
M 8	1,25	95	25	26	8	6,2	6,8	0080	●
M 10	1,50	106	31	30	10	8,0	8,5	0100	●
M 12	1,75	115	35	32	12	9,0	10,2	0120	●

ISO	Vc (m/min)
P	5-15
M	-
K	-
N	6-15
S	-

Example of order
G1-051001-0030
Tap M3-6H KOMBI D-R30 HSS

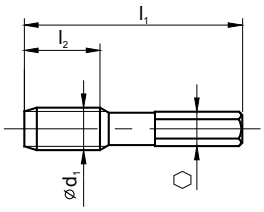
● **Available from stock**
○ **On request**

ISO Metric coarse thread ISO DIN-13

BIT

D

HSS



Material groups	P M K N S H
Hole type	 < 1,5d
Quality of material	HSS
Coating	-
Chamfer	D/4P

M Ød1	P	l1	l2	l3	Ød2	⬡	d	Norm	BIT
								Tol.	ISO2 (6H)
								INDEX	G1-031001
M3	0,50	33	11	-	-	1/4"	2,5	0030	●
M4	0,70	35	12	-	-	1/4"	3,3	0040	●
M5	0,80	36	15	-	-	1/4"	4,2	0050	●
M6	1,00	39	18	-	-	1/4"	5,0	0060	●
M8	1,25	40	19	-	-	1/4"	6,8	0080	●
M10	1,50	41	21	-	-	1/4"	8,5	0100	●

ISO	Vc (m/min)
P	5-15
M	-
K	-
N	6-15
S	-

BIT set p. 256

Example of order
G1-031001-0030
Tap M3-6H BIT HSS

● Available from stock
○ On request

1

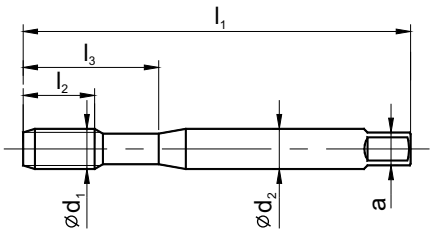
ISO Metric fine thread DIN-13

MASTERTAP

HSSE PM

HL

DIN 371



	B-HL	B-IKR-HL	C-R45-HL	C-R45-IK-HL	E-R45-HL	E-R45-IK-HL
						
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 3d	< 3d	< 2,5d	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	HL	HL	HL	HL	HL	HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-371					
								Tol.	6HX	6HX	6HX	6HX	6HX	6HX
								INDEX	C4-118M01	C4-118M61	C4-528M01	C4-528M51	C4-718M01	C4-718M51
M3x0,35	0,35	56	5	18	3,5	2,7	2,65	0031	●	-	●	-	○	-
M3,5x0,35	0,35	56	5	20	4,0	3,0	3,15	0036	●	-	●	-	○	-
M4x0,5	0,50	63	7	21	4,5	3,4	3,50	0041	●	-	●	-	○	-
M5x0,5	0,50	70	8	25	6,0	4,9	4,50	0051	●	○	●	○	○	○
M6x0,5	0,50	80	10	30	6,0	4,9	5,50	0061	●	○	●	○	○	○
M6x0,75	0,75	80	10	30	6,0	4,9	5,20	0062	●	○	●	○	○	○
M8x0,75	0,75	80	10	30	8,0	6,2	7,20	0082	●	○	●	○	○	○
M8x1	1,00	90	13	35	8,0	6,2	7,00	0083	●	●	●	●	●	●
M10x0,75	0,75	90	13	35	10,0	8,0	9,20	0102	●	○	●	○	○	○
M10x1	1,00	90	13	35	10,0	8,0	9,00	0103	●	●	●	●	●	●
M10x1,25	1,25	100	15	39	10,0	8,0	8,80	0104	●	○	●	○	○	○

ISO	Vc (m/min)					
P	5-40	5-50	5-40	5-50	5-40	5-50
M	5-15	5-25	5-15	5-25	5-15	5-25
K	10-30	10-50	10-30	10-50	10-30	10-50
N	10-30	10-50	10-30	10-50	10-30	10-50
S	1-8	1-8	1-8	1-8	1-8	1-8

Example of order

C4-118M01-0041
Tap MasterTAP M4x0,5-6HX DIN-371 B HSSE-PM HL

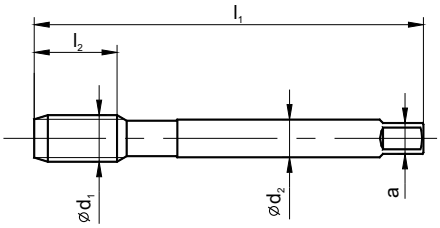
● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

HSSE PM

HL

DIN 374



MASTERTAP

	B-HL	B-IKR-HL	C-R45-HL	C-R45-IK-HL	E-R45-HL	E-R45-IK-HL
						
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 3d	< 3d	< 2,5d	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	HL	HL	HL	HL	HL	HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-374					
								Tol.	6HX	6HX	6HX	6HX	6HX	6HX
								INDEX	D4-118M01	D4-118M61	D4-528M01	D4-528M51	D4-718M01	D4-718M51
M8x1	1,00	90	10	-	6,0	4,9	7,00	0083	●	●	●	●	●	○
M10x0,75	0,75	90	10	-	7,0	5,5	9,20	0102	○	○	○	○	○	○
M10x1	1,00	90	10	-	7,0	5,5	9,00	0103	●	●	●	●	●	○
M10x1,25	1,25	100	15	-	7,0	5,5	8,80	0104	○	○	○	○	○	○
M12x1	1,00	100	10	-	9,0	7,0	11,00	0123	●	○	●	○	○	○
M12x1,25	1,25	100	15	-	9,0	7,0	10,80	0124	●	○	●	○	○	○
M12x1,5	1,50	100	15	-	9,0	7,0	10,50	0125	●	●	●	●	●	○
M14x1	1,00	100	10	-	11,0	9,0	13,00	0143	○	○	○	○	○	○
M14x1,25	1,25	100	15	-	11,0	9,0	12,80	0144	○	○	○	○	○	○
M14x1,5	1,50	100	15	-	11,0	9,0	12,50	0145	●	●	●	●	●	○
M15x1	1,00	100	10	-	12,0	9,0	14,00	0153	○	○	○	○	○	○
M16x1	1,00	100	10	-	12,0	9,0	15,00	0163	○	○	○	○	○	○
M16x1,5	1,50	100	15	-	12,0	9,0	14,50	0165	●	●	●	●	●	○
M18x1	1,00	110	13	-	14,0	11,0	17,00	0183	○	○	○	○	○	○
M18x1,5	1,50	110	17	-	14,0	11,0	16,50	0185	●	○	●	○	○	○
M18x2	2,00	125	20	-	14,0	11,0	16,00	0186	○	○	○	○	○	○
M20x1	1,00	125	13	-	16,0	12,0	19,00	0203	○	○	○	○	○	○
M20x1,5	1,50	125	17	-	16,0	12,0	18,50	0205	●	○	●	○	○	○
M20x2	2,00	140	20	-	16,0	12,0	18,00	0206	○	○	○	○	○	○
M22x1	1,00	125	13	-	18,0	14,5	21,00	0223	○	○	○	○	○	○
M22x1,5	1,50	125	17	-	18,0	14,5	20,50	0225	●	○	●	○	○	○
M22x2	2,00	140	20	-	18,0	14,5	20,00	0226	○	○	○	○	○	○
M24x1	1,00	140	13	-	18,0	14,5	23,00	0243	○	○	○	○	○	○
M24x1,5	1,50	140	20	-	18,0	14,5	22,50	0245	●	○	●	○	○	○
M24x2	2,00	140	20	-	18,0	14,5	22,00	0246	○	○	○	○	○	○

ISO	Vc (m/min)					
P	5-40	5-50	5-40	5-50	5-40	5-50
M	5-15	5-25	5-15	5-25	5-15	5-25
K	10-30	10-50	10-30	10-50	10-30	10-50
N	10-30	10-50	10-30	10-50	10-30	10-50
S	1-8	1-8	1-8	1-8	1-8	1-8

Example of order

D4-118M01-0083
Tap MasterTAP M8x1-6HX DIN-374 B HSSE-PM HL

● **Available from stock**
○ **On request**

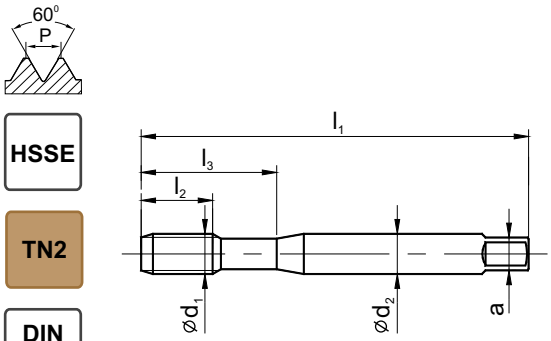
1

ISO Metric fine thread DIN-13

HSSE

TN2

DIN 371



800X

	C-TN2	B-TN2	C-R40-TN2
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	< 1.5d	< 3d	< 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

MF ød1	P	l1	l2	l2 R40	l3	ød2	a	d	Norm	DIN-371		
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
									INDEX	C2-123X01	C2-113X01	C2-513X01
M4x0,5	0,50	63	12	7	21	4,5	3,4	3,50	0041	○	○	○
M5x0,5	0,50	70	14	8	25	6,0	4,9	4,50	0051	○	○	○
M6x0,75	0,75	80	14	10	30	6,0	4,9	5,20	0062	○	○	○
M8x0,75	0,75	80	18	10	30	8,0	6,2	7,20	0082	○	○	○
M8x1	1,00	90	20	13	35	8,0	6,2	7,00	0083	●	●	●
M10x0,75	0,75	90	20	13	35	10,0	8,0	9,20	0102	○	○	○
M10x1	1,00	90	20	13	35	10,0	8,0	9,00	0103	●	●	●
M10x1,25	1,25	100	20	15	39	10,0	8,0	8,80	0104	○	●	●

ISO	Vc (m/min)		
P	5-35	5-35	5-35
M	5-15	5-15	5-15
K	5-25	5-25	5-25
N	10-30	10-30	10-30
S	-	-	-

Example of order

C2-123X01-0083
Tap 800X M8x1-6H DIN-371 C HSSE Tn2

● **Available from stock**
○ **On request**

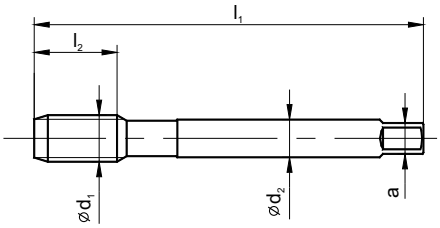
ISO Metric fine thread DIN-13

800X

HSSE

TN2

DIN 374



	C-TN2	B-TN2	C-R40-TN2
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 1.5d	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

MF ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norm	DIN-374		
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
									INDEX	D2-123X01	D2-113X01	D2-513X01
M8x1	1,00	90	20	10	-	6,0	4,9	7,00	0083	●	●	●
M9x1	1,00	90	20	10	-	7,0	5,5	8,00	0093	○	○	○
M10x0,75	0,75	90	18	10	-	7,0	5,5	9,20	0102	●	●	●
M10x1	1,00	90	20	10	-	7,0	5,5	9,00	0103	●	●	●
M10x1,25	1,25	100	20	15	-	7,0	5,5	8,80	0104	●	●	●
M11x1	1,00	90	20	10	-	8,0	6,2	10,00	0113	○	○	○
M12x1	1,00	100	20	10	-	9,0	7,0	11,00	0123	●	●	●
M12x1,25	1,25	100	20	15	-	9,0	7,0	10,80	0124	●	●	●
M12x1,5	1,50	100	20	15	-	9,0	7,0	10,50	0125	●	●	●
M14x1	1,00	100	20	10	-	11,0	9,0	13,00	0143	●	●	●
M14x1,25	1,25	100	20	15	-	11,0	9,0	12,80	0144	●	●	●
M14x1,5	1,50	100	20	15	-	11,0	9,0	12,50	0145	●	●	●
M15x1	1,00	100	20	10	-	12,0	9,0	14,00	0153	○	○	○
M16x1	1,00	100	20	10	-	12,0	9,0	15,00	0163	●	●	●
M16x1,5	1,50	100	20	15	-	12,0	9,0	14,50	0165	●	●	●
M18x1	1,00	110	24	13	-	14,0	11,0	17,00	0183	○	○	○
M18x1,5	1,50	110	24	17	-	14,0	11,0	16,50	0185	●	●	●
M18x2	2,00	125	27	20	-	14,0	11,0	16,00	0186	●	●	●
M20x1	1,00	125	24	13	-	16,0	12,0	19,00	0203	○	○	○
M20x1,5	1,50	125	24	17	-	16,0	12,0	18,50	0205	●	●	●
M20x2	2,00	140	27	20	-	16,0	12,0	18,00	0206	●	●	●
M22x1	1,00	125	24	13	-	18,0	14,5	21,00	0223	○	○	○
M22x1,5	1,50	125	24	17	-	18,0	14,5	20,50	0225	●	●	●
M22x2	2,00	140	27	20	-	18,0	14,5	20,00	0226	●	●	●
M24x1	1,00	140	27	13	-	18,0	14,5	23,00	0243	○	○	○
M24x1,5	1,50	140	27	20	-	18,0	14,5	22,50	0245	●	●	●
M24x2	2,00	140	27	20	-	18,0	14,5	22,00	0246	●	●	●
M25x1,5	1,50	140	27	20	-	18,0	14,5	23,50	0255	○	○	○
M26x1,5	1,50	140	27	20	-	18,0	14,5	24,50	0265	○	○	○
M27x1,5	1,50	140	27	20	-	20,0	16,0	25,50	0275	●	●	●
M27x2	2,00	140	27	20	-	20,0	16,0	25,00	0276	●	●	●
M28x1,5	1,50	140	27	20	-	20,0	16,0	26,50	0285	○	○	○

● **Available from stock**
○ **On request**

ISO	Vc (m/min)		
P	5-35	5-35	5-35
M	5-15	5-15	5-15
K	5-25	5-25	5-25
N	10-30	10-30	10-30
S	-	-	-

Example of order

D2-123X01-0083
Tap 800X M8x1-6H DIN-374 C HSSE Tn2

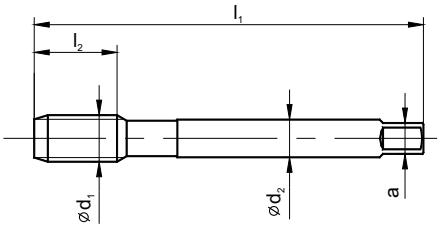
1

ISO Metric fine thread DIN-13

HSSE

TN2

DIN 374



800X

	C-TN2	B-TN2	C-R40-TN2
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 1.5d	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

MF ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norm	DIN-374		
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
									INDEX	D2-123X01	D2-113X01	D2-513X01
M28x2	2,0	140	27	20	-	20,0	16,0	26,00	0286	○	○	○
M30x1,5	1,5	150	27	22	-	22,0	18,0	28,50	0305	●	●	●
M30x2	2,0	150	27	22	-	22,0	18,0	28,00	0306	●	●	●
M32x1,5	1,5	150	27	22	-	22,0	18,0	30,50	0325	○	○	○
M32x2	2,0	150	27	22	-	22,0	18,0	30,00	0326	○	○	○
M33x1,5	1,5	160	30	22	-	25,0	20,0	31,50	0335	○	○	○
M33x2	2,0	160	30	24	-	25,0	20,0	31,00	0336	○	○	○
M34x1,5	1,5	170	30	22	-	28,0	22,0	32,50	0345	○	○	○
M35x1,5	1,5	170	30	22	-	28,0	22,0	33,50	0355	○	○	○
M36x1,5	1,5	170	30	22	-	28,0	22,0	34,50	0365	○	○	○
M36x2	2,0	170	30	24	-	28,0	22,0	34,00	0366	○	○	○
M36x3	3,0	200	50	30	-	28,0	22,0	33,00	0367	○	○	○
M38x1,5	1,5	170	30	24	-	28,0	22,0	36,50	0385	○	○	○
M39x1,5	1,5	170	30	25	-	32,0	24,0	37,50	0395	○	○	○
M39x2	2,0	170	30	25	-	32,0	24,0	37,00	0396	○	○	○
M39x3	3,0	200	50	30	-	32,0	24,0	36,00	0397	○	○	○
M40x1,5	1,5	170	30	25	-	32,0	24,0	38,50	0405	○	○	○
M40x2	2,0	170	30	25	-	32,0	24,0	38,00	0406	○	○	○
M42x1,5	1,5	170	30	25	-	32,0	24,0	40,50	0425	○	○	○
M42x2	2,0	170	30	25	-	32,0	24,0	40,00	0426	○	○	○
M42x3	3,0	200	50	30	-	32,0	24,0	39,00	0427	○	○	○
M45x1,5	1,5	180	32	27	-	36,0	29,0	43,50	0455	○	○	○
M45x2	2,0	180	32	27	-	36,0	29,0	43,00	0456	○	○	○
M45x3	3,0	200	50	30	-	36,0	29,0	42,00	0457	○	○	○
M48x1,5	1,5	190	32	27	-	36,0	29,0	46,50	0485	○	○	○
M48x2	2,0	190	32	27	-	36,0	29,0	46,00	0486	○	○	○
M48x3	3,0	225	50	33	-	36,0	29,0	45,00	0487	○	○	○
M50x1,5	1,5	190	32	27	-	36,0	29,0	48,50	0505	○	○	○
M50x2	2,0	190	32	27	-	36,0	29,0	48,00	0506	○	○	○
M52x1,5	1,5	190	32	27	-	40,0	32,0	50,50	0525	○	○	○
M52x2	2,0	190	32	27	-	40,0	32,0	50,00	0526	○	○	○
M52x3	3,0	225	50	33	-	40,0	32,0	49,00	0527	○	○	○

● **Available from stock**
○ **On request**

ISO	Vc (m/min)		
P	5-35	5-35	5-35
M	5-15	5-15	5-15
K	5-25	5-25	5-25
N	10-30	10-30	10-30
S	-	-	-

Example of order

D2-123X01-0305
Tap 800X M30x1,5-6H DIN-374 C HSSE TN2

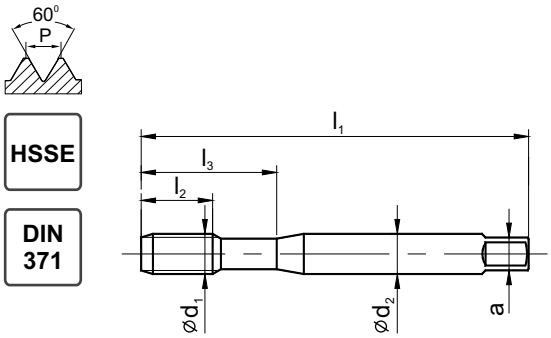
ISO Metric fine thread DIN-13

800

	C	B	C-R40
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	< 1.5d	< 3d	< 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating			
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

HSSE

DIN 371



MF Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371		
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
									INDEX	C2-121101	C2-111101	C2-511101
M3x0,35	0,35	56	10	5	18	3,5	2,7	2,65	0031	●	●	●
M3,5x0,35	0,35	56	10	5	20	4,0	3,0	3,15	0036	●	●	●
M4x0,5	0,50	63	12	7	21	4,5	3,4	3,50	0041	●	●	●
M5x0,5	0,50	70	14	8	25	6,0	4,9	4,50	0051	●	●	●
M6x0,75	0,75	80	14	10	30	6,0	4,9	5,20	0062	●	●	●
M8x0,75	0,75	80	18	10	30	8,0	6,2	7,20	0082	●	●	●
M8x1	1,00	90	20	13	35	8,0	6,2	7,00	0083	●	●	●
M10x0,75	0,75	90	20	13	35	10,0	8,0	9,20	0102	●	●	●
M10x1	1,00	90	20	13	35	10,0	8,0	9,00	0103	●	●	●
M10x1,25	1,25	100	20	15	39	10,0	8,0	8,80	0104	●	●	●

ISO	Vc (m/min)		
P	5-20	5-20	5-20
M	5-10	5-10	5-10
K	5-15	5-15	5-15
N	5-25	5-25	5-25
S	-	-	-

Example of order

C2-121101-0041
Tap 800 M4x0,5-6H DIN-371 C HSSE

● **Available from stock**
○ **On request**

1

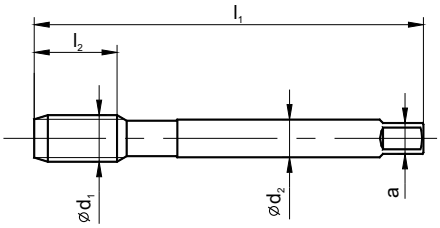
ISO Metric fine thread DIN-13

800

	C	B	C-R40
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 1.5d	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating			
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

HSSE

DIN 374



MF ød1	P	l1	l2	l2 R40 R45	l3	ød2	a	d	Norm	DIN-374		
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
									INDEX	D2-121101	D2-111101	D2-511101
M8x1	1,00	90	20	10	-	6,0	4,9	7,00	0083	●	●	●
M9x1	1,00	90	20	10	-	7,0	5,5	8,00	0093	○	○	○
M10x0,75	0,75	90	18	10	-	7,0	5,5	9,20	0102	●	●	●
M10x1	1,00	90	20	10	-	7,0	5,5	9,00	0103	●	●	●
M10x1,25	1,25	100	20	15	-	7,0	5,5	8,80	0104	●	●	●
M11x1	1,00	90	20	10	-	8,0	6,2	10,00	0113	○	○	○
M12x1	1,00	100	20	10	-	9,0	7,0	11,00	0123	●	●	●
M12x1,25	1,25	100	20	15	-	9,0	7,0	10,80	0124	●	●	●
M12x1,5	1,50	100	20	15	-	9,0	7,0	10,50	0125	●	●	●
M14x1	1,00	100	20	10	-	11,0	9,0	13,00	0143	●	●	●
M14x1,25	1,25	100	20	15	-	11,0	9,0	12,80	0144	●	●	●
M14x1,5	1,50	100	20	15	-	11,0	9,0	12,50	0145	●	●	●
M15x1	1,00	100	20	10	-	12,0	9,0	14,00	0153	○	○	○
M16x1	1,00	100	20	10	-	12,0	9,0	15,00	0163	●	●	●
M16x1,5	1,50	100	20	15	-	12,0	9,0	14,50	0165	●	●	●
M18x1	1,00	110	24	13	-	14,0	11,0	17,00	0183	○	○	○
M18x1,5	1,50	110	24	17	-	14,0	11,0	16,50	0185	●	●	●
M18x2	2,00	125	27	20	-	14,0	11,0	16,00	0186	●	●	●
M20x1	1,00	125	24	13	-	16,0	12,0	19,00	0203	○	○	○
M20x1,5	1,50	125	24	17	-	16,0	12,0	18,50	0205	●	●	●
M20x2	2,00	140	27	20	-	16,0	12,0	18,00	0206	●	●	●
M22x1	1,00	125	24	13	-	18,0	14,5	21,00	0223	○	○	○
M22x1,5	1,50	125	24	17	-	18,0	14,5	20,50	0225	●	●	●
M22x2	2,00	140	27	20	-	18,0	14,5	20,00	0226	●	●	●
M24x1	1,00	140	27	13	-	18,0	14,5	23,00	0243	○	○	○
M24x1,5	1,50	140	27	20	-	18,0	14,5	22,50	0245	●	●	●
M24x2	2,00	140	27	20	-	18,0	14,5	22,00	0246	●	●	●
M25x1,5	1,50	140	27	20	-	18,0	14,5	23,50	0255	○	○	○
M26x1,5	1,50	140	27	20	-	18,0	14,5	24,50	0265	○	○	○
M27x1,5	1,50	140	27	20	-	20,0	16,0	25,50	0275	●	●	●
M27x2	2,00	140	27	20	-	20,0	16,0	25,00	0276	●	●	●
M28x1,5	1,50	140	27	20	-	20,0	16,0	26,50	0285	○	○	○

● **Available from stock**
○ **On request**

ISO	Vc (m/min)		
P	5-20	5-20	5-20
M	5-10	5-10	5-10
K	5-15	5-15	5-15
N	5-25	5-25	5-25
S	-	-	-

Example of order

D2-121101-0083
Tap 800 M8x1-6H DIN-374 C HSSE

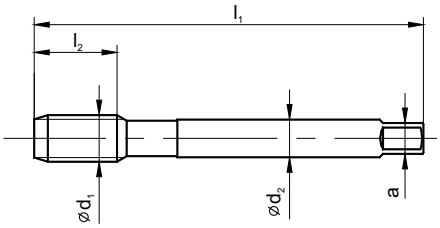
ISO Metric fine thread DIN-13

800

	C	B	C-R40
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 1.5d	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating			
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

HSSE

DIN 374



MF ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a		Norm	DIN-374		
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
									INDEX	D2-121101	D2-111101	D2-511101
M28x2	2,0	140	27	20	-	20,0	16,0	26,00	0286	○	○	○
M30x1,5	1,5	150	27	22	-	22,0	18,0	28,50	0305	●	●	●
M30x2	2,0	150	27	22	-	22,0	18,0	28,00	0306	●	●	●
M32x1,5	1,5	150	27	22	-	22,0	18,0	30,50	0325	○	○	○
M32x2	2,0	150	27	22	-	22,0	18,0	30,00	0326	○	○	○
M33x1,5	1,5	160	30	22	-	25,0	20,0	31,50	0335	●	●	●
M33x2	2,0	160	30	24	-	25,0	20,0	31,00	0336	●	●	●
M34x1,5	1,5	170	30	22	-	28,0	22,0	32,50	0345	○	○	○
M35x1,5	1,5	170	30	22	-	28,0	22,0	33,50	0355	○	○	○
M36x1,5	1,5	170	30	22	-	28,0	22,0	34,50	0365	●	●	●
M36x2	2,0	170	30	24	-	28,0	22,0	34,00	0366	●	●	●
M36x3	3,0	200	50	30	-	28,0	22,0	33,00	0367	○	○	○
M38x1,5	1,5	170	30	24	-	28,0	22,0	36,50	0385	○	○	○
M39x1,5	1,5	170	30	25	-	32,0	24,0	37,50	0395	○	○	○
M39x2	2,0	170	30	25	-	32,0	24,0	37,00	0396	○	○	○
M39x3	3,0	200	50	30	-	32,0	24,0	36,00	0397	○	○	○
M40x1,5	1,5	170	30	25	-	32,0	24,0	38,50	0405	○	○	○
M40x2	2,0	170	30	25	-	32,0	24,0	38,00	0406	○	○	○
M42x1,5	1,5	170	30	25	-	32,0	24,0	40,50	0425	○	○	○
M42x2	2,0	170	30	25	-	32,0	24,0	40,00	0426	○	○	○
M42x3	3,0	200	50	30	-	32,0	24,0	39,00	0427	○	○	○
M45x1,5	1,5	180	32	27	-	36,0	29,0	43,50	0455	○	○	○
M45x2	2,0	180	32	27	-	36,0	29,0	43,00	0456	○	○	○
M45x3	3,0	200	50	30	-	36,0	29,0	42,00	0457	○	○	○
M48x1,5	1,5	190	32	27	-	36,0	29,0	46,50	0485	○	○	○
M48x2	2,0	190	32	27	-	36,0	29,0	46,00	0486	○	○	○
M48x3	3,0	225	50	33	-	36,0	29,0	45,00	0487	○	○	○
M50x1,5	1,5	190	32	27	-	36,0	29,0	48,50	0505	○	○	○
M50x2	2,0	190	32	27	-	36,0	29,0	48,00	0506	○	○	○
M52x1,5	1,5	190	32	27	-	40,0	32,0	50,50	0525	○	○	○
M52x2	2,0	190	32	27	-	40,0	32,0	50,00	0526	○	○	○
M52x3	3,0	225	50	33	-	40,0	32,0	49,00	0527	○	○	○

● **Available from stock**
○ **On request**

ISO	Vc (m/min)		
P	5-20	5-20	5-20
M	5-10	5-10	5-10
K	5-15	5-15	5-15
N	5-25	5-25	5-25
S	-	-	-

Example of order

D2-121101-0286
Tap 800 M28x2-6H DIN-374 C HSSE

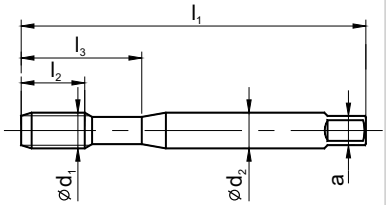
1

ISO Metric fine thread DIN-13

HSSE PM

TS

DIN 371



	FAN-I200		I400-HT				
	B-TS	C-R40-TS	C-TS	B-TS	C-R15-TS		
							
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H		
Hole type	 < 3d	 < 2,5d	 < 1,5d	 < 2,5d	 < 1,5d		
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM		
Coating	TS	TS	TS	TS	TS		
Chamfer	B / 4-5P	C / 2-3P	C / 2-3P	B / 4-5P	C / 2-3P		

MF Ød1	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371						
									Tol.	ISO2 (6H)	ISO2 (6H)	6HX	6HX	6HX		
									INDEX	C4-115001	C4-565001	C4-12G901	C4-11G901	C4-50G901		
M4x0,5	0,50	63	12	7	21	4,5	3,4	3,50	0041	○	○	○	○	○		
M5x0,5	0,50	70	14	8	25	6,0	4,9	4,50	0051	○	○	○	○	○		
M6x0,75	0,75	80	14	10	30	6,0	4,9	5,20	0062	○	○	○	○	○		
M8x0,75	0,75	80	18	10	30	8,0	6,2	7,20	0082	○	○	○	○	○		
M8x1	1,00	90	20	13	35	8,0	6,2	7,00	0083	●	●	●	●	●		
M10x0,75	0,75	90	20	13	35	10,0	8,0	9,20	0102	○	○	○	○	○		
M10x1	1,00	90	20	13	35	10,0	8,0	9,00	0103	●	●	●	●	●		
M10x1,25	1,25	100	20	15	39	10,0	8,0	8,80	0104	○	○	○	○	○		

ISO	Vc (m/min)						
P	5-35	5-35	1-20	1-20	1-20		
M	5-15	5-15	1-10	1-10	1-10		
K	5-25	5-25	1-20	1-20	1-20		
N	10-30	10-30	10-20	10-20	10-20		
S	-	-	-	-	-		

Example of order

C4-115001-0062
Tap FAN-1200 M6x0,75-6H DIN-371 B HSSE-PM TS

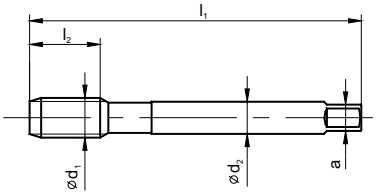
● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

HSSE PM

TS

DIN 374



	FAN-1200		I400-HT		
	B-TS	C-R40-TS	C-TS	B-TS	C-R15-TS
					
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d	 < 1,5d	 < 2,5d	 < 1,5d
Quality of material	PM/HSSE	PM/HSSE	PM/HSSE	PM/HSSE	PM/HSSE
Coating	TS	TS	TS	TS	TS
Chamfer	B / 4-5P	C / 2-3P	C / 2-3P	B / 4-5P	C / 2-3P

MF ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norm	DIN-374				
									Tol.	ISO2 (6H)	ISO2 (6H)	6HX	6HX	6HX
									INDEX	D4-115001	D4-565001	D4-12G901	D4-11G901	D4-50G901
M8x1	1,00	90	20	10	-	6,0	4,9	7,00	0083	●	●	●	●	●
M10x0,75	0,75	90	18	10	-	7,0	5,5	9,20	0102	○	○	○	○	○
M10x1	1,00	90	20	10	-	7,0	5,5	9,00	0103	●	●	●	●	●
M10x1,25	1,25	100	20	15	-	7,0	5,5	8,80	0104	○	○	○	○	○
M12x1	1,00	100	20	10	-	9,0	7,0	11,00	0123	●	●	●	●	●
M12x1,25	1,25	100	20	15	-	9,0	7,0	10,80	0124	●	●	●	●	●
M12x1,5	1,50	100	20	15	-	9,0	7,0	10,50	0125	●	●	●	●	●
M14x1	1,00	100	20	10	-	11,0	9,0	13,00	0143	○	○	○	○	●
M14x1,25	1,25	100	20	15	-	11,0	9,0	12,80	0144	○	○	○	○	○
M14x1,5	1,50	100	20	15	-	11,0	9,0	12,50	0145	●	●	●	●	●
M16x1	1,00	100	20	10	-	12,0	9,0	15,00	0163	●	●	●	●	●
M16x1,5	1,50	100	20	15	-	12,0	9,0	14,50	0165	●	●	●	●	●
M18x1	1,00	110	24	13	-	14,0	11,0	17,00	0183	○	○	○	○	○
M18x1,5	1,50	110	24	17	-	14,0	11,0	16,50	0185	●	●	●	●	●
M18x2	2,00	125	32	27	-	14,0	11,0	16,00	0186	●	○	○	○	○
M20x1	1,00	125	24	13	-	16,0	12,0	19,00	0203	○	○	○	○	○
M20x1,5	1,50	125	24	17	-	16,0	12,0	18,50	0205	●	●	●	●	●
M20x2	2,00	140	32	27	-	16,0	12,0	18,00	0206	○	○	○	○	○
M22x1	1,00	125	24	13	-	18,0	14,5	21,00	0223	○	○	○	○	○
M22x1,5	1,50	125	24	17	-	18,0	14,5	20,50	0225	○	○	○	○	○
M22x2	2,00	140	32	27	-	18,0	14,5	20,00	0226	○	○	○	○	○
M24x1	1,00	140	27	13	-	18,0	14,5	23,00	0243	○	○	○	○	○
M24x1,5	1,50	140	27	20	-	18,0	14,5	22,50	0245	○	○	○	○	○
M24x2	2,00	140	27	20	-	18,0	14,5	22,00	0246	○	○	○	○	○

ISO	Vc (m/min)				
P	5-35	5-35	1-20	1-20	1-20
M	5-15	5-15	1-10	1-10	1-10
K	5-25	5-25	1-20	1-20	1-20
N	10-30	10-30	10-20	10-20	10-20
S	-	-	-	-	-

Example of order

D4-115001-0083
Tap FAN-1200 M8x1-6H DIN-374 B HSSE-PM TS

● **Available from stock**
○ **On request**

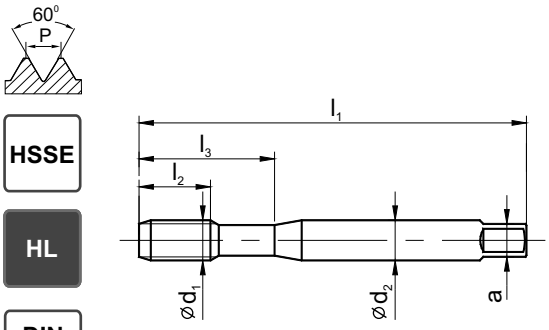
1

ISO Metric fine thread DIN-13

HSSE

HL

DIN 371



INOX

	B	B-HL	C-R40	C-R40-HL
				
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 3d	 < 3d	 < 2,5d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE	HSSE
Coating		HL		HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P

MF ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norm	DIN-371						
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)			
									INDEX	C2-111801	C2-118801	C2-511801	C2-518801			
M4x0,5	0,50	63	12	7	21	4,5	3,4	3,50	0041	●	●	●	●			
M5x0,5	0,50	70	14	8	25	6,0	4,9	4,50	0051	●	●	●	●			
M6x0,75	0,75	80	14	10	30	6,0	4,9	5,20	0062	●	●	●	●			
M8x0,75	0,75	80	18	10	30	8,0	6,2	7,20	0082	●	●	●	●			
M8x1	1,00	90	20	13	35	8,0	6,2	7,00	0083	●	●	●	●			
M10x0,75	0,75	90	20	13	35	10,0	8,0	9,20	0102	●	●	●	●			
M10x1	1,00	90	20	13	35	10,0	8,0	9,00	0103	●	●	●	●			
M10x1,25	1,25	100	20	15	39	10,0	8,0	8,80	0104	●	●	●	●			

ISO	Vc (m/min)						
P	-	-	-	-			
M	5-15	5-15	5-15	5-15			
K	-	-	-	-			
N	-	-	-	-			
S	-	-	-	-			

Example of order

C2-111801-0041
Tap INOX M4x0,5-6H DIN-371 B HSSE

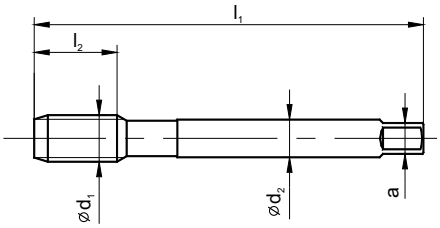
● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

HSSE

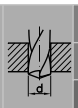
HL

DIN 374



INOX

	B	B-HL	C-R40	C-R40-HL
				
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 3d	 < 3d	 < 2,5d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE	HSSE
Coating		HL		HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P

MF ∅d_1	P	l_1	l_2	l_2 R40	l_3	∅d_2	a		Norm	DIN-374						
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)			
									INDEX	D2-111801	D2-118801	D2-511801	D2-518801			
M8x1	1,00	90	20	10	-	6,0	4,9	7,00	0083	●	○	●	○			
M10x0,75	0,75	90	18	10	-	7,0	5,5	9,20	0102	●	○	●	○			
M10x1	1,00	90	20	10	-	7,0	5,5	9,00	0103	●	●	●	●			
M10x1,25	1,25	100	20	15	-	7,0	5,5	8,80	0104	●	○	●	○			
M12x1	1,00	100	20	10	-	9,0	7,0	11,00	0123	●	○	●	○			
M12x1,25	1,25	100	20	15	-	9,0	7,0	10,80	0124	●	○	●	○			
M12x1,5	1,50	100	20	15	-	9,0	7,0	10,50	0125	●	●	●	●			
M14x1	1,00	100	20	10	-	11,0	9,0	13,00	0143	○	○	○	○			
M14x1,25	1,25	100	20	15	-	11,0	9,0	12,80	0144	○	○	○	○			
M14x1,5	1,50	100	20	15	-	11,0	9,0	12,50	0145	●	○	●	○			
M15x1	1,00	100	20	10	-	12,0	9,0	14,00	0153	○	○	○	○			
M16x1	1,00	100	20	10	-	12,0	9,0	15,00	0163	●	○	●	○			
M16x1,5	1,50	100	20	15	-	12,0	9,0	14,50	0165	●	●	●	●			
M18x1	1,00	110	24	13	-	14,0	11,0	17,00	0183	○	○	○	○			
M18x1,5	1,50	110	24	17	-	14,0	11,0	16,50	0185	●	○	●	○			
M18x2	2,00	125	27	20	-	14,0	11,0	16,00	0186	○	○	○	○			
M20x1	1,00	125	24	13	-	16,0	12,0	19,00	0203	○	○	○	○			
M20x1,5	1,50	125	24	17	-	16,0	12,0	18,50	0205	●	●	●	●			
M20x2	2,00	140	27	20	-	16,0	12,0	18,00	0206	○	○	○	○			
M22x1	1,00	125	24	13	-	18,0	14,5	21,00	0223	○	○	○	○			
M22x1,5	1,50	125	24	17	-	18,0	14,5	20,50	0225	●	○	●	○			
M22x2	2,00	140	27	20	-	18,0	14,5	20,00	0226	○	○	○	○			
M24x1	1,00	140	27	13	-	18,0	14,5	23,00	0243	○	○	○	○			
M24x1,5	1,50	140	27	20	-	18,0	14,5	22,50	0245	○	○	○	○			
M24x2	2,00	140	27	20	-	18,0	14,5	22,00	0246	○	○	○	○			
M26x1,5	1,50	140	27	20	-	18,0	14,5	24,50	0265	○	○	○	○			
M27x1,5	1,50	140	27	20	-	20,0	16,0	25,50	0275	○	○	○	○			
M27x2	2,00	140	27	20	-	20,0	16,0	25,00	0276	○	○	○	○			
M28x1,5	1,50	140	27	20	-	20,0	16,0	26,50	0285	○	○	○	○			

ISO	Vc (m/min)						
P	-	-	-	-			
M	5-15	5-15	5-15	5-15			
K	-	-	-	-			
N	-	-	-	-			
S	-	-	-	-			

● **Available from stock**

○ **On request**

Example of order

D2-118801-0083
Tap INOX M8x1-6H DIN-374 B HSSE HL

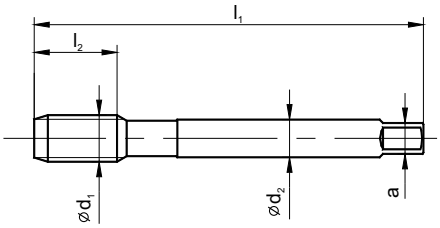
1

ISO Metric fine thread DIN-13

HSSE

HL

DIN 374



INOX

	B	B-HL	C-R40	C-R40-HL
				
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 3d	 < 3d	 < 2,5d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE	HSSE
Coating		HL		HL
Chamfer	B / 4-5P	B / 4-5P	C / 2-3P	C / 2-3P

MF Ød1	P	l1	l2	l2 R40	l3	Ød2	a		Norm	DIN-374			
									Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
									INDEX	D2-111801	D2-118801	D2-511801	D2-518801
M28x2	2,0	140	27	20	-	20,0	16,0	26,00	0286	o	o	o	o
M30x1,5	1,5	150	27	22	-	22,0	18,0	28,50	0305	o	o	o	o
M30x2	2,0	150	27	22	-	22,0	18,0	28,00	0306	o	o	o	o
M32x1,5	1,5	150	27	22	-	22,0	18,0	30,50	0325	o	o	o	o
M32x2	2,0	150	27	22	-	22,0	18,0	30,00	0326	o	o	o	o
M33x1,5	1,5	160	30	22	-	25,0	20,0	31,50	0335	o	o	o	o
M33x2	2,0	160	30	24	-	25,0	20,0	31,00	0336	o	o	o	o
M34x1,5	1,5	170	30	22	-	28,0	22,0	32,50	0345	o	o	o	o
M35x1,5	1,5	170	30	22	-	28,0	22,0	33,50	0355	o	o	o	o
M36x1,5	1,5	170	30	22	-	28,0	22,0	34,50	0365	o	o	o	o
M36x2	2,0	170	30	24	-	28,0	22,0	34,00	0366	o	o	o	o
M36x3	3,0	200	50	30	-	28,0	22,0	33,00	0367	o	o	o	o

ISO	Vc (m/min)			
P	-	-	-	-
M	5-15	5-15	5-15	5-15
K	-	-	-	-
N	-	-	-	-
S	-	-	-	-

Example of order

D2-118801-0325
Tap INOX M32x1,5-6H DIN-374 B HSSE HL

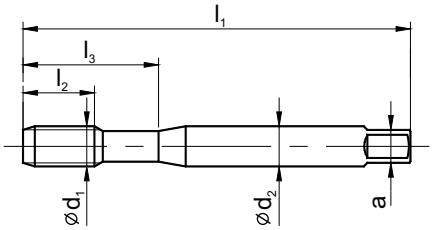
● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

HSSE PM

TS

DIN 371



	GG					GAL	
	C-TS	C-IK-TS	E-TS	E-IK-TS	E-IKR-TS	C-R15-TS	E-R15-IK-TS
							
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 2d	< 2,5d	< 2d	< 2,5d	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	TS	TS	TS	TS	TS	TS	TS
Chamfer	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P	E / 1,5-2P	C / 2-3P	E / 1,5-2P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-371						
								Tol.	6HX	6HX	6HX	6HX	6HX	6HX	6HX
								INDEX	C2-125501	C4-125551	C2-145501	C4-145551	C4-145561	C2-505601	C4-655601
M8x1	1,00	90	20	35	8,0	6,2	7,00	0083	●	○	●	○	○	●	○
M10x0,75	0,75	90	20	35	10,0	8,0	9,20	0102	○	○	○	○	○	○	○
M10x1	1,00	90	20	35	10,0	8,0	9,00	0103	●	○	●	○	○	●	○
M10x1,25	1,25	100	20	39	10,0	8,0	8,80	0104	○	○	●	○	○	●	○

ISO	Vc (m/min)						
P	-	-	-	-	-	-	-
M	-	-	-	-	-	-	-
K	1-60	1-60	1-60	1-60	1-60	-	-
N	-	-	-	-	-	10-30	10-30
S	-	-	-	-	-	-	-

Example of order

C2-125501-0083
Tap GG M8x1-6HX DIN-371 C HSSE-PM TS

● **Available from stock**
○ **On request**

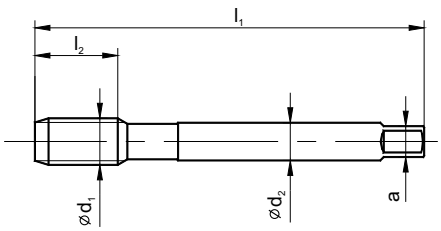
1

ISO Metric fine thread DIN-13

HSSE PM

TS

DIN 374



	GG					GAL	
	C-TS	C-IK-TS	E-TS	E-IK-TS	E-IKR-TS	C-R15-TS	E-R15-IK-TS
							
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 2d	< 2,5d	< 2d	< 2,5d	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	TS	TS	TS	TS	TS	TS	TS
Chamfer	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P	E / 1,5-2P	C / 2-3P	E / 1,5-2P

MF ∅d_1	P	l_1	l_2	∅d_2	a	d	Norm	DIN-374						
							Tol.	6HX	6HX	6HX	6HX	6HX	6HX	6HX
							INDEX	D2-125501	D4-125551	D2-145501	D4-145551	D4-145561	D2-505601	D4-655651
M8x1	1,00	90	20	6,0	4,9	7,00	0083	●	○	●	○	○	●	○
M10x0,75	0,75	90	18	7,0	5,5	9,2	0102	○	○	○	○	○	○	○
M10x1	1,00	90	20	7,0	5,5	9,00	0103	●	●	●	○	○	●	●
M10x1,25	1,25	100	20	7,0	5,5	8,80	0104	○	○	○	○	○	○	○
M12x1	1,00	100	20	9,0	7,0	11,00	0123	○	○	○	○	○	○	○
M12x1,25	1,25	100	20	9,0	7,0	10,80	0124	○	○	○	○	○	○	○
M12x1,5	1,50	100	20	9,0	7,0	10,50	0125	●	●	●	○	○	●	●
M14x1	1,00	100	20	11,0	9,0	13,00	0143	○	○	○	○	○	○	○
M14x1,25	1,25	100	20	11,0	9,0	12,80	0144	○	○	○	○	○	○	○
M14x1,5	1,50	100	20	11,0	9,0	12,50	0145	●	●	●	○	○	●	●
M16x1	1,00	100	20	12,0	9,0	15,00	0163	○	○	○	○	○	○	○
M16x1,5	1,50	100	20	12,0	9,0	14,50	0165	●	●	●	○	○	●	●
M18x1	1,00	110	24	14,0	11,0	17,00	0183	○	○	○	○	○	○	○
M18x1,5	1,50	110	24	14,0	11,0	16,50	0185	●	○	●	○	○	○	○
M18x2	2,00	125	27	14,0	11,0	16,00	0186	○	○	○	○	○	○	○
M20x1	1,00	125	24	16,0	12,0	19,00	0203	○	○	○	○	○	○	○
M20x1,5	1,50	125	24	16,0	12,0	18,50	0205	●	○	○	○	○	○	○
M20x2	2,00	140	27	16,0	12,0	18,00	0206	○	○	○	○	○	○	○

ISO	Vc (m/min)						
P	-	-	-	-	-	-	-
M	-	-	-	-	-	-	-
K	1-60	1-60	1-60	1-60	1-60	-	-
N	-	-	-	-	-	10-30	10-30
S	-	-	-	-	-	-	-

Example of order

D2-125501-0103
Tap GG M10x1-6HX DIN-374 C HSSE-PM TS

● **Available from stock**
○ **On request**

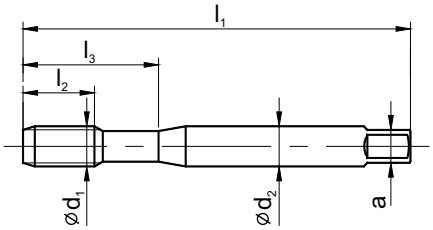
ISO Metric fine thread DIN-13

S-NC

HSSE PM

TC

DIN 371



	B-TC	C-R45-TC	C-R45-IK-TC
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d	 < 2,5d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM
Coating	TC	TC	TC
Chamfer	B / 4-5P	C / 2-3P	C / 2-3P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a		Norm	DIN-371		
								Tol.	6HX	6HX	6HX
								INDEX	C4-115301	C4-525301	C4-525351
M4x0,5	0,50	63	7	21	4,5	3,4	3,50	0041	○	○	○
M5x0,5	0,50	70	8	25	6,0	4,9	4,50	0051	○	○	○
M6x0,75	0,75	80	10	30	6,0	4,9	5,20	0062	○	○	○
M8x0,75	0,75	80	10	30	8,0	6,2	7,20	0082	●	●	○
M8x1	1,00	90	13	35	8,0	6,2	7,00	0083	○	○	○
M10x0,75	0,75	90	13	35	10,0	8,0	9,20	0102	○	○	○
M10x1	1,00	90	13	35	10,0	8,0	9,00	0103	●	●	○
M10x1,25	1,25	100	15	39	10,0	8,0	8,80	0104	○	○	○

ISO	Vc (m/min)		
P	5-50	5-50	5-60
M	5-20	5-20	5-30
K	5-40	5-40	5-60
N	5-40	5-40	5-60
S	1-8	1-8	1-8

Example of order

C4-115301-0041
Tap S-NC M4x0,5-6HX DIN-371 B HSSE-PM TC

● **Available from stock**
○ **On request**

1

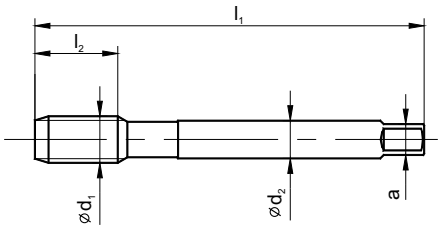
ISO Metric fine thread DIN-13

S-NC

HSSE PM

TC

DIN 374



	B-TC	C-R45-TC	C-R45-IK-TC
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	< 3d	< 2,5d	< 2,5d
Quality of material	PM/HSSE	PM/HSSE	PM/HSSE
Coating	TC	TC	TC
Chamfer	B / 4-5P	C / 2-3P	C / 2-3P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-374		
								Tol.	6HX	6HX	6HX
								INDEX	D4-115301	D4-525301	D4-525351
M8x1	1,00	90	10	-	6,0	4,9	7,00	0083	○	○	○
M10x1	1,00	90	10	-	7,0	5,5	9,00	0103	○	○	○
M10x1,25	1,25	100	15	-	7,0	5,5	8,80	0104	○	○	○
M11x1	1,00	90	10	-	8,0	6,2	10,00	0113	○	○	○
M12x1	1,00	100	10	-	9,0	7,0	11,00	0123	○	○	○
M12x1,25	1,25	100	15	-	9,0	7,0	10,80	0124	○	○	○
M12x1,5	1,50	100	15	-	9,0	7,0	10,50	0125	●	●	○
M14x1	1,00	100	10	-	11,0	9,0	13,00	0143	○	○	○
M14x1,25	1,25	100	15	-	11,0	9,0	12,80	0144	○	○	○
M14x1,5	1,50	100	15	-	11,0	9,0	12,50	0145	●	●	○
M15x1	1,00	100	10	-	12,0	9,0	14,00	0153	○	○	○
M16x1	1,00	100	10	-	12,0	9,0	15,00	0163	○	○	○
M16x1,5	1,50	100	15	-	12,0	9,0	14,50	0165	●	●	○

ISO	Vc (m/min)		
P	5-50	5-50	5-60
M	5-20	5-20	5-30
K	5-40	5-40	5-60
N	5-40	5-40	5-60
S	1-8	1-8	1-8

Example of order

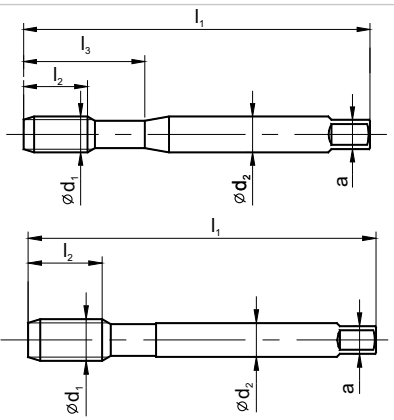
D4-115301-0144
Tap S-NC M14x1,25-6HX DIN-374 B HSSE-PM TC

● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

HSS

DIN 2181



Material groups	P M K N S H
Hole type	< 1,5d
Quality of material	HSS
Coating	
Chamfer	~3P

MF ød1	P	l1	l2	l3	ød2	a	d	Norm	DIN-2181
								Tol.	ISO2 (6H)
								INDEX	E1-131001
M4x0,5	0,50	45	10	18,0	4,5	3,4	3,5	0041	○
M4,5x0,5	0,50	50	12	22,0	6,0	4,9	4,0	0046	○
M5x0,5	0,50	52	13	22,0	6,0	4,9	4,5	0051	○
M5,5x0,5	0,50	56	13	24,0	6,0	4,9	5,0	0056	○
M6x0,75	0,75	56	14	24,0	6,0	4,9	5,2	0062	●
M7x0,75	0,75	56	14	-	6,0	4,9	6,2	0072	○
M8x0,75	0,75	63	14	-	6,0	4,9	7,2	0082	●
M8x1	1,00	63	17	-	6,0	4,9	7,0	0083	●
M9x0,75	0,75	63	14	-	7,0	5,5	8,2	0092	○
M9x1	1,00	63	17	-	7,0	5,5	8,0	0093	○
M10x0,75	0,75	63	18	-	7,0	5,5	9,2	0102	○
M10x1	1,00	63	18	-	7,0	5,5	9,0	0103	●
M10x1,25	1,25	70	22	-	7,0	5,5	8,8	0104	●
M11x0,75	0,75	63	18	-	8,0	6,2	10,2	0112	○
M11x1	1,00	63	18	-	8,0	6,2	10,0	0113	○
M12x1	1,00	70	18	-	9,0	7,0	11,0	0123	●
M12x1,25	1,25	70	20	-	9,0	7,0	10,8	0124	●
M12x1,5	1,50	70	20	-	9,0	7,0	10,5	0125	●
M14x1	1,00	70	18	-	11,0	9,0	13,0	0143	○
M14x1,25	1,25	70	20	-	11,0	9,0	12,8	0144	●
M14x1,5	1,50	70	20	-	11,0	9,0	12,5	0145	●
M15x1	1,00	70	18	-	12,0	9,0	14,0	0153	○
M15x1,5	1,50	70	20	-	12,0	9,0	13,5	0155	○
M16x1	1,00	80	18	-	12,0	9,0	15,0	0163	○
M16x1,25	1,25	80	18	-	18,0	9,0	14,8	0164	○
M16x1,5	1,50	80	22	-	12,0	9,0	14,5	0165	●
M17x1	1,00	80	18	-	12,0	9,0	16,0	0173	○
M17x1,5	1,50	80	22	-	12,0	9,0	15,5	0175	○
M18x1	1,00	80	18	-	14,0	11,0	17,0	0183	○
M18x1,5	1,50	80	22	-	14,0	11,0	16,5	0185	●
M18x2	2,00	80	22	-	14,0	11,0	16,0	0186	○
M20x1	1,00	80	18	-	16,0	12,0	19,0	0203	○

● **Available from stock**
○ **On request**

ISO	Vc (m/min)
P	5-20
M	-
K	-
N	-
S	-

Example of order

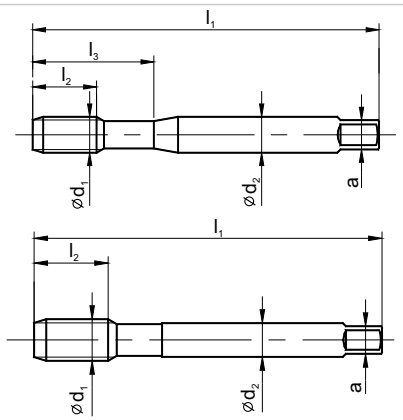
E1-131001-0062
Tap M6x0,75-6H DIN-2181 HSS

1

ISO Metric fine thread DIN-13

HSS

DIN 2181



Material groups	P M K N S H
Hole type	 < 1,5d
Quality of material	HSS
Coating	
Chamfer	~3P

MF Ød1	P	l1	l2	l3	Ød2	a	d	Norm	DIN-2181
								Tol.	ISO2 (6H)
								INDEX	E1-131001
M20x1,5	1,50	80	22	-	16	12,0	18,5	0205	●
M20x2	2,00	80	22	-	16	12,0	18,0	0206	○
M22x1	1,00	80	18	-	18	14,5	21,0	0223	○
M22x1,5	1,5	80	22	-	18	14,5	20,5	0225	●
M22x2	2,0	80	22	-	18	14,5	20,0	0226	○
M24x1	1,0	90	18	-	18	14,5	23,0	0243	○
M24x1,5	1,5	90	22	-	18	14,5	22,5	0245	●
M24x2	2,0	90	22	-	18	14,5	22,0	0246	●
M25x1	1,0	90	18	-	18	14,5	24,0	0253	○
M25x1,5	1,5	90	22	-	18	14,5	23,5	0255	●
M25x2	2,0	90	22	-	18	14,5	23,0	0256	○
M26x1,5	1,5	90	22	-	18	14,5	24,5	0265	●
M27x1	1,0	90	20	-	20	16,0	26,0	0273	○
M27x1,5	1,5	90	22	-	20	16,0	25,5	0275	○
M27x2	2,0	90	22	-	20	16,0	25,0	0276	○
M28x1	1,0	90	20	-	20	16,0	27,0	0283	○
M28x1,5	1,5	90	22	-	20	16,0	26,5	0285	○
M28x2	2,0	90	22	-	20	16,0	26,0	0286	○
M30x1	1,0	90	22	-	22	18,0	29,0	0303	○
M30x1,5	1,5	90	22	-	22	18,0	28,5	0305	●
M30x2	2,0	90	22	-	22	18,0	28,0	0306	○
M30x3	3,0	125	36	-	22	18,0	27,0	0307	○
M32x1,5	1,5	90	22	-	22	18,0	30,5	0325	○
M32x2	2,0	90	22	-	22	18,0	30,0	0326	○
M33x1,5	1,5	100	25	-	25	20,0	31,5	0335	○
M33x2	2,0	100	25	-	25	20,0	31,0	0336	○
M33x3	3,0	125	36	-	25	20,0	30,0	0337	○
M35x1,5	1,5	100	25	-	28	22,0	33,5	0355	○
M36x1,5	1,5	100	25	-	28	22,0	34,5	0365	○
M36x2	2,0	125	36	-	28	22,0	34,0	0366	○
M36x3	3,0	125	36	-	28	22,0	33,0	0367	○
M38x1,5	1,5	100	25	-	28	22,0	36,5	0385	○

● **Available from stock**
○ **On request**

ISO	Vc (m/min)
P	5-20
M	-
K	-
N	-
S	-

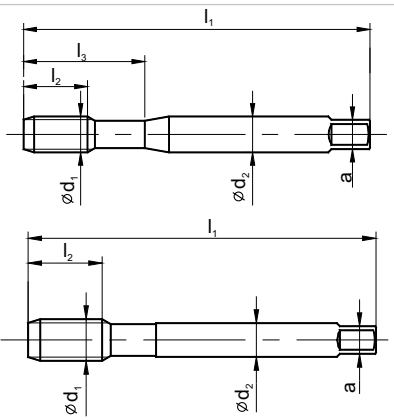
Example of order

E1-131001-0205
Tap M20x1,5-6H DIN-2181 HSS

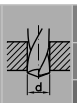
ISO Metric fine thread DIN-13

HSS

DIN 2181



Material groups	P M K N S H
Hole type	 < 1,5d
Quality of material	HSS
Coating	
Chamfer	~3P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a		Norm	DIN-2181
								Tol.	ISO2 (6H)
								INDEX	E1-131001
M39x1,5	1,5	110	25	-	32	24	37,5	0395	o
M39x2	2,0	125	36	-	32	24	37,0	0396	o
M39x3	3,0	125	36	-	32	24	36,0	0397	o
M40x1,5	1,5	110	25	-	32	24	38,5	0405	o
M40x2	2,0	125	36	-	32	24	38,0	0406	o
M40x3	3,0	125	36	-	32	24	37,0	0407	o
M42x1,5	1,5	110	25	-	32	24	40,5	0425	o
M42x2	2,0	125	36	-	32	24	40,0	0426	o
M42x3	3,0	125	36	-	32	24	39,0	0427	o
M42x4	4,0	150	50	-	32	24	38,0	0428	o
M45x1,5	1,5	110	25	-	36	29	43,5	0455	o
M45x2	2,0	125	36	-	36	29	43,0	0456	o
M45x3	3,0	125	36	-	36	29	42,0	0457	o
M45x4	4,0	160	50	-	36	29	41,0	0458	o
M48x1,5	1,5	140	30	-	36	29	46,5	0485	o
M48x2	2,0	140	36	-	36	29	46,0	0486	o
M48x3	3,0	140	36	-	36	29	45,0	0487	o
M48x4	4,0	180	55	-	36	29	44,0	0488	o
M50x1,5	1,5	140	30	-	36	29	48,5	0505	o
M50x2	2,0	140	36	-	36	29	48,0	0506	o
M50x3	3,0	140	36	-	36	29	47,0	0507	o
M52x1,5	1,5	140	30	-	40	32	50,5	0525	o
M52x2	2,0	140	36	-	40	32	50,0	0526	o
M52x3	3,0	140	40	-	40	32	49,0	0527	o
M52x4	4,0	180	55	-	40	32	48,0	0528	o

ISO	Vc (m/min)
P	5-20
M	-
K	-
N	-
S	-

Example of order

E1-131001-0395
Tap M39x1,5-6H DIN-2181 HSS

● **Available from stock**
○ **On request**

1

ISO Metric fine thread DIN-13

NUTAP

	soldered	torsioned
		
Material groups	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d
Quality of material	HSSE	HSSE
Coating	TS	TS
Chamfer	12P	12P

HSSE

TS

M $\varnothing d_1$	P	Overall dimensions	d		On request				
M8x1	1,0	On request	7,0						
M10x1	1,0		9,0						
M12x1	1,0		11,0						
M12x1,5	1,5		10,5						
M14x1,5	1,5		12,5						
M16x1	1,0		15,0						
M16x1,5	1,5		14,5						
M18x1,5	1,5		16,5						
M20x1,5	1,5		18,5						
M20x2	2,0		18,0						
M22x1,5	1,5		20,5						
M22x2	2,0		20,0						
M24x1,5	1,5		22,5						
M24x2	2,0		22,0						
M27x1,5	1,5		25,5						
M27x2	2,0		25,0						

ISO	Vc (m/min)				
P	5-20	5-20			
M	-	-			
K	-	-			
N	-	-			
S	-	-			

Example of order

NUT-TAP M24x1,5 ISO2 HSSE TS

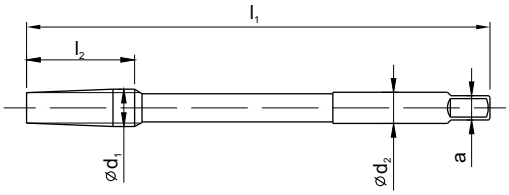
● **Available from stock**

○ **On request**

ISO Metric fine thread DIN-13

NGMf

HSS



		LH
Material groups	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d
Quality of material	HSS	HSS
Coating		
Chamfer	12P	12P

MF Ød1	P	l1	l2	Ød2	a	d	Norm	NGMf	
							Tol.	ISO2 (6H)	ISO2 (6H)
							INDEX	F1-151001	F1-251001
M4,5x0,5	0,50	100	10	3,15	2,5	4,0	0046	○	○
M5x0,5	0,50	110	10	3,55	2,8	4,5	0051	○	○
M5,5x0,5	0,50	110	10	4,5	3,55	5,0	0056	○	○
M6x0,75	0,75	120	16	4,5	3,55	5,2	0062	○	○
M7x0,75	0,75	120	16	5,6	4,5	6,2	0072	○	○
M8x0,75	0,75	140	16	6,3	5,0	7,2	0082	○	○
M8x1	1,00	140	20	6,3	5,0	7,0	0083	●	○
M10x0,75	0,75	160	16	8,0	6,3	9,2	0102	○	○
M10x1	1,00	160	20	8,0	6,3	9,0	0103	●	○
M10x1,25	1,25	160	25	8,0	6,3	8,8	0104	●	○
M12x1	1,00	180	20	9,0	7,1	11,0	0123	●	○
M12x1,25	1,25	180	25	9,0	7,1	10,8	0124	●	○
M12x1,5	1,50	180	30	9,0	7,1	10,5	0125	●	○
M14x1	1,00	180	20	10,0	8,0	13,0	0143	○	○
M14x1,25	1,25	180	25	10,0	8,0	12,8	0144	●	○
M14x1,5	1,50	180	30	10,0	8,0	12,5	0145	●	○
M15x1	1,00	180	20	12,5	10,0	14,0	0153	○	○
M15x1,5	1,50	180	30	12,5	10,0	13,5	0155	○	○
M16x1	1,00	200	20	12,5	10,0	15,0	0163	○	○
M16x1,5	1,50	200	30	12,5	10,0	14,5	0165	●	○
M17x1	1,00	200	20	14,0	11,2	16,0	0173	○	○
M17x1,5	1,50	200	30	14,0	11,2	15,5	0175	○	○
M18x1	1,00	200	20	14,0	11,2	17,0	0183	○	○
M18x1,5,	1,50	200	30	14,0	11,2	16,5	0185	○	○
M18x2	2,00	200	40	14,0	11,2	16,0	0186	○	○
M20x1	1,00	220	20	16,0	12,5	19,0	0203	○	○
M20x1,5	1,50	220	30	16,0	12,5	18,5	0205	●	○
M20x2	2,00	220	40	16,0	12,5	18,0	0206	○	○
M22x1	1,00	220	20	18,0	14,0	21,0	0223	○	○
M22x1,5	1,50	220	30	18,0	14,0	20,5	0225	○	○
M22x2	2,00	220	40	18,0	14,0	20,0	0226	○	○
M24x1	1,00	250	20	18,0	14,0	23,0	0243	○	○

● **Available from stock**
○ **On request**

ISO	Vc (m/min)	
P	5-20	5-20
M	-	-
K	6-15	6-15
N	6-15	6-15
S	-	-

Example of order

F1-151001-0083
Tap M8x1-6H NGMf HSS

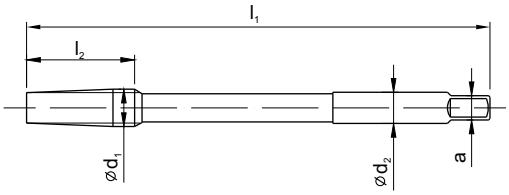
1

ISO Metric fine thread DIN-13

NGMf

LH

HSS



Material groups	P M K N S H	P M K N S H
Hole type	<1,5d	<1,5d
Quality of material	HSS	HSS
Coating		
Chamfer	12P	12P

MF ∅d_1	P	l_1	l_2	∅d_2	a	d	Norm	NGMf	
							Tol.	ISO2 (6H)	ISO2 (6H)
							INDEX	F1-151001	F1-251001
M24x1,5	1,50	250	30	18,0	14,0	22,5	0245	o	o
M24x2	2,00	250	40	18,0	14,0	22,0	0246	o	o
M25x1	1,00	250	20	20,0	16,0	24,0	0253	o	o
M25x1,5	1,50	250	30	20,0	16,0	23,5	0255	o	o
M25x2	2,00	250	40	20,0	16,0	23,0	0256	o	o
M26x1,5	1,50	250	30	20,0	16,0	24,5	0265	o	o
M27x1	1,00	250	20	20,0	16,0	26,0	0273	o	o
M27x1,5	1,50	250	30	20,0	16,0	25,5	0275	o	o
M27x2	2,00	250	40	20,0	16,0	25,0	0276	o	o
M28x1	1,00	250	20	22,4	18,0	27,0	0283	o	o
M28x1,5	1,50	250	30	22,4	18,0	26,5	0285	o	o
M28x2	2,00	250	40	22,4	18,0	26,0	0286	o	o
M30x1	1,00	280	20	22,4	18,0	29,0	0303	o	o
M30x1,5	1,50	280	30	22,4	18,0	28,5	0305	o	o
M30x2	2,00	280	40	22,4	18,0	28,0	0306	o	o
M30x3	3,00	280	60	22,4	18,0	27,0	0307	o	o
M32x1,5	1,50	280	30	25,0	20,0	30,5	0325	o	o
M32x2	2,00	280	40	25,0	20,0	30,0	0326	o	o
M33x1,5	1,50	280	30	25,0	20,0	31,5	0335	o	o
M33x2	2,00	280	40	25,0	20,0	31,0	0336	o	o
M33x3	3,00	280	60	25,0	20,0	30,0	0337	o	o
M35x1,5	1,50	280	30	28,0	22,4	33,5	0355	o	o
M36x1,5	1,50	280	30	28,0	22,4	34,5	0365	o	o
M36x2	2,00	280	40	28,0	22,4	34,0	0366	o	o
M36x3	3,00	280	60	28,0	22,4	33,0	0367	o	o

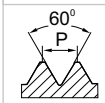
ISO	Vc (m/min)	
P	5-20	5-20
M	-	-
K	6-15	6-15
N	6-15	6-15
S	-	-

Example of order

F1-151001-0245
Tap M24x1,5-6H NGMf HSS

● **Available from stock**
○ **On request**

American unified coarse thread UNC, ANSI B-1.1

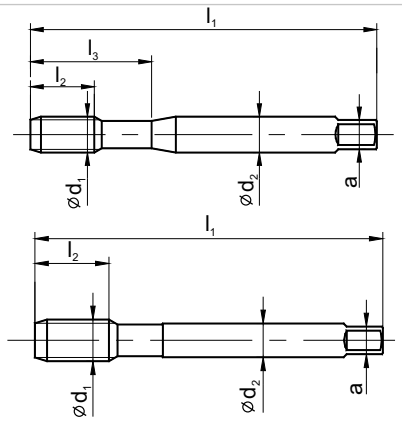


HSSE PM

HL

DIN 371

DIN 376



MASTERTAP

	B-HL	C-R45-HL
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	HL	HL
Chamfer	B / 4-5P	C / 2-3P

UNC	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a		Norm	DIN-371	
										Tol.	2BX	2BX
										INDEX	C4-118M01	C4-528M01
No2-56	2,184	56	0,455	45	10	13	2,8	2,1	1,85	4102	○	○
No4-40	2,844	40	0,635	56	5	18	3,5	2,7	2,35	4104	●	●
No5-40	3,175	40	0,635	56	7	18	3,5	2,7	2,65	4105	●	●
No6-32	3,505	32	0,794	56	6	20	4,0	3,0	2,85	4106	●	●
No8-32	4,165	32	0,794	63	7	21	4,5	3,4	3,50	4108	●	●
No10-24	4,826	24	1,058	70	8	25	6,0	4,9	3,90	4110	●	●
No12-24	5,486	24	1,058	80	10	30	6,0	4,9	4,50	4112	●	●
1/4-20	6,350	20	1,270	80	13	32	7,0	5,5	5,10	4127	●	●
5/16-18	7,938	18	1,411	90	13	35	8,0	6,2	6,60	4128	●	●
3/8-16	9,525	16	1,588	100	15	39	10,0	8,0	8,00	4129	●	●

UNC	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a		Norm	DIN-376	
										Tol.	2BX	2BX
										INDEX	D4-118M01	D4-528M01
7/16-14	11,112	14	1,814	100	15	-	8,0	6,2	9,40	4130	●	●
1/2-13	12,700	13	1,954	110	18	-	9,0	7,0	10,80	4131	●	●
9/16-12	14,288	12	2,117	110	20	-	11,0	9,0	12,20	4132	●	●
5/8-11	15,875	11	2,309	110	22	-	12,0	9,0	13,50	4133	●	●

ISO	Vc (m/min)	
P	5-40	5-40
M	5-15	5-15
K	10-30	10-30
N	10-30	10-30
S	1-8	1-8

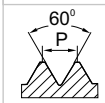
Example of order

C4-118M01-4104
Tap MasterTAP No5-40 UNC 2BX DIN-371 B HSSE-PM HL

● **Available from stock**
○ **On request**

1

American unified coarse thread UNC, ANSI B-1.1

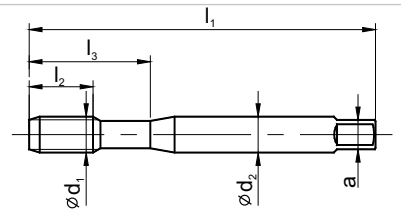


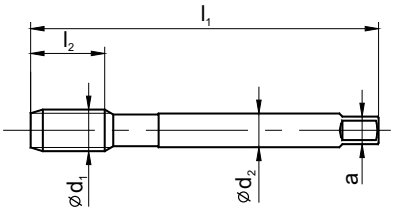
HSSE

TN2

DIN 371

DIN 376





800X

	B-TN2	C-R40-TN2
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE
Coating	TN2	TN2
Chamfer	B / 4-5P	C / 2-3P

UNC	Ød1	1"/P	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-371	
											Tol.	2B	2B
											INDEX	C2-113X01	C2-513X01
No2-56	2,184	56	0,455	45	10	10	13	2,8	2,1	1,85	4102	○	○
No4-40	2,844	40	0,635	56	10	5	18	3,5	2,7	2,35	4104	●	●
No5-40	3,175	40	0,635	56	10	7	18	3,5	2,7	2,65	4105	●	●
No6-32	3,505	32	0,794	56	12	6	20	4,0	3,0	2,85	4106	●	●
No8-32	4,165	32	0,794	63	12	7	21	4,5	3,4	3,50	4108	●	●
No10-24	4,826	24	1,058	70	14	8	25	6,0	4,9	3,90	4110	●	●
No12-24	5,486	24	1,058	80	18	10	30	6,0	4,9	4,50	4112	●	●
1/4-20	6,350	20	1,270	80	18	13	32	7,0	5,5	5,10	4127	●	●
5/16-18	7,938	18	1,411	90	20	13	35	8,0	6,2	6,60	4128	●	●
3/8-16	9,525	16	1,588	100	20	15	39	10,0	8,0	8,00	4129	●	●

UNC	Ød1	1"/P	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-376	
											Tol.	2B	2B
											INDEX	D2-113X01	D2-513X01
7/16-14	11,112	14	1,814	100	22	15	-	8,0	6,2	9,40	4130	●	●
1/2-13	12,700	13	1,954	110	24	18	-	9,0	7,0	10,80	4131	●	●
9/16-12	14,288	12	2,117	110	25	20	-	11,0	9,0	12,20	4132	●	●
5/8-11	15,875	11	2,309	110	32	22	-	12,0	9,0	13,50	4133	●	●
3/4-10	19,050	10	2,540	125	32	25	-	14,0	11,0	16,50	4135	●	●
7/8-9	22,225	9	2,822	140	32	30	-	18,0	14,5	19,50	4137	●	●
1-8	25,400	8	3,175	160	38	30	-	20,0	16,0	22,25	4139	●	●
1.1/8-7	28,575	7	3,629	180	45	37	-	22,0	18,0	25,00	4141	○	○
1.1/4-7	31,750	7	3,629	180	45	37	-	22,0	18,0	28,00	4143	○	○
1.3/8-6	34,925	6	4,233	200	50	40	-	28,0	22,0	30,75	4145	○	○
1.1/2-6	38,100	6	4,233	200	55	40	-	28,0	22,0	34,00	4147	○	○

ISO	Vc (m/min)	
P	5-35	5-35
M	5-15	5-15
K	5-25	5-25
N	10-30	10-30
S	-	-

Example of order

C2-113X01-4105
Tap 800X No5-40 UNC 2B DIN-371 B HSSE TN2

● **Available from stock**
○ **On request**

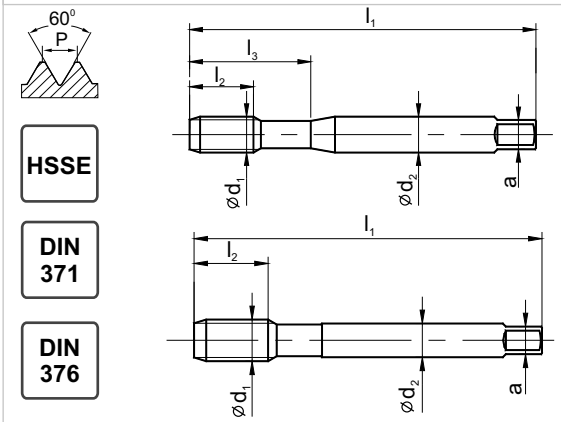
American unified coarse thread UNC, ANSI B-1.1

800

HSSE

DIN 371

DIN 376



	B	C-R40
Material groups	P M K N S H	P M K N S H
Hole type	< 3d	< 2,5d
Quality of material	HSSE	HSSE
Coating		
Chamfer	B / 4-5P	C / 2-3P

UNC	∅d_1	1"/P	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norma	DIN-371	DIN-371
											Tol.	2B	2B
											INDEX	C2-111101	C2-511101
No2-56	2,184	56	0,455	45	10	10	13	2,8	2,1	1,85	4102	○	○
No4-40	2,844	40	0,635	56	10	5	18	3,5	2,7	2,35	4104	●	●
No5-40	3,175	40	0,635	56	10	7	18	3,5	2,7	2,65	4105	●	●
No6-32	3,505	32	0,794	56	12	6	20	4,0	3,0	2,85	4106	●	●
No8-32	4,165	32	0,794	63	12	7	21	4,5	3,4	3,50	4108	●	●
No10-24	4,826	24	1,058	70	14	8	25	6,0	4,9	3,90	4110	●	●
No12-24	5,486	24	1,058	80	18	10	30	6,0	4,9	4,50	4112	●	●
1/4-20	6,350	20	1,270	80	18	13	32	7,0	5,5	5,10	4127	●	●
5/16-18	7,938	18	1,411	90	20	13	35	8,0	6,2	6,60	4128	●	●
3/8-16	9,525	16	1,588	100	20	15	39	10,0	8,0	8,00	4129	●	●

UNC	∅d_1	1"/P	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norm	DIN-376	DIN-376
											Tol.	2B	2B
											INDEX	D2-111101	D2-511101
7/16-14	11,112	14	1,814	100	22	15	-	8,0	6,2	9,40	4130	●	●
1/2-13	12,700	13	1,954	110	24	18	-	9,0	7,0	10,80	4131	●	●
9/16-12	14,288	12	2,117	110	25	20	-	11,0	9,0	12,20	4132	●	●
5/8-11	15,875	11	2,309	110	32	22	-	12,0	9,0	13,50	4133	●	●
3/4-10	19,050	10	2,540	125	32	25	-	14,0	11,0	16,50	4135	●	●
7/8-9	22,225	9	2,822	140	32	30	-	18,0	14,5	19,50	4137	●	●
1-8	25,400	8	3,175	160	38	30	-	20,0	16,0	22,25	4139	●	●
1.1/8-7	28,575	7	3,629	180	45	37	-	22,0	18,0	25,00	4141	●	●
1.1/4-7	31,750	7	3,629	180	45	37	-	22,0	18,0	28,00	4143	●	●
1.3/8-6	34,925	6	4,233	200	50	40	-	28,0	22,0	30,75	4145	●	●
1.1/2-6	38,100	6	4,233	200	55	40	-	28,0	22,0	34,00	4147	●	●

ISO	Vc (m/min)	
P	5-20	5-20
M	5-10	5-10
K	5-15	5-15
N	5-25	5-25
S	-	-

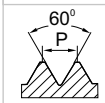
Example of order

C2-111101-4106
Tap 800 No5-40 UNC 2B DIN-371 B HSSE

● **Available from stock**
○ **On request**

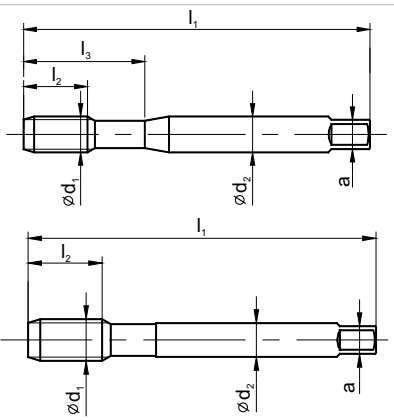
1

American unified coarse thread UNC, ANSI B-1.1



HSS

DIN 352



Material groups	P M K N S H
Hole type	
Quality of material	HSS
Coating	
Chamfer	~3P

UNC	∅d1	1"/P	P	l1	l2	l3	∅d2	a	d	Norma	DIN-352
										Tol.	2B
										INDEX	E1-131001
No4-40	2,844	40	0,635	40	10	18	3,5	2,7	2,35	4104	○
No5-40	3,175	40	0,640	42	10	18	3,5	2,7	2,65	4105	○
No6-32	3,505	32	0,794	45	11	18	4,0	3,0	2,85	4106	●
No8-32	4,166	32	0,794	48	12	23	4,5	3,4	3,50	4108	○
No10-24	4,826	24	1,060	52	14	26	6,0	4,9	3,90	4110	○
No12-24	5,486	24	1,060	56	16	27	6,0	4,9	4,50	4112	○
1/4-20	6,350	20	1,270	56	16	27	6,0	4,9	5,20	4127	●
5/16-18	7,938	18	1,411	63	20	-	6,0	4,9	6,60	4128	●
3/8-16	9,525	16	1,588	70	22	-	7,0	5,5	8,00	4129	●
7/16-14	11,112	14	1,814	70	22	-	8,0	6,2	9,40	4130	○
1/2-13	12,700	13	1,954	80	25	-	9,0	7,0	10,80	4131	●
9/16-12	14,288	12	2,117	80	26	-	11,0	9,0	12,20	4132	○
5/8-11	15,875	11	2,309	80	27	-	12,0	9,0	13,50	4133	●
3/4-10	19,050	10	2,540	95	30	-	14,0	11,0	16,50	4135	●
7/8-9	22,225	9	2,822	100	32	-	18,0	14,5	19,50	4137	○
1-8	25,400	8	3,175	110	36	-	18,0	14,5	22,25	4139	○
1.1/8-7	28,575	7	3,629	125	40	-	22,0	18,0	25,00	4141	○
1.1/4-7	31,750	7	3,629	125	40	-	22,0	18,0	28,00	4143	○
1.3/8-6	34,925	6	4,233	150	50	-	28,0	22,0	30,75	4145	○
1.1/2-6	38,100	6	4,233	150	50	-	28,0	22,0	34,00	4147	○
1.3/4-5	44,450	5	5,080	160	58	-	36,0	29,0	39,50	4151	○
2-4.1/2	50,800	4 1/2	5,644	180	65	-	40,0	32,0	45,00	4155	○

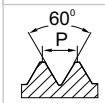
ISO	Vc (m/min)
P	5-20
M	-
K	-
N	-
S	-

Example of order

E1-131001-4106
Tap No6-32 UNC 2B DIN-352 HSS

● **Available from stock**
○ **On request**

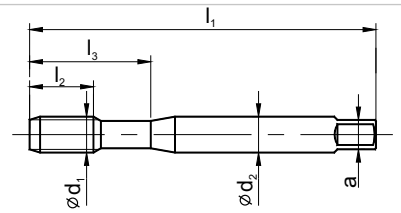
American unified fine thread
UNF, ANSI B-1.1

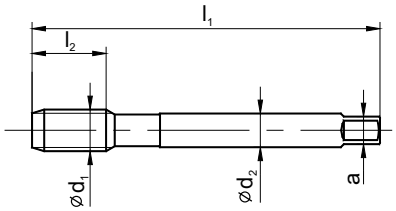


HSSE PM

HL

DIN 371





MASTERTAP

	B-HL	C-R45-HL
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	HL	HL
Chamfer	B / 4-5P	C / 2-3P

UNF	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norma	DIN-371	
										Tol.	2BX	2BX
										INDEX	C4-118M01	C4-528M01
No4-48	2,844	48	0,529	56	5	18	3,5	2,7	2,40	4204	●	●
No5-44	3,175	44	0,557	56	7	18	3,5	2,7	2,70	4205	●	●
No6-40	3,505	40	0,635	56	6	20	4,0	3,0	2,95	4206	●	●
No8-36	4,165	36	0,706	63	7	21	4,5	3,4	3,50	4208	●	●
No10-32	4,826	32	0,794	70	8	25	6,0	4,9	4,10	4210	●	●
No12-28	5,486	28	0,907	80	10	30	6,0	4,9	4,60	4212	●	●
1/4-28	6,350	28	0,907	80	10	30	7,0	5,5	5,50	4227	●	●
5/16-24	7,938	24	1,058	90	13	35	8,0	6,2	6,90	4228	●	●
3/8-24	9,525	24	1,058	90	15	35	10,0	8,0	8,50	4229	●	●

UNF	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norm	DIN-374	
										Tol.	2BX	2BX
										INDEX	D4-118M01	D4-528M01
7/16-20	11,112	20	1,270	100	15	-	8,0	6,2	9,90	4230	●	●
1/2-20	12,700	20	1,270	100	15	-	9,0	7,0	11,50	4231	●	●
9/16-18	14,288	18	1,411	100	15	-	11,0	9,0	12,90	4232	●	●
5/8-18	15,875	18	1,411	100	15	-	12,0	9,0	14,50	4233	●	●

ISO	Vc (m/min)	
P	5-40	5-40
M	5-15	5-15
K	10-30	10-30
N	10-30	10-30
S	1-8	1-8

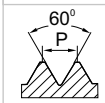
Example of order

C4-118M01-4210
Tap MasterTAP No10-32 UNF 2BX DIN-371 B HSSE-PM HL

● **Available from stock**
○ **On request**

1

American unified fine thread
UNF, ANSI B-1.1

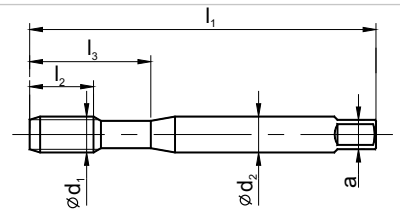


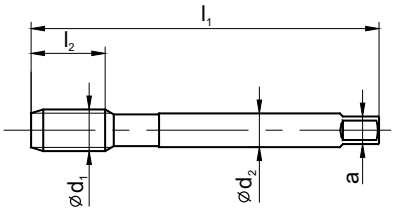
HSSE

TN2

DIN 371

DIN 374





800X

	B-TN2	C-R40-TN2
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE
Coating	TN2	TN2
Chamfer	B / 4-5P	C / 2-3P

UNF	Ød1	1"/P	P	l1	l2	l2 R40	l3	Ød2	a	d	Norma	DIN-371	
											Tol.	2B	2B
											INDEX	C2-113X01	C2-513X01
No6-40	3,505	40	0,635	56	12	6	20	4,0	3,0	2,95	4206	○	○
No8-36	4,165	36	0,706	63	12	7	21	4,5	3,4	3,50	4208	○	○
No10-32	4,826	32	0,794	70	14	8	25	6,0	4,9	4,10	4210	●	●
No12-28	5,486	28	0,907	80	18	10	30	6,0	4,9	4,60	4212	●	●
1/4-28	6,350	28	0,907	80	18	10	30	7,0	5,5	5,50	4227	●	●
5/16-24	7,938	24	1,058	90	20	13	35	8,0	6,2	6,90	4228	●	●
3/8-24	9,525	24	1,058	90	20	15	35	10,0	8,0	8,50	4229	●	●

UNF	Ød1	1"/P	P	l1	l2	l2 R40	l3	Ød2	a	d	Norm	DIN-374	
											Tol.	2B	2B
											INDEX	D2-113X01	D2-513X01
7/16-20	11,112	20	1,270	100	20	15	-	8,0	6,2	9,90	4230	●	●
1/2-20	12,700	20	1,270	100	20	15	-	9,0	7,0	11,50	4231	●	●
9/16-18	14,288	18	1,411	100	20	15	-	11,0	9,0	12,90	4232	●	●
5/8-18	15,875	18	1,411	100	20	15	-	12,0	9,0	14,50	4233	●	●
3/4-16	19,050	16	1,588	110	24	17	-	14,0	11,0	17,50	4235	●	●
7/8-14	22,225	14	1,814	125	24	17	-	18,0	14,5	20,40	4237	●	●
1-12	25,400	12	2,117	140	27	22	-	18,0	14,5	23,25	4239	●	●
1.1/8-12	28,575	12	2,117	150	27	22	-	22,0	18,0	26,50	4241	○	○
1.1/4-12	31,750	12	2,117	150	27	22	-	22,0	18,0	29,50	4243	○	○
1.3/8-12	34,925	12	2,117	170	30	22	-	28,0	22,0	32,75	4245	○	○
1.1/2-12	38,100	12	2,117	170	30	24	-	28,0	22,0	36,00	4247	○	○

ISO	Vc (m/min)	
P	5-35	5-35
M	5-15	5-15
K	5-25	10-25
N	10-30	10-30
S	-	-

Example of order

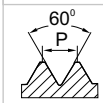
C2-113X01-4208
Tap 800X No8-36 UNF 2B DIN-371 B HSSE TN2

● **Available from stock**
○ **On request**

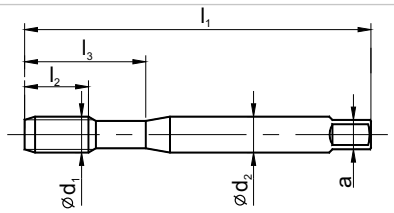
American unified fine thread
UNF, ANSI B-1.1

800

	B	C-R40
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 3d
Quality of material	HSSE	HSSE
Coating		
Chamfer	B / 4-5P	C / 2-3P

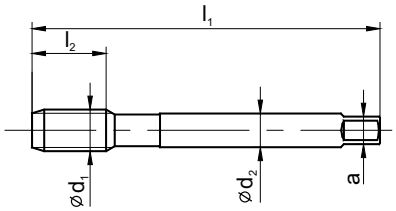


HSSE



DIN 371

DIN 374



UNF	∅d1	1"/P	P	l1	l2	l2 R40	l3	∅d2	a	d	Norma	DIN-371					
											Tol.	2B	2B				
											INDEX	C2-111101	C2-511101				
No6-40	3,505	40	0,635	56	12	6	20	4,0	3,0	2,95	4206	○	○				
No8-36	4,165	36	0,706	63	12	7	21	4,5	3,4	3,50	4208	○	○				
No10-32	4,826	32	0,794	70	14	8	25	6,0	4,9	4,10	4210	●	●				
No12-28	5,486	28	0,907	80	18	10	30	6,0	4,9	4,60	4212	●	●				
1/4-28	6,350	28	0,907	80	18	10	30	7,0	5,5	5,50	4227	●	●				
5/16-24	7,938	24	1,058	90	20	13	35	8,0	6,2	6,90	4228	●	●				
3/8-24	9,525	24	1,058	90	20	15	35	10,0	8,0	8,50	4229	●	●				

UNF	∅d1	1"/P	P	l1	l2	l2 R40	l3	∅d2	a	d	Norm	DIN-374					
											Tol.	2B	2B				
											INDEX	D2-111101	D2-511101				
7/16-20	11,112	20	1,270	100	20	15	-	8,0	6,2	9,90	4230	●	●				
1/2-20	12,700	20	1,270	100	20	15	-	9,0	7,0	11,50	4231	●	●				
9/16-18	14,288	18	1,411	100	20	15	-	11,0	9,0	12,90	4232	●	●				
5/8-18	15,875	18	1,411	100	20	15	-	12,0	9,0	14,50	4233	●	●				
3/4-16	19,050	16	1,588	110	24	17	-	14,0	11,0	17,50	4235	●	●				
7/8-14	22,225	14	1,814	125	24	17	-	18,0	14,5	20,40	4237	●	●				
1-12	25,400	12	2,117	140	27	22	-	18,0	14,5	23,25	4239	●	●				
1.1/8-12	28,575	12	2,117	150	27	22	-	22,0	18,0	26,50	4241	○	○				
1.1/4-12	31,750	12	2,117	150	27	22	-	22,0	18,0	29,50	4243	○	○				
1.3/8-12	34,925	12	2,117	170	30	22	-	28,0	22,0	32,75	4245	○	○				
1.1/2-12	38,100	12	2,117	170	30	24	-	28,0	22,0	36,00	4247	○	○				

ISO	Vc (m/min)					
P	5-20	5-20				
M	5-10	5-10				
K	5-15	5-15				
N	5-25	5-25				
S	-	-				

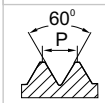
Example of order

C2-111101-4210
Tap 800 No10-32 UNF 2B DIN-371 B HSSE

● **Available from stock**
○ **On request**

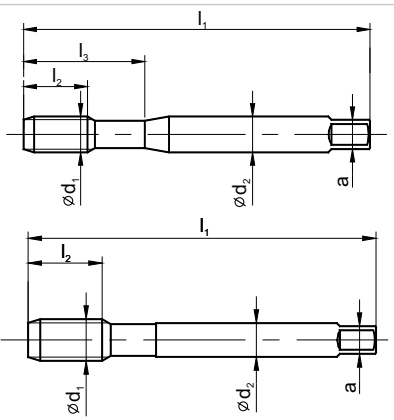
1

American unified fine thread
UNF, ANSI B-1.1



HSS

DIN 2181



Material groups	P M K N S H
Hole type	 < 1,5d
Quality of material	HSS
Coating	
Chamfer	~3P

UNF	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norma	DIN-2181
										Tol.	2B
										INDEX	E1-131001
No5-44	3,175	44	0,577	42	10	18	3,5	2,7	2,70	4205	○
No6-40	3,505	40	0,635	45	11	18	4,0	3,0	2,95	4206	○
No8-36	4,165	36	0,706	48	12	23	4,5	3,4	3,50	4208	○
No10-32	4,826	32	0,794	52	14	22	6,0	4,9	4,10	4210	○
No12-28	5,486	28	0,907	56	16	24	6,0	4,9	4,60	4212	○
1/4-28	6,350	28	0,907	56	16	24	6,0	4,9	5,50	4227	●
5/16-24	7,938	24	1,058	63	17	-	6,0	4,9	6,90	4228	●
3/8-24	9,525	24	1,058	63	18	-	7,0	5,5	8,50	4229	●
7/16-20	11,112	20	1,270	70	22	-	8,0	6,2	9,90	4230	●
1/2-20	12,700	20	1,270	70	20	-	9,0	7,0	11,50	4231	●
9/16-18	14,288	18	1,411	80	20	-	11,0	9,0	12,90	4232	●
5/8-18	15,875	18	1,411	80	20	-	12,0	9,0	14,50	4233	●
3/4-16	16,050	16	1,588	80	22	-	14,0	11,0	17,50	4235	●
7/8-14	22,225	14	1,814	80	22	-	18,0	14,5	20,40	4237	○
1-12	25,400	12	2,117	90	22	-	18,0	14,5	23,25	4239	○
1.1/8-12	28,575	12	2,117	90	22	-	22,0	18,0	26,50	4241	○
1.1/4-12	31,750	12	2,117	90	22	-	22,0	18,0	29,50	4243	○
1.3/8-12	34,925	12	2,117	125	36	-	28,0	22,0	32,75	4245	○
1.1/2-12	38,100	12	2,117	125	36	-	28,0	22,0	36,00	4247	○

ISO	Vc (m/min)
P	5-20
M	-
K	-
N	-
S	-

Example of order

E1-131001-4227
Tap 1/4-28 UNF 2B DIN-2181 HSS

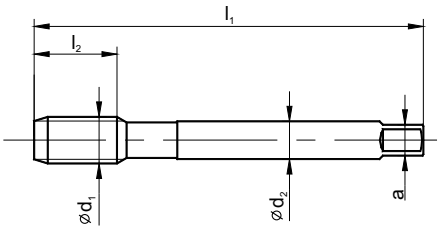
● **Available from stock**
○ **On request**

American unified fine thread
UNEF, ANSI B-1.1

HSSE

TN2

DIN ~374



800X

	B-TN2	C-R40-TN2
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE
Coating	TN2	TN2
Chamfer	B / 4-5P	C / 2-3P

UNEF	∅d_1	1"/P	P	l_1	l_2	l_2 R40	l_3	∅d_2	a	d	Norma	~DIN-374	
											Tol.	2B	2B
											INDEX	D2-113X01	D2-513X01
1/4-32	6,350	32	0,794	80	14	8	-	4,5	3,4	5,55	4327	○	○
5/16-32	7,938	32	0,794	80	14	8	-	6,0	4,9	7,15	4328	○	○
3/8-32	9,525	32	0,794	90	18	8	-	7,0	5,5	8,70	4329	○	○
7/16-28	11,112	28	0,907	90	18	10	-	8,0	6,2	10,20	4330	○	○
1/2-28	12,700	28	0,907	100	18	10	-	9,0	7,0	11,80	4331	○	○
9/16-24	14,288	24	1,058	100	18	11	-	11,0	9,0	13,20	4332	○	○
5/8-24	15,875	24	1,058	100	18	11	-	12,0	9,0	14,80	4333	○	○
3/4-20	19,050	20	1,270	110	25	13	-	14,0	11,0	17,80	4335	○	○
7/8-20	22,225	20	1,270	125	25	13	-	18,0	14,5	20,95	4337	○	○
1-20	25,400	20	1,270	140	28	13	-	18,0	14,5	24,15	4339	○	○

ISO	Vc (m/min)	
P	5-35	5-35
M	5-15	5-15
K	5-25	10-25
N	10-30	10-30
S	-	-

Example of order

D2-11X01-4327
Tap 800X 1/4-32 UNEF 2B DIN-374 B HSSE TN2

● **Available from stock**
○ **On request**

1

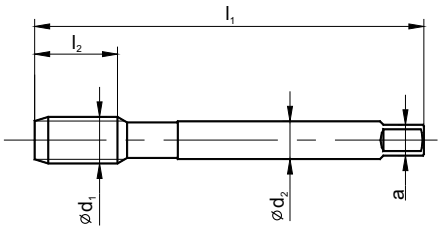
American unified fine thread
UNEF, ANSI B-1.1

800

	B	C-R40
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE
Coating		
Chamfer	B / 4-5P	C / 2-3P

HSSE

DIN ~374



UNEF	Ød1	1"/P	P	l1	l2	l2 R40	l3	Ød2	a	d	Norma	~DIN-374					
											Tol.	2B	2B				
											INDEX	D2-111101	D2-511101				
1/4-32	6,350	32	0,794	80	14	8	-	4,5	3,4	5,55	4327	o	o				
5/16-32	7,938	32	0,794	80	14	8	-	6,0	4,9	7,15	4328	o	o				
3/8-32	9,525	32	0,794	90	18	8	-	7,0	5,5	8,70	4329	o	o				
7/16-28	11,112	28	0,907	90	18	10	-	8,0	6,2	10,20	4330	o	o				
1/2-28	12,700	28	0,907	100	18	10	-	9,0	7,0	11,80	4331	o	o				
9/16-24	14,288	24	1,058	100	18	11	-	11,0	9,0	13,20	4332	o	o				
5/8-24	15,875	24	1,058	100	18	11	-	12,0	9,0	14,80	4333	o	o				
3/4-20	19,050	20	1,270	110	25	13	-	14,0	11,0	17,80	4335	o	o				
7/8-20	22,225	20	1,270	125	25	13	-	18,0	14,5	20,95	4337	o	o				
1-20	25,400	20	1,270	140	28	13	-	18,0	14,5	24,15	4339	o	o				

ISO	Vc (m/min)					
P	5-20	5-20				
M	5-10	5-10				
K	5-15	5-15				
N	5-25	5-25				
S	-	-				

Example of order

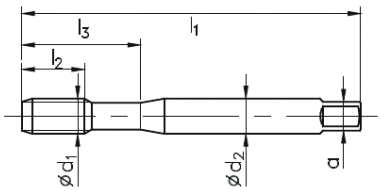
D2-111101-4327
Tap 800 1/4-32 UNEF 2B ~DIN-374 B HSSE

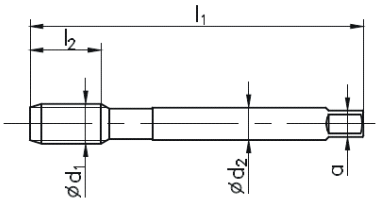
● **Available from stock**
○ **On request**

American unified coarse thread for aerospace industry UNJC ASME B1.15

HSSE PM

TS





I400-HT

	B-TS	C-R15-TS
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 1,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	TS	TS
Chamfer	B / 4-5P	C / 2-3P

UNJC	Ød1	P	l1	l2	l3	Ød2	a	d	Norma	DIN-371	
									Tol.	3BX	3BX
									INDEX	C4-11G902	C4-50G902
No4-40	2,844	40	56	10	18	3,5	2,7	2,35	4004	o	o
No6-32	3,505	32	56	12	20	4,0	3,0	2,85	4006	o	o
No8-32	4,165	32	63	12	21	4,5	3,4	3,50	4008	o	o
No10-24	4,826	24	70	14	25	6,0	4,9	3,90	4010	o	o
1/4-20	6,350	20	80	18	32	7,0	5,5	5,10	4027	o	o
5/16-18	7,938	18	90	20	35	8,0	6,0	6,60	4028	o	o
3/8-16	9,525	16	100	20	39	10,0	8,0	8,00	4029	o	o

UNJC	Ød1	P	l1	l2	l3	Ød2	a	d	Norma	DIN-376	
									Tol.	3BX	3BX
									INDEX	D4-11G902	D4-50G902
7/16-14	11,112	14	100	22	-	8,0	6,2	9,40	4030	o	o

Example of order

C4-11G902-4004
Tap 1400-HT No4-40 UNJC 3BX DIN-371 B HSSE-PM TS

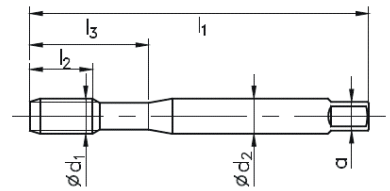
o On request

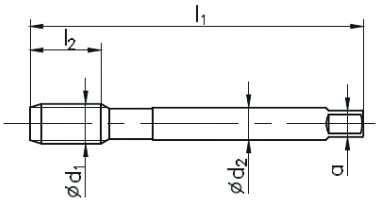
1

American unified fine thread for aerospace industry UNJF ASME B1.15

HSSE PM

TS





	I400-HT	
	B-TS	C-R15-TS
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 1,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	TS	TS
Chamfer	B / 4-5P	C / 2-3P

UNJF	Ød1	P	l1	l2	l3	Ød2	a	d	Norma	DIN-371	
									Tol.	3BX	3BX
									INDEX	C4-11G902	C4-50G902
No6-40	3,505	40	56	12	20	4,0	3,0	2,95	4906	o	o
No8-36	4,165	36	63	12	21	4,5	3,4	3,50	4908	o	o
No10-32	4,826	32	70	14	25	6,0	4,9	4,10	4910	o	o
1/4-28	6,350	28	80	18	32	7,0	5,5	5,50	4927	o	o
5/16-24	7,938	24	90	20	35	8,0	6,0	6,90	4928	o	o
3/8-24	9,525	24	100	20	39	10,0	8,0	8,50	4929	o	o

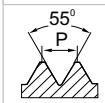
UNJF	Ød1	P	l1	l2	l3	Ød2	a	d	Norma	DIN-374	
									Tol.	3BX	3BX
									INDEX	D4-11G902	D4-50G902
7/16-20	11,112	20	100	20	-	8,0	6,2	9,40	4930	o	o

Example of order

C4-11G902-4906
Tap 1400-HT No6-40 UNJF 3BX DIN-371 B HSSE-PM TS

o **On request**

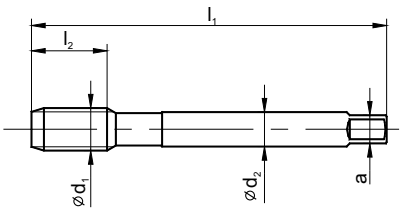
Whitworth pipe thread G, DIN-ISO 228



HSSE PM

HL

DIN 5156



MASTERTAP

	B-HL	C-R45-HL
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	HL	HL
Chamfer	B / 4-5P	C / 2-3P

G	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norma	DIN-5156	
										Tol.		
										INDEX	D4-118M01	D4-528M01
G1/16	7,723	28	0,907	90	10	-	6,0	4,9	6,80	3121	○	○
G1/8	9,728	28	0,907	90	10	-	7,0	5,5	8,80	3123	●	●
G1/4	13,157	19	1,337	100	14	-	11,0	9,0	11,80	3127	●	●
G3/8	16,662	19	1,337	100	15	-	12,0	9,0	15,25	3129	●	●
G1/2	20,955	14	1,814	125	17	-	16,0	12,0	19,00	3131	●	●
G5/8	22,911	14	1,814	125	20	-	18,0	14,5	21,00	3133	●	●
G3/4	26,441	14	1,814	140	20	-	20,0	16,0	24,50	3135	●	●
G7/8	30,201	14	1,814	150	22	-	22,0	18,0	28,25	3137	●	●
G1	33,249	11	2,309	160	24	-	25,0	20,0	30,75	3139	●	●

ISO	Vc (m/min)	
P	10-40	10-40
M	5-15	5-15
K	10-30	10-30
N	10-50	10-50
S	1-8	1-8

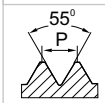
Example of order

D4-528M01-3123
Tap MasterTAP G-1/8" DIN-5156 C HSSE-PM HL

● **Available from stock**
○ **On request**

1

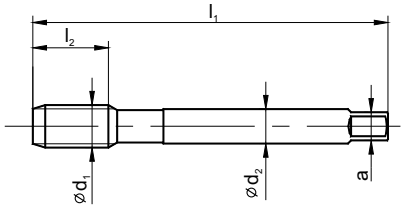
Whitworth pipe thread G, DIN-ISO 228



HSSE

TN2

DIN 5156



800X

	C-TN2	B-TN2	C-R40-TN2
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 1.5d	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating	TN2	TN2	TN2
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

G	Ød1	1"/P	P	l1	l2	l2 R40	Ød2	a	d	Norma	DIN-5156		
										Tol.			
										INDEX	D2-123X01	D2-113X01	D2-513X01
G1/16	7,723	28	0,907	90	17	10	6,0	4,9	6,80	3121	○	○	○
G1/8	9,728	28	0,907	90	18	10	7,0	5,5	8,80	3123	●	●	●
G1/4	13,157	19	1,337	100	22	14	11,0	9,0	11,80	3127	●	●	●
G3/8	16,662	19	1,337	100	22	15	12,0	9,0	15,25	3129	●	●	●
G1/2	20,955	14	1,814	125	25	17	16,0	12,0	19,00	3131	●	●	●
G5/8	22,911	14	1,814	125	25	20	18,0	14,5	21,00	3133	●	●	●
G3/4	26,441	14	1,814	140	28	20	20,0	16,0	24,50	3135	●	●	●
G7/8	30,201	14	1,814	150	30	22	22,0	18,0	28,25	3137	●	●	●
G1	33,249	11	2,309	160	32	24	25,0	20,0	30,75	3139	●	●	●
G1.1/8	37,907	11	2,309	170	34	24	28,0	22,0	35,50	3141	○	○	○
G1.1/4	41,910	11	2,309	170	34	25	32,0	24,0	39,50	3143	○	○	○
G1.1/2	47,800	11	2,309	190	36	-	36,0	29,0	45,25	3147	○	○	-
G1.3/4	53,756	11	2,309	190	36	-	40,0	32,0	51,00	3151	○	○	-
G2	59,614	11	2,309	220	40	-	45,0	35,0	57,00	3155	○	○	-

ISO	Vc (m/min)		
P	5-35	5-35	5-20
M	5-15	5-15	5-15
K	5-25	10-25	5-15
N	10-30	10-30	5-25
S	-	-	-

Example of order

D4-123X01-3139
Tap 800X G-1" DIN-5156 C HSSE TN2

● **Available from stock**
○ **On request**

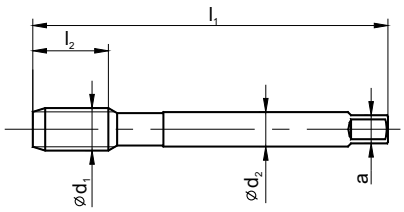
Whitworth pipe thread G, DIN-ISO 228

800

	C	B	C-R40
			
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 1.5d	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE	HSSE
Coating			
Chamfer	C / 2-3P	B / 4-5P	C / 2-3P

HSSE

DIN ~5156



G	Ød1	1"/P	P	l1	l2	l2 R40	Ød2	a	d	Norma	DIN-5156					
										Tol.						
										INDEX	D2-121101	D2-111101	D2-511101			
G1/16	7,723	28	0,907	90	17	10	6,0	4,9	6,80	3121	○	○	○			
G1/8	9,728	28	0,907	90	18	10	7,0	5,5	8,80	3123	●	●	●			
G1/4	13,157	19	1,337	100	22	14	11,0	9,0	11,80	3127	●	●	●			
G3/8	16,662	19	1,337	100	22	15	12,0	9,0	15,25	3129	●	●	●			
G1/2	20,955	14	1,814	125	25	17	16,0	12,0	19,00	3131	●	●	●			
G5/8	22,911	14	1,814	125	25	20	18,0	14,5	21,00	3133	●	●	●			
G3/4	26,441	14	1,814	140	28	20	20,0	16,0	24,50	3135	●	●	●			
G7/8	30,201	14	1,814	150	30	22	22,0	18,0	28,25	3137	●	●	●			
G1	33,249	11	2,309	160	32	24	25,0	20,0	30,75	3139	●	●	●			
G1.1/8	37,907	11	2,309	170	34	24	28,0	22,0	35,50	3141	○	○	○			
G1.1/4	41,910	11	2,309	170	34	25	32,0	24,0	39,50	3143	○	○	○			
G1.1/2	47,800	11	2,309	190	36	-	36,0	29,0	45,25	3147	○	○	-			
G1.3/4	53,756	11	2,309	190	36	-	40,0	32,0	51,00	3151	○	○	-			
G2	59,614	11	2,309	220	40	-	45,0	35,0	57,00	3155	○	○	-			

ISO	Vc (m/min)					
P	5-20	5-20	5-20			
M	5-10	5-10	5-10			
K	5-15	5-15	5-15			
N	5-25	5-25	5-25			
S	-	-	-			

Example of order

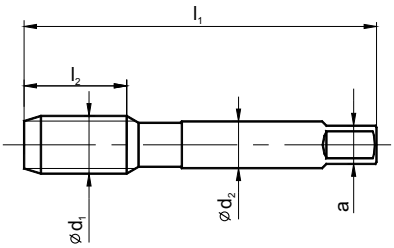
D2-121101-3123
Tap 800 G-1/8" DIN-5156 C HSSE

● **Available from stock**
○ **On request**

Whitworth pipe thread G, DIN-ISO 228

HSSE

DIN ~5157



	Ms
	F
Material groups	P M K N S H
Hole type	< 1,5d
Quality of material	HSSE
Coating	
Chamfer	F / 1P

G	Ød1	1"/P	P	l1	l2	Ød2	a	d	Norma	~DIN-5157
									Tol.	
									INDEX	E2-141401
G3/8	16,662	19	1,337	70	22	12	9	15,25	3129	●
G1/2	20,965	14	1,814	80	22	16	12	19,00	3131	●
G3/4	26,441	14	1,814	90	22	20	16	24,50	3135	●
G1	33,259	11	2,309	100	25	25	20	30,75	3139	●

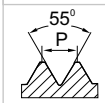
ISO	Vc (m/min)
P	-
M	-
K	-
N	10-25
S	-

Example of order

E1-141401-3129
Tap Ms G-3/8" ~DIN-5157 F HSSE

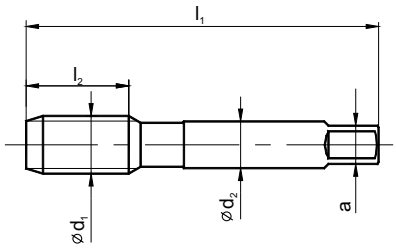
● **Available from stock**
○ **On request**

Whitworth pipe thread G, DIN-ISO 228



HSS

DIN 5157



Material groups	P M K N S H
Hole type	
Quality of material	HSS
Coating	
Chamfer	~3P

G	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a		Norma	DIN-5157
										Tol.	
										INDEX	E1-131001
G1/16	7,723	28	0,907	56	22	-	6	4,9	6,80	3121	○
G1/8	9,728	28	0,907	63	20	-	7	5,5	8,80	3123	○
G1/4	13,157	19	1,337	70	22	-	11	9,0	11,80	3127	●
G3/8	16,662	19	1,337	70	22	-	12	9,0	15,25	3129	●
G1/2	20,955	14	1,814	80	22	-	16	12,0	19,00	3131	●
G5/8	22,911	14	1,814	80	22	-	18	14,5	21,00	3133	○
G3/4	26,441	14	1,814	90	22	-	20	16,0	24,50	3135	●
G7/8	30,201	14	1,814	90	22	-	22	18,0	28,25	3137	○
G1	33,249	11	2,309	100	25	-	25	20,0	30,75	3139	●
G1.1/8	37,897	11	2,309	125	36	-	28	22,0	35,50	3141	○
G1.1/4	41,910	11	2,309	125	36	-	32	24,0	39,50	3143	○
G1.3/8	44,323	11	2,309	125	36	-	36	29,0	41,75	3145	○
G1.1/2	47,803	11	2,309	140	40	-	36	29,0	45,25	3147	○
G1.3/4	53,769	11	2,309	140	40	-	40	32,0	51,00	3151	○
G2	59,614	11	2,309	160	40	-	45	35,0	57,00	3155	○

ISO	Vc (m/min)
P	5-20
M	-
K	-
N	-
S	-

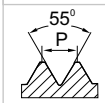
Example of order

E1-131001-3127
Tap G-1/4" DIN-5157 HSS

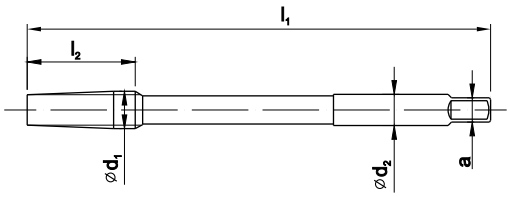
● **Available from stock**
○ **On request**

Whitworth pipe thread G, DIN-ISO 228

NGRf



HSS



Material groups	P M K N S H
Hole type	< 1,5d
Quality of material	HSS
Coating	
Chamfer	12P

G	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norma	NGRf
										Tol.	
										INDEX	F1-151001
G1/16	7,723	28	0,907	140	20	-	6,0	4,5	6,80	3121	○
G1/8	9,728	28	0,907	140	20	-	7,0	6,3	8,80	3123	○
G1/4	13,157	19	1,337	180	30	-	11,0	8,0	11,80	3127	○
G3/8	16,662	19	1,337	200	30	-	12,0	10,0	15,25	3129	○
G1/2	20,955	14	1,814	220	40	-	16,0	12,5	19,00	3131	●
G5/8	22,911	14	1,814	220	40	-	18,0	14,0	21,00	3133	○
G3/4	26,441	14	1,814	250	40	-	20,0	16,0	24,00	3135	○
G7/8	30,201	14	1,814	280	40	-	22,0	18,0	28,25	3137	○
G1	33,249	11	2,309	280	60	-	25,0	20,0	30,75	3139	○
G1.1/8	37,907	11	2,309	280	60	-	28,0	22,4	35,50	3141	-
G1.1/4	41,910	11	2,309	280	60	-	32,0	25,0	39,50	3143	○
G1.3/8	44,323	11	2,309	280	60	-	32,0	25,0	42,00	3145	-
G1.1/2	47,800	11	2,309	280	60	-	36,0	28,0	45,00	3147	○
G1.3/4	53,756	11	2,309	280	60	-	40,0	28,0	51,00	3151	-
G2	59,614	11	2,309	280	60	-	45,0	31,5	57,00	3155	○

ISO	Vc (m/min)
P	5-20
M	-
K	6-15
N	6-15
S	-

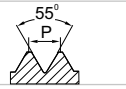
Example of order

F1-151001-3131
Tap G-1/2" NGRf HSS

● **Available from stock**
○ **On request**

Whitworth pipe thread Rp, PN-ISO 7/1, DIN EN 10226-1

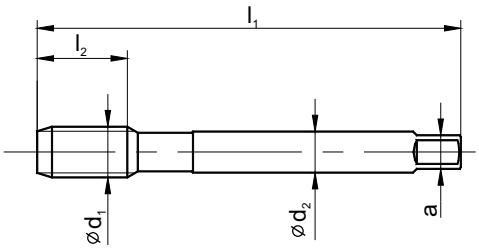
Tapered whitworth pipe thread Rc, PN-ISO 7/1, DIN EN 10226-2



HSSE

DIN 5156

DIN ~5156



	800	
	C	C
Material groups	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d
Quality of material	HSSE	HSSE
Coating		
Chamfer	C / 2-3P	C / 2-3P

Rp	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norma	DIN-5156
										Tol.	
										INDEX	D2-121101
Rp-1/16"	7,723	28	0,907	90	17	-	6,0	4,9	6,55	3221	○
Rp-1/8"	9,728	28	0,907	90	18	-	7,0	5,5	8,60	3223	○
Rp-1/4"	13,157	19	1,337	100	22	-	11,0	9,0	11,50	3227	○
Rp-3/8"	16,662	19	1,337	100	22	-	12,0	9,0	15,00	3229	○
Rp-1/2"	20,955	14	1,814	125	25	-	16,0	12,0	18,50	3231	○
Rp-3/4"	26,441	14	1,814	140	28	-	20,0	16,0	24,00	3235	○
Rp-1"	33,249	11	2,309	160	32	-	25,0	20,0	30,25	3239	○

Rc	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norm	~DIN-5156
										Tol.	
										INDEX	D2-121101
Rc-1/16"	-	28	0,907	90	15	-	6,0	4,9	6,15	3321	○
Rc-1/8"	-	28	0,907	90	15	-	7,0	5,5	8,15	3323	●
Rc-1/4"	-	19	1,337	100	19	-	11,0	9,0	10,85	3327	●
Rc-3/8"	-	19	1,337	100	21	-	12,0	9,0	14,30	3329	●
Rc-1/2"	-	14	1,814	125	26	-	16,0	12,0	17,80	3331	○
Rc-3/4"	-	14	1,814	140	28	-	20,0	16,0	23,20	3335	○
Rc-1"	-	11	2,309	160	33	-	25,0	20,0	29,20	3339	○

ISO	Vc (m/min)	
P	5-20	5-20
M	5-10	5-10
K	5-15	5-15
N	10-25	10-25
S	-	-

Conical reamer 1:16 p. 174

Information concerning dimensions of the holes for tapered threads in the technical part of the catalogue p. 335

Example of order

D2-121101-3221
Tap Rp-1/16" DIN-5156 C HSSE

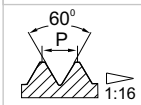
● **Available from stock**
○ **On request**

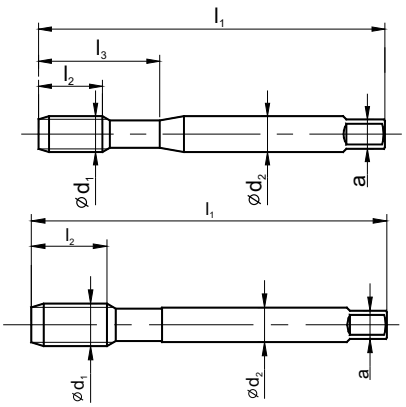
1

American tapered pipe thread
NPT 1:16, ANSI B-1.20.1

800

C





HSSE

DIN ~371

DIN ~374

Material groups	P M K N S H
Hole type	< 1,5d
Quality of material	HSSE
Coating	
Chamfer	C / 2-3P

NPT	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a	d	Norma	~DIN-371
										Tol.	
										INDEX	C2-121101
1/8	-	27	0,941	90	15	35	10,0	8,0	8,50	4623	●
1/4	-	18	1,411	100	20	37,7	14,0	11,0	11,10	4627	●

NPT	1"/P	P	l_1	l_2	l_3	∅d_2	a	d	Norm	~DIN-374
									Tol.	
									INDEX	D2-121101
3/8	18	1,411	110	22	-	14,0	11,0	14,40	4629	●
1/2	14	1,814	140	27	-	18,0	14,5	17,80	4631	●
3/4	14	1,814	140	28	-	20,0	16,0	23,15	4635	●
1	11.1/2	2,209	160	35	-	25,0	20,0	29,05	4639	●

ISO	Vc (m/min)
P	5-20
M	5-10
K	5-15
N	10-25
S	-

Example of order

C2-121101-4623
Tap 800 1/8" NPT DIN-371 C HSSE

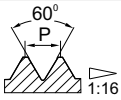
● **Available from stock**
○ **On request**

1

American tapered pipe thread NPTF 1:16, ANSI B-1.20.1

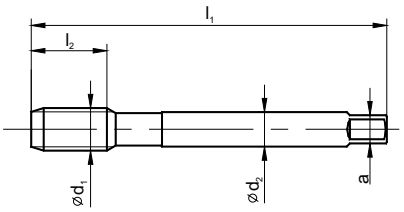
800

C



HSSE

DIN ~374



Material groups	P M K N S H
Hole type	< 1,5d
Quality of material	HSSE
Coating	
Chamfer	C / 2-3P

NPTF	Ød1	1"/P	P	l1	l2	Ød2	a	d	Norma	~DIN-374
									Tol.	
									INDEX	D2-121101
1/8	-	27	0,941	90	15	7,0	5,5	8,45	4723	●
1/4	-	18	1,411	100	20	11,0	9,0	10,90	4727	○
3/8	-	18	1,411	110	22	14,0	11,0	14,30	4729	○
1/2	-	14	1,814	140	27	18,0	14,5	17,60	4731	○

ISO	Vc (m/min)
P	5-20
M	5-10
K	5-15
N	10-25
S	-

Example of order

D2-121101-4723
Tap 800 1/8" NPTF ~DIN-374 C HSSE

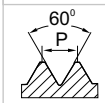
● **Available from stock**
○ **On request**

1

American parallel pipe threads NPSF, ANSI B 1.20.3

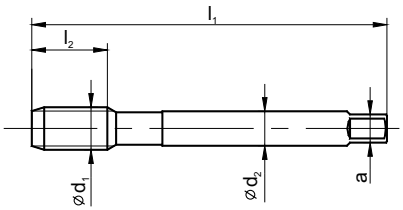
800

c



HSSE

DIN ~374



Material groups	P M K N S H
Hole type	< 1,5d
Quality of material	HSSE
Coating	
Chamfer	C / 2-3P

NPSF	∅d_1	1"/P	P	l_1	l_2	∅d_2	a	d	Norma	~DIN-374
									Tol.	
									INDEX	D2-121101
1/16	7,582	27	0,941	90	20	6,0	4,9	6,35	4521	○
1/8	9,929	27	0,941	90	20	7,0	5,5	8,70	4523	○
1/4	13,236	18	1,411	100	20	11,0	9,0	11,30	4527	○
3/8	16,673	18	1,411	100	20	12,0	9,0	14,75	4529	○
1/2	20,814	14	1,814	125	27	16,0	12,0	18,20	4531	○
3/4	26,166	14	1,814	140	27	20,0	16,0	23,50	4535	○
1	32,718	11.1/2	2,209	160	32	25,0	20,0	29,50	4539	○

ISO	Vc (m/min)
P	5-20
M	5-10
K	5-15
N	5-25
S	-

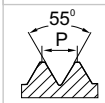
Example of order

D2-121101-4723
Tap 800 1/8" NPSF ~DIN-5156 C HSSE

● **Available from stock**
○ **On request**

Whitworth thread
BSW, BS-84:1956

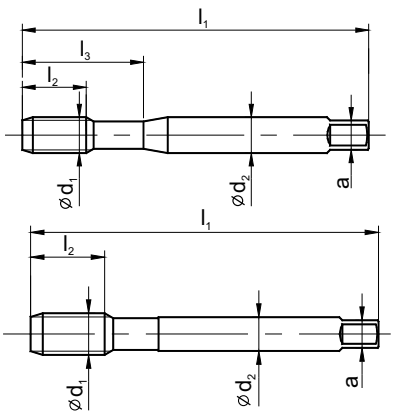
800



HSSE

DIN 371

DIN 376



	B	C-R40
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE	HSSE
Coating		
Chamfer	B / 4-5P	C / 2-3P

BSW	∅d_1	1"/P	P	l_1	l_2	l_2 R40	l_3	∅d_2	a		Norma	DIN-371(~DIN2182)	
											Tol.	normal	normal
											INDEX	C2-111101	C2-511101
1/8-40	3,175	40	0,635	56	10	5	18	3,5	2,7	2,55	7123	o	o
3/16-24	4,762	24	1,058	70	14	8	25	6,0	4,9	3,70	7125	o	o
1/4-20	6,350	20	1,270	80	18	13	32	7,0	5,5	5,10	7127	o	o
5/16-18	7,938	18	1,411	90	20	13	35	8,0	6,2	6,50	7128	o	o
3/8-16	9,525	16	1,588	100	20	15	39	10,0	8,0	7,90	7129	o	o

BSW	∅d_1	1"/P	P	l_1	l_2	l_2 R40	l_3	∅d_2	a		Norm	DIN-376(~DIN2182)	
											Tol.		
											INDEX	D2-111101	D2-511101
7/16-14	11,112	14	1,814	100	22	15	-	8,0	6,2	9,25	7130	o	o
1/2-12	12,700	12	2,117	110	24	18	-	9,0	7,0	10,50	7131	o	o
5/8-11	15,875	11	2,309	110	32	22	-	12,0	9,0	13,50	7133	o	o
3/4-10	19,050	10	2,540	125	32	25	-	14,0	11,0	16,40	7135	o	o
7/8-9	22,225	9	2,822	140	32	30	-	18,0	14,5	19,25	7137	o	o
1-8	25,400	8	3,175	160	38	30	-	20,0	16,0	22,00	7139	o	o

ISO	Vc (m/min)	
P	5-20	5-20
M	5-10	5-10
K	5-15	5-15
N	5-25	5-25
S	-	-

Example of order

C2-111101-7123
Tap 800 1/8-40 BSW DIN-371 B HSSE

● **Available from stock**
○ **On request**

1

MASTERTAP

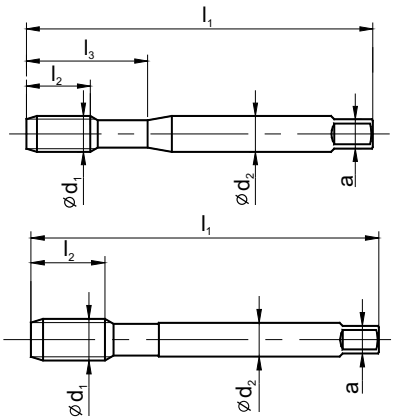
ISO Metric coarse thread DIN 8140-2

HSSE PM

HL

DIN ~371

DIN ~376



MASTERTAP

	B-HL	E-R45-HL
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	HL	HL
Chamfer	B / 4-5P	E / 1,5-2P

EG M (STI)	∅d_1	P	l_1	l_2	l_2 R45	l_3	∅d_2	a	d	Norma	~DIN-371(DIN-40435)	
										Tol.	6H mod.	6H mod.
										INDEX	C4-118M01	C4-718M01
M2	2,520	0,40	50	9	5	14	2,8	2,1	2,10	6020	●	●
M2,5	3,084	0,45	56	10	5	18	3,5	2,7	2,65	6025	●	●
M3	3,650	0,50	63	12	5	21	4,5	3,4	3,15	6030	●	●
M4	4,910	0,70	70	14	8	25	6,0	4,9	4,20	6040	●	●
M5	6,040	0,80	80	18	10	30	6,0	4,9	5,25	6050	●	●
M6	7,300	1,00	90	18	10	35	8,0	6,2	6,30	6060	●	●
M8	9,624	1,25	100	20	13	39	10,0	8,0	8,40	6080	●	●

EG M (STI)	∅d_1	P	l_1	l_2	l_2 R45	l_3	∅d_2	a	d	Norm	~DIN-376(DIN-40435)	
										Tol.	6H mod.	6H mod.
										INDEX	D4-118M01	D4-718M01
M10	11,948	1,50	100	15	15	-	9,0	7,0	10,50	6100	●	●
M12	14,274	1,75	110	20	20	-	11,0	9,0	12,50	6120	●	●
M14	16,598	2,00	110	20	20	-	12,0	9,0	14,50	6140	●	●
M16	18,598	2,00	125	20	20	-	14,0	11,0	16,50	6160	●	●
M18	21,248	2,50	140	27	27	-	18,0	14,5	18,75	6180	●	●
M20	23,248	2,50	160	30	30	-	18,0	14,5	20,75	6200	●	●

ISO	Vc (m/min)	
P	5-40	5-40
M	5-15	5-15
K	10-30	10-30
N	10-30	10-30
S	1-8	1-8

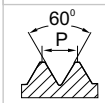
Example of order

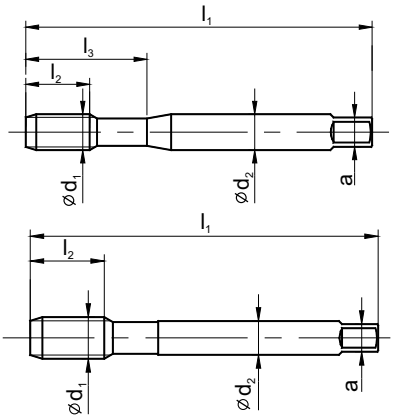
C4-118M01-6030
Tap MasterTAP EG M3-6H mod. DIN-371 B HSSE-PM HL

● **Available from stock**
○ **On request**

American unified coarse thread UNC, ASME B18.29.1

MASTERTAP





HSSE PM

HL

DIN ~371

DIN ~376

	B-HL	E-R45-HL
Material groups	P M K N S H	P M K N S H
Hole type	< 3d	< 2,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	HL	HL
Chamfer	B / 4-5P	E / 1,5-2P

EG UNC (STI)	∅d_1	1/P	l_1	l_2	l_2 R45	l_3	∅d_2	a	d	Norma	~DIN-371(DIN-40435)	
										Tol.	2B	2B
										INDEX	C4-118M01	C4-718M01
No4-40	3,671	40	63	13	7	21	4,5	3,4	3,10	6804	o	o
No6-32	4,536	32	70	14	8	25	6,0	4,9	3,80	6806	o	o
No8-32	5,197	32	80	16	10	30	6,0	4,9	4,40	6808	o	o
No10-24	6,200	24	80	17	12	30	7,0	5,5	5,20	6810	o	o
1/4-20	8,002	20	90	20	15	35	8,0	6,2	6,70	6827	o	o
5/16-18	9,771	18	100	22	18	39	10,0	8,0	8,40	6828	o	o

EG UNC (STI)	∅d_1	1/P	l_1	l_2	l_2 R45	l_3	∅d_2	a	d	Norm	~DIN-376(DIN-40435)	
										Tol.	2B	2B
										INDEX	D4-118M01	D4-718M01
3/8-16	11,587	16	100	15	15	-	9	7	10	6829	o	o
7/16-14	13,469	14	110	18	18	-	11	9	11,6	6830	o	o
1/2-13	15,237	13	110	18	18	-	12	9	13,3	6831	o	o
9/16-12	17,039	12	110	20	20	-	12	9	14,9	6832	o	o
5/8-11	18,875	11	125	20	20	-	14	11	16,5	6833	o	o
3/4-10	22,349	10	140	25	25	-	18	14,5	19,75	6835	o	o

ISO	Vc (m/min)	
P	5-40	5-40
M	5-15	5-15
K	10-30	10-30
N	10-30	10-30
S	1-8	1-8

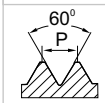
Example of order

C4-118M01-6804
Tap MasterTAP EG No4 UNC 2B ~DIN-371 B HSSE-PM HL

● **Available from stock**
○ **On request**

1

American unified fine thread UNF, ASME B18.29.1

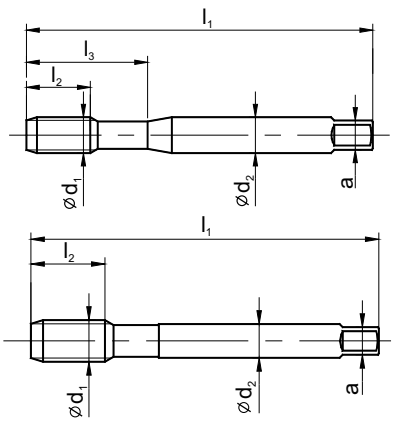


HSSE PM

HL

DIN ~371

DIN ~376



MASTERTAP

	B-HL	E-R45-HL
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	 < 2,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	HL	HL
Chamfer	B / 4-5P	E / 1,5-2P

EG UNF (STI)	ød1	1/P	l1	l2	l2 R45	l3	ød2	a		Norma	~DIN-371(DIN-40435)	
										Tol.	2B	2B
										INDEX	C4-118M01	C4-718M01
No4-48	3,533	48	56	9	6	20	4	3	3	6904	o	o
No6-40	4,330	40	70	10	7	25	6	4,9	3,7	6906	o	o
No8-36	5,083	36	80	13	9	30	6	4,9	4,4	6908	o	o
No10-32	5,858	32	80	13	9	30	6	4,9	5,1	6910	o	o
1/4-28	7,528	28	90	17	10	35	8	6,2	6,6	6927	o	o
5/16-24	9,312	24	90	18	12	35	10	8	8,3	6928	o	o

EG UNF (STI)	ød1	1/P	l1	l2	l2 R45	l3	ød2	a		Norm	~DIN-376(DIN-40435)	
										Tol.	2B	2B
										INDEX	D4-118M01	D4-718M01
3/8-24	10,899	24	90	12	12	-	8	6	9,8	6929	o	o
7/16-20	12,763	20	100	15	15	-	9	7	11,5	6930	o	o
1/2-20	14,352	20	100	15	15	-	11	9	13,1	6931	o	o
9/16-18	16,121	18	100	15	15	-	12	9	14,7	6932	o	o
5/8-18	17,709	18	110	15	15	-	14	11	16,25	6933	o	o
3/4-16	21,112	16	125	17	17	-	16	12,0	19,5	6935	o	o

ISO	Vc (m/min)	
P	5-40	5-40
M	5-15	5-15
K	10-30	10-30
N	10-30	10-30
S	1-8	1-8

MASTERTAP

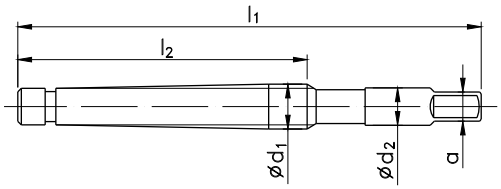
Example of order

C4-118M01-6904
Tap MasterTAP EG No4-56 UNF 2B ~DIN-371 B HSSE-PM HL

● **Available from stock**
○ **On request**

Trapezoidal thread Tr, DIN-103

HSS



	NGSt	NGSt LH
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 2d	 < 2d
Quality of material	HSS	HSS
Coating	-	-
Chamfer	24P	24P

Tr ∅d_1	P	l_1	l_2	∅d_2	a	d	Norma	NGSt	
							Tol.	7H	7H
							INDEX	G1-701002	G1-751002
Tr 10x1,5	1,5	100	45	7	5,5	8,5	8008	○	○
Tr 10x2	2	115	76	7	5,5	8	8009	●	○
Tr 12x2	2	120	74	8	6,3	10	8014	●	○
Tr 12x3	3	155	104	8	6,3	9	8015	●	○
Tr 14x2	2	130	74	10	8	12	8018	●	○
Tr 14x3	3	160	104	10	8	11	8019	●	○
Tr 16x2	2	135	74	11,2	9	14	8022	●	○
Tr 16x4	4	200	132	11,2	9	12	8024	●	○
Tr 18x2	2	140	74	12,5	10	16	8030	○	○
Tr 18x4	4	205	132	12,5	10	14	8032	○	○
Tr 20x2	2	145	74	14	11,2	18	8033	○	○
Tr 20x4	4	210	132	14	11,2	16	8034	○	○
Tr 22x3	3	185	104	16	12,5	19	8035	○	○
Tr 22x5	5	250	165	16	12,5	17	8037	○	○
Tr 24x3	3	190	104	18	14	21	8040	○	○
Tr 24x5	5	255	165	18	14	19	8042	○	○
Tr 26x3	3	195	104	20	16	23	8045	○	○
Tr 26x5	5	265	165	20	16	21	8047	○	○
Tr 28x3	3	205	104	22,4	18	25	8050	○	○
Tr 28x5	5	270	165	22,4	18	23	8052	○	○
Tr 30x3	3	205	104	22,4	18	27	8055	○	○
Tr 30x6	6	305	206	22,4	18	24	8057	○	○
Tr 32x6	6	315	206	25	20	26	8062	○	○
Tr 36x6	6	325	206	28	22,4	30	8072	○	○

ISO	Vc (m/min)	
P	2-6	2-6
M	-	-
K	2-6	2-6
N	2-8	2-8
S	-	-

Example of order

G1-701002-8009
Tap Tr10x2-7H NGSt HSS

● **Available from stock**
○ **On request**

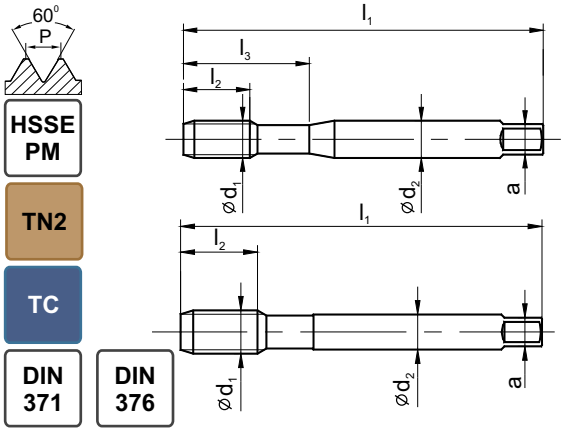
FORMING TAPS

FORMING TAPS

PAGE

M	**DIN-371** **DIN-376**	Forming taps with strengthened shank Forming taps with transient shank	WGN	**93**
MF	**DIN-371** **DIN-374**	Forming taps with strengthened shank Forming taps with transient shank	WGN	**94**
UNC	**DIN-371** **DIN-376**	Forming taps with strengthened shank Forming taps with transient shank	WGN	**95**
UNF	**DIN-371** **DIN-374**	Forming taps with strengthened shank Forming taps with transient shank	WGN	**96**
G	**~DIN-5156**	Forming taps with transient shank	WGN	**97**

ISO Metric coarse thread DIN-13



WGN

	C-TN2	C-SR-TN2	C-SR-TN2	C-SR-TC	E-SR-TC	E-SR-IK-TC	E-SR-IKR-TC
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	< 3d	< 3d	< 3d	< 3d	< 3d	< 3d	< 3d
Quality of material	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM	HSSE-PM
Coating	TN2	TN2	TN2	TC	TC	TC	TC
Chamfer	C / 2-3P	C / 2-3P	C / 2-3P	C / 2-3P	E / 1,5-2P	E / 1,5-2P	E / 1,5-2P

M ød1	P	l1	l2	l3	ød2	a	d	Norm	DIN-371 (~DIN-2174)						
								Tol.	6HX	6HX	6GX	6HX	6HX	6HX	6HX
								INDEX	C4-903005	C4-923005	C4-923006	C4-925005	C4-945005	C4-945055	C4-945065
M 1,6	0,35	40	8	8	2,5	2,1	1,47	0016	●	●	-	-	-	-	-
M 2	0,40	45	8	8	2,8	2,1	1,85	0020	●	●	-	-	-	-	-
M 2,5	0,45	50	9	9	2,8	2,1	2,33	0025	●	●	-	-	-	-	-
M 3	0,50	56	10	18	3,5	2,7	2,80	0030	●	●	●	●	●	-	-
M 3,5	0,60	56	12	20	4	3	3,25	0035	○	○	○	○	○	-	-
M 4	0,70	63	7	21	4,5	3,4	3,70	0040	●	●	●	●	●	-	-
M 5	0,80	70	8	25	6	4,9	4,65	0050	●	●	●	●	●	●	●
M 6	1,00	80	10	30	6	4,9	5,60	0060	●	●	●	●	●	●	●
M 7	1,00	80	10	30	7	5,5	6,60	0070	○	○	○	○	○	○	○
M 8	1,25	90	13	35	8	6,2	7,45	0080	●	●	●	●	●	●	●
M 9	1,25	90	13	35	9	7	8,45	0090	○	○	○	○	○	○	○
M 10	1,50	100	15	39	10	8	9,35	0100	●	●	●	●	●	●	●

M ød1	P	l1	l2	l3	ød2	a	d	Norm	DIN-376 (~DIN-2174)						
								Tol.	6HX	6HX	6GX				
								INDEX	D4-903005	D4-923005	D4-923006				
M6	1	80	10	-	4,5	3,4	5,60	0060	●	●	●				
M8	1,25	90	13	-	6	4,9	7,45	0080	●	●	●				
M 10	1,5	100	15	-	7	5,5	9,35	0100	●	●	●				
M 12	1,75	110	18	-	9	7	11,25	0120	●	●	●				
M 14	2	110	20	-	11	9	13,10	0140	●	●	●				
M 16	2	110	20	-	12	9	15,10	0160	●	●	●				
M 18	2,5	125	25	-	14	11	16,85	0180	●	●	●				
M 20	2,5	140	25	-	16	12	18,85	0200	●	●	●				

ISO	Vc (m/min)						
P	10-30	10-30	10-30	10-30	10-30	10-50	10-50
M	10-25	10-25	10-25	10-25	10-25	10-25	10-25
K	-	-	-	-	-	-	-
N	20-40	20-40	20-40	20-60	20-60	20-60	20-60
S	-	-	-	-	-	-	-

Example of order

C4-903005-0100
Forming tap WGN M10-6HX DIN-371 C HSSE-PM TN2

● **Available from stock**
○ **On request**

2

ISO Metric fine thread DIN-13

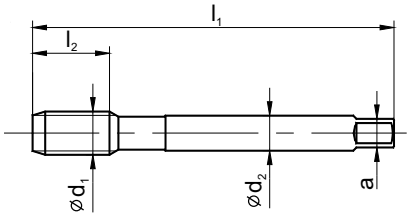
HSSE PM

TN2

TC

DIN 371

DIN 374



WGN

	C-SR-TN2	C-SR-TC
		
Material groups	P M K N S H	P M K N S H
Hole type	 < 3d	< 3d
Quality of material	HSSE-PM	HSSE-PM
Coating	TN2	TC
Chamfer	C / 2-3P	C / 2-3P

MF Ød1	P	l1	l2	l3	Ød2	a	d	Norm	DIN-371 (~DIN-2174)	
								Tol.	6HX	6HX
								INDEX	C4-923005	C4-925005
M 4 x 0,5	0,5	63	7	21	4,5	3,4	3,80	0041	●	●
M 5 x 0,5	0,5	70	8	25	6	4,9	4,80	0051	●	●
M 6 x 0,5	0,5	80	10	30	6	4,9	5,80	0061	●	●
M 6 x 0,75	0,75	80	10	30	7	5,5	5,70	0062	●	●
M 8 x 1	1	90	13	35	8	6,2	7,60	0083	●	●
M 10 x 1	1	90	13	35	10	8	9,60	0103	●	●
M 10 x 1,25	1,25	100	15	39	10	8	9,45	0104	●	●

MF Ød1	P	l1	l2	l3	Ød2	a	d	Norm	DIN-374 (~DIN-2174)	
								Tol.	6HX	6HX
								INDEX	D4-923005	D4-925005
M 6 x 0,5	0,5	80	10	-	4,5	3,4	5,80	0061	○	○
M 6 x 0,75	0,75	80	10	-	4,5	3,4	5,70	0062	○	○
M 8 x 1	1	90	10	-	6,0	4,9	7,60	0083	●	●
M 10 x 1	1	90	10	-	7,0	5,5	9,60	0103	●	●
M 10 x 1,25	1,25	100	15	-	7,0	5,5	9,45	0104	●	●
M 12 x 1	1	100	10	-	9,0	7	11,60	0123	●	●
M 12 x 1,25	1,25	100	15	-	9,0	7	11,45	0124	●	●
M 12 x 1,5	1,5	100	15	-	9,0	7	11,35	0125	●	●
M 16 x 1,5	1,5	100	15	-	12	9	15,35	0165	●	●
M 18 x 1,5	1,5	110	17	-	14	11	17,35	0185	●	●
M 20 x 1,5	1,5	125	17	-	16	12	19,35	0205	●	●

ISO	Vc (m/min)	
P	10-30	10-30
M	10-25	10-25
K	-	-
N	20-40	20-60
S	-	-

Example of order

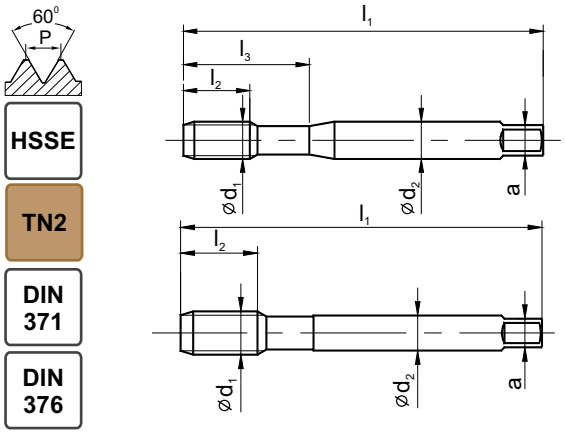
D2-923105-0083
Forming tap WGN M8x1-6HX DIN-374 C HSSE-PM TN2

● **Available from stock**
○ **On request**

American unified coarse thread UNC, ANSI B-1.1

WGN

C-SR-TN2



HSSE

TN2

DIN 371

DIN 376

Material groups	P M K N S H
Hole type	< 3d
Quality of material	HSSE
Coating	TN2
Chamfer	C / 2-3P

UNC	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norm	DIN-371 (~DIN-2174)
										Tol.	2BX
										INDEX	C2-923105
No 5-40	3,175	40	0,635	56	7	18	3,5	2,7	2,90	4105	o
No 6-32	3,505	32	0,795	56	6	20	4,0	3,0	3,15	4106	o
No 8-32	4,166	32	0,794	63	7	21	4,5	3,4	3,80	4108	o
No 10-24	4,826	24	1,058	70	8	25	6,0	4,9	4,35	4110	o
No 12-24	5,486	24	1,058	80	10	30	6,0	4,9	5,00	4112	o
1/4-20	6,350	20	1,270	80	13	30	7,0	5,5	5,75	4127	o
5/16-18	7,938	18	1,411	90	13	35	8,0	6,2	7,30	4128	o
3/8-16	9,525	16	1,588	100	15	39	10	8	8,80	4129	o

UNC	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norm	DIN-376 (~DIN-2174)
										Tol.	2BX
										INDEX	D2-923105
7/16-14	11,112	14	1,814	100	15	-	8	6,2	10,25	4130	o
1/2-13	12,700	13	1,954	110	18	-	9	7	11,80	4131	o
5/8-11	15,875	11	2,309	110	20	-	12	9	14,80	4133	o

ISO	Vc (m/min)
P	10-30
M	10-25
K	-
N	20-40
S	-

Example of order

C2-923105-4105
Forming tap WGN No5-40 UNC 2BX DIN-371 C HSSE TN2

● **Available from stock**
○ **On request**

2

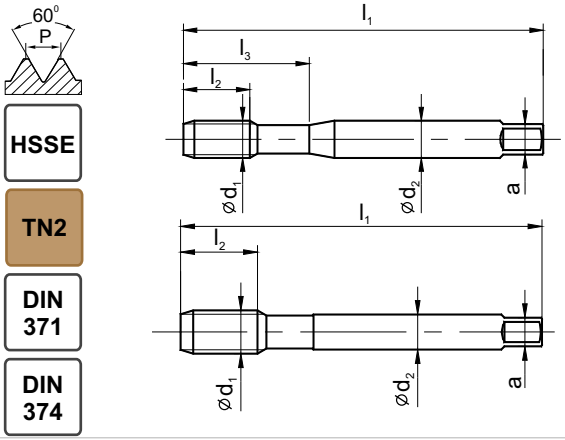
American unified fine thread UNF, ANSI B-1.1

HSSE

TN2

DIN 371

DIN 374



WGN

C-SR-TN2

Material groups	P M K N S H
Hole type	< 3d
Quality of material	HSSE
Coating	TN2
Chamfer	C / 2-3P

UNF	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norm	DIN-371 (~DIN-2174)
										Tol.	2BX
										INDEX	C2-923105
No 5-44	3,175	44	0,577	56	7	18	3,5	2,7	2,92	4205	o
No 6-40	3,505	40	0,635	56	6	20	4	3	3,22	4206	o
No 8-36	4,166	36	0,706	63	7	21	4,5	3,4	3,85	4208	o
No 10-32	4,826	32	0,794	70	8	25	6	4,9	4,45	4210	o
No 12-28	5,486	28	0,907	80	10	30	6	4,9	5,10	4212	o
1/4-28	6,350	28	0,907	80	10	30	6	4,9	5,95	4227	o
5/16-24	7,938	24	1,058	90	13	35	8	6,2	7,45	4228	o
3/8-24	9,525	24	1,058	90	15	35	10	8	9,05	4229	o

UNF	Ød1	1"/P	P	l1	l2	Ød2	a	d	Norm	DIN-374 (~DIN-2174)
									Tol.	2BX
									INDEX	D2-923105
7/16-20	11,112	20	1,270	100	15	8	6,2	10,55	4230	o
1/2-20	12,700	20	1,270	110	15	9	7	12,15	4231	o
5/8-18	15,875	18	1,411	110	15	12	9	15,25	4233	o
3/4-16	19,050	16	1,588	120	17	14	11	18,35	4235	o

ISO	Vc (m/min)
P	10-30
M	10-25
K	-
N	20-40
S	-

Example of order

C2-923105-4205
Forming tap WGN No5-44 UNF 2BX UNF DIN-371 C HSSE TN2

● **Available from stock**
○ **On request**

Whitworth pipe thread G, DIN-ISO 228

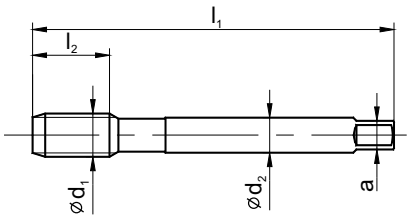
WGN

C-SR-TN2

HSSE

TN2

DIN ~5156



Material groups	P M K N S H
Hole type	< 3d
Quality of material	HSSE
Coating	TN2
Chamfer	C / 2-3P

G	∅d_1	1"/P	P	l_1	l_2	∅d_2	a	d	Norm	~DIN-5156
									Tol.	
									INDEX	D2-923105
G-1/8"	9,728	28	0,907	90	10	7	5,5	9,25	3123	●
G-1/4"	13,157	19	1,337	100	14	11	9	12,55	3127	●
G-3/8"	16,662	19	1,337	100	15	12	9	16,05	3129	●
G-1/2"	20,955	14	1,814	125	17	16	12	20,10	3131	●
G-5/8"	22,911	14	1,814	125	20	18	14,5	22,05	3133	●
G-3/4"	26,441	14	1,814	140	22	20	16	25,60	3135	●

ISO	Vc (m/min)
P	10-30
M	10-25
K	-
N	20-40
S	-

Example of order

D2-923105-3127
Forming tap WGN G-1/4" DIN-5156 C HSSE TN2

● **Available from stock**
○ **On request**

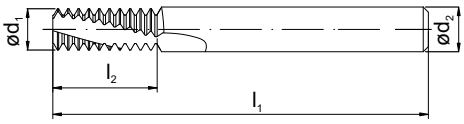
THREAD MILLS

THREAD MILLS

Metric coarse thread ISO DIN-13

VHM

TS



IK

Material groups	P M K N S H	P M K N S H
Quality of material	VHM	VHM
Coating	TS	TS

P	M	MF	Ød1	Ød2	l1	l2	z	INDEX	INDEX
0,5	M3	ø≥ 4	2,3	6	58,0	5,3	4	MI-41G100M-0050	-
0,5		ø≥ 5	3,9	6	58,0	10,3	4	MI-41G100M-0050A	MI-41G150M-0050A
0,7	M4	ø≥ 5	3,1	6	58,0	7,1	4	MI-41G100M-0070	MI-41G150M-0070
0,75		ø≥ 6	4,6	6	58,0	10,1	4	MI-41G100M-0075	MI-41G150M-0075
0,8	M5	ø≥ 6	3,9	6	58,0	8,7	4	MI-41G100M-0080	MI-41G150M-0080
1	M6	ø≥ 7	4,6	6	58,0	10,5	4	MI-41G100M-0100	MI-41G150M-0100
1	M6	ø≥ 7	4,6	6	58,0	15,0	4	MI-41G100M-0100A	MI-41G150M-0100A
1		ø≥ 9	6,0	6	58,0	12,5	4	MI-41G100M-0100B	MI-41G150M-0100B
1		ø≥ 10	8,0	8	64,0	16,5	4	MI-41G100M-0100C	MI-41G150M-0100C
1,25	M8	ø≥ 10	5,9	6	58,0	13,9	4	MI-41G100M-0125	MI-41G150M-0125
1,25	M8	ø≥ 10	5,9	6	58,0	20,0	4	MI-41G100M-0125A	MI-41G150M-0125A
1,5	M10	ø≥ 12	7,9	8	64,0	17,3	4	MI-41G100M-0150	MI-41G150M-0150
1,5	M10	ø≥ 12	7,9	8	76,0	25,0	4	MI-41G100M-0150A	MI-41G150M-0150A
1,5		ø≥ 14	10,0	10	73,0	21,8	4	MI-41G100M-0150B	MI-41G150M-0150B
1,5		ø≥ 20	15,9	16	105,0	33,8	4	MI-41G100M-0150C	MI-41G150M-0150C
1,75	M12	ø≥ 14	9,6	10	76,0	20,6	6	MI-61G100M-0175	MI-61G150M-0175
1,75	M12	ø≥ 14	9,6	10	76,0	30,0	6	MI-61G100M-0175A	MI-61G150M-0175A
2	M14/M16	ø≥ 17	11,4	12	73,0	27,0	6	MI-61G100M-0200	MI-61G150M-0200
2	M14/M16	ø≥ 17	11,4	12	105,0	39,0	6	MI-61G100M-0200A	MI-61G150M-0200A
2		ø≥ 20	15,9	16	105,0	35,0	6	MI-61G100M-0200B	MI-61G150M-0200B
2,5	M18/M20	ø≥ 22	14,9	16	84,0	33,8	6	MI-61G100M-0250	MI-61G150M-0250
2,5	M18/M20	ø≥ 22	14,9	16	105,0	50,0	6	MI-61G100M-0250A	MI-61G150M-0250A

ISO			Vc [m/min]	Feed [mm/tooth]								
				∅2	∅3	∅4	∅6	∅8	∅10	∅12	∅14	∅16
P	P1-P5	Constructional and carburizing steel	100-150	0,02	0,03	0,03	0,05	0,06	0,07	0,08	0,09	0,10
	P6-P9	Carbon steel, low-alloy steel, cast steel	85-120	0,015	0,02	0,025	0,03	0,04	0,05	0,06	0,07	0,08
	P10-P12	Alloy steel, Tool steel, Tempered steel up to 38 HRC	70-100	0,015	0,02	0,025	0,03	0,035	0,04	0,05	0,055	0,06
	P13-P14	Ferritic steel, martensitic steel	60-90	0,01	0,015	0,02	0,025	0,03	0,035	0,04	0,045	0,05
M	M1-M2	Austenitic steel	60-90	0,01	0,015	0,02	0,025	0,03	0,035	0,04	0,045	0,05
	M3	Duplex steel	50-70	0,01	0,015	0,02	0,025	0,03	0,035	0,04	0,045	0,05
K	K1-K5	Grey cast iron	70-150	0,015	0,02	0,025	0,03	0,04	0,05	0,06	0,07	0,08
N	N1-N10	Aluminium alloys 1% < Si < 7%, Pure copper, low-alloyed copper	150-220	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12
		Aluminium alloys Si ≥ 7%	100-180	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07
		Duroplasts and Thermoplastics	100-300	0,05	0,06	0,07	0,08	0,10	0,11	0,12	0,14	0,15

Example of order

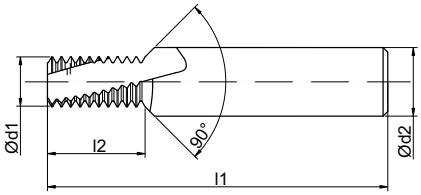
MI-41G100M-0050
Thread mill 2,3x6x5,3x58 P=0,5 VHM TS

Solid carbide thread mills with chamfering part

Metric coarse thread ISO DIN-13

VHM

TS



		IK		
				
Material groups	P M K N S H	P M K N S H		
Quality of material	VHM	VHM		
Coating	TS	TS		

P	M	MF	Ød$_1$	Ød$_2$	l$_1$	l$_2$	z	INDEX	INDEX		
0,5	M3	ø≥ 4	2,3	6	58,0	5,3	4	MI-41G1J0M-0050	-		
0,7	M4	ø≥ 5	3,1	6	58,0	7,1	4	MI-41G1J0M-0070	MI-41G1K0M-0070		
0,75		ø≥ 6	4,6	6	58,0	10,1	4	MI-41G1J0M-0075	MI-41G1K0M-0075		
0,8	M5	ø≥ 6	3,9	6	58,0	8,7	4	MI-41G1J0M-0080	MI-41G1K0M-0080		
1	M6	ø≥ 7	4,6	8	58,0	10,5	4	MI-41G1J0M-0100	MI-41G1K0M-0100		
1	M6	ø≥ 7	4,6	8	58,0	15,0	4	MI-41G1J0M-0100A	MI-41G1K0M-0100A		
1,25	M8	ø≥ 10	5,9	10	58,0	13,9	4	MI-41G1J0M-0125	MI-41G1K0M-0125		
1,25	M8	ø≥ 10	5,9	10	58,0	20,0	4	MI-41G1J0M-0125A	MI-41G1K0M-0125A		
1,5	M10	ø≥ 12	7,9	12	64,0	17,3	4	MI-41G1J0M-0150	MI-41G1K0M-0150		
1,5	M10	ø≥ 12	7,9	12	76,0	25,0	4	MI-41G1J0M-0150A	MI-41G1K0M-0150A		
1,75	M12	ø≥ 14	9,6	14	76,0	20,6	6	MI-61G1J0M-0175	MI-61G1K0M-0175		
1,75	M12	ø≥ 14	9,6	14	76,0	30,0	6	MI-61G1J0M-0175A	MI-61G1K0M-0175A		
2	M14		11,4	16	73,0	27,0	6	MI-61G1J0M-0200	MI-61G1K0M-0200		
2	M16	ø≥ 17	13,4	18	105,0	39,0	6	MI-61G1J0M-0200A	MI-61G1K0M-0200A		

ISO			Vc [m/min]	Feed [mm/tooth]								
				∅2	∅3	∅4	∅6	∅8	∅10	∅12	∅14	∅16
P	P1-P5	Constructional and carburizing steel	100-150	0,02	0,03	0,03	0,05	0,06	0,07	0,08	0,09	0,10
	P6-P9	Carbon steel, low-alloy steel, cast steel	85-120	0,015	0,02	0,025	0,03	0,04	0,05	0,06	0,07	0,08
	P10-P12	Alloy steel, Tool steel, Tempered steel up to 38 HRC	70-100	0,015	0,02	0,025	0,03	0,035	0,04	0,05	0,055	0,06
	P13-P14	Ferritic steel, martensitic steel	60-90	0,01	0,015	0,02	0,025	0,03	0,035	0,04	0,045	0,05
M	M1-M2	Austenitic steel	60-90	0,01	0,015	0,02	0,025	0,03	0,035	0,04	0,045	0,05
	M3	Duplex steel	50-70	0,01	0,015	0,02	0,025	0,03	0,035	0,04	0,045	0,05
K	K1-K5	Grey cast iron	70-150	0,015	0,02	0,025	0,03	0,04	0,05	0,06	0,07	0,08
N	N1-N10	Aluminium alloys 1% < Si < 7%, Pure copper, low-alloyed copper	150-220	0,03	0,04	0,04	0,06	0,07	0,08	0,09	0,11	0,12
		Aluminium alloys Si ≥ 7%	100-180	0,02	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07
		Duroplasts and Thermoplastics	100-300	0,05	0,06	0,07	0,08	0,10	0,11	0,12	0,14	0,15

Example of order

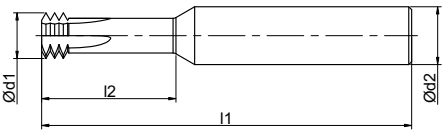
MI-41G1J0M-0070
Thread mill 3,1x6/90°x7,1x58 P=0,7 VHM TS

Metric coarse thread ISO DIN-13

HRC

VHM

TS



M04 - left hand cutting

Material groups	P M K N S H
Quality of material	VHM
Coating	TS

P	M	Ød$_1$	Ød$_2$	l$_1$	l$_2$	z	INDEX
0,5	M3	2,3	6	58	6,5	4	MI-40G9A2M-0050
		2,3	6	58	9,5	4	MI-40G9A2M-0050A
0,7	M4	3,1	6	58	9,0	4	MI-40G9A2M-0070
		3,1	6	58	12,5	4	MI-40G9A2M-0070A
0,8	M5	3,9	6	58	12,5	4	MI-40G9A2M-0080
		3,9	6	58	16,0	4	MI-40G9A2M-0080A
1	M6	4,6	6	58	14,0	4	MI-40G9A2M-0100
		4,6	6	58	20,0	4	MI-40G9A2M-0100A
1,25	M8	5,9	6	58	18,0	4	MI-40G9A2M-0125
		5,9	6	58	24,0	4	MI-40G9A2M-0125A
1,5	M10	7,9	8	64	23,0	4	MI-40G9A2M-0150
		7,9	8	64	32,2	4	MI-40G9A2M-0150A
1,75	M12	9,6	10	73	26,0	6	MI-60G9A2M-0175
		9,6	10	73	36,4	6	MI-60G9A2M-0175A
2	M16	11,4	12	84	35,0	6	MI-60G9A2M-0200
		11,4	12	84	49,0	6	MI-60G9A2M-0200A

ISO			Vc [m/min]	Feed [mm/tooth]						
				Ø2	Ø3	Ø4	Ø6	Ø8	Ø10	Ø12
P	P10-P12	Alloy steel, Tool steel, Tempered steel up to 38 HRC	70-100	0,02	0,03	0,04	0,05	0,06	0,07	0,08
	P13-P14	Ferritic steel, martensitic steel	60-90	0,02	0,03	0,03	0,04	0,05	0,06	0,06
M	M1-M2	Austenitic steel	60-90	0,02	0,03	0,03	0,04	0,05	0,06	0,06
	M3	Duplex steel	50-70	0,02	0,02	0,03	0,03	0,04	0,05	0,05
S	S1-S5	Nickel and its alloys	20-40	0,01	0,01	0,015	0,02	0,03	0,04	0,05
	S6-S8	Titanium and its alloys	30-50	0,01	0,01	0,015	0,02	0,03	0,04	0,05
H	H1	45-50HRC	55-70	0,015	0,02	0,03	0,04	0,05	0,06	0,07
	H2	50-55HRC	40-60	0,01	0,015	0,02	0,025	0,03	0,04	0,05
	H3	55-60HRC	35-50	0,01	0,01	0,015	0,02	0,025	0,035	0,04

Example of order

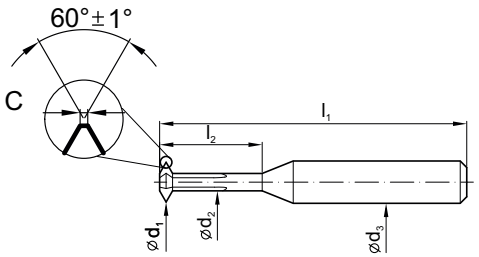
MI-40G9A2M-0050
Thread mill HRC 2,3x6x6,5x58 P=0,5 VHM TS

3

Universal thread mill for internal, external, left and right hand threads

VHM

AT

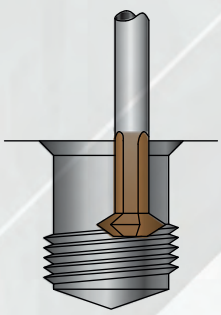


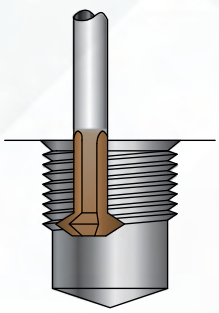
Material groups	P M K N S H
Quality of material	VHM
Coating	AT
Thread profile angle	60°

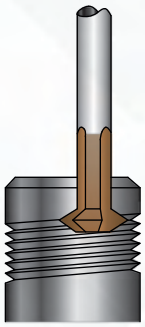
Thread	d_1	d_2	d_3	l_1	$l_{2\,min}$	C	INDEX
M1	0,71	0,39	3,0	39	3	0,015	MI-84V002-0100U
M2	1,50	0,99	3,0	39	6	0,020	MI-84V002-0200U
M3	2,30	1,62	6,0	66	9	0,030	MI-84V002-0300U
M4	3,10	2,19	6,0	66	12	0,040	MI-84V002-0400U
M5	4,00	2,98	6,0	66	15	0,050	MI-84V002-0500U
M6	4,80	3,55	6,0	75	18	0,070	MI-84V002-0600U
M8	6,50	4,96	8,0	80	22	0,080	MI-84V002-0800U
M10	7,90	6,07	8,0	80	26	0,090	MI-84V002-1000U

		Vc (m/min)	Feed [mm/tooth]				
			Ø1-Ø2	Ø3-Ø4	Ø6-Ø8	Ø10-Ø12	Ø16
P	Rm<500	70-90	0,010	0,012	0,015	0,020	0,030
	Rm<800	50-80	0,010	0,012	0,015	0,020	0,030
	Rm<1000	45-60	0,010	0,012	0,013	0,017	0,025
	Rm<1400	40-55	0,010	0,012	0,013	0,017	0,025
M		35-50	0,007	0,010	0,010	0,015	0,020
K		40-60	0,010	0,012	0,013	0,017	0,025
N		60-180	0,012	0,012	0,015	0,020	0,030
S		25-40	0,007	0,010	0,010	0,015	0,020

Practical example







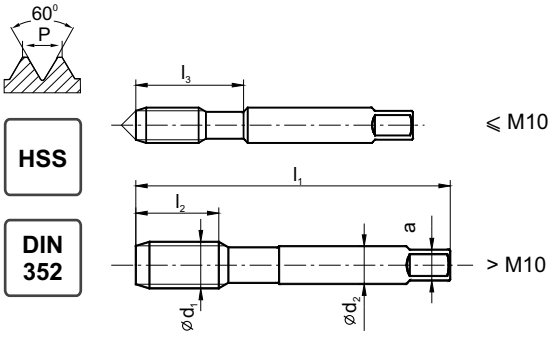
Example of order

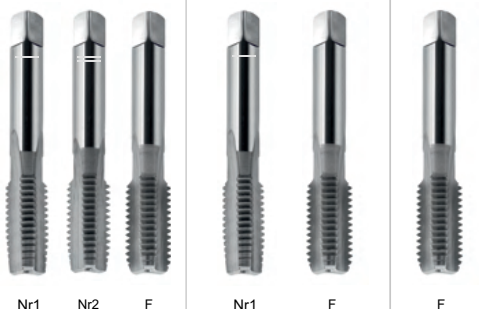
MI-84V002-0100U
Universal thread mill M1 0,71x0,39x3x3x39 VHM AT

HAND TAPS

HAND TAPS

ISO Metric coarse thread DIN-13





	KPL/3	KPL/2	F
Material groups	P	P	P
Hole type	< 2,5d	< 2,5d	< 2,5d
Quality of material	HSS	HSS	HSS
Coating			
Chamfer			~3P

M ⌀d_1	P	l_1	l_2	l_3	⌀d_2	a	d	Norm	DIN-352		
								Tol.	ISO1 (4H)		
								INDEX	A1-230002	A1-220002	E1-131002
M1	0,25	32,5	6,5	10,5	2,5	2,10	0,75	0010	○	-	-
M1,1	0,25	32,5	6,5	10,5	2,5	2,10	0,85	0011	○	-	-
M1,2	0,25	32,5	6,5	10,5	2,5	2,10	0,95	0012	○	-	-
M1,4	0,30	32,5	8,0	10,5	2,5	2,10	1,10	0014	○	-	-
								Tol.	ISO2 (6H)		
								INDEX	A1-230001	A1-220001	E1-131001
M1,6	0,35	41,0	9,0	10,5	2,5	2,10	1,25	0016	●	-	●
M1,7	0,35	41,0	9,0	10,5	2,5	2,10	1,35	0017	●	-	●
M1,8	0,35	41,0	9,0	10,5	2,5	2,10	1,45	0018	●	-	●
M2	0,40	36,0	10,0	10,0	2,8	2,10	1,60	0020	●	-	●
M2,2	0,45	36,0	9,0	13,0	2,8	2,10	1,75	0022	●	-	●
M2,3	0,40	36,0	9,0	13,0	2,8	2,10	1,90	0023	●	-	●
M2,5	0,45	40,0	9,0	15,0	2,8	2,10	2,05	0025	●	-	●
M2,6	0,45	40,0	9,0	15,0	2,8	2,10	2,15	0026	●	-	●
M3	0,50	40,0	11,0	18,0	3,5	2,70	2,50	0030	●	●	●
M3,5	0,60	45,0	13,0	21,0	4,0	3,00	2,90	0035	●	●	●
M4	0,70	45,0	13,0	21,0	4,5	3,40	3,30	0040	●	●	●
M4,5	0,75	50,0	16,0	25,0	6,0	4,90	3,70	0045	●	●	●
M5	0,80	52,0	16,0	26,0	6,0	4,90	4,20	0050	●	●	●
M6	1,00	56,0	18,0	27,0	6,0	4,90	5,00	0060	●	●	●
M7	1,00	56,0	18,0	-	6,0	4,90	6,00	0070	●	●	●
M8	1,25	63,0	20,0	-	6,0	4,90	6,80	0080	●	●	●
M9	1,25	63,0	20,0	-	7,0	5,50	7,80	0090	●	●	●
M10	1,50	70,0	22,0	-	7,0	5,50	8,50	0100	●	●	●
M11	1,50	70,0	22,0	-	8,0	6,20	9,50	0110	●	●	●
M12	1,75	80,0	24,0	-	9,0	7,00	10,20	0120	●	●	●
M14	2,00	80,0	26,0	-	11,0	9,00	12,00	0140	●	●	●
M16	2,00	80,0	27,0	-	12,0	9,00	14,00	0160	●	●	●
M18	2,50	95,0	30,0	-	14,0	11,00	15,50	0180	●	●	●
M20	2,50	95,0	32,0	-	16,0	12,00	17,50	0200	●	●	●
M22	2,50	100,0	32,0	-	18,0	14,50	19,50	0220	●	●	●
M24	3,00	110,0	34,0	-	18,0	14,50	21,00	0240	●	○	●
M27	3,00	110,0	36,0	-	20,0	16,00	24,00	0270	●	○	●

Example of order

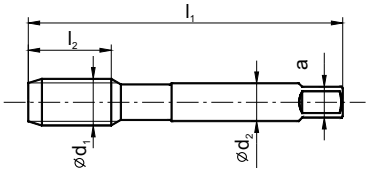
A1-230001-0060
KPL/3 M6-6H DIN-352 HSS

● **Available from stock**
○ **On request**

ISO Metric coarse thread DIN-13

HSS

DIN 352



	KPL/3	KPL/2	F
	 Nr1 Nr2 F	 Nr1 F	 F
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS	HSS
Coating			
Chamfer			~3P

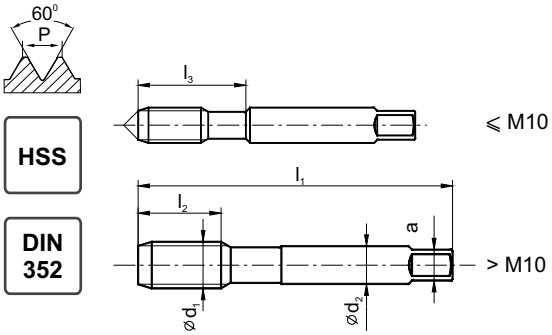
M ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-352		
								Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
								INDEX	A1-230001	A1-220001	E1-131001
M30	3,5	125	40	-	22	18	26,5	0300	●	-	●
M33	3,5	125	40	-	25	20	29,5	0330	●	-	●
M36	4,0	150	50	-	28	22	32,0	0360	●	-	●
M39	4,0	150	50	-	32	24	35,0	0390	●	-	●
M42	4,5	150	56	-	32	24	37,5	0420	●	-	●
M45	4,5	160	58	-	36	29	40,5	0450	●	-	●
M48	5,0	180	65	-	36	29	43,0	0480	●	-	●
M52	5,0	180	65	-	40	32	47,0	0520	●	-	●
M56	5,5	200	75	-	45	35	50,5	0560	○	-	○
M60	5,5	200	70	-	45	35	54,5	0600	○	-	○
M64	6,0	220	75	-	50	39	58,0	0640	○	-	○
M68	6,0	220	75	-	50	39	62,0	0680	○	-	○

Example of order

A1-230001-0420
KPL/3 M42-6H DIN-352 HSS

● **Available from stock**
○ **On request**

ISO Metric coarse thread DIN-13



	KPL/3-LH	KPL/2-LH	F-LH
			
	Nr1 Nr2 F	Nr1 F	F
	LH	LH	LH
Material groups	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS	HSS
Coating			
Chamfer			~3P

M ⌀d_1	P	l_1	l_2	l_3	⌀d_2	a	d	Norm	DIN-352		
								Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
								INDEX	A1-270001	A1-260001	E1-231001
M3	0,50	40	11	18	3,5	2,7	2,5	0030	●	●	●
M3,5	0,60	45	13	21	4,0	3,0	2,9	0035	○	○	○
M4	0,70	45	13	21	4,5	3,4	3,3	0040	●	●	●
M4,5	0,75	50	16	25	6,0	4,9	3,7	0045	○	○	○
M5	0,80	52	16	26	6,0	4,9	4,2	0050	●	●	●
M6	1,00	56	18	27	6,0	4,9	5,0	0060	●	●	●
M7	1,00	56	18	-	6,0	4,9	6,0	0070	○	○	○
M8	1,25	63	20	-	6,0	4,9	6,8	0080	●	●	●
M9	1,25	63	20	-	7,0	5,5	7,8	0090	○	○	○
M10	1,50	70	22	-	7,0	5,5	8,5	0100	●	●	●
M11	1,50	70	22	-	8,0	6,2	9,5	0110	○	○	○
M12	1,75	80	24	-	9,0	7,0	10,2	0120	●	●	●
M14	2,00	80	26	-	11,0	9,0	12,0	0140	○	○	○
M16	2,00	80	27	-	12,0	9,0	14,0	0160	●	●	●
M18	2,50	95	30	-	14,0	11,0	15,5	0180	○	○	○
M20	2,50	95	32	-	16,0	12,0	17,5	0200	●	●	●
M22	2,50	100	32	-	18,0	14,5	19,5	0220	○	○	○
M24	3,00	110	34	-	18,0	14,5	21,0	0240	○	○	○
M27	3,00	110	36	-	20,0	16,0	24,0	0270	○	○	○
M30	3,50	125	40	-	22,0	18,0	26,5	0300	○	○	○
M33	3,50	125	40	-	25,0	20,0	29,5	0330	○	○	○
M36	4,00	150	50	-	28,0	22,0	32,0	0360	○	○	○
M39	4,00	150	50	-	32,0	24,0	35,0	0390	○	○	○
M42	4,50	150	56	-	32,0	24,0	37,5	0420	○	○	○
M45	4,50	160	58	-	36,0	29,0	40,5	0450	○	○	○
M48	5,00	180	65	-	36,0	29,0	43,0	0480	○	○	○
M52	5,00	180	65	-	40,0	32,0	47,0	0520	○	○	○
M56	5,50	200	75	-	40,0	32,0	50,5	0560	○	○	○
M60	5,50	200	70	-	45,0	35,0	54,5	0600	○	○	○
M64	6,00	220	75	-	50,0	39,0	58,0	0640	○	○	○
M68	6,00	220	75	-	50,0	39,0	62,0	0680	○	○	○

Example of order

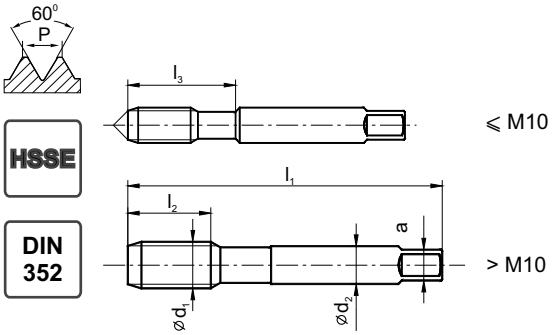
A1-270001-0270
KPL/3 M27-LH-6H DIN-352 HSS

● **Available from stock**
○ **On request**

ISO Metric coarse thread DIN-13

INOX

	KPL/3-P	F		
	 Nr1-P Nr2 F	F		
Material groups	P M K N S H	P M K N S H		
Hole type	 < 2,5d	 < 2,5d		
Quality of material	HSSE	HSSE		
Coating				
Chamfer		~3P		



HSSE

DIN 352

⩽ M10

> M10

M Ød1	P	l1	l2	l3	Ød2	a	d	Norm	DIN-352			
								Tol.	6HX	6HX		
								INDEX	A2-235801	A2-203801		
M2	0,40	36	10	10	2,8	2,1	1,6	0020	●	●		
M2,5	0,45	40	10	10	2,8	2,1	2,05	0025	●	●		
M3	0,50	40	10	18	3,5	2,7	2,5	0030	●	●		
M3,5	0,60	45	11	20	4,0	3,0	2,9	0035	○	○		
M4	0,70	45	12	21	4,5	3,4	3,3	0040	●	●		
M4,5	0,75	50	13	24	6,0	4,9	3,7	0045	○	○		
M5	0,80	52	14	25	6,0	4,9	4,2	0050	●	●		
M6	1,00	56	16	27	6,0	4,9	5,0	0060	●	●		
M8	1,25	63	22	-	6,0	4,9	6,8	0080	●	●		
M10	1,50	70	22	-	7,0	5,5	8,5	0100	●	●		
M12	1,75	80	24	-	9,0	7,0	10,2	0120	●	●		
M14	2,00	80	32	-	11,0	9,0	12,0	0140	●	●		
M16	2,00	80	32	-	12,0	9,0	14,0	0160	●	●		
M18	2,50	95	40	-	14,0	11,0	15,5	0180	●	●		
M20	2,50	95	40	-	16,0	12,0	17,5	0200	●	●		
M22	2,50	100	40	-	18,0	14,5	19,5	0220	●	●		
M24	3,00	110	50	-	18,0	14,5	21,0	0240	●	●		

Example of order

A2-235801-0080
KPL/3 INOX M8-6HX DIN-352 HSSE

● **Available from stock**
○ **On request**

ISO Metric coarse thread DIN-13

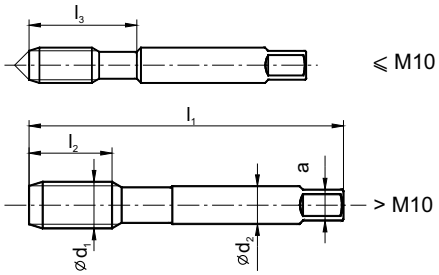
INOX

	KPL/3-P	F		
Material groups	P M K N S H	P M K N S H		
Hole type	< 2,5d	< 2,5d		
Quality of material	HSSE	HSSE		
Coating	TN2	TN2		
Chamfer		~3P		

HSSE

TN2

DIN 352



M ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-352			
								Tol.	6HX	6HX		
								INDEX	A2-235831	A2-203831		
M2	0,40	36	10	10	2,8	2,1	1,6	0020	●	●		
M2,5	0,45	40	10	10	2,8	2,1	2,05	0025	●	●		
M3	0,50	40	10	18	3,5	2,7	2,5	0030	●	●		
M3,5	0,60	45	11	20	4,0	3,0	2,9	0035	○	○		
M4	0,70	45	12	21	4,5	3,4	3,3	0040	●	●		
M4,5	0,75	50	13	24	6,0	4,9	3,7	0045	○	○		
M5	0,80	52	14	25	6,0	4,9	4,2	0050	●	●		
M6	1,00	56	16	27	6,0	4,9	5,0	0060	●	●		
M8	1,25	63	22	-	6,0	4,9	6,8	0080	●	●		
M10	1,50	70	22	-	7,0	5,5	8,5	0100	●	●		
M12	1,75	80	24	-	9,0	7,0	10,2	0120	●	●		
M14	2,00	80	32	-	11,0	9,0	12,0	0140	●	●		
M16	2,00	80	32	-	12,0	9,0	14,0	0160	●	●		
M18	2,50	95	40	-	14,0	11,0	15,5	0180	●	●		
M20	2,50	95	40	-	16,0	12,0	17,5	0200	●	●		
M22	2,50	100	40	-	18,0	14,5	19,5	0220	●	●		
M24	3,00	110	50	-	18,0	14,5	21,0	0240	●	●		

Example of order

A2-235831-0080
KPL/3 INOX M8-6HX DIN-352 HSSE TN2

● **Available from stock**
○ **On request**

ISO Metric coarse thread DIN-13

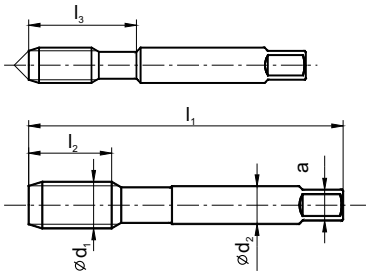
HRC40

	KPL/3-P	F		
	 Nr1-P Nr2 F	F		
Material groups	P M K N S H	P M K N S H		
Hole type	 < 1,5d	 < 1,5d		
Quality of material	HSSE-PM	HSSE-PM		
Coating	TS	TS		
Chamfer		~3P		

HSSE PM

TS

DIN 352



⩽ M10

> M10

M ⌀d_1	P	l_1	l_2	l_3	⌀d_2	a	d	Norm	~DIN-352	
								Tol.	6HX	6HX
								INDEX	A4-235D51	A4-203D51
M3	0,50	40	10	-	3,5	2,7	2,5	0030	●	●
M4	0,70	50	13	-	6,0	4,9	3,3	0040	●	●
M5	0,80	50	16	-	6,0	4,9	4,2	0050	●	●
M6	1,00	56	19	-	6,0	4,9	5,0	0060	●	●
M8	1,25	63	22	-	6,0	4,9	6,8	0080	●	●
M10	1,50	70	25	-	7,0	5,5	8,5	0100	●	●
M12	1,75	80	30	-	9,0	7,0	10,2	0120	●	●
M16	2,00	80	32	-	12,0	9,0	14,0	0160	●	●
M20	2,50	95	40	-	16,0	12,0	17,5	0200	○	○

Taps set HRC40 suitable for hardened steels up to 40HRC

Instruction of proper use HRC40 taps:

1. Maximum threading depth 1,5xD
2. Rigourosly respect sequence of tapping procedure for hand taps sets using tap numbers in corect order
3. Plese use only high qualiy cutting fluids (for example TEREBOR distributed by FANAR)
4. Carefully clear each tap from chips before next usage
5. Do not reverse the tap revolution before reach full depth of cut)

Taps F suitable for thread shape correction after hardening processor material galvanizing operations

Instruction of proper use F taps:

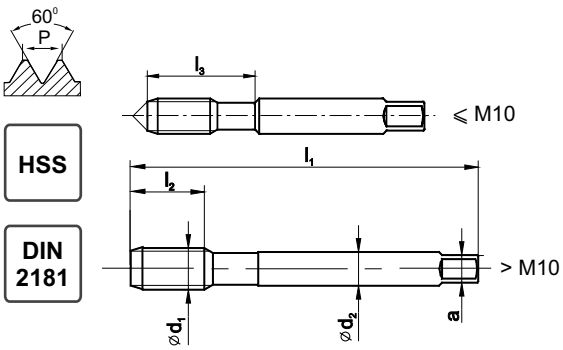
1. Please clean the threaded hole from mechanical impurities
2. Moisten bothe the tap and the hole with good quality tapping fluid (for example CIMTAP, TEREBOR or machine oil)
3. Enter tap into a hole by hand and make thread correction
4. Carefully clear each tap from chips before next usage

Example of order

A4-235D51-0040
KPL/3-P HRC40 M4-6HX DIN-352 HSSE-PM TS

● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13



	KPL/2	F	KPL/2-LH	F-LH
	 Nr1 F	 F	 Nr1 F LH	 F LH
Material groups	P	P	P	P
Hole type	 < 2,5d	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS	HSS	HSS
Coating				
Chamfer		~3P		~3P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-2181			
								Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
								INDEX	A1-220001	E1-131001	A1-260001	E1-231001
M4x0,5	0,50	45	10	18,0	4,5	3,4	3,5	0041	●	●	○	○
M4,5x0,5	0,50	50	12	22,0	6,0	4,9	4,0	0046	○	○	○	○
M5x0,5	0,50	52	13	22,0	6,0	4,9	4,5	0051	●	●	○	○
M5,5x0,5	0,50	56	13	24,0	6,0	4,9	5,0	0056	○	○	○	○
M6x0,75	0,75	56	14	24,0	6,0	4,9	5,2	0062	●	●	○	○
M7x0,75	0,75	56	14	-	6,0	4,9	6,2	0072	○	○	○	○
M8x0,75	0,75	63	14	-	6,0	4,9	7,2	0082	●	●	○	○
M8x1	1,00	63	17	-	6,0	4,9	7,0	0083	●	●	●	●
M9x0,75	0,75	63	14	-	7,0	5,5	8,2	0092	○	○	○	○
M9x1	1,00	63	17	-	7,0	5,5	8,0	0093	○	○	○	○
M10x0,75	0,75	63	18	-	7,0	5,5	9,2	0102	○	○	○	○
M10x1	1,00	63	18	-	7,0	5,5	9,0	0103	●	●	●	●
M10x1,25	1,25	70	22	-	7,0	5,5	8,8	0104	●	●	●	●
M11x0,75	0,75	63	18	-	8,0	6,2	10,2	0112	○	○	○	○
M11x1	1,00	63	18	-	8,0	6,2	10,0	0113	○	○	○	○
M12x1	1,00	70	18	-	9,0	7,0	11,0	0123	●	●	●	●
M12x1,25	1,25	70	20	-	9,0	7,0	10,8	0124	●	●	●	●
M12x1,5	1,50	70	20	-	9,0	7,0	10,5	0125	●	●	○	○
M14x1	1,00	70	18	-	11,0	9,0	13,0	0143	●	●	○	○
M14x1,25	1,25	70	22	-	11,0	9,0	12,8	0144	●	●	○	○
M14x1,5	1,50	70	22	-	11,0	9,0	12,5	0145	●	●	●	●
M15x1	1,00	70	18	-	12,0	9,0	14,0	0153	○	○	○	○
M15x1,5	1,50	70	22	-	12,0	9,0	13,5	0155	○	○	○	○
M16x1	1,00	80	18	-	12,0	9,0	15,0	0163	●	●	●	●
M16x1,25	1,25	80	18	-	12,0	9,0	14,8	0164	○	○	○	○
M16x1,5	1,50	80	22	-	12,0	9,0	14,5	0165	●	●	○	○
M17x1	1,00	80	18	-	12,0	9,0	16,0	0173	○	○	○	○
M17x1,5	1,50	80	22	-	12,0	9,0	15,5	0175	○	○	○	○
M18x1	1,00	80	18	-	14,0	11,0	17,0	0183	●	●	○	○
M18x1,5	1,50	80	22	-	14,0	11,0	16,5	0185	●	●	●	●
M18x2	2,00	80	22	-	14,0	11,0	16,0	0186	●	●	○	○
M20x1	1,00	80	18	-	16,0	12,0	19,0	0203	●	●	○	○
M20x1,5	1,50	80	22	-	16,0	12,0	18,5	0205	●	●	●	●
M20x2	2,00	80	22	-	16,0	12,0	18,0	0206	●	●	○	○
M22x1	1,00	80	18	-	18,0	14,5	21,0	0223	●	●	○	○

Example of order

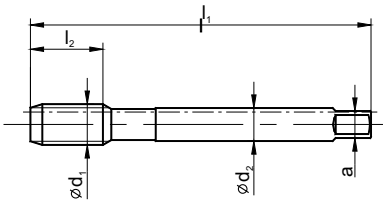
A1-220001-0083
KPL/2 M8x1-6H DIN-2181 HSS

● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

HSS

DIN 2181



	KPL/2	F	KPL/2-LH	F-LH
	 Nr1 F	 F	 Nr1 F LH	 F LH
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS	HSS	HSS
Coating				
Chamfer		~3P		~3P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a		Norm	DIN-2181			
								Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
								INDEX	A1-220001	E1-131001	A1-260001	E1-231001
M22x1,5	1,5	80	22	-	18	14,5	20,5	0225	●	●	●	●
M22x2	2,0	80	22	-	18	14,5	20,0	0226	●	●	○	○
M24x1	1,0	90	18	-	18	14,5	23,0	0243	●	●	●	●
M24x1,5	1,5	90	22	-	18	14,5	22,5	0245	●	●	○	○
M24x2	2,0	90	22	-	18	14,5	22,0	0246	●	●	○	○
M25x1	1,0	90	18	-	18	14,5	24,0	0253	○	○	○	○
M25x1,5	1,5	90	22	-	18	14,5	23,5	0255	○	○	○	○
M25x2	2,0	90	22	-	18	14,5	23,0	0256	○	○	○	○
M26x1,5	1,5	90	22	-	18	14,5	24,5	0265	○	○	○	○
M27x1	1,0	90	22	-	20	16,0	26,0	0273	○	○	○	○
M27x1,5	1,5	90	22	-	20	16,0	25,5	0275	●	●	○	○
M27x2	2,0	90	22	-	20	16,0	25,0	0276	●	●	○	○
M28x1	1,0	90	20	-	20	16,0	27,0	0283	○	○	○	○
M28x1,5	1,5	90	22	-	20	16,0	26,5	0285	●	●	○	○
M28x2	2,0	90	22	-	20	16,0	26,0	0286	○	○	○	○
M30x1	1,0	90	18	-	22	18,0	29,0	0303	○	○	○	○
M30x1,5	1,5	90	22	-	22	18,0	28,5	0305	●	●	○	○
M30x2	2,0	90	22	-	22	18,0	28,0	0306	●	●	○	○
M30x3	3,0	125	36	-	22	18,0	27,0	0307	●	○	○	○
M32x1,5	1,5	90	22	-	22	18,0	30,5	0325	○	○	○	○
M32x2	2,0	90	22	-	22	18,0	30,0	0326	○	○	○	○
M33x1,5	1,5	100	25	-	25	20,0	31,5	0335	●	●	○	○
M33x2	2,0	100	25	-	25	20,0	31,0	0336	●	●	○	○
M33x3	3,0	125	36	-	25	20,0	30,0	0337	●	●	○	○
M35x1,5	1,5	100	25	-	28	22,0	33,5	0355	○	○	○	○
M36x1,5	1,5	100	25	-	28	22,0	34,5	0365	○	○	○	○
M36x2	2,0	125	30	-	28	22,0	34,0	0366	○	○	○	○
M36x3	3,0	125	36	-	28	22,0	33,0	0367	○	○	○	○
M38x1,5	1,5	100	25	-	28	22,0	36,5	0385	○	○	○	○
M39x1,5	1,5	110	25	-	32	24,0	37,5	0395	○	○	○	○
M39x2	2,0	125	30	-	32	24,0	37,0	0396	○	○	○	○
M39x3	3,0	125	36	-	32	24,0	36,0	0397	○	○	○	○
M40x1,5	1,5	110	25	-	32	24,0	38,5	0405	○	○	○	○
M40x2	2,0	125	30	-	32	24,0	38,0	0406	●	●	○	○
M40x3	3,0	125	36	-	32	24,0	37,0	0407	○	○	○	○

Example of order

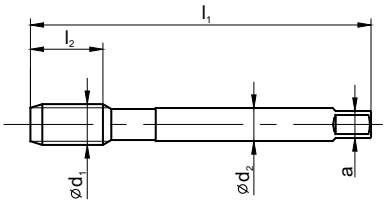
A1-220001-0225
KPL/2 M22x1,5-6H DIN-2181 HSS

● **Available from stock**
○ **On request**

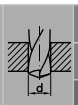
ISO Metric fine thread DIN-13

HSS

DIN 2181



	KPL/2	F	KPL/2-LH	F-LH
	 Nr1 F	 F	 Nr1 F LH	 F LH
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS	HSS	HSS
Coating				
Chamfer		~3P		~3P

MF ∅d_1	P	l_1	l_2	l_3	∅d_2	a		Norm	DIN-2181			
								Tol.	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)	ISO2 (6H)
								INDEX	A1-220001	E1-131001	A1-260001	E1-231001
M42x1,5	1,5	110	25	-	32	24	40,5	0425	●	●	○	○
M42x2	2,0	125	30	-	32	24	40,0	0426	○	○	○	○
M42x3	3,0	125	36	-	32	24	39,0	0427	●	●	○	○
M42x4	4,0	150	50	-	32	24	38,0	0428	○	○	○	○
M45x1,5	1,5	110	25	-	36	29	43,5	0455	●	●	○	○
M45x2	2,0	125	30	-	36	29	43,0	0456	○	○	○	○
M45x3	3,0	125	36	-	36	29	42,0	0457	●	●	○	○
M45x4	4,0	160	50	-	36	29	41,0	0458	○	○	○	○
M48x1,5	1,5	140	25	-	36	29	46,5	0485	○	○	○	○
M48x2	2,0	140	30	-	36	29	46,0	0486	○	○	○	○
M48x3	3,0	140	36	-	36	29	45,0	0487	○	○	○	○
M48x4	4,0	180	55	-	36	29	44,0	0488	○	○	○	○
M50x1,5	1,5	140	25	-	36	29	48,5	0505	●	●	○	○
M50x2	2,0	140	36	-	36	29	48,0	0506	○	○	○	○
M50x3	3,0	140	36	-	36	29	47,0	0507	●	●	○	○
M52x1,5	1,5	140	25	-	40	32	50,5	0525	●	●	○	○
M52x2	2,0	140	36	-	40	32,0	50,00	0526	○	○	○	○
M52x3	3,0	140	36	-	40	32,0	49,00	0527	●	●	○	○
M52x4	4,0	180	55	-	40	32,0	48,00	0528	○	○	○	○

4

Example of order

A1-220001-0425
KPL/2 M42x1,5-6H DIN-2181 HSS

● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

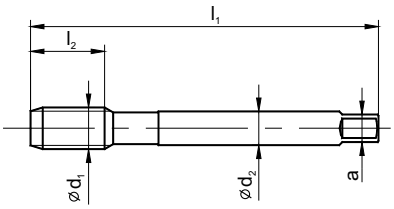
HRC40

KPL/2 | F

HSSE PM

TS

DIN 2181



Material groups	P M K N S H	P M K N S H
Hole type	 < 1,5d	 < 1,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	TS	TS
Chamfer		~3P

M ∅d_1	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-2181	
								Tol.	6HX	6HX
								INDEX	A4-225D51	A4-202D51
M8x1	1,0	63	18	-	6	4,9	7,0	0083	●	○
M10x1	1,0	63	18	-	7	5,5	9,0	0103	●	●
M12x1,5	1,5	70	20	-	9	7,0	10,5	0125	●	●
M16x1,5	1,5	70	22	-	12	9,0	14,5	0165	●	●

Taps set HRC40 suitable for hardened steels up to 40HRC

Instruction of proper use HRC40 taps:

1. Maximum threading depth 1,5xD
2. Rigourosly respect sequence of tapping procedure for hand taps sets using tap numbers in corect order
3. Plese use only high qualiy cutting fluids (for example TEREBOR distributed by FANAR)
4. Carefully clear each tap from chips before next usage
5. Do not reverse the tap revolution before reach full depth of cut)

Taps F suitable for thread shape correction after hardening processor material galvanizing operations

Instruction of proper use F taps:

1. Please clean the threaded hole from mechanical impurities
2. Moisten bothe the tap and the hole with good quality tapping fluid (for example CIMTAP, TEREBOR or machine oil)
3. Enter tap into a hole by hand and make thread correction
4. Carefully clear each tap from chips before next usage

Example of order

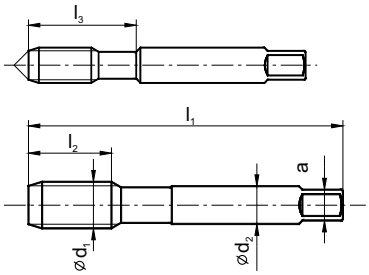
A4-225D51-0083
KPL/2 HRC40 M10x1-6HX DIN-2181 HSSE-PM TS

● **Available from stock**
○ **On request**

American unified coarse thread UNC, ANSI B-1.1

HSS

DIN 352



	KPL/3	F
	 Nr1 Nr2 F	 F
Material groups	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS
Coating		
Chamfer		~3P

UNC	Ød1	1"/P	P	l1	l2	l3	Ød2	a	d	Norm	DIN-352	
										Tol.	2B	2B
										INDEX	A1-230001	E1-131001
No2-56	2,184	56	0,454	36	10	10	2,8	2,1	1,85	4102	○	○
No4-40	2,844	40	0,635	40	10	18	3,5	2,7	2,35	4104	●	●
No5-40	3,175	40	0,640	42	10	18	3,5	2,7	2,65	4105	●	●
No6-32	3,505	32	0,794	45	11	18	4,0	3,0	2,85	4106	●	●
No8-32	4,166	32	0,794	48	12	23	4,5	3,4	3,50	4108	●	●
No10-24	4,826	24	1,058	52	14	26	6,0	4,9	3,90	4110	●	●
No12-24	5,486	24	1,058	56	16	27	6,0	4,9	4,50	4112	○	○
1/4-20	6,350	20	1,270	56	16	27	6,0	4,9	5,10	4127	●	●
5/16-18	7,938	18	1,411	63	20	-	6,0	4,9	6,60	4128	●	●
3/8-16	9,525	16	1,588	70	22	-	7,0	5,5	8,00	4129	●	●
7/16-14	11,112	14	1,814	70	22	-	8,0	6,2	9,40	4130	●	●
1/2-13	12,700	13	1,954	80	25	-	9,0	7,0	10,80	4131	●	●
9/16-12	14,288	12	2,117	80	26	-	11,0	9,0	12,20	4132	○	○
5/8-11	15,875	11	2,309	80	27	-	12,0	9,0	13,50	4133	●	●
3/4-10	19,050	10	2,540	95	30	-	14,0	11,0	16,50	4135	●	●
7/8-9	22,225	9	2,822	100	32	-	18,0	14,5	19,50	4137	●	●
1-8	25,400	8	3,175	110	36	-	18,0	14,5	22,25	4139	●	●
1.1/8-7	28,575	7	3,629	125	40	-	22,0	18,0	25,00	4141	○	○
1.1/4-7	31,750	7	3,629	125	40	-	22,0	18,0	28,00	4143	○	○
1.3/8-6	34,925	6	4,233	150	50	-	28,0	22,0	30,75	4145	○	○
1.1/2-6	38,100	6	4,233	150	50	-	28,0	22,0	34,00	4147	○	○
1.3/4-5	44,450	5	5,080	160	58	-	36,0	29,0	39,50	4151	○	○
2-4.1/2	50,800	4 1/2	5,645	180	70	-	40,0	32,0	45,00	4155	○	○

Example of order

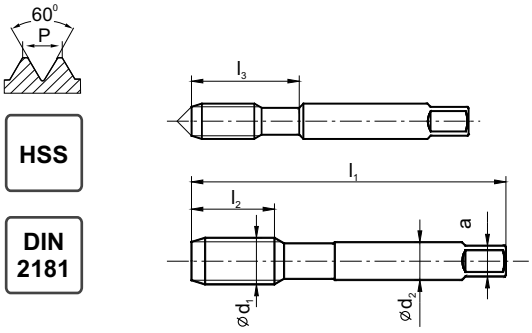
A1-230001-4104
KPL/3 No 4-40 UNC 2B DIN-352 HSS

● **Available from stock**
○ **On request**

American unified fine thread UNF, ANSI B-1.1

HSS

DIN 2181



	KPL/2	F
Material groups	P M K N S H	P M K N S H
Hole type	< 2,5d	< 2,5d
Quality of material	HSS	HSS
Coating		
Chamfer		~3P

UNF	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-2181	
										Tol.	2B	2B
										INDEX	A1-220001	E1-131001
No 5-44	3,175	44	0,577	42	10	18	3,5	2,7	2,70	4205	○	○
No 6-40	3,505	40	0,635	45	11	18	4,0	3,0	2,95	4206	○	○
No 8-36	4,166	36	0,705	48	12	23	4,5	3,4	3,50	4208	○	○
No 10-32	4,826	32	0,794	52	14	22	6,0	4,9	4,10	4210	●	●
No 12-28	5,486	28	0,907	56	16	24	6,0	4,9	4,60	4212	○	○
1/4-28	6,350	28	0,907	56	16	24	6,0	4,9	5,50	4227	●	●
5/16-24	7,938	24	1,058	63	17	-	6,0	4,9	6,90	4228	○	○
3/8-24	9,525	24	1,058	63	18	-	7,0	5,5	8,50	4229	●	●
7/16-20	11,112	20	1,270	70	20	-	8,0	6,2	9,90	4230	●	●
1/2-20	12,700	20	1,270	70	20	-	9,0	7,0	11,50	4231	●	●
9/16-18	14,288	18	1,411	80	20	-	12,0	9,0	12,90	4232	●	○
5/8-18	15,875	18	1,411	80	22	-	12,0	9,0	14,50	4233	○	○
3/4-16	19,050	16	1,588	80	22	-	14,0	11,0	17,50	4235	●	●
7/8-14	22,225	14	1,814	80	22	-	18,0	14,5	20,40	4237	○	○
1-12	25,400	12	2,117	90	22	-	18,0	14,5	23,25	4239	●	●
1.1/8-12	28,575	12	2,117	90	22	-	22,0	18,0	26,50	4241	○	○
1.1/4-12	31,750	12	2,117	90	22	-	22,0	18,0	29,50	4243	○	○
1.3/8-12	34,925	12	2,117	125	36	-	28,0	22,0	32,75	4245	○	○
1.1/2-12	38,100	12	2,117	125	36	-	28,0	22,0	36,00	4247	○	○

Example of order

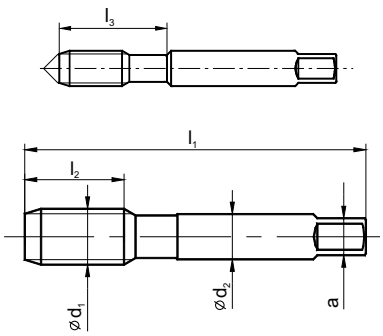
A1-220001-4210
KPL/2 No 10-32 UNF 2B DIN-2128 HSS

● **Available from stock**
○ **On request**

Whitworth pipe thread G, DIN-ISO 228

HSS

DIN 5157



	KPL/2	F	KPL/2-LH	F-LH
	 Nr1 F	 F	 Nr1 F LH	 F LH
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS	HSS	HSS
Coating				
Chamfer		~3P		~3P

G	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-5157			
										Tol.				
										INDEX	A1-220001	E1-131001	A1-260001	E1-231001
G1/16	7,723	28	0,907	63	18	-	6	4,9	6,80	3121	○	○	○	○
G1/8	9,728	28	0,907	63	20	-	7	5,5	8,80	3123	●	●	○	○
G1/4	13,157	19	1,337	70	22	-	11	9,0	11,80	3127	●	●	○	○
G3/8	16,662	19	1,337	70	22	-	12	9,0	15,25	3129	●	●	●	●
G1/2	20,955	14	1,814	80	22	-	16	12,0	19,00	3131	●	●	●	●
G5/8	22,911	14	1,814	80	22	-	18	14,5	21,00	3133	●	●	○	○
G3/4	26,441	14	1,814	90	22	-	20	16,0	24,50	3135	●	●	●	●
G7/8	30,201	14	1,814	90	22	-	22	18,0	28,25	3137	●	●	○	○
G1	33,249	11	2,309	100	25	-	25	20,0	30,75	3139	●	●	●	●
G1.1/8	37,897	11	2,309	125	36	-	28	22,0	35,50	3141	○	○	○	○
G1.1/4	41,910	11	2,309	125	36	-	32	24,0	39,50	3143	●	●	○	○
G1.3/8	44,323	11	2,309	125	36	-	36	29,0	41,75	3145	○	○	○	○
G1.1/2	47,803	11	2,309	140	40	-	36	29,0	45,25	3147	●	●	○	○
G1.3/4	53,769	11	2,309	140	40	-	40	32,0	51,00	3151	○	○	○	○
G2	59,614	11	2,309	160	40	-	45	35,0	57,00	3155	○	○	○	○

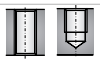
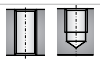
Example of order

A1-220001-3123
KPL/2 G-1/8" DIN-5157 HSS

● **Available from stock**
○ **On request**

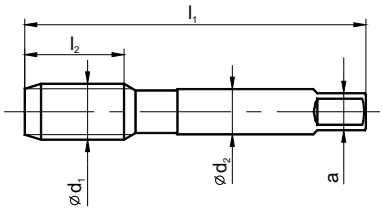
Whitworth pipe thread G, DIN-ISO 228

INOX

	KPL/2	F		
	 Nr1 F	 F		
Material groups	P M K N S H	P M K N S H		
Hole type	 < 1.5d	 < 1.5d		
Quality of material	HSSE	HSSE		
Coating				
Chamfer		~3P		

HSSE

DIN 5157



G	∅d_1	1"/P	P	l_1	l_2	∅d_2	a	d	Norm	DIN-5157			
									Tol.				
									INDEX	A2-225801	A2-202801		
G-1/8"	9,728	28	0,907	63	20	7	5,5	8,8	3123	○	○		
G-1/4"	13,157	19	1,337	70	22	11	9	11,8	3127	○	○		
G-3/8"	16,662	19	1,337	70	22	12	9	15,25	3129	○	○		
G-1/2"	20,955	14	1,814	80	22	16	12	19,0	3131	○	○		

Example of order

A2-225801-3123
KPL/2 G-1/8" DIN-5157 HSSE

● **Available from stock**
○ **On request**

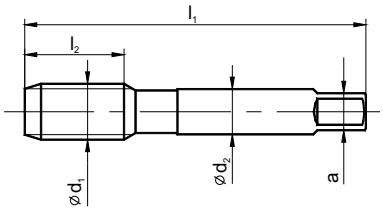
Whitworth pipe thread G, DIN-ISO 228

HRC40

HSSE PM

TS

DIN 5157



	KPL/2	F
	Nr1 F	F
Material groups	P M K N S H	P M K N S H
Hole type	< 1,5d	< 1,5d
Quality of material	HSSE-PM	HSSE-PM
Coating	TS	TS
Chamfer		~3P

G	Ød1	1"/P	P	l1	l2	Ød2	a	d	Norm	DIN-5157	
									Tol.		
									INDEX	A4-225D51	A4-202D51
G-1/8"	9,728	28	0,907	63	20	7,0	5,5	8,80	3123	●	●
G-1/4"	13,157	19	1,337	70	22	11,0	9,0	11,80	3127	●	●
G-3/8"	16,662	19	1,337	70	22	12,0	9,0	15,25	3129	●	●
G-1/2"	20,955	14	1,814	80	22	16,0	12,0	19,00	3131	●	●

Taps set HRC40 suitable for hardened steels up to 40HRC

Instruction of proper use HRC40 taps:

1. Maximum threading depth 1,5xD
2. Rigourosly respect sequence of tapping procedure for hand taps sets using tap numbers in corect order
3. Plese use only high qualiy cutting fluids (for example TEREBOR distributed by FANAR)
4. Carefully clear each tap from chips before next usage
5. Do not reverse the tap revolution before reach full depth of cut)

Taps F suitable for thread shape correction after hardening processor material galvanizing operations

Instruction of proper use F taps:

1. Please clean the threaded hole from mechanical impurities
2. Moisten bothe the tap and the hole with good quality tapping fluid (for example CIMTAP, TEREBOR or machine oil)
3. Enter tap into a hole by hand and make thread correction
4. Carefully clear each tap from chips before next usage

Example of order

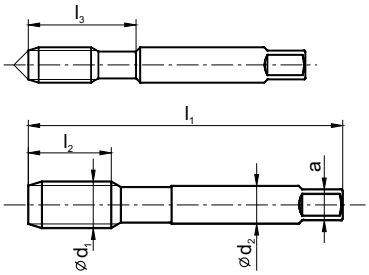
A4-225D51-3123
KPL/2 HRC40 G-1/8" DIN-5157 HSSE-PM TS

● **Available from stock**
○ **On request**

British Whitworth fine thread BSF, BS-84:1956

HSS

DIN 352



	KPL/3	F
	 Nr1 Nr2 F	 F
Material groups	P M K N S H	P M K N S H
Hole type	 < 2,5d	 < 2,5d
Quality of material	HSS	HSS
Coating		
Chamfer		~3P

BSW	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-352	
										Tol.	normal	normal
										INDEX	A1-230001	E1-131001
1/8-40	3,180	40	0,635	42	10	18	3,5	2,7	2,55	7123	●	●
3/16-24	4,760	24	1,058	52	14	26	6	4,9	3,70	7125	●	●
1/4-20	6,35	20	1,270	56	16	27	6	4,9	5,10	7127	●	●
5/16-18	7,938	18	1,411	63	20	-	6	4,9	6,50	7128	○	○
3/8-16	9,525	16	1,588	70	22	-	7	5,5	7,90	7129	●	●
7/16-14	11,112	14	1,814	70	22	-	8	6,2	9,25	7130	○	○
1/2-12	12,7	12	2,117	80	25	-	9	7,0	10,50	7131	●	●
9/16-12	14,288	12	2,117	80	26	-	11	9,0	12,00	7132	○	○
5/8-11	15,875	11	2,309	80	27	-	12	9,0	13,50	7133	○	○
3/4-10	19,050	10	2,504	95	30	-	14	11,0	16,40	7135	●	●
7/8-9	22,225	9	2,822	100	32	-	18	14,5	19,25	7137	○	○
1-8	25,400	8	3,175	110	36	-	18	14,5	22,00	7139	●	●
1.1/8-7	28,575	7	3,629	125	40	-	22	18,0	24,75	7141	○	○
1.1/4-7	31,750	7	3,629	125	40	-	22	18,0	27,75	7143	○	○
1.1/2-6	38,100	6	4,233	150	50	-	28	22,0	33,50	7147	○	○
1.3/4-5	44,450	5	5,080	160	58	-	36	29,0	39,00	7151	○	○
2-4.1/2	50,800	4 1/2	5,645	180	70	-	40	32,0	44,50	7155	○	○

Example of order

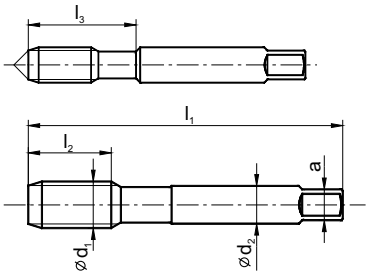
A1-230001-7123
KPL/3 1/8-40 BSW DIN-352 HSS

● **Available from stock**
○ **On request**

British Whitworth fine thread BSF, BS-84:1956

HSS

DIN 2181



	KPL/2	F
	Nr1 F	F
Material groups	P M K N S H	P M K N S H
Hole type	< 2,5d	< 2,5d
Quality of material	HSS	HSS
Coating		
Chamfer		~3P

BSF	∅d_1	1"/P	P	l_1	l_2	l_3	∅d_2	a	d	Norm	DIN-2181	
										Tol.	normal	normal
										INDEX	A1-220001	E1-131001
3/16-32	4,762	32	0,794	50	14	25	6	4,9	4,00	7225	●	●
1/4-26	6,350	26	0,977	56	14	21	6	4,9	5,30	7227	●	●
5/16-22	7,937	22	1,155	63	19	-	6	4,9	6,80	7228	○	○
3/8-20	9,525	20	1,270	70	20	-	7	5,5	8,30	7229	●	●
7/16-18	11,112	18	1,411	70	20	-	8	6,2	9,70	7230	○	○
1/2-16	12,700	16	1,588	70	20	-	9	7,0	11,10	7231	●	●
9/16-16	14,288	16	1,588	80	20	-	12	9,0	12,70	7232	○	○
5/8-14	15,875	14	1,814	80	27	-	12	9,0	14,00	7233	○	○
3/4-12	19,050	12	2,117	80	22	-	14	11,0	16,75	7235	●	●
7/8-11	22,225	11	2,309	80	22	-	18	14,5	19,75	7237	○	○
1-10	25,400	10	2,504	110	36	-	18	14,5	22,75	7239	●	●

4

Example of order

A1-220001-7225
KPL/2 3/16-32 BSF DIN-2181 HSS

● **Available from stock**
○ **On request**

SCREWING DIES

SCREWING DIES

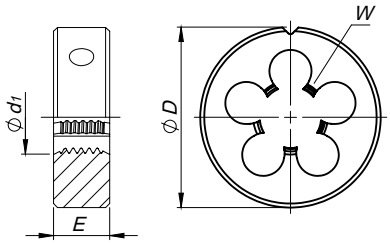
ISO Metric coarse thread DIN-13

800	800 LH	800 SPN	Ms	INOX

HSS

HSSE

DIN-EN 22 568



*SPN - Spiral point

LH

Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Execution		LH	SPN*		SPN
Quality of material	HSS	HSS	HSS	HSS	HSSE
Chamfer	1,75P	1,75P	1,75P	1,25P	2,25P

M Ød1	P	ØDxE	W	Ød	Norm	DIN-EN 22 568				
					Tol.	6g	6g	6g	6g	6g
					INDEX	N1-121001	N1-111001	N1-141001	N1-164001	N2-188001
M 1	0,25	16 x 5	3	0,96	0010	●	-	-	-	-
M 1,1	0,25	16 x 5	3	1,05	0011	●	-	-	-	-
M 1,2	0,25	16 x 5	3	1,15	0012	●	-	-	-	-
M 1,4	0,3	16 x 5	3	1,35	0014	●	-	-	-	-
M 1,6	0,35	16 x 5	3	1,55	0016	●	-	-	-	-
M 1,8	0,35	16 x 5	3	1,75	0018	●	-	-	-	-
M 2	0,4	16 x 5	3	1,95	0020	●	-	-	-	-
M 2,2	0,45	16 x 5	3	2,15	0022	●	-	-	-	-
M 2,5	0,45	16 x 5	3	2,42	0025	●	-	-	-	-
M 3	0,5	20 x 5	3	2,92	0030	●	●	●	●	●
M 3,5	0,6	20 x 5	3	3,41	0035	●	○	●	○	○
M 4	0,7	20 x 5	3	3,90	0040	●	●	●	●	●
M 4,5	0,75	20 x 7	3	4,40	0045	●	○	●	○	○
M 5	0,8	20 x 7	3	4,90	0050	●	●	●	●	●
M 6	1	20 x 7	4	5,88	0060	●	●	●	●	●
M 7	1	25 x 9	4	6,88	0070	●	○	●	○	○
M 8	1,25	25 x 9	4	7,86	0080	●	●	●	●	●
M 9	1,25	25 x 9	4	8,86	0090	●	○	●	○	○
M 10	1,5	30 x 11	4	9,85	0100	●	●	●	●	●
M 11	1,5	30 x 11	4	10,85	0110	●	○	●	○	○
M 12	1,75	38 x 14	4	11,83	0120	●	●	●	○	●
M 14	2	38 x 14	4	13,82	0140	●	●	●	○	●
M 16	2	45 x 18	5	15,82	0160	●	●	●	○	●
M 18	2,5	45 x 18	5	17,79	0180	●	●	●	○	●
M 20	2,5	45 x 18	5	19,79	0200	●	●	●	○	●
M 22	2,5	55 x 22	5	21,79	0220	●	●	●	○	●
M 24	3	55 x 22	5	23,76	0240	●	●	●	○	●
M 27	3	65 x 25	5	26,76	0270	●	●	●	○	●
M 30	3,5	65 x 25	6	29,73	0300	●	●	●	○	●
M 33	3,5	65 x 25	6	32,73	0330	●	●	●	○	○
M 36	4	65 x 25	7	35,70	0360	●	●	●	○	○
M 39	4	75 x 30	7	38,70	0390	●	○	○	○	○
M 42	4,5	75 x 30	7	41,68	0420	●	○	○	○	○
M 45	4,5	90 x 36	7	44,68	0450	●	○	○	○	○
M 48	5	90 x 36	7	47,66	0480	●	○	○	○	○
M 52	5	90 x 36	8	51,66	0520	●	○	○	○	○
M 56	5,5	105 x 36	7	55,65	0560	○	○	○	○	○
M 60	5,5	105 x 36	8	59,65	0600	○	○	○	○	○
M 64	6	120 x 36	7	63,62	0640	○	○	○	○	○
M 68	6	120 x 36	8	67,62	0680	○	○	○	○	○

Example of order

N1-121001-0030
DIN-EN 22 568 M3-6g HSS 800

● **Available from stock**
○ **On request**

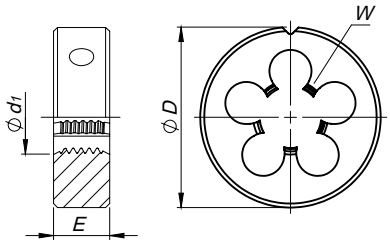
ISO Metric fine thread DIN-13

800	800	800 SPN	Ms	INOX

HSS

HSSE

DIN-EN 22 568



LH

*SPN - Spiral point

Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Execution		LH	SPN		SPN
Quality of material	HSS	HSS	HSS	HSS	HSSE
Chamfer	1,75P	1,75P	1,75P	1,25P	2,25P

M Ød1	P	ØDxE	W	Ø	Norm	DIN-EN 22 568				
					Tol.	6g	6g	6g	6g	6g
					INDEX	N1-121001	N1-111001	N1-141001	N1-164001	N2-188001
M 3,5 x 0,5	0,5	20 x 5	3	3,43	0037	○	○	○	○	○
M 4 x 0,5	0,5	20 x 5	4	3,92	0041	●	○	●	●	●
M 4,5 x 0,5	0,5	20 x 5	4	4,43	0046	○	○	○	○	○
M 5 x 0,5	0,5	20 x 5	4	4,92	0051	●	○	●	●	●
M 5 x 0,75	0,75	20 x 5	4	4,91	0052	○	○	○	○	○
M 5,5 x 0,5	0,5	20 x 5	4	5,43	0056	○	○	○	○	○
M 5,5 x 0,75	0,75	20 x 7	4	5,42	0057	○	○	○	○	○
M 6 x 0,5	0,5	20 x 5	4	5,92	0061	●	○	●	●	●
M 6 x 0,75	0,75	20 x 7	4	5,90	0062	●	○	●	●	●
M 7 x 0,75	0,75	25 x 9	4	6,90	0072	●	○	●	●	●
M 8 x 0,5	0,5	25 x 9	4	7,92	0081	●	○	●	●	●
M 8 x 0,75	0,75	25 x 9	4	7,90	0082	●	●	●	●	●
M 8 x 1	1	25 x 9	4	7,88	0083	●	●	●	●	●
M 9 x 0,75	0,75	25 x 9	4	8,90	0092	●	●	●	●	●
M 9 x 1	1	25 x 9	4	8,88	0093	●	●	●	●	●
M 10 x 0,75	0,75	30 x 11	4	9,90	0102	●	●	●	●	●
M 10 x 1	1	30 x 11	5	9,88	0103	●	●	●	●	●
M 10 x 1,25	1,25	30 x 11	4	9,86	0104	●	●	●	●	●
M 11 x 0,75	0,75	30 x 11	5	10,91	0112	●	○	●	●	●
M 11 x 1	1	30 x 11	4	10,88	0113	●	○	●	●	●
M 12 x 1	1	38 x 10	4	11,88	0123	●	●	●	●	●
M 12 x 1,25	1,25	38 x 10	4	11,86	0124	●	●	●	●	●
M 12 x 1,5	1,5	38 x 10	4	11,85	0125	●	●	●	●	●
M 14 x 1	1	38 x 10	5	13,88	0143	●	●	○	●	●
M 14 x 1,5	1,5	38 x 10	5	13,85	0145	●	●	●	●	●
M 15 x 1	1	38 x 10	5	14,88	0153	●	○	○	●	●
M 15 x 1,5	1,5	38 x 10	5	14,85	0155	●	○	○	●	●
M 16 x 1	1	45 x 14	5	15,88	0163	●	●	○	●	●
M 16 x 1,5	1,5	45 x 14	5	15,85	0165	●	●	●	●	●
M 17 x 1	1	45 x 14	5	16,88	0173	●	○	○	●	●
M 17 x 1,5	1,5	45 x 14	5	16,85	0175	●	○	○	●	●
M 18 x 1	1	45 x 14	5	17,88	0183	●	●	○	●	●
M 18 x 1,5	1,5	45 x 14	5	17,85	0185	●	●	●	●	●
M 18 x 2	2	45 x 14	5	17,82	0186	●	●	●	●	●
M 20 x 1	1	45 x 14	6	19,80	0203	●	●	●	●	●
M 20 x 1,5	1,5	45 x 14	6	19,85	0205	●	●	●	●	●
M 20 x 2	2	45 x 14	6	19,82	0206	●	●	○	●	●
M 22 x 1	1	55 x 16	6	21,88	0223	●	●	○	●	●
M 22 x 1,5	1,5	55 x 16	6	21,85	0225	●	●	●	●	●
M 22 x 2	2	55 x 16	6	21,82	0226	●	●	○	●	●
M 24 x 1	1	55 x 16	6	23,88	0243	●	●	○	●	●
M 24 x 1,5	1,5	55 x 16	6	23,85	0245	●	●	●	●	●

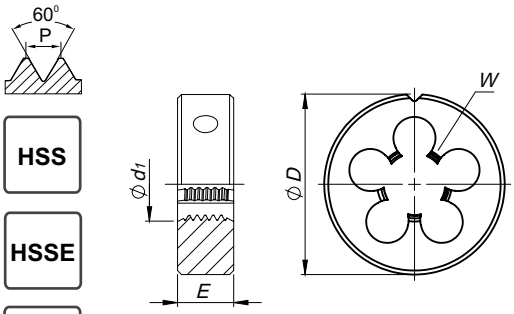
Example of order

N1-121001-0041
DIN-EN 22 568 M4x0,5-6g HSS 800

● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

	800	800	800 SPN	Ms	INOX
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Execution		LH	SPN		SPN
Quality of material	HSS	HSS	HSS	HSS	HSSE
Chamfer	1,75P	1,75P	1,75P	1,25P	2,25P



HSS

HSSE

DIN-EN 22 568

*SPN - Spiral point

LH

M Ød1	P	ØDxE	W	Ø	Norm	DIN-EN 22 568				
					Tol.	6g	6g	6g	6g	6g
					INDEX	N1-121001	N1-111001	N1-141001	N1-164001	N2-188001
M 24 x 2	2	55 x 16	6	23,82	0246	●	●	○	○	○
M 25 x 1	1	55 x 16	6	24,88	0253	●	○	○	○	○
M 25 x 1,5	1,5	55 x 16	6	24,85	0255	●	○	○	○	○
M 25 x 2	2	55 x 16	6	24,82	0256	●	○	○	○	○
M 26 x 1,5	1,5	55 x 16	6	25,85	0265	●	○	○	○	○
M 27 x 1	1	65 x 18	6	26,88	0273	●	○	○	○	○
M 27 x 1,5	1,5	65 x 18	6	26,85	0275	●	○	○	○	○
M 27 x 2	2	65 x 18	6	26,82	0276	●	○	○	○	○
M 28 x 1	1	65 x 18	6	27,88	0283	●	○	○	○	○
M 28 x 1,5	1,5	65 x 18	6	27,85	0285	●	○	○	○	○
M 28 x 2	2	65 x 18	6	27,82	0286	●	○	○	○	○
M 30 x 1	1	65 x 18	6	29,88	0303	●	○	○	○	○
M 30 x 1,5	1,5	65 x 18	6	29,85	0305	●	○	○	○	○
M 30 x 2	2	65 x 18	6	29,82	0306	●	○	○	○	○
M 30 x 3	3	65 x 25	6	29,76	0307	●	○	○	○	○
M 32 x 1,5	1,5	65 x 18	7	31,85	0325	●	○	○	○	○
M 32 x 2	2	65 x 18	7	31,82	0326	●	○	○	○	○
M 33 x 1,5	1,5	65 x 18	7	32,85	0335	●	○	○	○	○
M 33 x 2	2	65 x 18	7	32,82	0336	●	○	○	○	○
M 33 x 3	3	65 x 25	7	32,76	0337	●	○	○	○	○
M 35 x 1,5	1,5	65 x 18	7	34,85	0355	●	○	○	○	○
M 36 x 1,5	1,5	65 x 18	7	35,85	0365	●	○	○	○	○
M 36 x 2	2	65 x 18	7	35,82	0366	●	○	○	○	○
M 36 x 3	3	65 x 25	7	35,76	0367	●	○	○	○	○
M 38 x 1,5	1,5	75 x 20	7	37,85	0385	●	○	○	○	○
M 39 x 1,5	1,5	75 x 20	7	38,85	0395	●	○	○	○	○
M 39 x 2	2	75 x 20	7	38,82	0396	●	○	○	○	○
M 39 x 3	3	75 x 30	7	38,76	0397	●	○	○	○	○
M 40 x 1,5	1,5	75 x 20	7	39,85	0405	●	○	○	○	○
M 40 x 2	2	75 x 20	7	39,82	0406	●	○	○	○	○
M 40 x 3	3	75 x 30	7	39,76	0407	●	○	○	○	○
M 42 x 1,5	1,5	75 x 20	7	41,85	0425	●	○	○	○	○
M 42 x 2	2	75 x 20	8	41,82	0426	●	○	○	○	○
M 42 x 3	3	75 x 30	7	41,76	0427	●	○	○	○	○
M 45 x 1,5	1,5	90 x 22	7	44,85	0455	●	○	○	○	○
M 45 x 2	2	90 x 22	7	44,82	0456	●	○	○	○	○
M 45 x 3	3	90 x 36	7	44,76	0457	●	○	○	○	○
M 48 x 1,5	1,5	90 x 22	7	47,85	0485	●	○	○	○	○
M 48 x 2	2	90 x 22	7	47,82	0486	●	○	○	○	○
M 48 x 3	3	90 x 36	7	47,76	0487	●	○	○	○	○
M 48 x 4	4	90 x 36	7	47,73	0488	●	○	○	○	○
M 50 x 1,5	1,5	90 x 22	8	49,85	0505	●	○	○	○	○

Example of order

N1-121001-0285
DIN-EN 22 568 M28x1,5-6g HSS 800

● **Available from stock**
○ **On request**

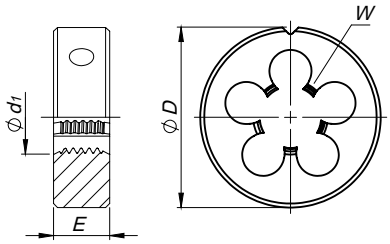
ISO Metric fine thread DIN-13

800	800	800 SPN	Ms	INOX

HSS

HSSE

DIN-EN 22 568



*SPN - Spiral point

LH

Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Execution		LH	SPN		SPN
Quality of material	HSS	HSS	HSS	HSS	HSSE
Chamfer	1,75P	1,75P	1,75P	1,25P	2,25P

M Ød1	P	ØDxE	W	Ød1	Norm	DIN-EN 22 568				
					Tol.	6g	6g	6g	6g	6g
					INDEX	N1-121001	N1-111001	N1-141001	N1-164001	N2-188001
M 50 x 2	2	90 x 22	8	49,82	0506	●	○	○	○	○
M 50 x 3	3	90 x 36	8	49,76	0507	●	○	○	○	○
M 52 x 1,5	1,5	90 x 22	8	51,85	0525	●	○	○	○	○
M 52 x 2	2	90 x 22	8	51,82	0526	●	○	○	○	○
M 52 X 3	3	90 x 36	8	51,76	0527	●	○	○	○	○
M 52 x 4	4	90 x 36	8	51,73	0528	●	○	○	○	○
M 55 x 1,5	1,5	105 x 22	8	54,85	0555	○	○	○	○	○
M 55 x 2	2	105 x 22	7	54,82	0556	○	○	○	○	○
M 55 x 3	3	105 x 36	7	54,76	0557	○	○	○	○	○
M 55 x 4	4	105 x 36	7	54,73	0558	○	○	○	○	○
M 56 x 1,5	2	105 x 22	8	55,85	0565	○	○	○	○	○
M 56 x 2	2	105 x 22	8	55,82	0566	○	○	○	○	○
M 56 x 3	3	105 x 36	8	55,76	0567	○	○	○	○	○
M 56 x 4	4	105 x 36	7	55,73	0568	○	○	○	○	○

Example of order

N1-121001-0506
DIN-EN 22 568 M50x2-6g HSS 800

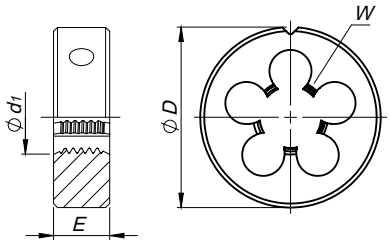
● **Available from stock**
○ **On request**

American unified coarse thread UNC, ANSI B-1.1

800

HSS

DIN-EN 22 568



Material groups	P M K N S H
Execution	
Quality of material	HSS
Chamfer	1,75P

UNC	Ød1	1"/P	P	ØD x E	W	ød	Norm	DIN-EN 22 568
							Tol.	2A
							INDEX	N1-121001
No 5 - 40	3,175	40	0,635	20 x 5	3	3,09	4105	●
No 6 - 32	3,505	32	0,794	20 x 5	3	3,41	4106	●
No 8 - 32	4,166	32	0,794	20 x 7	3	4,07	4108	●
No 10 - 24	4,826	24	1,058	20 x 7	3	4,71	4110	●
No 12 - 24	5,486	24	1,058	20 x 7	4	5,37	4112	●
1/4 - 20	6,35	20	1,270	20 x 7	4	6,22	4127	●
5/16 - 18	7,938	18	1,411	25 x 9	4	7,80	4128	●
3/8 - 16	9,525	16	1,588	30 x 11	4	9,37	4129	●
7/16 - 14	11,112	14	1,814	30 x 11	4	10,95	4130	●
1/2 - 13	12,7	13	1,954	38 x 14	4	12,52	4131	●
9/16 - 12	14,288	12	2,117	38 x 14	4	14,10	4132	●
5/8 - 11	15,875	11	2,309	45 x 18	5	15,68	4133	●
3/4 - 10	19,05	10	2,540	45 x 18	5	18,84	4135	●
7/8 - 9	22,225	9	2,822	55 x 22	5	22,00	4137	●
1 - 8	25,4	8	3,175	55 x 22	5	25,16	4139	●
1.1/8 - 7	28,575	7	3,629	65 x 25	5	28,31	4141	○
1.1/4 - 7	31,75	7	3,629	65 x 25	6	31,49	4143	○
1.3/8 - 6	34,925	6	4,233	65 x 25	7	34,63	4145	○
1.1/2 - 6	38,1	6	4,233	75 x 30	6	37,80	4147	○
1.3/4 - 5	44,45	5	5,080	90 x 36	6	44,12	4151	○
2 - 4.1/2	50,8	4.1/2	5,645	90 x 36	7	50,45	4155	○

5

Example of order

N1-121001-4128
DIN-EN 22 568 5/16-18 UNC-2A HSS 800

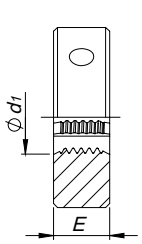
● **Available from stock**
○ **On request**

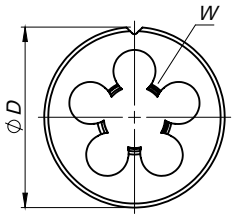
American unified fine thread UNF, ANSI B-1.1

800

HSS

DIN-EN 22 568





Material groups	P M K N S H
Execution	
Quality of material	HSS
Chamfer	1,75P

UNF	Ød1	1"/P	P	ØD x E	W	Ø	Norm	DIN-EN 22 568
							Tol.	2A
							INDEX	N1-121001
No 5 - 44	3,175	44	0,577	20 x 5	3	3,10	4205	●
No 6 - 40	3,505	40	0,635	20 x 5	3	3,42	4206	●
No 8 - 36	4,166	36	0,705	20 x 7	3	4,08	4208	●
No 10 - 32	4,826	32	0,794	20 x 7	3	4,73	4210	●
No 12 - 28	5,486	28	0,907	20 x 7	4	5,38	4212	●
1/4 - 28	6,35	28	0,907	20 x 7	4	6,24	4227	●
5/16 - 24	7,938	24	1,058	25 x 9	5	7,82	4228	●
3/8 - 24	9,525	24	1,058	30 x 11	4	9,41	4229	●
7/16 - 20	11,112	20	1,270	30 x 11	5	10,98	4230	●
1/2 - 20	12,7	20	1,270	38 x 10	5	12,56	4231	●
9/16 - 18	14,288	18	1,411	38 x 10	5	14,14	4232	●
5/8 - 18	15,875	18	1,411	45 x 14	5	15,73	4233	●
3/4 - 16	19,05	16	1,588	45 x 14	6	18,89	4235	●
7/8 - 14	22,225	14	1,814	55 x 16	5	22,05	4237	●
1 - 12	25,4	12	2,117	55 x 16	6	25,21	4239	●
1.1/8 - 12	28,575	12	2,117	65 x 18	6	28,38	4241	○
1.1/4 - 12	31,75	12	2,117	65 x 18	6	31,55	4243	○
1.3/8 - 12	34,925	12	2,117	65 x 18	7	34,73	4245	○
1.1/2 - 12	38,1	12	2,117	75 x 20	8	37,90	4247	○

Example of order

N1-121001-4228
DIN-EN 22 568 5/16-24 UNF-2A HSS 800

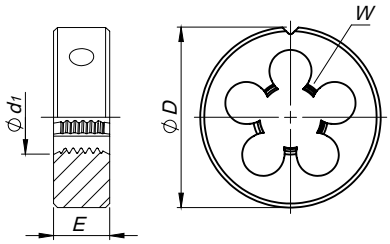
● **Available from stock**
○ **On request**

Whitworth pipe thread G, DIN-ISO 228

HSS

HSSE

DIN-EN 24 231



	800	800	Ms	INOX		
Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H		
Execution		LH		SPN		
Quality of material	HSS	HSS	HSS	HSSE		
Chamfer	1,75P	1,75P	1,25P	2,25P		

G	Ød1	1"/P	P	ØD x E	W		Norm	DIN-EN 24231					
							Tol.						
							INDEX	N1-121001	N1-111001	N1-164001	N2-188001		
G1/8	9,73	28	0,907	30 x 11	4	9,62	3123	●	○	●	●		
G1/4	13,16	19	1,337	38 x 10	4	13,03	3127	●	●	●	●		
G3/8	16,66	19	1,337	45 x 14	5	16,54	3129	●	●	●	●		
G1/2	20,96	14	1,814	45 x 14	6	20,81	3131	●	●	●	●		
G5/8	22,91	14	1,814	55 x 16	5	22,77	3133	●	○	○	○		
G3/4	26,44	14	1,814	55 x 16	6	26,30	3135	●	●	●	●		
G7/8	30,20	14	1,814	65 x 18	6	30,06	3137	●	○	○	○		
G1	33,25	11	2,309	65 x 18	7	33,07	3139	●	●	●	●		
G1.1/8	37,90	11	2,309	75 x 20	7	37,72	3141	○	○	○	○		
G1.1/4	41,91	11	2,309	75 x 20	8	41,73	3143	●	○	○	○		
G1.3/8	44,32	11	2,309	90 x 22	7	44,14	3145	○	○	○	○		
G1.1/2	47,80	11	2,309	90 x 22	7	47,62	3147	●	○	○	○		
G1.3/4	53,75	11	2,309	105 x 22	8	53,57	3151	○	○	○	○		
G2	59,61	11	2,309	105 x 22	8	59,43	3155	○	○	○	○		
G2.1/4	65,71	11	2,309	120 x 22	8	65,49	3157	○	○	○	○		

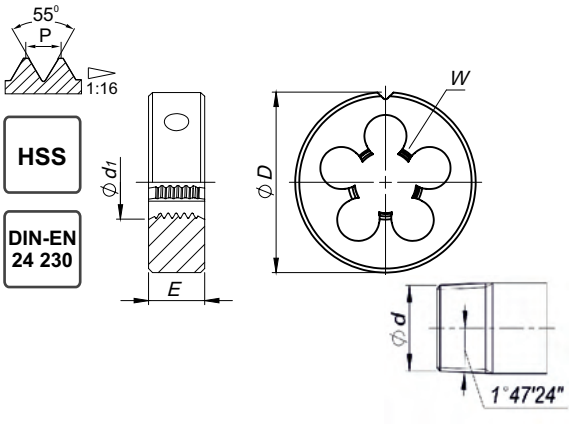
Example of order

N1-121001-3143
DIN-EN 24 231 G-1.1/4" A HSS 800

● **Available from stock**
○ **On request**

Whitworth pipe external thread R, ISO-7/1

800



Material groups	P M K N S H
Execution	
Quality of material	HSS
Chamfer	2P

R	Ød1	1"/P	P	ØD x E	W		Norm	DIN-EN 24 230
							Tol.	
							INDEX	N1-121001
R-1/8”	9,728	28	0,907	30 x 11	5	9,48	3423	●
R-1/4”	13,157	19	1,337	38 x 14	5	12,78	3427	●
R-3/8”	16,662	19	1,337	45 x 18	5	16,26	3429	●
R-1/2”	20,955	14	1,814	55 x 22	5	20,44	3431	●
R-3/4”	26,441	14	1,814	55 x 22	6	25,85	3435	●
R-1”	33,249	11	2,309	65 x 25	7	32,60	3439	●

5

Example of order

N1-121001-3427
DIN-EN 24 230 R-1/4”- HSS 800

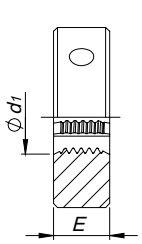
● **Available from stock**
○ **On request**

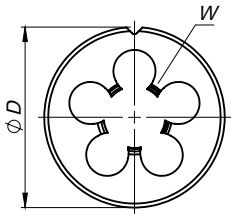
Whitworth thread BSW BS-84:2007

800

HSS

DIN-EN 22 568





Material groups	P M K N S H
Execution	
Quality of material	HSS
Chamfer	1,75P

BSW	Ød1	1"/P	P	ØD x E	W	≈	Norm	DIN-EN 22 568
							Tol.	medium
							INDEX	N1-121001
1/8 - 40	3,18	40	0,635	20 x 5	3	3,09	7123	●
3/16 - 24	4,76	24	1,058	20 x 7	4	4,66	7125	●
1/4 - 20	6,35	20	1,270	20 x 7	4	6,24	7127	●
5/16 - 18	7,94	18	1,411	25 x 9	4	7,82	7128	●
3/8 - 16	9,53	16	1,588	30 x 11	4	9,40	7129	●
7/16 - 14	11,11	14	1,814	30 x 11	4	10,98	7130	●
1/2 - 12	12,7	12	2,117	38 x 14	4	12,56	7131	●
9/16 - 12	14,29	12	2,117	38 x 14	4	14,14	7132	●
5/8 - 11	15,88	11	2,309	45 x 18	5	15,72	7133	●
3/4 - 10	19,05	10	2,540	45 x 18	5	18,89	7135	●
7/8 - 9	22,23	9	2,822	55 x 22	5	22,10	7137	●
1 - 8	25,4	8	3,175	55 x 22	5	25,27	7139	●

5

Example of order

N1-121001-7131
DIN-EN 22 568 1/2 - 12 BSW HSS 800

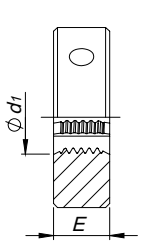
● **Available from stock**
○ **On request**

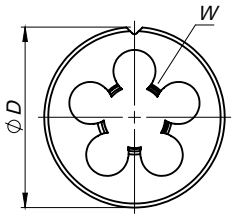
British Whitworth fine thread BSF, BS-84:2007

800

HSS

DIN-EN 22 568





Material groups	P M K N S H
Execution	
Quality of material	HSS
Chamfer	1,75P

BSF	Ød1	1"/P	P	ØD x E	W	ØD	Norm	DIN-EN 22 568
							Tol.	medium
							INDEX	N1-121001
3/16 - 32	4,76	32	0,794	20 x 7	4	4,76	7225	●
1/4 - 26	6,35	26	0,977	20 x 7	4	6,25	7227	●
5/16 - 22	7,94	22	1,155	25 x 9	4	7,83	7228	●
3/8 - 20	9,53	20	1,270	30 x 11	4	9,41	7229	●
7/16 - 18	11,11	18	1,411	30 x 11	5	10,99	7230	●
1/2 - 16	12,70	16	1,588	38 x 10	5	12,57	7231	●
9/16 - 16	14,29	16	1,588	38 x 10	4	14,16	7232	●
5/8 - 14	15,88	14	1,814	45 x 14	4	15,73	7233	●
3/4 - 12	19,05	12	2,117	45 x 14	5	18,89	7235	●
7/8 - 11	22,23	11	2,309	55 x 22	5	22,11	7237	●
1 - 10	25,40	10	2,540	55 x 22	5	25,28	7239	●

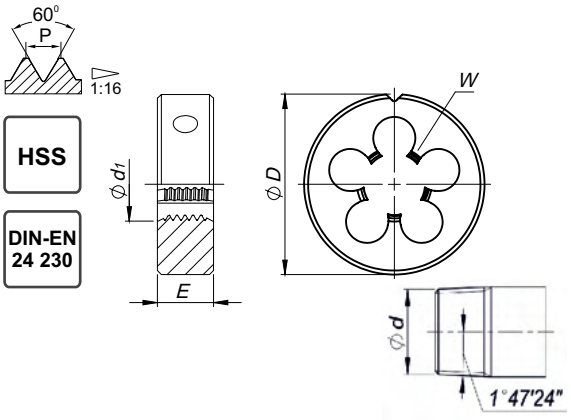
Example of order

N1-121001-7232
DIN-EN 22 568 9/16 - 16 BSF HSS 800

● **Available from stock**
○ **On request**

American tapered pipe thread NPT 1:16, ANSI B-1.20.1

800



Material groups	P M K N S H
Execution	
Quality of material	HSS
Chamfer	2P

NPT	Ød1	1"/P	P	ØD x E	W	Ød	Norm	DIN-EN 24 230
							Tol.	
							INDEX	N1-121001
1/8	9,728	27	0,941	30 x 11	5	9,99	4623	●
1/4	13,157	18	1,411	38 x 14	5	13,26	4627	●
3/8	16,662	18	1,411	45 x 18	5	16,67	4629	●
1/2	20,955	14	1,814	45 x 18	6	20,71	4631	●
3/4	26,441	14	1,814	55 x 22	6	26,03	4635	●
1	33,249	11.1/2	2,209	65 x 25	7	32,59	4639	●

5

Example of order

N1-121001-4627
DIN-EN 24 230 1/4" NPT - HSS 800

● **Available from stock**
○ **On request**

DRILLING TOOLS

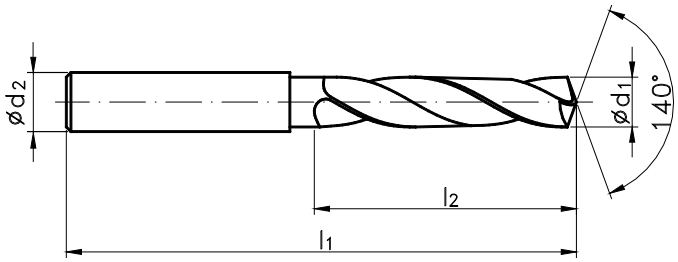
DRILLING TOOLS

3xD Maximal hole depth

VHM

AT

DIN 6537



MASTERDRILL

X-DRILL

	MASTERDRILL	X-DRILL
Material groups	P M K N S H	P M K N S H
Internal cooling	IK	-
Quality of material	VHM	VHM
Coating	AT	AT

∅d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-604M33	W9-604X13
3,00			62	20	6,0	0300	●	●
3,10			62	20	6,0	0310	○	○
3,20			62	20	6,0	0320	●	●
3,25		M3,5	62	20	6,0	0325	○	○
3,30	M4		62	20	6,0	0330	●	●
3,40			62	20	6,0	0340	○	○
3,50	M4x0,5		62	20	6,0	0350	○	●
3,60			62	20	6,0	0360	○	○
3,70	M4,5	M4	62	20	6,0	0370	●	●
3,80			66	24	6,0	0380	●	●
3,90			66	24	6,0	0390	○	○
4,00			66	24	6,0	0400	●	●
4,10			66	24	6,0	0410	○	○
4,20	M5	M4,5	66	24	6,0	0420	●	●
4,30			66	24	6,0	0430	●	●
4,40			66	24	6,0	0440	○	●
4,50	M5x0,5		66	24	6,0	0450	●	●
4,60	M5,5		66	24	6,0	0460	○	○
4,65		M5	66	24	6,0	0465	○	○
4,70			66	24	6,0	0470	○	○
4,80			66	28	6,0	0480	○	○
4,90			66	28	6,0	0490	○	○
5,00	M6		66	28	6,0	0500	●	●
5,10		M5,5	66	28	6,0	0510	○	●
5,20	M6x0,75		66	28	6,0	0520	●	●
5,30			66	28	6,0	0530	○	○
5,40			66	28	6,0	0540	○	○
5,50			66	28	6,0	0550	●	●
5,60		M6	66	28	6,0	0560	○	○
5,70			66	28	6,0	0570	○	○
5,80			66	28	6,0	0580	○	○
5,90			66	28	6,0	0590	○	○
6,00	M7		66	28	6,0	0600	●	●
6,10			79	34	8,0	0610	○	○
6,20	M7x0,75		79	34	8,0	0620	○	○
6,30			79	34	8,0	0630	○	○
6,40			79	34	8,0	0640	○	○
6,50			79	34	8,0	0650	●	●
6,60		M7	79	34	8,0	0660	○	○
6,70			79	34	8,0	0670	○	○
6,80	M8		79	34	8,0	0680	●	●
6,90			79	34	8,0	0690	○	○
7,00	M8x1		79	34	8,0	0700	●	●
7,10			79	41	8,0	0710	○	○
7,20	M8x0,75		79	41	8,0	0720	○	○
7,30			79	41	8,0	0730	○	○

6

Example of order

W9-604M33-0300
WK MasterDRILL 3,00 DIN-6537 3xD VHM IK AT

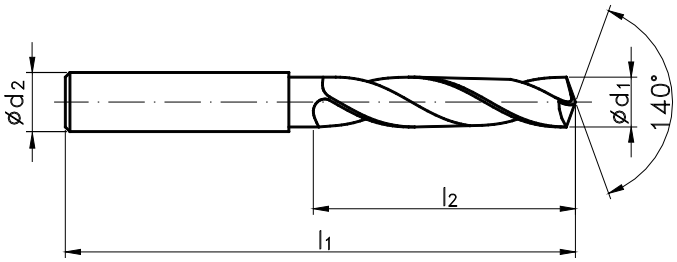
Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

3xD Maximal hole depth

VHM

AT

DIN 6537



MASTERDRILL

X-DRILL

	MASTERDRILL	X-DRILL
Material groups	P M K N S H	P M K N S H
Internal cooling	IK	-
Quality of material	VHM	VHM
Coating	AT	AT

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-604M33	W9-604X13
7,40			79	41	8,0	0740	○	○
7,45		M8	79	41	8,0	0745	●	○
7,50			79	41	8,0	0750	○	●
7,60		M8x1	79	41	8,0	0760	●	○
7,70			79	41	8,0	0770	○	○
7,80	M9		79	41	8,0	0780	●	○
7,90			79	41	8,0	0790	○	○
8,00	M9x1		79	41	8,0	0800	●	●
8,10			89	47	10,0	0810	○	○
8,20	M9x0,75		89	47	10,0	0820	○	○
8,30			89	47	10,0	0830	○	○
8,40			89	47	10,0	0840	○	○
8,45		M9	89	47	10,0	0845	○	○
8,50	M10		89	47	10,0	0850	●	●
8,60		M9x1	89	47	10,0	0860	○	○
8,70		M9x0,75	89	47	10,0	0870	○	○
8,80	M10x1,25		89	47	10,0	0880	○	○
8,90			89	47	10,0	0890	○	○
9,00	M10x1		89	47	10,0	0900	●	●
9,10			89	47	10,0	0910	○	○
9,20	M10x0,75		89	47	10,0	0920	○	○
9,30			89	47	10,0	0930	○	○
9,35		M10	89	47	10,0	0935	●	●
9,40			89	47	10,0	0940	○	○
9,45		M10x1,25	89	47	10,0	0945	○	○
9,50	M11		89	47	10,0	0950	●	●
9,60		M10x1	89	47	10,0	0960	○	○
9,70		M10x0,75	89	47	10,0	0970	○	○
9,80			89	47	10,0	0980	●	●
9,90			89	47	10,0	0990	○	○
10,00	M11x1		89	47	10,0	1000	●	●
10,10			102	55	12,0	1010	○	○
10,20	M12		102	55	12,0	1020	●	●
10,30			102	55	12,0	1030	○	○
10,40			102	55	12,0	1040	○	○
10,50	M12x1,5		102	55	12,0	1050	●	●
10,60		M11x1	102	55	12,0	1060	○	○
10,70			102	55	12,0	1070	○	○
10,80	M12x1,25		102	55	12,0	1080	○	○
10,90			102	55	12,0	1090	○	○
11,00	M12x1		102	55	12,0	1100	●	●
11,10			102	55	12,0	1110	○	○
11,20			102	55	12,0	1120	○	○
11,25		M12	102	55	12,0	1125	○	○
11,30			102	55	12,0	1130	○	○
11,35		M12x1,5	102	55	12,0	1135	○	○

Example of order

W9-604X13-0745
WK X-Drill DIN-6537 3xD 7,45 VHM AT

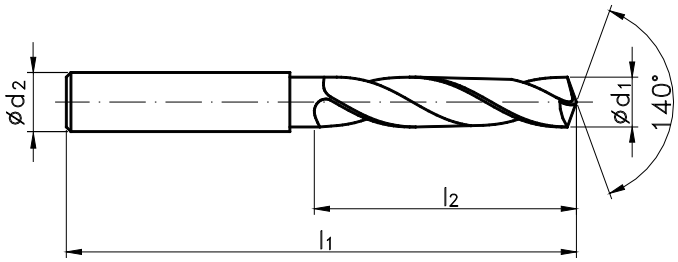
Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

3xD Maximal hole depth

VHM

AT

DIN 6537



MASTERDRILL

X-DRILL

	MASTERDRILL	X-DRILL
Material groups	P M K N S H	P M K N S H
Internal cooling	IK	-
Quality of material	VHM	VHM
Coating	AT	AT

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-604M33	W9-604X13
11,40			102	55	12,0	1140	○	○
11,45		M12x1,25	102	55	12,0	1145	○	○
11,50			102	55	12,0	1150	●	●
11,60		M12x1	102	55	12,0	1160	○	○
11,70			102	55	12,0	1170	○	○
11,80			102	55	12,0	1180	●	●
11,90			102	55	12,0	1190	○	○
12,00	M14		102	55	12,0	1200	●	●
12,30			107	60	14,0	1230	○	○
12,50	M14x1,5		107	60	14,0	1250	●	●
12,80	M14x1,25		107	60	14,0	1280	○	○
13,00	M14x1	M14	107	60	14,0	1300	●	●
13,50			107	60	14,0	1350	●	●
13,80			107	60	14,0	1380	○	○
14,00	M16; M15x1		107	60	14,0	1400	●	●
14,50	M16x1,5		115	65	16,0	1450	●	●
14,80			115	65	16,0	1480	○	○
15,00	M16x1	M16	115	65	16,0	1500	●	●
15,35		M16x1,5	115	65	16,0	1535	○	○
15,50	M18		115	65	16,0	1550	○	○
15,80			115	65	16,0	1580	●	●
16,00	M18x2		115	65	16,0	1600	●	●
16,50	M18x1,5		123	73	18,0	1650	○	○
16,80		M18	123	73	18,0	1680	○	○
17,00	M18x1		123	73	18,0	1700	●	●
17,35		M18x1,5	123	73	18,0	1735	○	○
17,50	M20		123	73	18,0	1750	○	○
17,80			123	73	18,0	1780	○	○
18,00	M20x2		123	73	18,0	1800	●	●
18,50	M20x1,5		131	79	20,0	1850	○	○
18,80		M20	131	79	20,0	1880	○	○
19,00	M20x1		131	79	20,0	1900	○	○
19,35		M20x1,5	131	79	20,0	1935	○	○
19,50	M22		131	79	20,0	1950	○	○
19,80			131	79	20,0	1980	○	○
20,00	M22x2		131	79	20,0	2000	○	○

6

Example of order

W9-604X13-1200
WK X-Drill DIN-6537 3xD 12,00 VHM AT

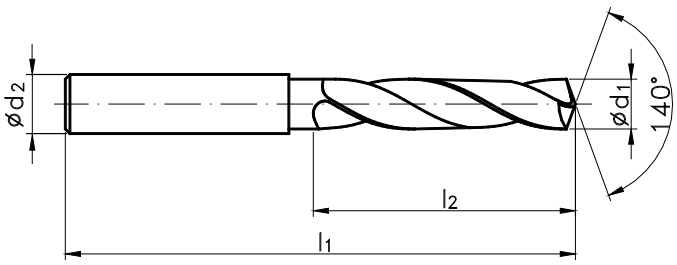
Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

5xD Maximal hole depth

VHM

AT

DIN 6537



MASTERDRILL

X-DRILL

	MASTERDRILL	X-DRILL
Material groups	P M K N S H	P M K N S H
Internal cooling	IK	-
Quality of material	VHM	VHM
Coating	AT	AT

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-614M33	W9-614X13
3,00			66	28	6,0	0300	●	●
3,10			66	28	6,0	0310	○	●
3,20			66	28	6,0	0320	●	●
3,25		M3,5	66	28	6,0	0325	○	●
3,30	M4		66	28	6,0	0330	●	●
3,40			66	28	6,0	0340	○	○
3,50	M4x0,5		66	28	6,0	0350	○	●
3,60			66	28	6,0	0360	○	●
3,70	M4,5	M4	66	28	6,0	0370	●	●
3,80			74	36	6,0	0380	●	●
3,90			74	36	6,0	0390	○	○
4,00			74	36	6,0	0400	●	●
4,10			74	36	6,0	0410	○	○
4,20	M5	M4,5	74	36	6,0	0420	●	●
4,30			74	36	6,0	0430	●	●
4,40			74	36	6,0	0440	○	○
4,50	M5x0,5		74	36	6,0	0450	●	●
4,60	M5,5		74	36	6,0	0460	○	○
4,65		M5	74	36	6,0	0465	○	○
4,70			74	36	6,0	0470	○	○
4,80			82	44	6,0	0480	○	○
4,90			82	44	6,0	0490	○	○
5,00	M6		82	44	6,0	0500	●	●
5,10		M5,5	82	44	6,0	0510	○	○
5,20	M6x0,75		82	44	6,0	0520	●	●
5,30			82	44	6,0	0530	○	○
5,40			82	44	6,0	0540	○	○
5,50			82	44	6,0	0550	●	●
5,60		M6	82	44	6,0	0560	●	●
5,70			82	44	6,0	0570	○	○
5,80			82	44	6,0	0580	○	○
5,90			82	44	6,0	0590	○	○
6,00	M7		82	44	6,0	0600	●	●
6,10			91	53	8,0	0610	○	○
6,20	M7x0,75		91	53	8,0	0620	○	○
6,30			91	53	8,0	0630	○	○
6,40			91	53	8,0	0640	○	○
6,50			91	53	8,0	0650	●	●
6,60		M7	91	53	8,0	0660	○	○
6,70			91	53	8,0	0670	○	○
6,80	M8		91	53	8,0	0680	●	●
6,90			91	53	8,0	0690	○	○
7,00	M8x1		91	53	8,0	0700	●	●
7,10			91	53	8,0	0710	○	○
7,20	M8x0,75		91	53	8,0	0720	○	○
7,30			91	53	8,0	0730	○	○

Example of order

W9-614X13-0300
WK X-Drill DIN-6537 5xD 3,00 VHM AT

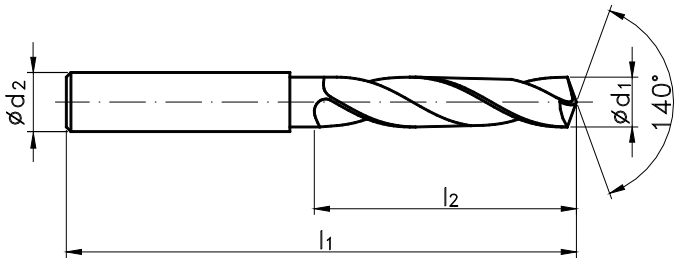
Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

5xD Maximal hole depth

VHM

AT

DIN 6537



MASTERDRILL

X-DRILL

	MASTERDRILL	X-DRILL
Material groups	P M K N S H	P M K N S H
Internal cooling	IK	-
Quality of material	VHM	VHM
Coating	AT	AT

∅ d1	M MF	M "WGN"	l1	l2	∅d2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-614M33	W9-614X13
7,40			91	53	8,0	0740	○	○
7,45		M8	91	53	8,0	0745	●	●
7,50			91	53	8,0	0750	○	●
7,60		M8x1	91	53	8,0	0760	●	●
7,70			91	53	8,0	0770	○	○
7,80	M9		91	53	8,0	0780	●	●
7,90			91	53	8,0	0790	○	○
8,00	M9x1		91	53	8,0	0800	●	●
8,10			103	61	10,0	0810	○	○
8,20	M9x0,75		103	61	10,0	0820	○	○
8,30			103	61	10,0	0830	○	○
8,40			103	61	10,0	0840	○	○
8,45		M9	103	61	10,0	0845	○	○
8,50	M10		103	61	10,0	0850	●	●
8,60		M9x1	103	61	10,0	0860	○	○
8,70		M9x0,75	103	61	10,0	0870	○	○
8,80	M10x1,25		103	61	10,0	0880	○	○
8,90			103	61	10,0	0890	○	○
9,00	M10x1		103	61	10,0	0900	●	●
9,10			103	61	10,0	0910	○	○
9,20	M10x0,75		103	61	10,0	0920	○	○
9,30			103	61	10,0	0930	○	○
9,35		M10	103	61	10,0	0935	●	●
9,40			103	61	10,0	0940	○	○
9,45		M10x1,25	103	61	10,0	0945	○	○
9,50	M11		103	61	10,0	0950	●	●
9,60		M10x1	103	61	10,0	0960	○	○
9,70		M10x0,75	103	61	10,0	0970	○	○
9,80			103	61	10,0	0980	●	●
9,90			103	61	10,0	0990	○	○
10,00	M11x1		103	61	10,0	1000	●	●
10,10			118	71	12,0	1010	○	○
10,20	M12		118	71	12,0	1020	●	●
10,30			118	71	12,0	1030	○	○
10,40			118	71	12,0	1040	○	○
10,50	M12x1,5		118	71	12,0	1050	●	●
10,60		M11x1	118	71	12,0	1060	○	○
10,70			118	71	12,0	1070	○	○
10,80	M12x1,25		118	71	12,0	1080	○	○
10,90			118	71	12,0	1090	○	○
11,00	M12x1		118	71	12,0	1100	●	●
11,10			118	71	12,0	1110	○	○
11,20			118	71	12,0	1120	○	○
11,25		M12	118	71	12,0	1125	○	○
11,30			118	71	12,0	1130	○	○
11,35		M12,1,5	118	71	12,0	1135	○	○

6

Example of order

W9-614X13-0750
WK X-Drill DIN-6537 5xD 7,50 VHM AT

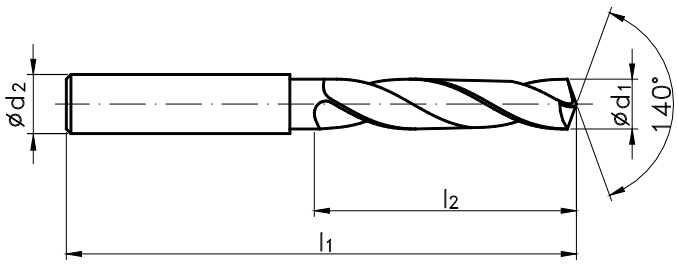
Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

5xD Maximal hole depth

VHM

AT

DIN 6537



MASTERDRILL

X-DRILL

	MASTERDRILL	X-DRILL
Material groups	P M K N S H	P M K N S H
Internal cooling	IK	-
Quality of material	VHM	VHM
Coating	AT	AT

∅ d1	M MF	M "WGN"	l1	l2	∅d2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-614M33	W9-614X13
11,40			118	71	12,0	1140	○	○
11,45		M12x1,25	118	71	12,0	1145	○	○
11,50			118	71	12,0	1150	●	●
11,60		M12x1	118	71	12,0	1160	○	○
11,70			118	71	12,0	1170	○	○
11,80			118	71	12,0	1180	●	●
11,90			118	71	12,0	1190	○	○
12,00	M14		118	71	12,0	1200	●	●
12,30			124	77	14,0	1230	○	○
12,50	M14x1,5		124	77	14,0	1250	●	●
12,80	M14x1,25		124	77	14,0	1280	○	○
13,00	M14x1	M14	124	77	14,0	1300	●	●
13,50			124	77	14,0	1350	●	●
13,80			124	77	14,0	1380	○	○
14,00	M16; M15x1		124	77	14,0	1400	●	●
14,50	M16x1,5		133	83	16,0	1450	●	●
14,80			133	83	16,0	1480	○	○
15,00	M16x1	M16	133	83	16,0	1500	●	●
15,35		M16x1,5	133	83	16,0	1535	○	○
15,50	M18		133	83	16,0	1550	○	○
15,80			133	83	16,0	1580	●	●
16,00	M18x2		133	83	16,0	1600	●	●
16,50	M18x1,5		143	93	18,0	1650	○	○
16,80		M18	143	93	18,0	1680	○	○
17,00	M18x1		143	93	18,0	1700	●	●
17,35		M18x1,5	143	93	18,0	1735	○	○
17,50	M20		143	93	18,0	1750	○	○
17,80			143	93	18,0	1780	○	○
18,00	M20x2		143	93	18,0	1800	●	●
18,50	M20x1,5		153	101	20,0	1850	○	○
18,80		M20	153	101	20,0	1880	○	○
19,00	M20x1		153	101	20,0	1900	○	○
19,35		M20x1,5	153	101	20,0	1935	○	○
19,50	M22		153	101	20,0	1950	○	○
19,80			153	101	20,0	1980	○	○
20,00	M22x2		153	101	20,0	2000	○	○

Example of order

W9-614X13-1200
WK X-Drill DIN-6537 5xD 12,00 VHM AT

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

8xD Maximal hole depth

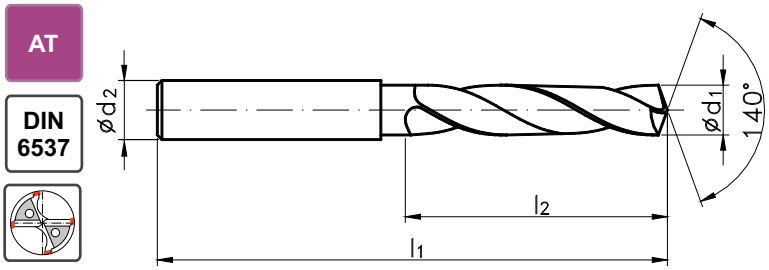
4 łysinki

MASTERDRILL

VHM

AT

DIN 6537



Material groups	P M K N S H
Internal cooling	IK
Quality of material	VHM
Coating	AT

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537
						Tol.	m7
						INDEX	W9-624063
3,00			72	34	6,0	0300	o
3,10			72	34	6,0	0310	o
3,20			72	34	6,0	0320	o
3,30	M4		72	34	6,0	0330	o
3,40			72	34	6,0	0340	o
3,50	M4x0,5		72	34	6,0	0350	o
3,60			72	34	6,0	0360	o
3,70	M4,5	M4	72	34	6,0	0370	o
3,80	M4x0,5		81	43	6,0	0380	o
3,90			81	43	6,0	0390	o
4,00			81	43	6,0	0400	o
4,10			81	43	6,0	0410	o
4,20	M5	M4,5	81	43	6,0	0420	o
4,30			81	43	6,0	0430	o
4,40			81	43	6,0	0440	o
4,50	M5x0,5		81	43	6,0	0450	o
4,60	M5,5		81	43	6,0	0460	o
4,70			81	43	6,0	0470	o
4,80	M5x0,5		95	57	6,0	0480	o
4,90			95	57	6,0	0490	o
5,00	M6		95	57	6,0	0500	o
5,10		M5,5	95	57	6,0	0510	o
5,20	M6x0,75		95	57	6,0	0520	o
5,30			95	57	6,0	0530	o
5,40			95	57	6,0	0540	o
5,50			95	57	6,0	0550	o
5,60		M6	95	57	6,0	0560	o
5,70	M6x0,75		95	57	6,0	0570	o
5,80	M6x0,5		95	57	6,0	0580	o
5,90			95	57	6,0	0590	o
6,00	M7		95	57	6,0	0600	o
6,10			114	76	8,0	0610	o
6,20	M7x0,75		114	76	8,0	0620	o
6,30			114	76	8,0	0630	o
6,40			114	76	8,0	0640	o
6,50			114	76	8,0	0650	o
6,60		M7	114	76	8,0	0660	o
6,70	M7x0,75		114	76	8,0	0670	o
6,80	M8		114	76	8,0	0680	o
6,90			114	76	8,0	0690	o
7,00	M8x1		114	76	8,0	0700	o
7,10			114	76	8,0	0710	o
7,20	M8x0,75		114	76	8,0	0720	o
7,30			114	76	8,0	0730	o
7,40			114	76	8,0	0740	o
7,50			114	76	8,0	0750	o

6

Example of order

W9-624063-0300
WK 1300 3,00 DIN-6537 8xD VHM IK AT

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

8xD Maximal hole depth

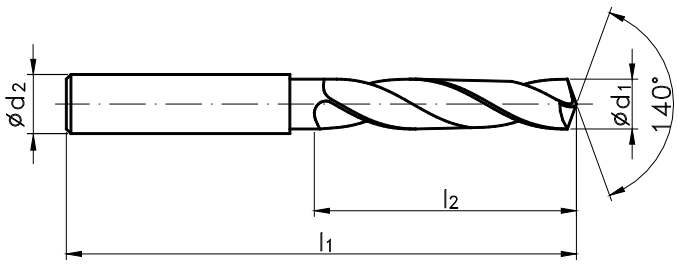
4 łysinki

MASTERDRILL

VHM

AT

DIN 6537



Material groups	P M K N S H
Internal cooling	IK
Quality of material	VHM
Coating	AT

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537
						Tol.	m7
						INDEX	W9-624063
7,60	M8x1		114	76	8,0	0760	o
7,70	M8x0,75		114	76	8,0	0770	o
7,80	M9		114	76	8,0	0780	o
7,90			114	76	8,0	0790	o
8,00	M9x1		114	76	8,0	0800	o
8,10			142	95	10,0	0810	o
8,20	M9x0,75		142	95	10,0	0820	o
8,30			142	95	10,0	0830	o
8,40			142	95	10,0	0840	o
8,50	M10		142	95	10,0	0850	o
8,60		M9x1	142	95	10,0	0860	o
8,70		M9x0,75	142	95	10,0	0870	o
8,80	M10x1,25		142	95	10,0	0880	o
8,90			142	95	10,0	0890	o
9,00	M10x1		142	95	10,0	0900	o
9,10			142	95	10,0	0910	o
9,20	M10x0,75		142	95	10,0	0920	o
9,30			142	95	10,0	0930	o
9,40			142	95	10,0	0940	o
9,50	M11		142	95	10,0	0950	o
9,60		M10x1	142	95	10,0	0960	o
9,70		M10x0,75	142	95	10,0	0970	o
9,80			142	95	10,0	0980	o
9,90			142	95	10,0	0990	o
10,00	M11x1		142	95	10,0	1000	o
10,10			162	114	12,0	1010	o
10,20	M12		162	114	12,0	1020	o
10,30			162	114	12,0	1030	o
10,40			162	114	12,0	1040	o
10,50	M12x1,5		162	114	12,0	1050	o
10,60		M11x1	162	114	12,0	1060	o
10,70			162	114	12,0	1070	o
10,80	M12x1,25		162	114	12,0	1080	o
10,90			162	114	12,0	1090	o
11,00	M12x1		162	114	12,0	1100	o
11,10			162	114	12,0	1110	o
11,20			162	114	12,0	1120	o
11,30			162	114	12,0	1130	o
11,40			162	114	12,0	1140	o
11,50			162	114	12,0	1150	o
11,60		M12x1	162	114	12,0	1160	o
11,70			162	114	12,0	1170	o
11,80			162	114	12,0	1180	o
11,90			162	114	12,0	1190	o
12,00	M14		162	114	12,0	1200	o
12,30			178	133	14,0	1230	o

Example of order

W9-624063-0760
WK 1300 7,60 DIN-6537 8xD VHM IK AT

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

8xD Maximal hole depth

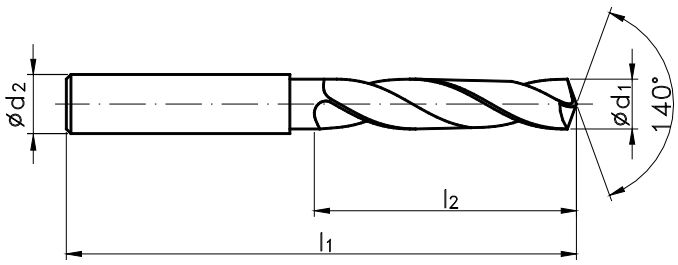
4 łysinki

MASTERDRILL

VHM

AT

DIN 6537



Material groups							P M K N S H			
Internal cooling							IK			
Quality of material							VHM			
Coating							AT			

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537			
						Tol.	m7			
						INDEX	W9-624063			
12,50	M14x1,5		178	133	14,0	1250	o			
12,80			178	133	14,0	1280	o			
13,00	M14x1		178	133	14,0	1300	o			
13,50			178	133	14,0	1350	o			
13,80			178	133	14,0	1380	o			
14,00	M16, M15x1		178	133	14,0	1400	o			
14,50	M16x1,5		203	152	16,0	1450	o			
14,80			203	152	16,0	1480	o			
15,00	M16x1		203	152	16,0	1500	o			
15,50	M18		203	152	16,0	1550	o			
15,80			203	152	16,0	1580	o			
16,00	M18x2		203	152	16,0	1600	o			
16,50	M18x1,5		222	171	18,0	1650	o			
16,80			222	171	18,0	1680	o			
17,00	M18x1		222	171	18,0	1700	o			
17,50	M20		222	171	18,0	1750	o			
17,80			222	171	18,0	1780	o			
18,00	M20x2		222	171	18,0	1800	o			
18,50	M20x1,5		243	190	20,0	1850	o			
19,00	M20x1		243	190	20,0	1900	o			
19,50	M22		243	190	20,0	1950	o			
19,80			243	190	20,0	1980	o			
20,00	M22x2		243	190	20,0	2000	o			

6

Example of order

W9-624063-1250
WK 1300 12,50 DIN-6537 8xD VHM IK AT

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

3xD Maximal hole depth

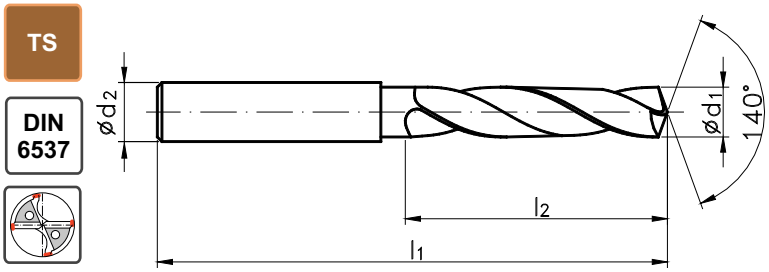
4 łysinki

HRC

VHM

TS

DIN 6537



Material groups	P M K N S H
Internal cooling	IK
Quality of material	VHM
Coating	TS

∅d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537
						Tol.	m7
						INDEX	W9-60G963
3,00			62	20	6,0	0300	o
3,10			62	20	6,0	0310	o
3,20			62	20	6,0	0320	o
3,25		M3,5	62	20	6,0	0325	o
3,30	M4		62	20	6,0	0330	o
3,40			62	20	6,0	0340	o
3,50	M4x0,5		62	20	6,0	0350	o
3,60			62	20	6,0	0360	o
3,70	M4,5	M4	62	20	6,0	0370	o
3,80			66	24	6,0	0380	o
3,90			66	24	6,0	0390	o
4,00			66	24	6,0	0400	o
4,10			66	24	6,0	0410	o
4,20	M5	M4,5	66	24	6,0	0420	o
4,30			66	24	6,0	0430	o
4,40			66	24	6,0	0440	o
4,50	M5x0,5		66	24	6,0	0450	o
4,60	M5,5		66	24	6,0	0460	o
4,65		M5	66	24	6,0	0465	o
4,70			66	24	6,0	0470	o
4,80			66	28	6,0	0480	o
4,90			66	28	6,0	0490	o
5,00	M6		66	28	6,0	0500	o
5,10		M5,5	66	28	6,0	0510	o
5,20	M6x0,75		66	28	6,0	0520	o
5,30			66	28	6,0	0530	o
5,40			66	28	6,0	0540	o
5,50			66	28	6,0	0550	o
5,60		M6	66	28	6,0	0560	o
5,70			66	28	6,0	0570	o
5,80			66	28	6,0	0580	o
5,90			66	28	6,0	0590	o
6,00	M7		66	28	6,0	0600	o
6,10			79	34	8,0	0610	o
6,20	M7x0,75		79	34	8,0	0620	o
6,30			79	34	8,0	0630	o
6,40			79	34	8,0	0640	o
6,50			79	34	8,0	0650	o
6,60		M7	79	34	8,0	0660	o
6,70			79	34	8,0	0670	o
6,80	M8		79	34	8,0	0680	o
6,90			79	34	8,0	0690	o
7,00	M8x1		79	34	8,0	0700	o
7,10			79	41	8,0	0710	o
7,20	M8x0,75		79	41	8,0	0720	o
7,30			79	41	8,0	0730	o

Example of order

W9-60G963-0300
WK HRC 3,00 DIN-6537 3xD VHM IK TS

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

3xD Maximal hole depth

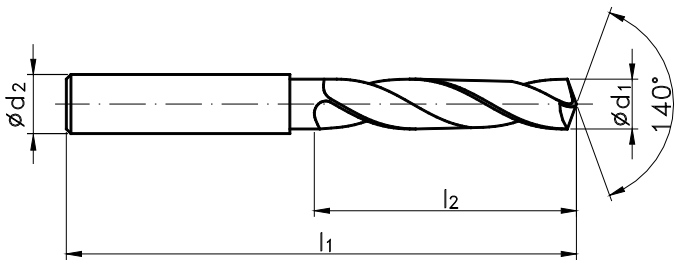
4 łysinki

HRC

VHM

TS

DIN 6537



Material groups	P M K N S H
Internal cooling	IK
Quality of material	VHM
Coating	TS

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537
						Tol.	m7
						INDEX	W9-60G963
7,40			79	41	8,0	0740	o
7,45		M8	79	41	8,0	0745	o
7,50			79	41	8,0	0750	o
7,60		M8x1	79	41	8,0	0760	o
7,70			79	41	8,0	0770	o
7,80	M9		79	41	8,0	0780	o
7,90			79	41	8,0	0790	o
8,00	M9x1		79	41	8,0	0800	o
8,10			89	47	10,0	0810	o
8,20	M9x0,75		89	47	10,0	0820	o
8,30			89	47	10,0	0830	o
8,40			89	47	10,0	0840	o
8,45		M9	89	47	10,0	0845	o
8,50	M10		89	47	10,0	0850	o
8,60		M9x1	89	47	10,0	0860	o
8,70		M9x0,75	89	47	10,0	0870	o
8,80	M10x1,25		89	47	10,0	0880	o
8,90			89	47	10,0	0890	o
9,00	M10x1		89	47	10,0	0900	o
9,10			89	47	10,0	0910	o
9,20	M10x0,75		89	47	10,0	0920	o
9,30			89	47	10,0	0930	o
9,35		M10	89	47	10,0	0935	o
9,40			89	47	10,0	0940	o
9,45		M10x1,25	89	47	10,0	0945	o
9,50	M11		89	47	10,0	0950	o
9,60		M10x1	89	47	10,0	0960	o
9,70		M10x0,75	89	47	10,0	0970	o
9,80			89	47	10,0	0980	o
9,90			89	47	10,0	0990	o
10,00	M11x1		89	47	10,0	1000	o
10,10			102	55	12,0	1010	o
10,20	M12		102	55	12,0	1020	o
10,30			102	55	12,0	1030	o
10,40			102	55	12,0	1040	o
10,50	M12x1,5		102	55	12,0	1050	o
10,60		M11x1	102	55	12,0	1060	o
10,70			102	55	12,0	1070	o
10,80	M12x1,25		102	55	12,0	1080	o
10,90			102	55	12,0	1090	o
11,00	M12x1		102	55	12,0	1100	o
11,10			102	55	12,0	1110	o
11,20			102	55	12,0	1120	o
11,25		M12	102	55	12,0	1125	o
11,30			102	55	12,0	1130	o
11,35		M12x1,5	102	55	12,0	1135	o

6

Example of order

W9-60G963-0740
WK HRC 3,00 DIN-6537 3xD VHM IK TS

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

3xD Maximal hole depth

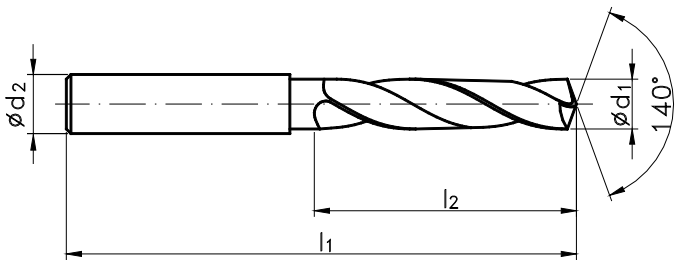
4 łysinki

HRC

VHM

TS

DIN 6537



Material groups							P M K N S H			
Internal cooling							IK			
Quality of material							VHM			
Coating							TS			
∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537			
						Tol.	m7			
						INDEX	W9-60G963			
11,40			102	55	12,0	1140	o			
11,45		M12x1,25	102	55	12,0	1145	o			
11,50			102	55	12,0	1150	o			
11,60		M12x1	102	55	12,0	1160	o			
11,70			102	55	12,0	1170	o			
11,80			102	55	12,0	1180	o			
11,90			102	55	12,0	1190	o			
12,00	M14		102	55	12,0	1200	o			
12,30			107	60	14,0	1230	o			
12,50	M14x1,5		107	60	14,0	1250	o			
12,80	M14x1,25		107	60	14,0	1280	o			
13,00	M14x1	M14	107	60	14,0	1300	o			
13,50			107	60	14,0	1350	o			
13,80			107	60	14,0	1380	o			
14,00	M16; M15x1		107	60	14,0	1400	o			
14,50	M16x1,5		115	65	16,0	1450	o			
14,80			115	65	16,0	1480	o			
15,00	M16x1	M16	115	65	16,0	1500	o			
15,35		M16x1,5	115	65	16,0	1535	o			
15,50	M18		115	65	16,0	1550	o			
15,80			115	65	16,0	1580	o			
16,00	M18x2		115	65	16,0	1600	o			
16,50	M18x1,5		123	73	18,0	1650	o			
16,80		M18	123	73	18,0	1680	o			
17,00	M18x1		123	73	18,0	1700	o			
17,35		M18x1,5	123	73	18,0	1735	o			
17,50	M20		123	73	18,0	1750	o			
17,80			123	73	18,0	1780	o			
18,00	M20x2		123	73	18,0	1800	o			
18,50	M20x1,5		131	79	20,0	1850	o			
18,80		M20	131	79	20,0	1880	o			
19,00	M20x1		131	79	20,0	1900	o			
19,35		M20x1,5	131	79	20,0	1935	o			
19,50	M22		131	79	20,0	1950	o			
19,80			131	79	20,0	1980	o			
20,00	M22x2		131	79	20,0	2000	o			

6

Example of order

W9-60G963-1140
WK HRC 3,00 DIN-6537 3xD VHM IK TS

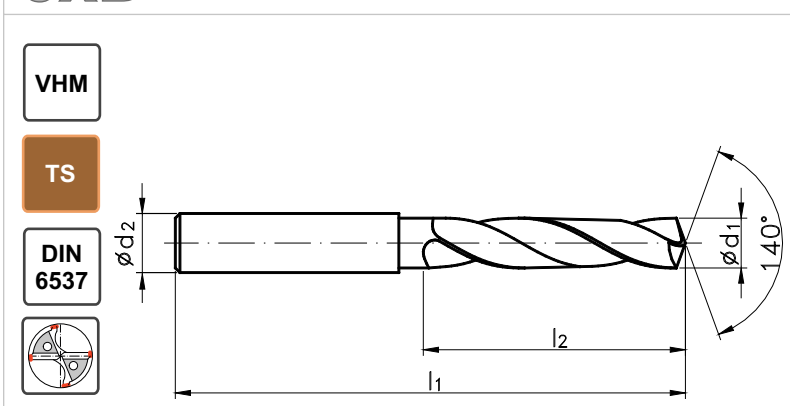
Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

5xD Maximal hole depth — 4 łysinki — HRC

VHM

TS

DIN 6537



Material groups	P M K N S H		
Internal cooling	IK		
Quality of material	VHM		
Coating	TS		

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537		
						Tol.	m7		
						INDEX	W9-61G963		
3,00			66	28	6,0	0300	o		
3,10			66	28	6,0	0310	o		
3,20			66	28	6,0	0320	o		
3,25		M3,5	66	28	6,0	0325	o		
3,30	M4		66	28	6,0	0330	o		
3,40			66	28	6,0	0340	o		
3,50	M4x0,5		66	28	6,0	0350	o		
3,60			66	28	6,0	0360	o		
3,70	M4,5	M4	66	28	6,0	0370	o		
3,80			74	36	6,0	0380	o		
3,90			74	36	6,0	0390	o		
4,00			74	36	6,0	0400	o		
4,10			74	36	6,0	0410	o		
4,20	M5	M4,5	74	36	6,0	0420	o		
4,30			74	36	6,0	0430	o		
4,40			74	36	6,0	0440	o		
4,50	M5x0,5		74	36	6,0	0450	o		
4,60	M5,5		74	36	6,0	0460	o		
4,65		M5	74	36	6,0	0465	o		
4,70			74	36	6,0	0470	o		
4,80			82	44	6,0	0480	o		
4,90			82	44	6,0	0490	o		
5,00	M6		82	44	6,0	0500	o		
5,10		M5,5	82	44	6,0	0510	o		
5,20	M6x0,75		82	44	6,0	0520	o		
5,30			82	44	6,0	0530	o		
5,40			82	44	6,0	0540	o		
5,50			82	44	6,0	0550	o		
5,60		M6	82	44	6,0	0560	o		
5,70			82	44	6,0	0570	o		
5,80			82	44	6,0	0580	o		
5,90			82	44	6,0	0590	o		
6,00	M7		82	44	6,0	0600	o		
6,10			91	53	8,0	0610	o		
6,20	M7x0,75		91	53	8,0	0620	o		
6,30			91	53	8,0	0630	o		
6,40			91	53	8,0	0640	o		
6,50			91	53	8,0	0650	o		
6,60		M7	91	53	8,0	0660	o		
6,70			91	53	8,0	0670	o		
6,80	M8		91	53	8,0	0680	o		
6,90			91	53	8,0	0690	o		
7,00	M8x1		91	53	8,0	0700	o		
7,10			91	53	8,0	0710	o		
7,20	M8x0,75		91	53	8,0	0720	o		
7,30			91	53	8,0	0730	o		

Example of order

W9-61G963-0300
WK HRC 3,00 DIN-6537 5xD VHM IK TS

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

5xD Maximal hole depth

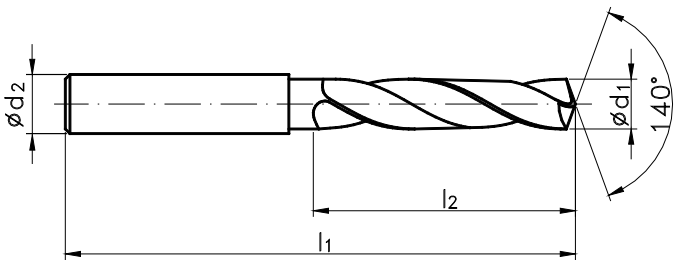
4 łysinki

HRC

VHM

TS

DIN 6537



Material groups	P M K N S H
Internal cooling	IK
Quality of material	VHM
Coating	TS

∅ d1	M MF	M "WGN"	l1	l2	∅d2h6	Norm	DIN-6537
						Tol.	m7
						INDEX	W9-61G963
7,40			91	53	8,0	0740	o
7,45		M8	91	53	8,0	0745	o
7,50			91	53	8,0	0750	o
7,60		M8x1	91	53	8,0	0760	o
7,70			91	53	8,0	0770	o
7,80	M9		91	53	8,0	0780	o
7,90			91	53	8,0	0790	o
8,00	M9x1		91	53	8,0	0800	o
8,10			103	61	10,0	0810	o
8,20	M9x0,75		103	61	10,0	0820	o
8,30			103	61	10,0	0830	o
8,40			103	61	10,0	0840	o
8,45		M9	103	61	10,0	0845	o
8,50	M10		103	61	10,0	0850	o
8,60		M9x1	103	61	10,0	0860	o
8,70		M9x0,75	103	61	10,0	0870	o
8,80	M10x1,25		103	61	10,0	0880	o
8,90			103	61	10,0	0890	o
9,00	M10x1		103	61	10,0	0900	o
9,10			103	61	10,0	0910	o
9,20	M10x0,75		103	61	10,0	0920	o
9,30			103	61	10,0	0930	o
9,35		M10	103	61	10,0	0935	o
9,40			103	61	10,0	0940	o
9,45		M10x1,25	103	61	10,0	0945	o
9,50	M11		103	61	10,0	0950	o
9,60		M10x1	103	61	10,0	0960	o
9,70		M10x0,75	103	61	10,0	0970	o
9,80			103	61	10,0	0980	o
9,90			103	61	10,0	0990	o
10,00	M11x1		103	61	10,0	1000	o
10,10			118	71	12,0	1010	o
10,20	M12		118	71	12,0	1020	o
10,30			118	71	12,0	1030	o
10,40			118	71	12,0	1040	o
10,50	M12x1,5		118	71	12,0	1050	o
10,60		M11x1	118	71	12,0	1060	o
10,70			118	71	12,0	1070	o
10,80	M12x1,25		118	71	12,0	1080	o
10,90			118	71	12,0	1090	o
11,00	M12x1		118	71	12,0	1100	o
11,10			118	71	12,0	1110	o
11,20			118	71	12,0	1120	o
11,25		M12	118	71	12,0	1125	o
11,30			118	71	12,0	1130	o
11,35		M12,1,5	118	71	12,0	1135	o

Example of order

W9-61G963-0740
WK HRC 3,00 DIN-6537 5xD VHM IK TS

Posibility of production drills with shank according to DIN-6535-HB, DIN-6535-HE

5xD Maximal hole depth

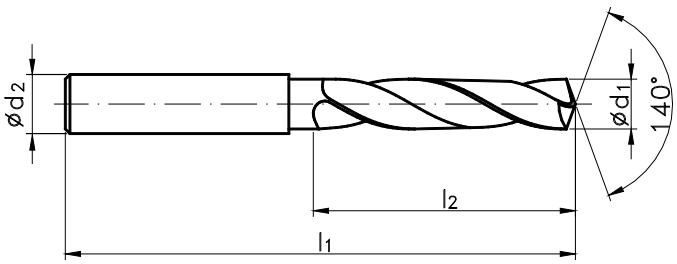
4 łysinki

HRC

VHM

TS

DIN 6537



Material groups							P M K N S H			
Internal cooling							IK			
Quality of material							VHM			
Coating							TS			

∅ d_1	M MF	M "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537		
						Tol.	m7		
						INDEX	W9-61G963		
11,40			118	71	12,0	1140	o		
11,45		M12x1,25	118	71	12,0	1145	o		
11,50			118	71	12,0	1150	o		
11,60		M12x1	118	71	12,0	1160	o		
11,70			118	71	12,0	1170	o		
11,80			118	71	12,0	1180	o		
11,90			118	71	12,0	1190	o		
12,00	M14		118	71	12,0	1200	o		
12,30			124	77	14,0	1230	o		
12,50	M14x1,5		124	77	14,0	1250	o		
12,80	M14x1,25		124	77	14,0	1280	o		
13,00	M14x1	M14	124	77	14,0	1300	o		
13,50			124	77	14,0	1350	o		
13,80			124	77	14,0	1380	o		
14,00	M16; M15x1		124	77	14,0	1400	o		
14,50	M16x1,5		133	83	16,0	1450	o		
14,80			133	83	16,0	1480	o		
15,00	M16x1	M16	133	83	16,0	1500	o		
15,35		M16x1,5	133	83	16,0	1535	o		
15,50	M18		133	83	16,0	1550	o		
15,80			133	83	16,0	1580	o		
16,00	M18x2		133	83	16,0	1600	o		
16,50	M18x1,5		143	93	18,0	1650	o		
16,80		M18	143	93	18,0	1680	o		
17,00	M18x1		143	93	18,0	1700	o		
17,35		M18x1,5	143	93	18,0	1735	o		
17,50	M20		143	93	18,0	1750	o		
17,80			143	93	18,0	1780	o		
18,00	M20x2		143	93	18,0	1800	o		
18,50	M20x1,5		153	101	20,0	1850	o		
18,80		M20	153	101	20,0	1880	o		
19,00	M20x1		153	101	20,0	1900	o		
19,35		M20x1,5	153	101	20,0	1935	o		
19,50	M22		153	101	20,0	1950	o		
19,80			153	101	20,0	1980	o		
20,00	M22x2		153	101	20,0	2000	o		

6

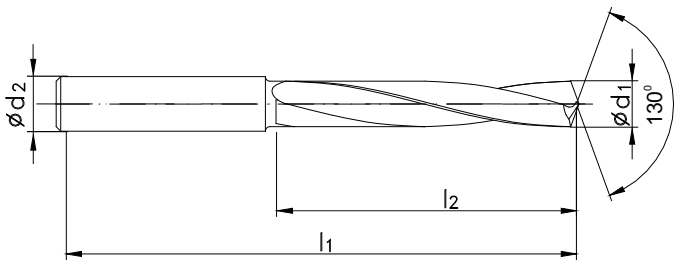
5xD Maximal hole depth

AL

VHM

TB

DIN 6537



Material groups	P M K N S H	P M K N S H
Internal cooling	IK	IK
Quality of material	VHM	VHM
Coating	-	TB

∅ d_1	M MF	M MF "WGN"	l_1	l_2	∅d_2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-611733	W9-61B733
3,00			66	28	6,0	0300	o	o
3,10			66	28	6,0	0310	o	o
3,20			66	28	6,0	0320	o	o
3,25		M3,5	66	28	6,0	0325	o	o
3,30	M4		66	28	6,0	0330	o	o
3,40			66	28	6,0	0340	o	o
3,50	M4x0,5		66	28	6,0	0350	o	o
3,60			66	28	6,0	0360	o	o
3,70	M4,5	M4	66	28	6,0	0370	o	o
3,80			74	36	6,0	0380	o	o
3,90			74	36	6,0	0390	o	o
4,00			74	36	6,0	0400	o	o
4,10			74	36	6,0	0410	o	o
4,20	M5	M4,5	74	36	6,0	0420	o	o
4,30			74	36	6,0	0430	o	o
4,40			74	36	6,0	0440	o	o
4,50	M5x0,5		74	36	6,0	0450	o	o
4,60	M5,5		74	36	6,0	0460	o	o
4,65		M5	74	36	6,0	0465	o	o
4,70			74	36	6,0	0470	o	o
4,80			82	44	6,0	0480	o	o
4,90			82	44	6,0	0490	o	o
5,00	M6		82	44	6,0	0500	o	o
5,10		M5,5	82	44	6,0	0510	o	o
5,20	M6x0,75		82	44	6,0	0520	o	o
5,30			82	44	6,0	0530	o	o
5,40			82	44	6,0	0540	o	o
5,50			82	44	6,0	0550	o	o
5,60		M6	82	44	6,0	0560	o	o
5,70			82	44	6,0	0570	o	o
5,80			82	44	6,0	0580	o	o
5,90			82	44	6,0	0590	o	o
6,00	M7		82	44	6,0	0600	o	o
6,10			91	53	8,0	0610	o	o
6,20	M7x0,75		91	53	8,0	0620	o	o
6,30			91	53	8,0	0630	o	o
6,40			91	53	8,0	0640	o	o
6,50			91	53	8,0	0650	o	o
6,60		M7	91	53	8,0	0660	o	o
6,70			91	53	8,0	0670	o	o
6,80	M8		91	53	8,0	0680	o	o
6,90			91	53	8,0	0690	o	o
7,00	M8x1		91	53	8,0	0700	o	o
7,10			91	53	8,0	0710	o	o
7,20	M8x0,75		91	53	8,0	0720	o	o
7,30			91	53	8,0	0730	o	o

Example of order

W9-611733-0300
WK AL 3,00 DIN-6537 5xD VHM IK TB

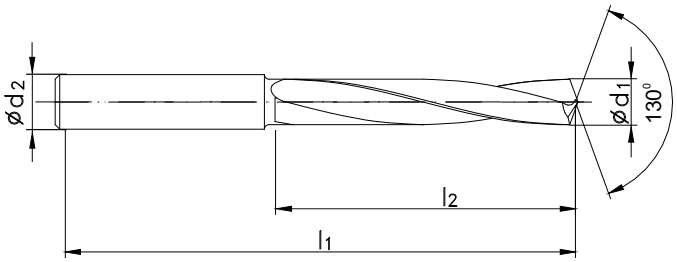
5xD Maximal hole depth

AL

VHM

TB

DIN 6537



Material groups	P M K N S H	P M K N S H
Internal cooling	IK	IK
Quality of material	VHM	VHM
Coating	-	TB

∅ d1	M MF	M MF "WGN"	l1	l2	∅d2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-611733	W9-61B733
7,40			91	53	8,0	0740	o	o
7,45		M8	91	53	8,0	0745	o	o
7,50			91	53	8,0	0750	o	o
7,60		M8x1	91	53	8,0	0760	o	o
7,70			91	53	8,0	0770	o	o
7,80	M9		91	53	8,0	0780	o	o
7,90			91	53	8,0	0790	o	o
8,00	M9x1		91	53	8,0	0800	o	o
8,10			103	61	10,0	0810	o	o
8,20	M9x0,75		103	61	10,0	0820	o	o
8,30			103	61	10,0	0830	o	o
8,40			103	61	10,0	0840	o	o
8,45		M9	103	61	10,0	0845	o	o
8,50	M10		103	61	10,0	0850	o	o
8,60		M9x1	103	61	10,0	0860	o	o
8,70		M9x0,75	103	61	10,0	0870	o	o
8,80	M10x1,25		103	61	10,0	0880	o	o
8,90			103	61	10,0	0890	o	o
9,00	M10x1		103	61	10,0	0900	o	o
9,10			103	61	10,0	0910	o	o
9,20	M10x0,75		103	61	10,0	0920	o	o
9,30			103	61	10,0	0930	o	o
9,35		M10	103	61	10,0	0935	o	o
9,40			103	61	10,0	0940	o	o
9,45		M10x1,25	103	61	10,0	0945	o	o
9,50	M11		103	61	10,0	0950	o	o
9,60		M10x1	103	61	10,0	0960	o	o
9,70		M10x0,75	103	61	10,0	0970	o	o
9,80			103	61	10,0	0980	o	o
9,90			103	61	10,0	0990	o	o
10,00	M11x1		103	61	10,0	1000	o	o
10,10			118	71	12,0	1010	o	o
10,20	M12		118	71	12,0	1020	o	o
10,30			118	71	12,0	1030	o	o
10,40			118	71	12,0	1040	o	o
10,50	M12x1,5		118	71	12,0	1050	o	o
10,60		M11x1	118	71	12,0	1060	o	o
10,70			118	71	12,0	1070	o	o
10,80	M12x1,25		118	71	12,0	1080	o	o
10,90			118	71	12,0	1090	o	o
11,00	M12x1		118	71	12,0	1100	o	o
11,10			118	71	12,0	1110	o	o
11,20			118	71	12,0	1120	o	o
11,25		M12	118	71	12,0	1125	o	o
11,30			118	71	12,0	1130	o	o
11,35		M12x1,5	118	71	12,0	1135	o	o

6

Example of order

W9-611733-0740
WK AL 7,40 DIN-6537 5xD VHM IK

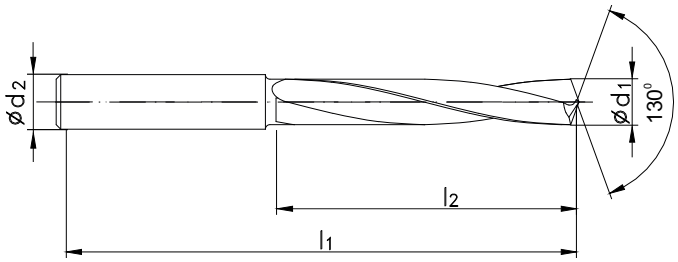
5xD Maximal hole depth

AL

VHM

TB

DIN 6537



Material groups	P M K N S H	P M K N S H
Internal cooling	IK	IK
Quality of material	VHM	VHM
Coating	-	TB

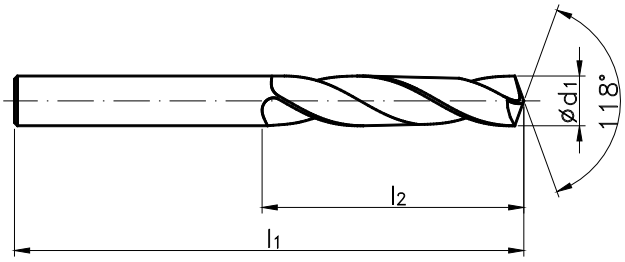
∅ d 1	M MF	M MF "WGN"	l1	l2	∅d2h6	Norm	DIN-6537	
						Tol.	m7	m7
						INDEX	W9-611733	W9-61B733
11,40			118	71	12,0	1140	o	o
11,45		M12x1,25	118	71	12,0	1145	o	o
11,50			118	71	12,0	1150	o	o
11,60		M12x1	118	71	12,0	1160	o	o
11,70			118	71	12,0	1170	o	o
11,80			118	71	12,0	1180	o	o
11,90			118	71	12,0	1190	o	o
12,00	M14		118	71	12,0	1200	o	o
12,30			124	77	14,0	1230	o	o
12,50	M14x1,5		124	77	14,0	1250	o	o
12,80	M14x1,25		124	77	14,0	1280	o	o
13,00	M14x1	M14	124	77	14,0	1300	o	o
13,50			124	77	14,0	1350	o	o
13,80			124	77	14,0	1380	o	o
14,00	M16; M15x1		124	77	14,0	1400	o	o
14,50	M16x1,5		133	83	16,0	1450	o	o
14,80			133	83	16,0	1480	o	o
15,00	M16x1	M16	133	83	16,0	1500	o	o
15,35		M16x1,5	133	83	16,0	1535	o	o
15,50	M18		133	83	16,0	1550	o	o
15,80			133	83	16,0	1580	o	o
16,00	M18x2		133	83	16,0	1600	o	o
16,50	M18x1,5		143	93	18,0	1650	o	o
16,80		M18	143	93	18,0	1680	o	o
17,00	M18x1		143	93	18,0	1700	o	o
17,35		M18x1,5	143	93	18,0	1735	o	o
17,50	M20		143	93	18,0	1750	o	o
17,80			143	93	18,0	1780	o	o
18,00	M20x2		143	93	18,0	1800	o	o
18,50	M20x1,5		153	101	20,0	1850	o	o
18,80		M20	153	101	20,0	1880	o	o
19,00	M20x1		153	101	20,0	1900	o	o
19,35		M20x1,5	153	101	20,0	1935	o	o
19,50	M22		153	101	20,0	1950	o	o
19,80			153	101	20,0	1980	o	o
20,00	M22x2		153	101	20,0	2000	o	o

Example of order

W9-611733-1140
WK AL 11,40 DIN-6537 VHM 5xD

VHM

DIN 6539



X-DRILL

Material groups	P M K N S H
Internal cooling	-
Quality of material	VHM
Coating	-

∅ d_1	M MF	M "WGN"	l_1	l_2	Norm	DIN-6539
					Tol.	h7
					INDEX	W9-801014
0,75	M1		22	6	0075	●
0,85	M1,1		24	6	0085	●
0,90		M1	24	7	0090	●
0,95	M1,2		24	7	0095	●
1,00		M1,1	26	7	0100	●
1,10	M1,4		28	8	0110	●
1,25	M1,6		30	9	0125	●
1,28		M1,4	30	9	0128	●
1,35	M1,7		30	9	0135	●
1,45	M1,8		32	10	0145	●
1,47		M1,6	32	10	0147	●
1,57		M1,7	32	10	0157	●
1,60	M2		34	11	0160	●
1,67		M1,8	34	11	0167	●
1,75	M2,2		34	11	0175	●
1,85		M2	36	12	0185	●
1,90	M2,3		36	12	0190	●
2,00			38	12	0200	●
2,03		M2,2	38	12	0203	●
2,05	M2,5		38	12	0205	●
2,10			38	12	0210	●
2,15	M2,6	M2,3	38	12	0215	●
2,20			40	13	0220	●
2,30			40	13	0230	●
2,33		M2,5	40	13	0233	●
2,40			43	14	0240	●
2,43		M2,6	43	14	0243	●
2,50	M3		43	14	0250	●
2,60			43	14	0260	●
2,70			46	16	0270	●
2,80		M3	46	16	0280	●
2,90	M3,5		46	16	0290	●

6

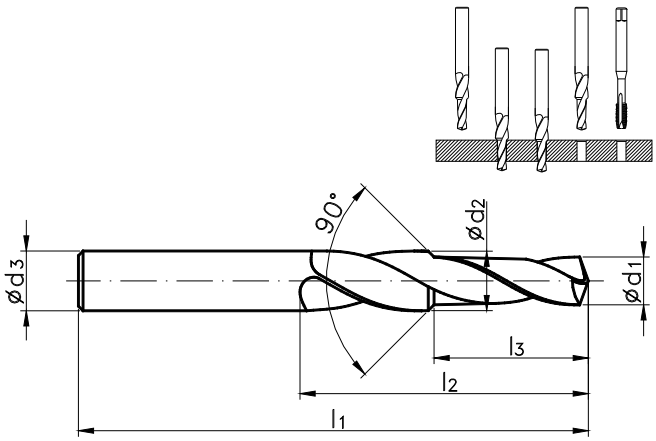
Example of order

W9-801014-0075
WK 1300micro 0,75 DIN-6539 VHM

VHM

AT

DIN 6537



X-DRILL

Material groups	P M K N S H
Execution	90°
Quality of material	VHM
Coating	AT

∅ d_1	M	l_1	l_2	l_3	∅ d_2	∅d_2h6	Norm	~DIN-6537
							Tol.	m7
							INDEX	W9-704010
2,50	M3	66	20	8,8	6	6	0250	●
3,30	M4	66	24	11,4	6	6	0330	●
4,20	M5	66	28	13,6	6	6	0420	●
5,00	M6	79	34	16,5	8	8	0500	●
6,80	M8	89	47	21,0	10	10	0680	●
8,50	M10	102	55	25,5	12	12	0850	●
10,20	M12	107	60	30,0	14	14	1020	●
12,00	M14	115	65	34,5	16	16	1200	●
14,00	M16	123	73	38,5	18	18	1400	●

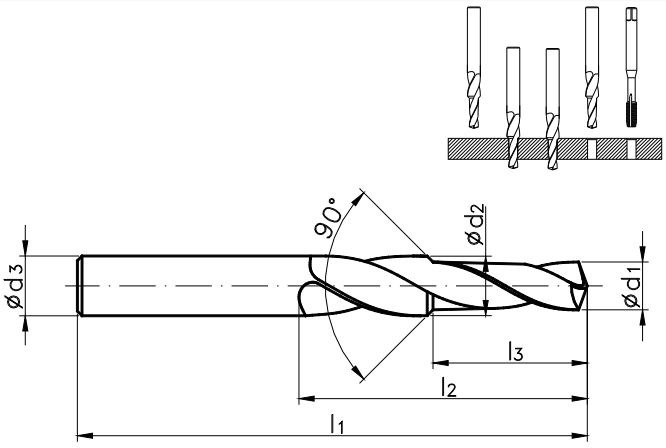
Example of order

W9-704010-0330
WT 1300 3,30 DIN-6537 VHM AT

VHM

AT

DIN ~6537



X-DRILL

Material groups	P M K N S H
Execution	90°
Quality of material	VHM
Coating	AT

Ød1	M MF	l1	l2	l3	Ø d2	Ød3h6	Norm	~DIN-6537
							Tol.	m7
							INDEX	W9-704010
2,80	M3	62	20	12	6	6	0280	●
3,70	M4	64	24	14	6	6	0370	●
4,65	M5	80	28	20	6	6	0465	●
5,55	M6	80	34	24	8	8	0555	●
7,45	M8	80	47	30	10	10	0745	●
9,30	M10	90	55	40	12	12	0930	●
11,20	M12	100	60	45	14	14	1120	○

6

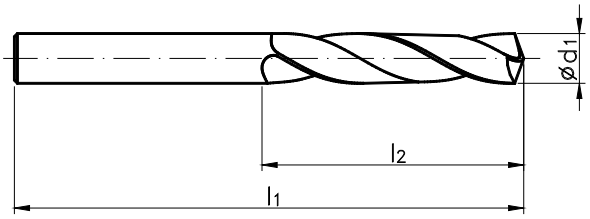
Example of order

W9-704010-0235
WT 1300 2,35 DIN-6537 VHM

HSSE

TN2

DIN 338



INOX

Material groups	P M K N S H	P M K N S H
Internal cooling	-	-
Quality of material	HSSE	HSSE
Coating	-	TN2

∅ d_1	M MF	M MF "WGN"	l_1	l_2	Norm	DIN-338	
					Tol.	h8	h8
					INDEX	W2-101811	W2-103811
1,00		M1,1	34	12	0100	●	○
1,10	M1,4	M1,2	36	14	0110	●	○
1,20			38	16	0120	●	○
1,30			38	16	0130	●	○
1,40			40	18	0140	●	○
1,50			40	18	0150	●	○
1,60	M2		43	20	0160	●	○
1,70			43	20	0170	●	○
1,80			46	22	0180	●	○
1,83		M2	46	22	0183	○	○
1,90	M2,3		46	22	0190	●	○
2,00		M2,2	49	24	0200	●	●
2,05	M2,5		49	24	0205	○	○
2,10			49	24	0210	●	○
2,20			53	27	0220	●	○
2,30		M2,5	53	27	0230	●	○
2,40			57	30	0240	●	○
2,50	M3		57	30	0250	●	●
2,60			57	30	0260	●	○
2,70			61	33	0270	●	○
2,80		M3	61	33	0280	●	○
2,90	M3,5		61	33	0290	●	○
3,00			61	33	0300	●	●
3,10			65	36	0310	●	○
3,20			65	36	0320	●	●
3,25		M3,5	65	36	0325	○	○
3,30	M4		65	36	0330	●	●
3,40			70	39	0340	●	○
3,50	M4x0,5		70	39	0350	●	●
3,60			70	39	0360	●	○
3,70	M4,5	M4	70	39	0370	●	○
3,80			75	43	0380	●	○
3,90			75	43	0390	●	○
4,00			75	43	0400	●	●
4,10			75	43	0410	●	○
4,20	M5		75	43	0420	●	●
4,30			80	47	0430	●	○
4,40			80	47	0440	●	○
4,50	M5x0,5		80	47	0450	●	●
4,60	M5,5		80	47	0460	●	○
4,65		M5	80	47	0465	○	○
4,70			80	47	0470	●	○
4,80			86	52	0480	●	○
4,90			86	52	0490	●	○
5,00	M6		86	52	0500	●	●
5,10			86	52	0510	●	●

6

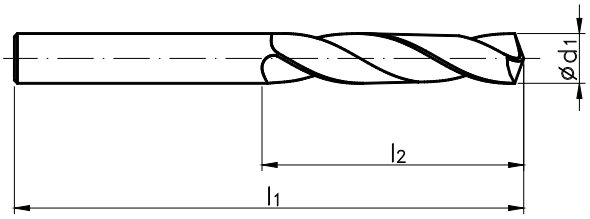
Example of order

W2-101811-0100
WK INOX 1,00 DIN-338 HSSE

HSSE

TN2

DIN 338



INOX

Material groups	P M K N S H	P M K N S H
Internal cooling	-	-
Quality of material	HSSE	HSSE
Coating	-	TN2

∅ d_1	M MF	M MF "WGN"	l_1	l_2	Norm	DIN-338	
					Tol.	h8	h8
					INDEX	W2-101811	W2-103811
5,20	M6x0,75		86	52	0520	●	○
5,30			86	52	0530	●	○
5,40			93	57	0540	●	○
5,50			93	57	0550	●	●
5,55			93	57	0555	○	○
5,60		M6	93	57	0560	●	○
5,70			93	57	0570	●	○
5,80			93	57	0580	●	○
5,90			93	57	0590	●	○
6,00	M7		93	57	0600	●	●
6,10			101	63	0610	●	○
6,20	M7x0,75		101	63	0620	●	○
6,30			101	63	0630	●	○
6,40			101	63	0640	●	○
6,50			101	63	0650	●	●
6,60		M7	101	63	0660	●	○
6,70			101	63	0670	●	○
6,80	M8		109	69	0680	●	●
6,90			109	69	0690	●	●
7,00	M8x1		109	69	0700	●	●
7,10			109	69	0710	●	○
7,20	M8x0,75		109	69	0720	●	○
7,30			109	69	0730	●	○
7,40		M8	109	69	0740	●	○
7,50			109	69	0750	●	●
7,60			117	75	0760	●	○
7,70			117	75	0770	●	○
7,80	M9		117	75	0780	●	○
7,90			117	75	0790	●	○
8,00	M9x1		117	75	0800	●	●
8,10			117	75	0810	●	○
8,20	M9x0,75		117	75	0820	●	●
8,30			117	75	0830	●	○
8,40			117	75	0840	●	○
8,50	M10		117	75	0850	●	●
8,60			125	81	0860	●	○
8,70			125	81	0870	●	○
8,80	M10x1,25		125	81	0880	●	○
8,90			125	81	0890	●	○
9,00	M10x1		125	81	0900	●	●
9,10			125	81	0910	●	○
9,20	M10x0,75		125	81	0920	●	○
9,30		M10	125	81	0930	●	○
9,40			125	81	0940	○	○
9,50	M11		125	81	0950	●	●
9,60			133	87	0960	○	○

6

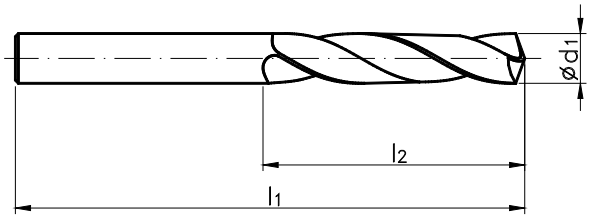
Example of order

W2-101811-0520
WK INOX 5,20 DIN-338 HSSE

HSSE

TN2

DIN 338



INOX

Material groups	P M K N S H	P M K N S H
Internal cooling	-	-
Quality of material	HSSE	HSSE
Coating	-	TN2

∅ d_1	M MF	M MF "WGN"	l_1	l_2	Norm	DIN-338	
					Tol.	h8	h8
					INDEX	W2-101811	W2-103811
9,70			133	87	0970	●	○
9,80			133	87	0980	●	○
9,90			133	87	0990	○	○
10,00	M11x1		133	87	1000	●	●
10,10			133	87	1010	●	○
10,20	M12		133	87	1020	●	●
10,30			133	87	1030	●	○
10,40			133	87	1040	○	○
10,50	M12x1,5		133	87	1050	●	●
10,60			133	87	1060	●	○
10,70			142	94	1070	○	○
10,80	M12x1,25		142	94	1080	●	○
10,90			142	94	1090	○	○
11,00	M12x1		142	94	1100	●	●
11,10			142	94	1110	○	○
11,20		M12	142	94	1120	●	○
11,30			142	94	1130	○	○
11,40			142	94	1140	○	○
11,50			142	94	1150	●	○
11,60			142	94	1160	○	○
11,70			142	94	1170	○	○
11,80			142	94	1180	●	○
11,90			151	101	1190	○	○
12,00	M14		151	101	1200	●	●
12,10			151	101	1210	●	○
12,20			151	101	1220	●	○
12,30			151	101	1230	●	○
12,50	M14x1,5		151	101	1250	●	●
12,60			151	101	1260	○	○
12,70			151	101	1270	●	○
12,80	M14x1,25		151	101	1280	●	○
12,90			151	101	1290	○	○
13,00	M14x1	M14	151	101	1300	●	●
13,20			151	101	1320	●	○
13,50			160	108	1350	●	○
13,80			160	108	1380	○	○
14,00	M16;M15x1		160	108	1400	●	●
14,50	M16x1,5		169	114	1450	●	○
15,00	M16x1	M16	169	114	1500	●	●
15,50	M18		178	120	1550	○	○
16,00	M18x2		178	120	1600	●	●

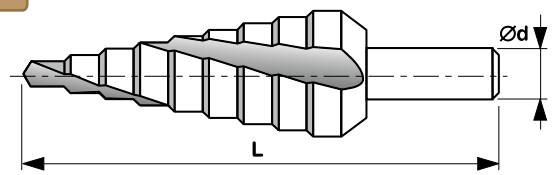
6

Example of order

W2-101811-0970
WK INOX 9,70 DIN-338 HSSE

HSS

TN2



Material groups			-	-	-	-
Internal cooling			-	-	-	-
Quality of material			HSS	HSS	HSS	HSS
Coating			-	-	TN2	TN2
Flute type			straight	spiral R25	straight	spiral R25
∅ d	L	∅ D	INDEX	INDEX	INDEX	INDEX
8	75	4/6/8/10/12/14/16/18/20	W1-641010-0420	W1-648010-0420	W1-646010-0420	W1-649010-0420
10	100	6/8/10/12/14/16/18/20/22/24/26/28/30	W1-641020-0630	W1-648020-0630	W1-646020-0630	W1-649020-0630
10	100	6/9/13/16/19/21/23/26/29/32/35/38	W1-641030-0638	W1-648030-0638	W1-646030-0638	W1-649030-0638
10	100	6/9/11,4/14/17,25/19/21,25/24/26,75/30/33/35,7	W1-642030-0636	W1-645030-0636	-	-
10	100	6/9/12,5/15,2/18,6/20,4/22,5/26/28,3/30,5/34/37	W1-642040-0637	W1-645040-0637	-	-

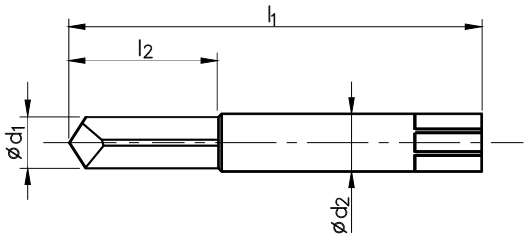
Example of order
WST W1-641010-0420

Drill to remove broken taps

WDG

VHM

AT



Material groups	P M K N S H
Internal cooling	-
Quality of material	VHM
Coating	AT

∅ d_1	M	l_1 ±2	l_2 ±2	∅ d_2	Norm	
					Tol.	
					INDEX	W9-900002
2,5	M3	38	10	3	0250	●
3,3	M4	46	14	4	0330	●
4,2	M5	50	19	5	0420	●
5,0	M6	50	23	6	0500	●
6,8	M8	60	23	8	0680	●
8,5	M10	80	25	10	0850	●
10,2	M12	80	35	12	1020	●

Operation instruction:
1. The workpiece has to be clamped very stable and safe.
2. The overlapping part of the tap has to be made plane with the workpiece.
3. Centering of the drill by multiple tip-centering. In case of tip-centering with an NC machine please choose a lower cutting feed.
4. The remove of a tap can be made with an NC machine with lubrication (Attention: risk of bonding) also by hand with a bench drilling or column driling machine. Multiple chipping removal is absolutely necessary.
5. Remove of remaining chippings with compressed air or with a scriber.
6. New thrad cutting with a new tap
7. After finishing the new thread please test the size accuracy.
1-5 taps can be remove with one drill to remove jammed taps.
Regrinding of drills to remove jammed taps is not economical.
Due to the hexagon this drill can also be clamped in normal three- or four-jaw chucks.
In case of correct use the core hole will not be damaged in all materials, also in Cu or Al and hardened materials

Feed		fz		fz		fz		fz		fz	
Vc m/min		ϕ3,3-6,8		ϕ6,8-10,2		ϕ10,2-14,0		ϕ14,0-15,5		ϕ15,5-17,5	
od	do	od	do	od	do	od	do	od	do	od	do
10	12	0,040	0,08	0,08	0,110	0,110	0,140	0,140	0,150	0,150	0,170

Drill set to remove broken taps
p. 260

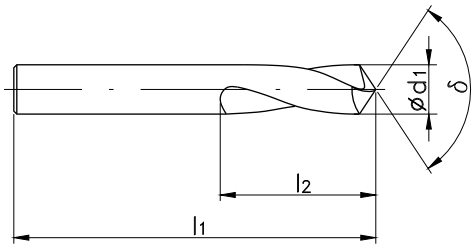
Example of order
W9-900002-0250
WDG 2,5 VHM AT

For spot and chamfering thread holes in one operation

VHM

TN2

HSSE



Material groups	P M K N S H	P M K N S H	P M K N S H
Internal cooling	-	-	-
Quality of material	HSSE	HSSE	VHM
Coating	TN2	TN2	-
Point angle	90°	120°	142°

Ø d1	δ90 / δ120°		δ142°		Norm			
	l1	l2	l1	l2	Tol.			
					INDEX	W2-003012	W2-003013	W9-001014
3,0	46	12	45	12,0	0300	●	○	○
4,0	55	12	50	15,0	0400	●	●	●
5,0	62	15	50	18,0	0500	●	●	●
6,0	66	20	50	21,0	0600	●	○	○
8,0	79	25	60	25,0	0800	○	○	○
10,0	89	25	70	27,0	0100	○	○	○
12,0	102	30	70	27,0	0120	●	●	●
14,0	107	34	75	30,0	0140	○	○	○
16,0	115	35	75	30,0	0160	○	○	○

		Vc[m/min]			Feed [mm/rev]		
		HSSE	HSSE+TN2	VHM	ø2-ø6	ø6-ø10	ø10-ø16
P	Rm<500	35-45	45-55	40-55	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<800	30-40	40-50		0,08-0,15	0,15-0,25	0,25-0,30
	Rm<1000	25-35	35-45		0,05-0,14	0,14-0,20	0,20-0,25
	Rm<1400	8-10	12-15	25-30	0,04-0,12	0,12-0,15	0,15-0,18
M		10-15	15-20	25-30	0,04-0,12	0,12-0,18	0,18-0,22
K		20-30	30-40	45-50	0,08-0,15	0,15-0,20	0,20-0,25
N		35-80	45-90	55-110	0,08-0,15	0,15-0,20	0,20-0,25
S		5-6	8-10	20-30	0,03-0,06	0,06-0,12	0,12-0,15
H		-	-	10-15	0,04-0,06	0,06-0,10	0,10-0,12

Example of order

W2-003012-0300
Spotting dril NC 3,00 HSSE TN2

For center drilling, A type

HSS

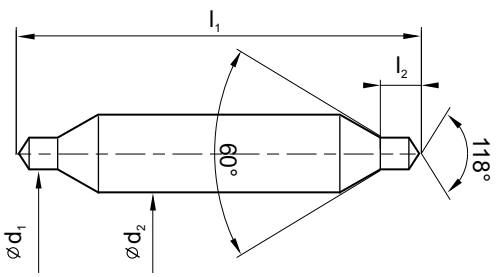
HSSE

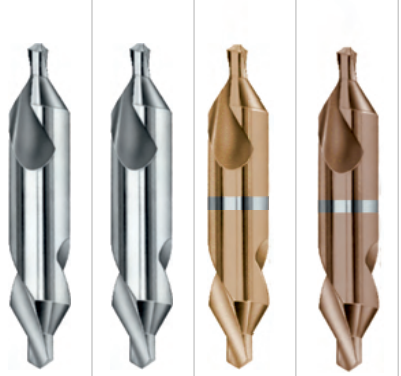
VHM

DIN 333 A

TN2

AT





Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Internal cooling	-	-	-	-
Quality of material	HSS	HSSE	HSSE	VHM
Coating	-	-	TN2	AT
Point angle	60°	60°	60°	60°

d_1	d_2	l_1	l_2 min-max	Norm	DIN-333 A			
				INDEX	W1-011021	W2-011021	W2-013021	W9-01L021
0,8	3,15	25	1,0-1,3	0080	●	○	○	○
1,0	3,15	31	1,3-1,7	0100	●	○	○	○
1,25	3,15	31	1,6-2,0	0125	●	○	○	○
1,6	4,0	35	2,0-2,6	0160	●	○	○	○
2,0	5,0	40	2,5-3,1	0200	●	○	○	○
2,5	6,3	45	3,1-3,8	0250	●	○	○	○
3,15	8,0	50	3,9-4,6	0315	●	○	○	○
4,0	10,0	55	5,0-5,9	0400	○	○	○	○
5,0	12,5	63	6,3-7,2	0500	●	○	○	○
6,3	16,0	71	8,0-8,9	0630	●	○	○	○
8,0	20,0	80	10,1-11,1	0800	●	○	○	○
10,0	25,0	100	12,8-13,8	1000	●	○	○	○

		Vc[m/min]				Feed [mm/rev]		
		HSS	HSSE	HSSE+TN2	VHM	Ø2-Ø6	Ø6-Ø10	Ø10-Ø16
P	Rm<500	30-35	35-45	45-55	-	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<800	20-25	30-40	40-50	-	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<1000	15-25	25-35	35-45	25-30	0,05-0,14	0,14-0,20	0,20-0,25
	Rm<1400	-	8-10	12-15	25-30	0,04-0,12	0,12-0,15	0,15-0,18
M		6-10	10-15	15-20	25-40	0,04-0,12	0,12-0,18	0,18-0,22
K		15-20	20-30	30-40	45-50	0,08-0,15	0,15-0,20	0,20-0,25
N		30-80	35-80	45-90	60-150	0,08-0,15	0,15-0,20	0,20-0,25
S		-	5-6	8-10	20-30	0,03-0,06	0,06-0,12	0,12-0,15
H		-	-	-	10-15	0,04-0,05	0,06-0,1	0,1-0,12

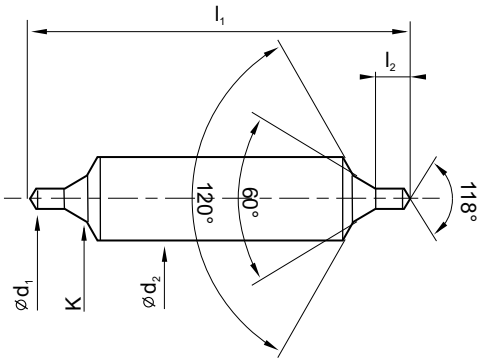
Example of order

W1-011021-0080
Center drill DIN-333 A 60° 0,8 HSS

For center drilling, B type

HSS

DIN 333 B



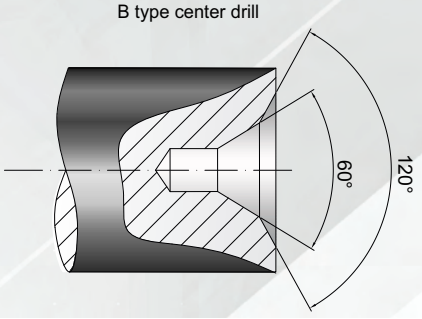
Material groups	P M K N S H
Internal cooling	-
Quality of material	HSS
Coating	-
Point angle	60°

d_1	d_2	K	l_1	l_2 min-max	Norm	DIN-333 B
					INDEX	W1-021021
1,00	4,0	2,1	35	1,3~1,7	0100	●
1,25	5,0	2,6	40	1,6~2,0	0125	●
1,60	6,3	3,3	45	2,0~2,6	0160	●
2,00	8,0	4,2	50	2,5~3,1	0200	●
2,50	10,0	5,3	55	3,1~3,8	0250	●
3,15	11,2	6,7	62	3,9~4,6	0315	●
4,00	14,0	8,5	69	5,0~5,9	0400	●
5,00	18,0	10,6	77	6,3~7,2	0500	●
6,30	20,0	13,2	80	8,0~8,9	0630	●

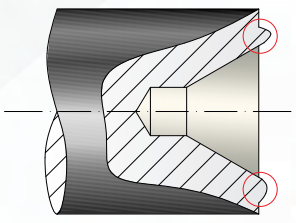
		Vc (m/min)	Feed [mm/rev]		
			ø2-ø6	ø6-ø10	ø10-ø16
P	Rm<500	30-35	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<800	20-25	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<1000	15-25	0,05-0,14	0,14-0,20	0,20-0,25
	Rm<1400	-	-	-	-
M		6-10	0,04-0,12	0,12-0,18	0,18-0,22
K		15-20	0,08-0,15	0,15-0,20	0,20-0,25
N		30-80	0,08-0,15	0,15-0,20	0,20-0,25

B type center drills advantages

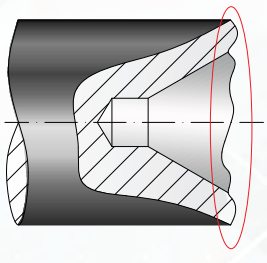
B type center drill



Removes burrs of center hole



It is recommended to use type B center drills when poor quality of the workpieces surface



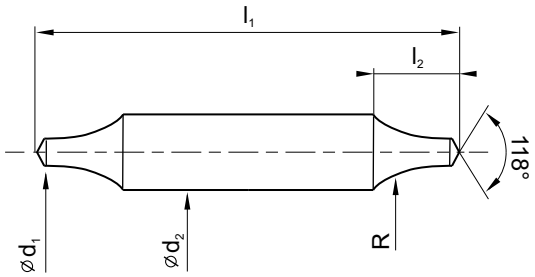
Example of order

W1-021021-0100
Center drill DIN-333 B 60° 1,0 HSS

For center drilling, R type

HSS

DIN 333 R



Material groups	P M K N S H
Internal cooling	-
Quality of material	HSS
Coating	-
Point angle	60°

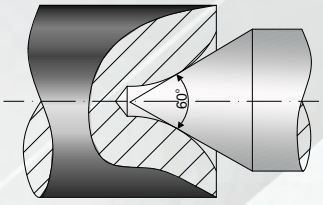
6

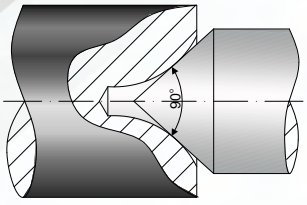
d_1	d_2	R	l_1	l_2 min-max	Norm	DIN-333 R
					INDEX	W1-031021
1,00	3,15	2,90	31	3,0~3,3	0100	●
1,25	3,15	3,15	31	3,3~3,6	0125	●
1,00	4,00	3,90	35	3,3~3,6	0100a	●
1,60	4,00	4,00	35	4,2~4,7	0160	●
1,50	5,00	5,00	40	4,5~4,9	0150	●
2,00	5,00	5,00	40	5,0~5,4	0200	●
2,00	6,00	5,80	45	5,4~5,8	0200a	●
2,50	6,30	6,30	45	6,3~6,8	0250	●
2,50	8,00	8,00	50	7,5~8,0	0250a	●
3,00	8,00	8,00	50	8,0~8,5	0300	●
3,15	8,00	8,00	50	8,0~8,5	0315	●
4,00	10,00	10,00	55	10,0~10,6	0400	●
5,00	12,50	12,50	63	12,5~13,1	0500	●

		Vc (m/min)	Feed [mm/rev]		
			Ø2-Ø6	Ø6-Ø10	Ø10-Ø16
P	Rm<500	30-35	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<800	20-25	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<1000	15-25	0,05-0,14	0,14-0,20	0,20-0,25
	Rm<1400	-	-	-	-
M		6-10	0,04-0,12	0,12-0,18	0,18-0,22
K		15-20	0,08-0,15	0,15-0,20	0,20-0,25
N		30-80	0,08-0,15	0,15-0,20	0,20-0,25

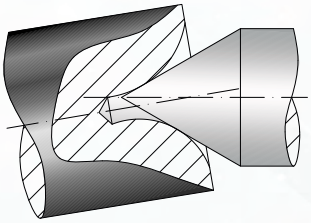
R type center drills advantages

Universal use for different angles of lathe centers





Can be used for turning taper by the tailstock offset method



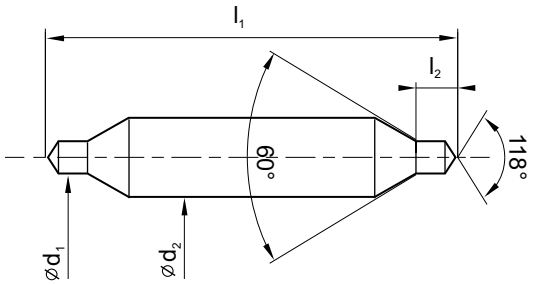
Example of order

W1-031021-0100
Center drill DIN-333 R 1,00x3,15 HSS

For center drilling, EL type

HSSE

DIN 333 EL



Material groups	P M K N S H
Internal cooling	-
Quality of material	HSSE
Coating	-
Point angle	60°

d_1	d_2	l_1	l_2 min-max	Norm	DIN-333 EL
				INDEX	W2-041021
1,50	5,0	100	2,0~2,6	0150	●
2,00	6,0	100	2,5~3,1	0200	●
2,50	8,0	120	3,1~3,8	0250	●
3,15	10,0	120	3,9~4,6	0315	●
4,00	10,0	120	5,0~5,9	0400	●
5,00	14,0	120	6,3~7,2	0500	●

		Vc (m/min)	Feed [mm/rev]		
			ø2-ø6	ø6-ø10	ø10-ø16
P	Rm<500	35-45	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<800	30-40	0,08-0,15	0,15-0,25	0,25-0,30
	Rm<1000	25-35	0,05-0,14	0,14-0,20	0,20-0,25
	Rm<1400	8-10	0,04-0,12	0,12-0,15	0,15-0,18
M		10-15	0,04-0,12	0,12-0,18	0,18-0,22
K		20-30	0,08-0,15	0,15-0,20	0,20-0,25
N		35-80	0,08-0,15	0,15-0,20	0,20-0,25
S		5-6	0,03-0,06	0,06-0,12	0,12-0,15

Example of order

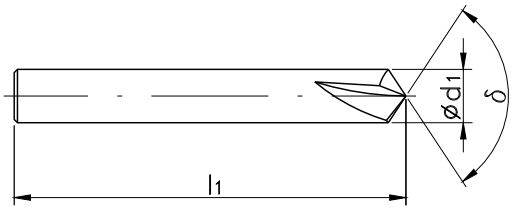
W2-041021-0150
Center drill DIN-333 EL A 60 1,50 HSSE

For chamfering thread holes

VHM

AT

DIN 6537L



Material groups	P M K N S H	P M K N S H
Internal cooling	-	-
Quality of material	VHM	VHM
Coating	AT	AT
Point angle	60°	90°

Ø d1	l1	z	Norm	DIN-6537L	
			Tol.		
			INDEX	W9-054011	W9-054012
4,0	54	4	0400	●	●
6,0	57	4	0600	●	●
8,0	63	5	0800	●	●
10,0	72	6	1000	●	●
12,0	83	6	1200	●	●
16,0	92	6	1600	●	●
20,0	104	6	2000	○	○

		Vc (m/min)	Feed [mm/tooth]						
			Ø4	Ø6	Ø8	Ø10	Ø12	Ø16	Ø20
P	Rm<500	150-200	0,025-0,030	0,036-0,041	0,052-0,058	0,066-0,073	0,085-0,090	0,100-0,110	0,120-0,130
	Rm<800	130-180	0,023-0,028	0,036-0,039	0,052-0,055	0,065-0,070	0,079-0,085	0,095-0,100	0,110-0,120
	Rm<1000	100-150	0,018-0,025	0,033-0,039	0,047-0,053	0,059-0,065	0,072-0,079	0,088-0,095	0,100-0,110
	Rm<1400	90-120	0,018-0,025	0,028-0,033	0,042-0,047	0,053-0,059	0,063-0,072	0,079-0,088	0,095-0,100
M		70-100	0,020-0,025	0,033-0,039	0,047-0,053	0,059-0,065	0,072-0,079	0,088-0,095	0,100-0,110
K		100-150	0,025-0,028	0,035-0,039	0,050-0,055	0,060-0,065	0,079-0,085	0,095-0,100	0,110-0,120
N		150-300	0,025-0,030	0,035-0,041	0,050-0,058	0,060-0,073	0,079-0,090	0,095-0,110	0,110-0,130
S		40-60	0,010-0,015	0,017-0,024	0,024-0,032	0,030-0,038	0,036-0,046	0,045-0,054	0,057-0,066

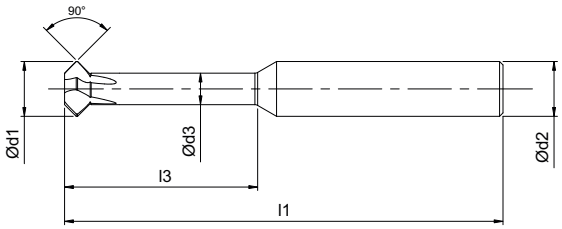
Example of order

W9-054011-0400
Chamfering tool 4,00 DIN-6537L VHM AT

For two sided edge and holes chamfering and deburring

VHM

TS

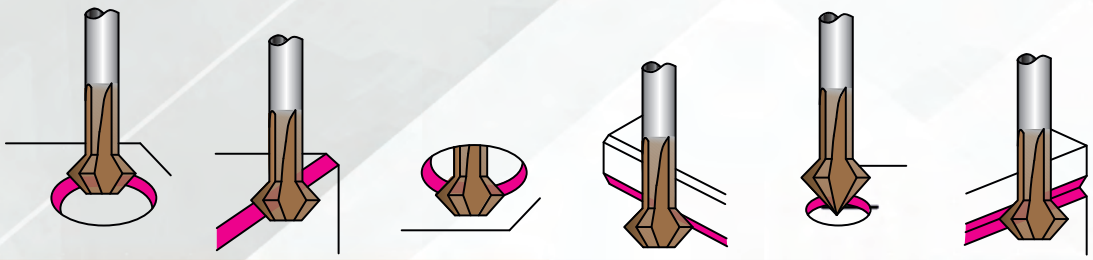


Material groups	P M K N S H
Internal cooling	-
Quality of material	VHM
Coating	AT
Point angle	90°

d_1	d_2	d_3	l_1	l_3	z	INDEX
2,5	3	1,5	39	6,5	3	M9-05G012-0250
3	3	1,8	39	8	3	M9-05G012-0300
3	3	1,8	39	12	3	M9-05G012-0300A
3,5	4	2,1	50	8,5	3	M9-05G012-0350
3,5	4	2,1	50	14	3	M9-05G012-0350A
4	4	2,4	50	10	3	M9-05G012-0400
4	4	2,4	50	16	3	M9-05G012-0400A
5	5	2,8	50	12,5	3	M9-05G012-0500
5	5	2,8	50	20	3	M9-05G012-0500A
6	6	3	57	15	4	M9-05G012-0600
6	6	3	57	24	4	M9-05G012-0600A
6	6	3	100	24	4	M9-05G012-0600B
8	8	4,8	63	20	4	M9-05G012-0800
8	8	4,8	63	32	4	M9-05G012-0800A
8	8	4,8	100	32	4	M9-05G012-0800B

		Vc (m/min)	Feed [mm/tooth]				
			ø1-ø2	ø3-ø4	ø6-ø8	ø10-ø12	ø16
P	Rm<500	70-90	0,010	0,012	0,015	0,020	0,030
	Rm<800	50-80	0,010	0,012	0,015	0,020	0,030
	Rm<1000	45-60	0,010	0,012	0,013	0,017	0,025
	Rm<1400	40-55	0,010	0,012	0,013	0,017	0,025
M		35-50	0,007	0,010	0,010	0,015	0,020
K		40-60	0,010	0,012	0,013	0,017	0,025
N		60-180	0,012	0,012	0,015	0,020	0,030
S		25-40	0,007	0,010	0,010	0,015	0,020

Practical example



Example of order

M9-05G012-0800
Two sided chamfering tool 90° 8x4,8x8x20x63 VHM TS

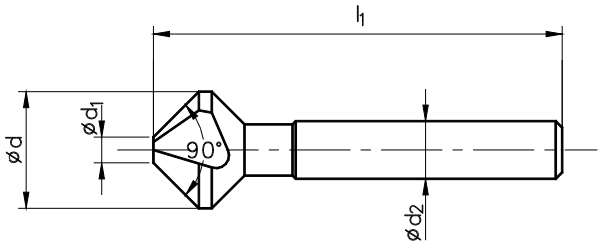
HSSE | DIN 335 C

VHM

TN2

TC

AT



Material groups	P M K N S H	P M K N S H	P M K N S H	P M K N S H	
Internal cooling	-	-	-	-	
Quality of material	HSSE	HSSE	HSSE	VHM	
Coating	-	TN2	TC	AT	
Point angle	90°	90°	90°	90°	

ød	ød$_1$	ød$_2$	l$_1$	Norm	DIN-335				
				Tol.					
				INDEX	T2-040010	T2-043010	T2-045110	T9-04V010	
6,3	1,50	5	45	0063	●	●	●	●	
8,3	2,00	6	50	0083	●	●	●	●	
10,4	2,50	6	50	0104	●	●	●	●	
12,4	2,80	8	56	0124	●	●	●	●	
16,5	3,20	10	60	0165	●	●	●	●	
20,5	3,50	10	63	0205	●	●	●	●	
25,0	3,80	10	67	0250	●	●	●	●	
30,0	4,20	12	71	0300	●	●	●	●	

		Vc (m/min)		Feed [mm/tooth]							
		HSSE	VHM	Ø6,3	Ø8,3	Ø10,4	Ø12,4	Ø16,5	Ø20,5	Ø25	Ø30
P	Rm<500	17-22	40-80	0,12	0,13	0,14	0,15	0,17	0,18	0,21	0,24
	Rm<800	10-15	30-60	0,07	0,08	0,09	0,10	0,11	0,13	0,15	0,17
	Rm<1000	8-12	20-40	0,07	0,08	0,09	0,10	0,11	0,13	0,15	0,17
	Rm<1400	-	15-20	0,07	0,08	0,09	0,10	0,11	0,13	0,15	0,17
M		6-10	20-40	0,07	0,08	0,09	0,10	0,11	0,13	0,15	0,17
K		15-25	40-80	0,12	0,13	0,14	0,15	0,17	0,18	0,21	0,24
N		15-45	40-100	0,19	0,20	0,22	0,23	0,26	0,28	0,30	0,36
S		-	10-12	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,12
H		-	10-12	0,04	0,05	0,06	0,06	0,07	0,08	0,09	0,12

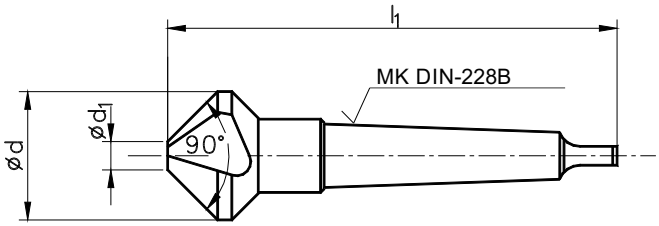
Countersinks set p. 260

Example of order

T2-040010-0063
Countersink DIN-335-C 6,3 SE

HSS

DIN 335 D



Material groups	P M K N S H
Internal cooling	-
Quality of material	HSS
Coating	-

∅ d	∅ d_1	l_1	MK DIN-228B	INDEX	T1-040210
37	4,8	118	2	0370	●

∅ d	∅ d_1	l_1	MK DIN-228B	INDEX	T1-040310
50	14	150	3	0500	●

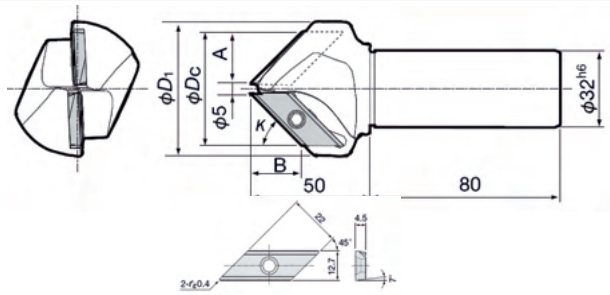
∅ d	∅ d_1	l_1	MK DIN-228B	INDEX	T1-040410
63,0	16,00	180	4	0630	●
80,0	20,00	180	4	0800	●

6

Example of order

T1-040210-0037
Countersink 37 DIN-228B HSS

PF



∅D_1	∅D_c	κ	A	B	Z	INDEX	
40	34	30°	14,5	25,5	1	T9-100013-0400	●
56	46	45°	20,5	20,5	2	T9-100012-0560	●
72	55	60°	14,5	14,5	2	T9-100011-0720	●

Accessories

Designation	INDEX
Insert AH 330	T9-104000-0127
Clamping screw	T9-100001-0000
Key	T9-100002-0000

Processing parameters

Material	feed f_z (mm/tooth)
Carbon steel	0,1~0,25
Superalloys	0,1~0,2
Tool steel	0,1~0,2
Stainless	0,1~0,25
Cast iron	0,1~0,25

6

Z-axis plunging depth Z (mm)

- For the phase 30°

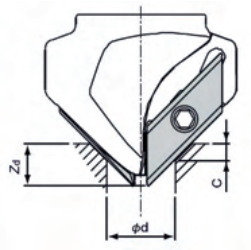
hole dia. ∅d (mm)	Size of chamfering C (mm)						
	0,5	1	1,5	2	2,5	3	3,5
5	0,6	1,1	1,6	2,1			
6	0,9	1,4	1,9	2,4			
6,8	1,1	1,6	2,1	2,6			
8	1,4	1,9	2,4	2,9			
8,5	1,6	2,1	2,6	3,1			
10	2,0	2,5	3,0	3,5	4,0	4,5	5,0
10,2	2,1	2,6	3,1	3,6	4,1	4,6	5,1
12	2,6	3,1	3,6	4,1	4,6	5,1	5,6
16	3,7	4,2	4,7	5,2	5,7	6,2	6,7
17,5	4,2	4,7	5,2	5,7	6,2	6,7	7,2
20	4,9	5,4	5,9	6,4	6,9	7,4	7,9
21	5,2	5,7	6,2	6,7	7,2	7,7	8,2
24	6,1	6,6	7,1	7,6	8,1	8,6	9,1
30	7,8	8,3	8,8	9,3	9,8	10,3	10,8
33	8,7	9,2	9,7	10,2	10,7	11,2	11,7
36	9,5	10,0	10,5	11,0	11,5	12,0	12,5
38	10,1	10,6	11,1	11,6	12,1	12,6	13,1
42	11,2	11,7	12,2	12,7	13,2	13,7	14,2
46	12,4	12,9	13,4	13,9	14,4		
48	13,0	13,5	14	14,5			
52	14,1						

- For the phase 45°

hole dia. ∅d (mm)	Size of chamfering C (mm)							
	0,5	1	1,5	2	2,5	3	3,5	4
5	0,8	1,3	1,8	2,3	2,8			
6	1,7	2,2	2,7	3,2	3,7			
6,8	2,4	2,9	3,4	3,9	4,4			
8	3,4	3,9	4,4	4,9	5,4			
8,5	3,8	4,3	4,8	5,3	5,8			
10	5,1	5,6	6,1	6,6	7,1	7,6	8,1	8,6
10,2	5,3	5,8	6,3	6,8	7,3	7,8	8,3	8,8
12	6,9	7,4	7,9	8,4	8,9	9,4	9,9	10,4
16	10,3	10,8	11,3	11,8	12,3	12,8	13,3	13,8
17,5	11,6	12,1	12,6	13,1	13,6	14,1	14,6	15,1
20	13,7	14,2	14,7	15,2	15,7	16,2	16,7	17,2
21	14,6	15,1	15,6	16,1	16,6	17,1	17,6	18,1
24	17,2	17,7	18,2	18,7	19,2	19,7	20,2	20,7
30	22,4	22,9	23,4	23,9	24,4	24,9	25,4	
33	24,9	25,4						

- For the phase 60°

hole dia. ∅d (mm)	Size of chamfering C (mm)						
	0,5	1	1,5	2	3	4	5
5	0,7	1,2	1,7	2,2	3,2		
6	1,2	1,7	2,2	2,7	3,7		
6,8	1,6	2,1	2,6	3,1	4,1		
8	2,2	2,7	3,2	3,7	4,7		
8,5	2,4	2,9	3,4	3,9	4,9		
10	3,2	3,7	4,2	4,7	5,7	6,7	7,7
10,2	3,3	3,8	4,3	4,8	5,8	6,8	7,8
12	4,2	4,7	5,2	5,7	6,7	7,7	8,7
14	5,2	5,7	6,2	6,7	7,7	8,7	9,7
16	6,2	6,7	7,2	7,7	8,7	9,7	10,7
17,5	6,9	7,4	7,9	8,4	9,4	10,4	11,4
20	8,2	8,7	9,2	9,7	10,7	11,7	12,7
21	8,7	9,2	9,7	10,2	11,2	12,2	13,2
24	10,2	10,7	11,2	11,7	12,7	13,7	14,7
30	13,2	13,7	14,2	14,7	15,7	16,7	17,7
33	14,7	15,2	15,7	16,2	17,2	18,2	19,2
36	16,2	16,7	17,2	17,7	18,7	19,7	
42	19,2	19,7	20,2				



Note:
When the hole depth is smaller than the Z-axis plunging depth (Zd), special care should be taken to avoid an interference between the tool's front end and the bottom of the hole.

Technical informations

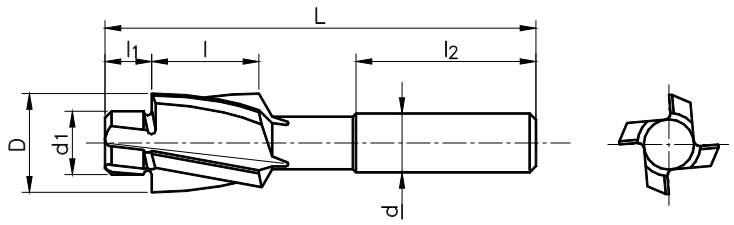
- When the hole diameter to be chamfered is small or the cutting edges near the front end of tool are used, use at higher side of the revolution range shown in the Table. In contrast, when the hole diameter to be chamfered is large or the cutting edges far from the tool's front end are used, use the lower side of the revolution range shown in the Table.
- When chamfering a small diameter hole (smaller than ø10 mm) in a plungemilling mode, peck-feeding should not be used.
- When the hole diameter to be chamfered is smaller than ø10 mm or the cutting edges near the tool's front end are used, the feed should be set within 0.15 mm/t.

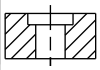
Example of order

T9-100013-0400
Countersink with insert 40

DIN-373

HSS



Execution	N	F	M
Lead	in tapping holes	in exact clearance hole	in medium clearance hole
Hole type			
Material type	HSS	HSS	HSS

D z9	d_1 e8	d h9	l	l_1	l_2	L	M	Norm	DIN-373				
								Tol.					
								INDEX	T1-044010				
6,0	2,5	5,0	14	3,0	31,5	71	M3	6025	●				
6,5	2,9	5,0	14	3,5	31,5	71	M3,5	6529	●				
8,0	3,3	5,0	14	4,0	31,5	71	M4	8033	●				
10,0	4,2	8,0	18	5,0	35,5	80	M5	1042	●				
11,0	5,0	8,0	18	6,0	35,5	80	M6	1150	●				
15,0	6,8	12,5	22	8,0	40,0	100	M8	1568	●				
18,0	8,5	12,5	22	10,0	40,0	100	M10	1885	●				
20,0	10,2	12,5	22	12,0	40,0	100	M12	2010	●				

D z9	d_1 e8	d h9	l	l_1	l_2	L	M	Norm		DIN-373			
								Tol.					
								INDEX		T1-045010			
6,0	3,2	5,0	14	3,0	31,5	71	M3	6032		●			
6,5	3,7	5,0	14	3,5	31,5	71	M3,5	6537		●			
8,0	4,3	5,0	14	4,0	31,5	71	M4	8043		●			
10,0	5,3	8,0	18	5,0	35,5	80	M5	1053		●			
11,0	6,4	8,0	18	6,0	35,5	80	M6	1164		●			
15,0	8,4	12,5	22	8,0	40,0	100	M8	1584		●			
18,0	10,5	12,5	22	10,0	40,0	100	M10	1810		●			
20,0	13,0	12,5	22	12,0	40,0	100	M12	2013		●			

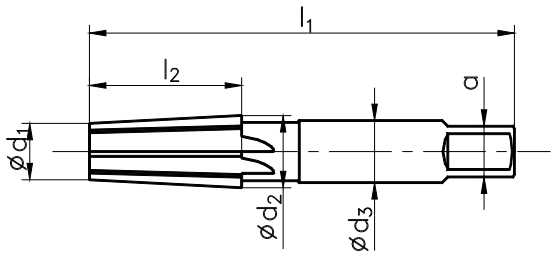
D z9	d_1 e8	d h9	l	l_1	l_2	L	M	Norm			DIN-373		
								Tol.					
								INDEX			T1-046010		
6,0	3,4	5,0	14	3,0	31,5	71	M3	6034			●		
6,5	3,9	5,0	14	3,5	31,5	71	M3,5	6539			●		
8,0	4,5	5,0	14	4,0	31,5	71	M4	8045			●		
10,0	5,5	8,0	18	5,0	35,5	80	M5	1055			●		
11,0	6,6	8,0	18	6,0	35,5	80	M6	1166			●		
15,0	9,0	12,5	22	8,0	40,0	100	M8	1590			●		
18,0	11,0	12,5	22	10,0	40,0	100	M10	1811			●		
20,0	14,0	12,5	22	12,0	40,0	100	M12	2014			●		

Example of order

T1-045010-0600
Counterbore 6,0 DIN-373 HSS

ASME B94,2-1995

HSS



Material type	HSS
Execution	C

∅ nom	∅ d_1	∅ d_2	∅ d_3	l_1	l_2	a	Norm / Tol. / INDEX	T1-030010
1/4	10,30	12,00	14,3	62	27	10,7	0027	●
3/8	13,70	15,40	17,5	65	27	13,5	0029	●
1/2	16,90	19,10	17,5	79	35	13,0	0031	●
3/4	22,25	24,40	23,0	82	35	17,5	0035	●

6

Information concerning dimensions of the holes for tapere threas in the technical part of the catalogue p. 333

Example of order

T1-030010-0027
Taper reamer 1:16 1/4 HSS

END MILLS

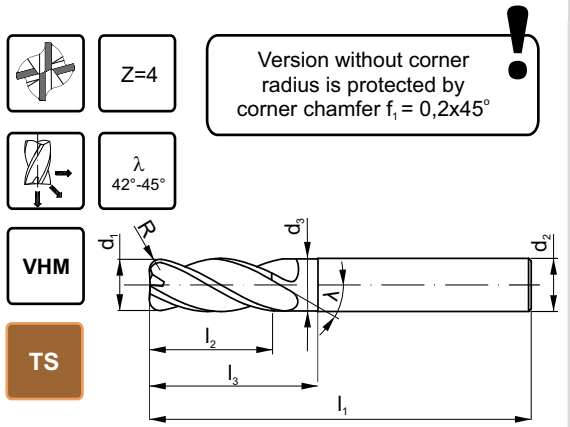
END MILLS

PAGE

For machining steel and cast iron with hardness up to 45 HRC, stainless steel and difficult to machine materials

MASTERMILL

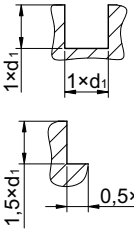
440N	R440N



Workpiece material	P M K N S H	P M K N S H
Shank		
Tool material	VHM	VHM
Coating	TS	TS
Corner type		

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	R	INDEX	
3	6	2,8	57	8	14	4	0,3	M9-44GMA0-0030	M9-44GMAD-0030
4	6	2,8	57	11	17	4	0,3	M9-44GMA0-0040	M9-44GMAD-0040
5	6	2,8	57	13	19	4	0,3	M9-44GMA0-0050	M9-44GMAD-0050
6	6	5,5	57	13	21	4	0,25	M9-44GMA0-0060	M9-44GMAC-0060
6	6	5,5	57	13	21	4	0,5	-	M9-44GMA1-0060
6	6	5,5	57	13	21	4	1	-	M9-44GMA3-0060
8	8	7,5	63	19	27	4	0,5	M9-44GMA0-0080	M9-44GMA1-0080
8	8	7,5	63	19	27	4	1	-	M9-44GMA3-0080
10	10	9,5	72	22	32	4	0,5	M9-44GMA0-0100	M9-44GMA1-0100
10	10	9,5	72	22	32	4	1	-	M9-44GMA3-0100
10	10	9,5	72	22	32	4	1,5	-	M9-44GMA4-0100
12	12	11,5	83	26	38	4	0,5	M9-44GMA0-0120	M9-44GMA1-0120
12	12	11,5	83	26	38	4	1	-	M9-44GMA3-0120
14	14	13	83	26	38	4	0,5	M9-44GMA0-0140	M9-44GMA1-0140
16	16	15	92	32	44	4	0,5	M9-44GMA0-0160	M9-44GMA1-0160
16	16	15	92	32	44	4	1	-	M9-44GMA3-0160
16	16	15	92	32	44	4	3	-	M9-44GMA7-0160
18	18	17	92	32	44	4	0,5	M9-44GMA0-0180	M9-44GMA1-0180
20	20	19	104	38	55	4	0,5	M9-44GMA0-0200	M9-44GMA1-0200
20	20	19	104	38	55	4	1	-	M9-44GMA3-0200

ISO		Vc [m/min]	d_1 [mm]							
			6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P4	150-200	0,020	0,030	0,045	0,055	0,060	0,065	0,070	0,080
	P5-P12	120-160	0,015	0,030	0,040	0,045	0,050	0,055	0,060	0,065
	P13	70-130	0,010	0,020	0,020	0,035	0,040	0,045	0,050	0,055
	P14	70-110	0,010	0,020	0,020	0,035	0,040	0,045	0,050	0,055
M	M1	90-140	0,010	0,020	0,020	0,035	0,040	0,045	0,050	0,055
	M2-M3	70-100	0,015	0,025	0,040	0,045	0,050	0,055	0,060	0,065
K	K1-K6	140-200	0,020	0,025	0,040	0,045	0,050	0,055	0,060	0,065
N	N1-N5	240-280	0,050	0,055	0,065	0,075	0,080	0,085	0,090	0,095
	N7-N10	260-300	0,050	0,055	0,060	0,070	0,075	0,080	0,085	0,090
S	S1-S5	30-50	0,020	0,030	0,050	0,055	0,060	0,065	0,070	0,075
	S6-S8	40-70	0,020	0,035	0,050	0,055	0,060	0,065	0,070	0,075



Example of order

M9-44GMAC-0060
MasterMILL R440N 6x5,5x6x13x21x57 R0,25 VHM TS

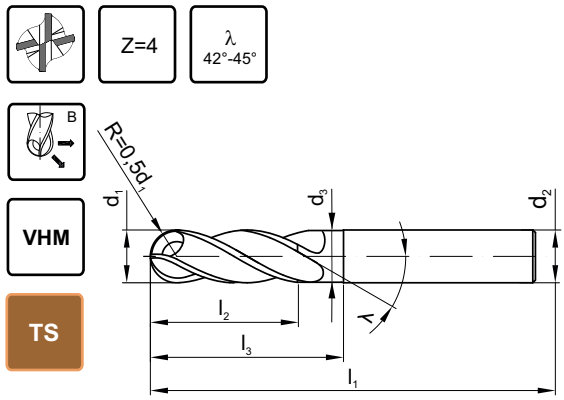
R - for tools with corner radius

Another tool dimensions available on request

For machining steel and cast iron with hardness up to 45 HRC, stainless steel and difficult to machine materials

MASTERMILL

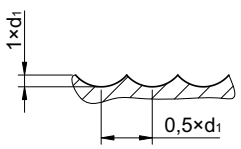
B440N



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TS
Corner type	

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	R	INDEX
3	6	-	57	8	-	4	1,5	M9-44GMAX-0030
4	6	-	57	11	-	4	2,0	M9-44GMAX-0040
5	6	-	57	13	-	4	2,5	M9-44GMAX-0050
6	6	5,5	57	13	21	4	3,0	M9-44GMAX-0060
8	8	7,5	63	19	27	4	4,0	M9-44GMAX-0080
10	10	9,5	72	22	32	4	5,0	M9-44GMAX-0100
12	12	11,5	83	26	38	4	6,0	M9-44GMAX-0120
14	14	13	83	26	38	4	7,0	M9-44GMAX-0140
16	16	15	92	32	44	4	8,0	M9-44GMAX-0160
18	18	17	92	32	44	4	9,0	M9-44GMAX-0180
20	20	19	104	38	55	4	10,0	M9-44GMAX-0200

ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P4	150-200	0,025	0,025	0,030	0,040	0,050	0,060	0,070	0,075	0,080	0,085	0,090
	P5-P12	120-160	0,025	0,025	0,030	0,035	0,050	0,055	0,060	0,065	0,070	0,075	0,080
	P13	70-130	0,025	0,025	0,030	0,030	0,045	0,045	0,050	0,055	0,060	0,065	0,070
	P14	70-110	0,015	0,015	0,025	0,030	0,045	0,045	0,050	0,055	0,060	0,065	0,070
M	M1	80-110	0,020	0,020	0,025	0,030	0,045	0,045	0,050	0,055	0,060	0,065	0,070
	M2-M3	60-90	0,020	0,020	0,025	0,040	0,045	0,050	0,055	0,060	0,065	0,070	0,075
K	K1-K5	140-200	0,025	0,025	0,030	0,040	0,060	0,060	0,070	0,075	0,080	0,085	0,090
N	N1-N5	240-280	0,035	0,040	0,050	0,050	0,055	0,065	0,075	0,080	0,085	0,090	0,095
	N7-N10	260-300	0,030	0,035	0,045	0,050	0,055	0,060	0,070	0,075	0,080	0,085	0,090
S	S3-S5	30-50	0,010	0,010	0,010	0,015	0,025	0,025	0,040	0,045	0,050	0,055	0,060
	S6-S8	40-70	0,010	0,010	0,015	0,020	0,030	0,030	0,040	0,045	0,050	0,060	0,065



Example of order

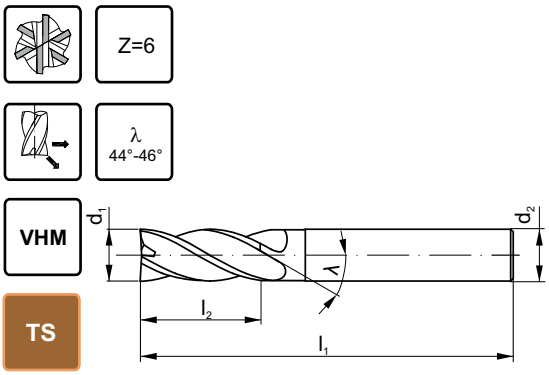
M9-44GMAX-0060
MasterMILL B440N 6x5,5x6x13x21x57 VHM TS

Another tool dimensions available on request

For machining steel and cast iron with hardness up to 45 HRC, stainless steel and difficult to machine materials

MASTERMILL

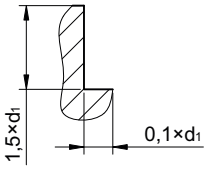
645



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TS
Corner type	

d_1	d_2h6	l_1	l_2	Z	INDEX
6	6	57	16	6	M9-64GM00-0060
8	8	63	20	6	M9-64GM00-0080
10	10	72	25	6	M9-64GM00-0100
12	12	83	30	6	M9-64GM00-0120
14	14	83	35	6	M9-64GM00-0140
16	16	92	40	6	M9-64GM00-0160
20	20	104	45	6	M9-64GM00-0200

ISO		Vc [m/min]	d_1 [mm]						
			6	8	10	12	14	16	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P4	170-220	0,015	0,020	0,025	0,030	0,035	0,040	0,050
	P5-P12	160-190	0,010	0,020	0,020	0,030	0,030	0,040	0,050
	P13	120-150	0,010	0,010	0,020	0,025	0,030	0,030	0,040
	P14	80-130	0,010	0,010	0,020	0,025	0,030	0,030	0,040
M	M1	90-120	0,010	0,010	0,020	0,025	0,030	0,030	0,040
	M2-M3	80-100	0,015	0,020	0,035	0,040	0,045	0,045	0,055
K	K1-K6	105-135	0,015	0,020	0,025	0,030	0,030	0,035	0,045
N	N1-N5	200-250	0,015	0,020	0,025	0,030	0,035	0,040	0,045
	N7-N10	150-200	0,010	0,010	0,020	0,025	0,030	0,030	0,040
S	S3-S5	40-70	0,015	0,025	0,025	0,040	0,045	0,050	0,060
	S6-S8	60-90	0,020	0,030	0,030	0,040	0,045	0,050	0,065



Example of order

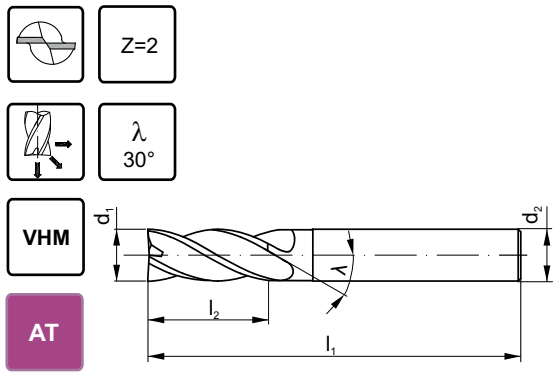
M9-64GM00-0060
MasterMILL 645 6x6x16x57 VHM TS

Corner radius and another tool dimensions available on request

For machining steel and cast iron with hardness up to 35 HRC

X-MILL

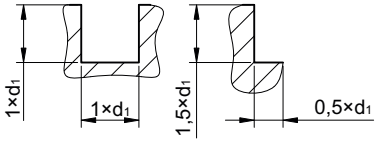
230



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	AT
Corner type	

d_1	d_2h6	l_1	l_2	Z	INDEX
1	4	50	3	2	M9-234X00-0010
1,5	4	50	4	2	M9-234X00-0015
2	4	50	6	2	M9-234X00-0020
2,5	4	50	8	2	M9-234X00-0025
3	4	50	8	2	M9-234X00-0030
4	4	50	14	2	M9-234X00-0040
5	6	50	16	2	M9-234X00-0050
6	6	50	19	2	M9-234X00-0060
7	8	58	19	2	M9-234X00-0070
8	8	58	20	2	M9-234X00-0080
9	10	72	22	2	M9-234X00-0090
10	10	72	25	2	M9-234X00-0100
11	12	73	25	2	M9-234X00-0110
12	12	73	30	2	M9-234X00-0120
14	14	83	35	2	M9-234X00-0140
16	16	92	40	2	M9-234X00-0160
18	18	100	45	2	M9-234X00-0180
20	20	104	45	2	M9-234X00-0200

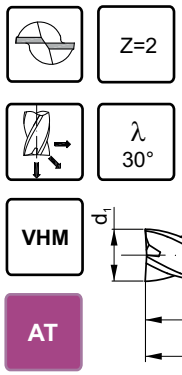
ISO		Vc [m/min]	d_1 [mm]														
			1	1,5	2	2,5	3	4	5	6-7	8-9	10-11	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	70-110	0,002	0,005	0,005	0,010	0,015	0,025	0,035	0,040	0,050	0,070	0,090	0,090	0,110	0,120	0,130
	P6-P12	50-80	0,002	0,004	0,005	0,050	0,010	0,015	0,025	0,030	0,035	0,050	0,060	0,065	0,080	0,085	0,090
	P13-P14	60-90	0,005	0,005	0,007	0,010	0,010	0,010	0,010	0,015	0,020	0,025	0,030	0,030	0,035	0,035	0,040
K	K1-K4	90-110	0,003	0,005	0,010	0,015	0,020	0,030	0,035	0,035	0,040	0,050	0,060	0,065	0,080	0,085	0.090
	K5-K6	80-90	0,003	0,005	0,010	0,015	0,020	0,030	0,035	0,035	0,040	0,050	0,060	0,065	0,080	0,085	0,090
N	N7-N9	150-170	0,005	0,005	0,010	0,010	0,010	0,015	0,015	0,025	0,030	0,035	0,045	0,050	0,055	0,090	0,100



Example of order
M9-234X00-0010
X-MILL 230 1x4x3x50 VHM AT

Another tool dimensions available on request

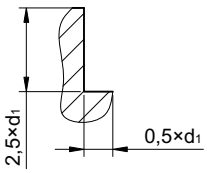
For machining steel and cast iron with hardness up to 35 HRC	X-MILL 230L



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	AT
Corner type	

d_1	d_2h6	l_1	l_2	Z	INDEX
6	6	75	15	2	M9-234X20-0060
6	6	100	15	2	M9-234X20-0060A
8	8	100	20	2	M9-234X20-0080
10	10	100	25	2	M9-234X20-0100
10	10	150	25	2	M9-234X20-0100A
12	12	100	30	2	M9-234X20-0120
12	12	150	30	2	M9-234X20-0120A

ISO		Vc [m/min]	d_1 [mm]			
			6	8	10	12
			fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	60-90	0,030	0,040	0,055	0,065
	P6-P14	50-80	0,010	0,015	0,020	0,025
K	K1-K4	80-100	0,030	0,030	0,040	0,045
	K5-K6	80-90	0,030	0,030	0,040	0,045
N	N7-N9	150-170	0,020	0,025	0,030	0,040



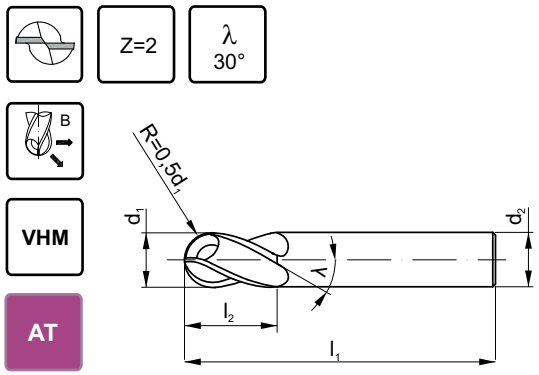
Example of order
M9-234X20-0060
X-MILL 230L 6x6x15x75 VHM AT

Another tool dimensions available on request

For machining steel and cast iron with hardness up to 35 HRC

X-MILL

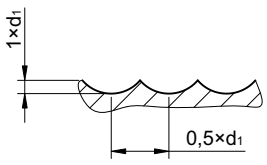
B230



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	AT
Corner type	

d_1	d_2h6	l_1	l_2	Z	INDEX
1	4	50	2	2	M9-234X0X-0010
1,5	4	50	3	2	M9-234X0X-0015
2	4	50	4	2	M9-234X0X-0020
2,5	4	50	5	2	M9-234X0X-0025
3	4	50	6	2	M9-234X0X-0030
4	4	50	8	2	M9-234X0X-0040
5	6	50	10	2	M9-234X0X-0050
6	6	50	12	2	M9-234X0X-0060
8	8	58	16	2	M9-234X0X-0080
10	10	72	20	2	M9-234X0X-0100
12	12	73	24	2	M9-234X0X-0120
16	16	92	32	2	M9-234X0X-0160
18	18	100	40	2	M9-234X0X-0180
20	20	104	40	2	M9-234X0X-0200

ISO		Vc [m/min]	d_1 [mm]													
			1	1,5	2	2,5	3	4	5	6	8	10	12	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	70-110	0,002	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,050	0,070	0,085	0,110	0,120	0,130
	P6-P12	50-80	0,002	0,005	0,005	0,005	0,010	0,015	0,025	0,030	0,035	0,050	0,060	0,080	0,085	0,090
K	K1-K4	90-110	0,003	0,005	0,010	0,015	0,020	0,030	0,035	0,035	0,035	0,050	0,060	0,070	0,075	0,080
	K5-K6	80-90	0,003	0,005	0,010	0,015	0,020	0,030	0,035	0,035	0,035	0,045	0,045	0,055	0,055	0,070
N	N7-N9	150-170	0,005	0,010	0,015	0,025	0,030	0,035	0,040	0,045	0,045	0,050	0,060	0,070	0,080	0,090

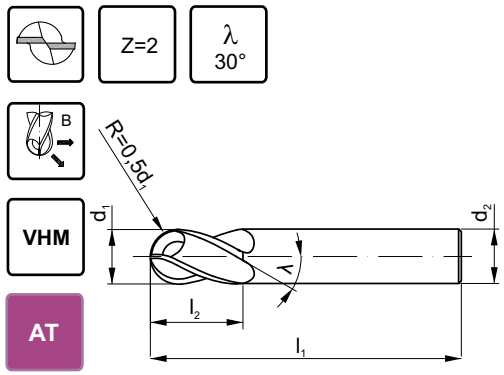


Example of order

M9-234X0X-0010
X-MILL B230 1x4x2x50 VHM AT

Another tool dimensions available on request

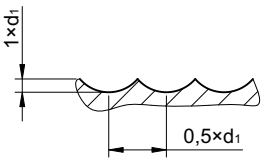
For machining steel and cast iron with hardness up to 35 HRC	X-MILL B230L



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	AT
Corner type	

d_1	d_2h6	l_1	l_2	Z	INDEX
6	6	75	12	2	M9-234X2X-0060
6	6	100	12	2	M9-234X2X-0060A
8	8	100	16	2	M9-234X2X-0080
10	10	100	20	2	M9-234X2X-0100
10	10	150	20	2	M9-234X2X-0100A
12	12	100	24	2	M9-234X2X-0120
12	12	150	24	2	M9-234X2X-0120A
16	16	150	32	2	M9-234X2X-0160

ISO		Vc [m/min]	d_1 [mm]					
			6	8	10	12	14	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	70-110	0,040	0,050	0,070	0,085	0,090	0,110
	P6-P12	50-80	0,030	0,035	0,050	0,060	0,065	0,080
K	K1-K4	90-110	0,035	0,035	0,050	0,060	0,065	0,070
	K5-K6	80-90	0,035	0,035	0,045	0,045	0,050	0,055
N	N7-N9	150-170	0,045	0,045	0,050	0,060	0,065	0,070



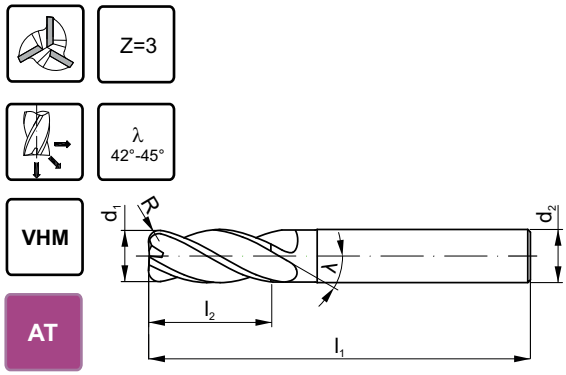
Example of order
M9-234X2X-0060
X-MILL B230L 6x6x12x75 VHM AT

Another tool dimensions available on request

For machining steel, stainless steel and cast iron with hardness up to 35 HRC

X-MILL

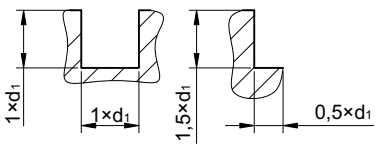
345	345	R345	R345
			



Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	AT	AT	AT	AT
Corner type				

d_1	d_2h6	l_1	l_2	Z	R	INDEX			
3	6	57	8	3	0,3	M9-344X00-0030	M9-344X00-0030-B	M9-344X0D-0030	M9-344X0D-0030-B
4	6	57	11	3	0,3	M9-344X00-0040	M9-344X00-0040-B	M9-344X0D-0040	M9-344X0D-0040-B
5	6	57	13	3	0,3	M9-344X00-0050	M9-344X00-0050-B	M9-344X0D-0050	M9-344X0D-0050-B
6	6	57	13	3	0,5	M9-344X00-0060	M9-344X00-0060-B	M9-344X01-0060	M9-344X01-0060-B
8	8	63	19	3	0,5	M9-344X00-0080	M9-344X00-0080-B	M9-344X01-0080	M9-344X01-0080-B
8	8	63	19	3	1,0	-	-	M9-344X03-0080	M9-344X03-0080-B
8	8	63	19	3	1,5	-	-	M9-344X04-0080	M9-344X04-0080-B
10	10	72	22	3	0,5	M9-344X00-0100	M9-344X00-0100-B	M9-344X01-0100	M9-344X01-0100-B
10	10	72	22	3	2,0	-	-	M9-344X05-0100	M9-344X05-0100-B
12	12	83	26	3	0,7	M9-344X00-0120	M9-344X00-0120-B	M9-344X02-0120	M9-344X02-0120-B
12	12	83	26	3	2,0	-	-	M9-344X05-0120	M9-344X05-0120-B
14	14	83	26	3	0,7	M9-344X00-0140	M9-344X00-0140-B	M9-344X02-0140	M9-344X02-0140-B
16	16	92	32	3	1,0	M9-344X00-0160	M9-344X00-0160-B	M9-344X03-0160	M9-344X03-0160-B

ISO		Vc [m/min]	d_1 [mm]								
			3	4	5	6	8	10	12	14	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	130-160	0,010	0,015	0,025	0,030	0,050	0,060	0,075	0,080	0,085
	P6-P9	80-110	0,010	0,015	0,020	0,025	0,040	0,045	0,055	0,060	0,065
	P10-P12	60-80	0,010	0,015	0,020	0,025	0,040	0,045	0,055	0,060	0,065
	P13	90-140	0,010	0,015	0,020	0,025	0,040	0,045	0,055	0,060	0,065
	P14	90-140	0,005	0,010	0,015	0,020	0,030	0,040	0,045	0,050	0,055
M	M1	90-140	0,010	0,015	0,020	0,025	0,040	0,050	0,060	0,065	0,070
	M2-M3	60-90	0,005	0,010	0,015	0,020	0,030	0,040	0,045	0,050	0,055
K	K1-K6	90-130	0,005	0,010	0,020	0,025	0,040	0,045	0,050	0,055	0,060
N	N1-N5	240-280	0,035	0,040	0,050	0,050	0,055	0,065	0,075	0,080	0,085
	N7-N10	260-300	0,030	0,035	0,045	0,050	0,055	0,060	0,070	0,075	0,080
S	S1,S3	15-25	0,005	0,010	0,015	0,020	0,025	0,035	0,040	0,045	0,050
	S2,S4-S5	10-20	0,005	0,010	0,010	0,015	0,020	0,025	0,030	0,035	0,040
	S6	40-60	0,010	0,015	0,015	0,020	0,025	0,030	0,040	0,045	0,050
	S7-S8	15-20	0,010	0,015	0,015	0,020	0,025	0,030	0,040	0,045	0,050



Example of order
M9-344X00-0030
X-MILL 345 3x6x8x57 VHM AT

R - for tools with corner radius

Another tool dimensions available on request

For machining steel, stainless steel and cast iron with hardness up to 35 HRC

X-MILL

440S	440S	R440S	R440S

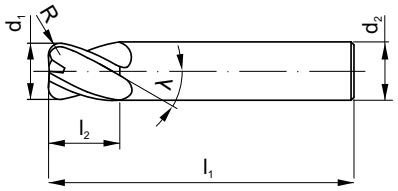
Z=4

λ 35°-39°

VHM

AT

Version without corner radius is protected by corner chamfer:
for Ø < 6mm f_1 = 0,1x45°
for Ø ≥ 6mm f_1 = 0,2x45°

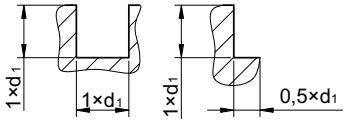





Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	AT	AT	AT	AT
Corner type				

d_1	d_2h6	l_1	l_2	Z	R	INDEX			
3	6	54	7	4	0,3	M9-444X10-0030	M9-444X10-0030-B	M9-444X1D-0030	M9-444X1D-0030-B
4	6	54	8	4	0,3	M9-444X10-0040	M9-444X10-0040-B	M9-444X1D-0040	M9-444X1D-0040-B
5	6	54	10	4	0,3	M9-444X10-0050	M9-444X10-0050-B	M9-444X1D-0050	M9-444X1D-0050-B
6	6	54	10	4	0,5	M9-444X10-0060	M9-444X10-0060-B	M9-444X11-0060	M9-444X11-0060-B
8	8	58	12	4	0,5	M9-444X10-0080	M9-444X10-0080-B	M9-444X11-0080	M9-444X11-0080-B
8	8	58	12	4	1,0	-	-	M9-444X13-0080	M9-444X13-0080-B
10	10	66	14	4	0,5	M9-444X10-0100	M9-444X10-0100-B	M9-444X11-0100	M9-444X11-0100-B
10	10	66	14	4	1,0	-	-	M9-444X13-0100	M9-444X13-0100-B
10	10	66	14	4	1,5	-	-	M9-444X14-0100	M9-444X14-0100-B
12	12	73	16	4	0,5	M9-444X10-0120	M9-444X10-0120-B	M9-444X11-0120	M9-444X11-0120-B
12	12	73	16	4	0,7	-	-	M9-444X12-0120	M9-444X12-0120-B
12	12	73	16	4	1,0	-	-	M9-444X13-0120	M9-444X13-0120-B
14	14	75	18	4	0,5	M9-444X10-0140	M9-444X10-0140-B	M9-444X11-0140	M9-444X11-0140-B
16	16	82	22	4	0,5	M9-444X10-0160	M9-444X10-0160-B	M9-444X11-0160	M9-444X11-0160-B
16	16	82	22	4	1,0	-	-	M9-444X13-0160	M9-444X13-0160-B
16	16	82	22	4	2,0	-	-	M9-444X15-0160	M9-444X15-0160-B
20	20	92	26	4	1,0	M9-444X10-0200	M9-444X10-0200-B	M9-444X13-0200	M9-444X13-0200-B

ISO		Vc [m/min]	d_1 [mm]									
			3	4	5	6	8	10	12	14	16	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P7	130-160	0,005	0,010	0,015	0,020	0,030	0,045	0,055	0,060	0,065	0,080
	P8-P13	60-110	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,065
	P14	90-140	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,055
M	M1	90-140	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,055
	M2	60-90	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,065
	M3	60-80	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,055
K	K1-K6	90-130	0,005	0,010	0,020	0,025	0,030	0,040	0,045	0,050	0,055	0,065
N	N1-N5	240-280	0,035	0,040	0,045	0,050	0,055	0,065	0,075	0,080	0,085	0,095
	N7-N10	260-300	0,030	0,035	0,045	0,050	0,055	0,060	0,070	0,075	0,080	0,090
S	S1-S5	15-25	0,005	0,005	0,010	0,020	0,030	0,050	0,055	0,060	0,065	0,080
	S6-S8	40-60	0,005	0,010	0,015	0,020	0,035	0,050	0,055	0,060	0,065	0,080



Example of order

M9-444X10-0030
X-MILL 440S 3x6x7x54 VHM AT

R - for tools with corner radius

Another tool dimensions available on request

For machining steel, stainless steel and cast iron with hardness up to 35 HRC

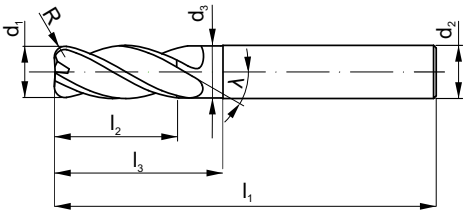
X-MILL

440N	440N	R440N	R440N

VHM

AT

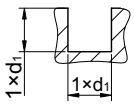
Version without corner radius is protected by corner chamfer:
for Ø < 6mm f_1 = 0,1x45°
for Ø ≥ 6mm f_1 = 0,2x45°

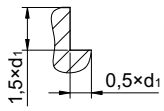


Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	AT	AT	AT	AT
Corner type				

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	R	INDEX			
1	4	-	50	3	-	4	-	M9-444XA0-0010	-	-	-
1,5	4	-	50	4	-	4	-	M9-444XA0-0015	-	-	-
2,0	4	-	50	6	-	4	-	M9-444XA0-0020	-	-	-
2,5	4	-	50	8	-	4	-	M9-444XA0-0025	-	-	-
3	6	-	57	8	-	4	0,3	M9-444XA0-0030	M9-444XA0-0030-B	M9-444XAD-0030	M9-444XAD-0030-B
4	6	-	57	11	-	4	0,3	M9-444XA0-0040	M9-444XA0-0040-B	M9-444XAD-0040	M9-444XAD-0040-B
5	6	-	57	13	-	4	0,3	M9-444XA0-0050	M9-444XA0-0050-B	M9-444XAD-0050	M9-444XAD-0050-B
6	6	5,5	57	13	21	4	0,5	M9-444XA0-0060	M9-444XA0-0060-B	M9-444XA1-0060	M9-444XA1-0060-B
6	6	5,5	57	13	21	4	1,0	-	-	M9-444XA3-0060	M9-444XA3-0060-B
8	8	7,5	63	19	27	4	0,5	M9-444XA0-0080	M9-444XA0-0080-B	M9-444XA1-0080	M9-444XA1-0080-B
8	8	7,5	63	19	27	4	1,0	-	-	M9-444XA3-0080	M9-444XA3-0080-B
8	8	7,5	63	19	27	4	2,0	-	-	M9-444XA5-0080	M9-444XA5-0080-B
10	10	9,2	72	22	32	4	0,5	M9-444XA0-0100	M9-444XA0-0100-B	M9-444XA1-0100	M9-444XA1-0100-B
10	10	9,2	72	22	32	4	1,0	-	-	M9-444XA3-0100	M9-444XA3-0100-B
10	10	9,2	72	22	32	4	2,0	-	-	M9-444XA5-0100	M9-444XA5-0100-B

ISO		Vc [m/min]	d_1 < 3 mm			
			1	1,5	2	2,5
			fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	75	0,004	0,008	0,015	0,015
	P6-P12	60	0,003	0,006	0,010	0,010
K	K1-K4	100	0,003	0,006	0,010	0,015
	K5-K6	85	0,003	0,006	0,020	0,025
N	N7-N9	170	0,005	0,010	0,015	0,020





ISO		Vc [m/min]	3	4	5	6	8	10	12	14	16	18	20	25
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P7	130-160	0,005	0,010	0,015	0,020	0,030	0,045	0,055	0,060	0,065	0,070	0,080	0,095
	P8-P13	60-110	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,060	0,065	0,080
	P14	90-140	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,050	0,055	0,065
M	M1	80-120	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,050	0,055	0,065
	M2	60-90	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,060	0,065	0,080
	M3	60-80	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,050	0,055	0,065
K	K1-K6	90-130	0,005	0,010	0,020	0,025	0,030	0,040	0,045	0,050	0,055	0,060	0,065	0,080
N	N1-N5	240-280	0,035	0,040	0,050	0,050	0,055	0,065	0,075	0,080	0,085	0,090	0,095	0,105
	N7-N10	260-300	0,030	0,035	0,045	0,050	0,055	0,060	0,070	0,075	0,080	0,085	0,090	0,105
S	S1-S5	15-25	0,005	0,005	0,010	0,020	0,030	0,050	0,055	0,060	0,065	0,070	0,080	0,095
	S6-S8	40-60	0,005	0,005	0,015	0,020	0,035	0,050	0,055	0,060	0,065	0,070	0,080	0,095

Example of order

M9-444XA1-0060
X-MILL R440N 6x5,5x6x13x21x57 R0,5 VHM AT

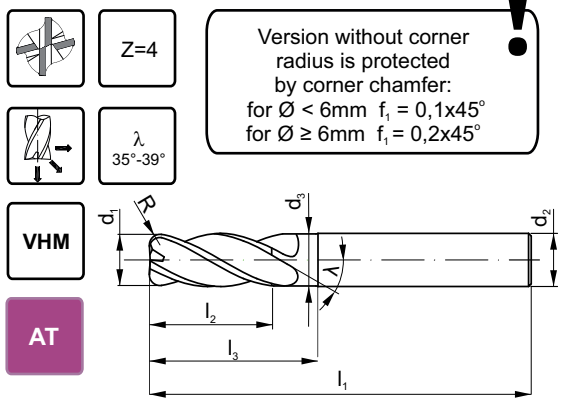
R - for tools with corner radius

Another tool dimensions available on request

For machining steel, stainless steel and cast iron with hardness up to 35 HRC

X-MILL

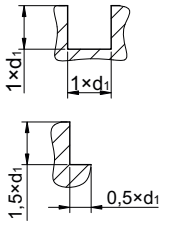
440N	440N	R440N	R440N



Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	AT	AT	AT	AT
Corner type				

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	R	INDEX			
12	12	11	83	26	38	4	0,5	M9-444XA0-0120	M9-444XA0-0120-B	M9-444XA1-0120	M9-444XA1-0120-B
12	12	11	83	26	38	4	0,7	-	-	M9-444XA2-0120	M9-444XA2-0120-B
12	12	11	83	26	38	4	1,0	-	-	M9-444XA3-0120	M9-444XA3-0120-B
12	12	11	83	26	38	4	1,5	-	-	M9-444XA4-0120	M9-444XA4-0120-B
12	12	11	83	26	38	4	2,0	-	-	M9-444XA5-0120	M9-444XA5-0120-B
12	12	11	83	26	38	4	3,0	-	-	M9-444XA7-0120	M9-444XA7-0120-B
14	14	13	83	26	38	4	0,5	M9-444XA0-0140	M9-444XA0-0140-B	M9-444XA1-0140	M9-444XA1-0140-B
14	14	13	83	26	38	4	0,7	-	-	M9-444XA2-0140	M9-444XA2-0140-B
14	14	13	83	26	38	4	1,0	-	-	M9-444XA3-0140	M9-444XA3-0140-B
14	14	13	83	26	38	4	2,0	-	-	M9-444XA5-0140	M9-444XA5-0140-B
16	16	15	92	32	44	4	0,5	M9-444XA0-0160	M9-444XA0-0160-B	M9-444XA1-0160	M9-444XA1-0160-B
16	16	15	92	32	44	4	1,0	-	-	M9-444XA3-0160	M9-444XA3-0160-B
16	16	15	92	32	44	4	2,0	-	-	M9-444XA5-0160	M9-444XA5-0160-B
16	16	15	92	32	44	4	3,0	-	-	M9-444XA7-0160	M9-444XA7-0160-B
18	18	17	92	32	44	4	1,0	M9-444XA0-0180	M9-444XA0-0180-B	M9-444XA3-0180	M9-444XA3-0180-B
20	20	19	104	38	55	4	1,0	M9-444XA0-0200	M9-444XA0-0200-B	M9-444XA3-0200	M9-444XA3-0200-B
20	20	19	104	45	55	4	1,0	M9-444XA0-0200A	M9-444XA0-0200A-B	M9-444XA3-0200A	M9-444XA3-0200A-B
20	20	19	104	45	55	4	2,0	-	-	M9-444XA5-0200A	M9-444XA5-0200A-B
25	25	24	122	55	66	4	1,0	M9-444XA0-0250	M9-444XA0-0250-B	M9-444XA3-0250	M9-444XA3-0250-B

ISO		Vc [m/min]	d_1 [mm]											
			3	4	5	6	8	10	12	14	16	18	20	25
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P7	130-160	0,005	0,010	0,015	0,020	0,030	0,045	0,055	0,060	0,065	0,070	0,080	0,095
	P8-P13	60-110	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,060	0,065	0,080
	P14	90-140	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,050	0,055	0,065
M	M1	80-120	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,050	0,055	0,065
	M2	60-90	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,060	0,065	0,080
	M3	60-80	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,050	0,055	0,065
K	K1-K6	90-130	0,005	0,010	0,020	0,025	0,030	0,040	0,045	0,050	0,055	0,060	0,065	0,080
N	N1-N5	240-280	0,035	0,040	0,050	0,050	0,055	0,065	0,075	0,080	0,085	0,090	0,095	0,105
	N7-N10	260-300	0,030	0,035	0,045	0,050	0,055	0,060	0,070	0,075	0,080	0,085	0,090	0,105
S	S1-S5	15-25	0,005	0,005	0,010	0,020	0,030	0,050	0,055	0,060	0,065	0,070	0,080	0,095
	S6-S8	40-60	0,005	0,005	0,015	0,020	0,035	0,050	0,055	0,060	0,065	0,070	0,080	0,095



Example of order

M9-444XA1-0120
X-MILL R440N 12x11x12x26x38x83 R0,5 VHM AT

R - for tools with corner radius

Another tool dimensions available on request

For machining steel, stainless steel and cast iron with hardness up to 35 HRC

X-MILL

440NL	440NL	R440NL	R440NL

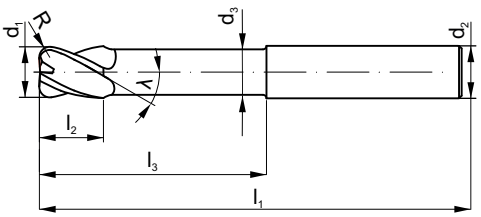
Z=4

λ 35°-39°

Version without corner radius is protected by corner chamfer:
for Ø < 6mm f_1 = 0,1x45°
for Ø ≥ 6mm f_1 = 0,2x45°

VHM

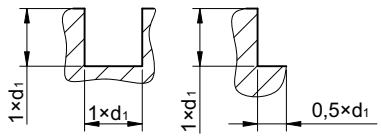
AT



Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	AT	AT	AT	AT
Corner type				

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	R	INDEX			
3	6	2,7	57	7	17	4	0,3	M9-444XG0-0030	M9-444XG0-0030-B	M9-444XGD-0030	M9-444XGD-0030-B
4	6	3,7	63	8	22	4	0,3	M9-444XG0-0040	M9-444XG0-0040-B	M9-444XGD-0040	M9-444XGD-0040-B
5	6	4,7	67	10	27	4	0,3	M9-444XG0-0050	M9-444XG0-0050-B	M9-444XGD-0050	M9-444XGD-0050-B
6	6	5,5	74	10	32	4	0,5	M9-444XG0-0060	M9-444XG0-0060-B	M9-444XG1-0060	M9-444XG1-0060-B
6	6	5,5	74	10	32	4	1,0	-	-	M9-444XG3-0060	M9-444XG3-0060-B
8	8	7,5	90	12	46	4	0,5	M9-444XG0-0080	M9-444XG0-0080-B	M9-444XG1-0080	M9-444XG1-0080-B
8	8	7,5	90	12	46	4	1,0	-	-	M9-444XG3-0080	M9-444XG3-0080-B
10	10	9,2	102	14	55	4	0,5	M9-444XG0-0100	M9-444XG0-0100-B	M9-444XG1-0100	M9-444XG1-0100-B
10	10	9,2	102	14	55	4	1,0	-	-	M9-444XG3-0100	M9-444XG3-0100-B
10	10	9,2	102	14	55	4	2,5	-	-	M9-444XG6-0100	M9-444XG6-0100-B
12	12	11	117	16	64	4	0,5	M9-444XG0-0120	M9-444XG0-0120-B	M9-444XG1-0120	M9-444XG1-0120-B
12	12	11	117	16	64	4	1,0	-	-	M9-444XG3-0120	M9-444XG3-0120-B
16	16	15	141	22	87	4	0,5	M9-444XG0-0160	M9-444XG0-0160-B	M9-444XG1-0160	M9-444XG1-0160-B
16	16	15	141	22	87	4	1,0	-	-	M9-444XG3-0160	M9-444XG3-0160-B
16	16	15	141	22	87	4	2,0	-	-	M9-444XG5-0160	M9-444XG5-0160-B
20	20	19	164	26	110	4	1,0	M9-444XG0-0200	M9-444XG0-0200-B	M9-444XG3-0200	M9-444XG3-0200-B

ISO		Vc [m/min]	d_1 [mm]									
			3	4	5	6	8	10	12	14	16	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P7	130-160	0,005	0,010	0,015	0,020	0,030	0,045	0,055	0,060	0,065	0,080
	P8-P13	60-110	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,065
	P14	90-140	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,055
M	M1	75-90	0,005	0,005	0,010	0,015	0,020	0,035	0,040	0,045	0,045	0,055
	M2	60-70	0,005	0,010	0,010	0,015	0,025	0,040	0,045	0,050	0,055	0,065
	M3	45-55	0,005	0,005	0,010	0,015	0,025	0,035	0,040	0,045	0,045	0,055
K	K1-K6	90-130	0,005	0,010	0,020	0,025	0,030	0,040	0,045	0,050	0,055	0,065
N	N1-N5	240-280	0,035	0,040	0,050	0,050	0,055	0,065	0,075	0,080	0,085	0,095
	N7-N10	260-300	0,030	0,035	0,045	0,050	0,055	0,060	0,070	0,075	0,080	0,090
S	S1-S5	15-25	0,005	0,010	0,015	0,020	0,030	0,050	0,055	0,060	0,065	0,080
	S6-S8	40-60	0,005	0,010	0,015	0,020	0,035	0,050	0,055	0,060	0,650	0,075



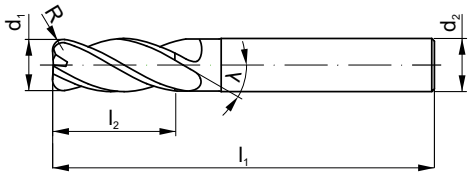
Example of order

M9-444XGD-0030
X-MILL 440NL 3x2,7x6x7x17x57 R0,3 VHM AT

R - for tools with corner radius

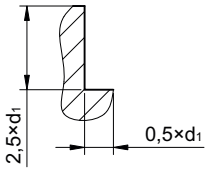
Another tool dimensions available on request

For machining steel and cast iron with hardness up to 35 HRC	X-MILL		
	430L	430L	R430L
Z=4			
λ 30°			
VHM			
AT			
Workpiece material	P M K N S H	P M K N S H	P M K N S H
Shank			
Tool material	VHM	VHM	VHM
Coating	AT	AT	AT
Corner type			



d_1	d_2h6	l_1	l_2	Z	R	INDEX		
2	4	50	15	4	-	M9-434X20-0020	-	-
3	4	50	20	4	0,3	M9-434X20-0030	-	M9-434X2D-0030
4	4	75	25	4	0,3	M9-434X20-0040	-	M9-434X2D-0040
5	6	75	30	4	0,3	M9-434X20-0050	M9-434X20-0050-B	M9-434X2D-0050
6	6	75	30	4	0,5	M9-434X20-0060	M9-434X20-0060-B	M9-434X21-0060
8	8	100	40	4	0,5	M9-434X20-0080	M9-434X20-0080-B	M9-434X21-0080
10	10	100	40	4	0,5	M9-434X20-0100	M9-434X20-0100-B	M9-434X21-0100
12	12	100	45	4	0,7	M9-434X20-0120	M9-434X20-0120-B	M9-434X22-0120
16	16	150	60	4	1,0	M9-434X20-0160	M9-434X20-0160-B	M9-434X23-0160
20	20	150	60	4	1,0	M9-434X20-0200	M9-434X20-0200-B	M9-434X23-0200

ISO		Vc [m/min]	d_1 [mm]									
			2	3	4	5	6	8	10	12	16	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	50-65	0,010	0,015	0,020	0,030	0,040	0,060	0,075	0,085	0,100	0,110
	P6-P12	40-50	0,005	0,010	0,010	0,100	0,010	0,015	0,020	0,020	0,025	0,030
K	K1-K4	60-80	0,005	0,010	0,010	0,015	0,030	0,030	0,040	0,050	0,055	0,060
	K5-K6	50-70	0,005	0,010	0,010	0,015	0,030	0,030	0,040	0,050	0,055	0,060
N	N7-N9	90-140	0,015	0,025	0,030	0,030	0,035	0,040	0,050	0,060	0,075	0,090



Example of order
M9-434X20-0020
X-MILL 440L 3x4x15x50 VHM AT

R - for tools with corner radius

Another tool dimensions available on request

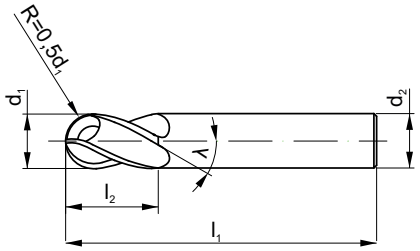
For machining steel, stainless steel and cast iron with hardness up to 35 HRC

X-MILL

B440

VHM

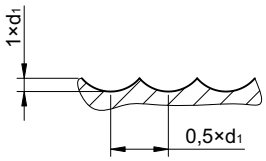
AT



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	AT
Corner type	

d_1	d_2h6	l_1	l_2	Z	R	INDEX
3	6	54	7	4	1,5	M9-444X1X-0030
4	6	54	8	4	2,0	M9-444X1X-0040
5	6	54	10	4	2,5	M9-444X1X-0050
6	6	54	10	4	3,0	M9-444X1X-0060
8	8	58	12	4	4,0	M9-444X1X-0080
10	10	66	14	4	5,0	M9-444X1X-0100
12	12	73	16	4	6,0	M9-444X1X-0120
14	14	75	18	4	7,0	M9-444X1X-0140
16	16	82	22	4	8,0	M9-444X1X-0160
18	18	84	24	4	9,0	M9-444X1X-0180
20	20	92	26	4	10,0	M9-444X1X-0200

ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P13	80-130	0,025	0,025	0,030	0,040	0,060	0,060	0,070	0,075	0,080	0,085	0,090
	P14	60-70	0,015	0,015	0,025	0,030	0,040	0,045	0,050	0,055	0,060	0,065	0,070
M	M1-M2	60-85	0,020	0,020	0,025	0,040	0,045	0,050	0,055	0,060	0,065	0,070	0,075
K	K1-K6	80-130	0,025	0,025	0,030	0,040	0,060	0,060	0,070	0,075	0,080	0,085	0,090
N	N1-N5	240-280	0,035	0,040	0,050	0,050	0,055	0,065	0,075	0,080	0,085	0,090	0,095
	N7-N10	260-300	0,030	0,035	0,045	0,050	0,055	0,060	0,070	0,075	0,080	0,085	0,090
S	S1-S5	20-30	0,010	0,010	0,010	0,015	0,025	0,025	0,040	0,045	0,050	0,055	0,060
	S6-S8	40-55	0,010	0,010	0,015	0,020	0,030	0,030	0,040	0,045	0,050	0,060	0,065



Example of order
M9-444X1X-0030
X-MILL B440 3x6x7x54 VHM AT

Another tool dimensions available on request

For machining steel, stainless steel and cast iron with hardness up to 35 HRC

X-MILL

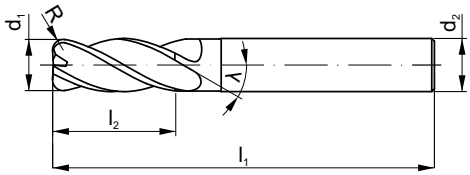
	540	540	R540	R540
				
Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	AT	AT	AT	AT
Corner type				

Z=5

λ 40°

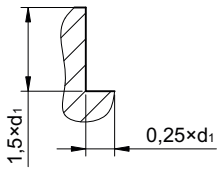
VHM

AT



d_1	d_2h6	l_1	l_2	Z	R	INDEX			
6	6	57	13	5	0,5	M9-544X00-0060	M9-544X00-0060-B	M9-544X01-0060	M9-544X01-0060-B
8	8	63	19	5	0,5	M9-544X00-0080	M9-544X00-0080-B	M9-544X01-0080	M9-544X01-0080-B
8	8	63	19	5	1,0	-	-	M9-544X03-0080	M9-544X03-0080-B
8	8	63	19	5	1,5	-	-	M9-544X04-0080	M9-544X04-0080-B
8	8	63	19	5	2,0	-	-	M9-544X05-0080	M9-544X05-0080-B
10	10	72	22	5	0,5	M9-544X00-0100	M9-544X00-0100-B	M9-544X01-0100	M9-544X01-0100-B
10	10	72	22	5	2,5	-	-	M9-544X06-0100	M9-544X06-0100-B
12	12	83	26	5	0,5	M9-544X00-0120	M9-544X00-0120-B	M9-544X01-0120	M9-544X01-0120-B
12	12	83	26	5	0,7	-	-	M9-544X02-0120	M9-544X02-0120-B
12	12	83	26	5	1,0	-	-	M9-544X03-0120	M9-544X03-0120-B
14	14	83	26	5	0,5	M9-544X00-0140	M9-544X00-0140-B	M9-544X01-0140	M9-544X01-0140-B
16	16	92	32	5	0,5	M9-544X00-0160	M9-544X00-0160-B	M9-544X01-0160	M9-544X01-0160-B
16	16	92	32	5	1,0	-	-	M9-544X03-0160	M9-544X03-0160-B
16	16	92	32	5	2,0	-	-	M9-544X05-0160	M9-544X05-0160-B
18	18	92	32	5	1,0	M9-544X00-0180	M9-544X00-0180-B	M9-544X03-0180	M9-544X03-0180-B
20	20	104	38	5	1,0	M9-544X00-0200	M9-544X00-0200-B	M9-544X03-0200	M9-544X03-0200-B

ISO		Vc [m/min]	d_1 [mm] 6 fz [mm]	8 fz [mm]	10 fz [mm]	12 fz [mm]	14 fz [mm]	16 fz [mm]	18 fz [mm]	20 fz [mm]
P	P1-P13	130-150	0,035	0,040	0,050	0,065	0,070	0,075	0,080	0,090
	P14	90-100	0,030	0,035	0,040	0,045	0,065	0,070	0,070	0,075
M	M1-M2	70-100	0,030	0,035	0,040	0,045	0,065	0,070	0,070	0,075
K	K1-K6	110-140	0,035	0,040	0,050	0,065	0,070	0,075	0,075	0,090
N	N1-N5	240-280	0,050	0,055	0,065	0,075	0,080	0,085	0,085	0,095
	N7-N10	260-300	0,050	0,055	0,060	0,070	0,075	0,080	0,085	0,090
S	S1-S5	20-30	0,015	0,020	0,025	0,035	0,045	0,050	0,050	0,060
	S6-S8	40-65	0,030	0,035	0,040	0,050	0,055	0,065	0,065	0,075



Example of order

M9-544X00-0060
X-MILL 540 6x6x13x57 VHM AT

R - for tools with corner radius

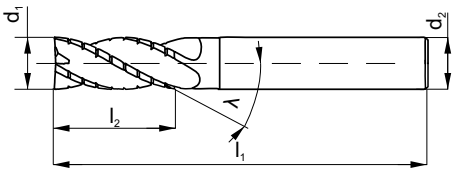
Another tool dimensions available on request

For roughing steel, cast iron, difficult to machine materials and non-ferrous materials

ZGR

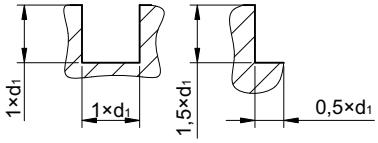
	420	420
		
Workpiece material	P M K N S H	P M K N S H
Shank		
Tool material	VHM	VHM
Coating	AT	AT
Corner type		

Typ HR | Z=4 | λ 20° | VHM | AT



d_1	d_2h6	l_1	l_2	Z	INDEX	
6	6	57	16	4	M9-424A00-0060	M9-424A00-0060-B
7	8	63	16	4	M9-424A00-0070	M9-424A00-0070-B
8	8	63	16	4	M9-424A00-0080	M9-424A00-0080-B
9	10	72	19	4	M9-424A00-0090	M9-424A00-0090-B
10	10	72	22	4	M9-424A00-0100	M9-424A00-0100-B
12	12	83	26	4	M9-424A00-0120	M9-424A00-0120-B
14	14	83	26	4	M9-424A00-0140	M9-424A00-0140-B
16	16	92	32	4	M9-424A00-0160	M9-424A00-0160-B
18	18	92	32	4	M9-424A00-0180	M9-424A00-0180-B
20	20	104	38	4	M9-424A00-0200	M9-424A00-0200-B

ISO		Vc [m/min]	d_1 [mm]							
			6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P8	100-140	0,030	0,035	0,035	0,045	0,050	0,055	0,060	0,070
	P9-P11	100-120	0,025	0,030	0,030	0,035	0,040	0,045	0,045	0,050
	P13-P14	50-65	0,015	0,020	0,020	0,025	0,030	0,035	0,035	0,040
M	M1-M3	40-60	0,015	0,020	0,020	0,025	0,030	0,035	0,035	0,040
K	K1-K2	110-160	0,030	0,035	0,045	0,050	0,055	0,056	0,060	0,070
	K3-K6	80-110	0,020	0,020	0,035	0,035	0,040	0,040	0,045	0,050
H	H1,H2,H4	50-90	0,020	0,020	0,035	0,030	0,035	0,035	0,040	0,040



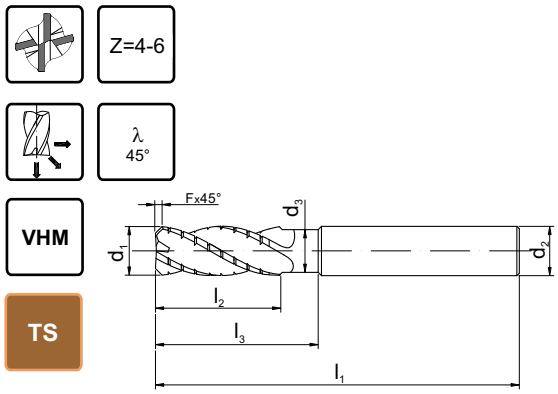
Example of order

M9-424A00-0060
ZGR 420 6x6x16x57 VHM AT

For roughing steel, cast iron, difficult to machine materials and non-ferrous materials

ZGR

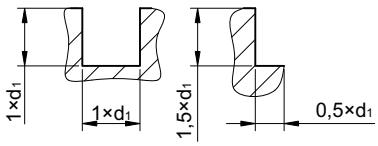
440N / 540N / 640N



Workpiece material	P M K N S H
Shank	VHM
Tool material	TS
Coating	
Corner type	

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	F	INDEX
6	6	5,5	57	13	21	4	0,3	M9-44GAA0-0060
8	8	7,5	63	19	27	4	0,4	M9-44GAA0-0080
10	10	9,5	72	22	32	5	0,5	M9-54GAA0-0100
12	12	11,5	83	26	38	5	0,6	M9-54GAA0-0120
16	16	15	92	32	44	6	0,8	M9-64GAA0-0160

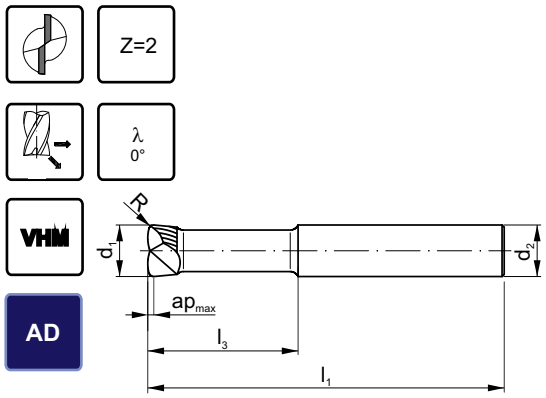
ISO		Vc [m/min]	d_1 [mm]				
			6	8	10	12	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P8	130-150	0,03	0,035	0,035	0,45	0,55
	P9-P11	90-120	0,025	0,03	0,03	0,035	0,045
	P13-P14	60-80	0,015	0,02	0,02	0,025	0,035
M	M1-M3	50-70	0,015	0,02	0,2	0,025	0,035
K	K1-K2	110-160	0,03	0,035	0,045	0,05	0,055
	K3-K6	80-110	0,02	0,02	0,035	0,035	0,04
H	H1,H2,H4	40-80	0,02	0,02	0,03	0,035	0,035



Example of order

M9-44GAA0-0060
ZGR 440N 6x5,5x6x13x21x57 VHM TS

For high feed machining materials with hardness up to 55 HRC	HRC HFM 200



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	AD
Corner type	

d_1	d_2h6	l_1	ap_{max}	l_3	Z	R	INDEX
6	6	57	0,30	20	2	0,6	M9-20E9A0-0060
8	8	63	0,35	20	2	0,8	M9-20E9A0-0080
10	10	72	0,40	30	2	1,0	M9-20E9A0-0100
12	12	83	0,70	35	2	1,2	M9-20E9A0-0120
16	16	92	0,80	50	2	1,6	M9-20E9A0-0160

ISO		Vc [m/min]	a_e[mm]	d_1 [mm]				
				6	8	10	12	16
				fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
P	P1-P5	300-350	0,4 - 0,6xD	0,4	0,5	0,6	0,8	1,2
	P6-P14	200-250	0,4 - 0,6xD	0,3	0,4	0,5	0,6	1,0
K	K1-K3	400-450	0,4 - 0,6xD	0,4	0,5	0,6	0,8	1,2
	K4-K6	300-350	0,4 - 0,6xD	0,3	0,4	0,5	0,6	1,0
H	H1-H4	70-120	0,2 - 0,4xD	0,3	0,4	0,5	0,6	1,0

H - group materials may only be machined dry. For more information see p. 325 in Technical Information.

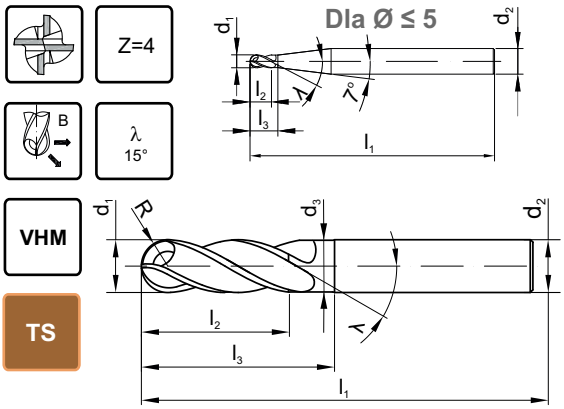
Example of order

M9-20E9A0-0060
HRC HFM 200 6x6x20x57 R0,6 VHM AD

For hardened materials

HRC

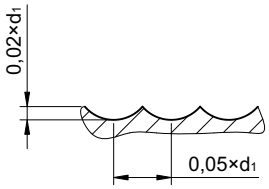
B415N



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TS
Corner type	

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	R	INDEX
3	6	2,9	57	7	21	4	1,5	M9-41G9AX-0030
4	6	3,9	57	8	21	4	2,0	M9-41G9AX-0040
5	6	4,9	57	10	21	4	2,5	M9-41G9AX-0050
6	6	5,9	57	10	21	4	3,0	M9-41G9AX-0060
8	8	7,8	63	12	23	4	4,0	M9-41G9AX-0080
10	10	9,8	72	14	27	4	5,0	M9-41G9AX-0100
12	12	11,8	75	16	30	4	6,0	M9-41G9AX-0120
16	16	15,8	92	22	44	4	8,0	M9-41G9AX-0160

ISO		Vc [m/min]	d_1 [mm]							
			3	4	5	6	8	10	12	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
H	H1	180-220	0,040	0,055	0,070	0,085	0,100	0,120	0,160	0,220
	H2, H4	140-180	0,030	0,035	0,055	0,065	0,080	0,100	0,150	0,175
	H3	115-160	0,025	0,035	0,045	0,055	0,065	0,085	0,100	0,150



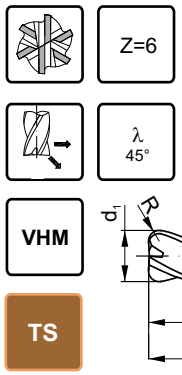
H - group materials may only be machined dry. For more information see p. 325 in Technical Information.

Example of order

M9-41G9AX-0030
HRC B415N 3x2,9x6x7x21x57 VHM TS

Another tool dimensions available on request

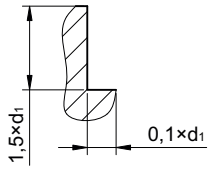
For hardened materials	HRC R645



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TS
Corner type	

d_1	d_2h6	l_1	l_2	Z	R	INDEX
6	6	57	13	6	0,5	M9-64G901-0060
8	8	63	19	6	0,5	M9-64G901-0080
10	10	72	22	6	1,0	M9-64G903-0100
12	12	75	26	6	1,0	M9-64G903-0120
16	16	92	32	6	1,5	M9-64G904-0160

ISO		Vc [m/min]	d_1 [mm]				
			6	8	10	12	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
H	H1	80-140	0,035	0,050	0,060	0,070	0,085
	H2-H4	50-80	0,025	0,035	0,045	0,050	0,065

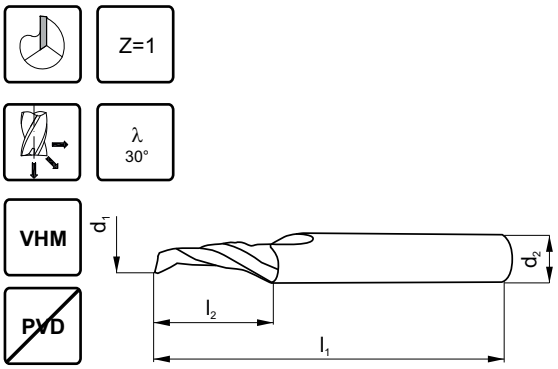


H - group materials may only be machined dry. For more information see p. 325 in Technical Information.

Example of order
M9-464G901-0060
HRC R645 6x6x13x57 R0,5 VHM TS

Another tool dimensions available on request

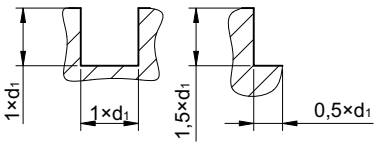
For machining aluminium alloys and other non-ferrous materials	AL 130



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	-
Corner type	

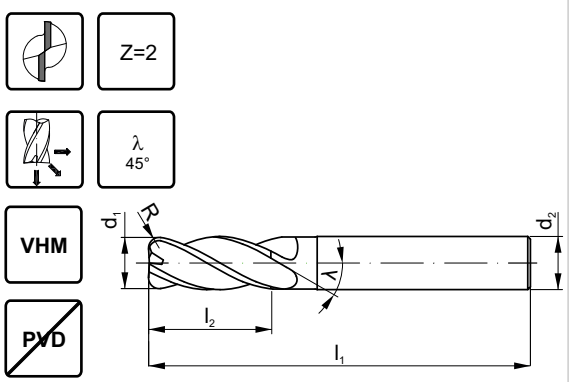
d_1	d_2h_6	l_1	l_2	Z	INDEX
3	6	57	12	1	M9-131700-0030
4	6	57	12	1	M9-131700-0040
5	6	57	14	1	M9-131700-0050
6	6	57	16	1	M9-131700-0060
8	8	63	20	1	M9-131700-0080
10	10	72	22	1	M9-131700-0100

ISO		Vc [m/min]	d_1 [mm]					
			3	4	5	6	8	10
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N2	250-400	0,010	0,015	0,020	0,025	0,030	0,035
	N3-N5	290-440	0,010	0,015	0,020	0,025	0,030	0,035
	N7-N9	210-360	0,005	0,010	0,015	0,020	0,025	0,030



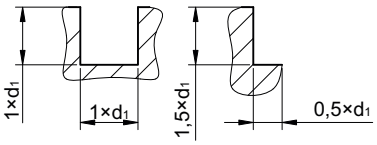
Example of order
M9-131700-0030
AL 130 3x6x12x57 VHM

Another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL			
	245	245	R245	R245
				
Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	-	-	-	-
Corner type				

d_1	d_2	l_1	l_2	Z	R	INDEX			
3	3	39	12	2	0,3	M9-241700-0030	-	M9-24170D-0030	-
4	4	51	12	2	0,3	M9-241700-0040	-	M9-24170D-0040	-
5	5	51	14	2	0,3	M9-241700-0050	-	M9-24170D-0050	-
6	6	57	16	2	0,5	M9-241700-0060	M9-241700-0060-B	M9-241701-0060	M9-241701-0060-B
6	6	57	16	2	1	-	-	M9-241703-0060	M9-241703-0060-B
8	8	63	20	2	0,5	M9-241700-0080	M9-241700-0080-B	M9-241701-0080	M9-241701-0080-B
8	8	63	20	2	1	-	-	M9-241703-0080	M9-241703-0080-B
10	10	72	22	2	0,5	M9-241700-0100	M9-241700-0100-B	M9-241701-0100	M9-241701-0100-B
12	12	83	32	2	0,5	M9-241700-0120	M9-241700-0120-B	M9-241701-0120	M9-241701-0120-B
14	14	83	32	2	0,5	M9-241700-0140	M9-241700-0140-B	M9-241701-0140	M9-241701-0140-B
16	16	92	36	2	0,5	M9-241700-0160	M9-241700-0160-B	M9-241701-0160	M9-241701-0160-B
18	18	92	45	2	1	M9-241700-0180	M9-241700-0180-B	M9-241703-0180	M9-241703-0180-B
20	20	104	50	2	1	M9-241700-0200	M9-241700-0200-B	M9-241703-0200	M9-241703-0200-B

ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N2	180-270	0,035	0,045	0,050	0,060	0,090	0,110	0,135	0,145	0,155	0,180	0,200
	N3-N4	380-480	0,045	0,055	0,065	0,080	0,150	0,160	0,170	0,200	0,230	0,250	0,270
	N7-N9	180-270	0,010	0,015	0,020	0,025	0,030	0,035	0,050	0,050	0,055	0,090	0,100



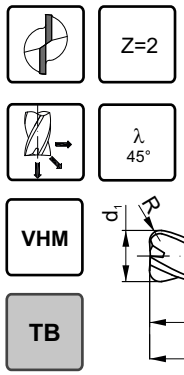
Example of order

M9-241700-0030
AL 245 3x3x12x39 R0,3 VHM

R - for tools with corner radius

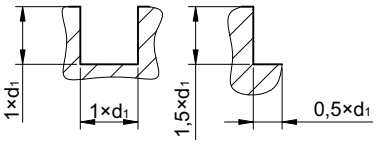
Another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL			
	245	245	R245	R245
				
Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	TB	TB	TB	TB
Corner type				



d_1	d_2	l_1	l_2	Z	R	INDEX			
3	3	39	12	2	0,3	M9-24B700-0030	-	M9-24B70D-0030	-
4	4	51	12	2	0,3	M9-24B700-0040	-	M9-24B70D-0040	-
5	5	51	14	2	0,3	M9-24B700-0050	-	M9-24B70D-0050	-
6	6	57	16	2	0,5	M9-24B700-0060	M9-24B700-0060-B	M9-24B701-0060	M9-24B701-0060-B
6	6	57	16	2	1	-	-	M9-24B703-0060	M9-24B703-0060-B
8	8	63	20	2	0,5	M9-24B700-0080	M9-24B700-0080-B	M9-24B701-0080	M9-24B701-0080-B
8	8	63	20	2	1	-	-	M9-24B703-0080	M9-24B703-0080-B
10	10	72	22	2	0,5	M9-24B700-0100	M9-24B700-0100-B	M9-24B701-0100	M9-24B701-0100-B
12	12	83	32	2	0,5	M9-24B700-0120	M9-24B700-0120-B	M9-24B701-0120	M9-24B701-0120-B
14	14	83	32	2	0,5	M9-24B700-0140	M9-24B700-0140-B	M9-24B701-0140	M9-24B701-0140-B
16	16	92	36	2	0,5	M9-24B700-0160	M9-24B700-0160-B	M9-24B701-0160	M9-24B701-0160-B
18	18	92	45	2	1	M9-24B700-0180	M9-24B700-0180-B	M9-24B703-0180	M9-24B703-0180-B
20	20	104	50	2	1	M9-24B700-0200	M9-24B700-0200-B	M9-24B703-0200	M9-24B703-0200-B

ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N2	180-270	0,035	0,045	0,050	0,060	0,090	0,110	0,135	0,145	0,155	0,180	0,200
	N3-N4	380-480	0,045	0,055	0,065	0,080	0,150	0,160	0,170	0,200	0,230	0,250	0,270
	N7-N9	180-270	0,010	0,015	0,020	0,025	0,030	0,035	0,050	0,050	0,055	0,090	0,100

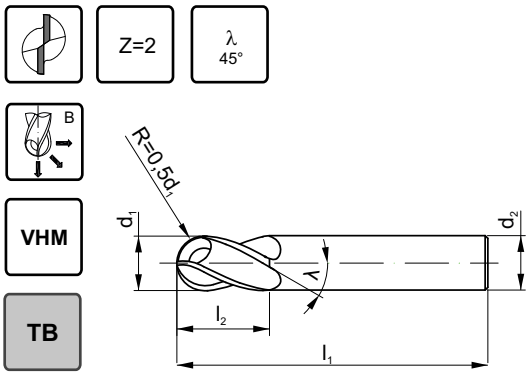


Example of order
M9-24B700-0030
AL 245 3x3x12x39 R0,3 VHM TB

R - for tools with corner radius

Another tool dimensions available on request

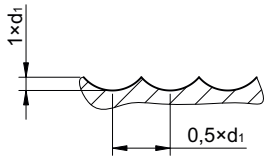
For machining aluminium alloys and other non-ferrous materials	AL B245



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TB
Corner type	

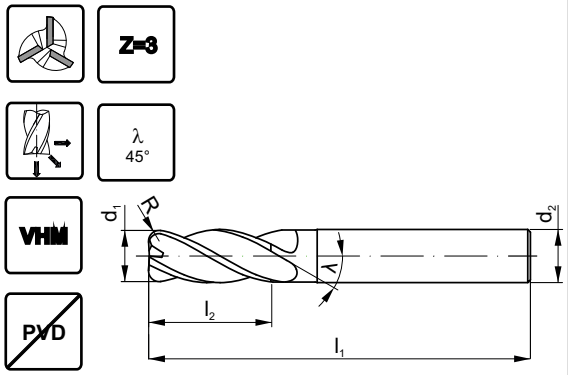
d_1	d_2	l_1	l_2	Z	R	INDEX
3	3	39	12	2	1,5	M9-24B70X-0030
4	4	51	12	2	2	M9-24B70X-0040
5	5	51	14	2	2,5	M9-24B70X-0050
6	6	57	16	2	3	M9-24B70X-0060
8	8	63	20	2	4	M9-24B70X-0080
10	10	72	22	2	5	M9-24B70X-0100
12	12	83	32	2	6	M9-24B70X-0120
16	16	92	36	2	8	M9-24B70X-0160

ISO		Vc [m/min]	d_1 [mm]							
			3	4	5	6	8	10	12	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	230-350	0,030	0,035	0,040	0,050	0,070	0,085	0,110	0,175
	N7-N9	130-170	0,007	0,008	0,010	0,015	0,025	0,030	0,040	0,055



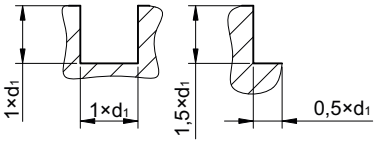
Example of order
M9-24B70X-0030
AL B245 3x3x12x39 VHM TB

Another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL			
	345	345	R345	R345
				
Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	-	-	-	-
Corner type				

d_1	d_2	l_1	l_2	Z	R	INDEX			
3	3	39	12	3	0,3	M9-341700-0030	-	M9-34170D-0030	-
4	4	51	12	3	0,3	M9-341700-0040	-	M9-34170D-0040	-
5	5	51	14	3	0,3	M9-341700-0050	-	M9-34170D-0050	-
6	6	57	16	3	0,5	M9-341700-0060	M9-341700-0060-B	M9-341701-0060	M9-341701-0060-B
6	6	57	16	3	1	-	-	M9-341703-0060	M9-341703-0060-B
8	8	63	20	3	0,5	M9-341700-0080	M9-341700-0080-B	M9-341701-0080	M9-341701-0080-B
8	8	63	20	3	1	-	-	M9-341703-0080	M9-341703-0080-B
8	8	63	20	3	2	-	-	M9-341705-0080	M9-341705-0080-B
10	10	72	22	3	0,5	M9-341700-0100	M9-341700-0100-B	M9-341701-0100	M9-341701-0100-B
10	10	72	22	3	1	-	-	M9-341703-0100	M9-341703-0100-B
10	10	72	22	3	1,5	-	-	M9-341704-0100	M9-341704-0100-B
10	10	72	22	3	2	-	-	M9-341705-0100	M9-341705-0100-B
10	10	72	22	3	2,5	-	-	M9-341706-0100	M9-341706-0100-B
12	12	83	32	3	0,5	M9-341700-0120	M9-341700-0120-B	M9-341701-0120	M9-341701-0120-B
12	12	83	32	3	1	-	-	M9-341703-0120	M9-341703-0120-B
12	12	83	32	3	1,5	-	-	M9-341704-0120	M9-341704-0120-B
12	12	83	32	3	2	-	-	M9-341705-0120	M9-341705-0120-B
12	12	83	32	3	2,5	-	-	M9-341706-0120	M9-341706-0120-B
12	12	83	32	3	3	-	-	M9-341707-0120	M9-341707-0120-B

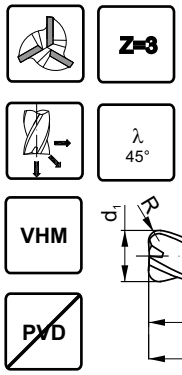
ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	350-450	0,020	0,030	0,055	0,070	0,085	0,100	0,115	0,135	0,150	0,200	0,220
	N7-N9	160-280	0,020	0,030	0,040	0,550	0,070	0,090	0,095	0,105	0,120	0,140	0,150



Example of order
M9-34470D-0030
AL R345 3x3x12x39 R0,3 VHM

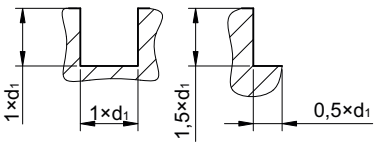
R - for tools with corner radius

Another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL			
	345	345	R345	R345
				
Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	-	-	-	-
Corner type				

d_1	d_2	l_1	l_2	Z	R	INDEX			
14	14	83	32	3	0,5	M9-341700-0140	M9-341700-0140-B	M9-341701-0140	M9-341701-0140-B
14	14	83	32	3	1	-	-	M9-341703-0140	M9-341703-0140-B
16	16	92	36	3	0,5	M9-341700-0160	M9-341700-0160-B	M9-341701-0160	M9-341701-0160-B
16	16	92	36	3	1	-	-	M9-341703-0160	M9-341703-0160-B
16	16	92	36	3	2	-	-	M9-341705-0160	M9-341705-0160-B
16	16	92	36	3	2,5	-	-	M9-341706-0160	M9-341706-0160-B
16	16	92	36	3	3	-	-	M9-341707-0160	M9-341707-0160-B
18	18	92	45	3	1	M9-341700-0180	M9-341700-0180-B	M9-341703-0180	M9-341703-0180-B
20	20	104	50	3	1	M9-341700-0200	M9-341700-0200-B	M9-341703-0200	M9-341703-0200-B
20	20	104	50	3	2	-	-	M9-341705-0200	M9-341705-0200-B
20	20	104	50	3	3	-	-	M9-341707-0200	M9-341707-0200-B
20	20	104	50	3	4	-	-	M9-341708-0200	M9-341708-0200-B

ISO		Vc [m/min]	d_1 [mm]									
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	350-450	0,020	0,030	0,054	0,069	0,085	0,100	0,115	0,135	0,150	0,200	0,220
	N7-N9	160-280	0,020	0,030	0,040	0,055	0,070	0,090	0,095	0,105	0,120	0,140	0,150

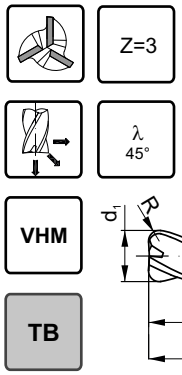


Example of order
M9-341701-0140
AL R345 14x14x32x83 R0,5 VHM

R - for tools with corner radius

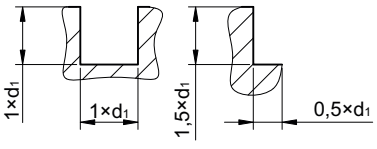
Another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL			
	345	345	R345	R345
				
Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	TB	TB	TB	TB
Corner type				



d_1	d_2	l_1	l_2	Z	R	INDEX			
14	14	83	32	3	0,5	M9-34B700-0140	M9-34B700-0140-B	M9-34B701-0140	M9-34B701-0140-B
14	14	83	32	3	1	-	-	M9-34B703-0140	M9-34B703-0140-B
16	16	92	36	3	0,5	M9-34B700-0160	M9-34B700-0160-B	M9-34B701-0160	M9-34B701-0160-B
16	16	92	36	3	1	-	-	M9-34B703-0160	M9-34B703-0160-B
16	16	92	36	3	2	-	-	M9-34B705-0160	M9-34B705-0160-B
16	16	92	36	3	2,5	-	-	M9-34B706-0160	M9-34B706-0160-B
16	16	92	36	3	3	-	-	M9-34B707-0160	M9-34B707-0160-B
18	18	92	45	3	1	M9-34B700-0180	M9-34B700-0180-B	M9-34B703-0180	M9-34B703-0180-B
20	20	104	50	3	1	M9-34B700-0200	M9-34B700-0200-B	M9-34B703-0200	M9-34B703-0200-B
20	20	104	50	3	2	-	-	M9-34B705-0200	M9-34B705-0200-B
20	20	104	50	3	3	-	-	M9-34B707-0200	M9-34B707-0200-B
20	20	104	50	3	4	-	-	M9-34B708-0200	M9-34B708-0200-B

ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	350-450	0,020	0,030	0,054	0,069	0,085	0,100	0,115	0,135	0,150	0,200	0,220
	N7-N9	160-280	0,020	0,030	0,040	0,055	0,070	0,090	0,095	0,105	0,120	0,140	0,150

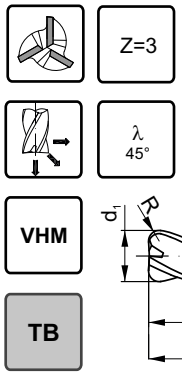


Example of order
M9-34B701-0140
AL R345 14x14x32x83 R0,5 VHM TB

R - for tools with corner radius

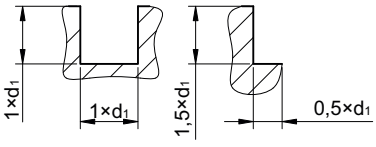
Another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL			
	345	345	R345	R345
				
Workpiece material	P M K N S H	P M K N S H	P M K N S H	P M K N S H
Shank				
Tool material	VHM	VHM	VHM	VHM
Coating	TB	TB	TB	TB
Corner type				



d_1	d_2	l_1	l_2	Z	R	INDEX			
3	3	39	12	3	0,3	M9-34B700-0030	-	M9-34B70D-0030	-
4	4	51	12	3	0,3	M9-34B700-0040	-	M9-34B70D-0040	-
5	5	51	14	3	0,3	M9-34B700-0050	-	M9-34B70D-0050	-
6	6	57	16	3	0,5	M9-34B700-0060	M9-34B700-0060-B	M9-34B701-0060	M9-34B701-0060-B
6	6	57	16	3	1	-	-	M9-34B703-0060	M9-34B703-0060-B
8	8	63	20	3	0,5	M9-34B700-0080	M9-34B700-0080-B	M9-34B701-0080	M9-34B701-0080-B
8	8	63	20	3	1	-	-	M9-34B703-0080	M9-34B703-0080-B
8	8	63	20	3	2	-	-	M9-34B705-0080	M9-34B705-0080-B
10	10	72	22	3	0,5	M9-34B700-0100	M9-34B700-0100-B	M9-34B701-0100	M9-34B701-0100-B
10	10	72	22	3	1	-	-	M9-34B703-0100	M9-34B703-0100-B
10	10	72	22	3	1,5	-	-	M9-34B704-0100	M9-34B704-0100-B
10	10	72	22	3	2	-	-	M9-34B705-0100	M9-34B705-0100-B
10	10	72	22	3	2,5	-	-	M9-34B706-0100	M9-34B706-0100-B
12	12	83	32	3	0,5	M9-34B700-0120	M9-34B700-0120-B	M9-34B701-0120	M9-34B701-0120-B
12	12	83	32	3	1	-	-	M9-34B703-0120	M9-34B703-0120-B
12	12	83	32	3	1,5	-	-	M9-34B704-0120	M9-34B704-0120-B
12	12	83	32	3	2	-	-	M9-34B705-0120	M9-34B705-0120-B
12	12	83	32	3	2,5	-	-	M9-34B706-0120	M9-34B706-0120-B
12	12	83	32	3	3	-	-	M9-34B707-0120	M9-34B707-0120-B

ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	350-450	0,020	0,030	0,054	0,069	0,085	0,100	0,115	0,135	0,150	0,200	0,220
	N7-N9	160-280	0,020	0,030	0,040	0,055	0,070	0,090	0,095	0,105	0,120	0,140	0,150

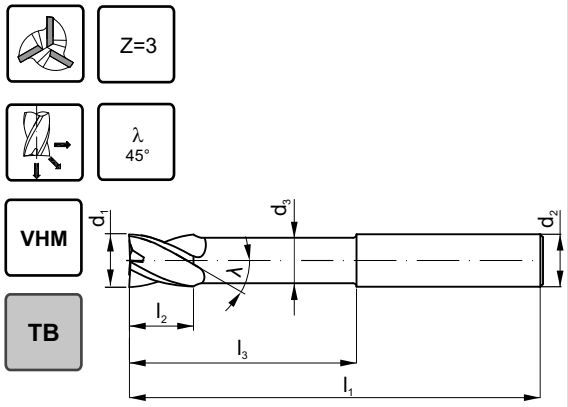


Example of order
M9-34B70D-0030
AL R345 3x3x12x39 R0,3 VHM TB

R - for tools with corner radius

Another tool dimensions available on request

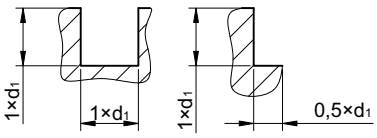
For machining aluminium alloys and other non-ferrous materials	AL
	345NL



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TB
Corner type	

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	INDEX
3	6	2,7	57	7	17	3	M9-34B7A0-0030
4	6	3,7	63	8	22	3	M9-34B7A0-0040
5	6	4,7	67	10	27	3	M9-34B7A0-0050
6	6	5,5	74	10	32	3	M9-34B7A0-0060
8	8	7,5	90	12	46	3	M9-34B7A0-0080
10	10	9,2	102	14	55	3	M9-34B7A0-0100
12	12	11	117	16	64	3	M9-34B7A0-0120
16	16	15	141	22	87	3	M9-34B7A0-0160

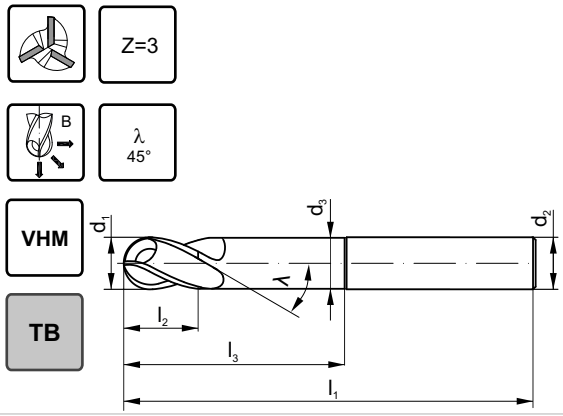
ISO		Vc [m/min]	d_1 [mm]										
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	150-250	0,020	0,030	0,055	0,070	0,085	0,100	0,115	0,135	0,150	0,200	0,220
	N7-N9	100-200	0,020	0,030	0,040	0,550	0,070	0,090	0,100	0,105	0,120	0,140	0,150



Example of order

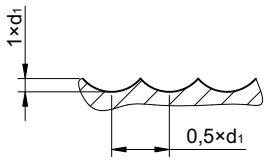
M9-34B7A0-0030
AL 345NL 3x2,7x6x7x17x57 VHM TB

Corner radius and another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL B345NL
	
Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TB
Corner type	

d_1	d_2h6	d_3	l_1	l_2	l_3	Z	R	INDEX
3	6	2,7	57	7	17	3	1,5	M9-34B7AX-0030
4	6	3,7	63	8	22	3	2	M9-34B7AX-0040
5	6	4,7	67	10	27	3	2,5	M9-34B7AX-0050
6	6	5,5	74	10	32	3	3	M9-34B7AX-0060
8	8	7,5	90	12	46	3	4	M9-34B7AX-0080
10	10	9,2	102	14	55	3	5	M9-34B7AX-0100
12	12	11	117	16	64	3	6	M9-34B7AX-0120
16	16	15	141	22	87	3	8	M9-34B7AX-0160

ISO		Vc [m/min]	d_1 [mm]								
			3	4	5	6	8	10	12	14	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	150-250	0,020	0,030	0,055	0,070	0,085	0,100	0,115	0,135	0,150
	N7-N9	100-200	0,020	0,030	0,040	0,550	0,070	0,090	0,100	0,105	0,120

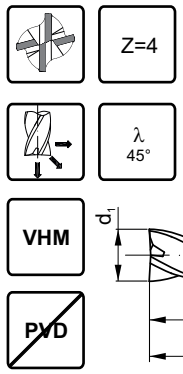


Example of order

M9-34B7AX-0030
AL B345NL 3x2,7x6x7x17x57 VHM TB

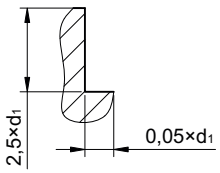
Another tool dimensions available on request

For machining aluminium alloys and other non-ferrous materials	AL	
	445	445
		
Workpiece material	P M K N S H	P M K N S H
Shank		
Tool material	VHM	VHM
Coating	-	-
Corner type		



d_1	d_2	l_1	l_2	Z	INDEX	
3	3	39	12	4	M9-441700-0030	-
4	4	51	12	4	M9-441700-0040	-
5	5	51	15	4	M9-441700-0050	-
6	6	57	18	4	M9-441700-0060	M9-441700-0060-B
8	8	63	24	4	M9-441700-0080	M9-441700-0080-B
10	10	72	30	4	M9-441700-0100	M9-441700-0100-B
12	12	83	36	4	M9-441700-0120	M9-441700-0120-B
14	14	83	42	4	M9-441700-0140	M9-441700-0140-B
16	16	92	48	4	M9-441700-0160	M9-441700-0160-B
18	18	92	54	4	M9-441700-0180	M9-441700-0180-B
20	20	104	60	4	M9-441700-0200	M9-441700-0200-B

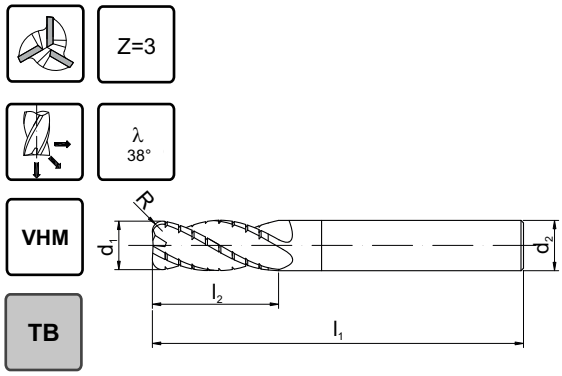
ISO		Vc [m/min]	d_1 [mm]									
			3	4	5	6	8	10	12	14	16	18	20
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	270-400	0,025	0,035	0,045	0,055	0,060	0,065	0,070	0,075	0,080	0,090	0,110
	N7-N9	130-250	0,020	0,030	0,035	0,040	0,045	0,050	0,055	0,060	0,075	0,085	0,090



Example of order
M9-441700-0030
AL 445 3x3x12X39 VHM

Another tool dimensions available on request

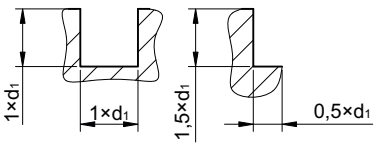
For machining aluminium alloys and other non-ferrous materials	ALZGR R338



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TB
Corner type	

d_1	d_2h6	l_1	l_2	Z	R	INDEX
6	6	57	16	3	0,5	M9-33B701-0060
8	8	63	20	3	0,5	M9-33B701-0080
10	10	72	22	3	1	M9-33B703-0100
12	12	83	26	3	1	M9-33B703-0120
16	16	92	32	3	2	M9-33B705-0160

ISO		Vc [m/min]	d_1 [mm]				
			6	8	10	12	16
			fz [mm]	fz [mm]	fz [mm]	fz [mm]	fz [mm]
N	N1-N4	380-600	0,06	0,09	0,12	0,14	0,2
	N7-N9	230-400	0,06	0,09	0,12	0,14	0,2



7

Example of order

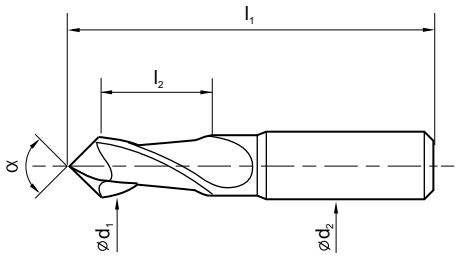
M9-33B701-0060
AL ZGR 338 6x6x16x57 R0,5 VHM TB

Multipurpose end mill for grooving, profiling, spot drilling, chamfering and engraving

MultiCUT

VHM

AT



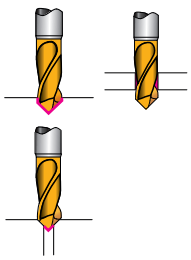
End mill tip diameter 0,1 x d_1

Workpiece material	P M K N S H
Coating	AT
Tool marerial	VHM
Point angle	90°

d_1	d_2	l_1	$l_{2\,min}$	INDEX
1,0	3,00	39	2,0	M9-80V001-0100
1,5	3,00	39	3,0	M9-80V001-0150
2,0	3,00	39	4,0	M9-80V001-0200
2,5	3,00	39	5,0	M9-80V001-0250
3,0	4,00	50	6,0	M9-80V001-0300
4,0	5,00	50	8,0	M9-80V001-0400
5,0	6,00	50	10,0	M9-80V001-0500
6,0	8,00	60	12,0	M9-80V001-0600
8,0	10,00	70	16,0	M9-80V001-0800
10,0	12,00	70	18,0	M9-80V001-1000
12,0	12,00	70	20,0	M9-80V001-1200

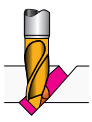
Spot drilling

		Vc (m/min)	Feed [mm/tooth]									
			Ø0,3	Ø0,5	Ø1	Ø2	Ø3	Ø5	Ø8	Ø12	Ø16	Ø20
P	Rm<500	60-75	0,003	0,005	0,012	0,025	0,050	0,100	0,150	0,200	0,250	0,300
	Rm<800	40-60	0,003	0,005	0,012	0,025	0,050	0,100	0,150	0,200	0,250	0,300
	Rm<1000	35-40	0,003	0,005	0,010	0,023	0,045	0,070	0,120	0,180	0,220	0,280
	Rm<1400	30-35	0,002	0,004	0,009	0,023	0,045	0,070	0,120	0,170	0,220	0,260
M		25-30	0,002	0,004	0,010	0,020	0,040	0,060	0,110	0,160	0,220	0,250
K		30-35	0,002	0,004	0,009	0,023	0,045	0,070	0,120	0,170	0,220	0,260
N		50-150	0,003	0,005	0,020	0,040	0,070	0,120	0,200	0,250	0,320	0,400
S		15-20	0,002	0,004	0,010	0,020	0,040	0,060	0,110	0,160	0,200	0,250



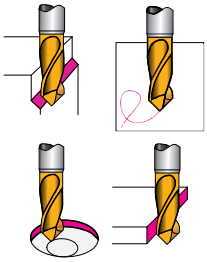
Grooving

		Vc (m/min)	Feed [mm/tooth]									
			Ø0,3	Ø0,5	Ø1	Ø2	Ø3	Ø5	Ø8	Ø12	Ø16	Ø20
P	Rm<500	60-75	0,002	0,003	0,005	0,008	0,010	0,018	0,030	0,040	0,050	0,065
	Rm<800	40-60	0,001	0,002	0,004	0,008	0,010	0,015	0,030	0,040	0,050	0,065
	Rm<1000	35-40	0,001	0,002	0,004	0,008	0,010	0,015	0,030	0,040	0,050	0,065
	Rm<1400	30-35	0,001	0,002	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
M		25-30	0,001	0,002	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
K		30-35	0,001	0,002	0,004	0,006	0,008	0,012	0,025	0,032	0,040	0,055
N		50-150	0,001	0,003	0,006	0,012	0,016	0,020	0,034	0,040	0,060	0,080
S		15-20	0,001	0,001	0,003	0,005	0,006	0,010	0,020	0,026	0,036	0,050



Engraving/Chamfering/Profiling

		Vc (m/min)	Feed [mm/tooth]									
			Ø0,3	Ø0,5	Ø1	Ø2	Ø3	Ø5	Ø8	Ø12	Ø16	Ø20
P	Rm<500	60-75	0,002	0,004	0,008	0,012	0,015	0,020	0,038	0,060	0,080	0,100
	Rm<800	40-60	0,002	0,004	0,008	0,012	0,015	0,020	0,038	0,060	0,080	0,100
	Rm<1000	35-40	0,002	0,003	0,008	0,012	0,014	0,020	0,038	0,060	0,080	0,090
	Rm<1400	30-35	0,001	0,003	0,007	0,012	0,014	0,020	0,038	0,055	0,075	0,080
M		25-30	0,011	0,002	0,005	0,010	0,012	0,018	0,035	0,050	0,065	0,080
K		30-35	0,001	0,003	0,007	0,012	0,014	0,020	0,038	0,055	0,075	0,080
N		50-150	0,002	0,005	0,009	0,018	0,014	0,022	0,042	0,065	0,072	0,095
S		15-20	0,001	0,002	0,005	0,010	0,012	0,018	0,035	0,050	0,065	0,080

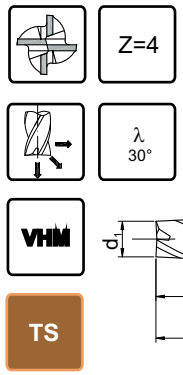


Example of order

M9-80V001-0100
End mill MultiCUT 90° 1x3x2x39 VHM AT

● **Available from stock**
○ **On request**

For NPT, NPTF, BSPT (1:16) threads



Workpiece material	P M K N S H
Shank	
Tool material	VHM
Coating	TS
Corner type	

d_1	d_2h6	l_1	l_2	Z	Threads	INDEX
5,2	6	58	12	4	1/16" - 1/8"	M9-43GD00-0052
8,5	10	73	24	4	1/8" - 1"	M9-43GD00-0085
10	12	84	33	4	1/4" - 3"	M9-43GD00-0100

7

Example of order
M9-43GD00-0052
End mill for NPT 430 5,2x6x12x58 VHM TS

GAUGES

GAUGES

CATALOGUE PAGES

Gauge dimensions
PN-EN ISO 1938-1:2016-03

Symbol		MSBa	MSBa					
Typ		GO / NOGO	GO / NOGO					
∅ nom.	Tol	H7	H8					
	INDEX	S3-100111	S3-100112					
1	0010	●	○					
1,2	0012	●	○					
1,5	0015	●	○					
1,8	0018	●	○					
2	0020	●	○					
2,2	0022	●	○					
2,5	0025	●	○					
2,8	0028	●	○					
3	0030	●	○					
3,5	0035	○	○					
4	0040	●	○					
4,5	0045	○	○					
5	0050	●	○					
6	0060	●	○					
7	0070	○	○					
8	0080	●	○					
9	0090	○	○					
10	0100	●	○					
12	0120	●	○					
14	0140	●	○					
16	0160	●	○					
18	0180	●	○					
20	0200	●	○					
22	0220	●	○					
24	0240	●	○					
25	0250	●	○					
26	0260	●	○					
27	0270	○	○					
28	0280	●	○					
30	0300	●	○					
32	0320	●	○					
33	0330	●	○					
34	0340	●	○					
35	0350	●	○					
36	0360	●	○					
37	0370	●	○					
38	0380	●	○					
40	0400	●	○					
42	0420	●	○					
44	0440	○	○					
45	0450	●	○					
46	0460	○	○					
47	0470	●	○					
48	0480	○	○					
50	0500	●	○					
52	0520	○	○					

GO gauges above M42 are called MSCb and NO GO MSCc and they are produced with separate handle

Example of order

S3-100111-0100
MSBa 10-H7

● Available from stock
○ On request

ISO Metric coarse thread DIN-13

LH

6G

			MSBg	MSBg LH	MSBg	MSRh	MSRk
Symbol							
Typ			GO / NOGO	GO / NOGO	GO / NOGO	GO	NOGO
M	P	Tol	6H	6H	6G	6g	6g
		INDEX	S3-302161	S3-301161	S3-302162	Y3-412162	Y3-422162
M 1	0,25	0010	●	○	○	●	●
M 1,2	0,25	0012	●	○	○	●	●
M 1,4	0,3	0014	●	○	○	●	●
M 1,6	0,35	0016	●	○	○	●	●
M 1,7	0,35	0017	●	○	○	●	●
M 1,8	0,35	0018	●	○	○	●	●
M 2	0,4	0020	●	○	○	●	●
M 2,2	0,45	0022	●	○	○	●	●
M 2,5	0,45	0025	●	○	○	●	●
M 2,6	0,45	0026	●	○	○	●	●
M 3	0,5	0030	●	●	○	●	●
M 3,5	0,6	0035	●	○	○	●	●
M 4	0,7	0040	●	●	○	●	●
M 4,5	0,75	0045	●	○	○	●	●
M 5	0,8	0050	●	●	○	●	●
M 6	1	0060	●	●	○	●	●
M 7	1	0070	●	○	○	●	●
M 8	1,25	0080	●	●	○	●	●
M 9	1,25	0090	●	○	○	●	●
M 10	1,5	0100	●	●	○	●	●
M 12	1,75	0120	●	●	○	●	●
M 14	2	0140	●	●	○	●	●
M 16	2	0160	●	●	○	●	●
M 18	2,5	0180	●	●	○	●	●
M 20	2,5	0200	●	●	○	●	●
M 22	2,5	0220	●	●	○	●	●
M 24	3	0240	●	●	○	●	●
M 27	3	0270	●	●	○	●	●
M 30	3,5	0300	●	●	○	●	●
M 33	3,5	0330	●	●	○	●	●
M 36	4	0360	●	●	○	●	●
M 39	4	0390	●	○	○	●	●
M 42	4,5	0420	○	○	○	●	●
M 45	4,5	0450	○	○	○	●	●
M 48	5	0480	○	○	○	●	●
M 52	5	0520	○	○	○	●	●

Set of gauges on p. 263

GO gauges above M42 are called MSCh and NO GO MSCk and they are produced with separate handle

8

Example of order
S3-302161-0030
MSBg M3-6H

● Available from stock
○ On request

ISO Metric coarse thread DIN-13

Symbol			MSBg	MSBg LH	MSBg	MSRh	MSRk
Typ			GO / NOGO	GO / NOGO	GO / NOGO	GO	NOGO
MF	P	Tol	6H	6H	6G	6g	6g
		INDEX	S3-302161	S3-301161	S3-302162	Y3-412162	Y3-422162
M 3 x 0,35	0,35	0031	○	○	○	○	○
M 3,5 x 0,35	0,35	0036	○	○	○	○	○
M 4 x 0,35	0,35	0043	○	○	○	○	○
M 4x0,5	0,5	0041	○	○	○	○	○
M 4,5 x 0,5	0,5	0046	○	○	○	○	○
M 5 x 0,5	0,5	0051	○	○	○	○	○
M 6 x 0,5	0,5	0061	○	○	○	○	○
M 6 x 0,75	0,75	0062	○	○	○	○	○
M 8 x 0,5	0,5	0081	○	○	○	○	○
M 8 x 0,75	0,75	0082	○	○	○	○	○
M 8 x 1	1	0083	●	●	○	●	●
M 9 x 1	1	0093	○	○	○	○	○
M 10 x 0,75	0,75	0102	○	○	○	○	○
M 10 x 1	1	0103	●	●	○	●	●
M 10 x 1,25	1,25	0104	●	●	○	●	●
M 11 x 1	1	0113	○	○	○	○	○
M 12 x 1	1	0123	●	●	○	●	●
M 12 x 1,25	1,25	0124	●	●	○	●	●
M 12 x 1,5	1,5	0125	●	●	○	●	●
M 13 x 1	1	0133	○	○	○	○	○
M 14 x 1	1	0143	○	○	○	○	○
M 14 x 1,25	1,25	0144	○	○	○	○	○
M 14 x 1,5	1,5	0145	●	●	○	●	●
M 15 x 1	1	0153	○	○	○	○	○
M 15 x 1,5	1,5	0155	○	○	○	○	○
M 16 x 1	1	0163	●	●	○	●	●
M 16 x 1,5	1,5	0165	●	●	○	●	●
M 18 x 1	1	0183	○	○	○	○	○
M 18 x 1,5	1,5	0185	●	●	○	●	●
M 18 x 2	2	0186	○	○	○	○	○
M 20 x 1	1	0203	●	●	○	●	●
M 20 x 1,5	1,5	0205	●	●	○	●	●
M 20 x 2	2	0206	○	○	○	○	○
M 22 x 1	1	0223	○	○	○	○	○
M 22 x 1,5	1,5	0225	●	●	○	●	●
M 22 x 2	2	0226	●	●	○	●	●
M 24 x 1	1	0243	○	○	○	○	○
M 24 x 1,5	1,5	0245	●	●	○	●	●
M 24 x 2	2	0246	●	○	○	○	○
M 25 x 1,5	1,5	0255	●	○	○	○	○
M 26 x1,5	1,5	0265	●	○	○	○	○
M 27 x 1,5	1,5	0275	●	○	○	○	○

Example of order

S3-302162-0083
MSBg M8x1-6G

● **Available from stock**
○ **On request**

ISO Metric fine thread DIN-13

Gauge dimensions ISO 1502

LH

6G

Symbol			MSBg	MSBg LH	MSBg	MSRh	MSRk
Typ			GO / NOGO	GO / NOGO	GO / NOGO	GO	NOGO
MF	P	Tol	6H	6H	6G	6g	6g
		INDEX	S3-302161	S3-301161	S3-302162	Y3-412162	Y3-422162
M 27 x 2	2	0276	●	○	○	○	○
M 28 x 1,5	1,5	0285	●	○	○	○	○
M 28 x 2	2	0286	○	○	○	○	○
M 30 x 1	1	0303	○	○	○	○	○
M 30 x 1,5	1,5	0305	●	○	○	○	○
M 30 x 2	2	0306	●	○	○	○	○
M 32 x 1,5	1,5	0325	●	○	○	○	○
M 33 x 1,5	1,5	0335	●	○	○	○	○
M 33 x 2	2	0336	●	○	○	○	○
M 33 x 3	3	0337	○	○	○	○	○
M 34 x 1,5	1,5	0345	○	○	○	○	○
M 35 x 1,5	1,5	0355	●	○	○	○	○
M 36 x 1,5	1,5	0365	●	○	○	○	○
M 36 x 2	2	0366	●	○	○	○	○
M 36 x 3	3	0367	○	○	○	○	○
M 38 x 1,5	1,5	0385	●	○	○	○	○
M 39 x 2	2	0396	●	○	○	○	○
M 39 x 3	3	0397	○	○	○	○	○
M 40 x 1,5	1,5	0405	●	○	○	○	○
M 40 x 2	2	0406	○	○	○	○	○
M 40 x 3	3	0407	○	○	○	○	○
M 42 x 1,5	1,5	0425	○	○	○	○	○
M 42 x 2	2	0426	○	○	○	○	○
M 42 x 3	3	0427	○	○	○	○	○
M 45 x 1,5	1,5	0455	○	○	○	○	○
M 45 x 2	2	0456	○	○	○	○	○
M 45 x 3	3	0457	○	○	○	○	○
M 48 x 1,5	1,5	0485	○	○	○	○	○
M 48 x 2	2	0486	○	○	○	○	○
M 48 x 3	3	0487	○	○	○	○	○
M 50 x 1,5	1,5	0505	○	○	○	○	○
M 50 x 2	2	0506	○	○	○	○	○
M 50 x 3	3	0507	○	○	○	○	○
M 52 x 1,5	1,5	0525	○	○	○	○	○
M 52 x 2	2	0526	○	○	○	○	○
M 52 x 3	3	0527	○	○	○	○	○

Set of gauges p. 263

GO gauges above M42 are called MSCh and NO GO MSCk and they are produced with separate handle

Example of order
Y3-412162-0276
MSRh M27x2-6g

● Available from stock
○ On request

American unified coarse thread UNC, ANSI B-1.1

Gauge dimensions ANSI/ASME B1.2

Symbol				MSBg	MSBg	MSRh	MSRk
Typ				GO / NOGO	GO / NOGO	GO	NOGO
UNC	∅ d_1	1"/P	Tol	2B	3B	2A	2A
			INDEX	S3-302186	S3-302187	Y3-412182	Y3-422182
No 5 - 40	3,175	40	4105	●	○	○	○
No 6 - 32	3,505	32	4106	●	○	○	○
No 8 - 32	4,166	32	4108	●	○	○	○
No 10 - 24	4,826	24	4110	●	○	○	○
No 12 - 24	5,486	24	4112	●	○	○	○
1/4 - 20	6,350	20	4127	●	○	○	○
5/16 - 18	7,938	18	4128	●	○	○	○
3/8 - 16	9,525	16	4129	●	○	○	○
7/16 - 14	11,112	14	4130	●	○	○	○
1/2 - 13	12,700	13	4131	●	○	○	○
9/16 - 12	14,288	12	4132	●	○	○	○
5/8 - 11	15,875	11	4133	●	○	○	○
3/4 - 10	19,050	10	4135	●	○	○	○
7/8 - 9	22,225	9	4137	●	○	○	○
1 - 8	25,400	8	4139	●	○	○	○
1.1/8 - 7	28,575	7	4141	○	○	○	○
1.1/4 - 7	31,750	7	4143	○	○	○	○
1.3/8 - 6	34,925	6	4145	○	○	○	○
1.1/2 - 6	38,100	6	4147	○	○	○	○
1.3/4 - 5	44,450	5	4151	○	○	○	○
2 - 4.1/2	50,800	4.1/2	4155	○	○	○	○

GO gauges above 1 ¾" - UNC are called MSCh and NO GO MSCk and they are produced with separate handle

8

Example of order
S3-302187-4127
MSBg 1/4-20 UNC-3B

● **Available from stock**
○ **On request**

American unified fine thread UNF, ANSI B-1.1

Gauge dimensions ANSI/ASME B1.2

Symbol				MSBg	MSBg	MSRh	MSRk
Typ				GO / NOGO	GO / NOGO	GO	NOGO
UNF	∅ d_1	1"/P	Tol	2B	3B	2A	2A
			INDEX	S3-302186	S3-302187	Y3-412182	Y3-422182
No 5 - 44	3,175	44	4205	○	○	○	○
No 6 - 40	3,505	40	4206	○	○	○	○
No 8 - 36	4,166	36	4208	○	○	○	○
No 10 - 32	4,826	32	4210	○	○	○	○
No 12 - 28	5,486	28	4212	○	○	○	○
1/4 - 28	6,350	28	4227	●	○	○	○
5/16 - 24	7,938	24	4228	●	○	○	○
3/8 - 24	9,525	24	4229	●	○	○	○
7/16 - 20	11,112	20	4230	●	○	○	○
1/2 - 20	12,700	20	4231	●	○	○	○
9/16 - 18	14,288	18	4232	●	○	○	○
5/8 - 18	15,875	18	4233	●	○	○	○
3/4 - 16	19,050	16	4235	●	○	○	○
7/8 - 14	22,225	14	4237	●	○	○	○
1 - 12	25,400	12	4239	●	○	○	○
1.1/8 - 12	28,575	12	4241	○	○	○	○
1.1/4 - 12	31,750	12	4243	○	○	○	○
1.3/8 - 12	34,925	12	4245	○	○	○	○
1.1/2 - 12	38,100	12	4247	○	○	○	○

GO gauges above 1 ¾" - UNC are called MSCh and NO GO MSCk and they are produced with separate handle

Example of order

Y3-422182-4235
MSRk 3/4-16 UNF-2A

● **Available from stock**
○ **On request**

Whitworth pipe thread G, DIN-ISO 228

Gauge dimensions ISO 228-2

Symbol				MSBg	MSRh	MSRk
Typ				GO / NOGO	GO	NOGO
G	∅ d_1	1"/P	Tol		A	A
			INDEX	S3-302180	Y3-412180	Y3-422180
G-1/8"	9,73	28	3123	●	○	○
G-1/4"	13,16	19	3127	●	○	○
G-3/8"	16,66	19	3129	●	●	●
G-1/2"	20,96	14	3131	●	●	●
G-5/8"	22,91	14	3133	○	○	○
G-3/4"	26,44	14	3135	●	●	●
G-7/8"	30,20	14	3137	○	○	○
G-1"	33,25	11	3139	●	●	●
G-1.1/8"	37,90	11	3141	●	○	○
G-1.1/4"	41,91	11	3143	●	○	○

8

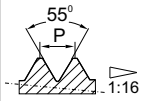
Example of order

S3-302180-3127
MSBg G-1/4"

● **Available from stock**
○ **On request**

Thread gauges plug and ring

Pipe thread without dry seal material	PN-EN 10226-3 (ISO7-2:2000)



R, Rc

Rp

PN-EN 10226-1,
PN-EN 10226-2 (ISO7-1:2000)

Gauge system acc. PN-EN 10226-3

Gauge dimensions PN-EN 10226-3





Symbol				MSXa	MSXa	MSXc	MSXc	MSXa	
Typ				Nr 1	Nr 2	Nr 3	Nr 4	Nr 5	
Rc/Rp	Ø d_1	1”/P	Tol	Rc/Rp	Rc/Rp	R	R	R	
			INDEX	S3-332101	S3-332102	-	-	S3-332105	
1/16”	7,72	28	3321	o	o			o	
1/8”	9,73	28	3323	o	o			o	
1/4”	13,16	19	3327	o	o			o	
3/8”	16,66	19	3329	o	o			o	
1/2”	20,96	14	3331	o	o			o	
3/4”	26,44	14	3335	o	o			o	
1”	32,25	11	3339	o	o			o	
1.1/4”	41,91	11	3343	o	o			o	
1.1/2”	47,80	11	3347	o	o			o	
2”	59,61	11	3355	o	o			o	
2.1/2"	75,18	11	3359	o	o			o	
3"	87,88	11	3363	o	o			o	
4"	113,03	11	3371	o	o			o	
R	Ø d_1	1”/P	INDEX	-	-	Y3-432103	Y3-432104	-	
1/16”	7,72	28	3421			o	o		
1/8”	9,73	28	3423			o	o		
1/4”	13,16	19	3427			o	o		
3/8”	16,66	19	3429			o	o		
1/2”	20,96	14	3431			o	o		
3/4”	26,44	14	3435			o	o		
1”	32,25	11	3439			o	o		
1.1/4”	41,91	11	3443			o	o		
1.1/2”	47,80	11	3447			o	o		
2”	59,61	11	3455			o	o		
2.1/2"	75,18	11	3459			o	o		
3"	87,88	11	3463			o	o		
4"	113,03	11	3471			o	o		

Technical information concerning construction and use of gauges R an RC/RP in the technical part of the catalouge on p. 306

Example of order
S3-332101-3327
MSXa EN 10226 1/4”-Rc/Rp Nr1

● **Available from stock**
○ **On request**

Steel conduit thread Pg, DIN-40430

Gauge dimensions DIN 404031

Symbol				MSBg	MSRh	MSRc
Typ				GO / NOGO	GO	NOGO
Pg	∅ d_1	1"/P	Tol INDEX	S3-832100	Y3-412100	Y3-450100
Pg 7	12,5	20	8807	o	o	o
Pg 9	15,2	18	8809	o	o	o
Pg 11	18,6	18	8811	o	o	o
Pg 13,5	20,4	18	8813	o	o	o
Pg 16	22,5	18	8816	o	o	o
Pg 21	28,3	16	8821	o	o	o
Pg 29	37	16	8829	o	o	o
Pg 36	47	16	8836	o	o	o

Pg thread is replaced by metric fine MF according to DIN 60423 available on request

8

Example of order

S3-832100-8807
MSBg Pg7

● **Available from stock**
○ **On request**

Whitworth thread BSW, BS-84:1956

Gauge dimensions BS 919-2

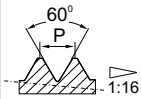
Symbol				MSBg	MSRh	MSRk
Typ				GO / NOGO	GO	NOGO
BSW	∅ d_1	1"/P	Tol	medium	medium	medium
			INDEX	S3-302100	Y3-412100	Y3-422100
1/8 - 40	3,175	40	7123	○	○	○
3/16 - 24	4,762	24	7125	○	○	○
1/4 - 20	6,350	20	7127	○	○	○
5/16 - 18	7,938	18	7128	○	○	○
3/8 - 16	9,525	16	7129	○	○	○
7/16 - 14	11,112	14	7130	○	○	○
1/2 - 12	12,700	12	7131	○	○	○
9/16 - 12	14,288	12	7132	○	○	○
5/8 - 11	15,875	11	7133	○	○	○
3/4 - 10	19,050	10	7135	○	○	○
7/8 - 9	22,225	9	7137	○	○	○
1 - 8	25,400	8	7139	○	○	○
1.1/8 - 7	28,575	7	7141	○	○	○
1.1/4 - 7	31,750	7	7143	○	○	○
1.3/8 - 6	34,925	6	7145	○	○	○
1.1/2 - 6	38,100	6	7147	○	○	○
1.3/4 - 5	44,450	5	7151	○	○	○
2 - 4.1/2	50,800	4.1/2	7155	○	○	○

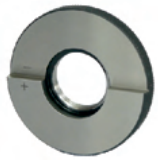
8

Example of order
Y3-412100-7131
MSRh 1/2-12 BSW

● **Available from stock**
○ **On request**

American tapered pipe thread
NPT 1:16, ANSI B-1.20.1





Gauge dimensions ANSI/ASME B1.20.1

Symbol			MSXa	MSXc	
Typ					
NPT ∅ d_1	1"/P	Tol INDEX	S3-332100	Y3-432100	
1/16"	27	4621	○	○	
1/8"	27	4623	○	○	
1/4"	18	4627	○	○	
3/8"	18	4629	●	○	
1/2"	14	4631	●	○	
3/4"	14	4635	●	○	
1"	11.1/2	4639	●	○	
1.1/4"	11.1/2	4643	○	○	
1.1/2"	11.1/2	4647	○	○	
2"	11.1/2	4655	○	○	

Technical information concerning use of gauges NPT in the technical part of the catalogue on p. 303

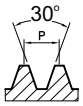
8

Example of order

S3-332100-4627
MSXa 1/4" NPT

● **Available from stock**
○ **On request**

Trapezoidal thread Tr, DIN-103



Gauge dimensions DIN 103-9

Tr ∅ d_1 [mm]	P [mm]	Tol	7H	7e	7e
		INDEX	S3-302171	Y3-412174	Y3-422174
Symbol			MSBg	MSRh	MSRk
Typ			GO / NOGO	GO	NOGO
Tr 10 x 2	2	8009	o	o	o
Tr 12 x 3	3	8015	o	o	o
Tr 14 x 3	3	8019	o	o	o
Tr 16 x 4	4	8024	o	o	o
Tr 18 x 4	4	8032	o	o	o
Tr 20 x 4	4	8034	o	o	o
Tr 22 x 5	5	8037	o	o	o
Tr 24 x 5	5	8042	o	o	o
Tr 26 x 5	5	8047	o	o	o
Tr 28 x 5	5	8052	o	o	o
Tr 30 x 6	6	8057	o	o	o
Tr 32 x 6	6	8062	o	o	o
Tr 36 x 6	6	8072	o	o	o

Example of order

S3-302171-8009
MSBg Tr 10x2-7H

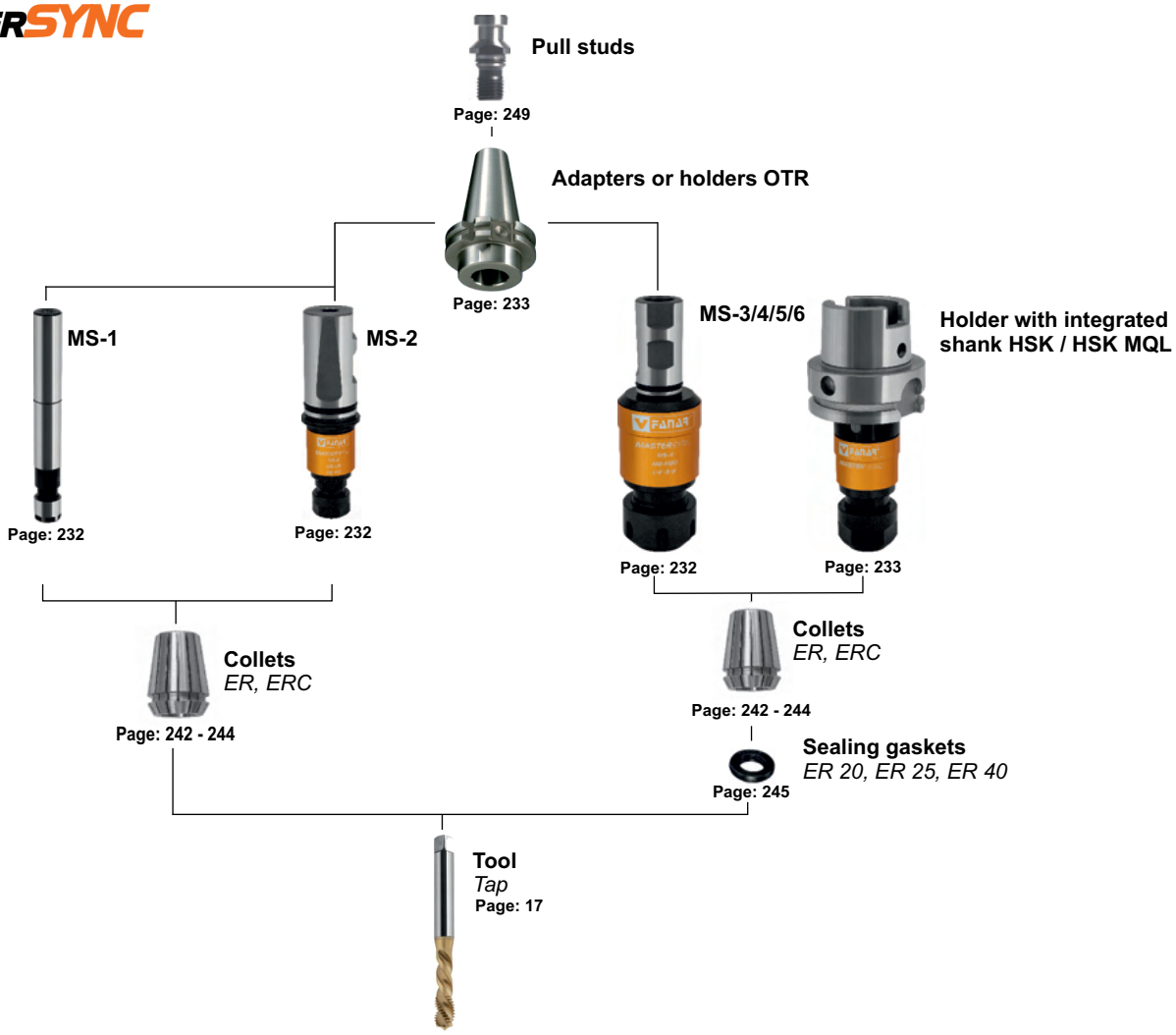
● **Available from stock**
○ **On request**

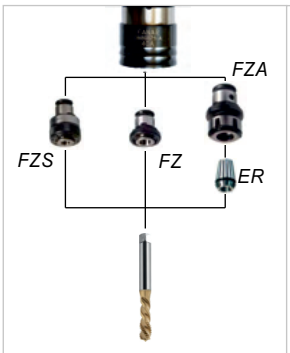
TOOL HOLDERS

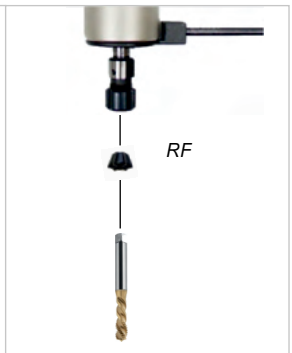
TOOL HOLDERS

CATALOGUE PAGES

MASTERSYNC

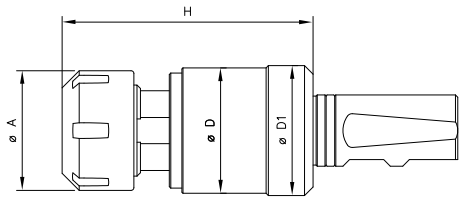






		Page	234 - 237	238
		Description	For tapping with axial compression and extension compensation	For tapping wit axial compression and extension compesation and reversing motion intended for machines withe the right spindle rotation
Shank	Norm	Symbol	OGK	OGN
MORSE'A	DIN-228 A/B	MK	MK2, MK3, MK4, MK5	MK1, MK2, MK3, MK4 (JT6, M20)
DIN	DIN-2080	DIN	DIN30, DIN40, DIN50	
TR	DIN-6327	TR	TR20, TR28, TR36, TR48	
ISO	DIN 69871 A	ISO	ISO30, ISO40, ISO50	
MAS-BT	JIS B 6339	BT	BT30, BT40, BT50	
HSK	DIN 69893 A	HSK	HSK50, HSK63, HSK80, HSK100	
VDI	DIN 69880	VDI	VDI20, VDI25, VDI30, VDI40, VDI50	
WELDON	DIN 1835 B	W	W20, W25, W32, W40	
POLYGONAL	ISO 26623-1	C	C40, C50, C63, C80	

• Axial compensation: +/- 0,5



Accesories

Collet 192

ER

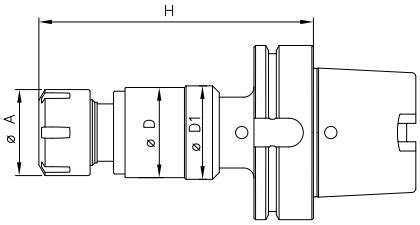
Sealing Gaskets 195

MASTERSYNC

	MS-1	MS-2	MS-3	MS-4	MS-5	MS-6
						
Capacity	M1÷M3	M2÷M5	M4,5÷M12	M8÷M20	M16÷M30	M22÷M48
Internal cooling	-	-	IK	IK	IK	IK

Model	Shank	Collet	M	D	D1	A	H	Sealing Gaskets	INDEX					
MS-1-D12	12	ER8	M1÷M3	12	12	12	28	-	R-MS-1-D12					
MS-2-W25	25	ER11	M2÷M5	23,5	23,5	19	52	-		R-MS-2-W25				
MS-3-W25	25	ER20	M4,5÷M12	34,6	36,3	34	69	+			R-MS-3-W25			
MS-4-W25	25	ER25	M8÷M20	44	45,6	42	88	+				R-MS-4-W25		
MS-5-W25	25	ER40	M16÷M30	62	63,6	63	117	+					R-MS-5-W25	
MS-6-W40	40	ER50	M22÷M48	80	87	78	166	+						R-MS-6-W40

•Axial compensation: +/- 0,5



Accessories

Collet 192

ER

Sealing Gaskets 195

MASTERSYNC

	MS-3	MS-4	MS-5
			
Capacity	M4÷M12	M8÷M20	M16÷M30
Internal cooling	IK	IK	IK

Model	Shank	Collet	M	D	D1	A	H	Sealing Gaskets	INDEX		
MS-3-HSK63A	HSK63A	ER20	M4÷M12	34,6	36,3	34	108	+	R-MS-3-HSK63A		
MS-3-HSK80A	HSK80A	ER20	M4÷M12	34,6	36,3	34	113	+	R-MS-3-HSK80A		
MS-3-HSK100A	HSK100A	ER20	M4÷M12	34,6	36,3	34	115	+	R-MS-3-HSK100A		
MS-4-HSK63A	HSK63A	ER25	M8÷M20	44	45,6	42	128	+		R-MS-4-HSK63A	
MS-4-HSK80A	HSK80A	ER25	M8÷M20	44	45,6	42	115	+		R-MS-4-HSK80A	
MS-4-HSK100A	HSK100A	ER25	M8÷M20	44	45,6	42	131	+		R-MS-4-HSK100A	
MS-5-HSK63A	HSK63A	ER40	M16÷M30	62	63,6	63	160	+			R-MS-5-HSK63A
MS-5-HSK80A	HSK80A	ER40	M16÷M30	62	63,6	63	161	+			R-MS-5-HSK80A
MS-5-HSK100A	HSK100A	ER40	M16÷M30	62	63,6	63	163	+			R-MS-5-HSK100A

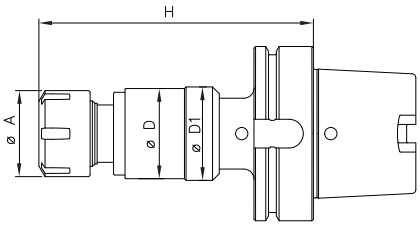
Example of order

R-MS-4-HSK63A

● **Available from stock**

○ **On request**

Features and Advantages
- increase tap life by 100% or more
- improves thread quality
- precise lubrication delivery for improved tool life
- reduce coolant and maintenance costs
- environmentally friendddly alternative to recirculating coolant
- standardd for one channel system, but multi-channel also available
- axial compensation: +/- 0,5



MASTERSYNC

	MS-3	MS-4
		
Capacity	M4÷M12	M8÷M20
Internal cooling	MQL	MQL

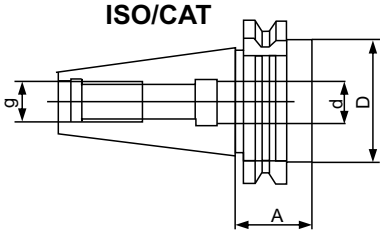
Model	Shank	Collet	M	D	D_1	A	H	Sealing Gaskets	INDEX	
MS-3-HSK63A-MQL	HSK63A	ER20	M4÷M12	34,6	36,6	34	108	+	R-MS-3-HSK63A-MQL	
MS-3-HSK80A-MQL	HSK80A	ER20	M4÷M12	34,6	36,6	34	113	+	R-MS-3-HSK80A-MQL	
MS-3-HSK100A-MQL	HSK100A	ER20	M4÷M12	34,6	36,6	34	115	+	R-MS-3-HSK100A-MQL	
MS-4-HSK63A-MQL	HSK63A	ER25	M8÷M20	44	44	42	128	+		R-MS-4-HSK63A-MQL
MS-4-HSK80A-MQL	HSK80A	ER25	M8÷M20	44	44	42	131	+		R-MS-4-HSK80A-MQL
MS-4-HSK100A-MQL	HSK100A	ER25	M8÷M20	44	44	42	133	+		R-MS-4-HSK100A-MQL

MASTERSYNC

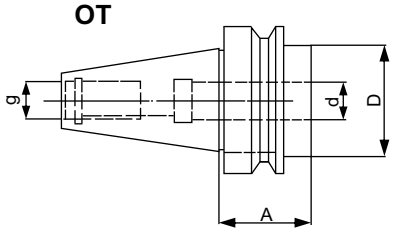
ADAPTERS

OTR

ISO/CAT



OT



Capacity	
Internal cooling	

Model	Shank	D	d	A	g		INDEX
ISO40	ISO40	45	25	35	M16	DIN-69871	R-OTR-ISO40/D25
ISO40	ISO40	90	40	120	M16	DIN-69871	R-OTR-ISO40/D40
ISO50	ISO50	72	25	35	M24	DIN-69871	R-OTR-ISO50/D25
ISO50	ISO50	90	40	100	M24	DIN-69871	R-OTR-ISO50/D40
CAT40	CAT40	45	25	35	5/8"-11	CAT	R-OTR-CAT40/D25
CAT50	CAT50	70	25	35	1"-8	CAT	R-OTR-CAT50/D25
CAT50	CAT50	70	40	75	1"-8	CAT	R-OTR-CAT50/D40
BT40	BT40	45	25	35	M16	DIN-B6339	R-OTR-BT40/D25
BT50	BT50	70	25	48	M24	DIN-B6339	R-OTR-BT50/D25
BT50	BT50	90	40	110	M24	DIN-B6339	R-OTR-BT50/D40

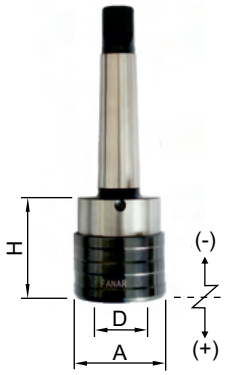
9

Example of order
R-OTR-ISO40/D25

● **Available from stock**
○ **On request**

Quick change tap holders with axial compensation

MK



MK-A

Accessories

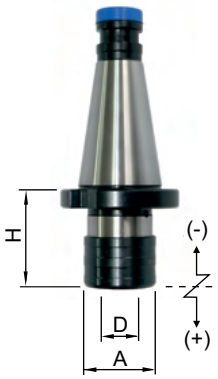
Adapters 188	Adapters 191	Collet 192
 FZS	 FZA	 ER

Norm: MORSE DIN-228 B | MORSE DIN-228 A

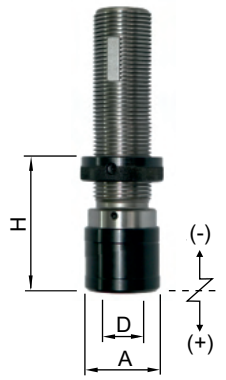
Internal cooling

Shank	Adapters	D	A	H	M	(-)	(+)	INDEX		INDEX	
MK2	FZ19	19	38	46	M2-M12	9	9	R-OGK-MK2/FZ19	●		
MK3	FZ19	19	38	46	M2-M12	9	9	R-OGK-MK3/FZ19	●		
MK3	FZ31	31	55	69	M6-M20	15	15	R-OGK-MK3/FZ31	●		
MK4	FZ48	48	79	108	M14-M33	24	24	R-OGK-MK4/FZ48	●		
MK5	FZ60	60	98	116	M22-M48	26	26	R-OGK-MK5/FZ60	●		
MK2	FZ19	19	38	46	M2-M12	9	9			R-OGK-MK2/FZ19-A	○
MK3	FZ19	19	38	46	M2-M12	9	9			R-OGK-MK3/FZ19-A	○
MK3	FZ31	31	55	69	M6-M20	15	15			R-OGK-MK3/FZ31-A	○
MK4	FZ48	48	79	108	M14-M33	24	24			R-OGK-MK4/FZ48-A	○
MK5	FZ60	60	98	116	M22-M48	26	26			R-OGK-MK5/FZ60-A	○

DIN



TR



Accessories

Adapters 188	Adapters 191	Collets 192
 FZS	 FZA	 ER

Norm: DIN-2080 | DIN-6327

Internal cooling

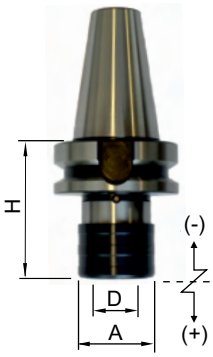
Shank	Adapter	D	A	H	M	(-)	(+)	INDEX		INDEX	
DIN30	FZ19	19	38	51	M2-M12	9	9	R-OGK-DIN30/FZ19	○		
DIN30	FZ31	31	55	86	M6-M20	15	15	R-OGK-DIN30/FZ31	○		
DIN40	FZ19	19	38	53	M2-M12	9	9	R-OGK-DIN40/FZ19	○		
DIN40	FZ31	31	55	77	M6-M20	15	15	R-OGK-DIN40/FZ31	○		
DIN40	FZ48	48	79	118	M14-M33	24	24	R-OGK-DIN40/FZ48	○		
DIN50	FZ19	19	38	57	M2-M12	9	9	R-OGK-DIN50/FZ19	○		
DIN50	FZ31	31	55	79	M6-M20	15	15	R-OGK-DIN50/FZ31	○		
DIN50	FZ48	48	79	125	M14-M33	24	24	R-OGK-DIN50/FZ48	○		
DIN50	FZ60	60	98	143	M22-M48	26	26	R-OGK-DIN50/FZ60	○		
TR20	FZ19	19	38	53	M2-M12	9	9			R-OGK-TR20/FZ19	○
TR28	FZ19	19	38	53	M2-M12	9	9			R-OGK-TR28/FZ19	○
TR28	FZ31	31	55	76	M6-M20	15	15			R-OGK-TR28/FZ31	○
TR36	FZ19	19	38	55	M2-M12	9	9			R-OGK-TR36/FZ19	○
TR36	FZ31	31	55	78	M6-M20	15	15			R-OGK-TR36/FZ31	○
TR36	FZ48	48	79	111	M14-M33	24	24			R-OGK-TR36/FZ48	○
TR36	FZ60	60	98	123	M22-M48	26	26			R-OGK-TR36/FZ60	○
TR48	FZ48	48	79	115	M14-M33	24	24			R-OGK-TR48/FZ48	○
TR48	FZ60	60	98	127	M22-M48	26	26			R-OGK-TR48/FZ60	○

Example of order

R-OGK-DIN50/FZ60

● **Available from stock**

○ **On request**

	ISO	MAS BT
		
Accessories		
Adapters 188  FZS		
Adapters 190  FZA		
Collets 192  ER		
Pull studs 199 - 200  C		
Norm	DIN-69871 A	JIS B6339
Internal cooling		

Shank	Adapters	D	A	H	M	(-)	(+)	INDEX		INDEX	
ISO30	FZ19	19	38	60	M2-M12	9	9	R-OGK-ISO30/FZ19	○		
ISO30	FZ31	31	55	101	M6-M20	15	15	R-OGK-ISO30/FZ31	○		
ISO40	FZ19	19	38	60	M2-M12	9	9	R-OGK-ISO40/FZ19	●		
ISO40	FZ31	31	55	100	M6-M20	15	15	R-OGK-ISO40/FZ31	●		
ISO40	FZ48	48	79	138	M14-M33	24	24	R-OGK-ISO40/FZ48	○		
ISO40	FZ60	60	98	154	M22-M48	26	26	R-OGK-ISO40/FZ60	○		
ISO50	FZ19	19	38	62	M2-M12	9	9	R-OGK-ISO50/FZ19	○		
ISO50	FZ31	31	55	83	M6-M20	15	15	R-OGK-ISO50/FZ31	●		
ISO50	FZ48	48	79	133	M14-M33	24	24	R-OGK-ISO50/FZ48	●		
ISO50	FZ60	60	98	147	M22-M48	26	26	R-OGK-ISO50/FZ60	●		
BT30	FZ19	19	38	63	M2-M12	9	9			R-OGK-BT30/FZ19	○
BT30	FZ31	31	55	96	M6-M20	15	15			R-OGK-BT30/FZ31	○
BT40	FZ19	19	38	68	M2-M12	9	9			R-OGK-BT40/FZ19	●
BT40	FZ31	31	55	93	M6-M20	15	15			R-OGK-BT40/FZ31	●
BT40	FZ48	48	79	138	M14-M33	24	24			R-OGK-BT40/FZ48	○
BT40	FZ60	60	98	157	M22-M48	26	26			R-OGK-BT40/FZ60	○
BT50	FZ19	19	38	80	M2-M12	9	9			R-OGK-BT50/FZ19	○
BT50	FZ31	31	55	102	M6-M20	15	15			R-OGK-BT50/FZ31	●
BT50	FZ48	48	79	133	M14-M33	24	24			R-OGK-BT50/FZ48	○
BT50	FZ60	60	98	147	M22-M48	26	26			R-OGK-BT50/FZ60	○

OGKC version with internal cooling on request

9

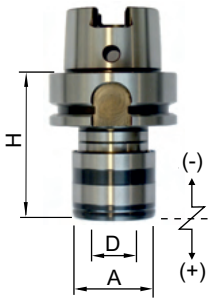
Example of order

R-OGK-ISO40/FZ31

● **Available from stock**

○ **On request**

Quick change tap holders with axial compensation

	HSK	VDI
		
Accessories		
Norm	DIN-69893 A	DIN-69880
Internal cooling		

Accessories

Adapters 188	Adapters 191	Collets 192
 FZS	 FZA	 ER

Shank	Adapters	D	A	H	M	(-)	(+)	INDEX		INDEX	
HSK50	FZ19	19	41	72	M2-M12	7,5	7,5	R-OGK-HSK50/FZ19	○		
HSK50	FZ31	31	60	110	M6-M20	10	10	R-OGK-HSK50/FZ31	○		
HSK63	FZ19	19	41	72	M2-M12	7,5	7,5	R-OGK-HSK63/FZ19	●		
HSK63	FZ31	31	60	110	M6-M20	10	10	R-OGK-HSK63/FZ31	●		
HSK63	FZ48	48	86	141	M14-M33	17,5	17,5	R-OGK-HSK63/FZ48	○		
HSK80	FZ19	19	41	75	M2-M12	7,5	7,5	R-OGK-HSK80/FZ19	○		
HSK80	FZ31	31	60	95	M6-M20	10	10	R-OGK-HSK80/FZ31	○		
HSK80	FZ48	48	86	141	M14-M33	17,5	17,5	R-OGK-HSK80/FZ48	○		
HSK100	FZ19	19	41	80	M2-M12	7,5	7,5	R-OGK-HSK100/FZ19	○		
HSK100	FZ31	31	60	100	M6-M20	10	10	R-OGK-HSK100/FZ31	○		
HSK100	FZ48	48	86	141	M14-M33	17,5	17,5	R-OGK-HSK100/FZ48	○		
VDI20	FZ19	19	38	55	M2-M12	9	9			R-OGK-VDI20/FZ19	○
VDI20	FZ31	31	55	77	M6-M20	15	15			R-OGK-VDI20/FZ31	○
VDI25	FZ19	19	38	55	M2-M12	9	9			R-OGK-VDI25/FZ19	●
VDI25	FZ31	31	55	77	M6-M20	15	15			R-OGK-VDI25/FZ31	●
VDI30	FZ19	19	38	55	M2-M12	9	9			R-OGK-VDI30/FZ19	●
VDI30	FZ31	31	55	77	M6-M20	15	15			R-OGK-VDI30/FZ31	●
VDI40	FZ19	19	38	55	M2-M12	9	9			R-OGK-VDI40/FZ19	○
VDI40	FZ31	31	55	77	M6-M20	15	15			R-OGK-VDI40/FZ31	●
VDI40	FZ48	48	79	110	M14-M33	24	24			R-OGK-VDI40/FZ48	○
VDI50	FZ48	48	79	110	M14-M33	24	24			R-OGK-VDI50/FZ48	○

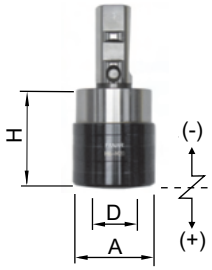
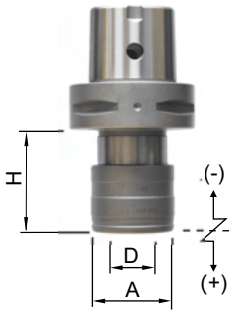
OGKC version with internal cooling on request

9

Example of order
R-OGK-VDI50/FZ48

● Available from stock
○ On request

236

	WELDON	POLYGONAL
		
Norm	DIN-1835 B+E	ISO 26623-1
Internal cooling		

Accessories

Adapters 188	Adapters 190	Collets 192
 FZS	 FZA	 ER

Shank	Adapters	D	A	H	M	(-)	(+)	INDEX		INDEX	
W20	FZ19	19	38	41	M2-M12	9	9	R-OGK-W20/FZ19	○		
W20	FZ31	31	55	63	M6-M20	15	15	R-OGK-W20/FZ31	○		
W25	FZ19	19	38	41	M2-M12	9	9	R-OGK-W25/FZ19	●		
W25	FZ31	31	55	63	M6-M20	15	15	R-OGK-W25/FZ31	●		
W32	FZ19	19	38	41	M2-M12	9	9	R-OGK-W32/FZ19	○		
W32	FZ31	31	55	63	M6-M20	15	15	R-OGK-W32/FZ31	●		
W32	FZ48	48	79	109	M14-M33	24	24	R-OGK-W32/FZ48	○		
W40	FZ19	19	38	41	M2-M12	9	9	R-OGK-W40/FZ19	○		
W40	FZ31	31	55	63	M6-M20	15	15	R-OGK-W40/FZ31	○		
W40	FZ48	48	79	98	M14-M33	24	24	R-OGK-W40/FZ48	○		
C40	FZ19	19	41	48	M2-M12	7,5	7,5			R-OGK-C40/FZ19	○
C40	FZ31	31	60	71	M6-M20	10	10			R-OGK-C40/FZ31	○
C50	FZ19	19	41	48	M2-M12	7,5	7,5			R-OGK-C50/FZ19	○
C50	FZ31	31	60	71	M6-M20	10	10			R-OGK-C50/FZ31	○
C63	FZ19	19	41	73	M2-M12	7,5	7,5			R-OGK-C63/FZ19	○
C63	FZ31	31	60	97	M6-M20	10	10			R-OGK-C63/FZ31	○
C63	FZ48	48	86	124	M12-M33	17,5	17,5			R-OGK-C63/FZ48	○
C80	FZ19	19	41	45	M2-M12	7,5	7,5			R-OGK-C80/FZ19	○
C80	FZ31	31	60	60	M6-M20	10	10			R-OGK-C80/FZ31	○
C80	FZ48	48	86	107	M12-M33	17,5	17,5			R-OGK-C80/FZ48	○

OGKC version with internal cooling on request

9

Example of order

R-OGK-W40/FZ48

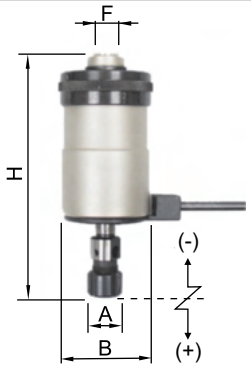
● **Available from stock**

○ **On request**

Information:

- For machines with the right spindle rotation
- Toolholder has axial compensation for compression, extension and safety clutch

$I = U / U_n$
U - tapping speed
U_n - reversing speed



Accessories

Shank

R-TM-MK2/JT6

Collets 198

RF

Norm

JT6 / M20 (+ MK DIN-228 B)

F	Collet	H	B	A	U_{max} [1/min]	I	M	In box		INDEX	
								RF	TM		
JT6	RF15	134	55	23	1500	1,6	M2-M7	J116, J117	MK1, MK3	R-OGN-JT6/RF15-Z	●
JT6	RF23	158	75	28	1000	1,75	M5-M12	J421, J422	MK3, MK4	R-OGN-JT6/RF23-Z	●
M20	RF32	205	91	40	600	1,7	M5-M18	J441, J445	MK3, MK4	R-OGN-M20/RF32-Z	●

Toolholder is sold in a set with accesories - details above in the table

9

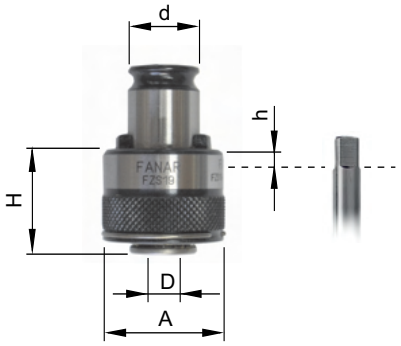
Example of order

R-OGN-JT6/RF15-Z

● **Available from stock**
○ **On request**

Information:

- Adapters with safety clutch are intended for OGK holders with axial compensation
- Safety clutch can prevent the tool from damage in case of a large increase of cutting forces



Size					FZS13	FZS19	FZS31	FZS48	FZS60
d / A / H / h					13 / 23 / 21 / 6	19 / 32 / 25 / 8	31 / 50 / 34 / 4	48 / 72 / 45 / 1	60 / 95 / 68 / 3
M	DIN	D	⌀	INDEX	R-FZS13	R-FZS19	R-FZS31	R-FZS48	R-FZS60
M. 2	371	2,8	2,1	M2 D2,8 DIN	○	●			
M 3	371	3,5	2,7	M3 D3,5 DIN	○	●			
M 4	371	4,5	3,4	M4 D4,5 DIN	○	●			
M 5	371	6	4,9	M5 D6 DIN	○	●			
M 6	371	6	4,9	M6 D6 DIN	○	●	●		
M 8	371	8	6,2	M8 D8 DIN		●	●		
M 8	376	6	4,9	M8 D6 DIN		○	○		
M 10	371	10	8	M10 D10 DIN		●	●	○	
M 10	376	7	5,5	M10 D7 DIN		○	○		
M 12	376	9	7	M12 D9 DIN		●	●	○	
M 14	376	11	9	M14 D11 DIN		○	●	●	
M 16	376	12	9	M16 D12 DIN			●	○	
M 18	376	14	11	M18 D14 DIN			●	●	
M 20	376	16	12	M20 D16 DIN			●	○	○
M 22-M 24	376	18	14,5	M24 D18 DIN			●	●	○
M 27	376	20	16	M27 D20 DIN			○	●	○
M 30	376	22	18	M30 D22 DIN				○	○
M 33	376	25	20	M33 D25 DIN				○	○
M 36	376	28	22	M36 D28 DIN					●
M 39	376	32	24	M39 D32 DIN					○
M 42	376	32	24	M42 D32 DIN					●
M 45	376	36	29	M45 D36 DIN					○
M 48	376	36	29	M48 D36 DIN					○

Extended version FZSL of quick-change adapters and FL extensions on request

Recommended torque values for safety clutch p. 312

9

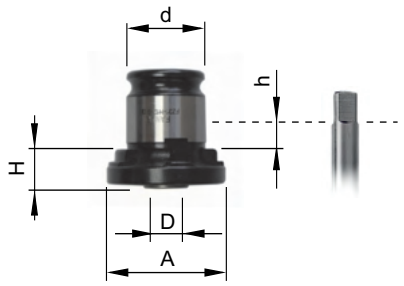
Example of order

R-FZS31/M12 D9 DIN

● **Available from stock**
○ **On request**

Quick-change adapters without safety clutch for taps

Information:
- Adapters are intended for OGK and OG holders



Size					FZ13	FZ19	FZ31	FZ48	FZ60
d / A / H / h					13 / 22 / 7 / 8	19 / 30 / 7 / 10	31 / 46 / 11 / 19	48 / 68 / 14 / 25	60 / 83 / 42 / 29
M	DIN	D	⌀	INDEX	R-FZ13	R-FZ19	R-FZ31	R-FZ48	R-FZ60
M 2	371	2,8	2,1	M2 D2,8 DIN	○	○			
M 3	371	3,5	2,7	M3 D3,5 DIN	○	●			
M 4	371	4,5	3,4	M4 D4,5 DIN	○	●			
M 5, M6	371	6	4,9	M6 D6 DIN	○	●	●		
M 8	371	8	6,2	M8 D8 DIN		●	●		
M 10	371	10	8	M10 D10 DIN		●	●		
M 12	376	9	7	M12 D9 DIN		●	●		
M 14	376	11	9	M14 D11 DIN		○	○	○	
M 16	376	12	9	M16 D12 DIN			●	○	
M 18	376	14	11	M18 D14 DIN			○	○	
M 20	376	16	12	M20 D16 DIN			●	○	
M 22, M24	376	18	14,5	M24 D18 DIN			○	○	○
M 27	376	20	16	M27 D20 DIN				○	○
M 30	376	22	18	M30 D22 DIN				○	○
M 33	376	25	20	M33 D25 DIN				○	○
M 36	376	28	22	M36 D28 DIN					○
M 39, M42	376	32	24	M42 D32 DIN					○
M 45, M48	376	36	29	M48 D36 DIN					○

Extended version FZSL of quick-change adapters and FL extensions on request

Quick-change adapters FZN for dies on request

Example of order

R-FZ31/M16 D12 DIN

● **Available from stock**
○ **On request**

Information:
- Adapters are intended for OGK and OG holders
- In ER standard tap clamping - **adapter has fastening screws**

**After each change of the tap, it is necessary to tighten the Adapters.*

Accessories

Collets 192

ER

Size	Collet	H	h	A	d	D	M	INDEX	
FZA19	ER16	29,5	8,5	28	19	2-10	M3-M12	R-FZA19/ER16	●
FZA31	ER25	38,5	15	42	31	2-16	M6-M20	R-FZA31/ER25	●

FR

Quick-change adapters reduction

Information:
- Reductions are intended for OGK and OG holders to connect FZS, FZ quick-change adapters and FZA Adapters

Reduction	H	A	d	D	INDEX	
19/13	6	30	19	13	R-FR19/13	○
31/19	8,5	46	31	19	R-FR31/19	●
48/31	7	68	48	31	R-FR48/31	●
60/48	13	92	60	48	R-FR60/48	○

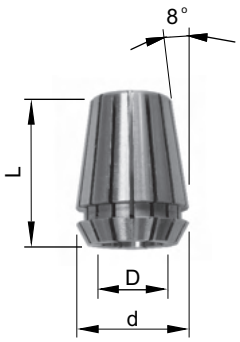
9

Example of order

R-FR19/13

● **Available from stock**
○ **On request**

DIN-6499



Size				ER16	ER20	ER25	ER32	ER40	ER50
d / L				17 / 27,5	21 / 31,5	26 / 34	33 / 40	41 / 46	52 / 60
D	M		INDEX	R-ER16	R-ER20	R-ER25	R-ER32	R-ER40	R-ER50
	DIN 371	DIN 376							
2			D2	●	●	●	●		
3	M2-M2,5	M3,5-M4	D3	●	●	●	●	○	
4	M3-M3,5	M5	D4	●	●	●	●	○	
5	M4	M6	D5	●	●	●	●	○	
6	M4,5-M5-M6	M8	D6	●	●	●	●	●	○
7	M7	M9-M10	D7	●	●	●	●	○	○
8	M8	M11	D8	●	●	●	●	●	○
9	M9	M12	D9	●	●	●	●	●	○
10	M10		D10	●	●	●	●	●	○
11		M14	D11		○	●	●	●	○
12		M16	D12		●	●	●	●	○
13		M16	D13		○	●	●	○	○
14		M18	D14			●	●	●	○
15		M18	D15			●	●	○	○
16		M20	D16			●	●	●	○
18		M22-M24	D18				●	●	○
20		M27	D20				●	●	○
22		M30	D22					●	○
25		M33	D25					●	○
28		M36	D28					●	○
32		M39-42	D32						○

9

Collets set on p. 261

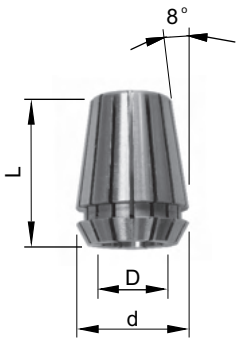
Example of order

R-ER25/D3

● Available from stock

○ On request

DIN-6499



Size					ERC16	ERC20	ERC25	ERC32	ERC40	ERC50
d / L					17 / 27,5	21 / 31,5	26 / 34	33 / 40	41 / 46	52 / 60
D	⌀	M		INDEX	R-ERC16	R-ERC20	R-ERC25	R-ERC32	R-ERC40	R-ERC50
		DIN 371	DIN 376							
3,5	2,7	M3	M4-M4,5	D3,5	○	○	●	○		
4,0	3,0	M3,5		D4	○	○	○	○		
4,5	3,4	M4	M6	D4,5	○	○	●	○		
5,0	4,0			D5	○	○	○	○		
5,5	4,3		M7	D5,5	○	○	○	○		
6,0	4,9	M4,5-M5-M6	M8	D6	●	●	●	●	○	
7,0	5,5	M7	M9-M10	D7	○	○	●	●	○	
8,0	6,2	M8	M11	D8	●	●	●	●	○	○
9,0	7,0	M9	M12	D9		○	●	●	○	○
10,0	8,0	M10		D10		●	●	●	○	○
11,0	9,0		M14	D11			○	●	○	○
12,0	9,0		M16	D12			●	●	●	○
14,0	11,0		M18	D14				●	○	○
16,0	12,0		M20	D16				●	●	○
18,0	14,5		M22-M24	D18					○	○
20,0	16,0		M27	D20					○	○
22,0	18,0		M30	D22						○
25,0	20,0		M33	D25						○
28,0	22,0		M36	D28						○
32,0	24,0		M39-42	D32						○

9

Example of order

R-ERC16/D3,5

● **Available from stock**

○ **On request**

MAX 25 BAR

DIN-6499

Size				ERG16	ERG20	ERG25	ERG32	ERG40
d / L				17 / 27,5	21 / 31,5	26 / 34	33 / 40	41 / 46
D	M		INDEX	R-ERG16	R-ERG20	R-ERG25	R-ERG32	R-ERG40
	DIN 371	DIN 376						
3	M2-M2,5	M3,5-M4	D3	○	○	○	○	
4	M3-M3,5	M5	D4	○	○	○	○	○
5	M4	M6	D5	○	○	○	○	○
6	M4,5-M5-M6	M8	D6	○	○	●	●	○
7	M7	M9-M10	D7	○	○	○	○	○
8	M8	M11	D8	○	○	●	●	○
9	M9	M12	D9	○	○	○	○	○
10	M10		D10	○	○	●	●	○
11		M14	D11		○	○	○	○
12		M16	D12		○	●	●	○
13		M16	D13		○	○	○	○
14		M18	D14			●	●	○
15		M18	D15			○	○	○
16		M20	D16			●	●	○
18		M22-M24	D18				○	○
20		M27	D20				●	○
22		M30	D22					○
25		M33	D25					○

ERCG

Rubber sealed collets with square drive for taps

MAX 25 BAR

DIN-6499

Size					ERCG16	ERCG20	ERCG25	ERCG32	ERCG40
d / L					17 / 27,5	21 / 31,5	26 / 34	33 / 40	41 / 46
D	⌀	M		INDEX	R-ERCG16	R-ERCG20	R-ERCG25	R-ERCG32	R-ERCG40
		DIN 371	DIN 376						
4	3,0	M3,5		D4	○	○	●	○	
4,5	3,4	M4	M6	D4,5	○	○	○	○	
5	4			D5	○	○	●	○	
5,5	4,3		M7	D5,5	○	○	○	○	
6	4,9	M4,5-M5-M6	M8	D6	○	○	○	○	
7	5,5	M7	M9-M10	D7	●	●	●	●	○
8	6,2	M8	M11	D8	○	○	●	●	○
9	7	M9	M12	D9	●	●	●	●	○
10	8	M10		D10		○	●	●	○
11	9		M14	D11		●	●	●	○
12	9		M16	D12			○	●	○
14	11		M18	D14			●	●	●
16	12		M20	D16				●	○
18	14,5		M22-M24	D18				●	●
20	16			D20					○

Example of order

R-ERCG32/D8

● Available from stock

○ On request

Sealing Gaskets

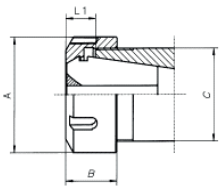
Seals ER40 and ER50 also available on request

Sealing Gaskets to ER20	INDEX
3-3.5mm	R-U20/D3
3.5-4mm	R-U20/D3,5
4-4.5mm	R-U20/D4
4.5-5mm	R-U20/D4,5
5-5.5mm	R-U20/D5
5.5-6mm	R-U20/D5,5
6-6.5mm	R-U20/D6
6.5-7mm	R-U20/D6,5
7-7.5mm	R-U20/D7
7.5-8mm	R-U20/D7,5
8-8.5mm	R-U20/D8
8.5-9mm	R-U20/D8,5
9-9.5mm	R-U20/D9
9.5-10mm	R-U20/D9,5
10-10.5mm	R-U20/D10
10.5-11mm	R-U20/D10,5
11-11.5mm	R-U20/D11
11.5-12mm	R-U20/D11,5
12-12.5mm	R-U20/D12

Sealing Gaskets to ER25	INDEX
3-3.5mm	R-U25/D3
3.5-4mm	R-U25/D3,5
4-4.5mm	R-U25/D4
4.5-5mm	R-U25/D4,5
5-5.5mm	R-U25/D5
5.5-6mm	R-U25/D5,5
6-6.5mm	R-U25/D6
6.5-7mm	R-U25/D6,5
7-7.5mm	R-U25/D7
7.5-8mm	R-U25/D7,5
8-8.5mm	R-U25/D8
8.5-9mm	R-U25/D8,5
9-9.5mm	R-U25/D9
9.5-10mm	R-U25/D9,5
10-10.5mm	R-U25/D10
10.5-11mm	R-U25/D10,5
11-11.5mm	R-U25/D11
11.5-12mm	R-U25/D11,5
12-12.5mm	R-U25/D12
12.5-13mm	R-U25/D12,5
13-13.5mm	R-U25/D13
13.5-14mm	R-U25/D13,5
14-14.5mm	R-U25/D14
14.5-15mm	R-U25/D14,5
15-15.5mm	R-U25/D15
15.5-16mm	R-U25/D15,5
16-16.5mm	R-U25/D16

Clamping nuts acc. to DIN 6499 standard without internal coolant sealing

Note: Max. Nm shows the maximum allowed tightening torque for each respective nut size.



Type	A mm	B mm	max. Nm	INDEX
ER11	19	11,3	30	R-NT11-SE
ER16	28	17,5	70	R-NT16-SE
ER20	34	19	100	R-NT20-SE

Type	A mm	B mm	max. Nm	INDEX
ER25	42	20	130	R-NT25-S
ER40	63	25,5	220	R-NT40-S
ER50	78	35,3	300	R-NT50-S

9

Example of order

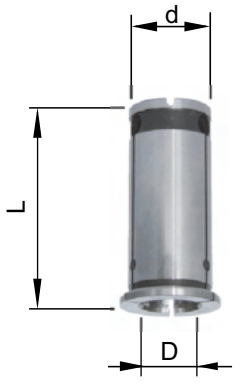
R-NTU16-SE

● **Available from stock**

○ **On request**

Reduction collets for ogs holders

Information:
- Use of reduction collets causes necessity to reduce maximum speed to 50%



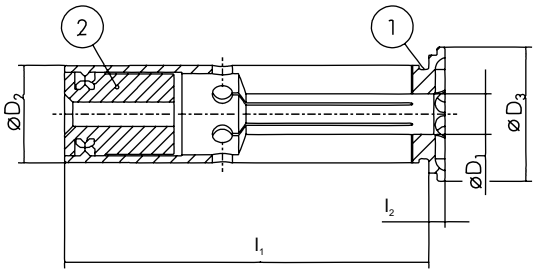
Size		TR20	TR32
d / L		20 / 54	32 / 64
D	INDEX	R-TR20	R-TR32
3	D3	○	○
4	D4	○	○
5	D5	○	○
6	D6	○	○
7	D7	○	○
8	D8	○	○
9	D9	○	○
10	D10	○	○
11	D11	○	○
12	D12	○	○
13	D13	○	○
14	D14	○	○
15	D15	○	○
16	D16	○	○
17	D17	○	○
18	D18	○	○
19	D19		○
20	D20		○
21	D21		○
22	D22		○
23	D23		○
24	D24		○
25	D25		○
26	D26		○
28	D28		○

Example of order

R-TR20/D10

● **Available from stock**

○ **On request**

Basic accessories	TRH20	TRH20-EK
① O-ring sealing ② Adjustable back stop for lenght adjustment 		
Cooling	-	EK with curtain cooling

D_1	D_2	D_3	l_1	l_2	m	INDEX	R-TRH20	R-TRH20-EK
3,0	20	24	50,5	2,0	0,1	D3	○	○
4,0	20	24	50,5	2,0	0,1	D4	○	○
5,0	20	24	50,5	2,0	0,1	D5	○	○
6,0	20	24	50,5	2,0	0,1	D6	○	○
7,0	20	24	50,5	2,0	0,1	D7	○	○
8,0	20	24	50,5	2,0	0,1	D8	○	○
9,0	20	24	50,5	2,0	0,1	D9	○	○
10,0	20	24	50,5	2,0	0,1	D10	○	○
11,0	20	24	50,5	2,0	0,1	D11	○	○
12,0	20	24	50,5	2,0	0,1	D12	○	○
13,0	20	24	50,5	2,0	0,1	D13	○	○
14,0	20	24	50,5	2,0	0,1	D14	○	○
15,0	20	24	50,5	2,0	0,1	D15	○	○
16,0	20	24	50,5	2,0	0,1	D16	○	○

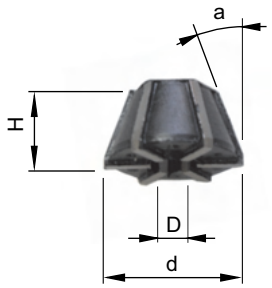
9

Example of order

R-TRH20/D16

● **Available from stock**
○ **On request**

Rubber flex collets for OGN holders



Size	d	H	a	D	M	INDEX	
RF15	15	12	13	2,5-4,5	M2-M4	R-RF15/J116	●
RF15	15	12	13	4,5-6,5	M4-M7	R-RF15/J117	●
RF23	23	13	20	3,5-6,5	M5-M6	R-RF23/J421	●
RF23	23	13	20	6,5-10,0	M6-M12	R-RF23/J422	●
RF32	32,5	16	22,5	4,5-10,0	M8-M12	R-RF32/J441	●
RF32	32,5	16	22,5	10,0-15,0	M10-M18	R-RF32/J445	●

Example of order

R-RF32/J445

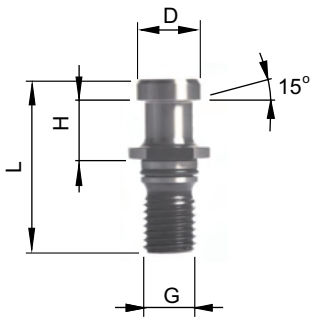
● **Available from stock**

○ **On request**

Information:

- Application: for tool holders with ISO shank according to DIN-69871
- IK- with central cooling

C ISO A



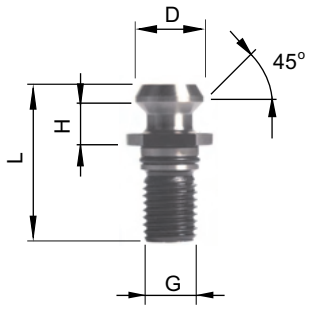
Norm ISO-7388/2A

Size ISO	IK	O-RING	L	H	D	G	INDEX	
30			44	19	12	M12	R-C-ISO-A-30	○
30	●		44	19	12	M12	R-C-ISO-A-30-IK	○
40		●	54	20	19	M16	R-C-ISO-A-40	○
40	●	●	54	20	19	M16	R-C-ISO-A-40-IK	○
50		●	74	25	28	M24	R-C-ISO-A-50	○
50	●	●	74	25	28	M24	R-C-ISO-A-50-IK	○

Information:

- Application: for tool holders with ISO shank according to DIN-69871
- IK - with central cooling

C ISO B



Norm ISO-7388/2B

Size ISO	IK	O-RING	L	H	D	G	INDEX	
30			34,0	8,15	13,35	M12	R-C-ISO-B-30	○
30	●		34,0	8,15	13,35	M12	R-C-ISO-B-30-IK	○
40		●	44,5	11,15	18,95	M16	R-C-ISO-B-40	●
40	●	●	44,5	11,15	18,95	M16	R-C-ISO-B-40-IK	●
50		●	65,5	17,95	29,10	M24	R-C-ISO-B-50	○
50	●	●	65,5	17,95	29,10	M24	R-C-ISO-B-50-IK	○

9

Example of order

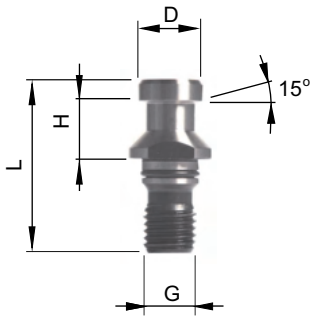
R-C-ISO-B-30

● **Available from stock**
○ **On request**

Information:

- Application: for tool holders with ISO shank according to DIN-69871
- IK- with central cooling

C DIN



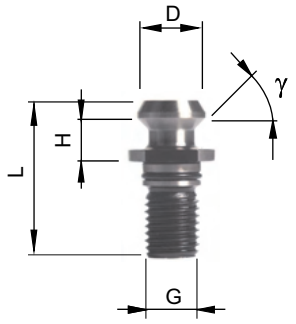
Norm DIN-69872

Size ISO	IK	O-RING	L	H	D	G	INDEX	
30			44	19	13	M12	R-C-DIN-30	○
30	●		44	19	13	M12	R-C-DIN-30-IK	○
40		●	54	20	19	M16	R-C-DIN-40	●
40	●	●	54	20	19	M16	R-C-DIN-40-IK	●
50		●	74	25	28	M24	R-C-DIN-50	○
50	●	●	74	25	28	M24	R-C-DIN-50-IK	○

Information:

- Application: for tool holders with ISO sank according to MAS-BT
- IK- with central cooling

C BT



Size MAS-BT	IK	O-RING	L	H	D	G	γ	INDEX	
30			43	18	11	M12	45	R-C-BT-30/45	○
30	●		43	18	11	M12	45	R-C-BT-30/45-IK	○
30			43	18	11	M12	60	R-C-BT-30/60	○
30	●		43	18	11	M12	60	R-C-BT-30/60-IK	○
40		●	60	28	15	M16	45	R-C-BT-40/45	●
40	●	●	60	28	15	M16	45	R-C-BT-40/45-IK	●
40		●	60	28	15	M16	60	R-C-BT-40/60	○
40	●	●	60	28	15	M16	60	R-C-BT-40/60-IK	○
40		●	60	28	15	M16	90	R-C-BT-40/90	○
40	●	●	60	28	15	M16	90	R-C-BT-40/90-IK	○
50		●	85	35	23	M24	45	R-C-BT-50/45	○
50	●	●	85	35	23	M24	45	R-C-BT-50/45-IK	○
50		●	85	35	23	M24	60	R-C-BT-50/60	○
50	●	●	85	35	23	M24	60	R-C-BT-50/60-IK	○
50		●	85	35	23	M24	90	R-C-BT-50/90	○
50	●	●	85	35	23	M24	90	R-C-BT-50/90-IK	○

Example of order

R-C-BT-40/90-IK

● **Available from stock**

○ **On request**

TOOL KITS

TOOL KITS

PAGE

CATALOGUE PAGES 253 - 264

CZD-40 HSS M3÷M20 — INDEX Z1-040011-0000

	Taps	Dies	Screw pitch gauge	Taps wrench	Die stock	Screwdriver
CONTENTS	DIN-352 HSS dla M3÷M12 DIN-352/2 HSS dla M14÷M20	DIN-EN 22 568 HSS 800	MWGa	PBPc	PBGa	RWWe
						
	M3 | M4 | M5 | M6 | M7, M8, M10 | M12 | M14 | M16 | M20	∅25 x 9: M3 | M4 | M5 | M6 | M7 | M8 | M10 ∅38 x 14: M12 | M14 | M16 | M20	0,4 ÷ 6 mm	Nr 2 zm.: 2,5 ÷ 9 mm Nr 3: 4,9 ÷ 14 mm	∅25 x 9 mm ∅38 x 14 mm	4 x 90 mm
DIMENSIONS	475 x 255 x 40 mm					
WEIGHT	3,4 kg					

CZD-85 HSS M3÷M24 — INDEX Z1-085011-0000

	Taps	Dies	Screw pitch gauge	Taps wrenches	Die stocks	„T" type wrench	Screwdriver	Distance ring
CONTENTS	DIN-352 HSS - M3÷M12 DIN-352/2 HSS - M14÷M24 DIN-2181/2 HSS - MF≥14x1,25	DIN-EN 22 568 HSS 800	MWGa	PBPc	PBGa		RWWe	
								
	M3, M4, M5, M6, M8, M10, M12, M14, M16, M18, M20, M22, M24, M8x1, M10x1, M12x1,25, M12x1,5, M14x1,25, M14x1,5, M16x1,5,M18x1,5, M20x1,5, M22x1,5, M24x1,5	M3 | M4 | M5 | M6 | M8 | M10 M12 | M14 | M16 | M18 M20 | M22 | M24 M8x1 | M10x1 | M12x1,25 M12x1,5 | M14x1,25 | M14x1,5 M16x1,5 | M18x1,5 | M20x1,5 M22x1,5 | M24x1,5	0,4 ÷ 6 mm	Nr 2 zm.: 2,5 ÷ 9 mm Nr 3: 4,9 ÷ 14 mm	∅25 x 9 mm ∅38 x 14 mm ∅45 x 18 mm ∅55 x 22 mm	Nr 1 (M2 ÷ M5)	4 x 90 mm	38 x 2 45 x 2 55 x 3
DIMENSIONS	550 x 380 x 70 mm							
WEIGHT	12 kg							

Example of order
Z1-040011-0000
CZD-40 HSS

CZB-29 HSS M3÷M12 — INDEX Z1-029012-0000

	Taps	Dies
CONTENTS	DIN-352/3 HSS	DIN-EN 22 568 HSS 800
		
	M3 | M4 | M5 | M6 | M8 | M10| M12	∅25 x 9: M3 | M4 | M5 | M6 | M8 | M10 | M12
DIMENSIONS	270 x 230 x 30 mm	
WEIGHT	0,9 kg	

CZB-29W HSS M3÷M12 — INDEX Z1-029112-0000

	Taps	Dies	Drills
CONTENTS	DIN-352/2 HSS	DIN-EN 22 568 HSS 800	DIN-338 N HSS
			
	M3, M4, M5, M6, M8, M10, M12	∅25 x 9: M3, M4, M5, M6, M8, M10, M12	∅2,5;∅3,3;∅4,2; ∅5,0;∅6,8;∅8,5;∅10,2
DIMENSIONS	340 x 290 x 40 mm		
WEIGHT	1,2 kg		

Example of order
Z1-029112-0000
CZB-29W HSS

CZB-31 HSS M3÷M12 — INDEX Z1-031012-0000

	Taps	Dies	Tap wrenches	Die stocks	Screwdriver
CONTENTS	DIN-352/3 HSS	DIN-EN 22 568 HSS 800	PBPc	PBGa	RWWe
					
	M3 | M4 | M5 | M6 | M8 | M10 | M12	∅25 x 9: M3 | M4 | M5 | M6 | M8 | M10 | M12	Nr 1,5: 2,5 ÷ 8 mm	∅25 x 9 mm	4 x 90 mm
DIMENSIONS	340 x 290 x 40 mm				
WEIGHT	1,6 kg				

CZB-31 INOX M3÷M12 — INDEX Z2-031012-0000

	Taps	Dies	Tap wrenches	Die stocks	Screwdriver
CONTENTS	DIN-352/3 HSSE INOX	DIN-EN 22 568 HSSE INOX	PBPc	PBGa	RWWe
					
	M3 | M4 | M5 | M6 | M8 | M10 | M12	∅25 x 9: M3 | M4 | M5 | M6 | M8 | M10 | M12	Nr 1,5: 2,5 ÷ 8 mm	∅25 x 9 mm	4 x 90 mm
DIMENSIONS	340 x 290 x 40 mm				
WEIGHT	1,6 kg				

CZP-31 HSS mini M1÷M2,5 — INDEX Z1-031115-0000

	Taps	Dies	Tap and die wrench
CONTENTS	DIN-352/2 HSS	DIN-EN 22 568 HSS	
			
	M1 | M1,1 | M1,2 | M1,4 | M1,6 | M1,8 | M2 | M2,2 | M2,5	∅12 x 3: M1 | M1,1 | M1,2 | M1,4 | M1,6 | M1,8 | M2, ∅16 x 3: M2,2 | M2,5	
DIMENSIONS	155 x 85 x 12 mm		
WEIGHT	0,2 kg		

CZP-7 BIT HSS M3÷M10 — Z1-007020-0310

Designation	M ∅d_1	⬡	INDEX	Z1-007020
CZP-7 BIT HSS	M 3 ÷ M 10	1/4”	0310	●

10

Example of order
Z1-007020-0310
CZP-7 BIT HSS

CZP-8 MasterTAP R45 HSSE-PM HL

INDEX Z4-528M15-0310

CONTENTS

Taps

MasterTAP 6HX DIN-371 C R45 HSSE-PM HL

M3 | M4 | M5 | M6 | M8 | M10

Dimensions	Weight
155 x 145 x 32 mm	0,2 kg

CZP-8 MasterTAP B HSSE-PM HL

INDEX Z4-118M15-0310

MasterTAP 6HX DIN-371 B HSSE-PM HL

M3 | M4 | M5 | M6 | M8 | M10

CZP-8 800X C R40 HSSE TN2

INDEX Z2-513X15-0310

CONTENTS

Taps

800X 6H DIN-371 C R40 HSSE TN2

M3 | M4 | M5 | M6 | M8 | M10

800X 6H DIN-376 C R40 HSSE TN2

M12

Dimensions	Weight
145 x 90 x 37 mm	0,2 kg

CZP-8 800X B HSSE TN2

INDEX Z2-113X15-0310

800X 6H DIN-371 B HSSE TN2

M3 | M4 | M5 | M6 | M8 | M10

800X 6H DIN-376 B HSSE TN2

M12

Example of order

Z4-528M15-0310
Taps set CZP-8 MasterTAP R45 HSSE-PM HL

CZP-5 800X C R40 HSSE TN2	CZP-5 800X B HSSE TN2
INDEX Z2-X53520-0408	INDEX Z2-X53120-0408
	
CONTENTS	
Taps	
800X 6H DIN-371 C R40 HSSE TN2	800X 6H DIN-371 B HSSE TN2
	
M4 | M5 | M6 | M8	M4 | M5 | M6 | M8
Dimensions	**Weight**
120 x 80 x 45 mm	0,1 kg

CZP-5 R40 HSSE	CZP-5 B HSSE
INDEX Z2-055115-0408	INDEX Z2-051115-0408
	
CONTENTS	
Taps	
DIN-371-C ISO2(6H) R40 HSSE 800	DIN-371-B ISO2(6H) HSSE 800
	
M4 | M5 | M6 | M8	M4 | M5 | M6 | M8
Dimensions	**Weight**
120 x 80 x 45 mm	0,1 kg

Example of order
Z2-X53520-0408
Taps set CZP-5 800X C R40 HSSE TN

CZP-8 B HSSE OPTI OX	CZP-8 R40 HSSE OPTI OX	CZP-8 C HSSE OPTI OX
INDEX Z2-081015-0000	INDEX Z2-085015-0000	INDEX Z2-082015-0000
		
CONTENTS		
Taps		
DIN-371 B ISO2 (6H) HSSE OPTI OX	**DIN-371 C** ISO2 (6H) R40 HSSE OPTI OX	**DIN-371 C** ISO2 (6H) C HSSE OPTI OX
		
M3 | M4 | M5 | M6 | M8 | M10	M3 | M4 | M5 | M6 | M8 | M10	M3 | M4 | M5 | M6 | M8 | M10
DIN-376 B ISO2 (6H) HSSE OPTI OX	**DIN-376 C** ISO2 (6H) R40 HSSE OPTI OX	**DIN-376 C** ISO2 (6H) C HSSE OPTI OX
		
M12	M12	M12
Dimensions		**Weight**
145 x 90 x 37 mm		0,2 kg

CZW-19 HSSE INOX TiN Ø1,0 ÷ Ø10	CZW-24 HSSE INOX TiN Ø1,0 ÷ Ø10,5	CZW-25 HSSE INOX TiN Ø1,0 ÷ Ø13
INDEX Z2-019315-0000	INDEX Z2-024315-0000	INDEX Z2-025315-0000
		
CONTENTS		
Steel drills		
DIMENSIONS		
1 | 1,5 | 2 | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 5,5 | 6 6,5 | 7 |7,5 | 8 | 8,5 | 9 | 9,5 | 10	1 | 1,5 | 2 | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 5,5 | 6 6,5 | 7 |7,5 | 8 | 8,5 | 9 | 9,5 | 10 **+** **the dimensions of the thread** 3,3 | 4,2 | 6,8 | 10,2 |10,5	1 | 1,5 | 2 | 2,5 | 3 | 3,5 | 4 | 4,5 | 5 | 5,5 | 6 6,5 | 7 |7,5 | 8 | 8,5 | 9 | 9,5 | 10 | 10,5 | 11 11,5 | 12 | 12,5 | 13

Example of order

Z2-019315-0000
CZW-19 HSSE INOX TiN Ø1÷Ø10

CZP-6 DIN-335-C Master-line Ø6,3÷Ø25 HSSE TC	CZP-6 DIN-335-C X-line Ø6,3÷Ø25 HSSE TN2	CZP-6 DIN-335-C Ø6,3÷Ø25 HSSE
INDEX Z2-065015-0000	**INDEX Z2-065X15-0000**	**INDEX Z2-065S15-0000**
		
CONTENTS		
Countersinks		
DIN-335-C HSSE TC	**DIN-335-C HSSE TN2**	**DIN-335-C HSSE**
		
6,3 | 10,4 | 16,5 | 20,5 | 25	6,3 | 10,4 | 16,5 | 20,5 | 25	6,3 | 10,4 | 16,5 | 20,5 | 25
Dimensions		**Weight**
145 x 100 x 42 mm		0,3 kg

WDG M3÷M12	INDEX W9-900002-0000
	

10

	Drills to remove broken taps
CONTENTS	WDG
	
	M3 | M4 | M5 | M6 | M8 | M10 | M12
DIMENSIONS	290 x 340 x 40 mm
WEIGHT	1,2 kg

Example of order

Z2-065015-0000
Countersinks set CZP-6 DIN-335-C 6,3-25 90° HSSE TC

MasterMill 440N 6-12 VHM TS	X-MILL 440N 6-12 VHM AT
INDEX Z9-44GMA0-0612	**INDEX Z9-444XA0-0612**
	
CONTENTS	
End mills	
MasterMill 440N VHM TS	X-MILL 440N VHM AT
 6 | 8 | 10 | 12	 6 | 8 | 10 | 12
Dimensions	**Weight**
155 x 145 x 32 mm	0,4 kg

R-ER11	R-ER16	R-ER20
INDEX: R-ER11-13BOX	**INDEX: R-ER16-10BOX**	**INDEX: R-ER20-12BOX**
		
Collet chunk		
Plastic box D.1÷7 x 0,5 mm	Plastic box D.1÷10 x 1 mm	Plastic box D.2÷13 x 1 mm

R-ER25	R-ER32	R-ER40
INDEX: R-ER25-15BOX	**INDEX: R-ER32-18BOX**	**INDEX: R-ER40-23BOX**

Collet chunk		
Aluminium Box D.2÷16 x 1 mm	Aluminium Box D.3÷20 x 1 mm	Aluminium Box D.4÷26 x 1 mm

CZD-8 MSRh M3÷M12 — Index: Z3-200120-0312

Dimensions standard ISO 1502

	Gauges set
CONTENTS	MSRh 6g
	
	M3 | M4 | M5 | M6 | M8 | M10 | M12
DIMENSIONS	145 x 145 x 35 mm
WEIGHT	0,5 kg

Example of order
R-ER32-18BOX
Collets set R-ER32

CZD-8 MSBg M3÷M12

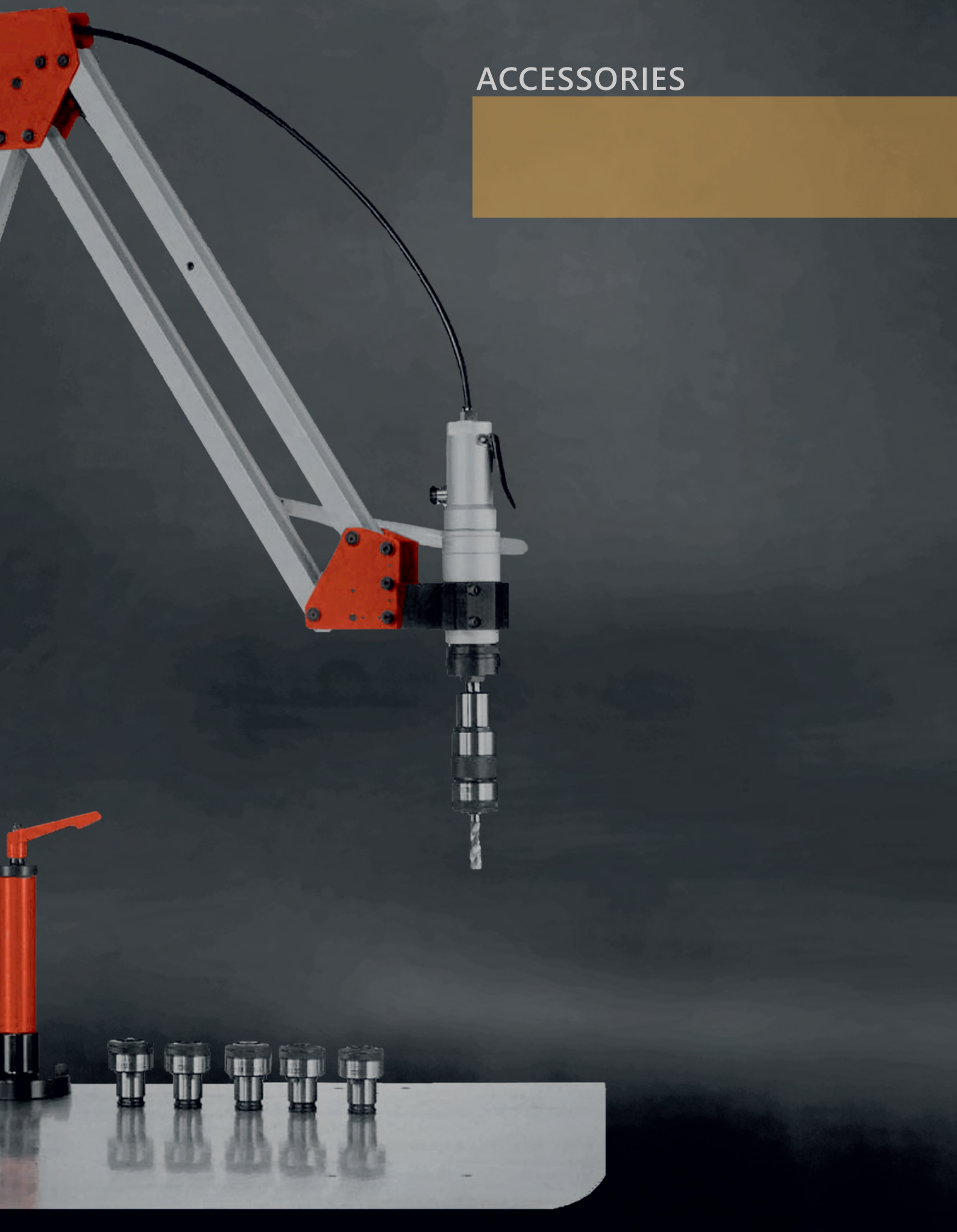
Index: Z3-302161-0312

Dimensions standard ISO 1502

CONTENTS	**Gauges set**
	MSBg 6H
	
	M3 | M4 | M5 | M6 | M8 | M10 | M12
DIMENSIONS	290 x 175 x 35 mm
WEIGHT	0,6 kg

10

ACCESSORIES



ACCESSORIES

PAGE

CATALOGUE PAGES 267 - 274

TEREBOR

Speciment for threading

Application: for threading hard working steels especially:
- stainless steels,
- acidproff steels,
- hardening andd tempered steels

CAPACITY	INDEX
250 ml	T0-100110-0250
500 ml	T0-100110-0500
5 l	T0-100110-5000

VARIOCUT B 40

Oil for machining

Application: for threading tool steels an soft constructional steels

CAPACITY	INDEX
250 ml	T0-100340-0250
500 ml	T0-100340-0500
5 l	T0-100340-5000
200 l*	Na zapytanie

*For use in lathes

CIMTAP

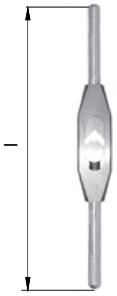
Paste for threading

Application: for hand andd machine threadding of iron and non-iron metals

CAPACITY	INDEX
1 l	T0-100410-1000

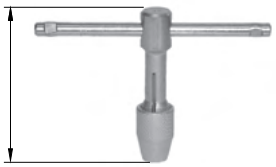
Tap wrenches

Mark	□	l	M		INDEX
			ISO-529	DIN-352	
PBPc/m - 0	2 ÷ 4,5	125	M1 ÷ M5	M1 ÷ M4	V0-303000-0204
PBPc/m - 1	3,15 ÷ 6,3	205	M4 ÷ M8	M3 ÷ M11	V0-303010-0306
PBPc/m - 1,5	2,5 ÷ 7,1	205	M3 ÷ M9	M3 ÷ M12	V0-303015-0207
PBPc/m - 2	3,55 ÷ 9	305	M4,5 ÷ M14	M4,5 ÷ M16	V0-303020-0309
PBPc/m - 4	5,6 ÷ 16	395	M7 ÷ M27	M11 ÷ M27	V0-303040-0516
PBPc/m - 5	7 ÷ 20	700	M9 ÷ M30	M13 ÷ M32	V0-303050-0720



Tap wrenches type „T”

Mark	□	l	M		INDEX
			ISO-529	DIN-352	
PT Nr 1	2,0 ÷ 4,0	55	M1 ÷ M5	M1 ÷ M4	V0-310000-0205
PT Nr 1D	2,0 ÷ 4,0	200	M1 ÷ M5	M1 ÷ M4	V0-311000-0205
PT Nr 2	4,0 ÷ 7,1	90	M6 ÷ M12	M5 ÷ M12	V0-320000-0612
PT Nr 2D	4,0 ÷ 7,1	250	M6 ÷ M12	M5 ÷ M12	V0-321000-0612
PT Nr 3	9,0 ÷ 11,2	110	M14 ÷ M20	M14 ÷ M18	V0-330000-1420

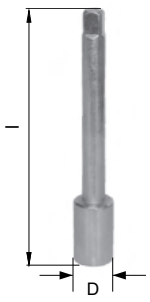


Tap wrenches with ratchet system

Mark	l	M DIN-352	INDEX
PG Nr 1	85	M3 ÷ M6	V0-310500-0306
PG Nr 1 D	250	M3 ÷ M6	V0-311500-0306
PG Nr 2	110	M6 ÷ M12	V0-320500-0612
PG Nr 2 D	300	M6 ÷ M12	V0-321500-0612

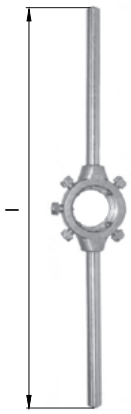
Extension sleeves for taps

Mark	□	l	D	M		INDEX
				ISO-529	DIN-352	
PBNa - 5	5,0	110	11	M6		V0-200000-0050
PBNa - 6,3	6,3	120	14	M8, M11		V0-200000-0063
PBNa - 7,1	7,1	125	15	M9, M12		V0-200000-0071
PBNa - 8	8,0	130	17	M10		V0-200000-0080
PBNa - 9	9,0	130	19	M14	M14, M16	V0-200000-0090
PBNa - 10	10,0	140	21	M16		V0-200000-0100



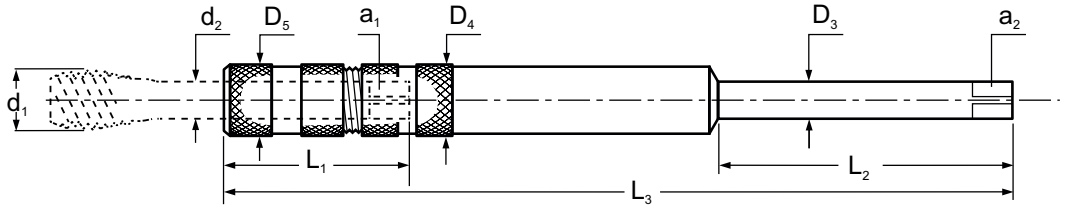
Die stocks

Mark	l	M	INDEX
PBGa/m - 16x5	160	M1 ÷ M2,5	V0-103000-1605
PBGa/m - 20x5	185	M3 ÷ M6	V0-103000-2005
PBGa/m - 25x9	220	M7 ÷ M9	V0-103000-2509
PBGa/m - 30x11	260	M10 ÷ M11	V0-103000-3011
PBGa/m - 38x14	310	M12 ÷ M14	V0-103000-3814
PBGa/m - 45x18	400	M16 ÷ M20	V0-103000-4518
PBGa/m - 55x22	500	M22 ÷ M24	V0-103000-5522
PBGa/m - 65x25	560	M27 ÷ M36	V0-103000-6525



Example of order

V0-103000-1605
PBGa/m-16x5



Short

Mark	d1		d2	D3	D4=D5	L1	L2	L3	a1	a2	INDEX
	DIN-371	DIN-376									
PBNm 2,8/2,1-6/4,9-130	M2 - M2,6	M4	2,8	6	6,1	22	60	130	2,1	4,9	V0-211130-0206
PBNm 3,5/2,7-6/4,9-130	M3	M4,5 - M5	3,5	6	7,5	23	60	130	2,7	4,9	V0-211130-0306
PBNm 4,5/3,4-6/4,9-130	M4	M6	4,5	6	8,4	23	60	130	3,4	4,9	V0-211130-0406
PBNm 6/4,9-7/5,5-130	M4,5 - M6	M8	6	7	12,1	26	60	130	4,9	5,5	V0-211130-0607
PBNm 7/5,5-7/5,5-130	M7	M9 - M10	7	7	12,1	26	60	130	5,5	5,5	V0-211130-0707
PBNm 8/6,2-8/6,2-130	M8	M11	8	8	13	30	60	130	6,2	6,2	V0-211130-0808
PBNm 9/7-9/7-130	M9	M12	9	9	15	31	60	130	7	7	V0-211130-0909
PBNm 10/8-10/8-130	M10	-	10	10	15	33	60	130	8	8	V0-211130-1010
PBNm 11/9-11/9-130		M14	11	11	18	36	90	130	9	9	V0-211130-1111
PBNm 12/9-12/9-130		M16	12	12	18	36	90	130	9	9	V0-211130-1212
PBNm 14/11-14/11-200		M18	14	14	22	42	90	200	11	11	V0-211200-1414
PBNm 16/12-16/12-200		M20	16	16	22	42	90	200	12	12	V0-211200-1616
PBNm 18/14,5-18/14,5-200		M22/M24	18	18	26	43	100	200	14,5	14,5	V0-211200-1818
PBNm 20/16-20/16-200		M27	20	20	28	48	100	200	16	16	V0-211200-2020

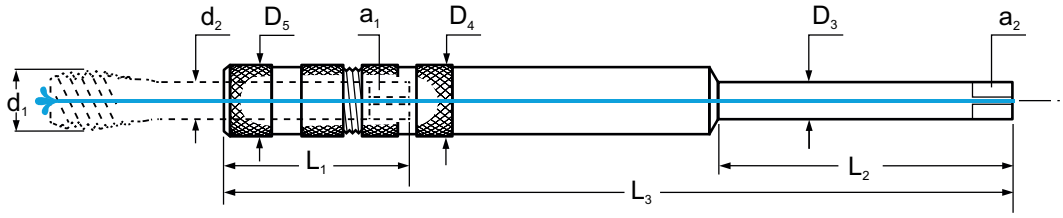
Long

Mark	d1		d2	D3	D4=D5	L1	L2	L3	a1	a2	INDEX
	DIN-371	DIN-376									
PBNm 2,8/2,1-6/4,9-230	M2-M2,6	M4	2,8	6	6,1	22	70	230	2,1	4,9	V0-211230-0206
PBNm 3,5/2,7-6/4,9-230	M3	M4,5-M5	3,5	6	7,5	23	70	230	2,7	4,9	V0-211230-0306
PBNm 4,5/3,4-6/4,9-230	M4	M6	4,5	6	8,4	23	70	230	3,4	4,9	V0-211230-0406
PBNm 6/4,9-7/5,5-230	M4,5 - M6	M8	6	7	12,1	26	70	230	4,9	5,5	V0-211230-0607
PBNm 7/5,5-7/5,5-230	M7	M9 - M10	7	7	12,1	26	70	230	5,5	5,5	V0-211230-0707
PBNm 8/6,2-8/6,2-230	M8	M11	8	8	13	30	80	230	6,2	6,2	V0-211230-0808
PBNm 9/7-9/7-230	M9	M12	9	9	15	31	80	230	7	7	V0-211230-0909
PBNm 10/8-10/8-230	M10	-	10	10	15	33	80	230	8	8	V0-211230-1010
PBNm 11/9-11/9-230		M14	11	11	18	36	90	230	9	9	V0-211230-1111
PBNm 12/9-12/9-230		M16	12	12	18	36	90	230	9	9	V0-211230-1212
PBNm 14/11-14/11-330		M18	14	14	22	42	90	330	11	11	V0-211330-1414
PBNm 16/12-16/12-330		M20	16	16	22	42	90	330	12	12	V0-211330-1616
PBNm 18/14,5-18/14,5-330		M22/M24	18	18	26	43	100	330	14,5	14,5	V0-211330-1818
PBNm 20/16-20/16-330		M27	20	20	28	48	100	330	16	16	V0-211330-2020

Example of order

V0-211230-1212
PBNm 12/9-12/9-230

IK



Short

Mark	d1		d2	D3	D4=D5	L1	L2	L3	a1	a2	INDEX
	DIN-371	DIN-376									
PBNm 2,8/2,1-6/4,9-130	M2 - M2,6	M4	2,8	6	6,1	22	60	130	2,1	4,9	V0-211135-0206
PBNm 3,5/2,7-6/4,9-130	M3	M4,5 - M5	3,5	6	7,5	23	60	130	2,7	4,9	V0-211135-0306
PBNm 4,5/3,4-6/4,9-130	M4	M6	4,5	6	8,4	23	60	130	3,4	4,9	V0-211135-0406
PBNm 6/4,9-7/5,5-130	M4,5 - M6	M8	6	7	12,1	26	60	130	4,9	5,5	V0-211135-0607
PBNm 7/5,5-7/5,5-130	M7	M9 - M10	7	7	12,1	26	60	130	5,5	5,5	V0-211135-0707
PBNm 8/6,2-8/6,2-130	M8	M11	8	8	13	30	60	130	6,2	6,2	V0-211135-0808
PBNm 9/7-9/7-130	M9	M12	9	9	15	31	60	130	7	7	V0-211135-0909
PBNm 10/8-10/8-130	M10	-	10	10	15	33	60	130	8	8	V0-211135-1010
PBNm 11/9-11/9-130		M14	11	11	18	36	90	130	9	9	V0-211135-1111
PBNm 12/9-12/9-130		M16	12	12	18	36	90	130	9	9	V0-211135-1212
PBNm 14/11-14/11-200		M18	14	14	22	42	90	200	11	11	V0-211205-1414
PBNm 16/12-16/12-200		M20	16	16	22	42	90	200	12	12	V0-211205-1616
PBNm 18/14,5-18/14,5-200		M22/M24	18	18	26	43	100	200	14,5	14,5	V0-211205-1818
PBNm 20/16-20/16-200		M27	20	20	28	48	100	200	16	16	V0-211205-2020

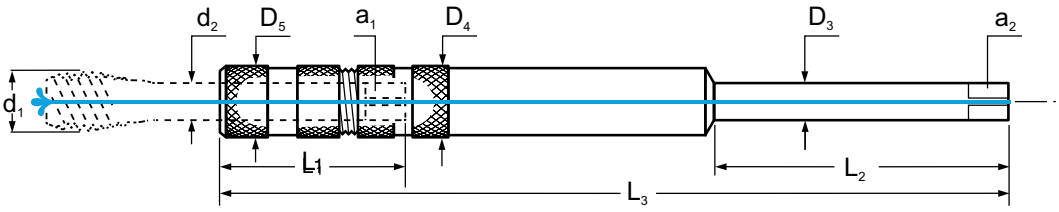
Long

Mark	d1		d2	D3	D4=D5	L1	L2	L3	a1	a2	INDEX
	DIN-371	DIN-376									
PBNm 6/4,9-7/5,5-230	M4,5 - M6	M8	6	7	12,1	26	70	230	4,9	5,5	V0-211235-0607
PBNm 7/5,5-7/5,5-230	M7	M9 - M10	7	7	12,1	26	70	230	5,5	5,5	V0-211235-0707
PBNm 8/6,2-8/6,2-230	M8	M11	8	8	13	30	80	230	6,2	6,2	V0-211235-0808
PBNm 9/7-9/7-230	M9	M12	9	9	15	31	80	230	7	7	V0-211235-0909
PBNm 10/8-10/8-230	M10	-	10	10	15	33	80	230	8	8	V0-211235-1010
PBNm 11/9-11/9-230		M14	11	11	18	36	80	230	9	9	V0-211235-1111
PBNm 12/9-12/9-230		M16	12	12	18	36	80	230	9	9	V0-211235-1212
PBNm 14/11-14/11-330		M18	14	14	22	42	90	330	11	11	V0-211335-1414
PBNm 16/12-16/12-330		M20	16	16	22	42	100	330	12	12	V0-211335-1616
PBNm 18/14,5-18/14,5-330		M22/M24	18	18	26	43	100	330	14,5	14,5	V0-211335-1818
PBNm 20/16-20/16-330		M27	20	20	28	48	100	330	16	16	V0-211335-2020

Example of order

V0-211235-1212
PBNm 12/9-12/9-230-IK

IK-H6



Short

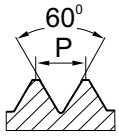
Mark	d1		d2	D3	D4=D5	L1	L2	L3	a1	a2	INDEX
	DIN-371	DIN-376									
PBNm 2,8/2,1-6/4,9-130	M2 - M2,6	M4	2,8	6	6,1	22	60	130	2,1	4,9	V0-211136-0206
PBNm 3,5/2,7-6/4,9-130	M3	M4,5 - M5	3,5	6	7,5	23	60	130	2,7	4,9	V0-211136-0306
PBNm 4,5/3,4-6/4,9-130	M4	M6	4,5	6	8,4	23	60	130	3,4	4,9	V0-211136-0406
PBNm 6/4,9-7/5,5-130	M4,5 - M6	M8	6	8	12,1	26	60	130	4,9	6,2	V0-211136-0607
PBNm 7/5,5-7/5,5-130	M7	M9 - M10	7	8	12,1	26	60	130	5,5	6,2	V0-211136-0707
PBNm 8/6,2-8/6,2-130	M8	M11	8	8	13	30	60	130	6,2	6,2	V0-211136-0808
PBNm 9/7-9/7-130	M9	M12	9	9	15	31	60	130	7	8	V0-211136-0909
PBNm 10/8-10/8-130	M10	-	10	10	15	33	60	130	8	8	V0-211136-1010
PBNm 11/9-11/9-130		M14	11	12	18	36	90	130	9	9	V0-211136-1111
PBNm 12/9-12/9-130		M16	12	12	18	36	90	130	9	9	V0-211136-1212
PBNm 14/11-14/11-200		M18	14	14	22	42	90	200	11	11	V0-211206-1414
PBNm 16/12-16/12-200		M20	16	16	22	42	90	200	12	12	V0-211206-1616
PBNm 18/14,5-18/14,5-200		M22M24	18	18	26	43	100	200	14,5	14,5	V0-211206-1818
PBNm 20/16-20/16-200		M27	20	20	28	48	100	200	16	16	V0-211206-2020

Long

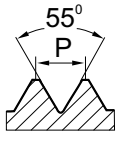
Mark	d1		d2	D3	D4=D5	L1	L2	L3	a1	a2	INDEX
	DIN-371	DIN-376									
PBNm 6/4,9-7/5,5-230	M4,5 - M6	M8	6	8	12,1	26	70	230	4,9	6,2	V0-211236-0607
PBNm 7/5,5-7/5,5-230	M7	M9 - M10	7	8	12,1	26	70	230	5,5	6,2	V0-211236-0707
PBNm 8/6,2-8/6,2-230	M8	M11	8	8	13	30	80	230	6,2	6,2	V0-211236-0808
PBNm 9/7-9/7-230	M9	M12	9	10	15	31	80	230	7	8	V0-211236-0909
PBNm 10/8-10/8-230	M10	-	10	10	15	33	80	230	8	8	V0-211236-1010
PBNm 11/9-11/9-230		M14	11	12	18	36	90	230	9	9	V0-211236-1111
PBNm 12/9-12/9-230		M16	12	12	18	36	90	230	9	9	V0-211236-1212
PBNm 14/11-14/11-330		M18	14	14	22	42	100	330	11	11	V0-211336-1414
PBNm 16/12-16/12-330		M20	16	16	22	42	100	330	12	12	V0-211336-1616
PBNm 18/14,5-18/14,5-330		M22/M24	18	18	26	43	100	330	14,5	14,5	V0-211336-1818
PBNm 20/16-20/16-330		M27	20	20	28	48	100	330	16	16	V0-211336-2020

Screw pitch gauge

ISO Metric thread DIN-13



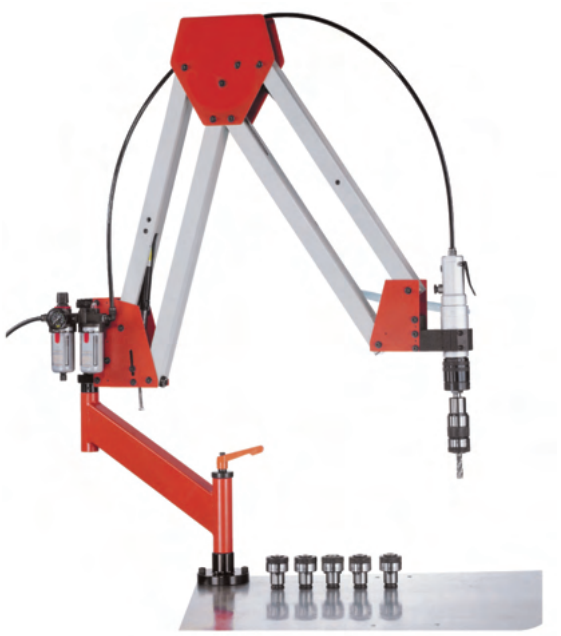
Whitworth thread BS-84:1956



Mark	Pitch range	Amount of blades	INDEX
60°	0,4 ÷ 7 mm	20	V0-600000-0000
55°	62 ÷ 4 1"/P (TPI)	28	V0-550000-0000
55°/60°	62 ÷ 4 1"/P (TPI) 0,25 ÷ 7 mm	58	V0-556000-0000

Example of order

V0-211236-1212
PBNm 12/9-12/9-230-IK-6h



MODEL	MPD-08/II	MPD-12/II	MPD-16/II	MPD-22/II	MPD-27/II
INDEX	P0-130000-10208	P0-130000-10312	P0-130000-10316	P0-130000-10322	P0-130000-10327
Tapping range	M2-M8	M3-M12	M3-M16	M3-M22	M3-M27
n [1/min]	700	400	300	120/300	70/220
Working area	Rmax=1900mm Rmin=200mm				
Weight [kg]	23	23	27	39	39
Max. Torque [Nm]	12	32	52	100	160
Air flow rate [l/min]	840	840	840	935	935
Aapters in the delivery	FZS19/... M2,3,4,5,6,8	FZS19/... M4,5,6,8,10,12	FZS31/... M6,8,10,12,14,16	FZS31/... M6,8,10,12,16,20	FZS31/... M8,10,12,16,20,24
Adapters in option	-	FZS19/M3	FZS19/...M3,4,5 +FR31/19	FZS19/...M3,4,5 +FR-31/19; FZS31/...M14,18,22	FZS19/...M3,4,5 +FR-31/19; FZS31/...M6,14,18,22,27

Standard accessories

- spindle with pneumatic drive
- dual rigid arm
- monting column
- air preparation system
- radial arm
- six adapters for taps

Full range of FZS adapters and FR reductions on p. 239 and 241

Example of order

P0-130000-10208
MPD-08/II

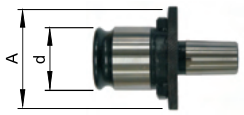
Tilting head for spinddle mounting with ajustable angle in range 0-90°

MODEL	Weight	INDEX
MGO-08-90°	1,1 kg	P0-133000-00890
MGO-12-90°	1,1 kg	P0-133000-01290
MGO-16-90°	1,5 kg	P0-133000-01690
MGO-22-90°	1,5 kg	P0-133000-02290
MGO-27-90°	1,5 kg	P0-133000-02790

Magnetic base for machines

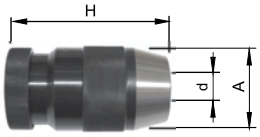
MODEL	Clamping force	Dimensions	Machine type	Weight	INDEX
MMP-300	300 kg	150x90x93	MPD-08,12,16	8,6 kg	P0-133000-00300
MMP-600	600 kg	224x115x120	MPD-22,27	21 kg	P0-133000-00600

Drill chuck adapters



MODEL	d	Taper	A	INDEX
FZA19/JT2	19	JT2	30	R-FZA19/JT2
FZA19/JT6	19	JT6	30	R-FZA19/JT6
FZA31/JT6	31	JT6	48	R-FZA31/JT6

Drill chucks



MODEL	Taper	A	H	d	INDEX
OW-JT2/D8	JT2	38	68	0-8	R-OW-JT2/D8
OW-JT6/D13	JT6	48	90	0-13	R-OW-JT6/D13

Pneumatic hand tapping machines

MPP-12-1

with flexible head

MPP-12-3

with holder for FZS adapters

MODEL	M	n [1/min]	Taper	Air flow rate	Diameter of the pipe	Weight	Equipment	INDEX
MPP-12-1	M2-M12	250	B12	400 l/min	9,5 mm	2 kg	Handle	P0-136000-00121
MPP-12-3	M2-M12	250	B12	400 l/min	9,5 mm	1,5 kg	Handle + FZS19/...M3,4,5,6,8,10	P0-136000-00123

Example of order

P0-136000-00121
MPP-12-1

PMW-1300 ∅2mm÷∅13mm

INDEX: PMW-1300

Dimensions: 305x172x180 (mm)

Drill diameter: ∅2÷∅13
Point angle: 85°-140°
Power: 220÷230 V 50Hz
Motor: 90 W
Revolutions per minute: 6000 rpm/min
Weight: 10 kg
Diamond wheel: B200
Collets: ER-20

Set accessories:
Collets ER20 ∅2,5÷∅13 - 12 pcs., Diamond wheel B200 - 1 pcs ., Allen key - 4mm i 6mm after 1 pcs.

PMW-2000 ∅3mm÷∅20mm

INDEX: PMW-2000

Dimensions: 480x260x240 (mm)

Drill diameter: ∅3÷∅20
Point angle: 85°-140°
Power: 220÷230 V 50Hz
Motor: 450 W
Revolutions per minute: 4300 rpm/min
Weight: 21 kg
Diamond wheel: CBN200
Collets: ER-25

Set accessories:
Collets ER25 ∅3÷∅20 - 18 pcs., Diamond wheel CBN200 - 1 pcs., Allen key - 4mm i 6mm after 1 pcs.

PMW-3000 ∅12mm÷∅26mm

INDEX: PMW-3000

Dimensions: 470x260x235 (mm)

Drill diameter: ∅12÷∅26, optional ∅8÷∅30
Point angle: 85°-140°
Power: 220÷230 V 50Hz
Motor: 450 W
Revolutions per minute: 4300 rpm/min
Weight: 25 kg
Diamond wheel: B150
Collets: ER-40

Set accessories:
Collets ER40 ∅12÷∅26 - 15 pcs., Diamond wheel B150 - 1 pcs., Allen key - 4mm i 6mm after 1 pcs.

Example of order

PMW-1300
Fast drill re-sharpening machine PMW-1300

TECHNICAL INFORMATION

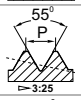
TECHNICAL INFORMATION

PAGE

CATALOGUE PAGES 277 - 346

1. THREAD TYPE

M		Metric thread ISO DIN-13
MF		Metric fine thread ISO DIN-13 (symbol used only in catalogues for distinguish from metric coarse thread)
UNC		American unified coarse thread ANSI B-1.1
UNF		American unified fine thread ANSI B-1.1
UNEF		American unified extra fine thread ANSI B-1.1
UNJC		American unified coarse thread for aerospace industry UNJC ASME B1.15
UNJF		American unified fine thread for aerospace industry UNJF ASME B1.15
G		Whitworth pipe thread DIN-ISO 228 (identical with BSP)
Rp		Whitworth internal cylindrical pipe thread PN-ISO 7/1 and DIN EN 10226-1 (identical with BSPP)
Rc		Whitworth internal tapered pipe thread PN-ISO 7/1, DIN EN 10226-2 (identical with BSPT)
NPT		American tapered pipe thread with dryseal material ANSI B-1.20.1
NPTF		American tapered pipe thread without dryseal material ANSI B 1.20.4
NPSF		American cylindrical pipe thread ANSI B 1.20.3
BSW		Whitworth thread BS-84:1956 (in the past - W)
BSF		Whitworth fine thread BS-84:2007
EG M		Metric thread for thread inserts V-Coil
EG UNC		Metric thread for thread inserts V-Coil
EG UNF		Metric thread for thread inserts V-Coil
Pg		Steel conduit thread DIN-40430 (P)
Tr		Trapezoidal symetric thread DIN-103

R		Whiworth external tapered pipe thread ISO-7/1 (identical with BSPT)
Rd		Cylindrical round thread PN-84/M-02035 and DIN 405
FG		Bicycle thread DIN 79012
BSC		Bicycle thread BS 811
Ven		Valve thread PN-ISO 4570
Vg		Valve thread DIN 7756
E		Edison electrical thread IEC 60061
UN		American unified thread ANSI B-1.1 (with preferential piches: 4, 6, 8, 12, 16, 20, 28, 32 of threads per inch)
UNS		American unified special thread ANSI B-1.1
Whit. S		Special Whitworth thread BS 84
S		Trapezoidal non-symetric thread
Wzyl		Cylindrical Whitworth thread for gas cylinder valves DIN 477
Wkeg		Tapered Whitworth thread for gas cylinder valves PN-82/M-69223 and DIN 477
NPSM (NPS)		American cylindrical pipe thread ANSI B 1.20.1

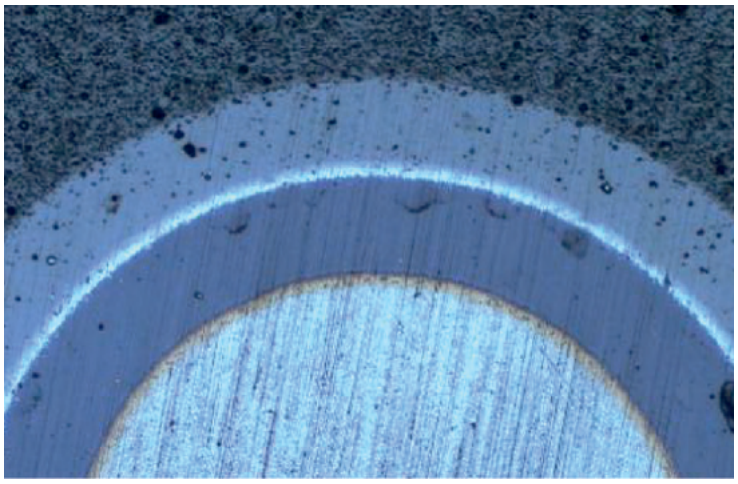
2. MATERIALS USED FOR PRODUCTION OF TOOLS

Symbol	Name	Description
HSS	High-speed steel	Standard material for general purpose cutting tools
HSSE (HSCo5)	High-speed steel	Material with high heat resistance, cobalt content allows to increase the hardening temperature and improves the stability of cutting edges.
HSSE-PM	High-speed powder steel	This homogeneously structured material for tools, obtained with the use of powder metallurgy, has the high-hardness and high-temperature resistance properties, which ensure that the tools made with it are characterized by high stability of cutting edges.
VHM	Micrograin cemented carbide	The homogeneously structured material for tools, obtained with the use of powder metallurgy from the tungsten carbide, features high abrasion resistance and hardness. In comparison with the high-speed steel it is more brittle and usually used with the PVD coatings

3. PVD COATINGS USED FOR TOOLS

HL COATING

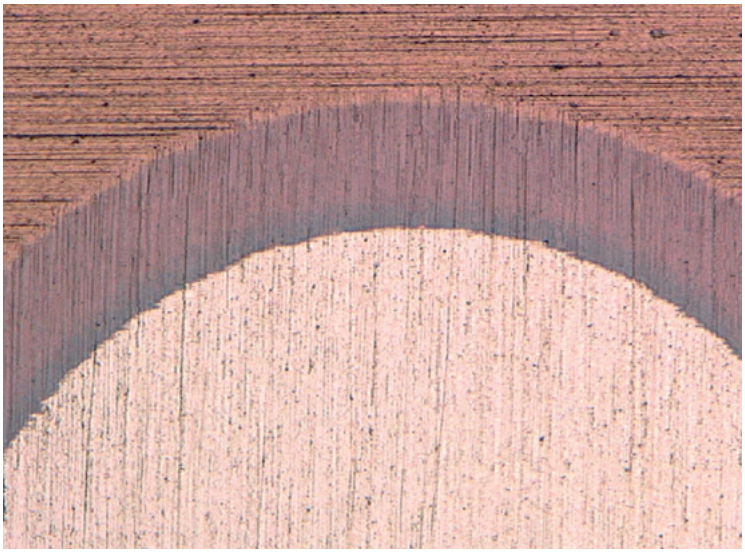
Coating	TiAlN + WC/C
Structure	Multilayer nanocomposite
Hardness	3000 $HV_{0,05}$
Max. working temp.	800°C
Coefficient of friction	0,15
Color of coating	Dark Grey 



High performance properties of the HL coating have been achieved by application of the advanced nanocomposite structure. TiAlN layer, with its high hardness and temperature resistance, provides a stable, resistant to abrasion base of the coating. The top WC/C layer consists of tungsten carbide nanocrystallites surrounded by a carbon ply features excellent tribological properties. Hard WC separations provide abrasion resistance, while maintaining excellent the sliding properties of carbon. By combining advantages of two layers, the HL coating is ideal for processing of a wide variety of materials, it improves chips evacuation, reduces cutting forces and protects cutting edges from the impact of high temperatures. The HL-coated tools can work with the minimum quantity of lubrication (MQL). The coating is designed for processing materials from the Groups P, M, K, N, S.

TS COATING

Coating	TiAlN + TiAlSiN
Structure	Nanocomposite
Hardness	3800 $HV_{0,05}$
Max. working temp	1100°C
Coefficient of friction	0,15
Color of coating	Coppery 

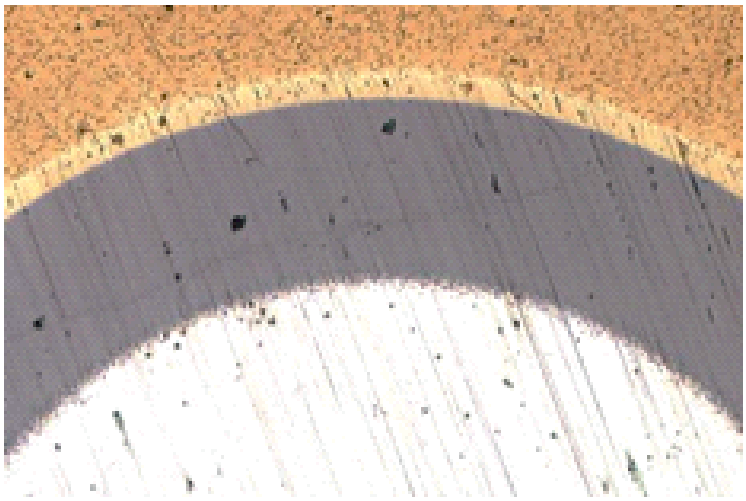


Due to silicon content in TiAlN coating, TS has multilayer nanocomposie structure. TS is being produced in the newest HiPIMS technology which ensures mechanical properties unreachable for other methods. Coatings produced in HiPIMS technology are characterized by the highest cracking resistant. Composition and coating technology causes that new TS coating works very well both in traditional materials from P, K ISO groups and in difficult to machine M, S groups.

PVD COATINGS USED FOR TOOLS

TN2 COATING

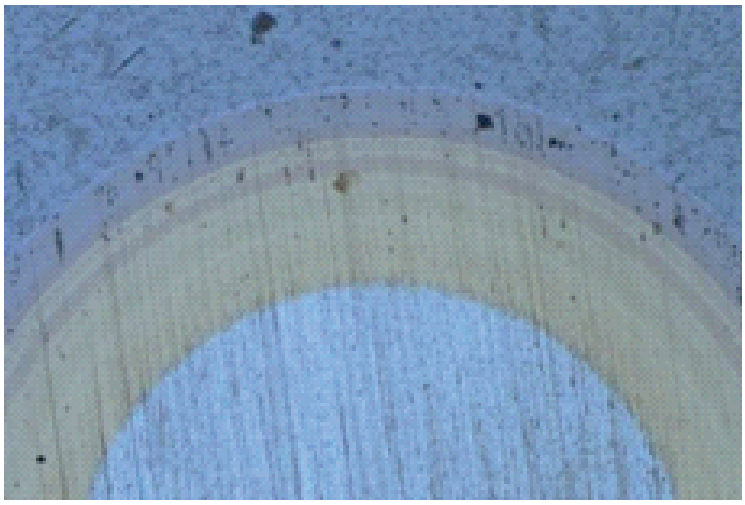
Coating	TiAlN + TiN
Structure	Double-layer nanostructure
Hardness	3500 $HV_{0,05}$
Max. working temp	800°C
Coefficient of friction	0,3
Color of coating	Gold 



The double-layer coating TN2, manufactured with a dropless method and treated with the surface fine finish processes, features very good resistance to abrasion, high thermal resistance and low coefficient of friction. Due to reduction of friction, the tool's life is considerably longer, and the quality of the surface processed by the tool is improved. By combining the extremely hard TiAlN layer with the malleable TiN layer, we have obtained a smart, self-adjusting structure of the tool's surface, which accommodates itself to the processing related stresses, thus improving the tool's resistance to breaks. Tn2 is intended, in particular, for the tools for processing of the Group P materials (for Rm < 1000 MPa), and the materials from Groups M, K, N.

TC COATING

Coating	TiN + TiCN
Structure	Multilayer
Hardness	3700 $HV_{0,05}$
Max. working temp	400°C
Coefficient of friction	0,2
Color of coating	Anthracite 

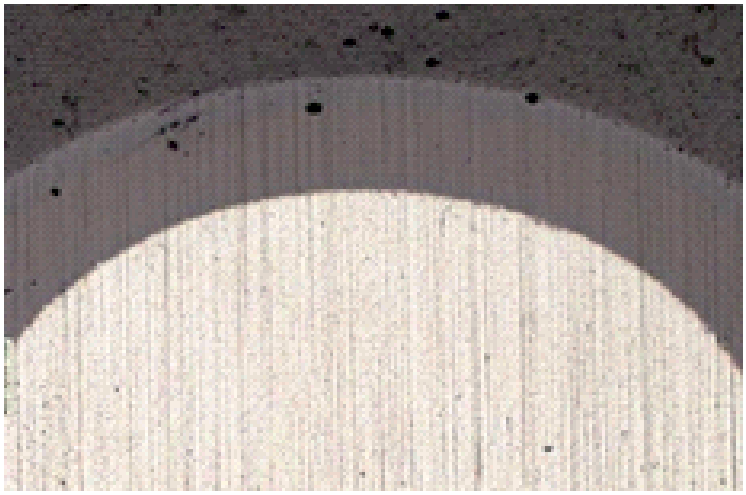


TC is a multilayer, general purpose coating. It features a very high hardness, good durability and low coefficient of friction. The basic TiN layer provides high adhesion to a tool and considerable resistance to dynamic loads. The top TiCN/TiC layer, with its high hardness and low coefficient of friction, ensures a very good resistance to abrasion. Combination of the above properties allows for protection of the edges from the processed material buildup, and from chipping. Due to the relatively low temperature resistance, proper cooling of the tool should be applied. The coating is intended mainly for the tools for processing of materials from the Groups P (in particular of high strength Rm > 1000 MPa) K, N, H.

PVD COATINGS USED FOR TOOLS

AT COATING

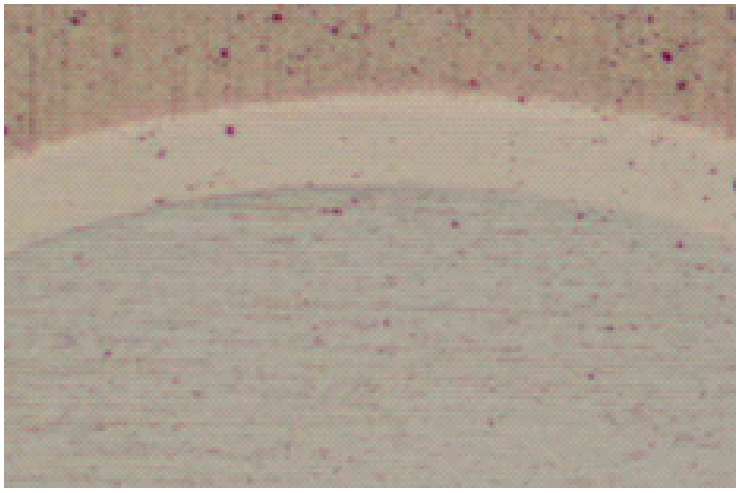
Coating	AlTiN
Structure	Gradient
Hardness	3700 $HV_{0,05}$
Max. working temp.	900°C
Coefficient of friction	0,3
Color of coating	Purplish-Grey 



The AT Coating, with the increased Aluminum (Al) content, features high hardness and temperature resistance. The released from the coating, during processing, aluminum oxides serve as additional lubrication of a tool, and at the same they create a thermal barrier, preventing the coating from being worn out, even in the most extreme conditions. Chemical composition and the nanogradient structure ensure high hardness of the coating. As a result, the high resistance to abrasion is achieved, which directly translates into the tool's longer life. The coating may be used for tools exposed to high temperatures, and is suitable for work both, with coolant and without it. The coating is designed for processing materials from the Groups P, M, K, N, S.

TIB_2 COATING

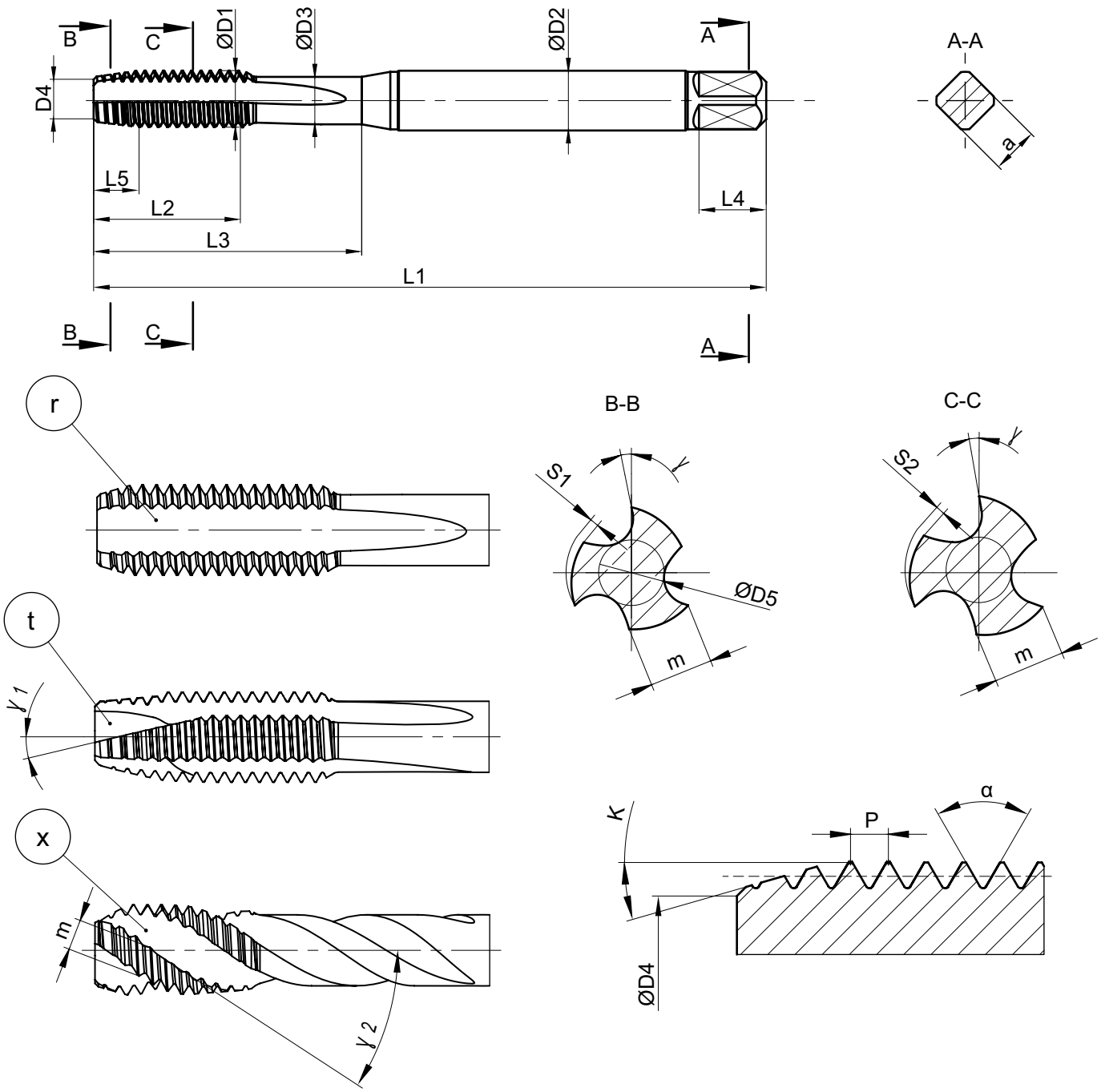
Coating	TiB_2
Structure	Monolayer
Hardness	4000 $HV_{0,05}$
Max. working temp.	900°C
Color of coating	Silver 



The material of coating, the TB (titanium diboride), is a ceramic material with outstanding properties with regard to its hardness and resistance to abrasion. With its carefully prepared composition (no affinity with aluminum), the material provides high chemical stability and prevents the processed material buildup on cutting edges. The dropless method of manufacturing the coating allows to obtain a very smooth finish, which in turn translates into a very good quality the workpieces' surfaces. The coating is designed for processing materials form the Group N, mainly aluminum alloys (Si<12%) and unalloyed titanium.

4. TAPS

4.1. Tap construction elements (on example of DIN-371)



L1 - total length
L2 - thread length
L3 - useful length
L4 - length of driving square
L5 - chamfer length
a - size of square
ØD1 - thread diameter
ØD2 - shank diameter
ØD3 - neck diameter
ØD4 - (chamfer) point diameter
ØD5 - web (core) diameter
m - width of land

S1 - relief of chamfer
S2 - relief of thread
P - pitch of thread
α - angle of thread
γ - rake angle
$\gamma 1$ - spiral point angle
$\gamma 2$ - angle of spiral flutes
κ - chamfer angle
r - straight flute
x - spiral flute
t - spiral point
z - number of lands

4.2. Dimension standards

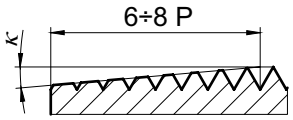
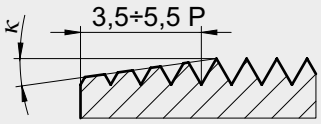
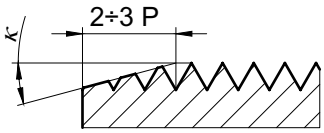
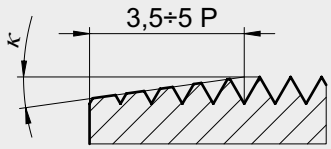
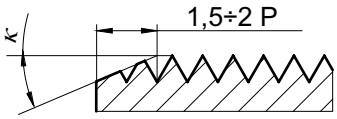
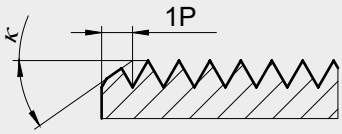
Dimension standards assign proper taps outer dimensions (total length, thread length, shank diameter and size of square) of nominal threads dimensions.

Symbols	Description
DIN-371	Machine taps with reinforced shank for metric coarse and fine threads M3 ÷ M10 and for the threads UNC, UNF, BSW, BSF within the range of nominal diameters 1/8” ÷ 3/8”
DIN-376	Machine taps with reduced shank diameter for metric coarse threads and for the threads UNC and BSW
DIN-374	Machine taps with reduced shank diameter for metric fine threads and for the threads UNF i BSF
DIN-5156	Machine taps with reduced shank diameter for the threads G, Rp and Rc
DIN-352	Short hand taps for metric coarse threads Norm is also suitable for UNC and BSW threads
DIN-2181	Short hand taps for metric fine threads Norm is also suitable for UNF and BSF threads
DIN-5157	Short hand taps and machine taps for pipe threads G, Rp

4.2. Groups of Tools by Applications

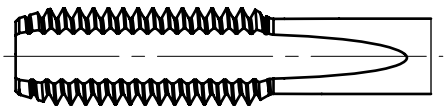
MASTERTAP P M K N S	Group of machine taps intended for high performance thread cutting in a wide range of materials, such as **steel, stainless steel, cast iron, non-ferrous metals and heat-resistant alloys, and titanium alloys.** The thread cutting may be carried out in modern, highly efficient machining centers with high cutting speeds, on the older types of CNC machines, and on the conventional machines with slightly lower processing parameters.
800X P M K N	Innovative variety of machine tap 800, designed also for **processing of stainless steel**. The innovative manufacturing technologies may even double durability and processing performance we had so far. All these features make the 800X tap the best choice for small and medium size production series, while still offering favorable price to quality ratio.
800 P K N	For structural, free machining and low alloy steels with the tensile strength of 600 MPa ≤ Rm ≤ 800 Mpa
FAN-1200 P	For tool and difficult to process steels with the tensile strength of 800 MPa ≤ Rm ≤ 1200 MPa, and for heat treated steels up to 38 HRC
1400-HT P M K N	For machining hard and abrasive materials such as steel with a tensile strength from 1200 to 1400 MPa and aluminium with high silicon content.
INOX P M	For high alloy steel, stainless and acid resistant steels with a tensile strength of Rm ≤ 1000 MPa
GG K	For processing of grey and nodular cast iron
GAL N	For cast aluminum alloys with the Si content of max. 12%
HRC H	For materials, which have been hardened. The number next to the symbol indicates the maximum hardness of the material to be processed, in the HRC scale
S-NC P M K N S	For synchronized tapping on CNC machines with the "rigid tapping" function for a wide range of materials with the high cutting speeds
Ms N	For brass and short chip bronze

4.3. Types of machine tap chamfers

Symbol	Sketch	Chamfer length presented in the quantity of the thread coils	Angle
A		6 ÷ 8 P	5°
B		3,5 ÷ 5,5 P	8°
C		2 ÷ 3 P	17°
D		3,5 ÷ 5 P	8°
E		1,5 ÷ 2 P	23°
F		1 P	35°

4.4. Types of Machine Tap Chip Flutes

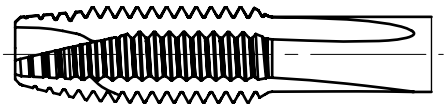
Straight Flutes



In combination with the chamfer A or D applied for the through holes and with the chamfer E or F for the blind holes. Tap with the chamfer C can be used for both types of holes.

It is recommended for materials giving a short chip. The grooves evacuate only some of the chips, which slowly move along the axis. The tap should not be used for deep blind holes or materials giving a long chip. The length of threads, which can be made - up to ca 1.5xD

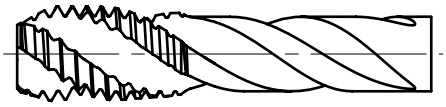
Straight Flutes with Spiral Point



Designed for through holes, with thread along the full length of the hole.

Used together with the chamfer B, it is recommended for materials giving a long chip. The spiral point moves tightly squashed chips in the direction of feed, and prevents the grooves from clogging. Coolant reaches the working zone freely. The length of threads, which can be made - up to ca 3xD.

Spiral flutes

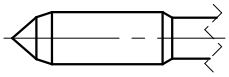
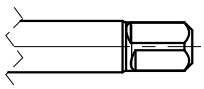
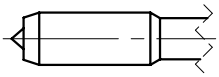
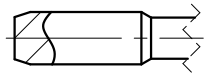
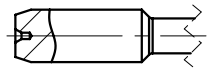
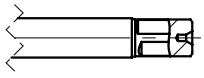


Together with the chamfer C and E used for the blind holes.

It is recommended for materials giving a long chip. Spiral flutes provide good chip evacuation in the direction from the hole toward the shank. Depending on the hole diameter, it is possible to make threads of up to 2,5xD.

Machine tap with spiral flutes should not be used for the through holes.

4.6. Types of the high performance machine tap center holes, depending on the diameter of the thread, chamfer and the applied standards

Working Part		Shank
Solid cone	① 	 ⑤ Phase
Stepped cone	② 	
Chamfer E (without center hole)	③ 	
Internal center hole	④ 	 ⑥ Internal center hole

	External thread diameter (mm)	Type of center hole on cutting segment side			Type of center hole on shank side
		Chamfers A, C, D,	Chamfer B	Chamfer E, F	
DIN-371	≤7,2	①	①	③	⑤
	7,2≤8,2	②	①	③	⑤
	8,2<10,2	②	②	③	⑤
DIN-374 DIN-376 DIN-5156	≤7,2	①	①	③	⑤
	>7,2	④	④	④	⑥

Length of full solid cones for selected types of thread (Length of stepped cone Lnak=1.8 mm)

M		MF	
M1	0,6	M2,5 x 0,35	1,9
M1,2	0,8	M2,6 x 0,35	1,9
M1,4	1,0	M3 x 0,35	1,3
M1,6	1,1	M 3,5 x 0,35	1,6
M1,7	1,1	M4 x 0,5	1,8
M1,8	1,3	M5 x 0,5	2,3
M2	1,4	M6 x 0,75	2,6
M2,5	1,8	M7 x ,75	3,1
M2,6	1,8		
M3	1,3		
M3,5	1,5		
M4	1,7		
M4,5	1,9		
M5	2,1		
M6	2,5		
M7	3,0		
UNC		**UNF**	
No 4-40	2,0	No 4-48	2,1
No 5-40	1,3	No 5-44	1,4
No 6-32	1,4	No 6-40	1,5
No 8-32	1,8	No 8-36	1,8
No 10-24	2,0	No 10-32	2,1
No 12-24	2,3	No 12-28	2,3
1/4-20	2,6	1/4 - 28	2,8
5/16-18	3,3	5/16 - 24	3,5
BSW		**BSF**	
1/8 - 40	1,25	1/4 - 26	2,65
3/16 - 24	1,8	5/16 - 22	3,4
1/4 - 20	2,55		
5/16 - 18	3,25		

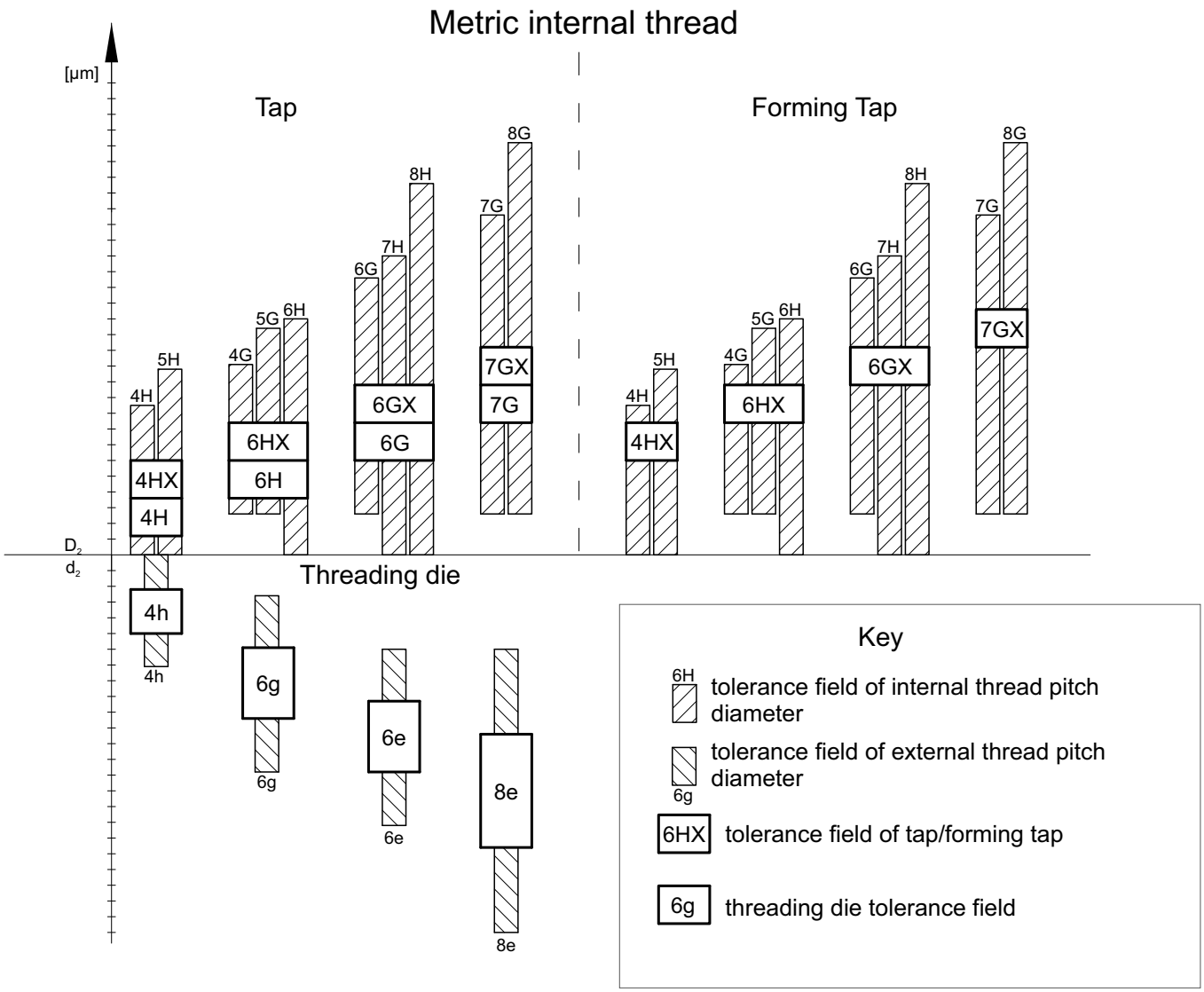
4.7. Application of Tools with Internal Channels for Supplying a Coolant IK/IKR

IK - Central cooling channel is recommended for the blind holes, facilitates chip evacuation of chips toward the shank, improves lubrication and cooling conditions, extends tool life

IKR - Central cooling channel divided into several radial channels, which supply coolant into each of the chip flutes separately. The solution is recommended for tapping of the through holes, facilitates evacuation of chips in the direction of feed, improve lubrication and cooling conditions, extends tool life.

4.8. Classes of Machine Taps

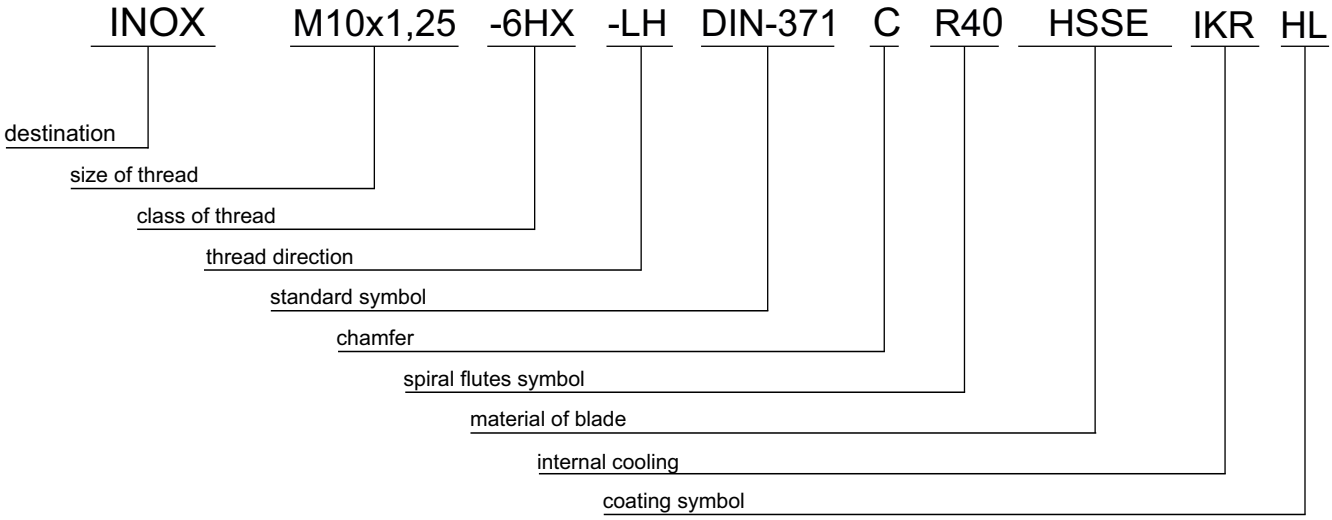
The machine taps presented in our catalog are made in the basic class, intended for the most commonly used internal thread tolerances, appropriate for the particular thread types: for metric thread 6H, for unified thread UNC, UNF - 2B, for Whitworth thread BSW, BSF - "normal." Per individual request we can manufacture the taps in other classes.Tap classes (ie. the tolerance field of a working segment) for metric threads are unified by international and national standards. A particular class of the tap threads allow for two or three fields of tolerance (see drawing and table below.)



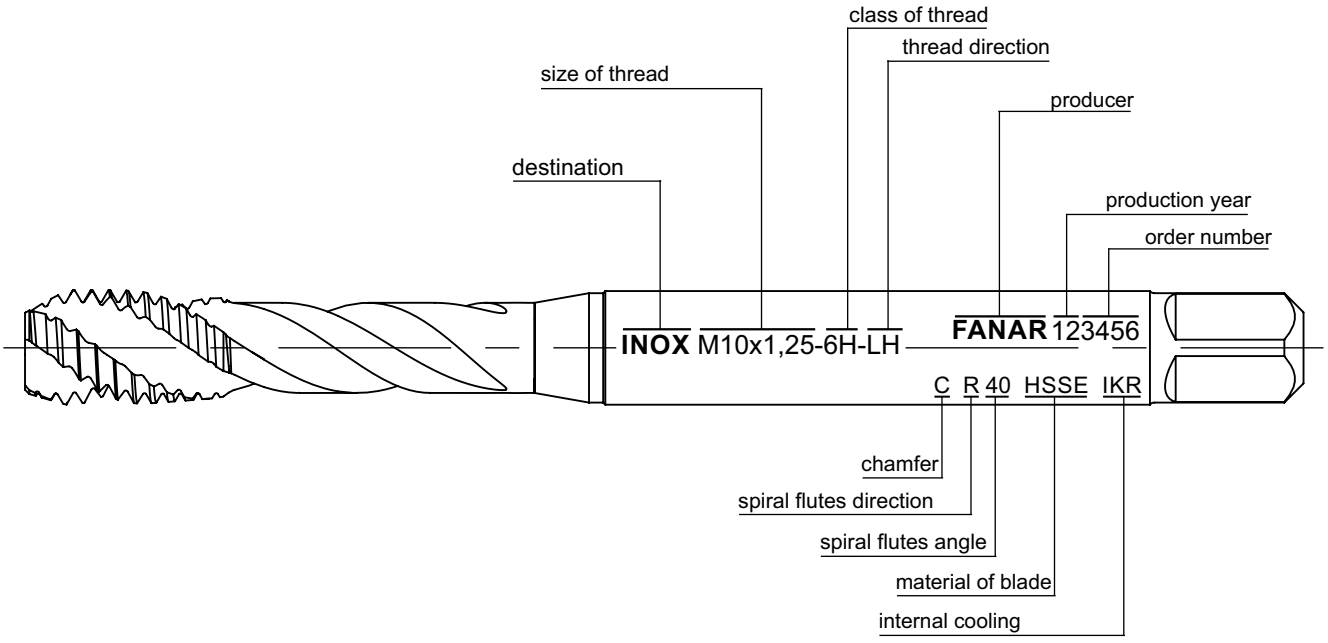
According to DIN 802	Tolerance field of internal thread				
4H	4H	5H	-	-	-
6H	4G	5G	6H	-	-
6G	-	-	6G	7H	8H
7G*	-	-	-	7G	8G

*DIN 802 provides the possibility of correction the tap tolerance comparing to the standard demands in case when it is required by the particular machining conditions, e.g. the sort of machining material. In such situation the symbol of the tap's class with the sign "X", e.g. 6HX, 6GX is obligatory.

Marking



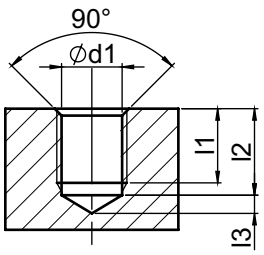
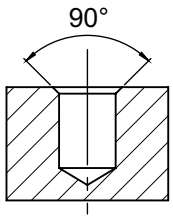
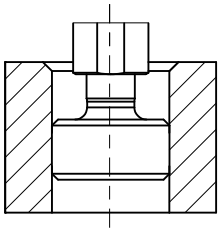
Stamping

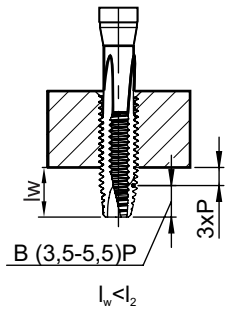
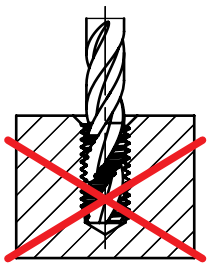
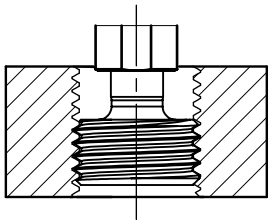


4.10. Recommendations for Processing with Machine Taps

Tapping is usually one of the last operations in the process of machining a workpiece. An error occurring in the process of tapping may result in additional costs associated not only with the damaged tap, but often with the workpiece material, as well as with the machining processes preceding the tapping. In order to avoid such problems, we encourage you to read and apply the below recommendations regarding the tapping process.

4.11. Threading process

Operation	Recommendations
10 **Drilling**  ∅d1 - recommended diameter for tapping l1 - depth of thread l2 - depth of tapping hole l3 - length of point	- The diameter of the drill (see chapter 6, page 141) should be consistent with the recommended value, presented on the catalog page of a tool being used. - In the case of materials with Rm > 1200 MPa, the hole diameter should be possibly close to the upper limit of its tolerance. - In the case of a blind hole, to achieve the required usable length of a thread ,the depth of the drilled hole should take into account the length of the point of the drill, length of the tap's cone (Table on page 231) and the chamfer.
20 **Chamfering of the Hole's Edge**  	- In order to facilitate insertion of the tap into the hole and to reduce resistance in the beginning of its work, the edges of the drilled hole should be chamfered with a deburring tool with the tip angle of 90º (Section 6, page 152)
30 **Validation of the tapping hole** 	- When notching thread with a tap, the minor diameter depends on the diameter of the drilled hole. Correctness of the drilled holes should be checked with a smooth gauge for tapping holes (Section 7, page 162), according to the recommendations included in the technical section referring to gauges

Operation	Recommendations
40 **Tapping** 	- When tapping the through holes using a tap with the spiral point, special attention must be paid when removing the tap from the hole. For the proper thread cut and the chip evacuation, the removal of the tap from the tap hole should include the entire length of the spiral point + ca 3 thread pitches.
	- When tapping blind holes, there should be no collision between the tap face and the bottom of the hole. - In the case of the numerically controlled machines with synchronous tapping cycle, it is recommended to use the tap grip with the minimal axial compensation. - Applied machining speeds should take into account how the workpiece and the tap have been fixed, type of the processed material, type and condition of the machine, and conditions of the tap lubrication.
50 **Validation of the Thread** 	- Upon completion of tapping, it should be checked with a tapping gauge (Section 7, page 221), in accordance with the recommendations included in the technical section referring to gauges.

4.11. Troubleshooting guide for tapping

Problem: Tapping oversized threads (no-go gauge is too loose)	
You used improper tap for material and thread application.	You should use a suitable tap hole type and material being cutted according to the table in catalogue.
Cuutting speed was too high.	You should reduce cutting speed. You should use more coolant/lubrication.
There was cold welding on the flanks of the tap.	You should change your tool for new one. You should use coated tap. You should use more coolant/lubrication. You should remove damagedd teeth.
Chip packing in flutes occured.	You should use tap with another flute geometry. There couldd be necessity of using set of taps.
Grinding burr occured.	Remove it with fiber brush.
Incorect fixturing or positioning of part .	You should use tap holders with axial and parallel compensation. Try presicely fix cutted element.
Inconsistent feed of tap.	You should control the feedd while tapping. You should check parameters of CNC machine (program) Check lead screw for backlash. You should use holdder with compensation.
Problem: Tapping oversized threads (nogo gauge is loose)	
The tolerance of used tap was too high comparing with required class of the thread.	You should check marking on the tap and revise if it is suitable for making required class of thread. If you have any problems contact our Technical Representative.
Inapropriate reconditioning of a tap..	While reconditioning it is required that all ground surfaces maintain the original geometry put on by the manufacturer. For instructive information please contact our Representative.
Problem: Tapping undersized threads (go gauge doesn't enter part way into hole).	
The chosen tap has not suitable geometry for multiple regrinds.	You should limit the number of tap regrinds. Try to use another tap.
A part of tap surface wasn't renewed while resharpening.	Try to grind the tap again. You should use a new tap.
You used inapropriate tap for the tread being made and material being cutted.	You should use tap suitable for the hole type and material being cutted according to the table from catalogue.
The used tap has too small nominal size (tolerance).	You should check marking on the tap and revise if it is suitable for making required class of thread. If you have any problems contact our Technical Representative.
Problem: Tapping bellmouthed hole (first few threads are oversized)	
The tolerance of used tap was too high comparing with required class of the thread.	You should check marking on the tap and revise if it is suitable for making required class of thread. If you have any problems contact our Technical Representative.
Inapropriate reconditioning of a tap.	While reconditioning it is required that all ground surfaces maintain the original geometry put on by the manufacturer. For instructive information please contact our Representative.
Problem: Too low tap life	
All reasons stated in next table "torn and rough threads".	Please read the table "torn and rough threads"
The tap lost its hardness by excess hear during regrinding.	You should change the specification of the grinding wheel. You should use coolant while grinding.
The loss of surface treatment occured after regrinding.	Retreat surface of tap. You should check suitability of surface treatment for material being tapped.
Work hardened drill hole and hole chamfer.	You sholud frequently change or regrind tap drill. You should check proper drilling speed and feed. Please anneal part before tapping.

Problem: Damage of cutting part	
You used improper tap for material and thread application.	You should use tap suitable for the hole type and material being cutted according to the table from catalogue.
Tap drill was too small.	You should use correct size of drill. Please check recommended size drill in catalogue (note that there are different sizes for taps and for forming taps). If you have any problems contact our Technical Representative.
The tap hole wasn't deep enough.	You should check the actual drill depth (the drill could have slipped back into holder).
Tap drill hole was missing.	Please make sure that the tap drill hole is present (that's common problem in multiple spindle applications on transfer lines).
Chips packing in flutes occured.	Try to use tap with different flute geometry (angle). There could be necessity of using set of taps.
Cold welding on the flanks of the tap (loading).	You should use a new tap. You should use coated tap. You should use more coolant/lubrication. You should remove damaged teeth.
Overload of the chamfer teeth occured.	Use tap with longer chamfer. You should use tap with increased number of flutes to provide more chamfered teeth.
Inorrect fixturing or positiong of part.	You should use tap holders with axial and parallel compensation. Try presicely fix cutted element.
The tap was hitting the bottom of the hole.	You should use tap holders with length compensation and with torque overload system.
Tapping hard or high tensile materials.	You should check if yor tap is properly selected. High performance taps HSSE-PM and VHM may be more suitable than HSSE taps.

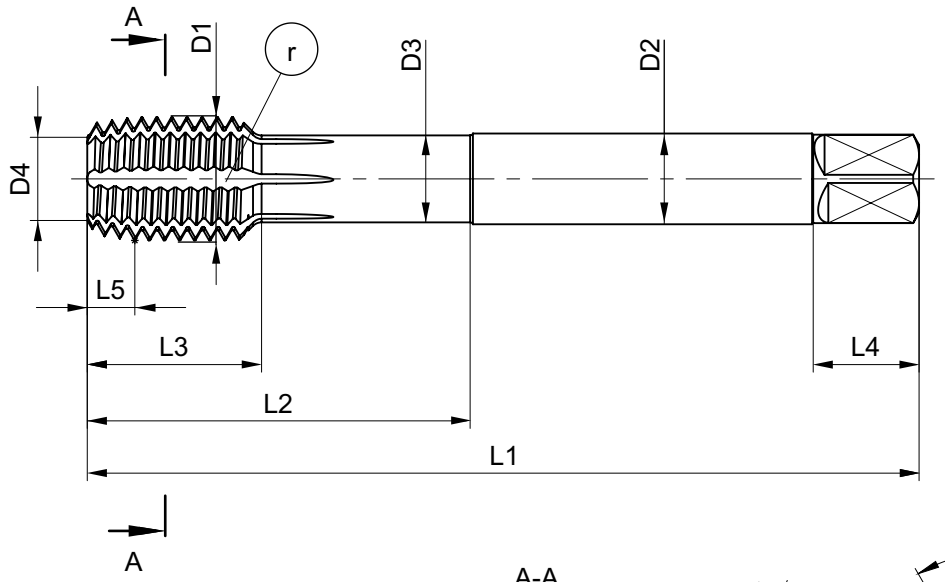
Problem: Torn and rough threads	
You used improper tap for material and thread application.	You should use tap suitable for the hole type and material being cutted according to the table from catalogue.
Cutting speed was too fast or too slow.	Please select proper cutting speed. Improve coolant selection to assist the effects of tap speed.
There was cold welding on the flanks of the tap.	You should use a new tap. You should use coated tap. You should use more coolant/lubrication. You should remove damaged teeth.
Chip packing in flutes occured.	Try to use tap with different flute geometry (angle). There could be necessity of using set of taps.
Grinding burr occured.	Remove it with fiber brush.
Tap drill was too small.	You should use correct size of drill. Please check recommended size drill in catalogue (note that there are different sizes for taps and for forming taps). If you have any problems contact our Technical Representative.
There wasn't proper cooling or lubrication while tapping.	Select properly lubricant according to the notes from the catalogue. Use adequate amounts of coolant/lubrication.
Tool overloading occured due to coarse pitch, hard materials or short chamfers.	There could be necessity of using set of taps.

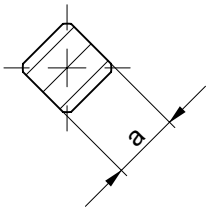
4.12. Regeneration - rake angle information

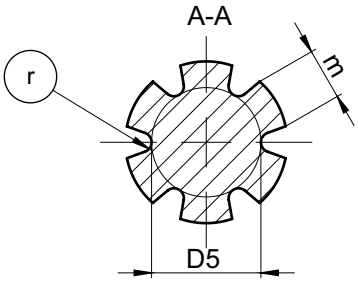
Material group	Material	Designation	γ_p [°]
P	Steel	800	10 – 13
		FAN-1200	7 – 10
		1400	5 – 7
M	Stainless steel	INOX	10 – 13
K	Cast iron	GG	4 – 6
N	Non-ferrous materials	GAL	7 – 9
			10 – 13
			4 – 6
S	heat-resistant alloys, titanium alloys	1400	5 – 7
H	Hard materials	HRC50	-5 – -4

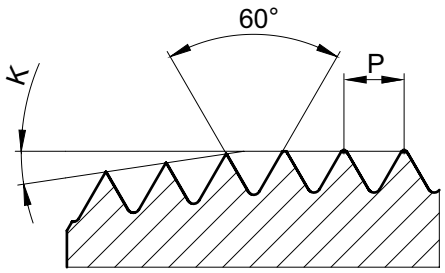
5. FORMING TAPS

5.1. Forming tap construction elements





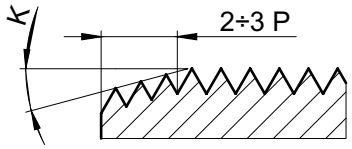
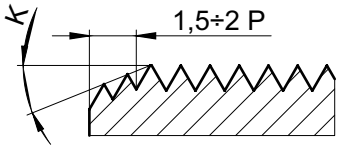




L1- total length
L2 - thread length
L3 - useful length
L4 - length of driving square
L5 - chamfer length
∅ D1 - thread diameter
∅ D2 - shank diameter
∅ D3 - neck diameter
∅ D4 - (chamfer) point diameter
∅ D5 - web (core) diameter

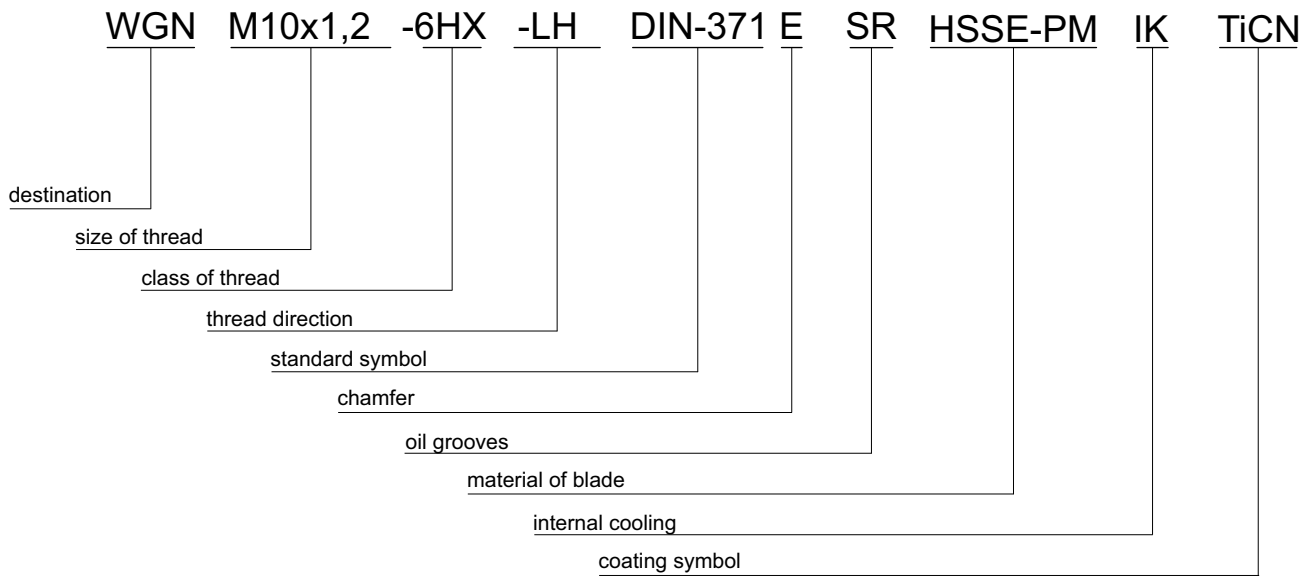
r - straight flute
κ - chamfer angle
α - angle of thread
P - pitch of thread
m - width of land
a - size of square

5.2. Types of forming tap chamfers

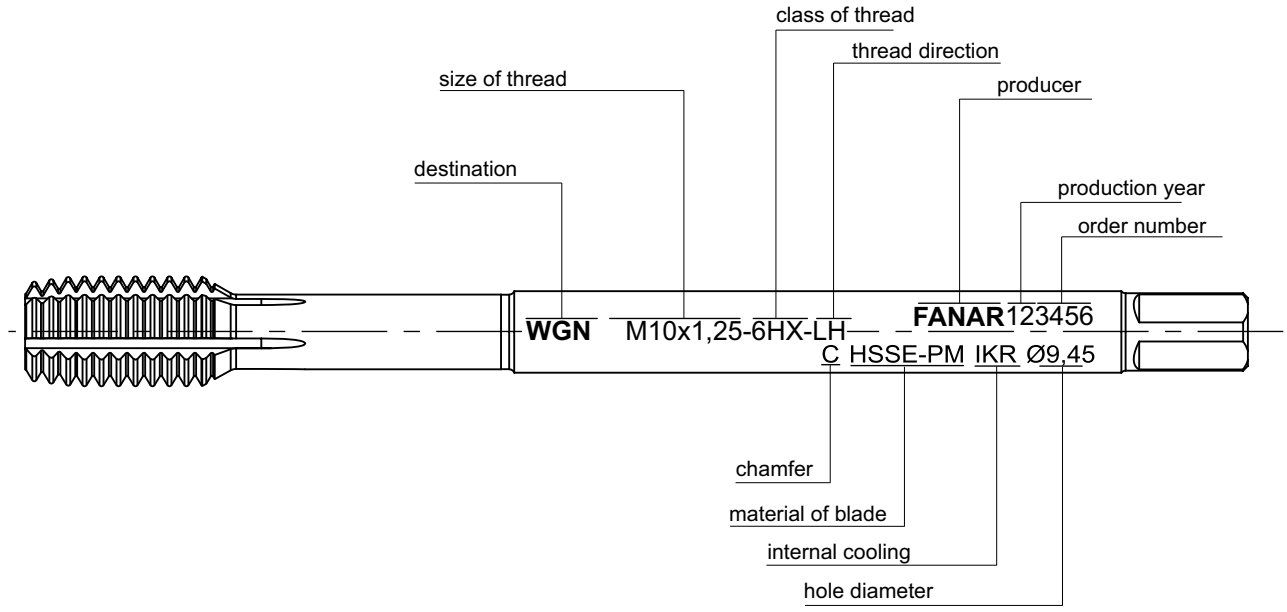
Symbol	Sketch	Chamfer length presented in the quantity of the thread coils	Angle
C		2 ÷ 3 P	8,5°
E		1,5 ÷ 2 P	11,5°

5.3. Marking and stamping of forming taps

Marking

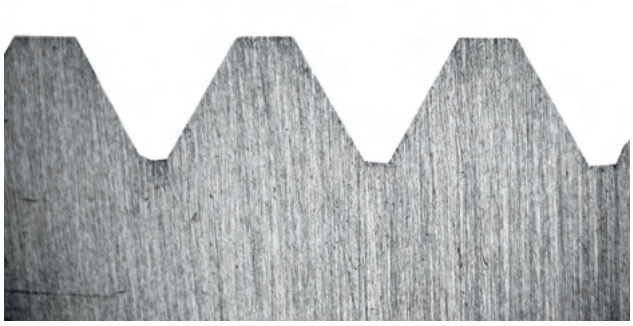


Stamping



5.4. Difference Between Cut and Formed Thread

Cold forming is a chip free method of processing, where the workpiece material is being imprinted, the thread is being formed by plastic deformation, without the need for the material evacuation. The material formed is cold, and its fibers are not being broken.

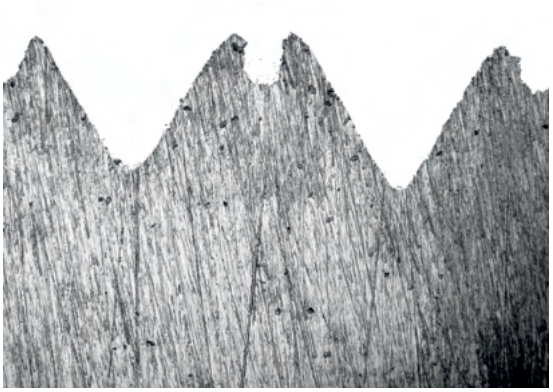
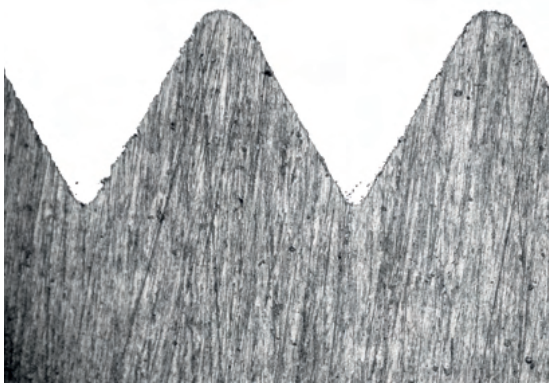


Cut Thread

Cold formed Thread

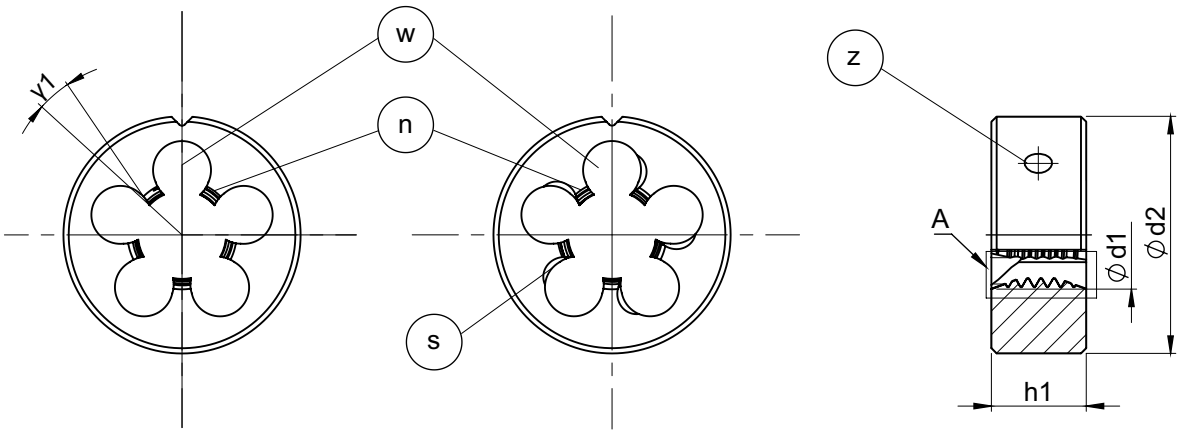
Advantages of Forming threads	Disadvantages of Forming threads
→ chip free processing	→ much greater forming torques in comparison to cutting
→ one tool for both, through and blind holes	→ incomplete formation of a thread top
→ possibility to tap deep holes 4xD	→ thread load carrying capacity amounts to about 80% of the load carrying capacity of the cut thread, but its strength is much greater
→ high durability of thread, especially on side surfaces of a thread pitch	→ application range limited to plastic materials
→ smoother thread surface	→ greater tolerance in the process of threading
→ no errors in pitch or form of thread	→ method not recommended for food and pharmaceutical industry
→ the ability to tap with significantly higher processing parameters, because the processing performance of most materials increases with speed, it has no negative impact on the tool life	
→ high rigidity of the tool reduces risk of its damage	

5.5. Thread forming Troubleshooting

Problem	Solution
Incomplete form of thread	
	Reduce the drill diameter for tapping hole or apply the drill diameter according to the selection Table for forming taps page 270.
Overdone form of thread, too small minor diameter	
	Increase the drill diameter for tapping hole or apply the drill diameter according to the selection Table for forming taps page 270.
Poor quality of thread surface, yanked off material from surface of thread	
	- Improve lubrication: Use forming taps with oil grooves - Increase amount of coolant/lubricant - Use oil for lubricant - Use coated forming tap
Tool breaks	
	- Increase tapping hole diameter - Increased amount of coolant/lubricant - Apply cover coating preventing sticking of material being processed - Check compliance of workpiece with recommendations regarding its plasticity and hardness

6. DIES

6.1. Die construction elements



⌀d1 - nominal thread diameter
⌀d2 - outside diameter
h1 - die thickness
κ - chamfer angle
γ1- rake angle
γ2 - spiral face inclination
w - chip hole
n - chamfer
s - spiral face
z - hole for fixing screw

6.2. Dimension standards

Dimension standards assign proper series of dies outer dimensions (diameters, thickness) to nominal standards as well as determine the dimensions connected with dies fixing in the holder (position, size of holes for fixing screws and V-grooves).

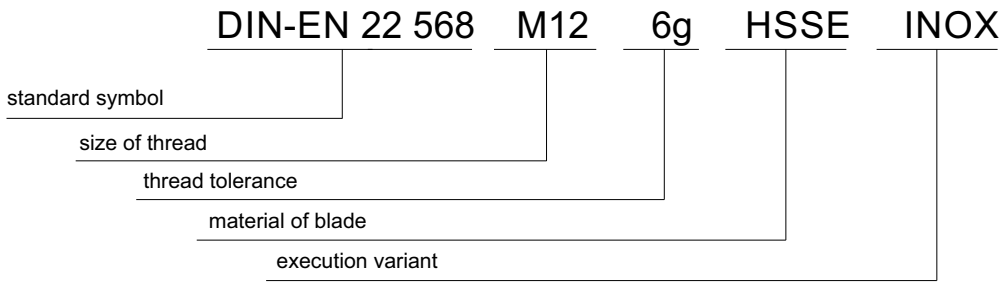
Symbol	Standards	Destination
DIN	EN 22 568 (in the past DIN 223) PN-92/M-58070 ISO 2568	Round dies for metric coarse M and MF fine threads, UNC, UNF, BSW, BSF as well as other threads, excluding the pipe threads G and R
DIN	EN 24 231 (in the past DIN 5158) PN-92/M-58161 ISO 4231	Round dies for pipe threads G
DIN	EN 24 230 (in the past DIN 5159) PN-92/M-58160 ISO 4230	Round dies for tapered pipe threads R

6.3. Marking and stamping of dies

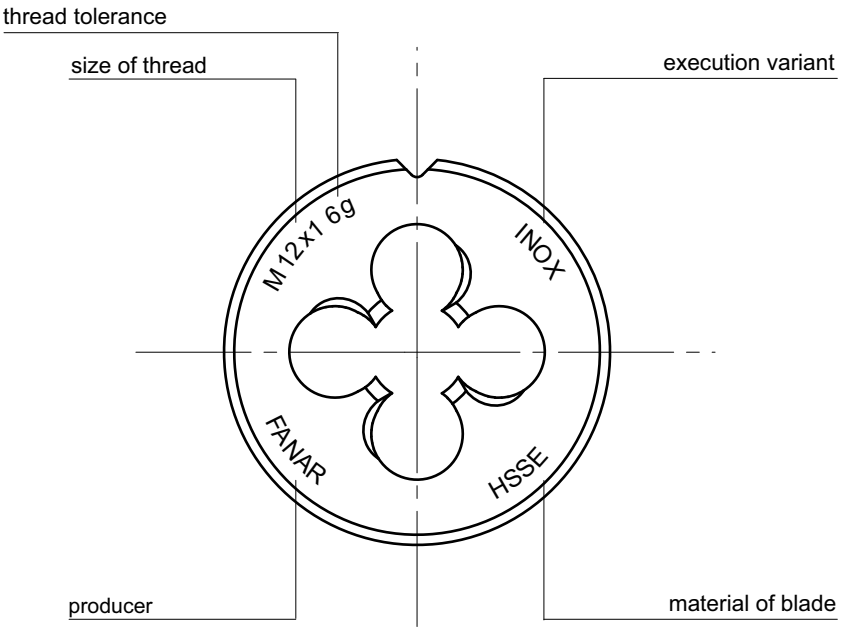
Marking

Example: high performance machine die acc. to DIN-EN 22 568 for the thread M12, thread tolerance 6g, for stainless steel

Marking: given in orders, invoices, specifikations, on the packages



Stamping



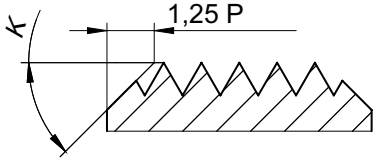
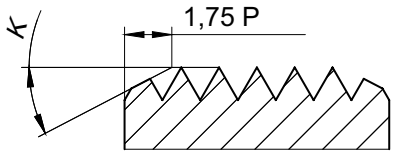
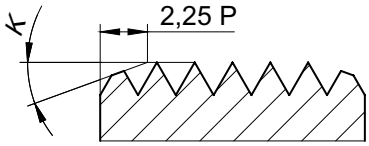
6.4. Cut Thread Tolerances

The threading dies presented in our catalog are designed for cutting the most common and basic for a given type of thread tolerances: for metric thread 6g, for threads UNC, UNF, etc., 2A. On individual request we can manufacture threading dies for other, than the above mentioned, fields of tolerance, e.g. for the metric threads: 4h for tight threads, 6e for threads to be covered with thin galvanized coating.

6.5. Groups of Tools by Applications

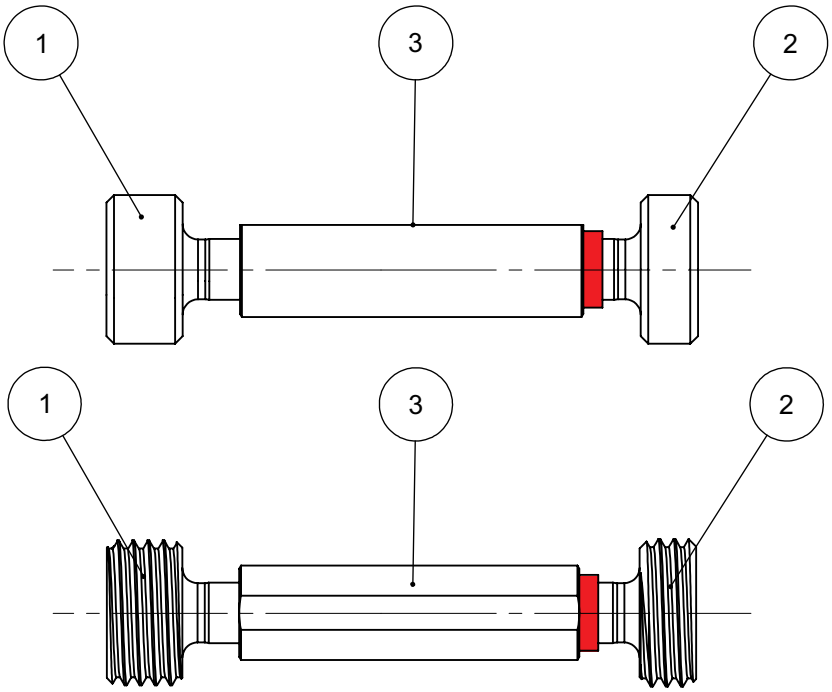
800 P N	For processing of structural steel and cast steel with Rm≤800MPa
800 SPN P N	For processing of structural steel and cast steel with Rm≤800MPa. Better cut thread quality can be achieved, for use on automatic lathes.
Ms N	For processing of brass and short chip bronze.
INOX P M K N	For processing of stainless steel, cast aluminum and nodular cast iron.

6.6. Chamfer

Length	Application	Sketch	Angle
1,25 P	Ms		45°
1,75 P	800		27,5°
2,25 P	INOX		20°

7. GAUGES

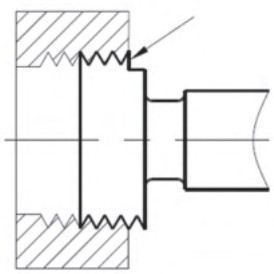
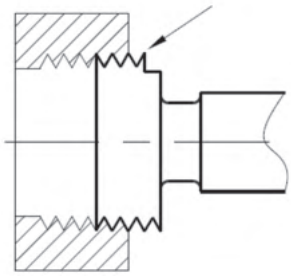
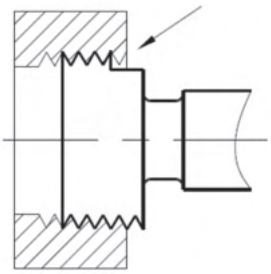
7.1. Gauges construction elements



1 - GO plug gauge
2 - NO GO plug gauge
3 - handle

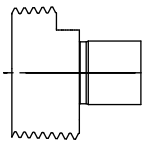
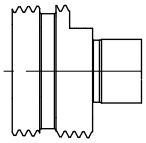
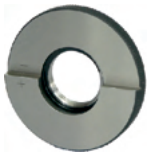
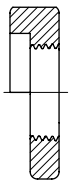
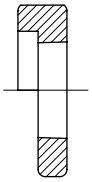
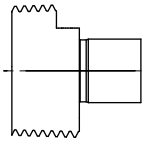
7.2. Types of gauges

7.2.1 Gauges NPT

Flattening equal with workpiece plane	Flattening one thread turn above workpiece plane	Flattening one thread turn below workpiece plane
		
The base depth	Minimal tapping depth	Maximum tapping depth

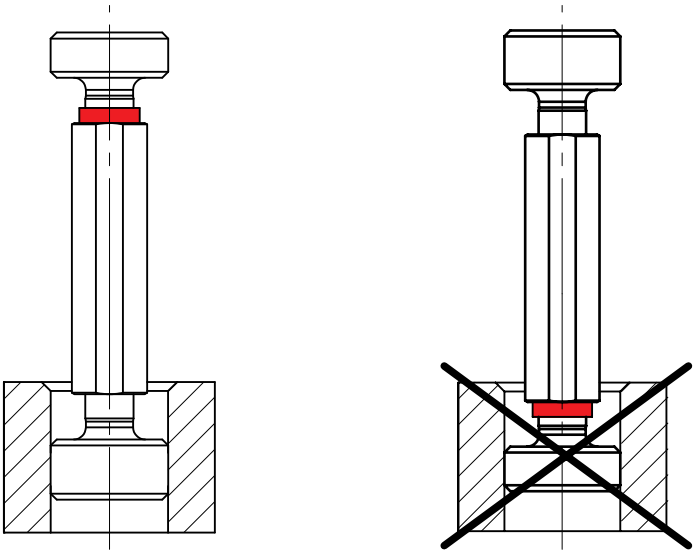
Pipe threads where pressure tight joint are made on the threads according to PN-EN 10226-1, PN-EN 10226-2 (ISO7-1:2000).
Verification by means of limit gauges according to PN-EN 10226-3 (ISO-7-2:2000)

7.2.2 Gauges R, Rc/Rp

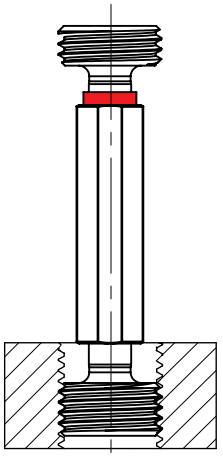
Gauge No. 1  	**Taper full form threaded plug gauge.** This gauge is a 1:16 taper full form threaded plug gauge and is suitable for checking the major diameter (D) and pitch diameter (D2) at the gauge plane of internal parallel (Rp) threads and internal taper (Rc) threads.
Gauge No. 2  	**Taper full form threaded plug gauge with relief.** This gauge is a 1:16 taper full form threaded plug gauge with relief of threads and is suitable for checking the major diameter (D) and pitch diameter (D2) at the gauge plane, and the accomodation [1]lenght of inernal parallel (Rp) threads and internal taper (Rc) threads. *[1]Accomodation lenght: distance from the face of an internally threaded workpiece to the first obstruction which the externally threaded workpiece will encounter on assembly.*
Gauge No. 3  	**Parallel full form threaded ring gauge.** This gauge is parallel full form threaded ring gauge and is suitable for checking the minor diameter (d1) and pitch diameter (d2) at the gauge plane of taper external (R) threads.
Gauge No. 4  	**Taper plane ring gauge.** This gauge is a 1:16 taper plain ring gauge and is suitable for checking the major diameter (d) and the related useful thread lenght on taper external (R) threads.
Gauge No. 5  	**Taper modified thread form check plug gauge** This check plug gauge is used to check the dimensions of the parallel threaded ring gauge (gauge No. 3) when manufacturing the ring gauge and for checking the ring gauge for wear.

7.3. Validation of Holes

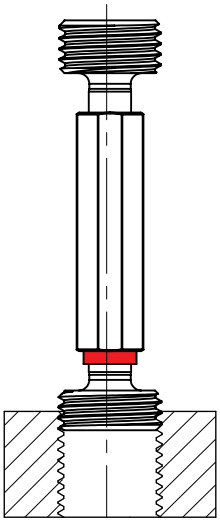
For checking of the through holes and blind holes, there are used go/no go plug gauges. The go gauge should be inserted into a hole with its own weight or with just a little push. The gauge must not be pushed with excessive force, as it could be jammed. The no go gauge should not let itself to be inserted into a hole.



Checking Internal Cylindrical Threads



For checking of the internal threads, there are used go and no go thread gauges. **With the go thread gauge** you check the virtual internal thread dimension by checking the bottom dimension of pitch diameter. The go gauge, when manually screwed in, should with no special effort let itself to be screwed in for the whole length of the thread. The thread does not meet requirements, when it proves impossible to screw the gauge in.

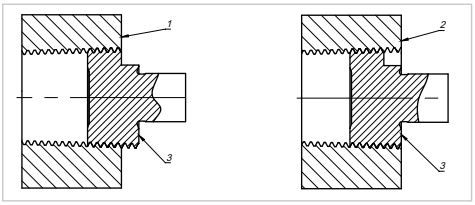


With the no go thread gauge you check whether the pitch diameter exceeds the upper limit dimension. The no go gauge, when manually screwed in, should with no special effort go in **no further than two thread pitches**. If the gauge can be screwed in further than the two pitches, it means the thread does not meet requirements.

7.4. Use of gauges and checking of threads

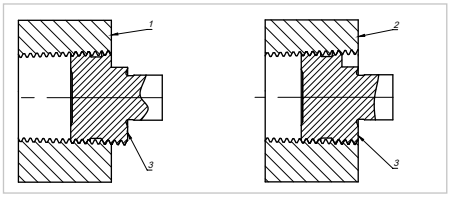
Checking of internal taper (Rc) and internal parallel (Rp) threads

Stage 1: The taper threaded plug gauge (gauge No. 1) is screwed hand tight into the internal thread. The internal thread is within the permissible tolerance if the end face of the threaded workpiece lies between the step faces, or flush with one of the step faces on the gauge.



Key:
1 - end face of work piece flush with tolerance step on gauge,
2 - end face of work piece flush with face of gauge
3 - gauge No. 1

Stage 2: The taper threaded plug gauge with relief (gauge No 2) is screwed hand tight into the internal thread. The internal thread is within the permissible tolerances if the end face of the threaded workpiece lies between the step faces, or flush with one of the step faces on the gauge.



Key:
1 - end face of work piece flush with tolerance step on gauge,
2 - end face of work piece flush with face of gauge
3 - gauge No. 2

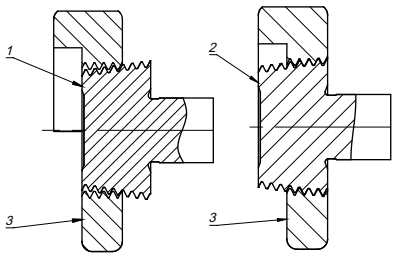
Note 1 : If a workpiece is rejected by gauge No. 2 but accepted by gauge No. 1, then this may indicate a lack of accomodation lenght.

Note 2 : A variation in the relative position of the gauge steps of gauge Nos. 1 and 2 in excess of 0,5P but not greater than 1P is permissible when the manufacturer and purchaser agree that the use of a thread sealant sealant during assembly of the workpiece will compensate for the increased differnce in the gaugin results.

Note 3 : In the case of Rp threads, if the depth of chamfer at the pitch diameter of the threads is more or less than 0,5P, then the gauging result will be slightly affected.

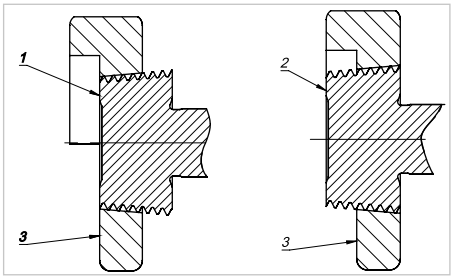
Checking of external taper (R) threads

Stage 1: The threaded ring gauge (gauge No. 3) is screwed hand-tight onto the external thread. The external thread is within the permissible tolerance if the end face of the workpiece lies between the step faces, or flush with one of the step faces on the gauge.



Key:
1 - end face of work piece flush with tolerance step on gauge,
2 - end face of work piece flush with face of gauge
3 - gauge No. 3

Stage 2: The taper plain ring gauge (gauge No. 4) is positioned hand tight over the external thread. The external thread is within the permissible tolerances if the end face of the threaded workpiece lies betwee the step faces, or flush with one of the step faces of the gauge and the roots of all threads within the area covered by the gauge are fully formed.

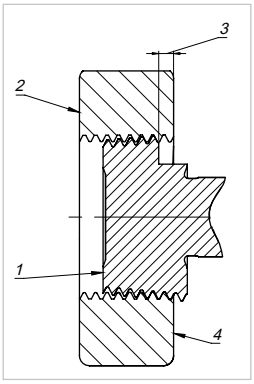


Key:
1 - end face of work piece flush with tolerance step on gauge,
2 - end face of work piece flush with face of gauge
3 - gauge No. 4

Note: A variation in the relative positions of the gauge steps of gauge Nos. 3 and 4 in excess of 0,5P but no greater than 1P is permissible when the manufacturer and purchaser agree that the use of a thread sealant during the assembly of the workpiece will compensate for the increased differnce in the gauging results.

Checking of taper plug gauges wear (gauge Nos. 1 and 2)

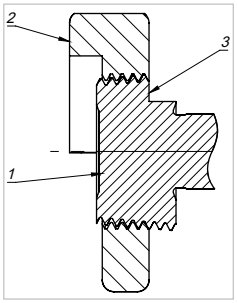
The pitch diameter of taper threaded plug gauges may be checked with the parallel modified thread form check ring gauge (gauge No. 6). The major diameter of taper threaded plug gauges shall be checked by direct measurment.



Key:
1 - gauges No 1 and 2,
2 - gauges No 6,
3 - distance from face of step on plug gauge to face of ring gauge shall be l_{13}
(see PN-EN 10226-3:2005 table 16)
4 - this face marked to indicate position of gauge plane

Checking of parallel ring gauges wear (gauge No 3)

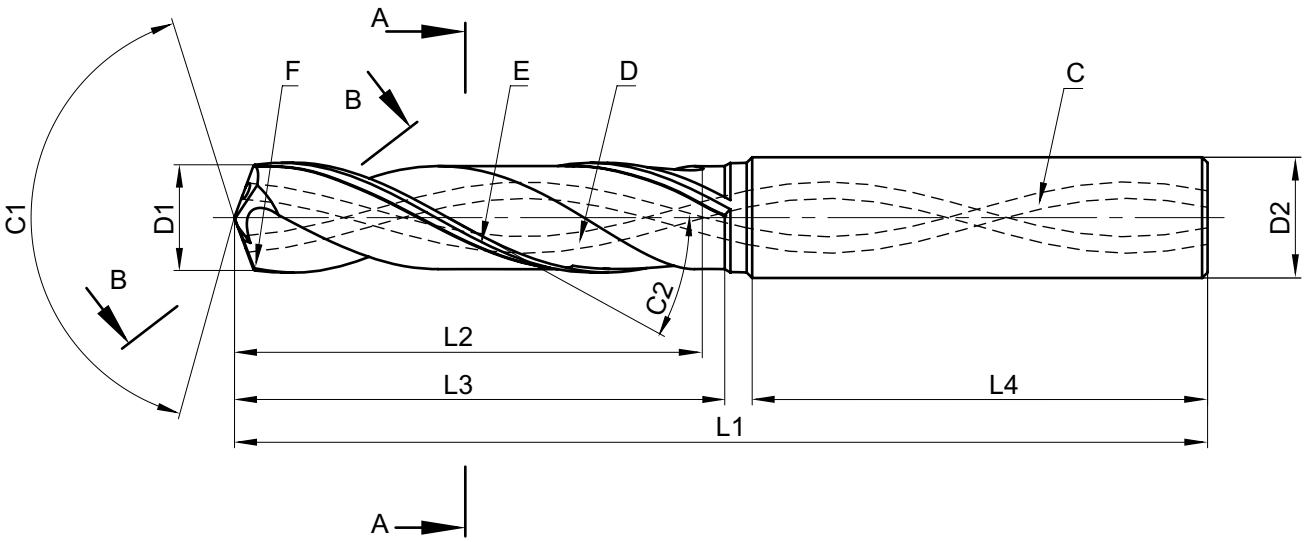
Parallel full form threaded ring gauges shall be checked by using the taper modified thread form check plug gauges at the pitch diameter. The minor diameter shall be checked by direct measurment.



Key:
1 - gauges No 5
2 - gauges No 3
3 - distance from face of step on plug gauge to face of ring gauge shall be l_{14}
(see PN-EN 10226-3:2005 table 16)
4 - this face marked to indicate position of gauge plane

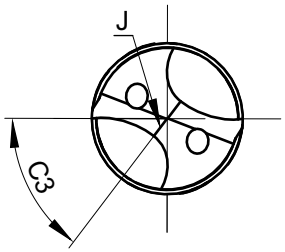
8. TWIST DRILLS

8.1. Nomenclature of Twist Drills

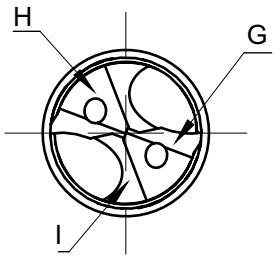


C - channel supplying coolant
D - chip flute
E - margin
F - rake face
G - primary clearance surface
H - secondary clearance surface
I - chamfer
J - chamfer edge

with no web thining

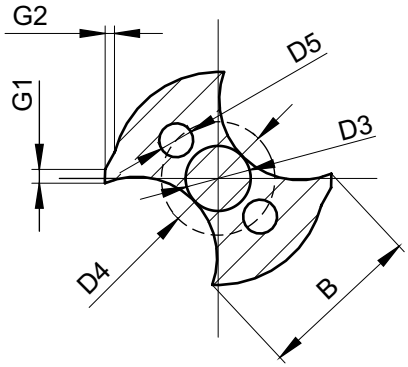


with web thining



L1 - total length
L2 - chip flutes length
L3 - margin length
L4 - shank length
D1 - working part diameter
D2 - shank diameter
D3 - core diameter
D4 - spacing of cooling channels
D5 - diameter of cooling channels
C1 - point angle
C2 - Helix angle
C3 - chisel angle
C4 - clearance angle
C5 - angle of primary clearance surface
C6 - angle of secondary clearance
G1 - margin width
G2 - lowering of margin
B - blade width

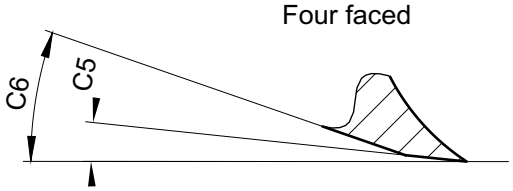
A-A



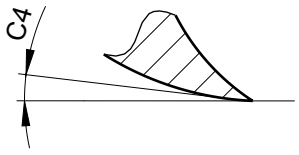
B-B

Types of Drill Clearance Surfaces

Four faced



Conical (eccentric)



8.2. Cooling and Lubrication Conditions

Application of Coolant:

- It is recommended when the drilling depth is at least twice greater than the diameter
- It is a must with depths five times greater than the drill diameter
- With application of external cooling, the coolant should be fed not only with the appropriate pressure, but also in the proper manner.

Methods of Coolant Supply:

Internal:

- Should be applied always, when the depth of the hole is at least three times greater than the diameter.
- Internal cooling is always recommended to avoid blocking of chips.

External:

- To improve chip evacuation, at least one coolant nozzle (two, if the drill bit is fixed) should be directed close to the axis of the tool.
- External cooling helps to avoid the formation of buildup on the edges, due to lowering the edges' temperature.
- External cooling is allowed for materials, which give short chips.

8.3. Problems and Troubleshooting

Problem: Buildup on edges	
Too low cutting speed	Increase cutting speed
Too high temperature of tool's edges	Apply cooling
Too great negative rake angle	Sharpen the cutting edge
Wear of coating	Coating on the edge
Too little oil in coolant	Increase amount of oil in coolant
Problem: Chipping off corners	
Excessive runout.	Use grip with better mounting precision
Excessive feed.	Decrease feed.
Insufficient amount of coolant (thermal cracking)	Check coolant pressure
Low rigidity of tool holding system	Check rigidity of tool's mount in the grip
Problem: Chipping off corners	
Excessive runout.	Use grip with better mounting precision
Excessive feed.	Decrease feed.
Discontinuous cutting process	Check coolant pressure
Low rigidity of tool holding system	Check rigidity of tool's mount in the grip

Problem: Excessive wear of the cutting edge	
Excessive runout	Use grip with better mounting precision
Excessive feed	Decrease feed
Discontinuous cutting process	Check coolant pressure
Low rigidity of tool holding system	Check rigidity of tool's mount in the grip
Problem: Chipping on cutting edge	
Excessive runout	Use grip with better mounting precision
Unstable cutting conditions	Check cutting parameters
Critical tool wear	Change tool more often
Too hard material	Select tool suitable for workpiece material
Problem: Wear on the lands	
Excessive runout	Use grip with better mounting precision
Low coolant pressure	Use pure oil or emulsion with more oil content
Too high cutting speed	Decrease cutting speed
Buildup formed by workpiece material	Select tool suitable for workpiece material
Problem: Wear of the chisel edge	
Too low cutting speed	Increase cutting speed
Excessive feed	Decrease feed
Too small chisel	Check dimensions
Problem: Plastic deformation	
Too high cutting speed	Decrease cutting speed
Excessive feed	Decrease feed
Poor coolant supply	Check coolant pressure and setting of nozzles
Too low rigidity of tool holding system	Use VHM drill bit
Problem: Abrasion of coating from the edge	
Too much friction	Apply coolant with greater content of oil or additives
Remove at an angle	Decrease feeding speed at removal
Buildup formed by workpiece material	Reduce number of tool's regenerations
Problem: Chip block	
Too low cutting speed	Increase cutting speed
Excessive feed	Decrease feed
Too small chip flutes	Select tool with proper geometry
Poor rinsing off chips	Apply internal cooling

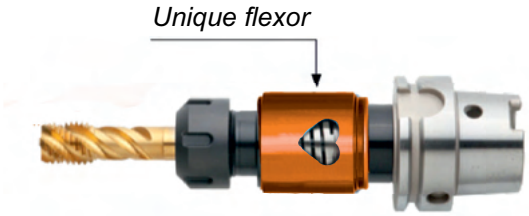
9. TAP HOLDERS

9.1. Tap holders „SOFT SYNCHRO”

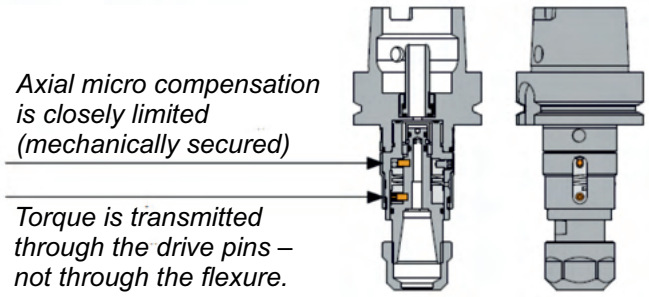
MASTERSYNC

Rule of action

At the heart of MasterSYNC is a precisely machined flexure which provides axial and radial compensation for the unavoidable discrepancy between the machine feed advance and the actual tap pitch. By compensating for this error, the thrust forces acting on the tap are dramatically reduced. The result is the longest possible tap life, 100 % improvement or more, and much better quality threads.



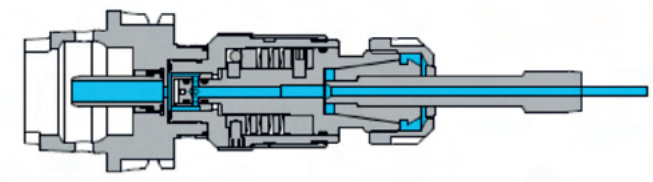
By limiting the axial compensation travel, and torsional forces acting on the flexure, millions of holes can be tapped without causing the MasterSYNC holder to fatigue, take a set, or wear out.



High Pressure Internal Coolant and MQL (Minimum Quantity Lubrication)

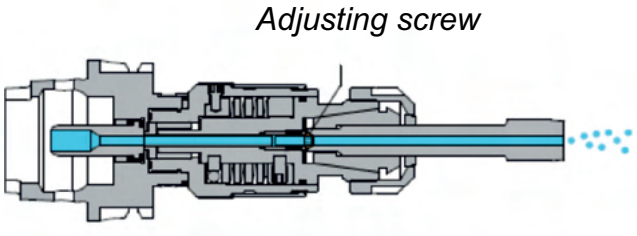
High pressure internal coolant system may be used at pressures up to 80 bar without affecting the axial compensation. Fanar can provide tools ready for Minimum Quantity Lubrication through the spindle. Our system provides direct flow of air and lubricant to the back of the tap.

IK



High Pressure Internal Coolant with increased flow rates

MQL

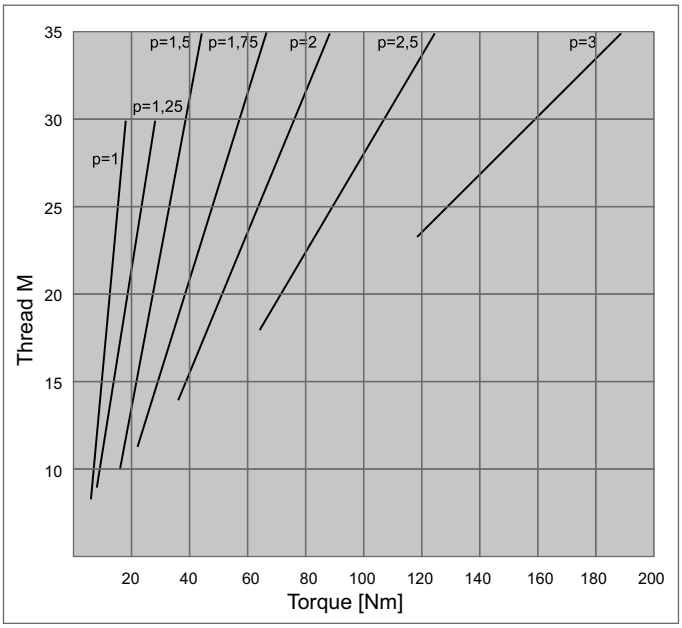


Minimum Quantity Lubrication Available for 1 channel or Multi channel systems

9.2. Quick-change adapters with safety clutch for taps

RECOMMENDED TORQUE VALUES FOR TAPPED MATERIALS WITH RM=1000 MPA

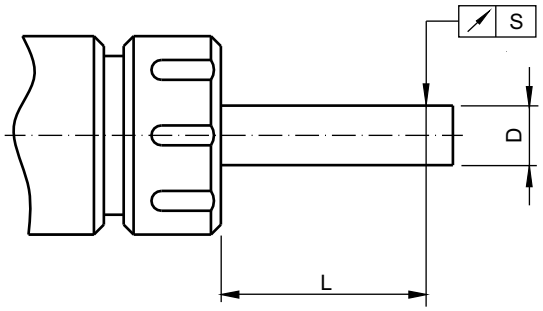
Thread M	Torque [Nm]
3	0,5
4	1,2
5	2
6	4
8	8
10	16
12	22
14	36
16	40
18	63
20	70
22	80
24	125
27	140
30	220
33	240



The values given are approximate and may be different depending on specific operating conditions

9.3. ER collets mounting

SHANK RUNOUT MOUNTED IN THE ER COLLET



D	L	S
1-1,6	6	0,008
1,6-3	10	0,008
3-6	16	0,008
6-10	25	0,008
10-18	40	0,008
18-26	50	0,008
26-40	60	0,008

9.4. Toolholders balance

Definition of unbalance

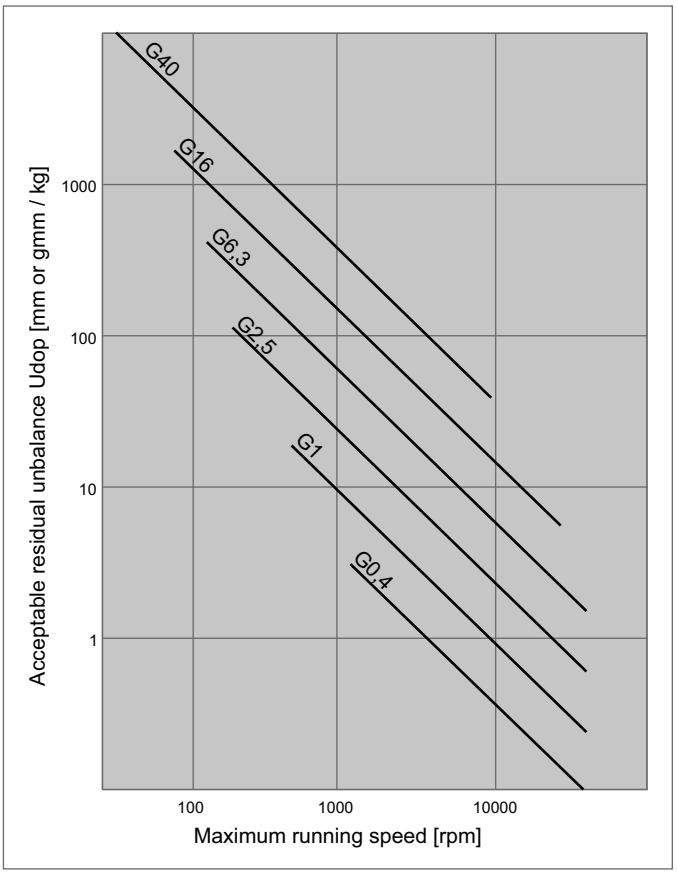
Unbalance is a displacement of the center of gravity of the rotating mass from the axis of rotation. The rotating mass includes: machine spindle, toolholder, intermediate components (collets), other additional elements of toolholders (nuts) and tool The reason of unbalance is geometric asymmetry, tolerance of, mounting errors, etc. Unbalance causes vibration of the setup, which reduce tool life and decrease quality of machining.To limit to an acceptable level of unbalance minimize clearances on the spindle and set suitable tools and toolholders. For most demanding applications it may be necessary not only balancing the toolholders, but also the tools.

Balancing

Balancing is to reduce the unbalance by moving the center of rotating mass in the direction of the axis. This is done by ensuring the proper geometry and adding additional weight or removing.
This target can only be achieved to some degree, as will always be residual unbalance.

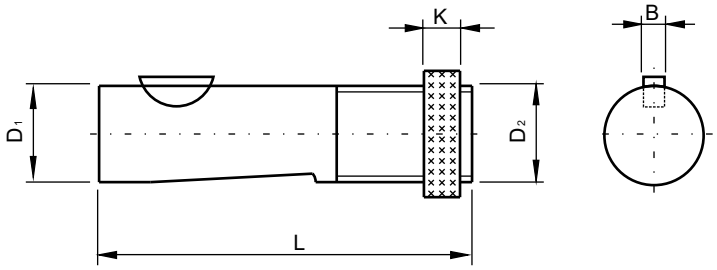
Balance accuracy classes

From an economic perspective it is not profitable too much tightening of requirements for rotating mass balance. In order to achieve a compromise between the technical and economic aspects, norm ISO 1940 introduced balance accuracy classes. It identifies the types of applications for each class, and so:
- G6,3 class is designed for machine parts and general use machines
- G2,5 class is designed for high speed machine parts.



9.5. Toolholders shanks

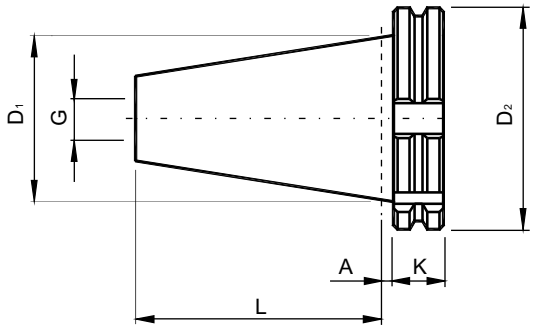
TR wg DIN-6327



Shank	D_1	D_2	L	B	K
TR20	20	TR20x1,5	88	5	12
TR28	28	TR28x2	95	6	12
TR36	36	TR36x2	118	8	14
TR48	48	TR48x2	144	10	18

Features:
- Toolholders made of nickel-chromium-molybdenum steel, carburized and hardened to 58HRC.
- Precision grinded shank in g5 tolerance.

ISO wg DIN-69871 A

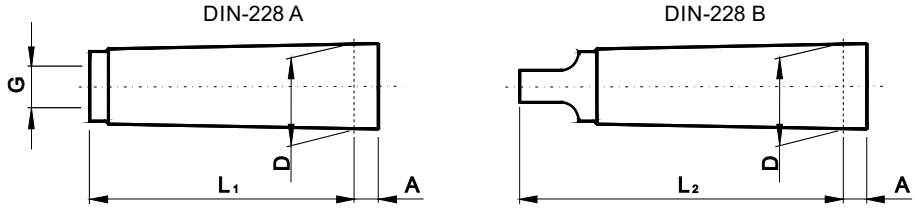


Tapper	D_1	D_2	L	A	K	G
ISO30	31,75	50,00	47,80	3,2	15,9	M12
ISO40	44,45	63,55	68,40	3,2	15,9	M16
ISO50	69,85	97,50	101,75	3,2	15,9	M24

Versions:
- DIN-69871 A - shank without internal cooling
- DIN-69871 AD - with a central hole
- DIN-69871 AD+B - with a central hole and the holes in the flange

Features:
- Toolholders for machines with automatic tool changing
- For toolholder mounting in the machine are used pull studs
- Toolholders made of nickel-chromium-molybdenum steel, carburized and hardened to 58HRC.
- Surface of taper precision grinded in AT3 class.
- Tool sockets made of 0,007 mm maximum runouts.
- Body balanced in G6,3/8000rpm class in standard version

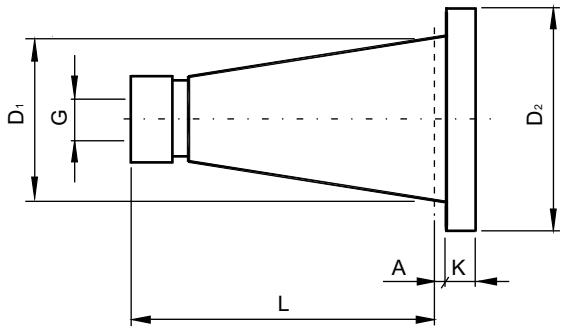
MORSE'A wg DIN-228



Taper	D	A	L_1	L_2	G
MK1	12,065	3,5	53,5	62,0	M6
MK2	17,780	5,0	64,0	75,0	M10
MK3	23,825	5,0	81,0	94,0	M12
MK4	31,267	6,5	102,5	117,5	M16
MK5	44,399	6,5	129,5	149,5	M20

Features:
- Toolholders made of nickel-chromium-molybdenum steel, carburized and hardened to 58HRC.
- Connecting surfaces precision grinded in AT3 class.

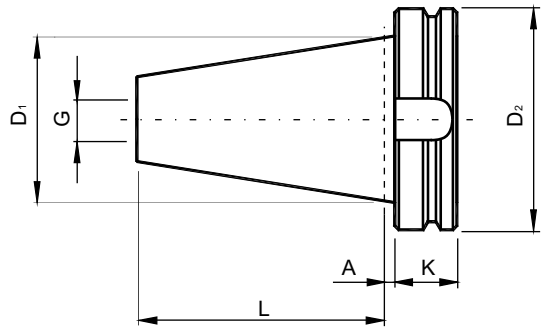
DIN wg DIN-2080



Taper	D_1	D_2	L	A	K	G
DIN30	31,75	50,0	68,4	1,6	8	M12
DIN40	44,45	63,0	93,4	1,6	10	M16
DIN50	69,85	97,5	126,8	3,2	12	M24

Features:
- Toolholders made of nickel-chromium-molybdenum steel, carburized and hardened to 58HRC.
- Surface of taper precision grinded in AT3 class.
- Tool sockets made of 0,007 mm maximum runouts.

MAS BT wg JIS B6339

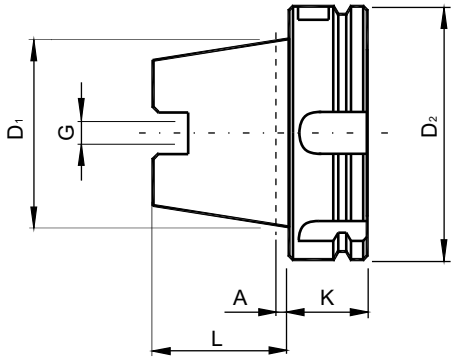


Taper	D_1	D_2	L	A	K	G
BT30	31,75	46	48,4	2	22	M12
BT40	44,45	63	65,4	2	27	M16
BT50	69,85	100	101,8	3	38	M24

Versions:
- shank without internal cooling
- with a central hole
- with a central hole and the holes in the flange

Features:
- Toolholders for machines with automatic tool changing
- For toolholder mounting in the machine are used pull studs
- Toolholders made of nickel-chromium-molybdenum steel, carburized and hardened to 58HRC.
- Surface of taper precision grinded in AT3 class.
- Tool sockets made of 0,007 mm maximum runouts.
- Maximum running speed 10 000 rpm in standard version

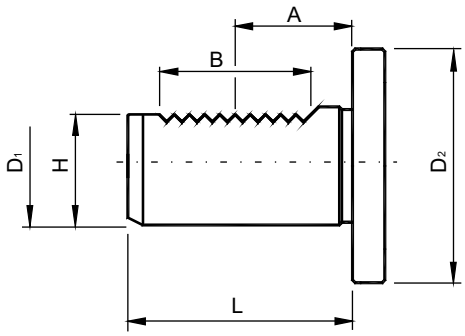
HSK wg DIN-69893 A



Taper	D_1	D_2	L	A	K	G
HSK40	30	40	20	4,0	20	M12x1
HSK50	38	50	25	5,0	26	M16x1
HSK63	48	63	32	6,3	26	M18x1
HSK80	60	80	40	8,0	26	M20x1,5
HSK100	75	100	50	10,0	29	M24x1,5

Features:
- Toolholders for machines with automatic tool changing
- Toolholders made of nickel-chromium-molybdenum steel, carburized and hardened to 58HRC.
- Surface of taper precision grinded in AT3 class.
- Tool sockets made of 0,007 mm maximum runouts.
- Body balanced in G6,3/8000rpm class in standard version
- Shank design provides axial positioning accuracy, high rigidity, high torque transfer at high speeds

VDI wg DIN-69880

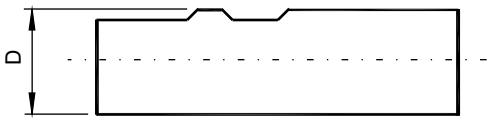


Shank	D_1	D_2	H	L	A	B
VDI20	20	50	18	40	21,7	24
VDI25	25	58	23,5	48	21,7	24
VDI30	30	68	27	55	29,7	40
VDI40	40	83	36	63	29,7	40
VDI50	50	98	45	78	35,7	48

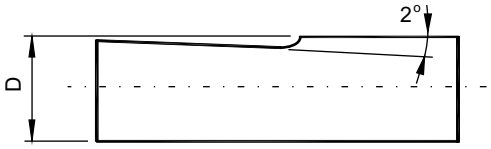
Features:
- Toolholders are made of chrome-manganese steel, carburized and hardened to 58HRC
- Cylindrical surface of shank is grinded in h6 tolerance

CYLINDRICAL wg DIN-1835

DIN-1835 B



DIN-1835 E



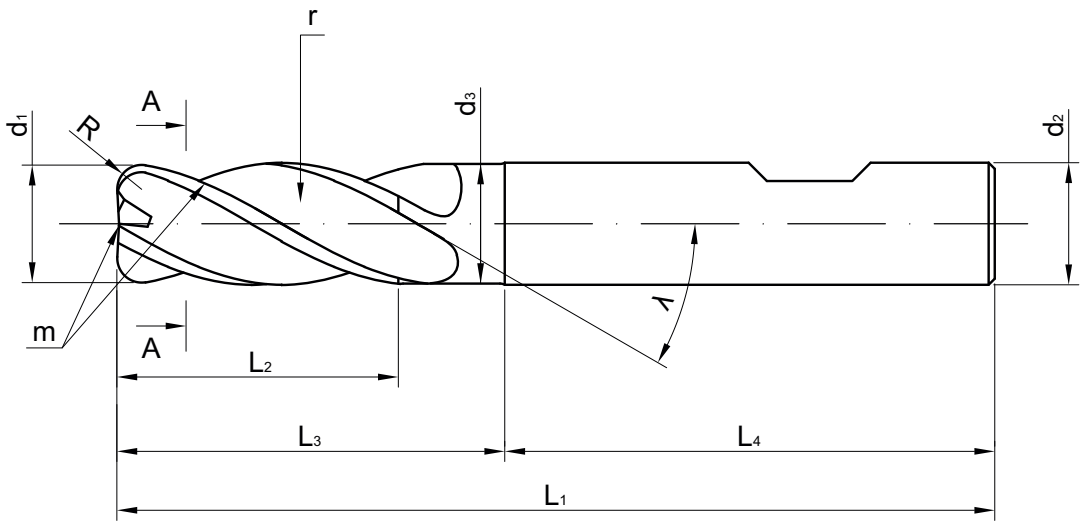
Weldon Shank	D
W20	20
W25	25
W32	32
W40	40
W50	50

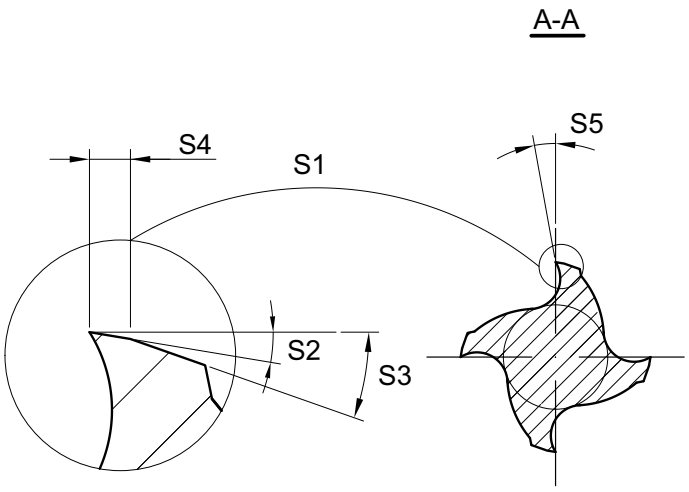
Versions:
- DIN-1835 A - straight cylindrical shank
- DIN-1835 B - WELDON: cylindrical shank with flats parallel to the axis of the cylinder
- DIN-1835 E - WHISTLE-NOTCH: cylindrical shank with 2 degrees of flattening

Features:
- Toolholders made of nickel-chromium-molybdenum steel, carburized and hardened to 58HRC.
- Cylindrical surface of shank is grinded in h6 tolerance

10. END MILLS

10.1. End mill construction elements

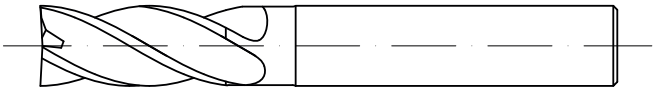
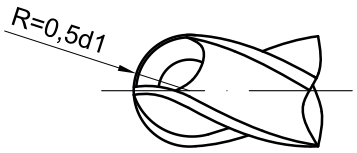
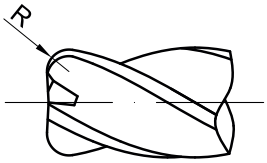
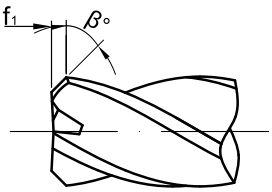




L1 - overall length
L2 - length of cut
L3 - reach length
L4 - shank length
d1 - working part diameter
d2 - shank diameter
d3 - neck diameter
r - chip flute

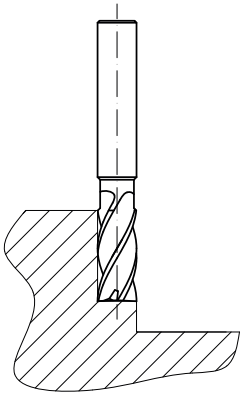
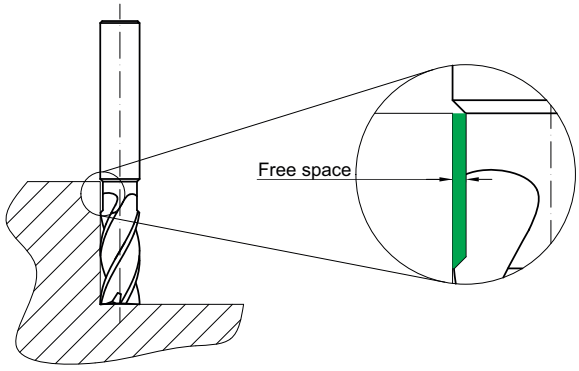
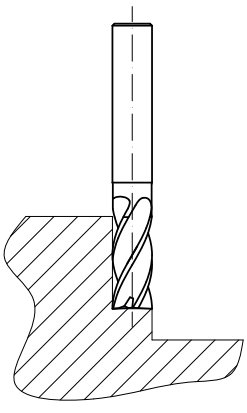
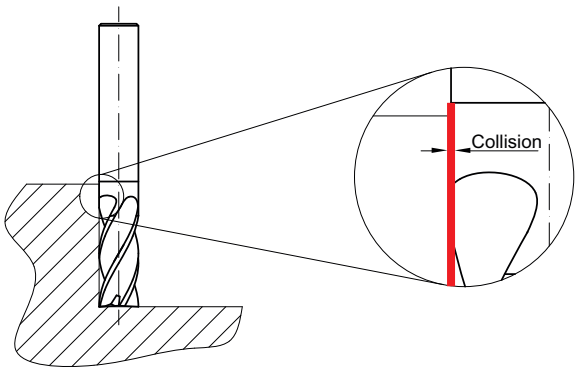
λ - helix angle
R - corner radius
S1 - relief
S2 - I relief angle
S3 - II relief angle
S4 - width of I relief
S5 - rake angle
m - cutting edges

10.2. Corner variants

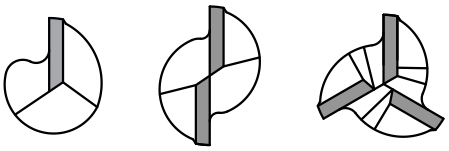
Sharp corner		
		
Ball nose	**Corner radius**	**Corner chamfer**
		

10.3. Neck

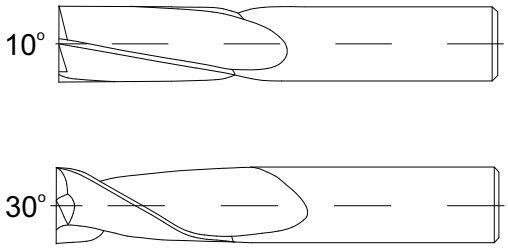
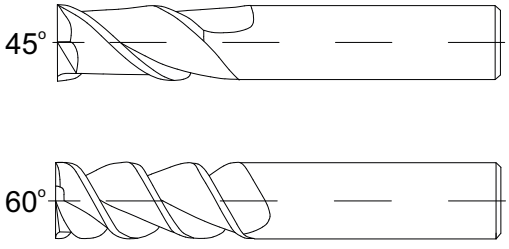
Neck of milling cutter is designed for extension working part of a tool. The table below shows a difference between end mills with and without neck.

	1st pass	2nd pass
With neck		
Without neck		

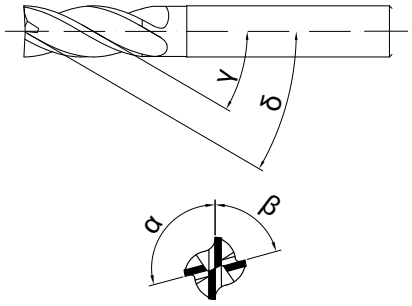
10.4. Flutes number

Low number of flutes		• Bigger capacity of flutes • Possibility of working with a larger width ae • Easier chip evacuation
More flutes		• Larger core • Greater rigidity of the tool • Better surface quality • Higher feed values

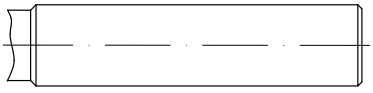
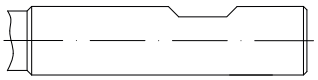
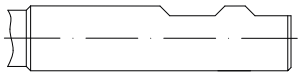
10.5. Helix angle

Smaller helix angle		• Lower risk of pulling out of the holder • Higher risk of vibrations
Bigger helix angle		• More teeth in workpiece in the same time • Longer cutting edges • Less vibration • Better surface quality

10.6. Variable helix angle and pitch

Unequal helix angle and pitch		• Cause that intervals between peaks of cutting forces are irregular • Reduce vibrations • Increase tool life • Allow to work with high cutting speeds.

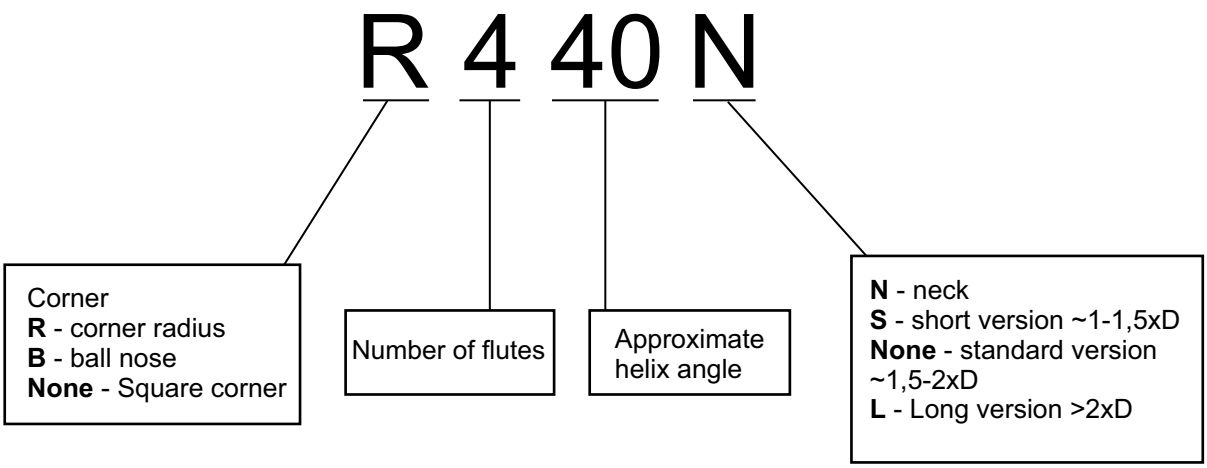
10.7. Shank types

Diameter	Cylindrical- Form HA	Weldon shank - Form HB
Ø6 - Ø20		
Ø25 - Ø32		

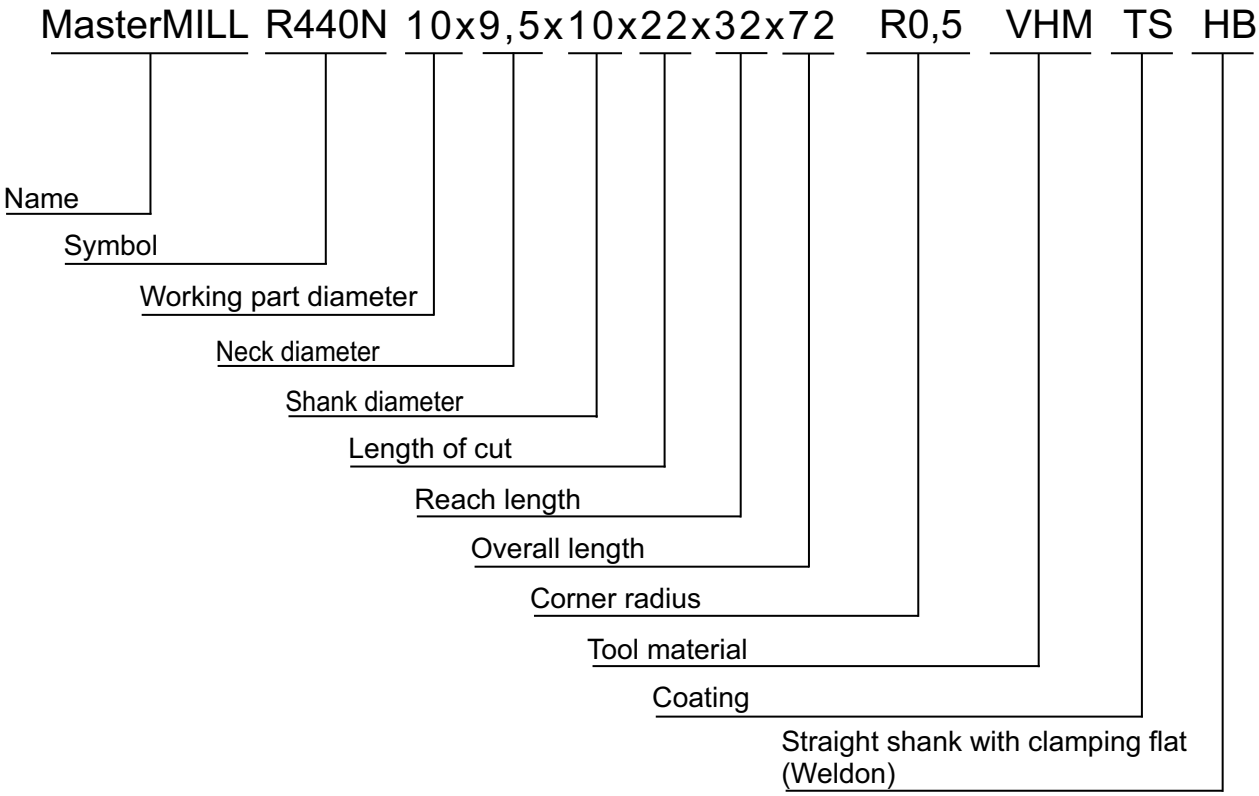
10.8. Designation and application

10.8.a. Tool groups according to application

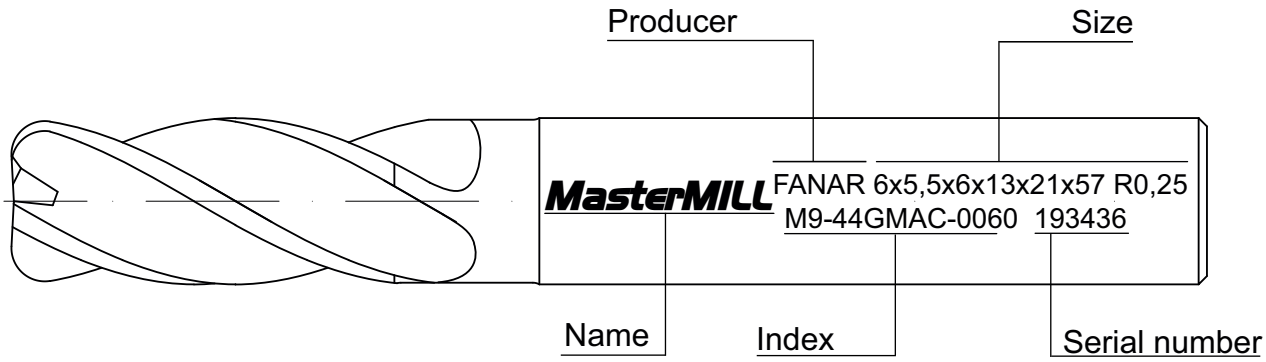
MASTERMILL P M K N S	High performance end mills dedicated to work on machining centers, for machining steel, stainless steel up to 45 HRC, cast iron and difficult to machine materials based on titanium and nickel.
X-MILL P M K	General purpose end mills for machining materials with hardness up to 35 HRC.
AL N	Group of tools with cutting geometry optimized to machining non-ferrous materials. Polished flutes and TB coating allow high performance machining of aluminium and copper alloys.
HRC H	End mills produced of comented carbide grade with nano-grain size (0,2 µm), dedicated for machining materials in hardened condition. Optimized geometry and TS coating allow machining materials with higher hardness than 65 HRC.



10.8.b. Designation



10.8.c. Marking



10.9. Technological recommendations for milling

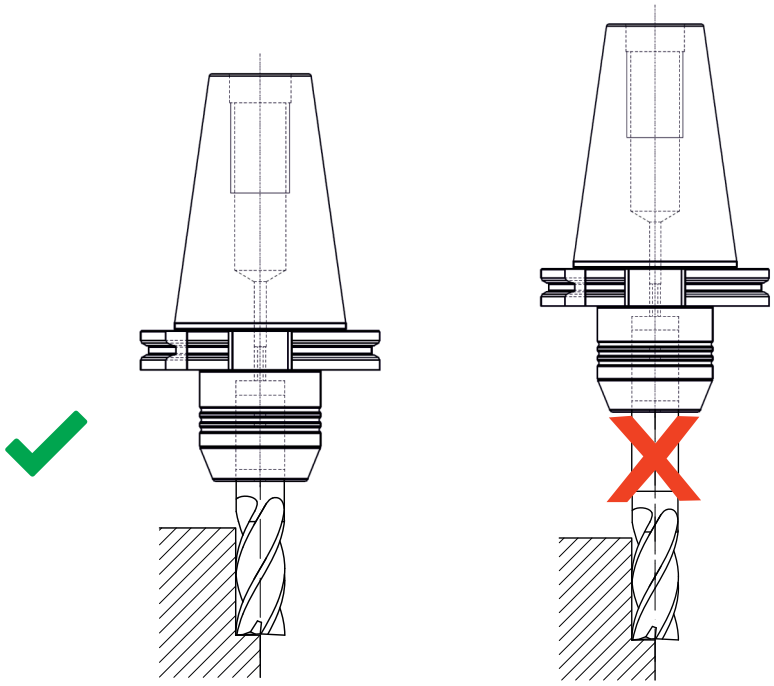
10.9.a. Effective milling is the result of:

- technical condition of the machine
- the proper selection of the end mills
- the selection of a precise and rigid holder
- rigid and securely fixation of work piece
- choice of coolant
- machine processing strategy

10.9.b. Correct tool selection

Milling cutter should be selected from selection table according to machined workpiece material. Adjust the cutter suitable for the material and dimensions; as short as possible, with a short cutting length and a larger diameter.For grooving choose end mills with a smaller number of flutes (2-3) for good chip evacuation. For profiling use 4-6 flutes cutters, in order to obtain a better surface quality and durability of the cutter.

10.9.c. Holder



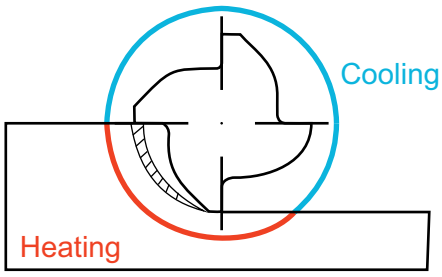
For high speed milling use the hydraulic holder or with shrink fit short reach, ensuring rigidity and precision mounting. Always secure the minimum influence of the tool holder.

10.9.d. Dry and wet milling

Dry milling increases the life of the cutting edge.

The milling operation in contrast to drilling is an inherently intermittent process. This causes the temperatures generated at the cutting edge to constantly fluctuate between various levels of hot and cold.

The cutting edge of a mill is subjected to thermal shocks and cyclic stresses that can result in cracking and, decreasing of tool life.



The best solution to facilitate chip removal and prevent recutting of chips is to use compressed air systems.

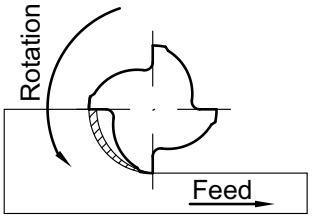
Justified cases of using coolant during working with carbide cutters are:

- finishing of stainless steel and aluminium
- milling of heat resistant alloys
- milling of thin walled components.

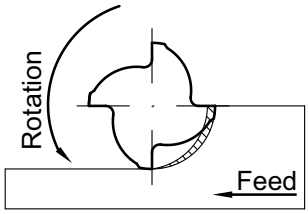
10.9.e. Processing technology and strategy

To increase the tool life,the climb-milling is recommended. Milling of the pockets usually begins with a pre-drill the hole. It is also used a spiral interpolation or linear ramping.

Climb milling



Conventional milling

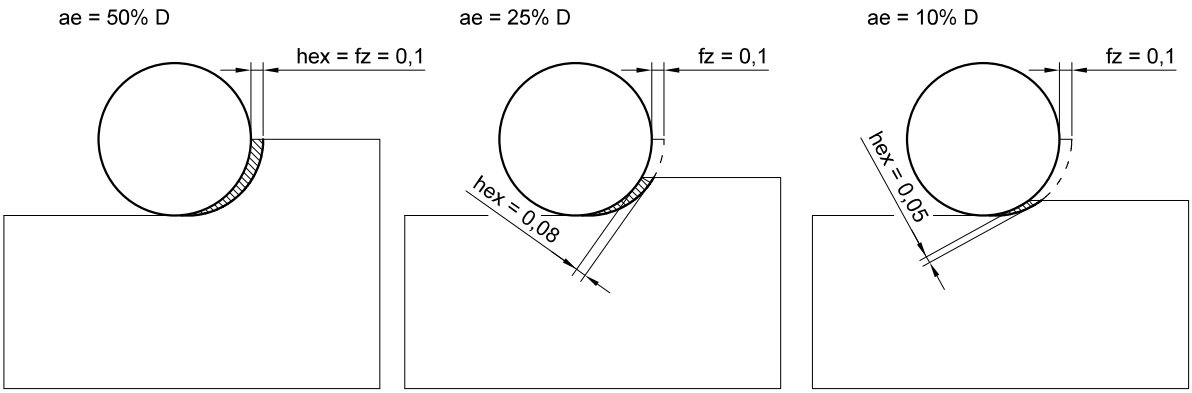


In these cases, the feed rate should be reduced to 25-50% of the values shown in the tables and cutting speed used as for grooving. In any case operating conditions can vary considerably. Therefore at the beginning of machining is recommended to reduce cutting to 50% from the tables selection, and then increasing to them. Deviations from the described conditions, exceeding the axial depth Ap and width Ae, can lead to a reduction in the cutting parameters V and f_z from those given in the tables.

10.9.f. High speed milling

HSM (High Speed Machining) – machining strategies based on chip thickness control and tool load reduction. By properly modifying the machining parameters, and in some cases using tools with a special design, it is possible to achieve lower mechanical and thermal load of cutting edges while increasing productivity.

Influence of the cutting width on the thickness of the chip.



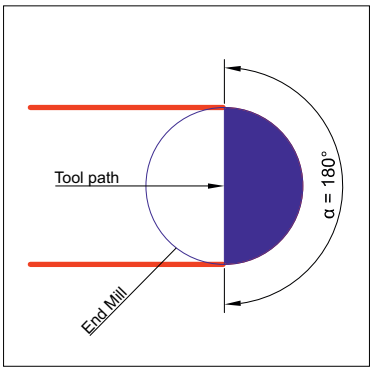
The most common milling strategies based on chip thickness control are:

- Trochoidal milling
- High Feed Milling (HFM)

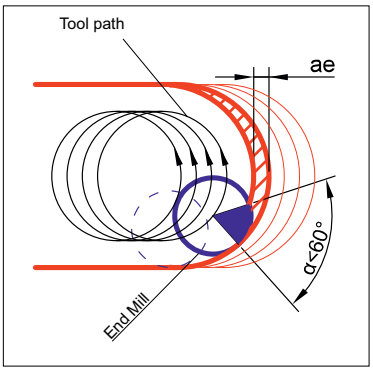
Trochoidal milling

High Feed Milling - Milling strategy developed to reduce chip thickness by using a tool with a special face geometry. This kind of a tool allows machining with several times higher feed rates than conventional machining.

- **Very small milling width ae and small wrap angle of the tool** - reduction of chip thickness hex and radial forces
- **Highest possible cutting speed Vc and number of flutes** - high feed speeds and productivity
- **Full length of cutting edges in use** – even wear of cutting edges



Milling a groove in a full material

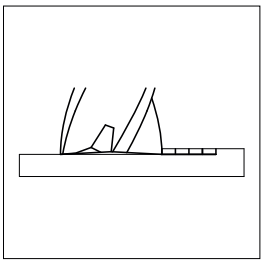


Trochoidal milling

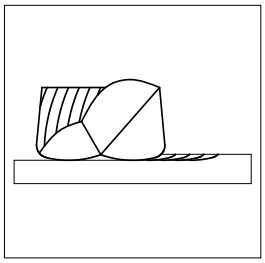
HFM - High Feed Milling

High Feed Milling - Milling strategy developed to reduce chip thickness by using a tool with a special face geometry. This kind of a tool allows machining with several times higher feed rates than conventional machining.

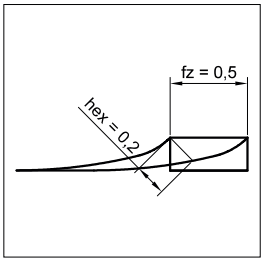
- **Very low cutting depth a_p** - reduced chip thickness hex and radial forces
- **Large cutting width a_e and feed per tooth fz** - even wear of the specially shaped cutting edge
- **Highest possible feed per tooth and number of teeth** - high feed speeds and productivity



Face of standard end mill



Face of milling cutter for High Feed Milling



Comparison of the chip shape with the same feed per tooth

Machine requirements:

- High speed spindle
- High dynamics of the machine - frequent changes of direction and feed values
- Balancing tools with a tool holder
- Necessity to be able to program the toolpath - CAM software
- Proper tool design

10.10. Formulas and tables

10.10.a. Basic formulas

Symbol	Unit	Name	Formula
V_c	m/min	Cutting speed	$v_c = \frac{d_1 \times \pi \times n}{1000}$
n	1/min	Rotational speed	$n = \frac{1000 \times v_c}{d_1 \times \pi}$
V_f	mm/min	Rate of feed	$v_f = f_z \times n \times z$
f_z	mm	Feed per tooth	$f_z = \frac{v_f}{n \times z}$

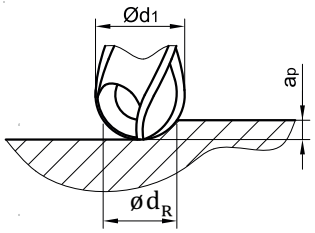
d_1 [mm] - diameter of milling cutters
z - number of teeth

10.10.b. Cutting speed factors depending on the working width ae - for solid carbide end mills

ae / D	1-0,5	0,4	0,3	0,2	0,1	0,05	0,04
Cutting speed multiplier Vc	1	1,1	1,2	1,3	1,4	2,5	3

10.10.c. Ball nose end mills real cutting diameter

	Depth of cut ap [mm]																
Ø d1	0,01	0,02	0,03	0,04	0,05	0,08	0,1	0,15	0,2	0,3	0,5	0,8	1,0	2,0	3,0	4,0	5,0
1	0,199	0,280	0,341	0,392	0,436	0,543	0,600	0,714	0,800	0,917	1,000	-	-	-	-	-	-
2	0,282	0,398	0,486	0,560	0,624	0,784	0,872	1,054	1,200	1,428	1,732	1,960	2,000	-	-	-	-
3	0,346	0,488	0,597	0,688	0,768	0,967	1,077	1,308	1,497	1,800	2,236	2,653	2,828	2,828	-	-	-
4	0,399	0,564	0,690	0,796	0,889	1,120	1,249	1,520	1,744	2,107	2,646	3,200	3,464	4,000	-	-	-
5	0,447	0,631	0,772	0,891	0,995	1,255	1,400	1,706	1,960	2,375	3,000	3,666	4,000	4,899	4,899	-	-
6	0,489	0,692	0,846	0,977	1,091	1,376	1,536	1,873	2,154	2,615	3,317	4,079	4,472	5,657	6,000	-	-
8	0,565	0,799	0,978	1,129	1,261	1,592	1,778	2,170	2,498	3,040	3,873	4,800	5,292	6,928	7,746	8,000	-
10	0,632	0,894	1,094	1,262	1,411	1,782	1,990	2,431	2,800	3,412	4,359	5,426	6,000	8,000	9,165	9,798	10,000
12	0,693	0,979	1,198	1,383	1,546	1,953	2,182	2,666	3,072	3,747	4,796	5,987	6,633	8,944	10,392	11,314	11,832
14	0,748	1,058	1,295	1,495	1,670	2,111	2,358	2,883	3,323	4,055	5,196	6,499	7,211	9,798	11,489	12,649	13,416
16	0,800	1,131	1,384	1,598	1,786	2,257	2,522	3,084	3,555	4,341	5,568	6,974	7,746	10,583	12,490	13,856	14,832
18	0,848	1,199	1,468	1,695	1,895	2,395	2,676	3,273	3,774	4,609	5,916	7,419	8,246	11,314	13,416	14,967	16,125
20	0,894	1,264	1,548	1,787	1,997	2,525	2,821	3,451	3,980	4,862	6,245	7,838	8,718	12,000	14,283	16,000	17,321

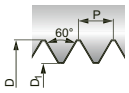


$$ø d_R = 2 \cdot \sqrt{a_p (ø d_1 - a_p)}$$

11. INFORMATION TABLE

11.1. Recommended Hole Diameters for Taps

ISO Metric Threads



M ISO Metric coarse thread DIN 13

Nom. size D mm	P mm	D_1 (6H) min. mm	D_1 (6H) max. mm	mm
M 1	0,25	0,729	0,785	0,75
1,1	0,25	0,829	0,885	0,85
1,2	0,25	0,929	0,985	0,95
1,4	0,3	1,075	1,142	1,1
1,6	0,35	1,221	1,321	1,25
1,7	0,35	1,321	1,421	1,35
1,8	0,35	1,421	1,521	1,45
2	0,4	1,567	1,679	1,6
2,2	0,45	1,713	1,838	1,75
2,3	0,4	1,867	1,979	1,9
2,5	0,45	2,013	2,138	2,05
2,6	0,45	2,113	2,238	2,15
3	0,5	2,459	2,599	2,5
3,5	0,6	2,850	3,010	2,9
4	0,7	3,242	3,422	3,3
4,5	0,75	3,688	3,878	3,7
5	0,8	4,134	4,334	4,2
5,5	0,9	4,526	4,750	4,6
6	1	4,917	5,153	5
7	1	5,917	6,153	6
8	1,25	6,647	6,912	6,8
9	1,25	7,647	7,912	7,8
10	1,5	8,376	8,676	8,5
11	1,5	9,376	9,676	9,5
12	1,75	10,106	10,441	10,2
14	2	11,835	12,210	12
16	2	13,835	14,210	14
18	2,5	15,294	15,744	15,5
20	2,5	17,294	17,744	17,5
22	2,5	19,294	19,744	19,5
24	3	20,752	21,252	21
27	3	23,752	24,252	24
30	3,5	26,211	26,771	26,5
33	3,5	29,211	29,771	29,5
36	4	31,670	32,270	32
39	4	34,670	35,270	35
42	4,5	37,129	37,799	37,5
45	4,5	40,129	40,799	40,5
48	5	42,587	43,297	43
52	5	46,587	47,297	47
56	5,5	50,046	50,796	50,5
60	5,5	54,046	54,796	54,5
64	6	57,505	58,305	58
68	6	61,505	62,305	62

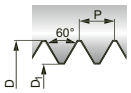
MF ISO Metric fine thread DIN 13

Nom. size D mm x P mm	D_1 (6H) min. mm	D_1 (6H) max. mm	mm
M 2,5 x 0,35	2,121	2,221	2,15
2,6 x 0,35	2,221	2,321	2,25
3 x 0,35	2,621	2,721	2,65
3,5 x 0,35	3,121	3,221	3,15
4 x 0,35	3,621	3,721	3,65
4 x 0,5	3,459	3,599	3,5
5 x 0,5	4,459	4,599	4,5
6 x 0,5	5,459	5,599	5,5
6 x 0,75	5,188	5,378	5,2
7 x 0,75	6,188	6,378	6,2
8 x 0,75	7,188	7,378	7,2
8 x 1	6,917	7,153	7
9 x 0,75	8,188	8,378	8,2
9 x 1	7,917	8,153	8
10 x 0,75	9,188	9,378	9,2
10 x 1	8,917	9,153	9
10 x 1,25	8,647	8,912	8,8
11 x 1	9,917	10,153	10
12 x 1	10,917	11,153	11
12 x 1,25	10,647	10,912	10,8
12 x 1,5	10,376	10,676	10,5
14 x 1	12,917	13,153	13
14 x 1,25	12,647	12,912	12,8
14 x 1,5	12,376	12,676	12,5
15 x 1	13,917	14,153	14
16 x 1	14,917	15,153	15
16 x 1,5	14,376	14,676	14,5
18 x 1	16,917	17,153	17
18 x 1,5	16,376	16,676	16,5
18 x 2	15,835	16,210	16
20 x 1	18,917	19,153	19
20 x 1,5	18,376	18,676	18,5
20 x 2	17,835	18,210	18
22 x 1	20,917	21,153	21
22 x 1,5	20,376	20,676	20,5
22 x 2	19,835	20,210	20
24 x 1	22,917	23,153	23
24 x 1,5	22,376	22,676	22,5
24 x 2	21,835	22,210	22
25 x 1,5	23,376	23,676	23,5
26 x 1,5	24,376	24,676	24,5
27 x 1,5	25,376	25,676	25,5
27 x 2	24,835	25,210	25
28 x 1,5	26,376	26,676	26,5
28 x 2	25,835	26,210	26
30 x 1,5	28,376	28,676	28,5
30 x 2	27,835	28,210	28
32 x 1,5	30,376	30,676	30,5
32 x 2	29,835	30,210	30
33 x 1,5	31,376	31,676	31,5
33 x 2	30,835	31,210	31
34 x 1,5	32,376	32,676	32,5

Nom. size D mm x P mm	D_1 (6H) min. mm	D_1 (6H) max. mm	mm
M 35 x 1,5	33,376	33,676	33,5
36 x 1,5	34,376	34,676	34,5
36 x 2	33,835	34,210	34
36 x 3	32,752	33,252	33
38 x 1,5	36,376	36,676	36,5
39 x 1,5	37,376	37,676	37,5
39 x 2	36,835	37,210	37
39 x 3	35,752	36,252	36
40 x 1,5	38,376	38,676	38,5
40 x 2	37,835	38,210	38
42 x 1,5	40,376	40,676	40,5
42 x 2	39,835	40,210	40
42 x 3	38,752	39,252	39
45 x 1,5	43,376	43,676	43,5
45 x 2	42,835	43,210	43
45 x 3	41,752	42,252	42
48 x 1,5	46,376	46,676	46,5
48 x 2	45,835	46,210	46
48 x 3	44,752	45,252	45
50 x 1,5	48,376	48,676	48,5
50 x 2	47,835	48,210	48
52 x 1,5	50,376	50,676	50,5
52 x 2	49,835	50,210	50
52 x 3	48,752	49,252	49
56 x 3	52,752	53,252	53
56 x 4	51,670	52,270	52
60 x 4	55,670	56,270	56
64 x 3	60,752	61,252	61
64 x 4	59,670	60,270	60
68 x 4	63,670	64,270	64
70 x 3	66,752	67,252	67
70 x 4	65,670	66,270	66
72 x 3	68,752	69,252	69
72 x 4	67,670	68,270	68
72 x 6	65,505	66,305	66
76 x 3	72,752	73,252	73
76 x 4	71,670	72,270	72
76 x 6	69,505	70,305	70
80 x 4	75,670	76,270	76
80 x 6	73,505	74,305	74
85 x 3	81,752	82,252	82
85 x 4	80,670	81,270	81
90 x 3	86,752	87,252	87
90 x 4	85,670	86,270	86
90 x 6	83,505	84,305	84
95 x 6	88,505	89,305	89
100 x 4	95,670	96,270	96
100 x 6	93,505	94,305	94
110 x 6	103,505	104,305	104
115 x 3	111,752	112,252	112
120 x 4	115,670	116,270	116
120 x 6	113,505	114,305	114

11.2. Thread Hole Preparatory Diameters

Unified Threads



UNC Unified coarse thread ANSI/ASME B1.1

Nom. size D inch - Gg/1" (tpi)	D_1 (2B) min. mm	D_1 (2B) max. mm	mm
Nr. 1 - 64	1,425	1,582	1,55
Nr. 2 - 56	1,694	1,872	1,85
Nr. 3 - 48	1,941	2,146	2,1
Nr. 4 - 40	2,156	2,385	2,35
Nr. 5 - 40	2,487	2,697	2,65
Nr. 6 - 32	2,647	2,896	2,85
Nr. 8 - 32	3,307	3,528	3,5
Nr. 10 - 24	3,680	3,949	3,9
Nr. 12 - 24	4,341	4,590	4,5
1/4 - 20	4,976	5,268	5,1
5/16 - 18	6,411	6,734	6,6
3/8 - 16	7,805	8,164	8
7/16 - 14	9,149	9,550	9,4
1/2 - 13	10,584	11,016	10,8
9/16 - 12	11,996	12,456	12,2
5/8 - 11	13,376	13,868	13,5
3/4 - 10	16,299	16,833	16,5
7/8 - 9	19,169	19,748	19,5
1" - 8	21,963	22,598	22,25
1 1/8 - 7	24,648	25,349	25
1 1/4 - 7	27,823	28,524	28
1 3/8 - 6	30,343	31,120	30,75
1 1/2 - 6	33,518	34,295	34
1 3/4 - 5	38,951	39,814	39,5
2" - 4 1/2	44,689	45,598	45

UNF Unified coarse thread ANSI/ASME B1.1

Nom. size D inch - Gg/1" (tpi)	D_1 (2B) min. mm	D_1 (2B) max. mm	mm
Nr. 2 - 64	1,755	1,913	1,85
Nr. 3 - 56	2,024	2,197	2,15
Nr. 4 - 48	2,271	2,459	2,4
Nr. 5 - 44	2,550	2,741	2,7
Nr. 6 - 40	2,817	3,012	2,95
Nr. 8 - 36	3,401	3,597	3,5
Nr. 10 - 32	3,967	4,168	4,1
Nr. 12 - 28	4,503	4,716	4,6
1/4 - 28	5,367	5,580	5,5
5/16 - 24	6,792	7,038	6,9
3/8 - 24	8,379	8,626	8,5
7/16 - 20	9,738	10,030	9,9
1/2 - 20	11,326	11,618	11,5
9/16 - 18	12,761	13,084	12,9
5/8 - 18	14,348	14,671	14,5
3/4 - 16	17,330	17,689	17,5
7/8 - 14	20,262	20,663	20,4
1" - 12	23,109	23,569	23,25
1 1/8 - 12	26,284	26,744	26,5
1 1/4 - 12	29,459	29,919	29,5
1 3/8 - 12	32,634	33,094	32,75
1 1/2 - 12	35,809	36,269	36

UN-8

Nom. size D inch - Gg/1" (tpi)	D_1 (2B) min. mm	D_1 (2B) max. mm	mm
1 1/8 - 8	25,138	25,773	25,4
1 1/4 - 8	28,313	28,948	28,6
1 1/2 - 8	34,663	35,298	35
1 3/4 - 8	41,013	41,648	41,3
2" - 8	47,363	47,998	47,7

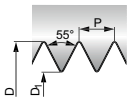
UNEF

Nom. size D inch - Gg/1" (tpi)	D_1 (2B) min. mm	D_1 (2B) max. mm	mm
1/4 - 32	5,491	5,679	5,55
5/16 - 32	7,079	7,267	7,15
3/8 - 32	8,666	8,854	8,7
7/16 - 28	10,130	10,343	10,2
1/2 - 28	11,717	11,930	11,8
9/16 - 24	13,142	13,388	13,2
5/8 - 24	14,729	14,975	14,8
3/4 - 20	17,676	17,968	17,8
7/8 - 20	20,851	21,143	20,95
1" - 20	24,026	24,318	24,15

Cylindrical PipeThreads

G

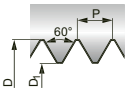
Whitworth pipe thread DIN EN ISO 228



Nom. size D - P/1" (tpi)	D_1 min. mm	D_1 max. mm	mm
G 1/16 - 28	6,561	6,843	6,8
1/8 - 28	8,566	8,848	8,8
1/4 - 19	11,445	11,890	11,8
3/8 - 19	14,950	15,395	15,25
1/2 - 14	18,631	19,172	19
5/8 - 14	20,587	21,128	21
3/4 - 14	24,117	24,658	24,5
7/8 - 14	27,877	28,418	28,25
1" - 11	30,291	30,931	30,75
1 1/8 - 11	34,939	35,579	35,5
1 1/4 - 11	38,952	39,592	39,5
1 3/8 - 11	41,365	42,005	41,75
1 1/2 - 11	44,845	45,485	45,25
1 5/8 - 11	49,030	49,670	49,5
1 3/4 - 11	50,788	51,428	51
2" - 11	56,656	57,296	57
2 1/4 - 11	62,752	63,392	63,3
2 1/2 - 11	72,226	72,866	72,8
2 3/4 - 11	78,576	79,216	79,1
3" - 11	84,926	85,566	85,5

NPSM

American Standard straight pipe thread
ANSI/ASME B1.20.1
for mechanical joints (previously NPS)



Nom. size D inch - P/1" (tpi)	D_1 min. mm	D_1 max. mm	mm
1/8 - 27	9,093	9,246	9,1
1/4 - 18	11,887	12,217	12
3/8 - 18	15,316	15,545	15,5
1/2 - 14	18,974	19,279	19
3/4 - 14	24,333	24,638	24,5
1" - 11 1/2	30,505	30,759	30,5

NPSF

American Standard straight pipe thread
ANSI B1.20.3
dryseal internal straight pipe thread for fuel, combined with external tapered pipe thread NPTF or PTF-SAE-SHORT; Gauge with tapered gauges

Nom. size D inch - P/1" (tpi)	D_1 min. mm	D_1 max. mm	mm
1/16 - 27	6,304	6,393	6,35
1/8 - 27	8,651	8,740	8,7
1/4 - 18	11,232	11,364	11,3
3/8 - 18	14,671	14,803	14,75
1/2 - 14	18,118	18,288	18,2
3/4 - 14	23,465	23,635	23,5
1" - 11 1/2	29,464	29,670	29,5

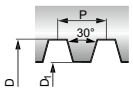
Rp (BSPP)

Cylindrical Whitworth pipe thread DIN EN 10226-1 and ISO 7-1
where pressure-tight joints are made on the threads

Nom. size D - P/1" (tpi)	D_1 min. mm	D_1 max. mm	mm
Rp 1/16 - 28	6,490	6,632	6,55
1/8 - 28	8,495	8,637	8,6
1/4 - 19	11,341	11,549	11,5
3/8 - 19	14,846	15,054	15
1/2 - 14	18,489	18,773	18,5
3/4 - 14	23,975	24,259	24
1" - 11	30,111	30,471	30,25

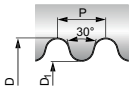
Trapezoidal and Round Threads

Tr ISO Metric trapezoidal coarse thread DIN 103



Nom. size D mm x P mm	D_1 (7H) min. mm	D_1 (7H) max. mm	mm
Tr 8 x 1,5	6,5	6,69	6,6
9 x 2	7	7,236	7,2
10 x 2	8	8,236	8,2
10 x 3	7	7,315	7,25
11 x 3	8	8,315	8,25
12 x 3	9	9,315	9,25
14 x 3	11	11,315	11,25
14 x 4	10	10,375	10,25
16 x 4	12	12,375	12,25
18 x 4	14	14,375	14,25
20 x 4	16	16,375	16,25
22 x 5	17	17,45	17,25
24 x 5	19	19,45	19,25
26 x 5	21	21,45	21,25
28 x 5	23	23,45	23,25
30 x 6	24	24,5	24,25
32 x 6	26	26,5	26,25
34 x 6	28	28,5	28,25
36 x 6	30	30,5	30,25
38 x 7	31	31,56	31,5
40 x 7	33	33,56	33,5
42 x 7	35	35,56	35,5
44 x 7	37	37,56	37,5
46 x 8	38	38,63	38,5
48 x 8	40	40,63	40,5
50 x 8	42	42,63	42,5
52 x 8	44	44,63	44,5

Rd Round thread DIN 405



Nom. size D mm x P/1" (tpi)	D_1 (7H) min. mm	D_1 (7H) max. mm	mm
Rd 8 x 10	5,714	6,164	6
9 x 10	6,714	7,164	7
10 x 10	7,714	8,164	8
11 x 10	8,714	9,164	9
12 x 10	9,714	10,164	10
14 x 8	11,142	11,672	11,5
16 x 8	13,142	13,672	13,5
18 x 8	15,142	15,672	15,5
20 x 8	17,142	17,672	17,5
22 x 8	19,142	19,672	19,5
24 x 8	21,142	21,672	21,5
26 x 8	23,142	23,672	23,5
28 x 8	25,142	25,672	25,5
30 x 8	27,142	27,672	27,5

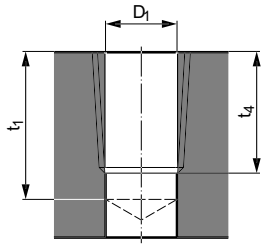
BSF

Nom. size D - P/1" (tpi)	D_1 min. mm	D_1 max. mm	mm
BSF 3/16 - 32	3,747	4,006	4
1/4 - 26	5,100	5,398	5,3
5/16 - 22	6,459	6,817	6,8
3/8 - 20	7,899	8,331	8,3
7/16 - 18	9,304	9,764	9,7
1/2 - 16	10,668	11,163	11,1
5/8 - 14	13,553	14,094	14
3/4 - 12	16,337	16,939	16,75
7/8 - 11	19,268	19,909	19,75
1" - 10	22,149	22,835	22,75

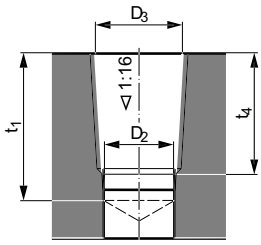
BSW

Nom. size D - P/1" (tpi)	D_1 min. mm	D_1 max. mm	mm
BSW 1/16 - 60	1,045	1,230	1,15
3/32 - 48	1,704	1,912	1,85
1/8 - 40	2,362	2,591	2,55
5/32 - 32	2,952	3,214	3,2
3/16 - 24	3,406	3,744	3,7
7/32 - 24	4,201	4,539	4,5
1/4 - 20	4,724	5,156	5,1
5/16 - 18	6,129	6,589	6,5
3/8 - 16	7,493	7,988	7,9
7/16 - 14	8,791	9,332	9,25
1/2 - 12	9,987	10,589	10,5
9/16 - 12	11,575	12,177	12
5/8 - 11	12,918	13,559	13,5
3/4 - 10	15,799	16,485	16,4
7/8 - 9	18,613	19,355	19,25
1" - 8	21,336	22,149	22
1 1/8 - 7	23,927	24,831	24,75
1 1/4 - 7	27,102	28,006	27,75
1 3/8 - 6	29,504	30,528	30,5
1 1/2 - 6	32,680	33,703	33,5
1 5/8 - 5	34,769	35,963	35,5
1 3/4 - 5	37,943	39,136	39
1 7/8 - 4 1/	40,396	41,702	41,5
2" - 4 1/	43,571	44,877	44,5

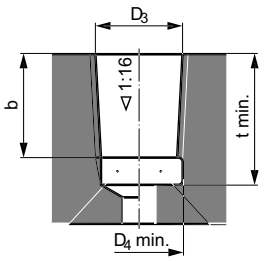
Drill cylindrically
without using a reamer



Drill cylindrically and prepare
tapered hole with reamer



Recommended preparation
of blind holes (minimum length)



Rc (BSPT)

Tapered Whitworth pipe thread DIN EN 10226-2
and ISO 7-1 where pressure-tight joints are made
on the threads, taper 1:16

Nom. size D inch - P/1" (tpi)	D_1 mm	t_1 mm	t_4 mm
Rc 1/16 - 28	6,15	11,1	9,5
1/8 - 28	8,15	11,1	9,5
1/4 - 19	10,85	16,3	14
3/8 - 19	14,3	16,7	14,4
1/2 - 14	17,8	22,3	19,1
3/4 - 14	23,2	23,6	20,4
1" - 11	29,2	28,3	24,3

Nom. size D inch - P/1" (tpi)	D_2 mm	D_3 (JS11) mm	t_1 mm	t_4 mm
Rc 1/16 - 28	6,1	6,56	11,1	9,5
1/8 - 28	8,1	8,57	11,1	9,5
1/4 - 19	10,75	11,45	16,3	14
3/8 - 19	14,25	14,95	16,7	14,4
1/2 - 14	17,7	18,63	22,3	19,1
3/4 - 14	23,1	24,12	23,6	20,4
1" - 11	29,1	30,29	28,3	24,3

Nom. size D inch - P/1" (tpi)	D_3 (JS11) mm	b	t min. mm	D_4 min. mm
Rc 1/16 - 28	6,56	5,6	9,9	7,6 +0,3
1/8 - 28	8,57	5,6	9,9	9,6 +0,3
1/4 - 19	11,45	8,4	14,6	13 +0,5
3/8 - 19	14,95	8,8	15	16,5 +0,5
1/2 - 14	18,63	11,4	20	20,6 +0,5
3/4 - 14	24,12	12,7	21,3	26 +0,5
1" - 11	30,29	14,5	25,4	32,8 +0,5

NPT

American tapered pipe thread ANSI/ASME B1.20.1
for threads with dryseal material taper 1:16

Nom. size D inch - P/1" (tpi)	D_1 mm	t_1 mm	t_4 mm
1/16 - 27	6,15	11,8	9,7
1/8 - 27	8,5	11,9	9,75
1/4 - 18	11	17,4	14,25
3/8 - 18	14,4	17,7	14,55
1/2 - 14	17,8	23,1	19
3/4 - 14	23,15	23,6	19,5
1" - 11 1/2	29,05	28,4	23,4
1 1/4 - 11 1/2	37,8	28,9	23,9
1 1/2 - 11 1/2	43,85	28,9	23,9
2" - 11 1/2	55,85	29,3	24,35

Nom. size D inch - P/1" (tpi)	D_2 mm	D_3 +0,05 mm	t_1 mm	t_4 mm
1/16 - 27	5,95	6,39	11,8	9,7
1/8 - 27	8,3	8,74	11,9	9,75
1/4 - 18	10,75	11,36	17,4	14,25
3/8 - 18	14,15	14,8	17,7	14,55
1/2 - 14	17,45	18,32	23,1	19
3/4 - 14	22,8	23,67	23,6	19,5
1" - 11 1/2	28,65	29,69	28,4	23,4
1 1/4 - 11 1/2	37,35	38,45	28,9	23,9
1 1/2 - 11 1/2	43,45	44,52	28,9	23,9
2" - 11 1/2	55,45	56,56	29,3	24,35

Nom. size D inch - P/1" (tpi)	D_3 +0,05 mm	b	t min. mm	D_4 min. mm
1/16 - 27	6,39	7	10	7,6
1/8 - 27	8,74	7	10	10
1/4 - 18	11,36	10,2	14,5	13,1
3/8 - 18	14,8	10,6	15	16,5
1/2 - 14	18,32	13,8	19	20,5
3/4 - 14	23,67	14,2	20	25,8
1" - 11 1/2	29,69	17	24	32,2
1 1/4 - 11 1/2	38,45	17,5	24,5	41
1 1/2 - 11 1/2	44,52	17,5	24,5	47,2
2" - 11 1/2	56,56	18	25	59,2

NPTF

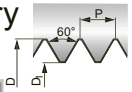
American tapered pipe thread ANSI B1.20.3
for threads without dryseal material taper 1:16

Nom. size D inch - P/1" (tpi)	D_1 mm	t_1 mm	t_4 mm
1/16 - 27	6,1	13	10,65
1/8 - 27	8,45	13	10,7
1/4 - 18	10,9	19,2	15,65
3/8 - 18	14,3	19,5	16
1/2 - 14	17,6	25,4	20,85
3/4 - 14	23	25,9	21,3
1" - 11 1/2	28,75	31,1	25,6
1 1/4 - 11 1/2	37,5	31,7	26,15
1 1/2 - 11 1/2	43,75	31,7	26,15
2" - 11 1/2	55,75	32,1	26,55

Nom. size D inch - P/1" (tpi)	D_2 mm	D_3 +0,05 mm	t_1 mm	t_4 mm
1/16 - 27	5,95	6,41	13	10,65
1/8 - 27	8,3	8,76	13	10,7
1/4 - 18	10,75	11,4	19,2	15,65
3/8 - 18	14,15	14,84	19,5	16
1/2 - 14	17,45	18,33	25,4	20,85
3/4 - 14	22,8	23,68	25,9	21,3
1" - 11 1/2	28,65	29,72	31,1	25,6
1 1/4 - 11 1/2	37,35	38,48	31,7	26,15
1 1/2 - 11 1/2	43,45	44,55	31,7	26,15
2" - 11 1/2	55,45	56,59	32,1	26,55

Nom. size D inch - P/1" (tpi)	D_3 +0,05 mm	b	t min. mm	D_4 min. mm
1/16 - 27	6,41	8	11	7,4
1/8 - 27	8,76	8	11	9,8
1/4 - 18	11,4	11,6	15,5	12,9
3/8 - 18	14,84	12	16	16,3
1/2 - 14	18,33	15,6	20,5	20,3
3/4 - 14	23,68	16	21,5	25,6
1" - 11 1/2	29,72	19,2	26	32
1 1/4 - 11 1/2	38,48	19,7	26,5	40,8
1 1/2 - 11 1/2	44,55	19,7	26,5	47
2" - 11 1/2	56,59	20,2	27	59

Threads for the Aerospace Industry



MJ MJ thread DIN ISO 5855

Nom. size		D_1		
D mm	P mm	min. mm	max. mm	mm
MJ 3	0,5	2,513	2,653	2,6
4	0,7	3,318	3,498	3,4
5	0,8	4,221	4,421	4,3
6	1	5,026	5,216	5,1
8	1	7,026	7,216	7,1
8	1,25	6,782	6,994	6,9
10	1,25	8,782	8,994	8,9
10	1,5	8,539	8,775	8,6

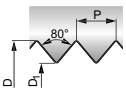
UNJF Unified fine thread ASME B1.15

Nom. size		D_1		
D inch	P/1" (tpi)	min. mm	max. mm	mm
Nr. 4	48	2,329	2,466	2,4
Nr. 6	40	2,888	3,053	3
Nr. 8	36	3,480	3,663	3,55
Nr. 10	32	4,054	4,255	4,15
1/4	28	5,466	5,662	5,55
5/16	24	6,906	7,109	7
3/8	24	8,494	8,679	8,6

UNJC Unified coarse thread ASME B1.15

Nom. size		D_1		
D inch	P/1" (tpi)	min. mm	max. mm	mm
Nr. 4	40	2,228	2,393	2,3
Nr. 6	32	2,733	2,939	2,85
Nr. 8	32	3,393	3,599	3,5
Nr. 10	24	3,795	4,064	3,9
1/4	20	5,113	5,387	5,25
5/16	18	6,563	6,833	6,7
3/8	16	7,978	8,255	8,1

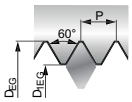
Steel Conduit Threads



Pg Steel conduit thread DIN 40430

Nom. size		D_1		
D mm	P/1" (tpi)	min. mm	max. mm	mm
Pg 7	20	11,28	11,43	11,35
9	18	13,86	14,01	13,95
11	18	17,26	17,41	17,35
13,5	18	19,06	19,21	19,15
16	18	21,16	21,31	21,25
21	16	26,78	27,03	26,95
29	16	35,48	35,73	35,6
36	16	45,48	45,73	45,6
42	16	52,48	52,73	52,6
48	16	57,78	58,03	57,9

Helical Coil Threads for Wire Thread Inserts



EG M (STI) ISO Metric coarse thread DIN 8140-2

Nom. size		D_{EG}	D_{1EG}		
D mm	P mm	min. mm	min. mm	max. mm	mm
EG M2,5	0,45	3,084	2,597	2,697	2,65
3	0,5	3,650	3,108	3,220	3,15
4	0,7	4,910	4,152	4,292	4,2
5	0,8	6,040	5,174	5,334	5,25
6	1	7,300	6,217	6,407	6,3
8	1,25	9,624	8,271	8,483	8,4
10	1,5	11,948	10,324	10,560	10,5
12	1,75	14,274	12,379	12,644	12,5
14	2	16,598	14,433	14,733	14,5
16	2	18,598	16,433	16,733	16,5
18	2,5	21,248	18,541	18,896	18,75
20	2,5	23,248	20,541	20,896	20,75

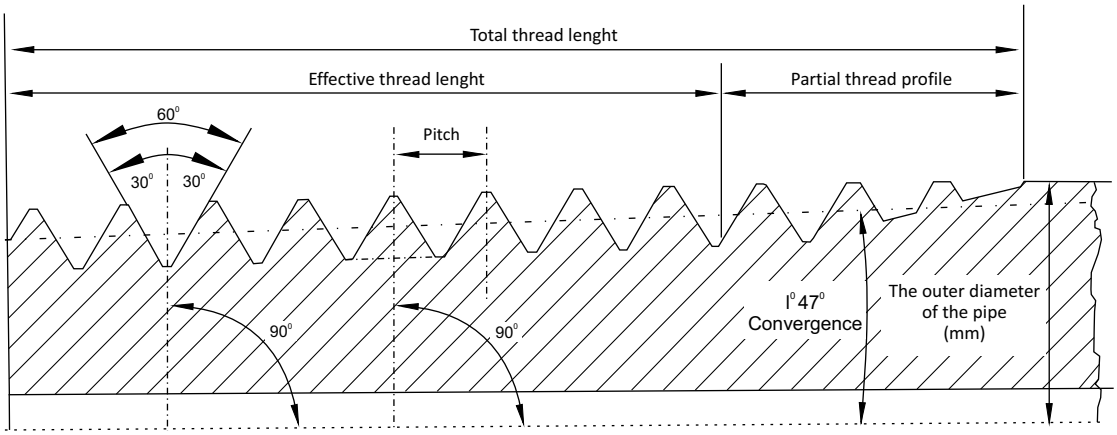
EG UNC (STI) Unified coarse thread ASME B18.29.1

Nom. size		D_{EG}	D_{1EG}		
D mm	P/1" (tpi)	min. mm	min. mm	max. mm	mm
EG Nr. 4	40	3,671	2,982	3,178	3,1
Nr. 6	32	4,536	3,678	3,879	3,8
Nr. 8	32	5,197	4,338	4,523	4,4
Nr. 10	24	6,200	5,054	5,283	5,2
1/4	20	8,002	6,628	6,872	6,7
5/16	18	9,771	8,244	8,490	8,4
3/8	16	11,587	9,867	10,126	10
7/16	14	13,469	11,506	11,783	11,6
1/2	13	15,237	13,121	13,393	13,3
9/16	12	17,039	14,747	15,031	14,9
5/8	11	18,875	16,376	16,673	16,5
3/4	10	22,349	19,598	19,908	19,75

EG UNF (STI) Unified coarse thread ASME B18.29.1

Nom. size		D_{EG}	D_{1EG}		
D mm	P/1" (tpi)	min. mm	min. mm	max. mm	mm
EG Nr. 4	48	3,533	2,959	3,119	3
Nr. 6	40	4,330	3,642	3,815	3,7
Nr. 8	36	5,083	4,318	4,496	4,4
Nr. 10	32	5,858	4,999	5,184	5,1
1/4	28	7,528	6,545	6,720	6,6
5/16	24	9,312	8,166	8,351	8,25
3/8	24	10,899	9,753	9,931	9,8
7/16	20	12,763	11,389	11,587	11,5
1/2	20	14,352	12,978	13,176	13,1
9/16	18	16,121	14,594	14,800	14,7
5/8	18	17,709	16,182	16,388	16,25
3/4	16	21,112	19,392	19,608	19,5

TAPERED TREAD PROFILE EXTERNAL NPT



Thread diameter (inch)	Thread pitch (T.P.I)	Outer diameter of the pipe (mm)	Total thread lenght (mm)
1/16	27	7,950	9,896
1/8	27	10,287	9,967
1/4	18	13,716	15,103
3/8	18	17,145	15,255
1/2	14	21,336	19,850
3/4	14	26,670	20,155
1	11.1/2	33,401	25,006
1.1/4	11.1/2	42,164	25,616
1.1/2	11.1/2	48,260	26,040
2	11.1/2	60,325	26,878
2.1/2	8	73,025	39,908
3	8	88,900	41,496
3.1/2	8	101,600	42,766
4	8	114,300	44,036

11.3. Recommended Hole Diameters for Forming Taps

M

Nom. size D mm	P mm	mm
M 1	0,25	0,9
1,1	0,25	1
1,2	0,25	1,1
1,4	0,3	1,28
1,6	0,35	1,47
1,7	0,35	1,57
1,8	0,35	1,67
2	0,4	1,85
2,2	0,45	2,03
2,3	0,4	2,15
2,5	0,45	2,33
2,6	0,45	2,43
3	0,5	2,8
3,5	0,6	3,25
4	0,7	3,7
4,5	0,75	4,2
5	0,8	4,65
5,5	0,9	5,1
6	1	5,6
7	1	6,6
8	1,25	7,45
9	1,25	8,45
10	1,5	9,35
12	1,75	11,25
14	2	13,1
16	2	15,1
18	2,5	16,85
20	2,5	18,85
22	2,5	20,85
24	3	22,65
27	3	25,65
30	3,5	28,4
33	3,5	31,4
36	4	34,15
39	4	37,15
42	4,5	39,9
45	4,5	42,9
48	5	45,65

MF

Nom. size D mm	x	P mm	mm
M 2,5	x	0,35	2,37
2,6	x	0,35	2,47
3	x	0,35	2,88
3,5	x	0,35	3,38
4	x	0,5	3,8
5	x	0,5	4,8
6	x	0,5	5,8
6	x	0,75	5,7
7	x	0,75	6,7
8	x	0,75	7,7
8	x	1	7,6
9	x	0,75	8,7
9	x	1	8,6
10	x	0,75	9,7
10	x	1	9,6
10	x	1,25	9,45
11	x	1	10,6
12	x	1	11,6
12	x	1,25	11,45
12	x	1,5	11,35
14	x	1	13,6
14	x	1,25	13,45
14	x	1,5	13,35
15	x	1	14,6
15	x	1,5	14,35
16	x	1	15,6
16	x	1,5	15,35
18	x	1	17,6
18	x	1,5	17,35
18	x	2	17,1
20	x	1	19,6
20	x	1,5	19,35
20	x	2	19,1
24	x	2	23,1
30	x	2	29,1
36	x	3	34,65
42	x	4	40,15
48	x	3	46,65

UNC

Nom. size D inch	-	P/1" (tpi)	mm
Nr. 4	-	40	2,55
Nr. 5	-	40	2,9
Nr. 6	-	32	3,15
Nr. 8	-	32	3,8
Nr. 10	-	24	4,35
Nr. 12	-	24	5
1/4	-	20	5,75
5/16	-	18	7,3
3/8	-	16	8,8
7/16	-	14	10,25
1/2	-	13	11,8
9/16	-	12	13,3
5/8	-	11	14,8
3/4	-	10	17,85
7/8	-	9	20,9
1"	-	8	23,9

UNF

Nom. size D inch	-	P/1" (tpi)	mm
Nr. 2	-	64	2,02
Nr. 3	-	56	2,32
Nr. 4	-	48	2,62
Nr. 5	-	44	2,92
Nr. 6	-	40	3,22
Nr. 8	-	36	3,85
Nr. 10	-	32	4,45
Nr. 12	-	28	5,1
1/4	-	28	5,95
5/16	-	24	7,45
3/8	-	24	9,05
7/16	-	20	10,55
1/2	-	20	12,15
9/16	-	18	13,65
5/8	-	18	15,25
3/4	-	16	18,35
7/8	-	14	21,4
1"	-	12	24,45

G

Nom. size D	-	P/1" (tpi)	mm
G 1/16	-	28	7,25
1/8	-	28	9,25
1/4	-	19	12,55
3/8	-	19	16,05
1/2	-	14	20,1
5/8	-	14	22,05
3/4	-	14	25,6
7/8	-	14	29,35
1"	-	11	32,15

11.4. Formulas to calculate technological parameters for drilling and tapping

Relationships of peripherial speed andd rotational speed andd tool diameter

Cutting speed Vc [m/min]

$$v_c = \frac{d_1 \times \pi \times n}{1000}$$

Spindle rotation speed [RPM]

$$n = \frac{1000 \times v_c}{d_1 \times \pi}$$

Feeding speed Vf [mm/min]

- when tapping

$$v_f = p \times n$$

- when drilling

$$v_f = f_o \times n$$

$$f_o = \frac{v_f}{n}$$

Torque when tapping M_d [Nm]

$$M_d = \frac{p^2 \times d_1 \times k_c}{8000}$$

Torque when drilling Mc [Nm]

$$M_c = \frac{F_c \times z \times d_1}{4000}$$

Cutting force per one tooth F_c [N]

$$F_c = \frac{d_1 \times f_o \times k_c}{2}$$

Power P [kW]

$$P = \frac{M_{c,d} \times 2 \times \pi \times n}{60000}$$

Key:

d_1 - nominal diameter of tool [mm]

v_c - cutting speed [m/min]

n - spindle rotation speed [RPM]

p - thread pitch [mm]

P - power [kW]

v_f - feeding speed [m/min]

f_o - feed per revolution [RPM]

k_c - specific resistance of workpiece material [MPa]

M_d - torque when tapping [Nm]

z - cutting edges

11.5. Recommended diameter for thread cuting rods

M

THREAD	ø d
M 1	0,96
M 1,1	1,05
M 1,2	1,15
M 1,4	1,35
M 1,6	1,55
M 1,8	1,75
M 2	1,95
M 2,2	2,15
M 2,5	2,42
M 3	2,92
M 3,5	3,41
M 4	3,90
M 4,5	4,40
M 5	4,90
M 6	5,88
M 7	6,88
M 8	7,86
M 9	8,86
M 10	9,85
M 11	10,85
M 12	11,83
M 14	13,82
M 16	15,82
M 18	17,79
M 20	19,79
M 22	21,79
M 24	23,76
M 27	26,76
M 30	29,73
M 33	32,73
M 36	35,70
M 39	38,70
M 42	41,68
M 45	44,68
M 48	47,66
M 52	51,66
M 56	55,65
M 60	59,65
M 64	63,62
M 68	67,62

MF

THREAD	ø d
M3,5x0,5	3,43
M4x0,5	3,92
M4,5x0,5	4,43
M5x0,5	4,92
M5x0,75	4,91
M5,5x0,5	5,43
M5,5x0,75	5,42
M6x0,5	5,92
M6x0,75	5,90
M7x0,75	6,90
M8x0,5	7,92
M8x0,75	7,90
M8x1	7,88
M9x0,75	8,90
M9x1	8,88
M10x0,75	9,90
M10x1	9,88
M10x1,25	9,86
M11x0,75	10,91
M11x1	10,88
M12x1	11,88
M12x1,25	11,86
M12x1,5	11,85
M14x1	13,88
M14x1,5	13,85

MF cd.

THREAD	ø d
M15x1	14,88
M15x1,5	14,85
M16x1	15,88
M16x1,5	15,85
M17x1	16,88
M17x1,5	16,85
M18x1	17,88
M18 x1,5	17,85
M18x2	17,82
M20x1	19,88
M20x1,5	19,85
M20x2	19,82
M22x1	21,88
M22x1,5	21,85
M22x2	21,82
M24x1	23,88
M24x1,5	23,85
M24x2	23,82
M25x1	24,88
M25x1,5	24,85
M25x2	24,82
M26x1,5	25,85
M27x1	26,88
M27x1,5	26,85
M27x2	26,82
M28x1	27,88
M28x1,5	27,85
M28x2	27,82
M30x1	29,88
M30x1,5	29,85
M30x2	29,82
M30x3	29,76
M32x1,5	31,85
M32x2	31,82
M33x1,5	32,85
M33x2	32,82
M33x3	32,76
M35x1,5	34,85
M36x1,5	35,85
M36x2	35,82
M36x3	35,76
M38x1,5	37,85
M39x1,5	38,85
M39x2	38,82
M39x3	38,76
M40x1,5	39,85
M40x2	39,82
M40x3	39,76
M42x1,5	41,85
M42x2	41,82
M42x3	41,76
M45x1,5	44,85
M45x2	44,82
M45x3	44,76
M48x1,5	47,85
M48x2	47,82
M48x3	47,76
M48x4	47,73
M50x1,5	49,85
M50x2	49,82
M50x3	49,76
M52x1,5	51,85
M52x2	51,82
M52x3	51,76
M52x4	51,73
M55x1,5	54,85
M55x2	54,82
M55x3	54,76
M55x4	54,73
M56x1,5	55,85
M56x2	55,82
M56x3	55,76
M56x4	55,73

G

THREAD	ø d
G - 1/8"	9,62
G - 1/4"	13,03
G - 3/8"	16,54
G - 1/2"	20,81
G - 5/8"	22,77
G - 3/4"	26,30
G - 7/8"	30,06
G - 1"	33,07
G - 1.1/8"	37,72
G - 1.1/4"	41,73
G - 1.3/8"	44,14
G - 1.1/2"	47,62
G - 1.3/4"	53,57
G - 2"	59,43
G - 2.1/4"	65,49

BSW

THREAD	ø d
1/8 - 40	3,09
3/16 - 24	4,66
1/4 - 20	6,24
5/16 - 18	7,82
3/8 - 16	9,40
7/16 - 14	10,98
1/2 - 12	12,56
9/16 - 12	14,14
5/8 - 11	15,72
3/4 - 10	18,89
7/8 - 9	22,10
1 - 8	25,27

NPT

THREAD	ø d
1/8"	9,99
1/4"	13,26
3/8"	16,67
1/2"	20,71
3/4"	26,03
1"	32,59

UNC

THREAD	ø d
No 5 - 40	3,09
No 6 - 32	3,41
No 8 - 32	4,07
No 10 - 24	4,71
No 12 - 24	5,37
1/4 - 20	6,22
5/16 - 18	7,80
3/8 - 16	9,37
7/16 - 14	10,95
1/2 - 13	12,52
9/16 - 12	14,10
5/8 - 11	15,68
3/4 - 10	18,84
7/8 - 9	22,00
1 - 8	25,16
1.1/8 - 7	28,31
1.1/4 - 7	31,49
1.3/8 - 6	34,63
1.1/2 - 6	37,80
1.3/4 - 5	44,12
2 - 4.1/2	50,45

UNF

THREAD	ø d
No 5 - 44	3,10
No 6 - 40	3,42
No 8 - 36	4,08
No 10 - 32	4,73
No 12 - 28	5,38
1/4 - 28	6,24
5/16 - 24	7,82
3/8 - 24	9,41
7/16 - 20	10,98
1/2 - 20	12,56
9/16 - 18	14,14
5/8 - 18	15,73
3/4 - 16	18,89
7/8 - 14	22,05
1 - 12	25,21
1.1/8 - 12	28,38
1.1/4 - 12	31,55
1.3/8 - 12	34,73
1.1/2 - 12	37,90

R

THREAD	ø d
R - 1/8"	9,48
R - 1/4"	12,78
R - 3/8"	16,26
R - 1/2"	20,44
R - 3/4"	25,85
R - 1"	32,60

BSF

THREAD	ø d
3/16 - 32	4,76
1/4 - 26	6,25
5/16 - 22	7,83
3/8 - 20	9,41
7/16 - 18	10,99
1/2 - 16	12,57
9/16 -16	14,16
5/8 - 14	15,73
3/4 - 12	18,89
7/8 - 11	22,11
1 - 10	25,28

Pg

THREAD	ø d
Pg 7	12,40
Pg 9	15,10
Pg 11	18,50
Pg 13,5	20,30
Pg 16	22,40
Pg 21	28,15
Pg 29	36,85
Pg 36	46,85
Pg 42	53,85
Pg 48	59,15

11.6. Relationships of peripherial speed andd rotational speed andd tool diameter

$\varnothing d_1$ [mm]	$V = \pi \cdot d_1 n / 1000$ [m/min]														
	2	3	4	5	6	8	10	12	15	18	20	25	30	35	40
3	212	318	424	531	637	849	1061	1273	1592	1910	2122	2653	3183	3714	4244
3,5	182	273	364	455	546	728	909	1091	1364	1637	1819	2274	2728	3183	3638
4	159	239	318	398	477	637	796	955	1194	1432	1592	1989	2387	2785	3183
4,5	141	212	283	354	424	566	707	849	1061	1273	1415	1768	2122	2476	2829
5	127	191	255	318	382	509	637	764	955	1146	1273	1592	1910	2228	2546
6	106	159	212	265	318	424	531	637	796	955	1061	1326	1592	1857	2122
7	91	136	182	227	273	364	455	546	682	819	909	1137	1364	1592	1819
8	80	119	159	199	239	318	398	477	597	716	796	995	1194	1393	1592
9	71	106	141	177	212	283	354	424	531	673	707	884	1061	1238	1415
10	64	95	127	159	191	255	318	382	477	573	637	796	955	1114	1273
11	58	87	116	145	174	231	289	347	434	521	579	723	868	1013	1157
12	53	80	106	133	159	212	265	318	398	477	531	663	796	928	1061
14	45	68	91	114	136	182	227	273	341	409	455	568	682	796	909
16	40	60	80	99	119	159	199	239	298	358	398	497	597	696	796
18	35	53	71	88	106	141	177	212	265	318	354	442	531	619	707
20	32	48	94	80	95	127	159	191	239	286	318	398	477	557	637
22	29	43	58	72	87	116	145	174	217	260	289	362	434	506	579
24	27	40	53	66	80	106	133	159	199	239	265	332	398	464	531
27	24	35	47	59	71	94	118	141	177	212	236	295	354	413	472
30	21	32	42	53	64	85	106	127	159	191	212	265	318	371	424
33	19	29	39	48	58	77	96	116	145	174	193	241	289	338	386
36	18	27	35	44	53	71	88	106	133	159	177	221	265	309	354
39	16	24	33	41	49	65	82	98	122	147	163	204	245	286	326
42	15	23	30	38	45	61	76	91	114	136	152	189	227	265	303
45	14	21	28	35	42	57	71	85	106	127	141	177	212	248	283
48	13	20	27	33	40	53	66	80	99	119	133	166	199	232	265
52	12	18	24	31	37	49	61	73	92	110	122	153	184	214	245

Relationships of resistances Rm, HRC, HB, HV 10

Rm [MPa]	HRC	HB	HV 10
240		71	75
255		76	80
270		81	85
285		86	90
305		90	95
320		95	100
335		100	105
350		105	110
370		109	115
385		114	120
400		119	125
415		124	130
430		128	135
450		133	140
465		138	145
480		143	150
495		147	155
510		152	160
530		157	165
545		162	170
560		166	175
575		171	180
595		176	185
610		181	190
625		185	195
640		190	200
660		195	205
675		199	210

Rm [MPa]	HRC	HB	HV 10
690		204	215
705		209	220
720		214	225
740		219	230
755		223	235
770		228	240
785		233	245
800	22	238	250
820	23	242	255
835	24	247	260
860	25	255	268
870	26	258	272
900	27	266	280
920	28	273	287
940	29	278	293
970	30	287	302
995	31	295	310
1020	32	301	317
1050	33	311	327
1080	34	319	336
1110	35	328	345
1140	36	337	355
1170	37	346	364
1200	38	354	373
1230	39	363	382
1260	40	372	392
1300	41	383	403
1330	42	393	413

Rm [MPa]	HRC	HB	HV 10
1360	43	402	423
1400	44	413	434
1440	45	424	446
1480	46	435	458
1530	47	449	473
1570	48	460	484
1620	49	472	497
1680	50	488	514
1730	51	501	527
1890	52	517	544
1845	53	532	560
1910	54	549	578
1980	55	567	596
2050	56	584	615
2140	57	607	639
	58	622	655
	59		675
	60		698
	61		720
	62		745
	63		773
	64		800
	65		829
	66		864
	67		900
	68		940

11.7. Limit dimensions of pitch diameter - internal thread

ISO metric thread

Nominal size		6H		6G	
M	MF	min	max	min	max
M 2		1,740	1,830	1,759	1,849
M 2,2		1,908	2,003	1,928	2,023
M 2,5		2,208	2,303	2,228	2,323
M 3		2,675	2,775	2,695	2,795
M 3,5		3,110	3,222	3,131	3,243
M 4		3,545	3,663	3,567	3,685
	M 4x0,5	3,675	3,775	3,695	3,795
M 4,5		4,013	4,131	4,035	4,153
M 5		4,480	4,605	4,504	4,629
	M 5x0,5	4,675	4,775	4,695	4,795
M 6		5,350	5,500	5,376	5,526
	M 6x0,75	5,513	5,645	5,535	5,667
M 7		6,350	6,500	6,376	6,526
M 8		7,188	7,348	7,216	7,376
	M 8x0,75	7,513	7,645	7,535	7,667
	M 8x1	7,350	7,500	7,376	7,526
M 9		8,188	8,348	8,216	8,376
M 10		9,026	9,206	9,058	9,238
	M 10x0,75	9,513	9,645	9,535	9,667
	M 10x1	9,350	9,500	9,376	9,526
	M 10x1,25	9,188	9,348	9,216	9,376
M 12		10,863	11,063	10,897	11,097
	M 12x1	11,350	11,510	11,376	11,536
	M 12x1,25	11,188	11,368	11,216	11,396
	M 12x1,5	11,026	11,216	11,058	11,248
M 14		12,701	12,913	12,739	12,951
	M 14x1,5	13,026	13,216	13,058	13,248
M 16		14,701	14,913	14,739	14,951
	M 16x1,5	15,026	15,216	15,058	15,248
M 18		16,376	16,600	16,418	16,642
	M 18x1,5	17,026	17,216	17,058	17,248
M 20		18,376	18,600	18,418	18,642
	M 20x1,5	19,026	19,216	19,058	19,248
	M 20x2	18,701	18,913	18,739	18,951
M 22		20,376	20,600	20,418	20,642
	M 22x1,5	21,026	21,216	21,058	21,248
M 24		22,051	22,316	22,099	22,364
	M 24x1,5	23,026	23,226	23,058	23,258
	M 24x2	22,701	22,925	22,739	22,963
	M 26x1,5	25,026	25,226	25,058	25,258
M 27		25,051	25,316	25,099	25,364
	M 27x1,5	26,026	26,226	26,058	26,258
	M 27x2	25,701	25,925	25,739	25,963
	M 28x1,5	27,026	27,226	27,058	27,258
M 30		27,727	28,007	27,780	28,060
	M 30x1,5	29,026	29,226	29,058	29,258
	M 30x2	28,701	28,925	28,739	28,963
	M 32x1,5	31,026	31,226	31,058	31,258
	M 32x2	30,701	30,925	30,739	30,963
M 33		30,727	31,007	30,780	31,060
	M 33x1,5	32,026	32,226	32,058	32,258
	M 33x2	31,701	31,925	31,739	31,963
M 36		33,402	33,702	33,462	33,762
	M 36x1,5	35,026	35,226	35,058	35,258
	M 36x2	34,701	34,925	34,739	34,963
	M 36x3	34,051	34,316	34,099	34,364
M 39		36,402	36,702	36,462	36,762
	M 39x1,5	38,026	38,226	38,058	38,258
	M 39x2	37,701	37,925	37,739	37,963
	M 39x3	37,051	37,316	37,099	37,364
	M 40x1,5	39,026	39,226	39,058	39,258
M 42		39,077	39,392	39,140	39,455
	M 42x1,5	41,026	41,226	41,058	41,258
	M 42x2	40,701	40,925	40,739	40,963
	M 42x3	40,051	40,316	40,099	40,364
M 45		42,077	42,392	42,140	42,455
	M 45x1,5	44,026	44,226	44,058	44,258
	M 45x2	43,701	43,925	43,739	43,963
	M 45x3	43,051	43,316	43,099	43,364
M 48		44,752	45,087	44,823	45,158
	M 48x1,5	47,026	47,238	47,058	47,270
	M 48x2	46,701	46,937	46,739	46,975
	M 48x3	46,051	46,331	46,099	46,379
M 52		48,752	49,087	48,823	49,158
	M 52x2	50,701	50,937	50,739	50,975
	M 52x3	50,051	50,331	50,099	50,379

American unified thread UNC and UNF

Nominal size		2B / 3B	2B	3B
UNC	UNF	min	max	max
No 5 - 40		2,764	2,847	2,827
	No 5 - 44	2,799	2,880	2,860
No 6 - 32		2,990	3,084	3,058
	No 6 - 40	3,094	3,180	3,157
No 8 - 32		3,650	3,746	3,721
	No 8 - 36	3,708	3,800	3,777
No 10 - 24		4,138	4,247	4,219
	No 10 - 32	4,310	4,409	4,384
No 12 - 24		4,798	4,910	4,882
	No 12 - 28	4,897	5,004	4,976
1/4 - 20		5,524	5,648	5,616
	1/4 - 28	5,761	5,870	5,842
5/16 - 18		7,021	7,155	7,120
	5/16 - 24	7,249	7,371	7,341
3/8 - 16		8,494	8,639	8,603
	3/8 - 24	8,837	8,961	8,931
7/16 - 14		9,934	10,089	10,051
	7/16 - 20	10,287	10,424	10,391
1/2 - 13		11,430	11,595	11,552
	1/2 - 20	11,874	12,017	11,981
9/16 - 12		12,913	13,086	13,043
	9/16 - 18	13,371	13,520	13,482
5/8 - 11		14,376	14,559	14,514
	5/8 - 18	14,958	15,110	15,072
3/4 - 10		17,399	17,595	17,544
	3/4 - 16	18,019	18,184	18,143
7/8 - 9		20,391	20,599	20,546
	7/8 - 14	21,026	21,224	21,181
1 - 8		23,338	23,561	23,505
	1 - 12	24,026	21,224	24,171
1.1/8 - 7		26,218	26,457	26,398
	1.1/8 - 12	27,201	21,224	27,351
1.1/4 - 7		29,393	29,637	29,576
	1.1/4 - 12	30,376	24,219	30,528
1.3/8 - 6		32,174	32,438	32,372
	1.3/8 - 12	33,551	27,399	33,706
1.1/2 - 6		35,349	35,616	35,550
	1.1/2 - 12	36,726	36,937	36,886
1.3/4 - 5		41,151	41,445	41,372
2 - 4.1/2		47,135	47,450	47,371

Whitworth pipe thread G

Nominal size	min	max
G-1/16”	7,142	7,249
G-1/8”	9,147	9,254
G-1/4”	12,301	12,426
G-3/8”	15,806	15,931
G-1/2”	19,793	19,935
G-5/8”	21,749	21,891
G-3/4”	25,279	25,421
G-7/8”	29,039	29,181
G-1”	31,770	31,950
G-1.1/8”	36,418	36,598
G-1.1/4”	40,431	40,611
G-1.3/8”	42,844	43,024
G-1.1/2”	46,324	46,504
G-1.3/4”	52,267	52,447
G-2”	58,135	58,315

FORM OF TOOL SELECTION

FANAR fills
Date:..... Representative:..... Inq. nr .....

Date: ..... **TAP** ☐ **FORMING TAP** ☐

CUSTOMER'S DATA

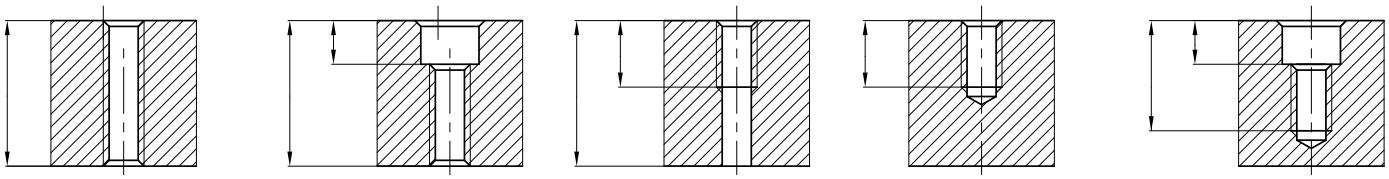
Name and company adress: .....

Contact person: .....tel.....

1. Thread type

1.1. Size: ..... 1.2. Tolerance: .....

1.3. Features and dimensions of threaded hole/bar



☐ ☐ ☐ ☐ ☐

2. Threading and machine

2.1. Type of machine: .....

2.2. Method of threading: horizontal ☐ vertical ☐ 2.3. Forced feed: yes ☐ no ☐

2.4. Type of holder / handle: .....

Axial float: yes ☐ no ☐
Radial float: yes ☐ no ☐
Friction clutch: yes ☐ no ☐

2.5. Cutting speed: .....m/min, ...obr/min

2.6. Lubrification: hand ☐ auto ☐ Lubricant: .....

3. Working material

3.1. Type of element: .....

3.2. Material (symbol): .....

3.3. Hardness: .....HB .....HRC; Extension strength Rm.....N/mm^2

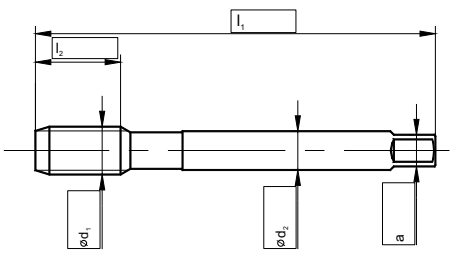
3.4. Type of threaded hole/bar: Drilled ☐ Casted ☐ Reamed ☐ Other:

4. Tool

4.1. Currently used tool (type): .....

4.2. Service life: .....

4.3. Desirable dimensions:



5. Notes .....

.....

Suggested price:

Online version

FORM OF TOOL SELECTION

FANAR fills

Date:..... Representative:..... Inq. nr .....

Date: .....

SCREWING DIE

CUSTOMER'S DATA

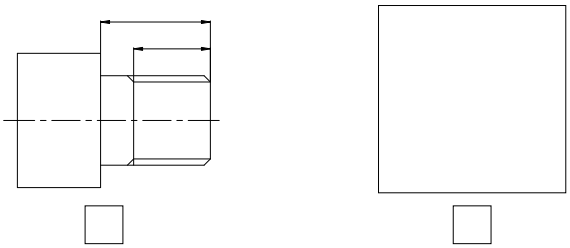
Name and company adress: .....

Contact person: .....tel.....

1. Thread type

1.1. Size: ..... 1.2. Tolerance: .....

1.3. Features and dimensions of threaded hole/bar



2. Threading and machine

2.1. Type of machine: .....

2.2. Method of threading: horizontal ☐ vertical ☐ 2.3. Forced feed: yes ☐ no ☐

2.4. Type of holder / handle: .....

Axial float:	yes ☐	no ☐
Radial float:	yes ☐	no ☐
Friction clutch:	yes ☐	no ☐

2.5. Cutting speed: .....m/min, ...V.p.m

2.6. Lubrification: hand ☐ auto ☐ Lubricant: .....

3. Working material

3.1. Type of element: .....

3.2. Materiał (symbol): .....

3.3. Hardness: .....HB .....HRC; Extension strength Rm.....N/mm^2

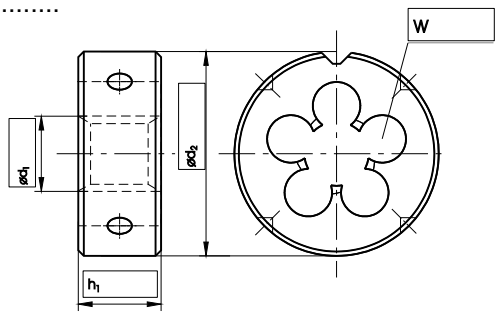
3.4. Type of threaded hole/bar: Drilled☐ Casted☐ Reamed☐ Other:

4. Tool

4.1. Currently used tool (type): .....

4.2. Service life: .....

4.3. Desirable dimensions:



5. Notes .....

.....

Suggested price:

FORM OF TOOL SELECTION

FANAR fills

Date:..... Representative:..... Inq. nr .....

Date: .....

SPECIAL DRILL

CUSTOMER'S DATA

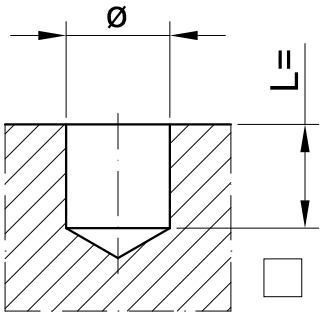
Name and company adress: .....

Contact person: .....tel.....

1. Sketch of the machined part:

1.1. Name of detail:..... 1.2. Workpiece material:.....

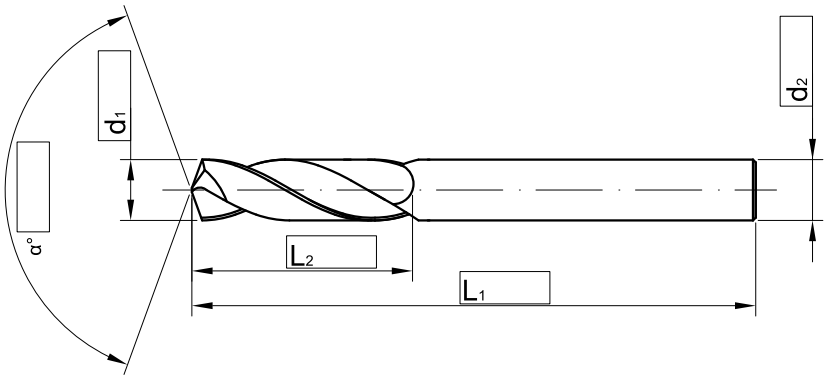
1.3. Hardness:



2. Tool:

2.1. Tool drawing nr:.....

2.2. Suggested material: 2.3. Suggested PVD coating:.....



3. Execution:

3.1. Flutes:	Right spiral	☐	Left spiral	☐	Straight	☐	Spiral angle: .....
3.2. Rotation direction:	Right hand	☐	Left hand	☐			
3.3. Cooling:	External	☐	Internal	☐	Non-cooling	☐	
3.4. Shank:	DIN-6535-HA	☐	DIN-6535-HB	☐	DIN-65350HE	☐	

4. Machine:

4.1.Type of machine: .....

4.2. Type of spindle: .....

4.3. Power[kW]: .....

4.4. Max. rotating speed[RPM]: .....

5. Notes .....

.....

Suggested price:

Online version

FORM OF TOOL SELECTION

FANAR fills

Date:..... Representative:..... Inq. nr .....

Date: .....

SPECIAL 1-STEP DRILL

CUSTOMER'S DATA

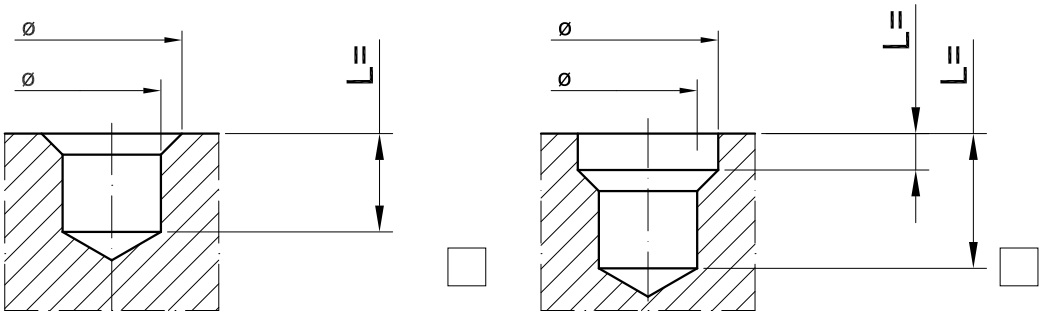
Name and company adress: .....

Contact person: .....tel.....

1. Sketch of the machined part:

1.1. Name of detail:..... 1.2. Workpiece material:.....

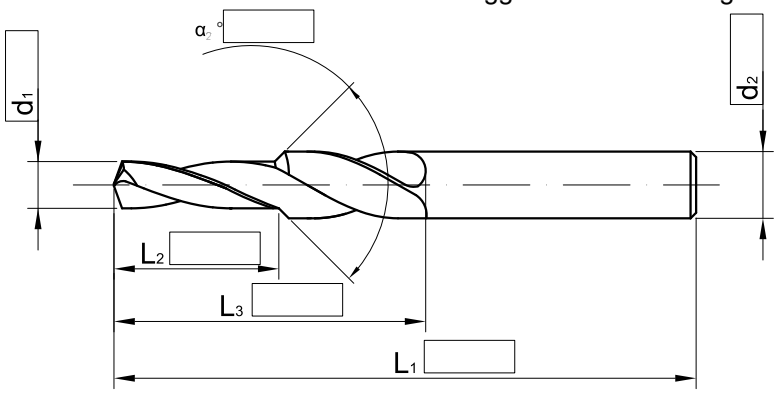
1.3. Hardness:



2. Tool:

2.1. Tool drawing nr:.....

2.2. Suggested material: 2.3. Suggested PVD coating:.....



3. Execution:

3.1. Flutes:	Right spiral	☐	Left spiral	☐	Straight	☐	Spiral angle: .....
3.2. Rotation direction:	Right hand	☐	Left hand	☐			
3.3. Cooling:	External	☐	Internal	☐	Non-cooling	☐	
3.4. Shank:	DIN-6535-HA	☐	DIN-6535-HB	☐	DIN-65350HE	☐	

4. Machine:

4.1.Type of machine:

4.2. Type of spindle: .....

4.3. Power[kW]: .....

4.4. Max. rotating speed[RPM]: .....

5. Notes .....

.....

Suggested price:

Online version

FORM OF TOOL SELECTION

FANAR fills

Date:..... Representative:..... Inq. nr .....

Date: .....

SPECIAL 2-STEP DRILL

CUSTOMER'S DATA

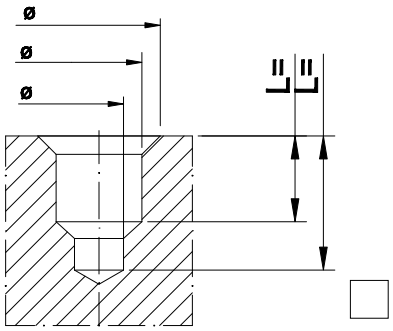
Name and company adress:

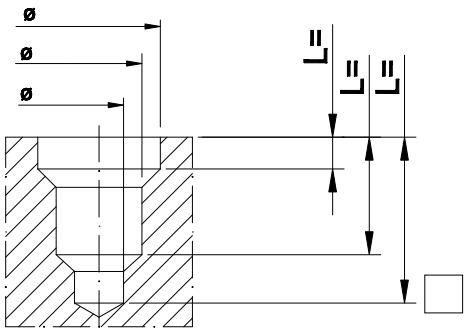
Contact person: .....tel.....

1. Sketch of the machined part:

1.1. Name of detail:..... 1.2. Workpiece material:.....

1.3. Hardness:

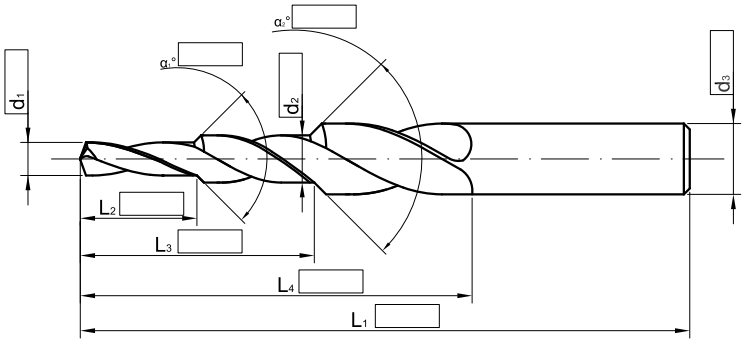




2. Tool:

2.1. Tool drawing nr:.....

2.2. Suggested material: 2.3. Suggested PVD coating:.....



3. Execution:

3.1. Flutes:	Right spiral	☐	Left spiral	☐	Straight	☐	Spiral angle: .....
3.2. Rotation direction:	Right hand	☐	Left hand	☐			
3.3. Cooling:	External	☐	Internal	☐	Non-cooling	☐	
3.4. Shank:	DIN-6535-HA	☐	DIN-6535-HB	☐	DIN-65350HE	☐	

4. Machine:

4.1.Type of machine:

4.2. Type of spindle: .....

4.3. Power[kW]: .....

4.4. Max. rotating speed[RPM]: .....

5. Notes .....

.....

Suggested price:

Online version

FORM OF TOOL SELECTION

FANAR fills

Date:..... Representative:..... Inq. nr .....

Date: .....

SPECIAL DRILL

CUSTOMER'S DATA

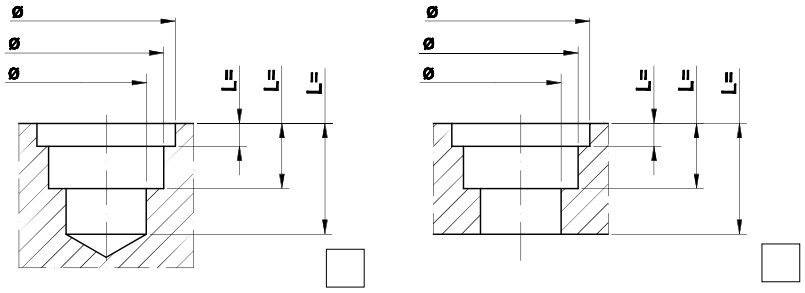
Name and company adress:

Contact person: .....tel.....

1. Sketch of the machined part:

1.1. Name of detail:..... 1.2. Workpiece material:.....

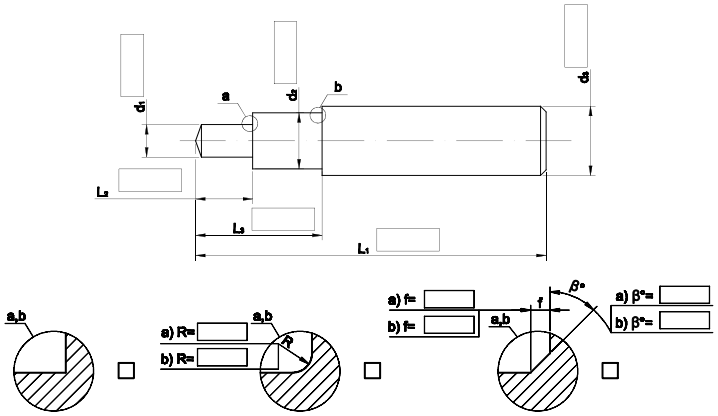
1.3. Hardness:



2. Tool:

2.1. Tool drawing nr:.....

2.2. Suggested material: 2.3. Suggested PVD coating:.....



3. Execution:

3.1. Flutes:	Right spiral	☐	Left spiral	☐	Straight	☐	Spiral angle: .....
3.2. Rotation direction:	Right hand	☐	Left hand	☐			
3.3. Cooling:	External	☐	Internal	☐	Non-cooling	☐	
3.4. Shank:	DIN-6535-HA	☐	DIN-6535-HB	☐	DIN-65350HE	☐	

4. Machine:

4.1.Type of machine:

4.2. Type of spindle: .....

4.3. Power[kW]: .....

4.4. Max. rotating speed[RPM]: .....

5. Notes .....

.....

Suggested price:

Online version