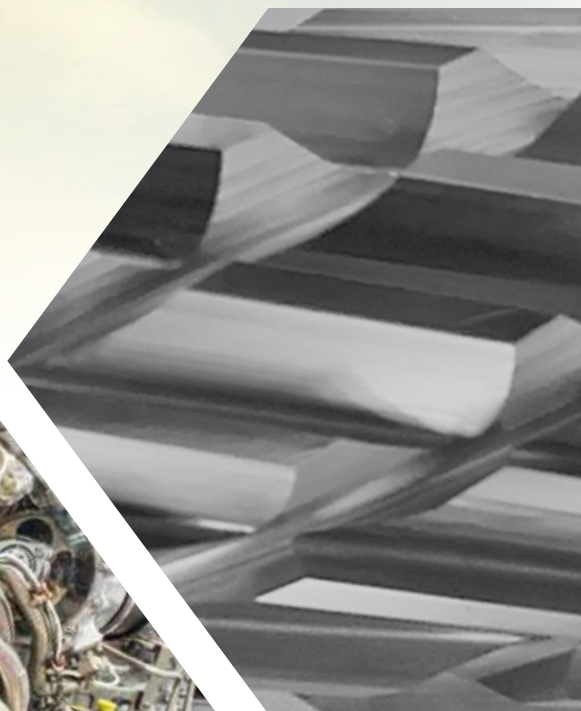




AEROSPACE



Composite Material
High temperature alloys
Titanium alloys
Stainless steel

Complete product range for aerospace industry



MADE IN ITALY



We've been shaping the future for over 45 years

Since 1971 CERIN S.p.A. has supplied the industry with **innovative solid carbide precision cutting tools**.

The engineers and employees have worked to push the limit of innovation allowing us to become one of the world leader in the design and manufacture of solid carbide precision cutting tools thanks to a high technological profile and the ability to offer standard and tailor-made solutions to satisfy the most sophisticated requests of the market. The standard range is one of the widest and most complete.

Our tools are suitable to work any kind of material even newly developed ones.

We are up to the challenge and ready to develop new products and processes to find you a terrific solution

The product range is focused on:

Multiple composite/metal stack panels (CFRP/titanium and CFRP/aluminum) drilling with diamond coated carbide tools;

CFRP and GFRP milling with diamond coated carbide end mills;

Honeycomb panels milling and cut with multi-flute tools;

Nickel-based alloy machining with roughing and finishing cylindrical tools, with and without internal cooling;

HSC end mills for aluminum high material removal;

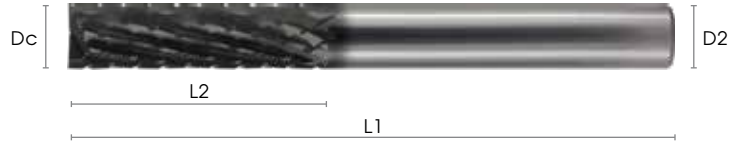
High performance cylindrical end mills with cutting edge preparation for low and high alloy steel.



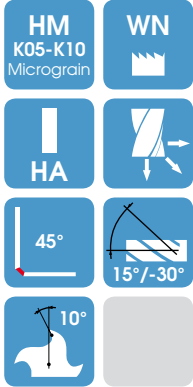
ADVANCED CFRP MILLING

Right helix

CVD Diamond Cer-DM



68DX

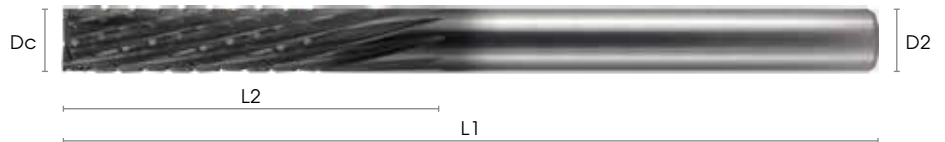


Cod.	Dc	Dc tol.	L2	L1	D2
68DX.040061660DM	4	e9	16	60	6
68DX.060062060DM	6	e9	20	60	6
68DX.060063575DM	6	e9	35	75	6
68DX.080083275DM	8	e9	32	75	8
68DX.0800840100DM	8	e9	40	100	8
68DX.100103272DM	10	e9	32	72	10
68DX.1001050100DM	10	e9	50	100	10
68DX.120123283DM	12	e9	32	83	12
68DX.1201260120DM	12	e9	60	120	12

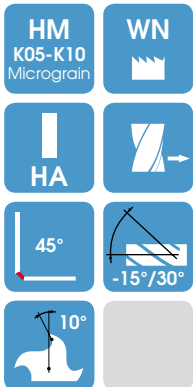
ADVANCED CFRP MILLING

Left helix

CVD Diamond Cer-DM



68SX



Cod.	Dc	Dc tol.	L2	L1	D2
68SX.040061680DM	4	e9	16	80	6
68SX.060062080DM	6	e9	20	80	6
68SX.0600635100DM	6	e9	35	100	6
68SX.0800832100DM	8	e9	32	100	8
68SX.0800840120DM	8	e9	40	120	8
68SX.1001032100DM	10	e9	32	100	10
68SX.1001050120DM	10	e9	50	120	10
68SX.1201232100DM	12	e9	32	100	12
68SX.1201260150DM	12	e9	60	150	12

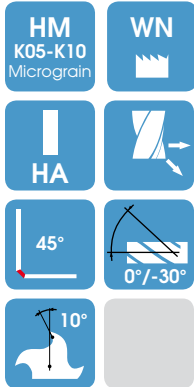
ADVANCED CFRP MILLING

Straight flute

CVD Diamond Cer-DM



68TD

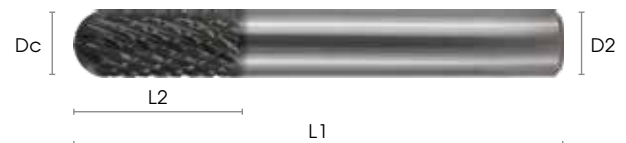


Cod.	Dc	Dc tol.	L2	L1	D2
68TD.040061680DM	4	e9	16	80	6
68TD.060062080DM	6	e9	20	80	6
68TD.0600635100DM	6	e9	35	100	6
68TD.0800832100DM	8	e9	32	100	8
68TD.0800840120DM	8	e9	40	120	8
68TD.1001032100DM	10	e9	32	100	10
68TD.1001050120DM	10	e9	50	120	10
68TD.1201232100DM	12	e9	32	100	12
68TD.1201260150DM	12	e9	60	150	12

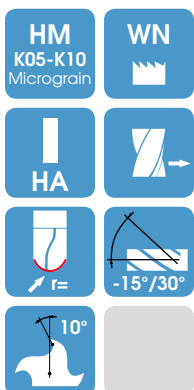
ADVANCED CFRP MILLING

Ball nose right helix

CVD Diamond Cer-DM



68RDX



Cod.	Dc	tol.	L2	L1	D2
68RDX.040061960DM	4	+0 / -0,02	19	60	6
68RDX.060062360DM	6	+0 / -0,02	23	60	6
68RDX.080083675DM	8	+0 / -0,02	36	75	8
68RDX.100103772DM	10	+0 / -0,02	37	72	10
68RDX.120123883DM	12	+0 / -0,02	38	83	12



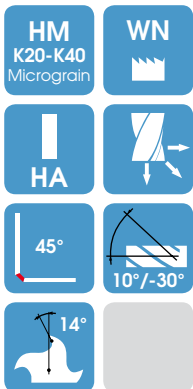
STANDARD CFRP MILLING

Right helix

CVD Diamond Cer-D
Also available without diamond coating



68SU



Cod.	Dc	Dc tol.	L2	L1	D2
68SU.050061660D	5	e9	16	60	6
68SU.050062875D	5	e9	28	75	6
68SU.060062060D	6	e9	20	60	6
68SU.060063575D	6	e9	35	75	6
68SU.080082263D	8	e9	22	63	8
68SU.0800840100D	8	e9	40	100	8
68SU.100102572D	10	e9	25	72	10
68SU.1001050100D	10	e9	50	100	10
68SU.120123083D	12	e9	30	83	12
68SU.1201250100D	12	e9	50	100	12
68SU.160163592D	16	e9	35	92	16
68SU.1601660125D	16	e9	60	125	16

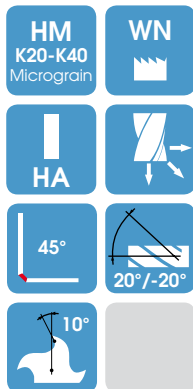
104PH

ADVANCED CFRP MILLING
Up&Down Cutter

CVD Diamond Cer-DM



104PH



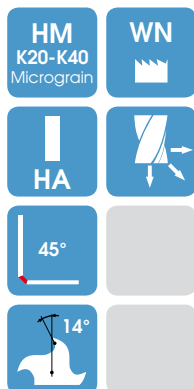
Cod.	Dc	Dc tol.	L2	L1	L3	D2
104PH.060061575DM	6	h10	15	75	7,5	6
104PH.080082075DM	8	h10	20	75	10	8
104PH.1001025100DM	10	h10	25	100	12,5	10
104PH.1201230100DM	12	h10	30	100	15	12

419TD

ADVANCED KEVLAR MILLING
4 Flutes cutter Up&Down chip breaker



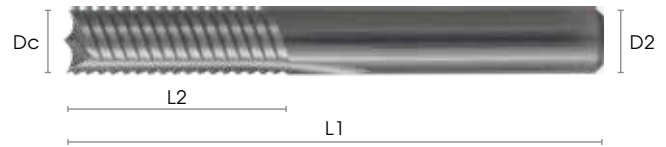
419TD



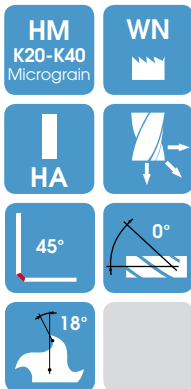
Cod.	Dc	Dc tol.	L2	L1	D2
419.060062060	6	h10	20	60	6
419.060063575	6	h10	35	75	6
419.080083275	8	h10	32	75	8
419.0800840100	8	h10	40	100	8
419.100103272	10	h10	32	72	10
419.1001050100	10	h10	50	100	10
419.120123283	12	h10	32	83	12
419.1201255120	12	h10	55	120	12

STANDARD KEVLAR MILLING

2 Flutes cutter Up&Down chip breaker



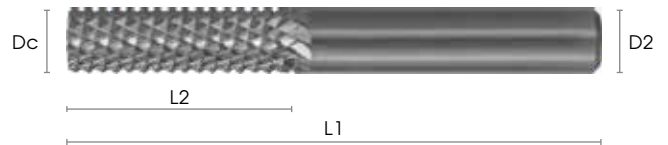
119P



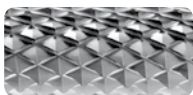
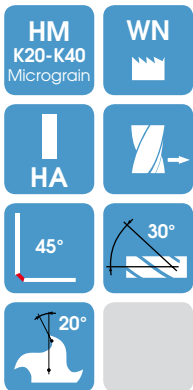
Cod.	Dc	Dc tol.	L2	L1	D2
119P.030031250	3	h10	12	50	3
119P.030061875	3	h10	18	75	6
119P.040041450	4	h10	14	50	4
119P.040062075	4	h10	20	75	6
119P.050051650	5	h10	16	50	5
119P.050062575	5	h10	25	75	6
119P.060062060	6	h10	20	60	6
119P.0600635100	6	h10	35	100	6
119P.080082263	8	h10	22	63	8
119P.0800840100	8	h10	40	100	8
119P.100102572	10	h10	25	72	10
119P.1001050125	10	h10	50	125	10
119P.120123083	12	h10	30	83	12
119P.1201260125	12	h10	60	125	12
119P.160163592	16	h10	35	92	16
119P.1601675150	16	h10	75	150	16
119P.2002045104	20	h10	45	104	20
119P.2002075150	20	h10	75	150	20

106 F, M, G

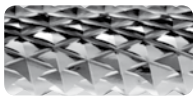
STANDARD GLASS FIBER MILLING
No front cut



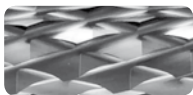
106 F, M, G



F



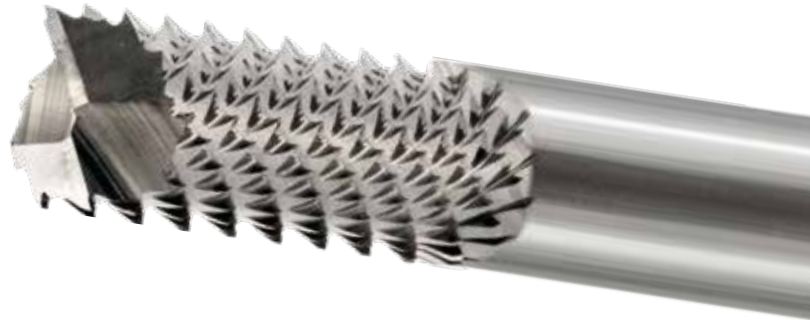
M



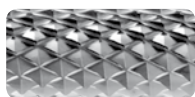
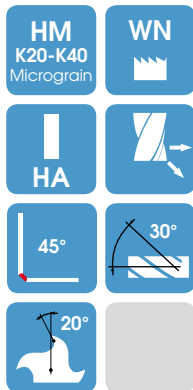
G

Cod.	Dc	Dc tol.	L2	L1	D2
106F.020060750	2	e9	7	50	6
106F.030061250	3	e9	12	50	6
106F.040062050	4	e9	20	50	6
106F.060061850	6	e9	18	50	6
106F.060063575	6	e9	35	75	6
106F.080082563	8	e9	25	63	8
106F.0800840100	8	e9	40	100	8
106F.100103072	10	e9	30	72	10
106F.120123283	12	e9	32	83	12
106M.020060750	2	e9	7	50	6
106M.030061250	3	e9	12	50	6
106M.040062050	4	e9	20	50	6
106M.060061850	6	e9	18	50	6
106M.060063575	6	e9	35	75	6
106M.080082563	8	e9	25	63	8
106M.0800840100	8	e9	40	100	8
106M.100103072	10	e9	30	72	10
106M.120123283	12	e9	32	83	12
106G.020060750	2	e9	7	50	6
106G.030061250	3	e9	12	50	6
106G.040062050	4	e9	20	50	6
106G.060061850	6	e9	18	50	6
106G.060063575	6	e9	35	75	6
106G.080082563	8	e9	25	63	8
106G.0800840100	8	e9	40	100	8
106G.100103072	10	e9	30	72	10
106G.120123283	12	e9	32	83	12

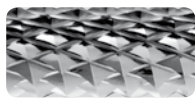
STANDARD GLASS FIBER MILLING With front cut



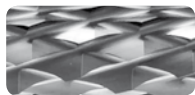
108 F, M, G



F



M



G

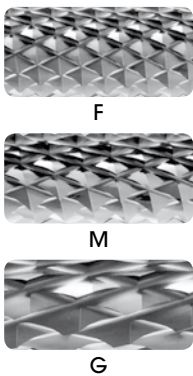
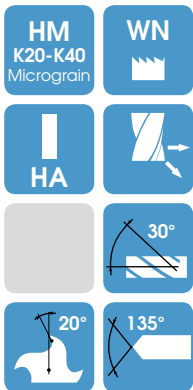
Cod.	Dc	Dc tol.	L2	L1	D2
108F.020060750	2	e9	7	50	6
108F.030061250	3	e9	12	50	6
108F.040062050	4	e9	20	50	6
108F.060061850	6	e9	18	50	6
108F.060063575	6	e9	35	75	6
108F.080082563	8	e9	25	63	8
108F.0800840100	8	e9	40	100	8
108F.100103072	10	e9	30	72	10
108F.120123283	12	e9	32	83	12
108M.020060750	2	e9	7	50	6
108M.030061250	3	e9	12	50	6
108M.040062050	4	e9	20	50	6
108M.060061850	6	e9	18	50	6
108M.060063575	6	e9	35	75	6
108M.080082563	8	e9	25	63	8
108M.0800840100	8	e9	40	100	8
108M.100103072	10	e9	30	72	10
108M.120123283	12	e9	32	83	12
108G.020060750	2	e9	7	50	6
108G.030061250	3	e9	12	50	6
108G.040062050	4	e9	20	50	6
108G.060061850	6	e9	18	50	6
108G.060063575	6	e9	35	75	6
108G.080082563	8	e9	25	63	8
108G.0800840100	8	e9	40	100	8
108G.100103072	10	e9	30	72	10
108G.120123283	12	e9	32	83	12

109 F, M, G

STANDARD GLASS FIBER MILLING
With drill point



109 F, M, G

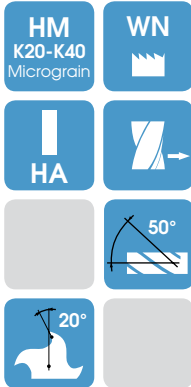


Cod.	Dc	Dc tol.	L2	L1	D2
109F.020060750	2	e9	7	50	6
109F.030061250	3	e9	12	50	6
109F.040062050	4	e9	20	50	6
109F.060061850	6	e9	18	50	6
109F.060063575	6	e9	35	75	6
109F.080082563	8	e9	25	63	8
109F.0800840100	8	e9	40	100	8
109F.100103072	10	e9	30	72	10
109F.120123283	12	e9	32	83	12
109M.020060750	2	e9	7	50	6
109M.030061250	3	e9	12	50	6
109M.040062050	4	e9	20	50	6
109M.060061850	6	e9	18	50	6
109M.060063575	6	e9	35	75	6
109M.080082563	8	e9	25	63	8
109M.0800840100	8	e9	40	100	8
109M.100103072	10	e9	30	72	10
109M.120123283	12	e9	32	83	12
109G.020060750	2	e9	7	50	6
109G.030061250	3	e9	12	50	6
109G.040062050	4	e9	20	50	6
109G.060061850	6	e9	18	50	6
109G.060063575	6	e9	35	75	6
109G.080082563	8	e9	25	63	8
109G.0800840100	8	e9	40	100	8
109G.100103072	10	e9	30	72	10
109G.120123283	12	e9	32	83	12

HONEYCOMB CUT AND DEBURRING multiflute with chipbraker

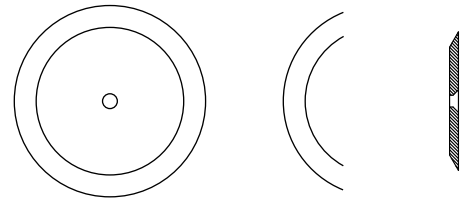


77SUPD / 77SUPP / 77SUPL ...

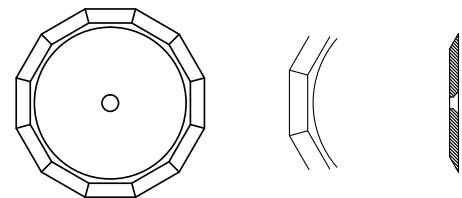


Cod.	Dc	Dc tol.	L2	L1	D2
.120122683	12	e9	26	83	12
.2001220100	20	e9	20	100	12
.2401217100	24	e9	17	100	12
.4401217100	44	e9	17	100	12

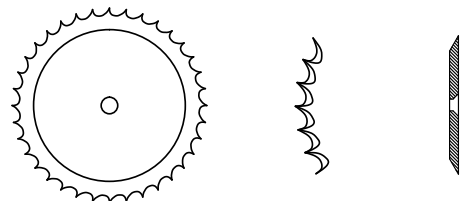
Cod.	Dc	Dc tol.
0GD130390°L	13	+/- 0,1
0GD2103120°L	21	+/- 0,1
0GD2503120°L	25	+/- 0,1
0GD4703120°L	47	+/- 0,1



Cod.	Dc	Dc tol.
0GD130390°P	13	+/- 0,1
0GD2103120°P	21	+/- 0,1
0GD2503120°P	25	+/- 0,1
0GD4703120°P	47	+/- 0,1



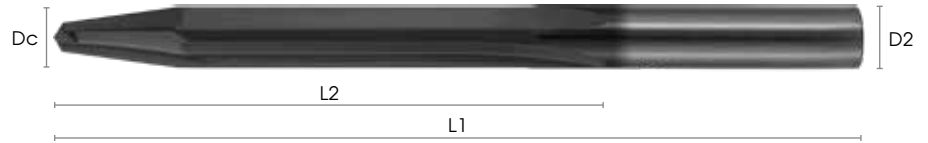
Cod.	Dc	Dc tol.
0GD130390°D	13	+/- 0,1
0GD2103120°D	21	+/- 0,1
0GD2503120°D	25	+/- 0,1
0GD4703120°D	47	+/- 0,1



STANDARD CFRP DRILLING

Straight flute for manual drilling

Also available with DLC coating



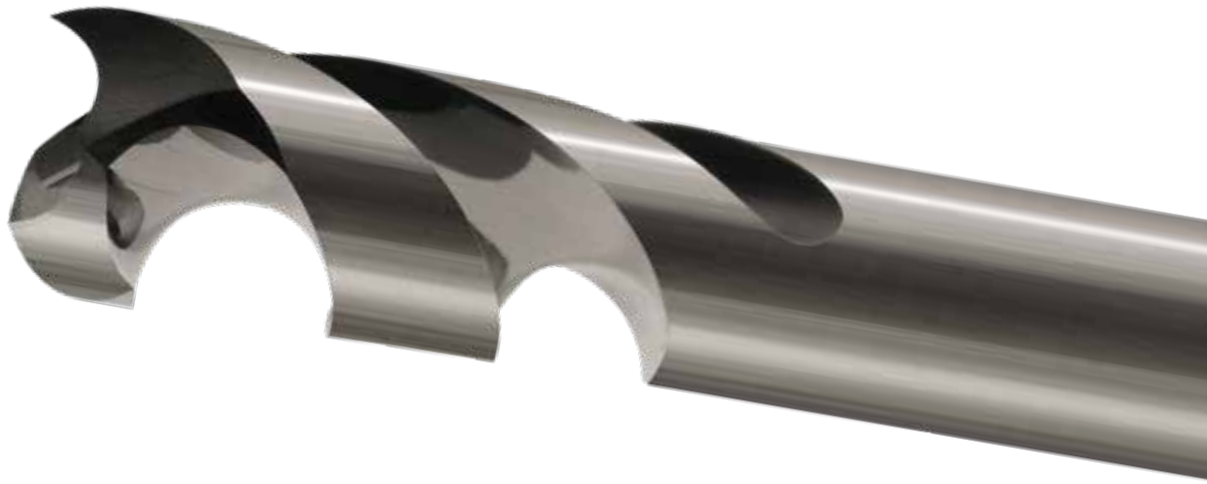
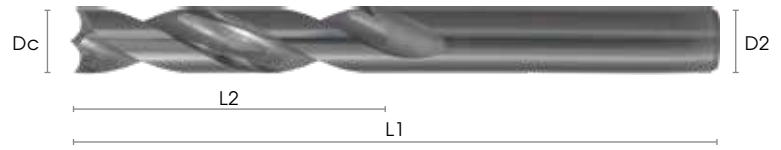
217



Cod.	Dc	Dc tol.	L2	L1	D2
217.020	2,00	H7	50	100	2
217.0248	2,48	H7	50	100	2,48
217.030	3,00	H7	50	100	3
217.0317	3,17	H7	50	100	3,17
217.040	4,00	H7	50	100	4
217.0421	4,21	H7	50	100	4,21
217.0482	4,82	H7	50	100	4,82
217.0505	5,05	H7	50	100	5,05
217.0553	5,53	H7	50	100	5,53
217.060	6,00	H7	50	100	6
217.0635	6,35	H7	50	100	6,35
217.660	6,60	H7	50	100	6,6
217.070	7,00	H7	50	100	7
217.0792	7,92	H7	50	100	7,92
217.080	8,00	H7	50	100	8
217.0863	8,63	H7	50	100	8,63
217.090	9,00	H7	50	100	9
217.100	10,00	H7	50	100	10
217.120	12,00	H7	50	100	12

STANDARD KEVLAR DRILLING

Twist drill for manual and CNC application



118



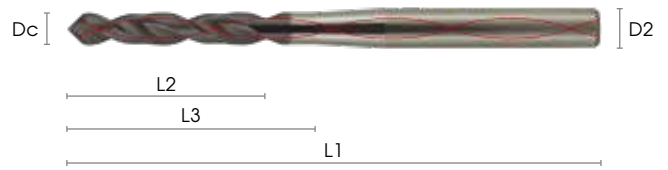
Cod.	Dc	Dc tol.	L2	L1	D2
118.030	3,00	h6	12	40	3
118.0317	3,17	h6	12	40	3,17
118.040	4,00	h6	18	55	4
118.050	5,00	h6	26	62	5
118.060	6,00	h6	28	66	6
118.0635	6,35	h6	31	70	6,35
118.065	6,50	h6	31	70	6,5
118.070	7,00	h6	34	74	7
118.0793	7,93	h6	37	79	7,93
118.080	8,00	h6	37	79	8
118.085	8,50	h6	37	79	8,5
118.090	9,00	h6	40	84	9
118.100	10,00	h6	48	89	10
118.120	12,00	h6	50	102	12

165C

ADVANCED CFRP DRILLING

Twist drill for CNC application on CFRP

CVD Diamond Cer-DA
Internal cooling



165C

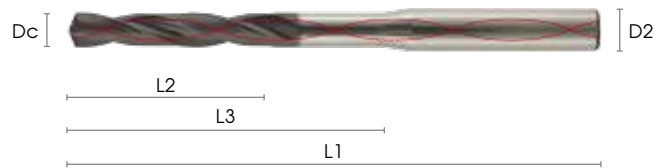


Cod.	Dc	Dc tol.	L2	L3	L1	D2
165C.0248062366DA	2,48	h6	23	28	66	6
165C.030062366DA	3	h6	23	28	66	6
165C.03175062366DA	3,175	h6	23	28	66	6
165C.040062974DA	4	h6	29	36	74	6
165C.04826063682DA	4,826	h6	36	44	82	6
165C.060063582DA	6	h6	35	44	82	6
165C.0635084391DA	6,35	h6	43	53	91	8
165C.0793084391DA	7,93	h6	43	53	91	8
165C.080084391DA	8	h6	43	53	91	8
165C.09521049103DA	9,52	h6	49	61	103	10
165C.1001049103DA	10	h6	49	61	103	10

ADVANCED CFRP DRILLING

Twist drill for CNC application on CFRP + Ti or CFRP + Al

CVD Diamond Cer-DA
Internal cooling



165ST



Cod.	Dc	Dc tol.	L2	L3	L1	D2
165ST.0248062366DA	2,48	h6	23	28	66	6
165ST.030062366DA	3	h6	23	28	66	6
165ST.03175062366DA	3,175	h6	23	28	66	6
165ST.040062974DA	4	h6	29	36	74	6
165ST.04826063682DA	4,826	h6	36	44	82	6
165ST.060063582DA	6	h6	35	44	82	6
165ST.0635084391DA	6,35	h6	43	53	91	8
165ST.0793084391DA	7,93	h6	43	53	91	8
165ST.080084391DA	8	h6	43	53	91	8
165ST.09521049103DA	9,52	h6	49	61	103	10
165ST.1001049103DA	10	h6	49	61	103	10

PKD MILLING

Straight flute PCD endmill with torus radius



PK62TDT



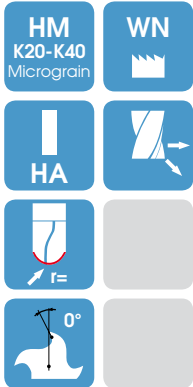
Cod.	Dc	Dc tol.	L2	L1	D2
PK62TDT.060060660	6	h10	6	60	6
PK62TDT.0600612100	6	h10	12	100	6
PK62TDT.080080863	8	h10	8	63	8
PK62TDT.0800816100	8	h10	16	100	8
PK62TDT.100101072	10	h10	10	72	10
PK62TDT.1001020100	10	h10	20	100	10
PK.62TDT120121283	12	h10	12	83	12
PK.62TDT1201224100	12	h10	24	100	12

PKD MILLING

Straight flute PCD ball nose



PK62TDR



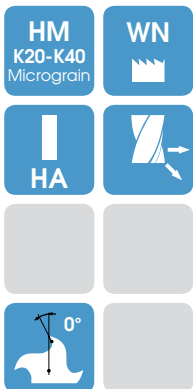
Cod.	Dc	Dc tol.	L2	L1	D2
PK62TDR.0600606100	6	h10	6	100	6
PK62TDR.0800808100	8	h10	8	100	8
PK62TDR.1001010100	10	h10	10	100	10
PK62TDR.1201212100	12	h10	12	100	12

PKD MILLING

Straight multiflute PCD



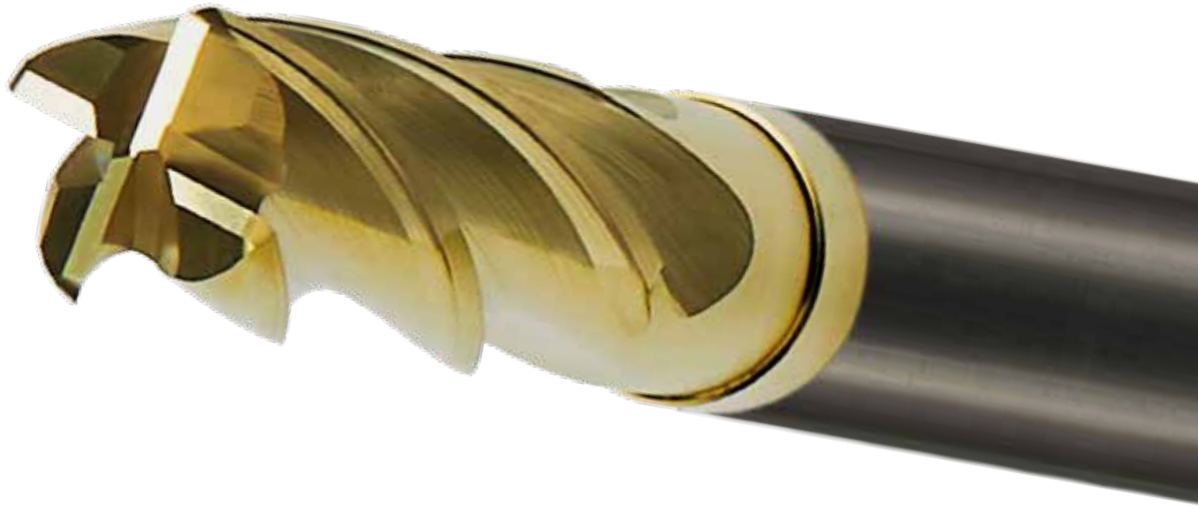
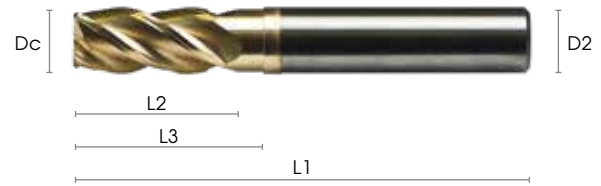
PK66TD



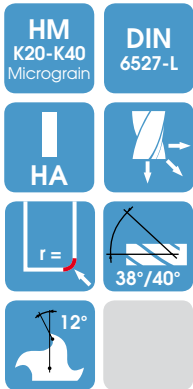
Cod.	Dc	Dc tol.	L2	L1	D2
PK66TD.080081063	8	h10	10	63	8
PK66TD.100101272	10	h10	12	72	10
PK66TD.120121583	12	h10	15	83	12

TITANIUM MILLING

4 flutes torus radius



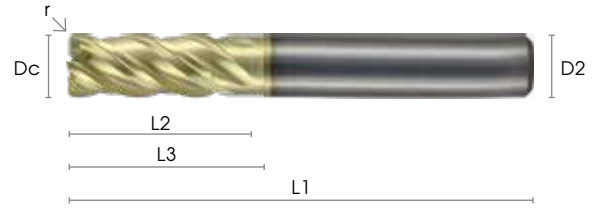
641



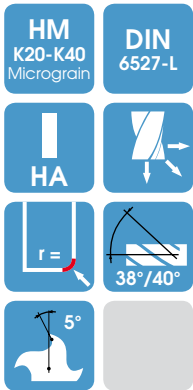
Cod.	Dc	Dc tol.	L2	L1	D2	L3	r
641.030060857R030N	3	h10	8	57	6	12	0,3
641.040061157R030N	4	h10	11	57	6	15	0,3
641.050061357R030N	5	h10	13	57	6	17	0,3
641.060061357R050N	6	h10	13	57	6	19	0,5
641.060061357R100N	6	h10	13	57	6	19	1
641.060061357R150N	6	h10	13	57	6	19	1,5
641.080081963R050N	8	h10	19	63	8	25	0,5
641.080081963R100N	8	h10	19	63	8	25	1
641.080081963R200N	8	h10	19	63	8	25	1,5
641.100102272R050N	10	h10	22	72	10	30	0,5
641.100102272R100N	10	h10	22	72	10	30	1
641.100102272R250N	10	h10	22	72	10	30	1,5
641.120122683R100N	12	h10	26	83	12	34	1
641.120122683R200N	12	h10	26	83	12	34	2
641.120122683R300N	12	h10	26	83	12	34	3
641.160163292R100N	16	h10	32	92	16	47	1
641.160163292R200N	16	h10	32	92	16	47	2
641.160163292R400N	16	h10	32	92	16	47	4
641.2002038104R200N	20	h10	38	104	20	53	2
641.2002038104R300N	20	h10	38	104	20	53	3
641.2002038104R500N	20	h10	38	104	20	53	5

Ni & High Temperature ALLOYS MILLING

4 flutes torus radius

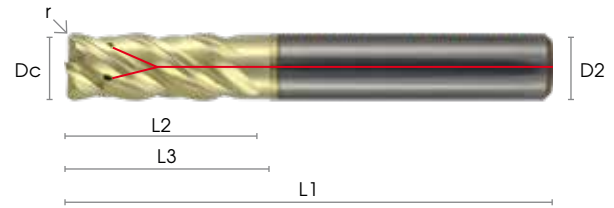


642

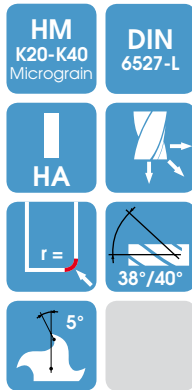


Cod.	Dc	Dc tol.	L2	L1	D2	L3	r
642.030060857R030N	3	h10	8	57	6	12	0,3
642.040061157R030N	4	h10	11	57	6	15	0,3
642.050061357R030N	5	h10	13	57	6	17	0,3
642.060061357R050N	6	h10	13	57	6	19	0,5
642.060061357R100N	6	h10	13	57	6	19	1
642.060061357R150N	6	h10	13	57	6	19	1,5
642.080081963R050N	8	h10	19	63	8	25	0,5
642.080081963R100N	8	h10	19	63	8	25	1
642.080081963R200N	8	h10	19	63	8	25	1,5
642.100102272R050N	10	h10	22	72	10	30	0,5
642.100102272R100N	10	h10	22	72	10	30	1
642.100102272R250N	10	h10	22	72	10	30	1,5
642.120122683R100N	12	h10	26	83	12	34	1
642.120122683R200N	12	h10	26	83	12	34	2
642.120122683R300N	12	h10	26	83	12	34	3
642.160163292R100N	16	h10	32	92	16	47	1
642.160163292R200N	16	h10	32	92	16	47	2
642.160163292R400N	16	h10	32	92	16	47	4
642.2002038104R200N	20	h10	38	104	20	53	2
642.2002038104R300N	20	h10	38	104	20	53	3
642.2002038104R500N	20	h10	38	104	20	53	5

Ni & High Temperature ALLOYS MILLING
4 flutes torus radius with internal coolant



642F

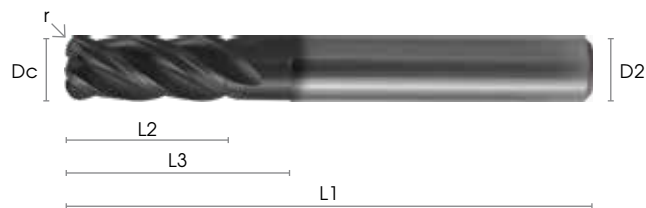


Cod.	Dc	Dc tol.	L2	L1	D2	L3	r
642F.060061357R050N	6	h10	13	57	6	19	0,5
642F.060061357R100N	6	h10	13	57	6	19	1
642F.060061357R150N	6	h10	13	57	6	19	1,5
642F.080081963R050N	8	h10	19	63	8	25	0,5
642F.080081963R100N	8	h10	19	63	8	25	1
642F.080081963R200N	8	h10	19	63	8	25	1,5
642F.100102272R050N	10	h10	22	72	10	30	0,5
642F.100102272R100N	10	h10	22	72	10	30	1
642F.100102272R250N	10	h10	22	72	10	30	1,5
642F.120122683R100N	12	h10	26	83	12	34	1
642F.120122683R200N	12	h10	26	83	12	34	2
642F.120122683R300N	12	h10	26	83	12	34	3
642F.160163292R100N	16	h10	32	92	16	47	1
642F.160163292R200N	16	h10	32	92	16	47	2
642F.160163292R400N	16	h10	32	92	16	47	4
642F.2002038104R200N	20	h10	38	104	20	53	2
642F.2002038104R300N	20	h10	38	104	20	53	3
642F.2002038104R500N	20	h10	38	104	20	53	5

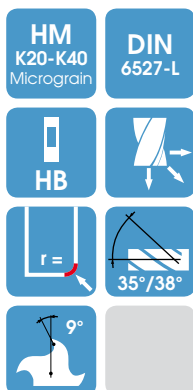
640WVT

STEEL ALLOYS MILLING

4 flutes with corner radius and rounded cutting edges



640WVT

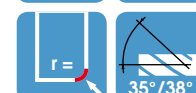


Cod.	Dc	Dc tol.	L2	L1	D2	L3	r
640WT.03006085701Y	3	h10	8	57	6	12	0,1
640WT.03006085703Y	3	h10	8	57	6	12	0,3
640WT.03006085705Y	3	h10	8	57	6	12	0,5
640WT.03006085710Y	3	h10	8	57	6	12	1
640WT.04006115701Y	4	h10	11	57	6	15	0,1
640WT.04006115703Y	4	h10	11	57	6	15	0,3
640WT.04006115705Y	4	h10	11	57	6	15	0,5
640WT.04006115710Y	4	h10	11	57	6	15	1
640WT.05006135701Y	5	h10	13	57	6	17	0,1
640WT.05006135703Y	5	h10	13	57	6	17	0,3
640WT.05006135705Y	5	h10	13	57	6	17	0,5
640WT.05006135710Y	5	h10	13	57	6	17	1
640WT.06006135701Y	6	h10	13	57	6	21	0,1
640WT.06006135703Y	6	h10	13	57	6	21	0,3
640WT.06006135705Y	6	h10	13	57	6	21	0,5
640WT.06006135710Y	6	h10	13	57	6	21	1
640WT.06006135715Y	6	h10	13	57	6	21	1,5
604WT.06006135720Y	6	h10	13	57	6	21	2
640WT.08008196301Y	8	h10	19	63	8	27	0,1
640WT.08008196303Y	8	h10	19	63	8	27	0,3
640WT.08008196305Y	8	h10	19	63	8	27	0,5
640WT.08008196310Y	8	h10	19	63	8	27	1
640WT.08008196315Y	8	h10	19	63	8	27	1,5
640WT.08008196316Y	8	h10	19	63	8	27	1,6

Cod.	Dc	Dc tol.	L2	L1	D2	L3	r
640WT.08008196320Y	8	h10	19	63	8	27	2
640WT.10010227201Y	10	h10	22	72	10	32	0,1
640WT.10010227203Y	10	h10	22	72	10	32	0,3
640WT.10010227205Y	10	h10	22	72	10	32	0,5
640WT.10010227210Y	10	h10	22	72	10	32	1
640WT.10010227215Y	10	h10	22	72	10	32	1,5
640WT.10010227216Y	10	h10	22	72	10	32	1,6
640WT.10010227220Y	10	h10	22	72	10	32	2
640WT.12012268301Y	12	h10	26	83	12	38	0,1
640WT.12012268303Y	12	h10	26	83	12	38	0,3
640WT.12012268305Y	12	h10	26	83	12	38	0,5
640WT.12012268310Y	12	h10	26	83	12	38	1
640WT.12012268315Y	12	h10	26	83	12	38	1,5
640WT.12012268316Y	12	h10	26	83	12	38	1,6
640WT.12012268320Y	12	h10	26	83	12	38	2
640WT.12012268330Y	12	h10	26	83	12	38	3
640WT.16016329201Y	16	h10	32	92	16	44	0,1
640WT.16016329203Y	16	h10	32	92	16	44	0,3
640WT.16016329205Y	16	h10	32	92	16	44	0,5
640WT.16016329210Y	16	h10	32	92	16	44	1
640WT.16016329215Y	16	h10	32	92	16	44	1,5
640WT.16016329216Y	16	h10	32	92	16	44	1,6
640WT.16016329220Y	16	h10	32	92	16	44	2
640WT.16016329230Y	16	h10	32	92	16	44	3
640WT.16016329240Y	16	h10	32	92	16	44	4
640WT.200203810401Y	20	h10	38	104	20	54	0,1
640WT.200203810403Y	20	h10	38	104	20	54	0,3
640WT.200203810405Y	20	h10	38	104	20	54	0,5
640WT.200203810410Y	20	h10	38	104	20	54	1
640WT.200203810415Y	20	h10	38	104	20	54	1,5
640WT.200203810416Y	20	h10	38	104	20	54	1,6
640WT.200203810420Y	20	h10	38	104	20	54	2
640WT.200203810430Y	20	h10	38	104	20	54	3
640WT.200203810440Y	20	h10	38	104	20	54	4

HM
K20-K40
Micrograin

DIN
6527-L

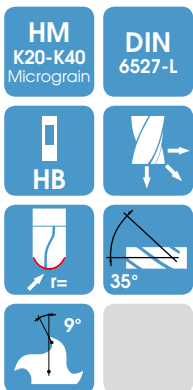


620WR

STEEL ALLOYS MILLING
2 flutes ball nose



620WR



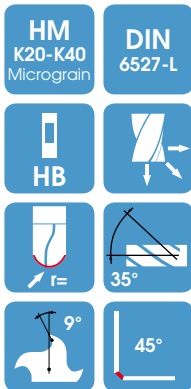
Cod.	Dc	Dc tol.	L2	L1	D2	L3	r	D3
620WR.030060550Y	3	h10	5	50	6	-	1,5	-
620WR.030060857Y	3	h10	8	57	6	12	1,5	2,8
620WR.040060854Y	4	h10	8	54	6	-	2	-
620WR.040061157Y	4	h10	11	57	6	15	2	3,8
620WR.050060954Y	5	h10	9	54	6	-	2,5	-
620WR.050061357Y	5	h10	13	57	6	17	2,5	4,8
620WR.060061054Y	6	h10	10	54	6	-	3	-
620WR.060061357Y	6	h10	13	57	6	8	3	5,8
620WR.080081258Y	8	h10	12	58	8	-	4	-
620WR.080081963Y	8	h10	19	63	8	27	4	7,7
620WR.100101466Y	10	h10	14	66	10	-	5	-
620WR.100102272Y	10	h10	22	72	10	10	5	9,7
620WR.120121673Y	12	h10	16	73	12	-	6	-
620WR.120122683Y	12	h10	26	83	12	38	6	11,6
620WR.160162282Y	16	h10	22	82	16	-	8	-
620WR.160163292Y	16	h10	32	92	16	44	8	15,5
620WR.200202692Y	20	h10	26	92	20	-	10	-
620WR.2002038104Y	20	h10	38	104	20	54	10	19,5

STEEL ALLOYS MILLING

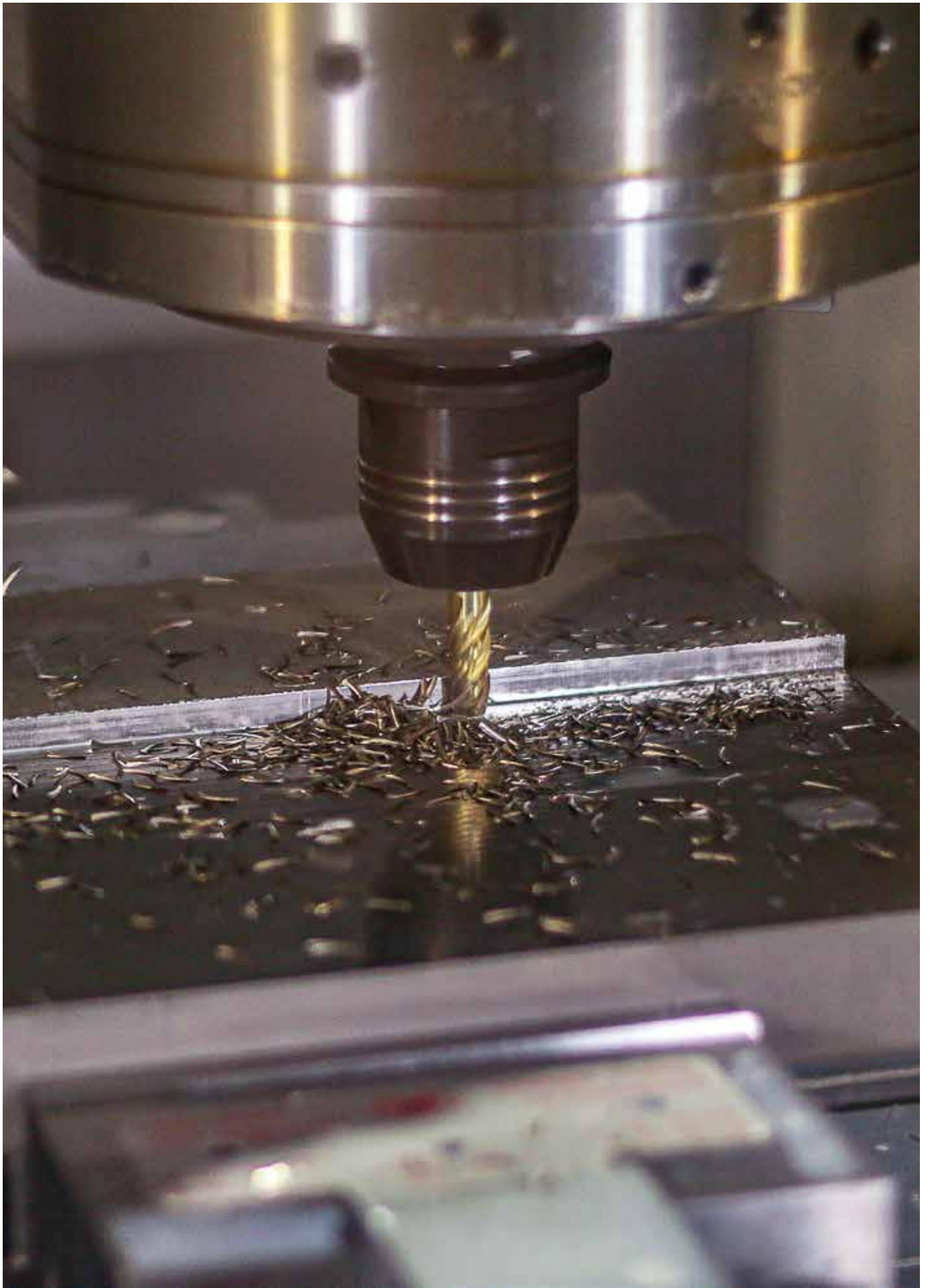
4 flutes with point corner and sharp cutting edges



640WS



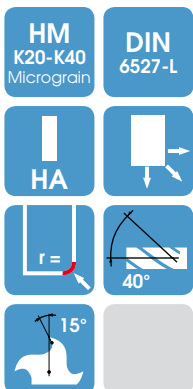
Cod.	Dc	Dc tol.	L2	L1	D2	L3	D3
640WS.030060550Y	3	h10	5	50	6	-	-
640WS.030060857Y	3	h10	8	57	6	12	2,8
640WS.030060870Y	3	h10	8	70	6	15	2,8
640WS.040060854Y	4	h10	8	54	6	-	-
640WS.040061157Y	4	h10	11	57	6	15	3,8
640WS.040061170Y	4	h10	11	70	6	20	3,8
640WS.050060954Y	5	h10	9	54	6	-	-
640WS.050061357Y	5	h10	13	57	6	17	4,8
640WS.050061370Y	5	h10	13	70	6	25	4,8
640WS.060061054Y	6	h10	10	54	6	-	-
640WS.060061357Y	6	h10	13	57	6	8	5,8
640WS.060061370Y	6	h10	13	70	6	30	5,8
640WS.080081258Y	8	h10	12	58	8	-	-
640WS.080081963Y	8	h10	19	63	8	27	7,7
640WS.080081980Y	8	h10	19	80	8	40	7,7
640WS.100101466Y	10	h10	14	66	10	-	-
640WS.100102272Y	10	h10	22	72	10	32	9,7
640WS.100102294Y	10	h10	22	94	10	28	9,7
640WS.120121673Y	12	h10	16	73	12	-	-
640WS.1201226109Y	12	h10	26	109	12	64	11,6
640WS.120122683Y	12	h10	26	83	12	38	11,6
640WS.160162282Y	16	h10	22	82	16	-	-
640WS.1601632132Y	16	h10	32	132	16	80	15,5
640WS.160163292Y	16	h10	32	92	16	44	15,5
640WS.200202692Y	20	h10	26	92	20	-	-
640WS.2002038104Y	20	h10	38	104	20	54	19,5
640WS.2002038154Y	20	h10	38	154	20	100	19,5



ALUMINUM HIGH REMOVAL MILLING 3 flutes torus radius



303



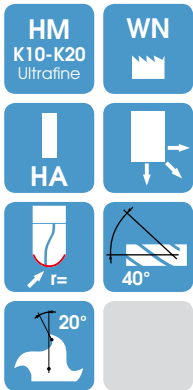
Cod.	Dc	L2	L1	D2	L3	r
303.040060657R02DL	4	6	57	6	12	0,2
303.040060670R02DL	4	6	70	6	20	0,2
303.060060957R03DL	6	9	57	6	18	0,3
303.060060970R03DL	6	9	70	6	30	0,3
303.080081263R04DL	8	12	63	8	24	0,4
303.080081280R04DL	8	12	80	8	40	0,4
303.100101572R05DL	10	15	72	10	30	0,5
303.100101590R05DL	10	15	90	10	50	0,5
303.120121883R06DL	12	18	83	12	36	0,6
303.1201218100R06DL	12	18	100	12	60	0,6
303.160162493R08DL	16	24	93	16	48	0,8
303.1601624120R08DL	16	24	120	16	80	0,8
303.2002030104R10DL	20	30	104	20	60	1
303.2002030150R10DL	20	30	150	20	100	1

102TC/TCL

ALUMINUM FINISHING
2 flutes torus radius



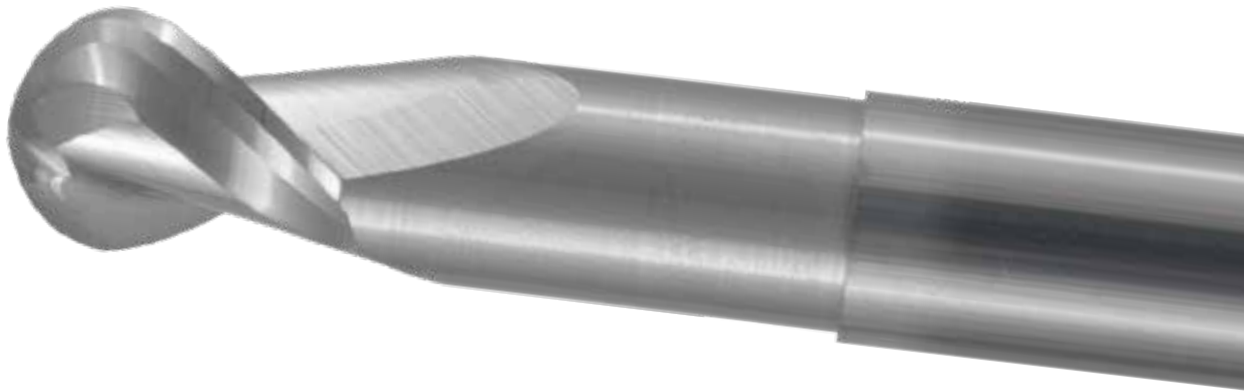
102TC/TCL



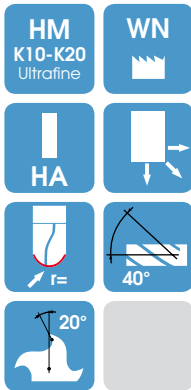
Cod.	Dc	Dc tol.	L2	L1	D2	L3	r
102TC.020-40°G	2	h10	4	57	6	6	0,5
102TC.030-40°G	3	h10	5	57	6	9	0,5
102TC.040-40°G	4	h10	6	57	6	12	0,5
102TC.050-40°G	5	h10	7	57	6	15	0,5
102TC.060-40°G	6	h10	8	57	6	20	1
102TC.080-40°G	8	h10	10	63	8	26	1
102TC.100-40°G	10	h10	12	72	10	31	1,5
102TC.120-40°G	12	h10	14	83	12	37	1,5
102TC.140-40°G	14	h10	16	83	14	41	2
102TC.160-40°G	16	h10	18	92	16	43	2
102TC.200-40°G	20	h10	22	104	20	53	2,5
102TCL.030-40°G	3	h10	6	100	6	50	0,5
102TCL.040-40°G	4	h10	8	100	6	50	0,5
102TCL.050-40°G	5	h10	10	100	6	50	0,5
102TCL.060-40°G	6	h10	12	100	6	50	1
102TCL.080-40°G	8	h10	16	100	8	50	1
102TCL.100-40°G	10	h10	20	120	10	70	1,5
102TCL.120-40°G	12	h10	24	150	12	100	1,5
102TCL.140-40°G	14	h10	28	150	14	100	2
102TCL.160-40°G	16	h10	32	150	16	100	2
102TCL.200-40°G	20	h10	40	150	20	100	2,5

102RC/RCL

ALUMINUM FINISHING
2 flutes ball nose



102RC/RCL

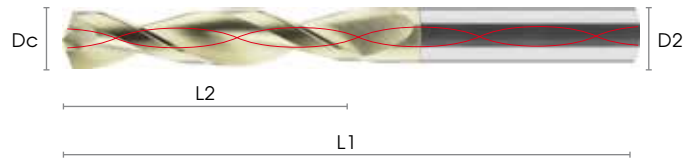


Cod.	Dc	Dc tol.	L2	L1	D2	L3	r
102RC.020-40°G	2	h10	4	57	6	6	1
102RC.030-40°G	3	h10	5	57	6	9	1,5
102RC.040-40°G	4	h10	6	57	6	12	2
102RC.050-40°G	5	h10	7	57	6	15	2,5
102RC.060-40°G	6	h10	8	57	6	20	3
102RC.080-40°G	8	h10	10	63	8	26	4
102RC.100-40°G	10	h10	12	72	10	31	5
102RC.120-40°G	12	h10	14	83	12	37	6
102RC.140-40°G	14	h10	16	83	14	41	7
102RC.160-40°G	16	h10	18	92	16	43	8
102RC.200-40°G	20	h10	22	104	20	53	10
102RCL.030-40°G	3	h10	6	100	6	50	1,5
102RCL.040-40°G	4	h10	8	100	6	50	2
102RCL.050-40°G	5	h10	10	100	6	50	2,5
102RCL.060-40°G	6	h10	12	100	6	50	3
102RCL.080-40°G	8	h10	16	100	8	50	4
102RCL.100-40°G	10	h10	20	120	10	70	5
102RCL.120-40°G	12	h10	24	150	12	100	6
102RCL.140-40°G	14	h10	28	150	14	100	7
102RCL.160-40°G	16	h10	32	150	16	100	8
102RCL.200-40°G	20	h10	40	150	20	100	10

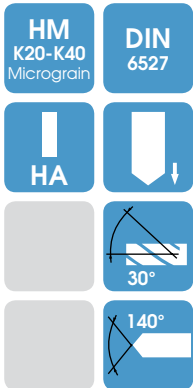
165

ALUMINUM DRILLING

Twist drill with internal coolant

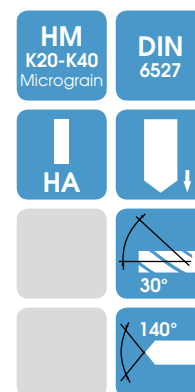


165



Cod.	Dc	Dc tol.	L2	L1	D2
165.030062866N	3,00	m7	28	66	6
165.031062866N	3,10	m7	28	66	6
165.032062866N	3,20	m7	28	66	6
165.033062866N	3,30	m7	28	66	6
165.034062866N	3,40	m7	28	66	6
165.035062866N	3,50	m7	28	66	6
165.036062866N	3,60	m7	28	66	6
165.037062866N	3,70	m7	28	66	6
165.038063674N	3,80	m7	36	74	6
165.039063674N	3,90	m7	36	74	6
165.040063674N	4,00	m7	36	74	6
165.041063674N	4,10	m7	36	74	6

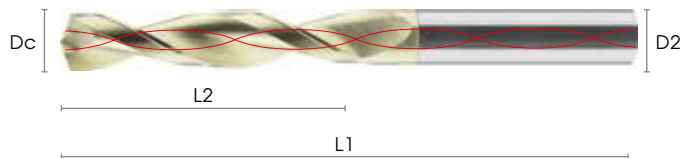
Cod.	Dc	Dc tol.	L2	L1	D2
165.042063674N	4,20	m7	36	74	6
165.043063674N	4,30	m7	36	74	6
165.044063674N	4,40	m7	36	74	6
165.045063674N	4,50	m7	36	74	6
165.046063674N	4,60	m7	36	74	6
165.047063674N	4,70	m7	36	74	6
165.048064482N	4,80	m7	44	82	6
165.049064482N	4,90	m7	44	82	6
165.050064482N	5,00	m7	44	82	6
165.051064482N	5,10	m7	44	82	6
165.052064482N	5,20	m7	44	82	6
165.053064482N	5,30	m7	44	82	6
165.054064482N	5,40	m7	44	82	6
165.055064482N	5,50	m7	44	82	6
165.056064482N	5,60	m7	44	82	6
165.057064482N	5,70	m7	44	82	6
165.058064482N	5,80	m7	44	82	6
165.059064482N	5,90	m7	44	82	6
165.060064482N	6,00	m7	44	82	6
165.061085391N	6,10	m7	53	91	8
165.062085391N	6,20	m7	53	91	8
165.063085391N	6,30	m7	53	91	8
165.064085391N	6,40	m7	53	91	8
165.065085391N	6,50	m7	53	91	8
165.066085391N	6,60	m7	53	91	8



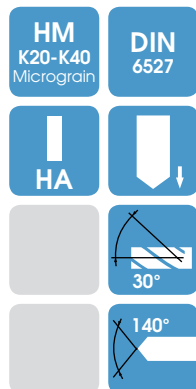
165

ALUMINUM DRILLING

Twis drill



165



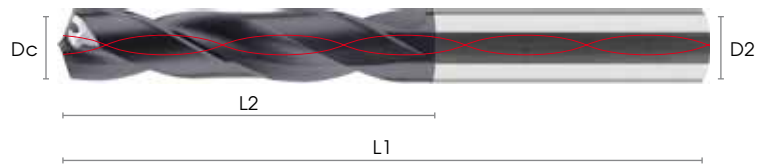
Cod.	Dc	Dc tol.	L2	L1	D2
165.067085391N	6,70	m7	53	91	8
165.068085391N	6,80	m7	53	91	8
165.069085391N	6,90	m7	53	91	8
165.070085391N	7,00	m7	53	91	8
165.071085391N	7,10	m7	53	91	8
165.072085391N	7,20	m7	53	91	8
165.073085391N	7,30	m7	53	91	8
165.074085391N	7,40	m7	53	91	8
165.075085391N	7,50	m7	53	91	8
165.076085391N	7,60	m7	53	91	8
165.077085391N	7,70	m7	53	91	8
165.078085391N	7,80	m7	53	91	8
165.079085391N	7,90	m7	53	91	8
165.080085391N	8,00	m7	53	91	8
165.0811061103N	8,10	m7	61	103	10
165.0821061103N	8,20	m7	61	103	10
165.0831061103N	8,30	m7	61	103	10
165.0841061103N	8,40	m7	61	103	10
165.0851061103N	8,50	m7	61	103	10
165.0861061103N	8,60	m7	61	103	10
165.0871061103N	8,70	m7	61	103	10
165.0881061103N	8,80	m7	61	103	10
165.0891061103N	8,90	m7	61	103	10
165.0901061103N	9,00	m7	61	103	10
165.0911061103N	9,10	m7	61	103	10
165.0921061103N	9,20	m7	61	103	10
165.0931061103N	9,30	m7	61	103	10
165.0941061103N	9,40	m7	61	103	10
165.0951061103N	9,50	m7	61	103	10
165.0961061103N	9,60	m7	61	103	10
165.0971061103N	9,70	m7	61	103	10
165.0981061103N	9,80	m7	61	103	10
165.0991061103N	9,90	m7	61	103	10

Cod.	Dc	Dc tol.	L2	L1	D2
165.1001061103N	10,00	m7	61	103	10
165.1011271118N	10,10	m7	71	118	12
165.1021271118N	10,20	m7	71	118	12
165.1031271118N	10,30	m7	71	118	12
165.1041271118N	10,40	m7	71	118	12
165.1051271118N	10,50	m7	71	118	12
165.1061271118N	10,60	m7	71	118	12
165.1071271118N	10,70	m7	71	118	12
165.1081271118N	10,80	m7	71	118	12
165.1091271118N	10,90	m7	71	118	12
165.1101271118N	11,00	m7	71	118	12
165.1111271118N	11,10	m7	71	118	12
165.1121271118N	11,20	m7	71	118	12
165.1131271118N	11,30	m7	71	118	12
165.1141271118N	11,40	m7	71	118	12
165.1151271118N	11,50	m7	71	118	12
165.1161271118N	11,60	m7	71	118	12
165.1171271118N	11,70	m7	71	118	12
165.1181271118N	11,80	m7	71	118	12
165.1191271118N	11,90	m7	71	118	12
165.1201271118N	12,00	m7	71	118	12
165.1221477124N	12,20	m7	77	124	14
165.1231477124N	12,30	m7	77	124	14
165.1251477124N	12,50	m7	77	124	14
165.1281477124N	12,80	m7	77	124	14
165.1301477124N	13,00	m7	77	124	14
165.1351477124N	13,50	m7	77	124	14
165.1381477124N	13,80	m7	77	124	14
165.1401477124N	14,00	m7	77	124	14
165.1451683133N	14,50	m7	83	133	16
165.1481683133N	14,80	m7	83	133	16
165.1501683133N	15,00	m7	83	133	16
165.1551683133N	15,50	m7	83	133	16
165.1581683133N	15,80	m7	83	133	16
165.1601683133N	16,00	m7	83	133	16
165.1651893143N	16,50	m7	93	143	18
165.1681893143N	16,80	m7	93	143	18
165.1701893143N	17,00	m7	93	143	18
165.1751893143N	17,50	m7	93	143	18
165.1781893143N	17,80	m7	93	143	18
165.1801893143N	18,00	m7	93	143	18
165.18520101153N	18,50	m7	101	153	20
165.19020101153N	19,00	m7	101	153	20
165.19520101153N	19,50	m7	101	153	20
165.20020101153N	20,00	m7	101	153	20

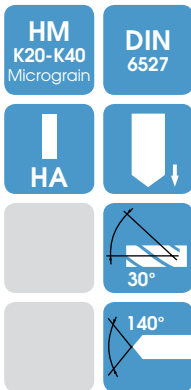
178 3XD

STEEL DRILLING

Twist drill with internal coolant



178



Cod.	Dc	Dc tol.	L2	L1	D2
178.030062062F	3,00	m7	20	62	6
178.031062062F	3,10	m7	20	62	6
178.032062062F	3,20	m7	20	62	6
178.033062062F	3,30	m7	20	62	6
178.034062062F	3,40	m7	20	62	6
178.035062062F	3,50	m7	20	62	6
178.036062062F	3,60	m7	20	62	6
178.037062062F	3,70	m7	20	62	6
178.038062466F	3,80	m7	24	66	6
178.039062466F	3,90	m7	24	66	6
178.040062466F	4,00	m7	24	66	6
178.041062466F	4,10	m7	24	66	6
178.042062466F	4,20	m7	24	66	6
178.043062466F	4,30	m7	24	66	6
178.044062466F	4,40	m7	24	66	6
178.045062466F	4,50	m7	24	66	6
178.046062466F	4,60	m7	24	66	6
178.047062466F	4,70	m7	24	66	6
178.048062866F	4,80	m7	28	66	6
178.049062866F	4,90	m7	28	66	6
178.050062866F	5,00	m7	28	66	6
178.051062866F	5,10	m7	28	66	6
178.052062866F	5,20	m7	28	66	6
178.053062866F	5,30	m7	28	66	6
178.054062866F	5,40	m7	28	66	6

Cod.	Dc	Dc tol.	L2	L1	D2
178.055062866F	5,50	m7	28	66	6
178.056062866F	5,60	m7	28	66	6
178.057062866F	5,70	m7	28	66	6
178.058062866F	5,80	m7	28	66	6
178.059062866F	5,90	m7	28	66	6
178.060062866F	6,00	m7	28	66	6
178.061083479F	6,10	m7	34	79	8
178.062083479F	6,20	m7	34	79	8
178.063083479F	6,30	m7	34	79	8
178.064083479F	6,40	m7	34	79	8
178.065083479F	6,50	m7	34	79	8
178.066083479F	6,60	m7	34	79	8
178.067083479F	6,70	m7	34	79	8
178.068083479F	6,80	m7	34	79	8
178.069083479F	6,90	m7	34	79	8
178.070083479F	7,00	m7	34	79	8
178.071084179F	7,10	m7	41	79	8
178.072084179F	7,20	m7	41	79	8
178.073084179F	7,30	m7	41	79	8
178.074084179F	7,40	m7	41	79	8
178.075084179F	7,50	m7	41	79	8
178.076084179F	7,60	m7	41	79	8
178.077084179F	7,70	m7	41	79	8
178.078084179F	7,80	m7	41	79	8
178.079084179F	7,90	m7	41	79	8
178.080084179F	8,00	m7	41	79	8
178.081104189F	8,10	m7	41	89	10
178.082104789F	8,20	m7	47	89	10
178.083104789F	8,30	m7	47	89	10
178.084104789F	8,40	m7	47	89	10
178.085104789F	8,50	m7	47	89	10
178.086104789F	8,60	m7	47	89	10
178.087104789F	8,70	m7	47	89	10
178.088104789F	8,80	m7	47	89	10
178.089104789F	8,90	m7	47	89	10
178.090104789F	9,00	m7	47	89	10
178.091104789F	9,10	m7	47	89	10
178.092104789F	9,20	m7	47	89	10
178.093104789F	9,30	m7	47	89	10
178.094104789F	9,40	m7	47	89	10
178.095104789F	9,50	m7	47	89	10
178.096104789F	9,60	m7	47	89	10
178.097104789F	9,70	m7	47	89	10
178.098104789F	9,80	m7	47	89	10
178.099104789F	9,90	m7	47	89	10

178 3XD

HM
K20-K40
Micrograin

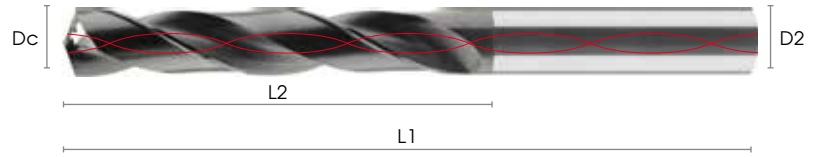
DIN
6527



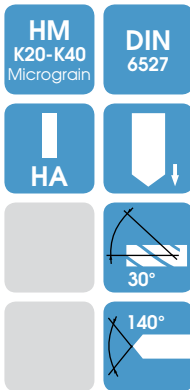
Cod.	Dc	Dc tol.	L2	L1	D2
178.100104789F	10,00	m7	47	89	10
178.1011255102F	10,10	m7	55	102	12
178.1021255102F	10,20	m7	55	102	12
178.1031255102F	10,30	m7	55	102	12
178.1041255102F	10,40	m7	55	102	12
178.1051255102F	10,50	m7	55	102	12
178.1061255102F	10,60	m7	55	102	12
178.1071255102F	10,70	m7	55	102	12
178.1081255102F	10,80	m7	55	102	12
178.1091255102F	10,90	m7	55	102	12
178.1101255102F	11,00	m7	55	102	12
178.1111255102F	11,10	m7	55	102	12
178.1121255102F	11,20	m7	55	102	12
178.1131255102F	11,30	m7	55	102	12
178.1141255102F	11,40	m7	55	102	12
178.1151255102F	11,50	m7	55	102	12
178.1161255102F	11,60	m7	55	102	12
178.1171255102F	11,70	m7	55	102	12
178.1181255102F	11,80	m7	55	102	12
178.1191255102F	11,90	m7	55	102	12
178.1201255102F	12,00	m7	55	102	12
178.1231460107F	12,30	m7	60	107	14
178.1251460107F	12,50	m7	60	107	14
178.1281460107F	12,80	m7	60	107	14
178.1301460107F	13,00	m7	60	107	14
178.1351460107F	13,50	m7	60	107	14
178.1381460107F	13,80	m7	60	107	14
178.1401460107F	14,00	m7	60	107	14
178.1451665115F	14,50	m7	65	115	16
178.1481665115F	14,80	m7	65	115	16
178.1501665115F	15,00	m7	65	115	16
178.1551665115F	15,50	m7	65	115	16
178.1581665115F	15,80	m7	65	115	16
178.1601665115F	16,00	m7	65	115	16
178.1651873123F	16,50	m7	73	123	18
178.1681873123F	16,80	m7	73	123	18
178.1701873123F	17,00	m7	73	123	18
178.1751873123F	17,50	m7	73	123	18
178.1781873123F	17,80	m7	73	123	18
178.1801873123F	18,00	m7	73	123	18
178.1852079131F	18,50	m7	79	131	20
178.1902079131F	19,00	m7	79	131	20
178.1952079131F	19,50	m7	79	131	20
178.2002079131F	20,00	m7	79	131	20

STEEL DRILLING

Twist drill with internal coolant



178



Cod.	Dc	Dc tol.	L2	L1	D2
178.030062866F	3,00	m7	28	66	6
178.031062866F	3,10	m7	28	66	6
178.032062866F	3,20	m7	28	66	6
178.033062866F	3,30	m7	28	66	6
178.034062866F	3,40	m7	28	66	6
178.035062866F	3,50	m7	28	66	6
178.036062866F	3,60	m7	28	66	6
178.037062866F	3,70	m7	28	66	6
178.038063674F	3,80	m7	36	74	6
178.039063674F	3,90	m7	36	74	6
178.040063674F	4,00	m7	36	74	6
178.041063674F	4,10	m7	36	74	6
178.042063674F	4,20	m7	36	74	6
178.043063674F	4,30	m7	36	74	6
178.044063674F	4,40	m7	36	74	6
178.045063674F	4,50	m7	36	74	6
178.046063674F	4,60	m7	36	74	6
178.047063674F	4,70	m7	36	74	6
178.048064482F	4,80	m7	44	82	6
178.049064482F	4,90	m7	44	82	6
178.050064482F	5,00	m7	44	82	6
178.051064482F	5,10	m7	44	82	6
178.052064482F	5,20	m7	44	82	6
178.053064482F	5,30	m7	44	82	6
178.054064482F	5,40	m7	44	82	6
178.055064482F	5,50	m7	44	82	6
178.056064482F	5,60	m7	44	82	6
178.057064482F	5,70	m7	44	82	6

178 5XD

HM
K20-K40
Micrograin

DIN
6527



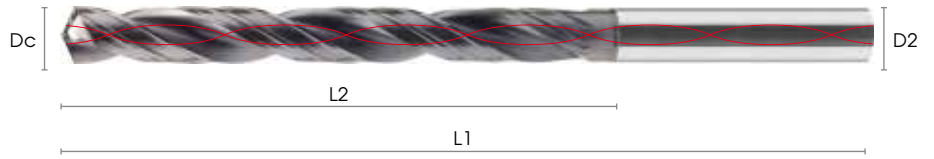
Cod.	Dc	Dc tol.	L2	L1	D2
178.058064482F	5,80	m7	44	82	6
178.059064482F	5,90	m7	44	82	6
178.060064482F	6,00	m7	44	82	6
178.061085391F	6,10	m7	53	91	8
178.062085391F	6,20	m7	53	91	8
178.063085391F	6,30	m7	53	91	8
178.064085391F	6,40	m7	53	91	8
178.065085391F	6,50	m7	53	91	8
178.066085391F	6,60	m7	53	91	8
178.067085391F	6,70	m7	53	91	8
178.068085391F	6,80	m7	53	91	8
178.069085391F	6,90	m7	53	91	8
178.070085391F	7,00	m7	53	91	8
178.071085391F	7,10	m7	53	91	8
178.072085391F	7,20	m7	53	91	8
178.073085391F	7,30	m7	53	91	8
178.074085391F	7,40	m7	53	91	8
178.075085391F	7,50	m7	53	91	8
178.076085391F	7,60	m7	53	91	8
178.077085391F	7,70	m7	53	91	8
178.078085391F	7,80	m7	53	91	8
178.079085391F	7,90	m7	53	91	8
178.080085391F	8,00	m7	53	91	8
178.0811061103F	8,10	m7	61	103	10
178.0821061103F	8,20	m7	61	103	10
178.0831061103F	8,30	m7	61	103	10
178.0841061103F	8,40	m7	61	103	10
178.0851061103F	8,50	m7	61	103	10
178.0861061103F	8,60	m7	61	103	10
178.0871061103F	8,70	m7	61	103	10
178.0881061103F	8,80	m7	61	103	10
178.0891061103F	8,90	m7	61	103	10
178.0901061103F	9,00	m7	61	103	10
178.0911061103F	9,10	m7	61	103	10
178.0921061103F	9,20	m7	61	103	10
178.0931061103F	9,30	m7	61	103	10
178.0941061103F	9,40	m7	61	103	10
178.0951061103F	9,50	m7	61	103	10
178.0961061103F	9,60	m7	61	103	10
178.0971061103F	9,70	m7	61	103	10
178.0981061103F	9,80	m7	61	103	10
178.0991061103F	9,90	m7	61	103	10
178.1001061103F	10,00	m7	61	103	10
178.1011271118F	10,10	m7	71	118	12
178.1021271118F	10,20	m7	71	118	12

Cod.	Dc	Dc tol.	L2	L1	D2
178.1031271118F	10,30	m7	71	118	12
178.1041271118F	10,40	m7	71	118	12
178.1051271118F	10,50	m7	71	118	12
178.1061271118F	10,60	m7	71	118	12
178.1071271118F	10,70	m7	71	118	12
178.1081271118F	10,80	m7	71	118	12
178.1091271118F	10,90	m7	71	118	12
178.1101271118F	11,00	m7	71	118	12
178.1111271118F	11,10	m7	71	118	12
178.1121271118F	11,20	m7	71	118	12
178.1131271118F	11,30	m7	71	118	12
178.1141271118F	11,40	m7	71	118	12
178.1151271118F	11,50	m7	71	118	12
178.1161271118F	11,60	m7	71	118	12
178.1171271118F	11,70	m7	71	118	12
178.1181271118F	11,80	m7	71	118	12
178.1191271118F	11,90	m7	71	118	12
178.1201271118F	12,00	m7	71	118	12
178.1221477124F	12,20	m7	77	124	14
178.1231477124F	12,30	m7	77	124	14
178.1251477124F	12,50	m7	77	124	14
178.1281477124F	12,80	m7	77	124	14
178.1301477124F	13,00	m7	77	124	14
178.1351477124F	13,50	m7	77	124	14
178.1381477124F	13,80	m7	77	124	14
178.1401477124F	14,00	m7	77	124	14
178.1451683133F	14,50	m7	83	133	16
178.1481683133F	14,80	m7	83	133	16
178.1501683133F	15,00	m7	83	133	16
178.1551683133F	15,50	m7	83	133	16
178.1581683133F	15,80	m7	83	133	16
178.1601683133F	16,00	m7	83	133	16
178.1651893143F	16,50	m7	93	143	18
178.1681893143F	16,80	m7	93	143	18
178.1701893143F	17,00	m7	93	143	18
178.1751893143F	17,50	m7	93	143	18
178.1781893143F	17,80	m7	93	143	18
178.1801893143F	18,00	m7	93	143	18
178.18520101153F	18,50	m7	101	153	20
178.19020101153F	19,00	m7	101	153	20
178.19520101153F	19,50	m7	101	153	20
178.20020101153F	20,00	m7	101	153	20

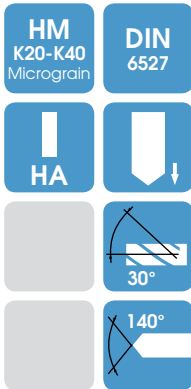
178 8XD

STEEL DRILLING

Twist drill with internal coolant



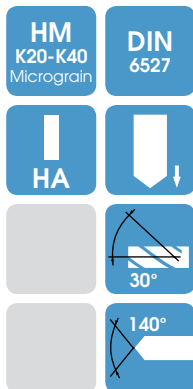
178



Cod.	Dc	Dc tol.	L2	L1	D2
178.030063472F	3,00	m7	34	72	6
178.031063472F	3,10	m7	34	72	6
178.032063472F	3,20	m7	34	72	6
178.033063472F	3,30	m7	34	72	6
178.034063472F	3,40	m7	34	72	6
178.035063472F	3,50	m7	34	72	6
178.036063472F	3,60	m7	34	72	6
178.037063472F	3,70	m7	34	72	6
178.038064386F	3,80	m7	43	86	6
178.039064386F	3,90	m7	43	86	6
178.040064386F	4,00	m7	43	86	6
178.041064386F	4,10	m7	43	86	6
178.042064386F	4,20	m7	43	86	6
178.043064386F	4,30	m7	43	86	6
178.044064386F	4,40	m7	43	86	6
178.045064386F	4,50	m7	43	86	6
178.046064386F	4,60	m7	43	86	6
178.047065795F	4,70	m7	57	95	6
178.048065795F	4,80	m7	57	95	6
178.049065795F	4,90	m7	57	95	6
178.050065795F	5,00	m7	57	95	6
178.051065795F	5,10	m7	57	95	6
178.052065795F	5,20	m7	57	95	6
178.053065795F	5,30	m7	57	95	6
178.054065795F	5,40	m7	57	95	6
178.055065795F	5,50	m7	57	95	6
178.056065795F	5,60	m7	57	95	6
178.057065795F	5,70	m7	57	95	6
178.058065795F	5,80	m7	57	95	6
178.059065795F	5,90	m7	57	95	6
178.060065795F	6,00	m7	57	95	6

Cod.	Dc	Dc tol.	L2	L1	D2
178.0610876114F	6,10	m7	76	114	8
178.0620876114F	6,20	m7	76	114	8
178.0630876114F	6,30	m7	76	114	8
178.0640876114F	6,40	m7	76	114	8
178.0650876114F	6,50	m7	76	114	8
178.0660876114F	6,60	m7	76	114	8
178.0670876114F	6,70	m7	76	114	8
178.0680876114F	6,80	m7	76	114	8
178.0690876114F	6,90	m7	76	114	8
178.0700876114F	7,00	m7	76	114	8
178.0710876114F	7,10	m7	76	114	8
178.0720876114F	7,20	m7	76	114	8
178.0730876114F	7,30	m7	76	114	8
178.0740876114F	7,40	m7	76	114	8
178.0750876114F	7,50	m7	76	114	8
178.0760876114F	7,60	m7	76	114	8
178.0770876114F	7,70	m7	76	114	8
178.0780876114F	7,80	m7	76	114	8
178.0790876114F	7,90	m7	76	114	8
178.0800876114F	8,00	m7	76	114	8
178.0811095142F	8,10	m7	95	142	10
178.0821095142F	8,20	m7	95	142	10
178.0831095142F	8,30	m7	95	142	10
178.0841095142F	8,40	m7	95	142	10
178.0851095142F	8,50	m7	95	142	10
178.0861095142F	8,60	m7	95	142	10
178.0871095142F	8,70	m7	95	142	10
178.0881095142F	8,80	m7	95	142	10
178.0891095142F	8,90	m7	95	142	10
178.0901095142F	9,00	m7	95	142	10
178.0911095142F	9,10	m7	95	142	10
178.0921095142F	9,20	m7	95	142	10
178.0931095142F	9,30	m7	95	142	10
178.0941095142F	9,40	m7	95	142	10
178.0951095142F	9,50	m7	95	142	10
178.0961095142F	9,60	m7	95	142	10
178.0971095142F	9,70	m7	95	142	10
178.0981095142F	9,80	m7	95	142	10
178.0991095142F	9,90	m7	95	142	10
178.1001095142F	10,00	m7	95	142	10
178.10112114162F	10,10	m7	114	162	12
178.10212114162F	10,20	m7	114	162	12
178.10312114162F	10,30	m7	114	162	12
178.10412114162F	10,40	m7	114	162	12
178.10512114162F	10,50	m7	114	162	12

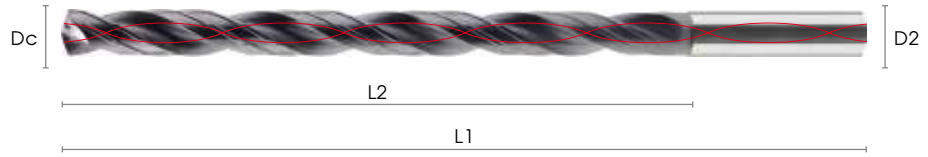
178 8XD



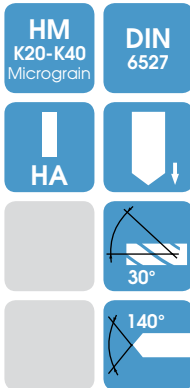
Cod.	Dc	Dc tol.	L2	L1	D2
178.10612114162F	10,60	m7	114	162	12
178.10712114162F	10,70	m7	114	162	12
178.10812114162F	10,80	m7	114	162	12
178.10912114162F	10,90	m7	114	162	12
178.11012114162F	11,00	m7	114	162	12
178.11112114162F	11,10	m7	114	162	12
178.11212114162F	11,20	m7	114	162	12
178.11312114162F	11,30	m7	114	162	12
178.11412114162F	11,40	m7	114	162	12
178.11512114162F	11,50	m7	114	162	12
178.11612114162F	11,60	m7	114	162	12
178.11712114162F	11,70	m7	114	162	12
178.11812114162F	11,80	m7	114	162	12
178.11912114162F	11,90	m7	114	162	12
178.12012114162F	12,00	m7	114	162	12
178.12514133178F	12,50	m7	133	178	14
178.12814133178F	12,80	m7	133	178	14
178.13014133178F	13,00	m7	133	178	14
178.13514133178F	13,50	m7	133	178	14
178.14014133178F	14,00	m7	133	178	14
178.14516152203F	14,50	m7	152	203	16
178.15016152203F	15,00	m7	152	203	16
178.15516152203F	15,50	m7	152	203	16
178.16016152203F	16,00	m7	152	203	16
178.16518171222F	16,50	m7	171	222	18
178.17018171222F	17,00	m7	171	222	18
178.17518171222F	17,50	m7	171	222	18
178.18018171222F	18,00	m7	171	222	18
178.18520190243F	18,50	m7	190	243	20
178.19020190243F	19,00	m7	190	243	20
178.20020190243F	20,00	m7	190	243	20

STEEL DRILLING

Twist drill with internal coolant

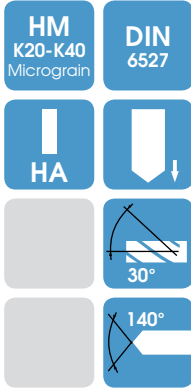


178



Cod.	Dc	Dc tol.	L2	L1	D2
178.010031555F	1,00	h7	15	55	3
178.011032355F	1,10	h7	23	55	3
178.012032355F	1,20	h7	23	55	3
178.013032355F	1,30	h7	23	55	3
178.014032355F	1,40	h7	23	55	3
178.015033065F	1,50	h7	30	65	3
178.016032965F	1,60	h7	29	65	3
178.017032965F	1,70	h7	29	65	3
178.018033065F	1,80	h7	30	65	3
178.019033065F	1,90	h7	30	65	3
178.020033065F	2,00	h7	30	65	3
178.021033874F	2,10	h7	38	74	3
178.022033874F	2,20	h7	38	74	3
178.023033874F	2,30	h7	38	74	3
178.024033874F	2,40	h7	38	74	3
178.025034481F	2,50	h7	44	81	3
178.026034481F	2,60	h7	44	81	3
178.027034481F	2,70	h7	44	81	3
178.028034481F	2,80	h7	44	81	3
178.029034481F	2,90	h7	44	81	3
178.030065492F	3,00	h7	54	92	6
178.031065492F	3,10	h7	54	92	6
178.032065492F	3,20	h7	54	92	6
178.033065492F	3,30	h7	54	92	6
178.034065492F	3,40	h7	54	92	6
178.035065492F	3,50	h7	54	92	6
178.036065492F	3,60	h7	54	92	6
178.037065492F	3,70	h7	54	92	6

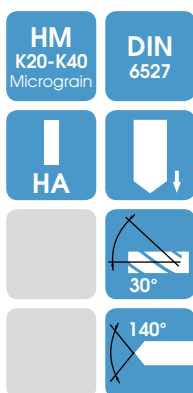
178 12XD



Cod.	Dc	Dc fol.	L2	L1	D2
178.0380664102F	3,80	h7	64	102	6
178.0390664102F	3,90	h7	64	102	6
178.0400664102F	4,00	h7	64	102	6
178.0410664102F	4,10	h7	64	102	6
178.0420664102F	4,20	h7	64	102	6
178.0430664102F	4,30	h7	64	102	6
178.0440664102F	4,40	h7	64	102	6
178.0450664102F	4,50	h7	64	102	6
178.0460664102F	4,60	h7	64	102	6
178.0470664102F	4,70	h7	64	102	6
178.0480678118F	4,80	h7	78	118	6
178.0490678118F	4,90	h7	78	118	6
178.0500678118F	5,00	h7	78	118	6
178.0510678118F	5,10	h7	78	118	6
178.0520678118F	5,20	h7	78	118	6
178.0530678118F	5,30	h7	78	118	6
178.0540678118F	5,40	h7	78	118	6
178.0550678118F	5,50	h7	78	118	6
178.0560678118F	5,60	h7	78	118	6
178.0570678118F	5,70	h7	78	118	6
178.0580678118F	5,80	h7	78	118	6
178.0590678118F	5,90	h7	78	118	6
178.0600678118F	6,00	h7	78	118	6
178.0610878146F	6,10	h7	78	146	8
178.0620878146F	6,20	h7	78	146	8
178.0630878146F	6,30	h7	78	146	8
178.0640878146F	6,40	h7	78	146	8
178.06508108146F	6,50	h7	108	146	8
178.0660878146F	6,60	h7	78	146	8
178.0670878146F	6,70	h7	78	146	8
178.06808108146F	6,80	h7	108	146	8
178.0690878146F	6,90	h7	78	146	8
178.07008108146F	7,00	h7	108	146	8
178.0710878146F	7,10	h7	78	146	8
178.0720878146F	7,20	h7	78	146	8
178.0730878146F	7,30	h7	78	146	8
178.0740878146F	7,40	h7	78	146	8
178.07508108146F	7,50	h7	108	146	8
178.0760878146F	7,60	h7	78	146	8
178.0770878146F	7,70	h7	78	146	8
178.07808108146F	7,80	h7	108	146	8
178.0790878146F	7,90	h7	78	146	8
178.08008108146F	8,00	h7	108	146	8
178.08110120162F	8,10	h7	120	162	10
178.08210120162F	8,20	h7	120	162	10

Cod.	Dc	Dc tol.	L2	L1	D2
178.08310120162F	8,30	h7	120	162	10
178.08410120162F	8,40	h7	120	162	10
178.08510120162F	8,50	h7	120	162	10
178.08610120162F	8,60	h7	120	162	10
178.08710120162F	8,70	h7	120	162	10
178.08810120162F	8,80	h7	120	162	10
178.08910120162F	8,90	h7	120	162	10
178.09010120162F	9,00	h7	120	162	10
178.09110120162F	9,10	h7	120	162	10
178.09210120162F	9,20	h7	120	162	10
178.09310120162F	9,30	h7	120	162	10
178.09410120162F	9,40	h7	120	162	10
178.09510120162F	9,50	h7	120	162	10
178.09610120162F	9,60	h7	120	162	10
178.09710120162F	9,70	h7	120	162	10
178.09810120162F	9,80	h7	120	162	10
178.09910120162F	9,90	h7	120	162	10
178.10010120162F	10,00	h7	120	162	10
178.10112156204F	10,10	h7	156	204	12
178.10212156204F	10,20	h7	156	204	12
178.10312156204F	10,30	h7	156	204	12
178.10412156204F	10,40	h7	156	204	12
178.10512156204F	10,50	h7	156	204	12
178.10612156204F	10,60	h7	156	204	12
178.10712156204F	10,70	h7	156	204	12
178.10812156204F	10,80	h7	156	204	12
178.10912156204F	10,90	h7	156	204	12
178.11012156204F	11,00	h7	156	204	12
178.11112156204F	11,10	h7	156	204	12
178.11212156204F	11,20	h7	156	204	12
178.11312156204F	11,30	h7	156	204	12
178.11412156204F	11,40	h7	156	204	12
178.11512156204F	11,50	h7	156	204	12
178.11612156204F	11,60	h7	156	204	12
178.11712156204F	11,70	h7	156	204	12
178.11812156204F	11,80	h7	156	204	12
178.11912156204F	11,90	h7	156	204	12
178.12012156204F	12,00	h7	156	204	12
178.12514182230F	12,50	h7	182	230	14
178.12814182230F	12,80	h7	182	230	14
178.13014182230F	13,00	h7	182	230	14
178.13514182230F	13,50	h7	182	230	14
178.13814182230F	13,80	h7	182	230	14
178.14014182230F	14,00	h7	182	230	14
178.14516208260F	14,50	h7	208	260	16

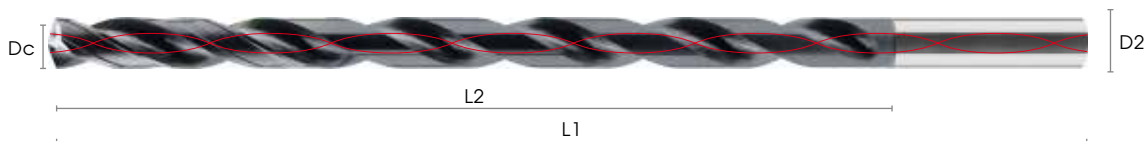
178 12XD



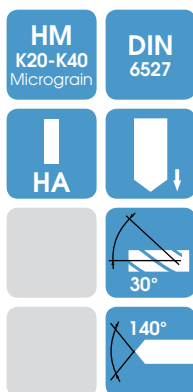
Cod.	Dc	Dc tol.	L2	L1	D2
178.14816208260F	14,80	h7	208	260	16
178.15016208260F	15,00	h7	208	260	16
178.15516208260F	15,50	h7	208	260	16
178.15816208260F	15,80	h7	208	260	16
178.16016208260F	16,00	h7	208	260	16
178.16518234285F	16,50	h7	234	285	18
178.16818234285F	16,80	h7	234	285	18
178.17018234285F	17,00	h7	234	285	18
178.17518234285F	17,50	h7	234	285	18
178.17818234285F	17,80	h7	234	285	18
178.18018234285F	18,00	h7	234	285	18
178.18520258310F	18,50	h7	258	310	20
178.18820258310F	18,80	h7	258	310	20
178.19020258310F	19,00	h7	258	310	20
178.19520258310F	19,50	h7	258	310	20
178.19820258310F	19,80	h7	258	310	20
178.20020258310F	20,00	h7	258	310	20

STEEL DRILLING

Twist drill with internal coolant



178



Cod.	Dc	Dc tol.	L2	L1	D2
178.010031860F	1,0	h7	18	60	3
178.011032060F	1,1	h7	20	60	3
178.012032460F	1,2	h7	24	60	3
178.013032460F	1,3	h7	24	60	3
178.014032760F	1,4	h7	27	60	3
178.015032760F	1,5	h7	27	60	3
178.016033065F	1,6	h7	30	65	3
178.017033065F	1,7	h7	30	65	3
178.018033565F	1,8	h7	35	65	3
178.019033565F	1,9	h7	35	65	3
178.020043565F	2,0	h7	35	65	4
178.021044075F	2,1	h7	40	75	4
178.022044075F	2,2	h7	40	75	4
178.023044075F	2,3	h7	40	75	4
178.024044575F	2,4	h7	45	75	4
178.025044575F	2,5	h7	45	75	4
178.026044880F	2,6	h7	48	80	4
178.027044880F	2,7	h7	48	80	4
178.028045080F	2,8	h7	50	80	4
178.029045080F	2,9	h7	50	80	4

178 15XD

HM
K20-K40
Micrograin

DIN
6527



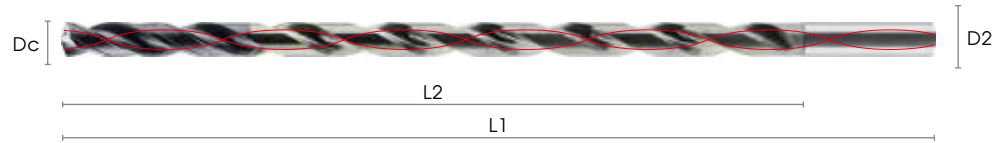
Cod.	Dc	Dc tol.	L2	L1	D2
178.0300655100F	3,0	h7	55	100	6
178.0310655100F	3,1	h7	55	100	6
178.0320660100F	3,2	h7	60	100	6
178.0330660100F	3,3	h7	60	100	6
178.0340660100F	3,4	h7	60	100	6
178.0350665100F	3,5	h7	65	100	6
178.0360665108F	3,6	h7	65	108	6
178.0370670108F	3,7	h7	70	108	6
178.0380670108F	3,8	h7	70	108	6
178.03906702108F	3,9	h7	70,2	108	6
178.0400675115F	4,0	h7	75	115	6
178.0410675115F	4,1	h7	75	115	6
178.0420675115F	4,2	h7	75	115	6
178.0430680115F	4,3	h7	80	115	6
178.0440680115F	4,4	h7	80	115	6
178.0450680115F	4,5	h7	80	115	6
178.0460685130F	4,6	h7	85	130	6
178.04706846130F	4,7	h7	84,6	130	6
178.0480690130F	4,8	h7	90	130	6
178.0490690130F	4,9	h7	90	130	6
178.0500690130F	5,0	h7	90	130	6
178.0510695130F	5,1	h7	95	130	6
178.0520695130F	5,2	h7	95	130	6
178.05306954130F	5,3	h7	95,4	130	6
178.0540695130F	5,4	h7	95	130	6
178.05506100145F	5,5	h7	100	145	6
178.05606100145F	5,6	h7	100	145	6
178.05706100145F	5,7	h7	100	145	6
178.05806100145F	5,8	h7	100	145	6
178.05906100145F	5,9	h7	100	145	6
178.06006100145F	6,0	h7	100	145	6
178.06108104145F	6,1	h7	104	145	8
178.06208104145F	6,2	h7	104	145	8
178.06308104145F	6,3	h7	104	145	8
178.06408104145F	6,4	h7	104	145	8
178.06508118160F	6,5	h7	118	160	8
178.06608118160F	6,6	h7	118	160	8
178.06708128170F	6,7	h7	128	170	8
178.06808128170F	6,8	h7	128	170	8
178.06908128170F	6,9	h7	128	170	8
178.07008128170F	7,0	h7	128	170	8
178.07508128170F	7,5	h7	128	170	8
178.07808138180F	7,8	h7	138	180	8
178.08008138180F	8,0	h7	138	180	8
178.08510152198F	8,5	h7	152	198	10

Cod.	Dc	Dc tol.	L2	L1	D2
178.08810162208F	8,8	h7	162	208	10
178.09010162208F	9,0	h7	162	208	10
178.09510162208F	9,5	h7	162	208	10
178.09810162208F	9,8	h7	162	208	10
178.10010172218F	10,0	h7	172	218	10
178.10212184235F	10,2	h7	184	235	12
178.10512194245F	10,5	h7	194	245	12
178.10812194245F	10,8	h7	194	245	12
178.11012194245F	11,0	h7	194	245	12
178.11212194245F	11,2	h7	194	245	12
178.11512194245F	11,5	h7	194	245	12
178.11812204255F	11,8	h7	204	255	12
178.12012204255F	12,0	h7	204	255	12

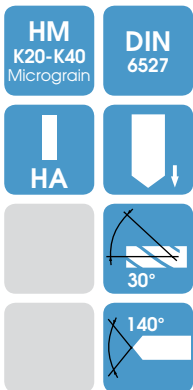
178 20XD

STEEL DRILLING

Twist drill with internal coolant



178



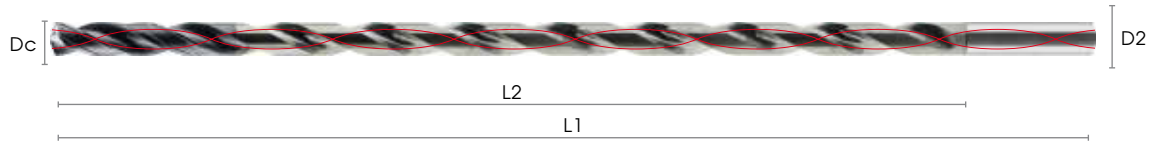
Cod.	Dc	Dc tol.	L2	L1	D2
178.020044595F	2,0	h7	45	95	4
178.021045095F	2,1	h7	50	95	4
178.022045095F	2,2	h7	50	95	4
178.023045595F	2,3	h7	55	95	4
178.024045595F	2,4	h7	55	95	4
178.0250460108F	2,5	h7	60	108	4
178.0260460108F	2,6	h7	60	108	4
178.0270465108F	2,7	h7	65	108	4
178.0280465108F	2,8	h7	65	108	4
178.0290468112F	2,9	h7	68	112	4
178.0300668112F	3,0	h7	68	112	6
178.0320675120F	3,2	h7	75	120	6
178.0330675120F	3,3	h7	75	120	6
178.0350680130F	3,5	h7	80	130	6
178.0380690140F	3,8	h7	90	140	6
178.0400695140F	4,0	h7	95	140	6
178.0420695140F	4,2	h7	95	140	6
178.04506110160F	4,5	h7	110	160	6
178.04606110160F	4,6	h7	110	160	6
178.04806115160F	4,8	h7	115	160	6

Cod.	Dc	Dc tol.	L2	L1	D2
178.05006115160F	5,0	h7	115	160	6
178.05506140185F	5,5	h7	140	185	6
178.05806140185F	5,8	h7	140	185	6
178.06006140185F	6,0	h7	140	185	6
178.06508147190F	6,5	h7	147	190	8
178.06808157200F	6,8	h7	157	200	8
178.07008167210F	7,0	h7	167	210	8
178.07508167210F	7,5	h7	167	210	8
178.07808187230F	7,8	h7	187	230	8
178.08008187230F	8,0	h7	187	230	8
178.08510193240F	8,5	h7	193	240	10
178.08810213260F	8,8	h7	213	260	10
178.09010213260F	9,0	h7	213	260	10
178.09810233280F	9,8	h7	233	280	10
178.10010233280F	10,0	h7	233	280	10
178.10212238290F	10,2	h7	238	290	12
178.10812263315F	10,8	h7	263	315	12
178.11812263315F	11,8	h7	263	315	12
178.12012263315F	12,0	h7	263	315	12

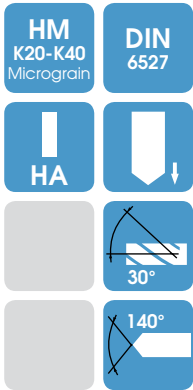
178 25XD

STEEL DRILLING

Twist drill with internal coolant



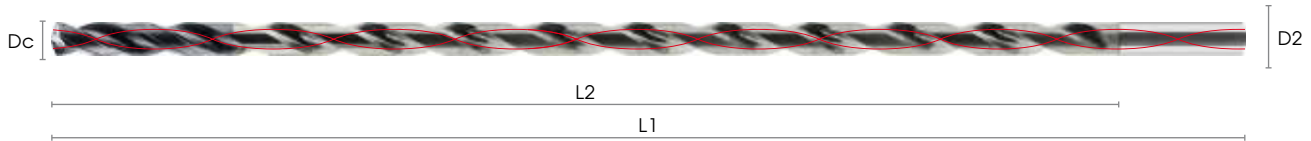
178



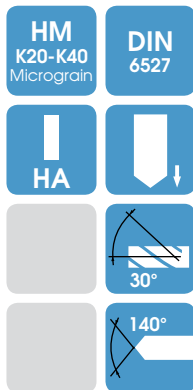
Cod.	Dc	Dc tol.	L2	L1	D2
178.0300685130F	3,0	h7	85	130	6
178.0320695140F	3,2	h7	95	140	6
178.0330695140F	3,3	h7	95	140	6
178.03506100150F	3,5	h7	100	150	6
178.03806105150F	3,8	h7	105	150	6
178.04006110160F	4,0	h7	110	160	6
178.04206120170F	4,2	h7	120	170	6
178.04506130180F	4,5	h7	130	180	6
178.04806140190F	4,8	h7	140	190	6
178.05006140190F	5,0	h7	140	190	6
178.05506160210F	5,5	h7	160	210	6
178.05806160210F	5,8	h7	160	210	6
178.06006170220F	6,0	h7	170	220	6
178.06508188230F	6,5	h7	188	230	8
178.06808188230F	6,8	h7	188	230	8
178.07008198240F	7,0	h7	198	240	8
178.07508211250F	7,5	h7	211	250	8
178.07808221260F	7,8	h7	221	260	8
178.08008221260F	8,0	h7	221	260	8
178.08510234280F	8,5	h7	234	280	10
178.08810244290F	8,8	h7	244	290	10
178.09010244290F	9,0	h7	244	290	10
178.09510264310F	9,5	h7	264	310	10
178.09810264310F	9,8	h7	264	310	10
178.10010264310F	10,0	h7	264	310	10
178.10212289340F	10,2	h7	289	340	12
178.10812299350F	10,8	h7	299	350	12
178.11812324375F	11,8	h7	324	375	12
178.12012324375F	12,0	h7	324	375	12

STEEL DRILLING

Twist drill with internal coolant

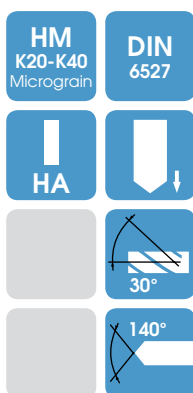


178

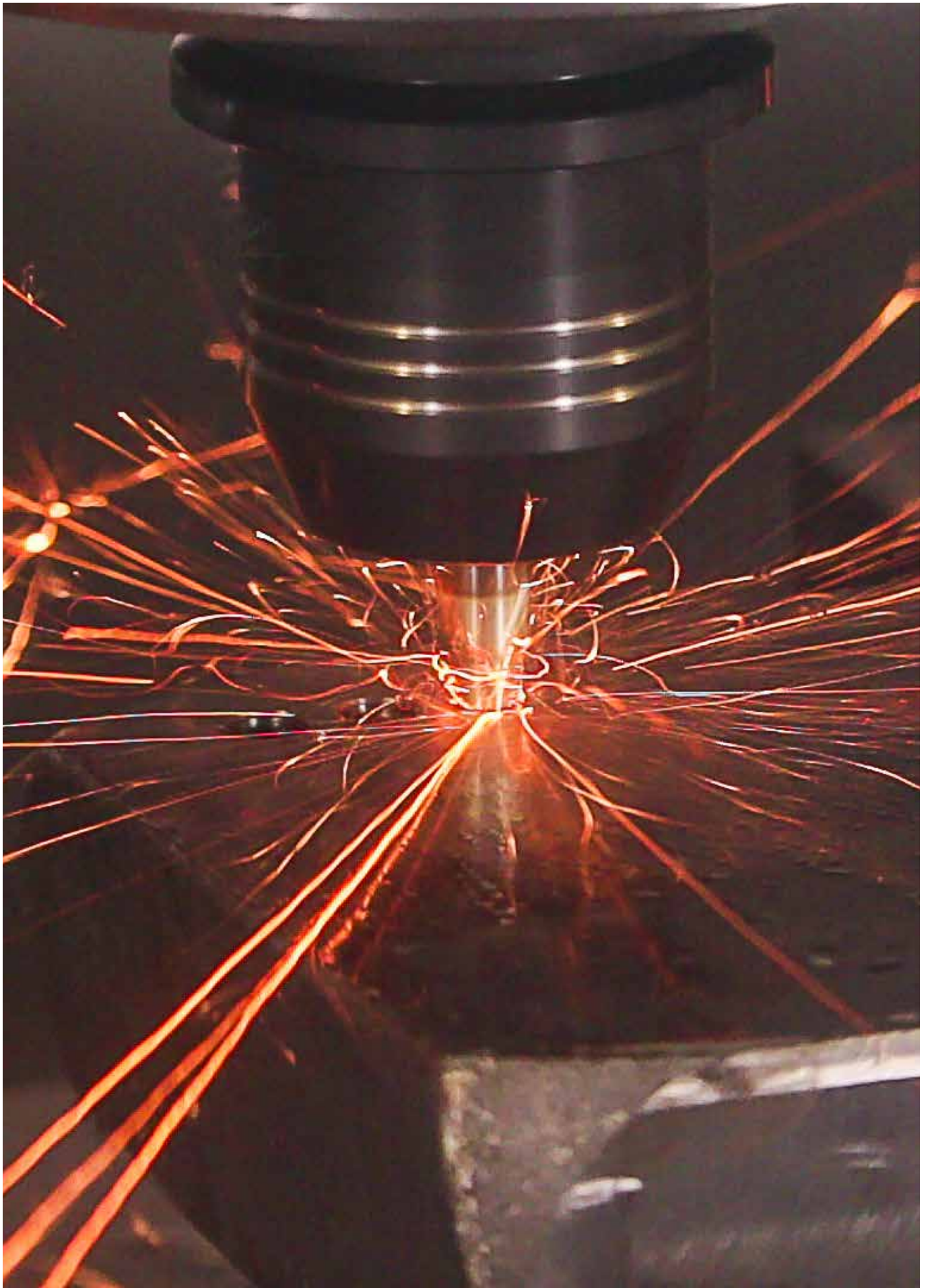


Cod.	Dc	Dc tol.	L2	L1	D2
178.0200465105F	2,0	h7	65	105	4
178.0220475115F	2,2	h7	75	115	4
178.0230475115F	2,3	h7	75	115	4
178.0240485130F	2,4	h7	85	130	4
178.0250485130F	2,5	h7	85	130	4
178.0270495140F	2,7	h7	95	140	4
178.0280495140F	2,8	h7	95	140	4
178.0290495140F	2,9	h7	95	140	4
178.03006105150F	3,0	h7	105	150	6
178.03206105150F	3,2	h7	105	150	6
178.03306115160F	3,3	h7	115	160	6
178.03506115160F	3,5	h7	115	160	6
178.03806125175F	3,8	h7	125	175	6
178.04006135185F	4,0	h7	135	185	6
178.04206135185F	4,2	h7	135	185	6
178.04506145195F	4,5	h7	145	195	6
178.04606155205F	4,6	h7	155	205	6

178 30XD



Cod.	Dc	Dc tol.	L2	L1	D2
178.04806165210F	4,8	h7	165	210	6
178.05006165210F	5,0	h7	165	210	6
178.05506180240F	5,5	h7	180	240	6
178.05806190240F	5,8	h7	190	240	6
178.06006190240F	6,0	h7	190	240	6
178.06508219260F	6,5	h7	219	260	8
178.06808219260F	6,8	h7	219	260	8
178.07008229270F	7,0	h7	229	270	8
178.07508249290F	7,5	h7	249	290	8
178.07808259300F	7,8	h7	259	300	8
178.08008265305F	8,0	h7	265	305	8
178.08510276320F	8,5	h7	276	320	10
178.08810296340F	8,8	h7	296	340	10
178.09010296340F	9,0	h7	296	340	10
178.09510316360F	9,5	h7	316	360	10
178.09810336380F	9,8	h7	336	380	10
178.10010336380F	10,0	h7	336	380	10



Composites Milling Working Parameters

Type	Material	Short m/mm	Long m/mm	ap x D1	ø 3			ø 4			ø 5			ø 6			
					ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1
					vc	vc	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz
Type	Material	m/mm	m/mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
68DX / 68SX / 68TD / 68RDX / 68SU	Thermoplastics	150	120	1.0				0,004	0,003	0,001				0,000	0,000		0,008
	Carbon fiber CFRP/ CFC	120	100	1.0				0,167	0,125	0,050				0,250	0,188	0,075	0,333
119P	Aramid fiber Kevlar	150	120	1.0										0,315	0,189	0,095	0,420
419TD 119P		300	200	1.0										0,220	0,132	0,066	0,293
77SUP P/D	Honeycomb/Nomex	1000		1.0													
106 / 108 / 109 *	Thermoplastics	150	120	1.0	0,100	0,075	0,030	0,133	0,100	0,040				0,200	0,150	0,060	0,267
	Glass fiber GFRP / GFK	250	200	1.0	0,100	0,075	0,030	0,133	0,100	0,040				0,200	0,150	0,060	0,267

Composites Drilling Working Parameters

Type	ISO	Materials	Strength (N/mm ²)	Material Number
165C	N	Thermoplastics		
		Duroplastics		
		Carbon fiber		
		Fibre-reinforced plastics		
118	N	Thermoplastics		
		Aramid fiber/Kevlar		
165ST	N	Aluminium (non alloyed, low alloyed)	< 350 N/mm ²	3.0255
		Aluminium alloys < 0.5% Si	< 500 N/mm ²	3.0515
		Aluminium alloy 0.5-10% Si	< 400 N/mm ²	3.2152
		Aluminium alloys 10-15% Si	< 400 N/mm ²	3.2381
		Aluminum alloys > 15% Si	< 400 N/mm ²	
		Copper (non alloyed, low alloyed)	< 350 N/mm ²	2.0060
		Copper wrought alloys	< 700 N/mm ²	2.0240
		Special copper alloys	< 200 HE	2.0916
		Special copper alloys	< 300 HB	2.0978
		Special copper alloys	> 300 HE	2.1247
		Short-chipping brass, bronze, red bronze	< 600 N/mm ²	2.0360
		Long-chipping brass	< 600 N/mm ²	2.0335
	S	Pure titanium	< 900 N/mm ²	3.7025
		Titanium alloys	< 700 N/mm ²	3.7114
Titanium alloys		< 1200 N/mm ²	3.7164	

ø 8		ø 10			ø 12			ø 16			ø 20			ø 24			ø 44			Emulsion	Compressed Air	Minimum quantity lubrication
ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1			
fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm			
0,006	0,002	0,010	0,008	0,003	0,012	0,009	0,004															
0,250	0,100	0,410	0,310	0,125	0,500	0,375	0,150															
0,252	0,126	0,525	0,315	0,158	0,630	0,378	0,189															
0,176	0,088	0,367	0,220	0,110	0,440	0,264	0,132															
					0,004	0,003	0,001	0,005	0,004	0,002	0,007	0,005	0,002	0,008	0,006	0,002	0,015	0,011	0,004			
0,200	0,080	0,333	0,250	0,100	0,400	0,300	0,120															
0,200	0,080	0,333	0,250	0,100	0,400	0,300	0,120															

Material designation	Vc m/min	ø 2 - ø 2,9	ø 3 - ø 5,9	ø 6 - ø 8,9	ø 9 - ø 11,9
		mm / U	mm / U	mm / U	mm / U
Delrin, Hostalen	200	0,035	0,050	0,070	0,090
Ferrozelf, Bakelit	200	0,035	0,050	0,070	0,090
CFC - CFK	120	0,035	0,050	0,070	0,090
GFK*	200	0,035	0,050	0,070	0,090
Delrin, Hostalen	150	0,045	0,060	0,080	0,100
	150	0,045	0,060	0,080	0,100
A199,5	200	0,150	0,200	0,300	0,380
AlMni	160	0,150	0,200	0,300	0,380
GD-AISI16Cu4	160	0,150	0,200	0,300	0,380
G-AISI10Mg	150	0,150	0,200	0,300	0,380
G-AISI17Cu4	150	0,150	0,200	0,300	0,380
E-Cu57	90	0,100	0,150	0,200	0,250
CuZn15	90	0,100	0,150	0,200	0,250
CuAl5	70	0,100	0,150	0,200	0,250
CuAl11Ni6Fe5	70	0,100	0,150	0,200	0,250
Cu13e2F1 25	70	0,100	0,150	0,200	0,250
CuZn40 (Ms60)	70	0,100	0,150	0,200	0,250
CuZn36 (Ms63)	70	0,100	0,150	0,200	0,250
Ti99,8	25	0,025	0,030	0,040	0,048
TiA15Sn2	20	0,025	0,030	0,040	0,048
TiA15V4	15	0,025	0,030	0,040	0,048

Metal Milling Working Parameters

Code	ISO	Material	Strength (N/mm ²)	Material Number	Material designation	m/min	m/min	apxXD1	ø 3			ø 4		
									ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1	ae 0,1-0,2 x d1	ae 0,3-0,4 x d1	ae 0,6-1,0 x d1
									vc	vc		fz	fz	fz
640WV	P	General construction steel	< 800 N/mm ²	1,0037	St37-2	200	160	1,0	0,024	0,019	0,014	0,029	0,022	0,016
		Free cutting steel	< 800 N/mm ²	1,0719	9SMnPb28	210	170	1,0	0,024	0,019	0,014	0,029	0,022	0,016
		Hardened steel, non alloyed	< 800 N/mm ²	1,0401	C15	180	140	1,0	0,017	0,013	0,010	0,029	0,022	0,016
		Alloyed hardened steel	< 1000 N/mm ²	1,7331	16MnCr5 (EC80)	160	130	1,0	0,012	0,009	0,007	0,029	0,022	0,016
		Tempering steel, unalloyed	< 850 N/mm ²	1,0503	C45	170	135	1,0	0,017	0,013	0,010	0,029	0,022	0,016
		Tempering steel, unalloyed	< 1000 N/mm ²	1,0601	C60	160	130	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Tempering steel, alloyed	< 800 N/mm ²	1,5131	50MnS14	160	130	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Tempering steel, alloyed	< 1300 N/mm ²	1,5755	31 NiCr14	140	115	1,0	0,012	0,009	0,007	0,029	0,022	0,016
		Steel castings	< 850 N/mm ²	0,9650	G-X260Cr27	140	110	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Nitriding steel	< 1000 N/mm ²	1,8504	34CrAl6	160	130	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Nitriding steel	< 1200 N/mm ²	1,8515	31CrV1o12	140	115	1,0	0,012	0,009	0,007	0,022	0,017	0,012
		Roller bearing steel	< 1200 N/mm ²	1,3505	100Cr6 (W3)	160	130	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Spring steel	< 1200 N/mm ²	1,5026	55Si7			1,0						
		High-speed steel	< 1300 N/mm ²	1,3344	S 6-5-3			1,0						
Cold working tool steel	< 1300 N/mm ²	1,2312	40CrMnMoS8 6	150	120	1,0	0,017	0,013	0,010	0,029	0,022	0,016		
Hot working tool steel	< 1300 N/mm ²	1,2343	X38CrMoV 51	130	100	1,0	0,017	0,013	0,010	0,029	0,022	0,016		
640W	M	Cast steel and sulphured stainless steel	< 850 N/mm ²	1,4305	X8CrNiS18 9	110	90	1,0	0,012	0,009	0,007	0,018	0,014	0,010
		Stainless steel, ferritic	< 750 N/mm ²	1,4510	X3CrTi17	100	80	1,0	0,012	0,009	0,007	0,018	0,014	0,010
		Stainless steel, martensitic	< 900 N/mm ²	1,4034	X46Cr13	85	70	1,0	0,012	0,009	0,007	0,018	0,014	0,010
		Stainless steel, ferritic / martensitic	< 1100 N/mm ²	1,4313	X3CrNi13.4	100	80	1,0	0,0122	0,009	0,007	0,0183	0,014	0,010
		Stainless steel, austenitic / ferritic	< 850 N/mm ²	1,4460	X8CrNiMo27 5	100	80	1,0	0,012	0,009	0,007	0,018	0,014	0,010
642	M	Heat resistant steel	< 1100 N/mm ²	1,4747	X80CrNiS120	26	20	1,0	0,0092	0,007	0,005	0,0153	0,012	0,009
640WV	K	Grey cast iron with lamellar graphite	100-350 N/mm ²	0,6010	GG10	170	135	1,0	0,024	0,019	0,014	0,036	0,028	0,020
		Grey cast iron with lamellar graphite	300-1000 N/mm ²	0,6030	GG30	140	110	1,0	0,018	0,014	0,010	0,036	0,028	0,020
		Gray cast iron with spheroidal graphite	300-500 N/mm ²	0,7040	GGG40	160	130	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Gray cast iron with spheroidal graphite	550-800 N/mm ²	0,7060	GGG60	130	100	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		White malleable cast iron	350-450 N/mm ²	0,8035	GTW35	150	120	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		White malleable cast iron	500-650 N/mm ²	0,8055	GTW55	140	110	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Black malleable cast iron	350-450 N/mm ²	0,8135	GTS35	150	120	1,0	0,018	0,014	0,010	0,029	0,022	0,016
		Black malleable cast iron	500-700 N/mm ²	0,8155	GTS55	135	110	1,0	0,018	0,014	0,010	0,029	0,022	0,016
102TC/ 102TCL	N	Aluminium (non alloyed, low alloyed)	< 350 N/mm ²	3,0255	A199,5	300	240		-	-	-	0,070	0,053	0,021
		Aluminium alloys < 0.5% Si	< 500 N/mm ²	3,0515	AlMni	300	240		-	-	-	0,070	0,053	0,021
		Aluminium alloy 0,5-10% Si	< 400 N/mm ²	3,2152	GD-AISi6Cu4	300	240		-	-	-	0,070	0,053	0,021
		Aluminium alloys 10-15% Si	< 400 N/mm ²	3,2381	G-AISiOMg	150	120		-	-	-	0,035	0,026	0,011
		Aluminum alloys > 15% Si	< 400 N/mm ²		G-AISi17Cu4				-	-	-			
303	N	Aluminium (non alloyed, low alloyed)	< 350 N/mm ²	3,0255	A199,5	500	400		-	-	-	0,140	0,105	0,042
		Aluminium alloys < 0.5% Si	< 500 N/mm ²	3,0515	AlMni	500	400		-	-	-	0,140	0,105	0,042
		Aluminium alloy 0,5-10% Si	< 400 N/mm ²	3,2152	GD-AISi6Cu4	500	400		-	-	-	0,140	0,105	0,042
		Aluminium alloys 10-15% Si	< 400 N/mm ²	3,2381	G-AISiOMg	300	240		-	-	-	0,070	0,053	0,021
		Aluminum alloys > 15% Si	< 400 N/mm ²		G-AISi17Cu4				-	-	-			
642	S	Pure nickel		1,3911	RNi24									
		Nickel alloys		1,3912	Ni36 (Invar)									
		Nickel alloys	< 850 N/mm ²	2,4360	S-NiCu 30 Fe	25	20	0,5	0,011	0,008	0,006	0,015	0,012	0,009
		Nickel-chromium alloys		2,4886	SG-NiMo16Cr16W	25	20	0,5	0,011	0,008	0,006	0,015	0,012	0,009
		Nickel alloys	< 1300 N/mm ²	2,4632	NiCr20Co18Ti	25	20	0,5	0,011	0,008	0,006	0,015	0,012	0,009
		Cobalt Chrome Alloys	< 1300 N/mm ²	2,4634	NiCo20Cr15, MoAlTi	25	20	0,5	0,011	0,008	0,006	0,015	0,012	0,009
		Heat resistant alloys	< 1300 N/mm ²		Hardox 400	25	20	0,5	0,011	0,008	0,006	0,015	0,012	0,009
		Nickel-cobalt-chromium alloys	< 1400 N/mm ²	2,4806	SG-NiCr2ONb, Inconel 82	25	20	0,5	0,011	0,008	0,006	0,015	0,012	0,009
641		Pure titanium	< 900 N/mm ²	3,7025	Ti99,8	135	110	1,0	0,021	0,017	0,012	0,031	0,024	0,017
		Titanium alloys	< 700 N/mm ²	3,7114	TiA15Sn2	45	45	1,0	0,007	0,009	0,023	0,009	0,012	0,031
		Titanium alloys	< 1200 N/mm ²	3,7164	TiAl5V4	45	45	1,0	0,007	0,009	0,023	0,009	0,012	0,031

Drills Up to 12xD

Type	ISO	Material	Strength (N/mm ²)	Material Number	Material designation	Vc m/min	Vc m/min	Vc m/min	Vc m/min	ø 1 - ø 2,9						
										3xD	5xD	8xD	12xD	3xD	5xD	8xD
										mm / U	mm / U	mm / U	mm / U	mm / U	mm / U	
178	P	General construction steel	< 800 N/mm ²	1,0037	St37-2	210	200	170	80							
		Free cutting steel	< 800 N/mm ²	1,0719	9SMnPb28	210	200	170	80							
		Hardened steel, non alloyed	< 800 N/mm ²	1,0401	C15	210	200	170	80							
		Alloyed hardened steel	< 1000 N/mm ²	1,7331	16MnCr5 (EC80)	120	110	70	60							
		Tempering steel, unalloyed	< 850 N/mm ²	1,0503	C45	130	120	90	70							
		Tempering steel, unalloyed	< 1000 N/mm ²	1,0601	C60	120	110	70	60							
		Tempering steel, alloyed	< 800 N/mm ²	1,5131	50MnS14	210	200	170	80							
		Tempering steel, alloyed	< 1300 N/mm ²	1,5755	31 NiCr14											
		Steel castings	< 850 N/mm ²	0,9650	G-X260Cr27	130	120	90	70							
		Nitriding steel	< 1000 N/mm ²	1,8504	34CrA16	120	110	70	60							
		Nitriding steel	< 1200 N/mm ²	1,8515	31CrV1o12											
		Roller bearing steel	< 1200 N/mm ²	1,3505	100Cr6 (W3)											
		Spring steel	< 1200 N/mm ²	1,5026	55Si7											
		High-speed steel	< 1300 N/mm ²	1,3344	S 6-5-3											
		Cold working tool steel	< 1300 N/mm ²	1,2312	40CrMnMoS8 6											
	Hot working tool steel	< 1300 N/mm ²	1,2343	X38CrMoV 51												
	M	Cast steel and sulphured stainless steel	< 850 N/mm ²	1,4305	X8CrNiS18 9	70	60	50	30							
		Stainless steel, ferritic	< 750 N/mm ²	1,4510	X3CrTi17	90	80	70	45							
		Stainless steel, martensitic	< 900 N/mm ²	1,4034	X46Cr13	70	60	50	30							
		Stainless steel, ferritic / martensitic	< 1100 N/mm ²	1,4313	X3CrN113.4	70	60	50	30							
		Stainless steel, austenitic / ferritic	< 850 N/mm ²	1,4460	X8CrNiMo27 5	70	60	50	30							
		Stainless steel, austenitic	< 750 N/mm ²	1,4301	X5CrNi18-10	70	60	50	30							
	M	Heat resistant steel	< 1100 N/mm ²	1,4747	X80CrNiS120	55	45	40								
	K	Grey cast iron with lamellar graphite	100-350 N/mm ²	0,6010	GG10	130	120	90	60							
		Grey cast iron with lamellar graphite	300-1000 N/mm ²	0,6030	GG30	130	120	90	60							
		Gray cast iron with spheroidal graphite	300-500 N/mm ²	0,7040	GGG40	90	80	80	60							
		Gray cast iron with spheroidal graphite	550-800 N/mm ²	0,7060	GGG60	90	80	80	60							
		White malleable cast iron	350-450 N/mm ²	0,8035	GTW35											
		White malleable cast iron	500-650 N/mm ²	0,8055	GTW55											
		Black malleable cast iron	350-450 N/mm ²	0,8135	GTS35											
		Black malleable cast iron	500-700 N/mm ²	0,8155	GTS55											
	N	Aluminium (non alloyed, low alloyed)	< 350 N/mm ²	3,0255	A199,5	250	240,0	230,0	140,0							
		Aluminium alloys < 0.5% Si	< 500 N/mm ²	3,0515	AlMn1	230	220,0	210,0	160,0							
		Aluminium alloy 0,5-10% Si	< 400 N/mm ²	3,2152	GD-AIS16Cu4	230	220,0	210,0	160,0							
		Aluminium alloys 10-15% Si	< 400 N/mm ²	3,2381	G-AISI10Mg	210	200,0	170,0	120,0							
		Aluminium alloys > 15% Si	< 400 N/mm ²		G-AISI17Cu4	210	200,0	170,0	120,0							
		Copper (non alloyed, low alloyed)	< 350 N/mm ²	2,0060	E-Cu57	160	150,0	120,0	80,0							
		Copper wrought alloys	< 700 N/mm ²	2,0240	CuZn15	160	150,0	120,0	80,0							
		Special copper alloys	< 200 HE	2,0916	CuAl5	160	150,0	120,0	80,0							
		Special copper alloys	< 300 HB	2,0978	CuAl11Ni6Fe5	160	150,0	120,0	80,0							
		Special copper alloys	> 300 HE	2,1247	Cu3e2F1 25	160	150,0	120,0	80,0							
		Short-chipping brass, bronze, red bronze	< 600 N/mm ²	2,0360	CuZn40 (Ms60)	160	150,0	120,0	80,0							
		Long-chipping brass	< 600 N/mm ²	2,0335	CuZn36 (Ms63)	160	150,0	120,0	80,0							
		Thermoplastics			Delrin, Hostalen											
		Duroplastics			Ferrozelf, Bakelit											
Fibre-reinforced plastics				GFK*												
Magnesium and magnesium alloys		< 850 N/mm ²	3,5200	M2, MgMn2												
Graphite				C8000, R8500X												
Tungsten and tungsten alloys				W-NiFe (Densimet W)												
Molybdenum and molybdenum alloys				Mo, Mo-50Re												
Aluminium alloys > 15% Si		< 400 N/mm ²		G-AISI17Cu4												
S	Pure nickel		1,3911	RNi24												
	Nickel alloys		1,3912	Ni36 (Invar)	55,000	45,000	40,000									
	Nickel alloys	< 850 N/mm ²	2,4360	S-NiCu 30 Fe	55,000	45,000	40,000									
	Nickel-chromium alloys		2,4886	SG-NiMo16Cr16W	55,000	45,000	40,000									
	Nickel alloys	< 1300 N/mm ²	2,4632	NiCr20Co18Ti	55,000	45,000	40,000									
	Cobalt Chrome Alloys	< 1300 N/mm ²	2,4634	NiCo20Cr15, MoAlTi	55,000	45,000	40,000									
	Heat resistant alloys	< 1300 N/mm ²		Hardox 400	55,000	45,000	40,000									
	Nickel-cobalt-chromium alloys	< 1400 N/mm ²	2,4806	SG-NiCr2ONb, Inconel 82	55,000	45,000	40,000									
	Pure titanium	< 900 N/mm ²	3,7025	Ti99,8												
	Titanium alloys	< 700 N/mm ²	3,7114	TiA15Sn2												
Titanium alloys	< 1200 N/mm ²	3,7164	TiAl5V4													

Drills Up to 30XD

						15xD							
Type	ISO	Material	Strength (N/mm ²)	Material Number	Material designation	Ø1 - Ø1.9 - Vc m/min	Ø2 - Ø2.9 - Vc m/min	Ø3 - Ø3.9 - Vc m/min	Ø4 - Ø4.9 - Vc m/min	Ø5 - Ø5.9 - Vc m/min	Ø6 - Ø7.9 - Vc m/min	Ø8 - Ø8.9 - Vc m/min	
178	P	General construction steel	< 800 N/mm ²	1,0037	St37-2	59	68	86	95	95	104	104	
		Free cutting steel	< 800 N/mm ²	1,0719	9SMnPb28	59	68	86	95	95	104	104	
		Hardened steel, non alloyed	< 800 N/mm ²	1,0401	C15	59	68	86	95	95	104	104	
		Alloyed hardened steel	< 1000 N/mm ²	1,7331	16MnCr5 (EC80)	52	60	76	84	84	92	92	
		Tempering steel, unalloyed	< 850 N/mm ²	1,0503	C45	55	64	81	89	89	98	98	
		Tempering steel, unalloyed	< 1000 N/mm ²	1,0601	C60	52	60	76	84	84	92	92	
		Tempering steel, alloyed	< 800 N/mm ²	1,5131	50MnS14	59	68	86	95	95	104	104	
		Tempering steel, alloyed	< 1300 N/mm ²	1,5755	31 NiCr14								
		Steel castings	< 850 N/mm ²	0,9650	G-X260Cr27	55	64	81	89	89	98	98	
		Nitriding steel	< 1000 N/mm ²	1,8504	34CrA16	52	60	76	84	84	92	92	
		Nitriding steel	< 1200 N/mm ²	1,8515	31CrV1o12								
		Roller bearing steel	< 1200 N/mm ²	1,3505	100Cr6 (W3)								
		Spring steel	< 1200 N/mm ²	1,5026	55Si7								
		High-speed steel	< 1300 N/mm ²	1,3344	S 6-5-3	49	56	71	79	79	86	86	
		Cold working tool steel	< 1300 N/mm ²	1,2312	40CrMnMoS8 6								
	Hot working tool steel	< 1300 N/mm ²	1,2343	X38CrMoV 51									
	M	Cast steel and sulphured stainless steel	< 850 N/mm ²	1,4305	X8CrNiS18 9								
		Stainless steel, ferritic	< 750 N/mm ²	1,4510	X3CrTi17	33	38	48	53	53	58	58	
		Stainless steel, martensitic	< 900 N/mm ²	1,4034	X46Cr13								
		Stainless steel, ferritic / martensitic	<1100 N/mm ²	1,4313	X3CrN113.4								
		Stainless steel, austenitic / ferritic	< 850 N/mm ²	1,4460	X8CrNiMo27 5								
		Stainless steel, austenitic	< 750 N/mm ²	1,4301	X5CrNi18-10	33	38	48	53	53	58	58	
	M	Heat resistant steel	< 1100 N/mm ²	1,4747	X80CrNiS120								
	K	Grey cast iron with lamellar graphite	100-350 N/mm ²	0,6010	GG10	59	68	86	95	95	104	104	
		Grey cast iron with lamellar graphite	300-1000 N/mm ²	0,6030	GG30	59	68	86	95	95	104	104	
		Gray cast iron with spheroidal graphite	300-500 N/mm ²	0,7040	GGG40	46	53	67	74	74	81	81	
		Gray cast iron with spheroidal graphite	550-800 N/mm ²	0,7060	GGG60	46	53	67	74	74	81	81	
		White malleable cast iron	350-450 N/mm ²	0,8035	GTW35								
White malleable cast iron		500-650 N/mm ²	0,8055	GTW55									
Black malleable cast iron		350-450 N/mm ²	0,8135	GTS35									
Black malleable cast iron		500-700 N/mm ²	0,8155	GTS55									

	20xD								25xD								30xD							
(Ø10-Ø12)-Vc m/min	(Ø1-Ø1.9)-Vc m/min	(Ø2-Ø2.9)-Vc m/min	(Ø3-Ø3.9)-Vc m/min	(Ø4-Ø4.9)-Vc m/min	(Ø5-Ø5.9)-Vc m/min	(Ø6-Ø7.9)-Vc m/min	(Ø8-Ø9.9)-Vc m/min	(Ø10-Ø12)-Vc m/min	(Ø1-Ø1.9)-Vc m/min	(Ø2-Ø2.9)-Vc m/min	(Ø3-Ø3.9)-Vc m/min	(Ø4-Ø4.9)-Vc m/min	(Ø5-Ø5.9)-Vc m/min	(Ø6-Ø7.9)-Vc m/min	(Ø8-Ø9.9)-Vc m/min	(Ø10-Ø12)-Vc m/min	(Ø1-Ø1.9)-Vc m/min	(Ø2-Ø2.9)-Vc m/min	(Ø3-Ø3.9)-Vc m/min	(Ø4-Ø4.9)-Vc m/min	(Ø5-Ø5.9)-Vc m/min	(Ø6-Ø7.9)-Vc m/min	(Ø8-Ø9.9)-Vc m/min	(Ø10-Ø12)-Vc m/min
104		63	81	90	90	99	99	99			77	86	86	95	95	95		54	72	81	81	90	90	
104		63	81	90	90	99	99	99			77	86	86	95	95	95		54	72	81	81	90	90	
104		63	81	90	90	99	99	99			77	86	86	95	95	95		54	72	81	81	90	90	
92		56	72	80	80	80	88	88			68	76	76	84	84	84		48	64	72	72	80	80	
98		60	77	85	85	94	94	94			72	81	81	89	89	89		51	68	77	77	85	85	
92		56	72	80	80	80	88	88			68	76	76	84	84	84		48	64	72	72	80	80	
104		63	81	90	90	99	99	99			77	86	86	95	95	95		54	72	81	81	90	90	
98		60	77	85	85	94	94	94			72	81	81	89	89	89		51	68	77	77	85	85	
92		56	72	80	80	80	88	88			68	76	76	84	84	84		48	64	72	72	80	80	
86		53	68	75	75	83	83	83			64	71	71	79	79	79		45	60	68	68	75	75	
58		35	45	50	50	55	55	55			43	48	48	53	53	53		30	40	45	45	50	50	
58		35	45	50	50	55	55	55			43	48	48	53	53	53		30	40	45	45	50	50	
104		63	81	90	90	99	99	99			77	86	86	95	95	95		54	72	81	81	90	90	
104		63	81	90	90	99	99	99			77	86	86	95	95	95		54	72	81	81	90	90	
81		49	63	70	70	77	77	77			60	67	67	74	74	74		42	56	63	63	70	70	
81		49	63	70	70	77	77	77			60	67	67	74	74	74		42	56	63	63	70	70	

Drills Up to 30xD

						ø 1 - ø 1,9				ø 2 - ø 2,9		
Type	ISO	Material	Strength (N/mm ²)	Material Number	Material designation	15xD mm / U	20xD mm / U	25xD mm / U	30xD mm / U	15xD mm / U	20xD mm / U	25xD mm / U
178	P	General construction steel	< 800 N/mm ²	1,0037	St37-2	0,017				0,050	0,050	
		Free cutting steel	< 800 N/mm ²	1,0719	9SMnPb28	0,017				0,050	0,050	
		Hardened steel, non alloyed	< 800 N/mm ²	1,0401	C15	0,017				0,050	0,050	
		Alloyed hardened steel	< 1000 N/mm ²	1,7331	16MnCr5 (EC80)	0,015				0,045	0,045	
		Tempering steel, unalloyed	< 850 N/mm ²	1,0503	C45	0,016				0,047	0,047	
		Tempering steel, unalloyed	< 1000 N/mm ²	1,0601	C60	0,015				0,045	0,045	
		Tempering steel, alloyed	< 800 N/mm ²	1,5131	50MnS14	0,017				0,050	0,050	
		Tempering steel, alloyed	< 1300 N/mm ²	1,5755	31 NiCr14							
		Steel castings	< 850 N/mm ²	0,9650	G-X260Cr27	0,016				0,047	0,047	
		Nitriding steel	< 1000 N/mm ²	1,8504	34CrA16	0,015				0,045	0,045	
		Nitriding steel	< 1200 N/mm ²	1,8515	31CrV1o12							
		Roller bearing steel	< 1200 N/mm ²	1,3505	100Cr6 (W3)							
		Spring steel	< 1200 N/mm ²	1,5026	55Si7							
		High-speed steel	< 1300 N/mm ²	1,3344	S 6-5-3	0,015				0,045	0,045	
		Cold working tool steel	< 1300 N/mm ²	1,2312	40CrMnMoS8 6							
	Hot working tool steel	< 1300 N/mm ²	1,2343	X38CrMoV 51								
	M	Cast steel and sulphured stainless steel	< 850 N/mm ²	1,4305	X8CrNiS18 9							
		Stainless steel, ferritic	< 750 N/mm ²	1,4510	X3CrTi17	0,010				0,025	0,025	
		Stainless steel, martensitic	< 900 N/mm ²	1,4034	X46Cr13							
		Stainless steel, ferritic / martensitic	< 1100 N/mm ²	1,4313	X3CrN113.4							
		Stainless steel, austenitic / ferritic	< 850 N/mm ²	1,4460	X8CrNiMo27 5							
		Stainless steel, austenitic	< 750 N/mm ²	1,4301	X5CrNi18-10	0,010				0,025	0,025	
	M	Heat resistant steel	< 1100 N/mm ²	1,4747	X80CrNiS120							
	K	Grey cast iron with lamellar graphite	100-350 N/mm ²	0,6010	GG10	0,017				0,050	0,050	
		Grey cast iron with lamellar graphite	300-1000 N/mm ²	0,6030	GG30	0,017				0,050	0,050	
		Gray cast iron with spheroidal graphite	300-500 N/mm ²	0,7040	GGG40	0,013				0,035	0,035	
		Gray cast iron with spheroidal graphite	550-800 N/mm ²	0,7060	GGG60	0,013				0,035	0,035	
		White malleable cast iron	350-450 N/mm ²	0,8035	GTW35							
White malleable cast iron		500-650 N/mm ²	0,8055	GTW55								
Black malleable cast iron		350-450 N/mm ²	0,8135	GTS35								
Black malleable cast iron		500-700 N/mm ²	0,8155	GTS55								

	ø 3 - ø 3,9				ø 4 - ø 4,9				ø 5 - ø 5,9				ø 6 - ø 7,9				ø 8 - ø 9,9				ø 10 - ø 12			
30xD	15xD	20xD	25xD	30xD	15xD	20xD	25xD	30xD	15xD	20xD	25xD	30xD	15xD	20xD	25xD	30xD	15xD	20xD	25xD	30xD	15xD	20xD	25xD	30xD
mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U	mm /U
0,050	0,120	0,120	0,120		0,160	0,160	0,160	0,160	0,190	0,190	0,160	0,160	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280	0,350	0,350	0,350	0,350
0,050	0,120	0,120	0,120		0,160	0,160	0,160	0,160	0,190	0,190	0,160	0,160	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280	0,350	0,350	0,350	0,350
0,050	0,120	0,120	0,120		0,160	0,160	0,160	0,160	0,190	0,190	0,160	0,160	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280	0,350	0,350	0,350	0,350
0,045	0,110	0,110	0,110		0,140	0,140	0,140	0,140	0,170	0,170	0,140	0,140	0,200	0,200	0,200	0,200	0,250	0,250	0,250	0,250	0,320	0,320	0,320	0,320
0,047	0,110	0,110	0,110		0,150	0,150	0,150	0,150	0,180	0,180	0,150	0,150	0,210	0,210	0,210	0,210	0,260	0,260	0,260	0,260	0,330	0,330	0,330	0,330
0,045	0,110	0,110	0,110		0,140	0,140	0,140	0,140	0,170	0,170	0,140	0,140	0,200	0,200	0,200	0,200	0,250	0,250	0,250	0,250	0,320	0,320	0,320	0,320
0,050	0,120	0,120	0,120		0,160	0,160	0,160	0,160	0,190	0,190	0,160	0,160	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280	0,350	0,350	0,350	0,350
0,047	0,110	0,110	0,110		0,150	0,150	0,150	0,150	0,180	0,180	0,150	0,150	0,210	0,210	0,210	0,210	0,260	0,260	0,260	0,260	0,330	0,330	0,330	0,330
0,045	0,110	0,110	0,110		0,140	0,140	0,140	0,140	0,170	0,170	0,140	0,140	0,200	0,200	0,200	0,200	0,250	0,250	0,250	0,250	0,320	0,320	0,320	0,320
0,045	0,110	0,110	0,110		0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,140	0,200	0,200	0,200	0,200	0,250	0,250	0,250	0,250	0,320	0,320	0,320	0,320
0,025	0,050	0,050	0,050		0,080	0,080	0,080	0,080	0,080	0,080	0,080	0,080	0,120	0,120	0,120	0,120	0,150	0,150	0,150	0,150	0,180	0,180	0,180	0,180
0,025	0,050	0,050	0,050		0,080	0,080	0,080	0,080	0,080	0,080	0,080	0,080	0,120	0,120	0,120	0,120	0,150	0,150	0,150	0,150	0,180	0,180	0,180	0,180
0,050	0,120	0,120	0,120		0,160	0,160	0,160	0,160	0,160	0,160	0,160	0,160	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280	0,350	0,350	0,350	0,350
0,050	0,120	0,120	0,120		0,160	0,160	0,160	0,160	0,160	0,160	0,160	0,160	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280	0,350	0,350	0,350	0,350
0,035	0,100	0,100	0,100		0,130	0,130	0,130	0,130	0,130	0,130	0,130	0,130	0,180	0,180	0,180	0,180	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280
0,035	0,100	0,100	0,100		0,130	0,130	0,130	0,130	0,130	0,130	0,130	0,130	0,180	0,180	0,180	0,180	0,220	0,220	0,220	0,220	0,280	0,280	0,280	0,280

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