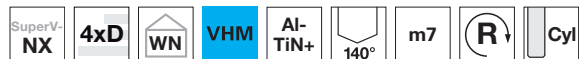


## SuperV drills

### SuperV-NX solid carbide high-performance microdrills w/o int. coolant



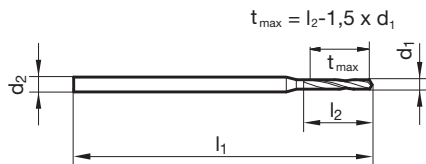
Catalog no. 71998



P	M	K	N	S	H
●	○	●	○	○	

Application  
recomm. p. 34

- web thinning  $\geq \varnothing 0.500$
- facet point grinding
- main cutting edge form straight
- edge preparation



d1 mm	inch	d2 mm	l1 mm	l2 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm
0.500		3.000	47.000	3.000	1.950		3.000	52.000	11.700
0.550		3.000	47.000	3.300	1.980	5/64	4.000	59.000	12.000
0.600		3.000	47.000	3.600	2.000		4.000	59.000	12.000
0.650		3.000	47.000	3.900	2.050		4.000	59.000	12.300
0.700		3.000	47.000	4.200	2.100		4.000	59.000	12.600
0.750		3.000	47.000	4.500	2.150		4.000	59.000	12.900
0.800		3.000	47.000	4.800	2.200		4.000	59.000	13.200
0.850		3.000	47.000	5.100	2.250		4.000	59.000	13.500
0.900		3.000	47.000	5.400	2.300		4.000	59.000	13.800
0.950		3.000	47.000	5.700	2.350		4.000	59.000	14.100
1.000		3.000	47.000	6.000	2.380	3/32	4.000	59.000	14.400
1.050		3.000	47.000	6.300	2.400		4.000	59.000	14.400
1.100		3.000	47.000	6.600	2.450		4.000	59.000	14.700
1.150		3.000	47.000	6.900	2.500		4.000	59.000	15.000
1.200		3.000	47.000	7.200	2.550		4.000	59.000	15.300
1.250		3.000	47.000	7.500	2.600		4.000	59.000	15.600
1.300		3.000	47.000	7.800	2.650		4.000	59.000	15.900
1.350		3.000	47.000	8.100	2.700		4.000	59.000	16.200
1.400		3.000	47.000	8.400	2.750		4.000	59.000	16.500
1.450		3.000	47.000	8.700	2.780	7/64	4.000	59.000	16.800
1.500		3.000	47.000	9.000	2.800		4.000	59.000	16.800
1.550		3.000	47.000	9.300	2.850		4.000	59.000	17.100
1.590	1/16	3.000	47.000	9.600	2.900		4.000	59.000	17.400
1.600		3.000	47.000	9.600	2.950		4.000	59.000	17.700
1.650		3.000	47.000	9.900	3.000		4.000	59.000	18.000
1.700		3.000	47.000	10.200					
1.750		3.000	47.000	10.500					
1.800		3.000	52.000	10.800					
1.850		3.000	52.000	11.100					
1.900		3.000	52.000	11.400					

## SuperV drills

### SuperV-NX solid carbide high-performance microdrills w/o int. coolant



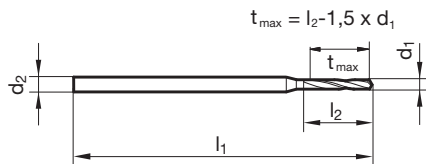
Catalog no. 71999



P	M	K	N	S	H
●	○	●	○	○	

Application  
recomm. p. 34

- web thinning  $\geq \varnothing 0.500$
- facet point grinding
- main cutting edge form straight
- edge preparation

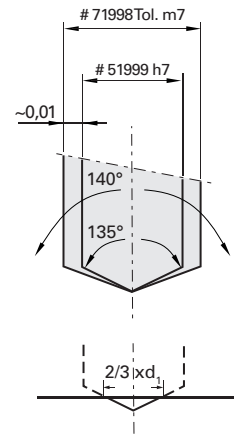


d1 mm	inch	d2 mm	l1 mm	l2 mm	d1 mm	inch	d2 mm	l1 mm	l2 mm
0.500		3.000	47.000	4.000	1.950		3.000	52.000	17.600
0.550		3.000	47.000	4.400	1.980	5/64	4.000	63.000	18.000
0.600		3.000	47.000	4.800	2.000		4.000	63.000	18.000
0.650		3.000	47.000	5.200	2.050		4.000	63.000	18.500
0.700		3.000	47.000	5.600	2.100		4.000	63.000	18.900
0.750		3.000	47.000	6.000	2.150		4.000	63.000	19.400
0.800		3.000	47.000	6.400	2.200		4.000	63.000	19.800
0.850		3.000	47.000	6.800	2.250		4.000	63.000	20.300
0.900		3.000	47.000	7.200	2.300		4.000	63.000	20.700
0.950		3.000	47.000	7.600	2.350		4.000	63.000	21.200
1.000		3.000	47.000	8.000	2.380	3/32	4.000	63.000	21.600
1.050		3.000	47.000	8.400	2.400		4.000	63.000	21.600
1.100		3.000	47.000	8.800	2.450		4.000	63.000	22.100
1.150		3.000	47.000	9.200	2.500		4.000	63.000	22.500
1.200		3.000	52.000	10.800	2.550		4.000	63.000	23.000
1.250		3.000	52.000	11.300	2.600		4.000	67.000	23.400
1.300		3.000	52.000	11.700	2.650		4.000	67.000	23.900
1.350		3.000	52.000	12.200	2.700		4.000	67.000	24.300
1.400		3.000	52.000	12.600	2.750		4.000	67.000	24.800
1.450		3.000	52.000	13.100	2.780	7/64	4.000	67.000	25.200
1.500		3.000	52.000	13.500	2.800		4.000	67.000	25.200
1.550		3.000	52.000	14.000	2.850		4.000	67.000	25.700
1.590	1/16	3.000	52.000	14.400	2.900		4.000	67.000	26.100
1.600		3.000	52.000	14.400	2.950		4.000	67.000	26.600
1.650		3.000	52.000	14.900	3.000		4.000	67.000	27.000
1.700		3.000	52.000	15.300					
1.750		3.000	52.000	15.800					
1.800		3.000	52.000	16.200					
1.850		3.000	52.000	16.700					
1.900		3.000	52.000	17.100					

# SuperV-NX sol. carb. high-performance micro drills

## Application recommendations

		Feed column														
Code-letter	AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM			
Drill-Ø mm	<b>0,50</b>	0,006	0,012	0,018	0,022	0,030	0,035	0,040	0,045	0,050	0,050	0,055	0,060	0,060	Feed f (mm/rev)	
	<b>0,80</b>	0,008	0,016	0,024	0,032	0,040	0,050	0,060	0,070	0,080	0,080	0,080	0,090	0,090		
	<b>1,00</b>	0,012	0,022	0,032	0,042	0,060	0,070	0,080	0,090	0,100	0,100	0,110	0,110	0,120		
	<b>1,50</b>	0,021	0,036	0,051	0,066	0,090	0,100	0,120	0,130	0,150	0,150	0,160	0,170	0,180		
	<b>2,00</b>	0,032	0,052	0,072	0,092	0,120	0,140	0,160	0,180	0,200	0,210	0,220	0,230	0,240		
	<b>2,50</b>	0,045	0,070	0,095	0,120	0,150	0,170	0,200	0,220	0,250	0,260	0,270	0,280	0,300		
	<b>3,00</b>	0,060	0,090	0,120	0,150	0,180	0,210	0,240	0,270	0,300	0,310	0,330	0,340	0,360		



Tools with feed column no. in **bold** are preferred choices for listed material group.

**Security advices:** For safety reasons it is very important, that a drill does not exceed a speed of  $n = 6000$  rev./min when not supported. The centrifugal forces could break these long tools before reaching the workpiece surface!

**General hints:** No play in spindle bearings, alignment accurate tool holders. We recommend the application of hydraulic chucks or shrink fit chucks. We recommend lubrication by soluble oil or neat oil, coolant pressure min. 40 bar.

### Pilot drilling

For the application of solid carbide SuperV-NX-drills 15xD we recommend a pilot hole 1xD up to 2xD depth.

For this pilot hole, the solid carbide SuperV-NX-drill 4xD is optimally suitable. Its point angle and its diameter tolerance are adapted.

### Centering

In order to achieve full performance with SuperV-NX-drills from 8xD drilling depth, we recommend centering.

The SuperV-NX-drills up to 4xD, Catalog no. 71998, can be applied for this purpose. The centering diameter should be approximately 2/3xD. Centering can alternatively be made with the NC-drill 142°, Catalog no. 71189.

### Lubricants:

- cutting oil, highly activated ■
- soluble oil (emulsion) ■
- without lubricant
- air only

Material group	Materials examples, <b>new designations</b> (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm <sup>2</sup> )	Hardness	Coolant
General purpose steels	<b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2) <b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)	≤500 >500-850		■
Free-cutting steels	<b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36) <b>1.0727</b> 46S20 (45S20), <b>1.0728</b> 60S20, <b>1.0757</b> 46SPb20 (45SPb20)	≤850 850-1000		■
Unalloyed tempering steels	<b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30) <b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45) <b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)	≤ 700 700-850 850-1000		■
Alloyed tempering steels	<b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4 <b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4	850-≤1000 1000-1200		■
Unalloyed case hardened steels	<b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)	≤750		■
Alloyed case hardened steels	<b>1.7043</b> 38Cr4 <b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5	850-≤1000 1000-1200		■
Nitriding steels	<b>1.8504</b> 34CrAl6 <b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7	≥850-≤1000 >1000-1200		■
Tool steels	<b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9 <b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4	≤850 >850-1000		■
High speed steels	<b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3	≥650-1000		■
Spring steels	<b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)		≤330 HB	■
Hardened steels	-		≤40-48 HRC >48-60 HRC	■
Stainless steels, sulphured	<b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9	≤850		■
austenitic	<b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	<b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2	≤850		■
Cast iron	<b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20) <b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)	850-≤1000 1000-1200		■
Spheroidal graphite iron and malleable cast iron	<b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMW-350-4(GTW35) <b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	■
Chilled cast iron	-		≤350 HB	■
New Cast iron GGV	<b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35) <b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6			■
New Cast iron ADI	<b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000) <b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)	800-1000 1200-1400		■
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	<b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2 <b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		■
Aluminium and Al-alloys	<b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1	≤400		■
Al wrought alloys	<b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5	≤450		■
Al cast alloys ≤ 10 % Si	<b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9	≤600		■
> 10 % Si	<b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	<b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1	≤450		■
Copper, low alloyed	<b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb	≤400		■
Brass, short-chipping	<b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2	≤600		■
long-chipping	<b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5	≤600		■
Bronze, short-chipping	<b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn	≤600		■
	<b>2.0790</b> CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	<b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10	≤850		■
	<b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2	>850-1000		■

