



HARTNER

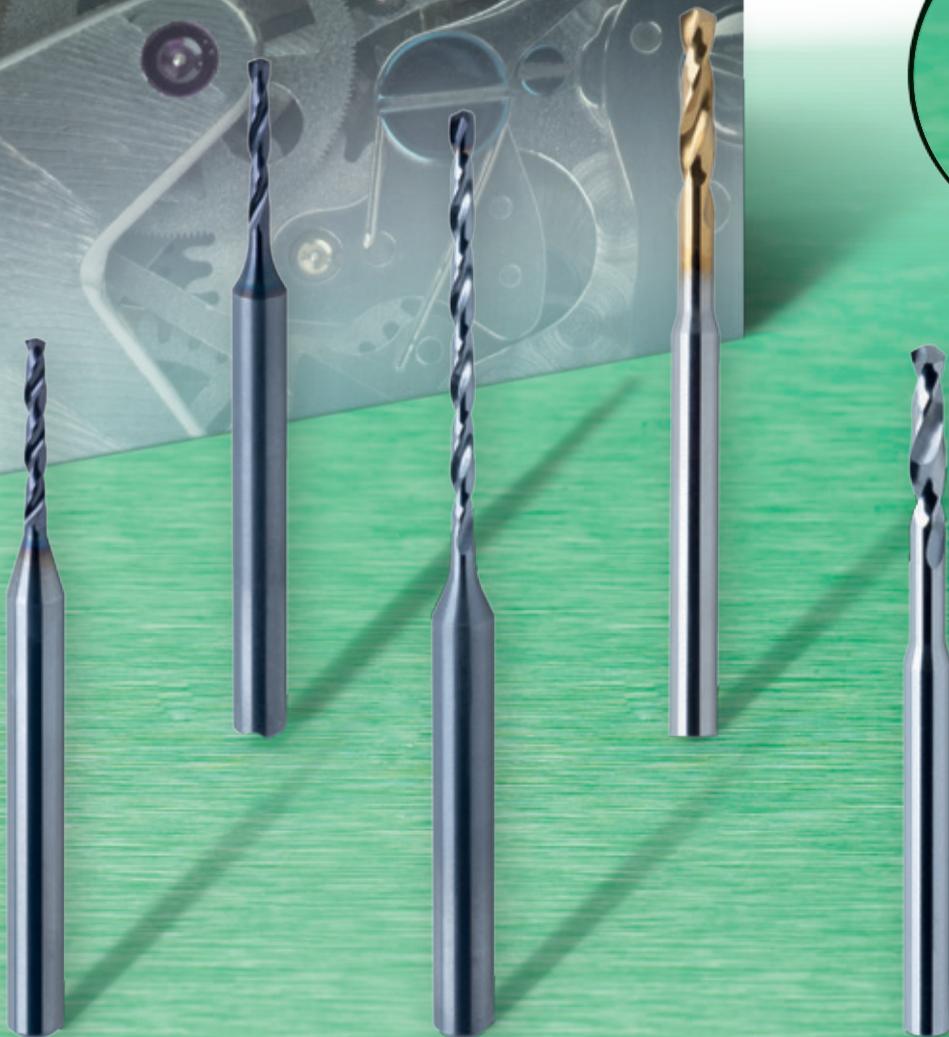
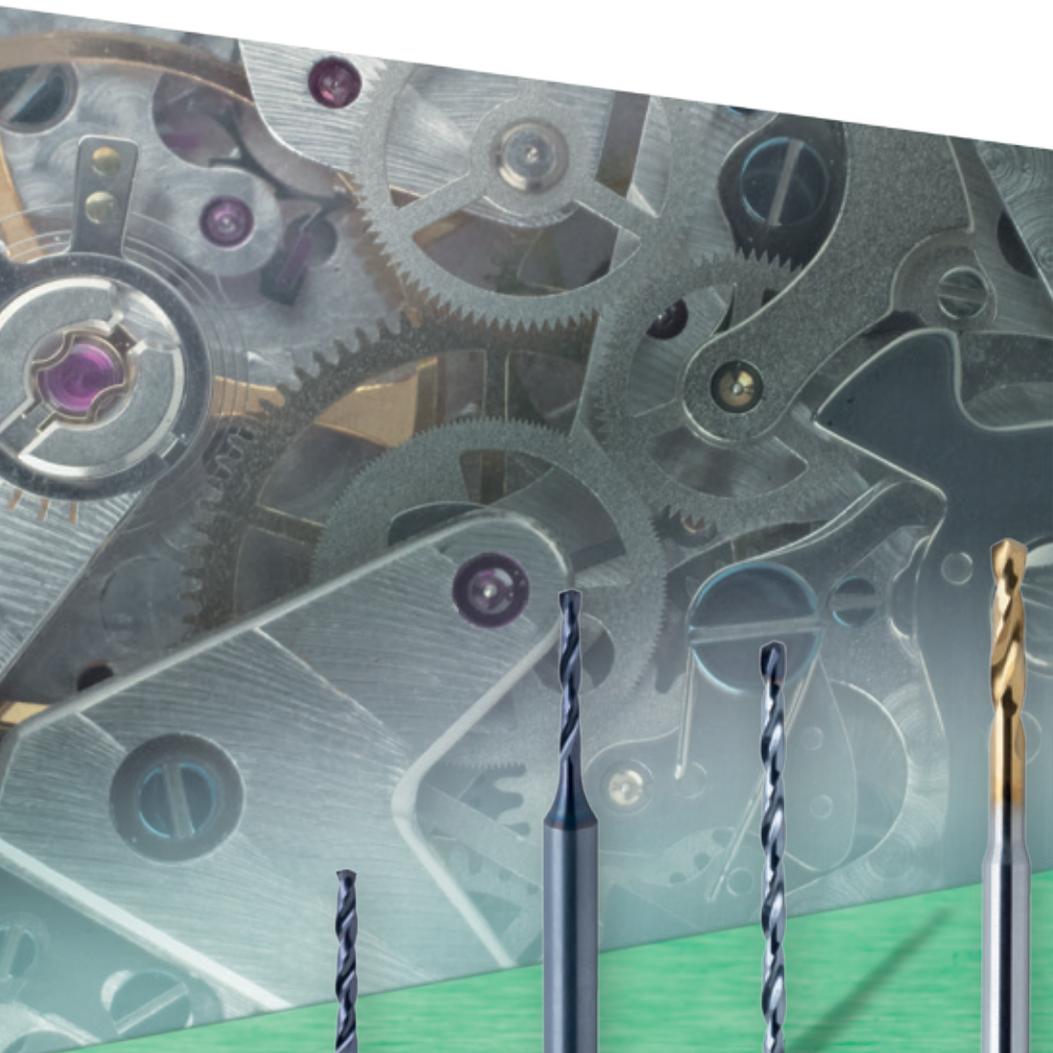
Precision Cutting Tools

Micro-Precision Drills

HSS-E-PM / Solid Carbide

New: Solid carbide
micro-precision drills
5 x D with IC

2013





Micro-precision drills without oil feed

Hartner HSS-E-PM and Solid Carbide Micro Drills – Precision starting from Diameter 0.05 mm

Smallest borings require highest quality, as the least deviation in the straightness of the boring, in the tolerance or in the surface quality on the workpiece will already mean a defect or scrap in today's miniaturised productions. For micro productions, Hartner offers precision micro drills made of HSS-E-PM and solid carbide in nominal diameters from 0.05 and 0.2 mm respectively.

Point- and flute geometry, surfaces, shank types and cutting materials are perfectly concerted to match the application, so that smallest borings are worked out well and fabricated process-safe. Our HSS-E-PM micro drills are especially applied for small-series productions, where they offer high quality at a beneficial cost-performance ratio.

On the one hand, Hartner solid carbide micro drills, as drills with a long tool life, stand by for large-scale productions. On the other hand, with the article no. 89286 we also offer a specialist for processing glass fibre reinforced plastics (GRP) in the electric and electronic industry.

See the quality and performance of our micro drills for yourself. Numerous customers in the branches of precision mechanics, horology, medical technology, conductor board manufacturing and other fields of the micro production already rely on Hartner.



Order no. 87011

from page 7



A special purpose drill with oversize shank for use in the instrument and clock making industries and for general precision engineering. Specially designed for drilling structural and carbon steels, high-alloyed steels, tool steels, cast and castalloys, Magnesium-alloys, Aluminium and plastics.

Standard	DIN 1899
Tool material	HSS-E-PM
Surface	○
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	118
Web thinned ≥ Ø	
Tolerance	0/-0,004

Order no. 87016

from page 7



A special purpose drill with oversize shank for use in the instrument and clock making industries and for general precision engineering. Specially designed for drilling structural and carbon steels, high-alloyed steels, tool steels, cast and castalloys, Magnesium-alloys, Aluminium and plastics.

Standard	DIN 1899
Tool material	HSS-E-PM
Surface	○
Type	N
Cutting direction	left-hand
Point grinding	Facet point
Point angle°	118
Web thinned ≥ Ø	
Tolerance	0/-0,004

○ bright

● TiAlN

● AlTiN

● TiN



Micro-precision drills without oil feed

Order no. 84810

from page 7



A special purpose drill with oversize shank for use in the instrument and clock making industries and for general precision engineering. Specially designed for drilling structural and carbon steels, high-alloyed steels, tool steels, cast und castalloys, Magnesium-alloys, Aluminium and plastics.

Standard	DIN 1899
Tool material	HSS-E-PM
Surface	T
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	118
Web thinned $\geq \emptyset$	
Tolerance	0/-0,004

Order no. 89281

from page 7



A special purpose drill with oversize shank for use in the instrument and clock making industries and for general precision engineering. Specially designed for drilling structural and carbon steels, high-alloyed steels, tool steels, cast und castalloys, Magnesium-alloys, Aluminium and plastics.

Standard	Hartner std.
Tool material	Solid carbide
Surface	○
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	130
Web thinned $\geq \emptyset$	
Tolerance	0/-0,004

Order no. 86402

from page 11



NEW

Micro drill for universal application with a uniform 3 mm shank and a uniform 38 mm total length. By using just one uniform carbide bar for the production of all diameters and due to large batch sizes, a good cost-effectiveness is achieved. The combination of solid carbide and the TiAlN-coating with a special flute geometry enables optimal chip evacuation also at higher cutting speeds and feeds. Good suitability for the machining of electronic circuit boards.

Standard	Hartner std.
Tool material	Solid carbide
Surface	A
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	140
Web thinned $\geq \emptyset$	0.80
Tolerance	h7

Order no. 89286

from page 13



Specially designed drill for drilling fiberglass reinforced plastics (i.e. printed circuit boards) and other resin-based thermo-hardened products likely to cause rapid wear on the lands and cutting edges of high speed steel drills.

Standard	Hartner std.
Tool material	Solid carbide
Surface	○
Type	N
Cutting direction	right-hand
Point grinding	Relieved cone
Point angle°	130
Web thinned $\geq \emptyset$	
Tolerance	h7

○ bright

● A TiAlN

● A AlTiN

● T TiN



Solid carbide Micro-precision drills for high performance machining

Small but mighty -

with and without internal cooling

Solid carbide micro-precision drills without internal cooling for drilling depths up to 4xD and 7xD are available in the diameter range from 0.8 to 3.0 mm.

Holes up to 5xD, 8xD and 15xD are the domain of solid carbide micro-precision drills with internal cooling. Thanks to the optimised tool geometry, pecking is not required for holes up to 15xD with Hartner's solid carbide micro-precision drills.

The tool design makes the solid carbide micro-precision drill 4xD without internal cooling optimally suitable as a pilot drill for the 15xD micro-precision drill with internal cooling.

Superior in every sense

Solid carbide micro-precision drills have proven their exceptional performance capabilities in various volume applications and tool life tests. The tables below document a few application examples with convincing results.



Machining examples of solid carbide micro-precision drills 8xD and 15xD with IC

Hartner no.	86408	86408	86412	86412
Diameter	1.4 mm	2.5 mm	2.5 mm	2.1 mm
Coating	AlTiN	AlTiN	AlTiN	AlTiN
Material group	cast iron	alloyed case hardened steel	alloyed heat-treatable steel	stainless steel
Material description	GG25	16MnCr5	42CrMo4	X6CrNiTi18 10
Drill. depth [mm]	8xD	8xD	15xD	15xD
Hole type	blind hole	blind hole	blind hole	blind hole
Cooling	IC 80 bar	IC 80 bar	IC 80 bar	IC 80 bar
Coolant	soluble oil	soluble oil	soluble oil	soluble oil
Machine type	machining centre	machining centre	machining centre	machining centre
v_c [mm/min]	80	120	100	60
f [mm/rev.]	0.1	0.14	0.1	0.03
Tool life [m]	150	110	60	60

Internal cooling increases tool life considerably!

A comparison between a conventional micro-precision drill w/o internal cooling for holes up to 7xD and a 8xD drill with internal cooling 86408

demonstrates the advantages of internal cooling: Tool life increases considerably.

Hartner no.	Competitor without internal cooling	86408 with internal cooling
Diameter	2.6 mm	2.6 mm
Coating	TiAlN	AlTiN
Material group	stainless steel	stainless steel
Material description	X105CrMo17	X105CrMo17
Drill. depth [mm]	7xD	8xD
Hole type	blind hole	blind hole
Cooling	external	internal 100 bar
Coolant	neat oil	neat oil
Machine type	machining centre	machining centre
v_c [mm/min]	53	53
f [mm/rev.]	0.06	0.06
Tool life [m]	100 workpieces	500 workpieces, end of tool life not reached!



Micro-precision drills without oil feed

Order no. 86400

page 14



Solid carbide special drill with AlTiN-coating and reinforced shank without internal cooling for drilling small holes up to 4 x D boring depth particularly for steel. Also applicable for machining cast iron. The special flute geometry enables optimal chip break and chip removal also at higher cutting speeds and feeds. The two-facet point grinding on every cutting edge and the special web thinning ensure a good self-centering.

Standard	Hartner std.
Tool material	Solid carbide
Surface	A
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	140
Web thinned ≥ Ø	0.80
Tolerance	m7

Order no. 86401

page 15



Solid carbide special drill with AlTiN-coating and reinforced shank without internal cooling for drilling small holes up to 7 x D boring depth particularly for steel. Also applicable for machining cast iron. The special flute geometry enables optimal chip break and chip removal also at higher cutting speeds and feeds. The two-facet point grinding on every cutting edge and the special web thinning ensure a good self-centering.

Standard	Hartner std.
Tool material	Solid carbide
Surface	A
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	140
Web thinned ≥ Ø	0.80
Tolerance	m7



Micro-precision drills with oil feed

Order no. 86405

page 16



NEW

Solid carbide special drill with AlTiN coating, reinforced shank and internal coolant supply for drilling small holes with drilling depths up to 5xD especially in steel. Also suitable for cast machining. The special flute geometry enables optimal chip break and chip removal even with high feeds and speeds. The two-facet point grind and the special web thinning offer good selfcentering.

Standard	Hartner std.
Tool material	Solid carbide
Surface	A
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	140
Web thinned ≥ Ø	1.40
Tolerance	m7

Order no. 86408

page 17



Solid carbide special drill with AlTiN coating, reinforced shank and internal coolant supply for drilling small holes with drilling depths up to 8xD especially in steel. Also suitable for cast machining. The special flute geometry enables optimal chip break and chip removal even with high feeds and speeds. The two-facet point grind and the special web thinning offer good selfcentering. The micro-precision drill order no. 86400 is the perfect pilot drill thanks to its 140° point angle.

Standard	Hartner std.
Tool material	Solid carbide
Surface	A
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	135
Web thinned ≥ Ø	1.40
Tolerance	h7

Order no. 86412

page 17



Solid carbide special drill with AlTiN coating, reinforced shank and internal coolant supply for drilling small holes with drilling depths up to 15xD especially in steel. Also suitable for cast machining. The special flute geometry enables optimal chip break and chip removal even with high feeds and speeds. The two-facet point grind and the special web thinning offer good selfcentering. The micro-precision drill order no. 86400 is the perfect pilot drill thanks to its 140° point angle.

Standard	Hartner std.
Tool material	Solid carbide
Surface	A
Type	N
Cutting direction	right-hand
Point grinding	Facet point
Point angle°	135
Web thinned ≥ Ø	1.40
Tolerance	h7

○ bright

A TiAlN

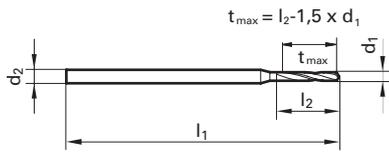
A AlTiN

T TiN



HARTNER

Micro-precision drills without oil feed



d1	d2	l1	l2	87011	87016	84810	89281
				134 right-hand N	138 left-hand N	135 right-hand N	102 right-hand N
				HSS-E-PM			Solid carbide
				Availability			
0.050	1.000	25.00	0.40	●			
0.060	1.000	25.00	0.40	●			
0.080	1.000	25.00	0.50	●			
0.090	1.000	25.00	0.50	●			
0.100	1.000	25.00	0.50	●			
0.110	1.000	25.00	0.50	●			
0.120	1.000	25.00	0.50	●			
0.130	1.000	25.00	0.80	●			
0.140	1.000	25.00	0.80	●			
0.150	1.000	25.00	0.80	●			
0.160	1.000	25.00	1.10	●	○		
0.170	1.000	25.00	1.10	●	○		
0.180	1.000	25.00	1.10	●	○		
0.190	1.000	25.00	1.10	●	●		
0.200	1.000	25.00	1.50	●	●	●	●
0.205	1.000	25.00	1.50	●			
0.210	1.000	25.00	1.50	●	○		
0.215	1.000	25.00	1.50	○			
0.220	1.000	25.00	1.50	●	●		
0.225	1.000	25.00	1.50	●			
0.230	1.000	25.00	1.50	●	○		
0.235	1.000	25.00	1.50	●			
0.240	1.000	25.00	1.50	●	●		
0.245	1.000	25.00	1.90	●			
0.250	1.000	25.00	1.90	●			
0.255	1.000	25.00	1.90	●			
0.260	1.000	25.00	1.90	●			
0.265	1.000	25.00	1.90	●			
0.270	1.000	25.00	1.90	●	●		
0.275	1.000	25.00	1.90	●			
0.280	1.000	25.00	1.90	●	○		
0.285	1.000	25.00	1.90	●			
0.290	1.000	25.00	1.90	●	●		
0.295	1.000	25.00	1.90	●			
0.300	1.000	25.00	1.90	●	●	●	●
0.310	1.000	25.00	2.40	●	●		
0.315	1.000	25.00	2.40	●			
0.320	1.000	25.00	2.40	●			
0.325	1.000	25.00	2.40	●			
0.330	1.000	25.00	2.40	●	●		
0.335	1.000	25.00	2.40	●			
0.340	1.000	25.00	2.40	●	●		
0.345	1.000	25.00	2.40	●			
0.350	1.000	25.00	2.40	●	●		●
0.355	1.000	25.00	2.40	●			
0.360	1.000	25.00	2.40	●	●		
0.365	1.000	25.00	2.40	●			
0.370	1.000	25.00	2.40	●	●		
0.375	1.000	25.00	2.40	●			
0.380	1.000	25.00	2.40	●	●		
0.385	1.000	25.00	3.00	●			
0.390	1.000	25.00	3.00	●	●		
0.400	1.000	25.00	3.00	●	●		●
0.405	1.000	25.00	3.00	●			

Intermediate sizes available.

○ bright

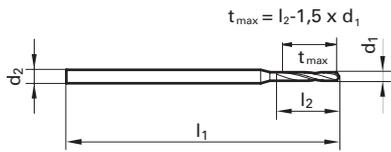
● TiAlN

● AlTiN

● TiN



Micro-precision drills without oil feed



				87011	87016	84810	89281
				HSS-E-PM			Solid carbide
				134	138	135	102
				right-hand	left-hand	right-hand	right-hand
				N	N	N	N
				○	○	●	○
d1	d2	l1	l2	Availability			
mm	mm	mm	mm				
0.410	1.000	25.00	3.00	●	●		
0.415	1.000	25.00	3.00	○			
0.420	1.000	25.00	3.00	●	○		
0.425	1.000	25.00	3.00	●			
0.430	1.000	25.00	3.00	●	●		
0.435	1.000	25.00	3.00	●			
0.440	1.000	25.00	3.00	●	●		
0.450	1.000	25.00	3.00	●	●	●	●
0.460	1.000	25.00	3.00	●	●		
0.470	1.000	25.00	3.00	●	●		
0.480	1.000	25.00	3.00	●	●		
0.485	1.000	25.00	3.40	●			
0.490	1.000	25.00	3.40	●	●	●	
0.495	1.000	25.00	3.40	●			
0.500	1.000	25.00	3.40	●	●	●	●
0.505	1.000	25.00	3.40	●			
0.510	1.000	25.00	3.40	●	●	●	
0.515	1.000	25.00	3.40	●			
0.520	1.000	25.00	3.40	●	●	●	
0.525	1.000	25.00	3.40	●			
0.530	1.000	25.00	3.40	●	●		
0.535	1.000	25.00	3.90	●			
0.540	1.000	25.00	3.90	●	○		
0.550	1.000	25.00	3.90	●	●		
0.555	1.000	25.00	3.90	●			
0.560	1.000	25.00	3.90	●	●		
0.570	1.000	25.00	3.90	●	●		
0.575	1.000	25.00	3.90	●			
0.580	1.000	25.00	3.90	●	●		
0.585	1.000	25.00	3.90	●			
0.590	1.000	25.00	3.90	●	●	●	
0.595	1.000	25.00	3.90	●			
0.600	1.000	25.00	3.90	●	●	●	●
0.605	1.000	25.00	4.20	●			
0.610	1.000	25.00	4.20	●	○		
0.615	1.000	25.00	4.20	●			
0.620	1.000	25.00	4.20	●	●		
0.625	1.000	25.00	4.20	●			
0.630	1.000	25.00	4.20	●			
0.640	1.000	25.00	4.20	●			
0.650	1.000	25.00	4.20	●			
0.660	1.000	25.00	4.20	●	●		
0.665	1.000	25.00	4.20	●			
0.670	1.000	25.00	4.20	●	●		
0.680	1.000	25.00	4.80	●	○		
0.690	1.000	25.00	4.80	●	○		
0.695	1.000	25.00	4.80	●			
0.700	1.000	25.00	4.80	●	●	●	●
0.705	1.000	25.00	4.80	●			
0.710	1.000	25.00	4.80	●	●		
0.720	1.000	25.00	4.80	●			
0.730	1.000	25.00	4.80	●			
0.740	1.000	25.00	4.80	●	●		
0.750	1.000	25.00	4.80	●	●		

Intermediate sizes available.

○ bright

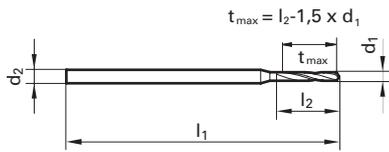
● TiAlN

● AlTiN

● TiN



Micro-precision drills without oil feed



d1	d2	l1	l2	87011	87016	84810	89281
				134 right-hand N	138 left-hand N	135 right-hand N	102 right-hand N
				HSS-E-PM			Solid carbide
				Availability			
0.760	1.000	25.00	5.30	●	○	●	
0.770	1.000	25.00	5.30	●			
0.780	1.000	25.00	5.30	●	○		
0.790	1.000	25.00	5.30	●	●		
0.800	1.500	25.00	5.30	●	●	●	●
0.810	1.500	25.00	5.30	●	●		
0.820	1.500	25.00	5.30	●	●		
0.830	1.500	25.00	5.30	●	●		
0.840	1.500	25.00	5.30	●	○		
0.850	1.500	25.00	5.30	●	●		
0.860	1.500	25.00	6.00	●	○		
0.870	1.500	25.00	6.00	●	●		
0.880	1.500	25.00	6.00	●	●	●	
0.890	1.500	25.00	6.00	●	●		
0.900	1.500	25.00	6.00	●	●	●	
0.910	1.500	25.00	6.00	●	○		
0.920	1.500	25.00	6.00	●	○	●	
0.930	1.500	25.00	6.00	●	●		
0.940	1.500	25.00	6.00	●	○		
0.950	1.500	25.00	6.00	●	○	●	
0.960	1.500	25.00	6.80	●	●		
0.970	1.500	25.00	6.80	●	●		
0.980	1.500	25.00	6.80	●	●	●	
0.990	1.500	25.00	6.80	●	○		
1.000	1.500	25.00	6.80	●	●	●	●
1.010	1.500	25.00	6.80	●	●		
1.020	1.500	25.00	6.80	●			
1.030	1.500	25.00	6.80	●			
1.040	1.500	25.00	6.80	●	○		
1.050	1.500	25.00	6.80	●	●	●	
1.060	1.500	25.00	6.80	●	●		
1.070	1.500	25.00	7.60	●			
1.080	1.500	25.00	7.60	●	●		
1.100	1.500	25.00	7.60	●	○	●	●
1.110	1.500	25.00	7.60	●			
1.120	1.500	25.00	7.60	●			
1.140	1.500	25.00	7.60	●			
1.150	1.500	25.00	7.60	●	●	●	
1.160	1.500	25.00	7.60	●	●		
1.170	1.500	25.00	7.60		●		
1.180	1.500	25.00	7.60	●		●	
1.190	1.500	25.00	8.50	●			
1.200	1.500	25.00	8.50	●	●	●	
1.210	1.500	25.00	8.50	●	●		
1.220	1.500	25.00	8.50	●	●		
1.230	1.500	25.00	8.50	●			
1.240	1.500	25.00	8.50	●			
1.250	1.500	25.00	8.50	●	○	●	●
1.260	1.500	25.00	8.50	●			
1.270	1.500	25.00	8.50	●			
1.280	1.500	25.00	8.50	●			
1.290	1.500	25.00	8.50		○		
1.300	1.500	25.00	8.50	●	●	●	●
1.310	1.500	25.00	8.50	●	○		

Intermediate sizes available.

○ bright

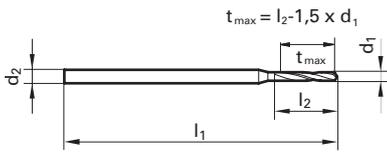
● TiAlN

● AlTiN

● TiN



Micro-precision drills without oil feed



				87011	87016	84810	89281
				HSS-E-PM			Solid carbide
				134 right-hand N	138 left-hand N	135 right-hand N	102 right-hand N
				○	○	●	○
d1	d2	l1	l2	Availability			
mm	mm	mm	mm				
1.320	1.500	25.00	8.50	●	○		
1.340	1.500	25.00	9.50	●			
1.350	1.500	25.00	9.50	●	○		
1.380	1.500	25.00	9.50	●			
1.390	1.500	25.00	9.50	●			
1.400	1.500	25.00	9.50	●	●	●	
1.410	1.500	25.00	9.50	●			
1.420	1.500	25.00	9.50	●			
1.430	1.500	25.00	9.50	●			
1.440	1.500	25.00	9.50	●			
1.450	1.500	25.00	9.50	●	●	●	
1.500	2.000	30.00	9.50	●		●	
1.600	2.000	30.00	10.60	●			
1.630	2.000	30.00	10.60	●			
1.700	2.000	30.00	10.60	●			
1.800	2.000	30.00	11.80	●			
1.850	2.000	30.00	11.80	●			
1.900	2.000	30.00	11.80	●			

Intermediate sizes available.

○ bright

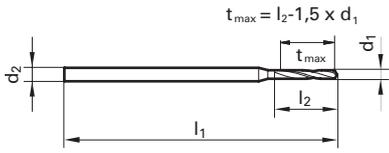
● TiAIN

● AlTiN

● TiN



Micro-precision drills without oil feed



89286

Solid carbide

102

right-hand

N



Availability

d1	d2	l1	l2
mm	mm	mm	mm
0.500	0.500	38.00	8.50
0.600	0.600	38.00	9.50
0.650	0.650	38.00	10.50
0.700	0.700	38.00	10.50
0.750	0.750	38.00	12.50
0.800	0.800	38.00	12.50
0.850	0.850	38.00	14.50
0.900	0.900	38.00	14.50
1.000	1.000	38.00	17.00
1.050	1.050	38.00	17.00
1.100	1.100	38.00	17.00
1.400	1.400	38.00	17.00
1.450	1.450	38.00	17.00



Intermediate sizes available.

○ bright

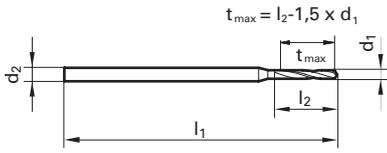
● TiAIN

● AlTiN

● TiN



Micro-precision drills without oil feed 4 x D



d1	d2	l1	l2	Availability
mm	mm	mm	mm	
0.500	3.000	47.00	3.00	●
0.550	3.000	47.00	3.30	●
0.600	3.000	47.00	3.60	●
0.650	3.000	47.00	3.90	●
0.700	3.000	47.00	4.20	●
0.750	3.000	47.00	4.50	●
0.800	3.000	47.00	4.80	●
0.850	3.000	47.00	5.10	●
0.900	3.000	47.00	5.40	●
0.950	3.000	47.00	5.70	●
1.000	3.000	47.00	6.00	●
1.050	3.000	47.00	6.30	●
1.100	3.000	47.00	6.60	●
1.150	3.000	47.00	6.90	●
1.200	3.000	47.00	7.20	●
1.250	3.000	47.00	7.50	●
1.300	3.000	47.00	7.80	●
1.350	3.000	47.00	8.10	●
1.400	3.000	47.00	8.40	●
1.450	3.000	47.00	8.70	●
1.500	3.000	47.00	9.00	●
1.550	3.000	47.00	9.30	●
1.590	3.000	47.00	9.60	●
1.600	3.000	47.00	9.60	●
1.650	3.000	47.00	9.90	●
1.700	3.000	47.00	10.20	●
1.750	3.000	47.00	10.50	●
1.800	3.000	52.00	10.80	●
1.850	3.000	52.00	11.10	●
1.900	3.000	52.00	11.40	●
1.950	3.000	52.00	11.70	●
1.980	4.000	59.00	12.00	●
2.000	4.000	59.00	12.00	●
2.050	4.000	59.00	12.30	●
2.100	4.000	59.00	12.60	●
2.150	4.000	59.00	12.90	●
2.200	4.000	59.00	13.20	●
2.250	4.000	59.00	13.50	●
2.300	4.000	59.00	13.80	●
2.350	4.000	59.00	14.10	●
2.380	4.000	59.00	14.40	●
2.400	4.000	59.00	14.40	●
2.450	4.000	59.00	14.70	●
2.500	4.000	59.00	15.00	●
2.550	4.000	59.00	15.30	●
2.600	4.000	59.00	15.60	●
2.650	4.000	59.00	15.90	●
2.700	4.000	59.00	16.20	●
2.750	4.000	59.00	16.50	●
2.780	4.000	59.00	16.80	●
2.800	4.000	59.00	16.80	●
2.850	4.000	59.00	17.10	●
2.900	4.000	59.00	17.40	●
2.950	4.000	59.00	17.70	●
3.000	4.000	59.00	18.00	●

Intermediate sizes available.

○ bright

● TiAlN

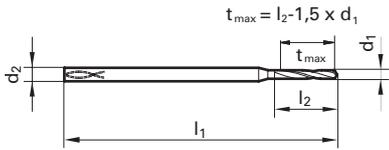
● AlTiN

● TiN



HARTNER

Micro-precision drills with oil feed 5 x D



86405

Solid carbide

164

right-hand

N

A

NEW

Availability

d1	d2	l1	l2	Availability
mm	mm	mm	mm	
1.400	4.000	52.00	11.00	●
1.450	4.000	52.00	12.00	●
1.500	4.000	52.00	12.00	●
1.550	4.000	52.00	12.00	●
1.590	4.000	52.00	13.00	●
1.600	4.000	52.00	13.00	●
1.650	4.000	52.00	13.00	●
1.700	4.000	56.00	14.00	●
1.750	4.000	56.00	14.00	●
1.800	4.000	56.00	14.00	●
1.850	4.000	56.00	15.00	●
1.900	4.000	56.00	15.00	●
1.950	4.000	56.00	16.00	●
1.980	4.000	56.00	16.00	●
2.000	4.000	56.00	16.00	●
2.050	4.000	56.00	16.00	●
2.100	4.000	62.00	17.00	●
2.150	4.000	62.00	17.00	●
2.200	4.000	62.00	18.00	●
2.250	4.000	62.00	18.00	●
2.300	4.000	62.00	18.00	●
2.350	4.000	62.00	19.00	●
2.380	4.000	62.00	19.00	●
2.400	4.000	62.00	19.00	●
2.450	4.000	62.00	20.00	●
2.500	4.000	62.00	20.00	●
2.550	4.000	62.00	20.00	●
2.600	4.000	66.00	21.00	●
2.650	4.000	66.00	21.00	●
2.700	4.000	66.00	22.00	●
2.750	4.000	66.00	22.00	●
2.780	4.000	66.00	22.00	●
2.800	4.000	66.00	22.00	●
2.850	4.000	66.00	23.00	●
2.900	4.000	66.00	23.00	●
2.950	4.000	66.00	24.00	●
3.000	4.000	66.00	24.00	●

Intermediate sizes available.

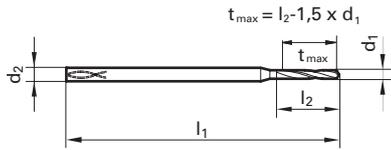
○ bright

A TiAlN

A AlTiN

T TiN

Micro-precision drills with oil feed 8 x D/15 x D



d1	d2	l1	l2
mm	mm	mm	mm
1.400	4.000	52.00	15.00
1.500	4.000	52.00	17.00
1.600	4.000	52.00	18.00
1.700	4.000	56.00	19.00
1.800	4.000	56.00	20.00
1.900	4.000	56.00	21.00
2.000	4.000	56.00	22.00
2.100	4.000	62.00	23.00
2.200	4.000	62.00	24.00
2.300	4.000	62.00	25.00
2.400	4.000	62.00	26.00
2.500	4.000	62.00	28.00
2.600	4.000	66.00	29.00
2.700	4.000	66.00	30.00
2.800	4.000	66.00	31.00
2.900	4.000	66.00	32.00
3.000	4.000	66.00	33.00

86408

Solid carbide

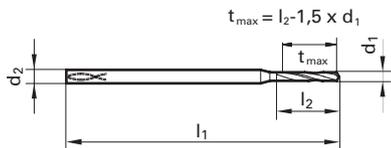
164

right-hand

N

A

Availability



d1	d2	l1	l2
mm	mm	mm	mm
1.400	4.000	62.00	25.00
1.500	4.000	62.00	27.00
1.600	4.000	62.00	29.00
1.700	4.000	70.00	31.00
1.800	4.000	70.00	32.00
1.900	4.000	70.00	34.00
2.000	4.000	70.00	36.00
2.100	4.000	78.00	38.00
2.200	4.000	78.00	40.00
2.300	4.000	78.00	42.00
2.400	4.000	78.00	44.00
2.500	4.000	78.00	45.00
2.600	4.000	87.00	47.00
2.700	4.000	87.00	48.00
2.800	4.000	87.00	50.00
2.900	4.000	87.00	52.00
3.000	4.000	87.00	54.00

86412

Solid carbide

164

right-hand

N

A

Availability



Intermediate sizes available.

○ bright

A TiAlN

A AlTiN

T TiN



HARTNER

Recommendations

NEW
now 5xD with IC

Pilot drilling

For the application of solid carbide micro precision drills 15xD we recommend a pilot hole 1xD up to 2xD depth. For this pilot hole, the solid carbide micro precision drill 4xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.

Filter quality

When applying solid carbide micro precision drills, we recommend constant monitoring of the lubricant's filter quality due to the extremely small coolant duct diameters.

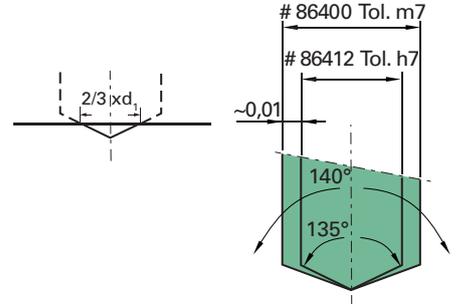
Centering

In order to achieve full performance with solid carbide micro precision drills from 8xD drilling depth, we recommend centering. The solid carbide micro precision drill up to 4xD, Hartner no. 86400, can be applied for this purpose. The centering diameter should be approximately 2/3xD.

Drill Ø mm	Feed column no.									
	101	102	103	104	105	106	107	108	109	
	f (mm/rev.)									
0.10	0.002	0.003	0.003	0.004	0.006	0.007	0.010	0.013	0.016	0.022
0.16	0.002	0.003	0.004	0.005	0.007	0.009	0.012	0.016	0.022	
0.25	0.003	0.004	0.005	0.007	0.009	0.011	0.014	0.019	0.024	
0.30	0.004	0.005	0.007	0.009	0.011	0.015	0.019	0.025	0.033	
0.50	0.005	0.007	0.008	0.011	0.014	0.019	0.024	0.031	0.041	
0.63	0.007	0.009	0.012	0.015	0.020	0.026	0.034	0.044	0.057	
0.80	0.010	0.013	0.016	0.020	0.024	0.031	0.038	0.048	0.060	
1.00	0.020	0.024	0.029	0.035	0.041	0.050	0.060	0.072	0.086	
1.50	0.030	0.035	0.040	0.046	0.052	0.060	0.069	0.080	0.092	
2.00	0.040	0.046	0.053	0.061	0.070	0.080	0.093	0.106	0.122	

☒ with external cooling
 with internal cooling

Drill Ø mm	Feed column no. for art. no. 86400/86401/86402/86405/86408/86412												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/rev.)												
0.50	0.006	0.012	0.018	0.022	0.030	0.035	0.040	0.045	0.050	0.055	0.060	0.060	0.060
0.80	0.008	0.016	0.024	0.032	0.040	0.050	0.060	0.070	0.080	0.080	0.090	0.090	0.090
1.00	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
1.50	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
2.00	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
2.50	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
3.00	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



STOP All drilling tools from 8xD must be guided during spot drilling. They must never operate at full speed without support in the machine shop

Material	Material example <i>Figures in bold = material no. to DIN EN 10 027</i>	Tens. strength MPa N/mm ²	Hard- ness
Common structural steels	1.0035 S185, 1.0486 StE P275N, 1.0345 P235GH, 1.0425 P265GH 1.0050 E295, 1.0070 E360, 1.8937 P500NH	≤500 >500-850	
Free-cutting steels	1.0718 11SMnPb30, 1.0736 115Mn37 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20	≤850 850-1000	
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C45E 1.0601 C60, 1.1221 C60E	≤ 700 700-850 850-1000	
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-1000 1000-1200	
Unalloyed case hardened steels	1.0301 C10, 1.1121 C10E	≤750	
Alloyed case hardened steels	1.7043 38Cr4 1.5752 14NiCr14, 1.7131 16MnCr5, 1.7264 20CrMo5	850-1000 1000-1200	
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-1000 1000-1200	
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 850-1000	
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 61CrV4	≥650-1000	
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4		≤330 HB
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18 9	≤850	
austenitic	1.4301 X5CrNi18 10, 1.4541 X6CrNiTi18 10, 1.4571 X6CrNiMoTi 17 12 2	≤850	
martensitic	1.4057 X17CrNi16-1, 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18 2	≤850	
Hardened steels	-		≤40-48 HRC >48-60 HRC
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200	
Cast iron	EN-GJL-100 ... EN-GJL-200 (bisher GG10 ... GG20) EN-GJL-250 ... EN-GJL-350 (bisher GG25 ... GG45)		≤240 HB <300 HB
Spheroidal graphite and malleable cast iron	EN-GJMW-350-4, EN-GJMB-550-4, EN-GJS-500-7 (bisher GTW35, GTS55, GGG50) EN-GJMB-700-2, EN-GJS-700-2 (bisher GTW65, GTS70, GGG70)		≤240 HB <300 HB
Chilled cast iron	-		≤350 HB
Ti and Ti-alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 850-1200	
Aluminium and Al-alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400	
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450	
Al cast iron ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600	
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600	
Magnesium alloys	MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤450	
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400	
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600	
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600	
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600	
long-chipping	2.0790 CuNi18Zn19Pb	>600-850	
long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 850-100	
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren		-
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon		-
Kevlar	Kevlar		-
Glass, carbon concent. plastics	GFK/CFK		-

○ bright ● A TiAlN ● A AlTiN ● T TiN

Tool material	HSS-E-PM	HSS-E-PM	Sol. carb.	Sol. carb.	Sol. carb.	Solid carbide	Solid carbide
Surface finish	○ ○	Ⓣ	○	ⓐ	○	ⓐ ⓐ	ⓐ ⓐ ⓐ
Cooling	☒ ☒	☒	☒	☒	☒	☒ ☒	☒ ☒ ☒
Drilling depth					~ 10 x D	~ 4 x D ~ 7 x D	~ 5 x D ~ 8 x D ~ 15 x D
Article no.	87011 87016	84810	89281	86402	89286	86400 86401	86405 86408 86412



V _c m/min	Feed column no.	V _c m/min	Feed column no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed column no.	V _c m/min	Feed column no.
21	106	27	106	50	105	100	62	100	64 62	105	62 58 58		
18	105	23	105	35	104	100	62	100	64 62	100	62 58 58		
18	106	23	106	50	105	100	62	100	64 62	105	62 59 59		
16	105	21	105	45	104	90	61	90	63 61	90	61 59 59		
20	105	26	105	45	104	90	62	90	64 62	95	62 58 58		
18	105	23	105	35	104	90	62	90	64 62	95	62 58 58		
14	104	18	104	30	103	90	61	90	63 61	90	61 58 58		
14	104	18	104	30	103	90	61	90	63 61	90	61 58 58		
12	103	16	103			70	60	70	62 60	70	60 58 58		
18	106	23	106	50	103	100	61	100	63 61	100	61 57 57		
14	104	18	104	40	103	85	61	85	63 61	85	61 58 58		
12	103	16	103			70	60	70	62 60	70	60 58 58		
14	104	18	104	25	103	70	60	70	62 60	70	60 57 57		
12	103	16	103			60	60	60	62 60	60	60 57 57		
16	104	20	104	25	103	50	60	50	62 60	50	60 58 58		
14	103	18	103			60	60	60	62 60	50	60 58 58		
14	103	18	103					60	57 57	50	57 57 57		
108	102	10	102	20	102			60	57 57	50	57 57 57		
106	104	108	104	25	103			30	57 57	70	57 57 57		
106	103	108	103	25	102			15	56 56	60	56 56 56		
106	103	108	103	25	102			30	57 57	70	57 57 57		
				15	104								
				15	103			10	56 56	25	56 56 56		
26	106	33	106	80	105	130	66	<150	68 66	<150	60 60 60		
22	106	28	106	60	105	130	66	<140	68 66	<140	60 60 60		
18	106	23	106	60	105	130	66	<140	68 66	<140	60 60 60		
22	106	28	106	50	105	120	65	<130	67 65	<130	60 60 60		
				45	104			15	56 56	35	56 56 56		
				25	104			15	56 56	35	56 56 56		
				160	107			70	68 68	70	68 68 68		
				150	106			70	68 68	70	68 68 68		
26	107	33	107	100	106			135	59 59	135	59 59 59		
18	106	23	106	60	106			135	59 59	135	59 59 59		
75	106	97	106	150	105								
42	105	53	105	50	105								
				67	106								
22	105	28	105	44	104								
22	104	28	104	68	103								
18	104	23	104	49	103								
13	104	16	104	53	103								
		14	104	36	103								
16	104	20	104	50	103			50	104				
18	104	23	104	36	103			40	103				
				60	104			80	103				

Our programme:



FU 500/FN500



Gun Drills



INOX Drills



Multiplex



Micro Precision Drills



Multiplex HPC



TS-Drills



Standard Range



Highlights



TM Vending Machines



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High Performance Milling Cutters

Hartner GmbH

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