

High Performance Drills

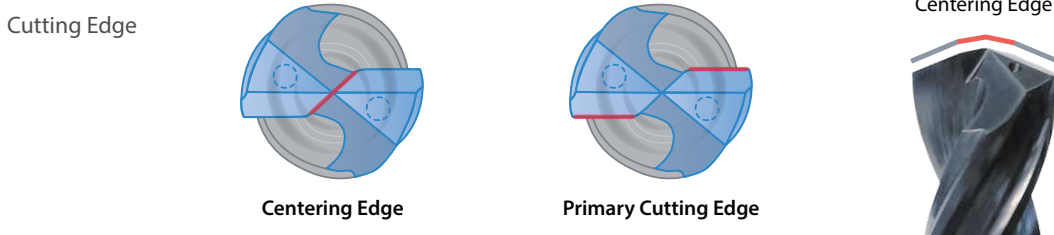


HYDROS Deep Drill

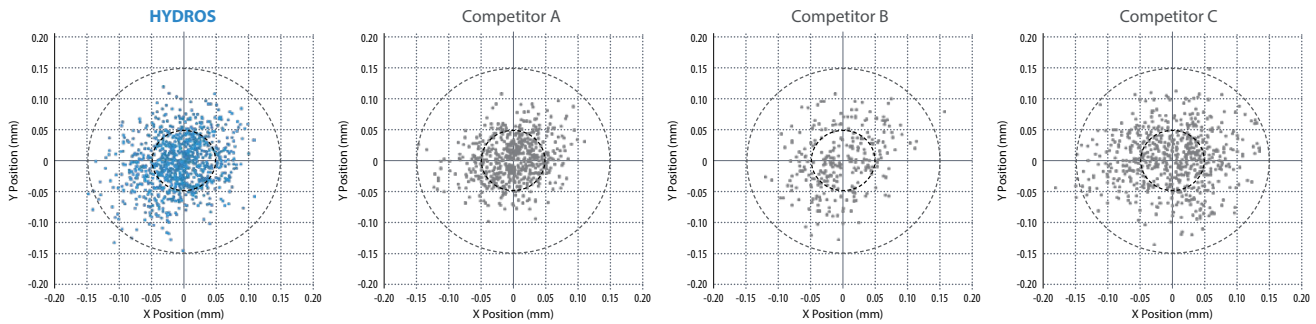
Excellent Hole Accuracy with a Low Cutting Force Design
Good for Difficult-to-Cut Materials

1 Optimized Cutting Edge for Increased Accuracy

The optimized cutting edge creates excellent drilling accuracy during the initial cut by consistently controlling the cutting force across the face of both cutting edges.



Drill Hole Positional Accuracy After 1400 Holes (In-house Evaluation)

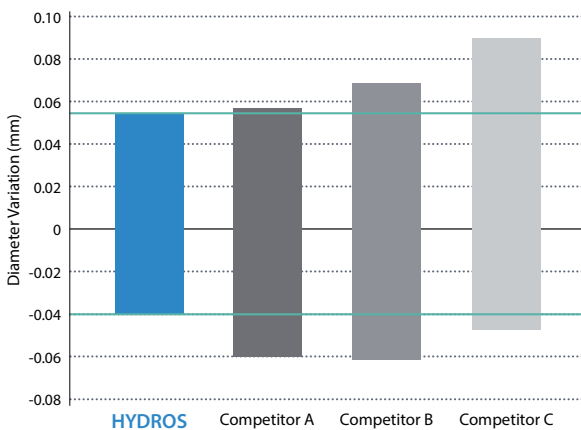


Excellent Hole Positional Accuracy

	HYDROS	Competitor A	Competitor B	Competitor C
Cp	1.92	1.97	1.70	1.50
CpK	1.34	1.35	1.03	0.86
Spec (+/-)	0.15mm	0.15mm	0.15mm	0.15mm

Cutting Conditions : N = 6468rpm, Vf = 575mm/min Drill Diameter Ø3mm Drilling Depth 25.4mm 17-4PH-900

Hole Diameter Variation (In-house Evaluation)



	No. of Holes	Diameter Variation (mm)
HYDROS	600	0.0937
Competitor A	600	0.1141
Competitor B	269 (Broken)	0.1281
Competitor C	600	0.1347

Cutting Conditions : N = 6468rpm, Vf = 575mm/min Drill Diameter Ø3mm Drilling Depth 25.4mm 17-4PH-900

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

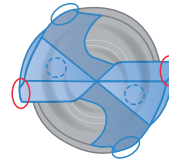
2 Double Margin for Smooth Hole Finish

Two margins create a cutting and wiping effect that create a smooth hole finish and smooth cutting performance along the hole wall.

Chip Comparison



Double Margins

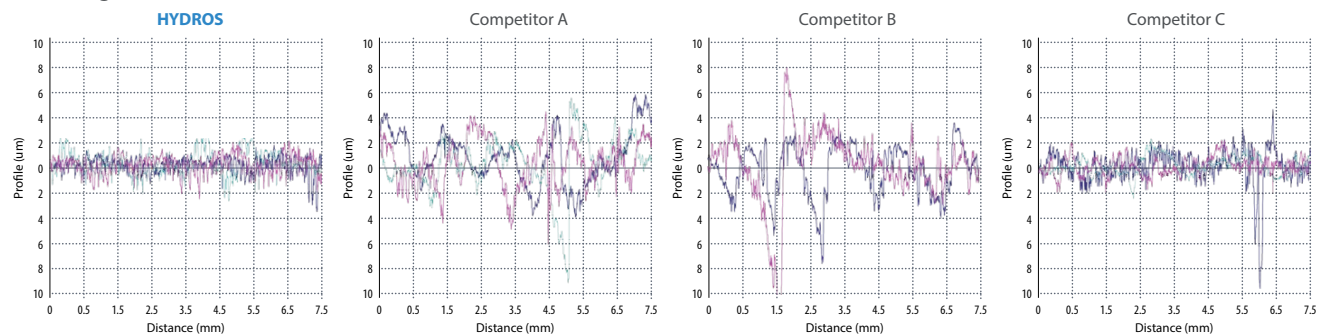


Cutting Edge

Wiping Edge

Optimized for smooth cutting performance with excellent chip evacuation

Hole Roughness (In-house Evaluation)



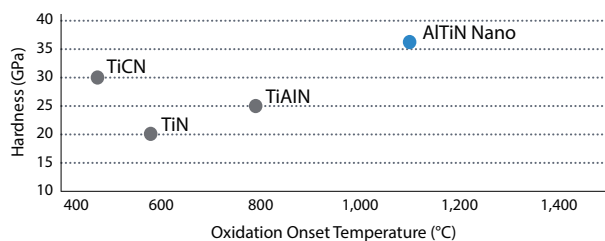
	HYDROS			Competitor A			Competitor B			Competitor C		
	Hole 1	Hole 300	Hole 600	Hole 1	Hole 300	Hole 600	Hole 1	Hole 300	Hole 600	Hole 1	Hole 300	Hole 600
Ra (µm)	0.421	0.539	0.676	1.705	1.540	1.572	1.638	1.977	Broken	0.893	0.559	0.562
Rq (µm)	0.554	0.677	0.869	2.123	1.832	2.113	1.979	2.581	Broken	1.249	0.712	0.687
Rz (µm)	3.282	3.478	4.406	8.076	8.480	10.077	8.847	10.973	Broken	7.178	3.845	3.206

Cutting Conditions : N = 6468rpm, Vf = 575mm/min Drill Diameter Ø3mm Drilling Depth 25.4mm 17-4PH-900

3 Nanocomposite Super-nitride AlTiN Coating Technology

Great for difficult-to-cut and hardened materials, the 2nd generation AlTiN supernitride with a nanocomposite coating structure has a hardness GPa of 36.3 and maximum application temperature (C°) of 1,100.

Coating Properties



Automotive

Mold & Die

Aerospace

High Performance

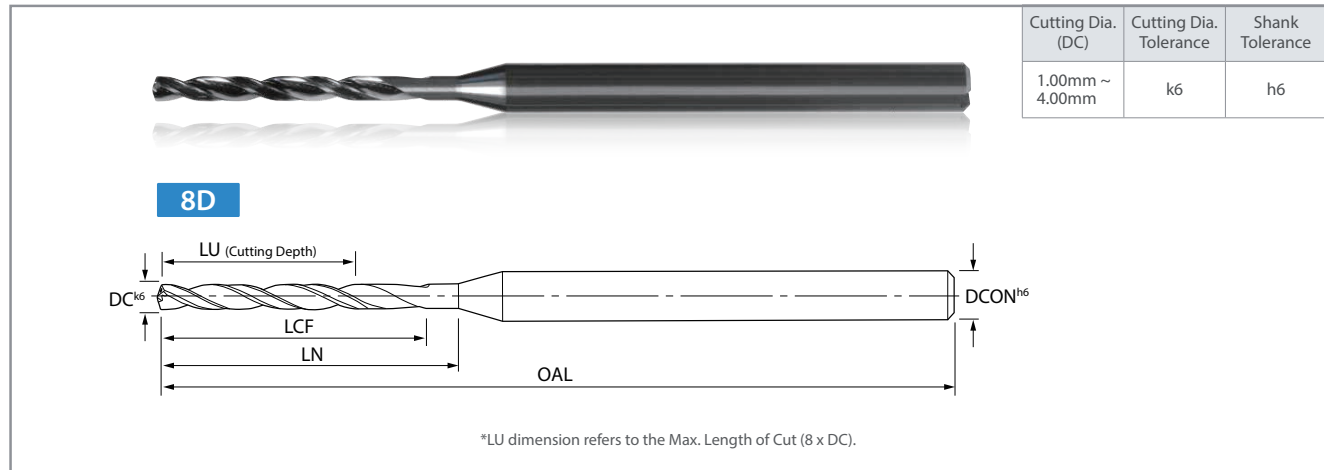
General

Special Tools

Deep Drill

Hydros I Series 814 / 865

HYDROS Mini 8xD Deep Drills - Metric Sizes (Ø1.00mm - Ø4.00mm) NEW



Metric Drill Dimensions

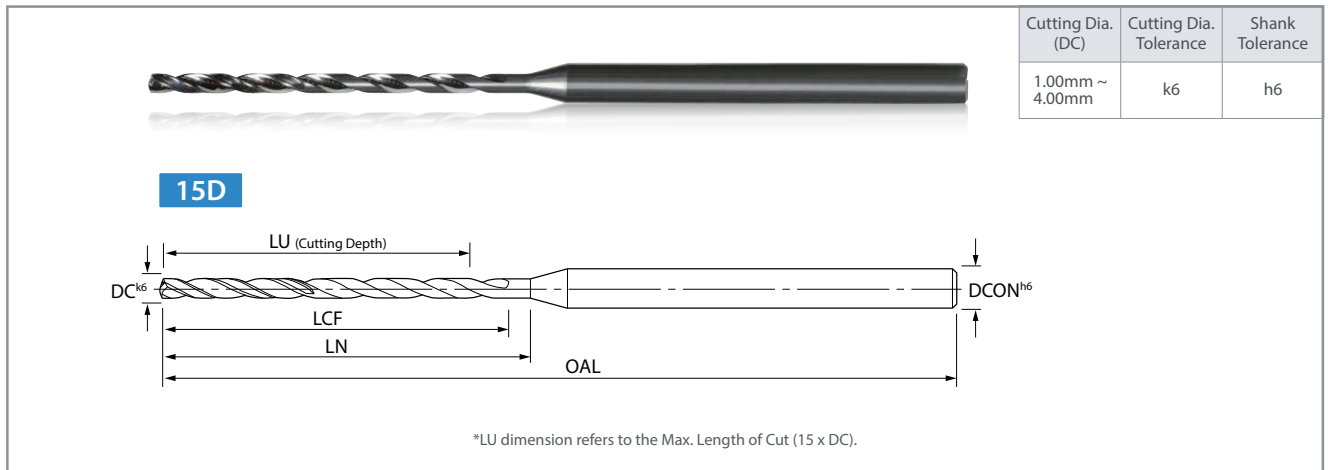
Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{k6}	DCON ^{h6}	OAL	*LU	LCF	LN	
814-0394L524	●	1.00	4.00	53.00	8.00	13.30	14.36	140°
814-0433L555	●	1.10	4.00	53.00	8.80	14.10	15.23	140°
814-0472L587	●	1.20	4.00	53.00	9.60	14.90	16.09	140°
814-0512L618	●	1.30	4.00	53.00	10.40	15.70	16.96	140°
814-0551L650	●	1.40	4.00	53.00	11.20	16.50	17.82	140°
814-0591L681	●	1.50	4.00	53.00	12.00	17.30	18.68	140°
814-0630L713	●	1.60	4.00	64.00	12.80	18.10	19.55	140°
814-0669L744	●	1.70	4.00	64.00	13.60	18.90	20.41	140°
814-0709L803	●	1.80	4.00	64.00	14.40	20.40	22.03	140°
814-0748L835	●	1.90	4.00	64.00	15.20	21.20	22.90	140°
814-0787L866	●	2.00	4.00	64.00	16.00	22.00	23.76	140°
814-0827L898	●	2.10	4.00	64.00	16.80	22.80	24.62	140°
814-0866L1012	●	2.20	4.00	64.00	17.60	25.70	27.76	140°
814-0906L1043	●	2.30	4.00	64.00	18.40	26.50	28.62	140°
814-0945L1075	●	2.40	4.00	64.00	19.20	27.30	29.48	140°
814-0984L1106	●	2.50	4.00	64.00	20.00	28.10	30.35	140°
814-1024L1138	●	2.60	4.00	76.00	20.80	28.90	31.21	140°
814-1063L1169	●	2.70	4.00	76.00	21.60	29.70	32.08	140°
814-1102L1201	●	2.80	4.00	76.00	22.40	30.50	32.94	140°
814-1142L1268	●	2.90	4.00	76.00	23.20	32.20	34.78	140°
814-1181L1299	●	3.00	4.00	76.00	24.00	33.00	35.64	140°
814-1220L1331	●	3.10	4.00	76.00	24.80	33.80	36.50	140°
814-1260L1362	●	3.20	4.00	76.00	25.60	34.60	37.37	140°
814-1299L1394	●	3.30	4.00	76.00	26.40	35.40	38.23	140°
814-1339L1500	●	3.40	4.00	76.00	27.20	38.10	41.15	140°
814-1378L1531	●	3.50	4.00	76.00	28.00	38.90	42.01	140°
814-1417L1563	●	3.60	4.00	76.00	28.80	39.70	42.88	140°
814-1457L1594	●	3.70	4.00	76.00	29.60	40.50	43.74	140°
814-1496L1626	●	3.80	4.00	76.00	30.40	41.30	44.60	140°
814-1535L1657	●	3.90	4.00	76.00	31.20	42.10	45.47	140°
814-1575L1689	●	4.00	4.00	76.00	32.00	42.90	46.33	140°

● : Standard Item

Deep Drill

Hydros I Series 814 / 865

HYDROS Mini 15xD Deep Drills - Metric Sizes (Ø1.00mm - Ø4.00mm)



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{k6}	DCON ^{h6}	OAL	*LU	LCF	LN	
814-0394L799	●	1.00	4.00	64.00	15.00	20.30	21.32	140°
814-0433L858	●	1.10	4.00	64.00	16.50	21.80	22.89	140°
814-0472L917	●	1.20	4.00	64.00	18.00	23.30	24.47	140°
814-0512L976	●	1.30	4.00	64.00	19.50	24.80	26.04	140°
814-0551L1035	●	1.40	4.00	64.00	21.00	26.30	27.62	140°
814-0591L1094	●	1.50	4.00	64.00	22.50	27.80	29.19	140°
814-0630L1154	●	1.60	4.00	81.00	24.00	29.30	30.77	140°
814-0669L1213	●	1.70	4.00	81.00	25.50	30.80	32.34	140°
814-0709L1299	●	1.80	4.00	81.00	27.00	33.00	34.65	140°
814-0748L1358	●	1.90	4.00	81.00	28.50	34.50	36.23	140°
814-0787L1417	●	2.00	4.00	81.00	30.00	36.00	37.80	140°
814-0827L1476	●	2.10	4.00	81.00	31.50	37.50	39.38	140°
814-0866L1618	●	2.20	4.00	81.00	33.00	41.10	43.16	140°
814-0906L1677	●	2.30	4.00	81.00	34.50	42.60	44.73	140°
814-0945L1736	●	2.40	4.00	81.00	36.00	44.10	46.31	140°
814-0984L1795	●	2.50	4.00	90.00	37.50	45.60	47.88	140°
814-1024L1854	●	2.60	4.00	90.00	39.00	47.10	49.46	140°
814-1063L1913	●	2.70	4.00	90.00	40.50	48.60	51.03	140°
814-1102L1972	●	2.80	4.00	90.00	42.00	50.10	52.61	140°
814-1142L2067	●	2.90	4.00	90.00	43.50	52.50	55.13	140°
814-1181L2126	●	3.00	4.00	90.00	45.00	54.00	56.70	140°
814-1220L2185	●	3.10	4.00	106.00	46.50	55.50	58.28	140°
814-1260L2244	●	3.20	4.00	106.00	48.00	57.00	59.85	140°
814-1299L2303	●	3.30	4.00	106.00	49.50	58.50	61.43	140°
814-1339L2437	●	3.40	4.00	106.00	51.00	61.90	65.00	140°
814-1378L2496	●	3.50	4.00	106.00	52.50	63.40	66.57	140°
814-1417L2555	●	3.60	4.00	106.00	54.00	64.90	68.15	140°
814-1457L2614	●	3.70	4.00	106.00	55.50	66.40	69.72	140°
814-1496L2673	●	3.80	4.00	106.00	57.00	67.90	71.30	140°
814-1535L2732	●	3.90	4.00	106.00	58.50	69.40	72.87	140°
814-1575L2791	●	4.00	4.00	106.00	60.00	70.90	74.45	140°

● : Standard Item

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

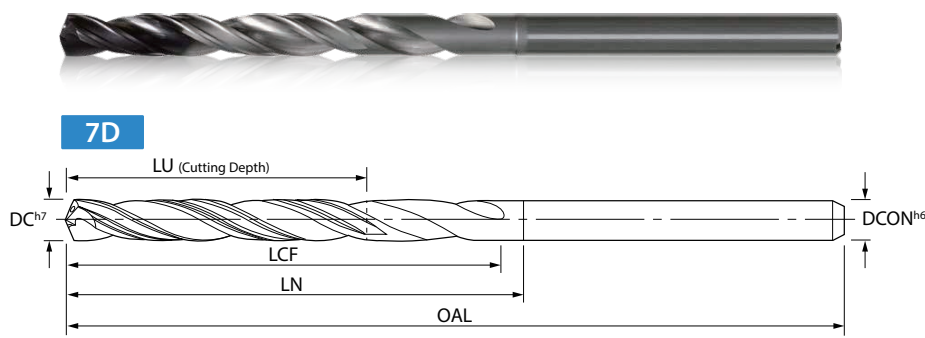
Deep Drill

Hydros I Series 814 / 865

HYDROS 7xD Deep Drills - Metric Sizes (Ø3.00mm - Ø6.00mm)



Cutting Dia. (DC)	Cutting Dia. Tolerance	Shank Tolerance
3.00mm ~ 6.00mm	h7	h6



*LU dimension refers to the Max. Length of Cut (7 x DC).
If a pilot drill is needed for your application please match with ORION High Performance Drills Series 165.

Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{h7}	DCON ^{h6}	OAL	*LU	LCF	LN	
865-1181AG1181	●	3.00	3.00	80.37	21.00	30.00	31.50	135°
865-1220AG1220	●	3.10	4.00	80.37	21.70	31.00	32.55	135°
865-1260AG1260	●	3.20	4.00	80.37	22.40	32.00	33.60	135°
865-1299AG1299	●	3.30	4.00	80.37	23.10	33.00	34.65	135°
865-1339AG1339	●	3.40	4.00	80.37	23.80	34.00	35.70	135°
865-1378AG1378	●	3.50	4.00	80.37	24.50	35.00	36.75	135°
865-1417AG1417	●	3.60	4.00	80.37	25.20	36.00	37.80	135°
865-1457AG1457	●	3.70	4.00	90.37	25.90	37.00	38.85	135°
865-1496AG1496	●	3.80	4.00	90.37	26.60	38.00	39.90	135°
865-1535AG1535	●	3.90	4.00	90.37	27.30	39.00	40.95	135°
865-1575AG1575	●	4.00	4.00	90.37	28.00	40.00	42.00	135°
865-1614AG1614	●	4.10	6.00	90.37	28.70	41.00	43.05	135°
865-1654AG1654	●	4.20	6.00	90.37	29.40	42.00	44.10	135°
865-1693AG1693	●	4.30	6.00	90.37	30.10	43.00	45.15	135°
865-1732AG1732	●	4.40	6.00	90.37	30.80	44.00	46.20	135°
865-1772AG1772	●	4.50	6.00	100.37	31.50	45.00	47.25	135°
865-1811AG1811	●	4.60	6.00	100.37	32.20	46.00	48.30	135°
865-1850AG1850	●	4.70	6.00	100.37	32.90	47.00	49.35	135°
865-1890AG1890	●	4.80	6.00	100.37	33.60	48.00	50.40	135°
865-1929AG1929	●	4.90	6.00	100.37	34.30	49.00	51.45	135°
865-1969AG1969	●	5.00	6.00	100.37	35.00	50.00	52.50	135°
865-2008AG2008	●	5.10	6.00	100.37	35.70	51.00	53.55	135°
865-2047AG2047	●	5.20	6.00	100.37	36.40	52.00	54.60	135°
865-2087AG2087	●	5.30	6.00	110.37	37.10	53.00	55.65	135°
865-2126AG2126	●	5.40	6.00	110.37	37.80	54.00	56.70	135°
865-2165AG2165	●	5.50	6.00	110.37	38.50	55.00	57.75	135°
865-2205AG2205	●	5.60	6.00	110.37	39.20	56.00	58.80	135°
865-2244AG2244	●	5.70	6.00	110.47	39.90	57.00	59.85	135°
865-2283AG2283	●	5.80	6.00	110.47	40.60	58.00	60.90	135°
865-2323AG2323	●	5.90	6.00	110.47	41.30	59.00	61.95	135°
865-2362AG2362	●	6.00	6.00	110.47	42.00	60.00	63.00	135°

● : Standard Item

Automotive

Mold & Die

Aerospace

High Performance


General

Special Tools

Deep Drill

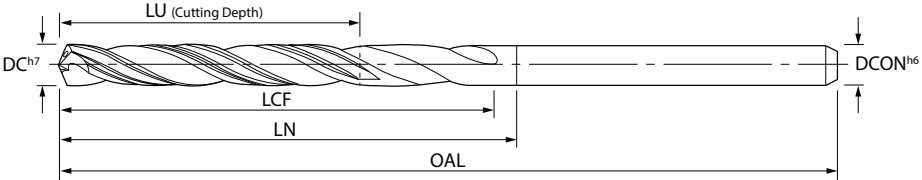
Hydros I Series 814 / 865

HYDROS 7xD Deep Drills - Metric Sizes (Ø6.10mm - Ø9.10mm) NEW



Cutting Dia. (DC)	Cutting Dia. Tolerance	Shank Tolerance
6.10mm ~ 9.10mm	h7	h6

7D



*LU dimension refers to the Max. Length of Cut (7 x DC).
If a pilot drill is needed for your application please match with ORION High Performance Drills Series 165.

Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{h7}	DCON ^{h6}	OAL	*LU	LCF	LN	
865-2402AG2402	●	6.10	8.00	110.47	42.70	61.00	64.05	135°
865-2441AG2441	●	6.20	8.00	110.47	43.40	62.00	65.10	135°
865-2480AG2480	●	6.30	8.00	110.47	44.10	63.00	66.15	135°
865-2520AG2520	●	6.40	8.00	120.47	44.80	64.00	67.20	135°
865-2559AG2559	●	6.50	8.00	120.47	45.50	65.00	68.25	135°
865-2598AG2598	●	6.60	8.00	120.47	46.20	66.00	69.30	135°
865-2638AG2638	●	6.70	8.00	120.47	46.90	67.00	70.35	135°
865-2677AG2677	●	6.80	8.00	120.47	47.60	68.00	71.40	135°
865-2717AG2717	●	6.90	8.00	120.47	48.30	69.00	72.45	135°
865-2756AG2756	●	7.00	8.00	120.47	49.00	70.00	73.50	135°
865-2795AG2795	●	7.10	8.00	120.47	49.70	71.00	74.55	135°
865-2835AG2835	●	7.20	8.00	120.47	50.40	72.00	75.60	135°
865-2874AG2874	●	7.30	8.00	120.47	51.10	73.00	76.65	135°
865-2913AG2913	●	7.40	8.00	130.47	51.80	74.00	77.70	135°
865-2953AG2953	●	7.50	8.00	130.47	52.50	75.00	78.75	135°
865-2992AG2992	●	7.60	8.00	130.62	53.20	76.00	79.80	135°
865-3031AG3031	●	7.70	8.00	130.62	53.90	77.00	80.85	135°
865-3071AG3071	●	7.80	8.00	130.62	54.60	78.00	81.90	135°
865-3110AG3110	●	7.90	8.00	130.62	55.30	79.00	82.95	135°
865-3150AG3150	●	8.00	8.00	130.62	56.00	80.00	84.00	135°
865-3189AG3189	●	8.10	10.00	140.62	56.70	81.00	85.05	135°
865-3228AG3228	●	8.20	10.00	140.62	57.40	82.00	86.10	135°
865-3268AG3268	●	8.30	10.00	140.62	58.10	83.00	87.15	135°
865-3307AG3307	●	8.40	10.00	140.62	58.80	84.00	88.20	135°
865-3346AG3346	●	8.50	10.00	140.62	59.50	85.00	89.25	135°
865-3386AG3386	●	8.60	10.00	140.62	60.20	86.00	90.30	135°
865-3425AG3425	●	8.70	10.00	140.62	60.90	87.00	91.35	135°
865-3465AG3465	●	8.80	10.00	140.62	61.60	88.00	92.40	135°
865-3504AG3504	●	8.90	10.00	140.62	62.30	89.00	93.45	135°
865-3543AG3543	●	9.00	10.00	140.62	63.00	90.00	94.50	135°
865-3583AG3583	●	9.10	10.00	140.62	63.70	91.00	95.55	135°

● : Standard Item

Automotive

Mold & Die

Aerospace

High Performance

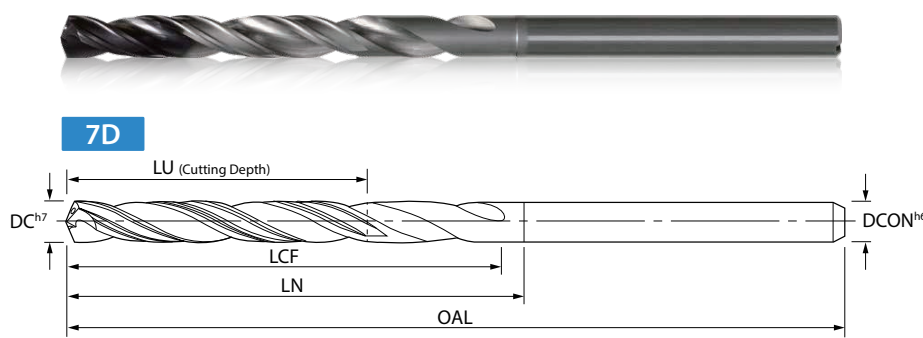
General

Special Tools

Deep Drill

Hydros I Series 814 / 865

HYDROS 7xD Deep Drills - Metric Sizes (Ø9.20mm - Ø12.00mm) NEW



Cutting Dia. (DC)	Cutting Dia. Tolerance	Shank Tolerance
9.20mm ~ 12.00mm	h7	h6

*LU dimension refers to the Max. Length of Cut (7 x DC).
If a pilot drill is needed for your application please match with ORION High Performance Drills Series 165.

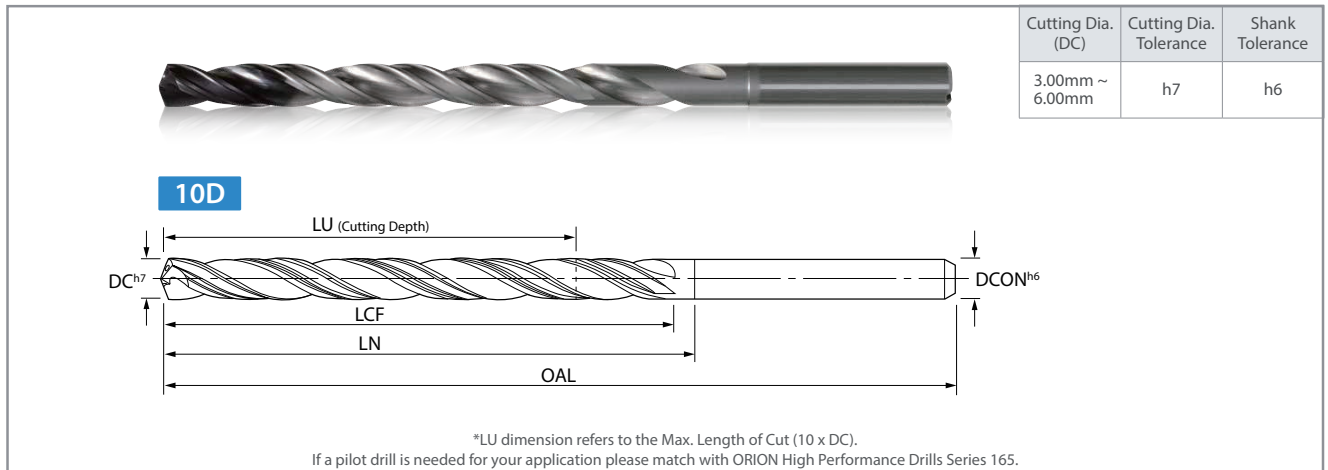
Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{h7}	DCON ^{h6}	OAL	*LU	LCF	LN	
865-3622AG3622	●	9.20	10.00	140.62	64.40	92.00	96.60	135°
865-3661AG3661	●	9.30	10.00	140.62	65.10	93.00	97.65	135°
865-3701AG3701	●	9.40	10.00	150.62	65.80	94.00	98.70	135°
865-3740AG3740	●	9.50	10.00	150.62	66.50	95.00	99.75	135°
865-3780AG3780	●	9.60	10.00	150.62	67.20	96.00	100.80	135°
865-3819AG3819	●	9.70	10.00	150.62	67.90	97.00	101.85	135°
865-3858AG3858	●	9.80	10.00	150.62	68.60	98.00	102.90	135°
865-3898AG3898	●	9.90	10.00	150.62	69.30	99.00	103.95	135°
865-3937AG3937	●	10.00	10.00	150.62	70.00	100.00	105.00	135°
865-3976AG3976	●	10.10	12.00	150.62	70.70	101.00	106.05	135°
865-4016AG4016	●	10.20	12.00	160.62	71.40	102.00	107.10	135°
865-4055AG4055	●	10.30	12.00	160.62	72.10	103.00	108.15	135°
865-4094AG4094	●	10.40	12.00	160.62	72.80	104.00	109.20	135°
865-4134AG4134	●	10.50	12.00	160.62	73.50	105.00	110.25	135°
865-4173AG4173	●	10.60	12.00	160.62	74.20	106.00	111.30	135°
865-4213AG4213	●	10.70	12.00	160.62	74.90	107.00	112.35	135°
865-4252AG4252	●	10.80	12.00	160.62	75.60	108.00	113.40	135°
865-4291AG4291	●	10.90	12.00	160.62	76.30	109.00	114.45	135°
865-4331AG4331	●	11.00	12.00	160.62	77.00	110.00	115.50	135°
865-4370AG4370	●	11.10	12.00	160.62	77.70	111.00	116.55	135°
865-4409AG4409	●	11.20	12.00	170.62	78.40	112.00	117.60	135°
865-4449AG4449	●	11.30	12.00	170.77	79.10	113.00	118.65	135°
865-4488AG4488	●	11.40	12.00	170.77	79.80	114.00	119.70	135°
865-4528AG4528	●	11.50	12.00	170.77	80.50	115.00	120.75	135°
865-4567AG4567	●	11.60	12.00	170.77	81.20	116.00	121.80	135°
865-4606AG4606	●	11.70	12.00	170.77	81.90	117.00	122.85	135°
865-4646AG4646	●	11.80	12.00	170.77	82.60	118.00	123.90	135°
865-4685AG4685	●	11.90	12.00	170.77	83.30	119.00	124.95	135°
865-4724AG4724	●	12.00	12.00	170.77	84.00	120.00	126.00	135°

● : Standard Item

Automotive
Mold & Die
Aerospace
High Performance
General
Special Tools

HYDROS 10xD Deep Drills - Metric Sizes (Ø3.00mm - Ø6.00mm)



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{h7}	DCON ^{h6}	OAL	*LU	LCF	LN	
865-1181AG1535	●	3.00	3.00	90.00	30.00	39.00	40.50	135°
865-1220AG1587	●	3.10	4.00	90.00	31.00	40.30	41.85	135°
865-1260AG1638	●	3.20	4.00	90.00	32.00	41.60	43.20	135°
865-1299AG1689	●	3.30	4.00	90.00	33.00	42.90	44.55	135°
865-1339AG1740	●	3.40	4.00	90.00	34.00	44.20	45.90	135°
865-1378AG1791	●	3.50	4.00	90.00	35.00	45.50	47.25	135°
865-1417AG1843	●	3.60	4.00	90.00	36.00	46.80	48.60	135°
865-1457AG1894	●	3.70	4.00	100.00	37.00	48.10	49.95	135°
865-1496AG1945	●	3.80	4.00	100.00	38.00	49.40	51.30	135°
865-1535AG1996	●	3.90	4.00	100.00	39.00	50.70	52.65	135°
865-1575AG2047	●	4.00	4.00	100.00	40.00	52.00	54.00	135°
865-1614AG2098	●	4.10	6.00	100.00	41.00	53.30	55.35	135°
865-1654AG2150	●	4.20	6.00	110.00	42.00	54.60	56.70	135°
865-1693AG2201	●	4.30	6.00	110.00	43.00	55.90	58.05	135°
865-1732AG2252	●	4.40	6.00	110.00	44.00	57.20	59.40	135°
865-1772AG2303	●	4.50	6.00	110.00	45.00	58.50	60.75	135°
865-1811AG2354	●	4.60	6.00	110.00	46.00	59.80	62.10	135°
865-1850AG2406	●	4.70	6.00	110.00	47.00	61.10	63.45	135°
865-1890AG2457	●	4.80	6.00	110.00	48.00	62.40	64.80	135°
865-1929AG2508	●	4.90	6.00	110.00	49.00	63.70	66.15	135°
865-1969AG2559	●	5.00	6.00	110.00	50.00	65.00	67.50	135°
865-2008AG2610	●	5.10	6.00	120.00	51.00	66.30	68.85	135°
865-2047AG2661	●	5.20	6.00	120.00	52.00	67.60	70.20	135°
865-2087AG2713	●	5.30	6.00	120.00	53.00	68.90	71.55	135°
865-2126AG2764	●	5.40	6.00	120.00	54.00	70.20	72.90	135°
865-2165AG2815	●	5.50	6.00	120.00	55.00	71.50	74.25	135°
865-2205AG2866	●	5.60	6.00	120.00	56.00	72.80	75.60	135°
865-2244AG2917	●	5.70	6.00	120.00	57.00	74.10	76.95	135°
865-2283AG2969	●	5.80	6.00	120.00	58.00	75.40	78.30	135°
865-2323AG3020	●	5.90	6.00	120.00	59.00	76.70	79.65	135°
865-2362AG3071	●	6.00	6.00	130.00	60.00	78.00	81.00	135°

● : Standard Item

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Deep Drill

Hydros I Series 814 / 865

HYDROS 10xD Deep Drills - Metric Sizes (Ø6.10mm - Ø9.10mm)

Cutting Dia. (DC)	Cutting Dia. Tolerance	Shank Tolerance
6.10mm ~ 9.10mm	h7	h6

10D

LU (Cutting Depth)

DC^{h7}

LCF

LN

OAL

DCON^{h6}

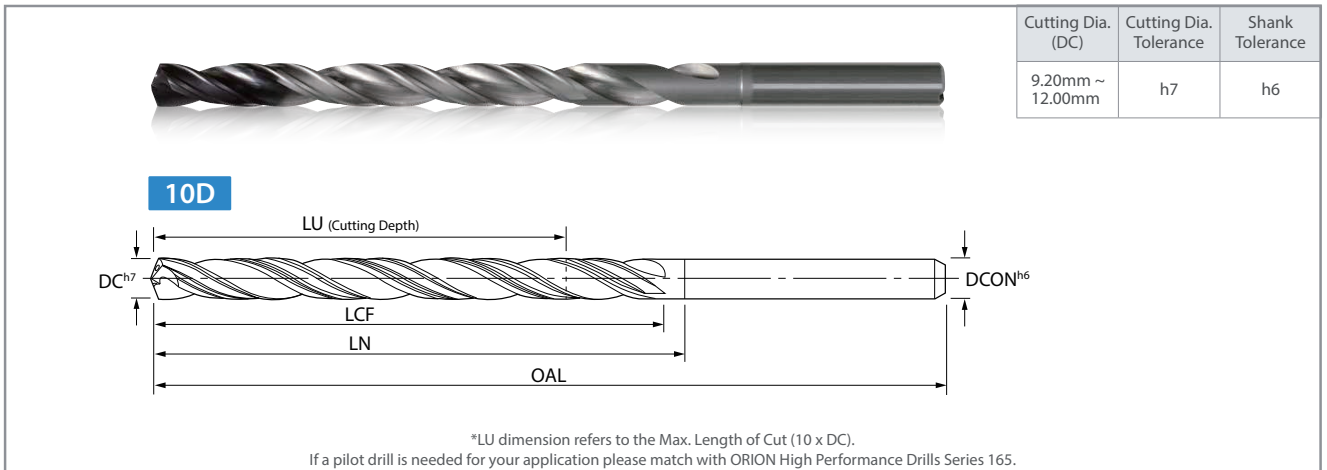
*LU dimension refers to the Max. Length of Cut (10 x DC).
If a pilot drill is needed for your application please match with ORION High Performance Drills Series 165.

Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{h7}	DCON ^{h6}	OAL	*LU	LCF	LN	
865-2402AG3122	●	6.10	8.00	130.00	61.00	79.30	82.35	135°
865-2441AG3173	●	6.20	8.00	130.00	62.00	80.60	83.70	135°
865-2480AG3224	●	6.30	8.00	130.00	63.00	81.90	85.05	135°
865-2520AG3276	●	6.40	8.00	130.00	64.00	83.20	86.40	135°
865-2559AG3327	●	6.50	8.00	140.00	65.00	84.50	87.75	135°
865-2598AG3378	●	6.60	8.00	140.00	66.00	85.80	89.10	135°
865-2638AG3429	●	6.70	8.00	140.00	67.00	87.10	90.45	135°
865-2677AG3480	●	6.80	8.00	140.00	68.00	88.40	91.80	135°
865-2717AG3531	●	6.90	8.00	140.00	69.00	89.70	93.15	135°
865-2756AG3583	●	7.00	8.00	140.00	70.00	91.00	94.50	135°
865-2795AG3634	●	7.10	8.00	140.00	71.00	92.30	95.85	135°
865-2835AG3685	●	7.20	8.00	140.00	72.00	93.60	97.20	135°
865-2874AG3736	●	7.30	8.00	140.00	73.00	94.90	98.55	135°
865-2913AG3787	●	7.40	8.00	150.00	74.00	96.20	99.90	135°
865-2953AG3839	●	7.50	8.00	150.00	75.00	97.50	101.25	135°
865-2992AG3890	●	7.60	8.00	150.00	76.00	98.80	102.60	135°
865-3031AG3941	●	7.70	8.00	150.00	77.00	100.10	103.95	135°
865-3071AG3992	●	7.80	8.00	150.00	78.00	101.40	105.30	135°
865-3110AG4043	●	7.90	8.00	150.00	79.00	102.70	106.65	135°
865-3150AG4094	●	8.00	8.00	150.00	80.00	104.00	108.00	135°
865-3189AG4146	●	8.10	10.00	160.00	81.00	105.30	109.35	135°
865-3228AG4197	●	8.20	10.00	160.00	82.00	106.60	110.70	135°
865-3268AG4248	●	8.30	10.00	160.00	83.00	107.90	112.05	135°
865-3307AG4299	●	8.40	10.00	160.00	84.00	109.20	113.40	135°
865-3346AG4350	●	8.50	10.00	160.00	85.00	110.50	114.75	135°
865-3386AG4402	●	8.60	10.00	160.00	86.00	111.80	116.10	135°
865-3425AG4453	●	8.70	10.00	160.00	87.00	113.10	117.45	135°
865-3465AG4504	●	8.80	10.00	170.00	88.00	114.40	118.80	135°
865-3504AG4555	●	8.90	10.00	170.00	89.00	115.70	120.15	135°
865-3543AG4606	●	9.00	10.00	170.00	90.00	117.00	121.50	135°
865-3583AG4657	●	9.10	10.00	170.00	91.00	118.30	122.85	135°

● : Standard Item

HYDROS 10xD Deep Drills - Metric Sizes (Ø9.20mm - Ø12.00mm)



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)						Point Angle
		DC ^{h7}	DCON ^{h6}	OAL	*LU	LCF	LN	
865-3622AG4709	●	9.20	10.00	170.00	92.00	119.60	124.20	135°
865-3661AG4760	●	9.30	10.00	170.00	93.00	120.90	125.55	135°
865-3701AG4811	●	9.40	10.00	170.00	94.00	122.20	126.90	135°
865-3740AG4862	●	9.50	10.00	170.00	95.00	123.50	128.25	135°
865-3780AG4913	●	9.60	10.00	180.00	96.00	124.80	129.60	135°
865-3819AG4965	●	9.70	10.00	180.00	97.00	126.10	130.95	135°
865-3858AG5016	●	9.80	10.00	180.00	98.00	127.40	132.30	135°
865-3898AG5067	●	9.90	10.00	180.00	99.00	128.70	133.65	135°
865-3937AG5118	●	10.00	10.00	180.00	100.00	130.00	135.00	135°
865-3976AG5169	●	10.10	12.00	180.00	101.00	131.30	136.35	135°
865-4016AG5220	●	10.20	12.00	190.00	102.00	132.60	137.70	135°
865-4055AG5272	●	10.30	12.00	190.00	103.00	133.90	139.05	135°
865-4094AG5323	●	10.40	12.00	190.00	104.00	135.20	140.40	135°
865-4134AG5374	●	10.50	12.00	190.00	105.00	136.50	141.75	135°
865-4173AG5425	●	10.60	12.00	190.00	106.00	137.80	143.10	135°
865-4213AG5476	●	10.70	12.00	190.00	107.00	139.10	144.45	135°
865-4252AG5528	●	10.80	12.00	190.00	108.00	140.40	145.80	135°
865-4291AG5579	●	10.90	12.00	190.00	109.00	141.70	147.15	135°
865-4331AG5630	●	11.00	12.00	200.00	110.00	143.00	148.50	135°
865-4370AG5681	●	11.10	12.00	200.00	111.00	144.30	149.85	135°
865-4409AG5732	●	11.20	12.00	200.00	112.00	145.60	151.20	135°
865-4449AG5783	●	11.30	12.00	200.00	113.00	146.90	152.55	135°
865-4488AG5835	●	11.40	12.00	200.00	114.00	148.20	153.90	135°
865-4528AG5886	●	11.50	12.00	200.00	115.00	149.50	155.25	135°
865-4567AG5937	●	11.60	12.00	200.00	116.00	150.80	156.60	135°
865-4606AG5988	●	11.70	12.00	200.00	117.00	152.10	157.95	135°
865-4646AG6039	●	11.80	12.00	200.00	118.00	153.40	159.30	135°
865-4685AG6091	●	11.90	12.00	210.00	119.00	154.70	160.65	135°
865-4724AG6142	●	12.00	12.00	210.00	120.00	156.00	162.00	135°

● : Standard Item

Automotive
Mold & Die
Aerospace
High Performance
General
Special Tools

Recommended Cutting Conditions

Workpiece Material	Material Hardness/Types	Recommended Cutting Speed (sfm)	Cutting Dia. DC (in)	Cutting Dia. DC (mm)	Drill Length (Cutting Depth) Feed Rate (ipr)			
					7xD HYDROS	8xD Mini	10xD HYDROS	15xD Mini
Low Carbon Steel	12L14 A36	400 - 450 - 500	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0010 - 0.0020	-	0.0006 - 0.0012
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0020 - 0.0040	0.0016 - 0.0032	0.0012 - 0.0024
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0040 - 0.0060	-	0.0032 - 0.0048	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0060 - 0.0080	-	0.0048 - 0.0064	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0080 - 0.0100	-	0.0064 - 0.0080	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0100 - 0.0120	-	0.0080 - 0.0095	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0120 - 0.0140	-	0.0095 - 0.0110	-
Mild Carbon Steel	1018 1028 1050	360 - 410 - 460	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0009 - 0.0018	-	0.0006 - 0.0012
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0018 - 0.0036	0.0015 - 0.0030	0.0012 - 0.0024
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0038 - 0.0056	-	0.0030 - 0.0045	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0056 - 0.0075	-	0.0045 - 0.0060	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0075 - 0.0095	-	0.0060 - 0.0075	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0095 - 0.0110	-	0.0075 - 0.0090	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0110 - 0.0122	-	0.0090 - 0.0105	-
Alloy Steel	4130 4140 4150 8620	260 - 310 - 360	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0008 - 0.0016	-	0.0005 - 0.0011
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0016 - 0.0034	0.0014 - 0.0027	0.0011 - 0.0022
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0035 - 0.0050	-	0.0027 - 0.0044	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0050 - 0.0070	-	0.0044 - 0.0056	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0070 - 0.0088	-	0.0056 - 0.0070	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0088 - 0.0105	-	0.0070 - 0.0084	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0105 - 0.0113	-	0.0084 - 0.0090	-
Preharden Tool Steel	4140PH A2 D2 H13 P20	190 - 240 - 290	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0005 - 0.0010	-	0.0003 - 0.0007
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0010 - 0.0020	0.0008 - 0.0016	0.0007 - 0.0014
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0020 - 0.0030	-	0.0016 - 0.0024	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0030 - 0.0040	-	0.0024 - 0.0032	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0040 - 0.0050	-	0.0032 - 0.0040	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0050 - 0.0060	-	0.0040 - 0.0048	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0060 - 0.0070	-	0.0048 - 0.0052	-
Harden Tool Steel	>48 HRC	125 - 150 - 175	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0004 - 0.0009	-	0.0003 - 0.0006
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0009 - 0.0016	0.0007 - 0.0014	0.0006 - 0.0011
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0017 - 0.0026	-	0.0014 - 0.0020	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0026 - 0.0035	-	0.0020 - 0.0028	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0035 - 0.0044	-	0.0028 - 0.0035	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0044 - 0.0053	-	0.0035 - 0.0042	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0053 - 0.0058	-	0.0042 - 0.0046	-
Stainless Steel	303 304 316 321	130 - 180 - 230	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0007 - 0.0014	-	0.0005 - 0.0010
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0014 - 0.0028	0.0012 - 0.0023	0.0010 - 0.0019
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0028 - 0.0043	-	0.0023 - 0.0035	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0043 - 0.0058	-	0.0035 - 0.0047	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0058 - 0.0073'	-	0.0047 - 0.0059	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0073 - 0.0088	-	0.0059 - 0.0070	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0088 - 0.0095	-	0.0070 - 0.0075	-
Stainless Steel	15-5PH 17-4PH 13-8 400 Series	100 - 125 - 150	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0006 - 0.0011	-	0.0004 - 0.0008
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0011 - 0.0022	0.0009 - 0.0018	0.0008 - 0.0015
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0022 - 0.0034	-	0.0018 - 0.0027	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0034 - 0.0046	-	0.0027 - 0.0037	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0046 - 0.0058	-	0.0037 - 0.0047	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0058 - 0.0070	-	0.0047 - 0.0057	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0070 - 0.0075	-	0.0057 - 0.0061	-
Gray Cast Iron	-	375 - 425 - 475	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0013 - 0.0025	-	0.0009 - 0.0018
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0025 - 0.0050	0.0020 - 0.0040	0.0018 - 0.0034
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0050 - 0.0075	-	0.0040 - 0.0063	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0075 - 0.0100	-	0.0063 - 0.0084	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0100 - 0.0120	-	0.0084 - 0.0105	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0120 - 0.0140	-	0.0105 - 0.0126	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0140 - 0.015	-	0.0126 - 0.0135	-
Nodular Cast Iron	-	310 - 360 - 410	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0010 - 0.0020	-	0.0006 - 0.0012
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0020 - 0.0030	0.0016 - 0.0032	0.0012 - 0.0024
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0040 - 0.0060	-	0.0032 - 0.0048	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0060 - 0.0080	-	0.0048 - 0.0064	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0080 - 0.0100	-	0.0064 - 0.0080	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0100 - 0.0120	-	0.0080 - 0.0095	-
			Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0120 - 0.0140	-	0.0095 - 0.0110	-

** Above recommendations are suggested starting parameters. Cutting speeds and feeds may vary according to machining application, setup, and tool runout.

PECK CYCLE: Depending on material, coolant pressure/ location, and depth of hole pecking may be needed. If needed the recommended peck depth is 1.0xDia to 3.0xDia per peck.

Recommended Cutting Conditions

Workpiece Material	Material Hardness/Types	Recommended Cutting Speed (sfm)	Cutting Dia. DC (in)	Cutting Dia. DC (mm)	Drill Length (Cutting Depth) Feed Rate (ipr)			
					7xD HYDROS	8xD Mini	10xD HYDROS	15xD Mini
Aluminum	-	ALLOY 375 - 425 - 475 CAST 490 - 540 - 590	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0016 - 0.0032	-	0.0010 - 0.0023
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0032 - 0.0062	0.0025 - 0.0050	0.0023 - 0.0045
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0062 - 0.0090	-	0.0050 - 0.0075	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0090 - 0.0125	-	0.0075 - 0.0100	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0125 - 0.0150	-	0.0100 - 0.0125	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0150 - 0.0175	-	0.0125 - 0.0150	-
Copper Alloys	-	275 - 325 - 375	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0016 - 0.0032	-	0.0010 - 0.0023
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0032 - 0.0062	0.0025 - 0.0050	0.0023 - 0.0045
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0062 - 0.0090	-	0.0050 - 0.0075	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0090 - 0.0125	-	0.0075 - 0.0100	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0125 - 0.0150	-	0.0100 - 0.0125	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0150 - 0.0175	-	0.0125 - 0.0150	-
Heat Resistant Alloy	Hastelloy Inconel Monel Waspaloy Promet	75 - 90 - 105	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0004 - 0.0007	-	0.0002 - 0.0005
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0007 - 0.0015	0.0006 - 0.0011	0.0005 - 0.0010
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0015 - 0.0022	-	0.0011 - 0.0017	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0022 - 0.0030	-	0.0017 - 0.0023	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0030 - 0.0037	-	0.0023 - 0.0029	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0037 - 0.0044	-	0.0029 - 0.0035	-
Titanium Alloy	-	125 - 150 - 175	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	-	0.0004 - 0.0009	-	0.0003 - 0.0006
			Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	-	0.0009 - 0.0016	0.0007 - 0.0014	0.0006 - 0.0011
			Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0017 - 0.0026	-	0.0014 - 0.0020	-
			Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0026 - 0.0035	-	0.0020 - 0.0028	-
			Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0035 - 0.0044	-	0.0028 - 0.0035	-
			Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0044 - 0.0053	-	0.0035 - 0.0042	-
Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0053 - 0.0058	-	0.0042 - 0.0046	-			

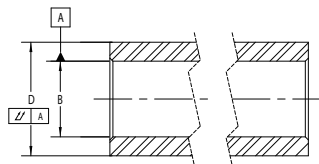
** Above recommendations are suggested starting parameters. Cutting speeds and feeds may vary according to machining application, setup, and tool runout.

PECK CYCLE: Depending on material, coolant pressure/ location, and depth of hole pecking may be needed. If needed the recommended peck depth is 1.0xDia to 3.0xDia per peck.

Case Studies

Adapter - Aerospace 17-4PH1150

Vc = 67sfm (n = 1,050rpm)
Vf = 4.2ipm
D.O.C. = 2.000"
Wet (Internal Coolant)
Ø0.244"
865-2441AG3173



Tool Life

HYDROS Ø0.244"

130 pcs / tool

Tool Life

1.6x

Competitor A
Ø0.244"

80 pcs / tool

The HYDROS drill showed 1.6 times the tool life of Competitor A.

(User Evaluation)

Implant Device - Medical 17-4

Vc = 125sfm (n = 3,970rpm)
Vf = 4.76ipm
D.O.C. = 1.000"
Wet (Internal Coolant)
Ø0.118"
865-1181AG1535



Tool Life

HYDROS Ø0.118"

180 pcs / tool

Tool Life

1.1x

Competitor B
Ø0.118"

165 pcs / tool

The HYDROS showed better wear and tool life was 1.1 times that of Competitor B.

(User Evaluation)

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools



ICe-Carb®

High Performance Internal Coolant Drills

The design of the ICe-Carb® Series 140 was created to bring to the end user the ability to achieve high performance results with high production demands. The internal coolant design allows for better control of machining temperatures during these types of applications, while the geometry features provide effective and efficient chip creation and removal. The results of the ICe-Carb® Series 140 design are reduced cutting loads, increased operating parameters and enhanced tool life.

SERIES 140

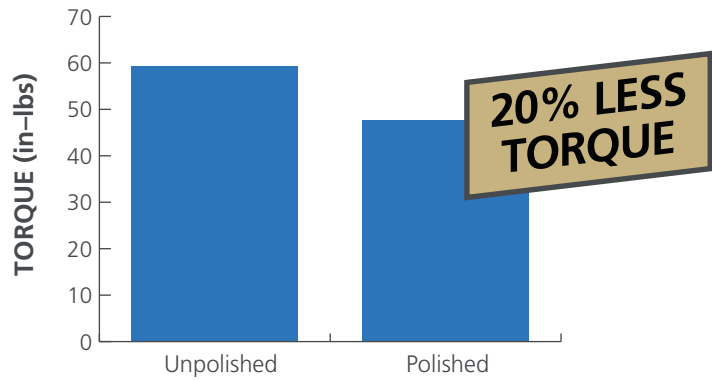
- (A) COOLANT THROUGH DESIGN**
 - promotes controlled and consistent operating temperatures
 - improves coolant flow to the cut while maintaining strength
 - increases tool life at increased operating parameters
- (B) HIGH PERFORMANCE FLUTE DESIGN**
 - optimized open fluting
 - improved surface finish through effective chip evacuation
- (C) POLISHED Ti-NAMITE A COATING**
 - reduces friction between the chip and tool preventing the impediment of chip flow
 - decreased machine loads associated with chip clogging
 - reduced friction reduces heat and abrasion wear
- (D) HIGH PENETRATION 140° POINT GEOMETRY**
 - split point geometry for improved drill penetration and accuracy
 - cam relief drill point
 - self centering design with high penetration capabilities
- (E) ENGINEERED CUTTING EDGES**
 - precisely ground with a curvature that allows efficient chip creation and control
 - controlled edge honing for longevity
 - negative corner position strengthens and protects

PERFORMANCE. PRECISION. PASSION.
ICe-CARB® SERIES 140 INTERNAL COOLANT DRILLS

PERFORMANCE.

The cutting edges of the ICe-Carb® Series 140 are designed to allow the tool to achieve high penetration rates, while the highly polished Ti-NAMITE A tool coating allows the chips to move smoothly along the flute and out of the cut. This helps to avoid chip clogging often associated with elevated penetration rates. Through efficient chip creation and movement, the drill operates at lower loads under identical conditions.

TORQUE COMPARISON
 8620 Carbon Steel @ 175 BHN
 3/8" Diameter 1.125" Deep
 350 sfm / 29 ipm



www.kyocera-sgstool.com

PRECISION.

The more efficient a drill can function, the more precise the results it can produce. The symmetrical grind of the cam relieved point ensures balanced pressure during cutting, while the split point design ensures fast and accurate engagement into the material. Precision must be maintained throughout the life of the drill, so the ICe-Carb® Series 140 specialized hone, strong margin design and negative corner position help to delay the wear that often causes a drill to lose precision in the cut and prematurely end tool life.

ICe-CARB® SERIES 140 VS. 2 COMPETITORS

DRILL SIZE	3/8" (.3750)
DEPTH OF HOLE	1.875"
MATERIAL	316 STAINLESS STEEL @ 140 BHN
SPEED	1430 RPM (140 sfm)
FEED	8.5 IPM (.0059 ipr)
COOLANT	8% WATER SOLUBLE @ 700 psi
MACHINE	HAAS VF-3 VMC
TYPE OF HOLE	BLIND

PASSION.

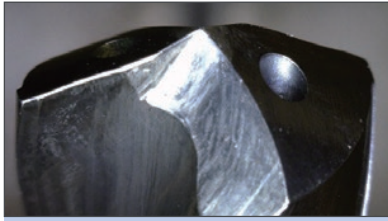
Controlling temperatures during the cutting process certainly helps to improve the operating parameters and tool life a tool is capable of achieving. All of the high performance features of the ICe-Carb® Series 140 are engineered to work together to create the most efficient total cutting performance beyond what simply having coolant through the tool can offer. The flute profile compliments the coolant through design of the ICe-Carb® Series 140 to create a strong cutting tool that effectively transports the chips being created, while the cutting edges offer a balance of strength and shear.

ACTUAL CUSTOMER TEST IN 17-4 PH STAINLESS STEEL @ 36 HRc ICe-CARB® SERIES 140 8xD VS. COMPETITOR 1

SPEED (RPM)	1600
FEED (IPM)	9.6
HOLE DIAMETER	9.1mm (.3583)
HOLE DEPTH	3.3"
COOLANT PRESSURE	60 psi (BELOW RECOMMENDATIONS)
TYPE OF COOLANT	WATER SOLUBLE
TYPE OF MACHINE	CNC LATHE – LIVE PART

CONDITION OF DRILLS AFTER 175 HOLES

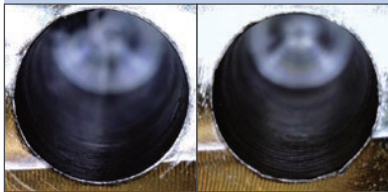
ICe-CARB® SERIES 140



No damage found, good condition to continue using; .375" Ø throughout depth with good finish

FIRST HOLE

LAST HOLE



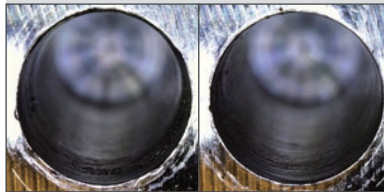
COMPETITOR 1



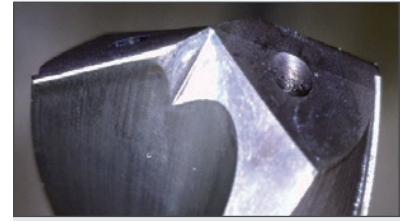
Point severely chipped with wear on margins; Coating loss below cutting lips; .375" Ø held but surface finish deteriorating

FIRST HOLE

LAST HOLE



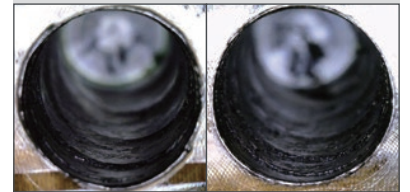
COMPETITOR 2



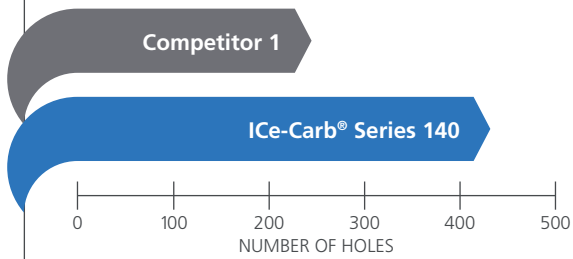
Better condition than Competitor 1 but unacceptable holes; Holes out of round, oversized to .385" Ø and tapered to .392" Ø with heavy swirl marks

FIRST HOLE

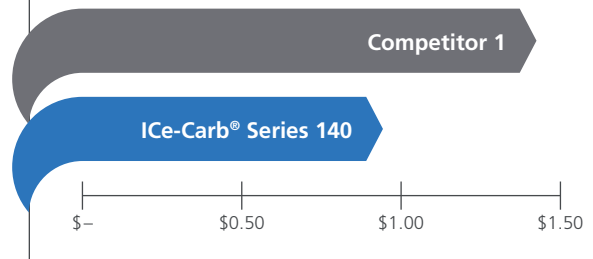
LAST HOLE



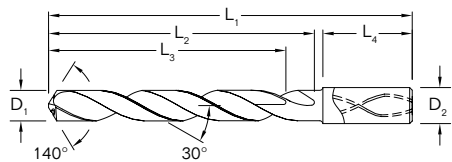
TOOL LIFE



COST PER PART



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TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+ .00008/+ .00047	h6
> .1181-.2362	+ .00016/+ .00063	h6
> .2362-.3937	+ .00024/+ .00083	h6
> .3937-.7087	+ .00028/+ .00098	h6
> .7087-1.1811	+ .00031/+ .00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	63901
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	63902
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	51901
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	63903
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	63904
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	63905
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	51902
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	63906
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	51903
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	63907
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	63908
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	51904
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	63909
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	51905
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	63910
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	51906
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	63911
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	63912
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	63913
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	51907
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	63914
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	63915
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	63916
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	63917
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	51908
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	63918
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	63919
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	63920
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	63900
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	51910
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	63921
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	63922
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	63998
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	63923
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	51912
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	63924
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	63925
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	63926
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	63927
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0	51913



Common



5xD Reach



Right Spiral



Internal Coolant



2 Flutes

(continued on next page)

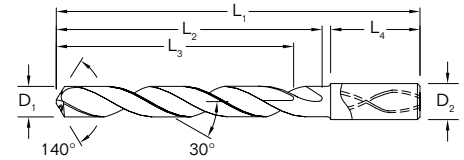


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+ .00008/+ .00047	h6
> .1181-.2362	+ .00016/+ .00063	h6
> .2362-.3937	+ .00024/+ .00083	h6
> .3937-.7087	+ .00028/+ .00098	h6
> .7087-1.1811	+ .00031/+ .00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



- 

Common
- 

5XD Reach
- 

Right Spiral
- 

Internal Coolant
- 

2 Flutes

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	63928
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	63929
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	63930
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	63931
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0	51914
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	63932
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	63933
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0	51915
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	63934
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	63935
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0	51916
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	63936
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0	63999
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	63937
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	63938
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0	51918
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	63939
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	63940
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	63941
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	63942
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0	51919
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	63943
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	63944
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	63945
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	63946
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0	51920
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	63947
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	63948
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	63949
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	63950
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0	51921
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	63951
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0	51922
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	63952
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	63953
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0	63954
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0	51923
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	63955
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	63956
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	63957

(continued on next page)

Automotive

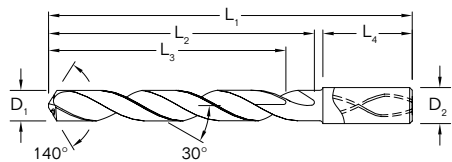
Mold & Die

Aerospace

High Performance

General

Special Tools



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+0.0008/+0.00047	h6
> .1181-.2362	+0.0016/+0.00063	h6
> .2362-.3937	+0.0024/+0.00083	h6
> .3937-.7087	+0.0028/+0.00098	h6
> .7087-1.1811	+0.0031/+0.00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	63958
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0	51924
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	63959
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	63960
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	51925
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	63961
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	63962
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	51926
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	63963
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	63964
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	63965
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	63966
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	51927
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	63967
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	63968
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	63969
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	63970
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	51928
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	63971
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	63972
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	63973
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	63974
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	51929
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	63975
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	63976
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	63977
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	63978
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	51930
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	63979
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	63980
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	63981
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64000
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	63982
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	63983
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	63984
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	63985
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	51932
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	63986
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	51933
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	63987



Common



5xD Reach



Right Spiral



Internal Coolant



2 Flutes

(continued on next page)

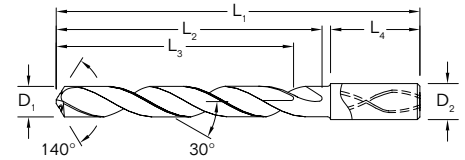



TOLERANCES (inch)


DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6


TOLERANCES (mm)


DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6




- 

Common
- 

5XD Reach
- 

Right Spiral
- 

Internal Coolant
- 

2 Flutes

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	51934
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	63988
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	63989
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	51935
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	64001
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	63990
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	63991
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	51937
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	63992
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	51938
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	63993
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	63994
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	63995
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	63996
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	51939
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	63997
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	51940
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	51941
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	51942

Automotive

Mold & Die

Aerospace

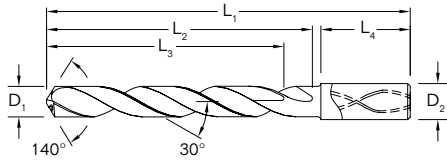
High Performance

General

Special Tools

Internal Coolant Drill

ICe-Carb I Series 140



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+ .00008/+ .00047	h6
> .1181-.2362	+ .00016/+ .00063	h6
> .2362-.3937	+ .00024/+ .00083	h6
> .3937-.7087	+ .00028/+ .00098	h6
> .7087-1.1811	+ .00031/+ .00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
3,0 mm	0.1181			6,0	72,0	34,0	29,0	36,0	63575
3,1 mm	0.1220			6,0	72,0	34,0	29,0	36,0	63576
1/8	0.1250	3.18		6,0	72,0	34,0	29,0	36,0	51801
3,2 mm	0.1260		M3,5 X 0,35	6,0	72,0	34,0	29,0	36,0	63577
3,3 mm	0.1299		M4 X 0,7	6,0	72,0	34,0	29,0	36,0	63578
3,4 mm	0.1339			6,0	72,0	34,0	29,0	36,0	63579
#29	0.1360	3.45	8-32,8-36	6,0	72,0	34,0	29,0	36,0	51802
3,5 mm	0.1378		M4 X 0,5	6,0	72,0	34,0	29,0	36,0	63580
9/64	0.1406	3.57		6,0	72,0	34,0	29,0	36,0	51803
3,6 mm	0.1417		M4 X 0,35	6,0	72,0	34,0	29,0	36,0	63581
3,7 mm	0.1457		M4,5 X 0,75	6,0	72,0	34,0	29,0	36,0	63582
3,8 mm	0.1496		10-24	6,0	81,0	43,0	36,0	36,0	63583
3,9 mm	0.1535			6,0	81,0	43,0	36,0	36,0	63584
5/32	0.1562	3.97		6,0	81,0	43,0	36,0	36,0	51804
4,0 mm	0.1575		M4,5 X 0,5	6,0	81,0	43,0	36,0	36,0	63585
#21	0.1590	4.04	10-32	6,0	81,0	43,0	36,0	36,0	51805
4,1 mm	0.1614			6,0	81,0	43,0	36,0	36,0	63586
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	81,0	43,0	36,0	36,0	63587
4,3 mm	0.1693			6,0	81,0	43,0	36,0	36,0	63588
11/64	0.1719	4.37		6,0	81,0	43,0	36,0	36,0	51806
4,4 mm	0.1732		12-24	6,0	81,0	43,0	36,0	36,0	63589
4,5 mm	0.1772		M5 X 0,5	6,0	81,0	43,0	36,0	36,0	63590
4,6 mm	0.1811		12-28	6,0	81,0	43,0	36,0	36,0	63591
4,7 mm	0.1850		12-32	6,0	81,0	43,0	36,0	36,0	63592
3/16	0.1875	4.76		6,0	95,0	57,0	48,0	36,0	51807
4,8 mm	0.1890		7/32-32	6,0	95,0	57,0	48,0	36,0	63593
4,9 mm	0.1929			6,0	95,0	57,0	48,0	36,0	63594
5,0 mm	0.1969		M6 X 1	6,0	95,0	57,0	48,0	36,0	63595
5,1 mm	0.2008		1/4-20	6,0	95,0	57,0	48,0	36,0	63596
13/64	0.2031	5.16		6,0	95,0	57,0	48,0	36,0	51808
5,2 mm	0.2047		M6 X 0,75	6,0	95,0	57,0	48,0	36,0	63597
5,3 mm	0.2087			6,0	95,0	57,0	48,0	36,0	63598
5,4 mm	0.2126			6,0	95,0	57,0	48,0	36,0	63599
5,5 mm	0.2165		M6 X 0,5	6,0	95,0	57,0	48,0	36,0	63600
7/32	0.2188	5.56	1/4-32	6,0	95,0	57,0	48,0	36,0	51809
5,6 mm	0.2205			6,0	95,0	57,0	48,0	36,0	63601
5,7 mm	0.2244			6,0	95,0	57,0	48,0	36,0	63602
5,8 mm	0.2283			6,0	95,0	57,0	48,0	36,0	63603
5,9 mm	0.2323			6,0	95,0	57,0	48,0	36,0	63604
15/64	0.2344	5.95		6,0	95,0	57,0	48,0	36,0	51810



Common



Reach



Right Spiral



Internal Coolant



2 Flutes

(continued on next page)

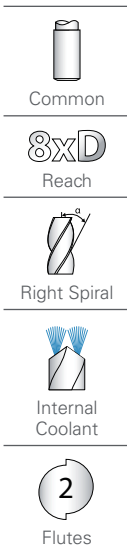
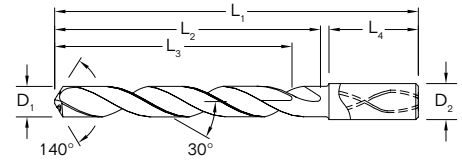


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
6,0 mm	0.2362		M7 X 1	6,0	95,0	57,0	48,0	36,0	63605
6,1 mm	0.2402			8,0	114,0	76,0	64,0	36,0	63606
6,2 mm	0.2441		M7 X 0,75	8,0	114,0	76,0	64,0	36,0	63607
6,3 mm	0.2480			8,0	114,0	76,0	64,0	36,0	63608
1/4	0.2500	6.35		8,0	114,0	76,0	64,0	36,0	51811
6,4 mm	0.2520			8,0	114,0	76,0	64,0	36,0	63609
6,5 mm	0.2559			8,0	114,0	76,0	64,0	36,0	63610
F	0.2570	6.53	5/16-18	8,0	114,0	76,0	64,0	36,0	51812
6,6 mm	0.2598			8,0	114,0	76,0	64,0	36,0	63611
6,7 mm	0.2638			8,0	114,0	76,0	64,0	36,0	63612
17/64	0.2656	6.75	5/16-20	8,0	114,0	76,0	64,0	36,0	51813
6,8 mm	0.2677		M8 X 1,25	8,0	114,0	76,0	64,0	36,0	63613
6,9 mm	0.2717			8,0	114,0	76,0	64,0	36,0	63614
7,0 mm	0.2756		M8 X 1	8,0	114,0	76,0	64,0	36,0	63615
7,1 mm	0.2795			8,0	114,0	76,0	64,0	36,0	63616
9/32	0.2812	7.14	5/16-32	8,0	114,0	76,0	64,0	36,0	51814
7,2 mm	0.2835		M8 X 0,75	8,0	114,0	76,0	64,0	36,0	63617
7,3 mm	0.2874			8,0	114,0	76,0	64,0	36,0	63618
7,4 mm	0.2913			8,0	114,0	76,0	64,0	36,0	63619
7,5 mm	0.2953		M8 X 0,5	8,0	114,0	76,0	64,0	36,0	63620
19/64	0.2969	7.54		8,0	114,0	76,0	64,0	36,0	51815
7,6 mm	0.2992			8,0	114,0	76,0	64,0	36,0	63621
7,7 mm	0.3031			8,0	114,0	76,0	64,0	36,0	63622
7,8 mm	0.3071		M9 X 1,25	8,0	114,0	76,0	64,0	36,0	63623
7,9 mm	0.3110			8,0	114,0	76,0	64,0	36,0	63624
5/16	0.3125	7.94	3/8-16	8,0	114,0	76,0	64,0	36,0	51816
8,0 mm	0.3150		M9 X 1	8,0	114,0	76,0	64,0	36,0	63625
8,1 mm	0.3189			10,0	142,0	95,0	80,0	40,0	63626
8,2 mm	0.3228			10,0	142,0	95,0	80,0	40,0	63627
8,3 mm	0.3268			10,0	142,0	95,0	80,0	40,0	63628
21/64	0.3281	8.33	3/8-20	10,0	142,0	95,0	80,0	40,0	51817
8,4 mm	0.3307			10,0	142,0	95,0	80,0	40,0	63629
Q	0.3320	8.43	3/8-24	10,0	142,0	95,0	80,0	40,0	51818
8,5 mm	0.3346		M10 X 1,5	10,0	142,0	95,0	80,0	40,0	63630
8,6 mm	0.3386			10,0	142,0	95,0	80,0	40,0	63631
8,7 mm	0.3425			10,0	142,0	95,0	80,0	40,0	63632
11/32	0.3438	8.73	3/8-32	10,0	142,0	95,0	80,0	40,0	51819
8,8 mm	0.3465		M10 X 1,25	10,0	142,0	95,0	80,0	40,0	63633
8,9 mm	0.3504			10,0	142,0	95,0	80,0	40,0	63634
9,0 mm	0.3543		M10 X 1	10,0	142,0	95,0	80,0	40,0	63635

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Automotive

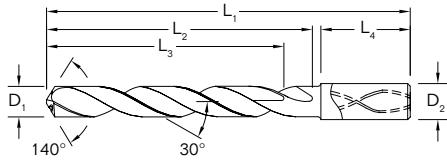
Mold & Die

Aerospace

High Performance

General

Special Tools



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+ .00008/+ .00047	h6
> .1181-.2362	+ .00016/+ .00063	h6
> .2362-.3937	+ .00024/+ .00083	h6
> .3937-.7087	+ .00028/+ .00098	h6
> .7087-1.1811	+ .00031/+ .00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
9,1 mm	0.3583			10,0	142,0	95,0	80,0	40,0	63636
23/64	0.3594	9.13		10,0	142,0	95,0	80,0	40,0	51820
9,2 mm	0.3622		M10 X 0,75	10,0	142,0	95,0	80,0	40,0	63637
9,3 mm	0.3661			10,0	142,0	95,0	80,0	40,0	63638
U	0.3680	9.35	7/16-14	10,0	142,0	95,0	80,0	40,0	51821
9,4 mm	0.3701			10,0	142,0	95,0	80,0	40,0	63639
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	142,0	95,0	80,0	40,0	63640
3/8	0.3750	9.53		10,0	142,0	95,0	80,0	40,0	51822
9,6 mm	0.3780			10,0	142,0	95,0	80,0	40,0	63641
9,7 mm	0.3819			10,0	142,0	95,0	80,0	40,0	63642
9,8 mm	0.3858			10,0	142,0	95,0	80,0	40,0	63643
9,9 mm	0.3898			10,0	142,0	95,0	80,0	40,0	63644
25/64	0.3906	9.92	7/16-20	10,0	142,0	95,0	80,0	40,0	51823
10,0 mm	0.3937			10,0	142,0	95,0	80,0	40,0	63645
10,1 mm	0.3976			12,0	162,0	114,0	96,0	45,0	63646
10,2 mm	0.4016		M12 X 1,75	12,0	162,0	114,0	96,0	45,0	63647
10,3 mm	0.4055			12,0	162,0	114,0	96,0	45,0	63648
13/32	0.4062	10.32		12,0	162,0	114,0	96,0	45,0	51824
10,4 mm	0.4094			12,0	162,0	114,0	96,0	45,0	63649
10,5 mm	0.4134		M12 X 1,5	12,0	162,0	114,0	96,0	45,0	63650
10,6 mm	0.4173			12,0	162,0	114,0	96,0	45,0	63651
10,7 mm	0.4213			12,0	162,0	114,0	96,0	45,0	63652
27/64	0.4219	10.72	1/2-13	12,0	162,0	114,0	96,0	45,0	51825
10,8 mm	0.4252		M12 X 1,25	12,0	162,0	114,0	96,0	45,0	63653
10,9 mm	0.4291			12,0	162,0	114,0	96,0	45,0	63654
11,0 mm	0.4331		M12 X 1	12,0	162,0	114,0	96,0	45,0	63655
11,1 mm	0.4370			12,0	162,0	114,0	96,0	45,0	63656
7/16	0.4375	11.11	1/4-18NPT	12,0	162,0	114,0	96,0	45,0	51826
11,2 mm	0.4409			12,0	162,0	114,0	96,0	45,0	63657
11,3 mm	0.4449			12,0	162,0	114,0	96,0	45,0	63658
11,4 mm	0.4488			12,0	162,0	114,0	96,0	45,0	63659
11,5 mm	0.4528		M12 X 0,5	12,0	162,0	114,0	96,0	45,0	63660
11,6 mm	0.4567			12,0	162,0	114,0	96,0	45,0	63661
11,7 mm	0.4606			12,0	162,0	114,0	96,0	45,0	63662
11,8 mm	0.4646			12,0	162,0	114,0	96,0	45,0	63663
11,9 mm	0.4685			12,0	162,0	114,0	96,0	45,0	63664
15/32	0.4688	11.91	1/2-28	12,0	162,0	114,0	96,0	45,0	51827
12,0 mm	0.4724		M14 X 2	12,0	162,0	114,0	96,0	45,0	63665
31/64	0.4844	12.30	9/16-12	14,0	178,0	133,0	112,0	45,0	51828
12,5 mm	0.4921		M14 X 1,5	14,0	178,0	133,0	112,0	45,0	63666



Common



Reach



Right Spiral



Internal Coolant



2 Flutes

(continued on next page)

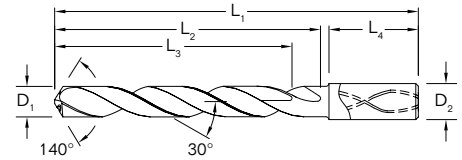


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+ .00008/+ .00047	h6
> .1181–.2362	+ .00016/+ .00063	h6
> .2362–.3937	+ .00024/+ .00083	h6
> .3937–.7087	+ .00028/+ .00098	h6
> .7087–1.1811	+ .00031/+ .00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



Common



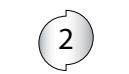
8XD Reach



Right Spiral



Internal Coolant



2 Flutes

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
1/2	0.5000	12.70		14,0	178,0	133,0	112,0	45,0	51829
12,8 mm	0.5039		M14 X 1,25	14,0	178,0	133,0	112,0	45,0	63667
13,0 mm	0.5118		M14 X 1	14,0	178,0	133,0	112,0	45,0	63668
33/64	0.5156	13.10	9/16-18	14,0	178,0	133,0	112,0	45,0	51830
13,5 mm	0.5315		5/8-11	14,0	178,0	133,0	112,0	45,0	63669
13,8 mm	0.5433			14,0	178,0	133,0	112,0	45,0	63670
14,0 mm	0.5512		M16 X 2	14,0	178,0	133,0	112,0	45,0	63671
9/16	0.5625	14.29		16,0	203,0	152,0	128,0	48,0	51831
14,5 mm	0.5709		M16 X 1,5	16,0	203,0	152,0	128,0	48,0	63672
37/64	0.5781	14.68	5/8-18	16,0	203,0	152,0	128,0	48,0	51832
14,8 mm	0.5827			16,0	203,0	152,0	128,0	48,0	63673
15,0 mm	0.5906		M16 X 1	16,0	203,0	152,0	128,0	48,0	63674
15,5 mm	0.6102		M18 X 2,5	16,0	203,0	152,0	128,0	48,0	63675
15,8 mm	0.6220			16,0	203,0	152,0	128,0	48,0	63676
5/8	0.6250	15.88	11/16-16	16,0	203,0	152,0	128,0	48,0	51833
16,0 mm	0.6299			16,0	203,0	152,0	128,0	48,0	63677
21/32	0.6562	16.67	3/4-10	18,0	222,0	171,0	144,0	48,0	51834
11/16	0.6875	17.46	3/4-16	18,0	222,0	171,0	144,0	48,0	51835
3/4	0.7500	19.05	13/16-16	20,0	243,0	190,0	160,0	50,0	51836

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ICe-Carb I Series 140



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Series 140M 5D Metric	Hardness	Vc (m/min)	Diameter (D,) (mm)								
			3	6	8	10	12	14	16		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	130 (104-155)	RPM	13733	6867	5150	4120	3433	2943	2575	
			Fr	0.095	0.189	0.252	0.316	0.379	0.442	0.505	
			Feed (mm/min)	1300	1300	1300	1300	1300	1300	1300	1300
	≤ 275 Bhn or ≤ 28 HRc	116 (93-139)	RPM	12279	6140	4605	3684	3070	2631	2302	
			Fr	0.086	0.171	0.228	0.285	0.342	0.399	0.456	
			Feed (mm/min)	1050	1050	1050	1050	1050	1050	1050	1050
	≤ 425 Bhn or ≤ 45 HRc	67 (54-80)	RPM	7109	3555	2666	2133	1777	1523	1333	
			Fr	0.071	0.142	0.189	0.237	0.284	0.332	0.379	
			Feed (mm/min)	505	505	505	505	505	505	505	505
	≤ 275 Bhn or ≤ 28 HRc	101 (80-121)	RPM	10664	5332	3999	3199	2666	2285	1999	
			Fr	0.071	0.143	0.190	0.238	0.285	0.333	0.380	
			Feed (mm/min)	760	760	760	760	760	760	760	760
H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	61 (49-73)	RPM	6463	3231	2424	1939	1616	1385	1212	
			Fr	0.062	0.124	0.165	0.206	0.248	0.289	0.330	
			Feed (mm/min)	400	400	400	400	400	400	400	
	≤ 450 Bhn or ≤ 48 HRc	43 (34-51)	RPM	4524	2262	1696	1357	1131	969	848	
			Fr	0.043	0.086	0.115	0.144	0.172	0.201	0.230	
			Feed (mm/min)	195	195	195	195	195	195	195	
	≤ 200 Bhn or ≤ 13 HRc	44 (35-53)	RPM	4686	2343	1757	1406	1171	1004	879	
			Fr	0.061	0.122	0.162	0.203	0.243	0.284	0.324	
			Feed (mm/min)	285	285	285	285	285	285	285	
	≤ 375 Bhn or ≤ 40 HRc	29 (23-35)	RPM	3070	1535	1151	921	767	658	576	
			Fr	0.029	0.059	0.078	0.098	0.117	0.137	0.156	
			Feed (mm/min)	90	90	90	90	90	90	90	
≤ 475 Bhn or ≤ 50 HRc	26 (21-31)	RPM	2747	1373	1030	824	687	589	515		
		Fr	0.018	0.036	0.049	0.061	0.073	0.085	0.097		
		Feed (mm/min)	50	50	50	50	50	50	50		
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	110 (88-132)	RPM	11633	5816	4362	3490	2908	2493	2181	
			Fr	0.109	0.218	0.291	0.364	0.437	0.509	0.582	
			Feed (mm/min)	1270	1270	1270	1270	1270	1270	1270	
	≤ 260 Bhn or ≤ 26 HRc	102 (82-123)	RPM	10825	5413	4059	3248	2706	2320	2030	
			Fr	0.109	0.218	0.291	0.363	0.436	0.509	0.581	
			Feed (mm/min)	1180	1180	1180	1180	1180	1180	1180	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	93 (74-112)	RPM	9856	4928	3696	2957	2464	2112	1848	
			Fr	0.061	0.123	0.164	0.205	0.246	0.286	0.327	
			Feed (mm/min)	605	605	605	605	605	605	605	
	≤ 275 Bhn or ≤ 28 HRc	59 (48-71)	RPM	6301	3151	2363	1890	1575	1350	1181	
			Fr	0.048	0.095	0.127	0.159	0.190	0.222	0.254	
			Feed (mm/min)	300	300	300	300	300	300	300	
STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	46 (37-55)	RPM	4847	2424	1818	1454	1212	1039	909	
			Fr	0.047	0.095	0.127	0.158	0.190	0.221	0.253	
			Feed (mm/min)	230	230	230	230	230	230	230	
	≤ 375 Bhn or ≤ 40 HRc	34 (27-40)	RPM	3555	1777	1333	1066	889	762	666	
			Fr	0.042	0.084	0.113	0.141	0.169	0.197	0.225	
			Feed (mm/min)	150	150	150	150	150	150	150	

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Series 140M 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			3	6	8	10	12	14	16		
S	≤ 300 Bhn or ≤ 32 HRc	29	RPM	3070	1535	1151	921	767	658	576	
		(23-35)	Fr	0.020	0.039	0.052	0.065	0.078	0.091	0.104	
			Feed (mm/min)	60	60	60	60	60	60	60	
	≤ 400 Bhn or ≤ 43 HRc	15	RPM	1616	808	606	485	404	346	303	
		(12-18)	Fr	0.015	0.031	0.041	0.052	0.062	0.072	0.083	
			Feed (mm/min)	25	25	25	25	25	25	25	
	Titanium Alloys Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	66	RPM	6947	3474	2605	2084	1737	1489	1303
			(52-79)	Fr	0.040	0.079	0.106	0.132	0.158	0.185	0.211
				Feed (mm/min)	275	275	275	275	275	275	275
		≤ 350 Bhn or ≤ 38 HRc	49	RPM	5170	2585	1939	1551	1293	1108	969
			(39-59)	Fr	0.039	0.077	0.103	0.129	0.155	0.181	0.206
				Feed (mm/min)	200	200	200	200	200	200	200
≤ 440 Bhn or ≤ 47 HRc		26	RPM	2747	1373	1030	824	687	589	515	
		(21-31)	Fr	0.029	0.058	0.078	0.097	0.117	0.136	0.155	
			Feed (mm/min)	80	80	80	80	80	80	80	
N	≤ 80 Bhn or ≤ 47 HRb	235	RPM	24882	12441	9331	7465	6220	5332	4665	
		(188-282)	Fr	0.118	0.237	0.316	0.395	0.473	0.552	0.631	
			Feed (mm/min)	2945	2945	2945	2945	2945	2945	2945	
	≤ 150 Bhn or ≤ 7 HRc	201	RPM	21327	10664	7998	6398	5332	4570	3999	
		(161-241)	Fr	0.119	0.238	0.318	0.397	0.476	0.556	0.635	
			Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540	
	≤ 140 Bhn or ≤ 3 HRc	168	RPM	17773	8886	6665	5332	4443	3808	3332	
		(134-201)	Fr	0.048	0.096	0.128	0.159	0.191	0.223	0.255	
			Feed (mm/min)	850	850	850	850	850	850	850	
Copper Alloys Alum Bronze, C110, Muntz Brass	≤ 200 Bhn or ≤ 23 HRc	134	RPM	14218	7109	5332	4265	3555	3047	2666	
		(107-161)	Fr	0.048	0.096	0.128	0.161	0.193	0.225	0.257	
			Feed (mm/min)	685	685	685	685	685	685	685	

Note:

- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (D₁ x 3.14)
- mm/min = Fr x RPM
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

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Series 140M 8D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			3	6	8	10	12	14	16		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	123 (100-170)	RPM	13087	6544	4908	3926	3272	2804	2454	
			Fr	0.085	0.171	0.228	0.285	0.342	0.399	0.455	
			Feed (mm/min)	1118	1118	1118	1118	1118	1118	1118	
	≤ 275 Bhn or ≤ 28 HRc	113 (90-135)	RPM	11956	5978	4484	3587	2989	2562	2242	
			Fr	0.072	0.144	0.193	0.241	0.289	0.337	0.385	
			Feed (mm/min)	864	864	864	864	864	864	864	
	≤ 425 Bhn or ≤ 45 HRc	64 (51-77)	RPM	6786	3393	2545	2036	1696	1454	1272	
			Fr	0.062	0.124	0.165	0.206	0.247	0.288	0.329	
			Feed (mm/min)	419	419	419	419	419	419	419	
	≤ 275 Bhn or ≤ 28 HRc	98 (78-117)	RPM	10340	5170	3878	3102	2585	2216	1939	
			Fr	0.061	0.123	0.164	0.205	0.246	0.287	0.328	
			Feed (mm/min)	635	635	635	635	635	635	635	
ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	58 (46-69)	RPM	6140	3070	2302	1842	1535	1316	1151	
			Fr	0.048	0.095	0.127	0.159	0.190	0.222	0.254	
			Feed (mm/min)	292	292	292	292	292	292	292	
≤ 450 Bhn or ≤ 48 HRc	41 (33-49)	RPM	4362	2181	1636	1309	1091	935	818		
		Fr	0.038	0.076	0.101	0.126	0.151	0.177	0.202		
		Feed (mm/min)	165	165	165	165	165	165	165		
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	43 (34-51)	RPM	4524	2262	1696	1357	1131	969	848	
			Fr	0.048	0.095	0.127	0.159	0.191	0.223	0.255	
			Feed (mm/min)	216	216	216	216	216	216	216	
	≤ 375 Bhn or ≤ 40 HRc	27 (22-33)	RPM	2908	1454	1091	872	727	623	545	
			Fr	0.026	0.052	0.070	0.087	0.105	0.122	0.140	
			Feed (mm/min)	76	76	76	76	76	76	76	
	≤ 475 Bhn or ≤ 50 HRc	24 (20-29)	RPM	2585	1293	969	776	646	554	485	
			Fr	0.015	0.029	0.039	0.049	0.059	0.069	0.079	
			Feed (mm/min)	38	38	38	38	38	38	38	
	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	107 (85-128)	RPM	11310	5655	4241	3393	2827	2424	2121
				Fr	0.090	0.180	0.240	0.299	0.359	0.419	0.479
				Feed (mm/min)	1016	1016	1016	1016	1016	1016	1016
≤ 260 Bhn or ≤ 26 HRc	94 (76-113)	RPM	10017	5009	3756	3005	2504	2147	1878		
		Fr	0.094	0.188	0.250	0.313	0.375	0.438	0.500		
		Feed (mm/min)	940	940	940	940	940	940	940		
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	88 (71-106)	RPM	9371	4686	3514	2811	2343	2008	1757	
			Fr	0.047	0.095	0.126	0.158	0.190	0.221	0.253	
			Feed (mm/min)	445	445	445	445	445	445	445	
	≤ 275 Bhn or ≤ 28 HRc	55 (44-66)	RPM	5816	2908	2181	1745	1454	1246	1091	
			Fr	0.044	0.087	0.116	0.146	0.175	0.204	0.233	
			Feed (mm/min)	254	254	254	254	254	254	254	
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	40 (32-48)	RPM	4201	2100	1575	1260	1050	900	788
				Fr	0.042	0.085	0.113	0.141	0.169	0.198	0.226
				Feed (mm/min)	178	178	178	178	178	178	178
	≤ 375 Bhn or ≤ 40 HRc	29 (23-35)	RPM	3070	1535	1151	921	767	658	576	
			Fr	0.037	0.074	0.099	0.124	0.149	0.174	0.199	
			Feed (mm/min)	114	114	114	114	114	114	114	

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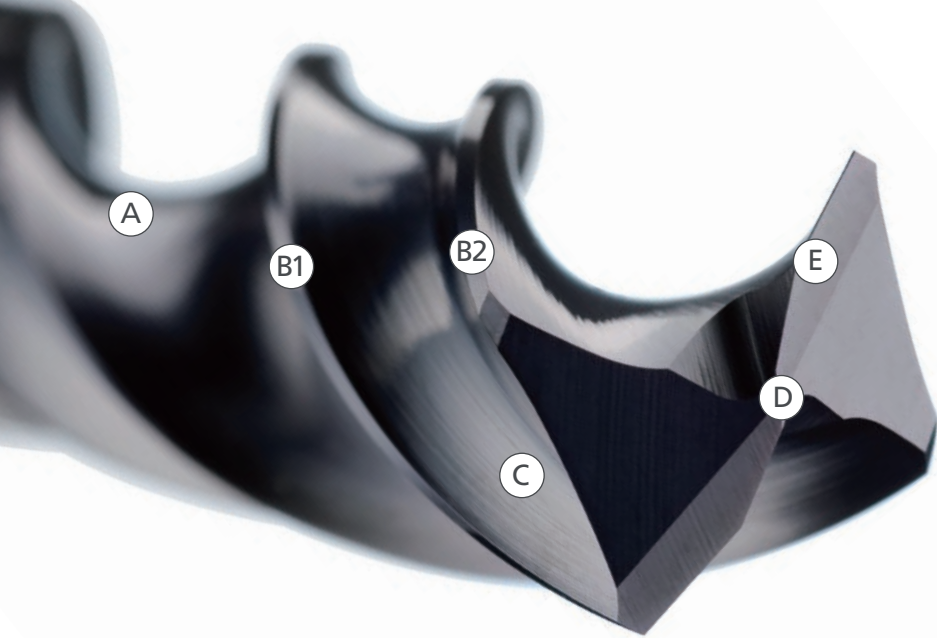


Series 140M 8D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			3	6	8	10	12	14	16		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	20	RPM	2100	1050	788	630	525	450	394	
		(16-24)	Fr	0.021	0.041	0.055	0.069	0.082	0.096	0.110	
			Feed (mm/min)	43	43	43	43	43	43	43	
	≤ 400 Bhn or ≤ 43 HRc	11	RPM	1131	565	424	339	283	242	212	
		(9-13)	Fr	0.013	0.027	0.036	0.045	0.054	0.063	0.072	
			Feed (mm/min)	15	15	15	15	15	15	15	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	56	RPM	5978	2989	2242	1793	1495	1281	1121
			(45-68)	Fr	0.038	0.076	0.102	0.127	0.153	0.178	0.204
				Feed (mm/min)	229	229	229	229	229	229	229
		≤ 350 Bhn or ≤ 38 HRc	43	RPM	4524	2262	1696	1357	1131	969	848
			(34-51)	Fr	0.028	0.056	0.075	0.094	0.112	0.131	0.150
				Feed (mm/min)	127	127	127	127	127	127	127
≤ 440 Bhn or ≤ 47 HRc		23	RPM	2424	1212	909	727	606	519	454	
		(18-27)	Fr	0.024	0.048	0.064	0.080	0.096	0.112	0.129	
			Feed (mm/min)	58	58	58	58	58	58	58	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	223	RPM	23589	11795	8846	7077	5897	5055	4423
			(178-267)	Fr	0.108	0.215	0.287	0.359	0.431	0.502	0.574
				Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540
	≤ 150 Bhn or ≤ 7 HRc	194	RPM	20519	10260	7695	6156	5130	4397	3847	
		(155-232)	Fr	0.111	0.223	0.297	0.371	0.446	0.520	0.594	
			Feed (mm/min)	2286	2286	2286	2286	2286	2286	2286	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	78	RPM	8240	4120	3090	2472	2060	1766	1545
			(62-93)	Fr	0.043	0.086	0.115	0.144	0.173	0.201	0.230
				Feed (mm/min)	356	356	356	356	356	356	356
		≤ 200 Bhn or ≤ 23 HRc	72	RPM	7594	3797	2848	2278	1898	1627	1424
			(57-86)	Fr	0.043	0.087	0.116	0.145	0.174	0.203	0.232
				Feed (mm/min)	330	330	330	330	330	330	330

Note:

- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (D₁ x 3.14)
- mm/min = Fr x RPM
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

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SERIES 135



HIGH PERFORMANCE CARBIDE DRILLS

The key features designed into the Hi-PerCarb Series 135 Drill allow the product to offer application benefits not only beyond that of standard carbide drills, but also other High Performance drills. Each feature of the Hi-PerCarb Series 135 Drill was uniquely engineered as a solution towards addressing the issues commonly encountered during high production drilling.

- A** HIGH PERFORMANCE FLUTE DESIGN

 - efficiently transports chips
 - increases strength for aggressive drilling
- Ti-NAMITE A COATING

 - improves resistance to heat and wear
 - enhances tool life
- B1** DOUBLE MARGIN DESIGN

 - improves accuracy and surface finish
- B2** increases stability and rigidity
- C** SECONDARY FLUTE

 - improves coolant flow to point
 - reduces friction along drill body
 - assists in fine swarf evacuation
- D** SPECIALIZED 145° NOTCHED POINT

 - self centering eliminates need for spot drill
 - improves chip control
 - decreases drill thrust and deflection
- E** ENGINEERED EDGE PROTECTION

 - improves edge strength
 - reduces edge fatigue
 - allows increased feed rates

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 HI-PER CARB SERIES 135 DRILLS

PERFORMANCE.

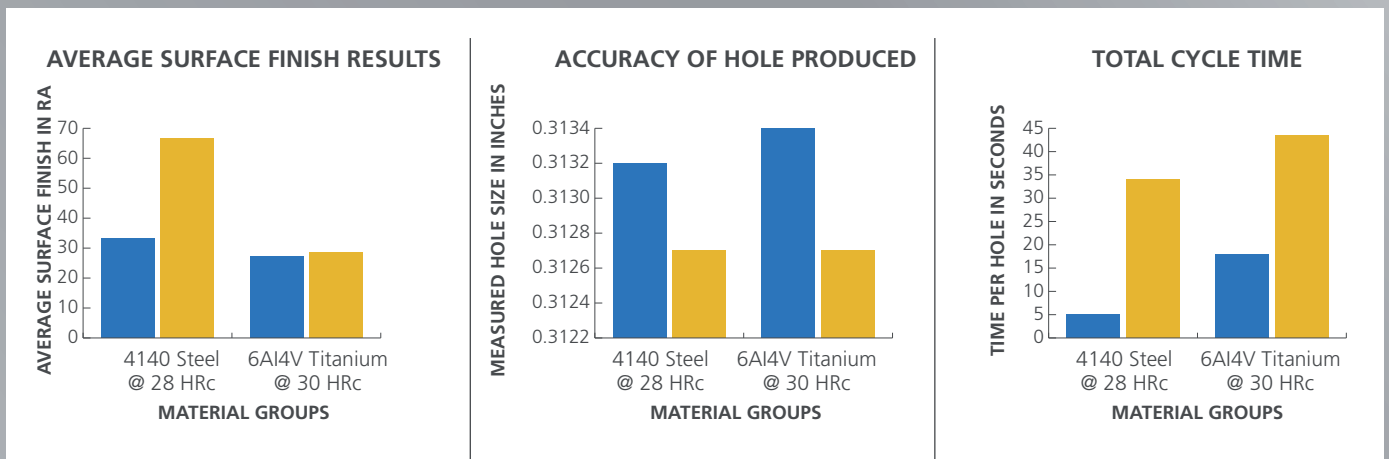
MACHINING ENVIRONMENT:

Haas VM-3 with 9% Water Soluble Oil Flood Coolant

5/16" (.3125) diameter hole:

4140 application – .650" deep

6Al-4V application – 1.125" deep



■ HI-PERCARB SERIES 135

■ SOLID CARBIDE DRILL AND REAMER

The second margin gives the Hi-PerCarb Series 135 Drill a burnishing effect and the flute form effectively controls and transports chips allowing the drill to offer superior surface finishes and hole size in high production environments saving cycle time by often avoiding the need for reaming in many applications.

PRECISION.

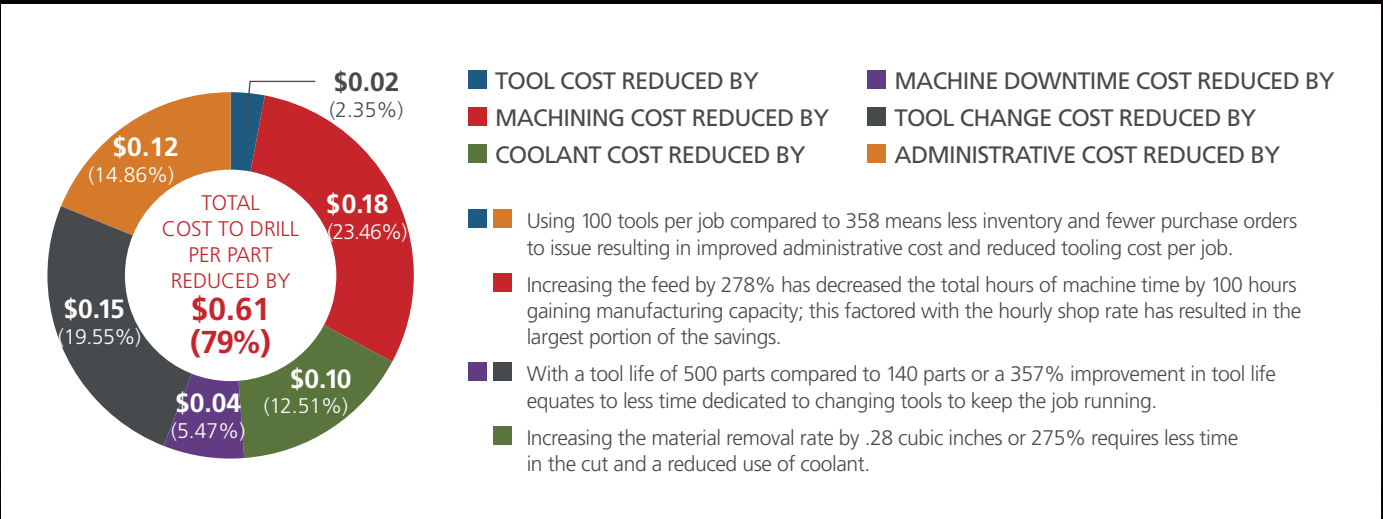
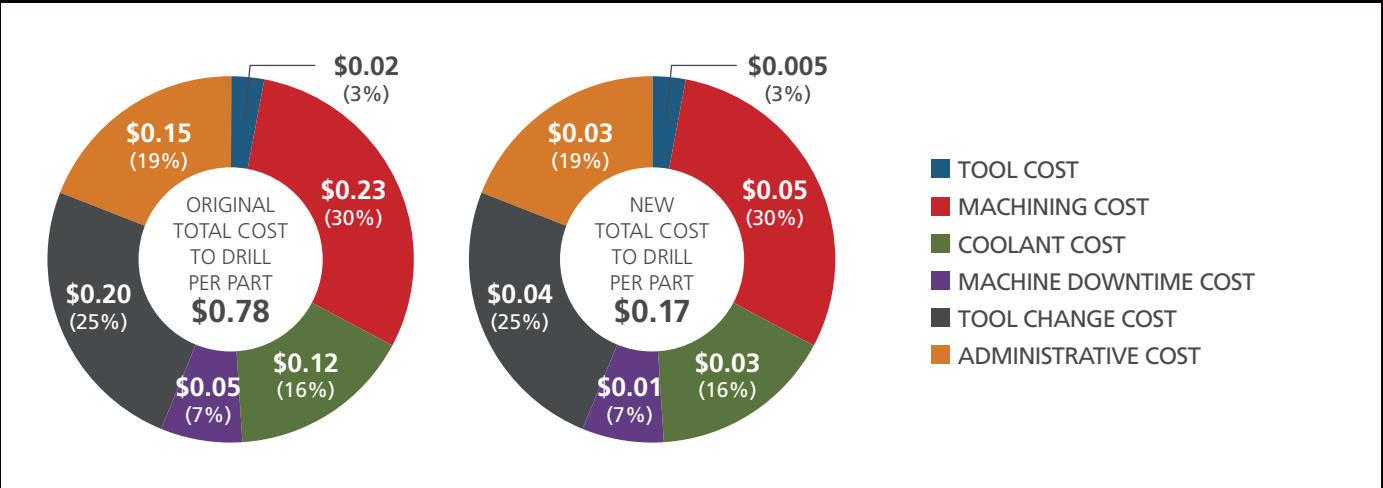
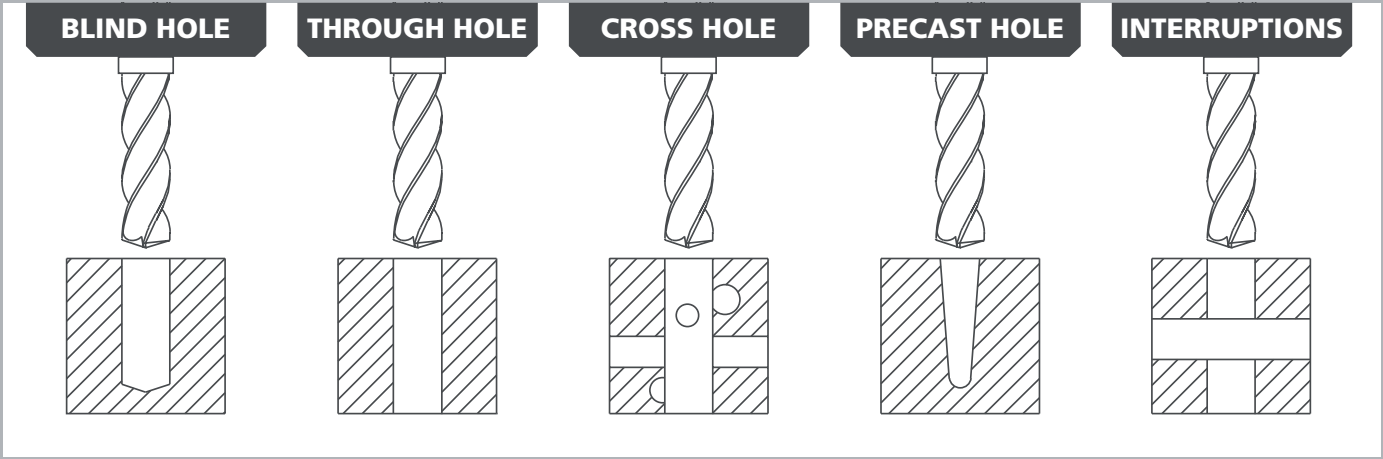
The stability of the double margin design and penetration capability of the point geometry allow the Hi-PerCarb Series 135 Drill to address demanding applications that would normally require reduced operating parameters or a two step process.

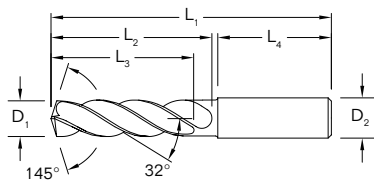
PASSION.

The secondary flute provides a channel for cooling capabilities normally not found in external coolant drills, this combined with the Ti-NAMITE A tool coating and the high strength edge design results in increased operating parameters with additional tool life.

ACTUAL CUSTOMER APPLICATION USING A 6MM DRILL IN 17-4 PH STAINLESS STEEL

	COMPETITOR	HI-PERCARB SERIES 135
NUMBER OF PARTS TO PRODUCE	50000	50000
SURFACE FEET PER MINUTE (SFM)	74	124
SPEED IN REVOLUTIONS PER MINUTE (RPM)	1200	2000
FEED IN INCHES PER MINUTE (IPM)	3.6	10
NUMBER OF PARTS PRODUCED PER TOOL	140	500
DEPTH OF HOLE	0.6800	0.6800
NUMBER OF NEW TOOLS REQUIRED TO COMPLETE JOB	358	100
TOTAL HOURS OF MACHINING TIME	157	57
TOTAL MACHINING COST	\$10,231.48	\$3,683.33
TOOL CHANGE COST	\$1,939.17	\$541.67
TOTAL COST	\$39,017.07	\$8,460.00
COST PER PART	\$0.78	\$0.17
MATERIAL REMOVAL RATE (IN ³ / MIN) – DRILLING	0.16	0.44
CUTTING TIME PER PART – MINUTES	0.19	0.07
SAVINGS PER PART – DOLLARS	0	\$0.61
TOTAL COST SAVINGS / JOB – PERCENTAGE	0	78.32%
TOTAL COST SAVINGS / JOB – DOLLARS	0	\$30,557.07





TOLERANCES (inch)			TOLERANCES (mm)		
DIAMETER	D ₁	D ₂	DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6	≤ 3	+0,002/+0,012	h6
>.1181-.2362	+0.0016/+0.0063	h6	> 3 - 6	+0,004/+0,016	h6
>.2362-.3937	+0.0024/+0.0083	h6	> 6 - 10	+0,006/+0,021	h6
>.3937-.7087	+0.0028/+0.0098	h6	> 10 - 18	+0,007/+0,025	h6
>.7087-1.1811	+0.0031/+0.0114	h6	> 18 - 30	+0,008/+0,029	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
1/64	0.0156	0.40		1/8	1-1/2	1/8	5/64	1	51752*
1/32	0.0312	0.79		1/8	1-1/2	1/4	3/16	1	51269*
3/64	0.0469	1.19	1/16-64	1/8	1-1/2	3/8	5/16	1	51270*
1,25 mm	0.0492			3,0	38,0	9,5	8,0	25,0	64500*
1,45 mm	0.0571			3,0	38,0	9,5	8,0	25,0	64501*
#53	0.0595	1.51		1/8	1-1/2	3/8	5/16	1	64502*
1/16	0.0625	1.59	5/64-60	1/8	2	7/16	3/8	1-1/4	51271*
1,6 mm	0.0630			3,0	50,0	11,0	9,0	32,0	64503*
1,75 mm	0.0689			3,0	50,0	11,0	9,0	32,0	64504*
#50	0.0700	1.78		1/8	2	7/16	3/8	1-1/4	64505*
5/64	0.0781	1.98		1/8	2	1/2	7/16	1-1/4	51272*
#47	0.0785	1.99		1/8	2	1/2	7/16	1-1/4	64506*
2,05 mm	0.0807			3,0	50,0	12,0	11,0	32,0	64507*
#46	0.0810	2.06		1/8	2	1/2	7/16	1-1/4	64508*
#43	0.0890	2.26		1/8	2	1/2	7/16	1-1/4	64509*
#42	0.0935	2.37		1/8	2	1/2	7/16	1-1/4	64510*
3/32	0.0938	2.38	1/8-32	1/8	2	1/2	7/16	1-1/4	51273
#40	0.0980	2.49		1/8	2	9/16	1/2	1-1/4	51274
2,5 mm	0.0984			3,0	50,0	14,0	12,0	32,0	64511
#39	0.0995	2.53		1/8	2	9/16	1/2	1-1/4	51753
#38	0.1015	2.58	5-40	1/8	2	9/16	1/2	1-1/4	51754
#37	0.1040	2.64	5-44	1/8	2	9/16	1/2	1-1/4	51755
#36	0.1065	2.71	6-32	1/8	2	9/16	1/2	1-1/4	51756
7/64	0.1094	2.78		1/8	2	5/8	9/16	1-1/4	51275
#35	0.1100	2.79		1/8	2	5/8	9/16	1-1/4	51276
#34	0.1110	2.82		1/8	2	5/8	9/16	1-1/4	51277
#33	0.1130	2.87	6-40	1/8	2	5/8	9/16	1-1/4	51757
2,9 mm	0.1142			3,0	50,0	16,0	14,0	32,0	64512
#32	0.1160	2.95		1/8	2	5/8	9/16	1-1/4	51758
3,0 mm	0.1181			6,0	62,0	20,0	17,0	36,0	63155
#31	0.1200	3.05		1/8	2	5/8	9/16	1-1/4	51759
3,1 mm	0.1220			6,0	62,0	20,0	17,0	36,0	63741
1/8	0.1250	3.18		1/4	2-1/2	3/4	21/32	1-7/16	51330
3,2 mm	0.1260		M3,5 X 0,35	6,0	62,0	20,0	17,0	36,0	63156
#30	0.1285	3.26		1/4	2-1/2	3/4	21/32	1-7/16	51278
3,3 mm	0.1299		M4 X 0,7	6,0	62,0	20,0	17,0	36,0	63157
3,4 mm	0.1339			6,0	62,0	20,0	17,0	36,0	63158
#29	0.1360	3.45	8-32,8-36	1/4	2-1/2	3/4	21/32	1-7/16	51331
3,5 mm	0.1378		M4 X 0,5	6,0	62,0	20,0	17,0	36,0	63159
#28	0.1405	3.57	8-40	1/4	2-1/2	3/4	21/32	1-7/16	51760
9/64	0.1406	3.57		1/4	2-1/2	3/4	21/32	1-7/16	51332
3,6 mm	0.1417		M4 X 0,35	6,0	62,0	20,0	17,0	36,0	63160

*Single Margin

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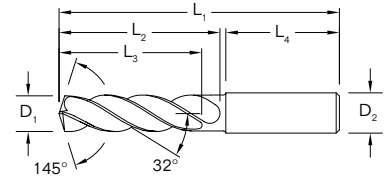







TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6



-  Common
-  3XD Reach
-  Right Spiral
-  External Coolant
-  2 Flutes

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
#27	0.1440	3.66		1/4	2-1/2	3/4	21/32	1-7/16	51761
3,7 mm	0.1457		M4,5 X 0,75	6,0	62,0	20,0	17,0	36,0	63161
#26	0.1470	3.73	3/16-24	1/4	2-1/2	3/4	21/32	1-7/16	51762
#25	0.1495	3.80	10-24	1/4	2-5/8	7/8	23/32	1-7/16	51333
3,8 mm	0.1496			6,0	66,0	24,0	21,0	36,0	63742
#24	0.1520	3.86	10-28	1/4	2-5/8	7/8	23/32	1-7/16	51763
3,9 mm	0.1535			6,0	66,0	24,0	21,0	36,0	63743
#23	0.1540	3.91		1/4	2-5/8	7/8	23/32	1-7/16	51764
5/32	0.1562	3.97		1/4	2-5/8	7/8	23/32	1-7/16	51334
#22	0.1570	3.99	10-30	1/4	2-5/8	7/8	23/32	1-7/16	51765
4,0 mm	0.1575		M4,5 X 0,5	6,0	66,0	24,0	21,0	36,0	63162
#21	0.1590	4.04	10-32	1/4	2-5/8	7/8	23/32	1-7/16	51335
#20	0.1610	4.09	13/64-24	1/4	2-5/8	7/8	23/32	1-7/16	51279
4,1 mm	0.1614			6,0	66,0	24,0	21,0	36,0	63744
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	66,0	24,0	21,0	36,0	63163
#19	0.1660	4.22		1/4	2-5/8	7/8	23/32	1-7/16	51766
4,3 mm	0.1693			6,0	66,0	24,0	21,0	36,0	63164
#18	0.1695	4.31		1/4	2-5/8	7/8	23/32	1-7/16	51767
11/64	0.1719	4.37		1/4	2-5/8	7/8	23/32	1-7/16	51336
#17	0.1730	4.39		1/4	2-5/8	7/8	23/32	1-7/16	51768
4,4 mm	0.1732			6,0	66,0	24,0	21,0	36,0	63745
#16	0.1770	4.50	12-24	1/4	2-5/8	7/8	23/32	1-7/16	51769
4,5 mm	0.1772		M5 X 0,5	6,0	66,0	24,0	21,0	36,0	63165
#15	0.1800	4.57		1/4	2-5/8	7/8	23/32	1-7/16	51770
4,6 mm	0.1811		12-28	6,0	66,0	24,0	21,0	36,0	63166
#14	0.1820	4.62		1/4	2-5/8	7/8	23/32	1-7/16	51771
#13	0.1850	4.70	12-32	1/4	2-5/8	7/8	23/32	1-7/16	51772
4,7 mm	0.1850			6,0	66,0	24,0	21,0	36,0	63746
3/16	0.1875	4.76		1/4	2-5/8	1	53/64	1-7/16	51337
#12	0.1890	4.80	7/32-32	1/4	2-5/8	1	53/64	1-7/16	51773
4,8 mm	0.1890			6,0	66,0	28,0	24,0	36,0	63167
#11	0.1910	4.85		1/4	2-5/8	1	53/64	1-7/16	51774
4,9 mm	0.1929			6,0	66,0	28,0	24,0	36,0	63747
#10	0.1935	4.91	14-20	1/4	2-5/8	1	53/64	1-7/16	51775
#9	0.1960	4.98		1/4	2-5/8	1	53/64	1-7/16	51776
5,0 mm	0.1969		M6 X 1	6,0	66,0	28,0	24,0	36,0	63168
#8	0.1990	5.05		1/4	2-5/8	1	53/64	1-7/16	51777
5,1 mm	0.2008			6,0	66,0	28,0	24,0	36,0	63748
#7	0.2010	5.11	1/4-20	1/4	2-5/8	1	53/64	1-7/16	51338
13/64	0.2031	5.16		1/4	2-5/8	1	53/64	1-7/16	51339
#6	0.2040	5.18		1/4	2-5/8	1	53/64	1-7/16	51778
5,2 mm	0.2047		M6 X 0,75	6,0	66,0	28,0	24,0	36,0	63749

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Automotive

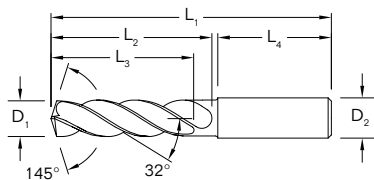
Mold & Die

Aerospace

High Performance

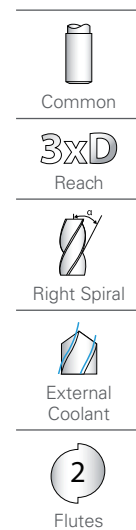
General

Special Tools



TOLERANCES (inch)			TOLERANCES (mm)		
DIAMETER	D ₁	D ₂	DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6	≤ 3	+0,002/+0,012	h6
>.1181-.2362	+0.0016/+0.0063	h6	> 3 - 6	+0,004/+0,016	h6
>.2362-.3937	+0.0024/+0.0083	h6	> 6 - 10	+0,006/+0,021	h6
>.3937-.7087	+0.0028/+0.0098	h6	> 10 - 18	+0,007/+0,025	h6
>.7087-1.1811	+0.0031/+0.0114	h6	> 18 - 30	+0,008/+0,029	h6

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
#5	0.2055	5.22		1/4	2-5/8	1	53/64	1-7/16	51779
5,25 mm	0.2067			6,0	66,0	28,0	24,0	36,0	63169
5,3 mm	0.2087			6,0	66,0	28,0	24,0	36,0	63170
#4	0.2090	5.31	1/4-24	1/4	2-5/8	1	53/64	1-7/16	51780
5,4 mm	0.2126			6,0	66,0	28,0	24,0	36,0	63750
#3	0.2130	5.41	1/4-28	1/4	2-5/8	1	53/64	1-7/16	51340
5,5 mm	0.2165		M6 X 0,5	6,0	66,0	28,0	24,0	36,0	63171
7/32	0.2188	5.56	1/4-32	1/4	2-5/8	1	53/64	1-7/16	51341
5,6 mm	0.2205			6,0	66,0	28,0	24,0	36,0	63751
#2	0.2210	5.61		1/4	2-5/8	1	53/64	1-7/16	51781
5,7 mm	0.2244			6,0	66,0	28,0	24,0	36,0	63752
#1	0.2280	5.79		1/4	2-5/8	1	53/64	1-7/16	51782
5,8 mm	0.2283			6,0	66,0	28,0	24,0	36,0	63172
5,9 mm	0.2323			6,0	66,0	28,0	24,0	36,0	63753
A	0.2340	5.94		1/4	2-5/8	1	53/64	1-7/16	51601
15/64	0.2344	5.95		1/4	2-5/8	1	53/64	1-7/16	51342
6,0	0.2362	6.00	M7 X 1	6,0	66,0	28,0	24,0	36,0	63173
B	0.2380	6.05		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51602
6,1 mm	0.2402			8,0	79,0	34,0	28,0	36,0	63754
C	0.2420	6.15		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51603
6,2 mm	0.2441			8,0	79,0	34,0	28,0	36,0	63755
D	0.2460	6.25		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51604
6,25 mm	0.2461		M7 X 0,75	8,0	79,0	34,0	28,0	36,0	63174
6,3 mm	0.2480			8,0	79,0	34,0	28,0	36,0	63756
1/4	0.2500	6.35		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51343
E	0.2500	6.35		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51605
6,4 mm	0.2520			8,0	79,0	34,0	28,0	36,0	63175
6,5 mm	0.2559			8,0	79,0	34,0	28,0	36,0	63213
F	0.2570	6.53	5/16-18	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51344
6,6 mm	0.2598			8,0	79,0	34,0	28,0	36,0	63757
G	0.2610	6.63		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51606
6,7 mm	0.2638			8,0	79,0	34,0	28,0	36,0	63758
17/64	0.2656	6.75	5/16-20	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51345
H	0.2660	6.76		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51607
6,8 mm	0.2677		M8 X 1,25	8,0	79,0	34,0	28,0	36,0	63176
6,9 mm	0.2717			8,0	79,0	34,0	28,0	36,0	63759
I	0.2720	6.91	5/16-24	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51346
7,0 mm	0.2756		M8 X 1	8,0	79,0	34,0	28,0	36,0	63177
J	0.2770	7.04		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51608
7,1 mm	0.2795			8,0	79,0	41,0	34,0	36,0	63760
K	0.2810	7.14		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51609
9/32	0.2812	7.14	5/16-32	5/16	3-1/8	1-9/16	1-3/16	1-7/16	51347



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Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

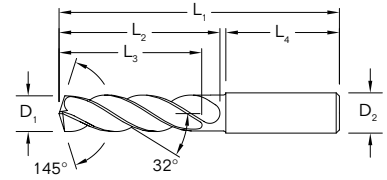


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181–.2362	+0.0016/+0.0063	h6
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>.3937–.7087	+0.0028/+0.0098	h6
>.7087–1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6



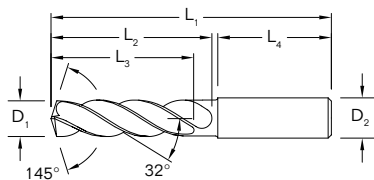
Common	Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
	7,2 mm	0.2835			8,0	79,0	41,0	34,0	36,0	63761
3xD Reach	7,25 mm	0.2854		M8 X 0,75	8,0	79,0	41,0	34,0	36,0	63178
	7,3 mm	0.2874			8,0	79,0	41,0	34,0	36,0	63762
Right Spiral	L	0.2900	7.37		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51610
	7,4 mm	0.2913			8,0	79,0	41,0	34,0	36,0	63763
	M	0.2950	7.49		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51611
	7,5 mm	0.2953		M8 X 0,5	8,0	79,0	41,0	34,0	36,0	63179
External Coolant	19/64	0.2969	7.54		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51348
	7,6 mm	0.2992			8,0	79,0	41,0	34,0	36,0	63764
	N	0.3020	7.67		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51612
	7,7 mm	0.3031			8,0	79,0	41,0	34,0	36,0	63765
2 Flutes	7,8 mm	0.3071		M9 X 1,25	8,0	79,0	41,0	34,0	36,0	63180
	7,9 mm	0.3110			8,0	79,0	41,0	34,0	36,0	63766
	5/16	0.3125	7.94	3/8-16	5/16	3-1/8	1-9/16	1-3/16	1-7/16	51349
	8,0 mm	0.3150		M9 x 1	8,0	79,0	41,0	34,0	36,0	63181
	O	0.3160	8.03		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51613
	8,1 mm	0.3189			10,0	89,0	47,0	40,0	40,0	63767
	8,2 mm	0.3228			10,0	89,0	47,0	40,0	40,0	63768
	P	0.3230	8.20		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51614
	8,3 mm	0.3268			10,0	89,0	47,0	40,0	40,0	63769
	21/64	0.3281	8.33	3/8-20	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51350
	8,4 mm	0.3307			10,0	89,0	47,0	40,0	40,0	63182
	Q	0.3320	8.43	3/8-24	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51351
	8,5 mm	0.3346		M10 X 1,5	10,0	89,0	47,0	40,0	40,0	63183
	8,6 mm	0.3386			10,0	89,0	47,0	40,0	40,0	63770
	R	0.3390	8.61		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51615
	8,7 mm	0.3425			10,0	89,0	47,0	40,0	40,0	63771
	11/32	0.3438	8.73	3/8-32	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51352
	8,8 mm	0.3465		M10 X 1,25	10,0	89,0	47,0	40,0	40,0	63184
	S	0.3480	8.84		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51616
	8,9 mm	0.3504			10,0	89,0	47,0	40,0	40,0	63772
	9,0 mm	0.3543		M10 X 1	10,0	89,0	47,0	40,0	40,0	63185
	T	0.3580	9.09		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51617
	9,1 mm	0.3583			10,0	89,0	47,0	40,0	40,0	63773
	23/64	0.3594	9.13		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51353
	9,2 mm	0.3622		M10 X 0,75	10,0	89,0	47,0	40,0	40,0	63774
	9,25 mm	0.3642	9.25		10,0	89,0	47,0	40,0	40,0	63186
	9,3 mm	0.3661			10,0	89,0	47,0	40,0	40,0	63775
	U	0.3680	9.35	7/16-14	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51354
	9,4 mm	0.3701			10,0	89,0	47,0	40,0	40,0	63776
	9,5 mm	0.3740		M10 X 0,5	10,0	89,0	47,0	40,0	40,0	63187
	3/8	0.3750	9.53		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51355

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Automotive
Mold & Die
Aerospace
High Performance
General
Special Tools

Hi Performance Drill

Hi-PerCarb I Series 135



TOLERANCES (inch)			TOLERANCES (mm)		
DIAMETER	D ₁	D ₂	DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6	≤ 3	+0,002/+0,012	h6
>.1181-.2362	+0.0016/+0.0063	h6	> 3 - 6	+0,004/+0,016	h6
>.2362-.3937	+0.0024/+0.0083	h6	> 6 - 10	+0,006/+0,021	h6
>.3937-.7087	+0.0028/+0.0098	h6	> 10 - 18	+0,007/+0,025	h6
>.7087-1.1811	+0.0031/+0.0114	h6	> 18 - 30	+0,008/+0,029	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
V	0.3770	9.58		1/2	3-1/2	1-27/32	1-37/64	1-9/16	51618
9,6 mm	0.3780			10,0	89,0	47,0	40,0	40,0	63777
9,7 mm	0.3819			10,0	89,0	47,0	40,0	40,0	63778
9,8 mm	0.3858			10,0	89,0	47,0	40,0	40,0	63779
W	0.3860			1/2	3-1/2	1-27/32	1-37/64	1-9/16	51619
9,9 mm	0.3898			10,0	89,0	47,0	40,0	40,0	63780
25/64	0.3906	9.92	7/16-20	1/2	3-1/2	1-27/32	1-37/64	1-9/16	51356
10,0 mm	0.3937			10,0	89,0	47,0	40,0	40,0	63188
X	0.3970	10.08	7/16-24	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51620
10,1 mm	0.3976			12,0	102,0	55,0	45,0	45,0	63781
10,2 mm	0.4016		M12 X 1,75	12,0	102,0	55,0	45,0	45,0	63189
Y	0.4040	10.26	7/16-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51621
10,3 mm	0.4055			12,0	102,0	55,0	45,0	45,0	63782
13/32	0.4062	10.32		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51357
10,4 mm	0.4094			12,0	102,0	55,0	45,0	45,0	63783
Z	0.4130	10.49		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51622
10,5 mm	0.4134		M12 X 1,5	12,0	102,0	55,0	45,0	45,0	63190
10,6 mm	0.4173			12,0	102,0	55,0	45,0	45,0	63784
10,7 mm	0.4213			12,0	102,0	55,0	45,0	45,0	63785
27/64	0.4219	10.72	1/2-13	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51358
10,8 mm	0.4252		M12 X 1,25	12,0	102,0	55,0	45,0	45,0	63191
10,9 mm	0.4291			12,0	102,0	55,0	45,0	45,0	63786
11,0 mm	0.4331		M12 X 1	12,0	102,0	55,0	45,0	45,0	63192
11,1 mm	0.4370			12,0	102,0	55,0	45,0	45,0	63787
7/16	0.4375	11.11	1/4-18 NPT	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51359
11,2 mm	0.4409			12,0	102,0	55,0	45,0	45,0	63788
11,25 mm	0.4429			12,0	102,0	55,0	45,0	45,0	63193
11,3 mm	0.4449			12,0	102,0	55,0	45,0	45,0	63789
11,4 mm	0.4488			12,0	102,0	55,0	45,0	45,0	63790
11,5 mm	0.4528		M12 X 0,5	12,0	102,0	55,0	45,0	45,0	63194
29/64	0.4531	11.51	1/2-20	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51360
11,6 mm	0.4567			12,0	102,0	55,0	45,0	45,0	63791
11,7 mm	0.4606			12,0	102,0	55,0	45,0	45,0	63792
11,8 mm	0.4646			12,0	102,0	55,0	45,0	45,0	63793
11,9 mm	0.4685			12,0	102,0	55,0	45,0	45,0	63794
15/32	0.4688	11.91	1/2-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51361
12,0 mm	0.4724		M14 X 2	12,0	102,0	55,0	45,0	45,0	63195
31/64	0.4844	12.30	9/16-12	1/2	4-1/4	2-5/16	1-7/8	1-49/64	51362
12,5 mm	0.4921		M14 X 1,5	14,0	107,0	60,0	49,0	45,0	63196
1/2	0.5000	12.70		1/2	4-1/4	2-5/16	1-7/8	1-49/64	51363
12,8 mm	0.5039		M14 X 1,25	14,0	107,0	60,0	49,0	45,0	63197
13,0 mm	0.5118		M14 X 1	14,0	107,0	60,0	49,0	45,0	63198



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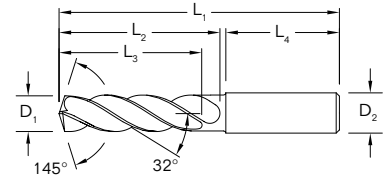


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6



-  Common
-  3XD Reach
-  Right Spiral
-  External Coolant
-  2 Flutes

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	TI-NAMITE-A (AlTiN) EDP No.
33/64	0.5156	13.10	9/16-18	5/8	4-1/4	2-5/16	1-7/8	1-49/64	51364
17/32	0.5312	13.49	5/8-11	5/8	4-1/4	2-5/16	1-7/8	1-49/64	51365
13,5 mm	0.5315			14,0	107,0	60,0	49,0	45,0	63199
35/64	0.5469	13.89	5/8-12	5/8	4-1/4	2-5/16	1-7/8	1-49/64	51783
14,0 mm	0.5512		M16 X 2	14,0	107,0	60,0	49,0	45,0	63200
9/16	0.5625	14.29		5/8	4-9/16	2-1/2	2	1-57/64	51366
14,5 mm	0.5709		M16 X 1,5	16,0	115,0	65,0	51,0	48,0	63201
37/64	0.5781	14.68	5/8-18	5/8	4-9/16	2-1/2	2	1-57/64	51367
15,0 mm	0.5906		M16 X 1	16,0	115,0	65,0	51,0	48,0	63202
19/32	0.5938	15.08	11/16-11	5/8	4-9/16	2-1/2	2	1-57/64	51784
39/64	0.6094	15.48	11/16-12	5/8	4-9/16	2-1/2	2	1-57/64	51785
15,5 mm	0.6102		M18 X 2,5	16,0	115,0	65,0	51,0	48,0	63203
5/8	0.6250	15.88	11/16-16	5/8	4-9/16	2-1/2	2	1-57/64	51368
16,0 mm	0.6299			16,0	115,0	65,0	51,0	48,0	63204
41/64	0.6406	16.27	11/16-24	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51786
16,5 mm	0.6496		M18 X 1,5	18,0	123,0	73,0	58,0	48,0	63205
21/32	0.6562	16.67	3/4-10	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51369
17,0 mm	0.6693			18,0	123,0	73,0	58,0	48,0	63206
43/64	0.6719	17.07	3/4-12	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51787
11/16	0.6875	17.46	3/4-16	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51370
17,5 mm	0.6890		M20 X 2,5	18,0	123,0	73,0	58,0	48,0	63207
45/64	0.7031	17.86	3/4-20, 1/2-14 NPT	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51788
18,0 mm	0.7087			18,0	123,0	73,0	58,0	48,0	63208
23/32	0.7188	18.26		3/4	4-7/8	2-3/4	2-5/16	1-57/64	51789
18,5 mm	0.7283		M20 X 1,5	20,0	131,0	79,0	63,0	50,0	63209
47/64	0.7344	18.65	13/16-12	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51790
19,0 mm	0.7480			20,0	131,0	79,0	63,0	50,0	63210
3/4	0.7500	19.05	13/16-16	3/4	5-1/4	3-1/16	2-7/16	1-31/32	51371
49/64	0.7656	19.45	7/8-9	7/8	5-1/4	3-1/16	2-7/16	1-31/32	51372
19,5 mm	0.7677		M22 X 2,5	20,0	131,0	79,0	63,0	50,0	63211
25/32	0.7812	19.84		7/8	6	3-11/16	2-11/16	2-1/8	51791
20,0 mm	0.7874			20,0	131,0	79,0	63,0	50,0	63212
51/64	0.7969	20.24	7/8-12	7/8	6	3-11/16	2-11/16	2-1/8	51792
20,5 mm	0.8071			22,0	150,0	93,0	73,0	53,0	64513
13/16	0.8125	20.64	7/8-14	7/8	6	3-11/16	2-11/16	2-1/8	51373
21,0 mm	0.8268			22,0	150,0	93,0	73,0	53,0	64514
22,0 mm	0.8661			22,0	150,0	93,0	73,0	53,0	64515
7/8	0.8750	22.23	15/16-16, 1-8	7/8	6	3-11/16	2-11/16	2-1/8	51374
59/64	0.9219	23.42	1-12	1	6	3-11/16	2-11/16	2-1/8	51375

Automotive

Mold & Die

Aerospace

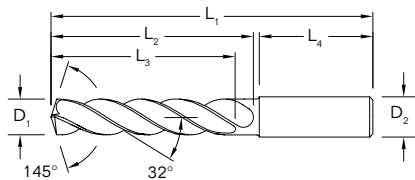
High Performance

General

Special Tools

Hi Performance Drill

Hi-PerCarb I Series 135



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
1/64	0.0156	0.40		1/8	1 1/2	5/32	7/64	1	52300*
1/32	0.0312	0.79		1/8	1 1/2	5/16	7/32	1	52301*
3/64	0.0469	1.19	1/16-64	1/8	1 1/2	25/64	19/64	1	52302*
1,25 mm	0.0492			3,0	38,0	10,0	7,5	25,0	64520*
1,45 mm	0.0571			3,0	38,0	10,0	7,5	25,0	64521*
#53	0.0595	1.51		1/8	1-1/2	25/64	19/64	1	64522*
1/16	0.0625	1.59	5/64-60	1/8	2	15/32	23/64	1-1/4	52303*
1,6 mm	0.0630			3,0	50,0	12,0	9,0	32,0	64523*
1,75 mm	0.0689			3,0	50,0	12,0	9,0	32,0	64524*
#50	0.0700	1.78		1/8	2	15/32	23/64	1-1/4	64525*
5/64	0.0781	1.98		1/8	2	35/64	27/64	1-1/4	52304*
#47	0.0785	1.99		1/8	2	35/64	27/64	1-1/4	64526*
2,05 mm	0.0807			3,0	50,0	14,0	11,0	32,0	64527*
#46	0.0810	2.06		1/8	2	35/64	27/64	1-1/4	64528*
#43	0.0890	2.26		1/8	2	19/32	15/32	1-1/4	64529*
#42	0.0935	2.37		1/8	2	5/8	1/2	1-1/4	64530*
3/32	0.0938	2.38	1/8-32	1/8	2	5/8	1/2	1-1/4	52305
#40	0.0980	2.49		1/8	2	43/64	17/32	1-1/4	52306
2,5 mm	0.0984			3,0	50,0	17,0	13,0	32,0	64531
#39	0.0995	2.53		1/8	2	43/64	17/32	1-1/4	52307
#38	0.1015	2.58	5-40	1/8	2	43/64	17/32	1-1/4	52308
#37	0.1040	2.64	5-44	1/8	2	45/64	9/16	1-1/4	52309
#36	0.1065	2.71	6-32	1/8	2	45/64	9/16	1-1/4	52310
7/64	0.1094	2.78		1/8	2	3/4	19/32	1-1/4	52311
#35	0.1100	2.79		1/8	2	3/4	19/32	1-1/4	52312
#34	0.1110	2.82		1/8	2	3/4	19/32	1-1/4	52313
#33	0.1130	2.87	6-40	1/8	2	3/4	19/32	1-1/4	52314
2,9 mm	0.1142			3,0	50,0	19,0	15,0	32,0	64532
#32	0.1160	2.95		1/8	2	3/4	39/64	1-1/4	52315
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	64100
#31	0.1200	3.05		1/8	2	3/4	39/64	1-1/4	52316
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	64101
1/8	0.1250	3.18		1/4	3	1	53/64	1-7/16	51580
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	64102
#30	0.1285	3.26		1/4	3	1	53/64	1-7/16	51581
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	64103
3,4 mm	0.1339		8-32,8-36	6,0	66,0	28,0	23,0	36,0	64104
#29	0.1360	3.45		1/4	3	1	53/64	1-7/16	51582
3,5 mm	0.1378			6,0	66,0	28,0	23,0	36,0	64105
#28	0.1405	3.57	8-40	1/4	3	1	53/64	1- 7/16	52317
9/64	0.1406	3.57		1/4	3	1	53/64	1-7/16	51583
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	64106

*Single Margin

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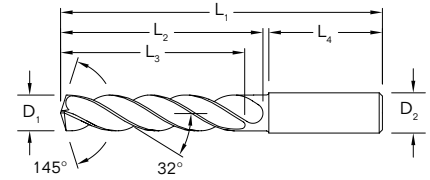






TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181–.2362	+0.0016/+0.0063	h6
>.2362–.3937	+0.0024/+0.0083	h6
>.3937–.7087	+0.0028/+0.0098	h6
>.7087–1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6

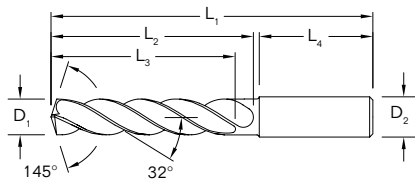


-  Common
-  5XD Reach
-  Right Spiral
-  External Coolant
-  2 Flutes

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
#27	0.1440	3.66		1/4	3	1	53/64	1-7/16	52318
3,7 mm	0.1457		M4.5 X 0,75	6,0	66,0	28,0	23,0	36,0	64107
#26	0.1470	3.73	3/16-24	1/4	3	1	53/64	1-7/16	52319
#25	0.1495	3.80	10-24	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51584
3,8 mm	0.1496			6,0	74,0	36,0	29,0	36,0	64108
#24	0.1520	3.86	10-28	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52321
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	64109
#23	0.1540	3.91		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52322
5/32	0.1562	3.97		1/4	3-1/4	1-1/4	1-5/64	1-7/16	51585
#22	0.1570	3.99	10-30	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52323
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	64110
#21	0.1590	4.04	10-32	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51586
#20	0.1610	4.09	13/64-24	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51587
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	64111
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	74,0	36,0	29,0	36,0	64112
#19	0.1660	4.22		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52324
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	64113
#18	0.1695	4.31		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52325
11/64	0.1719	4.37		1/4	3-1/4	1-1/4	1-5/64	1-7/16	51588
#17	0.1730	4.39		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52326
4,4 mm	0.1732			6,0	74,0	36,0	29,0	36,0	64114
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	64115
#15	0.1800	4.57		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52327
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	64116
#14	0.1820	4.62		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52328
#13	0.1850	4.70	12-32	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52329
4,7 mm	0.1850			6,0	74,0	36,0	29,0	36,0	64117
3/16	0.1875	4.76		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51589
#12	0.1890	4.80	7/32-32	1/4	3-1/4	1-3/4	1-37/64	1-7/16	52330
4,8 mm	0.1890			6,0	82,0	44,0	35,0	36,0	64118
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	64119
#10	0.1935	4.91	14-20	1/4	3-1/4	1-3/4	1-37/64	1-7/16	52331
#9	0.1960	4.98		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52332
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	64120
#8	0.1990	5.05		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52333
5,1 mm	0.2008			6,0	82,0	44,0	35,0	36,0	64121
#7	0.2010	5.11	1/4-20	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51506
13/64	0.2031	5.16		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51507
#6	0.2040	5.18		1/4	3 1/4	1 3/4	1 37/64	1 7/16	52334
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	64122
#5	0.2055	5.22		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51590
5,25 mm	0.2067			6,0	82,0	44,0	35,0	36,0	64123

(continued on next page)

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General
- Special Tools



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+0.0008/+0.00047	h6
> .1181-.2362	+0.0016/+0.00063	h6
> .2362-.3937	+0.0024/+0.00083	h6
> .3937-.7087	+0.0028/+0.00098	h6
> .7087-1.1811	+0.0031/+0.00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	64124
#4	0.2090	5.31	1/4-24	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51508
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	64125
#3	0.2130	5.41	1/4-28	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51509
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	64126
7/32	0.2188	5.56	1/4-32	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51510
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	64127
#2	0.2210	5.61		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52335
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	64128
#1	0.2280	5.79		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52336
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	64129
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	64130
A	0.2340	5.94		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52337
15/64	0.2344	5.95		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51591
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	64131
B	0.2380	6.05		1/4	3 5/8	2-5/64	1-51/64	1-7/16	52338
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	64132
C	0.2420	6.15		1/4	3 5/8	2-5/64	1-51/64	1-7/16	52339
6,2 mm	0.2441			8,0	91,0	53,0	43,0	36,0	64133
D	0.2460	6.25		1/4	3 5/8	2-5/64	1-51/64	1-7/16	52340
6,25 mm	0.2461		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	64134
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	64135
1/4	0.2500	6.35		1/4	3-5/8	2-5/64	1-51/64	1-7/16	51511
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	64136
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	64137
F	0.2570	6.53	5/16-18	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51512
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	64138
G	0.2610	6.63		5/16	3 5/8	2 5/64	1 51/64	1 7/16	52341
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	64139
17/64	0.2656	6.75	5/16-20	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51513
H	0.2660	6.76		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52342
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	64140
6,9 mm	0.2717			8,0	91,0	53,0	43,0	36,0	64141
I	0.2720	6.91	5/16-24	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51514
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	64142
J	0.2770	7.04		5/16	3 5/8	2-5/64	1-51/64	1-7/16	52343
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	64143
K	0.2810	7.14		5/16	3 5/8	2-5/64	1-51/64	1-7/16	52344
9/32	0.2812	7.14	5/16-32	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51515
7,2 mm	0.2835			8,0	91,0	53,0	43,0	36,0	64144
7,25 mm	0.2854		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	64145
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	64146

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Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools



Common



5xD Reach



Right Spiral



External Coolant



2 Flutes

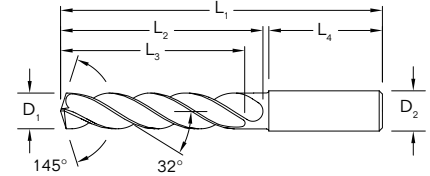







TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181–.2362	+0.0016/+0.0063	h6
>.2362–.3937	+0.0024/+0.0083	h6
>.3937–.7087	+0.0028/+0.0098	h6
>.7087–1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6



-  Common
-  5XD Reach
-  Right Spiral
-  External Coolant
-  2 Flutes

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
L	0.2900	7.37		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52345
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	64147
M	0.2950	7.49		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52346
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	64148
19/64	0.2969	7.54		5/16	3-5/8	2-5/64	1-51/64	1-7/16	51516
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	64149
N	0.3020	7.67		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52347
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	64150
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	64151
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	64152
5/16	0.3125	7.94	3/8-16	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51517
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	64153
O	0.3160	8.03		3/8	4	2-13/32	2-1/8	1-9/16	52348
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	64154
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	64155
P	0.3230	8.20		3/8	4	2-13/32	2-1/8	1-9/16	51518
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	64156
21/64	0.3281	8.33	3/8-20	3/8	4	2-13/32	2-1/8	1-9/16	51519
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	64157
Q	0.3320	8.43	3/8-24	3/8	4	2-13/32	2-1/8	1-9/16	51520
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	64158
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	64159
R	0.3390	8.61	3/8-32	3/8	4	2-13/32	2-1/8	1-9/16	52349
8,7 mm	0.3425		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	64160
11/32	0.3438	8.73		3/8	4	2-13/32	2-1/8	1-9/16	51521
8,8 mm	0.3465			10,0	103,0	61,0	49,0	40,0	64161
S	0.3480	8.84		3/8	4	2-13/32	2-1/8	1-9/16	51522
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	64162
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	64163
T	0.3580	9.09		3/8	4	2 13/32	2 1/8	1 9/16	52350
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	64164
23/64	0.3594	9.13		3/8	4	2-13/32	2-1/8	1-9/16	51523
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	64165
9,25 mm	0.3642			10,0	103,0	61,0	49,0	40,0	64166
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	64167
U	0.3680	9.35	7/16-14	3/8	4	2-13/32	2-1/8	1-9/16	51524
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	64168
9,5 mm	0.3740		M10 X 0,5	10,0	103,0	61,0	49,0	40,0	64169
3/8	0.3750	9.53		3/8	4	2-13/32	2-1/8	1-9/16	51525
V	0.3770	9.58		1/2	4	2-13/32	2-1/8	1-9/16	52351
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	64170
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	64171

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Automotive

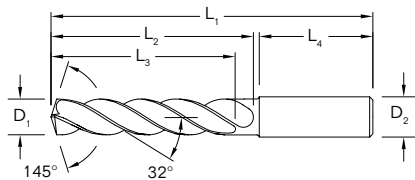
Mold & Die

Aerospace

High Performance

General

Special Tools



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤ .1181	+0.0008/+0.00047	h6
> .1181-.2362	+0.0016/+0.00063	h6
> .2362-.3937	+0.0024/+0.00083	h6
> .3937-.7087	+0.0028/+0.00098	h6
> .7087-1.1811	+0.0031/+0.00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	64172
W	0.3860	9.80		1/2	4	2-13/32	2-1/8	1-9/16	51526
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	64173
25/64	0.3906	9.92	7/16-20	1/2	4	2-13/32	2-1/8	1-9/16	51527
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	64174
X	0.3970	10.08	7/16-24	1/2	4-11/16	2-3/4	2-23/64	1-49/64	52352
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	64175
10,2 mm	0.4016			12,0	118,0	71,0	56,0	45,0	64176
Y	0.4040	10.26	7/16-28	1/2	4-11/16	2-3/4	2-23/64	1-49/64	52353
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	64177
13/32	0.4062	10.32		1/2	4-11/16	2-3/4	2-23/64	1-49/64	51528
10,4 mm	0.4095			12,0	118,0	71,0	56,0	45,0	64178
Z	0.4130	10.49		1/2	4-11/16	2-3/4	2-23/64	1-49/64	52354
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	64179
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	64180
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	64181
27/64	0.4219	10.72	1/2-13	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51529
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	64182
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	64183
11,0 mm	0.4331			12,0	118,0	71,0	56,0	45,0	64184
11,1 mm	0.4370		M12 X 1	12,0	118,0	71,0	56,0	45,0	64185
7/16	0.4375	11.11	1/4-18 NPT	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51530
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	64186
11,25 mm	0.4429			12,0	118,0	71,0	56,0	45,0	64187
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	64188
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	64189
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64190
29/64	0.4531	11.51	1/2-20	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51531
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	64191
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	64192
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	64193
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	64194
15/32	0.4688	11.91	1/2-28	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51532
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	64195
31/64	0.4844	12.30	9/16-12	1/2	4-7/8	3-1/32	2-19/32	1-49/64	51533
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	64196
1/2	0.5000	12.70		1/2	4-7/8	3-1/32	2-19/32	1-49/64	51534
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	64197
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	64198
33/64	0.5156	13.10	9/16-18	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51535
17/32	0.5312	13.49	5/8-11	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51536
13,5 mm	0.5315			14,0	124,0	77,0	60,0	45,0	64199



Common



5xD Reach



Right Spiral



External Coolant



2 Flutes

(continued on next page)

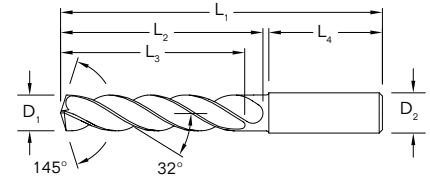


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6
> 18 - 30	+0,008/+0,029	h6



Common	Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-A (AlTiN) EDP No.
	35/64	0.5469	13.89	5/8-12	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51537
5xD Reach	14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	64200
	9/16	0.5625	14.29		5/8	5-1/4	3-1/4	2-3/4	1-57/64	51538
	14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	64201
Right Spiral	37/64	0.5781	14.68	5/8-18	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51539
	15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	64202
	19/32	0.5938	15.08	11/16-11	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51592
	39/64	0.6094	15.48	11/16-12	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51593
External Coolant	15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	64203
	5/8	0.6250	15.88	11/16-16	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51540
	16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	64204
2 Flutes	41/64	0.6406	16.27	11/16-24	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51594
	16,5 mm	0.6496		M18 X 1,5	18,0	143,0	93,0	71,0	48,0	64205
	21/32	0.6562	16.67	3/4-10	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51541
	17,0 mm	0.6693			18,0	143,0	93,0	71,0	48,0	64206
	43/64	0.6719	17.07	3/4-12	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51595
	11/16	0.6875	17.46	3/4-16	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51542
	17,5 mm	0.6890		M20 X 2,5	18,0	143,0	93,0	71,0	48,0	64207
	45/64	0.7031	17.86	3/4-20, 1/2-14 NPT	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51543
	18,0 mm	0.7087			18,0	143,0	93,0	71,0	48,0	64208
	23/32	0.7188	18.26		3/4	6	4	3-3/8	1-31/32	51596
	18,5 mm	0.7283		M20 X 1,5	20,0	153,0	101,0	77,0	50,0	64209
	47/64	0.7344	18.65	13/16-12	3/4	6	4	3-3/8	1-31/32	51544
	19,0 mm	0.7480			20,0	153,0	101,0	77,0	50,0	64210
	3/4	0.7500	19.05	13/16-16	3/4	6	4	3-3/8	1-31/32	51545
	49/64	0.7656	19.45	7/8-9	7/8	6	4	3-3/8	1-31/32	52355
	19,5 mm	0.7677		M22 X 2,5	20,0	153,0	101,0	77,0	50,0	64211
	25/32	0.7812	19.84		7/8	6	4	3-3/8	1-31/32	52356
	20,0 mm	0.7874			20,0	153,0	101,0	77,0	50,0	64212
	51/64	0.7969	20.24	7/8-12	7/8	6	4	3-3/8	1-31/32	52357
	20,5 mm	0.8071			22,0	153,0	101,0	77,0	50,0	64533
	13/16	0.8125	20.64	7/8-14	7/8	6-1/2	4-1/2	3-7/8	1-31/32	52358
	21,0 mm	0.8268			22,0	153,0	101,0	77,0	50,0	64534
	22,0 mm	0.8661			22,0	178,0	127,0	108,0	50,0	64535
	7/8	0.8750	22.23	15/16-16, 1-8	7/8	6-1/2	4-1/2	3-7/8	1-31/32	52359
	59/64	0.9219	23.42	1-12	1	7	5	4-3/8	2-1/8	52360

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General
- Special Tools



Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Series 135 3D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)									
			1.5	3	6	8	10	12	16	20		
CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	117	RPM	24882	12441	6220	4665	3732	3110	2333	1866	
		(94-141)	Fr	0.047	0.094	0.189	0.252	0.315	0.378	0.504	0.630	
			Feed (mm/min)	1175	1175	1175	1175	1175	1175	1175	1175	
	≤ 275 Bhn or ≤ 28 HRc	107	RPM	22620	11310	5655	4241	3393	2827	2121	1696	
		(85-128)	Fr	0.043	0.086	0.172	0.229	0.286	0.343	0.457	0.572	
			Feed (mm/min)	970	970	970	970	970	970	970	970	
	≤ 475 Bhn or ≤ 45 HRc	61	RPM	12926	6463	3231	2424	1939	1616	1212	969	
		(49-73)	Fr	0.036	0.071	0.142	0.190	0.237	0.285	0.380	0.475	
			Feed (mm/min)	460	460	460	460	460	460	460	460	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	91	RPM	19388	9694	4847	3635	2908	2424	1818	1454
			(73-110)	Fr	0.036	0.071	0.142	0.190	0.237	0.285	0.380	0.475
				Feed (mm/min)	690	690	690	690	690	690	690	690
≤ 375 Bhn or ≤ 40 HRc		56	RPM	11956	5978	2989	2242	1793	1495	1121	897	
		(45-68)	Fr	0.031	0.061	0.122	0.163	0.204	0.244	0.326	0.407	
			Feed (mm/min)	365	365	365	365	365	365	365	365	
≤ 450 Bhn or ≤ 48 HRc		40	RPM	8402	4201	2100	1575	1260	1050	788	630	
		(32-48)	Fr	0.021	0.042	0.083	0.111	0.139	0.167	0.222	0.278	
			Feed (mm/min)	175	175	175	175	175	175	175	175	
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	40	RPM	8402	4201	2100	1575	1260	1050	788	630
			(32-48)	Fr	0.032	0.063	0.126	0.168	0.210	0.252	0.336	0.421
				Feed (mm/min)	265	265	265	265	265	265	265	265
	≤ 375 Bhn or ≤ 40 HRc	27	RPM	5816	2908	1454	1091	872	727	545	436	
		(22-33)	Fr	0.014	0.028	0.055	0.073	0.092	0.110	0.147	0.183	
			Feed (mm/min)	80	80	80	80	80	80	80	80	
	≤ 475 Bhn or ≤ 50 HRc	23	RPM	4847	2424	1212	909	727	606	454	364	
		(18-27)	Fr	0.009	0.019	0.037	0.050	0.062	0.074	0.099	0.124	
			Feed (mm/min)	45	45	45	45	45	45	45	45	
	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	98	RPM	20681	10340	5170	3878	3102	2585	1939	1551
			(78-117)	Fr	0.055	0.110	0.220	0.293	0.366	0.439	0.585	0.732
				Feed (mm/min)	1135	1135	1135	1135	1135	1135	1135	1135
≤ 260 Bhn or ≤ 26 HRc		87	RPM	18419	9209	4605	3454	2763	2302	1727	1381	
		(69-104)	Fr	0.055	0.110	0.219	0.292	0.366	0.439	0.585	0.731	
			Feed (mm/min)	1010	1010	1010	1010	1010	1010	1010	1010	
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	84	RPM	17773	8886	4443	3332	2666	2222	1666	1333	
		(67-101)	Fr	0.031	0.061	0.123	0.164	0.204	0.245	0.327	0.409	
			Feed (mm/min)	545	545	545	545	545	545	545	545	
	≤ 275 Bhn or ≤ 28 HRc	52	RPM	10987	5493	2747	2060	1648	1373	1030	824	
		(41-62)	Fr	0.024	0.047	0.095	0.126	0.158	0.189	0.252	0.316	
			Feed (mm/min)	260	260	260	260	260	260	260	260	
STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	27	RPM	5816	2908	1454	1091	872	727	545	436	
		(22-33)	Fr	0.023	0.046	0.093	0.124	0.155	0.186	0.248	0.309	
			Feed (mm/min)	135	135	135	135	135	135	135	135	
	≤ 375 Bhn or ≤ 40 HRc	20	RPM	4201	2100	1050	788	630	525	394	315	
		(16-24)	Fr	0.020	0.040	0.081	0.108	0.135	0.162	0.216	0.270	
			Feed (mm/min)	85	85	85	85	85	85	85	85	

(continued on next page)



Series 135 3D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)									
			1.5	3	6	8	10	12	16	20		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	17 (13-20)	RPM	3555	1777	889	666	533	444	333	267	
			Fr	0.010	0.020	0.039	0.053	0.066	0.079	0.105	0.131	
			Feed (mm/min)	35	35	35	35	35	35	35	35	
	≤ 400 Bhn or ≤ 43 HRc	9 (7-11)	RPM	1939	969	485	364	291	242	182	145	
			Fr	0.008	0.015	0.031	0.041	0.052	0.062	0.083	0.103	
			Feed (mm/min)	15	15	15	15	15	15	15	15	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	41 (33-49)	RPM	8725	4362	2181	1636	1309	1091	818	654
				Fr	0.021	0.042	0.085	0.113	0.141	0.170	0.226	0.283
				Feed (mm/min)	185	185	185	185	185	185	185	185
		≤ 350 Bhn or ≤ 38 HRc	30 (24-37)	RPM	6463	3231	1616	1212	969	808	606	485
				Fr	0.019	0.039	0.077	0.103	0.129	0.155	0.206	0.258
				Feed (mm/min)	125	125	125	125	125	125	125	125
≤ 440 Bhn or ≤ 47 HRc		17 (13-20)	RPM	3555	1777	889	666	533	444	333	267	
			Fr	0.014	0.028	0.056	0.075	0.094	0.113	0.150	0.188	
			Feed (mm/min)	50	50	50	50	50	50	50	50	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	213 (171-256)	RPM	45239	22620	11310	8482	6786	5655	4241	3393
				Fr	0.059	0.119	0.238	0.317	0.396	0.476	0.634	0.793
				Feed (mm/min)	2690	2690	2690	2690	2690	2690	2690	2690
	≤ 150 Bhn or ≤ 7 HRc	183 (146-219)	RPM	38777	19388	9694	7271	5816	4847	3635	2908	
			Fr	0.060	0.120	0.240	0.320	0.400	0.480	0.640	0.799	
			Feed (mm/min)	2325	2325	2325	2325	2325	2325	2325	2325	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	152 (122-183)	RPM	32314	16157	8078	6059	4847	4039	3029	2424
				Fr	0.024	0.048	0.096	0.128	0.160	0.192	0.256	0.320
				Feed (mm/min)	776	776	776	776	776	776	776	776
		≤ 200 Bhn or ≤ 23 HRc	122 (98-146)	RPM	25851	12926	6463	4847	3878	3231	2424	1939
				Fr	0.024	0.049	0.097	0.130	0.162	0.195	0.260	0.325
				Feed (mm/min)	630	630	630	630	630	630	630	630

Note:

- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (D₁ x 3.14)
- mm/min = Fr x RPM
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Automotive

Mold & Die

Aerospace

High Performance

General

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Hi Performance Drill

Hi-PerCarb I Series 135



Automotive

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Special Tools

Series 135M 5D Metric	Hardness	Vc (m/min)	Diameter (D,) (mm)									
			1.5	3	6	8	10	12	16	20		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	105	RPM	22297	11148	5574	4181	3344	2787	2090	1672	
		(84-126)	Fr	0.048	0.095	0.190	0.254	0.317	0.380	0.507	0.634	
			Feed (mm/min)	1060	1060	1060	1060	1060	1060	1060	1060	
	≤ 275 Bhn or ≤ 28 HRc	94	RPM	20035	10017	5009	3756	3005	2504	1878	1503	
		(76-113)	Fr	0.043	0.085	0.171	0.228	0.285	0.341	0.455	0.569	
			Feed (mm/min)	855	855	855	855	855	855	855	855	
	≤ 425 Bhn or ≤ 45 HRc	55	RPM	11633	5816	2908	2181	1745	1454	1091	872	
		(44-66)	Fr	0.036	0.071	0.143	0.190	0.238	0.285	0.381	0.476	
			Feed (mm/min)	415	415	415	415	415	415	415	415	
	P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	82	RPM	17449	8725	4362	3272	2617	2181	1636	1309
			(66-99)	Fr	0.036	0.072	0.143	0.191	0.239	0.287	0.382	0.478
				Feed (mm/min)	625	625	625	625	625	625	625	625
≤ 375 Bhn or ≤ 40 HRc		50	RPM	10664	5332	2666	1999	1600	1333	1000	800	
		(40-60)	Fr	0.031	0.062	0.124	0.165	0.206	0.248	0.330	0.413	
			Feed (mm/min)	330	330	330	330	330	330	330	330	
≤ 450 Bhn or ≤ 48 HRc		35	RPM	7432	3716	1858	1394	1115	929	697	557	
		(28-42)	Fr	0.022	0.043	0.086	0.115	0.144	0.172	0.230	0.287	
			Feed (mm/min)	160	160	160	160	160	160	160	160	
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	37	RPM	7755	3878	1939	1454	1163	969	727	582
			(29-44)	Fr	0.031	0.062	0.124	0.165	0.206	0.248	0.330	0.413
				Feed (mm/min)	240	240	240	240	240	240	240	240
	≤ 375 Bhn or ≤ 40 HRc	24	RPM	5170	2585	1293	969	776	646	485	388	
		(20-29)	Fr	0.015	0.029	0.058	0.077	0.097	0.116	0.155	0.193	
			Feed (mm/min)	75	75	75	75	75	75	75	75	
	≤ 475 Bhn or ≤ 50 HRc	21	RPM	4524	2262	1131	848	679	565	424	339	
		(17-26)	Fr	0.010	0.020	0.040	0.053	0.066	0.080	0.106	0.133	
			Feed (mm/min)	45	45	45	45	45	45	45	45	
	K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	91	RPM	19388	9694	4847	3635	2908	2424	1818	1454
			(73-110)	Fr	0.054	0.108	0.217	0.289	0.361	0.433	0.578	0.722
				Feed (mm/min)	1050	1050	1050	1050	1050	1050	1050	1050
≤ 260 Bhn or ≤ 26 HRc		81	RPM	17126	8563	4282	3211	2569	2141	1606	1284	
		(65-97)	Fr	0.055	0.109	0.218	0.291	0.364	0.437	0.582	0.728	
			Feed (mm/min)	935	935	935	935	935	935	935	935	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	76	RPM	16157	8078	4039	3029	2424	2020	1515	1212
			(61-91)	Fr	0.031	0.061	0.123	0.163	0.204	0.245	0.327	0.408
				Feed (mm/min)	495	495	495	495	495	495	495	495
		≤ 275 Bhn or ≤ 28 HRc	46	RPM	9694	4847	2424	1818	1454	1212	909	727
			(37-55)	Fr	0.024	0.047	0.095	0.127	0.158	0.190	0.253	0.316
				Feed (mm/min)	230	230	230	230	230	230	230	230
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	24	RPM	5170	2585	1293	969	776	646	485	388
			(20-29)	Fr	0.023	0.046	0.093	0.124	0.155	0.186	0.248	0.309
				Feed (mm/min)	120	120	120	120	120	120	120	120
		≤ 375 Bhn or ≤ 40 HRc	17	RPM	3555	1777	889	666	533	444	333	267
			(13-20)	Fr	0.021	0.042	0.084	0.113	0.141	0.169	0.225	0.281
				Feed (mm/min)	75	75	75	75	75	75	75	75

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Series 135M 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)									
			1.5	3	6	8	10	12	16	20		
SUPER ALLOYS (Nickel, Cobalt, Iron Base) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	12	RPM	2585	1293	646	485	388	323	242	194	
		(10-15)	Fr	0.010	0.019	0.039	0.052	0.064	0.077	0.103	0.129	
			Feed (mm/min)	25	25	25	25	25	25	25	25	
	≤ 400 Bhn or ≤ 43 HRc	6	RPM	1293	646	323	242	194	162	121	97	
		(5-7)	Fr	0.007	0.014	0.028	0.037	0.046	0.056	0.074	0.093	
			Feed (mm/min)	9	9	9	9	9	9	9	9	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	32	RPM	6786	3393	1696	1272	1018	848	636	509
			(26-38)	Fr	0.021	0.043	0.085	0.114	0.142	0.171	0.228	0.285
				Feed (mm/min)	145	145	145	145	145	145	145	145
		≤ 350 Bhn or ≤ 38 HRc	24	RPM	5170	2585	1293	969	776	646	485	388
			(20-29)	Fr	0.019	0.039	0.077	0.103	0.129	0.155	0.206	0.258
				Feed (mm/min)	100	100	100	100	100	100	100	100
≤ 440 Bhn or ≤ 47 HRc		13	RPM	2714	1357	679	509	407	339	254	204	
		(10-15)	Fr	0.015	0.029	0.059	0.079	0.098	0.118	0.157	0.196	
			Feed (mm/min)	40	40	40	40	40	40	40	40	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	194	RPM	41039	20519	10260	7695	6156	5130	3847	3078
			(155-232)	Fr	0.059	0.118	0.237	0.316	0.395	0.474	0.632	0.790
				Feed (mm/min)	2430	2430	2430	2430	2430	2430	2430	2430
	≤ 150 Bhn or ≤ 7 HRc	165	RPM	34899	17449	8725	6544	5235	4362	3272	2617	
		(132-198)	Fr	0.059	0.118	0.237	0.316	0.394	0.473	0.631	0.789	
			Feed (mm/min)	2065	2065	2065	2065	2065	2065	2065	2065	
	Copper Alloys Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	137	RPM	29082	14541	7271	5453	4362	3635	2726	2181
			(110-165)	Fr	0.027	0.053	0.107	0.142	0.178	0.213	0.284	0.355
				Feed (mm/min)	775	775	775	775	775	775	775	775
		≤ 200 Bhn or ≤ 23 HRc	110	RPM	23266	11633	5816	4362	3490	2908	2181	1745
			(88-132)	Fr	0.027	0.054	0.108	0.144	0.181	0.217	0.289	0.361
				Feed (mm/min)	630	630	630	630	630	630	630	630

Note:

- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (D₁ x 3.14)
- mm/min = Fr x RPM
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Automotive
Mold & Die
Aerospace
High Performance
General
Special Tools

ORION High Performance Drill

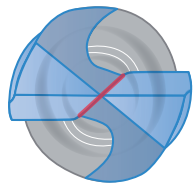
Excellent Hole Accuracy with a Low Cutting Force Design

Good for Difficult-to-Cut Materials

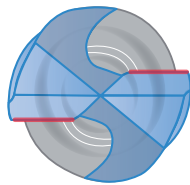
1 Optimized Cutting Edge for Increased Accuracy

The optimized cutting edge creates excellent drilling accuracy during the initial cut by consistently controlling the cutting force across the face of both cutting edges.

Cutting Edge



Centering Edge

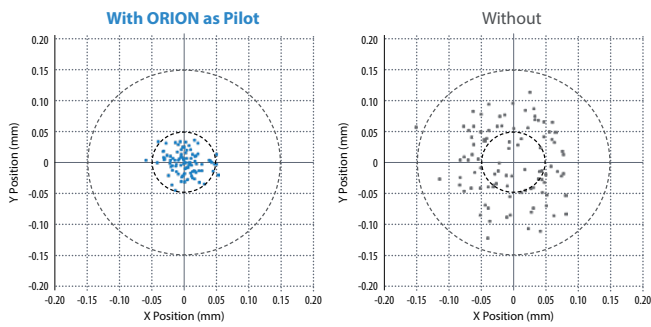


Primary Cutting Edge

Centering Edge



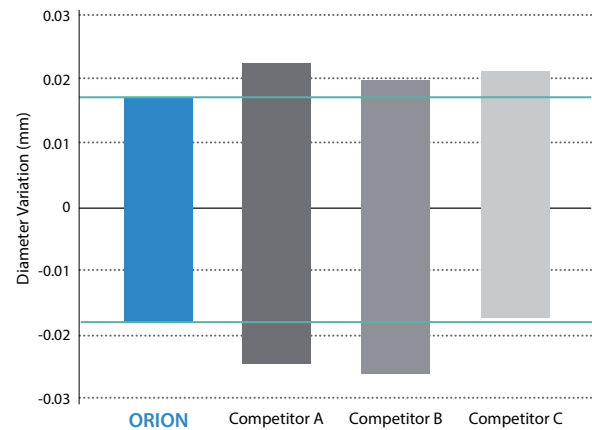
3mm Coolant Fed Drill Hole Positional Accuracy
(After using the ORION as a pilot drill)



	With ORION	Without
Cp	3.80	1.98
CpK	3.17	1.06
Spec (+/-)	0.15	0.15

Cutting Conditions : N = 2588rpm, Vf = 196mm/min Drill Diameter Ø3mm Drilling Depth 9mm 17-4PH-900

Hole Diameter Variation (In-house Evaluation)



Drill	No. of Holes	Diameter Variation (mm)
ORION	600	0.0071
Competitor A	600	0.0113
Competitor B	600	0.0109
Competitor C	600	0.0087

Cutting Conditions : N = 2588rpm, Vf = 196mm/min Drill Diameter Ø3mm Drilling Depth 9mm 17-4PH-900

Automotive

Mold & Die

Aerospace

High Performance

General

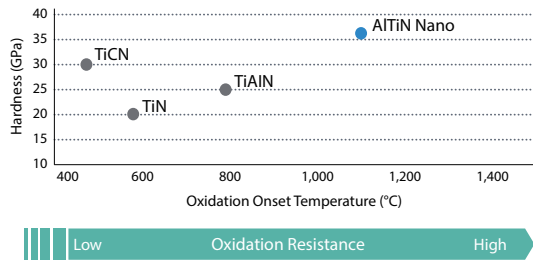
Special Tools



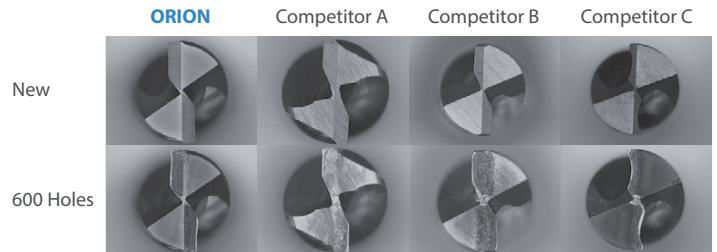
2 Nanocomposite Super-nitride AlTiN Coating Technology

Great for difficult-to-cut and hardened materials, the 2nd generation AlTiN supernitride with a nanocomposite coating structure has a hardness GPa of 36.3 and maximum application temperature (C°) of 1,100.

Coating Properties



Wear Resistance Comparison (In-house Evaluation)



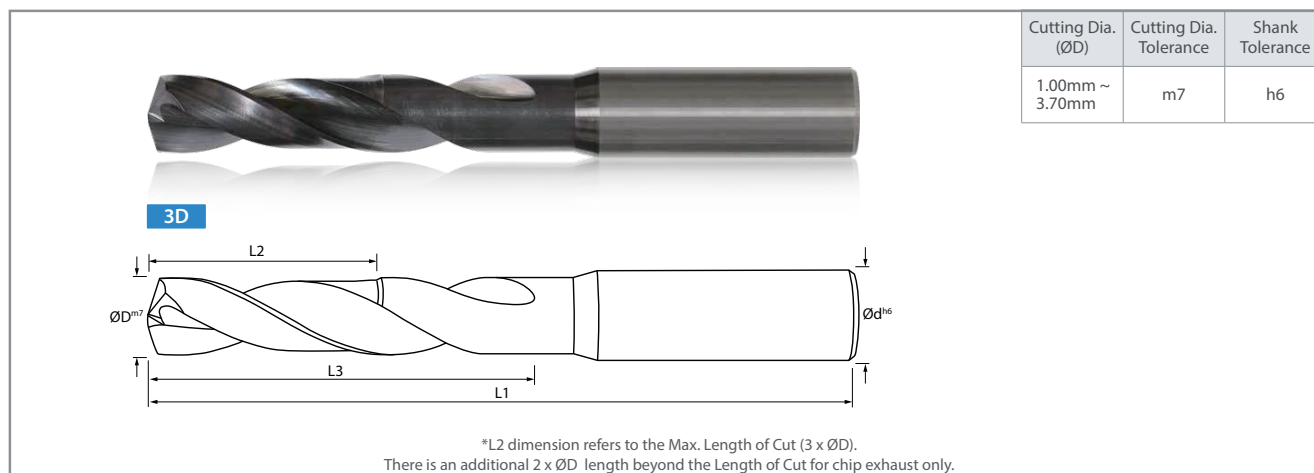
The ORION performed with good overall wear while still maintaining good tool finish

Drill	Total Holes	At 300 Holes	At 600 Holes
		Wear (mm)	Wear (mm)
ORION	600	0.032	0.068
Competitor A	600	0.031	0.057
Competitor B	600	0.044	0.073
Competitor C	600	0.044	0.071

Cutting Conditions : N = 2588rpm, Vf = 196mm/min Drill Diameter Ø3mm Drilling Depth 9mm 17-4PH-900

- Automotive
- Mold & Die
- Aerospace
- High Performance**
- General
- Special Tools

3xD ORION Drills - Metric Sizes (Ø1.00mm - Ø3.70mm)



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
NEW 165-0394AG197	●	1.00	3.00	50.00	3.00	5.00	142°
NEW 165-0433AG217	●	1.10	3.00	50.00	3.30	5.50	142°
NEW 165-0472AG236	●	1.20	3.00	50.00	3.60	6.00	142°
NEW 165-0512AG256	●	1.30	3.00	50.00	3.90	6.50	142°
NEW 165-0551AG276	●	1.40	3.00	50.00	4.20	7.00	142°
NEW 165-0591AG295	●	1.50	3.00	50.00	4.50	7.50	142°
NEW 165-0630AG315	●	1.60	3.00	50.00	4.80	8.00	142°
NEW 165-0669AG335	●	1.70	3.00	50.00	5.10	8.50	142°
NEW 165-0709AG354	●	1.80	3.00	50.00	5.40	9.00	142°
NEW 165-0748AG374	●	1.90	3.00	50.00	5.70	9.50	142°
NEW 165-0787AG394	●	2.00	3.00	50.00	6.00	10.00	142°
165-0827AG413	●	2.10	3.00	50.00	6.30	10.50	142°
165-0866AG433	●	2.20	3.00	50.00	6.60	11.00	142°
165-0906AG453	●	2.30	3.00	50.00	6.90	11.50	142°
165-0945AG472	●	2.40	3.00	50.00	7.20	12.00	142°
165-0984AG492	●	2.50	3.00	50.00	7.50	12.50	142°
165-1024AG512	●	2.60	3.00	50.00	7.80	13.00	142°
165-1063AG531	●	2.70	3.00	50.00	8.10	13.50	142°
165-1102AG551	●	2.80	3.00	50.00	8.40	14.00	142°
165-1142AG571	●	2.90	3.00	50.00	8.70	14.50	142°
165-1181AG591	●	3.00	4.00	60.00	9.00	15.00	142°
165-1220AG610	●	3.10	4.00	60.00	9.30	15.50	142°
165-1260AG630	●	3.20	4.00	60.00	9.60	16.00	142°
165-1299AG650	●	3.30	4.00	60.00	9.90	16.50	142°
165-1339AG669	●	3.40	4.00	60.00	10.20	17.00	142°
165-1378AG689	●	3.50	4.00	60.00	10.50	17.50	142°
165-1417AG709	●	3.60	4.00	60.00	10.80	18.00	142°
165-1457AG728	●	3.70	4.00	60.00	11.10	18.50	142°

● : U.S. Stock

Automotive

Mold & Die

Aerospace

High Performance

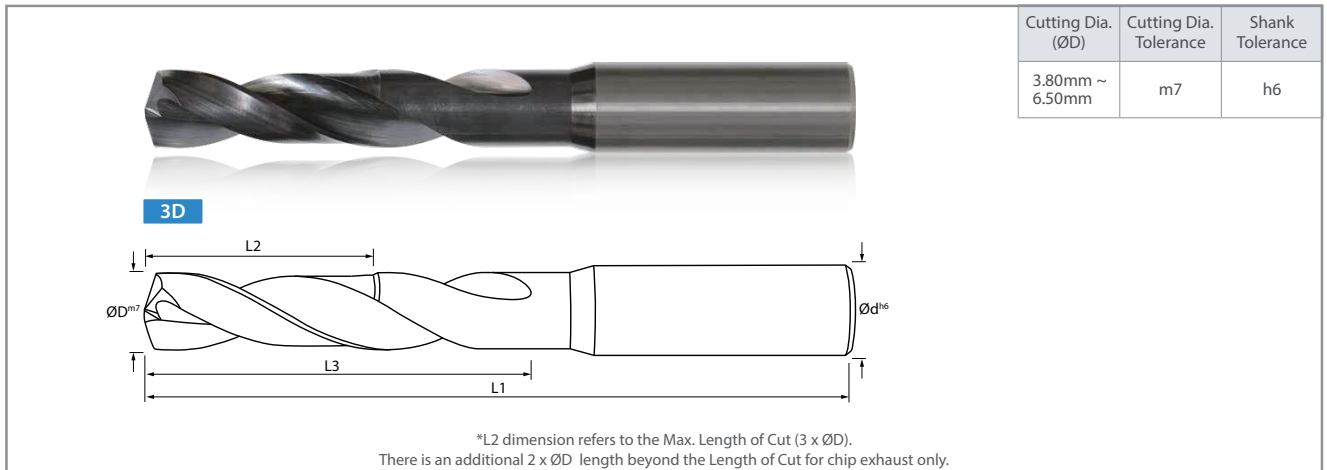
General

Special Tools

Hi Performance Drill

ORION I Series 165

3xD ORION Drills - Metric Sizes (Ø3.80mm - Ø6.50mm)



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
165-1496AG748	●	3.80	4.00	60.00	11.40	19.00	142°
165-1535AG768	●	3.90	4.00	60.00	11.70	19.50	142°
165-1575AG787	●	4.00	6.00	70.00	12.00	20.00	142°
165-1614AG807	●	4.10	6.00	70.00	12.30	20.50	142°
165-1654AG827	●	4.20	6.00	70.00	12.60	21.00	142°
165-1693AG846	●	4.30	6.00	70.00	12.90	21.50	142°
165-1732AG866	●	4.40	6.00	70.00	13.20	22.00	142°
165-1772AG886	●	4.50	6.00	70.00	13.50	22.50	142°
165-1811AG906	●	4.60	6.00	70.00	13.80	23.00	142°
165-1850AG925	●	4.70	6.00	70.00	14.10	23.50	142°
165-1890AG945	●	4.80	6.00	70.00	14.40	24.00	142°
165-1929AG965	●	4.90	6.00	70.00	14.70	24.50	142°
165-1969AG984	●	5.00	6.00	70.00	15.00	25.00	142°
165-2008AG1004	●	5.10	6.00	70.00	15.30	25.50	142°
165-2047AG1024	●	5.20	6.00	70.00	15.60	26.00	142°
165-2087AG1043	●	5.30	6.00	70.00	15.90	26.50	142°
165-2126AG1063	●	5.40	6.00	70.00	16.20	27.00	142°
165-2165AG1083	●	5.50	6.00	70.00	16.50	27.50	142°
165-2205AG1102	●	5.60	6.00	70.00	16.80	28.00	142°
165-2244AG1122	●	5.70	6.00	70.00	17.10	28.50	142°
165-2283AG1142	●	5.80	6.00	70.00	17.40	29.00	142°
165-2323AG1161	●	5.90	6.00	70.00	17.70	29.50	142°
165-2362AG1181	●	6.00	8.00	80.00	18.00	30.00	142°
165-2402AG1201	●	6.10	8.00	80.00	18.30	30.50	142°
165-2441AG1220	●	6.20	8.00	80.00	18.60	31.00	142°
165-2480AG1240	●	6.30	8.00	80.00	18.90	31.50	142°
165-2520AG1260	●	6.40	8.00	80.00	19.20	32.00	142°
165-2559AG1280	●	6.50	8.00	80.00	19.50	32.50	142°

● : U.S. Stock

Automotive

Mold & Die

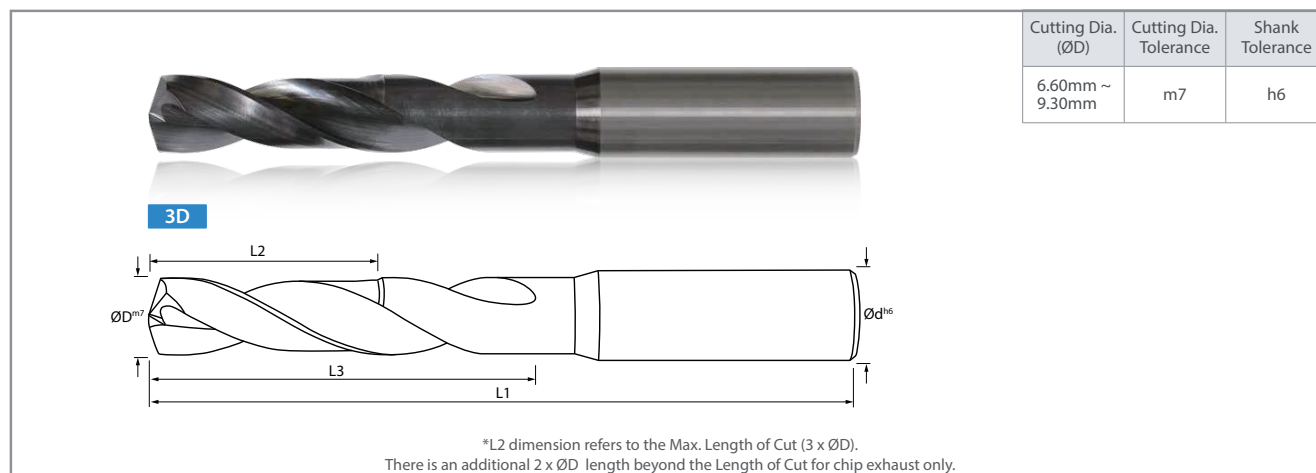
Aerospace

High Performance

General

Special Tools

3xD ORION Drills - Metric Sizes (Ø6.60mm - Ø9.30mm)



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
165-2598AG1299	●	6.60	8.00	80.00	19.80	33.00	142°
165-2638AG1319	●	6.70	8.00	80.00	20.10	33.50	142°
165-2677AG1339	●	6.80	8.00	80.00	20.40	34.00	142°
165-2717AG1358	●	6.90	8.00	80.00	20.70	34.50	142°
165-2756AG1378	●	7.00	8.00	80.00	21.00	35.00	142°
165-2795AG1398	●	7.10	8.00	80.00	21.30	35.50	142°
165-2835AG1417	●	7.20	8.00	80.00	21.60	36.00	142°
165-2874AG1437	●	7.30	8.00	80.00	21.90	36.50	142°
165-2913AG1457	●	7.40	8.00	80.00	22.20	37.00	142°
165-2953AG1476	●	7.50	8.00	80.00	22.50	37.50	142°
165-2992AG1496	●	7.60	8.00	80.00	22.80	38.00	142°
165-3031AG1516	●	7.70	8.00	80.00	23.10	38.50	142°
165-3071AG1535	●	7.80	8.00	80.00	23.40	39.00	142°
165-3110AG1555	●	7.90	8.00	80.00	23.70	39.50	142°
165-3150AG1575	●	8.00	10.00	100.00	24.00	40.00	142°
165-3189AG1594	●	8.10	10.00	100.00	24.30	40.50	142°
165-3228AG1614	●	8.20	10.00	100.00	24.60	41.00	142°
165-3268AG1634	●	8.30	10.00	100.00	24.90	41.50	142°
165-3307AG1654	●	8.40	10.00	100.00	25.20	42.00	142°
165-3346AG1673	●	8.50	10.00	100.00	25.50	42.50	142°
165-3386AG1693	●	8.60	10.00	100.00	25.80	43.00	142°
165-3425AG1713	●	8.70	10.00	100.00	26.10	43.50	142°
165-3465AG1732	●	8.80	10.00	100.00	26.40	44.00	142°
165-3504AG1752	●	8.90	10.00	100.00	26.70	44.50	142°
165-3543AG1772	●	9.00	10.00	100.00	27.00	45.00	142°
165-3583AG1791	●	9.10	10.00	100.00	27.30	45.50	142°
165-3622AG1811	●	9.20	10.00	100.00	27.60	46.00	142°
165-3661AG1831	●	9.30	10.00	100.00	27.90	46.50	142°

● : U.S. Stock

Automotive

Mold & Die

Aerospace

High Performance

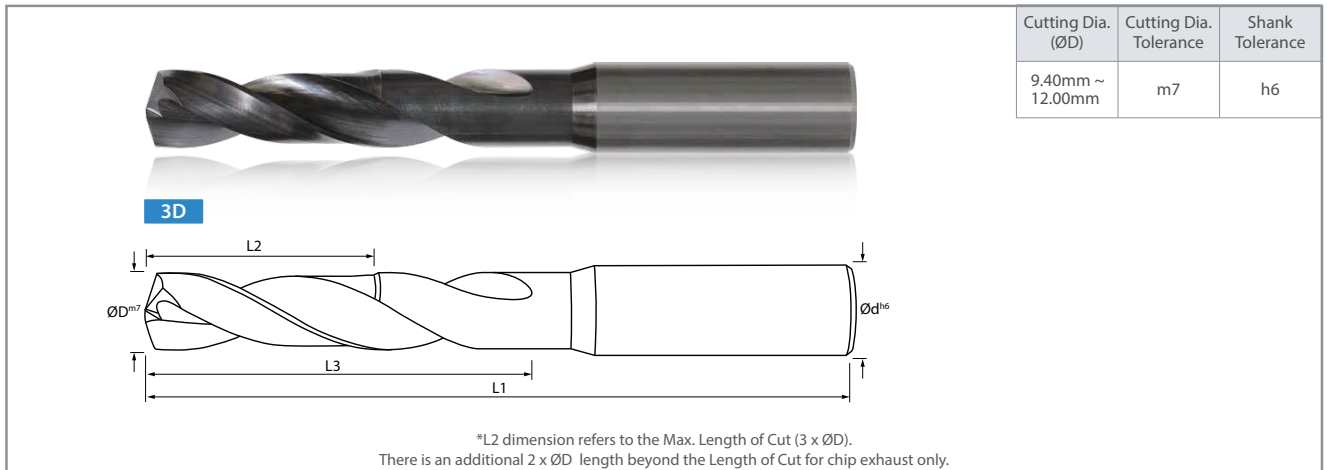
General

Special Tools

Hi Performance Drill

ORION I Series 165

3xD ORION Drills - Metric Sizes (Ø9.40mm - Ø12.00mm)

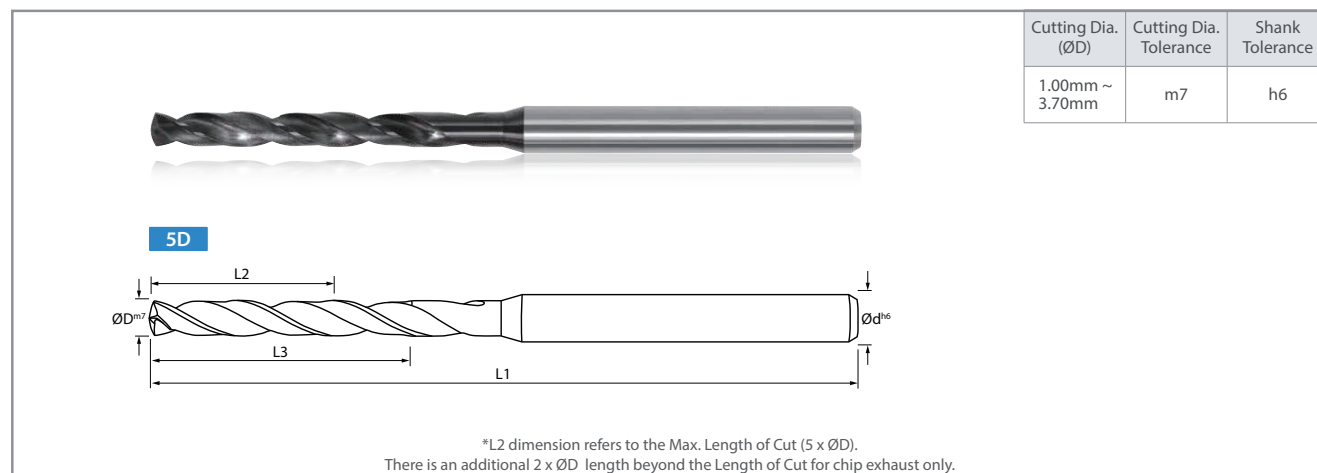


Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
165-3701AG1850	●	9.40	10.00	100.00	28.20	47.00	142°
165-3740AG1870	●	9.50	10.00	100.00	28.50	47.50	142°
165-3780AG1890	●	9.60	10.00	100.00	28.80	48.00	142°
165-3819AG1909	●	9.70	10.00	100.00	29.10	48.50	142°
165-3858AG1929	●	9.80	10.00	100.00	29.40	49.00	142°
165-3898AG1949	●	9.90	10.00	100.00	29.70	49.50	142°
165-3937AG1969	●	10.00	12.00	110.00	30.00	50.00	142°
165-3976AG1988	●	10.10	12.00	110.00	30.30	50.50	142°
165-4016AG2008	●	10.20	12.00	110.00	30.60	51.00	142°
165-4055AG2028	●	10.30	12.00	110.00	30.90	51.50	142°
165-4094AG2047	●	10.40	12.00	110.00	31.20	52.00	142°
165-4134AG2067	●	10.50	12.00	110.00	31.50	52.50	142°
165-4173AG2087	●	10.60	12.00	110.00	31.80	53.00	142°
165-4213AG2106	●	10.70	12.00	110.00	32.10	53.50	142°
165-4252AG2126	●	10.80	12.00	110.00	32.40	54.00	142°
165-4291AG2146	●	10.90	12.00	110.00	32.70	54.50	142°
165-4331AG2165	●	11.00	12.00	110.00	33.00	55.00	142°
165-4370AG2185	●	11.10	12.00	110.00	33.30	55.50	142°
165-4409AG2205	●	11.20	12.00	110.00	33.60	56.00	142°
165-4449AG2224	●	11.30	12.00	110.00	33.90	56.50	142°
165-4488AG2244	●	11.40	12.00	110.00	34.20	57.00	142°
165-4528AG2264	●	11.50	12.00	110.00	34.50	57.50	142°
165-4567AG2283	●	11.60	12.00	110.00	34.80	58.00	142°
165-4606AG2303	●	11.70	12.00	110.00	35.10	58.50	142°
165-4646AG2323	●	11.80	12.00	110.00	35.40	59.00	142°
165-4685AG2343	●	11.90	12.00	110.00	35.70	59.50	142°
165-4724AG2362	●	12.00	14.00	110.00	36.00	60.00	142°

● : U.S. Stock

5xD ORION Drills - Metric Sizes (Ø1.00mm - Ø3.70mm) NEW



Metric Drill Dimensions

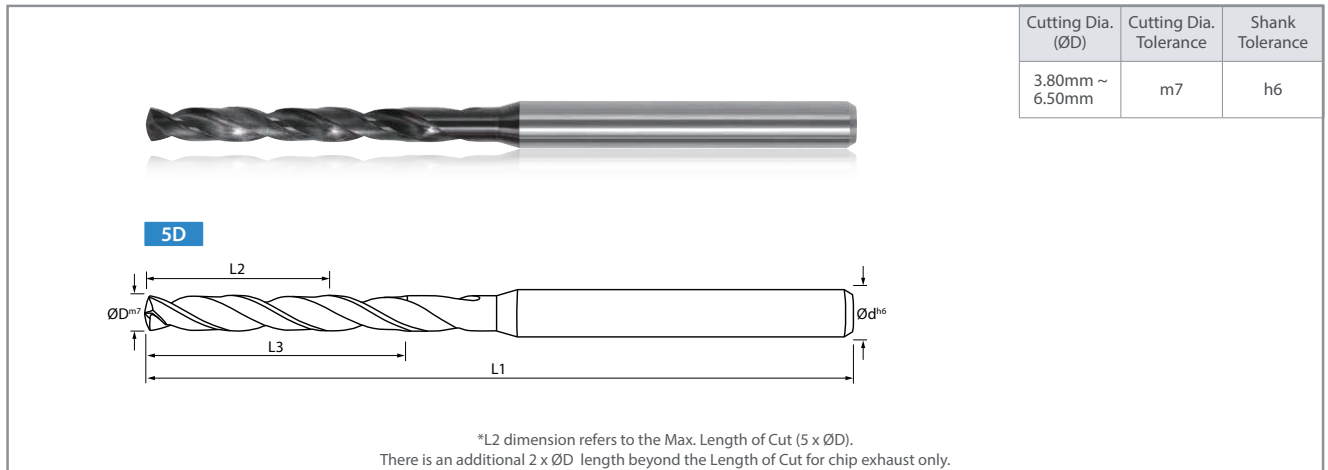
Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
165-0394AG276	●	1.00	3.00	60.00	5.00	0.276	142°
165-0433AG303	●	1.10	3.00	60.00	5.50	0.303	142°
165-0472AG331	●	1.20	3.00	60.00	6.00	0.331	142°
165-0512AG358	●	1.30	3.00	60.00	6.50	0.358	142°
165-0551AG386	●	1.40	3.00	60.00	7.00	0.386	142°
165-0591AG413	●	1.50	3.00	60.00	7.50	10.50	142°
165-0630AG441	●	1.60	3.00	60.00	8.00	11.20	142°
165-0669AG469	●	1.70	3.00	60.00	8.50	11.90	142°
165-0709AG496	●	1.80	3.00	60.00	9.00	12.60	142°
165-0748AG524	●	1.90	3.00	60.00	9.50	13.30	142°
165-0787AG551	●	2.00	3.00	60.00	10.00	14.00	142°
165-0827AG579	●	2.10	3.00	60.00	10.50	14.70	142°
165-0866AG606	●	2.20	3.00	60.00	11.00	15.40	142°
165-0906AG634	●	2.30	3.00	60.00	11.50	16.10	142°
165-0945AG661	●	2.40	3.00	60.00	12.00	16.80	142°
165-0984AG689	●	2.50	3.00	60.00	12.50	17.50	142°
165-1024AG717	●	2.60	3.00	60.00	13.00	18.20	142°
165-1063AG744	●	2.70	3.00	60.00	13.50	18.90	142°
165-1102AG772	●	2.80	3.00	60.00	14.00	19.60	142°
165-1142AG799	●	2.90	3.00	60.00	14.50	20.30	142°
165-1181AG827	●	3.00	4.00	70.00	15.00	21.00	142°
165-1220AG854	●	3.10	4.00	70.00	15.50	21.70	142°
165-1260AG882	●	3.20	4.00	70.00	16.00	22.40	142°
165-1299AG909	●	3.30	4.00	70.00	16.50	23.10	142°
165-1339AG937	●	3.40	4.00	70.00	17.00	23.80	142°
165-1378AG965	●	3.50	4.00	70.00	17.50	24.50	142°
165-1417AG992	●	3.60	4.00	70.00	18.00	25.20	142°
165-1457AG1020	●	3.70	4.00	70.00	18.50	25.90	142°

● : U.S. Stock

Hi Performance Drill

ORION I Series 165

5xD ORION Drills - Metric Sizes (Ø3.80mm - Ø6.50mm) NEW



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
165-1496AG1047	●	3.80	4.00	70.00	19.00	26.60	142°
165-1535AG1075	●	3.90	4.00	70.00	19.50	27.30	142°
165-1575AG1102	●	4.00	6.00	90.00	20.00	28.00	142°
165-1614AG1130	●	4.10	6.00	90.00	20.50	28.70	142°
165-1654AG1157	●	4.20	6.00	90.00	21.00	29.40	142°
165-1693AG1185	●	4.30	6.00	90.00	21.50	30.10	142°
165-1732AG1213	●	4.40	6.00	90.00	22.00	30.80	142°
165-1772AG1240	●	4.50	6.00	90.00	22.50	31.50	142°
165-1811AG1268	●	4.60	6.00	90.00	23.00	32.20	142°
165-1850AG1295	●	4.70	6.00	90.00	23.50	32.90	142°
165-1890AG1323	●	4.80	6.00	90.00	24.00	33.60	142°
165-1929AG1350	●	4.90	6.00	90.00	24.50	34.30	142°
165-1969AG1378	●	5.00	6.00	90.00	25.00	35.00	142°
165-2008AG1406	●	5.10	6.00	90.00	25.50	35.70	142°
165-2047AG1433	●	5.20	6.00	90.00	26.00	36.40	142°
165-2087AG1461	●	5.30	6.00	90.00	26.50	37.10	142°
165-2126AG1488	●	5.40	6.00	90.00	27.00	37.80	142°
165-2165AG1516	●	5.50	6.00	90.00	27.50	38.50	142°
165-2205AG1543	●	5.60	6.00	90.00	28.00	39.20	142°
165-2244AG1571	●	5.70	6.00	90.00	28.50	39.90	142°
165-2283AG1598	●	5.80	6.00	90.00	29.00	40.60	142°
165-2323AG1626	●	5.90	6.00	90.00	29.50	41.30	142°
165-2362AG1654	●	6.00	8.00	100.00	30.00	42.00	142°
165-2402AG1681	●	6.10	8.00	100.00	30.50	42.70	142°
165-2441AG1709	●	6.20	8.00	100.00	31.00	43.40	142°
165-2480AG1736	●	6.30	8.00	100.00	31.50	44.10	142°
165-2520AG1764	●	6.40	8.00	100.00	32.00	44.80	142°
165-2559AG1791	●	6.50	8.00	100.00	32.50	45.50	142°

● : U.S. Stock

Automotive

Mold & Die

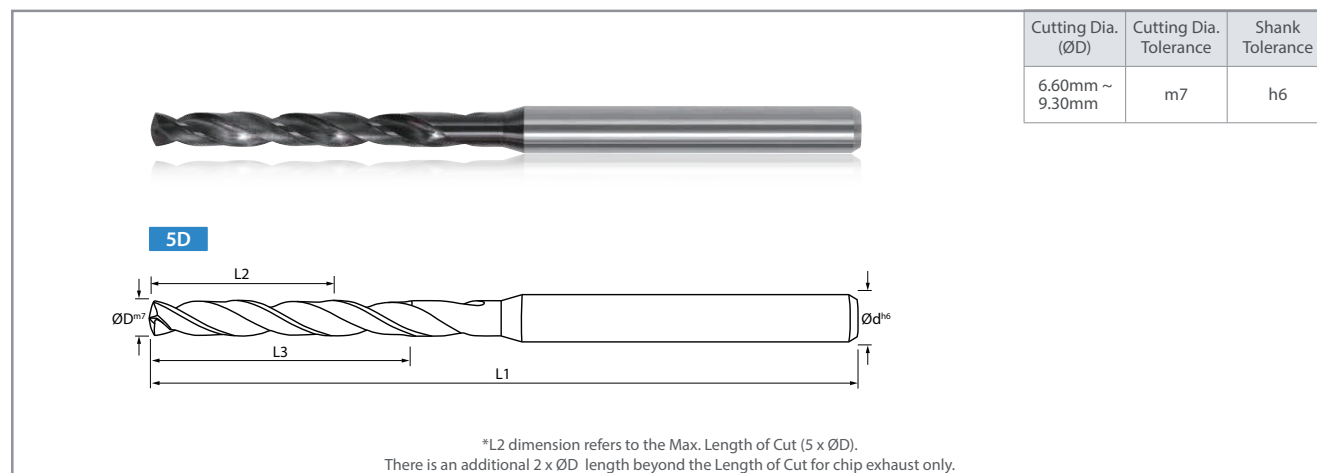
Aerospace

High Performance

General

Special Tools

5xD ORION Drills - Metric Sizes (Ø6.60mm - Ø9.30mm) NEW



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
165-2598AG1819	●	6.60	8.00	100.00	33.00	46.20	142°
165-2638AG1846	●	6.70	8.00	100.00	33.50	46.90	142°
165-2677AG1874	●	6.80	8.00	100.00	34.00	47.60	142°
165-2717AG1902	●	6.90	8.00	100.00	34.50	48.30	142°
165-2756AG1929	●	7.00	8.00	100.00	35.00	49.00	142°
165-2795AG1957	●	7.10	8.00	100.00	35.50	49.70	142°
165-2835AG1984	●	7.20	8.00	100.00	36.00	50.40	142°
165-2874AG2012	●	7.30	8.00	100.00	36.50	51.10	142°
165-2913AG2039	●	7.40	8.00	100.00	37.00	51.80	142°
165-2953AG2067	●	7.50	8.00	100.00	37.50	52.50	142°
165-2992AG2094	●	7.60	8.00	100.00	38.00	53.20	142°
165-3031AG2122	●	7.70	8.00	100.00	38.50	53.90	142°
165-3071AG2150	●	7.80	8.00	100.00	39.00	54.60	142°
165-3110AG2177	●	7.90	8.00	100.00	39.50	55.30	142°
165-3150AG2205	●	8.00	10.00	120.00	40.00	56.00	142°
165-3189AG2232	●	8.10	10.00	120.00	40.50	56.70	142°
165-3228AG2260	●	8.20	10.00	120.00	41.00	57.40	142°
165-3268AG2287	●	8.30	10.00	120.00	41.50	58.10	142°
165-3307AG2315	●	8.40	10.00	120.00	42.00	58.80	142°
165-3346AG2343	●	8.50	10.00	120.00	42.50	59.50	142°
165-3386AG2370	●	8.60	10.00	120.00	43.00	60.20	142°
165-3425AG2398	●	8.70	10.00	120.00	43.50	60.90	142°
165-3465AG2425	●	8.80	10.00	120.00	44.00	61.60	142°
165-3504AG2453	●	8.90	10.00	120.00	44.50	62.30	142°
165-3543AG2480	●	9.00	10.00	120.00	45.00	63.00	142°
165-3583AG2508	●	9.10	10.00	120.00	45.50	63.70	142°
165-3622AG2535	●	9.20	10.00	120.00	46.00	64.40	142°
165-3661AG2563	●	9.30	10.00	120.00	46.50	65.10	142°

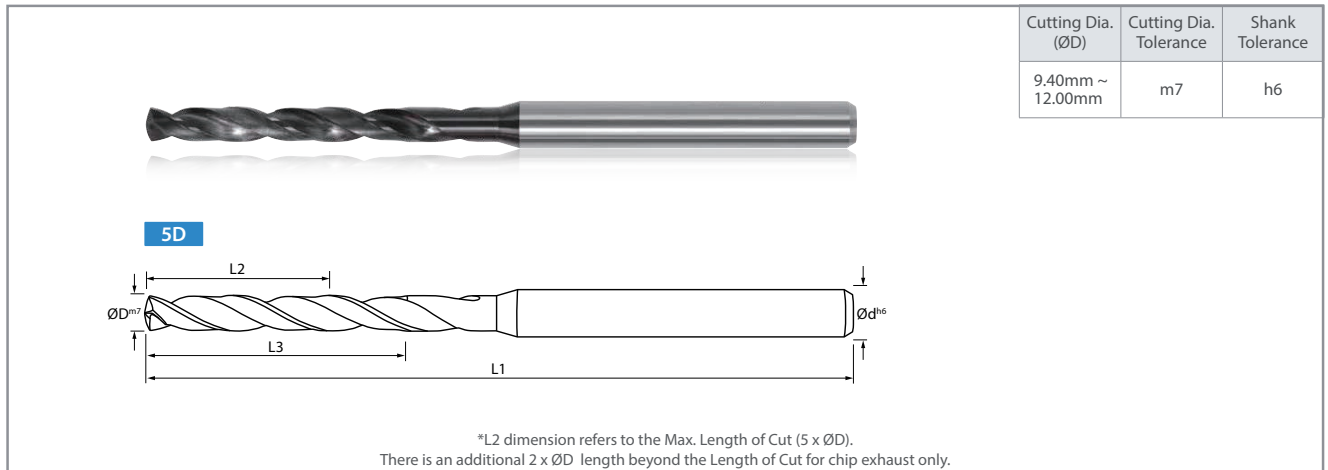
● : U.S. Stock

Hi Performance Drill

ORION I Series 165

5xD ORION Drills - Metric Sizes (Ø9.40mm - Ø12.00mm)

NEW



Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØD ^{m7}	Ød ^{h6}	L1	*L2	L3	
165-3701AG2591	●	9.40	10.00	120.00	47.00	65.80	142°
165-3740AG2618	●	9.50	10.00	120.00	47.50	66.50	142°
165-3780AG2646	●	9.60	10.00	120.00	48.00	67.20	142°
165-3819AG2673	●	9.70	10.00	120.00	48.50	67.90	142°
165-3858AG2701	●	9.80	10.00	120.00	49.00	68.60	142°
165-3898AG2728	●	9.90	10.00	120.00	49.50	69.30	142°
165-3937AG2756	●	10.00	12.00	140.00	50.00	70.00	142°
165-3976AG2783	●	10.10	12.00	140.00	50.50	70.70	142°
165-4016AG2811	●	10.20	12.00	140.00	51.00	71.40	142°
165-4055AG2839	●	10.30	12.00	140.00	51.50	72.10	142°
165-4094AG2866	●	10.40	12.00	140.00	52.00	72.80	142°
165-4134AG2894	●	10.50	12.00	140.00	52.50	73.50	142°
165-4173AG2921	●	10.60	12.00	140.00	53.00	74.20	142°
165-4213AG2949	●	10.70	12.00	140.00	53.50	74.90	142°
165-4252AG2976	●	10.80	12.00	140.00	54.00	75.60	142°
165-4291AG3004	●	10.90	12.00	140.00	54.50	76.30	142°
165-4331AG3031	●	11.00	12.00	140.00	55.00	77.00	142°
165-4370AG3059	●	11.10	12.00	140.00	55.50	77.70	142°
165-4409AG3087	●	11.20	12.00	140.00	56.00	78.40	142°
165-4449AG3114	●	11.30	12.00	140.00	56.50	79.10	142°
165-4488AG3142	●	11.40	12.00	140.00	57.00	79.80	142°
165-4528AG3169	●	11.50	12.00	140.00	57.50	80.50	142°
165-4567AG3197	●	11.60	12.00	140.00	58.00	81.20	142°
165-4606AG3224	●	11.70	12.00	140.00	58.50	81.90	142°
165-4646AG3252	●	11.80	12.00	140.00	59.00	82.60	142°
165-4685AG3280	●	11.90	12.00	140.00	59.50	83.30	142°
165-4724AG3307	●	12.00	14.00	140.00	60.00	84.00	142°

● : U.S. Stock

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

RECOMMENDED CUTTING CONDITIONS

Workpiece Material	Material Hardness/Types	Recommended Cutting Speed		Cutting Dia. DC (in)	Cutting Dia. DC (mm)	Feed Rate Drill Length to Dia Ratio	
		sfm	m/min			3xD & 5xD	
						(ipr)	(mm/rev)
Low Carbon Steel	12L14 A36	270 - 300 - 330	80 - 90 - 100	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0015 - 0.0030	0.04 - 0.08
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0030 - 0.0060	0.08 - 0.15
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0060 - 0.0090	0.15 - 0.23
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0090 - 0.0120	0.23 - 0.30
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0120 - 0.0150	0.30 - 0.38
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0120 - 0.0150	0.30 - 0.38
Mild Carbon Steel	1018 1028 1050	250 - 275 - 300	75 - 85 - 90	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0015 - 0.0030	0.04 - 0.08
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0030 - 0.0060	0.08 - 0.15
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0060 - 0.0090	0.15 - 0.23
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0090 - 0.0120	0.23 - 0.30
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0120 - 0.0150	0.30 - 0.38
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0120 - 0.0150	0.30 - 0.38
Alloy Steel	4130 4140 4150 8620	225 - 250 - 275	70 - 75 - 85	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0010 - 0.0020	0.03 - 0.05
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0020 - 0.0045	0.05 - 0.11
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0045 - 0.0070	0.11 - 0.18
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0070 - 0.0090	0.18 - 0.23
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0090 - 0.0115	0.23 - 0.29
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0090 - 0.0115	0.23 - 0.29
Prehardened Tool Steel	4140PH A2 D2 H13 P20	150 - 200 - 250	45 - 60 - 75	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0010 - 0.0020	0.03 - 0.05
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0020 - 0.0040	0.05 - 0.10
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0040 - 0.0060	0.10 - 0.15
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0060 - 0.0080	0.15 - 0.20
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0060 - 0.0080	0.15 - 0.20
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0060 - 0.0080	0.15 - 0.20
Hardened Tool Steel	>48 HRc	75 - 100 - 125	20 - 30 - 40	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0005 - 0.0010	0.01 - 0.03
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0010 - 0.0020	0.03 - 0.05
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0020 - 0.0030	0.05 - 0.08
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0030 - 0.0040	0.08 - 0.10
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0040 - 0.0050	0.10 - 0.13
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0040 - 0.0050	0.10 - 0.13
Stainless Steel	303 304 316 321	115 - 130 - 145	35 - 40 - 45	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0010 - 0.0020	0.03 - 0.05
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0020 - 0.0045	0.05 - 0.11
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0045 - 0.0070	0.11 - 0.18
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0070 - 0.0090	0.18 - 0.23
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0090 - 0.0115	0.23 - 0.29
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0110 - 0.0125	0.28 - 0.32
Stainless Steel	15-5PH 17-4PH 13-8 400 Series	90 - 100 - 110	25 - 30 - 35	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0010 - 0.0020	0.03 - 0.05
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0020 - 0.0040	0.05 - 0.10
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0040 - 0.0060	0.10 - 0.15
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0050 - 0.0070	0.13 - 0.18
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0060 - 0.0080	0.15 - 0.20
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0070 - 0.0090	0.18 - 0.23
Ø0.4685 - Ø0.5000	Ø11.90 - Ø12.70	0.0090 - 0.0110	0.23 - 0.28				

Recommended starting parameters based on good setup, minimum tool runout & good tooling

• Above recommendations are suggested starting parameters. Cutting speeds and feed rates may vary according to machining application and setup.

RECOMMENDED CUTTING CONDITIONS

Workpiece Material	Material Hardness/Types	Recommended Cutting Speed		Cutting Dia. DC (in)	Cutting Dia. DC (mm)	Feed Rate Drill Length to Dia Ratio	
		sfm	m/min			3xD & 5xD	
						(ipr)	(mm/rev)
Gray Cast Iron	-	295 - 325 - 355	90 - 100 - 110	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0015 - 0.0030	0.04 - 0.08
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0030 - 0.0060	0.08 - 0.15
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0060 - 0.0090	0.15 - 0.23
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0090 - 0.0120	0.23 - 0.30
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0120 - 0.0150	0.30 - 0.38
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0150 - 0.0170	0.38 - 0.43
Nodular Cast Iron	-	235 - 260 - 285	70 - 80 - 85	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0010 - 0.0025	0.03 - 0.06
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0025 - 0.0050	0.06 - 0.13
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0055 - 0.0080	0.14 - 0.20
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0080 - 0.0110	0.20 - 0.28
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0110 - 0.0130	0.28 - 0.33
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0130 - 0.0150	0.33 - 0.38
Aluminum	-	ALLOY 320 - 350 - 380	ALLOY 100 - 105 - 115	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0015 - 0.0030	0.04 - 0.08
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0030 - 0.0070	0.08 - 0.18
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0070 - 0.0095	0.18 - 0.24
		CAST 400 - 450 - 500	CAST 120 - 135 - 150	Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0095 - 0.0125	0.24 - 0.32
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0125 - 0.0140	0.32 - 0.36
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0140 - 0.0155	0.36 - 0.39
Copper Alloys	-	280 - 325 - 360	85 - 100 - 110	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0015 - 0.0030	0.04 - 0.08
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0030 - 0.0070	0.08 - 0.18
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0070 - 0.0095	0.18 - 0.24
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0095 - 0.0125	0.24 - 0.32
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0125 - 0.0140	0.32 - 0.36
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0140 - 0.0155	0.36 - 0.39
Heat Resistant Alloy	Hastelloy Inconel Monel Waspalloy Promet	60 - 75 - 85	20 - 22 - 25	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0005 - 0.0010	0.01 - 0.03
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0010 - 0.0020	0.03 - 0.05
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0020 - 0.0030	0.05 - 0.08
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0030 - 0.0040	0.08 - 0.10
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0040 - 0.0050	0.10 - 0.13
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0050 - 0.0060	0.13 - 0.15
Titanium Alloy	-	90 - 100 - 110	27 - 30 - 33	Ø0.0394 - Ø0.0787	Ø1.00 - Ø2.00	0.0005 - 0.0010	0.01 - 0.03
				Ø0.0787 - Ø0.1535	Ø2.00 - Ø3.90	0.0010 - 0.0020	0.03 - 0.05
				Ø0.1575 - Ø0.2320	Ø4.00 - Ø5.90	0.0020 - 0.0030	0.05 - 0.08
				Ø0.2360 - Ø0.3110	Ø6.00 - Ø7.90	0.0030 - 0.0040	0.08 - 0.10
				Ø0.3150 - Ø0.3898	Ø8.00 - Ø9.90	0.0040 - 0.0050	0.10 - 0.13
				Ø0.3937 - Ø0.4685	Ø10.00 - Ø11.90	0.0040 - 0.0050	0.10 - 0.13

Recommended starting parameters based on good setup, minimum tool runoff & good tooling

- Above recommendations are suggested starting parameters. Cutting speeds and feed rates may vary according to machining application and setup.

Automotive

Mold & Die

Aerospace

High Performance

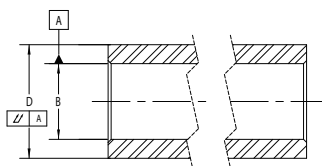
General

Special Tools

Case Studies

Bushing 17-4PH Stainless Steel

Vc = 147.3 sfm (n = 1,800 rpm)
Vf = 4.32 ipm
D.O.C. = 0.500"
Ø0.3125"
160-3125AG1563



Tool Life

ORION Ø0.3125"

659 pcs / tool

Tool Life
↑
3.3x

Competitor A
Ø0.3125"

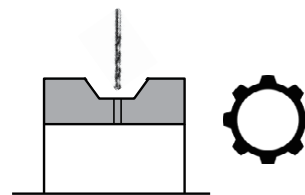
200 pcs / tool

The ORION drill showed 3.3 times the tool life of Competitor A.

(User Evaluation)

Gear 1045 Steel

Vc = 165 sfm (n = 7,583 rpm)
Vf = 0.005 ipt
D.O.C. = 0.276"
Ø2.1mm
165-0827AG413 (Special)
Number of Holes: 4



Tool Life

ORION Ø2.1mm

1,000 Parts (4,000 Holes)

Tool Life
↑
1.7x

Competitor B
Ø2.1mm

600 Parts (2,400 Holes)

The ORION drill showed 1.7 times the tool life of Competitor B.
There is also a 10% better cost performance.

(User Evaluation)

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

High Performance Drills



Flat Bottom Drill

2ZDK-HP

New Generation Flat Bottom Drill. Stable Machining in a Wide Range of Applications Including Counterboring and Drilling in Cylinder Surfaces. Low Cutting Force Corner Edge Prevents Burr Formation

Automotive

Mold & Die

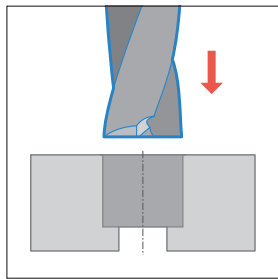
Aerospace

High Performance

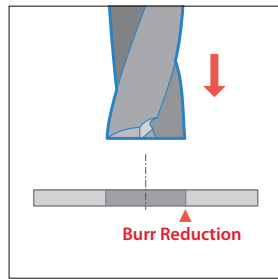
General

Special Tools

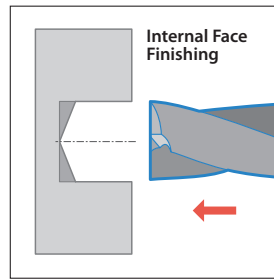
1 Flat Bottom Used in a Wide Range of Machining Applications



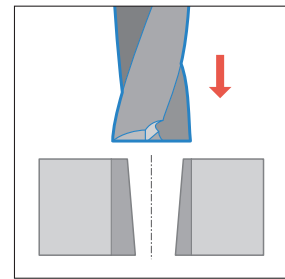
Hole Counterboring



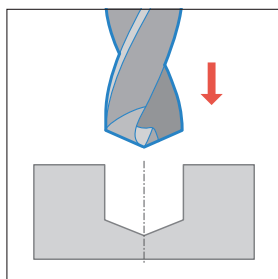
Plunging on Thin Plate



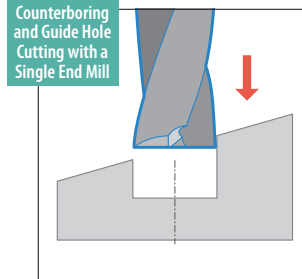
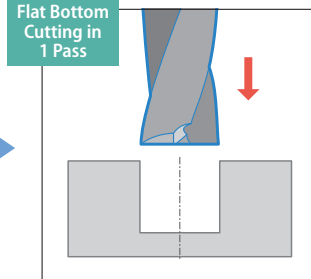
Turning in Automatic Lathes



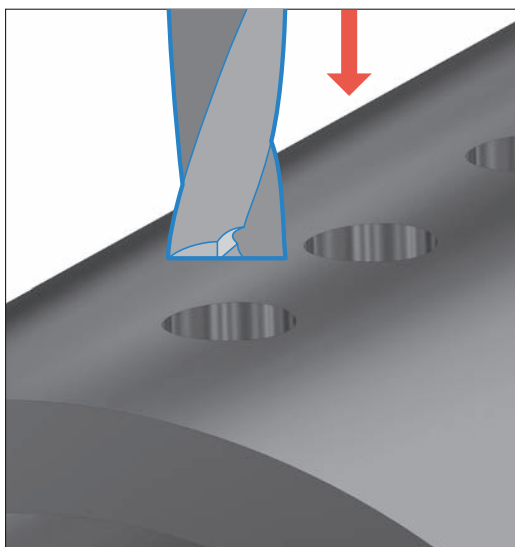
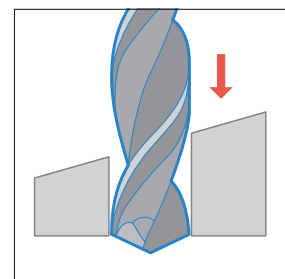
Hole Expanding



Flat Bottom Finishing after Drilling



Counterboring on Slant Surface/Spotting for Secondary Process



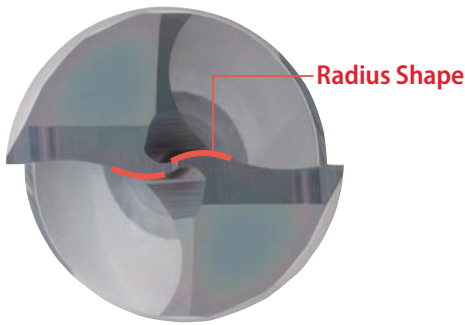
Achieves Stable Machining even in Difficult Drilling Situations

Drilling in Cylinder and Curved Surfaces

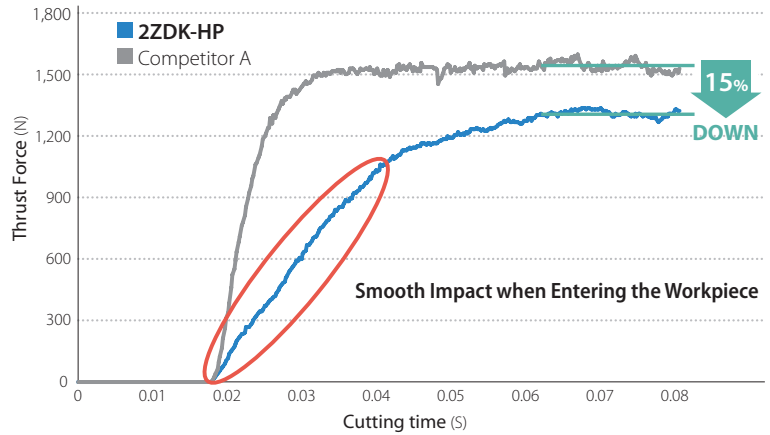
2 High Precision Machining

Chisel Edge with S-curve Provides Lower Cutting Forces
 Reduced Impact Forces when Entering the Workpiece and Provides Excellent Vibration Control for High Precision Drilling

Special Thinning Shape



Cutting Force Comparison (In-house Evaluation)

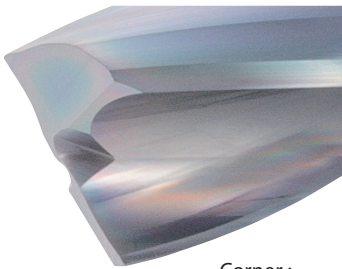


Cutting Conditions: $n = 1,800 \text{ min}^{-1}$, $V_f = 400 \text{ mm/min}$, Drilling Depth 10 mm, Dry Drilling Dia. $\phi 12 \text{ mm}$ (3D Type)
 Workpiece: S50C

3 Minimizes Burrs

Low Cutting Force with Flat Bottom and Sharp Cutting Edge
 Minimizes Burrs

Low Cutting Force Corner Edge Design



Corner :
 Positive Rake Angle

Burr Comparison (In-house Evaluation)

Drilling in Cylinder Surface

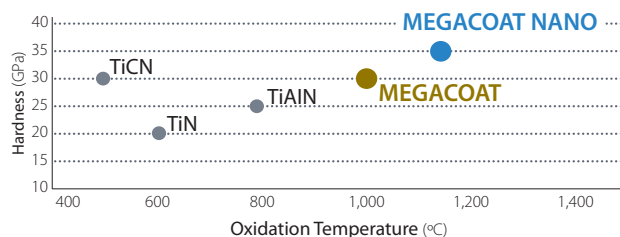


Cutting Conditions: $n = 7,000 \text{ min}^{-1}$, $V_f = 420 \text{ mm/min}$, Wet Drilling Dia. $\phi 3.5 \text{ mm}$ (3D Type)
 Workpiece: Carbon Steel Pipe $\phi 17.3 \text{ mm}$ (Thickness 3.2 mm)

4 Long Tool Life with MEGACOAT NANO Coating Technology

The special Multilayer Nano Coating prevents wear and chipping with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150 °C)

Coating Property

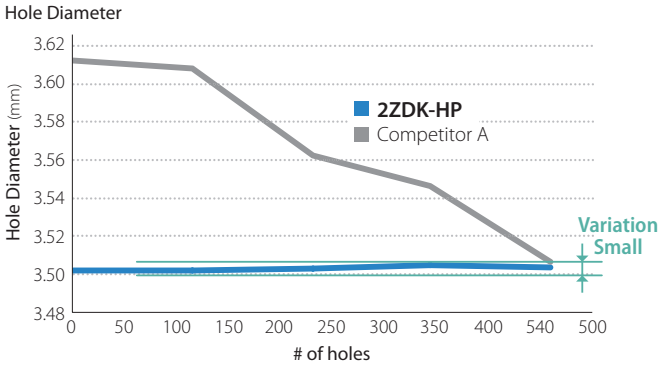


Drilling in Flat Surface

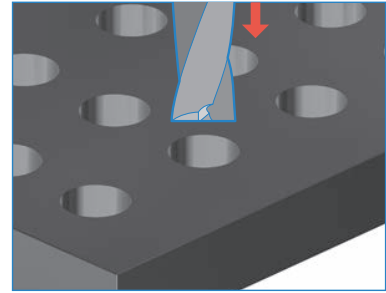
Cutting Performance Comparison (In-house Evaluation)

Drilling Dia. : $\phi 3.5\text{mm}$

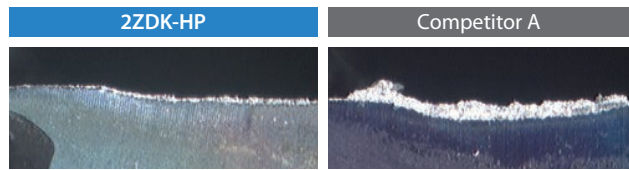
Stable and High Precision Machining with Less Variation in Hole Diameter
Excellent Cutting Edge Condition



Cutting Conditions: $n = 6,000 \text{ min}^{-1}$, $V_f = 360 \text{ mm/min}$, Drilling Depth 5 mm, Wet Drilling Dia. $\phi 3.5 \text{ mm}$ (3D Type) Workpiece: SCM440



Cutting Edge after Machining 500 holes



Automotive

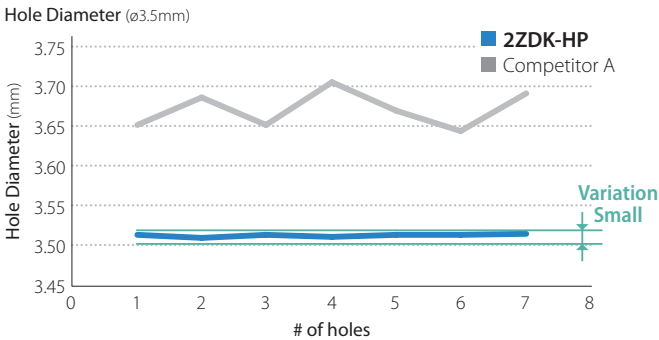
Mold & Die

Drilling in Cylinder Surface

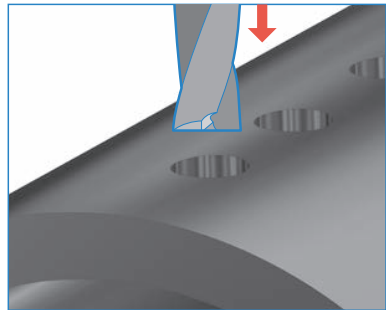
Cutting Performance Comparison (In-house Evaluation)

Drilling Dia. : $\phi 3.5\text{mm}$

Stable and High Precision Machining with Less Variation in Hole Diameter



Cutting Conditions: $n = 7,000 \text{ min}^{-1}$, $V_f = 420 \text{ mm/min}$, Wet Drilling Dia. $\phi 3.5 \text{ mm}$ (3D Type) Workpiece: Carbon Steel Pipe $\phi 17.3 \text{ mm}$ (Thickness 3.2 mm)



Aerospace

High Performance

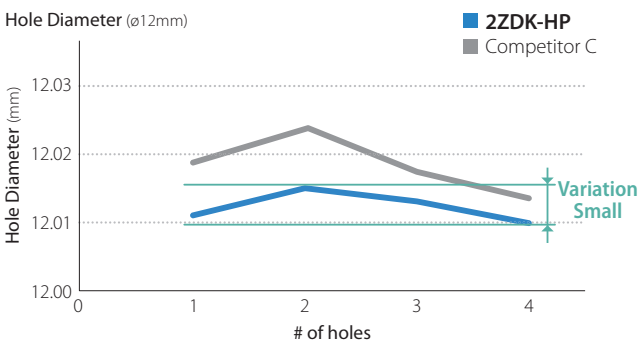
General

Special Tools

Cutting Performance Comparison (In-house Evaluation)

Drilling Dia. : $\phi 12\text{mm}$

Minimizes Hole Diameter Variation even at Feed Rates as High as 0.3mm/rev. Stable Machining without Chip Clogging

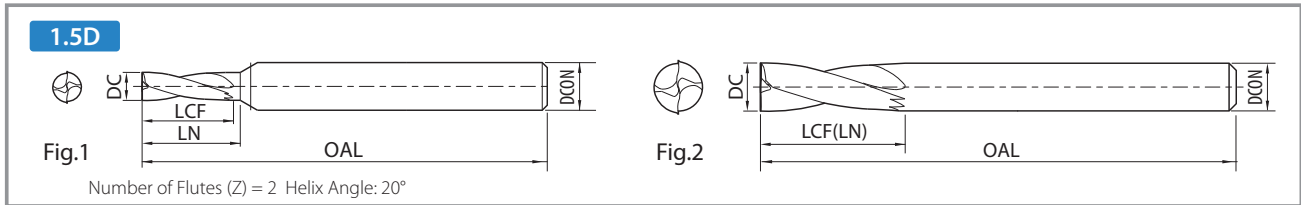


Surface Finish and Chips

	2ZDK-HP	Competitor C
Surface Finish		
Chips		

Cutting Conditions: $n = 1,800 \text{ min}^{-1}$, $V_f = 540 \text{ mm/min}$, Wet Drilling Dia. $\phi 12 \text{ mm}$ (3D Type) Workpiece: Carbon Steel Pipe $\phi 25 \text{ mm}$ (Thickness 4 mm)

Stock Items (1.5D Type)



Description	Stock	Dimensions (mm)						Drawing
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL	
2ZDK030HP-1.5D	●	3.0	⁰ / _{-0.010}	9	10	6	60	Fig.1
2ZDK031HP-1.5D	●	3.1						
2ZDK032HP-1.5D	●	3.2	⁰ / _{-0.012}	10	11	6	60	Fig.1
2ZDK033HP-1.5D	●	3.3						
2ZDK034HP-1.5D	●	3.4						
2ZDK035HP-1.5D	●	3.5	⁰ / _{-0.012}	11	12	6	60	Fig.1
2ZDK036HP-1.5D	●	3.6						
2ZDK037HP-1.5D	●	3.7						
2ZDK038HP-1.5D	●	3.8						
2ZDK039HP-1.5D	●	3.9	⁰ / _{-0.012}	12	13	6	60	Fig.1
2ZDK040HP-1.5D	●	4.0						
2ZDK041HP-1.5D	●	4.1						
2ZDK042HP-1.5D	●	4.2	⁰ / _{-0.012}	13	14	6	60	Fig.1
2ZDK043HP-1.5D	●	4.3						
2ZDK044HP-1.5D	●	4.4						
2ZDK045HP-1.5D	●	4.5	⁰ / _{-0.012}	14	15	6	60	Fig.1
2ZDK046HP-1.5D	●	4.6						
2ZDK047HP-1.5D	●	4.7						
2ZDK048HP-1.5D	●	4.8	⁰ / _{-0.012}	15	16	6	60	Fig.1
2ZDK049HP-1.5D	●	4.9						
2ZDK050HP-1.5D	●	5.0						
2ZDK051HP-1.5D	●	5.1	⁰ / _{-0.012}	16	17	6	60	Fig.1
2ZDK052HP-1.5D	●	5.2						
2ZDK053HP-1.5D	●	5.3						
2ZDK054HP-1.5D	●	5.4						
2ZDK055HP-1.5D	●	5.5	⁰ / _{-0.012}	17	18	6	60	Fig.1
2ZDK056HP-1.5D	●	5.6						
2ZDK057HP-1.5D	●	5.7						
2ZDK058HP-1.5D	●	5.8	⁰ / _{-0.012}	18	19	6	60	Fig.1
2ZDK059HP-1.5D	●	5.9						
2ZDK060HP-1.5D	●	6.0	⁰ / _{-0.012}	19	(21)	6	60	Fig.2
2ZDK061HP-1.5D	●	6.1						
2ZDK062HP-1.5D	●	6.2	⁰ / _{-0.015}	19	21	8	70	Fig.1
2ZDK063HP-1.5D	●	6.3						
2ZDK064HP-1.5D	●	6.4						
2ZDK065HP-1.5D	●	6.5	⁰ / _{-0.015}	20	22	8	70	Fig.1
2ZDK066HP-1.5D	●	6.6						
2ZDK067HP-1.5D	●	6.7						
2ZDK068HP-1.5D	●	6.8	⁰ / _{-0.015}	21	23	8	70	Fig.1
2ZDK069HP-1.5D	●	6.9						
2ZDK070HP-1.5D	●	7.0						
2ZDK071HP-1.5D	●	7.1	⁰ / _{-0.015}	22	24	8	70	Fig.1
2ZDK072HP-1.5D	●	7.2						
2ZDK073HP-1.5D	●	7.3						
2ZDK074HP-1.5D	●	7.4	⁰ / _{-0.015}	23	25	8	70	Fig.1
2ZDK075HP-1.5D	●	7.5						

Description	Stock	Dimensions (mm)						Drawing
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL	
2ZDK076HP-1.5D	●	7.6						
2ZDK077HP-1.5D	●	7.7						
2ZDK078HP-1.5D	●	7.8	⁰ / _{-0.015}	24	25	8	70	Fig.1
2ZDK079HP-1.5D	●	7.9						
2ZDK080HP-1.5D	●	8.0	⁰ / _{-0.015}	25	(27)	8	70	Fig.2
2ZDK081HP-1.5D	●	8.1	⁰ / _{-0.015}	25	27	10	80	Fig.1
2ZDK082HP-1.5D	●	8.2						
2ZDK083HP-1.5D	●	8.3						
2ZDK084HP-1.5D	●	8.4	⁰ / _{-0.015}	26	28	10	80	Fig.1
2ZDK085HP-1.5D	●	8.5						
2ZDK086HP-1.5D	●	8.6						
2ZDK087HP-1.5D	●	8.7	⁰ / _{-0.015}	27	29	10	80	Fig.1
2ZDK088HP-1.5D	●	8.8						
2ZDK089HP-1.5D	●	8.9						
2ZDK090HP-1.5D	●	9.0	⁰ / _{-0.015}	28	30	10	80	Fig.1
2ZDK091HP-1.5D	●	9.1						
2ZDK092HP-1.5D	●	9.2						
2ZDK093HP-1.5D	●	9.3	⁰ / _{-0.015}	29	31	10	80	Fig.1
2ZDK094HP-1.5D	●	9.4						
2ZDK095HP-1.5D	●	9.5						
2ZDK096HP-1.5D	●	9.6						
2ZDK097HP-1.5D	●	9.7	⁰ / _{-0.015}	30	32	10	80	Fig.1
2ZDK098HP-1.5D	●	9.8						
2ZDK099HP-1.5D	●	9.9	⁰ / _{-0.015}	31	33	10	80	Fig.1
2ZDK100HP-1.5D	●	10.0	⁰ / _{-0.015}	31	(33)	10	80	Fig.2
2ZDK101HP-1.5D	●	10.1	⁰ / _{-0.018}	31	33	12	100	Fig.1
2ZDK102HP-1.5D	●	10.2						
2ZDK103HP-1.5D	●	10.3	⁰ / _{-0.018}	32	34	12	100	Fig.1
2ZDK104HP-1.5D	●	10.4						
2ZDK105HP-1.5D	●	10.5						
2ZDK106HP-1.5D	●	10.6						
2ZDK107HP-1.5D	●	10.7	⁰ / _{-0.018}	33	35	12	100	Fig.1
2ZDK108HP-1.5D	●	10.8						
2ZDK109HP-1.5D	●	10.9						
2ZDK110HP-1.5D	●	11.0	⁰ / _{-0.018}	34	36	12	100	Fig.1
2ZDK111HP-1.5D	●	11.1						
2ZDK112HP-1.5D	●	11.2						
2ZDK113HP-1.5D	●	11.3	⁰ / _{-0.018}	35	37	12	100	Fig.1
2ZDK114HP-1.5D	●	11.4						
2ZDK115HP-1.5D	●	11.5						
2ZDK116HP-1.5D	●	11.6						
2ZDK117HP-1.5D	●	11.7	⁰ / _{-0.018}	36	38	12	100	Fig.1
2ZDK118HP-1.5D	●	11.8						
2ZDK119HP-1.5D	●	11.9						
2ZDK120HP-1.5D	●	12.0	⁰ / _{-0.018}	37	(39)	12	100	Fig.2

● : Standard Stock

Automotive

Mold & Die

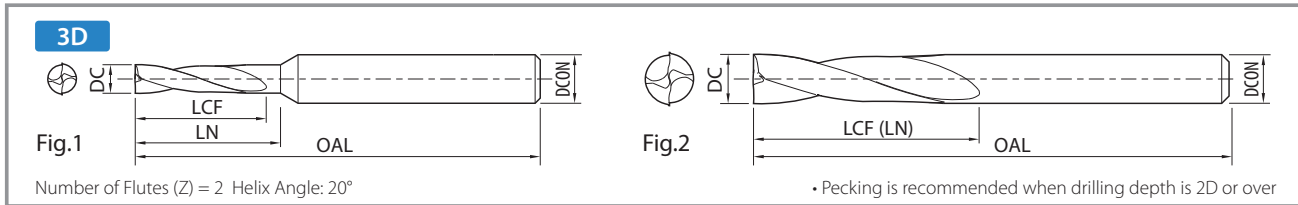
Aerospace

High Performance

General

Special Tools

Stock Items (3D Type)

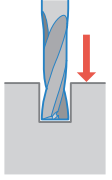


Description	Stock	Dimensions (mm)						Drawing
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL	
2ZDK030HP-3D	●	3.0	⁰ / _{-0.010}	14	15	6	60	Fig.1
2ZDK031HP-3D	●	3.1	⁰ / _{-0.012}	14	15	6	60	Fig.1
2ZDK032HP-3D	●	3.2	⁰ / _{-0.012}	14	15	6	60	Fig.1
2ZDK033HP-3D	●	3.3	⁰ / _{-0.012}	15	16	6	60	Fig.1
2ZDK034HP-3D	●	3.4	⁰ / _{-0.012}	15	16	6	60	Fig.1
2ZDK035HP-3D	●	3.5	⁰ / _{-0.012}	17	18	6	60	Fig.1
2ZDK036HP-3D	●	3.6	⁰ / _{-0.012}	17	18	6	60	Fig.1
2ZDK037HP-3D	●	3.7	⁰ / _{-0.012}	17	18	6	60	Fig.1
2ZDK038HP-3D	●	3.8	⁰ / _{-0.012}	17	18	6	60	Fig.1
2ZDK039HP-3D	●	3.9	⁰ / _{-0.012}	19	20	6	60	Fig.1
2ZDK040HP-3D	●	4.0	⁰ / _{-0.012}	19	20	6	60	Fig.1
2ZDK041HP-3D	●	4.1	⁰ / _{-0.012}	19	20	6	60	Fig.1
2ZDK042HP-3D	●	4.2	⁰ / _{-0.012}	20	21	6	60	Fig.1
2ZDK043HP-3D	●	4.3	⁰ / _{-0.012}	20	21	6	60	Fig.1
2ZDK044HP-3D	●	4.4	⁰ / _{-0.012}	21	22	6	60	Fig.1
2ZDK045HP-3D	●	4.5	⁰ / _{-0.012}	21	22	6	60	Fig.1
2ZDK046HP-3D	●	4.6	⁰ / _{-0.012}	21	22	6	60	Fig.1
2ZDK047HP-3D	●	4.7	⁰ / _{-0.012}	21	22	6	60	Fig.1
2ZDK048HP-3D	●	4.8	⁰ / _{-0.012}	21	22	6	60	Fig.1
2ZDK049HP-3D	●	4.9	⁰ / _{-0.012}	23	24	6	60	Fig.1
2ZDK050HP-3D	●	5.0	⁰ / _{-0.012}	23	24	6	60	Fig.1
2ZDK051HP-3D	●	5.1	⁰ / _{-0.012}	23	24	6	60	Fig.1
2ZDK052HP-3D	●	5.2	⁰ / _{-0.012}	24	25	6	60	Fig.1
2ZDK053HP-3D	●	5.3	⁰ / _{-0.012}	24	25	6	60	Fig.1
2ZDK054HP-3D	●	5.4	⁰ / _{-0.012}	24	25	6	60	Fig.1
2ZDK055HP-3D	●	5.5	⁰ / _{-0.012}	25	26	6	60	Fig.1
2ZDK056HP-3D	●	5.6	⁰ / _{-0.012}	26	27	6	60	Fig.1
2ZDK057HP-3D	●	5.7	⁰ / _{-0.012}	26	27	6	60	Fig.1
2ZDK058HP-3D	●	5.8	⁰ / _{-0.012}	26	27	6	60	Fig.1
2ZDK059HP-3D	●	5.9	⁰ / _{-0.012}	28	(28)	6	60	Fig.2
2ZDK060HP-3D	●	6.0	⁰ / _{-0.012}	28	(28)	6	60	Fig.2
2ZDK061HP-3D	●	6.1	⁰ / _{-0.015}	28	29	8	70	Fig.1
2ZDK062HP-3D	●	6.2	⁰ / _{-0.015}	28	29	8	70	Fig.1
2ZDK063HP-3D	●	6.3	⁰ / _{-0.015}	28	29	8	70	Fig.1
2ZDK064HP-3D	●	6.4	⁰ / _{-0.015}	30	31	8	70	Fig.1
2ZDK065HP-3D	●	6.5	⁰ / _{-0.015}	30	31	8	70	Fig.1
2ZDK066HP-3D	●	6.6	⁰ / _{-0.015}	30	31	8	70	Fig.1
2ZDK067HP-3D	●	6.7	⁰ / _{-0.015}	31	32	8	70	Fig.1
2ZDK068HP-3D	●	6.8	⁰ / _{-0.015}	31	32	8	70	Fig.1
2ZDK069HP-3D	●	6.9	⁰ / _{-0.015}	31	32	8	70	Fig.1
2ZDK070HP-3D	●	7.0	⁰ / _{-0.015}	32	33	8	70	Fig.1
2ZDK071HP-3D	●	7.1	⁰ / _{-0.015}	32	33	8	70	Fig.1
2ZDK072HP-3D	●	7.2	⁰ / _{-0.015}	32	33	8	70	Fig.1
2ZDK073HP-3D	●	7.3	⁰ / _{-0.015}	34	35	8	70	Fig.1
2ZDK074HP-3D	●	7.4	⁰ / _{-0.015}	34	35	8	70	Fig.1
2ZDK075HP-3D	●	7.5	⁰ / _{-0.015}	34	35	8	70	Fig.1

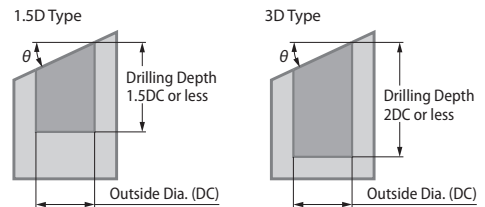
Description	Stock	Dimensions (mm)						Drawing
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL	
2ZDK076HP-3D	●	7.6	⁰ / _{-0.015}	34	35	8	70	Fig.1
2ZDK077HP-3D	●	7.7	⁰ / _{-0.015}	34	35	8	70	Fig.1
2ZDK078HP-3D	●	7.8	⁰ / _{-0.015}	34	35	8	70	Fig.1
2ZDK079HP-3D	●	7.9	⁰ / _{-0.015}	34	35	8	70	Fig.1
2ZDK080HP-3D	●	8.0	⁰ / _{-0.015}	36	(36)	8	70	Fig.2
2ZDK081HP-3D	●	8.1	⁰ / _{-0.015}	36	37	10	80	Fig.1
2ZDK082HP-3D	●	8.2	⁰ / _{-0.015}	36	37	10	80	Fig.1
2ZDK083HP-3D	●	8.3	⁰ / _{-0.015}	36	37	10	80	Fig.1
2ZDK084HP-3D	●	8.4	⁰ / _{-0.015}	36	37	10	80	Fig.1
2ZDK085HP-3D	●	8.5	⁰ / _{-0.015}	38	39	10	80	Fig.1
2ZDK086HP-3D	●	8.6	⁰ / _{-0.015}	38	39	10	80	Fig.1
2ZDK087HP-3D	●	8.7	⁰ / _{-0.015}	38	39	10	80	Fig.1
2ZDK088HP-3D	●	8.8	⁰ / _{-0.015}	39	40	10	80	Fig.1
2ZDK089HP-3D	●	8.9	⁰ / _{-0.015}	39	40	10	80	Fig.1
2ZDK090HP-3D	●	9.0	⁰ / _{-0.015}	40	41	10	80	Fig.1
2ZDK091HP-3D	●	9.1	⁰ / _{-0.015}	40	41	10	80	Fig.1
2ZDK092HP-3D	●	9.2	⁰ / _{-0.015}	40	41	10	80	Fig.1
2ZDK093HP-3D	●	9.3	⁰ / _{-0.015}	40	41	10	80	Fig.1
2ZDK094HP-3D	●	9.4	⁰ / _{-0.015}	42	43	10	80	Fig.1
2ZDK095HP-3D	●	9.5	⁰ / _{-0.015}	42	43	10	80	Fig.1
2ZDK096HP-3D	●	9.6	⁰ / _{-0.015}	42	43	10	80	Fig.1
2ZDK097HP-3D	●	9.7	⁰ / _{-0.015}	42	43	10	80	Fig.1
2ZDK098HP-3D	●	9.8	⁰ / _{-0.015}	42	43	10	80	Fig.1
2ZDK099HP-3D	●	9.9	⁰ / _{-0.015}	45	(45)	10	80	Fig.2
2ZDK100HP-3D	●	10.0	⁰ / _{-0.015}	45	(45)	10	80	Fig.2
2ZDK101HP-3D	●	10.1	⁰ / _{-0.018}	45	46	12	100	Fig.1
2ZDK102HP-3D	●	10.2	⁰ / _{-0.018}	45	46	12	100	Fig.1
2ZDK103HP-3D	●	10.3	⁰ / _{-0.018}	46	47	12	100	Fig.1
2ZDK104HP-3D	●	10.4	⁰ / _{-0.018}	46	47	12	100	Fig.1
2ZDK105HP-3D	●	10.5	⁰ / _{-0.018}	47	48	12	100	Fig.1
2ZDK106HP-3D	●	10.6	⁰ / _{-0.018}	47	48	12	100	Fig.1
2ZDK107HP-3D	●	10.7	⁰ / _{-0.018}	47	48	12	100	Fig.1
2ZDK108HP-3D	●	10.8	⁰ / _{-0.018}	51	52	12	100	Fig.1
2ZDK109HP-3D	●	10.9	⁰ / _{-0.018}	51	52	12	100	Fig.1
2ZDK110HP-3D	●	11.0	⁰ / _{-0.018}	51	52	12	100	Fig.1
2ZDK111HP-3D	●	11.1	⁰ / _{-0.018}	51	52	12	100	Fig.1
2ZDK112HP-3D	●	11.2	⁰ / _{-0.018}	51	52	12	100	Fig.1
2ZDK113HP-3D	●	11.3	⁰ / _{-0.018}	53	54	12	100	Fig.1
2ZDK114HP-3D	●	11.4	⁰ / _{-0.018}	53	54	12	100	Fig.1
2ZDK115HP-3D	●	11.5	⁰ / _{-0.018}	53	54	12	100	Fig.1
2ZDK116HP-3D	●	11.6	⁰ / _{-0.018}	53	54	12	100	Fig.1
2ZDK117HP-3D	●	11.7	⁰ / _{-0.018}	53	54	12	100	Fig.1
2ZDK118HP-3D	●	11.8	⁰ / _{-0.018}	54	(54)	12	100	Fig.2
2ZDK119HP-3D	●	11.9	⁰ / _{-0.018}	54	(54)	12	100	Fig.2
2ZDK120HP-3D	●	12.0	⁰ / _{-0.018}	54	(54)	12	100	Fig.2

● : Standard Stock

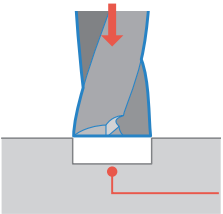
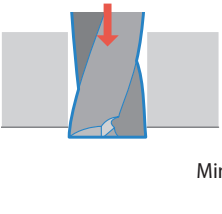
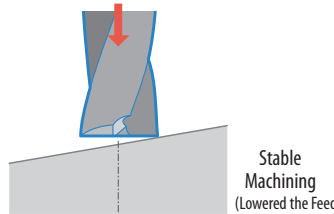
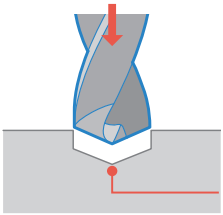
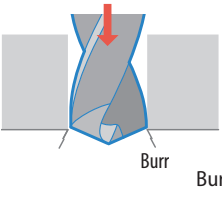
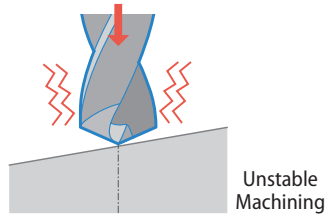
Cutting Conditions

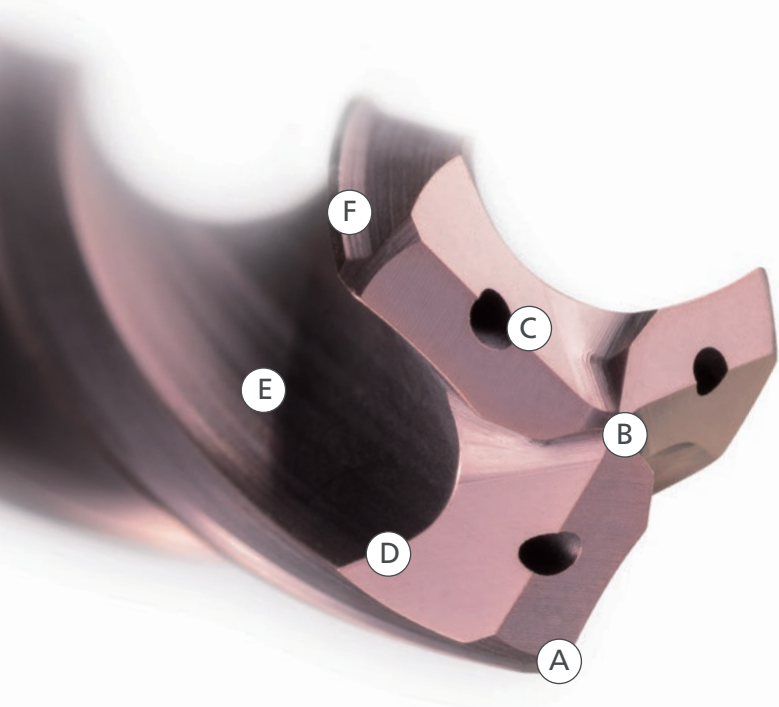
Workpiece	Application	Drilling Depth (mm)	Outside Dia. DC (mm)	Drilling Depth (mm)								
				3	3.5	4	4.5	5	6	8	10	12
Structural Steel Carbon Steel SS400, S45C		1.5D Type: $ap \leq 1.5DC$ 3D Type: $ap \leq 2DC$	Spindle Revolution (min ⁻¹)	9,100	7,800	6,800	6,100	5,500	4,600	3,500	2,800	2,300
			Feed Rate (mm/min)	520	520	520	520	520	520	520	520	520
Alloy Steel SCM, SNCM		1.5D Type: $ap \leq 1.5DC$ 3D Type: $ap \leq 2DC$	Spindle Revolution (min ⁻¹)	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800
			Feed Rate (mm/min)	450	450	450	450	450	450	450	450	450
Pre-hardened Steel (30 ~ 45HRC)		1.5D Type: $ap \leq 1.5DC$ 3D Type: $ap \leq 2DC$	Spindle Revolution (min ⁻¹)	3,900	3,400	2,900	2,600	2,300	1,900	1,500	1,200	1,000
			Feed Rate (mm/min)	210	210	210	210	210	210	210	210	210
Nodular Cast Iron FCD400		1.5D Type: $ap \leq 1.5DC$ 3D Type: $ap \leq 2DC$	Spindle Revolution (min ⁻¹)	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800
			Feed Rate (mm/min)	390	390	390	390	390	390	390	390	390
Aluminum Alloy A7075		1.5D Type: $ap \leq 1.5DC$ 3D Type: $ap \leq 2DC$	Spindle Revolution (min ⁻¹)	17,800	15,200	13,100	11,800	10,500	8,900	6,700	5,400	4,500
			Feed Rate (mm/min)	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270
Aluminum Alloy Casting AC, ADC	1.5D Type: $ap \leq 1.5DC$ 3D Type: $ap \leq 2DC$	Spindle Revolution (min ⁻¹)	13,100	11,500	10,000	8,800	8,000	6,700	5,000	4,000	3,400	
		Feed Rate (mm/min)	820	820	820	820	820	820	820	820	820	

- **This tool is specially designed for plunging and NOT recommended for traversing**
- Coolant is recommended
- Adjust ap to suit machine rigidity and overhang length
- Use chuck and machine with the highest rigidity possible
- Pecking is recommended when drilling depth is 2D or over
- Stainless steel cutting (SUS304/SUS316) is NOT recommended
- Cutting condition modifications may be needed when cutting a slant surface, depending on the slant angle (Right Figure)
- When workpiece slant is 30° or less, reduce the feed rate by 50%
- When workpiece slant is 30° or more, reduce the revolution by 70% and the feed rate by 30%



Comparison with Standard Drill

	Bottom Shape	Burr	Drilling in Slant Surface
2ZDK-HP	 Almost even	 Minimizes Burrs	 Stable Machining (Lowered the Feed)
Standard Drill	 Same as Bottom Shape	 Burr Build-up	 Unstable Machining



SERIES 141K



HIGH PERFORMANCE CARBIDE DRILLS

The key features designed into the Hi-PerCarb Series 141K Drill allow the product to offer application benefits not only beyond that of standard carbide drills, but also other High Performance drills. Each feature of the Hi-PerCarb Series 141K Drill was uniquely engineered as a solution towards addressing the issues commonly encountered during high production drilling.

A TRI-MARGIN DESIGN

- improved hole stability over two-flute designs
- superior surface finish, roundness, and hole cylindricity
- unsurpassed hole size control

B SELF-STABILIZING POINT AND OPEN FLUTE STRUCTURE

- pyramid design stabilizes the drill on contact with the workpiece
- engineered flute shape efficiently transports chip volume without sacrificing strength

C COOLANT THROUGH TOOLING

- puts coolant as close to cut as possible for consistent chip flushing, maximum cooling, and highest productivity

D EDGE AND CORNER PROTECTION

- corner chamfers provide strength and reduce breakout when drilling through holes in cast iron
- automated edge treatment process extends tool life by eliminating microscopic imperfections in the cutting edges

E APPLICATION SPECIFIC COATING AND PREMIUM CARBIDE

- Ti-Namite M is a state-of-the-art nano-composite surface coating that maximizes wear resistance in abrasive cast irons
- 141K drills are manufactured from premium certified carbide to further ensure the highest level of quality, performance, and longevity

F MINIMAL MARGIN DESIGN

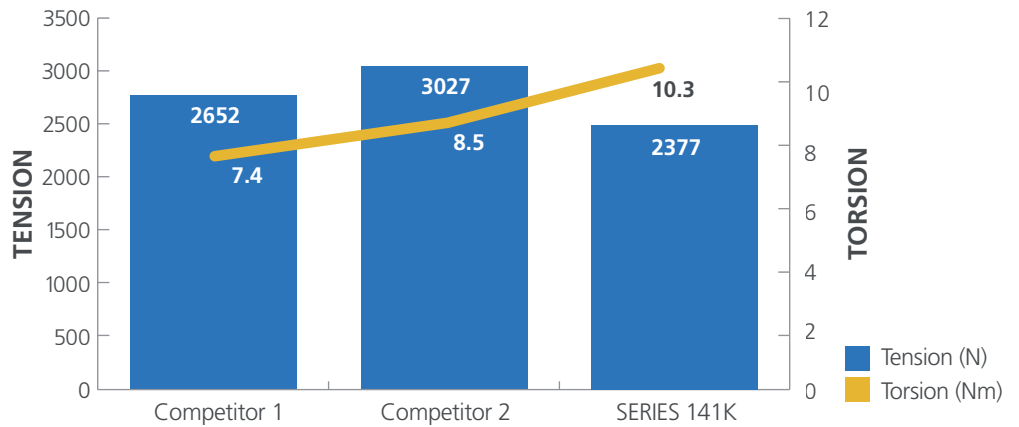
- a narrow margin reduces frictional heat generated by excessive contact with the workpiece, and the parallel design helps to maintain a consistent contact width as the margins wear

PERFORMANCE. PRECISION. PASSION.
HI-PERCARB SERIES 141K CAST IRON DRILLS

PERFORMANCE.

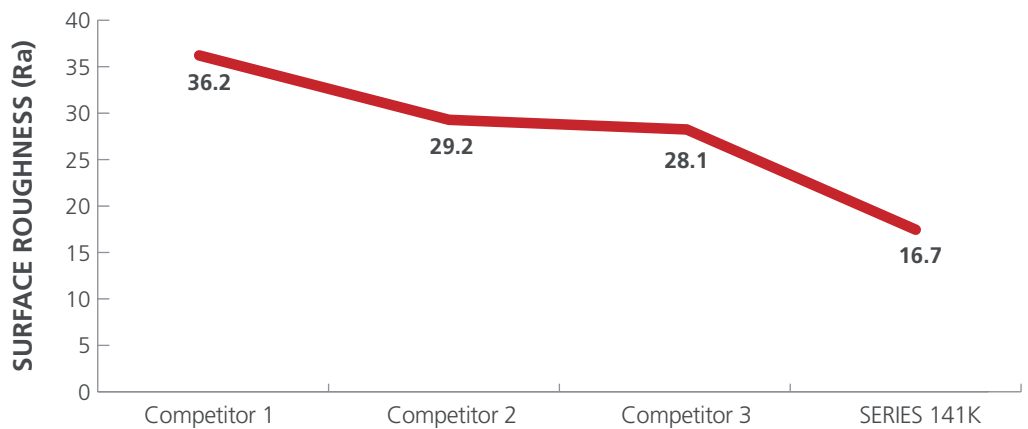
FORCE COMPARISON

Series 141K drills with 20% less force than the top competitors



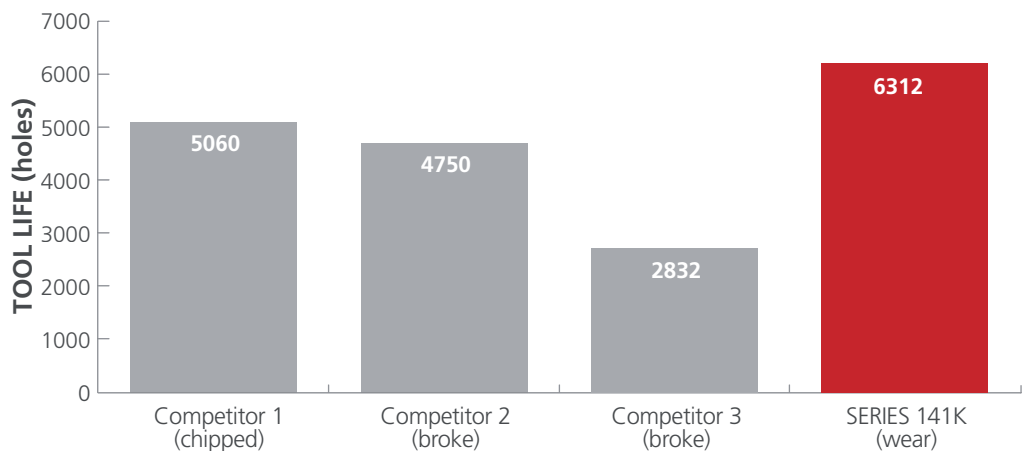
SURFACE FINISH COMPARISON

Series 141K drill results in improvement of hole finishes 40-50% over leading competitors



USAGE & WEAR COMPARISONS

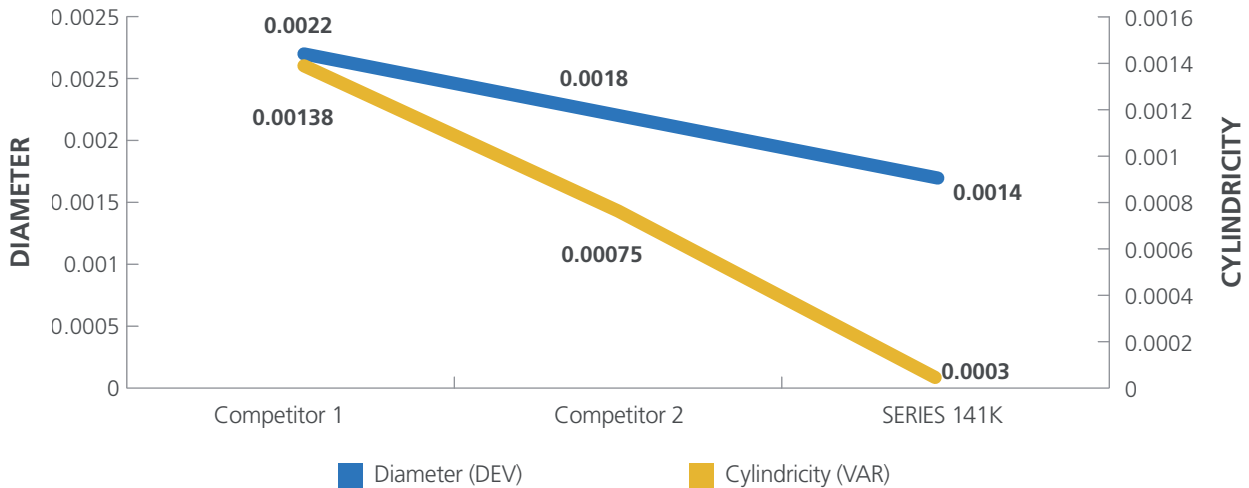
Series 141K drill results in 50% tool life improvement over a range of leading competitors



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PRECISION.

SERIES 141K Hole Size Comparison vs. Competition in Class 40 Cast Iron



PASSION.

Lab Results Indicate the Hi-PerCarb Series 141K Drill outperforms the competition in measured hole quality at a variety of speed and feed rates.

Ti-NAMITE-M

Features of Ti-Namite-M include high wear resistance, reduced friction, and excellent prevention of cutting edge build up. This coating allows superior material removal rates and tool life when used in high performance operations in Cast Iron and Steel and with difficult to machine materials like Titanium.

Hardness (HV): 3600

Oxidation Temperature: 1150°C / 2100°F

Coefficient of Friction: 0.45

Thickness: 1-4 Microns (based on tool diameter)



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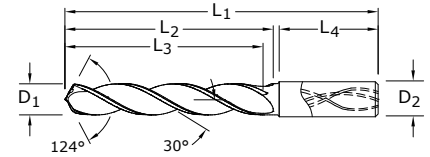


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181–.2362	+0.0016/+0.0063	h6
>.2362–.3937	+0.0024/+0.0083	h6
>.3937–.7087	+0.0028/+0.0098	h6
>.7087–1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



-  Common
-  5XD Reach
-  Right Spiral
-  Internal Coolant
-  3 Flutes

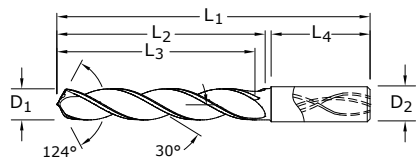
Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-M (TM) EDP No.
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	65160
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	65161
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	55160
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	65162
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	65163
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	65164
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	55161
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	65165
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	55162
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	65166
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	65167
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	65168
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	65169
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	55163
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	65170
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	55164
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	65171
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	65172
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	65173
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	55165
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	65174
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	65175
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	65176
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	65177
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	55166
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	65178
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	65179
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	65180
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	65181
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	55167
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	65182
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	65183
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	65184
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	65185
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	55168
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	65186
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	65187
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	65188
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	65189
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0	55169

(continued on next page)

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General
- Special Tools

Hi Performance Drill

Hi-PerCarb I Series 141K



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.00047	h6
>.1181-.2362	+0.0016/+0.00063	h6
>.2362-.3937	+0.0024/+0.00083	h6
>.3937-.7087	+0.0028/+0.00098	h6
>.7087-1.1811	+0.0031/+0.00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-M (TM) EDP No.
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	65190
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	65191
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	65192
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	65193
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0	55170
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	65194
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	65195
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0	55171
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	65196
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	65197
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0	55172
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	65198
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0	65199
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	65200
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	65201
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0	55173
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	65202
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	65203
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	65204
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	65205
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0	55174
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	65206
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	65207
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	65208
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	65209
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0	55175
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	65210
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	65211
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	65212
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	65213
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0	55176
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	65214
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0	55177
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	65215
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	65216
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0	65217
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0	55178
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	65218
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	65219
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	65220



Common



5xD Reach



Right Spiral



Internal Coolant



3 Flutes

(continued on next page)

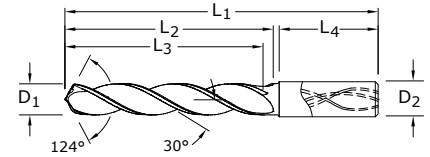


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



-  Common
-  5XD Reach
-  Right Spiral
-  Internal Coolant
-  3 Flutes

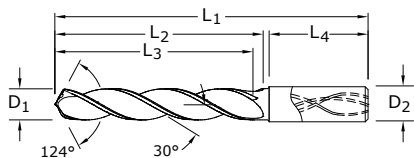
Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-M (TM) EDP No.
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	65221
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0	55179
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	65222
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	65223
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	55180
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	65224
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	65225
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	55181
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	65226
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	65227
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	65228
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	65229
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	55182
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	65230
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	65231
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	65232
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	65233
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	55183
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	65234
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	65235
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	65236
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	65237
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	55184
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	65238
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	65239
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	65240
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	65241
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	55185
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	65242
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	65243
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	65244
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	65245
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	65246
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	65247
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	65248
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	65249
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	55186
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	65250
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	55187
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	65251

(continued on next page)

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General
- Special Tools

Hi Performance Drill

Hi-PerCarb I Series 141K



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Ti-NAMITE-M (TM) EDP No.
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	55188
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	65252
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	65253
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	55189
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	65254
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	65255
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	65256
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	55190
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	65257
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	55191
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	65258
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	65259
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	65260
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	65261
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	55192
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	65262
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	55193
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	55194
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	55195



Common



5xD Reach



Right Spiral



Internal Coolant



3 Flutes



Series 141K 5D Metric	Hardness	Vc (m/min)		Diameter (D ₁) (mm)							
				3	6	8	10	12	14	16	
K	GRAY CAST IRON FERRITIC ASTM A48: CLASS 20 SAE J431C: GRADE 1800	≤ 150 Bhn or ≤ 80 HRb (110-165)	137	RPM	14541	7271	5453	4362	3635	3116	2726
			Fr	0.119	0.237	0.316	0.395	0.475	0.554	0.633	
			Feed (mm/min)	1725	1725	1725	1725	1725	1725	1725	
	GRAY CAST IRON PEARLITIC ASTM A48: CLASS 30, 35, 40 SAE J431C: GRADE 3000	≤ 220 Bhn or ≤ 19 HRc (91-137)	114	RPM	12118	6059	4544	3635	3029	2597	2272
			Fr	0.094	0.189	0.252	0.315	0.378	0.441	0.504	
			Feed (mm/min)	1145	1145	1145	1145	1145	1145	1145	
	COMPACTED GRAPHITE IRON	≤ 250 Bhn or ≤ 25 HRc (79-119)	99	RPM	10502	5251	3938	3151	2626	2250	1969
			Fr	0.094	0.189	0.251	0.314	0.377	0.440	0.503	
			Feed (mm/min)	990	990	990	990	990	990	990	
MALLEABLE CAST IRON FERRITIC ASTM A220: GRADE 40010 SAE J158: GRADE M4504	≤ 160 Bhn or ≤ 3 HRc (110-165)	137	RPM	14541	7271	5453	4362	3635	3116	2726	
		Fr	0.119	0.237	0.316	0.395	0.475	0.554	0.633		
		Feed (mm/min)	1725	1725	1725	1725	1725	1725	1725		
MALLEABLE CAST IRON MARTENSITE ASTM A220: GRADE 90001 SAE J158: GRADE M8501	≤ 320 Bhn or ≤ 34 HRc (61-91)	76	RPM	8078	4039	3029	2424	2020	1731	1515	
		Fr	0.076	0.151	0.201	0.252	0.302	0.352	0.403		
		Feed (mm/min)	610	610	610	610	610	610	610		

Note:

- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (D₁ x 3.14)
- mm/min = Fr x rpm
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Automotive

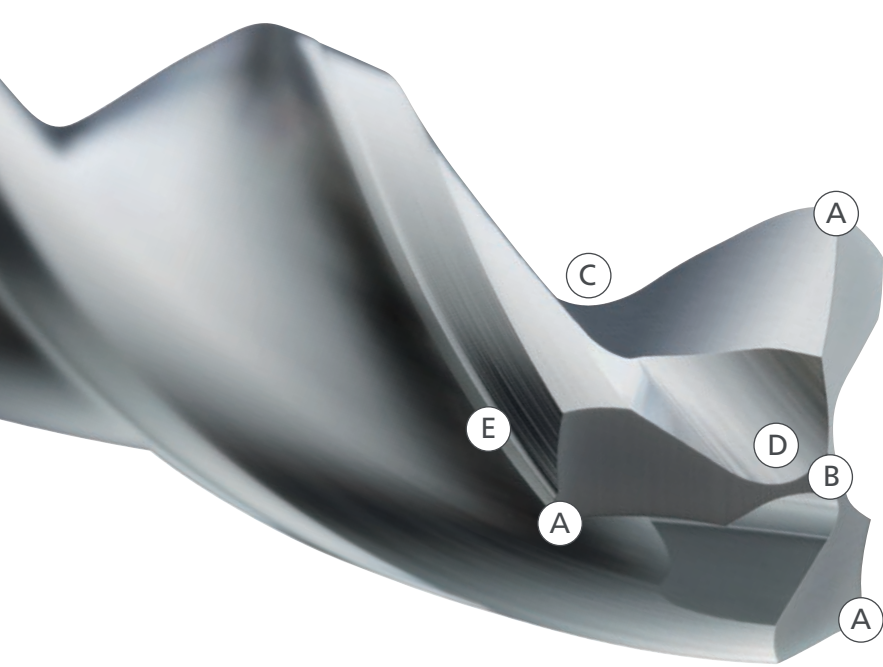
Mold & Die

Aerospace

High Performance

General

Special Tools



SERIES 131N



HIGH PERFORMANCE CARBIDE DRILLS

The key features designed into the Hi-PerCarb Series 131N Drill allow the product to offer application benefits not only beyond that of standard carbide drills, but also other High Performance drills. Each feature of the Hi-PerCarb Series 131N Drill was uniquely engineered as a solution towards addressing the issues commonly encountered during high production drilling.

- A TRI-MARGIN DESIGN**
 - improved hole stability over two-flute designs
 - superior surface finish, roundness and hole cylindricity
 - unsurpassed hole size control
- B SELF-STABILIZING POINT**
 - pyramid design stabilizes the drill on contact with the workpiece
- C OPEN FLUTE STRUCTURE**
 - efficiently transports chips while maintaining strength at high feed rates
- D SCULPTED GASH**
 - allows chips to easily flow away from the drill center
 - reduced cutting forces over competitive three-flute designs
- E MINIMAL MARGIN DESIGN**
 - reduces frictional heat generated by excessive margin contact with the workpiece
 - parallel design maintains contact width as margin wears for performance consistency

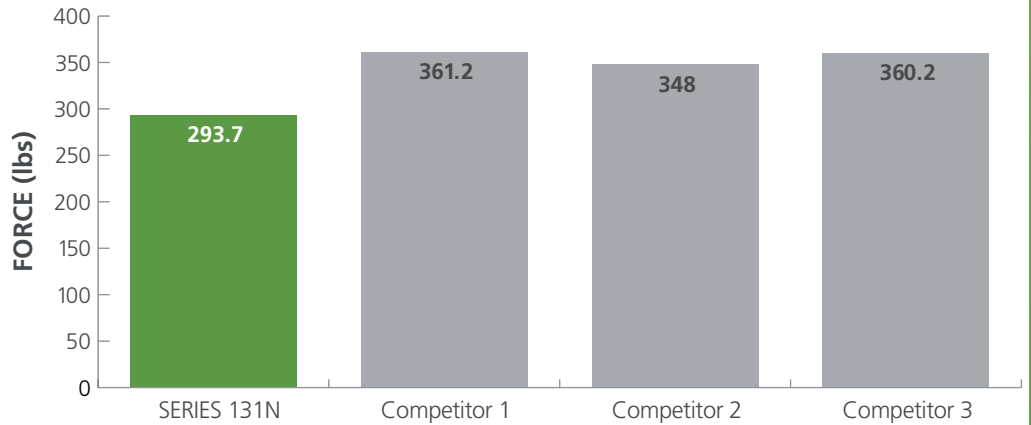
Now available with 3XD and 5XD Coated and Uncoated Options!

PERFORMANCE. PRECISION. PASSION.
 HI-PERCARB SERIES 131N ALUMINUM DRILLS

PERFORMANCE.

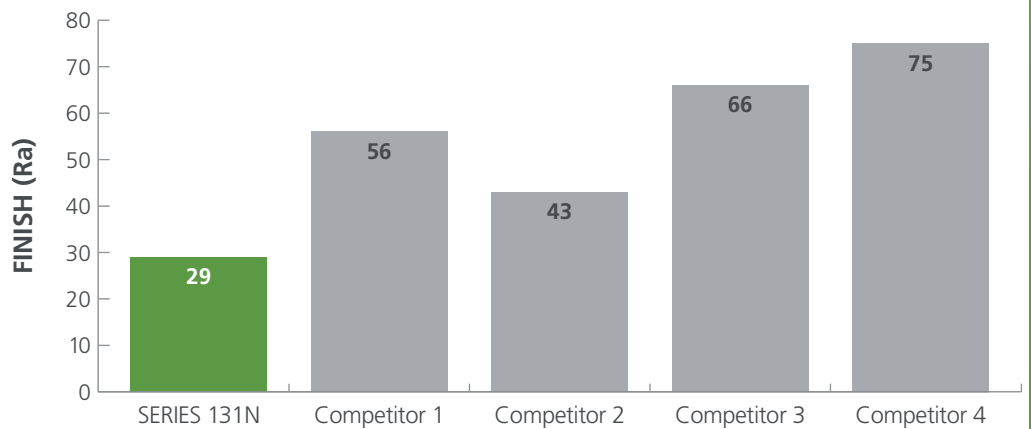
FORCE COMPARISON

Series 131N drills with 15-20% less force than the top competitors



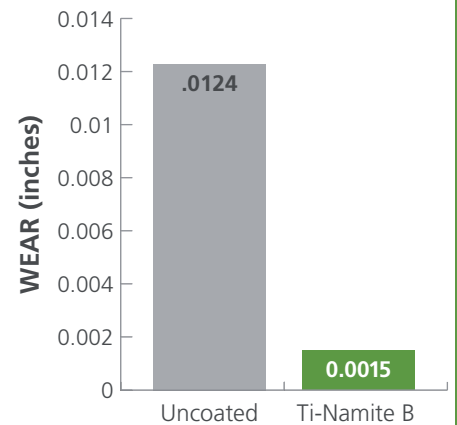
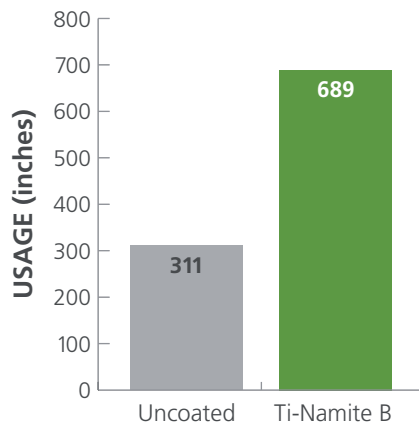
SURFACE FINISH COMPARISON

Series 131N drill results in improvement of hole finishes 30-60% over leading competitors



USAGE & WEAR COMPARISONS

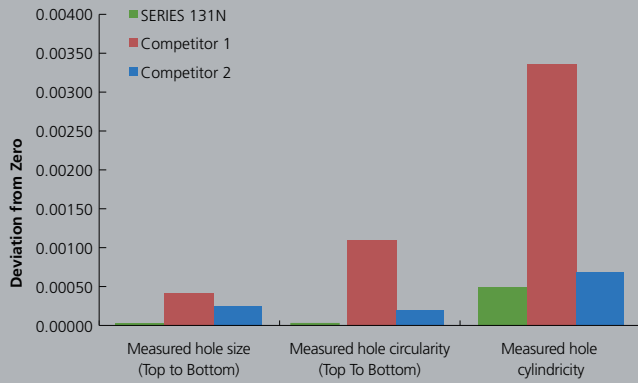
Ti-NAMITE B coating significantly improves wear resistance, which is particularly beneficial when drilling high silicon aluminum alloys



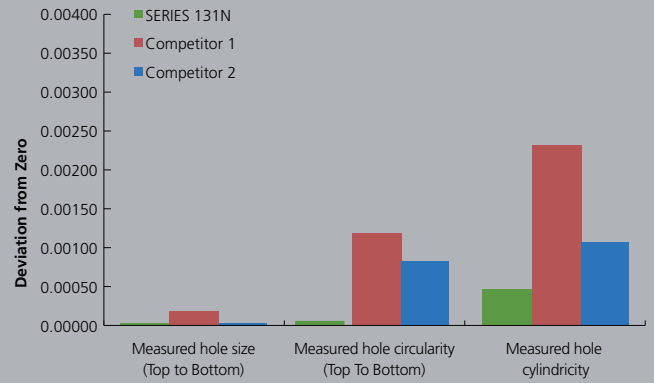
PRECISION.

SERIES 131N 3 Flute Drill vs. Competition 2 Flute Drill in 2024 Aluminum

**4847 RPM
65 INCHES PER MINUTE**



**6786 RPM
100 INCHES PER MINUTE**

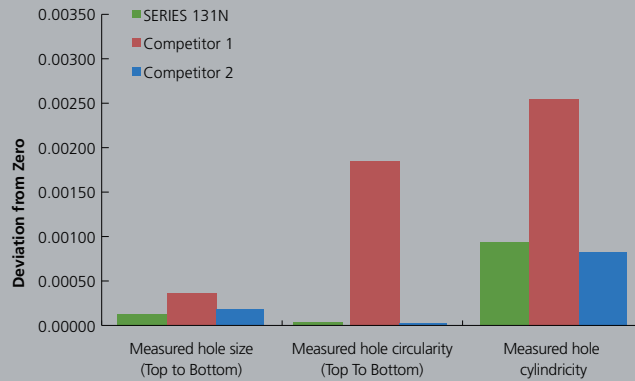


PASSION.

Lab Results Indicate the Hi-PerCarb Series 131N Drill outperforms the competition in measured hole quality at a variety of speed and feed rates.



**9530 RPM
200 INCHES PER MINUTE**



Now also available uncoated!

Ti-NAMITE-B

This ceramic based coating ensures a smooth surface and a low affinity to cold welding or edge build-up, which makes it optimal for aluminum and copper applications. It has high toughness and high hardness.

Microhardness: 4000 HV

Oxidation Temperature: 850°C / 1562°F

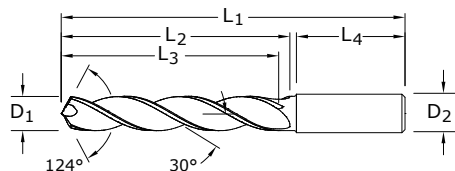
Coefficient of Friction: 0.45

Thickness: 1-2 Microns (based on tool diameter)

www.kyocera-sgstool.com

Hi Performance Drill

Hi-PerCarb I Series 131N



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

New Expanded Tools

Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
3,0 mm	0.1181			6,0	62,0	20,0	14,0	36,0	64600	67600
3,1 mm	0.1220			6,0	62,0	20,0	14,0	36,0	64601	67601
1/8	0.1250	3.18		6,0	62,0	20,0	14,0	36,0	54600	54700
3,2 mm	0.1260		M3,5 X 0,35	6,0	62,0	20,0	14,0	36,0	64602	67602
3,3 mm	0.1299		M4 X 0,7	6,0	62,0	20,0	14,0	36,0	64603	67603
3,4 mm	0.1339			6,0	62,0	20,0	14,0	36,0	64604	67604
#29	0.1360	3.45	8-32,8-36	6,0	62,0	20,0	14,0	36,0	54601	54701
3,5 mm	0.1378		M4 X 0,5	6,0	62,0	20,0	14,0	36,0	64605	67605
9/64	0.1406	3.57		6,0	62,0	20,0	14,0	36,0	54602	54702
3,6 mm	0.1417		M4 X 0,35	6,0	62,0	20,0	14,0	36,0	64606	67606
3,7 mm	0.1457		M4,5 X 0,75	6,0	62,0	20,0	14,0	36,0	64607	67607
3,8 mm	0.1496		10-24	6,0	66,0	24,0	17,0	36,0	64608	67608
3,9 mm	0.1535			6,0	66,0	24,0	17,0	36,0	64609	67609
5/32	0.1562	3.97		6,0	66,0	24,0	17,0	36,0	54603	54703
4,0 mm	0.1575		M4,5 X 0,5	6,0	66,0	24,0	17,0	36,0	64610	67610
#21	0.1590	4.04	10-32	6,0	66,0	24,0	17,0	36,0	54604	54704
4,1 mm	0.1614			6,0	66,0	24,0	17,0	36,0	64611	67611
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	66,0	24,0	17,0	36,0	64612	67612
4,3 mm	0.1693			6,0	66,0	24,0	17,0	36,0	64613	67613
11/64	0.1719	4.37		6,0	66,0	24,0	17,0	36,0	54605	54705
4,4 mm	0.1732		12-24	6,0	66,0	24,0	17,0	36,0	64614	67614
4,5 mm	0.1772		M5 X 0,5	6,0	66,0	24,0	17,0	36,0	64615	67615
4,6 mm	0.1811		12-28	6,0	66,0	24,0	17,0	36,0	64616	67616
4,7 mm	0.1850		12-32	6,0	66,0	24,0	17,0	36,0	64617	67617
3/16	0.1875	4.76		6,0	66,0	28,0	20,0	36,0	54606	54706
4,8 mm	0.1890		7/32-32	6,0	66,0	28,0	20,0	36,0	64618	67618
4,9 mm	0.1929			6,0	66,0	28,0	20,0	36,0	64619	67619
5,0 mm	0.1969		M6 X 1	6,0	66,0	28,0	20,0	36,0	64620	67620
5,1 mm	0.2008		1/4-20	6,0	66,0	28,0	20,0	36,0	64621	67621
13/64	0.2031	5.16		6,0	66,0	28,0	20,0	36,0	54607	54707
5,2 mm	0.2047		M6 X 0,75	6,0	66,0	28,0	20,0	36,0	64622	67622
5,3 mm	0.2087			6,0	66,0	28,0	20,0	36,0	64623	67623
5,4 mm	0.2126			6,0	66,0	28,0	20,0	36,0	64624	67624
5,5 mm	0.2165		M6 X 0,5	6,0	66,0	28,0	20,0	36,0	64625	67625
7/32	0.2188	5.56	1/4-32	6,0	66,0	28,0	20,0	36,0	54608	54708
5,6 mm	0.2205			6,0	66,0	28,0	20,0	36,0	64626	67626
5,7 mm	0.2244			6,0	66,0	28,0	20,0	36,0	64627	67627
5,8 mm	0.2283			6,0	66,0	28,0	20,0	36,0	64628	67628
5,9 mm	0.2323			6,0	66,0	28,0	20,0	36,0	64629	67629
15/64	0.2344	5.95		6,0	66,0	28,0	20,0	36,0	54609	54709

(continued on next page)

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools



Common



3XD Reach



Right Spiral



External Coolant



3 Flutes

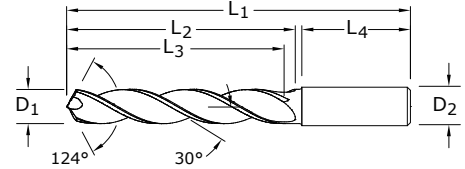


TOLERANCES (inch)

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>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



New Expanded Tools

Common	3XD Reach	Right Spiral	External Coolant	3 Flutes	Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
					6,0 mm	0.2362		M7 X 1	6,0	66,0	28,0	20,0	36,0	64630	67630
					6,1 mm	0.2402			8,0	79,0	34,0	24,0	36,0	64631	67631
					6,2 mm	0.2441		M7 X 0,75	8,0	79,0	34,0	24,0	36,0	64632	67632
					6,3 mm	0.2480			8,0	79,0	34,0	24,0	36,0	64633	67633
					1/4	0.2500	6.35		8,0	79,0	34,0	24,0	36,0	54610	54710
					6,4 mm	0.2520			8,0	79,0	34,0	24,0	36,0	64634	67634
					6,5 mm	0.2559			8,0	79,0	34,0	24,0	36,0	64635	67635
					F	0.2570	6.53	5/16-18	8,0	79,0	34,0	24,0	36,0	54611	54711
					6,6 mm	0.2598			8,0	79,0	34,0	24,0	36,0	64636	67636
					6,7 mm	0.2638			8,0	79,0	34,0	24,0	36,0	64637	67637
					17/64	0.2656	6.75	5/16-20	8,0	79,0	34,0	24,0	36,0	54612	54712
					6,8 mm	0.2677		M8 X 1,25	8,0	79,0	34,0	24,0	36,0	64638	67638
					6,9 mm	0.2717		5/16-24	8,0	79,0	34,0	24,0	36,0	64639	67639
					7,0 mm	0.2756		M8 X 1	8,0	79,0	34,0	24,0	36,0	64640	67640
					7,1 mm	0.2795			8,0	79,0	41,0	29,0	36,0	64641	67641
					9/32	0.2812	7.14	5/16-32	8,0	79,0	41,0	29,0	36,0	54613	54713
					7,2 mm	0.2835		M8 X 0,75	8,0	79,0	41,0	29,0	36,0	64642	67642
					7,3 mm	0.2874			8,0	79,0	41,0	29,0	36,0	64643	67643
					7,4 mm	0.2913			8,0	79,0	41,0	29,0	36,0	64644	67644
					7,5 mm	0.2953		M8 X 0,5	8,0	79,0	41,0	29,0	36,0	64645	67645
					19/64	0.2969	7.54		8,0	79,0	41,0	29,0	36,0	54614	54714
					7,6 mm	0.2992			8,0	79,0	41,0	29,0	36,0	64646	67646
					7,7 mm	0.3031			8,0	79,0	41,0	29,0	36,0	64647	67647
					7,8 mm	0.3071		M9 X 1,25	8,0	79,0	41,0	29,0	36,0	64648	67648
					7,9 mm	0.3110			8,0	79,0	41,0	29,0	36,0	64649	67649
					5/16	0.3125	7.94	3/8-16	8,0	79,0	41,0	29,0	36,0	54615	54715
					8,0 mm	0.3150		M9 X 1	8,0	79,0	41,0	29,0	36,0	64650	67650
					8,1 mm	0.3189			10,0	89,0	47,0	35,0	40,0	64651	67651
					8,2 mm	0.3228			10,0	89,0	47,0	35,0	40,0	64652	67652
					8,3 mm	0.3268			10,0	89,0	47,0	35,0	40,0	64653	67653
					21/64	0.3281	8.33	3/8-20	10,0	89,0	47,0	35,0	40,0	54616	54716
					8,4 mm	0.3307			10,0	89,0	47,0	35,0	40,0	64654	67654
					Q	0.3320	8.43	3/8-24	10,0	89,0	47,0	35,0	40,0	54617	54717
					8,5 mm	0.3346		M10 X 1,5	10,0	89,0	47,0	35,0	40,0	64655	67655
					8,6 mm	0.3386			10,0	89,0	47,0	35,0	40,0	64656	67656
					8,7 mm	0.3425			10,0	89,0	47,0	35,0	40,0	64657	67657
					11/32	0.3438	8.73	3/8-32	10,0	89,0	47,0	35,0	40,0	54618	54718
					8,8 mm	0.3465		M10 X 1,25	10,0	89,0	47,0	35,0	40,0	64658	67658
					8,9 mm	0.3504			10,0	89,0	47,0	35,0	40,0	64659	67659
					9,0 mm	0.3543		M10 X 1	10,0	89,0	47,0	35,0	40,0	64660	67660

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Automotive

Mold & Die

Aerospace

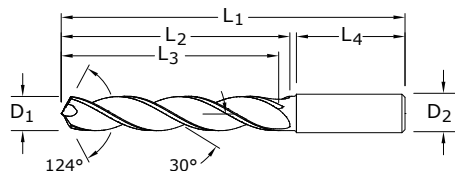
High Performance

General

Special Tools

Hi Performance Drill

Hi-PerCarb I Series 131N



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

New Expanded Tools

Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
9,1 mm	0.3583			10,0	89,0	47,0	35,0	40,0	64661	67661
23/64	0.3594	9.13		10,0	89,0	47,0	35,0	40,0	54619	54719
9,2 mm	0.3622		M10 X 0,75	10,0	89,0	47,0	35,0	40,0	64662	67662
9,3 mm	0.3661			10,0	89,0	47,0	35,0	40,0	64663	67663
U	0.3680	9.35	7/16-14	10,0	89,0	47,0	35,0	40,0	54620	54720
9,4 mm	0.3701			10,0	89,0	47,0	35,0	40,0	64664	67664
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	89,0	47,0	35,0	40,0	64665	67665
3/8	0.3750	9.53		10,0	89,0	47,0	35,0	40,0	54621	54721
9,6 mm	0.3780			10,0	89,0	47,0	35,0	40,0	64666	67666
9,7 mm	0.3819			10,0	89,0	47,0	35,0	40,0	64667	67667
9,8 mm	0.3858			10,0	89,0	47,0	35,0	40,0	64668	67668
9,9 mm	0.3898			10,0	89,0	47,0	35,0	40,0	64669	67669
25/64	0.3906	9.92	7/16-20	10,0	89,0	47,0	35,0	40,0	54622	54722
10,0 mm	0.3937			10,0	89,0	47,0	35,0	40,0	64670	67670
10,1 mm	0.3976			12,0	102,0	55,0	40,0	45,0	64671	67671
10,2 mm	0.4016		M12 X 1,75	12,0	102,0	55,0	40,0	45,0	64672	67672
10,3 mm	0.4055			12,0	102,0	55,0	40,0	45,0	64673	67673
13/32	0.4062	10.32		12,0	102,0	55,0	40,0	45,0	54623	54723
10,4 mm	0.4094			12,0	102,0	55,0	40,0	45,0	64674	67674
10,5 mm	0.4134		M12 X 1,5	12,0	102,0	55,0	40,0	45,0	64675	67675
10,6 mm	0.4173			12,0	102,0	55,0	40,0	45,0	64676	67676
10,7 mm	0.4213			12,0	102,0	55,0	40,0	45,0	64677	67677
27/64	0.4219	10.72	1/2-13	12,0	102,0	55,0	40,0	45,0	54624	54724
10,8 mm	0.4252		M12 X 1,25	12,0	102,0	55,0	40,0	45,0	64678	67678
10,9 mm	0.4291			12,0	102,0	55,0	40,0	45,0	64679	67679
11,0 mm	0.4331		M12 X 1	12,0	102,0	55,0	40,0	45,0	64680	67680
11,1 mm	0.4370			12,0	102,0	55,0	40,0	45,0	64681	67681
7/16	0.4375	11.11	1/4-18NPT	12,0	102,0	55,0	40,0	45,0	54625	54725
11,2 mm	0.4409			12,0	102,0	55,0	40,0	45,0	64682	67682
11,3 mm	0.4449			12,0	102,0	55,0	40,0	45,0	64683	67683
11,4 mm	0.4488			12,0	102,0	55,0	40,0	45,0	64684	67684
11,5 mm	0.4528		M12 X 0,5	12,0	102,0	55,0	40,0	45,0	64685	67685
11,6 mm	0.4567			12,0	102,0	55,0	40,0	45,0	64686	67686
11,7 mm	0.4606			12,0	102,0	55,0	40,0	45,0	64687	67687
11,8 mm	0.4646			12,0	102,0	55,0	40,0	45,0	64688	67688
11,9 mm	0.4685			12,0	102,0	55,0	40,0	45,0	64689	67689
15/32	0.4688	11.91	1/2-28	12,0	102,0	55,0	40,0	45,0	54626	54726
12,0 mm	0.4724		M14 X 2	12,0	102,0	55,0	40,0	45,0	64690	67690
31/64	0.4844	12.30	9/16-12	14,0	107,0	60,0	43,0	45,0	54627	54727
12,5 mm	0.4921		M14 X 1,5	14,0	107,0	60,0	43,0	45,0	64691	67691

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Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools



Common



3XD Reach



Right Spiral



External Coolant



3 Flutes

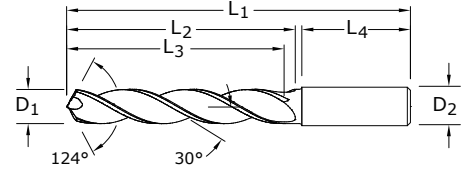


TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.00047	h6
>.1181-.2362	+0.0016/+0.00063	h6
>.2362-.3937	+0.0024/+0.00083	h6
>.3937-.7087	+0.0028/+0.00098	h6
>.7087-1.1811	+0.0031/+0.00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



New Expanded Tools

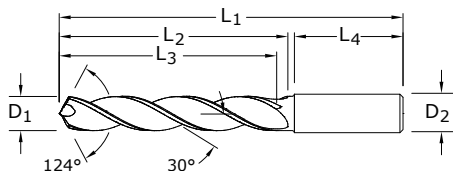
Common	3XD Reach	Right Spiral	External Coolant	Flutes	Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
					1/2	0.5000	12.70		14,0	107,0	60,0	43,0	45,0	54628	54728
					12,8 mm	0.5039		M14 X 1,25	14,0	107,0	60,0	43,0	45,0	64692	67692
					13,0 mm	0.5118		M14 X 1	14,0	107,0	60,0	43,0	45,0	64693	67693
					33/64	0.5156	13.10	9/16-18	14,0	107,0	60,0	43,0	45,0	54629	54729
					13,5 mm	0.5315		5/8-11	14,0	107,0	60,0	43,0	45,0	64694	67694
					13,8 mm	0.5433			14,0	107,0	60,0	43,0	45,0	64695	67695
					14,0 mm	0.5512		M16 X 2	14,0	107,0	60,0	43,0	45,0	64696	67696
					9/16	0.5625	14.29		16,0	115,0	65,0	45,0	48,0	54630	54730
					14,5 mm	0.5709		M16 X 1,5	16,0	115,0	65,0	45,0	48,0	64697	67697
					37/64	0.5781	14.68	5/8-18	16,0	115,0	65,0	45,0	48,0	54631	54731
					14,8 mm	0.5827			16,0	115,0	65,0	45,0	48,0	64698	67698
					15,0 mm	0.5906		M16 X 1	16,0	115,0	65,0	45,0	48,0	64699	67699
					15,5 mm	0.6102		M18 X 2,5	16,0	115,0	65,0	45,0	48,0	64700	67700
					15,8 mm	0.6220			16,0	115,0	65,0	45,0	48,0	64701	67701
					5/8	0.6250	15.88	11/16-16	16,0	115,0	65,0	45,0	48,0	54632	54732
					16,0 mm	0.6299			16,0	115,0	65,0	45,0	48,0	64702	67702
					21/32	0.6562	16.67	3/4-10	18,0	123,0	73,0	51,0	48,0	54633	54733
					11/16	0.6875	17.46	3/4-16	18,0	123,0	73,0	51,0	48,0	54634	54734
					3/4	0.7500	19.05	13/16-16	20,0	131,0	79,0	55,0	50,0	54635	54735

- Common
- 3XD Reach
- Right Spiral
- External Coolant
- Flutes

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General
- Special Tools

Hi Performance Drill

Hi-PerCarb I Series 131N



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

New Expanded Tools

Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	65000	64800
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	65001	64801
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	55000	54800
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	65002	64802
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	65003	64803
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	65004	64804
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	55001	54801
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	65005	64805
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	55002	54802
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	65006	64806
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	65007	64807
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	65008	64808
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	65009	64809
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	55003	54803
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	65010	64810
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	55004	54804
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	65011	64811
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	65012	64812
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	65013	64813
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	55005	54805
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	65014	64814
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	65015	64815
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	65016	64816
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	65017	64817
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	55006	54806
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	65018	64818
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	65019	64819
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	65020	64820
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	65021	64821
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	55007	54807
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	65022	64822
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	65023	64823
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	65024	64824
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	65025	64825
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	55008	54808
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	65026	64826
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	65027	64827
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	65028	64828
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	65029	64829
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0	55009	54809

(continued on next page)

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools



Common



5xD Reach



Right Spiral



External Coolant



3 Flutes

Hi Performance Drill

Hi-PerCarb I Series 131N

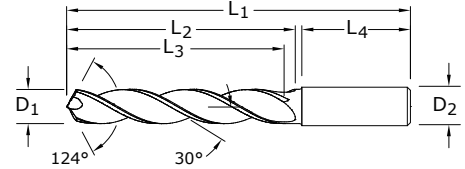


TOLERANCES (inch)



DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



New Expanded Tools

-  Common
-  5XD Reach
-  Right Spiral
-  External Coolant
-  3 Flutes

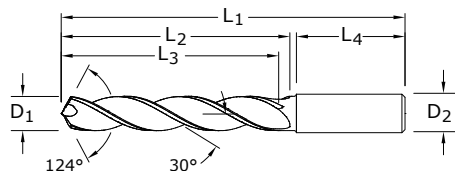
Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	65030	64830
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	65031	64831
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	65032	64832
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	65033	64833
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0	55010	54810
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	65034	64834
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	65035	64835
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0	55011	54811
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	65036	64836
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	65037	64837
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0	55012	54812
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	65038	64838
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0	65039	64839
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	65040	64840
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	65041	64841
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0	55013	54813
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	65042	64842
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	65043	64843
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	65044	64844
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	65045	64845
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0	55014	54814
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	65046	64846
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	65047	64847
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	65048	64848
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	65049	64849
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0	55015	54815
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	65050	64850
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	65051	64851
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	65052	64852
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	65053	64853
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0	55016	54816
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	65054	64854
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0	55017	54817
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	65055	64855
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	65056	64856
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0	65057	64857
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0	55018	54818
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	65058	64858
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	65059	64859
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	65060	64860

(continued on next page)

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General
- Special Tools

Hi Performance Drill

Hi-PerCarb I Series 131N



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.0047	h6
>.1181-.2362	+0.0016/+0.0063	h6
>.2362-.3937	+0.0024/+0.0083	h6
>.3937-.7087	+0.0028/+0.0098	h6
>.7087-1.1811	+0.0031/+0.0114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6

New Expanded Tools

Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	65061	64861
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0	55019	54819
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	65062	64862
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	65063	64863
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	55020	54820
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	65064	64864
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	65065	64865
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	55021	54821
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	65066	64866
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	65067	64867
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	65068	64868
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	65069	64869
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	55022	54822
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	65070	64870
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	65071	64871
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	65072	64872
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	65073	64873
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	55023	54823
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	65074	64874
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	65075	64875
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	65076	64876
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	65077	64877
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	55024	54824
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	65078	64878
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	65079	64879
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	65080	64880
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	65081	64881
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	55025	54825
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	65082	64882
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	65083	64883
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	65084	64884
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	65085	64885
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	65086	64886
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	65087	64887
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	65088	64888
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	65089	64889
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	55026	54826
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	65090	64890
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	55027	54827
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	65091	64891

(continued on next page)

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools



Common



5XD Reach



Right Spiral



External Coolant



3 Flutes

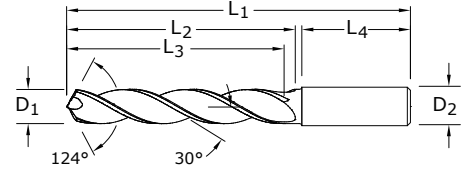


TOLERANCES (inch)






DIAMETER	D ₁	D ₂
≤.1181	+0.0008/+0.00047	h6
>.1181-.2362	+0.0016/+0.00063	h6
>.2362-.3937	+0.0024/+0.00083	h6
>.3937-.7087	+0.0028/+0.00098	h6
>.7087-1.1811	+0.0031/+0.00114	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
≤ 3	+0,002/+0,012	h6
> 3 - 6	+0,004/+0,016	h6
> 6 - 10	+0,006/+0,021	h6
> 10 - 18	+0,007/+0,025	h6



New Expanded Tools

-  Common
-  5XD Reach
-  Right Spiral
-  External Coolant
-  3 Flutes

Cutting Diameter D ₁	Decimal Equiv.	Metric Equiv.	Tap Size Reference Only	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂	Min. Cleared Length L ₃	Shank Length L ₄	Uncoated EDP No.	Ti-NAMITE-B (TB) EDP No.
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	55028	54828
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	65092	64892
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	65093	64893
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	55029	54829
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	65094	64894
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	65095	64895
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	65096	64896
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	55030	54830
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	65097	64897
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	55031	54831
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	65098	64898
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	65099	64899
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	65100	64900
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	65101	64901
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	55032	54832
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	65102	64902
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	55033	54833
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	55034	54834
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	55035	54835

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools



Series 131N 3D& 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)							
			3	6	8	10	12	14	16	
ALUMINUM ALLOYS < 12% SI 6061, 2024, 7075	≤ 150 Bhn or ≤ 7 HRC	244	RPM	25851	12926	9694	7755	6463	5540	4847
		(195-293)	Fr	0.133	0.265	0.354	0.442	0.531	0.619	0.708
			Feed (mm/min)	3430	3430	3430	3430	3430	3430	3430
ALUMINUM ALLOYS > 12% SI A356.0, 390.0, 319.0	≤ 125 Bhn or ≤ 77 HRb	183	RPM	19388	9694	7271	5816	4847	4155	3635
		(146-219)	Fr	0.131	0.262	0.349	0.437	0.524	0.611	0.699
			Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540
COPPER ALLOYS Alum Bronze, Muntz Brass, Naval Brass	≤ 175 Bhn or ≤ 16 HRC	168	RPM	17773	8886	6665	5332	4443	3808	3332
		(134-201)	Fr	0.049	0.097	0.130	0.162	0.194	0.227	0.259
			Feed (mm/min)	864	864	864	864	864	864	864
PLASTICS Acrylic, PVC, Polypropylene		137	RPM	14541	7271	5453	4362	3635	3116	2726
		(110-165)	Fr	0.059	0.119	0.158	0.198	0.238	0.277	0.317
			Feed (mm/min)	864	864	864	864	864	864	864

- Note:**
- Bhn (Brinell) HRC (Rockwell C) HRb (Rockwell B)
 - rpm = (Vc x 1000) / (D₁ x 3.14)
 - mm/min = Fr x RPM
 - reduce speed and feed for materials harder than listed
 - refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Automotive

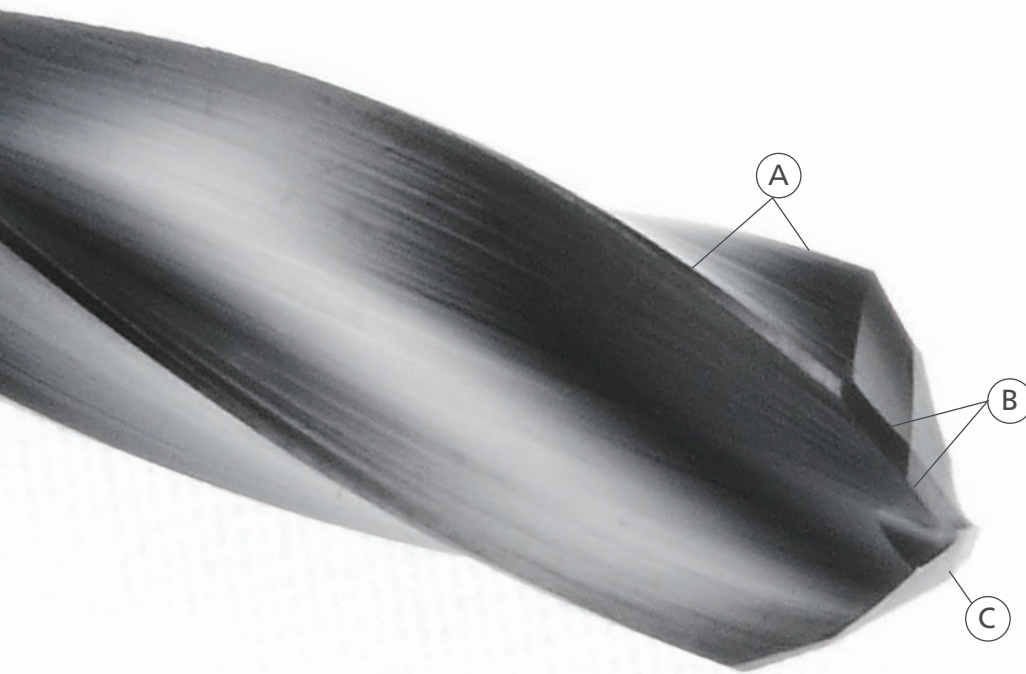
Mold & Die

Aerospace

High Performance

General

Special Tools



SERIES 120



SERIES 120 COMPOSITE DRILL

The key features of the 8 Facet Double Angle Series 120 drill design offers application benefits beyond that of other high performance drills in its category. Each feature of this 8 facet design was engineered as a solution towards addressing the issues commonly encountered during Composite drilling. This unique High Performance design successfully creates an accurate hole without splintering or delamination.

- A** DOUBLE MARGIN CONSTRUCTION
 - improves drill stability for better hole finish and size control
 - allows coolant to reach the point for improved hole quality and extended tool life
- B** DOUBLE ANGLE POINT
 - minimizes workpiece delamination on drill entry and exit
 - redistributes loads along multiple cutting edges for improved performance
- C** NOTCHED POINT
 - reduces cutting forces at the drill center for enhanced performance and tool life
 - manufactured exclusively with Di-NAMITE® coating for even wear, extended tool life, and improved finishes.

PERFORMANCE. PRECISION. PASSION.
SERIES 120 COMPOSITE DRILL

PERFORMANCE.



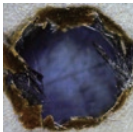

- Double margin design stabilized the drill for greater hole accuracy and improved surface finish in final hole.
- Minimized delamination at hole entry/exit.
- Manufactured exclusively with Di-NAMITE® coating for even wear, extended tool life and improved finishes.


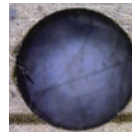


PRECISION.

A test was conducted of our CFRP drill to determine the necessity of coating when drilling Carbon Fiber material. Fifty holes were drilled using a special size .190" CFRP drill. The tool's design produces acceptable quality holes; but as shown in the photos, early edge wear on the uncoated drill resulted in holes with frayed edges. The diamond coated drill produced all 50 holes with little to no fraying and edge wear was 38% less than the uncoated drills.

The geometry of the 8 Facet drill with the Di-NAMITE® coating is a necessity for additional tool life and productivity when manufacturing Carbon Fiber material.

SPEED 5,000 rpm	FEED 5.0 ipm	DIAMETER .190"	HOLE DEPTH .240"	WORKPIECE CFRP	MACHINE TYPE Vertical Machining Center	COOLANT none
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TOOL NO.	TYPE DESCRIPTION	TIR IN MACHINE	USAGE
1	.190" CFRP drill uncoated	.0001"	50 holes
INSPECTION NOTES Good hole quality for 1st 3 holes. fraying starting by 3rd hole, .0021" wear			
1ST HOLE	3RD HOLE	50TH HOLE	AFTER 50 HOLES
			

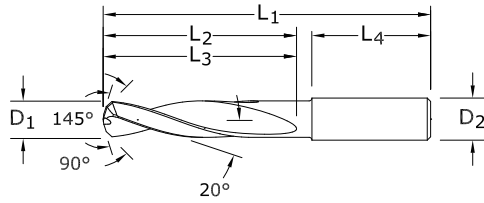
TOOL NO.	TYPE DESCRIPTION	TIR IN MACHINE	USAGE
2	.190" CFRP drill diamond	.0002"	50 holes
INSPECTION NOTES Good hole quality all 50 holes slight fraying, .0013" wear			
1ST HOLE	25TH HOLE	50TH HOLE	AFTER 50 HOLES
			



PASSION.

- The compound angle creates 4 cutting edges along the drill point.
- Distinct double angle prevents abrasiveness of the Composite from localizing along the point and diminishing tool life.

www.kyocera-sgstool.com



TOLERANCES (inch)

DIAMETER	D ₁	D ₂
#40-1/2	+0.0000 / -0.0005	h6

TOLERANCES (mm)

DIAMETER	D ₁	D ₂
2,7-12	+0,000 / -0,013	h6

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Cutting Diameter D ₁	Decimal Equivalent	Metric Equivalent	Shank Diameter D ₂	Overall Length L ₁	Flute Length L ₂ / L ₃	Shank Length L ₄	Di-NAMITE® (Diamond) EDP No.
#40	0.0980	2.49	1/8	2	9/16	1-1/4	50000
2,7 mm	0.1063		6,0	63,0	20,0	32,0	50001
3,0 mm	0.1181		6,0	63,0	20,0	36,0	50002
1/8	0.1250	3.18	1/4	2-1/2	3/4	1-7/16	50003
3,2 mm	0.1260		6,0	63,0	20,0	36,0	50004
#30	0.1285	3.26	1/4	2-1/2	3/4	1-7/16	50005
#28	0.1405	3.57	1/4	2-1/2	3/4	1-7/16	50006
#22	0.1570	3.99	1/4	2-5/8	7/8	1-7/16	50007
#21	0.1590	4.04	1/4	2-5/8	7/8	1-7/16	50008
4,1 mm	0.1614		6,0	66,0	24,0	36,0	50009
#19	0.1660	4.22	1/4	2-5/8	7/8	1-7/16	50010
11/64	0.1719	4.37	1/4	2-5/8	7/8	1-7/16	50011
3/16	0.1875	4.76	1/4	2-5/8	1	1-7/16	50012
#11	0.1910	4.85	1/4	2-5/8	1	1-7/16	50013
#8	0.1990	5.05	1/4	2-5/8	1	1-7/16	50014
#7	0.2010	5.11	1/4	2-5/8	1	1-7/16	50015
#2	0.2210	5.61	1/4	2-5/8	1	1-7/16	50016
6,0 mm	0.2362		6,0	66,0	28,0	36,0	50017
1/4	0.2500	6.35	1/4	3-1/8	1-5/16	1-7/16	50018
.2510	0.2510	6.38	5/16	3-1/8	1-5/16	1-7/16	50019
F	0.2570	6.53	5/16	3-1/8	1-5/16	1-7/16	50020
I	0.2720	6.91	5/16	3-1/8	1-5/16	1-7/16	50021
J	0.2770	7.04	5/16	3-1/8	1-5/16	1-7/16	50022
K	0.2810	7.14	5/16	3-1/8	1-9/16	1-7/16	50023
5/16	0.3125	7.94	5/16	3-1/8	1-9/16	1-7/16	50024
8,0 mm	0.3150		8,0	79,0	41,0	36,0	50025
3/8	0.3750	9.53	3/8	3-1/2	1-27/32	1-9/16	50026
V	0.3770	9.58	1/2	3-1/2	1-27/32	1-9/16	50027
10,0 mm	0.3937		10,0	89,0	47,0	40,0	50028
7/16	0.4375	11.11	1/2	4-1/16	2-3/16	1-9/16	50029
12,0 mm	0.4724		12,0	102,0	55,0	45,0	50030
1/2	0.5000	12.70	1/2	4-1/4	2-5/16	1-3/4	50031



Common



3xD Reach



Right Spiral



External Coolant



2 Flutes



Series 120 Metric	Vc (m/min)		Diameter (D ₁) (mm)						
			2.5	3	4	6	8	10	12
N	100 (80-120)	RPM	12722	10602	7951	5301	3976	3181	2650
		Fr	0.012	0.014	0.019	0.028	0.038	0.047	0.057
		Feed (mm/min)	150	150	150	150	150	150	150
	75 (65-90)	RPM	9542	7951	5963	3976	2982	2385	1988
		Fr	0.012	0.014	0.019	0.029	0.039	0.048	0.058
		Feed (mm/min)	115	115	115	115	115	115	115
CARBON, GRAPHITE	120 (96-144)	RPM	15266	12722	9542	6361	4771	3817	3181
		Fr	0.015	0.018	0.025	0.037	0.049	0.062	0.074
		Feed (mm/min)	235	235	235	235	235	235	235

Note:

- rpm = (Vc x 1000) / (D₁ x 3.14)
- mm/min = Fr x RPM
- adjust speed and / or feed based on resin type and / or fiber structure
- refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

General Purpose Drills

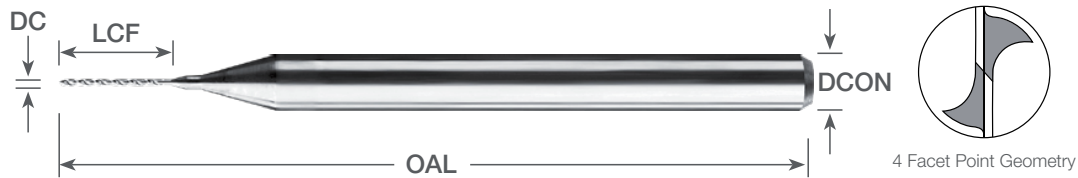


3.00mm SHANK

MICRO DRILLS

0.04mm - 0.34mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length

Uncoated		AlTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0016.020	●	-	-	0.04	3.00	38.00	0.50	118°
NEW 226-0018.025	●	-	-	0.045	3.00	38.00	0.65	118°
226-0020.030	●	-	-	0.05	3.00	38.00	0.80	118°
226-0024.030	●	-	-	0.06	3.00	38.00	0.80	118°
226-0028.050	●	-	-	0.07	3.00	38.00	1.30	118°
226-0031.050	●	-	-	0.08	3.00	38.00	1.30	118°
226-0035.050	●	-	-	0.09	3.00	38.00	1.30	118°
226-0039.040	●	-	-	0.10	3.00	38.00	1.00	118°
226-0043.040	●	-	-	0.11	3.00	38.00	1.00	118°
226-0047.040	●	-	-	0.12	3.00	38.00	1.00	118°
226-0051.040	●	-	-	0.13	3.00	38.00	1.00	118°
226-0055.040	●	-	-	0.14	3.00	38.00	1.00	118°
226-0059.080	●	-	-	0.15	3.00	38.00	2.00	118°
226-0063.080	●	-	-	0.16	3.00	38.00	2.00	118°
226-0067.080	●	-	-	0.17	3.00	38.00	2.00	118°
226-0071.100	●	-	-	0.18	3.00	38.00	2.50	118°
226-0075.100	●	-	-	0.19	3.00	38.00	2.50	118°
226-0079.100	●	-	-	0.20	3.00	38.00	2.50	118°
226-0083.100	●	-	-	0.21	3.00	38.00	2.50	118°
226-0087.100	●	-	-	0.22	3.00	38.00	2.50	118°
226-0091.150	●	-	-	0.23	3.00	38.00	3.80	118°
226-0094.150	●	-	-	0.24	3.00	38.00	3.80	118°
226-0098.150	●	NEW 226-0098L150	-	0.25	3.00	38.00	3.80	118°
226-0102.150	●	NEW 226-0102L150	-	0.26	3.00	38.00	3.80	118°
226-0106.150	●	NEW 226-0106L150	-	0.27	3.00	38.00	3.80	118°
226-0110.150	●	NEW 226-0110L150	-	0.28	3.00	38.00	3.80	118°
226-0114.150	●	NEW 226-0114L150	-	0.29	3.00	38.00	3.80	118°
226-0118.225	●	226-0118L225	●	0.30	3.00	38.00	5.70	118°
226-0122.225	●	226-0122L225	●	0.31	3.00	38.00	5.70	118°
226-0126.225	●	226-0126L225	●	0.32	3.00	38.00	5.70	118°
226-0130.225	●	226-0130L225	●	0.33	3.00	38.00	5.70	118°
226-0134.225	●	226-0134L225	●	0.34	3.00	38.00	5.70	118°

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~55HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AlTiN	★	★	★	★	★	☆	☆	☆	☆	★	★	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★		☆

★ : Priority ☆ : Applicable Materials

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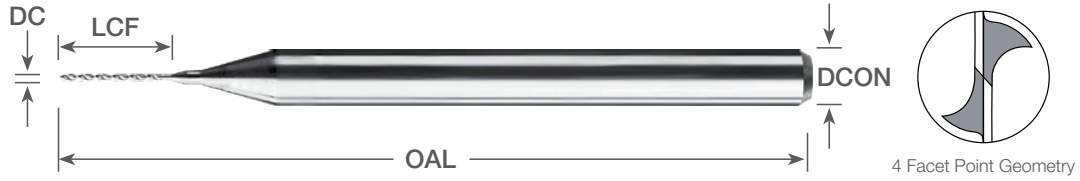
U.S. Stock Standard : ●
NOT STOCKED - Call for Delivery : ■

3.00mm SHANK

MICRO DRILLS

0.35mm - 0.54mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length



Uncoated		AITIN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0138.225	●	226-0138L225	●	0.35	3.00	38.00	5.70	130°
226-0142.225	●	226-0142L225	●	0.36	3.00	38.00	5.70	130°
226-0146.225	●	226-0146L225	●	0.37	3.00	38.00	5.70	130°
226-0150.250	●	226-0150L250	●	0.38	3.00	38.00	6.40	130°
226-0154.250	●	226-0154L250	●	0.39	3.00	38.00	6.40	130°
226-0157.250	●	226-0157L250	●	0.40	3.00	38.00	6.40	130°
226-0161.250	●	226-0161L250	●	0.41	3.00	38.00	6.40	130°
226-0165.250	●	226-0165L250	●	0.42	3.00	38.00	6.40	130°
226-0169.250	●	226-0169L250	●	0.43	3.00	38.00	6.40	130°
226-0173.250	●	226-0173L250	●	0.44	3.00	38.00	6.40	130°
226-0177.250	●	226-0177L250	●	0.45	3.00	38.00	6.40	130°
226-0181.250	●	226-0181L250	●	0.46	3.00	38.00	6.40	130°
226-0185.250	●	226-0185L250	●	0.47	3.00	38.00	6.40	130°
226-0189.260	●	226-0189L260	●	0.48	3.00	38.00	6.60	130°
226-0193.260	●	226-0193L260	●	0.49	3.00	38.00	6.60	130°
226-0197.260	●	226-0197L260	●	0.50	3.00	38.00	6.60	130°
226-0201.260	●	226-0201L260	●	0.51	3.00	38.00	6.60	130°
226-0205.260	●	226-0205L260	●	0.52	3.00	38.00	6.60	130°
226-0209.260	●	226-0209L260	●	0.53	3.00	38.00	6.60	130°
226-0213.260	●	226-0213L260	●	0.54	3.00	38.00	6.60	130°

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~58HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AITIN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★		☆

★ : Priority ☆ : Applicable Materials

● : U.S. Stock Standard
■ : NOT STOCKED - Call for Delivery

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3.00mm SHANK

MICRO DRILLS

0.55mm - 0.84mm DIAMETER

Mirror Surface Finishes

Sub Micron Grain Carbide



4 Facet Point Geometry



STANDARD Flute Length

Uncoated		AlTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0217.340	●	226-0217L340	●	0.55	3.00	38.00	8.60	130°
226-0220.340	●	226-0220L340	●	0.56	3.00	38.00	8.60	130°
226-0224.340	●	226-0224L340	●	0.57	3.00	38.00	8.60	130°
226-0228.340	●	226-0228L340	●	0.58	3.00	38.00	8.60	130°
226-0232.340	●	226-0232L340	●	0.59	3.00	38.00	8.60	130°
226-0236.340	●	226-0236L340	●	0.60	3.00	38.00	8.60	130°
226-0240.340	●	226-0240L340	●	0.61	3.00	38.00	8.60	130°
226-0244.340	●	226-0244L340	●	0.62	3.00	38.00	8.60	130°
226-0248.340	●	226-0248L340	●	0.63	3.00	38.00	8.60	130°
226-0252.340	●	226-0252L340	●	0.64	3.00	38.00	8.60	130°
226-0256.340	●	226-0256L340	●	0.65	3.00	38.00	8.60	130°
226-0260.340	●	226-0260L340	●	0.66	3.00	38.00	8.60	130°
226-0264.340	●	226-0264L340	●	0.67	3.00	38.00	8.60	130°
226-0268.340	●	226-0268L340	●	0.68	3.00	38.00	8.60	130°
226-0272.340	●	226-0272L340	●	0.69	3.00	38.00	8.60	130°
226-0276.400	●	226-0276L400	●	0.70	3.00	38.00	10.20	130°
226-0280.400	●	226-0280L400	●	0.71	3.00	38.00	10.20	130°
226-0283.400	●	226-0283L400	●	0.72	3.00	38.00	10.20	130°
226-0287.400	●	226-0287L400	●	0.73	3.00	38.00	10.20	130°
226-0291.400	●	226-0291L400	●	0.74	3.00	38.00	10.20	130°
226-0295.400	●	226-0295L400	●	0.75	3.00	38.00	10.20	130°
226-0299.400	●	226-0299L400	●	0.76	3.00	38.00	10.20	130°
226-0303.400	●	226-0303L400	●	0.77	3.00	38.00	10.20	130°
226-0307.400	●	226-0307L400	●	0.78	3.00	38.00	10.20	130°
226-0311.400	●	226-0311L400	●	0.79	3.00	38.00	10.20	130°
226-0315.400	●	226-0315L400	●	0.80	3.00	38.00	10.20	130°
226-0319.400	●	226-0319L400	●	0.81	3.00	38.00	10.20	130°
226-0323.400	●	226-0323L400	●	0.82	3.00	38.00	10.20	130°
226-0327.400	●	226-0327L400	●	0.83	3.00	38.00	10.20	130°
226-0331.400	●	226-0331L400	●	0.84	3.00	38.00	10.20	130°

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~55HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AlTiN	★	★	★	★	★	☆	☆	☆	☆	★	★	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★		☆

★ : Priority ☆ : Applicable Materials

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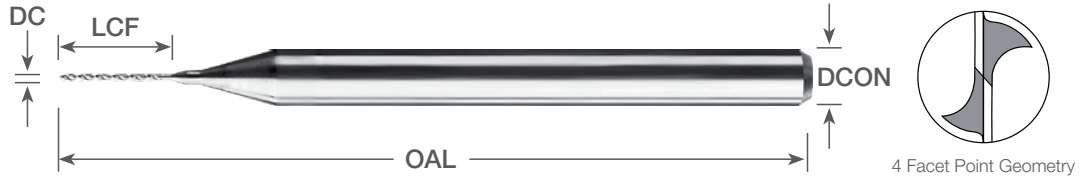
U.S. Stock Standard : ●
 NOT STOCKED - Call for Delivery : ■

3.00mm SHANK

MICRO DRILLS

0.85mm - 1.14mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length



Uncoated		TiTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0335.400	●	226-0335L400	●	0.85	3.00	38.00	10.20	130°
226-0339.400	●	226-0339L400	●	0.86	3.00	38.00	10.20	130°
226-0343.400	●	226-0343L400	●	0.87	3.00	38.00	10.20	130°
226-0346.400	●	226-0346L400	●	0.88	3.00	38.00	10.20	130°
226-0350.400	●	226-0350L400	●	0.89	3.00	38.00	10.20	130°
226-0354.400	●	226-0354L400	●	0.90	3.00	38.00	10.20	130°
226-0358.400	●	226-0358L400	●	0.91	3.00	38.00	10.20	130°
226-0362.400	●	226-0362L400	●	0.92	3.00	38.00	10.20	130°
226-0366.400	●	226-0366L400	●	0.93	3.00	38.00	10.20	130°
226-0370.400	●	226-0370L400	●	0.94	3.00	38.00	10.20	130°
226-0374.400	●	226-0374L400	●	0.95	3.00	38.00	10.20	130°
226-0378.400	●	226-0378L400	●	0.96	3.00	38.00	10.20	130°
226-0382.400	●	226-0382L400	●	0.97	3.00	38.00	10.20	130°
226-0386.400	●	226-0386L400	●	0.98	3.00	38.00	10.20	130°
226-0390.400	●	226-0390L400	●	0.99	3.00	38.00	10.20	130°
226-0394.400	●	226-0394L400	●	1.00	3.00	38.00	10.20	130°
226-0398.400	●	226-0398L400	●	1.01	3.00	38.00	10.20	130°
226-0402.400	●	226-0402L400	●	1.02	3.00	38.00	10.20	130°
226-0406.400	●	226-0406L400	●	1.03	3.00	38.00	10.20	130°
226-0409.400	●	226-0409L400	●	1.04	3.00	38.00	10.20	130°
226-0413.400	●	226-0413L400	●	1.05	3.00	38.00	10.20	130°
226-0417.400	●	226-0417L400	●	1.06	3.00	38.00	10.20	130°
226-0421.400	●	226-0421L400	●	1.07	3.00	38.00	10.20	130°
226-0425.400	●	226-0425L400	●	1.08	3.00	38.00	10.20	130°
226-0429.400	●	226-0429L400	●	1.09	3.00	38.00	10.20	130°
226-0433.400	●	226-0433L400	●	1.10	3.00	38.00	10.20	130°
226-0437.400	●	226-0437L400	●	1.11	3.00	38.00	10.20	130°
226-0441.400	●	226-0441L400	●	1.12	3.00	38.00	10.20	130°
226-0445.400	●	226-0445L400	●	1.13	3.00	38.00	10.20	130°
226-0449.400	●	226-0449L400	●	1.14	3.00	38.00	10.20	130°

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General**
- Special Tools

SERIES 226 WORKPIECE MATERIAL																
Coating	P	P	H	H	M	K	N	N	N	N	N	N	N	S	S	
	Steel ~30HRC	Steel 30-40HRC	Hardened Steel ~58HRC	Hardened Steel ~68HRC	Stainless Steel	Cast Iron	Aluminum	Graphite	Copper Alloy	Brass	CFRP	Plastic	Thermoset Plastic	High Density Plastic	Nickel / Cobalt	Titanium Alloy
AiTIN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★	☆	☆

★ : Priority ☆ : Applicable Materials

● : U.S. Stock Standard
■ : NOT STOCKED - Call for Delivery

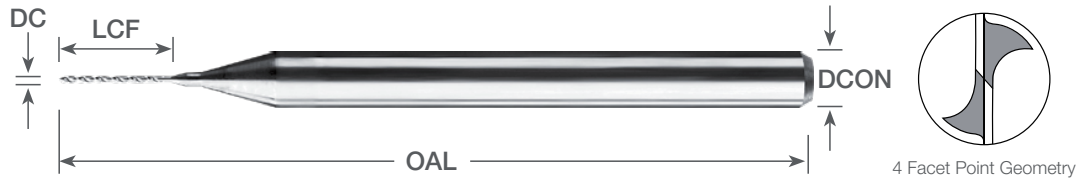
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3.00mm SHANK

MICRO DRILLS

1.15mm - 1.44mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length



Uncoated		AlTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0453.400	●	226-0453L400	●	1.15	3.00	38.00	10.20	130°
226-0457.400	●	226-0457L400	●	1.16	3.00	38.00	10.20	130°
226-0461.400	●	226-0461L400	●	1.17	3.00	38.00	10.20	130°
226-0465.400	●	226-0465L400	●	1.18	3.00	38.00	10.20	130°
226-0469.400	●	226-0469L400	●	1.19	3.00	38.00	10.20	130°
226-0472.400	●	226-0472L400	●	1.20	3.00	38.00	10.20	130°
226-0476.400	●	226-0476L400	●	1.21	3.00	38.00	10.20	130°
226-0480.400	●	226-0480L400	●	1.22	3.00	38.00	10.20	130°
226-0484.400	●	226-0484L400	●	1.23	3.00	38.00	10.20	130°
226-0488.400	●	226-0488L400	●	1.24	3.00	38.00	10.20	130°
226-0492.400	●	226-0492L400	●	1.25	3.00	38.00	10.20	130°
226-0496.400	●	226-0496L400	●	1.26	3.00	38.00	10.20	130°
226-0500.400	●	226-0500L400	●	1.27	3.00	38.00	10.20	130°
226-0504.400	●	226-0504L400	●	1.28	3.00	38.00	10.20	130°
226-0508.400	●	226-0508L400	●	1.29	3.00	38.00	10.20	130°
226-0512.400	●	226-0512L400	●	1.30	3.00	38.00	10.20	130°
226-0516.400	●	226-0516L400	●	1.31	3.00	38.00	10.20	130°
226-0520.400	●	226-0520L400	●	1.32	3.00	38.00	10.20	130°
226-0524.400	●	226-0524L400	●	1.33	3.00	38.00	10.20	130°
226-0528.400	●	226-0528L400	●	1.34	3.00	38.00	10.20	130°
226-0531.400	●	226-0531L400	●	1.35	3.00	38.00	10.20	130°
226-0535.400	●	226-0535L400	●	1.36	3.00	38.00	10.20	130°
226-0539.400	●	226-0539L400	●	1.37	3.00	38.00	10.20	130°
226-0543.400	●	226-0543L400	●	1.38	3.00	38.00	10.20	130°
226-0547.400	●	226-0547L400	●	1.39	3.00	38.00	10.20	130°
226-0551.400	●	226-0551L400	●	1.40	3.00	38.00	10.20	130°
226-0555.400	●	226-0555L400	●	1.41	3.00	38.00	10.20	130°
226-0559.400	●	226-0559L400	●	1.42	3.00	38.00	10.20	130°
226-0563.400	●	226-0563L400	●	1.43	3.00	38.00	10.20	130°
226-0567.400	●	226-0567L400	●	1.44	3.00	38.00	10.20	130°

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~55HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AlTiN	★	★	★	★	★	☆	☆	☆	☆	★	★	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★		☆

★ : Priority ☆ : Applicable Materials

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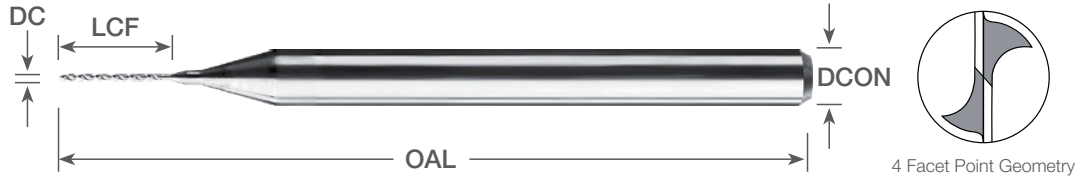
U.S. Stock Standard : ●
NOT STOCKED - Call for Delivery : ■

3.00mm SHANK

MICRO DRILLS

1.45mm - 1.74mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length

Uncoated		TiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0571.400	●	226-0571L400	●	1.45	3.00	38.00	10.20	130°
226-0575.400	●	226-0575L400	●	1.46	3.00	38.00	10.20	130°
226-0579.400	●	226-0579L400	●	1.47	3.00	38.00	10.20	130°
226-0583.400	●	226-0583L400	●	1.48	3.00	38.00	10.20	130°
226-0587.400	●	226-0587L400	●	1.49	3.00	38.00	10.20	130°
226-0591.400	●	226-0591L400	●	1.50	3.00	38.00	10.20	130°
226-0594.400	●	226-0594L400	●	1.51	3.00	38.00	10.20	130°
226-0598.400	●	226-0598L400	●	1.52	3.00	38.00	10.20	130°
226-0602.400	●	226-0602L400	●	1.53	3.00	38.00	10.20	130°
226-0606.400	●	226-0606L400	●	1.54	3.00	38.00	10.20	130°
226-0610.400	●	226-0610L400	●	1.55	3.00	38.00	10.20	130°
226-0614.400	●	226-0614L400	●	1.56	3.00	38.00	10.20	130°
226-0618.400	●	226-0618L400	●	1.57	3.00	38.00	10.20	130°
226-0622.400	●	226-0622L400	●	1.58	3.00	38.00	10.20	130°
226-0626.400	●	226-0626L400	●	1.59	3.00	38.00	10.20	130°
226-0630.400	●	226-0630L400	●	1.60	3.00	38.00	10.20	130°
226-0634.400	●	226-0634L400	●	1.61	3.00	38.00	10.20	130°
226-0638.400	●	226-0638L400	●	1.62	3.00	38.00	10.20	130°
226-0642.400	●	226-0642L400	●	1.63	3.00	38.00	10.20	130°
226-0646.400	●	226-0646L400	●	1.64	3.00	38.00	10.20	130°
226-0650.400	●	226-0650L400	●	1.65	3.00	38.00	10.20	130°
226-0654.400	●	226-0654L400	●	1.66	3.00	38.00	10.20	130°
226-0657.400	●	226-0657L400	●	1.67	3.00	38.00	10.20	130°
226-0661.400	●	226-0661L400	●	1.68	3.00	38.00	10.20	130°
226-0665.400	●	226-0665L400	●	1.69	3.00	38.00	10.20	130°
226-0669.400	●	226-0669L400	●	1.70	3.00	38.00	10.20	130°
226-0673.400	●	226-0673L400	●	1.71	3.00	38.00	10.20	130°
226-0677.400	●	226-0677L400	●	1.72	3.00	38.00	10.20	130°
226-0681.400	●	226-0681L400	●	1.73	3.00	38.00	10.20	130°
226-0685.400	●	226-0685L400	●	1.74	3.00	38.00	10.20	130°

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General**
- Special Tools

SERIES 226 WORKPIECE MATERIAL																
Coating	P	P	H	H	M	K	N	N	N	N	N	N	N	S	S	
	Steel ~30HRC	Steel 30~40HRC	Hardened Steel ~58HRC	Hardened Steel ~68HRC	Stainless Steel	Cast Iron	Aluminum	Graphite	Copper Alloy	Brass	CFRP	Plastic	Thermoset Plastic	High Density Plastic	Nickel / Cobalt	Titanium Alloy
AiTIN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	☆	☆	☆

★ : Priority ☆ : Applicable Materials

● : U.S. Stock Standard
■ : NOT STOCKED - Call for Delivery

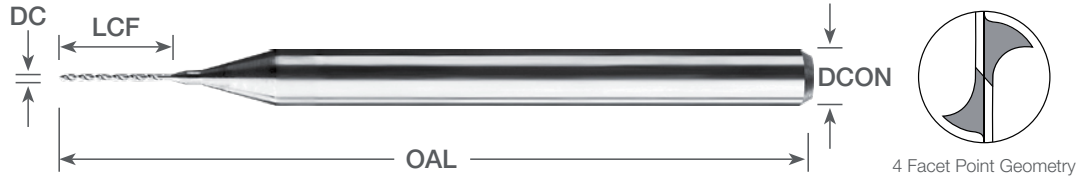
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3.00mm SHANK

MICRO DRILLS

1.75mm - 2.02mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length

Uncoated		AlTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0689.400	●	226-0689L400	●	1.75	3.00	38.00	10.20	130°
226-0693.400	●	226-0693L400	●	1.76	3.00	38.00	10.20	130°
226-0697.400	●	226-0697L400	●	1.77	3.00	38.00	10.20	130°
226-0701.400	●	226-0701L400	●	1.78	3.00	38.00	10.20	130°
226-0705.400	●	226-0705L400	●	1.79	3.00	38.00	10.20	130°
226-0709.400	●	226-0709L400	●	1.80	3.00	38.00	10.20	130°
226-0713.400	●	226-0713L400	●	1.81	3.00	38.00	10.20	130°
226-0717.400	●	226-0717L400	●	1.82	3.00	38.00	10.20	130°
226-0720.400	●	226-0720L400	●	1.83	3.00	38.00	10.20	130°
226-0724.400	●	226-0724L400	●	1.84	3.00	38.00	10.20	130°
226-0728.400	●	226-0728L400	●	1.85	3.00	38.00	10.20	130°
226-0732.400	●	226-0732L400	●	1.86	3.00	38.00	10.20	130°
226-0736.400	●	226-0736L400	●	1.87	3.00	38.00	10.20	130°
226-0740.400	●	226-0740L400	●	1.88	3.00	38.00	10.20	130°
226-0744.400	●	226-0744L400	●	1.89	3.00	38.00	10.20	130°
226-0748.400	●	226-0748L400	●	1.90	3.00	38.00	10.20	130°
226-0752.400	●	226-0752L400	●	1.91	3.00	38.00	10.20	130°
226-0756.400	●	226-0756L400	●	1.92	3.00	38.00	10.20	130°
226-0760.400	●	226-0760L400	●	1.93	3.00	38.00	10.20	130°
226-0764.400	●	226-0764L400	●	1.94	3.00	38.00	10.20	130°
226-0768.400	●	226-0768L400	●	1.95	3.00	38.00	10.20	130°
226-0772.400	●	226-0772L400	●	1.96	3.00	38.00	10.20	130°
226-0776.400	●	226-0776L400	●	1.97	3.00	38.00	10.20	130°
226-0780.400	●	226-0780L400	●	1.98	3.00	38.00	10.20	130°
226-0783.400	●	226-0783L400	●	1.99	3.00	38.00	10.20	130°
226-0787.400	●	226-0787L400	●	2.00	3.00	38.00	10.20	130°
226-0791.400	●	226-0791L400	●	2.01	3.00	38.00	10.20	130°
226-0795.400	●	226-0795L400	●	2.02	3.00	38.00	10.20	130°

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~55HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AlTiN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated						☆	☆	★	★	☆	★	★	★	★		☆

★ : Priority ☆ : Applicable Materials

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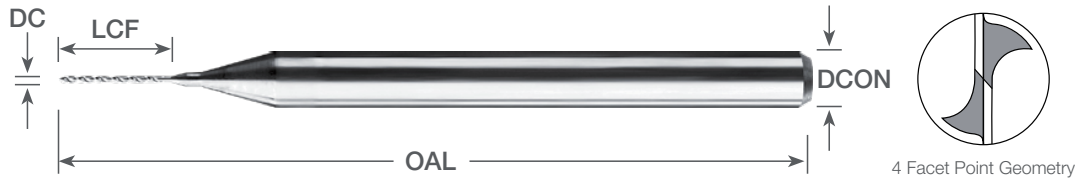
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Aerospace
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Special Tools

3.00mm SHANK

MICRO DRILLS

2.03mm - 2.30mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length



Uncoated		TiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0799.400	●	226-0799L400	●	2.03	3.00	38.00	10.20	130°
226-0803.400	●	226-0803L400	●	2.04	3.00	38.00	10.20	130°
226-0807.400	●	226-0807L400	●	2.05	3.00	38.00	10.20	130°
226-0811.400	●	226-0811L400	●	2.06	3.00	38.00	10.20	130°
226-0815.400	●	226-0815L400	●	2.07	3.00	38.00	10.20	130°
226-0819.400	●	226-0819L400	●	2.08	3.00	38.00	10.20	130°
226-0823.400	●	226-0823L400	●	2.09	3.00	38.00	10.20	130°
226-0827.400	●	226-0827L400	●	2.10	3.00	38.00	10.20	130°
226-0831.400	●	226-0831L400	●	2.11	3.00	38.00	10.20	130°
226-0835.400	●	226-0835L400	●	2.12	3.00	38.00	10.20	130°
226-0839.400	●	226-0839L400	●	2.13	3.00	38.00	10.20	130°
226-0843.400	●	226-0843L400	●	2.14	3.00	38.00	10.20	130°
226-0846.400	●	226-0846L400	●	2.15	3.00	38.00	10.20	130°
226-0850.400	●	226-0850L400	●	2.16	3.00	38.00	10.20	130°
226-0854.400	●	226-0854L400	●	2.17	3.00	38.00	10.20	130°
226-0858.400	●	226-0858L400	●	2.18	3.00	38.00	10.20	130°
226-0862.400	●	226-0862L400	●	2.19	3.00	38.00	10.20	130°
226-0866.400	●	226-0866L400	●	2.20	3.00	38.00	10.20	130°
226-0870.400	●	226-0870L400	●	2.21	3.00	38.00	10.20	130°
226-0874.400	●	226-0874L400	●	2.22	3.00	38.00	10.20	130°
226-0878.400	●	226-0878L400	●	2.23	3.00	38.00	10.20	130°
226-0882.400	●	226-0882L400	●	2.24	3.00	38.00	10.20	130°
226-0886.400	●	226-0886L400	●	2.25	3.00	38.00	10.20	130°
226-0890.400	●	226-0890L400	●	2.26	3.00	38.00	10.20	130°
226-0894.400	●	226-0894L400	●	2.27	3.00	38.00	10.20	130°
226-0898.400	●	226-0898L400	●	2.28	3.00	38.00	10.20	130°
226-0902.400	●	226-0902L400	●	2.29	3.00	38.00	10.20	130°
226-0906.400	●	226-0906L400	●	2.30	3.00	38.00	10.20	130°

SERIES 226 WORKPIECE MATERIAL																
Coating	P	P	H	H	M	K	N	N	N	N	N	N	N	S	S	
	Steel ~30HRC	Steel 30-40HRC	Hardened Steel ~58HRC	Hardened Steel ~68HRC	Stainless Steel	Cast Iron	Aluminum	Graphite	Copper Alloy	Brass	CFRP	Plastic	Thermoset Plastic	High Density Plastic	Nickel / Cobalt	Titanium Alloy
AiTIN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★	☆	☆

★ : Priority ☆ : Applicable Materials

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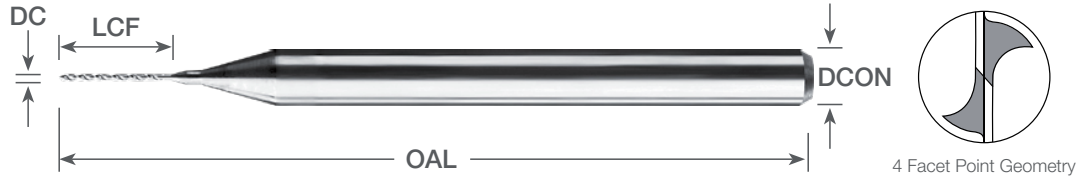
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- General**
- Special Tools

3.00mm SHANK

MICRO DRILLS

2.31mm - 2.60mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length

Uncoated		AlTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0909.400	●	226-0909L400	●	2.31	3.00	38.00	10.20	130°
226-0913.400	●	226-0913L400	●	2.32	3.00	38.00	10.20	130°
226-0917.400	●	226-0917L400	●	2.33	3.00	38.00	10.20	130°
226-0921.400	●	226-0921L400	●	2.34	3.00	38.00	10.20	130°
226-0925.400	●	226-0925L400	●	2.35	3.00	38.00	10.20	130°
226-0929.400	●	226-0929L400	●	2.36	3.00	38.00	10.20	130°
226-0933.400	●	226-0933L400	●	2.37	3.00	38.00	10.20	130°
226-0937.400	●	226-0937L400	●	2.38	3.00	38.00	10.20	130°
226-0941.400	●	226-0941L400	●	2.39	3.00	38.00	10.20	130°
226-0945.400	●	226-0945L400	●	2.40	3.00	38.00	10.20	130°
226-0949.400	●	226-0949L400	●	2.41	3.00	38.00	10.20	130°
226-0953.400	●	226-0953L400	●	2.42	3.00	38.00	10.20	130°
226-0957.400	●	226-0957L400	●	2.43	3.00	38.00	10.20	130°
226-0961.400	●	226-0961L400	●	2.44	3.00	38.00	10.20	130°
226-0965.400	●	226-0965L400	●	2.45	3.00	38.00	10.20	130°
226-0969.400	●	226-0969L400	●	2.46	3.00	38.00	10.20	130°
226-0972.400	●	226-0972L400	●	2.47	3.00	38.00	10.20	130°
226-0976.400	●	226-0976L400	●	2.48	3.00	38.00	10.20	130°
226-0980.400	●	226-0980L400	●	2.49	3.00	38.00	10.20	130°
226-0984.400	●	226-0984L400	●	2.50	3.00	38.00	10.20	130°
226-0988.400	●	226-0988L400	●	2.51	3.00	38.00	10.20	130°
226-0992.400	●	226-0992L400	●	2.52	3.00	38.00	10.20	130°
226-0996.400	●	226-0996L400	●	2.53	3.00	38.00	10.20	130°
226-1000.400	●	226-1000L400	●	2.54	3.00	38.00	10.20	130°
226-1004.400	●	226-1004L400	●	2.55	3.00	38.00	10.20	130°
226-1008.400	●	226-1008L400	●	2.56	3.00	38.00	10.20	130°
226-1012.400	●	226-1012L400	●	2.57	3.00	38.00	10.20	130°
226-1016.400	●	226-1016L400	●	2.58	3.00	38.00	10.20	130°
226-1020.400	●	226-1020L400	●	2.59	3.00	38.00	10.20	130°
226-1024.400	●	226-1024L400	●	2.60	3.00	38.00	10.20	130°

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~55HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AlTiN	★	★	★	★	★	☆	☆	☆	☆	★	★	☆	☆	☆	☆	☆
Uncoated						☆	☆	☆	★	★	☆	★	★	★		☆

★ : Priority ☆ : Applicable Materials

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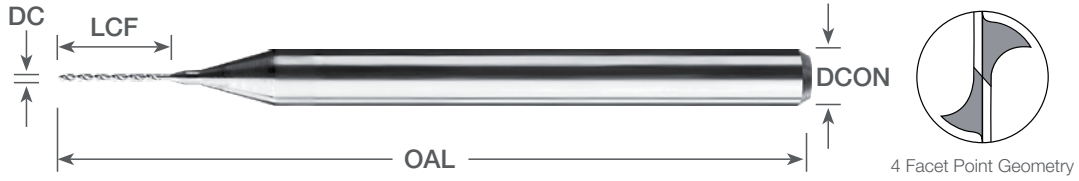
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3.00mm SHANK

MICRO DRILLS

2.61mm - 2.90mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



STANDARD Flute Length



Uncoated		TiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-1028.400	●	226-1028L400	●	2.61	3.00	38.00	10.20	130°
226-1031.400	●	226-1031L400	●	2.62	3.00	38.00	10.20	130°
226-1035.400	●	226-1035L400	●	2.63	3.00	38.00	10.20	130°
226-1039.400	●	226-1039L400	●	2.64	3.00	38.00	10.20	130°
226-1043.400	●	226-1043L400	●	2.65	3.00	38.00	10.20	130°
226-1047.400	●	226-1047L400	●	2.66	3.00	38.00	10.20	130°
226-1051.400	●	226-1051L400	●	2.67	3.00	38.00	10.20	130°
226-1055.400	●	226-1055L400	●	2.68	3.00	38.00	10.20	130°
226-1059.400	●	226-1059L400	●	2.69	3.00	38.00	10.20	130°
226-1063.400	●	226-1063L400	●	2.70	3.00	38.00	10.20	130°
226-1067.400	●	226-1067L400	●	2.71	3.00	38.00	10.20	130°
226-1071.400	●	226-1071L400	●	2.72	3.00	38.00	10.20	130°
226-1075.400	●	226-1075L400	●	2.73	3.00	38.00	10.20	130°
226-1079.400	●	226-1079L400	●	2.74	3.00	38.00	10.20	130°
226-1083.400	●	226-1083L400	●	2.75	3.00	38.00	10.20	130°
226-1087.400	●	226-1087L400	●	2.76	3.00	38.00	10.20	130°
226-1091.400	●	226-1091L400	●	2.77	3.00	38.00	10.20	130°
226-1094.400	●	226-1094L400	●	2.78	3.00	38.00	10.20	130°
226-1098.400	●	226-1098L400	●	2.79	3.00	38.00	10.20	130°
226-1102.400	●	226-1102L400	●	2.80	3.00	38.00	10.20	130°
226-1106.400	●	226-1106L400	●	2.81	3.00	38.00	10.20	130°
226-1110.400	●	226-1110L400	●	2.82	3.00	38.00	10.20	130°
226-1114.400	●	226-1114L400	●	2.83	3.00	38.00	10.20	130°
226-1118.400	●	226-1118L400	●	2.84	3.00	38.00	10.20	130°
226-1122.400	●	226-1122L400	●	2.85	3.00	38.00	10.20	130°
226-1126.400	●	226-1126L400	●	2.86	3.00	38.00	10.20	130°
226-1130.400	●	226-1130L400	●	2.87	3.00	38.00	10.20	130°
226-1134.400	●	226-1134L400	●	2.88	3.00	38.00	10.20	130°
226-1138.400	●	226-1138L400	●	2.89	3.00	38.00	10.20	130°
226-1142.400	●	226-1142L400	●	2.90	3.00	38.00	10.20	130°

SERIES 226 WORKPIECE MATERIAL																
Coating	P	P	H	H	M	K	N	N	N	N	N	N	N	S	S	
	Steel ~30HRC	Steel 30-40HRC	Hardened Steel ~58HRC	Hardened Steel ~68HRC	Stainless Steel	Cast Iron	Aluminum	Graphite	Copper Alloy	Brass	CFRP	Plastic	Thermoset Plastic	High Density Plastic	Nickel / Cobalt	Titanium Alloy
AiTIN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★	☆	☆

★ : Priority ☆ : Applicable Materials

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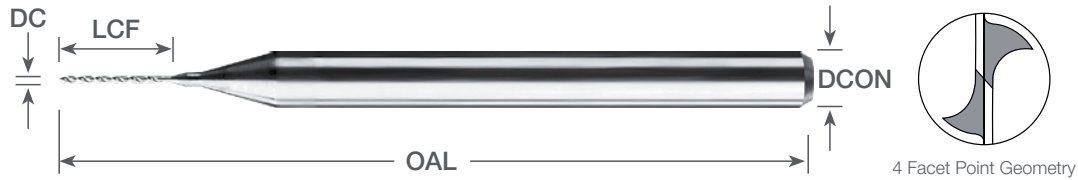
3.00mm SHANK

MICRO DRILLS

2.91mm - 3.00mm DIAMETER

Mirror Surface Finishes

Sub Micron Grain Carbide



STANDARD Flute Length

Uncoated		AlTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm} _{-0.008mm}	DCON	OAL	LCF	
226-1146.400	●	226-1146L400	●	2.91	3.00	38.00	10.20	130°
226-1150.400	●	226-1150L400	●	2.92	3.00	38.00	10.20	130°
226-1154.400	●	226-1154L400	●	2.93	3.00	38.00	10.20	130°
226-1157.400	●	226-1157L400	●	2.94	3.00	38.00	10.20	130°
226-1161.400	●	226-1161L400	●	2.95	3.00	38.00	10.20	130°
226-1165.400	●	226-1165L400	●	2.96	3.00	38.00	10.20	130°
226-1169.400	●	226-1169L400	●	2.97	3.00	38.00	10.20	130°
226-1173.400	●	226-1173L400	●	2.98	3.00	38.00	10.20	130°
226-1177.400	●	226-1177L400	●	2.99	3.00	38.00	10.20	130°
226-1181.400	●	226-1181L400	●	3.00	3.00	38.00	10.20	130°

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~55HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AlTiN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated						☆	☆	★	★	☆	★	★	★			☆

★ : Priority ☆ : Applicable Materials

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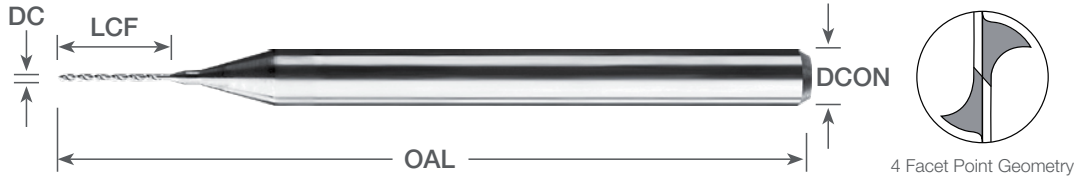
U.S. Stock Standard : ●
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3.00mm SHANK

MICRO DRILLS

0.75mm - 1.80mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



EXTENDED Flute Length



Uncoated		AITIN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0295.433	●	226-0295L433	●	0.75	3.00	50.00	11.00	130°
226-0315.433	●	226-0315L433	●	0.80	3.00	50.00	11.00	130°
226-0335.512	●	226-0335L512	●	0.85	3.00	50.00	13.00	130°
226-0354.512	●	226-0354L512	●	0.90	3.00	50.00	13.00	130°
226-0374.591	●	226-0374L591	●	0.95	3.00	50.00	15.00	130°
226-0394.591	●	226-0394L591	●	1.00	3.00	50.00	15.00	130°
226-0413.670	●	226-0413L670	●	1.05	3.00	50.00	17.00	130°
226-0433.670	●	226-0433L670	●	1.10	3.00	50.00	17.00	130°
226-0453.670	●	226-0453L670	●	1.15	3.00	50.00	17.00	130°
226-0472.670	●	226-0472L670	●	1.20	3.00	50.00	17.00	130°
226-0492.749	●	226-0492L749	●	1.25	3.00	50.00	19.00	130°
226-0512.749	●	226-0512L749	●	1.30	3.00	50.00	19.00	130°
226-0531.749	●	226-0531L749	●	1.35	3.00	50.00	19.00	130°
226-0551.749	●	226-0551L749	●	1.40	3.00	50.00	19.00	130°
226-0571.788	●	226-0571L788	●	1.45	3.00	50.00	20.00	130°
226-0591.788	●	226-0591L788	●	1.50	3.00	50.00	20.00	130°
226-0610.788	●	226-0610L788	●	1.55	3.00	50.00	20.00	130°
226-0630.788	●	226-0630L788	●	1.60	3.00	50.00	20.00	130°
226-0650.788	●	226-0650L788	●	1.65	3.00	50.00	20.00	130°
226-0669.788	●	226-0669L788	●	1.70	3.00	50.00	20.00	130°
226-0689.788	●	226-0689L788	●	1.75	3.00	50.00	20.00	130°
226-0709.788	●	226-0709L788	●	1.80	3.00	50.00	20.00	130°

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~58HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AITIN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★		☆

★ : Priority ☆ : Applicable Materials

● : U.S. Stock Standard
■ : NOT STOCKED - Call for Delivery

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3.00mm SHANK

MICRO DRILLS

1.85mm - 3.00mm DIAMETER

Mirror Surface Finishes
Sub Micron Grain Carbide



EXTENDED Flute Length

Uncoated		AlTiN Coating		Dimensions (mm)				Point Angle
Part Number	Stock	Part Number	Stock	DC ^{+0.000mm -0.008mm}	DCON	OAL	LCF	
226-0728.898	●	226-0728L898	●	1.85	3.00	60.00	22.80	130°
226-0748.898	●	226-0748L898	●	1.90	3.00	60.00	22.80	130°
226-0768.945	●	226-0768L945	●	1.95	3.00	60.00	24.00	130°
226-0787.945	●	226-0787L945	●	2.00	3.00	60.00	24.00	130°
226-0807.992	●	226-0807L992	●	2.05	3.00	60.00	25.20	130°
226-0827.992	●	226-0827L992	●	2.10	3.00	60.00	25.20	130°
226-0846.1039	●	226-0846L1039	●	2.15	3.00	60.00	26.40	130°
226-0866.1039	●	226-0866L1039	●	2.20	3.00	60.00	26.40	130°
226-0886.1087	●	226-0886L1087	●	2.25	3.00	60.00	27.60	130°
226-0906.1087	●	226-0906L1087	●	2.30	3.00	60.00	27.60	130°
226-0925.1134	●	226-0925L1134	●	2.35	3.00	60.00	28.80	130°
226-0945.1134	●	226-0945L1134	●	2.40	3.00	60.00	28.80	130°
226-0965.1181	●	226-0965L1181	●	2.45	3.00	60.00	30.00	130°
226-0984.1181	●	226-0984L1181	●	2.50	3.00	60.00	30.00	130°
226-1004.1228	●	226-1004L1228	●	2.55	3.00	60.00	31.20	130°
226-1024.1228	●	226-1024L1228	●	2.60	3.00	60.00	31.20	130°
226-1043.1276	●	226-1043L1276	●	2.65	3.00	60.00	32.40	130°
226-1063.1276	●	226-1063L1276	●	2.70	3.00	60.00	32.40	130°
226-1083.1323	●	226-1083L1323	●	2.75	3.00	60.00	33.60	130°
226-1102.1323	●	226-1102L1323	●	2.80	3.00	60.00	33.60	130°
226-1122.1370	●	226-1122L1370	●	2.85	3.00	60.00	34.80	130°
226-1142.1370	●	226-1142L1370	●	2.90	3.00	60.00	34.80	130°
226-1161.1417	●	226-1161L1417	●	2.95	3.00	60.00	36.00	130°
226-1181.1417	●	226-1181L1417	●	3.00	3.00	60.00	36.00	130°

SERIES 226 WORKPIECE MATERIAL

Coating	P Steel ~30HRC	P Steel 30-40HRC	H Hardened Steel ~55HRC	H Hardened Steel ~68HRC	M Stainless Steel	K Cast Iron	N Aluminum	N Graphite	N Copper Alloy	N Brass	N CFRP	N Plastic	N Thermoset Plastic	N High Density Plastic	S Nickel / Cobalt	S Titanium Alloy
AlTiN	★	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Uncoated							☆	☆	★	★	☆	★	★	★		☆

★ : Priority ☆ : Applicable Materials

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U.S. Stock Standard : ●
NOT STOCKED - Call for Delivery : ■

Solid Carbide Micro Drills

◆ Series 105 / 226 / 226L / 390 / 392

Workpiece Material	Material Hardness/Types	Uncoated Recommended Cutting Speed		AlTiN Coated Recommended Cutting Speed		Cutting Dia. DC (in)	Cutting Dia. DC (mm)	Feed Per Rev	
		(sfm)	(m/min)	(sfm)	(m/min)			(ipr)	(mm/rev)
Low Carbon Steel	12L14 A36	130 - 165	40 - 50	165 - 195	50 - 60	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00015 - 0.00030	0.0040 - 0.0075
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00030 - 0.00045	0.0075 - 0.0115
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00045 - 0.00060	0.0115 - 0.0150
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00060 - 0.00120	0.0150 - 0.0300
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00120 - 0.00240	0.0300 - 0.0600
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00240 - 0.00360	0.0600 - 0.0900
Mild Carbon Steel	1018 1028 1050	98 - 150	30 - 45	130 - 180	40 - 54	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00014 - 0.00028	0.0035 - 0.0070
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00028 - 0.00042	0.0070 - 0.0106
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00042 - 0.00056	0.0106 - 0.0140
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00056 - 0.00115	0.0140 - 0.0280
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00115 - 0.00226	0.0280 - 0.0560
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00226 - 0.00353	0.0560 - 0.0896
Alloy Steel	4130 4140 8620	180 - 245	55 - 75	195 - 260	60 - 80	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00013 - 0.00026	0.0033 - 0.0066
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00026 - 0.00039	0.0066 - 0.0099
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00039 - 0.00052	0.0099 - 0.0132
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00052 - 0.00104	0.0132 - 0.0264
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00104 - 0.00208	0.0264 - 0.0528
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00208 - 0.00326	0.0528 - 0.0828
Preharden Tool Steel	P20 4140PH A2 D2 H13	100 - 165	30 - 50	130 - 195	40 - 60	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00008 - 0.00015	0.0020 - 0.0038
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00015 - 0.00023	0.0038 - 0.0058
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00023 - 0.00030	0.0038 - 0.0076
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00030 - 0.00060	0.0076 - 0.0152
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00060 - 0.00120	0.0152 - 0.0304
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00120 - 0.00190	0.0304 - 0.0483
Harden Tool Steel	>48 HRc/ <55HRc	60 - 100	18 - 30	80 - 140	25 - 42	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00006 - 0.00013	0.0015 - 0.0033
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00013 - 0.00019	0.0033 - 0.0048
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00019 - 0.00026	0.0048 - 0.0066
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00026 - 0.00052	0.0066 - 0.0132
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00052 - 0.00105	0.0132 - 0.0264
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00105 - 0.00163	0.0264 - 0.0414
Stainless Steel	303 304 316 321	50 - 80	15 - 24	65 - 100	20 - 30	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00011 - 0.00022	0.0028 - 0.0056
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00022 - 0.00033	0.0056 - 0.0084
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00033 - 0.00044	0.0084 - 0.0110
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00044 - 0.00087	0.0110 - 0.0220
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00087 - 0.00174	0.0220 - 0.0442
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00174 - 0.00272	0.0442 - 0.0690
Stainless Steel	15-5PH 17-4PH 13-8 400 Series	30 - 50	10 - 15	40 - 70	12 - 21	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00009 - 0.00017	0.0023 - 0.0043
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00017 - 0.00026	0.0043 - 0.0066
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00026 - 0.00035	0.0066 - 0.0089
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00035 - 0.00070	0.0089 - 0.0178
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00070 - 0.00139	0.0178 - 0.0353
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00139 - 0.00218	0.0353 - 0.0553

Recommended starting parameters are for standard flute length if using extended flute length drill reduce feed per rev by 25%

Recommended starting parameters based on good setup, minimum tool runout & good tooling

Note: These tools can also be used in PLASTICS, when doing so use the parameters for aluminum listed above

• Above recommendations are suggested starting parameters. Cutting speeds and feed rates may vary according to machining application and setup.

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

Solid Carbide Micro Drills

◆ Series 105 / 226 / 226L / 390 / 392

Workpiece Material	Material Hardness/Types	Uncoated		AlTiN Coated		Cutting Dia. DC (in)	Cutting Dia. DC (mm)	Feed Per Rev	
		Recommended Cutting Speed		Recommended Cutting Speed				(ipr)	(mm/rev)
		(sfm)	(m/min)	(sfm)	(m/min)				
Gray Cast Iron	-	130 - 165	40 - 50	165 - 190	50 - 57	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00020 - 0.00039	0.0051 - 0.0099
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00039 - 0.00059	0.0099 - 0.0149
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00059 - 0.00078	0.0149 - 0.0198
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00078 - 0.00157	0.0198 - 0.0398
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00157 - 0.00313	0.0398 - 0.0795
Nodular Cast Iron	-	95 - 150	28 - 45	115 - 150	35 - 45	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00015 - 0.00030	0.0040 - 0.0075
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00030 - 0.00045	0.0075 - 0.0115
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00045 - 0.00060	0.0115 - 0.0150
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00060 - 0.00120	0.0150 - 0.0300
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00120 - 0.00240	0.0300 - 0.0600
Aluminum	-	165 - 295	50 - 90	245 - 325	74 - 98	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00025 - 0.00049	0.0063 - 0.0124
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00049 - 0.00074	0.0124 - 0.0188
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00074 - 0.00099	0.0188 - 0.0250
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00099 - 0.00197	0.0250 - 0.0500
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00197 - 0.00394	0.0500 - 0.1000
Copper Alloys	-	140 - 190	42 - 58	180 - 230	55 - 70	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00025 - 0.00049	0.0063 - 0.0124
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00049 - 0.00074	0.0124 - 0.0188
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00074 - 0.00099	0.0188 - 0.0250
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00099 - 0.00197	0.0250 - 0.0500
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00197 - 0.00394	0.0500 - 0.1000
Heat Resistant Alloy	Waspaloy Hastelloy Inconel Monel	40 - 55	12 - 16	50 - 65	15 - 19	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00005 - 0.00011	0.0014 - 0.0028
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00011 - 0.00016	0.0028 - 0.0041
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00016 - 0.00022	0.0041 - 0.0055
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00022 - 0.00044	0.0055 - 0.0110
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00044 - 0.00087	0.0110 - 0.0220
Titanium Alloy	-	40 - 55	12 - 16	50 - 65	15 - 19	Ø0.005 - Ø0.010	Ø0.13 - Ø0.25	0.00006 - 0.00013	0.0015 - 0.0033
						Ø0.010 - Ø0.015	Ø0.25 - Ø0.38	0.00013 - 0.00019	0.0033 - 0.0048
						Ø0.015 - Ø0.020	Ø0.38 - Ø0.50	0.00019 - 0.00026	0.0048 - 0.0066
						Ø0.020 - Ø0.040	Ø0.50 - Ø1.00	0.00026 - 0.00052	0.0066 - 0.0132
						Ø0.040 - Ø0.080	Ø1.00 - Ø2.00	0.00052 - 0.00105	0.0132 - 0.0264
						Ø0.080 - Ø0.125	Ø2.00 - Ø3.00	0.00105 - 0.00163	0.0264 - 0.0414

Recommended starting parameters are for standard flute length if using extended flute length drill reduce feed per rev by 25%

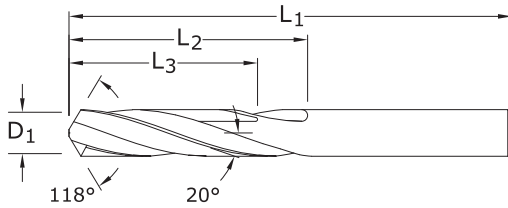
Recommended starting parameters based on good setup, minimum tool runout & good tooling

Note: These tools can also be used in PLASTICS, when doing so use the parameters for aluminum listed above

- Above recommendations are suggested starting parameters. Cutting speeds and feed rates may vary according to machining application and setup.

FRACTIONAL & METRIC

2 Flute Drills • Metric: DIN 338



Pictured:
Series 101 Drill Set

101

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
#80	0.0135	0.34	3/4	3/16	—	51080	57076
#79	0.0145	0.37	3/4	3/16	—	51079	57077
1/64	0.0156	0.40	3/4	3/16	—	51101	57078
#78	0.0160	0.41	3/4	3/16	—	51078	57079
#77	0.0180	0.46	3/4	3/16	—	51077	57080
#76	0.0200	0.51	7/8	1/4	—	51076	57081
#75	0.0210	0.53	7/8	1/4	—	51075	57082
#74	0.0225	0.57	7/8	1/4	—	51074	57083
#73	0.0240	0.61	7/8	1/4	—	51073	57084
#72	0.0250	0.64	1	5/16	—	51072	57085
#71	0.0260	0.66	1	5/16	—	51071	57086
0,7 mm	0.0276		28,0	9,0	—	61001	68268
#70	0.0280	0.71	1-1/4	1/2	—	51070	57087
#69	0.0292	0.74	1-1/4	1/2	—	51069	57088
#68	0.0310	0.79	1-1/4	1/2	—	51068	57089
1/32	0.0312	0.79	1-1/4	1/2	—	51102	57090
0,8 mm	0.0315		30,0	10,0	—	61003	68269
#67	0.0320	0.81	1-1/4	1/2	—	51067	57091
#66	0.0330	0.84	1-1/4	1/2	—	51066	57092
#65	0.0350	0.89	1-3/8	5/8	1/2	51065	57093
0,9 mm	0.0354		32,0	11,0	8,0	61005	68270
#64	0.0360	0.91	1-3/8	5/8	1/2	51064	57094
#63	0.0370	0.94	1-3/8	5/8	1/2	51063	57095
#62	0.0380	0.97	1-3/8	5/8	1/2	51062	57096
#61	0.0390	0.99	1-3/8	5/8	1/2	51061	57097
1,0 mm	0.0394		34,0	12,0	9,0	61007	68271
#60	0.0400	1.02	1-1/2	3/4	39/64	51060	57098
#59	0.0410	1.04	1-1/2	3/4	39/64	51059	57099
#58	0.0420	1.07	1-1/2	3/4	39/64	51058	57100
#57	0.0430	1.09	1-1/2	3/4	39/64	51057	57101
1,1 mm	0.0433		36,0	14,0	11,0	61052	68294
#56	0.0465	1.18	1-1/2	3/4	39/64	51056	57102
3/64	0.0469	1.19	1-1/2	3/4	39/64	51103	57103
1,2 mm	0.0472		38,0	16,0	12,0	61053	68295
1,3 mm	0.0512		38,0	16,0	12,0	61054	68296
#55	0.0520	1.32	1-1/2	3/4	39/64	51055	57104
#54	0.0550	1.40	1-1/2	3/4	39/64	51054	57105
1,4 mm	0.0551		40,0	18,0	14,0	61055	68297
1,5 mm	0.0591		40,0	18,0	14,0	61009	68272
#53	0.0595	1.51	1-1/2	3/4	39/64	51053	57106
*1/16	0.0625	1.59	1-1/2	3/4	39/64	51104	57107
1,6 mm	0.0630		43,0	20,0	16,0	61056	68298
#52	0.0635	1.61	1-1/2	3/4	39/64	51052	57108
1,7 mm	0.0669		43,0	20,0	17,0	61057	68299
#51	0.0670	1.70	1-1/2	3/4	39/64	51051	57109

TOLERANCES (inch)

D₁ = +.0000/--.0005

TOLERANCES (mm)

D₁ = +0,0000/-0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

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continued on next page

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

FRACTIONAL & METRIC 2 Flute Drills • Metric: DIN 338

101

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
#50	0.0700	1.78	1-3/4	7/8	45/64	51050	57110
1,8 mm	0.0709		46,0	22,0	17,0	61058	68300
#49	0.0730	1.85	1-3/4	7/8	45/64	51049	57111
1,9 mm	0.0748		46,0	22,0	17,0	61059	68301
#48	0.0760	1.93	1-3/4	7/8	45/64	51048	57112
5/64	0.0781	1.98	1-3/4	7/8	45/64	51105	57113
#47	0.0785	1.99	1-3/4	7/8	45/64	51047	57114
2,0 mm	0.0787		49,0	24,0	19,0	61011	68273
#46	0.0810	2.06	1-3/4	7/8	45/64	51046	57115
#45	0.0820	2.08	1-3/4	7/8	45/64	51045	57116
2,1 mm	0.0827		49,0	24,0	19,0	61060	68302
#44	0.0860	2.18	2	1	51/64	51044	57117
2,2 mm	0.0866		53,0	27,0	21,0	61061	68303
#43	0.0890	2.26	2	1	51/64	51043	57118
2,3 mm	0.0906		53,0	27,0	21,0	61062	68304
#42	0.0935	2.37	2	1	51/64	51042	57119
3/32	0.0938	2.38	2	1	51/64	51106	57120
2,4 mm	0.0945		57,0	30,0	24,0	61063	68305
#41	0.0960	2.44	2	1	51/64	51041	57121
#40	0.0980	2.49	2	1	51/64	51040	57122
2,5 mm	0.0984		57,0	30,0	24,0	61013	68274
#39	0.0995	2.53	2-1/4	1-1/4	1	51039	57123
#38	0.1015	2.58	2-1/4	1-1/4	1	51038	57124
2,6 mm	0.1024		57,0	30,0	24,0	61064	68306
#37	0.1040	2.64	2-1/4	1-1/4	1	51037	57125
2,7 mm	0.1063		61,0	33,0	26,0	61065	68307
#36	0.1065	2.71	2-1/4	1-1/4	1	51036	57126
7/64	0.1094	2.78	2-1/4	1-1/4	1	51107	57127
#35	0.1100	2.79	2-1/4	1-1/4	1	51035	57128
2,8 mm	0.1102		61,0	33,0	26,0	61066	68308
#34	0.1110	2.82	2-1/4	1-1/4	1	51034	57129
#33	0.1130	2.87	2-1/4	1-1/4	1	51033	57130
2,9 mm	0.1142		61,0	33,0	26,0	61067	68309
#32	0.1160	2.95	2-1/4	1-1/4	1	51032	57131
3,0 mm	0.1181		61,0	33,0	26,0	61015	68275
#31	0.1200	3.05	2-1/4	1-1/4	1	51031	57132
3,1 mm	0.1220		65,0	36,0	28,0	61068	68310
*1/8	0.1250	3.18	2-1/4	1-1/4	1	51108	57133
3,2 mm	0.1260		65,0	36,0	28,0	61069	68311
#30	0.1285	3.26	2-1/4	1-1/4	1	51030	57134
3,3 mm	0.1299		65,0	36,0	28,0	61070	68312
3,4 mm	0.1339		70,0	39,0	31,0	61071	68313
#29	0.1360	3.45	2-1/2	1-3/8	1-7/64	51029	57135
3,5 mm	0.1378		70,0	39,0	31,0	61017	68276
#28	0.1405	3.57	2-1/2	1-3/8	1-7/64	51028	57136
9/64	0.1406	3.57	2-1/2	1-3/8	1-7/64	51109	57137
3,6 mm	0.1417		70,0	39,0	31,0	61072	68314
#27	0.1440	3.66	2-1/2	1-3/8	1-7/64	51027	57138
3,7 mm	0.1457		70,0	39,0	31,0	61073	68315
#26	0.1470	3.73	2-1/2	1-3/8	1-7/64	51026	57139
#25	0.1495	3.80	2-1/2	1-3/8	1-7/64	51025	57140
3,8 mm	0.1496		75,0	43,0	34,0	61074	68316
#24	0.1520	3.86	2-1/2	1-3/8	1-7/64	51024	57141
3,9 mm	0.1535		75,0	43,0	34,0	61075	68317

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CONTINUED

Automotive

Mold & Die

Aerospace

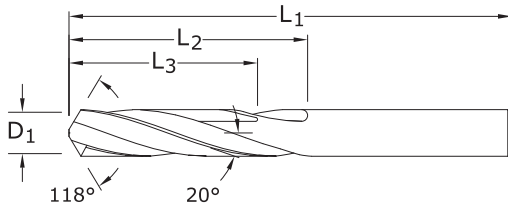
High Performance

General

Special Tools

FRACTIONAL & METRIC

2 Flute Drills • Metric: DIN 338



Pictured:
Series 101 Drill Set

101

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
#23	0.1540	3.91	2-1/2	1-3/8	1-7/64	51023	57142
5/32	0.1562	3.97	2-1/2	1-3/8	1-7/64	51110	57143
#22	0.1570	3.99	2-1/2	1-3/8	1-7/64	51022	57144
4,0 mm	0.1575		75,0	43,0	34,0	61019	68277
#21	0.1590	4.04	2-1/2	1-3/8	1-7/64	51021	57145
#20	0.1610	4.09	2-1/2	1-3/8	1-7/64	51020	57146
4,1 mm	0.1614		75,0	43,0	34,0	61076	68318
4,2 mm	0.1654		75,0	43,0	34,0	61077	68319
#19	0.1660	4.22	2-1/2	1-5/8	1-19/64	51019	57147
4,3 mm	0.1693		80,0	47,0	37,0	61078	68320
#18	0.1695	4.31	2-3/4	1-5/8	1-19/64	51018	57148
11/64	0.1719	4.37	2-3/4	1-5/8	1-19/64	51111	57149
#17	0.1730	4.39	2-3/4	1-5/8	1-19/64	51017	57150
4,4 mm	0.1732		80,0	47,0	37,0	61079	68321
#16	0.1770	4.50	2-3/4	1-5/8	1-19/64	51016	57151
4,5 mm	0.1772		80,0	47,0	37,0	61021	68278
#15	0.1800	4.57	2-3/4	1-5/8	1-19/64	51015	57152
4,6 mm	0.1811		80,0	47,0	37,0	61080	68322
#14	0.1820	4.62	2-3/4	1-5/8	1-19/64	51014	57153
4,7 mm	0.1850		80,0	47,0	37,0	61081	68323
#13	0.1850	4.70	2-3/4	1-5/8	1-19/64	51013	57154
*3/16	0.1875	4.76	2-3/4	1-5/8	1-19/64	51112	57155
4,8 mm	0.1890		86,0	52,0	41,0	61082	68324
#12	0.1890	4.80	2-3/4	1-5/8	1-19/64	51012	57156
#11	0.1910	4.85	2-3/4	1-5/8	1-19/64	51011	57157
4,9 mm	0.1929		86,0	52,0	41,0	61083	68325
#10	0.1935	4.91	2-3/4	1-5/8	1-19/64	51010	57158
#9	0.1960	4.98	3	1-3/4	1-13/32	51009	57159
5,0 mm	0.1969		86,0	52,0	41,0	61023	68279
#8	0.1990	5.05	3	1-3/4	1-13/32	51008	57160
5,1 mm	0.2008		86,0	52,0	41,0	61084	68326
#7	0.2010	5.11	3	1-3/4	1-13/32	51007	57161
13/64	0.2031	5.16	3	1-3/4	1-13/32	51113	57162
#6	0.2040	5.18	3	1-3/4	1-13/32	51006	57163
5,2 mm	0.2047		86,0	52,0	41,0	61085	68327
#5	0.2055	5.22	3	1-3/4	1-13/32	51005	57164
5,3 mm	0.2087		86,0	52,0	41,0	61086	68328
#4	0.2090	5.31	3	1-3/4	1-13/32	51004	57165
5,4 mm	0.2126		93,0	57,0	45,0	61087	68329
#3	0.2130	5.41	3	1-3/4	1-13/32	51003	57166
5,5 mm	0.2165		93,0	57,0	45,0	61025	68280
7/32	0.2188	5.56	3	1-3/4	1-13/32	51114	57167
5,6 mm	0.2205		93,0	57,0	45,0	61088	68330
#2	0.2210	5.61	3	1-3/4	1-13/32	51002	57168

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TOLERANCES (inch)

D₁ = +.0000/--.0005

TOLERANCES (mm)

D₁ = +0,0000/-0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

FRACTIONAL & METRIC 2 Flute Drills • Metric: DIN 338

101

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
5,7 mm	0.2244		93,0	57,0	45,0	61089	68331
#1	0.2280	5.79	3	1-3/4	1-13/32	51001	57169
5,8 mm	0.2283		93,0	57,0	45,0	61090	68332
5,9 mm	0.2323		93,0	57,0	45,0	61091	68333
A	0.2340	5.94	3-1/4	2	1-39/64	51201	57170
15/64	0.2344	5.95	3-1/4	2	1-39/64	51115	57171
6,0 mm	0.2362		93,0	57,0	45,0	61027	68281
B	0.2380	6.05	3-1/4	2	1-39/64	51202	57172
6,1 mm	0.2402		101,0	63,0	50,0	61092	68334
C	0.2420	6.15	3-1/4	2	1-39/64	51203	57173
6,2 mm	0.2441		101,0	63,0	50,0	61093	68335
D	0.2460	6.25	3-1/4	2	1-39/64	51204	57174
6,3 mm	0.2480		101,0	63,0	50,0	61094	68336
*1/4	0.2500	6.35	3-1/4	2	1-39/64	51116	57176
6,4 mm	0.2520		101,0	63,0	50,0	61095	68337
6,5 mm	0.2559		101,0	63,0	50,0	61029	68282
F	0.2570	6.53	3-1/4	2	1-39/64	51206	57177
6,6 mm	0.2598		101,0	63,0	50,0	61096	68338
G	0.2610	6.63	3-1/2	2-1/8	1-45/64	51207	57178
6,7 mm	0.2638		101,0	63,0	50,0	61097	68339
17/64	0.2656	6.75	3-1/2	2-1/8	1-45/64	51117	57179
H	0.2660	6.76	3-1/2	2-1/8	1-45/64	51208	57180
6,8 mm	0.2677		109,0	69,0	55,0	61098	68340
6,9 mm	0.2717		109,0	69,0	55,0	61099	68341
I	0.2720	6.91	3-1/2	2-1/8	1-45/64	51209	57181
7,0 mm	0.2756		109,0	69,0	55,0	61031	68283
J	0.2770	7.04	3-1/2	2-1/8	1-45/64	51210	57182
7,1 mm	0.2795		109,0	69,0	55,0	61100	68342
K	0.2810	7.14	3-1/2	2-1/8	1-45/64	51211	57183
9/32	0.2812	7.14	3-1/2	2-1/8	1-45/64	51118	57184
7,2 mm	0.2835		109,0	69,0	55,0	61101	68343
7,3 mm	0.2874		109,0	69,0	55,0	61102	68344
L	0.2900	7.37	3-1/2	2-1/8	1-45/64	51212	57185
7,4 mm	0.2913		109,0	69,0	55,0	61103	68345
M	0.2950	7.49	3-3/4	2-3/8	1-29/32	51213	57186
7,5 mm	0.2953		109,0	69,0	55,0	61033	68284
19/64	0.2969	7.54	3-3/4	2-3/8	1-29/32	51119	57187
7,6 mm	0.2992		117,0	75,0	60,0	61104	68346
N	0.3020	7.67	3-3/4	2-3/8	1-29/32	51214	57188
7,7 mm	0.3031		117,0	75,0	60,0	61105	68347
7,8 mm	0.3071		117,0	75,0	60,0	61106	68348
7,9 mm	0.3110		117,0	75,0	60,0	61107	68349
*5/16	0.3125	7.94	3-3/4	2-3/8	1-29/32	51120	57189
8,0 mm	0.3150		117,0	75,0	60,0	61035	68285
O	0.3160	8.03	3-3/4	2-3/8	1-29/32	51215	57190
8,1 mm	0.3189		117,0	75,0	60,0	61108	68350
8,2 mm	0.3228		117,0	75,0	60,0	61109	68351
P	0.3230	8.20	3-3/4	2-3/8	1-29/32	51216	57191
8,3 mm	0.3268		117,0	75,0	60,0	61110	68352
21/64	0.3281	8.33	4	2-1/2	2	51121	57192
8,4 mm	0.3307		117,0	75,0	60,0	61111	68353
Q	0.3320	8.43	4	2-1/2	2	51217	57193
8,5 mm	0.3346		117,0	75,0	60,0	61037	68286
8,6 mm	0.3386		125,0	81,0	64,0	61112	68354

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CONTINUED

Automotive

Mold & Die

Aerospace

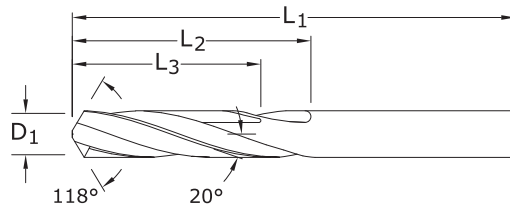
High Performance

General

Special Tools

FRACTIONAL & METRIC

2 Flute Drills • Metric: DIN 338



Pictured:
Series 101 Drill Set

101

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
R	0.3390	8.61	4	2-1/2	2	51218	57194
8,7 mm	0.3425		125,0	81,0	64,0	61113	68355
11/32	0.3438	8.73	4	2-1/2	2	51122	57195
8,8 mm	0.3465		125,0	81,0	64,0	61114	68356
S	0.3480	8.84	4	2-1/2	2	51219	57196
8,9 mm	0.3504		125,0	81,0	64,0	61115	68357
9,0 mm	0.3543		125,0	81,0	64,0	61039	68287
T	0.3580	9.09	4-1/4	2-3/4	2-13/64	51220	57197
9,1 mm	0.3583		125,0	81,0	64,0	61116	68358
23/64	0.3594	9.13	4-1/4	2-3/4	2-13/64	51123	57198
9,2 mm	0.3622		125,0	81,0	64,0	61117	68359
9,3 mm	0.3661		125,0	81,0	64,0	61118	68360
U	0.3680	9.35	4-1/4	2-3/4	2-13/64	51221	57199
9,4 mm	0.3701		125,0	81,0	64,0	61119	68361
9,5 mm	0.3740		125,0	81,0	64,0	61041	68288
*3/8	0.3750	9.53	4-1/4	2-3/4	2-13/64	51124	57200
V	0.3770	9.58	4-1/4	2-3/4	2-13/64	51222	57201
9,6 mm	0.3780		133,0	87,0	69,0	61120	68362
9,7 mm	0.3819		133,0	87,0	69,0	61121	68363
9,8 mm	0.3858		133,0	87,0	69,0	61122	68364
W	0.3860	9.80	4-1/2	2-7/8	2-19/64	51223	57202
9,9 mm	0.3898		133,0	87,0	69,0	61123	68365
25/64	0.3906	9.92	4-1/2	2-7/8	2-19/64	51125	57203
10,0 mm	0.3937		133,0	87,0	69,0	61043	68289
X	0.3970	10.08	4-1/2	2-7/8	2-19/64	51224	57204
10,2 mm	0.4016		133,0	87,0	69,0	61124	68366
Y	0.4040	10.26	4-1/2	2-7/8	2-19/64	51225	57205
13/32	0.4062	10.32	4-1/2	2-7/8	2-19/64	51126	57206
Z	0.4130	10.49	4-1/2	2-7/8	2-19/64	51226	57207
10,5 mm	0.4134		133,0	87,0	69,0	61045	68290
27/64	0.4219	10.72	4-1/2	2-7/8	2-19/64	51127	57208
11,0 mm	0.4331		142,0	94,0	75,0	61047	68291
7/16	0.4375	11.11	4-1/2	2-7/8	2-19/64	51128	57209
11,5 mm	0.4528		142,0	94,0	75,0	61049	68292
29/64	0.4531	11.51	4-3/4	3	2-13/32	51129	57210
15/32	0.4688	11.91	4-3/4	3	2-13/32	51130	57211
12,0 mm	0.4724		151,0	101,0	80,0	61051	68293
31/64	0.4844	12.30	4-3/4	3	2-13/32	51131	57212
1/2	0.5000	12.70	4-3/4	3	2-13/32	51132	57213
*Series 101 Set						61175	57351

TOLERANCES (inch)

D₁ = +0.0000/-0.0005

TOLERANCES (mm)

D₁ = +0,0000/-0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Automotive

Mold & Die

Aerospace

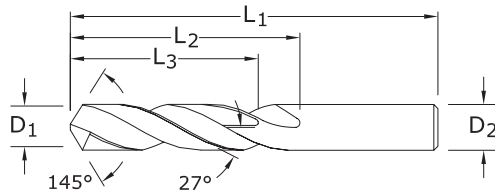
High Performance

General

Special Tools

METRIC

Short Length Self Centering Drills • DIN 6539



108M Plus
METRIC SERIES

TOLERANCES (mm)

≤3 DIAMETER

$D_1 = +0,000/-0,010$

$D_2 = h_6$

>3–6 DIAMETER

$D_1 = +0,000/-0,012$

$D_2 = h_6$

>6–10 DIAMETER

$D_1 = +0,000/-0,015$

$D_2 = h_6$

>10–18 DIAMETER

$D_1 = +0,000/-0,018$

$D_2 = h_6$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

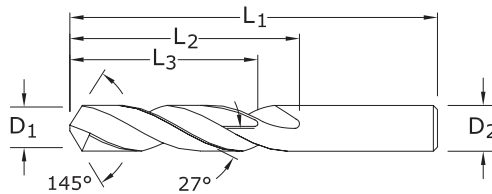
CUTTING DIAMETER D_1/D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO.	
				UNCOATED	Ti-NAMITE-A (AlTiN)
0,5	20,0	3,0	–	62001	68643
0,55	21,0	3,5	–	62003	68644
0,6	21,0	3,5	–	62005	68645
0,65	22,0	4,0	–	62007	68646
0,7	23,0	4,5	–	62009	68647
0,75	23,0	4,5	–	62011	68648
0,8	24,0	5,0	–	62013	68649
0,85	24,0	5,0	–	62015	68650
0,9	25,0	5,5	4,0	62017	68651
0,95	25,0	5,5	4,0	62019	68652
1,0	26,0	6,0	4,7	62021	68653
1,05	26,0	6,0	4,7	62023	68654
1,1	28,0	7,0	5,4	62025	68655
1,15	28,0	7,0	5,4	62027	68656
1,2	30,0	8,0	6,0	62029	68657
1,25	30,0	8,0	6,0	62031	68658
1,3	30,0	8,0	6,0	62033	68659
1,35	32,0	9,0	7,0	62035	68660
1,4	32,0	9,0	7,0	62037	68661
1,45	32,0	9,0	7,0	62039	68662
1,5	32,0	9,0	7,0	62041	68663
1,6	34,0	10,0	7,0	62043	68664
1,7	34,0	10,0	7,0	62045	68665
1,8	36,0	11,0	8,0	62047	68666
1,9	36,0	11,0	8,0	62049	68667
2,0	38,0	12,0	9,0	62051	68668
2,1	38,0	12,0	9,0	62053	68669
2,2	40,0	13,0	10,0	62055	68670
2,3	40,0	13,0	10,0	62057	68671
2,4	43,0	14,0	11,0	62059	68672
2,5	43,0	14,0	11,0	62061	68673
2,6	43,0	14,0	11,0	62063	68674
2,7	46,0	16,0	12,0	62065	68675
2,8	46,0	16,0	12,0	62067	68676

continued on next page

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General**
- Special Tools

METRIC

Short Length Self Centering Drills • DIN 6539



108M Plus METRIC SERIES

CUTTING DIAMETER D ₁ /D ₂	mm			EDP NO.	
	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	UNCOATED	Ti-NAMITE-A (AlTiN)
2,9	46,0	16,0	12,0	62069	68677
3,0	46,0	16,0	12,0	62071	68678
3,1	49,0	18,0	14,0	62073	68679
3,2	49,0	18,0	14,0	62075	68680
3,3	49,0	18,0	14,0	62077	68681
3,4	52,0	20,0	15,0	62079	68682
3,5	52,0	20,0	15,0	62081	68683
3,6	52,0	20,0	15,0	62083	68684
3,7	52,0	20,0	15,0	62085	68685
3,8	55,0	22,0	17,0	62087	68686
3,9	55,0	22,0	17,0	62089	68687
4,0	55,0	22,0	17,0	62091	68688
4,1	55,0	22,0	17,0	62093	68689
4,2	55,0	22,0	17,0	62095	68690
4,3	58,0	24,0	18,0	62097	68691
4,4	58,0	24,0	18,0	62099	68692
4,5	58,0	24,0	18,0	62101	68693
4,6	58,0	24,0	18,0	62103	68694
4,7	58,0	24,0	18,0	62105	68695
4,8	62,0	26,0	20,0	62107	68696
4,9	62,0	26,0	20,0	62109	68697
5,0	62,0	26,0	20,0	62111	68698
5,1	62,0	26,0	20,0	62113	68699
5,2	62,0	26,0	20,0	62115	68700
5,3	62,0	26,0	20,0	62117	68701
5,4	66,0	28,0	21,0	62119	68702
5,5	66,0	28,0	21,0	62121	68703
5,6	66,0	28,0	21,0	62123	68704
5,7	66,0	28,0	21,0	62125	68705
5,8	66,0	28,0	21,0	62127	68706
5,9	66,0	28,0	21,0	62129	68707
6,0	66,0	28,0	21,0	62131	68708

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,000/-0,010

D₂ = h₆

>3-6 DIAMETER

D₁ = +0,000/-0,012

D₂ = h₆

>6-10 DIAMETER

D₁ = +0,000/-0,015

D₂ = h₆

>10-16 DIAMETER

D₁ = +0,000/-0,018

D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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Automotive

Mold & Die

Aerospace

High Performance

General

Special Tools

METRIC

Short Length Self Centering Drills • DIN 6539

108M Plus METRIC SERIES

CUTTING DIAMETER D ₁ /D ₂	mm			EDP NO.	
	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	UNCOATED	Ti-NAMITE-A (AlTiN)
6,1	70,0	31,0	23,0	62133	68709
6,2	70,0	31,0	23,0	62135	68710
6,3	70,0	31,0	23,0	62137	68711
6,4	70,0	31,0	23,0	62139	68712
6,5	70,0	31,0	23,0	62141	68713
6,8	70,0	31,0	23,0	62142	68603
7,0	74,0	34,0	25,0	62143	68718
7,5	74,0	34,0	25,0	62145	68723
7,8	79,0	37,0	27,0	62146	68604
8,0	79,0	37,0	27,0	62147	68728
8,5	79,0	37,0	27,0	62149	68733
9,0	84,0	40,0	29,0	62151	68738
9,5	84,0	40,0	29,0	62153	68743
9,8	89,0	43,0	31,0	62154	68606
10,0	89,0	43,0	31,0	62155	68748
10,2	89,0	43,0	31,0	62156	68607
10,5	89,0	43,0	31,0	62066	68753
11,0	95,0	47,0	33,0	62157	68758
11,5	95,0	47,0	33,0	62084	68763
11,8	102,0	51,0	35,0	62158	68608
12,0	102,0	51,0	35,0	62159	68768
12,5	102,0	51,0	35,0	62102	68773
13,0	102,0	51,0	35,0	62112	68778
13,8	107,0	54,0	37,0	62164	68609
14,0	107,0	54,0	37,0	62116	68780
14,5	111,0	56,0	38,0	62166	68611
14,8	111,0	56,0	38,0	62167	68612
15,0	111,0	56,0	38,0	62168	68613
15,8	115,0	58,0	38,0	62170	68614
16,0	115,0	58,0	38,0	62171	68616

CONTINUED

- Automotive
- Mold & Die
- Aerospace
- High Performance
- General**
- Special Tools

METRIC

2 Flute Drills Short Length Self Centering Drills • DIN 6539

Series 101M, 108M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			1	3	6	8	10	12	16		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	81	RPM	25690	8563	4282	3211	2569	2141	1606	
		(65-97)	Fr	0.014	0.041	0.082	0.109	0.136	0.163	0.218	
			Feed (mm/min)	350	350	350	350	350	350	350	
	≤ 300 Bhn or ≤ 32 HRc	38	RPM	12118	4039	2020	1515	1212	1010	757	
		(30-46)	Fr	0.012	0.036	0.072	0.096	0.120	0.144	0.191	
			Feed (mm/min)	145	145	145	145	145	145	145	
	≤ 425 Bhn or ≤ 45 HRc	26	RPM	8240	2747	1373	1030	824	687	515	
		(21-31)	Fr	0.007	0.020	0.040	0.053	0.067	0.080	0.107	
			Feed (mm/min)	55	55	55	55	55	55	55	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	70	RPM	22297	7432	3716	2787	2230	1858	1394
			(56-84)	Fr	0.012	0.036	0.073	0.097	0.121	0.145	0.194
				Feed (mm/min)	270	270	270	270	270	270	270
≤ 375 Bhn or ≤ 40 HRc		44	RPM	14057	4686	2343	1757	1406	1171	879	
		(35-53)	Fr	0.012	0.036	0.073	0.097	0.121	0.145	0.194	
			Feed (mm/min)	170	170	170	170	170	170	170	
≤ 450 Bhn or ≤ 48 HRc		18	RPM	5816	1939	969	727	582	485	364	
		(15-22)	Fr	0.005	0.015	0.030	0.040	0.050	0.060	0.080	
			Feed (mm/min)	29	29	29	29	29	29	29	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	26	RPM	8240	2747	1373	1030	824	687	515
			(21-31)	Fr	0.007	0.020	0.040	0.053	0.067	0.080	0.107
				Feed (mm/min)	55	55	55	55	55	55	55
	≤ 375 Bhn or ≤ 40 HRc	17	RPM	5332	1777	889	666	533	444	333	
		(13-20)	Fr	0.003	0.010	0.020	0.027	0.034	0.041	0.054	
			Feed (mm/min)	18	18	18	18	18	18	18	
	≤ 475 Bhn or ≤ 50 HRc	12	RPM	3878	1293	646	485	388	323	242	
		(10-15)	Fr	0.003	0.009	0.019	0.025	0.031	0.037	0.050	
			Feed (mm/min)	12	12	12	12	12	12	12	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	85	RPM	27144	9048	4524	3393	2714	2262	1696
			(68-102)	Fr	0.016	0.049	0.097	0.130	0.162	0.195	0.259
				Feed (mm/min)	440	440	440	440	440	440	440
≤ 330 Bhn or ≤ 36 HRc		76	RPM	24235	8078	4039	3029	2424	2020	1515	
		(61-91)	Fr	0.017	0.050	0.099	0.132	0.165	0.198	0.264	
			Feed (mm/min)	400	400	400	400	400	400	400	
General STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F		≤ 250 Bhn or ≤ 24 HRc	64	RPM	20358	6786	3393	2545	2036	1696	1272
			(51-77)	Fr	0.010	0.029	0.059	0.079	0.098	0.118	0.157
				Feed (mm/min)	200	200	200	200	200	200	200
		≤ 330 Bhn or ≤ 36 HRc	34	RPM	10664	3555	1777	1333	1066	889	666
			(27-40)	Fr	0.006	0.017	0.034	0.045	0.056	0.068	0.090
				Feed (mm/min)	60	60	60	60	60	60	60
	Special Tools STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	20	RPM	6301	2100	1050	788	630	525	394
			(16-24)	Fr	0.007	0.021	0.043	0.057	0.071	0.086	0.114
				Feed (mm/min)	45	45	45	45	45	45	45
		≤ 375 Bhn or ≤ 40 HRc	17	RPM	5332	1777	889	666	533	444	333
			(13-20)	Fr	0.007	0.020	0.039	0.053	0.066	0.079	0.105
				Feed (mm/min)	35	35	35	35	35	35	35

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METRIC

2 Flute Drills Short Length Self Centering Drills • DIN 6539

Series 101M, 108M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			1	3	6	8	10	12	16		
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	12 (10-15)	RPM	3878	1293	646	485	388	323	242	
			Fr	0.006	0.019	0.039	0.052	0.064	0.077	0.103	
			Feed (mm/min)	25	25	25	25	25	25	25	
	≤ 320 Bhn or ≤ 34 HRc	8 (6-9)	RPM	2424	808	404	303	242	202	151	
			Fr	0.006	0.019	0.037	0.050	0.062	0.074	0.099	
			Feed (mm/min)	15	15	15	15	15	15	15	
	≤ 425 Bhn or ≤ 45 HRc	6 (5-7)	RPM	1939	646	323	242	194	162	121	
			Fr	0.005	0.015	0.031	0.041	0.052	0.062	0.083	
			Feed (mm/min)	10	10	10	10	10	10	10	
S TITANIUM ALLOYS (DIFFICULT) Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	26 (21-31)	RPM	8240	2747	1373	1030	824	687	515	
			Fr	0.013	0.040	0.080	0.107	0.133	0.160	0.214	
			Feed (mm/min)	110	110	110	110	110	110	110	
	≤ 350 Bhn or ≤ 38 HRc	20 (16-24)	RPM	6301	2100	1050	788	630	525	394	
			Fr	0.007	0.021	0.043	0.057	0.071	0.086	0.114	
			Feed (mm/min)	45	45	45	45	45	45	45	
	≤ 440 Bhn or ≤ 47 HRc	17 (13-20)	RPM	5332	1777	889	666	533	444	333	
			Fr	0.007	0.020	0.039	0.053	0.066	0.079	0.105	
			Feed (mm/min)	35	35	35	35	35	35	35	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	165 (132-198)	RPM	52348	17449	8725	6544	5235	4362	3272	
			Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.319	
			Feed (mm/min)	1045	1045	1045	1045	1045	1045	1045	
	≤ 150 Bhn or ≤ 7 HRc	139 (111-166)	RPM	44108	14703	7351	5514	4411	3676	2757	
			Fr	0.020	0.060	0.120	0.160	0.200	0.239	0.319	
			Feed (mm/min)	880	880	880	880	880	880	880	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	58 (46-69)	RPM	18419	6140	3070	2302	1842	1535	1151
				Fr	0.010	0.030	0.060	0.080	0.100	0.121	0.161
				Feed (mm/min)	185	185	185	185	185	185	185
≤ 200 Bhn or ≤ 23 HRc		53 (43-64)	RPM	16965	5655	2827	2121	1696	1414	1060	
			Fr	0.010	0.030	0.060	0.080	0.100	0.120	0.160	
			Feed (mm/min)	170	170	170	170	170	170	170	
PLASTICS Polycarbonate, PVC	152 (122-183)	RPM	48471	16157	8078	6059	4847	4039	3029		
		Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.320		
			Feed (mm/min)	970	970	970	970	970	970	970	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fr \times rpm$
 reduce speed and feed 30 percent when using uncoated drills
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

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