



ORION Drills

High Performance Drills for Difficult-to-Cut Material



Excellent Hole Accuracy with a Low Cutting Force Design

Optimized Cutting Edge

Point Design for Accuracy

3xD & 5xD Drilling Capabilities

Increased Positional Accuracy

Less Heat Build Up

3xD ORION Drills Make Excellent Pilot Hole Drills for
Matching Diameter 10xD HYDROS Deep Drills - Series 860/865

NEW

New 5xD Sizes Added

NEW

New Diameters from 1.5mm



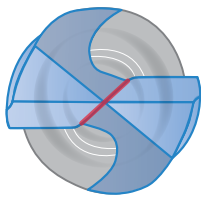
ORION High Performance Drill

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

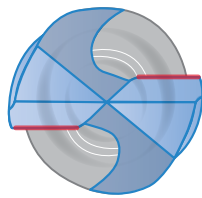
1 Optimized Cutting Edge for Increased Accuracy

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

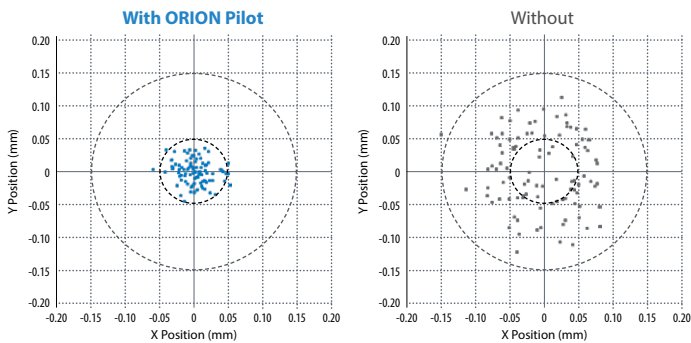


Primary Cutting Edge

Centering Edge



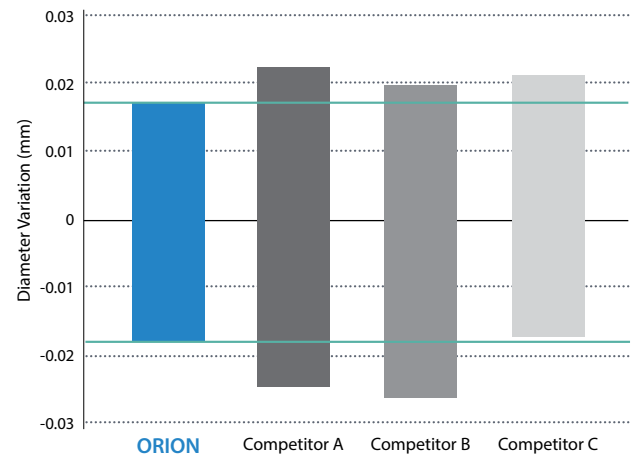
3mm Coolant Fed Drill Hole Positional Accuracy
(After using the ORION as a pilot drill)



	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

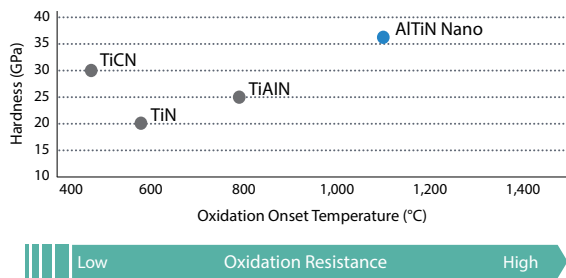
Cutting Conditions : N = 2588rpm, Vf = 196mm/min Drill Diameter Ø3mm Drilling Depth 9mm 17-4PH-900



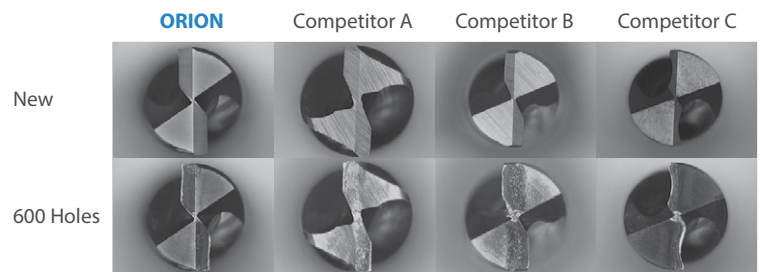
2 Nanocomposite Super-nitride AlTiN Coating Technology

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)

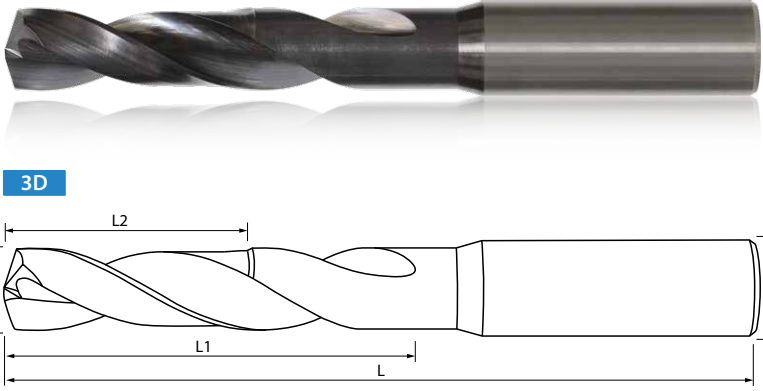


The ORION performed with good overall wear while still maintaining good tool finish

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

3xD ORION Drills - Inch Sizes (Ø0.0625" - Ø0.5000")



Cutting Dia. (ØDc)	Cutting Dia. Tolerance	Shank Tolerance
0.0625" ~ 0.2344"	+0.00016" +0.00063"	+0.00000" -0.00032"
0.2500" ~ 0.3750"	+0.00024" +0.00083"	+0.00000" -0.00035"
0.4219" ~ 0.5000"	+0.00028" +0.00098"	+0.00000" -0.00043"

3D

Match with HYDROS Deep Drills
 Series 860

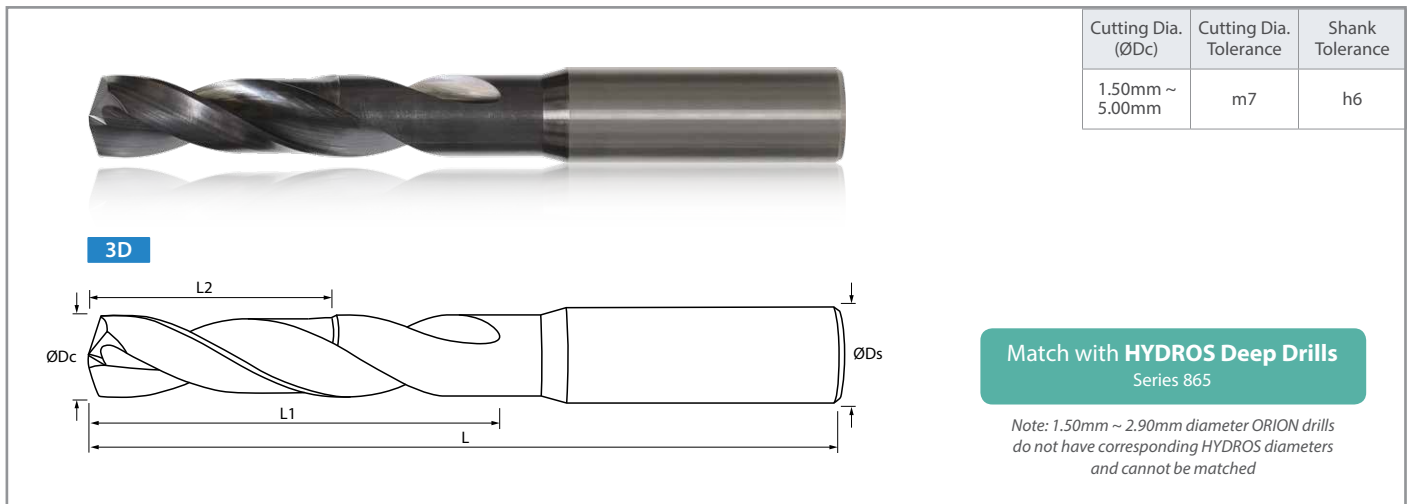
Note: 0.0625" ~ 0.1094" diameter ORION drills do not have corresponding HYDROS diameters and cannot be matched

Inch Drill Dimensions

Part Number	Stock	Dimensions (in)					Point Angle	
		ØDc		ØDs	L	L1		*L2
NEW 160-0625AG313	●	0.0625	1/16	0.1250	2.0	0.3125	0.1875	142°
NEW 160-0781AG391	●	0.0781	5/64			0.3906	0.2344	
NEW 160-0938AG469	●	0.0938	3/32			0.4688	0.2813	
NEW 160-1094AG547	●	0.1094	7/64			0.5469	0.3281	
160-1250AG625	●	0.1250	1/8	0.1875	2.5	0.6250	0.3750	
160-1406AG703	●	0.1406	9/64			0.7031	0.4219	
160-1563AG781	●	0.1563	5/32			0.7813	0.4688	
160-1719AG859	●	0.1719	11/64			0.8594	0.5156	
160-1875AG938	●	0.1875	3/16	0.2500	2.5	0.9375	0.5625	
160-2031AG1016	●	0.2031	13/64			1.0156	0.6094	
160-2188AG1094	●	0.2188	7/32			1.0938	0.6563	
160-2344AG1172	●	0.2344	15/64			1.1719	0.7031	
160-2500AG1250	●	0.2500	1/4	0.3125	3.0	1.2500	0.7500	
160-2570AG1285	●	0.2570	F			1.2850	0.7710	
160-2656AG1328	●	0.2656	17/64			1.3281	0.7969	
160-2813AG1406	●	0.2813	9/32			1.4063	0.8438	
160-3125AG1563	●	0.3125	5/16	0.3750	4.0	1.5625	0.9375	
160-3320AG1660	●	0.3320	Q			1.6600	0.9960	
160-3438AG1719	●	0.3438	11/32			1.7188	1.0313	
160-3750AG1875	●	0.3750	3/8	0.4375	4.5	1.8750	1.1250	
160-4219AG2109	●	0.4219	27/64			2.1094	1.2656	
160-4375AG2188	●	0.4375	7/16	0.5000	5.0	2.1875	1.3125	
160-4531AG2266	●	0.4531	29/64			2.2656	1.3594	
160-5000AG2500	●	0.5000	1/2			2.5000	1.5000	

L2 dimension refers to the Max. Length of Cut (3 x ØDc).
 There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

3xD ORION Drills - Metric Sizes (Ø1.50mm - Ø5.00mm)

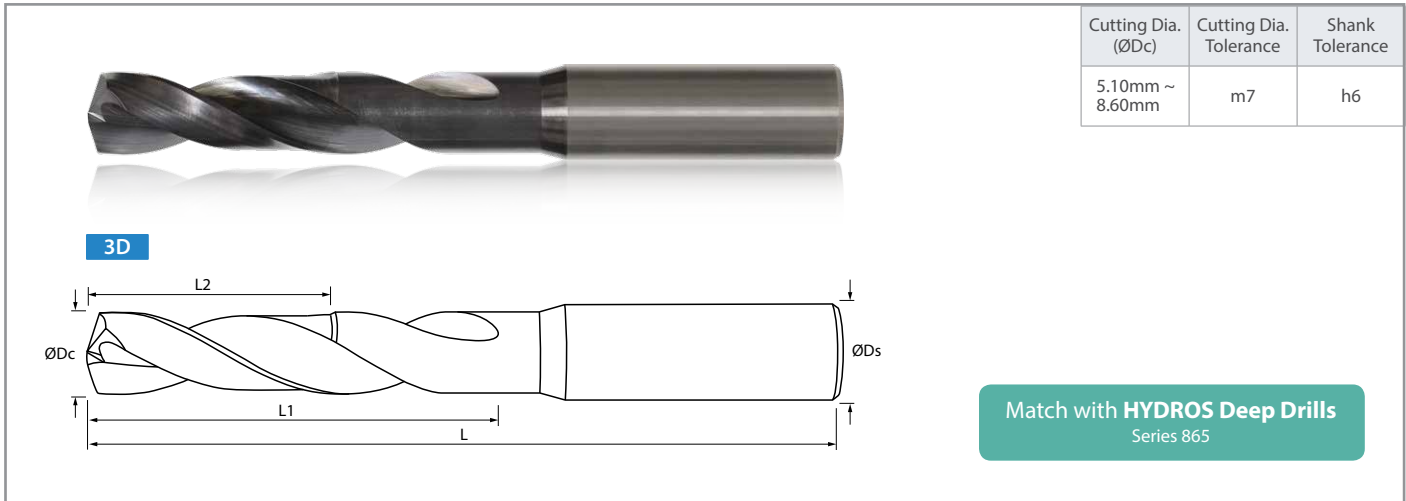


Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØDc ^{m7}	ØDs ^{h6}	L	L1	*L2	
NEW 165-0591AG295	●	1.50	3	50	7.50	4.50	142°
NEW 165-0630AG315	●	1.60			8.00	4.80	
NEW 165-0669AG335	●	1.70			8.50	5.10	
NEW 165-0709AG354	●	1.80			9.00	5.40	
NEW 165-0748AG374	●	1.90			9.50	5.70	
NEW 165-0787AG394	●	2.00			10.00	6.00	
NEW 165-0827AG413	●	2.10			10.50	6.30	
NEW 165-0866AG433	●	2.20			11.00	6.60	
NEW 165-0906AG453	●	2.30			11.50	6.90	
NEW 165-0945AG472	●	2.40			12.00	7.20	
NEW 165-0984AG492	●	2.50			12.50	7.50	
NEW 165-1024AG512	●	2.60			13.00	7.80	
NEW 165-1063AG531	●	2.70			13.50	8.10	
NEW 165-1102AG551	●	2.80			14.00	8.40	
NEW 165-1142AG571	●	2.90	14.50	8.70			
165-1181AG591	●	3.00	4	60	15.00	9.00	
165-1220AG610	●	3.10			15.50	9.30	
165-1260AG630	●	3.20			16.00	9.60	
165-1299AG650	●	3.30			16.50	9.90	
165-1339AG669	●	3.40			17.00	10.20	
165-1378AG689	●	3.50			17.50	10.50	
165-1417AG709	●	3.60			18.00	10.80	
165-1457AG728	●	3.70			18.50	11.10	
165-1496AG748	●	3.80			19.00	11.40	
165-1535AG768	●	3.90			19.50	11.70	
165-1575AG787	●	4.00	6	70	20.00	12.00	
165-1614AG807	●	4.10			20.50	12.30	
165-1654AG827	●	4.20			21.00	12.60	
165-1693AG846	●	4.30			21.50	12.90	
165-1732AG866	●	4.40			22.00	13.20	
165-1772AG886	●	4.50			22.50	13.50	
165-1811AG906	●	4.60			23.00	13.80	
165-1850AG925	●	4.70			23.50	14.10	
165-1890AG945	●	4.80			24.00	14.40	
165-1929AG965	●	4.90			24.50	14.70	
165-1969AG984	●	5.00	25.00	15.00			

L2 dimension refers to the Max. Length of Cut (3 x ØDc).
There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

3xD ORION Drills - Metric Sizes (Ø5.10mm - Ø8.60mm)



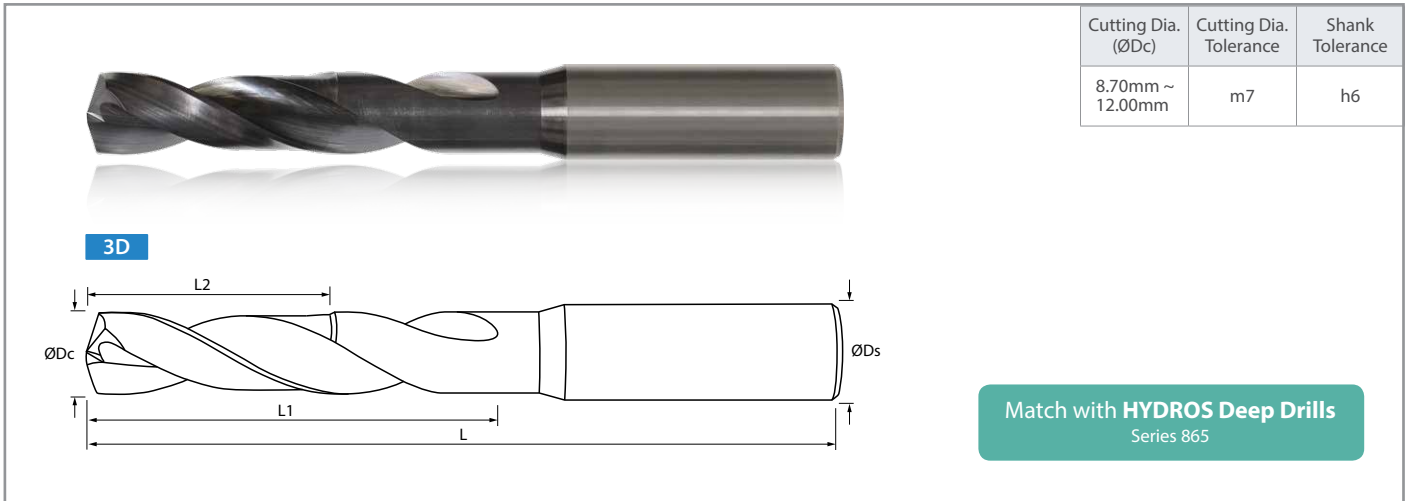
Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØDc ^{m7}	ØDs ^{h6}	L	L1	*L2	
165-2008AG1004	●	5.10	6	70	25.50	15.30	142°
165-2047AG1024	●	5.20			26.00	15.60	
165-2087AG1043	●	5.30			26.50	15.90	
165-2126AG1063	●	5.40			27.00	16.20	
165-2165AG1083	●	5.50			27.50	16.50	
165-2205AG1102	●	5.60			28.00	16.80	
165-2244AG1122	●	5.70			28.50	17.10	
165-2283AG1142	●	5.80			29.00	17.40	
165-2323AG1161	●	5.90			29.50	17.70	
165-2362AG1181	●	6.00			30.00	18.00	
165-2402AG1201	●	6.10	30.50	18.30			
165-2441AG1220	●	6.20	31.00	18.60			
165-2480AG1240	●	6.30	31.50	18.90			
165-2520AG1260	●	6.40	32.00	19.20			
165-2559AG1280	●	6.50	32.50	19.50			
165-2598AG1299	●	6.60	33.00	19.80			
165-2638AG1319	●	6.70	33.50	20.10			
165-2677AG1339	●	6.80	34.00	20.40			
165-2717AG1358	●	6.90	34.50	20.70			
165-2756AG1378	●	7.00	35.00	21.00			
165-2795AG1398	●	7.10	35.50	21.30			
165-2835AG1417	●	7.20	36.00	21.60			
165-2874AG1437	●	7.30	36.50	21.90			
165-2913AG1457	●	7.40	37.00	22.20			
165-2953AG1476	●	7.50	37.50	22.50			
165-2992AG1496	●	7.60	38.00	22.80			
165-3031AG1516	●	7.70	38.50	23.10			
165-3071AG1535	●	7.80	39.00	23.40			
165-3110AG1555	●	7.90	39.50	23.70			
165-3150AG1575	●	8.00	40.00	24.00			
165-3189AG1594	●	8.10	40.50	24.30			
165-3228AG1614	●	8.20	41.00	24.60			
165-3268AG1634	●	8.30	41.50	24.90			
165-3307AG1654	●	8.40	42.00	25.20			
165-3346AG1673	●	8.50	42.50	25.50			
165-3386AG1693	●	8.60	43.00	25.80			

L2 dimension refers to the Max. Length of Cut (3 x ØDc).
There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

● : U.S. Stock

3xD ORION Drills - Metric Sizes (Ø8.70mm - Ø12.00mm)

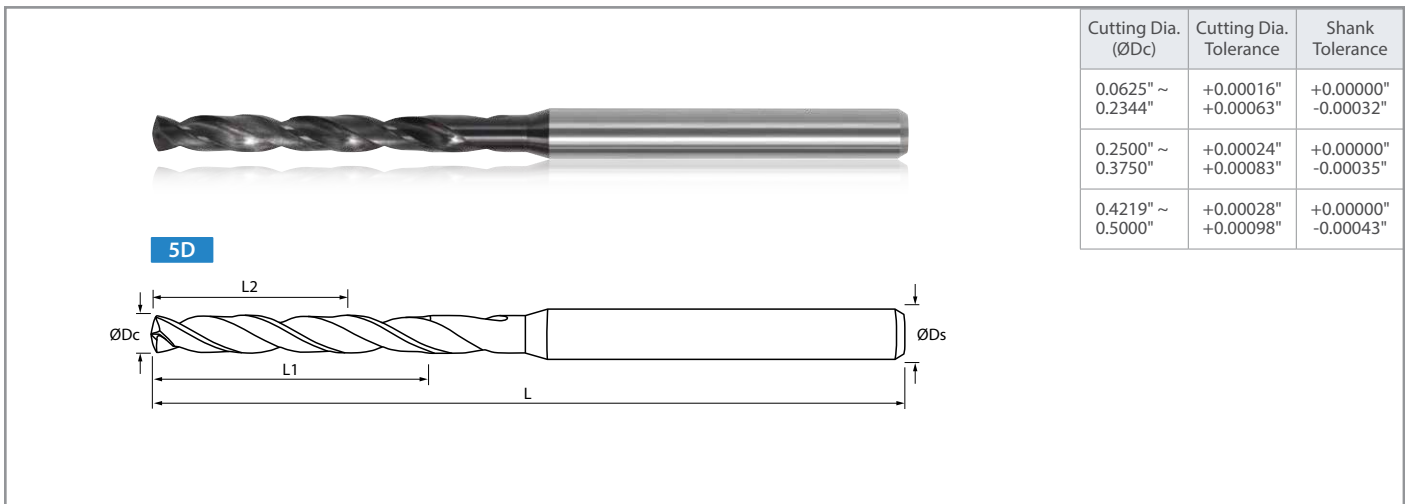


Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØDc ^{m7}	ØDs ^{h6}	L	L1	*L2	
165-3425AG1713	●	8.70	10	100	43.50	26.10	142°
165-3465AG1732	●	8.80			44.00	26.40	
165-3504AG1752	●	8.90			44.50	26.70	
165-3543AG1772	●	9.00			45.00	27.00	
165-3583AG1791	●	9.10			45.50	27.30	
165-3622AG1811	●	9.20			46.00	27.60	
165-3661AG1831	●	9.30			46.50	27.90	
165-3701AG1850	●	9.40			47.00	28.20	
165-3740AG1870	●	9.50			47.50	28.50	
165-3780AG1890	●	9.60			48.00	28.80	
165-3819AG1909	●	9.70			48.50	29.10	
165-3858AG1929	●	9.80			49.00	29.40	
165-3898AG1949	●	9.90			49.50	29.70	
165-3937AG1969	●	10.00	12	110	50.00	30.00	
165-3976AG1988	●	10.10			50.50	30.30	
165-4016AG2008	●	10.20			51.00	30.60	
165-4055AG2028	●	10.30			51.50	30.90	
165-4094AG2047	●	10.40			52.00	31.20	
165-4134AG2067	●	10.50			52.50	31.50	
165-4173AG2087	●	10.60			53.00	31.80	
165-4213AG2106	●	10.70			53.50	32.10	
165-4252AG2126	●	10.80			54.00	32.40	
165-4291AG2146	●	10.90			54.50	32.70	
165-4331AG2165	●	11.00			55.00	33.00	
165-4370AG2185	●	11.10			55.50	33.30	
165-4409AG2205	●	11.20			56.00	33.60	
165-4449AG2224	●	11.30			56.50	33.90	
165-4488AG2244	●	11.40	57.00	34.20			
165-4528AG2264	●	11.50	57.50	34.50			
165-4567AG2283	●	11.60	58.00	34.80			
165-4606AG2303	●	11.70	58.50	35.10			
165-4646AG2323	●	11.80	59.00	35.40			
165-4685AG2343	●	11.90	59.50	35.70			
165-4724AG2362	●	12.00	14	110	60.00	36.00	

L2 dimension refers to the Max. Length of Cut (3 x ØDc).
There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

● : U.S. Stock



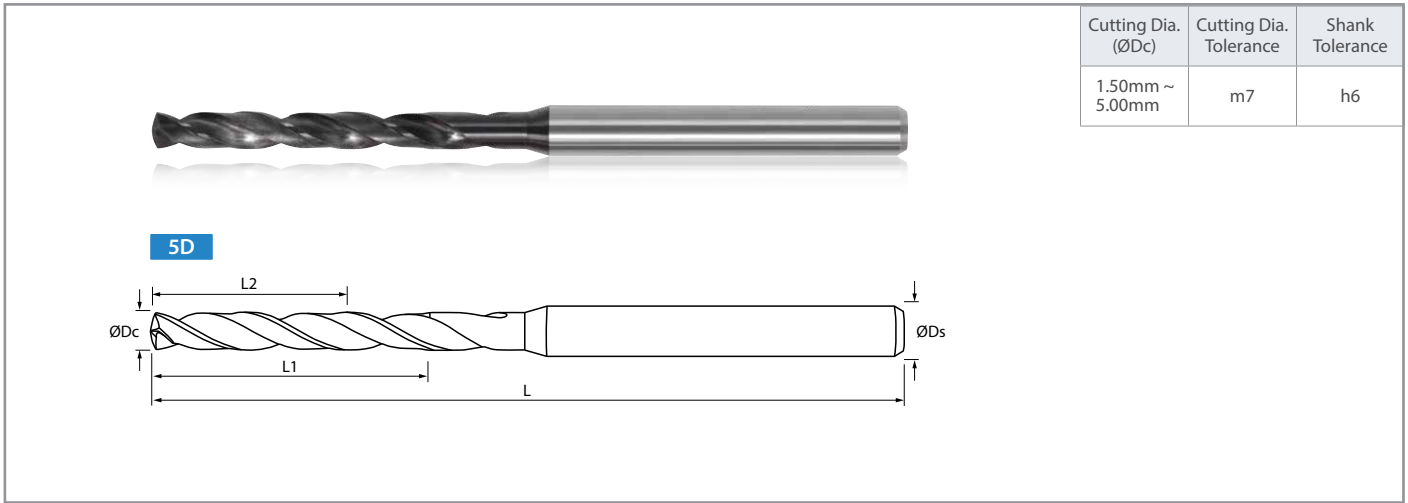
Cutting Dia. (ØDc)	Cutting Dia. Tolerance	Shank Tolerance
0.0625" ~ 0.2344"	+0.00016" +0.00063"	+0.00000" -0.00032"
0.2500" ~ 0.3750"	+0.00024" +0.00083"	+0.00000" -0.00035"
0.4219" ~ 0.5000"	+0.00028" +0.00098"	+0.00000" -0.00043"

Inch Drill Dimensions

Part Number	Stock	Dimensions (in)					Point Angle	
		ØDc		ØDs	L	L1		*L2
160-0625AG438	●	0.0625	1/16	0.1250	2.5	0.4375	0.3125	142°
160-0781AG547	●	0.0781	5/64			0.5469	0.3906	
160-0938AG656	●	0.0938	3/32			0.6563	0.4688	
160-1094AG766	●	0.1094	7/64			0.7656	0.5469	
160-1250AG875	●	0.1250	1/8	0.1875	3.0	0.8750	0.6250	
160-1406AG984	●	0.1406	9/64			0.9844	0.7031	
160-1563AG1094	●	0.1563	5/32			1.0938	0.7813	
160-1719AG1203	●	0.1719	11/64			1.2031	0.8594	
160-1875AG1313	●	0.1875	3/16	0.2500	3.5	1.3125	0.9375	
160-2031AG1422	●	0.2031	13/64			1.4219	1.0156	
160-2188AG1531	●	0.2188	7/32			1.5313	1.0938	
160-2344AG1641	●	0.2344	15/64			1.6406	1.1719	
160-2500AG1750	●	0.2500	1/4	0.3125	4.0	1.7500	1.2500	
160-2570AG1799	●	0.2570	F			1.7990	1.2850	
160-2656AG1859	●	0.2656	17/64			1.8594	1.3281	
160-2813AG1969	●	0.2813	9/32			1.9688	1.4063	
160-3125AG2188	●	0.3125	5/16	0.3750	4.5	2.1875	1.5625	
160-3320AG2324	●	0.3320	Q			2.3240	1.6600	
160-3438AG2406	●	0.3438	11/32			2.4063	1.7188	
160-3750AG2625	●	0.3750	3/8	0.4375	5.0	2.6250	1.8750	
160-4219AG2953	●	0.4219	27/64			2.9531	2.1094	
160-4375AG3063	●	0.4375	7/16	0.5000	6.0	3.0625	2.1875	
160-4531AG3172	●	0.4531	29/64			3.1719	2.2656	
160-5000AG3500	●	0.5000	1/2			3.5000	2.5000	

L2 dimension refers to the Max. Length of Cut (5 x ØDc).
There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

● : U.S. Stock



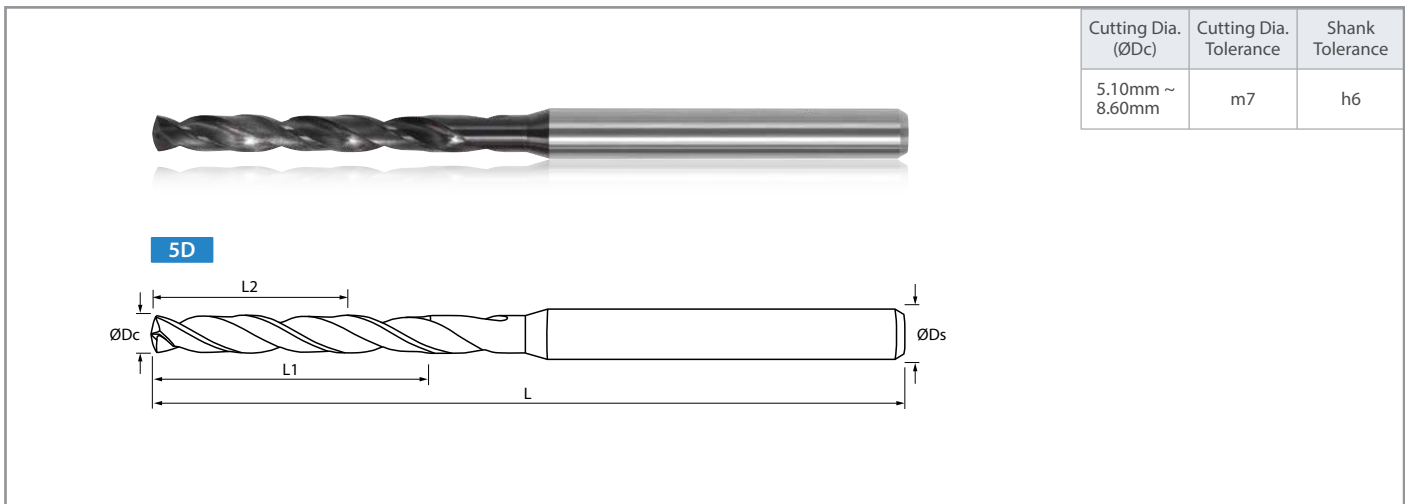
Cutting Dia. (ØDc)	Cutting Dia. Tolerance	Shank Tolerance
1.50mm ~ 5.00mm	m7	h6

Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØDc ^{m7}	ØDs ^{h6}	L	L1	*L2	
165-0591AG413	●	1.50	3	60	10.50	7.50	142°
165-0630AG441	●	1.60			11.20	8.00	
165-0669AG469	●	1.70			11.90	8.50	
165-0709AG496	●	1.80			12.60	9.00	
165-0748AG524	●	1.90			13.30	9.50	
165-0787AG551	●	2.00			14.00	10.00	
165-0827AG579	●	2.10			14.70	10.50	
165-0866AG606	●	2.20			15.40	11.00	
165-0906AG634	●	2.30			16.10	11.50	
165-0945AG661	●	2.40			16.80	12.00	
165-0984AG689	●	2.50			17.50	12.50	
165-1024AG717	●	2.60			18.20	13.00	
165-1063AG744	●	2.70			18.90	13.50	
165-1102AG772	●	2.80			19.60	14.00	
165-1142AG799	●	2.90			20.30	14.50	
165-1181AG827	●	3.00	21.00	15.00			
165-1220AG854	●	3.10	21.70	15.50			
165-1260AG882	●	3.20	22.40	16.00			
165-1299AG909	●	3.30	23.10	16.50			
165-1339AG937	●	3.40	23.80	17.00			
165-1378AG965	●	3.50	24.50	17.50			
165-1417AG992	●	3.60	25.20	18.00			
165-1457AG1020	●	3.70	25.90	18.50			
165-1496AG1047	●	3.80	26.60	19.00			
165-1535AG1075	●	3.90	27.30	19.50			
165-1575AG1102	●	4.00	28.00	20.00			
165-1614AG1130	●	4.10	28.70	20.50			
165-1654AG1157	●	4.20	29.40	21.00			
165-1693AG1185	●	4.30	30.10	21.50			
165-1732AG1213	●	4.40	30.80	22.00			
165-1772AG1240	●	4.50	31.50	22.50			
165-1811AG1268	●	4.60	32.20	23.00			
165-1850AG1295	●	4.70	32.90	23.50			
165-1890AG1323	●	4.80	33.60	24.00			
165-1929AG1350	●	4.90	34.30	24.50			
165-1969AG1378	●	5.00	35.00	25.00			

L2 dimension refers to the Max. Length of Cut (5 x ØDc).
 There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

● : U.S. Stock

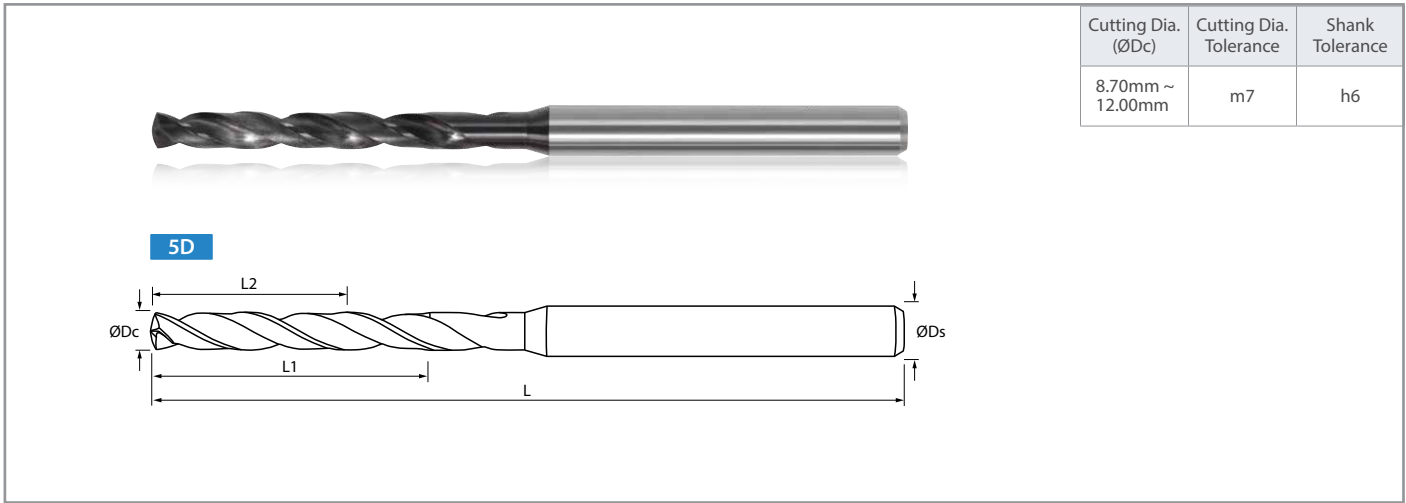


Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØDc ^{m7}	ØDs ^{h6}	L	L1	*L2	
165-2008AG1406	●	5.10	6	90	35.70	25.50	142°
165-2047AG1433	●	5.20			36.40	26.00	
165-2087AG1461	●	5.30			37.10	26.50	
165-2126AG1488	●	5.40			37.80	27.00	
165-2165AG1516	●	5.50			38.50	27.50	
165-2205AG1543	●	5.60			39.20	28.00	
165-2244AG1571	●	5.70			39.90	28.50	
165-2283AG1598	●	5.80			40.60	29.00	
165-2323AG1626	●	5.90			41.30	29.50	
165-2362AG1654	●	6.00			42.00	30.00	
165-2402AG1681	●	6.10	42.70	30.50			
165-2441AG1709	●	6.20	43.40	31.00			
165-2480AG1736	●	6.30	44.10	31.50			
165-2520AG1764	●	6.40	44.80	32.00			
165-2559AG1791	●	6.50	45.50	32.50			
165-2598AG1819	●	6.60	46.20	33.00			
165-2638AG1846	●	6.70	46.90	33.50			
165-2677AG1874	●	6.80	47.60	34.00			
165-2717AG1902	●	6.90	48.30	34.50			
165-2756AG1929	●	7.00	49.00	35.00			
165-2795AG1957	●	7.10	49.70	35.50			
165-2835AG1984	●	7.20	50.40	36.00			
165-2874AG2012	●	7.30	51.10	36.50			
165-2913AG2039	●	7.40	51.80	37.00			
165-2953AG2067	●	7.50	52.50	37.50			
165-2992AG2094	●	7.60	53.20	38.00			
165-3031AG2122	●	7.70	53.90	38.50			
165-3071AG2150	●	7.80	54.60	39.00			
165-3110AG2177	●	7.90	55.30	39.50			
165-3150AG2205	●	8.00	56.00	40.00			
165-3189AG2232	●	8.10	56.70	40.50			
165-3228AG2260	●	8.20	57.40	41.00			
165-3268AG2287	●	8.30	58.10	41.50			
165-3307AG2315	●	8.40	58.80	42.00			
165-3346AG2343	●	8.50	59.50	42.50			
165-3386AG2370	●	8.60	60.20	43.00			

L2 dimension refers to the Max. Length of Cut (5 x ØDc).
There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

● : U.S. Stock



Cutting Dia. (ØDc)	Cutting Dia. Tolerance	Shank Tolerance
8.70mm ~ 12.00mm	m7	h6

Metric Drill Dimensions

Part Number	Stock	Dimensions (mm)					Point Angle
		ØDc ^{m7}	ØDs ^{h6}	L	L1	*L2	
165-3425AG2398	●	8.70	10	120	60.90	43.50	142°
165-3465AG2425	●	8.80			61.60	44.00	
165-3504AG2453	●	8.90			62.30	44.50	
165-3543AG2480	●	9.00			63.00	45.00	
165-3583AG2508	●	9.10			63.70	45.50	
165-3622AG2535	●	9.20			64.40	46.00	
165-3661AG2563	●	9.30			65.10	46.50	
165-3701AG2591	●	9.40			65.80	47.00	
165-3740AG2618	●	9.50			66.50	47.50	
165-3780AG2646	●	9.60			67.20	48.00	
165-3819AG2673	●	9.70			67.90	48.50	
165-3858AG2701	●	9.80			68.60	49.00	
165-3898AG2728	●	9.90			69.30	49.50	
165-3937AG2756	●	10.00	12	140	70.00	50.00	
165-3976AG2783	●	10.10			70.70	50.50	
165-4016AG2811	●	10.20			71.40	51.00	
165-4055AG2839	●	10.30			72.10	51.50	
165-4094AG2866	●	10.40			72.80	52.00	
165-4134AG2894	●	10.50			73.50	52.50	
165-4173AG2921	●	10.60			74.20	53.00	
165-4213AG2949	●	10.70			74.90	53.50	
165-4252AG2976	●	10.80			75.60	54.00	
165-4291AG3004	●	10.90			76.30	54.50	
165-4331AG3031	●	11.00			77.00	55.00	
165-4370AG3059	●	11.10			77.70	55.50	
165-4409AG3087	●	11.20			78.40	56.00	
165-4449AG3114	●	11.30			79.10	56.50	
165-4488AG3142	●	11.40			79.80	57.00	
165-4528AG3169	●	11.50	80.50	57.50			
165-4567AG3197	●	11.60	81.20	58.00			
165-4606AG3224	●	11.70	81.90	58.50			
165-4646AG3252	●	11.80	82.60	59.00			
165-4685AG3280	●	11.90	83.30	59.50			
165-4724AG3307	●	12.00	14	140	84.00	60.00	

L2 dimension refers to the Max. Length of Cut (5 x ØDc).
 There is an additional 2 x ØDc length beyond the Length of Cut for chip exhaust only.

● : U.S. Stock

Recommended Cutting Conditions

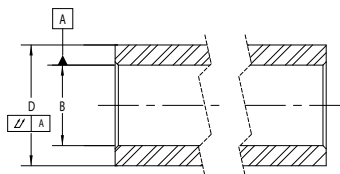
Workpiece Material	Hardness	Cutting Speed (sfm)	Drill Diameter / Feed Rate (ipr)									
			3xD					5xD				
			Ø1.50mm - Ø2.90mm Ø0.0625" - Ø0.1094"	Ø3.00mm - Ø5.90mm Ø0.1250" - Ø0.2344"	Ø6.00mm - Ø9.90mm Ø0.2500" - Ø0.3438"	Ø10.00mm - Ø11.90mm Ø0.3750" - Ø0.4531"	Ø12.00mm Ø0.5000"	Ø1.50mm - Ø2.90mm Ø0.0625" - Ø0.1094"	Ø3.00mm - Ø5.90mm Ø0.1250" - Ø0.2344"	Ø6.00mm - Ø9.90mm Ø0.2500" - Ø0.3438"	Ø10.00mm - Ø11.90mm Ø0.3750" - Ø0.4531"	Ø12.00mm Ø0.5000"
Low Carbon Steel	< 24 HRc	350	0.0015	0.0035	0.0080	0.0110	0.0150	0.0014	0.0032	0.0072	0.0099	0.0135
Alloy Steel	24 - 30 HRc	250	0.0013	0.0030	0.0080	0.0100	0.0120	0.0012	0.0027	0.0072	0.0090	0.0108
Stainless Steel	< 30HRc	150	0.0013	0.0030	0.0050	0.0070	0.0080	0.0012	0.0027	0.0045	0.0063	0.0072
Gray Cast Iron	< 50 kpsi	375	0.0014	0.0050	0.0100	0.0150	0.0180	0.0013	0.0045	0.0090	0.0135	0.0162
Nodular Cast Iron	< 60 kpsi	275	0.0014	0.0050	0.0090	0.0120	0.0160	0.0013	0.0045	0.0081	0.0108	0.0144
Aluminum	-	750	0.0016	0.0070	0.0120	0.0160	0.0220	0.0014	0.0063	0.0108	0.0144	0.0198
Copper	-	400	0.0012	0.0040	0.0060	0.0080	0.0120	0.0011	0.0036	0.0054	0.0072	0.0108
Heat-Resistant Alloy	-	70	0.0008	0.0020	0.0035	0.0050	0.0060	0.0007	0.0018	0.0032	0.0045	0.0054
Titanium Alloy	-	110	0.0008	0.0025	0.0040	0.0055	0.0065	0.0007	0.0023	0.0036	0.0050	0.0059
Hardened Steel	30 - 50 HRc	150	0.0006	0.0020	0.0045	0.0060	0.0070	0.0005	0.0018	0.0041	0.0054	0.0063
Tool Steel	> 50 HRc	70	0.0006	0.0020	0.0030	0.0040	0.0050	0.0005	0.0018	0.0027	0.0036	0.0045

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

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

↑
3.3x
Tool Life

Competitor A
Ø0.3125"

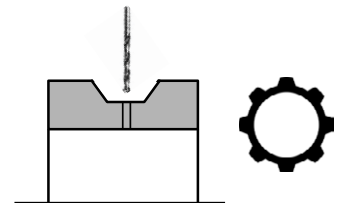
200 pcs / tool

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)

↑
1.7x
Tool Life

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)



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