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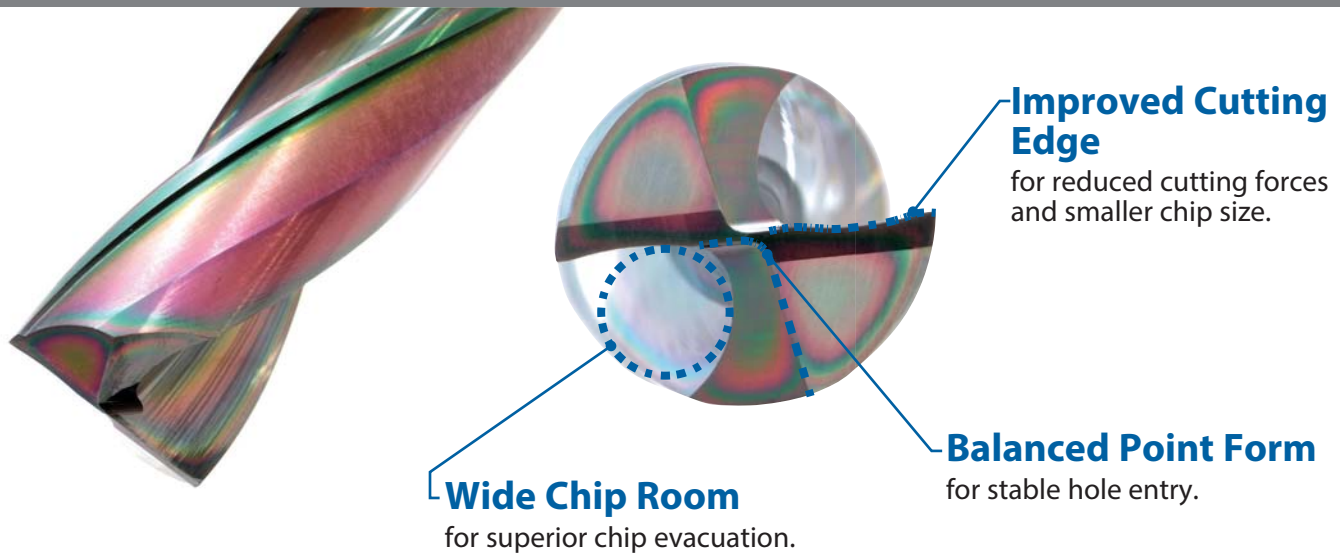
Vol 2

Carbide Flat Drills Designed for Various Applications

EXOCARB[®] ADF

ADF-2D

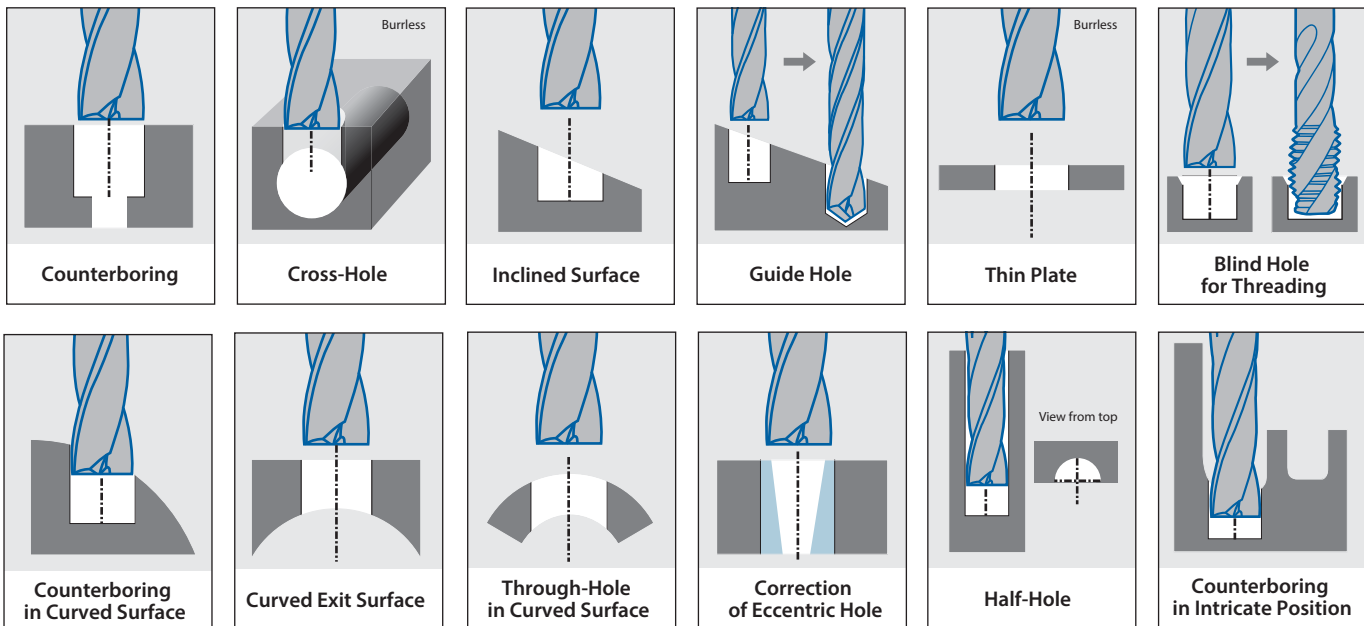




Multi-Purpose

Designed for a Wide Variety of Applications

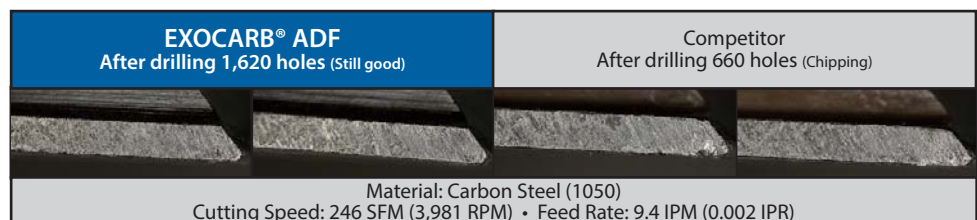
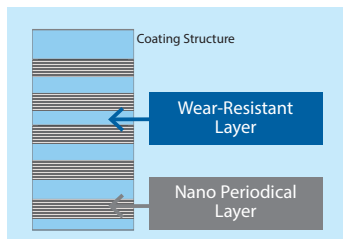
The ADF drill is capable of drilling in numerous applications such as inclined surfaces, curved surfaces, flat-bottom holes and more.



EgiAs Coating

Exceptional Wear Resistance & Toughness

Suppresses friction with the wear resistance layer; prevents breakage with the nano periodical layer.



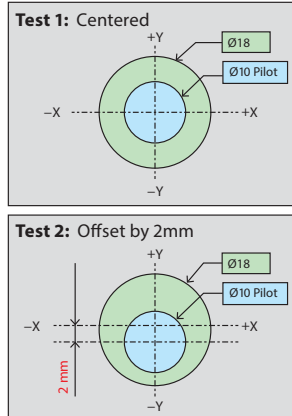
Counterboring

Grey Cast Iron

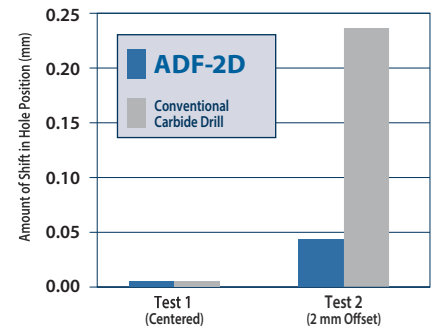


Both EXOCARB® ADF Drills and conventional drills show little to no positional inaccuracies when processed over the center of a pre-existing hole. However, when it is necessary to process the drill off-center over a pre-existing hole, the position and straightness of the hole made with the ADF is **5 times more accurate** than the conventional drill.

Tool	ADF-2D	Conventional Carbide Drill
Drill Size	Ø18	
Machined Surface	Flat Surface	
Work Material	Grey Cast Iron	
Cutting Speed	246 SFM (1,327 RPM)	
Feed Rate	5.2 IPM (0.004 IPR)	
Depth of Hole	34 mm (Blind)	
Coolant	Water Soluble	
Machine	Horizontal Machining Center	

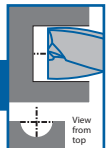


Shift Amount in Hole Position
Centered vs Offset



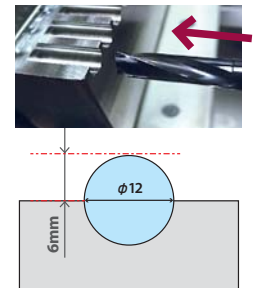
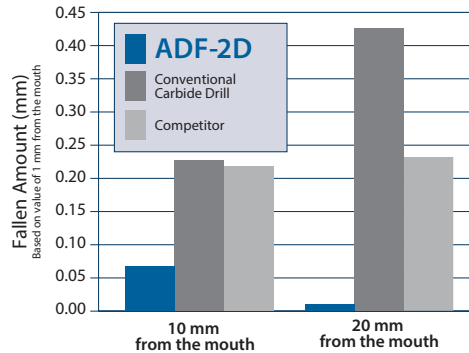
Half-Hole

Carbon Steel (1050)



The ADF minimized the amount of shift when drilling a half-hole as compared to both the conventional and competitor drills.

Tool	ADF-2D	Conventional Carbide Drill	Competitor
Drill Size	Ø12		
Machined Surface	Flat Surface		
Work Material	Carbon Steel (1050)		
Cutting Speed	121 SFM (979 RPM)		
Feed Rate	5.9 IPM (0.006 IPR)		
Depth of Hole	24 mm (Blind)		
Coolant	Water Soluble		
Machine	Horizontal Machining Center		



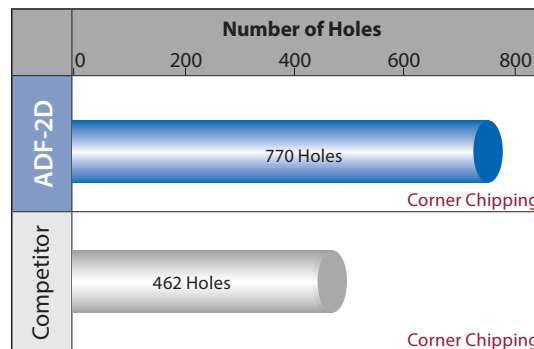
Inclined Surface

Alloy Steel (4140)

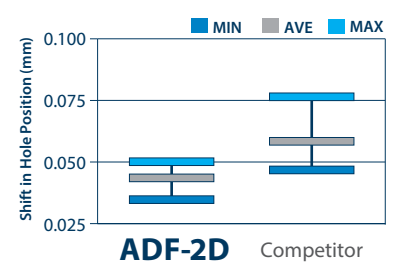


The ADF maintained accurate hole position and resisted chipping while drilling on an inclined surface.

Tool	ADF-2D	Competitor
Drill Size	Ø10	
Machined Surface	Angled Surface (30°)	
Work Material	Alloy Steel (4140)	
Cutting Speed	200 SFM (1,944 RPM)	
Feed Rate	7.7 IPM (0.004 IPR)	
Depth of Hole	20 mm (Blind)	
Coolant	Water Soluble	
Machine	Horizontal Machining Center	

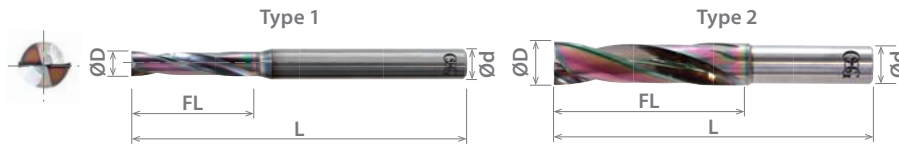


Shift in Hole Position
ADF vs Competitor



List 5700 NEW!

2D



SPEED FEED P7	CARBIDE	EgiAs		SHRINK h6
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Size	Tolerance (h8)	
	mm	inch
2 ≤ D ≤ 3	+0 / -0.014	+0 / -0.0006
3 < D ≤ 6	+0 / -0.018	+0 / -0.0007
6 < D ≤ 10	+0 / -0.022	+0 / -0.0009
10 < D ≤ 18	+0 / -0.027	+0 / -0.0011
18 < D ≤ 20	+0 / -0.033	+0 / -0.0013

EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Type
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3330200	-	-	-	2.00	0.0787	10	50	4	1
3330210	-	-	-	2.10	0.0827	10	50	4	1
3330220	-	-	-	2.20	0.0866	11	50	4	1
3330230	-	-	-	2.30	0.0906	11	50	4	1
570009311	3/32	-	-	2.38	0.0937	11	50	4	1
3330240	-	-	-	2.40	0.0945	12	50	4	1
3330250	-	-	-	2.50	0.0984	12	50	4	1
3330260	-	-	-	2.60	0.1024	13	50	4	1
3330270	-	-	-	2.70	0.1063	13	50	4	1
3330280	-	-	-	2.80	0.1102	14	50	4	1
3330290	-	-	-	2.90	0.1142	14	50	4	1
3330300	-	-	-	3.00	0.1181	15	55	6	1
3330310	-	-	-	3.10	0.1220	15	55	6	1
570012511	1/8	-	-	3.18	0.1250	15	55	1/8	2
3330320	-	-	-	3.20	0.1260	15	55	6	1
3330330	-	-	-	3.30	0.1299	15	55	6	1
3330340	-	-	-	3.40	0.1339	16	55	6	1
3330350	-	-	-	3.50	0.1378	16	55	6	1
3330360	-	-	-	3.60	0.1417	16	55	6	1
3330370	-	-	-	3.70	0.1457	16	55	6	1
3330380	-	-	-	3.80	0.1496	19	60	6	1
3330390	-	-	-	3.90	0.1535	19	60	6	1
570015611	5/32	-	-	3.97	0.1563	19	60	3/16	1
3330400	-	-	-	4.00	0.1575	19	60	6	1
3330410	-	-	-	4.10	0.1614	19	60	6	1
3330420	-	-	-	4.20	0.1654	21	60	6	1
3330430	-	-	-	4.30	0.1693	21	60	6	1
3330440	-	-	-	4.40	0.1732	21	60	6	1
3330450	-	-	-	4.50	0.1772	21	60	6	1
3330460	-	-	-	4.60	0.1811	21	60	6	1
3330470	-	-	-	4.70	0.1850	21	60	6	1
570018711	3/16	-	-	4.76	0.1875	24	65	3/16	2
3330480	-	-	-	4.80	0.1890	24	65	6	1
3330490	-	-	-	4.90	0.1929	24	65	6	1
3330500	-	-	-	5.00	0.1969	24	65	6	1
3330510	-	-	-	5.10	0.2008	24	65	6	1
3330520	-	-	-	5.20	0.2047	24	65	6	1
3330530	-	-	-	5.30	0.2087	24	65	6	1
3330540	-	-	-	5.40	0.2126	27	65	6	1
3330550	-	-	-	5.50	0.2165	27	65	6	1
570021811	7/32	-	-	5.56	0.2188	27	65	1/4	1
3330560	-	-	-	5.60	0.2205	27	65	6	1
3330570	-	-	-	5.70	0.2244	27	65	6	1
3330580	-	-	-	5.80	0.2283	27	65	6	1
3330590	-	-	-	5.90	0.2323	27	65	6	1
3330600	-	-	-	6.00	0.2362	27	65	6	2
3330610	-	-	-	6.10	0.2402	30	70	6	2
3330620	-	-	-	6.20	0.2441	30	70	6	2
3330630	-	-	-	6.30	0.2480	30	70	6	2
570025011	1/4	-	E	6.35	0.2500	30	70	1/4	2
3330640	-	-	-	6.40	0.2520	30	70	6	2
3330650	-	-	-	6.50	0.2559	30	70	6	2
3330660	-	-	-	6.60	0.2598	30	70	6	2
3330670	-	-	-	6.70	0.2638	30	70	6	2
3330680	-	-	-	6.80	0.2677	30	70	6	2
3330690	-	-	-	6.90	0.2717	30	70	6	2
3330700	-	-	-	7.00	0.2756	30	70	6	2
3330710	-	-	-	7.10	0.2795	34	75	6	2
570028111	9/32	-	-	7.14	0.2813	34	75	5/16	1
3330720	-	-	-	7.20	0.2835	34	75	6	2

Packed: 1 pc.
Available EgiAs Coating Only.



List 5700 NEW!



2D

EDP Number	Diameter					Flute Length	Overall Length	Shank Diameter	Type
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3330730	-	-	-	7.30	0.2874	34	75	6	2
3330740	-	-	-	7.40	0.2913	34	75	6	2
3330750	-	-	-	7.50	0.2953	34	75	6	2
3330760	-	-	-	7.60	0.2992	34	75	6	2
3330770	-	-	-	7.70	0.3031	34	75	6	2
3330780	-	-	-	7.80	0.3071	34	75	6	2
3330790	-	-	-	7.90	0.3110	34	75	6	2
570031211	5/16	-	-	7.94	0.3125	34	75	5/16	2
3330800	-	-	-	8.00	0.3150	34	75	8	2
3330810	-	-	-	8.10	0.3189	38	80	8	2
3330820	-	-	-	8.20	0.3228	38	80	8	2
3330830	-	-	-	8.30	0.3268	38	80	8	2
570032811	21/64	-	-	8.33	0.3281	38	80	3/8	1
3330840	-	-	-	8.40	0.3307	38	80	8	2
3330850	-	-	-	8.50	0.3346	38	80	8	2
3330860	-	-	-	8.60	0.3386	38	80	8	2
3330870	-	-	-	8.70	0.3425	38	80	8	2
3330880	-	-	-	8.80	0.3465	38	80	8	2
3330890	-	-	-	8.90	0.3504	38	80	8	2
3330900	-	-	-	9.00	0.3543	38	80	8	2
3330910	-	-	-	9.10	0.3583	42	85	8	2
570035911	23/64	-	-	9.13	0.3594	42	85	3/8	1
3330920	-	-	-	9.20	0.3622	42	85	8	2
3330930	-	-	-	9.30	0.3661	42	85	8	2
3330940	-	-	-	9.40	0.3701	42	85	8	2
3330950	-	-	-	9.50	0.3740	42	85	8	2
570037511	3/8	-	-	9.53	0.3750	42	85	3/8	2
3330960	-	-	-	9.60	0.3780	42	85	8	2
3330970	-	-	-	9.70	0.3819	42	85	8	2
3330980	-	-	-	9.80	0.3858	42	85	8	2
3330990	-	-	-	9.90	0.3898	42	85	8	2
3331000	-	-	-	10.00	0.3937	42	85	10	2
3331010	-	-	-	10.10	0.3976	46	90	10	2
3331020	-	-	-	10.20	0.4016	46	90	10	2
3331030	-	-	-	10.30	0.4055	46	90	10	2
570040611	13/32	-	-	10.32	0.4063	46	90	7/16	1
3331040	-	-	-	10.40	0.4094	46	90	10	2
3331050	-	-	-	10.50	0.4134	46	90	10	2
3331060	-	-	-	10.60	0.4173	46	90	10	2
3331070	-	-	-	10.70	0.4213	46	90	10	2
3331080	-	-	-	10.80	0.4252	46	90	10	2
3331090	-	-	-	10.90	0.4291	46	90	10	2
3331100	-	-	-	11.00	0.4331	46	90	10	2
3331110	-	-	-	11.10	0.4370	50	95	10	2
570043711	7/16	-	-	11.11	0.4374	50	95	7/16	2
3331120	-	-	-	11.20	0.4409	50	95	10	2
3331130	-	-	-	11.30	0.4449	50	95	10	2
3331140	-	-	-	11.40	0.4488	50	95	10	2
3331150	-	-	-	11.50	0.4528	50	95	10	2
570045311	29/64	-	-	11.51	0.4531	50	95	1/2	1
3331160	-	-	-	11.60	0.4567	50	95	10	2
3331170	-	-	-	11.70	0.4606	50	95	10	2
3331180	-	-	-	11.80	0.4646	50	95	10	2
3331190	-	-	-	11.90	0.4685	50	95	10	2
570046811	15/32	-	-	11.91	0.4688	50	95	1/2	1
3331200	-	-	-	12.00	0.4724	50	95	12	2
3331210	-	-	-	12.10	0.4764	56	100	12	2
3331220	-	-	-	12.20	0.4803	56	100	12	2

Packed: 1 pc.
Available EgiAs Coating Only.

[continued on next page](#)

List No.	Work Material																
	P			M			K	N		S		H					
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High	4140	400	300	400	17-4 PH		6061	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
5700	1010	1035	1065	4340						7075							
	1018	1045															

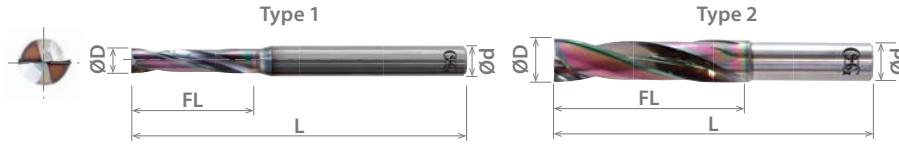
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List 5700 NEW!

2D

SPEED FEED P7	CARBIDE	EgiAs		SHRINK h6
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Size	Tolerance (h8)	
	mm	inch
2 ≤ D ≤ 3	+0 / -0.014	+0 / -0.0006
3 < D ≤ 6	+0 / -0.018	+0 / -0.0007
6 < D ≤ 10	+0 / -0.022	+0 / -0.0009
10 < D ≤ 18	+0 / -0.027	+0 / -0.0011
18 < D ≤ 20	+0 / -0.033	+0 / -0.0013

EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Type
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3331230	-	-	-	12.30	0.4843	56	100	12	2
3331240	-	-	-	12.40	0.4882	56	100	12	2
3331250	-	-	-	12.50	0.4921	56	100	12	2
3331260	-	-	-	12.60	0.4961	56	100	12	2
3331270	1/2	-	-	12.70	0.5000	56	100	12	2
3331280	-	-	-	12.80	0.5039	56	100	12	2
3331290	-	-	-	12.90	0.5079	56	100	12	2
3331300	-	-	-	13.00	0.5118	56	100	12	2
3331310	-	-	-	13.10	0.5157	60	105	12	2
3331320	-	-	-	13.20	0.5197	60	105	12	2
3331330	-	-	-	13.30	0.5236	60	105	12	2
3331340	-	-	-	13.40	0.5276	60	105	12	2
3331350	-	-	-	13.50	0.5315	60	105	12	2
3331360	-	-	-	13.60	0.5354	60	105	12	2
3331370	-	-	-	13.70	0.5394	60	105	12	2
3331380	-	-	-	13.80	0.5433	60	105	12	2
3331390	-	-	-	13.90	0.5472	60	105	12	2
3331400	-	-	-	14.00	0.5512	60	105	12	2
3331410	-	-	-	14.10	0.5551	64	110	12	2
3331420	-	-	-	14.20	0.5591	64	110	12	2
570056211	9/16	-	-	14.29	0.5625	64	110	5/8	1
3331430	-	-	-	14.30	0.5630	64	110	12	2
3331440	-	-	-	14.40	0.5669	64	110	12	2
3331450	-	-	-	14.50	0.5709	64	110	12	2
3331460	-	-	-	14.60	0.5748	64	110	12	2
3331470	-	-	-	14.70	0.5787	64	110	12	2
3331480	-	-	-	14.80	0.5827	64	110	12	2
3331490	-	-	-	14.90	0.5866	64	110	12	2
3331500	-	-	-	15.00	0.5906	64	110	12	2
3331510	-	-	-	15.10	0.5945	68	115	12	2
3331520	-	-	-	15.20	0.5984	68	115	12	2
3331530	-	-	-	15.30	0.6024	68	115	12	2
3331540	-	-	-	15.40	0.6063	68	115	12	2
3331550	-	-	-	15.50	0.6102	68	115	12	2
3331560	-	-	-	15.60	0.6142	68	115	12	2
3331570	-	-	-	15.70	0.6181	68	115	12	2
3331580	-	-	-	15.80	0.6220	68	115	12	2
570062511	5/8	-	-	15.88	0.6250	68	115	5/8	2
3331590	-	-	-	15.90	0.6260	68	115	12	2
3331600	-	-	-	16.00	0.6299	68	115	16	2
3331650	-	-	-	16.50	0.6496	74	125	16	2
3331700	-	-	-	17.00	0.6693	74	125	16	2
570068711	11/16	-	-	17.46	0.6875	78	130	3/4	1
3331750	-	-	-	17.50	0.6890	78	130	16	2
3331800	-	-	-	18.00	0.7087	78	130	16	2
3331850	-	-	-	18.50	0.7283	84	135	16	2
3331900	-	-	-	19.00	0.7480	84	135	16	2
570075011	3/4	-	-	19.05	0.7500	88	140	3/4	2
3331950	-	-	-	19.50	0.7677	88	140	16	2
3332000	-	-	-	20.00	0.7874	88	140	20	2

Packed: 1 pc.
Available EgiAs Coating Only.



List No.	Work Material																
	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
5700	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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List 5700 - EXOCARB® ADF

2D

General Drilling Operations

Work Material		Carbon Steels, Mild Steel 1010, 1050, 12L14		Alloy Steels 4140, 4130		Stainless Steels 300SS, 400SS, 17-4PH		Cast Iron		Ductile Cast Iron	
Hardness				28-35 HRC							
Drilling Speed		200-330 SFM		100-300 SFM		65-140 SFM		200-400 SFM		165-260 SFM	
Drill Dia.		Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
mm	Inch										
2	-	12,700	0.0004-0.002	9,550	0.0004-0.002	6310	0.0004 - 0.002	14,300	0.0004-0.002	10,350	0.0004-0.002
3	-	8,500	0.001-0.004	6,350	0.001-0.004	4250	0.001 - 0.004	9,550	0.001-0.004	6,900	0.001-0.004
-	1/8	8,000	0.001-0.004	6,020	0.001-0.004	3970	0.001 - 0.004	9,020	0.001-0.004	6,570	0.001-0.004
4	-	6,350	0.001-0.005	4,750	0.001-0.005	3200	0.001 - 0.005	7,150	0.001-0.005	5,150	0.001-0.005
-	3/16	5,300	0.001-0.006	4,020	0.001-0.006	2650	0.001 - 0.006	6,010	0.001-0.006	4,380	0.001-0.006
6	-	4,250	0.001-0.007	3,200	0.001-0.007	2100	0.001 - 0.007	4,750	0.001-0.007	3,450	0.001-0.007
-	1/4	4,000	0.001-0.008	3,010	0.001-0.008	1990	0.001 - 0.008	4,510	0.001-0.008	3,290	0.001-0.008
8	-	3,200	0.002-0.009	2,400	0.002-0.009	1600	0.002 - 0.009	3,600	0.002-0.009	2,600	0.002-0.009
-	3/8	2,650	0.002-0.011	2,010	0.002-0.011	1320	0.002 - 0.011	3,010	0.002-0.011	2,190	0.002-0.011
10	-	2,550	0.002-0.012	1,900	0.002-0.012	1260	0.002 - 0.012	2,850	0.002-0.012	2,050	0.002-0.012
-	7/16	2,300	0.002-0.012	1,720	0.002-0.012	1140	0.002 - 0.012	2,580	0.002-0.012	1,880	0.002-0.012
12	-	2,100	0.002-0.012	1,600	0.002-0.012	1050	0.002 - 0.012	2,400	0.002-0.012	1,700	0.002-0.012
-	1/2	2,000	0.002-0.013	1,510	0.002-0.013	990	0.002 - 0.013	2,250	0.002-0.013	1,650	0.002-0.013
14	-	1,800	0.003-0.014	1,350	0.003-0.014	910	0.003 - 0.014	2,050	0.003-0.014	1,500	0.003-0.014
-	5/8	1,600	0.003-0.015	1,210	0.003-0.014	790	0.003 - 0.015	1,800	0.003-0.014	1,310	0.003-0.014
18	-	1,400	0.004-0.015	1,050	0.004-0.015	700	0.004 - 0.015	1,600	0.004-0.015	1,150	0.004-0.015
-	3/4	1,350	0.004-0.016	1,000	0.004-0.015	660	0.004 - 0.016	1,500	0.004-0.016	1,100	0.004-0.016
20	-	1,250	0.004-0.016	950	0.004-0.016	635	0.004 - 0.016	1,450	0.004-0.016	1,050	0.004-0.016

General Drilling Operations

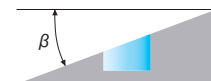
Work Material		Aluminum		Aluminum Alloy		Hardened Steel-Pre Hardened Steel		Plastic Mold Steel	
Hardness						Up to 50 HRC		Up to 40 HRC	
Drilling Speed		265-650 SFM		265-650 SFM		65-100 SFM		65-130 SFM	
Drill Dia.		Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
mm	Inch								
2	-	22,300	0.0004-0.002	22,300	0.0004-0.002	4,000	0.0004-0.001	4,750	0.0004-0.002
3	-	14,850	0.001-0.004	14,850	0.001-0.004	2,650	0.001-0.002	3,200	0.001-0.002
-	1/8	14,060	0.001-0.004	14,060	0.001-0.004	2,500	0.001-0.002	3,050	0.001-0.002
4	-	11,150	0.001-0.005	11,150	0.001-0.005	2,000	0.001-0.002	2,400	0.001-0.003
-	3/16	9,370	0.001-0.006	9,370	0.001-0.006	1,670	0.001-0.003	2,040	0.001-0.004
6	-	7,450	0.001-0.007	7,450	0.001-0.007	1,350	0.001-0.004	1,600	0.001-0.005
-	1/4	7,030	0.001-0.008	7,030	0.001-0.008	1,250	0.001-0.004	1,530	0.001-0.005
8	-	5,550	0.001-0.009	5,550	0.001-0.009	1,000	0.002-0.005	1,200	0.002-0.006
-	3/8	4,690	0.002-0.011	4,690	0.002-0.011	840	0.002-0.005	1,020	0.002-0.007
10	-	4,450	0.002-0.012	4,450	0.002-0.012	800	0.002-0.006	950	0.002-0.008
-	7/16	4,020	0.002-0.013	4,020	0.002-0.013	720	0.002-0.006	880	0.002-0.009
12	-	3,700	0.002-0.014	3,700	0.002-0.014	650	0.002-0.007	800	0.002-0.009
-	1/2	3,520	0.002-0.016	3,520	0.002-0.016	630	0.002-0.007	770	0.002-0.010
14	-	3,200	0.003-0.017	3,200	0.003-0.017	550	0.003-0.008	700	0.003-0.011
-	5/8	2,820	0.003-0.019	2,820	0.003-0.019	500	0.003-0.009	610	0.003-0.013
18	-	2,500	0.004-0.021	2,500	0.004-0.021	450	0.004-0.011	550	0.004-0.014
-	3/4	2,350	0.004-0.023	2,350	0.004-0.023	420	0.004-0.012	510	0.004-0.015
20	-	2,250	0.004-0.024	2,250	0.004-0.024	400	0.004-0.012	500	0.004-0.016

Note:

- Water-soluble coolant may be applied as noted in the above table only under the premise that the work surface has been flattened by milling.
- When using non-water soluble oil or water-emulsifiable (over 20 times dilution), reduce cutting speed by 30%.
- Use a rigid and precise machine and holder.
- Please minimize tool hang over as much as possible during machining.
- Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity or work holding.
- Please set up the drill so that the runout of the cutting edge is under 0.01 mm.

- When machining an inclined plane, adjust the rotational speed and the feed rate in accordance with the angle of the incline (β).

- When the machining incline angle(β) is less than 30°, please reduce the feed to 40-60%.
- When the machining incline angle(β) is over 30°, please reduce the speed to 60-80%, the feed to 20-40%.



- Please use step drilling in pilot holes to improve cutting chip separation.
- If it is necessary to ensure the locating precision of the hole to be machined, adjust the rotational speed and the feed rate as indicated above (in accordance with the machining precision requirement).

