

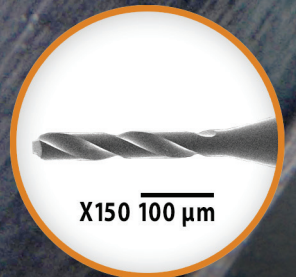
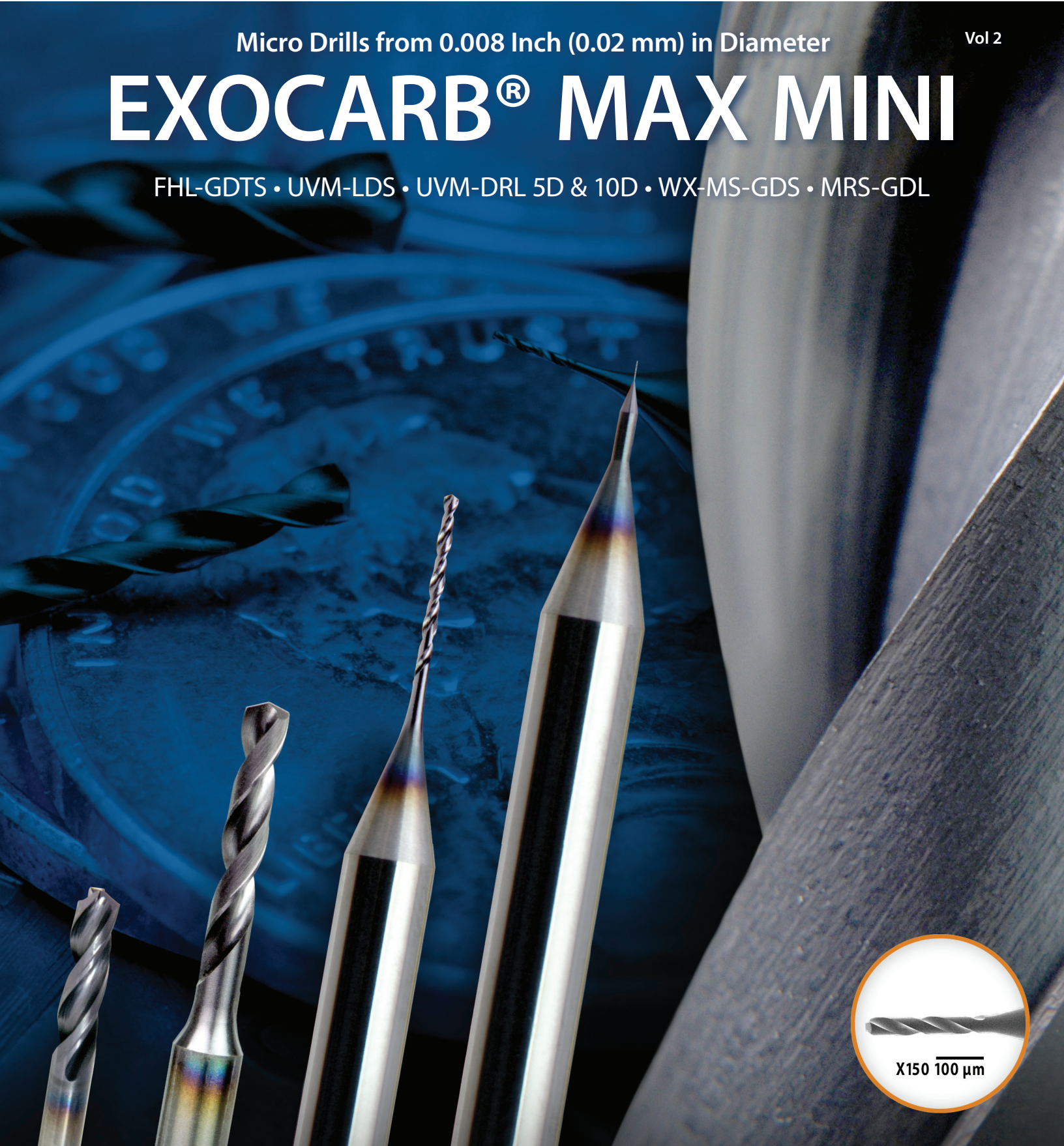


Micro Drills from 0.008 Inch (0.02 mm) in Diameter

Vol 2

# EXOCARB® MAX MINI

FHL-GDTS • UVM-LDS • UVM-DRL 5D & 10D • WX-MS-GDS • MRS-GDL



# EXOCARB® MAX-MINI Drills

OSG offers a complete line of high performance micro drills in stocked sizes ranging from 5 mm down to 0.02 mm (0.0008") in diameter.

Made from tungsten carbide, OSG micro drills feature unique designs and specialized coatings for unsurpassed performance in any micro drilling application.



## EXOCARB® MAX-MINI FHL-GDTS

*The FHL-GDTS drill is a 3-flute miniature drill designed specifically for applications in hardened steel. With a rigid flute form and reduced neck configuration, the FHL-GDTS can drill up to 20 times the diameter in materials up to 65 HRC.*

### EXO® Coating

a multilayered TiAlN coating for greater resistance to heat and wear

### 3-Flute High Rigid Flute Form

provides a larger core diameter for rigidity in hardened steels

### Reduced Neck Configuration

further optimizes tool body rigidity

### Stocked Sizes

from 1 mm to 3 mm

## EXOCARB® MAX-MINI UVM-DRL/UVM-LDS

*The UVM-DRL drill is designed for unsurpassed performance processing micro-sized holes as small as 0.02 mm in super alloys, stainless steels and hardened steel up to 50 HRC. The UVM-DRL is available in pilot, 5D and 10D flute lengths.*

### OSG's Super Smooth Coating

for better chip evacuation and reduced friction during drilling

### Pilot, 5D & 10D Flute Lengths

for optimal results

### Stocked Sizes

from 0.02 mm to 0.08 mm

## High Performance Micro Carbide Drills

### EXOCARB® MAX-MINI WX-MS-GDS

*The WX-MS-GDS is a micro drill series specifically designed for difficult to machine materials. The WX-MS-GDS features a unique flute design for both rigidity and wide chip room.*

#### **TiAlN Coating**

for greater resistance to heat and wear

#### **Unique Flute Design**

for rigidity and wide chip room

#### **Wide Range of Sizes**

from 0.2 mm to 5 mm

### EXOCARB® MAX-MINI MRS-GDL

*The MRS-GDL series is the premium solution for processing micro-sized holes as small as 0.5 mm in aluminum and stainless steel. This drill features a unique flute shape designed for both rigidity and wide chip room.*

#### **OSG' Super Smooth Coating**

for better chip evacuation and reduced friction during drilling

#### **Long Flute Length**

for deeper drilling

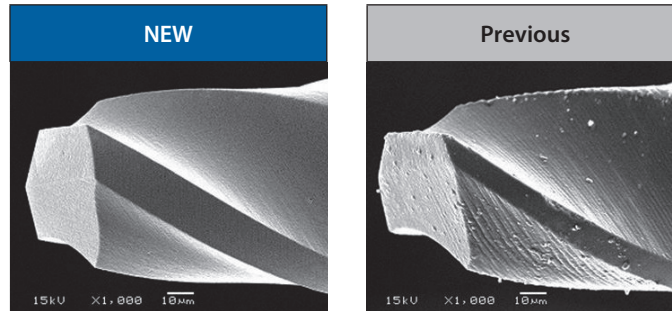
#### **Wide Range of Sizes**

from 0.5 mm to 3 mm

## Machining Data for UVM-DRL

### Unsurpassed Quality and Accuracy

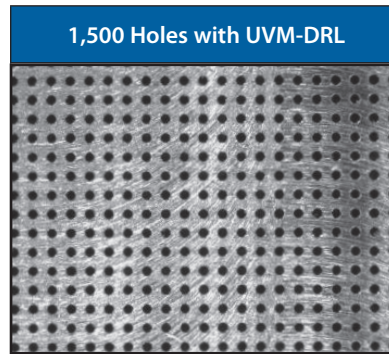
The UVM-DRL shows a superior cutting edge and exceptional quality when viewed under an electron microscope.



### EXOCARB® MAX-MINI UVM-DRL Machining Austenitic Stainless Steel (SUS430)

The UVM-DRL showed exceptional performance when drilling 1,500 through holes in thin plate stainless steel.

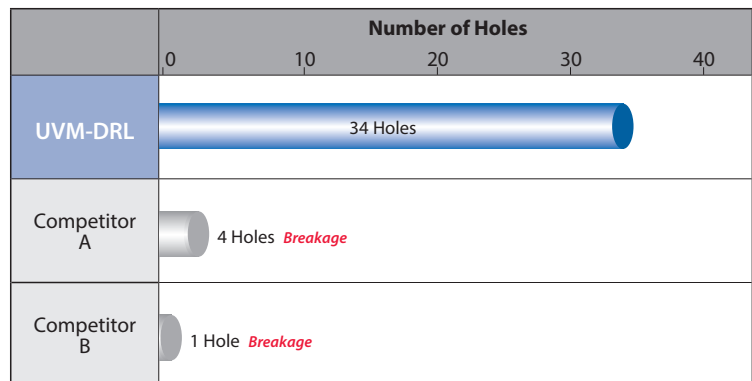
Tool	UVM-LDS	UVM-DRL 10D
Size	Ø0.07 mm X 120° X 3	Ø0.07 mm X 10D X 3
Work Material	304 Stainless Steel	
Cutting Speed	12,025 RPM (8.5 SFM)	
Feed Rate	4.8 IPM (0.00004 IPR)	2.4 IPM (0.00002 IPR)
Step Feed	0.05 mm	0.008 mm
Depth of Hole	0.05 mm	0.5 mm (Through)
Coolant	Mist	
Machine	High Precision Vertical Machining Center	



### EXOCARB® MAX-MINI UVM-DRL for Drilling STAVAX (53 HRC)

Even in STAVAX, a material with a high hardness level of 53 HRC, the UVM-DRL can stably machine more than 30 holes.

Tool	UVM-DRL
Size	Ø0.1 mm X 10D (Special Order)
Work Material	STAVAX (53 HRC)
Cutting Speed	24,487 RPM (25 SFM)
Feed Rate	24.5 IPM (0.0001 IPR)
Step Feed	0.02 mm
Depth of Hole	0.8 mm (Blind)
Coolant	Mist
Machine	Vertical Machining Center



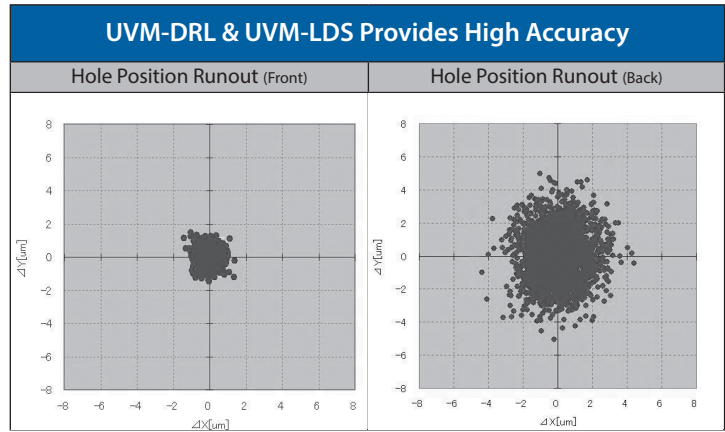
\*Use a leading drill for machining.

## Machining Data for UVM-DRL (Continued)

### EXOCARB® MAX-MINI UVM-DRL & UVM-LDS for High Accuracy Hole Making in Machineable Ceramics

While machining a 10D through hole, the rigid UVM-DRL & UVM-LDS maintained hole position accuracy within 5 µm (0.0002").

Tool	UVM-LDS	UVM-DRL
Size	Ø0.04 mm X 120° X 3.175	Ø0.045 mm X 12D X 3.175
Coating	Non-Coated	Non-Coated
Work Material	Machineable Ceramic	
Cutting Speed	12,165 RPM (5 SFM)	11,654 RPM (5.4 SFM)
Feed Rate	0.12 IPM (0.00001 IPR)	
Step Feed	0.04 mm	0.045 mm
Depth of Hole	0.065 mm	0.45 mm (Through)
Coolant	Air Blow	
Machine	High Precision Vertical Machining Center	



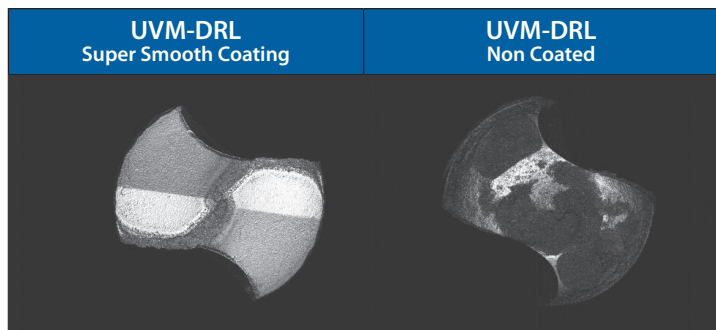
Maintains accuracy within 5 µm.

### EXOCARB® MAX-MINI UVM-DRL for Drilling Machineable Ceramic (Macerite HSP)

The UVM-DRL demonstrated superb wear resistance in ceramic, after machining 3,500 holes, due to OSG's Super Smooth coating.

Tool	UVM-DRL
Size	Ø0.1 mm X 13D (Special Order)
Work Material	Machineable Ceramic
Depth of Hole	1.2 mm (Blind)
Coolant	Mist
Machine	Vertical Machining Center

\*Machining conditions were not made public.

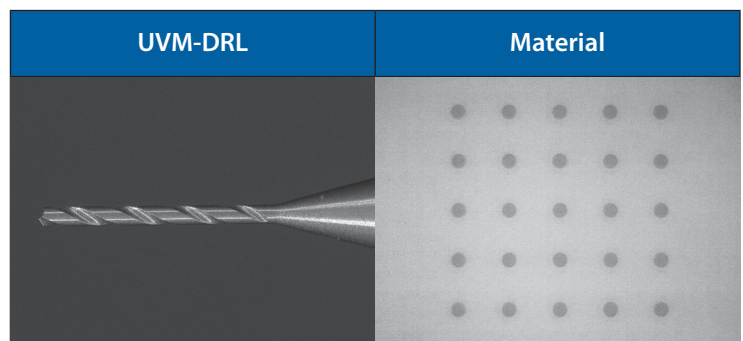


### EXOCARB® MAX-MINI UVM-DRL for Drilling Quartz Glass (SiO<sub>2</sub>)

With OSG's Super Smooth diamond coating, the UVM-DRL demonstrated consistent drilling of brittle quartz glass material.

Tool	UVM-DRL
Size	Ø0.04 mm
Work Material	SiO <sub>2</sub>

\*Machining conditions were not made public.

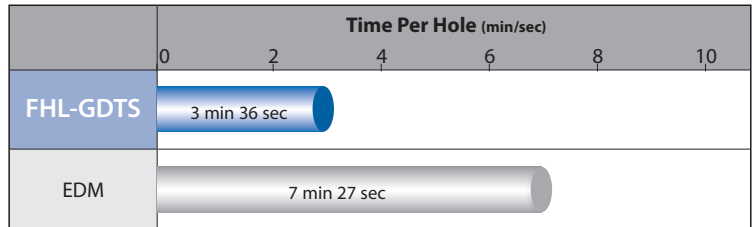


## Machining Data for FHL-GDTS

### EXOCARB® MAX-MINI FHL-GDTS for Deep Holes in Hardened Steels

The FHL-GDTS can replace deep hole EDM processing, and thus improve hole quality with better tolerance and surface finish.

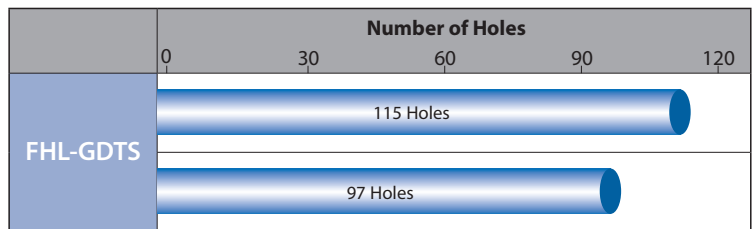
Tool	FHL-GDTS
Size	Ø1 mm x 20
Work Material	HPM38 (55 HRC)
Cutting Speed	16,000 RPM (164 SFM)
Feed Rate	38 IPM (0.0023 IPR)
Step Feed	0.0025"
Depth of Hole	20 mm (20xD) (Blind)
Coolant	Water Soluble Fluid
Machine	Vertical Machining Center



### EXOCARB® MAX-MINI FHL-GDTS for Drilling Extremely Deep Holes

The FHL-GDTS showed consistent drilling for over 90 holes at extreme depths.

Tool	FHL-GDTS
Size	Ø1.5 mm x 40 (Special Order)
Work Material	HPM38 (53 HRC)
Cutting Speed	10,600 RPM (164 SFM)
Feed Rate	25 IPM (0.0015 IPR)
Step Feed	0.0019"
Depth of Hole	40 mm (26xD) (Blind)
Coolant	Water Soluble Fluid
Machine	Vertical Machining Center

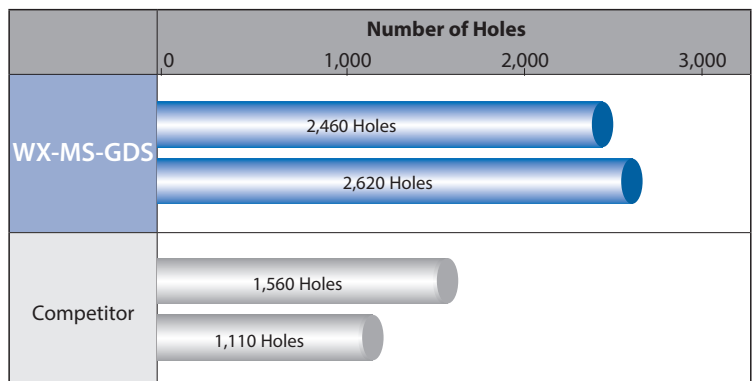


## Machining Data for WX-MS-GDS

### EXOCARB® MAX-MINI WX-MS-GDS for Drilling in Kovar (60 HRC)

WX-MS-GDS improves chip ejection and prevents breakage caused by chip packing, thanks to the unique flute form with both rigidity and wide chip room. Thus, it has stable tool life and its tool life is 1.9 times longer than the competitor.

Tool	WX-MS-GDS
Size	Ø1 mm
Work Material	Kovar
Cutting Speed	6,415 RPM (66 SFM)
Feed Rate	2.5 IPM (0.0004 IPR)
Step Feed	0.0098"
Depth of Hole	0.157" (Blind)
Coolant	Water Soluble Fluid
Machine	Vertical Machining Center

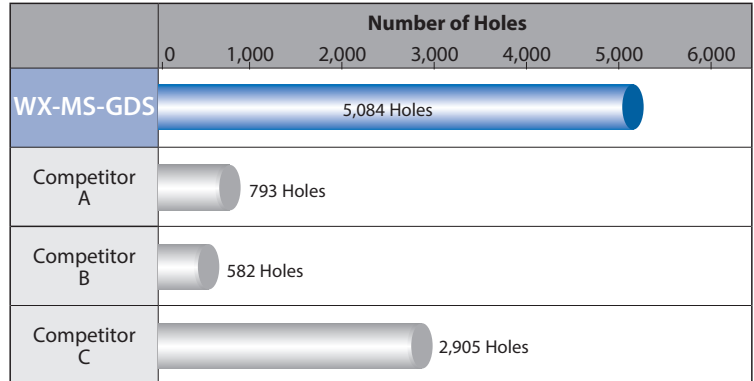


## Machining Data for WX-MS-GDS (Continued)

### EXOCARB® MAX-MINI WX-MS-GDS in High Carbon Steel (S50C)

WX-MS-GDS has 1.8 - 8.8 times longer tool life in 4D deep hole drilling in S50C (High Carbon Steel) without step feeding.

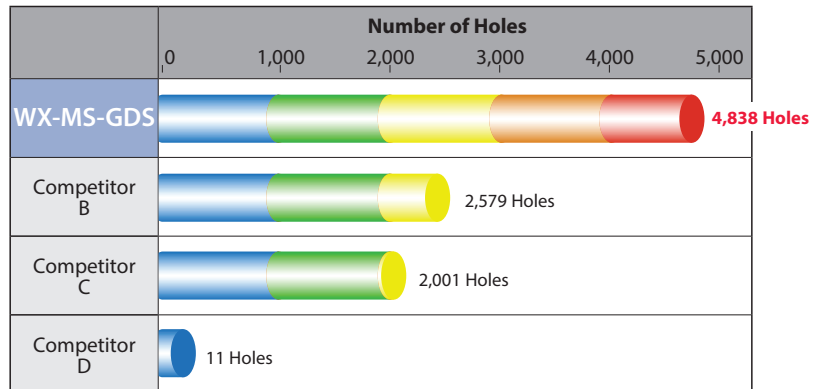
Tool	WX-MS-GDS
Size	Ø1 mm
Work Material	S50C (0.5% Carbon Steel)
Cutting Speed	6464 RPM (66 SFM)
Feed Rate	7.1 IPM (0.0011 IPR)
Step Feed	Non-step feed
Depth of Hole	0.157" (Blind)
Coolant	Water Soluble Fluid
Machine	Vertical Machining Center








### WX-MS-GDS Outperforms in Ferritic Stainless Steel (SUS410)

WX-MS-GDS can be used in a wide range of cutting conditions while still performing 1.9-2.4 times better than competitor drills.

Tool	WX-MS-GDS
Size	Ø1 mm
Work Material	410 Stainless Steel
Step Feed	Non-Step Feed
Depth of Hole	0.157" (Blind)
Coolant	Water Soluble
Machine	Vertical Machining Center



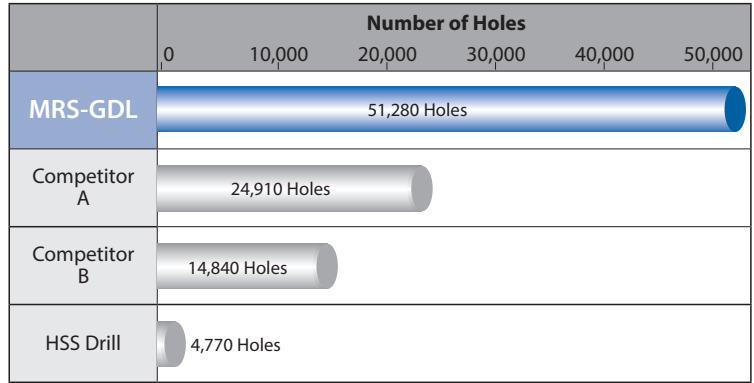
					
Cutting Speed	66 SFM	82 SFM	98 SFM	115 SFM	131 SFM
Feed Rate	0.0004 IPR	0.0004 IPR	0.0008 IPR	0.0008 IPR	0.0012 IPR

## Machining Data for MRS-GDL

### EXOCARB® MAX-MINI MRS-GDL in SUS420J2

The MRS-GDL demonstrated excellent tool life in SUS420J2.

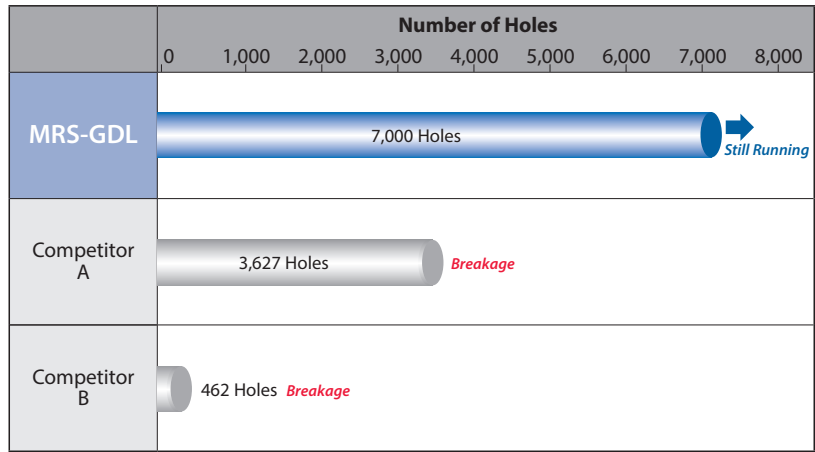
Tool	MRS-GDL
Size	Ø1.82 mm
Work Material	420J2 Stainless Steel
Cutting Speed	6,135 RPM (115 SFM)
Feed Rate	10.1 IPM (0.00165 IPR)
Work	M2 X 0.4 Drill Hole
Depth of Hole	7.2 mm



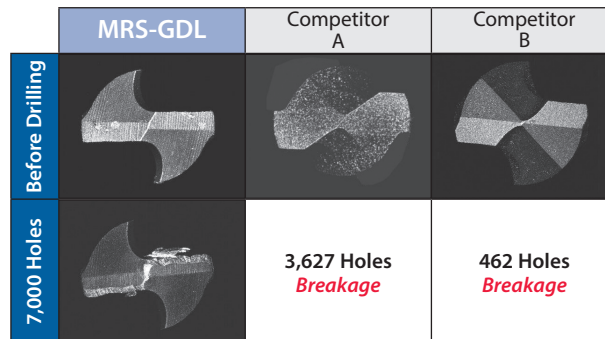
### EXOCARB® MAX-MINI MRS-GDL Machining Austenitic Stainless Steel (SUS304)

The MRS-GDL showed no structural cutting edge and minimum wear width after machining over 7,000 holes.

Tool	MRS-GDL	Competitor A, B
Size	Ø0.5 mm	
Work Material	304 Stainless Steel	
Cutting Speed	9,550 RPM (49 SFM)	
Feed Rate	1.9 IPM (0.0002 IPR)	
Step Feed	0.05 mm (0.1D)	
Depth of Hole	1.5 mm (3D Blind)	
Coolant	Mist	
Machine	Vertical Machining Center	



Drill for Pilot Hole	
Tool	EXOCARB® MAX-MINI UMV-LDS
Size	Ø0.5 mm X 90°
Depth of Hole	0.25 mm
Run Out Tolerance	1 µm at Shank
Results	Tool Life 7,000+ Holes



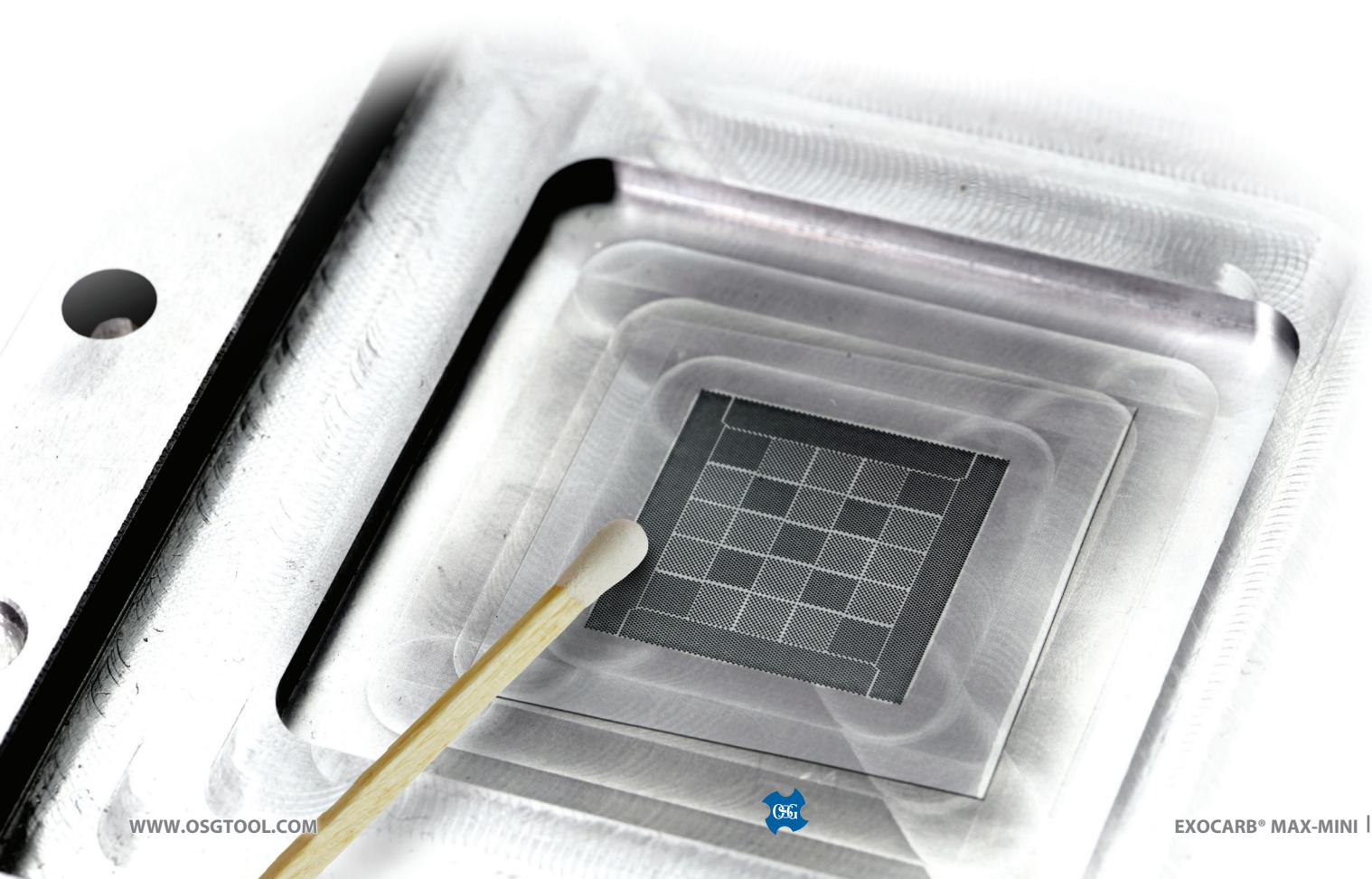
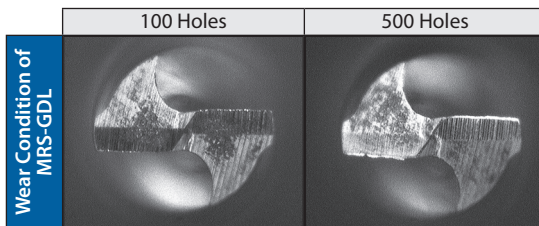
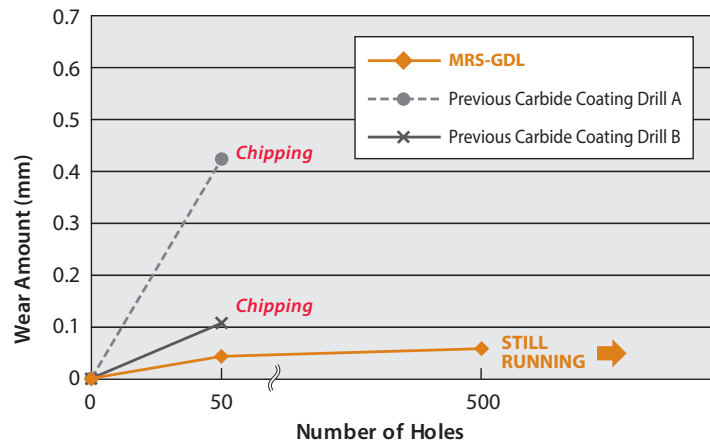


## Machining Data for MRS-GDL (Continued)

### MRS-GDL Stable Machining in Austenitic Stainless Steel (SUS304)

The MRS-GDL drills are able to achieve stable drilling even in SUS304.

Tool	MRS-GDL
Size	Ø0.5 mm
Work Material	304 Stainless Steel
Cutting Speed	13,068 RPM (65 SFM)
Feed Rate	5.2 IPM (0.0004 IPR)
Step Feed	0.5 mm (1D Step)
Depth of Hole	5 mm (Blind)



# EXOCARB® MAX-MINI

High Performance Micro Carbide Drills

## List 5310

FHL-GDTS, Miniature, 3 Flute, Up to 20D, 40-65 HRC

SPEED FEED P24	CARBIDE	EXO®	25°	SHANK h6
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Cutting Diameter Tolerance (h8)		
Size	mm	inch
1≤D≤3	+0/-0.014	+0/-0.0006



EDP Number	Diameter					Neck Length L1	Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch					
8569010	-	-	-	1.00	0.0394	20	5.0	57	3	140°
8569011	-	-	-	1.10	0.0433		5.5			
8569012	-	-	-	1.20	0.0472		6.5			
8569013	-	-	-	1.30	0.0512		7.5			
8569014	-	54	-	1.40	0.0551					
8569015	-	-	-	1.50	0.0591					
8569016	-	-	-	1.60	0.0630					
8569017	-	51	-	1.70	0.0669		9.5			
8569018	-	-	-	1.80	0.0709					
8569019	-	-	-	1.90	0.0748					
8569020	-	-	-	2.00	0.0787					
8569025	-	-	-	2.50	0.0984	30	10.5	65	120°	
8569030	-	-	-	3.00	0.1181		13.0			
							15.0			

Packed: 1 pc.  
Available EXO® coating only.  
Shrink fit holders recommended.  
Must utilize recommended peck cycle for optimum tool life.



Work Material																	
List No.	P				Die Steels	M			K Cast Iron	N		S		H			
	Carbon Steels			Alloy Steels 4140 4340		Stainless Steels				Aluminum		Nickel Alloy Inconel	Titanium 6Al4V (30 HRC)	Hardened Steels			
	Low 1010 1018	Med. 1035 1045	High 1065			300	400	17-4 PH		6061 7075	Casting			~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
5310													<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

good  best



## List 5320

UVM-DRL-5D, Miniature



SPEED FEED	CARBIDE	SS	30°	SHANK
P25				h3

Cutting Diameter Tolerance		
Size	mm	inch
0.02≤D≤0.08	+0/-0.003	+0/-0.0001

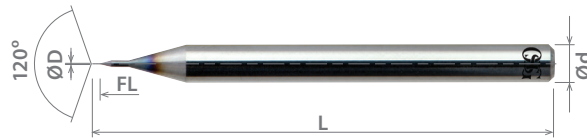
EDP Number	Diameter					Flute Length	Overall Length	Shank Diameter
	Fractional Size	Wire Gage	Letter Size	mm	Inch			
8589002	-	-	-	0.02	0.00079	0.12	38	3
8589052	-	-	-					1/8
8589003	-	-	-	0.03	0.00118	0.18		3
8589053	-	-	-					1/8
8589004	-	-	-	0.04	0.00157	0.24		3
8589054	-	-	-					1/8
8589005	-	-	-	0.05	0.00197	0.30		3
8589055	-	-	-					1/8
8589008	-	-	-	0.08	0.00315	0.48		3
8589058	-	-	-					1/8

Packed: 1 pc.  
Available Super Smooth coating only.



## List 5325

UVM-DRL-10D, Miniature



SPEED FEED	CARBIDE	SS	30°	SHANK
P25				h3

Cutting Diameter Tolerance		
Size	mm	inch
0.02≤D≤0.08	+0/-0.003	+0/-0.0001

EDP Number	Diameter					Flute Length	Overall Length	Shank Diameter
	Fractional Size	Wire Gage	Letter Size	mm	Inch			
8589102	-	-	-	0.02	0.00079	0.22	38	3
8589152	-	-	-					1/8
8589103	-	-	-	0.03	0.00118	0.33		3
8589153	-	-	-					1/8
8589104	-	-	-	0.04	0.00157	0.44		3
8589154	-	-	-					1/8
8589105	-	-	-	0.05	0.00197	0.55		3
8589155	-	-	-					1/8
8589108	-	-	-	0.08	0.00315	0.88		3
8589158	-	-	-					1/8

Packed: 1 pc.  
Available Super Smooth coating only.



Work Material																		
List No.	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 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC	
5320						⊗	⊗	⊗		⊙	⊙	⊗	⊙	⊙	⊙	⊙	⊗	
5325						⊗	⊗	⊗		⊙	⊙	⊗	⊙	⊙	⊙	⊙	⊗	

⊙ good ⊗ best



# EXOCARB® MAX-MINI

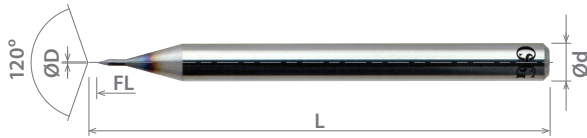
High Performance Micro Carbide Drills

## List 5315

UVM-LDS, Miniature, Pilot

SPEED FEED P25	CARBIDE	SS	30°	SHANK h3
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Cutting Diameter Tolerance		
Size	mm	inch
0.05	+0/-0.003	+0/-0.0001



EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d
	Fractional Size	Wire Gage	Letter Size	mm	Inch			
8589205	-	-	-	0.05	0.00197	0.075	38	3
8589255	-	-	-					1/8

Packed: 1 pc.  
Available Super Smooth coating only.



### Work Material

List No.	P				Die Steels	M			K Cast Iron	N		S		H			
	Carbon Steels			Alloy Steels 4140 4340		Stainless Steels				Aluminum		Nickel Alloy Inconel	Titanium 6Al4V (30 HRC)	Hardened Steels			
	Low 1010 1018	Med. 1035 1045	High 1065			300	400	17-4 PH		6061 7075	Casting			~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
5315						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" 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 type="checkbox"/>

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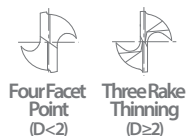


## List 5330

WX-MS-GDS, Precision Drill

<b>SPEED FEED</b> P26	<b>CARBIDE</b>	<b>TiAlN</b>	<b>30°</b>	<b>SHANK</b> h6
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Cutting Diameter Tolerance		
Size	mm	inch
0.02 ≤ D ≤ 5.00	+0 / -0.010	+0 / -0.0004



EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3300020	-	92	-	0.20	0.0079	1.5	38	3	140°
3300021	-	91	-	0.21	0.0083				
3300022	-	90	-	0.22	0.0087				
3300023	-	89	-	0.23	0.0091				
3300024	-	-	-	0.24	0.0094				
3300025	-	-	-	0.25	0.0098				
3300026	-	-	-	0.26	0.0102				
3300027	-	-	-	0.27	0.0106				
3300028	-	85	-	0.28	0.0110				
3300029	-	-	-	0.29	0.0114				
3300030	-	-	-	0.30	0.0118	2.0	38	3	140°
3300031	-	-	-	0.31	0.0122				
3300032	-	-	-	0.32	0.0126				
3300033	-	81	-	0.33	0.0130				
3300034	-	-	-	0.34	0.0134				
3300035	-	-	-	0.35	0.0138				
3300036	-	-	-	0.36	0.0142				
3300037	-	-	-	0.37	0.0146				
3300038	-	-	-	0.38	0.0150				
3300039	-	-	-	0.39	0.0154				
3300040	-	-	-	0.40	0.0157	2.5	38	3	140°
3300041	-	-	-	0.41	0.0161				
3300042	-	-	-	0.42	0.0165				
3300043	-	-	-	0.43	0.0169				
3300044	-	-	-	0.44	0.0173				
3300045	-	-	-	0.45	0.0177				
3300046	-	-	-	0.46	0.0181				
3300047	-	-	-	0.47	0.0185				
3300048	-	-	-	0.48	0.0189				
3300049	-	-	-	0.49	0.0193				
3300050	-	-	-	0.50	0.0197	3.0	38	3	140°
3300051	-	76	-	0.51	0.0201				
3300052	-	-	-	0.52	0.0205				
3300053	-	75	-	0.53	0.0209				
3300054	-	-	-	0.54	0.0213				
3300055	-	-	-	0.55	0.0217				
3300056	-	-	-	0.56	0.0220				
3300057	-	74	-	0.57	0.0224				
3300058	-	-	-	0.58	0.0228				
3300059	-	-	-	0.59	0.0232				
3300060	-	-	-	0.60	0.0236	3.5	38	3	140°
3300061	-	73	-	0.61	0.0240				
3300062	-	-	-	0.62	0.0244				
3300063	-	-	-	0.63	0.0248				
3300064	-	-	-	0.64	0.0252				
3300064	-	72	-	0.64	0.0252				

Packed: 1 pc.  
Available TiAlN 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 4340	300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC	
5330	⊙	⊙	⊙	○	○	○	○	○	⊙	⊙		○					

○ good ⊙ best



# EXOCARB® MAX-MINI

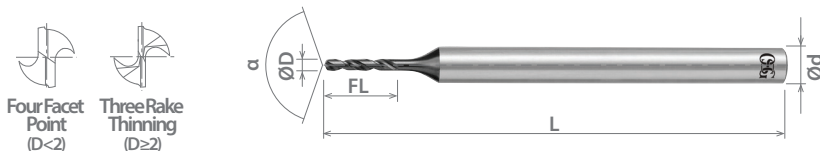
High Performance Micro Carbide Drills

## List 5330 (Continued)

WX-MS-GDS, Precision Drill

<b>SPEED FEED</b>	<b>CARBIDE</b>	<b>TiAlN</b>	<b>30°</b>	<b>SHANK</b>
P26				h6

Cutting Diameter Tolerance		
Size	mm	inch
0.02≤D≤5.00	+0 / -0.010	+0 / -0.0004



EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3300065	-	-	-	0.65	0.0256	4.0	38	3	140°
3300066	-	71	-	0.66	0.0260				
3300067	-	-	-	0.67	0.0264				
3300068	-	-	-	0.68	0.0268	4.5			
3300069	-	-	-	0.69	0.0272				
3300070	-	-	-	0.70	0.0276				
3300071	-	70	-	0.71	0.0280	5.0			
3300072	-	-	-	0.72	0.0283				
3300073	-	-	-	0.73	0.0287				
3300074	-	69	-	0.74	0.0291	5.5			
3300075	-	-	-	0.75	0.0295				
3300076	-	-	-	0.76	0.0299				
3300077	-	-	-	0.77	0.0303	6.0			
3300078	-	-	-	0.78	0.0307				
3300079	1/32	68	-	0.79	0.0311				
3300080	-	-	-	0.80	0.0315	7.0			
3300081	-	67	-	0.81	0.0319				
3300082	-	-	-	0.82	0.0323				
3300083	-	-	-	0.83	0.0327	42			
3300084	-	66	-	0.84	0.0331				
3300085	-	-	-	0.85	0.0335				
3300086	-	-	-	0.86	0.0339	6.0			
3300087	-	-	-	0.87	0.0343				
3300088	-	-	-	0.88	0.0346				
3300089	-	65	-	0.89	0.0350	7.0			
3300090	-	-	-	0.90	0.0354				
3300091	-	64	-	0.91	0.0358				
3300092	-	-	-	0.92	0.0362	42			
3300093	-	-	-	0.93	0.0366				
3300094	-	63	-	0.94	0.0370				
3300095	-	-	-	0.95	0.0374	6.0			
3300096	-	-	-	0.96	0.0378				
3300097	-	62	-	0.97	0.0382				
3300098	-	-	-	0.98	0.0386	7.0			
3300099	-	61	-	0.99	0.0390				
3300100	-	-	-	1.00	0.0394				
3300101	-	-	-	1.01	0.0398	42			
3300102	-	60	-	1.02	0.0402				
3300103	-	-	-	1.03	0.0406				
3300104	-	59	-	1.04	0.0409	6.0			
3300105	-	-	-	1.05	0.0413				
3300106	-	-	-	1.06	0.0417				
3300107	-	58	-	1.07	0.0421	7.0			
3300108	-	-	-	1.08	0.0425				
3300109	-	57	-	1.09	0.0429				
3300110	-	-	-	1.10	0.0433	42			
3300111	-	-	-	1.11	0.0437				
3300112	-	-	-	1.12	0.0441				
3300113	-	-	-	1.13	0.0445	6.0			
3300114	-	-	-	1.14	0.0449				
3300115	-	-	-	1.15	0.0453				
3300116	-	-	-	1.16	0.0457	7.0			
3300117	-	-	-	1.17	0.0461				
3300118	-	56	-	1.18	0.0465				

Packed: 1 pc.  
Available TiAlN coating only.



## List 5330 (Continued)

WX-MS-GDS, Precision Drill

SPEED FEED P26	CARBIDE	TiAIN	30°	SHANK h6
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EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3300119	3/64	-	-	1.19	0.0469	8.0	42	3	140°
3300120	-	-	-	1.20	0.0472				
3300121	-	-	-	1.21	0.0476				
3300122	-	-	-	1.22	0.0480				
3300123	-	-	-	1.23	0.0484				
3300124	-	-	-	1.24	0.0488				
3300125	-	-	-	1.25	0.0492				
3300126	-	-	-	1.26	0.0496				
3300127	-	-	-	1.27	0.0500				
3300128	-	-	-	1.28	0.0504				
3300129	-	-	-	1.29	0.0508				
3300130	-	-	-	1.30	0.0512				
3300131	-	-	-	1.31	0.0516				
3300132	-	55	-	1.32	0.0520				
3300133	-	-	-	1.33	0.0524				
3300134	-	-	-	1.34	0.0528				
3300135	-	-	-	1.35	0.0531				
3300136	-	-	-	1.36	0.0535				
3300137	-	-	-	1.37	0.0539				
3300138	-	-	-	1.38	0.0543				
3300139	-	-	-	1.39	0.0547				
3300140	-	54	-	1.40	0.0551				
3300141	-	-	-	1.41	0.0555				
3300142	-	-	-	1.42	0.0559				
3300143	-	-	-	1.43	0.0563				
3300144	-	-	-	1.44	0.0567				
3300145	-	-	-	1.45	0.0571				
3300146	-	-	-	1.46	0.0575				
3300147	-	-	-	1.47	0.0579				
3300148	-	-	-	1.48	0.0583				
3300149	-	-	-	1.49	0.0587				
3300150	-	-	-	1.50	0.0591				
3300151	-	53	-	1.51	0.0594				
3300152	-	-	-	1.52	0.0598				
3300153	-	-	-	1.53	0.0602				
3300154	-	-	-	1.54	0.0606				
3300155	-	-	-	1.55	0.0610				
3300156	-	-	-	1.56	0.0614				
3300157	-	-	-	1.57	0.0618				
3300158	-	-	-	1.58	0.0622				
3300159	1/16	-	-	1.59	0.0626				
3300160	-	-	-	1.60	0.0630				
3300161	-	52	-	1.61	0.0634				
3300162	-	-	-	1.62	0.0638				
3300163	-	-	-	1.63	0.0642				
3300164	-	-	-	1.64	0.0646				
3300165	-	-	-	1.65	0.0650				

Packed: 1 pc.  
Available TiAIN 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 1010 1018	Med. 1035 1045	High 1065	4140 4340		300	400	17-4 PH			6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC
5330	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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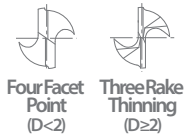
High Performance Micro Carbide Drills

## List 5330 (Continued)

WX-MS-GDS, Precision Drill

<b>SPEED FEED</b>	<b>CARBIDE</b>	<b>TiAlN</b>	<b>30°</b>	<b>SHANK</b>
P26				h6

Cutting Diameter Tolerance		
Size	mm	inch
0.02 ≤ D ≤ 5.00	+0 / -0.010	+0 / -0.0004



EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3300166	-	-	-	1.66	0.0654	10	42	3	140°
3300167	-	-	-	1.67	0.0657				
3300168	-	-	-	1.68	0.0661				
3300169	-	-	-	1.69	0.0665				
3300170	-	51	-	1.70	0.0669				
3300171	-	-	-	1.71	0.0673				
3300172	-	-	-	1.72	0.0677				
3300173	-	-	-	1.73	0.0681				
3300174	-	-	-	1.74	0.0685				
3300175	-	-	-	1.75	0.0689				
3300176	-	-	-	1.76	0.0693				
3300177	-	-	-	1.77	0.0697				
3300178	-	50	-	1.78	0.0701				
3300179	-	-	-	1.79	0.0705				
3300180	-	-	-	1.80	0.0709				
3300181	-	-	-	1.81	0.0713				
3300182	-	-	-	1.82	0.0717				
3300183	-	-	-	1.83	0.0720				
3300184	-	-	-	1.84	0.0724				
3300185	-	49	-	1.85	0.0728				
3300186	-	-	-	1.86	0.0732				
3300187	-	-	-	1.87	0.0736				
3300188	-	-	-	1.88	0.0740				
3300189	-	-	-	1.89	0.0744				
3300190	-	-	-	1.90	0.0748				
3300191	-	-	-	1.91	0.0752				
3300192	-	-	-	1.92	0.0756				
3300193	-	48	-	1.93	0.0760				
3300194	-	-	-	1.94	0.0764				
3300195	-	-	-	1.95	0.0768				
3300196	-	-	-	1.96	0.0772				
3300197	-	-	-	1.97	0.0776				
3300198	5/64	-	-	1.98	0.0780				
3300199	-	47	-	1.99	0.0783				
3300200	-	-	-	2.00	0.0787				
48172201	-	-	-	2.01	0.0791				
48172202	-	-	-	2.02	0.0795				
48172203	-	-	-	2.03	0.0799				
48172204	-	-	-	2.04	0.0803				
3300205	-	-	-	2.05	0.0807				
48172206	-	46	-	2.06	0.0811				
48172207	-	-	-	2.07	0.0815				
48172208	-	45	-	2.08	0.0819				
48172209	-	-	-	2.09	0.0823				
3300210	-	-	-	2.10	0.0827				
48172211	-	-	-	2.11	0.0831				
48172212	-	-	-	2.12	0.0835				

Packed: 1 pc.  
Available TiAlN coating only.





## List 5330 (Continued)

WX-MS-GDS, Precision Drill

<b>SPEED FEED</b> P26	<b>CARBIDE</b>	<b>TiAlN</b>	<b>30°</b>	<b>SHANK</b> h6
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EDP Number	Diameter					Flute Length	Overall Length	Shank Diameter	Point Angle
	Fractional Size	Wire Gage	Letter Size	mm	Inch	FL	L	d	α
48172213	-	-	-	2.13	0.0839	13	50	3	140°
48172214	-	-	-	2.14	0.0843				
3300215	-	-	-	2.15	0.0846				
48172216	-	-	-	2.16	0.0850				
48172217	-	-	-	2.17	0.0854				
48172218	-	44	-	2.18	0.0858				
48172219	-	-	-	2.19	0.0862				
3300220	-	-	-	2.20	0.0866				
48172221	-	-	-	2.21	0.0870				
48172222	-	-	-	2.22	0.0874				
48172223	-	-	-	2.23	0.0878				
48172224	-	-	-	2.24	0.0882				
3300225	-	-	-	2.25	0.0886				
48172226	-	43	-	2.26	0.0890				
48172227	-	-	-	2.27	0.0894				
48172228	-	-	-	2.28	0.0898				
48172229	-	-	-	2.29	0.0902				
3300230	-	-	-	2.30	0.0906				
48172231	-	-	-	2.31	0.0909				
48172232	-	-	-	2.32	0.0913				
48172233	-	-	-	2.33	0.0917				
48172234	-	-	-	2.34	0.0921				
3300235	-	-	-	2.35	0.0925				
48172236	-	-	-	2.36	0.0929				
48172237	-	42	-	2.37	0.0933				
48172238	3/32	-	-	2.38	0.0937				
48172239	-	-	-	2.39	0.0941				
3300240	-	-	-	2.40	0.0945				
48172241	-	-	-	2.41	0.0949				
48172242	-	-	-	2.42	0.0953				
48172243	-	-	-	2.43	0.0957				
48172244	-	41	-	2.44	0.0961				
3300245	-	-	-	2.45	0.0965				
48172246	-	-	-	2.46	0.0969				
48172247	-	-	-	2.47	0.0972				
48172248	-	-	-	2.48	0.0976				
48172249	-	40	-	2.49	0.0980				
3300250	-	-	-	2.50	0.0984				
48172251	-	-	-	2.51	0.0988				
48172252	-	-	-	2.52	0.0992				
48172253	-	39	-	2.53	0.0996				
48172254	-	-	-	2.54	0.1000				
3300255	-	-	-	2.55	0.1004				
48172256	-	-	-	2.56	0.1008				
48172257	-	-	-	2.57	0.1012				
48172258	-	38	-	2.58	0.1016				
48172259	-	-	-	2.59	0.1020				
3300260	-	-	-	2.60	0.1024				
48172261	-	-	-	2.61	0.1028				
48172262	-	-	-	2.62	0.1031				
						14	50	3	130°

Packed: 1 pc.  
Available TiAlN coating only.

continued on next page **HTE**

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 4340		300	400	17-4 PH			6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC
5330	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

good  best



# EXOCARB® MAX-MINI

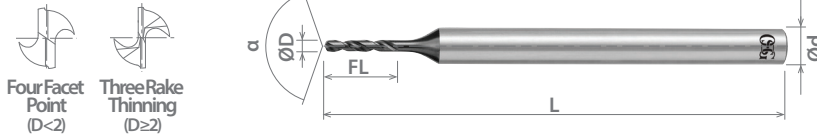
High Performance Micro Carbide Drills

## List 5330 (Continued)

WX-MS-GDS, Precision Drill

<b>SPEED FEED</b> P26	<b>CARBIDE</b>	<b>TiAlN</b>	<b>30°</b>	<b>SHANK</b> h6
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Cutting Diameter Tolerance		
Size	mm	inch
0.02 ≤ D ≤ 5.00	+0 / -0.010	+0 / -0.0004



EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
48172263	-	-	-	2.63	0.1035	14	50	3	130°
48172264	-	37	-	2.64	0.1039				
3300265	-	-	-	2.65	0.1043				
48172266	-	-	-	2.66	0.1047				
48172267	-	-	-	2.67	0.1051				
48172268	-	-	-	2.68	0.1055				
48172269	-	-	-	2.69	0.1059				
3300270	-	-	-	2.70	0.1063				
48172271	-	36	-	2.71	0.1067				
48172272	-	-	-	2.72	0.1071				
48172273	-	-	-	2.73	0.1075				
48172274	-	-	-	2.74	0.1079				
3300275	-	-	-	2.75	0.1083				
48172276	-	-	-	2.76	0.1087				
48172277	-	-	-	2.77	0.1091				
48172278	7/64	-	-	2.78	0.1094				
48172279	-	35	-	2.79	0.1098				
3300280	-	-	-	2.80	0.1102				
48172281	-	-	-	2.81	0.1106				
48172282	-	34	-	2.82	0.1110				
48172283	-	-	-	2.83	0.1114				
48172284	-	-	-	2.84	0.1118				
3300285	-	-	-	2.85	0.1122				
48172286	-	-	-	2.86	0.1126				
48172287	-	33	-	2.87	0.1130				
48172288	-	-	-	2.88	0.1134				
48172289	-	-	-	2.89	0.1138				
3300290	-	-	-	2.90	0.1142				
48172291	-	-	-	2.91	0.1146				
48172292	-	-	-	2.92	0.1150				
48172293	-	-	-	2.93	0.1154				
48172294	-	-	-	2.94	0.1157				
3300295	-	32	-	2.95	0.1161				
48172296	-	-	-	2.96	0.1165				
48172297	-	-	-	2.97	0.1169				
48172298	-	-	-	2.98	0.1173				
48172299	-	-	-	2.99	0.1177				
3300300	-	-	-	3.00	0.1181				
48172301	-	-	-	3.01	0.1185				
48172302	-	-	-	3.02	0.1189				
48172303	-	-	-	3.03	0.1193				
48172304	-	-	-	3.04	0.1197				
3300305	-	31	-	3.05	0.1201				
48172306	-	-	-	3.06	0.1205				
48172307	-	-	-	3.07	0.1209				
48172308	-	-	-	3.08	0.1213				
48172309	-	-	-	3.09	0.1217				
3300310	-	-	-	3.10	0.1220				
48172311	-	-	-	3.11	0.1224				
48172312	-	-	-	3.12	0.1228				
48172313	-	-	-	3.13	0.1232				
48172314	-	-	-	3.14	0.1236				
3300315	-	-	-	3.15	0.1240				
48172316	-	-	-	3.16	0.1244				
					18	56	4		

Packed: 1 pc.  
Available TiAlN coating only.



## List 5330 (Continued)

WX-MS-GDS, Precision Drill

<b>SPEED FEED</b> P26	<b>CARBIDE</b>	<b>TiAlN</b>	<b>30°</b>	<b>SHANK</b> h6
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EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
48172317	-	-	-	3.17	0.1248	18	56	4	130°
48172318	1/8	-	-	3.18	0.1252				
48172319	-	-	-	3.19	0.1256				
3300320	-	-	-	3.20	0.1260				
48172321	-	-	-	3.21	0.1264				
48172322	-	-	-	3.22	0.1268				
48172323	-	-	-	3.23	0.1272				
48172324	-	-	-	3.24	0.1276				
3300325	-	-	-	3.25	0.1280				
48172326	-	30	-	3.26	0.1283				
48172327	-	-	-	3.27	0.1287				
48172328	-	-	-	3.28	0.1291				
48172329	-	-	-	3.29	0.1295				
3300330	-	-	-	3.30	0.1299				
48172331	-	-	-	3.31	0.1303				
48172332	-	-	-	3.32	0.1307				
48172333	-	-	-	3.33	0.1311				
48172334	-	-	-	3.34	0.1315				
3300335	-	-	-	3.35	0.1319				
48172336	-	-	-	3.36	0.1323				
48172337	-	-	-	3.37	0.1327				
48172338	-	-	-	3.38	0.1331				
48172339	-	-	-	3.39	0.1335				
3300340	-	-	-	3.40	0.1339				
48172341	-	-	-	3.41	0.1343				
48172342	-	-	-	3.42	0.1346				
48172343	-	-	-	3.43	0.1350				
48172344	-	-	-	3.44	0.1354				
3300345	-	29	-	3.45	0.1358				
48172346	-	-	-	3.46	0.1362				
48172347	-	-	-	3.47	0.1366				
48172348	-	-	-	3.48	0.1370				
48172349	-	-	-	3.49	0.1374				
3300350	-	-	-	3.50	0.1378				
48172351	-	-	-	3.51	0.1382				
48172352	-	-	-	3.52	0.1386				
48172353	-	-	-	3.53	0.1390				
48172354	-	-	-	3.54	0.1394				
3300355	-	-	-	3.55	0.1398				
48172356	-	-	-	3.56	0.1402				
48172357	9/64	-	-	3.57	0.1406				
48172358	-	-	-	3.58	0.1409				
48172359	-	-	-	3.59	0.1413				
3300360	-	-	-	3.60	0.1417				
48172361	-	-	-	3.61	0.1421				
48172362	-	-	-	3.62	0.1425				
48172363	-	-	-	3.63	0.1429				
48172364	-	-	-	3.64	0.1433				
3300365	-	-	-	3.65	0.1437				
48172366	-	27	-	3.66	0.1441				
48172367	-	-	-	3.67	0.1445				

Packed: 1 pc.  
Available TiAlN 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 1010 1018	Med. 1035 1045	High 1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
5330	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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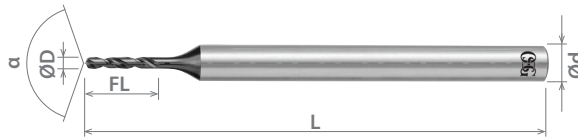
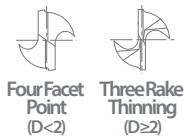


# EXOCARB® MAX-MINI

High Performance Micro Carbide Drills

## List 5330 (Continued)

WX-MS-GDS, Precision Drill



<b>SPEED FEED</b>	<b>CARBIDE</b>	<b>TiAlN</b>	<b>30°</b>	<b>SHANK</b>
P26				h6

Cutting Diameter Tolerance		
Size	mm	inch
0.02 ≤ D ≤ 5.00	+0 / -0.010	+0 / -0.0004

EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
48172368	-	-	-	3.68	0.1449	20	56	4	130°
48172369	-	-	-	3.69	0.1453				
3300370	-	-	-	3.70	0.1457				
48172371	-	-	-	3.71	0.1461				
48172372	-	-	-	3.72	0.1465				
48172373	-	26	-	3.73	0.1469				
48172374	-	-	-	3.74	0.1472				
3300375	-	-	-	3.75	0.1476				
48172376	-	-	-	3.76	0.1480				
48172377	-	-	-	3.77	0.1484				
48172378	-	-	-	3.78	0.1488				
48172379	-	-	-	3.79	0.1492				
3300380	-	25	-	3.80	0.1496				
48172381	-	-	-	3.81	0.1500				
48172382	-	-	-	3.82	0.1504				
48172383	-	-	-	3.83	0.1508				
48172384	-	-	-	3.84	0.1512				
3300385	-	-	-	3.85	0.1516				
48172386	-	24	-	3.86	0.1520				
48172387	-	-	-	3.87	0.1524				
48172388	-	-	-	3.88	0.1528				
48172389	-	-	-	3.89	0.1531				
3300390	-	-	-	3.90	0.1535				
48172391	-	23	-	3.91	0.1539				
48172392	-	-	-	3.92	0.1543				
48172393	-	-	-	3.93	0.1547				
48172394	-	-	-	3.94	0.1551				
3300395	-	-	-	3.95	0.1555				
48172396	-	-	-	3.96	0.1559				
48172397	5/32	-	-	3.97	0.1563				
48172398	-	-	-	3.98	0.1567				
48172399	-	22	-	3.99	0.1571				
3300400	-	-	-	4.00	0.1575				
3300405	-	-	-	4.05	0.1594				
3300410	-	-	-	4.10	0.1614				
3300415	-	-	-	4.15	0.1634				
3300420	-	-	-	4.20	0.1654				
3300425	-	-	-	4.25	0.1673				
3300430	-	-	-	4.30	0.1693				
3300435	-	-	-	4.35	0.1713				
3300440	-	-	-	4.40	0.1732				
3300445	-	-	-	4.45	0.1752				
3300450	-	16	-	4.50	0.1772				
3300455	-	-	-	4.55	0.1791				
3300460	-	-	-	4.60	0.1811				
3300465	-	-	-	4.65	0.1831				
3300470	-	13	-	4.70	0.1850				
3300475	-	-	-	4.75	0.1870				

Packed: 1 pc.  
Available TiAlN coating only.



## List 5330 (Continued)

WX-MS-GDS, Precision Drill

SPEED FEED P26	CARBIDE	TiAIN	30°	SHANK h6
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EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	Point Angle α
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
3300480	-	12	-	4.80	0.1890	26	64	5	130°
3300485	-	-	-	4.85	0.1909				
3300490	-	-	-	4.90	0.1929				
3300495	-	-	-	4.95	0.1949				
3300500	-	-	-	5.00	0.1969				

Packed: 1 pc.  
Available TiAIN coating only.



List No.	Work Material																
	P					M			K	N		S	H				
	Carbon Steels			Alloy Steels 4140 4340	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy Inconel	Titanium 6Al4V (30 HRC)	Hardened Steels			
	Low 1010 1018	Med. 1035 1045	High 1065			300	400	17-4 PH		6061 7075	Casting			~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
5330	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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# EXOCARB® MAX-MINI

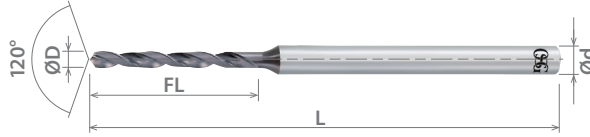
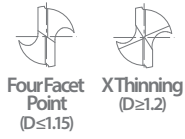
High Performance Micro Carbide Drills

## List 5340

MRS-GDL, Precision Drill

SPEED FEED P27	CARBIDE	SS	30°	SHANK h6
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Cutting Diameter Tolerance		
Size	mm	inch
0.50 ≤ D ≤ 3.00	+0 / -0.008	+0 / -0.0003



EDP Number	Diameter					Flute Length	Overall Length	Shank Diameter
	Fractional Size	Wire Gage	Letter Size	mm	Inch			
8577050	-	-	-	0.50	0.0197	6.0	42	3
8577054	-	-	-	0.54	0.0213	6.6		
8577055	-	-	-	0.55	0.0217	7.2		
8577056	-	-	-	0.56	0.0220			
8577060	-	-	-	0.60	0.0236	7.8		
8577063	-	-	-	0.63	0.0248			
8577064	-	72	-	0.64	0.0252	8.4		
8577065	-	-	-	0.65	0.0256			
8577070	-	-	-	0.70	0.0276	9.0		
8577071	-	70	-	0.71	0.0280			
8577072	-	-	-	0.72	0.0283	9.6		
8577073	-	-	-	0.73	0.0287			
8577074	-	69	-	0.74	0.0291	10.2		
8577075	-	-	-	0.75	0.0295			
8577080	-	-	-	0.80	0.0315	10.8		
8577081	-	67	-	0.81	0.0319			
8577082	-	-	-	0.82	0.0323	11.4		
8577090	-	-	-	0.90	0.0354			
8577091	-	64	-	0.91	0.0358	12.0		
8577092	-	-	-	0.92	0.0362			
8577100	-	-	-	1.00	0.0394	13.2		
8577110	-	-	-	1.10	0.0433			
8577111	-	-	-	1.11	0.0437	13.8		
8577112	-	-	-	1.12	0.0441			
8577115	-	-	-	1.15	0.0453	14.4		
8577120	-	-	-	1.20	0.0472			
8577127	-	-	-	1.27	0.0500	15.6		
8577128	-	-	-	1.28	0.0504			
8577129	-	-	-	1.29	0.0508	16.8		
8577130	-	-	-	1.30	0.0512			
8577140	-	54	-	1.40	0.0551	17.4		
8577145	-	-	-	1.45	0.0571			
8577146	-	-	-	1.46	0.0575	18.0		
8577147	-	-	-	1.47	0.0579			
8577150	-	-	-	1.50	0.0591	18.6		
8577151	-	53	-	1.51	0.0594			
8577152	-	-	-	1.52	0.0598	19.2		
8577153	-	-	-	1.53	0.0602			
8577155	-	-	-	1.55	0.0610	20.4		
8577156	-	-	-	1.56	0.0614			
8577157	-	-	-	1.57	0.0618	21.6		
8577160	-	-	-	1.60	0.0630			
8577170	-	51	-	1.70	0.0669	22.2		
8577180	-	-	-	1.80	0.0709			
8577181	-	-	-	1.81	0.0713	22.8		
8577182	-	-	-	1.82	0.0717			
8577183	-	-	-	1.83	0.0720	24.0		
8577190	-	-	-	1.90	0.0748			
8577198	5/64	-	-	1.98	0.0780	24.0		
8577199	-	47	-	1.99	0.0783			
8577200	-	-	-	2.00	0.0787			

Packed: 1 pc.  
Available Super Smooth coating only.



## List 5340 (Continued)

MRS-GDL, Precision Drill

SPEED FEED P27	CARBIDE	SS	30°	SHANK h6
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EDP Number	Diameter					Flute Length FL	Overall Length L	Shank Diameter d	
	Fractional Size	Wire Gage	Letter Size	mm	Inch				
8577210	-	-	-	2.10	0.0827	25.2	62	3	
8577212	-	-	-	2.12	0.0835	25.8			
8577213	-	-	-	2.13	0.0839				
8577214	-	-	-	2.14	0.0843				
8577220	-	-	-	2.20	0.0866				26.4
8577229	-	-	-	2.29	0.0902				27.6
8577230	-	-	-	2.30	0.0906				28.2
8577231	-	-	-	2.31	0.0909				
8577239	-	-	-	2.39	0.0941				28.8
8577240	-	-	-	2.40	0.0945				
8577241	-	-	-	2.41	0.0949	29.4			
8577242	-	-	-	2.42	0.0953				
8577250	-	-	-	2.50	0.0984	30.0			
8577255	-	-	-	2.55	0.1004				
8577256	-	-	-	2.56	0.1008	30.6			
8577257	-	-	-	2.57	0.1012				
8577260	-	-	-	2.60	0.1024	31.2			
8577270	-	-	-	2.70	0.1063				
8577277	-	-	-	2.77	0.1091	32.4			
8577278	7/64	-	-	2.78	0.1094				
8577279	-	35	-	2.79	0.1098	33.6			
8577280	-	-	-	2.80	0.1102				
8577290	-	-	-	2.90	0.1142	34.8			
8577300	-	-	-	3.00	0.1181				

Packed: 1 pc.  
Available Super Smooth 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 1010 1018	Med. 1035 1045	High 1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
5340	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>				

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## List 5310-EXOCARB® MAX-MINI FHL-GDTS

Work Material	Hardened Steel, Pre-Hardened Steels			Tool Steels H13, D2			Stainless Steels 440		
Drilling Speed	130-160 SFM			110-150 SFM			100-130 SFM		
Drill Dia. mm	Speed RPM	Feed IPR	Pecking (In)	Speed RPM	Feed IPR	Pecking (In)	Speed RPM	Feed IPR	Pecking (In)
1	14,000	0.0008-0.0020	0.0008-0.0020	13,000	0.0008-0.0020	0.0008-0.0020	11,000	0.0008-0.0020	0.0008-0.0020
1.1	13,000	0.0008-0.0020	0.0008-0.0020	12,000	0.0008-0.0020	0.0008-0.0020	10,000	0.0008-0.0020	0.0008-0.0020
1.2	12,000	0.0008-0.0020	0.0008-0.0020	11,000	0.0008-0.0020	0.0008-0.0020	9,000	0.0008-0.0020	0.0008-0.0020
1.3	11,000	0.0008-0.0020	0.0008-0.0020	10,000	0.0008-0.0020	0.0008-0.0020	8,600	0.0008-0.0020	0.0008-0.0020
1.4	10,000	0.0008-0.0020	0.0008-0.0020	9,000	0.0008-0.0020	0.0008-0.0020	8,000	0.0008-0.0020	0.0008-0.0020
1.5	9,500	0.0008-0.0020	0.0008-0.0020	8,500	0.0008-0.0020	0.0008-0.0020	7,400	0.0008-0.0020	0.0008-0.0020
1.6	9,000	0.0008-0.0020	0.0008-0.0020	8,000	0.0008-0.0020	0.0008-0.0020	7,000	0.0008-0.0020	0.0008-0.0020
1.7	8,400	0.0008-0.0020	0.0008-0.0020	7,500	0.0008-0.0020	0.0008-0.0020	6,600	0.0008-0.0020	0.0008-0.0020
1.8	8,000	0.0008-0.0020	0.0008-0.0020	7,100	0.0008-0.0020	0.0008-0.0020	6,200	0.0008-0.0020	0.0008-0.0020
1.9	7,500	0.0008-0.0020	0.0008-0.0020	6,700	0.0008-0.0020	0.0008-0.0020	5,900	0.0008-0.0020	0.0008-0.0020
2	7,200	0.0008-0.0020	0.0008-0.0020	6,400	0.0008-0.0020	0.0008-0.0020	5,600	0.0008-0.0020	0.0008-0.0020
2.5	5,700	0.0008-0.0020	0.0008-0.0020	5,100	0.0008-0.0020	0.0008-0.0020	4,500	0.0008-0.0020	0.0008-0.0020
3	4,800	0.0008-0.0020	0.0008-0.0020	4,200	0.0008-0.0020	0.0008-0.0020	3,700	0.0008-0.0020	0.0008-0.0020

1. Please use in a machine with precise spindle rotation. Tight clamping is critical.
2. The indicated speeds and feeds are for drilling with water-soluble fluid.
3. Please use water-soluble high density fluid (less than 20 times dilution).
4. We recommend the pilot hole operation prior to EXOCARB® MAX-MINI (List 5310).
5. The run out with a drill in the spindle should be less than 0.0001".
6. OSG's Shrink Fit System is the recommended tool holder for these drills.

For machines that cannot achieve the speeds indicated in the above table, please set rotation as high as possible. Tool life may be decreased.



**List 5315-EXOCARB® MAX-MINI UVM-LDS**  
**List 5320-EXOCARB® MAX-MINI UVM-DRL: 5D**  
**List 5325-EXOCARB® MAX-MINI UVM-DRL: 10D**

Work Material	Stainless Steels 300SS, 400SS, 17-4PH			Special Alloy Steels, Hardened Steels			Aluminum Alloys, Cast Aluminum		
Drilling Speed	2-20 SFM			2-20 SFM			2-30 SFM		
Drill Dia. mm	Speed RPM	Feed IPR	Pecking (In)	Speed RPM	Feed IPR	Pecking (In)	Speed RPM	Feed IPR	Pecking (In)
0.02	10,000-20,000	0.00004-0.00006	0.00008	10,000-20,000	0.00004-0.00006	0.00008	10,000-30,000	0.0002-0.0004	0.00008
0.03	10,000-20,000	0.00004-0.00006	0.00012	10,000-20,000	0.00004-0.00006	0.00012	10,000-30,000	0.0002-0.0004	0.00012
0.04	10,000-20,000	0.00004-0.00006	0.00016	10,000-20,000	0.00004-0.00006	0.00016	10,000-30,000	0.0002-0.0004	0.00016
0.05	10,000-20,000	0.00004-0.00006	0.00020	10,000-20,000	0.00004-0.00006	0.00020	10,000-30,000	0.0002-0.0004	0.00020
0.06	10,000-20,000	0.00004-0.00006	0.00024	10,000-20,000	0.00004-0.00006	0.00024	10,000-30,000	0.0002-0.0004	0.00024
0.07	10,000-20,000	0.00004-0.00006	0.00027	10,000-20,000	0.00004-0.00006	0.00027	10,000-30,000	0.0002-0.0004	0.00027
0.08	10,000-20,000	0.00004-0.00006	0.00031	10,000-20,000	0.00004-0.00006	0.00031	10,000-30,000	0.0002-0.0004	0.00031
0.09	10,000-20,000	0.00004-0.00006	0.00035	10,000-20,000	0.00004-0.00006	0.00035	10,000-30,000	0.0002-0.0004	0.00035
0.10	10,000-20,000	0.00004-0.00006	0.00040	10,000-20,000	0.00004-0.00006	0.00040	10,000-30,000	0.0002-0.0004	0.00040

Work Material	High Heat Material					
	Ti-Alloy			Inconel, Waspaloy		
Drilling Speed	2-7 SFM			2-5 SFM		
Drill Dia. mm	Speed RPM	Feed IPR	Pecking (In)	Speed RPM	Feed IPR	Pecking (In)
0.02	19,400	0.000012-0.000028	0.00008	19,405	0.000012-0.000028	0.00008
0.03	16,200	0.000012-0.000028	0.00012	16,200	0.000012-0.000028	0.00012
0.04	14,500	0.000012-0.000028	0.00016	12,100	0.000012-0.000028	0.00016
0.05	13,600	0.000012-0.000028	0.00020	9,700	0.000012-0.000028	0.00020
0.06	11,300	0.000012-0.000028	0.00024	8,085	0.000012-0.000028	0.00024
0.07	9,700	0.000012-0.000028	0.00027	6,930	0.000012-0.000028	0.00027
0.08	8,500	0.000012-0.000028	0.00031	6,050	0.000012-0.000028	0.00031
0.09	7,550	0.000012-0.000028	0.00035	5,390	0.000012-0.000028	0.00035
0.10	7,400	0.000012-0.000028	0.00040	4,300	0.000012-0.000028	0.00040

1. Please use in a machine with precise spindle rotation. Tight clamping is critical.
2. The indicated feeds and speeds are for drilling with water-soluble fluid.
3. Please use water-soluble high density fluid (less than 20 times dilution).
4. Please utilize pecking cycle as specified in table.
5. The run out with a drill in the spindle should be less than 0.0001".
6. OSG's Shrink Fit System is the recommended tool holder for these drills.

For machines that cannot achieve the speeds indicated in the above table, please set rotation as high as possible. Tool life may be decreased.



## List 5330-EXOCARB® MAX-MINI WX-MS

### General Drilling Operations

Work Material	Carbon Steels 1010, 1050		Alloy Steels 4140, 4130		Martensitic, Ferritic Stainless Steels 420, 430, 430F, 440		Copper, Copper Alloys C1020, S2600	
Drilling Speed	65-260 SFM		65-180 SFM		65-120 SFM		100-200 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
0.2	25,000	0.00008	25,000	0.00008	25,000	0.00008	25,000	0.00008
0.3	20,000	0.00012	20,000	0.00012	20,000	0.00012	20,000	0.0001
0.5	15,000	0.0003	14,000	0.0003	13,000	0.0003	15,000	0.0003
1	12,000	0.0008	11,000	0.0008	6,400	0.0004	12,000	0.0004
1.5	10,000	0.0008-0.0016	8,400	0.0008-0.0016	4,800	0.0005 - 0.0012	10,000	0.0005-0.0012
2	8,000	0.0012-0.0019	6,500	0.0012-0.0019	4,000	0.0006 - 0.0016	8,000	0.0006-0.0016
3	5,500	0.0016-0.0028	4,500	0.0016-0.0028	3,000	0.0009 - 0.0024	6,500	0.0009-0.0024
4	4,000	0.0024-0.0040	3,200	0.0024-0.0040	2,500	0.0012 - 0.0031	5,000	0.0012-0.0031
5	3,200	0.0027-0.0047	2,600	0.0027-0.0047	2,000	0.0016 - 0.004	4,000	0.0016-0.0040

### General Drilling Operations

Work Material	Aluminum Alloy 6061, 7075		Cast Aluminum	
Drilling Speed	65-150 SFM		65-120 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR
0.2	25,000	0.00008	25,000	0.00008
0.3	20,000	0.00012	20,000	0.00012
0.5	13,000	0.00030	13,000	0.00030
1	6,400	0.00040	10,000	0.00080
1.5	4,800	0.0005-0.0012	6,800	0.0012-0.0019
2	4,000	0.0006-0.0016	5,000	0.0016-0.0024
3	3,000	0.0009-0.0024	3,400	0.0024-0.0035
4	2,500	0.0012-0.0031	2,500	0.0031-0.0047
5	2,000	0.0016-0.0040	2,000	0.0040-0.0059

1. Please use in a machine with precise spindle rotation. Tight clamping is critical.
2. The indicated feeds and speeds are for drilling with water-soluble fluid.
3. Please use water-soluble high density fluid (less than 20 times dilution).
4. These tables are applicable for less than 3xD deep drilling operations.  
When drilling deeper than 3xD, please peck every 0.25-0.5xD accordingly.
5. The run out with a drill in the spindle should be less than 0.0001".
6. OSG's Shrink Fit System is the recommended tool holder for these drills.

For machines that cannot achieve the speeds indicated in the above table, please set rotation as high as possible. Tool life may be decreased.

## List 5340-EXOCARB® MAX-MINI MRS

### General Drilling Operations

Work Material	Carbon Steels 1015, 1050		Alloy Steels 4140, 4130		Austenitic Stainless Steels 304, 316		Martensitic, Ferritic Stainless Steels 420, 430, 430F, 440		Precipitation Hardened Stainless Steels 17-4, 15-5	
Drilling Speed	65-260 SFM		65-180 SFM		50-130 SFM		65-165 SFM		50-130 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
0.5	15,000	0.0003	14,000	0.0003	17,465	0.0002-0.0006	22,300	0.0002-0.0006	17,465	0.0002-0.0006
1	12,000	0.0008	11,000	0.0008	8,730	0.0004-0.0012	11,150	0.0004-0.0012	8,730	0.0004-0.0012
1.5	10,000	0.0008-0.0016	8,400	0.0008-0.0016	5,820	0.0006-0.0018	7,440	0.0006-0.0018	5,820	0.0006-0.0018
2	8,000	0.0012-0.0019	6,500	0.0012-0.0019	4,365	0.0008-0.0024	5,580	0.0008-0.0024	4,365	0.0008-0.0024
2.5	6,400	0.0014-0.0025	5,400	0.0014-0.0025	3,500	0.0009-0.0030	4,460	0.0009-0.0030	3,500	0.0009-0.0030
3	5,500	0.0016-0.0028	4,500	0.0016-0.0028	2,900	0.0012-0.0035	3,720	0.0012-0.0035	2,900	0.0012-0.0035

### General Drilling Operations

Work Material	Aluminum Alloy 6061, 7075		Cast Aluminum		Copper, Copper Alloys C1020, S2600		Special Alloy Steels, Hardened Steels	
Drilling Speed	100-260 SFM		100-200 SFM		65-150 SFM		65-120 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
0.5	15,000	0.0006	15,000	0.0003	13,000	0.0003	13,000	0.0003
1	12,000	0.0012	12,000	0.0004	6,400	0.0004	10,000	0.0008
1.5	10,000	0.0012-0.0031	10,000	0.0005-0.0012	4,800	0.0005-0.0012	6,800	0.0012-0.0019
2	8,000	0.0016-0.0040	8,000	0.0006-0.0016	4,000	0.0006-0.0016	5,000	0.0016-0.0024
2.5	7,000	0.0020-0.0049	7,000	0.0007-0.0020	3,600	0.0007-0.0020	4,100	0.0020-0.0030
3	6,500	0.0024-0.0059	6,500	0.0009-0.0024	3,000	0.0009-0.0024	3,400	0.0024-0.0035

1. Please use in a machine with precise spindle rotation. Tight clamping is critical.
2. The indicated feeds and speeds are for drilling with water-soluble fluid.
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*shaping your dreams*

 **Safe use of cutting tools**

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges with bare hands.
- Do not touch cutting chips with bare hands. Chips will be hot after cutting.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any abnormal cutting sounds.
- Do not modify tools.
- Please use appropriate tools for the operation. Check dimensions to ensure proper selection.

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