

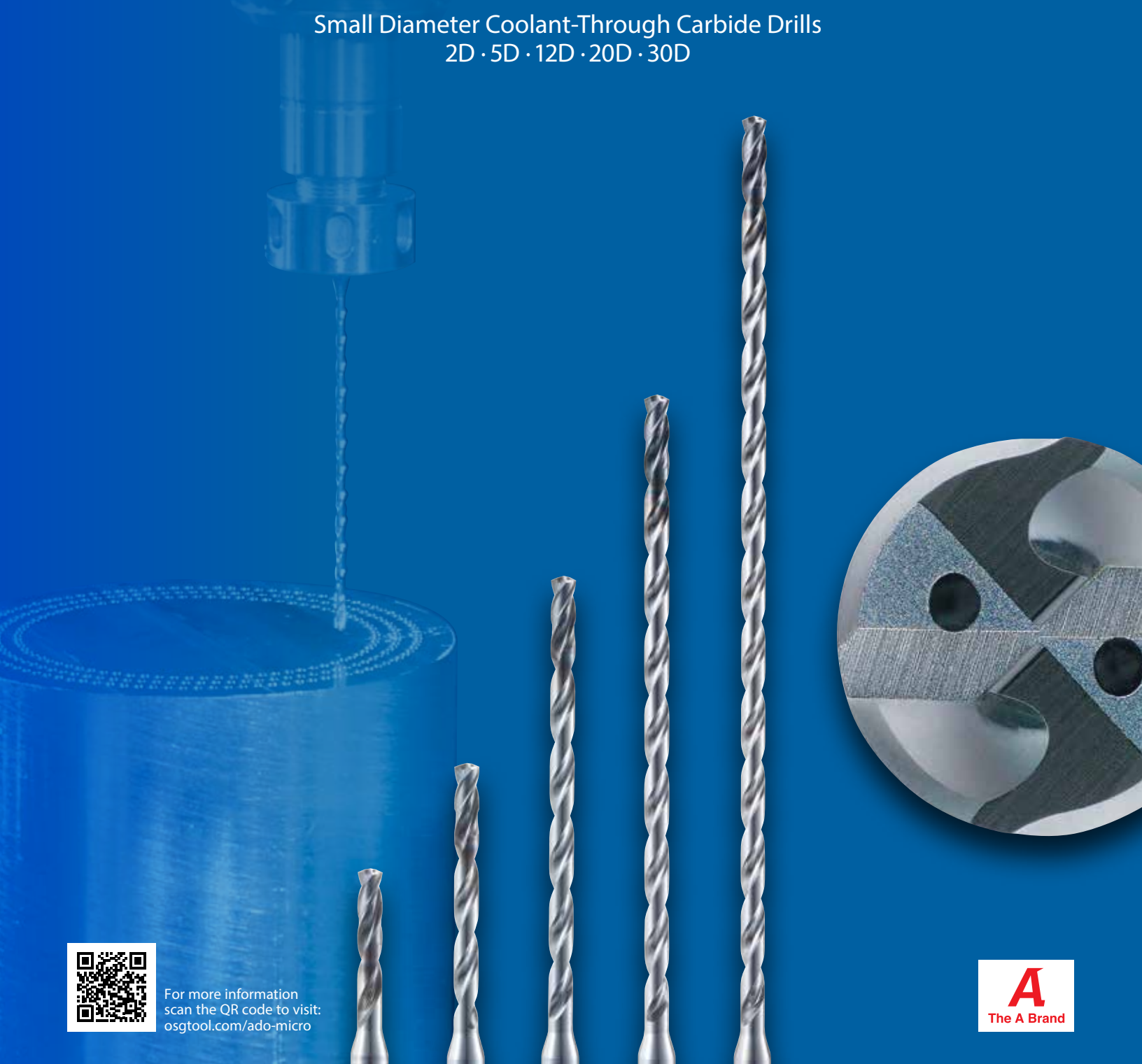


Advanced Performance Carbide Micro Drills

Vol 1

ADO-MICRO

Small Diameter Coolant-Through Carbide Drills
2D · 5D · 12D · 20D · 30D

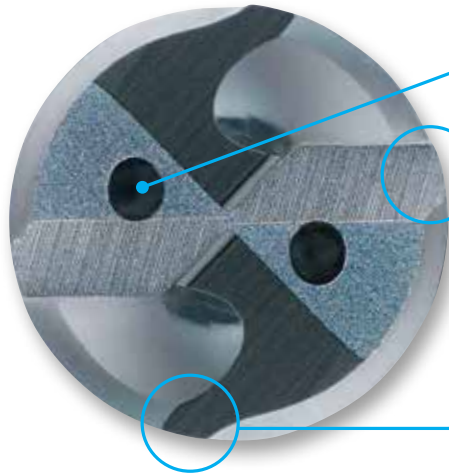


For more information
scan the QR code to visit:
osgtool.com/ado-micro



A Brand® ADO-MICRO

Advanced Performance Carbide Micro Drills



Coolant Hole

Improved coolant flow enables superior chip evacuation

Double Margin

For increased hole accuracy

IchAda Coating

Provides extremely low coefficient of friction for smooth chip evacuation.

Outstanding Chip Evacuation

Flute Structure

The flute design provides stable performance even in difficult small diameter deep-hole applications.



Enlarged Flute

Chips are discharged from the tip of the flute to the enlarged flute with enhanced evacuation capability



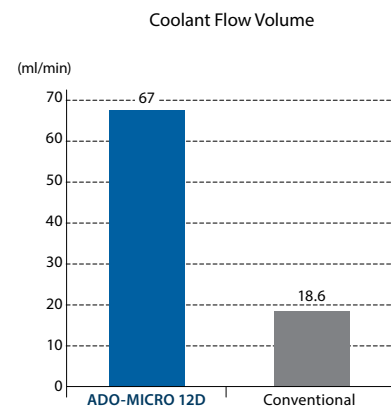
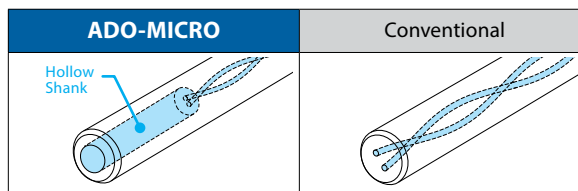
Removed End of Margin

Capability to smoothly discharge "micro sludges" that easily accumulate around the outer periphery of the tool, which is a key cause of tool breakage.

Coolant Holes

The hollow shank design allows greater coolant flow volume which enables smooth chip evacuation.

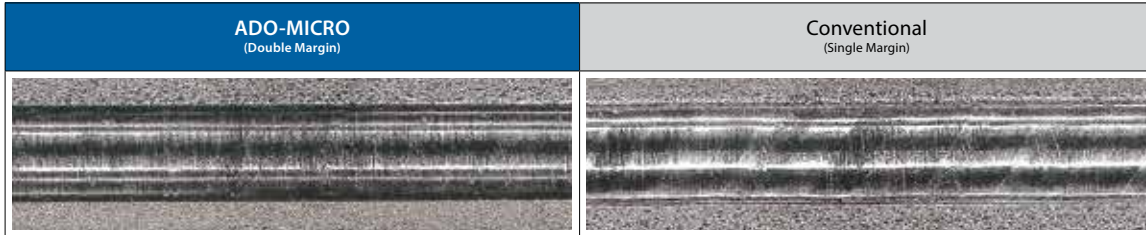
Tool	ADO-MICRO 12D	Conventional
Tool Size	Ø1.5	
Shank Style	Hollow	Solid
Coolant	Water-Soluble (Internal)	
Coolant Pressure	1.5 Mpa	
Time of Supply	60 Seconds	



Stable Performance

Double Margin

The double margin enhances the drill's stability while drilling, improving performance, hole accuracy, and surface finish.



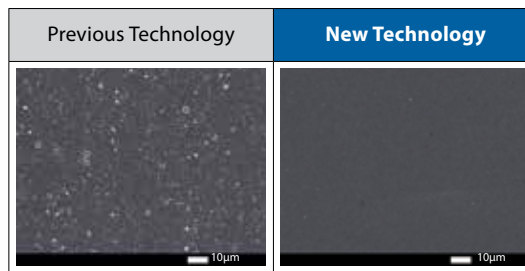
Tool: ADO-MICRO 20D Ø2 | Work Material: 304 Stainless | Depth of Hole: 40mm

Coating

IchAda Coating

The excellent smoothness in conjunction with high wear and heat resistance extends the life of small diameter tools.

Surface of Coating



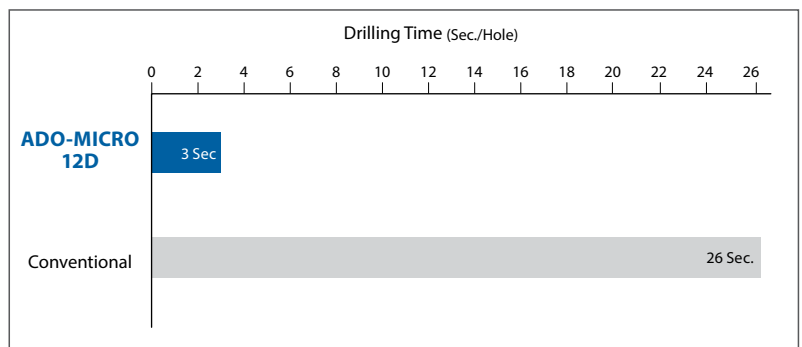
IchAda is a registered trademark of OSG Corporation.

High Efficiency

304 Stainless Steel

Non-step drilling is possible even for deep holes, enabling processing up to 9x faster than conventional step drilling.

Tool	ADO-MICRO 12D	Conventional
Tool Size	Ø1.5	
Work Material	304 Stainless Steel	
Machining	Non-Step Drilling	Step Drilling (0.5mm Step)
Cutting Speed	164 SFM (10,610 RPM)	92 SFM (5,940 RPM)
Feed	12.5 IPM (0.0011 IPR)	3.5 IPM (0.0006 IPR)
Depth of Hole	12mm (Blind with Pilot Hole)	
Coolant	Water Soluble (Internal)	Water Soluble (External)
Machine	Vertical Machining Center	

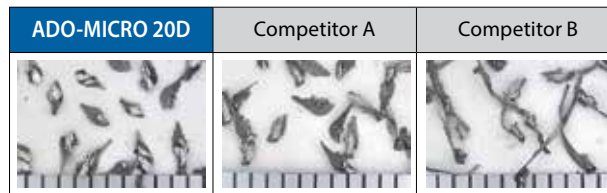
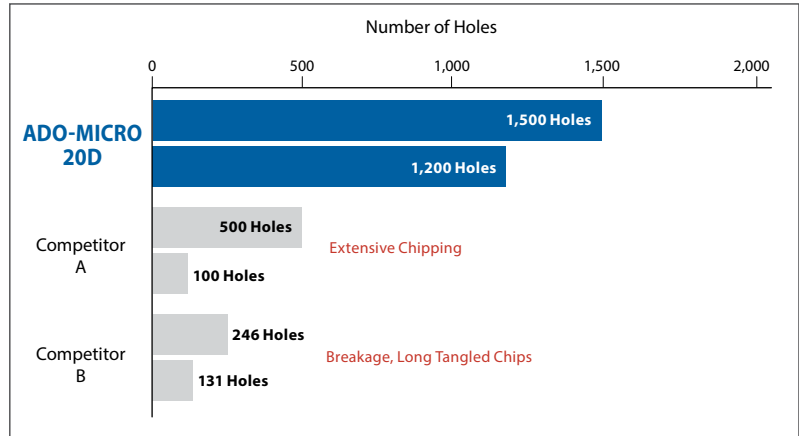


Unique Flute Geometry

4140 Alloy Steel

The ADO-MICRO's unique flute geometry provides stable drilling and results in longer tool life.

Tool	ADO-MICRO 20D	Competitor A	Competitor B
Tool Size	Ø2		
Work Material	4140 Alloy Steel		
Cutting Speed	164 SFM (7,960 RPM)		
Feed Rate	30 IPM (0.003 IPR)		
Depth of Hole	38 mm (Blind with Pilot Hole)		
Coolant	Water-Soluble (Internal)		
Coolant Pressure	3MPa		
Machine	Vertical Machining Center		

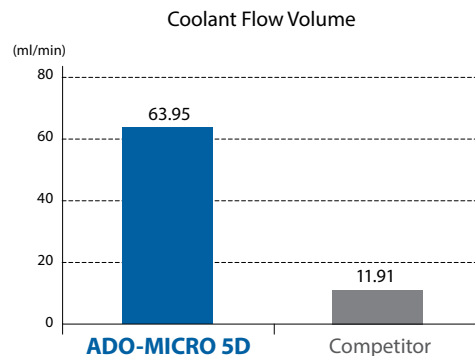
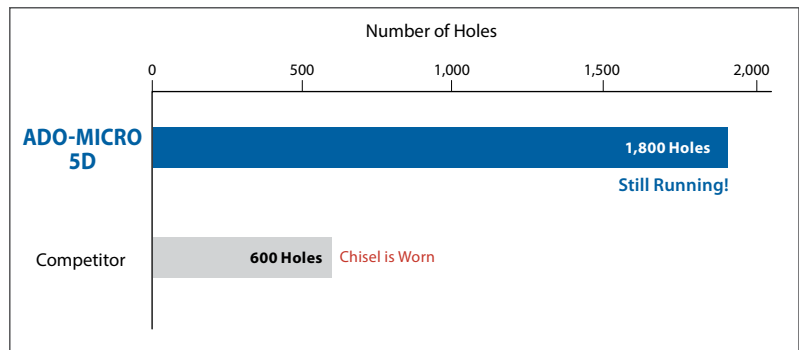


Enlarged Oil Holes

304 Stainless Steel

The ADO-MICRO's large coolant holes increase the coolant flow volume resulting in stable drilling.

Tool	ADO-MICRO 5D	Competitor
Tool Size	Ø0.7	
Work Material	304 Stainless Steel	
Cutting Speed	99 SFM (13,640 RPM)	
Feed Rate	5.35 IPM (0.0004 IPR)	
Depth of Hole	3.5 mm (Blind)	
Coolant	Water-Soluble (Internal)	
Coolant Pressure	3MPa	
Machine	Vertical Machining Center	

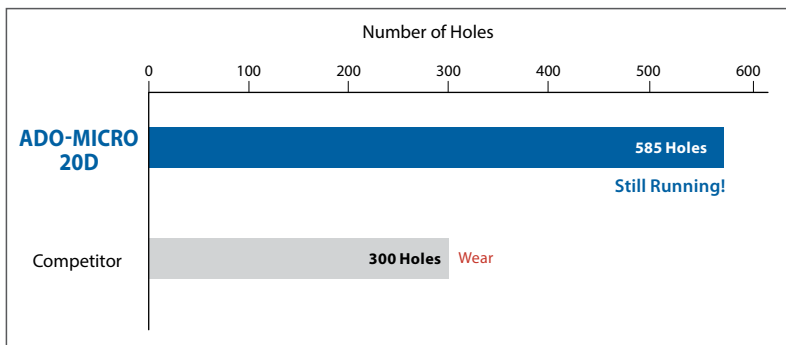


Improved Efficiency

Titanium Alloy (Ti-6Al-4V)

The ADO-MICRO displays increased efficiency in titanium alloy running at **5X the productivity** of the competitor.

Tool	ADO-MICRO 20D	Competitor
Tool Size	Ø1.2	
Work Material	Ti-6Al-4V	
Machining	Non-Step Drilling	Step Drilling (0.12mm Step)
Cutting Speed	115 SFM (9,300 RPM)	33 SFM (2,600 RPM)
Feed Rate	6.5 IPM (0.0008 IPR)	1.2 IPM (0.0004 IPR)
Depth of Hole	15 mm (Blind with Pilot Hole)	
Coolant	Water-Soluble (Internal)	
Coolant Pressure	2MPa	
Machine	Vertical Machining Center	



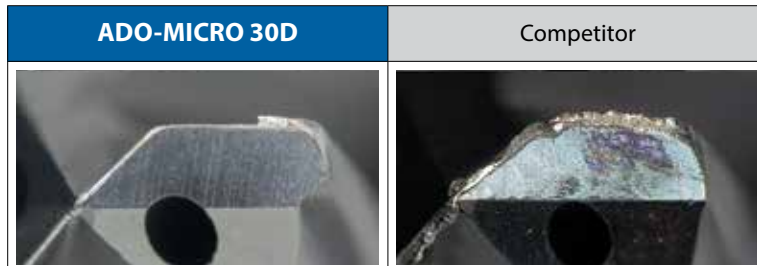
Excellent Durability in Stainless

440 Stainless Steel

The ADO-MICRO shows excellent durability in Lathe applications using oil-based coolant.

Tool	ADO-MICRO 30D	Competitor
Tool Size	Ø1.6	
Work Material	440 Stainless Steel	
Cutting Speed	66 SFM (4,000 RPM)	
Feed Rate	4.7 IPM (0.0012 IPR)	
Depth of Hole	45mm (Blind with Pilot Hole)	
Coolant	Oil-Based Coolant (Internal)	
Coolant Pressure	7MPa	
Machine	Lathe	

Wear Condition of Cutting Edge (After Drilling 1,200 Holes)



Excellent Durability in Steel

A295 Bearing Steel

The ADO-MICRO maintained good cutting edge condition even after machining in bearing steel.

Tool	ADO-MICRO 30D	Competitor
Tool Size	Ø1.5	
Work Material	A295 Bearing Steel	
Cutting Speed	148 SFM (9,550 RPM)	
Feed Rate	17 IPM (0.002 IPR)	
Depth of Hole	9mm (Blind with Pilot Hole)	
Coolant	Water-Soluble Coolant (Internal)	
Coolant Pressure	1.5MPa	
Machine	Vertical Machining Center	

Wear Condition of Cutting Edge (After Drilling 900 Holes)



Still good for use

Margin is worn

List 6501

ADO-MICRO-2D, Coolant-Through



NEW	SPEED FEED P7	CARBIDE	IchAda	+0.001~+0.010	~30°	SHRINK FIT
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Cutting Diameter Tolerance		
Size	mm	inch
0.7 ≤ D ≤ 2	+0.001 / +0.010	+0.00004 / +0.0004

EDP Number	Diameter (D)					Flute Length FL (mm)	Overall Length L (mm)	Shank Diameter d (mm)
	Fractional Size	Wire Gage	Letter Size	mm	inch			
8732001	-	-	-	0.700	0.02756	4.2	47	3
8732002	-	-	-	0.750	0.02953	4.5		
8732003	-	-	-	0.800	0.03150	4.8		
8732004	-	-	-	0.850	0.03346	5.1	50	
8732005	-	-	-	0.900	0.03543	5.4		
8732006	-	-	-	0.950	0.03740	5.7		
8732007	-	-	-	1.000	0.03937	6	53	
8732008	-	-	-	1.100	0.04331	6.6		
8732009	-	-	-	1.200	0.04724	7.2		
8732010	-	-	-	1.300	0.05118	7.8		
8732011	-	-	-	1.400	0.05512	8.4		
8732012	-	-	-	1.500	0.05906	9		
8732013	-	-	-	1.600	0.06299	9.6		
8732014	-	-	-	1.700	0.06693	10.2		
8732015	-	-	-	1.800	0.07087	10.8		
8732016	-	-	-	1.900	0.07480	11.4		
8732017	-	-	-	2.000	0.07874	12	58	

Packed: 1 pc.
Available IchAda coating only.
Can be used as Pilot Drill for long type drills (ADO-MICRO 12D, 20D, and 30D).



Work Material																	
List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels 4140 4340	Die Steels	Stainless Steels ≤200HB			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
6501	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	○	○	○	⊙	○		

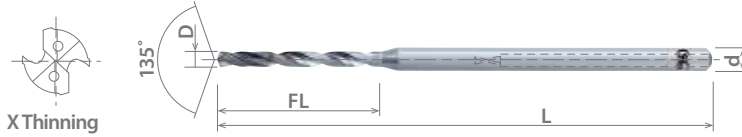
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List 6502

ADO-MICRO-5D, Coolant-Through

NEW	SPEED FEED P7	CARBIDE				SHRINK FIT
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Cutting Diameter Tolerance		
Size	mm	inch
0.7 ≤ D ≤ 2	+0 / -0.009	+0 / -0.0004

EDP Number	Diameter (D)					Flute Length FL (mm)	Overall Length L (mm)	Shank Diameter d (mm)
	Fractional Size	Wire Gage	Letter Size	mm	inch			
8732018	-	-	-	0.700	0.02756	7	47	3
8732019	-	-	-	0.750	0.02953	7.5		
8732020	-	-	-	0.800	0.03150	8		
8732021	-	-	-	0.850	0.03346	8.5	50	
8732022	-	-	-	0.900	0.03543	9		
8732023	-	-	-	0.950	0.03740	9.5		
8732024	-	-	-	1.000	0.03937	10	55	
8732025	-	-	-	1.100	0.04331	11		
8732026	-	-	-	1.200	0.04724	12		
8732027	-	-	-	1.300	0.05118	13	60	
8732028	-	-	-	1.400	0.05512	14		
8732029	-	-	-	1.500	0.05906	15		
8732030	-	-	-	1.600	0.06299	16	65	
8732031	-	-	-	1.700	0.06693	17		
8732032	-	-	-	1.800	0.07087	18		
8732033	-	-	-	1.900	0.07480	19		
8732034	-	-	-	2.000	0.07874	20		

Packed: 1 pc.
Available IchAda coating only.



List No.	Work Material																
	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			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
6502	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	○	○	○	⊙	○		

○ good ⊙ best

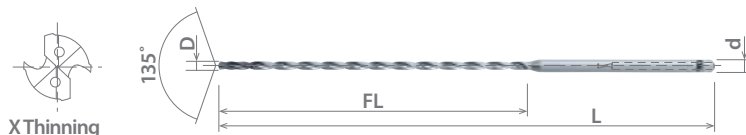


List 6505

ADO-MICRO-30D, Coolant-Through

NEW	SPEED FEED P7	CARBIDE		IchAda	 0-0.009	 ~30°	SHRINK FIT
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Cutting Diameter Tolerance		
Size	mm	inch
0.7 ≤ D ≤ 2	+0 / -0.009	+0 / -0.0004



EDP Number	Diameter (D)					Flute Length FL (mm)	Overall Length L (mm)	Shank Diameter d (mm)
	Fractional Size	Wire Gage	Letter Size	mm	inch			
8732057	-	-	-	1.000	0.03937	34	77	3
8732058	-	-	-	1.100	0.04331	37.4	86	
8732059	-	-	-	1.200	0.04724	40.8		
8732060	-	-	-	1.300	0.05118	44.2	95	
8732061	-	-	-	1.400	0.05512	47.6		
8732062	-	-	-	1.500	0.05906	51	101	
8732063	-	-	-	1.600	0.06299	54.4		
8732064	-	-	-	1.700	0.06693	57.8	107	
8732065	-	-	-	1.800	0.07087	61.2		
8732066	-	-	-	1.900	0.07480	64.6	112	
8732067	-	-	-	2.000	0.07874	68		

Packed: 1 pc.
Available IchAda coating only.
ADO-MICRO 2D is the recommended pilot hole drill.



List No.	Work Material																
	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			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	
6505	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	○	○	○	⊙	○		

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List 6501 - A Brand® ADO-MICRO: 2D

List 6502 - A Brand® ADO-MICRO: 5D

General Drilling Operations

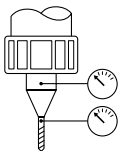
Work Material	Carbon Steels, Mild Steels 1010, 1050, 12L14		Alloy Steels 4140, 4130		300 Series Austenitic Stainless Steels		400 Series Ferritic Stainless Steels Martensitic Stainless Steels		High Heat Material			
	Ti-Alloy, Ti-6Al-4V		Ni-Base Material, Inconel									
Drilling Speed	65-195 SFM		65-195 SFM		65-195 SFM		80-145 SFM		130-195 SFM		15-50 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
0.7	18,200	0.0003-0.0008	18,200	0.0006-0.0011	13,600	0.0003-0.0008	15,900	0.0003-0.0008	22,700	0.0004-0.0007	4,500	0.0002-0.0006
1	12,700	0.0004-0.0012	12,700	0.0008-0.0016	9,500	0.0004-0.0012	11,100	0.0004-0.0012	15,900	0.0006-0.001	3,200	0.0002-0.0008
1.5	8,500	0.0006-0.0018	8,500	0.0012-0.0024	6,400	0.0006-0.0018	7,400	0.0006-0.0018	10,600	0.001-0.0015	2,100	0.0003-0.0012
2	6,400	0.0008-0.0024	6,400	0.0016-0.0031	4,800	0.0008-0.0024	5,600	0.0008-0.0024	8,000	0.0012-0.002	1,600	0.0004-0.0016

General Drilling Operations

Work Material	Cast Iron		Ductile Cast Iron		Aluminum Alloy 5025,7075		Cast Aluminum		Special Alloy Steels, Hardened Steels			
	26-30 HRC		30-34 HRC									
Drilling Speed	130-195 SFM		100-165 SFM		65-195 SFM		65-195 SFM		100-130 SFM		100-130 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
0.7	22,700	0.0006-0.0011	18,200	0.0006-0.0011	18,200	0.0003-0.0008	22,700	0.0006-0.0017	15,900	0.0006-0.0011	11,500	0.0006-0.0011
1	15,900	0.0008-0.0016	12,700	0.0008-0.0016	12,700	0.0004-0.0012	15,900	0.0008-0.0024	11,100	0.0008-0.0016	8,000	0.0008-0.0016
1.5	10,600	0.0012-0.0024	8,500	0.0012-0.0024	8,500	0.0006-0.0018	10,600	0.0012-0.0035	7,400	0.0012-0.0024	5,300	0.0012-0.0024
2	8,000	0.0016-0.0031	6,400	0.0016-0.0031	6,400	0.0008-0.0024	8,000	0.0016-0.0047	5,600	0.0016-0.0031	4,000	0.0016-0.0031

Note:

1. This cutting condition chart is based on the usage of **water-soluble coolant and internal supply**.
2. Please use quality water-soluble coolant with a dilution factor of approximately 20 times, e.g. 5% concentration.
3. Please use a precision filter (rating of 3µm to 5µm) to prevent the oil holes from clogging.
4. Although the recommended coolant pressure is 3 MPa or more, please adjust accordingly if the level of flow volume is unsatisfactory due to the type and concentration of cutting fluid used.
5. For accurate mounting, acceptable deflection of the body cylindrical part at the shank end should be **less than 0.002µm**, as shown in the illustrated figure.
6. For work materials with poor chip evacuation, please perform step drilling as required.
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.



List 6503 - A Brand® ADO-MICRO: 12D

List 6504 - A Brand® ADO-MICRO: 20D

List 6505 - A Brand® ADO-MICRO: 30D

General Drilling Operations

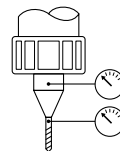
Work Material	Carbon Steels, Mild Steels 1010, 1050, 12L14		Alloy Steels 4140, 4130		300 Series Austenitic Stainless Steels		400 Series Ferritic Stainless Steels Martensitic Stainless Steels		High Heat Material			
	65-195 SFM		65-195 SFM		65-195 SFM		80-145 SFM		Ti-Alloy, Ti-6Al-4V		Ni-Base Material, Inconel	
Drilling Speed	65-195 SFM		65-195 SFM		65-195 SFM		80-145 SFM		130-195 SFM		15-50 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
1	12,700	0.0004-0.0012	12,700	0.0008-0.0016	9,500	0.0004-0.0012	11,100	0.0004-0.0012	15,900	0.0006-0.001	3,200	0.0002-0.0008
1.5	8,500	0.0006-0.0018	8,500	0.0012-0.0024	6,400	0.0006-0.0018	7,400	0.0006-0.0018	10,600	0.001-0.0015	2,100	0.0003-0.0012
2	6,400	0.0008-0.0024	6,400	0.0016-0.0031	4,800	0.0008-0.0024	5,600	0.0008-0.0024	8,000	0.0012-0.002	1,600	0.0004-0.0016

General Drilling Operations

Work Material	Cast Iron		Ductile Cast Iron		Aluminum Alloy 5025,7075		Cast Aluminum		Special Alloy Steels, Hardened Steels			
	130-195 SFM		100-165 SFM		65-195 SFM		100-230 SFM		26-30 HRC		30-34 HRC	
Drilling Speed	130-195 SFM		100-165 SFM		65-195 SFM		100-230 SFM		100-130 SFM		65-100 SFM	
Drill Dia. mm	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR	Speed RPM	Feed IPR
1	15,900	0.0008-0.0016	12,700	0.0008-0.0016	12,700	0.0004-0.0012	15,900	0.0008-0.0024	11,100	0.0008-0.0016	8,000	0.0008-0.0016
1.5	10,600	0.0012-0.0024	8,500	0.0012-0.0024	8,500	0.0006-0.0018	10,600	0.0012-0.0035	7,400	0.0012-0.0024	5,300	0.0012-0.0024
2	8,000	0.0016-0.0031	6,400	0.0016-0.0031	6,400	0.0008-0.0024	8,000	0.0016-0.0047	5,600	0.0016-0.0031	4,000	0.0016-0.0031

Note:

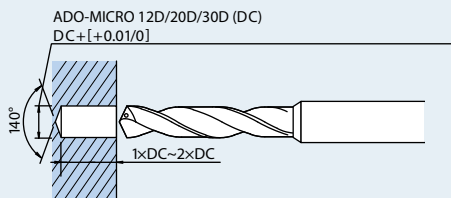
- This cutting condition chart is based on the usage of **water-soluble coolant and internal supply**.
- Please use quality water-soluble coolant with a dilution factor of approximately 20 times, e.g. 5% concentration.
- Please use a precision filter (rating of 3µm to 5µm) to prevent the oil holes from clogging.
- Although the recommended coolant pressure is 3 MPa or more, please adjust accordingly if the level of flow volume is unsatisfactory due to the type and concentration of cutting fluid used.
- For accurate mounting, acceptable deflection of the body cylindrical part at the shank end should be **less than 0.002µm**, as shown in the illustrated figure.
- For work materials with poor chip evacuation, please perform step drilling as required.
- For holes deeper than 12D, please use a 2D type drill to prepare a pilot hole prior to processing.
- Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.



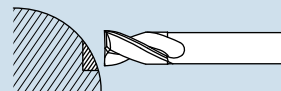
Deep Hole Drilling Procedures ADO-MICRO 12D/20D/30D

1. Make a Pilot Hole with the ADO-MICRO 2D.

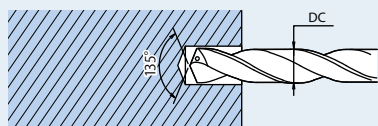
The ADO-MICRO 2D (140° point angle) is the recommended pilot hole drills of the ADO-MICRO 12D/20D/30D



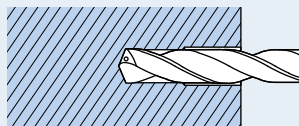
When working on a curved surface, use the ADF (carbide flat drill) to counterbore a flat surface before drilling a pilot hole.



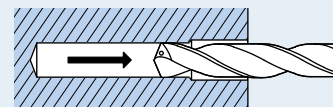
2. Insert the long drill into a pilot hole with a low revolution of 500 to 1,000 RPM.



3. Increase the revolution to the designated speed and start drilling.



4. After drilling, move the drill away from the bottom of the hole; then reduce its speed to 500 to 1,000 RPM while continuing to retract.





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.

FOR MORE INFORMATION CONTACT US

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