



Carbide flat drill

ADF

ADF-2D ADFLS-2D



Key Features: ADF

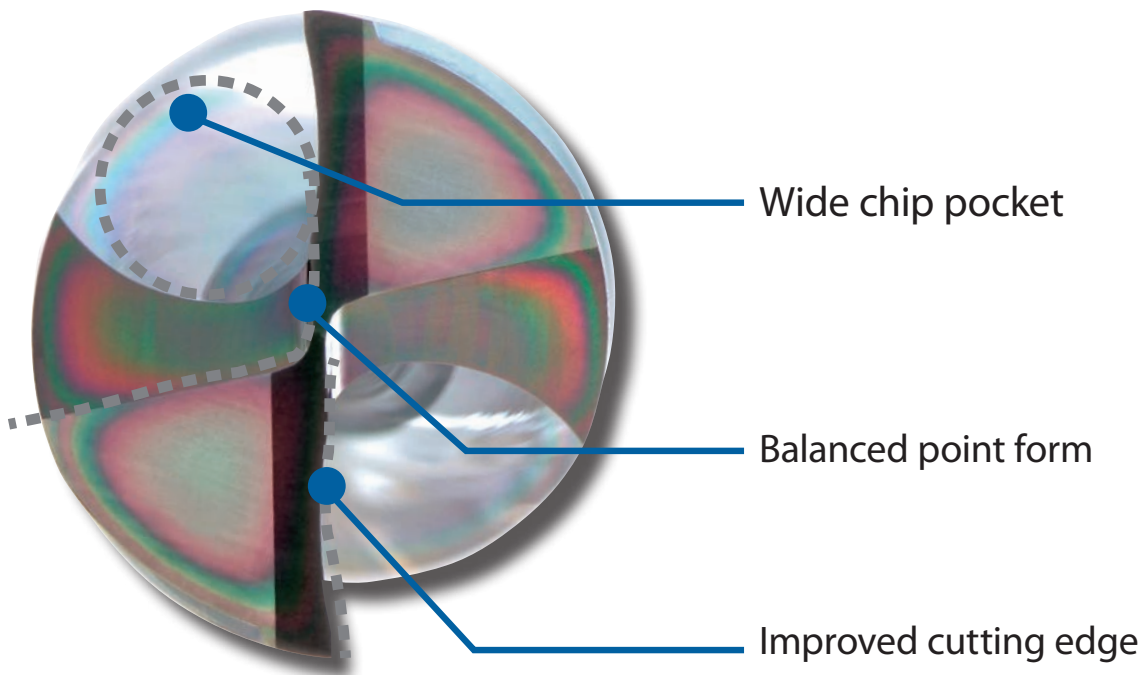
1 Designed for a wide variety of applications

2 New EgiAs Coating :
Exceptional wear resistance &
toughness

3 Unique end cut geometry :
Stable cutting resistance



Key features & benefits ADF

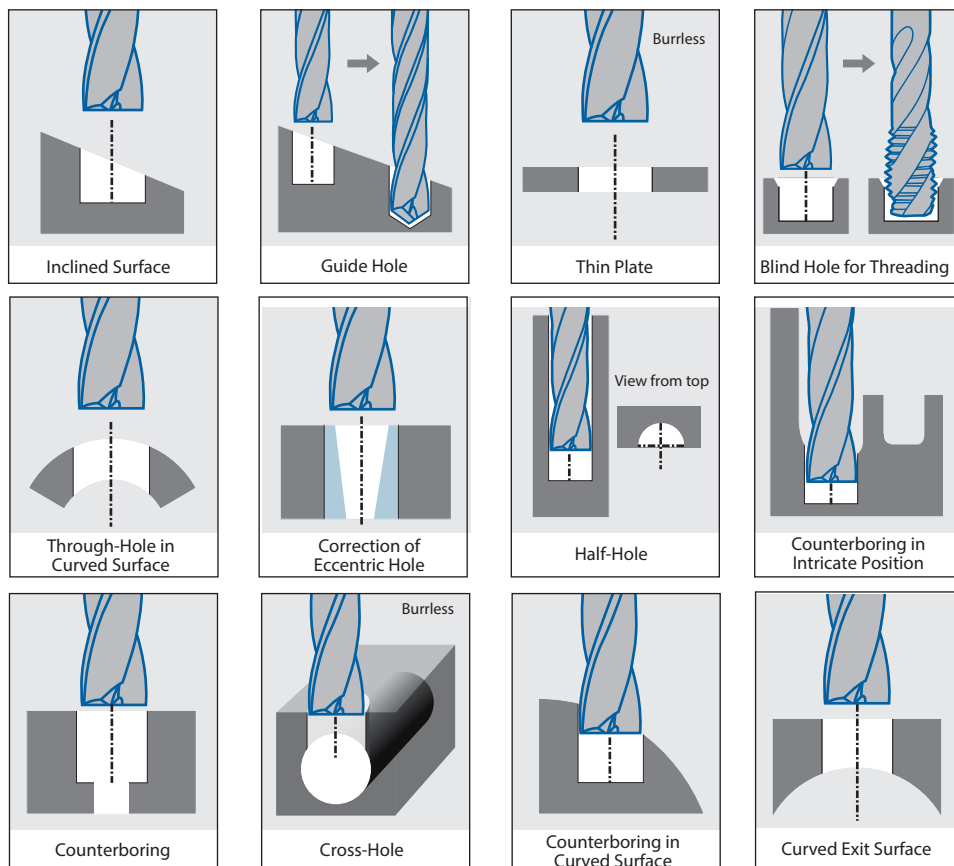


1 One Drill Does it All

Designed for a Wide Variety of Application

Applicable for a multitude of drilling applications such as inclined surface, curved surface, flat-bottom hole, eccentric hole, and more.

- Standard lineup for thread forming of pilot holes under M6.

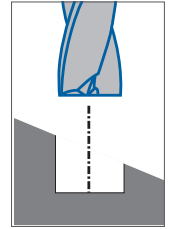


Key features & Benefits of ADF

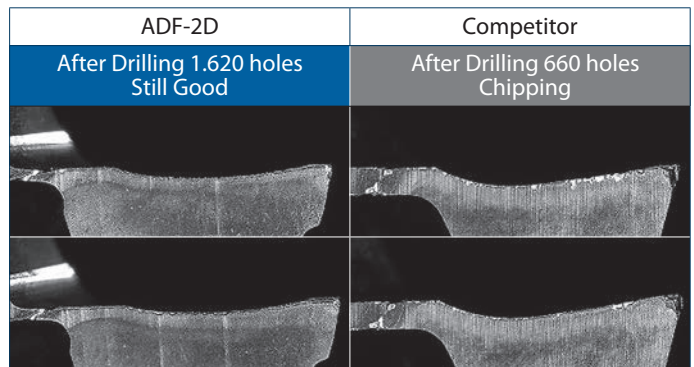
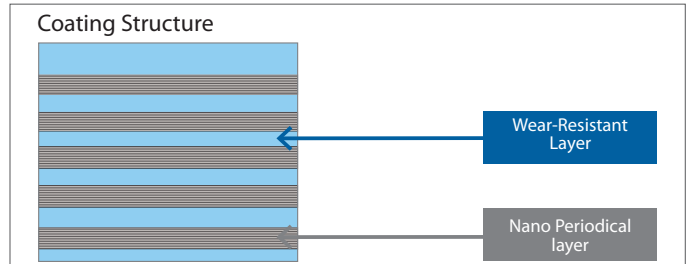
2 New Coating

Exceptional Wear Resistance & Toughness

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



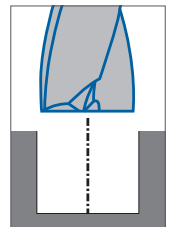
Tool	ADF-2D Ø6
Machined Surface	(30°) Angled Surface
Work Material	S50C
Cutting Speed	75m/min (3.981 min ⁻¹)
Feed Rate	239 mm/min (0,06 mm/rev)
Depth of Hole	12 mm (Blind)
Coolant	Water Soluble
Machine	Horizontal Machining Center



3 End Cut Geometry

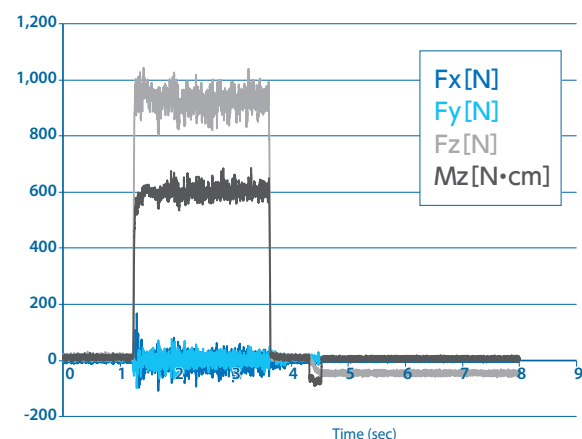
Stable Cutting Resistance

Unique end cut geometry reduces cutting force to enable stable machining.



Tool	ADF-2D Ø10
Machined Surface	Flat Surface
Work Material	S50C
Cutting Speed	60m/min (1.911 min ⁻¹)
Feed Rate	382 mm/min (0,2 mm/rev)
Depth of Hole	20 mm (Blind)
Coolant	Water Soluble
Machine	Vertical Machining Center

■ Cutting Resistance Waveform

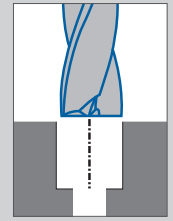


■ Oversize

Mouth **0,01mm** Depth of Hole **0,01mm**

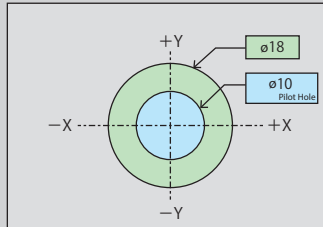
Machining Data

Counterboring

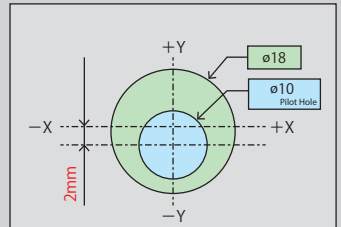


Tool	ADF-2D Ø18
Machined Surface	Flat Surface
Work Material	FC250
Cutting Speed	75m/min (1.327 min ⁻¹)
Feed Rate	133 mm/min (0,1 mm/rev)
Depth of Hole	34 mm (Blind)
Coolant	Water Soluble
Machine	Horizontal Machining Center

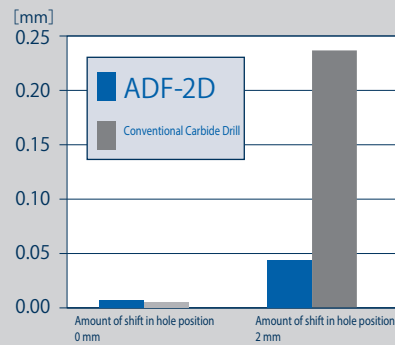
Amount of shift in hole position 0 mm



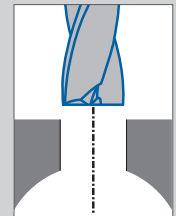
Amount of shift in hole position 2mm



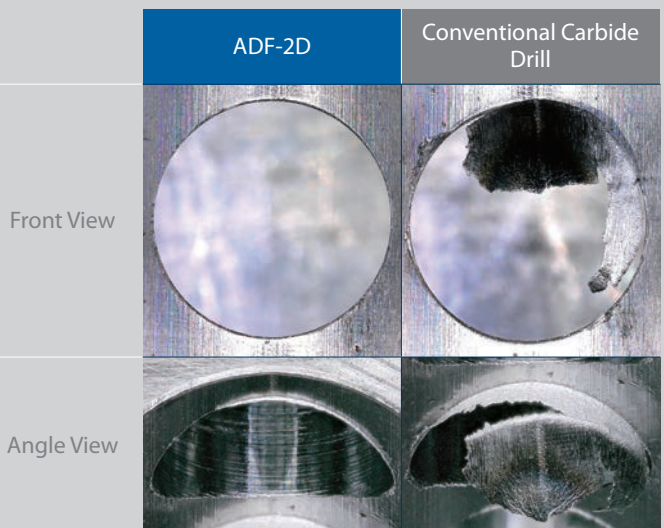
Shift length in hole position



Through-Hole in Curved Surface

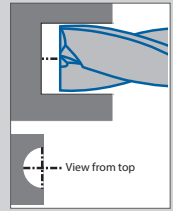


Tool	ADF-2D Ø6
Machined Surface	Flat Surface - Curved Surface
Work Material	S50C
Cutting Speed	75m/min (3.981 min ⁻¹)
Feed Rate	398 mm/min (0,1 mm/rev)
Depth of Hole	15 mm (Through)
Coolant	Water Soluble
Machine	Horizontal Machining Center

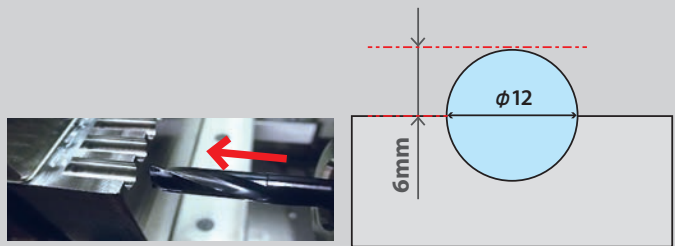


Machining Data

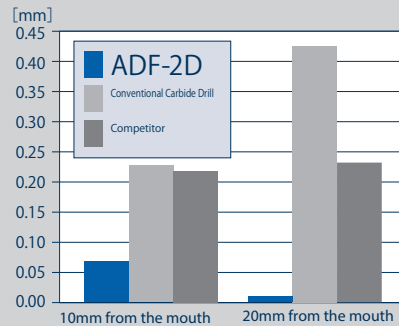
Half-Hole



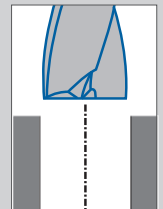
Tool	ADF-2D Ø12
Machined Surface	Flat Surface
Work Material	S50C
Cutting Speed	37m/min (982 min ⁻¹)
Feed Rate	157 mm/min (0,16 mm/rev)
Depth of Hole	24 mm (Blind)
Coolant	Water Soluble
Machine	Horizontal Machining Center



■ Fallen amount

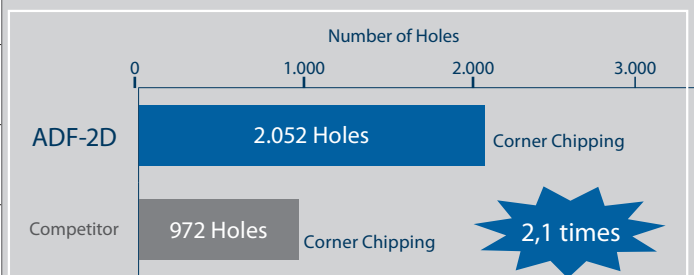
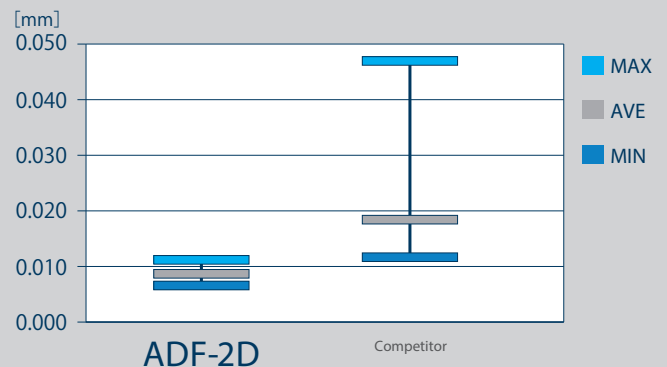


Flat Surface



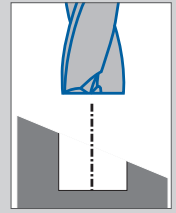
Tool	ADF-2D Ø10
Machined Surface	Flat Surface
Work Material	S50C
Cutting Speed	75m/min (2.387 min ⁻¹)
Feed Rate	430 mm/min (0,18 mm/rev)
Depth of Hole	20 mm (Through)
Coolant	Water Soluble
Machine	Horizontal Machining Center

■ Oversize



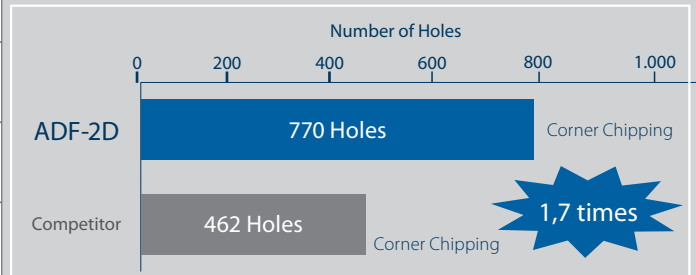
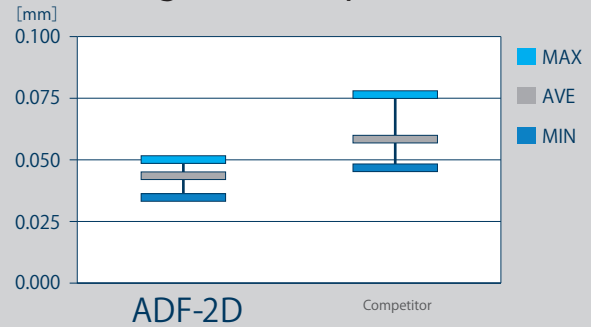
Machining Data

Inclined Surface



Tool	ADF-2D Ø10
Machined Surface	Angled Surface
Work Material	SCM440(30HRC)
Cutting Speed	60m/min (1.910 min ⁻¹)
Feed Rate	191 mm/min (0,1 mm/rev)
Depth of Hole	20 mm (Blind)
Coolant	Water Soluble
Machine	Horizontal Machining Center

Shift length in hole position



Guide for Icons

Tool Materials



Micro Grain Carbide

Surface Treatment



EgiAs Coating

Tolerance drill diameter

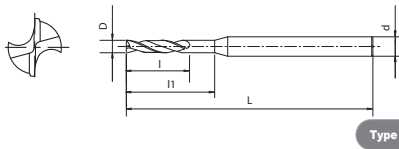


Tolerance for drill diameter.

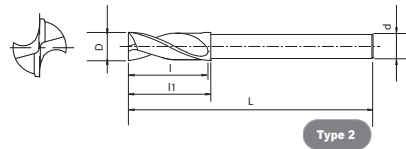
Helix angle



Display helix angle of flute for drills.



Type 1



Type 2



Drills may have some discoloration, but it does not cause any performance problems.

EDP	D	L	I	I1	d	Type	Price	EDP	D	L	I	I1	d	Type	Price
3332300	3	100	15	30	6	1		3332590	5,9	110	27	59	6	1	
3332310	3,1	100	15	31	6	1		3332600	6	110	27	29	6	2	
3332320	3,2	100	15	32	6	1		3332650	6,5	120	30	32	6	2	
3332330	3,3	100	15	33	6	1		3332680	6,8	120	30	32	6	2	
3332340	3,4	100	16	34	6	1		3332700	7	120	30	32	6	2	
3332350	3,5	100	16	35	6	1		3332750	7,5	130	34	36	6	2	
3332360	3,6	100	16	36	6	1		3332780	7,8	130	34	36	6	2	
3332370	3,7	100	16	37	6	1		3332800	8	130	34	36	8	2	
3332380	3,8	100	19	38	6	1		3332850	8,5	140	38	40	8	2	
3332390	3,9	100	19	39	6	1		3332880	8,8	140	38	40	8	2	
3332400	4	100	19	40	6	1		3332900	9	140	38	40	8	2	
3332410	4,1	100	19	41	6	1		3332950	9,5	150	42	44	8	2	
3332420	4,2	100	21	42	6	1		3332980	9,8	150	42	44	8	2	
3332430	4,3	100	21	43	6	1		3333000	10	150	42	44	10	2	
3332440	4,4	100	21	44	6	1		3333050	10,5	160	46	48	10	2	
3332450	4,5	100	21	45	6	1		3333080	10,8	160	46	48	10	2	
3332460	4,6	100	21	46	6	1		3333100	11	160	46	48	10	2	
3332470	4,7	100	21	47	6	1		3333180	11,8	170	50	52	10	2	
3332480	4,8	100	24	48	6	1		3333200	12	170	50	52	12	2	
3332490	4,9	100	24	49	6	1		3333250	12,5	180	56	58	12	2	
3332500	5	110	24	50	6	1		3333300	13	180	56	58	12	2	
3332510	5,1	110	24	51	6	1		3333350	13,5	190	60	62	12	2	
3332520	5,2	110	24	52	6	1		3333400	14	190	60	62	12	2	
3332530	5,3	110	24	53	6	1		3333500	15	200	64	66	12	2	
3332540	5,4	110	27	54	6	1		3333600	16	210	68	70	16	2	
3332550	5,5	110	27	55	6	1		3333700	17	220	74	76	16	2	
3332560	5,6	110	27	56	6	1		3333750	17,5	230	78	80	16	2	
3332570	5,7	110	27	57	6	1		3333800	18	230	78	80	16	2	
3332580	5,8	110	27	58	6	1		3334000	20	250	88	90	20	2	

Applications - Anwendungen - Applicazioni - Applications - Applikation - Applikation - Aplicaciones - Применение - Uygulama - Zastosowania								
C _s ≤0.2%	0.25<C _s ≤0.4%	C _s ≥0.45%	SCM	~35 HRC	35~45 HRC	45~50 HRC	50~70 HRC	SUS
○	○	○	○	○	○			
SKD	GG	GGG	Cu	Al	AC	Ti	TiAl	Inc
	○	○		○	○			

Conditions

ADF-2D

Work Material	Low Carbon Steel - Alloy Steel (C<0.3%) SS400 - SCM ~710N/mm ²		Carbon Steel S35C- S50C ~210HB ~710N/mm ²		Alloy Steel SCM - SCr - SNCM 28~35HRC 900~1,100N/mm ²		Plastic Mold Steel NAK80 ~40HRC		Special Alloy Steel-Hardened Steel-Prehardened Steel SKD61 ~50HRC	
	Cutting Speed		60~100m/min		30~90m/min		20~40m/min		20~30m/min	
Drill Dia. (mm)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)
2	12.700	0,01 ~ 0,06	12.700	0,01 ~ 0,06	9.550	0,01 ~ 0,06	4.750	0,01 ~ 0,04	4.000	0,01 ~ 0,03
3	8.500	0,015 ~ 0,09	8.500	0,015 ~ 0,09	6.350	0,015 ~ 0,09	3.200	0,015~0,06	2.650	0,015 ~ 0,045
4	6.350	0,02 ~ 0,12	6.350	0,02 ~ 0,12	4.750	0,02 ~ 0,12	2.400	0,02 ~ 0,08	2.000	0,02 ~ 0,06
6	4.250	0,03 ~ 0,18	4.250	0,03 ~ 0,18	3.200	0,03 ~ 0,18	1.600	0,03 ~ 0,12	1.350	0,03 ~ 0,09
8	3.200	0,04 ~ 0,24	3.200	0,04 ~ 0,24	2.400	0,04 ~ 0,24	1.200	0,04 ~ 0,16	1.000	0,04 ~ 0,12
10	2.550	0,05 ~ 0,3	2.550	0,05 ~ 0,3	1.900	0,05 ~ 0,3	950	0,05 ~ 0,2	800	0,05 ~ 0,15
12	2.100	0,06 ~ 0,3	2.100	0,06 ~ 0,3	1.600	0,06 ~ 0,3	800	0,06 ~ 0,24	650	0,06 ~ 0,18
14	1.800	0,07 ~ 0,35	1.800	0,07 ~ 0,35	1.350	0,07 ~ 0,35	700	0,07 ~ 0,28	550	0,07 ~ 0,21
16	1.600	0,08 ~ 0,36	1.600	0,08 ~ 0,36	1.200	0,08 ~ 0,36	600	0,08 ~ 0,32	500	0,08 ~ 0,24
18	1.400	0,09 ~ 0,38	1.400	0,09 ~ 0,38	1.050	0,09 ~ 0,38	550	0,09 ~ 0,36	450	0,09 ~ 0,27
20	1.250	0,1 ~ 0,4	1.250	0,1 ~ 0,4	950	0,1 ~ 0,4	500	0,1 ~ 0,4	400	0,1 ~ 0,3

ADF-2D

Cast Iron FC250 ~350N/mm ²		Ductile Cast Iron FCD600 400~600N/mm ²		Aluminum A5052 - A7075 ~350N/mm ²		Aluminum Alloy AC4C - ADC 400~600N/mm ²	
60~120m/min		50~80m/min		80~200m/min		80~200m/min	
Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)
14.300	0,01 ~ 0,06	10.350	0,01 ~ 0,06	22.300	0,01 ~ 0,06	22.300	0,01 ~ 0,06
9.550	0,015 ~ 0,09	6.900	0,015 ~ 0,09	14.850	0,015 ~ 0,09	14.850	0,015 ~ 0,09
7.150	0,02 ~ 0,12	5.150	0,02 ~ 0,12	11.150	0,02 ~ 0,12	11.150	0,02 ~ 0,12
4.750	0,03 ~ 0,18	3.450	0,03 ~ 0,18	7.450	0,03 ~ 0,18	7.450	0,03 ~ 0,18
3.600	0,04 ~ 0,24	2.600	0,04 ~ 0,24	5.550	0,04 ~ 0,24	5.550	0,04 ~ 0,24
2.850	0,05 ~ 0,3	2.050	0,05 ~ 0,3	4.450	0,05 ~ 0,3	4.450	0,05 ~ 0,3
2.400	0,06 ~ 0,3	1.700	0,06 ~ 0,3	3.700	0,06 ~ 0,36	3.700	0,06 ~ 0,36
2.050	0,07 ~ 0,35	1.500	0,07 ~ 0,35	3.200	0,07 ~ 0,42	3.200	0,07 ~ 0,42
1.800	0,08 ~ 0,36	1.300	0,08 ~ 0,36	2.800	0,08 ~ 0,48	2.800	0,08 ~ 0,48
1.600	0,09 ~ 0,38	1.150	0,09 ~ 0,38	2.500	0,09 ~ 0,54	2.500	0,09 ~ 0,54
1.450	0,1 ~ 0,4	1.050	0,1 ~ 0,4	2.250	0,1 ~ 0,6	2,250	0,1 ~ 0,6

- 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).



Conditions

ADFLS-2D

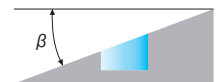
Work Material	Low Carbon Steel - Alloy Steel (C<0.3%) SS400 - SCM ~710N/mm ²		Carbon Steel S35C- S50C ~210HB ~710N/mm ²		Alloy Steel SCM - SCr - SNCM 28~35HRC 900~1,100N/mm ²		Plastic Mold Steel NAK80 ~40HRC		Special Alloy Steel-Hardened Steel-Prehardened Steel SKD61 ~50HRC	
	Cutting Speed		60~100m/min		30~90m/min		20~40m/min		20~30m/min	
Drill Dia. (mm)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)
3	8.500	0,045 ~ 0,075	8.500	0,045 ~ 0,075	6.350	0,045 ~ 0,075	3.200	0,045 ~ 0,06	2.650	0,03 ~ 0,06
4	6.350	0,06 ~ 0,1	6.350	0,06 ~ 0,1	4.750	0,06 ~ 0,1	2.400	0,06 ~ 0,08	2.000	0,04 ~ 0,08
6	4.250	0,09 ~ 0,15	4.250	0,09 ~ 0,15	3.200	0,09 ~ 0,15	1.600	0,09 ~ 0,12	1.350	0,06 ~ 0,12
8	3.200	0,12 ~ 0,2	3.200	0,12 ~ 0,2	2.400	0,12 ~ 0,2	1.200	0,12 ~ 0,16	1.000	0,08 ~ 0,16
10	2.550	0,15 ~ 0,25	2.550	0,15 ~ 0,25	1.900	0,15 ~ 0,25	950	0,15 ~ 0,2	800	0,1 ~ 0,2
12	2.100	0,18 ~ 0,3	2.100	0,18 ~ 0,3	1.600	0,18 ~ 0,3	800	0,18 ~ 0,24	650	0,12 ~ 0,24
14	1.800	0,21 ~ 0,35	1.800	0,21 ~ 0,35	900	0,21 ~ 0,35	700	0,21 ~ 0,28	550	0,14 ~ 0,28
16	1.600	0,24 ~ 0,4	1.600	0,24 ~ 0,4	800	0,24 ~ 0,4	600	0,24 ~ 0,32	500	0,16 ~ 0,32
18	1.400	0,27 ~ 0,45	1.400	0,27 ~ 0,45	700	0,27 ~ 0,45	550	0,27 ~ 0,36	450	0,18 ~ 0,36
20	1.250	0,3 ~ 0,5	1.250	0,3 ~ 0,5	650	0,3 ~ 0,5	500	0,3 ~ 0,4	400	0,2 ~ 0,4

ADFLS-2D

Cast Iron FC250 ~350N/mm ²		Ductile Cast Iron FCD600 400~600N/mm ²		Aluminum A5052 - A7075 ~350N/mm ²		Aluminum Alloy AC4C - ADC 400~600N/mm ²	
60~120m/min		50~80m/min		80~200m/min		80~200m/min	
Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)	Speed (min ⁻¹)	Feed Rate (mm/rev)
9.550	0,06 ~ 0,09	6.900	0,06 ~ 0,09	14.850	0,015 ~ 0,09	14.850	0,015 ~ 0,09
7.150	0,08 ~ 0,12	5.150	0,08 ~ 0,12	11.150	0,02 ~ 0,12	11.150	0,02 ~ 0,12
4.750	0,12 ~ 0,18	3.450	0,12 ~ 0,18	7.450	0,03 ~ 0,18	7.450	0,03 ~ 0,18
3.600	0,16 ~ 0,24	2.600	0,16 ~ 0,24	5.550	0,04 ~ 0,24	5.550	0,04 ~ 0,24
2.850	0,2 ~ 0,3	2.050	0,2 ~ 0,3	4.450	0,05 ~ 0,3	4.450	0,05 ~ 0,3
2.400	0,24 ~ 0,36	1.700	0,24 ~ 0,36	3.700	0,06 ~ 0,36	3.700	0,06 ~ 0,36
2.050	0,28 ~ 0,42	1.500	0,28 ~ 0,42	3.200	0,07 ~ 0,42	3.200	0,07 ~ 0,42
1.800	0,32 ~ 0,48	1.300	0,32 ~ 0,48	2.800	0,08 ~ 0,48	2.800	0,08 ~ 0,48
1.600	0,36 ~ 0,54	1.150	0,36 ~ 0,54	2.500	0,09 ~ 0,54	2.500	0,09 ~ 0,54
1.450	0,4 ~ 0,6	1.050	0,4 ~ 0,6	2.250	0,1 ~ 0,6	2.250	0,1 ~ 0,6

1. To process flat surfaces, prior center-drilling with a larger diameter is required.
2. 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.
3. When using non-water soluble oil or water-emulsifiable (over 20 times dilution), reduce cutting speed by 30%.
4. Use a rigid and precise machine and holder.
5. Please minimize tool hang over as much as possible during machining.
6. Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity, or work holding.
7. Please set up the drill so that the runout of the cutting edge is under 0.01 mm.

8. 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%.
9. Please use step drilling in pilot holes to improve cutting chip separation.
10. 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).





shaping your dreams

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