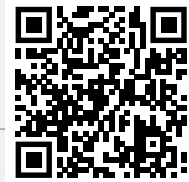


# FBD 2 Flute Flat Bottom Drills for Aluminum



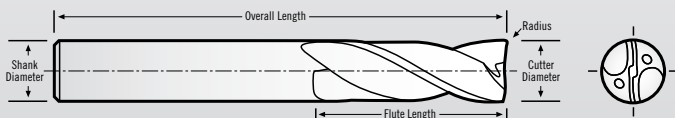
Characteristics



Applications



Materials



## FBD Series Tolerances

Cutting Dia. =  $+0.000/-0.001$ "  
 Shank Dia. =  $-0.0001/-0.0002$ "  
 Flute Length =  $+0.060/-0.000$ "  
 OAL =  $\pm 0.060$ "



**NEW!**

**180° Tip**

## FBD-201 2 Flute 2x Diameter Flat Bottom Drills

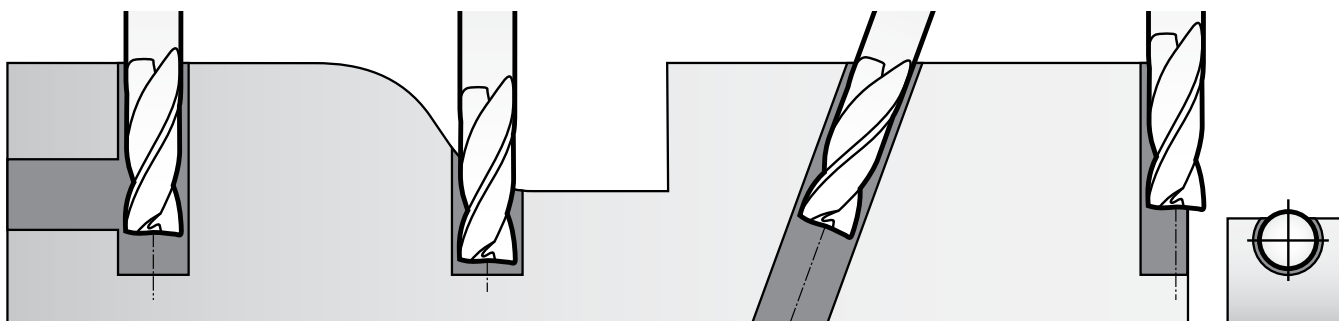
Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated
1/8"	1/8"	3/8"	1/4"	0.005	1-1/2"	FBD-201-04	FBD-201-04-DLC	FBD-201-04-TC	FBD-201-04-TC-DLC
3/16"	3/16"	9/16"	3/8"	0.01	2-1/2"	FBD-201-06	FBD-201-06-DLC	FBD-201-06-TC	FBD-201-06-TC-DLC
1/4"	1/4"	3/4"	1/2"	0.01	2-1/2"	FBD-201-08	FBD-201-08-DLC	FBD-201-08-TC	FBD-201-08-TC-DLC
5/16"	5/16"	15/16"	5/8"	0.02	2-1/2"	FBD-201-10	FBD-201-10-DLC	FBD-201-10-TC	FBD-201-10-TC-DLC
3/8"	3/8"	1-1/8"	3/4"	0.02	3"	FBD-201-12	FBD-201-12-DLC	FBD-201-12-TC	FBD-201-12-TC-DLC
1/2"	1/2"	1-1/2"	1"	0.02	3-1/2"	FBD-201-16	FBD-201-16-DLC	FBD-201-16-TC	FBD-201-16-TC-DLC



**NEW!**

## FBD-202 2 Flute 5x Diameter Flat Bottom Drills

Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Uncoated	DLC Coated	Thru Coolant Uncoated	Thru Coolant DLC Coated
1/8"	1/8"	3/4"	5/8"	0.005	2"	FBD-202-04	FBD-202-04-DLC	FBD-202-04-TC	FBD-202-04-TC-DLC
3/16"	3/16"	1-1/8"	15/16"	0.01	2-1/2"	FBD-202-06	FBD-202-06-DLC	FBD-202-06-TC	FBD-202-06-TC-DLC
1/4"	1/4"	1-1/2"	1-1/4"	0.01	3"	FBD-202-08	FBD-202-08-DLC	FBD-202-08-TC	FBD-202-08-TC-DLC
5/16"	5/16"	1-7/8"	1-9/16"	0.02	3-1/2"	FBD-202-10	FBD-202-10-DLC	FBD-202-10-TC	FBD-202-10-TC-DLC
3/8"	3/8"	2-1/4"	1-7/8"	0.02	4"	FBD-202-12	FBD-202-12-DLC	FBD-202-12-TC	FBD-202-12-TC-DLC
1/2"	1/2"	3"	2-1/2"	0.02	5"	FBD-202-16	FBD-202-16-DLC	FBD-202-16-TC	FBD-202-16-TC-DLC



Burr-Free Intersecting Holes

Shoulder Drilling

Drilling Angled Holes

Creating a Guide Hole

# 2 Flute Flat Bottom Drills for Aluminum **FBD**

Use maximum RPM if it exceeds your machines RPM

Guide hole recommended if you get chatter. Pecking in small depths might help. Always start holes with short 2X drill first.

\*Adjust inch per revolution to 50% when on angled surfaces is 30 degrees or less.

\*Adjust inch per revolution to 30% of recommended when on an angled or curved surface is greater than 30 degrees or when the cutter is not fully encapsulated and only drilling a partial hole

\*\* Adjust RPM to 70% of recommended RPM when on an angled or curved surface is greater than 30 degrees or when the cutter is not fully encapsulated and only drilling a partial hole

When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

Thru coolant holes recommended on FBD-202 (5x) deep holes

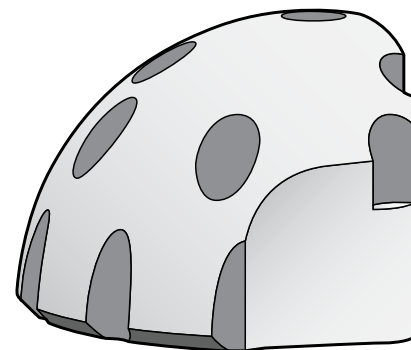
If chip packing is a problem thru coolant holes are recommended.

Pecking may help if you do not have thru coolant.

Aluminum and similar materials			
Tool Diameter	FBD-201(2x) (SFM 500-1000) RPM**	FBD-202(5x) (SFM 250-500) RPM**	Inch per Revolution*
1/8	15280 - 30560	7640 - 15280	.0016-.0032
3/16	10187 - 20373	5093 - 10187	.0024-.0048
1/4	7640 - 15280	3820 - 7640	.0032-.006
5/16	6112 - 12224	3056 - 6112	.004-.008
3/8	5093 - 10187	2547 - 5093	.0048-.0098
1/2	3820 - 7640	1910 - 3820	.0065-.013

## Drilling Curved Material

If drilling on flat surfaces and the drill walks spot drill first to reduce the amount of surface contact when starting the hole. The longer a drill is, the higher the chance that it will walk.



## Aluminum Tools in Other Sections

**SB / B 201/203**  
**MSB / MB 201/203**

2 Flute Ball End  
(See Multiple Applications)



**156**

**C8**  
**201/203/301/303**

2 & 3 Flute on 1/4" Shank  
(See Multiple Applications)



**151**

**NR / MNR**  
**204/303/404**

2, 3 and 4 Flute  
(See Multiple Applications)



**160**

**PCD**  
**203 Routers**

2 Flute PCD Diamond  
(See Composites & Plastics)



**109**

**PCD-BN**  
**201 Routers**

2 Flute PCD Diamond, Ball End  
(See Composites & Plastics)



**109**

**MINIATURES**

(See Miniatures Applications)



**132**

**SAWS**

(See Saws Applications)



**170**

# FBD 2 Flute Flat Bottom Drills for Steel and difficult alloys

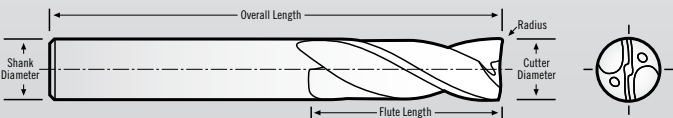


Characteristics

Applications

Materials

Coatings



**FBD Series Tolerances**  
 Cutting Dia. = +0.000/-0.001"  
 Shank Dia. = -0.0001/-0.0002"  
 Flute Length = +0.060/-0.000"  
 OAL = ±0.060"



**NEW!**

**180° Tip**

## FBD-201 2 Flute 2x Diameter Flat Bottom Drills



Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Tool Number AlTiN Coated	Tool Number Thru Coolant AlTiN Coated
1/8"	1/8"	3/8"	1/4"	0.005	1-1/2"	FBD-201-04-TP-A	FBD-201-04-TC-TP-A
3/16"	3/16"	9/16"	3/8"	0.01	2-1/2"	FBD-201-06-TP-A	FBD-201-06-TC-TP-A
1/4"	1/4"	3/4"	1/2"	0.01	2-1/2"	FBD-201-08-TP-A	FBD-201-08-TC-TP-A
5/16"	5/16"	15/16"	5/8"	0.02	2-1/2"	FBD-201-10-TP-A	FBD-201-10-TC-TP-A
3/8"	3/8"	1-1/8"	3/4"	0.02	3"	FBD-201-12-TP-A	FBD-201-12-TC-TP-A
1/2"	1/2"	1-1/2"	1"	0.02	3-1/2"	FBD-201-16-TP-A	FBD-201-16-TC-TP-A

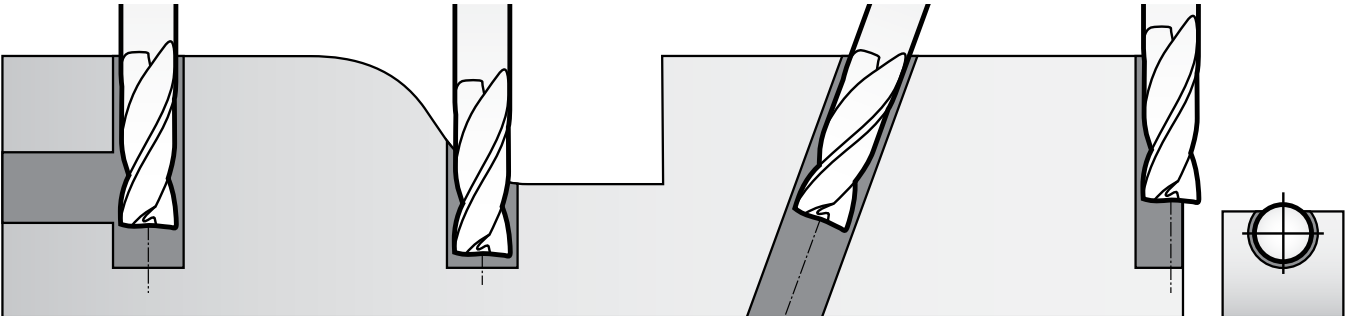


**NEW!**

## FBD-202 2 Flute 5x Diameter Flat Bottom Drills



Cutting Diameter	Shank Diameter	Flute Length	Max Hole depth	Corner Radius	Overall Length	Tool Number AlTiN Coated	Tool Number Thru Coolant AlTiN Coated
1/8"	1/8"	3/4"	5/8"	0.005	2"	FBD-202-04-TP-A	FBD-202-04-TC-TP-A
3/16"	3/16"	1-1/8"	15/16"	0.01	2-1/2"	FBD-202-06-TP-A	FBD-202-06-TC-TP-A
1/4"	1/4"	1-1/2"	1-1/4"	0.01	3"	FBD-202-08-TP-A	FBD-202-08-TC-TP-A
5/16"	5/16"	1-7/8"	1-9/16"	0.02	3-1/2"	FBD-202-10-TP-A	FBD-202-10-TC-TP-A
3/8"	3/8"	2-1/4"	1-7/8"	0.02	4"	FBD-202-12-TP-A	FBD-202-12-TC-TP-A
1/2"	1/2"	3"	2-1/2"	0.02	5"	FBD-202-16-TP-A	FBD-202-16-TC-TP-A



Burr-Free Intersecting Holes

Shoulder Drilling

Drilling Angled Holes

Creating a Guide Hole

# 2 Flute Flat Bottom Drills for Steel and difficult alloys **FBD**

Tool Diameter	Ductile Cast Iron		Alloy Steel 4130/ 4140/ A2/ H13 up to 35 HRC		303,304, 316 Stainless Steel		6Al4V Titanium, Inconel, 13-8 & 17-4SS, 440C		Inch per Revolution*
	FBD-201(2x) (SFM 200-350) RPM	FBD-202(5x) (SFM 150-300) RPM	FBD-201(2x) (SFM 150-225) RPM	FBD-202(5x) (SFM 125-200) RPM	FBD-201(2x) (SFM 100-150) RPM	FBD-202(5x) (SFM 90-150) RPM	FBD-201(2x) (SFM 60-90) RPM	FBD-202(5x) (SFM 60-90) RPM	
1/8	6112 - 10696	4584 - 9168	4584 - 6876	3820 - 6112	3056 - 4584	2750 - 4584	1834 - 2750	1834 - 2750	.001-.002
3/16	4075 - 7131	3056 - 6112	3056 - 4584	2547 - 4075	2037 - 3056	1834 - 3056	1222 - 1834	1222 - 1834	.0015-.003
1/4	3056 - 5348	2292 - 4584	2292 - 3438	1910 - 3056	1528 - 2292	1375 - 2292	917 - 1375	917 - 1375	.002-.003
5/16	2445 - 4278	1834 - 3667	1834 - 2750	1528 - 2445	1222 - 1834	1100 - 1834	733 - 1100	733 - 1100	.003-.004
3/8	2037 - 3565	1528 - 3056	1528 - 2292	1273 - 2037	1019 - 1528	917 - 1528	611 - 917	611 - 917	.005-.006
1/2	1528 - 2674	1146 - 2292	1146 - 1719	955 - 1528	764 - 1146	688 - 1146	458 - 688	458 - 688	.006-.007

Mild Carbon Steel/Gray Cast Iron			
Tool Diameter	FBD-201(2x) (SFM 200-350) RPM**	FBD-202(5x) (SFM 150-300) RPM**	Inch per Revolution*
1/8	6112 - 10696	4584 - 9168	.002-.003
3/16	4075 - 7131	3056 - 6112	.003-.004
1/4	3056 - 5348	2292 - 4584	.004-.006
5/16	2445 - 4278	1834 - 3667	.006-.007
3/8	2037 - 3565	1528 - 3056	.006-.009
1/2	1528 - 2674	1146 - 2292	.009-.012

Use maximum RPM if it exceeds your machines RPM

Guide hole recommend if you get chatter. Pecking in small depths might help. Always start holes with short 2X drill first.

\*Adjust inch per revolution to 50% when on angled surfaces is 30° or less.

\*Adjust inch per revolution to 30% of recommended when on an angled or curved surface is greater than 30° or when the cutter is not fully encapsulated and only drilling a partial hole

\*\* Adjust RPM to 70% of recommended RPM when on an angled or curved surface is greater than 30° or when the cutter is not fully encapsulated and only drilling a partial hole

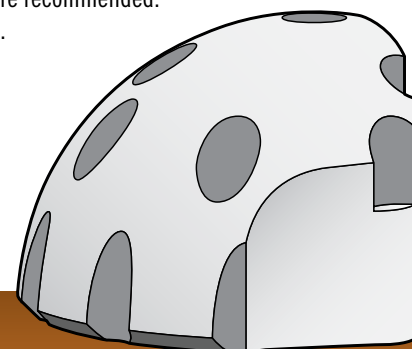
When using FBD-202 (5x) use FBD-201(2x) to start the hole to reduce walking.

Thru coolant holes recommended on FBD-202 (5x) deep holes

If chip packing is a problem thru coolant holes are recommended. Pecking may help if you do not have thru coolant.

## Drilling Curved Material

If drilling on flat surfaces and the drill walks spot drill first to reduce the amount of surface contact when starting the hole. The longer a drill is, the higher the chance that it will walk.



## Hi-Temp Alloys Tools in Other Sections

### TS / MTS 201/301/401

(See Multiple Applications)



**152**

### TR 303/404/606

(See Multiple Applications)



**154**

### MINIATURES

(See Miniatures Applications)



**132**

### SAWS

(See Saws Applications)



**170**