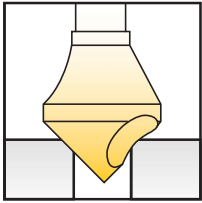


Zero Flute Deburring Tool with Hole



The deburring tool "with hole" is specially designed for countersinking and chamfering light metals and plastics.

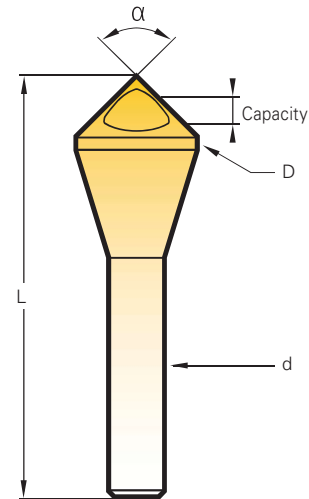
The surface obtained is smooth and without burrs. We recommend lubricating.

Metric Zero Flute Deburring Tool with Hole - Angle 90°

#	Diameter		Capacity min/max	d	L	Cobalt 411	M352/TiN 4811
	(inch)	(mm)					
0	1/4 ¹		5/64 - 3/16	1/4	1-3/4	84411063500	84481106350
	0.394	10	5/32 - 11/32	0.236	1-3/4	84411100000	84481110000
1	7/16		7/32 - 13/32	1/4	1-3/4	84411112000	84481111200
	9/16		1/4 - 1/2	1/4	2	84411140000	84481114000
2	0.590	15	1/4 - 9/16	0.315	2-1/4	84411150000	84481115000
	0.787	20	5/16 - 11/16	0.394	2-1/2	84411200000	84481120000
3	13/16		5/16 - 11/16	1/2	2-5/8	84411204000	84481120400
	0.984	25	3/8 - 7/8	0.472	3	84411250000	84481125000
-	1.102	28	7/16 - 1	0.472	3-3/8	84411280000	84481128000
	1.181	30	1/2 - 1-1/8	0.472	3-1/2	84411300000	84481130000
4	1-3/16		1/2 - 1-1/8	1/2	3-1/2	84411301000	84481130100
	1.378	35	9/16 - 1-5/16	0.630 ²	4	84411350000	84481135000
-	1.575	40	5/8 - 1-1/2	0.630 ²	4-5/8	84411400000	84481140000
	1.969	50	3/4 - 1-7/8	0.630 ²	5	84411500000	84481150000

¹ Double end cutter

² Shanks with 3 flats for better holding



Metric Zero Flute Deburring Tool with Hole - Angles 60°, 82°, 100° and 120°

Angle	#	Diameter		Capacity min/max	d	L	Cobalt
		(inch)	(mm)				
60° 412	0	1/4 ¹	-	7/64 - 3/16	1/4	1-3/4	84412063500
	-	0.394	10	3/16 - 11/32	0.236	2	84412100000
	1	7/16	-	3/16 - 3/8	1/4	1-3/4	84412112000
	2	9/16	-	9/32 - 1/2	1/4	2	84412140000
	-	0.590	15	5/16 - 9/16	0.315	2-3/8	84412150000
	-	0.787	20	3/8 - 11/16	0.394	2-7/8	84412200000
	3	13/16	-	3/8 - 11/16	1/2	2-5/8	84412204000
	-	0.984	25	1/2 - 7/8	0.472	3-3/8	84412250000
	-	1.181	30	9/16 - 1 - 1/8	0.472	3-5/8	84412300000
	-	1.378	35	11/16 - 1 - 5/16	0.630	4-1/2	84412350000
82° 414	0	1/4 ¹	-	5/64 - 3/16	1/4	1-3/4	84414063500
	-	0.394	10	5/32 - 11/32	0.236	1-3/4	84414100000
	1	7/16	-	7/32 - 13/32	1/4	1-3/4	84414112000
	2	9/16	-	1/4 - 1/2	1/4	2	84414140000
	-	0.590	15	1/4 - 9/16	0.315	2-1/4	84414150000
	-	0.787	20	5/16 - 11/16	0.394	2-1/2	84414200000
	3	13/16	-	5/16 - 11/16	1/2	2-5/8	84414204000
	-	0.984	25	3/8 - 7/8	0.472	3	84414250000
	-	1.181	30	1/2 - 1-1/8	0.472	3-1/2	84414300000
	-	1.378	35	9/16 - 1-5/16	0.630	4	84414350000
100° 415	-	0.394	10	5/32 - 11/32	0.236	1-3/4	84415100000
	-	0.590	15	1/4 - 9/16	0.315	2-1/8	84415150000
	-	0.787	20	9/32 - 11/16	0.394	2-1/2	84415200000
	-	0.984	25	11/32 - 7/8	0.472	3	84415250000
	-	1.181	30	7/16 - 1-1/16	0.472	3-3/8	84415300000
	-	1.387	35	1/2 - 1-5/16	0.630	4	84415350000
120° 413	-	0.394	10	5/32 - 11/32	0.236	1-3/4	84413100000
	-	0.590	15	1/4 - 9/16	0.315	2	84413150000
	-	0.787	20	9/32 - 11/16	0.394	2-3/8	84413200000
	-	0.984	25	11/32 - 7/8	0.472	2-7/8	84413250000
-	1.181	30	7/16 - 1-1/16	0.472	3-1/4	84413300000	
-	1.378	35	1/2 - 1-5/16	0.630	3-3/4	84413350000	

¹ Double end cutter

² Shanks with 3 flats for better holding

Tolerances

D	Angle	d	L
± .03	- 1°	h9	± 1mm



Metric Single Flute Countersink Sets - 5 pieces

Angle	EDP No.	Composition
60°	84412000000	Ø 10-15-20-25-30 mm
	84412000005	# 0-1-2-3-4
82°	84414000000	Ø 10-15-20-25-30 mm
	84414000005	# 0-1-2-3-4
90°	84411000000	Ø 10-15-20-25-30 mm
	84481100000-TiN	Ø 10-15-20-25-30 mm
	84411000002	Ø 10-15-20-28-35 mm
100°	84411000005	# 0-1-2-3-4
	84481100005-TiN	# 0-1-2-3-4
120°	84415000000	Ø 10-15-20-25-30 mm
	84413000000	Ø 10-15-20-25-30 mm

Deburring Countersinking - Performance

Performance

Use Recommendations

Example:


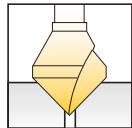
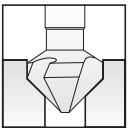
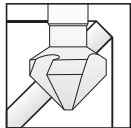
3/4" - .750 Diameter 3 Flute to Countersink 304 SS

SFM = Speed : Surface Feet Per Minute

IPM = Feed : Inches Per Minute

RPM = SFM X 12
3.14 X Diameter

$$RPM = \frac{45 \times 12}{3.14 \times .75} = \frac{540}{2.35} = 230 \text{ RPM}$$

Deburring Countersinking												Contouring					
 												 					
Material		HSS. Co =+TiN		HSS. Co =+TiN		HSS. Co =+TiN		HSS. 8% Co +Red'X		Carbure/Carbide +Hard'X		HSS. Co =+TiN		HSS. 8% Co +Red'X		Carbure/Carbide +Hard'X	
		SFM	IPM	SFM	IPM	SFM	IPM	SFM	IPM	SFM	IPM	SFM	IPM	SFM	IPM	SFM	IPM
Steel < 81 HRB (B)	Ø10	6.5	6.5	6.5	6.5	3.4	3.4	6.5	6.5	10.0	10.0	3.4	3.4	6.5	6.5	10.0	10.0
	Ø20	3.4	3.4	3.4	3.4	1.8	1.8	3.4	3.4	5.0	5.0	1.8	1.8	3.4	3.4	5.0	5.0
	Ø30	2.0	2.0	2.0	2.0	1.2	1.2	2.0	2.0	3.4	3.4	1.2	1.2	2.0	2.0	3.4	3.4
Steel < 24 Rc	Ø10	4.3	4.3	4.3	4.3	2.4	2.4	4.3	4.3	6.6	6.6	2.4	2.4	4.3	4.3	6.6	6.6
	Ø20	2.0	2.0	2.0	2.0	1.2	1.2	2.0	2.0	3.4	3.4	1.2	1.2	2.0	2.0	3.4	3.4
	Ø30	1.4	1.4	1.4	1.4	0.8	0.8	1.4	1.4	2.4	2.4	0.8	0.8	1.4	1.4	2.4	2.4
Steel 24 - 32 Rc	Ø10	2.0	2.0	2.0	2.0	1.4	1.4	2.0	2.0	4.0	4.0	1.4	1.4	2.0	2.0	4.0	4.0
	Ø20	1.4	1.4	1.4	1.4	1.0	1.0	1.4	1.4	2.4	2.4	1.0	1.0	1.4	1.4	2.4	2.4
	Ø30	1.0	1.0	1.0	1.0	0.6	0.6	1.0	1.0	1.8	1.8	0.6	0.6	1.0	1.0	1.8	1.8
Stainless Steel 32 - 41 Rc	Ø10	1.8	1.8	1.8	1.8	1.2	1.2	1.8	1.8	4.0	4.0	1.2	1.2	1.8	1.8	4.0	4.0
	Ø20	1.0	1.0	1.0	1.0	0.6	0.6	1.0	1.0	2.4	2.4	0.6	0.6	1.0	1.0	2.4	2.4
	Ø30	0.8	0.8	0.8	0.8	0.3	0.3	0.8	0.8	1.6	1.6	0.3	0.3	0.8	0.8	1.6	1.6
Abrasion Resistant Steel	Ø10									1.6	2.0			1.6	2.0	2.0	2.0
	Ø20									1.2	1.4			1.2	1.4	1.4	1.4
	Ø30									0.8	1.0			0.8	1.0	1.0	1.0
Inconel	Ø10							13-20	13-20	32-38	32-38			13-20	13-20	32-38	32-38
	Ø20							0.6	0.6	1.2	1.2			0.6	0.6	1.2	1.2
	Ø30							0.3	0.3	0.6	0.6			0.3	0.3	0.6	0.6
Cast Iron	Ø10	5.0	5.0	5.0	5.0	2.8	2.8	5.0	5.0	0.3	0.3	2.8	2.8	5.0	5.0	0.3	0.3
	Ø20	3.0	3.0	3.0	3.0	1.6	1.6	3.0	3.0	6.0	6.0	1.6	1.6	3.0	3.0	6.0	6.0
	Ø30	2.0	2.0	2.0	2.0	1.2	1.2	2.0	2.0	4.0	4.0	1.2	1.2	2.0	2.0	4.0	4.0
Aluminium	Ø10	10.0	10.0	10.0	10.0	7.8	7.8	10.0	10.0	13.8	13.8	7.8	7.8	10.0	10.0	13.8	13.8
	Ø20	7.0	7.0	7.0	7.0	5.2	5.2	7.0	7.0	9.0	9.0	5.2	5.2	7.0	7.0	9.0	9.0
	Ø30	6.0	6.0	6.0	6.0	4.3	4.3	6.0	6.0	7.8	7.8	4.3	4.3	6.0	6.0	7.8	7.8
Bronze Brass	Ø10	6.0	6.0	6.0	6.0	4.7	4.7	6.0	6.0			4.7	4.7	6.0	6.0		
	Ø20	4.3	4.3	4.3	4.3	3.4	3.4	4.3	4.3			3.4	3.4	4.3	4.3		
	Ø30	3.5	3.5	3.5	3.5	2.8	2.8	3.5	3.5			2.8	2.8	3.5	3.5		
Copper	Ø10	4.7	4.7	4.7	4.7	3.75	3.75	4.7	4.7	12.0	12.0	3.75	3.75	4.7	4.7	12.0	12.0
	Ø20	3.0	3.0	3.0	3.0	2.4	2.4	3.0	3.0	7.8	7.8	2.4	2.4	3.0	3.0	7.8	7.8
	Ø30	2.6	2.6	2.6	2.6	1.8	1.8	2.6	2.6	7.0	7.0	1.8	1.8	2.6	2.6	7.0	7.0
Laminated	Ø10	16.0	16.0	16.0	16.0	12.0	12.0	12.0	12.0			12.0	12.0	12.0	12.0		
	Ø20	12.0	12.0	12.0	12.0	7.8	7.8	7.8	7.8			7.8	7.8	7.8	7.8		
	Ø30	10.0	10.0	10.0	10.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0		
Nylon, PVC Plastics	Ø10	18.0	18.0	18.0	18.0	16.0	16.0	16.0	16.0			16.0	16.0	16.0	16.0		
	Ø20	13.8	13.8	13.8	13.8	12.0	12.0	12.0	12.0			12.0	12.0	12.0	12.0		
	Ø30	12.0	12.0	12.0	12.0	10.0	10.0	10.0	10.0			10.0	10.0	10.0	10.0		