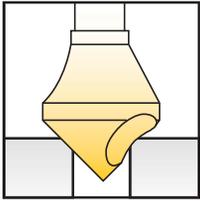


Zero Flute Deburring Tool with Hole



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 |
| | 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 |
| 3 | 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 |
| | 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 |
| 4 | 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

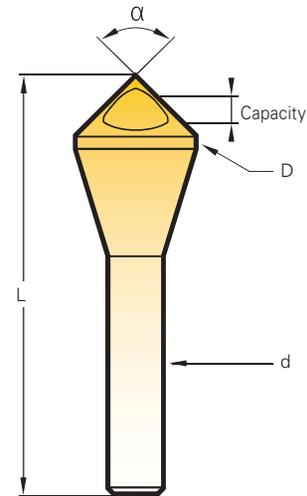
² Shanks with 3 flats for better holding

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 |
| | 4 | 1-3/16 | - | 9/16 - 1 - 1/8 | 1/2 | 3-1/2 | 84412301000 |
| 82° 414 | - | 1.378 | 35 | 11/16 - 1 - 5/16 | 0.630 | 4-1/2 | 84412350000 |
| | 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 |
| 100° 415 | 4 | 1-3/16 | - | 1/2 - 1-1/8 | 1/2 | 3-1/2 | 84414301000 |
| | - | 1.378 | 35 | 9/16 - 1-5/16 | 0.630 | 4 | 84414350000 |
| | - | 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 |
| 120° 413 | - | 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 |
| | - | 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 |
| | 84411000005 | # 0-1-2-3-4 |
| 100° | 84481100005-TiN | # 0-1-2-3-4 |
| | 84415000000 | Ø 10-15-20-25-30 mm |
| 120° | 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 | | | | | | | | |
|----------------------------------|-----|--------------------------|------|--------------------|------|------------------|-------|----------------------|-------|----------------------------|------|------------------|------|----------------------|-------|----------------------------|-------|-------|--|--|
| | | | | | | | | | | | | | | | | | | | | |
| | | Recommendation N°1 | | Recommendation N°2 | | | | | | | | | | | | | | | | |
| 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 | | SFM | | SFM | | SFM | | SFM | | SFM | | SFM | | SFM | | SFM | | |
| Steel < 81 HRB (B) | Ø10 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | | | | | | | | 1.6 | 2.0 | 2.0 | | | 1.6 | 2.0 | 2.0 | 2.0 | | |
| | Ø20 | IPM | | | | | | | | 1.2 | 1.4 | 1.4 | | | 1.2 | 1.4 | 1.4 | 1.4 | | |
| | Ø30 | IPM | | | | | | | | 0.8 | 1.0 | 1.0 | | | 0.8 | 1.0 | 1.0 | 1.0 | | |
| Inconel | Ø10 | IPM | | | | | 13-20 | 13-20 | 32-38 | 32-38 | | | | | 13-20 | 13-20 | 32-38 | 32-38 | | |
| | Ø20 | IPM | | | | | 0.6 | 0.6 | 1.2 | 1.2 | | | | | 0.6 | 0.6 | 1.2 | 1.2 | | |
| | Ø30 | IPM | | | | | 0.3 | 0.3 | 0.6 | 0.6 | | | | | 0.3 | 0.3 | 0.6 | 0.6 | | |
| Cast Iron | Ø10 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 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 | IPM | 12.0 | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | 10.0 | | | 10.0 | 10.0 | 10.0 | 10.0 | | | | |