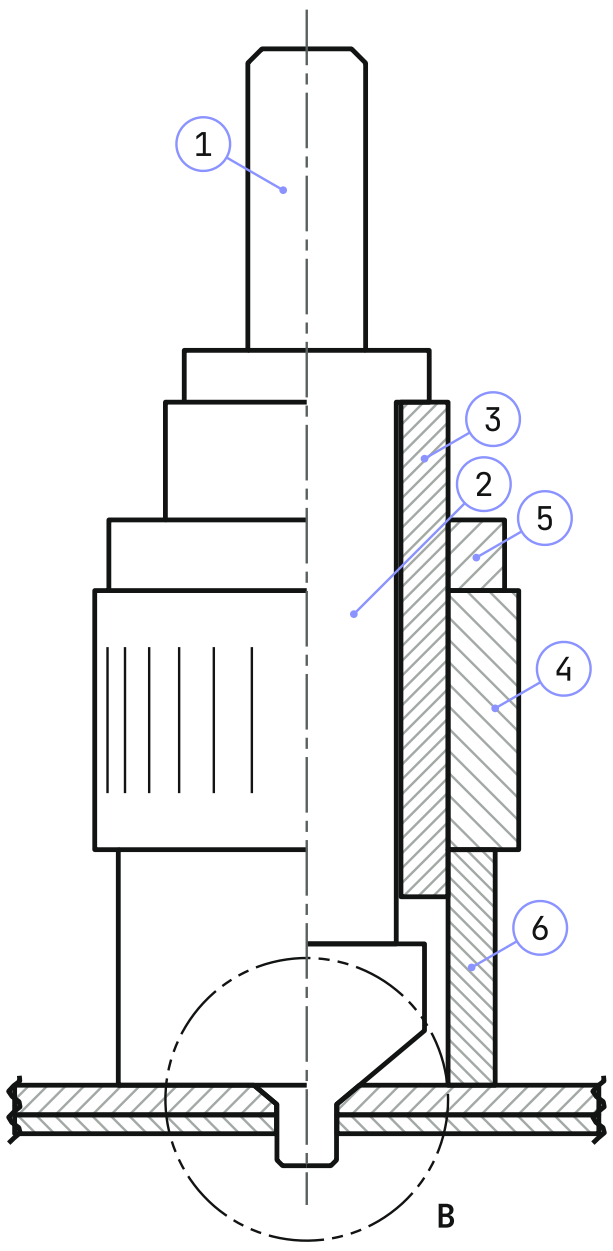
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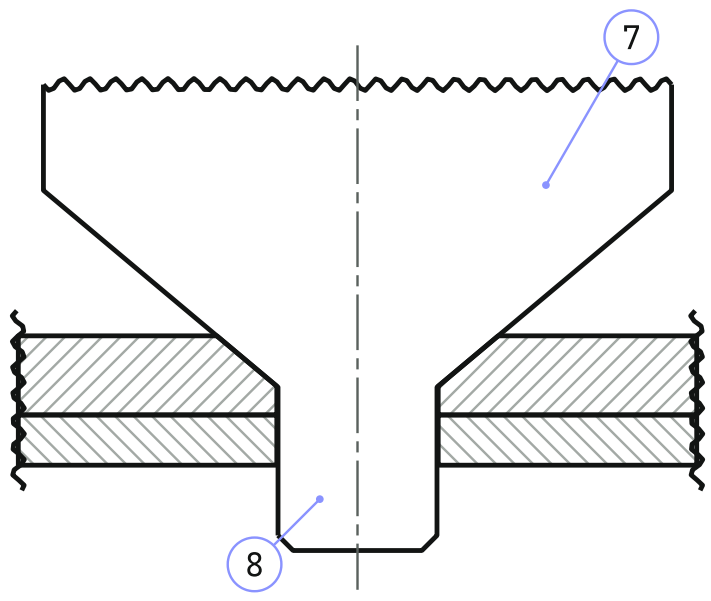


# Countersink Cutters and Stop Cages: Parts, Angles and Pilots

A countersink cutter cuts the cone that lets a flush head sit level with the skin; the stop cage sets how deep it goes and holds it square.



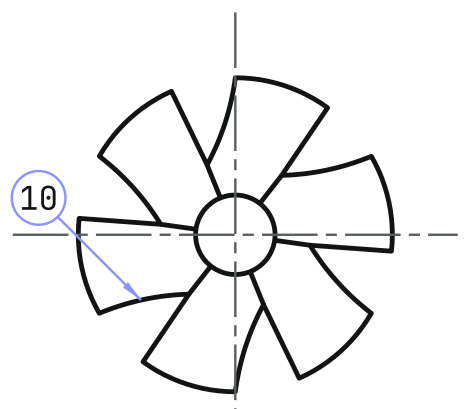

HALF SECTION
SCALE 1.5:1



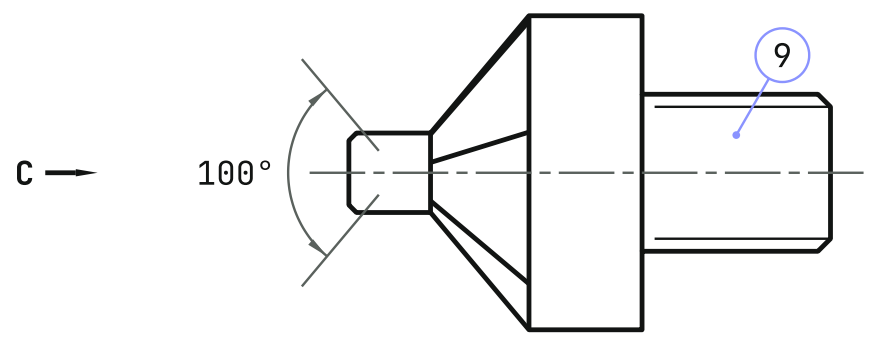

DETAIL B
SCALE 4:1

| PILOT BY FINAL HOLE | |
|---|---|
| HOLE | PILOT IN (MM) |
| #40 | 0.096 (2.44) |
| #30 | 0.1265 (3.21) |
| #21 | 0.157 (3.99) |
| #11 | 0.189 (4.80) |
| F | 0.255 (6.48) |
| 0.002 (0.05) UNDER: TAP ADVICE | |

NOTES
1. DIMENSIONS IN INCHES (MM).
2. CUTTER ANGLE TO MATCH THE FASTENER HEAD: 100° IS THE STANDARD.
3. CUTTER THREAD 1/4-28: CHECK IT AGAINST THE CAGE.
4. SET THE DEPTH ON SCRAP OF THE SAME STACK. SLEEVE STEPS 0.001 (0.03).
5. SLOW SPEED, STEADY PRESSURE, SKIRT 6 FLAT ON THE SKIN.
6. REPAIR DATA GOVERNS THE DEPTH.




VIEW C
SCALE 2:1




VIEW D, CUTTER
SCALE 2:1

| ITEM | DESCRIPTION |
|---|---|
| 10 | FLUTE |
| 9 | THREADED SHANK 1/4-28 |
| 8 | PILOT |
| 7 | CUTTER, 100° |
| 6 | SKIRT |
| 5 | LOCK RING |
| 4 | MICRO-SLEEVE |
| 3 | HOUSING |
| 2 | SPINDLE |
| 1 | DRIVE SHANK |

| | |
|---|---|
| COUNTERSINK, PILOTED, STOP CAGE | |
| SHEET 1 OF 1 | |
| DWG TAP-TG-027 | REV A |
| SCALE 1.5:1 | |

## Types and sizes

| Type or size | Range, inches (mm) | Where it fits |
|---|---|---|
| Piloted cutter, 100° | Pilots for #40 to F holes, 0.098 to 0.257 (2.49 to 6.53) | Standard flush rivets and screws: the cutter for most aircraft countersinks. |
| Cutter, 82° or 120° | Same pilots | Heads of another angle: the cutter angle always matches the head. |
| Interchangeable-pilot cutter | One body, pilots by hole size | One cutter body for several hole sizes; check that the pilot is tight in the body. |
| Micrometer stop cage | Steps of 0.001 (0.03); 1/4-28 cutter thread | All countersinking where the cage sits flat on the skin. |
| Cage with a nylon skirt | Same cutters | Painted or clad skins: the skirt does not mark the finish. |
| Extended or offset cage | Cutter bodies from 3/8 (9.5) | Channels, flanges and tight corners where the standard cage does not fit. |
| Cutter body | 3/8 to 3/4 (9.5 to 19.1); 1/2 (12.7) is the common size | Larger bodies for larger heads; the body must fit inside the cage skirt. |
| Back countersink cutter | Fitted through the hole | Wells on the far side of a part that cannot be reached from that side. |

## What to check when buying

| Check | What to look for |
|---|---|
| Angle | The angle of the heads you install: 100° for standard flush rivets and screws. Keep other angles apart and marked. |
| Pilot | One cutter or pilot per final hole size. Check the pilot against the hole: a #10 pilot, 0.1935 in (4.91 mm), will not enter a #11 hole, 0.191 in (4.85 mm). |
| Thread | Most cages and cutters use a 1/4-28 thread: check the cutter against the cage before you mix sources. |
| Cage adjustment | Clear marks in steps of 0.001 in (0.03 mm) and a lock ring that holds the setting. |
| Skirt | Flat and square to the spindle, open enough to see the cutter and let the chips out; a nylon skirt for painted skins. |
| Flutes | Six flutes for aluminum; a single-flute cutter for CRES; sharp edges with no chips. |
| Reach | An extended or offset cage only if your work has channels and flanges. |



Educational reference only, not approved data. Always consult the applicable SRM, AMM, or AC 43.13-1B and your certifying authority.

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## Accessories

| Item | What it is for |
|---|---|
| Cutter set | One 100° cutter for each final hole size, in a marked case. |
| Spare pilots | For interchangeable-pilot cutters: pilots wear and break first. |
| Test rivets and scrap | A strip of the same material and thickness to set the depth before the part. |
| Countersink depth gauge | Reads the well diameter or depth to check the setting. |
| Backing block | Holds thin sheet steady under the pilot. |
| Deburring tool | Cleans the hole edge on the far side after countersinking. |

SCAN · OPEN THIS GUIDE
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