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How to Use a Drill Motor for Rivet Holes

A good hole is round, straight and burr-free.

Which drill motor

Type	Use	Note
Pneumatic pistol-grip	The most common motor for aircraft repair: light, enough power, good speed control	Most are rated 3,000 rpm; recommended around flammables because there are no sparks (H-31 p. 4-14)
Electric	Portable power drill	Spark hazard around flammable material (p. 4-14)
Right-angle and 45 degree	Where a pistol grip does not fit	Mostly threaded drill bits in several lengths (p. 4-14)
Two-hole drill	Nutplate holes	Drills both holes at once, so spacing is fixed (p. 4-15)
Drill press	Accuracy; clamp the part	Aluminum 200 to 300 sfm, mild steel 30 to 50 sfm; rpm = CS x 4 / D (p. 4-15)
Lower rpm, more torque motor	Deep holes, corrosion-resistant steel, titanium	p. 4-14

Drill sizes for the standard solid rivets

Rivet diameter	Pilot drill	Final drill
3/32	3/32 (0.0937)	No. 40 (0.098)
1/8	1/8 (0.125)	No. 30 (0.1285)
5/32	5/32 (0.1562)	No. 21 (0.159)
3/16	3/16 (0.1875)	No. 11 (0.191)
1/4	1/4 (0.250)	F (0.257)

Typical mistakes

Mistake	What happens	Fix
Bent or wobbling bit	Oversize holes	Replace the bit
Tilting the drill	Elongated (egg-shaped) hole	Stay at 90 degrees through the whole stroke
Pushing hard	Bigger burrs, bit through the stock, damage behind	Light pressure; use a drill stop
No backup block	Burr and sheet distortion	Wood block under the hole
Extension bit too long or unsupported	Bit whips, hole is off	Shortest bit that works; support those under 1/4 in with a guard (p. 4-16)
Wrong bit for the metal	HSS wears fast in titanium or stainless; cobalt does not give a quality hole in aluminum	HSS 135 degree split point for aluminum; cobalt vanadium for titanium and stainless (pp. 4-16, 4-17)

Key points

- **Not approved data.** The SRM or drawing sets hole sizes, fits and limits. Do not drill or enlarge holes in primary structure without the repair data.
- **Speeds.** The cutting speeds are the Handbook's general range; use the bit maker's data for hard materials.

SOURCES · FAA-H-8083-31B, AMT Handbook: Airframe, Chapter 4 · FAA AC 43.13-1B CHG 1, Acceptable Methods, Techniques and Practices

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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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