

# Pilot Hole Drilling Chart for Hanger Bolts

**Tip:** Set your PDF viewer to "Actual size" before printing to maintain scale.

## Recommended Pilot Hole Sizes by Wood Type

Hanger Bolt Diameter	Shank Diameter	Hardwoods (Oak, Maple, Walnut)	Medium Woods (Cherry, Birch, Ash)	Softwoods (Pine, Fir, Cedar)	Plywood (Multi-Ply)	Particle Board
1/4"	0.250"	3/16" (0.1875") 75% of diameter	11/64" (0.172") 69% of diameter	5/32" (0.156") 62% of diameter	3/16" (0.1875")	Use threaded insert
5/16"	0.3125"	1/4" (0.250") 80% of diameter	15/64" (0.234") 75% of diameter	7/32" (0.219") 70% of diameter	1/4" (0.250")	Use threaded insert
3/8"	0.375"	5/16" (0.3125") 83% of diameter	19/64" (0.297") 79% of diameter	9/32" (0.281") 75% of diameter	5/16" (0.3125")	Use threaded insert
1/2"	0.500"	3/8" (0.375") 75% of diameter	23/64" (0.359") 72% of diameter	11/32" (0.344") 69% of diameter	3/8" (0.375")	Use threaded insert
5/8"	0.625"	1/2" (0.500") 80% of diameter	15/32" (0.469") 75% of diameter	7/16" (0.438") 70% of diameter	1/2" (0.500")	Use threaded insert

## Recommended Pilot Hole Depths

Hanger Bolt Diameter	Minimum Penetration	Recommended Penetration	Maximum Penetration	Pilot Hole Depth
1/4"	3/4"	1" - 1.25"	2"	Add 1/8" to penetration depth
5/16"	7/8"	1.25" - 1.5"	2.5"	Add 1/8" to penetration depth
3/8"	1"	1.5" - 2"	3"	Add 1/8" to penetration depth
1/2"	1.25"	2" - 2.5"	4"	Add 1/8" to penetration depth
5/8"	1.5"	2.5" - 3"	5"	Add 1/8" to penetration depth

**Note:** Extra 1/8" depth provides clearance for wood chips and prevents bottoming out.

# Pilot Hole Drilling Chart for Hanger Bolts

## Wood Species Classification Guide

Hardwoods (Dense)	Medium Density Woods	Softwoods (Less Dense)
Oak (Red, White)	Cherry	Pine (White, Yellow)
Maple (Hard, Sugar)	Birch	Fir (Douglas, True)
Walnut (Black)	Ash	Cedar (Red, White)
Hickory	Poplar	Spruce
Mahogany	Alder	Redwood
Beech	Mahogany (Soft varieties)	Hemlock
	Sycamore	Basswood

## Pilot Hole Drilling Best Practices

### Drill Bit Selection:

- Use sharp brad point bits for clean, accurate holes in wood
- Standard twist drill bits work but may wander in soft wood
- Forstner bits create flat-bottom holes but not necessary for hanger bolts
- Replace dull bits - they create rough holes and may cause splitting

### Depth Control:

- Use depth stop collar on drill bit for consistent depth
- Wrap masking tape around bit as visual depth indicator
- Drill press provides best depth control and perpendicular accuracy
- Check depth with ruler before installing hanger bolt

### Alignment:

- Use drill press for perfect perpendicular holes when possible
- Handheld drilling: use square or speed square as visual guide
- Start slowly and check alignment before drilling to full depth
- Angled holes significantly reduce holding power

### Wood Preparation:

- Mark center point accurately with awl or center punch
- Ensure wood is clamped securely to prevent movement
- Drill from "show side" to minimize tearout on exit
- Clean out wood chips from hole before installing hanger bolt

### Special Situations:

- **End grain:** Use pilot hole 10-15% smaller than side grain
- **Wet or green wood:** Use smaller pilot to account for shrinkage
- **Very hard exotic woods:** May require pilot closer to 85-90% of shank diameter
- **Knotty wood:** Avoid installing through knots - they're unpredictable
- **Laminated wood:** Penetrate multiple laminations for adequate holding power

**Critical:** Pilot hole size is the most important factor in hanger bolt installation success. Too small causes splitting; too large provides inadequate holding power. When in doubt, test in scrap wood first.