

# Insert Material Selection Guide

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

## Insert Selection by Base Material

Base Material	Recommended Insert Type	Installation Method	Key Considerations
Aluminum	HeliCoil, Tangless, Key-Locking	Drill, tap with STI tap, install mandrel	Prevents thread stripping, 2-3x strength increase, stainless prevents galvanic corrosion
Magnesium	HeliCoil, Tangless	Same as aluminum	Very soft - inserts essential, stainless steel inserts required
Cast Iron	HeliCoil, Key-Locking	Drill, tap, install	For thread repair in damaged castings, salvage expensive parts
Steel (Soft)	HeliCoil (repair only)	Drill, tap, install	Used only for thread repair, not strength enhancement
Hardwood	Threaded inserts (brass or steel)	Drill, drive in with hex key	Brass easier to install, provides strong reusable threads
Softwood	Threaded inserts, Expansion inserts	Drill, drive in carefully	Expansion type better for very soft woods, avoid over-tightening
Particleboard/MDF	Expansion inserts, Pronged tee nuts	Drill and drive, or hammer in	Regular wood inserts don't hold well, expansion critical
Plywood	Threaded inserts, Expansion inserts	Drill perpendicular to grain	Through-thickness installation strongest
ABS Plastic	Heat-set inserts	Heat with iron, press in	Most common 3D print material, 400-450°F installation temp
PLA Plastic	Heat-set inserts	Heat 350-400°F, press in	3D printing, lower temp than ABS, brittle when cold
Nylon	Heat-set, Ultrasonic	Heat or ultrasonic	Engineering plastic, high strength, requires higher heat
Polycarbonate	Heat-set, Ultrasonic	Heat 475-525°F	High-temp plastic, strong, requires hot iron
Fiberglass/Composites	Press-fit, Bonded	Press + epoxy adhesive	Cannot melt for heat-set, bond with epoxy for permanence

## Insert Selection by Application

Application	Recommended Insert	Why This Type
Thread Repair - Aluminum	HeliCoil or Tangless	Restores full strength, stainless prevents corrosion
Thread Repair - Cast Iron	HeliCoil or Key-Locking	Salvages expensive castings, stronger than original
High-Torque Metal	Key-Locking inserts	Cannot rotate, highest pull-out strength
Aerospace Applications	Tangless HeliCoil	No tang to break off, reliable in blind holes
Furniture Assembly	Threaded inserts (brass)	Allows repeated disassembly, professional finish
Jigs & Fixtures	Threaded inserts (steel)	Reusable, withstands many cycles
Cabinet Hardware	Expansion inserts	Works in particleboard, prevents pull-out
3D Printed Prototypes	Heat-set inserts (brass)	Easy installation, strong threads, reusable
Production Plastic Parts	Ultrasonic inserts	Fastest installation, highest strength, automated
Electrical Enclosures	Self-tapping inserts	Quick field installation, no tapping required
Composite Structures	Bonded press-fit	Permanent installation, epoxy distributes load

### Quick Selection Decision Tree

#### 1. What is your base material?

- Soft metal (aluminum, magnesium) → HeliCoil or Key-Locking
- Hardwood → Threaded inserts (brass or steel)
- Particleboard/MDF → Expansion inserts
- Thermoplastic → Heat-set or Ultrasonic

- Thermoset/composite → Press-fit + epoxy

## **2. What is your primary need?**

- Thread repair → HeliCoil (metal) or replace part (wood/plastic)
- Repeated assembly/disassembly → Any threaded insert type
- Maximum strength → Key-Locking (metal) or Ultrasonic (plastic)
- Quick installation → Self-tapping or Heat-set

## **3. What is your production volume?**

- Prototypes/low volume → Hand-installed types (HeliCoil, Heat-set, Threaded)
- High volume → Automated types (Ultrasonic, Self-tapping)

## **4. Do you need special features?**

- Blind holes → Tangless HeliCoil
- High torque → Key-Locking inserts
- Corrosion resistance → Stainless steel inserts

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