

# Fastener Materials and Coatings Guide

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

## Steel Grades

Material	Composition	Tensile Strength	Characteristics & Uses
Low Carbon Steel (Grade 2)	0.05-0.30% carbon	64,000 psi	Economical, easy to form. General purpose, non-critical applications
Medium Carbon Steel (Grade 5)	0.30-0.60% carbon, heat treated	120,000 psi	Good strength/cost balance. Automotive, machinery, construction
Alloy Steel (Grade 8)	Medium carbon + alloys, quenched & tempered	150,000 psi	High strength, fatigue resistant. Critical/high-stress applications
ASTM A325	Medium carbon, heat treated	120,000 psi min	Structural bolts for steel-to-steel connections
ASTM A490	Alloy steel, quenched & tempered	150,000 psi min	High-strength structural bolts, bridges, heavy construction

## Stainless Steel Types

Type	Designation	Composition	Best Applications
18-8	304 / A2	18% chromium, 8% nickel	General corrosion resistance, food equipment, architectural
316	316 / A4	16% Cr, 10% Ni, 2% molybdenum	Marine, chemical exposure, salt environments, medical
410	410 (Martensitic)	12% chromium, hardenable	Heat treatable, moderate corrosion resistance, wear parts
430	430 (Ferritic)	17% chromium, no nickel	Economical, magnetic, interior/decorative applications

*Note: 18-8/304 is the most common stainless for fasteners. Use 316 when exposed to salt, chemicals, or marine environments.*

## Other Fastener Materials

### Non-Ferrous Metals

- **Brass:** Corrosion resistant, decorative, electrical conductivity. Soft - not for high loads
- **Bronze:** Superior corrosion resistance, marine hardware, bearings. Silicon bronze for welding
- **Aluminum:** Lightweight, corrosion resistant. Low strength - use with aluminum parts only
- **Copper:** Electrical/thermal conductivity. Roofing, electrical grounding

### Specialty Materials

- **Titanium:** Highest strength-to-weight, biocompatible, corrosion proof. Aerospace, medical
- **Monel:** Nickel-copper alloy, extreme corrosion resistance. Marine, chemical processing
- **Inconel:** High-temp strength, oxidation resistant. Exhaust systems, turbines
- **Nylon:** Lightweight, non-conductive, chemical resistant. Electronics, food equipment

## Protective Coatings & Finishes

Coating	Process	Salt Spray Hours	Characteristics & Applications
Zinc Plated	Electroplating	12-72 hrs	Most common, economical. Indoor use, light corrosion protection
Hot-Dip Galvanized	Molten zinc bath	500+ hrs	Thick coating, excellent outdoor protection. Construction, utilities
Yellow Zinc	Zinc + chromate	96-120 hrs	Enhanced zinc, gold color. Automotive, machinery
Black Oxide	Chemical conversion	5-10 hrs (oiled)	Minimal protection, aesthetic. Indoor, low corrosion environments
Phosphate	Chemical conversion	24-48 hrs (oiled)	Paint base, oil retention, break-in. Automotive, firearms
Dacromet/Geomet	Dip-spin coating	500-1000+ hrs	Zinc-aluminum flake, no hydrogen embrittlement. Automotive, structural
Zinc-Nickel	Electroplating	500-1000 hrs	High-performance, temp resistant. Automotive, aerospace
Cadmium	Electroplating	200-500 hrs	Excellent corrosion/lubricity. Aerospace, military (restricted use)
Chrome	Electroplating	200+ hrs	Hard, decorative, wear resistant. Decorative hardware, hydraulics

Coating	Process	Salt Spray Hours	Characteristics & Applications
Ceramic/Teflon	Spray coating	1000+ hrs	Extreme protection, low friction. Deck screws, outdoor, marine

**⚠ Pressure-Treated Wood Compatibility**  
ACQ-treated lumber is corrosive to standard zinc and galvanized coatings. Use only: Hot-dip galvanized (G185 or better), Stainless steel (304 or 316), or ACQ-compatible coated fasteners.

Selection Quick Reference

Environment/Application	Recommended Material	Recommended Coating
Indoor, dry conditions	Low carbon steel	Zinc plated or black oxide
Outdoor, general exposure	Medium carbon steel	Hot-dip galvanized
Marine/coastal	316 stainless steel	None needed (passivated)
Pressure-treated lumber	304/316 SS or HDG	G185 galvanized minimum
Automotive underbody	Grade 5/8 steel	Dacromet or zinc-nickel
Food processing	304 or 316 stainless	None (passivated)
High temperature	Inconel or stainless	None or ceramic
Decorative/visible	Stainless or brass	Chrome or polished

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