

ASTM A453 Grade 660 Stud Bolts & Hex Nuts – Technical Datasheet

ASTM A453 Grade 660 stud bolts and hex nuts are high-temperature, precipitation-hardened alloy steel fasteners manufactured for severe service applications involving elevated temperature and pressure. Grade 660 fasteners (UNS S66286) are widely used in power generation, petrochemical plants, refineries, turbines, pressure vessels, and heat exchangers.

Applicable Standards

ASTM A453 / ASME SA453 – High Temperature Bolting Materials

EN 10204 3.1 – Mill Test Certification

ASME B1.1 – Unified Inch Screw Threads

Chemical Composition (Typical)

Element	Content (%)
Nickel (Ni)	24.0 – 27.0
Chromium (Cr)	13.5 – 16.0
Molybdenum (Mo)	1.0 – 1.75
Titanium (Ti)	1.90 – 2.35
Aluminum (Al)	≤ 0.35
Carbon (C)	≤ 0.08
Manganese (Mn)	≤ 2.00
Silicon (Si)	≤ 1.00
Phosphorus (P)	≤ 0.025
Sulfur (S)	≤ 0.025
Iron (Fe)	Balance

Heat Treatment

- Solution heat treated
- Precipitation hardened (aged)
- Heat treatment carried out strictly in accordance with ASTM A453 requirements

Mechanical Properties – Grade Comparison

Grade	Tensile Strength	Yield Strength (0.2%)	Elongation
A	130 ksi (895 MPa)	85 ksi (585 MPa)	≥ 15%
B	140 ksi (965 MPa)	95 ksi (655 MPa)	≥ 12%
C	150 ksi (1035 MPa)	105 ksi (725 MPa)	≥ 10%
D	160 ksi (1105 MPa)	115 ksi (795 MPa)	≥ 8%

Testing & Inspection Requirements

Mandatory tests include tensile test, yield strength, elongation, reduction of area, hardness test, chemical analysis, and dimensional inspection. Optional tests such as PMI, stress rupture, creep testing, and ultrasonic testing are available upon request. All products are supplied with EN 10204 3.1 Mill Test Certificate and full heat traceability.

Product Range

- Stud Bolts: 1/4" to 4" diameter
- Hex Nuts: Heavy Hex Nuts compatible with Grade 660 stud bolts
- Threads: UNC / UNF / Metric
- Surface Finish: Plain, Black Oxide, or as specified

Typical Applications

Power generation plants, oil and gas refineries, petrochemical equipment, boilers, pressure vessels, gas and steam turbines, and high-temperature flanged connections.

Keywords: ASTM A453 Grade 660 Stud Bolts, ASTM A453 Grade 660 Hex Nuts, High Temperature Fasteners, Grade 660 Alloy Steel Bolting

