



ASTM A449 Bolts

Heat-treated medium-strength steel · sizes 1/4" through 3" · comparable to SAE Grade 5



A449

Marked with maker's symbol

Grade 5-equivalent strength (and A325), but across a wider diameter range and any configuration. Identified by its stamped designation, not the SAE radial-line system.

Types

Type	Material
Type 1	Plain carbon, carbon boron, alloy, or alloy boron steel.
Type 2	Withdrawn (2003).
Type 3	Weathering steel (atmospheric-corrosion resistant).

Mechanical properties

Size Range	Tensile, min	Yield, min	Elongation, min	RA, min
1/4" thru 1"	120,000 psi	92,000 psi	14%	35%
Over 1" thru 1-1/2"	105,000 psi	81,000 psi	14%	35%
Over 1-1/2" thru 3"	90,000 psi	58,000 psi	14%	35%

Strength steps down as diameter increases. The 1/4"–1-1/2" values match SAE J429 Grade 5.

Chemical requirements – Type 1

Element	Carbon Steel	Carbon Boron	Alloy Steel	Alloy Boron
Carbon	0.30–0.52%	0.30–0.52%	0.30–0.52%	0.30–0.52%
Manganese, min	0.60%	0.60%	0.60%	0.60%
Phosphorus, max	0.040%	0.040%	0.035%	0.035%
Sulfur, max	0.050%	0.050%	0.040%	0.040%
Silicon	0.15–0.30%	0.10–0.30%	0.15–0.35%	0.15–0.35%
Boron	—	0.0005–0.003%	—	0.0005–0.003%

Type 3 (weathering steel) has its own composition across six manufacturer-selectable classes, not shown here.

Recommended hardware

Finish	Size	Nut	Washer
Plain	1/4" – 1-1/2"	A563 Grade B hex	F436
Plain	1-5/8" – 3"	A563 Grade A heavy hex	F436
Galvanized	1/4" – 3"	A563 DH heavy hex	F436

Nuts of other grades with proof-load stresses greater than the specified grade are also suitable.