

The American Society for Testing and Materials is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

ASTM A325 Structural bolts, steel, heat treated, 120/105 ksi minimum tensile strength. Replaced by ASTM F3125.

Note: In 2016, ASTM A325 was officially withdrawn and replaced by ASTM F3125, in which A325 now becomes a grade under the F3125 specification. The F3125 specification is a consolidation and replacement of six ASTM standards, including; A325, A325M, A490, A490M, F1852, and F2280. We are choosing to keep this technical information about the now obsolete A325 specification on our website for reference and informational purposes only.

Prior to its withdraw in 2016, the ASTM A325 specification covered high strength heavy hex structural bolts from 1/2" diameter through 1-1/2" diameter. These bolts are intended for use in structural connections and therefore have shorter thread lengths than standard hex bolts. Refer to the Structural Bolts page of our site for thread lengths and other related dimensions.

This specification is applicable to heavy hex structural bolts only. For bolts of other configurations and thread lengths with similar mechanical properties, see Specification A449.

Bolts for general applications, including anchor bolts, are covered by Specification A449. Also refer to Specification A449 for quenched and tempered steel bolts and studs with diameters greater than 1-1/2" but with similar mechanical properties.

A325 Types

TYPE 1	Medium carbon, carbon boron, or medium carbon alloy steel.
TYPE 2	Withdrawn November 1991.
TYPE 3	Weathering steel.
T	Fully threaded A325. <i>(Restricted to 4 times the diameter in length)</i>
M	Metric A325.

A325 Connection Types

SC	Slip critical connection.
N	Bearing type connection with threads included in the shear plane.
X	Bearing-type connection with threads excluded from the shear plane.

A325 Mechanical Properties

Size	Tensile, ksi	Yield, ksi	Elong. %, min	RA %, min
1/2 - 1	120min	92min	14	35
1 1/8 - 1 1/2	105min	81min	14	35

A325 Type 1 Chemical Properties

Heat Analysis	120ksi, %	150ksi, %
Carbon	0.30 – 0.52	0.30 – 0.48*
Manganese	0.60 min	0.60 min
Phosphorus	0.035 max	0.035 max
Sulfur	0.040 max	0.040 max
Silicon	0.15 – 0.30	--
Boron	0.003 max	0.003 max
Copper	-	-

Nickel	-	-
Chromium	-	-
Molybdenum	-	-
*Carbon 0.35-0.53% for 1-1/2" A490/150ksi bolts		

A325 Type 3 Chemical Properties

Heat Analysis	120ksi, % Comp A	120ksi, % Comp B	120ksi, % Index	150ksi, % Index
Carbon	0.33-0.40	0.38-0.48	0.30-0.52	0.30-0.53
Manganese	0.90-1.20	0.70-0.90	0.60min	0.60min
Phosphorus	0.035max	0.035max	0.035max	0.035max
Sulfur	0.040max	0.040max	0.040max	0.040max
Silicon	0.15-0.30	0.30-0.50		
Copper	0.25-0.45	0.20-0.40	0.20-0.60	0.20-0.60
Nickel	0.25-0.45	0.50-0.80	0.20 min*	0.20 min*
Chromium	0.45-0.65	0.50-0.80	0.20min	0.20min
Molybdenum		0.06max	0.10 min*	0.10 min*
*Either Nickel or Molybdenum must be present in the amount specified *Corrosion Index based on ASTM Guide G101				

A325 Recommended Hardware

Nuts			Washers	
Type 1		Type 3	Type 1	Type 3
Plain	Galvanized	Plain		
A563C, C3, D, DH, DH3	A563DH	A563C3, DH3	F436-1	F436-3
Note: Nuts conforming to A194 Grade 2H are a suitable substitute for use with A325 heavy hex structural bolts. The ASTM A563 Nut Compatibility Chart has a complete list of specifications.				

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