

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 A490 Structural bolts, alloy steel, heat treated, 150 ksi minimum tensile strength. Replaced by ASTM F3125.

Note: In 2016, ASTM A490 was officially withdrawn and replaced by ASTM F3125, in which A490 now becomes a grade under the F3125 specification.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 A490 specification on our website for reference and informational purposes only.

Prior to its withdraw in 2016, the ASTM A490 specification covered quenched and tempered, alloy steel, heavy hex structural bolts from 1/2" diameter through 1-1/2" diameter with a minimum 150 ksi tensile. 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. A490 bolts are similar in application and dimensions to A325 heavy hex structural bolts but are made from an alloy steel rather than a medium carbon steel, resulting in a higher strength fastener. The A490 specification is applicable to heavy hex structural bolts only. For bolts with different thread lengths than specified for structural bolts but with similar mechanical properties, see Specification A354 grade BD. ASTM A490 bolts shall not be coated by hot-dip galvanizing, mechanical deposition, or electroplating with zinc due to the potential risk of hydrogen embrittlement. ASTM has approved coating A490 bolts with Zinc/Aluminum Corrosion Protective Coatings per ASTM F1136 Grade 3, commercially called Geomet. Additional testing in the form of Magnetic Particle Inspection for Longitudinal Discontinuities and Transverse Cracks is a requirement of the A490 specification.

A490 Types

TYPE 1	Medium carbon and alloy steel.
TYPE 2	Withdrawn in 2002.
TYPE 3	Weathering steel.
M	Metric A490.

A490 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.

A490 Mechanical Properties

Size	Tensile, ksi	Yield, ksi	Elong. %, min	RA %, min
1/2 - 1-1/2	150-173	130	14	40

A490 Chemical Properties

Element	Type 1 Bolts	
	Sizes 1/2 to 1-3/8	Size 1-1/2
Carbon, max	0.30 - 0.48%	0.35 - 0.53%
Phosphorus, max	0.040%	0.040%
Sulfur, max	0.040%	0.040%
Alloying Elements	*	*

* Steel, as defined by the American Iron and Steel Institute, shall be considered to be alloy when the maximum range given for the content of alloying elements exceeds one of more of the following limits: Manganese, 1.65%, silicon, 0.60%, copper, 0.60%, or in which a definite range or a minimum quantity of any of the following elements is specified or required within the limits of the recognized field of constructional alloy steels: aluminum, chromium up to 3.99%, cobalt, columbium,

molybdenum, nickel, titanium, tungsten, vanadium, zirconium or any other alloying elements added to obtain a desired alloying effect.

Type 3 Bolts

Element	Sizes 1/2 to 3/4	Size above 3/4
Carbon	0.20 - 0.53%	0.30 - 0.53%
Manganese, min	0.40%	0.40%
Phosphorus, max	0.035%	0.035%
Sulfur, max	0.040%	0.040%
Copper	0.20 - 0.60%	0.20 - 0.60%
Chromium, min	0.45%	0.45%
Nickel, min	0.20%	0.20%
or		
Molybdenum, min	0.15%	0.15%

A490 Recommended Hardware

Nuts		Washers	
Type 1	Type 3	Type 1	Type 3
A563DH	A563DH3	F436-1	F436-3

Note: Nuts conforming to A194 Grade 2H are a suitable substitute for use with A490 heavy hex structural bolts. Follow the link for an ASTM A563 Nut Compatibility Chart.

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