

# ASTM A325

# CARBON STEEL

## TYPE 1

BOLTING MATERIAL FOR STRUCTURAL PURPOSE

ASTM A325 is an ASTM International standard for heavy hex structural bolts, titled Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. It defines mechanical properties for bolts that range from 1/2 to 1-1/2 in diameter. The equivalent metric standard is ASTM A325M, which is titled Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength. It defines mechanical properties for sizes M12-36. There is also a T version, which is used to refer to fully threaded bolts. The type refers to the type of material used to make the bolt. The standard currently defines two types, however it previously defined the following three:  
 Type 1: Medium carbon steel, boron steel, or medium carbon alloy steel  
 Type 2: Low carbon martensitic steel (withdrawn from the standard in 1991)  
 Type 3: Weathering steel

### Chemical Properties

C	Mn	P	S	Si
	Max	Max	Max	Max
0.28-0.55	0.57	0.048	0.058	0.13-0.32

### Characteristic Standard

Materials & Manufacture	ASTM A325M
Finish (Self Colour/Black)	ASTM A325M
Hot Dip Galvanised	ASTM A153/A153M Clas C
Mechanical Properties	ASTM A325M
Dimensions & Tolerances	ASME B18.2.3.7M
Threads	ASME B1.13M tolerance class 6g
Workmanship	ASTM F788/F788M
Product marking	ASTM A325

### Mechanical Properties

Dia	Yield strength	Tensile strength	Proof Load	Hardness
	Method	Min	Method	BHN
1/2" - 1"	635	827	586	253-319

### A325M Tensile Strength Requirements For Specimens machined from Bolts

Nominal Dia	Tensile Strength Min	Yield Strength Min	Elongation in 4D min	Reduction of Area Min
	MPa	MPa	%	%
M16- M36	830	660	14	35

### A325M Tensile Load & Proof Load Requirements For Full Size Bolts

Nominal Dia, & Thread Pitch	Stress Area	Tensile Load	Proof Load #	Alternative Proof Load*	Hardness Rockwell HRC	
	mm <sup>2</sup>	Min (kN)	kN	kN	min	max
M16 x 2	157	130	94.2	104	25	34
M20 x 2.5	245	203	147	162	25	34
M22 x 2.5	303	251	182	200	25	34
M24 x 3	353	293	212	233	25	34
M27 x 3	459	381	275	303	19	30
M30 x 3.5	561	466	337	370	19	30
M36 x 4	817	678	490	539	19	30

### Heat Treatment

Quenched & tempered

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