

# ASTM A449

# ALLOY STEEL

## TYPE 2

BOLTING MATERIAL FOR STRUCTURAL PURPOSE

SA 453M covers five grades of bolting materials such as grade 660, 651, 662, 665 & 668 with Twelve classes of yield strength ranging from 50 to 120 ksi for use in high-temperature service such as fasteners for pressure vessel and valve flanges. The term "bolting material" as used in SA 453M 660 Class A, covers rolled, forged, or hot-extruded bars; bolts, nuts, screws, washers, studs and stud bolts. SA 453M 660 Class A expressed in both inch-pound units and in SI units. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

### Chemical Properties

C	Mn	P	S	B
	Max	Max	Max	Max
0.13-0.41	0.67	0.048	0.058	0.0005

### Mechanical Properties

Dia	Yield strength	Tensile strength	Elongation	Reduction	Hardness
	Min 0.2% Mpa	Min Mpa	Min %	Min %	BHN
1/4 to 1"	635	825	14	35	255-321
1 to 1 1/2"	560	725	14	35	223-285
1 1/2 to 3"	620	400	14	35	183-235

### Heat Treatment

Quenched & tempered

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