

# SA 453M 662

# NICKEL ALLOY

## CLASS A

BOLTING MATERIAL FOR HIGH TEMPERATURE SERVICE

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 662 Class A, covers rolled, forged, or hot-extruded bars; bolts, nuts, screws, washers, studs and stud bolts. SA 453M 662 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	Si	Cr	Mo	Ni	Cu	Ti	Al	B
0.08 Max	0.40-1.00	0.040 Max	0.030 Max	0.40-1.00	12.0-15.0	2.0-3.5	24.0-28.0	0.50 Max	1.80-2.10	0.35 Max	0.001-0.010

### Mechanical Properties

Yield strength	Tensile strength	Elongation	Reduction	Hardness		
Mpa	Mpa	%	%	BHN	HRB	HRC
min	min	min	min			
585	895	15	18	255-321	100	35

### STREE RUPTURE REQUIREMENTS

Grade	Class	Test Temperature	Stress, Min		Time to Rupture	Elongation
		Deg F [ Deg C ]	Ksi	Mpa	Min, h*	Min %
662	A	1200 [650]	55	380	100	5

### Heat Treatment

Solution treated @ 980°C ± 14°C hold 2 h, & liquid quenched and Hardened @ 730°C to 760°C, hold 20 h, furnace cool to 1200 ± 25°F (650±14°C) hold 20 h, air cool

### Equivalent Designation

UNS 66220

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