

AANURAJ FASTENERS PVT.LTD.

ASTM A453 Grade 660 Class A/B/C/D Bolt/Stud/Nut/Washer

Chemical Composition	
Element	Content %
Carbon	0.08 max
Manganese	2.00 max
Phosphorus	0.04 max
Sulfur	0.03 max
Silicon	1.00 max
Nickel	24.00 - 27.00
Chromium	13.50 - 16.00
Molybdenum	1.00 - 1.50
Titanium	1.90 - 2.35
Aluminium	0.35 max
Vanadium	0.10 - 0.50
Boron	0.001 - 0.010

Mechanical Properties									
Class	Tensile Strength		Yield Strength		Elongati on in 4D, min, %	Reducti on of Area, min, %	Brinell Hardness Number	Approximate Rockwell Hardness, B & C	
	Ksi	MPa	Ksi	MPa				min	max
A, B, C	130	895	85	585	15	18	248-341	24 HRC	37 HRC
D	130	895	105	725	15	18	248-341	24 HRC	35 HRC

Heat Treatment Requirements		
Class	Solution Treatment	Hardening Treatment
A	1650 +/- 25°F (900 +/-14°C) hold 2hr, min and liquid quench	1325 +/- 25°F (720 +/-14°C) Hold 16 hr, air cool
B	1800 +/- 25°F (980 +/-14°C) hold 1hr, min and liquid quench	1325 +/- 25°F (720 +/-14°C) Hold 16 hr, air cool
C	1800 +/- 25°F (980 +/-14°C) hold 1hr, min and oil quench	1425 +/- 25°F (775 +/- 14°C) Hold 16 hr, air cool, Followed by 1200 +/- 25°F (650 +/-14°C) air cool
D	1650 +/- 25°F (900 +/- 14°C), hold 2 hr, min and liquid quench 1800 +/- 25°F (980 +/-14°C) hold 1hr, min and liquid quench	1325 +/- 25°F (720 +/-14°C) hold 16 hr, air cool If required to achieve properties, second stage: 1200 +/- 25°F (650 +/- 14°C), air cool

Stress Rupture Requirements						
Class	Text Temperature		Stress, Min		Time to Rupture, min,	Elongation, min, %
	°F	°C	Ksi	MPa		
A, B, C	1200	650	56	385	100	5