



Chemical and Mechanical Properties

Petrochemical

Grade of Bolting

| GRADE OF BOLTING | B7/L7 | B16 | B8 Class 1 | B8M Class 1 |
|---------------------------------------|---|--|----------------------------------|----------------------------------|
| Service Conditions† | Min:-100 °C Max 400 °C | Min: 0 °C Max: 520 °C | Min: -250 °C Max: 575 °C | Min: -250 °C Max: 600 °C |
| Material Specifications | B7 ASTM-A193/A193M L7 ASTM-A320/A320M AISI 4140 | ASTM-A193/193M Chrome-Moly-Vanadium | ASTM-A193/A193M AISI Type 304 | ASTM-A193/A193M AISI Type 316 |
| Chemical Composition | | | | |
| Carbon | 0.37-0.49 | 0.36-0.47 | 0.08 Max | 0.08 Max |
| Silicon | 0.15-0.35 | 0.15-0.35 | 1.00 Max | 1.00 Max |
| Manganese | 0.65-1.10 | 0.45-0.70 | 2.00 Max | 2.00 Max |
| Nickel | - | - | 8.00-10.50 | 10.00-14.00 |
| Chromium | 0.75-1.20 | 0.80-1.15 | 18.00-20.00 | 16.00-18.00 |
| Molybdenum | 0.15-0.25 | 0.50-0.65 | - | 2.00-3.00 |
| Vanadium | - | 0.25-0.35 | - | - |
| Sulphur | 0.040 Max | 0.040 Max | 0.030 Max | 0.030 Max |
| Phosphorus | 0.035 Max | 0.035 Max | 0.045 Max | 0.045 Max |
| Mechanical Properties | | | | |
| Limiting Ruling Selection | 2 1/2" and under | 2 1/2" and under | - | - |
| Tensile Strength Minimum | 860 MPA | 860 MPA | 515 MPA | 515 MPA |
| Yield Strength Min 0.2% Offset | 720 MPA (725 MPA for L7) | 725 MPA | 205 MPA | 205 MPA |
| Elongational in 4D% Minimum | 16 | 18 | 30 | 30 |
| Reduction of Area% Minimum | 50 | 50 | 50 | 50 |
| Brinell Harness | - | - | 223HB or 96HRB | 223HB or 96HRB |



† Service Temperatures refer to actual metal temperatures.

L7 STUDBOLTS

An ASTM A320/A320M current issue grade L7 Studbolt is manufactured from AISI 4140 material that has undergone an impact test at -101°C. For the material to be classed as Grade L7 it must have the following values:

| Size of Speciment (mm) | Minimum Impact Value Required for Average of Each of 3 Specimens (J) | Minimum Impact Value Permitted for One Specimen only of Set (J) |
|------------------------|--|---|
| 10 x 10.0 | 27 | 20 |
| 10 x 7.5 | 22 | 16 |

Bolt Tension | Anti-Vibration | Product Reliability | Traceability



Chemical and Mechanical Properties

Petrochemical

Grade of Bolting

| GRADE OF BOLTING | B5 | B6 | B8 CLASS 2 | | | | B8M CLASS 2 | | | |
|--------------------------------|-----------------------------|----------------------------|----------------------------------|-------------|---------------|-------------------|----------------------------------|-------------|---------------|-------------------|
| Service Conditions† | | Min: 0 °C Max: 500 °C | Min: -250 °C Max: 575 °C | | | | Min: -250 °C Max: 600 °C | | | |
| Material Specifications | ASTM-A193/A193M AISI 501 | ASTM-A193/193M AISI 410 | ASTM-A193/A193M AISI Type 304 | | | | ASTM-A193/A193M AISI Type 316 | | | |
| Chemical Composition | | | | | | | | | | |
| Carbon | 0.10 Min | 0.15 Max | 0.08 Max | | | | 0.08 Max | | | |
| Silicon | 1.00 Max | 1.00 Max | 1.00 Max | | | | 1.00 Max | | | |
| Manganese | 1.00 Max | 1.00 Max | 2.00 Max | | | | 2.00 Max | | | |
| Nickel | - | - | 8.00-10.50 | | | | 10.00-14.00 | | | |
| Chromium | 4.00-6.00 | 11.50-13.50 | 18.00-20.00 | | | | 16.00-18.00 | | | |
| Molybdenum | 0.40-0.65 | - | - | | | | 2.00-3.00 | | | |
| Vanadium | - | - | - | | | | - | | | |
| Sulphur | 0.030 Max | 0.030 Max | 0.030 Max | | | | 0.030 Max | | | |
| Phosphorus | 0.040 Max | 0.040 Max | 0.045 Max | | | | 0.045 Max | | | |
| Mechanical Properties | | | | | | | | | | |
| Limiting Ruling Selection | - | - | <3/4" | >3/4" 1" | >1" 1 1/4" | >1 1/4" 1 1/2" | <3/4" | >3/4" 1" | >1" 1 1/4" | >1 1/4" 1 1/2" |
| Tensile Strength Minimum | 690 | 760 | 860 | 795 | 725 | 690 | 760 | 690 | 655 | 620 |
| Yield Strength Min 0.2% Offset | 550 | 585 | 690 | 550 | 450 | 345 | 665 | 550 | 450 | 345 |
| Elongational in 4D% Minimum | 16 | 15 | 12 | 15 | 20 | 28 | 15 | 20 | 25 | 30 |
| Reduction of Area% Minimum | 50 | 50 | 35 | 35 | 35 | 45 | 45 | 45 | 45 | 45 |
| Brinell Harness | - | - | 321 | 321 | 321 | 321 | 321 | 321 | 321 | 321 |



† Service Temperatures refer to actual metal temperatures.