

## **Steel Bolts ASTM A193 - B7M specification High - Temperature Service Alloy**

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Alloy steel bolts for high - temperature service components conforming to ASTM A193 Gr. B7M.

### **Scope:**

This technical specification defines the requirements for materials used in pressure - containing bolts. The material must meet the requirements of NACE MR - 01 - 75 Level 3 (latest edition). The material must also meet the requirements of this technical specification and all relevant standards. The content described herein is only the minimum quality requirements for the material. When there are differences between these requirements and relevant standards, the relevant standards shall be adopted first.

### **Process:**

The process of the bolt material shall comply with the requirements of Section 4 "Manufacture" in ASTM A193.

### **Heat Treatment:**

The material for bolts shall be supplied after heat treatment. The heat treatment shall be carried out in accordance with the relevant requirements in Section 6 "Heat Treatment" of ASTM A193.

### **Chemical Composition:**

The chemical composition and deviation shall be in accordance with ASTM A193 as follows:

Element	Composition Range	Deviation
Carbon (C)	0.37 - 0.49%	± 0.02%
Manganese (Mn)	0.65 - 1.10%	± 0.04%
Phosphorus (P)	≤ 0.035%	+ 0.005%
Sulfur (S)	≤ 0.040%	+ 0.005%
Silicon (Si)	0.15 - 0.35%	± 0.02%
Chromium (Cr)	0.75 - 1.20%	± 0.05%
Molybdenum (Mo)	0.15 - 0.25%	± 0.02%

**Mechanical Properties:**

Parameter Name	Requirement	Unit
Tensile Strength (minimum)	100000 (Psi) / 690 (Mpa)	-
Yield Limit (minimum)	80000 (Psi) / 550 (Mpa)	-
Elongation (minimum)	18%	-
Reduction of Area (minimum)	50%	-
Hardness HB (HRC)	200 (18.5) (minimum) ~ 235 (22) (maximum)	-

**Test Pieces:**

The test piece material shall be from the same heat as the material to be inspected and shall have the same machining and heat - treatment conditions as the material to be inspected. The test pieces shall conform to the standard of API 6A 406, and the tests shall be carried out in accordance with API 6A and ASTM A370 requirements, and records shall be made in accordance with the requirements of this document.

**Nondestructive Testing:**

Each component shall be visually inspected. The bolt material shall conform to ASTM A193 and the requirements of "11. Quality of Workmanship" in the executive standard. If nondestructive testing is required, it shall be specified in the purchase order.

**Marking:**

The product marking shall be marked in accordance with the requirements of Section 17 "Product Marking" in ASTM A193. Bolts and studs with diameters less than 3/8" and Nuts diameters less than 9/4" do not need to be marked.

**Certification:**

Unless otherwise specified in the order, the supplier must provide LTE Company with a certificate containing the following contents:

1. Order number, material number, heat number, lot number, and part name, part quantity;
2. Chemical analysis report;
3. Mechanical properties and hardness (HB) report;
4. Heat - treatment process type (including time and temperature) report;
5. Certification of consistency in handling and storage;
6. Nondestructive testing certification report (if required by the contract).