

ASTM A193 GRADE B7 DATA SHEET

ASTM A193 Grade B7 specification covers requirements for high tensile alloy steel bolting material for use in high temperature or high-pressure service and other special purpose applications. It is a standard specification defining typical chemical composition, mechanical properties, hardness requirement, preferential heat treatment, product marking, certification and other requirements, suitable for bolting used in pressure vessel service, valves, flanges and fittings. ASTM A193 defines both SI (Metric) and inch-pound units.

ASTM A193 Grade B7 Chemical Composition

Elements	Range	Product Variation, Over or Under B
Carbon	0.37-0.49 % ^D	0.02 %
Manganese, max	0.65-1.10 %	0.04 %
Phosphorus, max	0.035 %	0.005 % over
Sulfur, max	0.040 %	0.005 % over
Silicon	0.15 - 0.35 %	0.02 %
Chromium	0.75-1.20 %	0.05 %
Molybdenum	0.15-0.25 %	0.02 %

ASTM A193 Grade B7 Mechanical Properties - Metric Sizes

Diameter mm	Min Tempering Temperature, °C	Tensile Strength min, MPa	Yield strength, min, 0.2% offset, MPa	Elongation in 4D min, %	Reduction of Area, min, %	Hardness, max
M64 and Under	593	860	720	16	50	321 HBW or 35 HRC
over M64 to M100	593	795	655	16	50	321 HBW or 35 HRC
over M100 to M180	593	690	515	18	50	321 HBW or 35 HRC

ASTM A193 Grade B7 Mechanical Properties - Inch Sizes

Diameter Inch	Min Tempering Temperature, °C	Tensile Strength min, ksi	Yield strength, min, 0.2% offset, ksi	Elongation in 4D min, %	Reduction of Area, min, %	Hardness, max
2.5 and under	1100	125	105	16	50	321 HBW or 35 HRC
over 2.5 to 4	1100	115	95	16	50	321 HBW or 35 HRC
over 4 to 7	1100	100	75	18	50	321 HBW or 35 HRC

Heat Treatment

Quenched & Tempered at 1100° F minimum.