

ASTM A193 bolts and stud bolts

Technical reference sheet | Rev. 29.09.2026

Bolts and studs for flanges, valves and pressure equipment: specify grade, class, dimensions and service conditions.

Which product do you need?

Stud bolts

Fully threaded or double-ended: state length, diameter, pitch and number of nuts.

Headed bolts

Specify the head geometry and dimensional standard as well as the A193 grade.

Bolting with nuts

Complete the enquiry with the ASTM A194 nut grade and any supplementary requirements.

Materials, grades and metallurgical conditions

Grade	Material / condition	Specify
B7	Quenched and tempered Cr-Mo alloy steel	Diameter and surface finish
B7M	Cr-Mo alloy steel with specific hardness requirements	Not automatically interchangeable with B7
B8	Type 304 stainless steel	Class 1 / Class 2
B8M	Type 316 stainless steel	Class 1 / Class 2

For B8/B8M, Class 1 is solution treated; Class 2 is additionally strain hardened. Class affects performance: "stainless steel" alone is not a complete specification.

Room-temperature mechanical properties

Selected inch-series requirements. Minimum strengths depend on grade, class and diameter; these are not allowable design stresses at elevated temperature.

Grade	Nominal diameter	Tensile min. · ksi	Yield min. · ksi	Hardness max. · HBW
B7	≤ 2½"	125	105	321
B7M	≤ 4"	100	80	235
B8 / B8M · Class 1	All diameters in the reference table	75	30	223
B8 · Class 2	≤ ¾"	125	100	321
B8M · Class 2	≤ ¾"	110	95	321

1 ksi ≈ 6.895 MPa. Conversion does not replace A193M metric-series requirements. Larger diameters and other classes require their applicable standard row. Actual lot results belong in the inspection certificate.

Service temperatures: understanding the values

A193 specifies bolting material, not a universal assembly temperature rating. The permitted range depends on the design code, allowable stress at temperature, diameter and service conditions.

Grade	Indicative elevated-temperature reference*
B7	400 °C
B7M	454 °C
B8 · Class 1 / Class 2	593 °C
B8M · Class 1	593 °C

*Selection guidance, not certified maximum temperatures. Not suitable for sizing or approving a joint. Check the applicable code and edition, pressure, medium, duration, relaxation and coating. Do not automatically apply the Class 1 value to B8M Class 2.

Low-temperature service: specify minimum design temperature and required impact testing. L7 and L7M belong to ASTM A320, not A193. Manufacturing tempering temperature is not service temperature.

Threads, dimensions and finish

Dimensions to specify

Diameter, overall length and measurement convention, threaded length, end or head geometry. A193 alone does not define the complete geometry.

Threads

State inch or metric, UNC / 8UN series or metric pitch, and tolerance class. Do not replace an inch diameter with its nearest metric size.

Coatings

Specify coatings alongside service temperature: base-material thermal capability does not automatically apply to coated parts. Check lubrication and tightening friction too.

Nuts, inspection and documentation

ASTM A194 nuts: select grade, class where applicable, thread and finish to match the assembly and project specification. Specify chemical analysis, mechanical and hardness testing, markings, traceability and required inspection documentation. Define impact testing, PMI and corrosive-service requirements where specified.

Project-specific documentation

Assembly and traceability

Lot, markings, component list and conformity documents relevant to the supply.

EN 10204 3.1 · DoP · CoC

State the required documents. Applicability and availability are confirmed during enquiry review.

Testing and coatings

Dimensional reports, mechanical tests, coating reports and ROCAP where applicable to the specification.

Related standards and components

Nuts associated with bolting enquiries for high pressure and/or temperature service. Pairing depends on grade and service requirements.

Bolts and studs in L7 and L7M, separate from A193 and linked to applicable nut and testing requirements.

Bolts, studs and other externally threaded fasteners, through a route separate from F3125 structural bolts.

Application sectors

Industrial and EPC projects, according to the specified application.

Enquiries and supply

Specify standard, grade, dimensions, finish, quantity and required documents. This technical reference sheet does not replace the lot documentation, manufacturer installation instructions or project design.