

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard



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(R) HIGH-STRENGTH, QUENCHED, AND TEMPERED STRUCTURAL STEELS

Introduction—The steels covered by this SAE Recommended Practice have enhanced mechanical properties obtained by quench and temper treatment. Grade Q550 is a carbon-manganese steel, while grades Q550B, Q620B, and Q690B are carbon-manganese boron steels. Other grades (designated by suffix A) represent steels containing one or more additional alloying elements as required to achieve higher strengths and to accommodate greater thicknesses. These steels are produced fully deoxidized and to fine grain practice.

Since these steels are characterized by their mechanical properties, care must be exercised in the selection of grade, especially where fabrication by welding or forming is required. Special procedures may be applicable to varying compositions and section sizes, as produced by a given supplier; therefore, the purchaser should consult with the producer in order to be aware of these variables.

1. **Scope**—This SAE Recommended Practice covers three strength levels of quenched and tempered carbon-manganese, carbon-manganese-boron, and alloy steel plates for structural use.

2. References

2.1 **Applicable Documents**—The following publication forms a part of this specification to the extent specified herein.

2.1.1 **ASTM PUBLICATION**—Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM A 6/A 6M—Specification for General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use

3. **Application**—These steels, because of their high strength-to-weight ratio, abrasion resistance and, in the case of certain compositions, improved atmospheric corrosion resistance, are adapted particularly for use in mobile equipment and other structures where substantial weight savings are desirable. Typical applications are truck bodies, frames, structural members, scrapers, truck wheels, cranes, shovels, booms, chutes, and conveyors.

4. **General Requirements**—Material furnished under this report shall conform to the applicable requirements of the current edition of ASTM A 6/A 6M.

5. **Mechanical Properties**—The mechanical properties of these steels shall be as shown in Table 1. Producers should be consulted concerning requirements for plate thicknesses greater than those shown in the table and for all sheets and rolled shapes. Consultation with suppliers on availability and characteristics is also suggested.

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TABLE 1—MECHANICAL PROPERTIES

Grade and Thickness	Strength Yield ¹ , min MPa	Strength Yield ¹ , min ksi	Strength Tensile MPa	Strength Tensile ksi	Elongation ² in 50 mm or 2 in min %	Bend ³ Test	Typical Hardness Range HB
Q550 To 20 mm (3/4 in) incl	550	80	655-795	95-115	18	2T	200-235
Q550B To 32 mm (1-1/4 in) incl	550	80	655-795	95-115	18	2T	200-235
Q550A To 38 mm (1-1/2 in) incl	550	80	655-795	95-115	18	2T	200-235
Q620B To 38 mm (1-1/2 in) incl	620	90	690-895	100-130	18	3T	217-285
Q620A To 25 mm (1 in) incl	620	90	690-895	100-130	18	2T	217-285
Over 25 to 50 mm (1 to 2 in) incl	620	90	690-895	100-130	18	3T	217-285
Over 50 to 100 mm (2 to 4 in) incl	620	90	690-895	100-130	18	4T	217-285
Q690B To 25 mm (1 in) incl	690	100	760 min	110 min	18	2T	223 min
Over 25 to 32 mm (1 to 1-1/4 in) incl	690	100	760 min	110 min	18	3T	223 min
Q690A To 25 mm (1 in) incl	690	100	760-895	110-130	18	2T	223-285
Over 25 to 65 mm (1 to 2-1/2 in) incl	690	100	760-895	110-130	18	2T	223-285

¹ Yield strength to be measured at 0.2% offset or 0.5% extension under load.

² Minimum percent elongation for all material under 6.35 mm (1/4 in) thick shall be 15%.

³ Bend test not required unless specified. Test shall be conducted in accordance with ASTM A 6/A 6M Supplement S14.