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JIS

JAPANESE INDUSTRIAL STANDARD

Mechanical properties for steel bolts and screws

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Mechanical properties of steel bolts and screws

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1. Scope

This Japanese Industrial Standard specifies the mechanical properties and the testing, inspection, and marking of steel bolts and machine screws at ambient temperature(2) which satisfy the conditions of Table 1(1).

The mechanical properties of bolts and machine screws in strength classes 4 T to 7 T shall be in accordance with the Annex.

Notes (1) External threaded fasteners shall be used as a general term for steel bolts and machine screws applicable to this standard.

The term Product shall be used for completed external threaded fasteners used in their entirety in testing, to distinguish from partial test specimens.

(2) Ambient temperature, as stipulated in JIS Z 8703, is within the range 5 to 35°C.

Remarks 1. This Standard does not apply to external threaded fasteners for which weldability, corrosion resistance, heat resistance against temperature of not lower than 300°C, and cold resistance against temperature of not higher than -50°C are required.

2. This Standard may be applied to external threaded fasteners with a size beyond the range of this standard (for example, a size exceeding 39 mm in nominal diameter of the screw thread) if the requirements for the strength classes specified in this Standard are satisfied.

3. The values for mechanical properties specified in this Standard apply at ambient temperature. The values differ somewhat for temperatures above or below the range of the ambient temperature. For reference, Informative Reference Table 1, at the end of this Standard, provides examples on the decrease in the yield point between 100 to 300°C.

4. The Standards cited in this Standard are listed in Attached Table 1.

5. The body of this Standard is in accordance with ISO 898-1:1988 Mechanical properties of fasteners-Part 1: Bolts, screws and studs

6. In this standard, units and values given in { } are in accordance with the conventional units, and are provided for informative reference. (1 N/mm^2= 1 MPa)

Table 1. External Threaded Fasteners Applicable to this Standard

Item	Applicable External thread fastener
Types of external threaded fastener	External threaded fasteners such as bolts, studs bolts, machine screws, etc., for which minimum mechanical properties are required, whether or not there is a head, and regardless of the shape. However, set screws are excluded.
Screw thread shape	Screw thread with the standard shape, nominal diameter, and pitch of JIS B 0205 and JIS B 0207.
Range of the nominal diameter of screw threads	1.6 to 39 mm
Materials	Carbon steel and alloy steel

2. Mechanical Properties

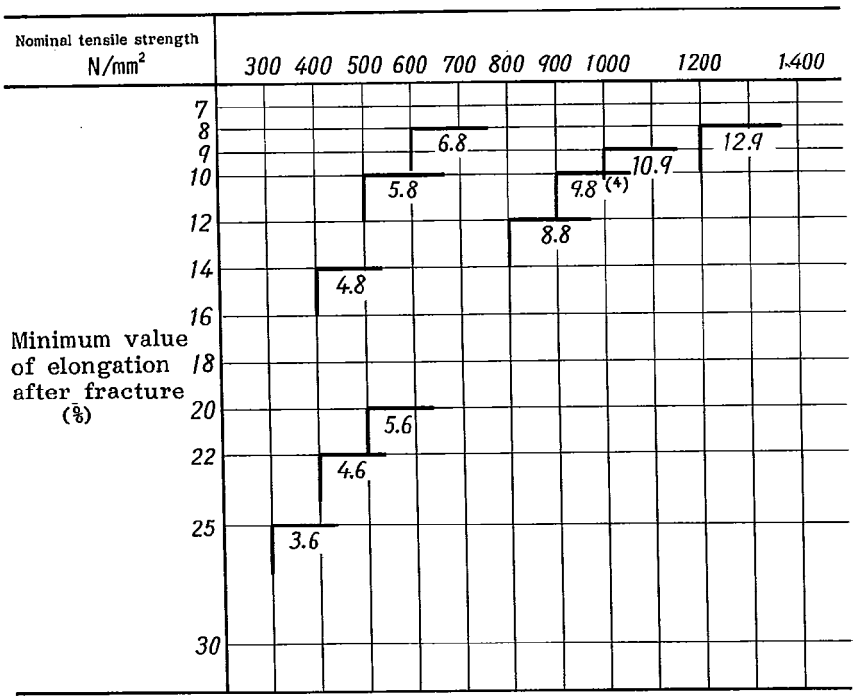
2.1 Indication of the Strength Class The strength class of external threaded fasteners, based on the mechanical properties, shall be indicated by a two or three digit number which contains a decimal point, as shown in Table 2. The X-axis indicates the designated tensile strength (N/mm^2), and the Y-axis indicates the rupture elongation (%). The digits before the decimal point indicate 1/100 of the designated tensile strength (N/mm^2)([3]), and the digit after the decimal point indicates ten times the ratio of the designated lower yield point ([3]) or the designated proof stress ([3]) to the designated tensile strength

$$\left(\frac{\text{designated yield point or designated proof stress}}{\text{designated tensile strength}}\right) N/mm^2$$

(See Informative Reference Table 1). Therefore, the value obtained by multiplying the product of the digits before the decimal point and the digits after the decimal point by 10 yields the designated yield point or the designated proof stress (N/mm^2).

Note ([3]) The designated tensile strength, designated yield point, and designated proof stress have been set for convenience in the strength classes, and the minimum values of the tensile strength and yield point (or proof stress) as applied to external threaded fasteners shall be equal to or larger than these designated values (see Table 3).

Table 2. Strength Class System



Note ([4]) Applies to external threaded fasteners of a maximum 16 mm in designated diameter of screw thread.

Informative Reference Table 1. Ratio of the Yield Point (or Proof Stress) to the Tensile Strength

Digit after the decimal point in the strength chass	.6	.8	.9
$\frac{\text{Nominal lower yield point (or nominal proof stress)}}{\text{Nominal tensile stress}}$ x 100 %	60	80	90

2.2 Mechanical Properties for Each Strength Class The mechanical properties for each strength class of external threaded fasteners shall comply with Table 3 when subjected to the tests of Clause 4.