

JIS

JAPANESE INDUSTRIAL STANDARD

**Tapping screws – Mechanical
properties**

JIS B 1055—1995
(ISO 2702 : 1992)

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Preface

The text of this Standard has been described based on ISO 2702 (Heat-treated steel tapping screws - Mechanical properties) published in 1992 as the 2nd edition, without any alteration in the technical contents and the rules for the drafting and presentation of standard. However, the title has been altered to "Tapping screws - Mechanical properties".

The phrases being indicated with underlines (dotted lines) in the text of this Standard and Annexes are the matter not included in the Original International Standard.

Introduction The primary objective of this Standard is to ensure that tapping screws will form mating threads in materials into which they are normally driven without deforming their own thread and without breaking during assembly or service.

1. Scope This Japanese Industrial Standard specifies the characteristics of heat-treated steel tapping screws, with tapping screw thread from ST2.2 to ST8 inclusive in accordance with ISO 1478, together with the corresponding test methods.

Informative references 1. The specified contents in ISO 1478 are equivalent to the text of JIS B 1007 (Threads and thread ends for tapping screws).

2. The characteristics and testing methods of designations, ST1.5, ST1.9 and ST9.5 of screw threads specified in ISO 1478 are as agreed between the parties concerned with delivery.

2. Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1478: 1983 Tapping screws thread

ISO 6507-1: 1982 Metallic materials - Hardness test - Vickers test -
Part 1: HV5 to HV100

ISO 6507-2: 1983 Metallic materials - Hardness test - Vickers test -
Part 2: HV0.2 to less than HV5

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3. Materials Tapping screws shall be made from cold heading, case hardening quality steel.

4. Requirements

4.1 Metallurgical requirements

4.1.1 Surface hardness The minimum surface hardness after heat treatment shall be 450 HV0.3 (see ISO 6507-2).

Informative reference: The specified contents in ISO 6507-2 are equivalent to JIS Z 2244 (Method of Vickers hardness test).

4.1.2 Case depth The case depth shall conform to the values given in Table 1.

Table 1. Case depth

Unit: mm

Thread	Case depth	
	Min.	Max.
ST2.2, ST2.6	0.04	0.10
ST2.9, ST3.3, ST3.5	0.05	0.18
ST3.9, ST4.2, ST4.8, ST5.5	0.10	0.23
ST6.3, ST8	0.15	0.28

4.1.3 Core hardness The core hardness after heat treatment shall be 270 HV5 to 390 HV5 for threads $\leq$ ST3.9 and 270 HV10 to 390 HV10 for threads $\geq$ ST4.2.

4.1.4 Microstructure The microstructure shall show no band of free ferrite between the case and core.

4.2 Mechanical requirements

4.2.1 Thread-forming capability Tapping screws shall form a mating thread without deforming their own thread when driven into a test plate, in accordance with 6.2.1.

4.2.2 Torsional strength Tapping screws shall have a torsional strength such that the torque necessary to cause failure, when tested in accordance with 6.2.2, shall equal or exceed the minimum torque values given in Table 3 for the applicable screw threads.

5. Acceptance For routine acceptance tests, the drive test, torsional test and core hardness test may be used, but for referee purposes all requirements specified in this Standard shall be satisfied.

6. Test methods

6.1 Test methods for the metallurgical requirements

6.1.1 Surface hardness test Vickers hardness test shall be carried out in accordance with ISO 6507-2.

The impression of the pyramid shall be made on a flat face, for preference on the screw head.

6.1.2 Case depth (microscopic test) Case depth shall be measured at the thread flank mid-point between crest and root or, in the case of smaller tapping screws up to ST3.9, in the root of the thread.

For referee purposes, a micro hardness plot shall be made using a Vickers indenter and a 2.94 N load on the thread profile of a properly prepared metallographic specimen. The case depth shall be the point at which the hardness recorded is 30 HV above the actual core hardness.

6.1.3 Core hardness test Vickers core hardness test shall be carried out in accordance with ISO 6507-1 at the mid-radius of a transverse section through the screw taken at a distance sufficiently behind the point of the screw to be through the full minor diameter.

Informative reference: The specified contents of ISO 6507-1 are equivalent to those of JIS Z 2244.

6.1.4 Microstructure test The microstructure test shall be carried out by metallographic examination.

6.2 Test methods for the mechanical requirements

6.2.1 Drive test The sample screw (coated or uncoated, as received) shall be driven into a test plate until a thread of full diameter is completely through the test plate.

The test plate shall be made from low carbon steel with a carbon content not exceeding 0.23 %. The hardness of the plate shall be 130 HV to 170 HV measured in accordance with ISO 6507-1 and ISO 6507-2. The thickness of the plate shall conform to the values given in Table 2.

The test hole shall be drilled, or punched and redrilled, or reamed to the hole diameter specified in Table 2 for the size of screw being tested.