JIS

JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS B 1052-2 : 2009

(ISO 898-2 : 1992)
(JFRI/JSA)

Mechanical properties of fasteners—Part 2: Nuts with specified proof load values—Coarse thread

ICS 21.060.20

Reference number : **JIS B 1052-2 : 2009** (E)

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Full document details: http://www.avadocuments.com/doc/jis-b-1052-2-2009

Date of Establishment: 2009-11-20
Date of Public Notice in Official Gazette: 2009-11-20
Investigated by: Japanese Industrial Standards Committee
Standards Board
Technical Committee on Machine Elements

JIS B 1052-2:2009, First English edition published in 2010-02

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by the Japan Research Institute for Screw Threads and Fasteners (JFRI)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

Consequently **JIS B 1052**: 1998 has been withdrawn and a part of the standard is replaced with this Standard.

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JIS B 1052 series consists of the following 2 parts under the general title *"Mechanical properties of fasteners":*

Part 2: Nuts with specified proof loud values — Course thread

Part 6: Nuts with specified proof load values — Fine pitch thread

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Mechanical properties of fasteners— Part 2: Nuts with specified proof load values—Coarse thread

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **ISO 898-2** published in 1992 without any modifications of the technical contents or the structure.

The portions underlined with dots are the matters not given in the corresponding International Standard.

1 Scope

This Standard specifies the mechanical properties of nuts with specified proof load values (coarse thread) when tested at room temperature. Properties will vary at higher and lower temperature.

It applies to nuts

— with nominal thread diameters d up to and including 39 mm;

— with diameter/pitch combinations according to **JIS B 0205-2** (coarse thread);

— with thread tolerances 6H according to **JIS B 0209-1** and **JIS B 0209-2;**

— with specific mechanical requirements;

— with widths across flats as specified in **JIS B 1002** (shaded values are excluded);

— with nominal heights greater than or equal to $0.5d$;

— made of carbon steel or low alloy steel (see NOTE **1)**

It does not apply to nuts requiring special properties such as

— locking abilities (see **JIS B 1056);**

— weldability;

— corrosion resistance (see **JIS B 1054-2);**

— ability to withstand temperatures above +300 °C or below −50 °C (see NOTE 1).

NOTE 1 Nuts made from free-cutting steel should not be used above +250 "C.

NOTE 2 For special products such as nuts for high-strength structural bolting, and overtapped nuts for use with hot-dipped galvanized bolts, see the product standards for appropriate values.

NOTE 3 For assemblies with threads having tolerances wider than 6H/6g, there is an increased risk of stripping; see also table 1.

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Table 1 Reduction in thread strength

Thread		Test load %		
		Thread tolerances		
greater than	less than or equal to	6H	7H	6G
—	M2.5	100	—	95.5
M2.5	M7	100	95.5	97
M7	M16	100	96	97.5
M16	M39	100	98	98.5

NOTE 4 In the case of thread tolerances other or larger than 6H, a decrease of the stripping strength should be considered (see table 1).

NOTE 5 The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows:

ISO 898-2 : 1992 *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread* (IDT)

The symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1.**

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0205-2 *ISO general purpose metric screw threads — Part 2: General plan*

NOTE : Corresponding International Standard: ISO 261 : 1998 *ISO general purpose metric screw threads — General plan* (IDT)

JIS B 0205-4 *ISO general purpose metric screw threads — Part 4: Basic dimensions*

NOTE : Corresponding International Standard: ISO 724 : 1993 *ISO general-purpose metric screw threads — Basic dimensions* (IDT)

JIS B 0209-1 *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

NOTE : Corresponding International Standard: ISO 965-1 : 1998 *ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data* (IDT)

JIS B 0209-2 *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality*

NOTE : Corresponding International Standard: ISO 965-2 : 1998 *ISO general purpose metric screw threads — Tolerances — Part 2: Limits of sizes for general purpose external and internal screw threads — Medium quality* (IDT)

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JIS B 0209-3 *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads*

JIS B 0401-2 *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

NOTE : Corresponding International Standard: ISO 286-2 : 1998 *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts* (IDT)

JIS B 1002 *Dimensions of widths across flats*

NOTE : Corresponding International Standard: ISO 272 : 1952 *Fasteners—Hexagon products — Widths across flats* (MOD)

JIS B 1042 *Fasteners — Surface discontinuities — Part 2: Nuts*

NOTE : Corresponding International Standard: ISO 6157-2 : 1995 *Fasteners— Surface discontinuities — Part 2: Nuts* (IDT)

JIS B 1054-2 *Mechanical properties of corrosion-resistant stainless-steel fasteners— Part 2: Nuts*

NOTE : Corresponding International Standard: ISO 3506-2 : 1997 *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 2: Nuts* (IDT)

JIS B 1056 *Prevailing torque type steel hexagon nuts — Mechanical and performance properties*

NOTE : Corresponding International Standard: ISO 2320 : 1997 *Prevailing torque type steel hexagon nuts — Mechanical and performance properties* (IDT)

JIS Z 2243 *Brinell hardness test — Test method*

NOTE : Corresponding International Standard: ISO 6506-1 : 2005 *Metallic materials — Brine11 hardness test — Purt 1: Test method* (MOD)

JIS Z 2244 *Vickers hardness test — Test method*

NOTE : Corresponding International Standard: ISO 6507-1 : 1997 *Metallic materials — Vickers hardness test — Part 1: Test method* (MOD)

JIS Z 2245 *Rockwell hardness test — Test method*

NOTE : Corresponding International Standard: ISO 6508-1 : 1999 *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, TI* (MOD)

3 Designation system

3.1 Nuts with nominal heights ≥ 0.8*d* (effectivelengths of thread ≥ 0.6*d*) (style 1 and style 2)

Nuts with nominal heights ≥ 0.8*d* (effective lengths of thread ≥ 0.6*d*) are designated by a number to indicate the maximum appropriate property class of bolts with which they may be mated as shown in table 2.

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Failure of threaded fasteners due to over-tightening can occur by bolt shank fracture or by stripping of the threads of the nut and/or bolt. Shank fracture is sudden and therefore easily noticed. Stripping is gradual and therefore difficult to detect and this introduces the danger of partly failed fasteners being left in assemblies.

It would therefore be desirable to design threaded connections so that their mode of failure would always be by shank fracture but, unfortunately, because of the many variables which govern stripping strength (nut and bolt material strengths, thread clearances, across-flats dimensions, etc.), nuts would have to be objectionably thick to guarantee this mode in all cases.

A bolt or screw of thread M5 to M39 assembled with a nut of the appropriate property class, in accordance with table 2, is intended to provide an assembly capable of being tightened to the bolt proof load without thread stripping occurring.

However, should tightening beyond bolt proof load take place, the nut design is intended to ensure at least 10 % of the over-tightened assemblies fail through bolt breakage in order to warn the user that the installation practice is not appropriate.

NOTE : For more detailed information on the strength of screw thread assemblies, see Annex A.

Table 2 Designation system for nuts with nominal heights ≥ 0.8d and their mating bolts

Property class of nut	Mating bolts		Nuts	
	Property class	Thread range	Style 1	Style 2
			Thread ranges	
4	3.6, 4.6, 4.8	> M16	> M16	—
5	3.6, 4.6, 4.8	≤ M16	≤ M39	—
	5.6, 5.8	≤ M39		
6	6.8	≤ M39	≤ M39	—
8	8.8	≤ M39	≤ M39	> M16 ≤ M39
9	9.8	≤ M16	—	≤ M16
10	10.9	≤ M39	≤ M39	—
12	12.9	≤ M39	≤ M16	≤ M39

3.2 Nuts with nominal heights ≥ 0.5d but < 0.8d (effective heights of thread ≥ 0.4d but < 0.6d) (Thin nut)

Nuts with nominal heights ≥ 0.5d but < 0.8d (effective height of thread ≥ 0.4d but < 0.6d are designated by a combination of two numbers (as shown in table **3);** the second **(4** and 5) indicates the nominal stress under proof load on a hardened test mandrel, while the first (0) indicates that the loadability of a bolt-nut assembly is reduced in comparison with the loadability on a hardened test mandrel and also in comparison with a bolt-nut assembly described in **3.1.** The effective loading capacity is not

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