



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS B 1056 : 2019

(JFRI/JSA)

**Fasteners—Prevailing torque steel
nuts—Functional properties**

ICS 21.060.20

Reference number : JIS B 1056 : 2019 (E)

Date of Establishment: 1987-03-01
Date of Revision: 2019-11-20
Date of Public Notice in Official Gazette: 2019-11-20
Investigated by: Japanese Industrial Standards Committee
Standards Board for ISO area

JIS B 1056:2019, First English edition published in 2020-04

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2020

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Symbols	3
5 Thread	4
6 Lubrication	4
7 Mechanical properties of prevailing torque nuts	4
8 Functional requirements for prevailing torque properties	4
9 Test method	12
9.1 General	12
9.2 Proof load test	12
9.3 Prevailing torque test	12
Annex A (informative) Temperature influence on prevailing torque non-metallic insert type nuts	17
Annex B (informative) Principles for evaluation of the coefficient of total friction μ_{tot}	18
Annex C (informative) Test clamp force and prevailing torques for prevailing torque nuts M3 and M4 in property classes 8 and 10	19
Annex JA (informative) Comparison table between JIS and corresponding International Standard	20

Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Research Institute for Screw Threads and Fasteners (JFRI)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS B 1056**: 2011), which has been technically revised.

This **JIS** document is protected by the Copyright Act.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, published patent application or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, published patent application or utility model rights.

Fasteners—Prevailing torque steel nuts— Functional properties

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 2320:2015**, Edition 5, with some modifications of the technical contents, providing requirements that reflect the use of the product in Japan.

The dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies the functional properties for prevailing torque steel nuts when tested at an ambient temperature range of +10 °C to +35 °C.

It includes a combined test method to determine the prevailing torque properties and the coefficient of total friction as the torque/clamp force properties at the same time.

It applies to prevailing torque all metal type nuts and prevailing torque non-metallic insert type nuts (hereafter referred to as nuts):

- with triangular **ISO** thread in accordance with **JIS B 0205-1**;
- with diameter/pitch combination in accordance with **JIS B 0205-3**;
- with coarse pitch thread M5 to M39 or with fine pitch thread M8×1 to M39×3;
- with thread tolerances in accordance with **JIS B 0209-2**;
- with mechanical properties in accordance with **JIS B 1052-2**.

Prevailing torque values specified in this Standard are based on laboratory test conditions.

NOTE 1 Actual prevailing torques in practical application can vary.

NOTE 2 Prevailing torque all metal type nuts conforming to the requirements of this Standard are used in applications ranging from −50 °C to +150 °C.

NOTE 3 Prevailing torque non-metallic insert type nuts conforming to the requirements of this Standard are used in applications ranging from −50 °C to +120 °C. At the temperature outside this range, the capability of functional properties (torque and clamp force, and prevailing torque properties) may be reduced (see Annex A).

NOTE 4 The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 2320:2015 *Fasteners—Prevailing torque steel nuts—Functional properties* (MOD)

In addition, 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 0205-1 *ISO general purpose metric screw threads—Part 1: Basic profile*

JIS B 0205-3 *ISO general purpose metric screw threads—Part 3: Selected sizes for screws, bolts and nuts*

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

JIS B 0251 *Limit gauges for metric screw threads*

JIS B 1001 *Diameter of clearance holes and counterbores for bolts and screws*

NOTE Corresponding International Standard: ISO 273:1979 *Fasteners—Clearance holes for bolts and screws*

JIS B 1051 *Mechanical properties of fasteners made of carbon steel and alloy steel—Bolts, screws and studs with specified property classes—Coarse thread and fine pitch thread*

NOTE Corresponding International Standard: ISO 898-1:2013 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 1: Bolts, screws and studs with specified property classes—Coarse thread and fine pitch thread*

JIS B 1052-2 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 2: Nuts with specified property classes—Coarse thread and fine pitch thread*

NOTE Corresponding International Standard: ISO 898-2:2012 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 2: Nuts with specified property classes—Coarse thread and fine pitch thread*

JIS B 1084 *Fasteners—Torque/clamp force testing*

NOTE Corresponding International Standard: ISO 16047:2005 *Fasteners—Torque/clamp force testing*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS B 1084**, and the following apply.

3.1

prevailing torque nut

nut which is not free-running on a mating thread by virtue of a self-contained prevailing torque feature, and which provides resistance to rotation independent of clamping or compression forces

3.2

prevailing torque developed by the nut

torque necessary to rotate the nut on its mating externally threaded component and without clamp force

3.3

prevailing-on torque

torque to rotate the nut on its mating externally threaded component with the torque measured while the nut is in motion and without clamp force

3.4

prevailing-off torque

torque to rotate after backing off the nut until the removal of the clamp force in the following 360° rotation of the nut

3.5

prevailing torque all metal type nut

nut which has a one piece or a multiple piece metal construction and derives its prevailing torque characteristics from a controlled distortion of the nut thread and/or body, or from metallic insert(s)

3.6

prevailing torque non-metallic insert type nut

nut which has a multiple piece construction and derives its prevailing torque characteristics from insert(s) of non-metallic material retained in the nut

3.7

seating point

point in the tightening process where clamp force first appears

4 Symbols

For the purpose of this Standard, the following symbols apply.

D	nominal diameter of thread, <u>mm</u>
d_4	diameter of the hole of the fixture of test apparatus, <u>mm</u>
F_p	proof load value of bolt or nut, <u>N</u>
F_{65}	lower load limit for the evaluation of the coefficient of total friction at 65 % of F_p , <u>N</u>
F_{75}	upper load limit for the evaluation of the coefficient of total friction at 75 % of F_p , <u>N</u>
F_{80}	test clamp force (shut-down force for the tightening process) at 80 % of F_p , <u>N</u>
P	pitch of the thread, <u>mm</u>
T_{Fv}	prevailing-on torque, <u>N·m</u>
T_{Fd}	prevailing-off torque, <u>N·m</u>

T_{65}	torque for the evaluation of the coefficient of total friction at F_{65} , $\text{N} \cdot \text{m}$
T_{75}	torque for the evaluation of the coefficient of total friction at F_{75} , $\text{N} \cdot \text{m}$
T_{80}	torque corresponding at F_{80} , $\text{N} \cdot \text{m}$
μ_{tot}	coefficient of total friction

5 Thread

Threads for prevailing torque nuts shall be in accordance with **JIS B 0209-2** except for the prevailing torque feature:

- for prevailing torque non-metallic insert type nuts, the GO gauge specified in **JIS B 0251** shall be suitable for free installation (by hand) until it is seated against the prevailing torque feature;
- for prevailing torque all metal type nuts, the GO gauge specified in **JIS B 0251** shall be suitable for free installation (by hand) to one pitch at least.

6 Lubrication

At the option of the manufacturer, a lubricant may be applied to the manufacturing lot to fulfil the functional requirements.

7 Mechanical properties of prevailing torque nuts

The mechanical properties of prevailing torque nuts shall conform to **JIS B 1052-2**. With regard to proof load tests for prevailing torque nuts, the method specified in **9.2** shall apply.

8 Functional requirements for prevailing torque properties

The 1st prevailing-on torque shall not exceed the value specified for the applicable nut in Tables 1 to 7.

The 1st prevailing-off torque shall exceed the value specified for the applicable nut in Tables 1 to 7.

For delivery inspection, the first installation/removal test applies, unless otherwise agreed.

For initial type testing and in case of dispute, a 5th removal test shall also be applied unless otherwise agreed. Prevailing torque performance decreases as a function of the number of reuses; the consumer shall take into consideration the consequences of the decreased performance before any reuse of the nut.

By request of the customer, a temperature influence test for prevailing torque non-metallic insert type nuts as specified in Annex A may be carried out.

Table 1 Test clamp force and prevailing torques for prevailing torque nuts of property class 04

Thread D $D \times P$	Test clamp force F_{80} ^{a)} N	Clamp force for evaluation of coefficient of total friction ^{b)}		Prevailing torque N · m		
		Upper limit F_{75} ^{b)} N	Lower limit F_{65} ^{b)} N	1st installation Upper limit ^{c)}	1st removal Lower limit	5th removal Lower limit
M5	4 320	4 050	3 510	1.6	0.29	0.2
M6	6 112	5 730	4 966	3	0.45	0.3
M7	8 800	8 250	7 150	4.5	0.65	0.45
M8	11 120	10 425	9 035	6	0.85	0.6
M8×1	11 920	11 175	9 685			
M10	17 600	16 500	14 300	10.5	1.5	1
M10×1.25	18 640	17 475	15 145			
M10×1	19 600	18 375	15 925			
M12	25 600	24 000	20 800	15.5	2.3	1.6
M12×1.5	26 800	25 125	21 775			
M12×1.25	28 000	26 250	22 750			
M14	34 960	32 775	28 405	24	3.3	2.3
M14×1.5	38 000	35 625	30 875			
M16	47 760	44 775	38 805	32	4.5	3
M16×1.5	50 800	47 625	41 275			
M18	58 400	54 750	47 450	42	6	4.2
M18×1.5	65 360	61 275	53 105			
M20	74 480	69 825	60 515	54	7.5	5.3
M20×1.5	82 720	77 550	67 210			
M22	92 080	86 325	74 815	68	9.5	6.5
M22×1.5	101 200	94 875	82 225			
M24	107 280	100 575	87 165	80	11.5	8
M24×2	116 720	109 425	94 835			
M27	139 520	130 800	113 360	94	13.5	10
M27×2	150 800	141 375	122 525			
M30	170 560	159 900	138 580	108	16	12
M30×2	188 800	177 000	153 400			
M33	210 960	197 775	171 405	122	18	14
M33×2	231 360	216 900	187 980			
M36	248 400	232 875	201 825	136	21	16
M36×3	262 960	246 525	213 655			
M39	296 720	278 175	241 085	150	23	18
M39×3	313 120	293 550	254 410			

NOTE The evaluation of results from the prevailing torque test by statistical process control methods (SPC) has no statistical relevance.

Notes ^{a)} The test clamp force for property class 04 nuts is equal to 80 % of the proof load value of property class 04 specified in **JIS B 1052-2** for nuts with $5 \text{ mm} \leq D \leq 39 \text{ mm}$.

^{b)} See Annex B.

^{c)} The values of prevailing torque for first assembly apply for prevailing torque all metal type nuts only. For prevailing torque non-metallic insert type nuts, the maximum prevailing torques shall be 50 % of the values.