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**General rules for tightening of
threaded fasteners**

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Foreword

This translation has been made based on the original Japanese Industrial Standard 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 the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 1083**:1990 is replaced with this Standard.

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General rules for tightening of threaded fasteners

Introduction

This Japanese Industrial Standard was established in 1990 together with **JIS B 1084** as the original standard in Japan regarding the tightening method of threaded fasteners and became what to this day through thrice confirmation.

According to the publication of **ISO 16047** *Fasteners—Torque/clamp force testing* in 2005 based on **JIS B 1084**:1990, **JIS B 1084** was revised in 2007 as the identical standard with **ISO 16047**:2005, and the title was also altered to “*Fasteners—Torque/clamp force testing*”.

The revision of this time is intended to conform with **JIS B 1084** revised in 2007.

The corresponding International Standard has not yet been established at this point.

1 Scope

This Standard specifies the determination method of the target values of tightening index for threaded fasteners in the representative tightening control method and the related matters to this.

This Standard shall apply to bolts, machine screws, studs (hereafter these are referred to as “bolts”) and nuts made of carbon steel and alloy steel. This Standard is also applicable to other combination of external and internal thread parts having the general purpose metric screw threads of the basic profile based on **JIS B 0205-1**.

This Standard may not apply to the studded side of stud bolts, set screws and similar threaded fasteners not under tensile stresses, threaded fasteners forming profile of internal threads by external threads themselves and threaded fasteners having the additional whirl-stop function.

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 0101 *Screw threads and fasteners—Vocabulary*

JIS B 0205-1 *ISO general purpose metric screw threads—Part 1: Basic profile*

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

JIS B 4650 *Torque wrenches*

3 Terms and definitions

For the purposes of this Standard, the definitions given in **JIS B 0101** and the following definitions shall apply.

3.1 tightening

to give tensile stress to the shank of external threaded part and compression stress to the clamped part by fitting the external thread to the internal thread

3.2 thread clamping, bolting

connecting method or connected condition of two or more items (clamped parts) in tightening by fitting the external threaded part of the bolt to the nut or the internal threaded part formed in the item

3.3 clamped part, clamped member

part or member to be connected by thread clamping

3.4 bolted joint

whole body of construction having the thread clamping part or a part of construction including thread clamping part

3.5 axial tension

tensile stress acting on the shank of external threaded part

3.6 clamp force

tensile stress of axial direction (axial tension) acting on the bolt shank, or compression stress acting on the clamped part by tightening

When it is necessary to distinguish these two, the former shall be called the tightening axial tension (see **JIS B 1084**).

3.7 initial clamp force

clamp force immediately after the completion of clamp work

In the case where there is no confusion, it may be simply called the clamp force or the tightening axial tension.

3.8 tightening torque, wrenching torque, applied torque

torque acting on the nut or bolt head in tightening (see **JIS B 1084**)

3.9 tightening angle

relative turning angle of external threaded part and internal threaded part in order to generate the initial clamp force

3.10 elastic-region tightening

tightening in the range where the bolt does not yield by tightening (see figure 1)

3.11 plastic-region tightening

tightening in the range from when the bolt yields by tightening till the ultimate clamp force has been reached (see figure 1)

3.12 tightening control

control of initial clamp force in clamp work

3.13 tightening indices

characteristics (tightening torque, tightening angle, torque gradient, etc.) to control the clamp force

3.14 torque control method, calibrated wrench method

method to perform tightening control by taking tightening torque as the tightening index

3.15 angle control method, turn-of-nut method

method to perform tightening control by taking tightening angle as the tightening index

3.16 torque gradient control method

method to perform tightening control by taking tightening torque gradient as the tightening index

3.17 torque coefficient

proportional constant expressing the relation between the tightening torque and the clamp force

3.18 thread torque

torque acting on the bolt shank through mating threads in tightening (see **JIS B 1084**)

3.19 bearing surface friction torque

torque acting on the clamped part through bearing surface in tightening (see **JIS B 1084**)

3.20 coefficient of friction between threads

coefficient of friction between the external thread flank and the internal thread flank

3.21 coefficient of friction between bearing surfaces

coefficient of friction between the bearing surface of nut or bolt and the bearing surface of clamped part

3.22 tightening coefficient

ratio of the maximum value and the minimum value of initial clamp forces to express the initial clamp force dispersion

3.23 yield clamp force

clamp force at which the cylindrical part of bolt or the engaged thread yield under combined stress condition in tightening (see figure 1) (see **JIS B 1084**)

3.24 yield tightening torque

tightening torque with which ultimate clamp force is gained in tightening (see **JIS B 1084**)

3.25 ultimate clamp force

maximum clamp force under combined stress condition potentially induced before the bolt shank fracture (see figure 1) (see **JIS B 1084**)

3.26 tightening characteristics

characteristics values of variables related to tightening (torque coefficient, comprehensive coefficient of friction, coefficient of friction between bearing surfaces, yield clamp force, yield tightening torque, tightening angle, ultimate clamp force, etc.)

3.27 stiffness of bolt, spring constant of bolt

ratio of change of the tensile stress (axial tension) acting on the bearing surface of the clamped bolt and nut to the deformation amount (elongation) of bolt in axial direction

3.28 compressive stiffness of clamped parts, compressive spring constant of clamped parts

ratio of change of compression stress acting on the bearing surface of the clamped part to the deformation amount (shrinkage) in axial direction between the bearing surfaces of clamped parts

3.29 snag torque

tightening torque required for adhering the bearing surface closely in the angle tightening method

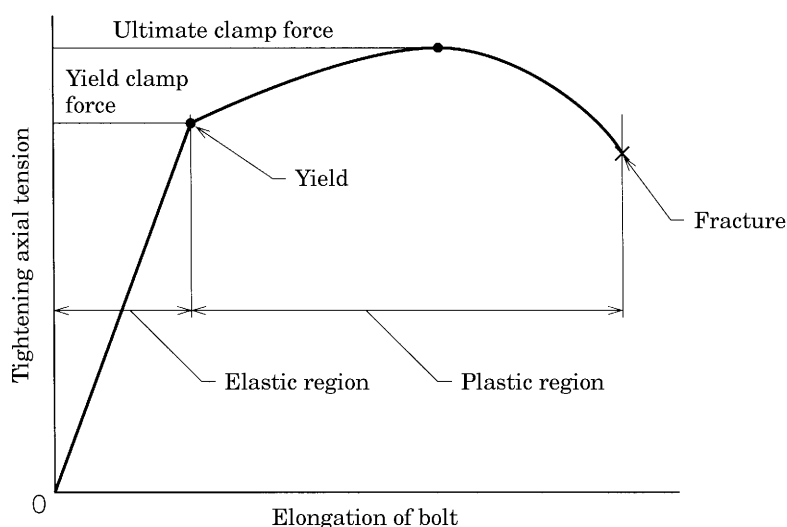


Figure 1 Relation between elongation of bolt and tightening axial tension

4 Symbol and meaning thereof

Symbols and meanings thereof used in this Standard shall be in accordance with table 1.