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

*Fixations — Écrous autofreinés en acier — Caractéristiques  
fonctionnelles*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 2, *Fasteners*, Subcommittee SC 12, *Fasteners with metric internal thread*.

This fifth edition cancels and replaces the fourth edition (ISO 2320:2008), which has been technically revised. The following changes have been made:

- property class 9 has been deleted;
- prevailing torques for nuts M3 and M4 have been moved to [Annex C](#);
- in the test fixture, the thread protrusion through the prevailing torque feature has been changed to 3 to 5 pitches;
- the reference surface condition for the test bolt has been specified in accordance with ISO 16047 (plain surface, uncoated and degreased, unless otherwise agreed);
- the determination of the prevailing-off torque has been changed from the upper value to the minimum value (new point 5 in [Figure 2](#)), which changes the acceptance conditions;
- other editorial revisions.

# Fasteners — Prevailing torque steel nuts — Functional properties

## 1 Scope

This International 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 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:

- with triangular ISO thread in accordance with ISO 68-1;
- with diameter/pitch combination in accordance with ISO 261 and ISO 262;
- with coarse pitch thread M5 to M39 or with fine pitch thread M8 × 1 to M39 × 3;
- with thread tolerances in accordance with ISO 965-2;
- with mechanical properties in accordance with ISO 898-2;

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 All metal type nuts conforming to the requirements of this International Standard are used in applications ranging from -50 °C to +150 °C.

NOTE 3 Non-metallic insert type nuts conforming to the requirements of this International Standard are used in applications ranging from -50 °C to +120 °C.

**WARNING — Temperatures outside the ambient temperature range can influence the functional properties (torque/clamp force and prevailing torque properties), see [Annex A](#).**

## 2 Normative references

The following referenced documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 273, *Fasteners — Clearance holes for bolts and screws*

ISO 898-1, *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*

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

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*

ISO 16047:2005, *Fasteners — Torque/clamp force testing*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16047 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 and/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 International Standard, the following symbols apply together with those defined in ISO 16047.

- $D$  nominal diameter, in millimetre
- $d_4$  diameter of the hole of the fixture, in millimetre
- $F_P$  proof load, in newton
- $F_{65}$  lower load limit for the evaluation of the coefficient of total friction at 65 % of  $F_P$ , in newton
- $F_{75}$  upper load limit for the evaluation of the coefficient of total friction at 75 % of  $F_P$ , in newton
- $F_{80}$  test clamp force (shut-down force for the tightening process) at 80 % of  $F_P$ , in newton
- $P$  pitch of the thread, in millimetre
- $T_{FV}$  prevailing-on torque, in newton metre
- $T_{Fd}$  prevailing-off torque, in newton metre
- $T_{65}$  lower torque limit for the evaluation of the coefficient of total friction at  $F_{65}$ , in newton metre
- $T_{75}$  upper torque limit for the evaluation of the coefficient of total friction at  $F_{75}$ , in newton metre

$T_{80}$  test torque corresponding to 80 % of the proof load, in newton metre (see [Tables 1 to 7](#))

$\mu_{\text{tot}}$  coefficient of total friction

## 5 Thread

Threads for prevailing torque nuts shall be in accordance with ISO 965-2 except for the prevailing torque feature:

- a) for prevailing torque non-metallic insert type nuts, the GO gauge shall be suitable for free installation (by hand) until it is seated against the prevailing torque feature;
- b) for prevailing torque all metal type nuts, the GO gauge 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 ISO 898-2.

With regard to proof load, the test method specified in [9.2](#) shall apply.

## 8 Functional requirements for prevailing torque properties

The prevailing-on torque shall not exceed the value specified for the applicable nut in [Tables 1 to 7](#).

The 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 5<sup>th</sup> 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.