

## **Fasteners - Torque/clamp force testing**

Fasteners - Torque/clamp force testing

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 16047:2005 sisaldab Euroopa standardi EN ISO 16047:2005 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 30.03.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 16047:2005 consists of the English text of the European standard EN ISO 16047:2005.</p> <p>This document is endorsed on 30.03.2005 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This International Standard specifies the conditions for carrying out torque/clamp force tests on threaded fasteners and related parts. It is applicable, basically, to bolts, screws, studs and nuts made of carbon steel and alloy steel, whose mechanical properties are specified in ISO 898-1, ISO 898-2 or ISO 898-6, having ISO metric threads with thread sizes M3 to M39. It is also applicable to the combination of other externally and internally threaded fasteners with a triangular ISO thread according to ISO 68-1.</p>	<p><b>Scope:</b></p> <p>This International Standard specifies the conditions for carrying out torque/clamp force tests on threaded fasteners and related parts. It is applicable, basically, to bolts, screws, studs and nuts made of carbon steel and alloy steel, whose mechanical properties are specified in ISO 898-1, ISO 898-2 or ISO 898-6, having ISO metric threads with thread sizes M3 to M39. It is also applicable to the combination of other externally and internally threaded fasteners with a triangular ISO thread according to ISO 68-1.</p>
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Võtmesõnad:

English version

## Fasteners - Torque/clamp force testing (ISO 16047:2005)

Eléments de fixation - Essais couple/tension (ISO  
16047:2005)

Verbindungselemente - Drehmoment/Vorspannkraft-  
Versuch (ISO 16047:2005)

This European Standard was approved by CEN on 17 January 2005.

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## Foreword

This document (EN ISO 16047:2005) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 "Threaded and non-threaded mechanical fasteners and accessories", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2005, and conflicting national standards shall be withdrawn at the latest by August 2005.

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## Endorsement notice

The text of ISO 16047:2005 has been approved by CEN as EN ISO 16047:2005 without any modifications.

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## Fasteners — Torque/clamp force testing

*Éléments de fixation — Essais couple/tension*



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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 16047 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 1, *Mechanical properties of fasteners*.



# Fasteners — Torque/clamp force testing

## 1 Scope

This International Standard specifies the conditions for carrying out torque/clamp force tests on threaded fasteners and related parts.

It is applicable, basically, to bolts, screws, studs and nuts made of carbon steel and alloy steel, whose mechanical properties are specified in ISO 898-1, ISO 898-2 or ISO 898-6, having ISO metric threads with thread sizes M3 to M39. It is also applicable to the combination of other externally and internally threaded fasteners with a triangular ISO thread according to ISO 68-1.

It is not applicable to set screws and similar threaded fasteners that are not under tensile stresses, nor to screws which form their own mating thread or threaded fasteners having additional self-locking features.

Unless otherwise agreed, the tests are carried out at room temperature. However, tests carried out under standard conditions are made at a temperature of 10 °C to 35 °C.

This method allows determination of the tightening characteristics of threaded fasteners and related parts.

## 2 Normative references

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

ISO 68-1, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads*

ISO 273:1979, *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*

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

ISO 898-6, *Mechanical properties of fasteners — Part 6: Nuts with specified proof load values — Fine pitch thread*

ISO 4014, *Hexagon head bolts — Product grades A and B*

ISO 4017, *Hexagon head screws — Product grades A and B*

ISO 4032, *Hexagon nuts, style 1 — Product grades A and B*

ISO 4033, *Hexagon nuts, style 2 — Product grades A and B*

ISO 4042:1999, *Fasteners — Electroplated coatings*

ISO 4759-3:2000, *Tolerances for fasteners — Part 3: Plain washers for bolts, screws and nuts — Product grades A and C*

ISO 4762, *Hexagon socket head cap screws*

ISO 6892, *Metallic materials — Tensile testing at ambient temperature*

ISO 7093-1, *Plain washers — Large series — Product grade A*

ISO 8673, *Hexagon nuts, style 1, with metric fine pitch thread — Product grades A and B*

ISO 8674, *Hexagon nuts, style 2, with metric fine pitch thread — Product grades A and B*

ISO 8765, *Hexagon head bolts with metric fine pitch thread — Product grades A and B*

ISO 15071, *Hexagon bolts with flange — Small series — Product grade A*

ISO 15072, *Hexagon bolts with flange with metric fine pitch thread — Small series — Product grade A*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 clamp force

$F$

axial tension acting on the bolt shank or compression acting on the clamped member during tightening

#### 3.2 yield clamp force

$F_y$

clamp force at which the bolt shank or the engaged thread yield under combined stress condition in tightening

#### 3.3 ultimate clamp force

$F_u$

maximum clamp force under combined stress condition potentially induced before bolt shank fracture

#### 3.4 tightening torque

wrenching torque

applied torque

$T$

overall torque applied on nut or bolt head in tightening

#### 3.5 yield tightening torque

$T_y$

tightening torque with which yield clamp force is gained

#### 3.6 thread torque

$T_{th}$

torque acting on bolt shank through mating threads during tightening