SLOVENSKI STANDARD
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Vijačne zveze brez prednapetja - 2. del: Preskus ustreznosti

Non-preloaded structural bolting assemblies - Part 2: Suitability test

Garnituren für nicht planmäßig vorgespannte Schraubenverbindungen für den Metallbau - Teil 2: Eignungsprüfung

Boulonnerie de construction métallique non précontrainte - Partie 2 : Essai d'aptitude a l'emploi

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21.060.10 Sorniki, vijaki, stebelni vijaki Bolts, screws, studs

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document (EN 15048-2:2007) has been prepared by Technical Committee CEN/TC 185 “Fasteners”, 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of an identical text or by endorsement, at the latest by October 2007, and conflicting national standards shall be withdrawn at the latest by October 2009.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This part of this European Standard is intended to test the tensile resistance of bolt/nut/washer assemblies to ensure that the assemblies are suitable for use in non-preloaded structural bolting. The assemblies may be used in shear connections or in tension connections if no preload is required. Structural fasteners which meet the requirements of this part of this European Standard have been designed to allow tensile loading of at least $f_{ub} \times A_s$ according to EN 1993-1-8 (Eurocode 3).

NOTE A_s according to EN 1993-1-8 means $A_{s,nom}$ according to the definition in Clause 4.

1 Scope

This part of this European Standard specifies a tensile test for bolt/nut assemblies to guarantee their suitability for non-preloaded bolted connections in civil engineering structures. It applies to assemblies of bolts, nuts (and washers if required) with dimensional and mechanical characteristics as specified in EN 15048-1.

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.

EN 15048-1:2007, *Non-preloaded structural bolting assemblies — Part 1: General requirements*

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs (ISO 898-1:1999)*

EN ISO 3506-1, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts, screws and studs (ISO 3506-1:1997)*

EN ISO 7500-1, *Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Verification and calibration of the force-measuring system (ISO 7500-1:2004)*

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

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

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 15048-1:2007 apply.

4 Symbols

$A_{s,\,nom}$ nominal stress area of the bolt, in mm^2 (see also EN ISO 898-1 and EN ISO 3506-1)

d nominal thread diameter, in mm

F_b force in the bolted assembly during the test, in kN

$F_{bi,max}$ individual value of the maximum force reached by the assembly during the test, in kN

F_{ub} minimum tensile resistance, in kN, (see also EN 15048-1)

f_{ub} nominal tensile strength ($R_{m, nom}$) of bolt, in N/mm^2

l bolt length, in mm

5 Tensile test of bolt/nut assemblies

5.1 Principle

The principle of the test is to load the bolt/nut assembly and to measure the force in the bolted assembly during the tensile test.

5.2 Test conditions

5.2.1 General

The test shall be carried out in accordance with 5.2.2 to 5.2.5.

NOTE Other conditions may be specified, see Annex A.

5.2.2 Test apparatus

The tensile testing machine shall be in accordance with EN ISO 7500-1. Side thrust on the fastener shall be avoided, e.g. by self aligning grips.

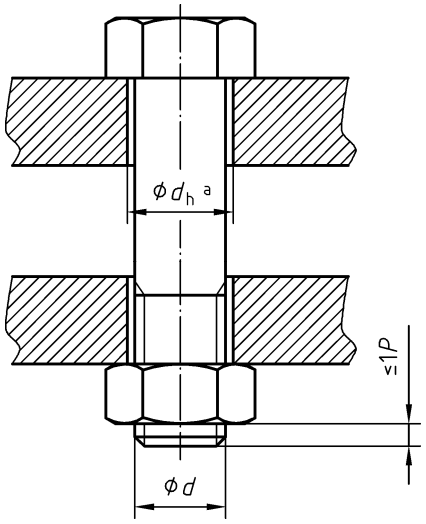
5.2.3 Test assemblies

The test shall be carried out on a bolt/nut assembly without washers. Test assemblies shall be taken from a single assembly lot or extended assembly lot (see EN 15048-1). Each component of a test assembly shall be tested in the as received condition and shall be used once only.

5.2.4 Test set-up

Usually tests can be carried out on bolts or screws with $l > 3\ d$ or studs with $l > 4\ d$. The test assemblies shall be positioned in a test set-up as shown in Figure 1 such that the clamp length is the maximum allowed in practice. The end of the bolt shall protrude not more than one pitch (1 P) beyond the unloaded face of the nut.

To be suitable for bolts with specific geometry (fitted or countersunk head bolt) the test setup has to be adapted.



Key

a d_h according to ISO 273, medium series

Figure 1 — Typical test set-up

5.2.5 Test procedure

The test shall be carried out at an ambient temperature range of 10 °C to 35 °C.

The tensile test shall be carried out in a continuous manner in accordance with ISO 6892 and the actual force in the bolted assembly, $F_{b,}$ shall be measured continuously throughout the test. The speed of testing shall not exceed 20 mm/min.

5.3 Required failure mode

Failure of an assembly with components of carbon steel or alloy steel shall occur by fracture in the free threaded length or by stripping the engaged threads but not in the shank or at the junction of the head to the shank or the thread or in the head.

The failure of an assembly with components of stainless steel shall occur by fracture in the shank or in the free threaded length or by stripping the engaged threads but not by fracture at the junction of the head to the shank or the thread or in the head.

5.4 Required tensile resistance

In each tensile test the individual value of the maximum force reached by the assembly $F_{bi,\ max}$ shall not be less than the specified tensile resistance F_{ub}:

$$F_{bi,\ max} \geq F_{ub} \qquad (1)$$

where

$$F_{ub} = R_{m,\ min} \times A_{s,\ nom}$$

6 Test documentation

The following minimum information shall be included in the test documentation:

a) identification of the laboratory;