

High-strength structural bolting assemblies for  
preloading - Part 2: Suitability for preloading

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 14399-2:2015 sisaldab Euroopa standardi EN 14399-2:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 14399-2:2015 consists of the English text of the European standard EN 14399-2:2015.
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English Version

## High-strength structural bolting assemblies for preloading - Part 2: Suitability for preloading

Boulonnerie de construction métallique à haute résistance  
apte à la précontrainte - Partie 2 : Aptitude à l'emploi pour  
la mise en précontrainte

Hochfeste vorspannbare Garnituren für  
Schraubverbindungen im Metallbau - Teil 2: Eignung zum  
Vorspannen

This European Standard was approved by CEN on 18 October 2014.

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## Foreword

This document (EN 14399-2:2015) 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of an identical text or by endorsement, at the latest by August 2015 and conflicting national standards shall be withdrawn at the latest by November 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14399-2:2005.

In comparison with EN 14399-2:2005, the following modifications have been made:

- technical requirements and delivery conditions for bolting assemblies have been transferred from EN 14399-1;
- Table 1 containing the overview of the composition of bolting assemblies and component marking has been added;
- requirements for necessary information on the use of tightening methods to be stated on the label or packaging have been added;
- requirements for the test report have been revised.

EN 14399 consists of the following parts, under the general title *High-strength structural bolting assemblies for preloading*:

- *Part 1: General requirements*;
- *Part 2: Suitability for preloading*;
- *Part 3: System HR — Hexagon bolt and nut assemblies*;
- *Part 4: System HV — Hexagon bolt and nut assemblies*;
- *Part 5: Plain washers*;
- *Part 6: Plain chamfered washers*;
- *Part 7: System HR — Countersunk head bolt and nut assemblies*;
- *Part 8: System HV — Hexagon fit bolt and nut assemblies*;
- *Part 9: System HR or HV — Direct tension indicators for bolt and nut assemblies*;
- *Part 10: System HRC — Bolt and nut assemblies with calibrated preload*.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

This document on structural bolting reflects the situation in Europe where two technical solutions exist to achieve the necessary ductility of bolt/nut/washer(s) assemblies. These solutions consist of two different systems (HR and HV) of bolt/nut/washer assemblies (see Table 1). Both systems are well proven and it is the responsibility of the experts using structural bolting whether they use the one or the other system.

It is, however, important for the performance of the assembly to avoid mixing up the components of both systems. Therefore, bolts and nuts for both systems are standardized in one single part of this European Standard each and the marking of the components of the same system is uniform.

Preloaded bolted assemblies are very sensitive to differences in manufacture and lubrication. Therefore, it is important that the bolting assemblies are supplied by one manufacturer who is always responsible for the functionality of the bolting assemblies.

For the same reason it is important that coating of the bolting assemblies is under the control of one manufacturer.

Beside the mechanical properties of the components, the functionality of the bolting assemblies requires that the specified preload can be achieved if the bolting assemblies are tightened with a suitable procedure. For this purpose, a test method for the suitability of the bolting assemblies for preloading was created, which will demonstrate whether the functionality of the bolting assemblies is fulfilled.

It should be pointed out that compared to ISO 272 the widths across flats (large series) for M12 and M20 have been changed to 22 mm and 32 mm respectively. These changes are justified by the following reasons.

Under the specific conditions of structural bolting, the compressive stresses under the bolt head or nut for the sizes M12 may become too large with the width across flats of 21 mm, especially if the washer is fitted eccentrically to the bolt axis.

For the size M20, the width across flats of 34 mm is very difficult to be produced. The change to 32 mm is primarily motivated by economics but it should also be pointed out that the width across flats of 32 mm was common practice in Europe.

## 1 Scope

This European Standard specifies the technical requirements for high-strength structural bolting assemblies in order to ensure the suitability for preloading of bolted connections in metallic structures.

A suitability test is specified to check the behaviour of the structural bolting assemblies so as to ensure that the required preload can be reliably obtained by the tightening methods specified in EN 1090-2 with sufficient margins against overtightening and against failure.

## 2 Normative references

The following 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.

EN 1090-2, *Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures*

EN 14399-1:2015, *High-strength structural bolting assemblies for preloading - Part 1: General requirements*

EN 14399-3, *High-strength structural bolting assemblies for preloading - Part 3: System HR - Hexagon bolt and nut assemblies*

EN 14399-4, *High-strength structural bolting assemblies for preloading - Part 4: System HV - Hexagon bolt and nut assemblies*

EN 14399-5, *High-strength structural bolting assemblies for preloading - Part 5: Plain washers*

EN 14399-6, *High-strength structural bolting assemblies for preloading - Part 6: Plain chamfered washers*

EN 14399-7, *High-strength structural bolting assemblies for preloading - Part 7: System HR - Countersunk head bolt and nut assemblies*

EN 14399-8, *High-strength structural bolting assemblies for preloading - Part 8: System HV - Hexagon fit bolt and nut assemblies*

EN 14399-9, *High-strength structural bolting assemblies for preloading - Part 9: System HR or HV - Direct tension indicators for bolt and nut assemblies*

EN 14399-10, *High-strength structural bolting assemblies for preloading - Part 10: System HRC - Bolt and nut assemblies with calibrated preload*

EN 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 898-1)*

EN 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 898-2)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14399-1:2015 apply.