

**Eelkoormatavad kõrgtugevad ehituslikud
kinnitusmehhanismid. Osa 8: HV-süsteem.
Koostud kuuskantpea ning täppispoldi ja
mutriga**

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

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<p>Käesolev Eesti standard EVS-EN 14399-8:2008 sisaldab Euroopa standardi EN 14399-8:2007 ingliskeelset teksti.</p>	<p>This Estonian standard EVS-EN 14399-8:2008 consists of the English text of the European standard EN 14399-8:2007.</p>
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English Version

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

Boulonnerie de construction métallique à haute résistance
apte à la précontrainte - Partie 8: Système HV - Boulons
ajustés à tête hexagonale (vis + écrou)

Hochfeste planmäßig vorspannbare
Schraubenverbindungen für den Metallbau - Teil 8: System
HV - Garnituren aus Sechskant-Passschrauben und
Muttern

This European Standard was approved by CEN on 10 November 2007.

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Foreword

This document (EN 14399-8:2007) 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of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2010.

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 the United Kingdom.

Introduction

This document for structural bolting reflects the situation in Europe where two technical solutions exist to achieve the necessary ductility of bolt/nut/washer assemblies. These solutions utilize different systems (HR and HV) of bolt/nut/washer assemblies, see Table 1. Both systems are well proved and it is up to the experts responsible for 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.

Table 1 — Systems of bolt/nut/washer(s) assemblies

	Bolt/nut/washer(s) assembly System HR		Bolt/nut/washer(s) assembly System HV
General requirements	EN 14399-1		
Bolt/nut assemblies	EN 14399-3, EN 14399-7		EN 14399-4, EN 14399-8
Marking	HR		HV
Property classes	8.8/8	10.9/10	10.9/10
Washer(s)	EN 14399-5 or EN 14399-6		EN 14399-5 or EN 14399-6
Marking	H		H
Suitability test for preloading	EN 14399-2		EN 14399-2

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

For the same reason it is important that the coating of the assembly is under the control of the manufacturer.

Beside the mechanical properties of the components, the functionality of the assembly requires that the specified pre-load can be achieved if the assembly is tightened with a suitable procedure. For this purpose a test method for the suitability of the components for preloading was created which will demonstrate whether the function of the assembly 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 excentrically 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 is already common practice in Europe.

Attention is drawn to the importance of ensuring that the bolts are correctly used if satisfactory results are to be obtained. For recommendations concerning proper application, reference to prEN 1090-2 is made.

1 Scope

This document belongs to the suite of European Standards EN 14399 and is designed to be read in conjunction with EN 14399-1 for:

- general requirements;
- testing for conformity evaluation;
- evaluation of conformity;
- regulatory marking;

for assemblies of high-strength structural fit bolts and nuts of system HV suitable for preloaded joints with, thread sizes M12 to M36 and bolt property class 10.9 and EN 14399-2 for suitability testing.

This part gives requirements for:

- dimensions;
- associated washer(s) according to EN 14399-6;
- performance and suitability tests

for assemblies with thread sizes M12 to M36 and bolt property class 10.9.

Assemblies of hexagon fit bolts with shaft diameter ($d + 1$ mm) and nuts according to this part of this European Standard have been designed to allow preloading of at least $0,7 f_{ub} \times A_s^{1)}$ according to EN 1993-1-8 (Eurocode 3) and to obtain ductility predominantly by deformation of the engaged thread. For this purpose the components have the following characteristics:

- nut height approximately $0,8 d$;
- hexagon fit bolt with short thread length.

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 1993-1-8, *Eurocode 3: Design of steel structures — Part 1-8: Design of joints*

EN 10045-1, *Metallic materials - Charpy impact test - Part 1: Test method*

EN 14399-1:2005, *High-strength structural bolting assemblies for preloading - Part 1: General requirements*

EN 14399-2:2005, *High-strength structural bolting assemblies for preloading - Part 2: Suitability test for preloading*

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 20898-2, *Mechanical properties of fasteners - Part 2: Nuts with specified proof load values - Coarse thread (ISO 898-2:1992)*

1) f_{ub} is the nominal tensile strength (R_m) and A_s is the nominal stress area of the bolt.

EN 26157-1, *Fasteners - Surface discontinuities - Part 1: Bolts, screws and studs for general requirements (ISO 6157-1:1988)*

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 3269, *Fasteners - Acceptance inspection (ISO 3269:2000)*

EN ISO 4759-1, *Tolerances for fasteners - Part 1: Bolts, screws, studs and nuts - Product grades A, B and C (ISO 4759-1:2000)*

EN ISO 6157-2, *Fasteners - Surface discontinuities - Part 2: Nuts (ISO 6157-2:1995)*

EN ISO 10684, *Fasteners - Hot dip galvanized coatings (ISO 10684:2004)*

ISO 148-1, *Metallic materials - Charpy pendulum impact test - Part 1: Test method*

ISO 261, *ISO general purpose metric screw threads — General plan*

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 965-5, *ISO general purpose metric screw threads - Tolerances - Part 5: Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14399-1:2005 and EN 14399-2:2005 apply.

4 Fit bolts

4.1 General

The test method for suitability for preloading shall be as specified in EN 14399-2.

4.2 Dimensions of fit bolts

Dimensions see Figure 1 and Table 2, clamp length see Figure 2 and Table 3.