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BSI Standards Publication

Mechanical properties of fasteners made of carbon steel and alloy steel

Part 3: Flat washers with specified property classes

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National foreword

This British Standard is the UK implementation of EN ISO 898-3:2018. It is identical to ISO 898-3:2018.

The UK participation in its preparation was entrusted to Technical Committee FME/9, Fasteners.

A list of organizations represented on this committee can be obtained on request to its secretary.

BSI, as a member of CEN, is obliged to publish EN ISO 898-3:2018 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK committee voted against its approval as a European Standard.

FME/9 voted to disapprove this standard for the following reason.

Table 1 of ISO 898-3:2018 does not permit 100 HV washers to be used with 8.8/8 bolt and nut assemblies or with 10.9/10 bolt and nut assemblies.

Bolt, nut and washer assemblies using these washers are permitted in accordance with the cited harmonized standard EN 15048-1:2007 (see EN 15048-1:2007, Table 6), and are required for use in structural connections as specified in EN 1090-2, *Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures*.

These assemblies are used extensively in non-preloaded structural bolting in the UK and have been used successfully for well over 40 years. The function of the washers in these non-preloaded structural bolting assemblies is solely to reduce local damage to metal coatings applied to the structural steelwork, and there is therefore no technical justification for prohibiting the use of 100 HV washers for these assemblies.

Note: EN 15048-1:2016 and EN 15048-2:2016 have been published but the harmonized standard EN 15048-1:2016 has not yet been cited. Requirements concerning washers have been removed from EN 15048-1:2016 but the requirements concerning the use of 100 HV washers with 8.8/8 bolt and nut assemblies or with 10.9/10 bolt and nut assemblies are retained in EN 15048-2:2016 (see EN 15048-2:2016, Clause 5.2)

FME/9 recommends that for all structural bolting assemblies required for EN 1090-2 connections the requirements of ISO 898-3:2018 should be disregarded.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Date

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English Version

Mechanical properties of fasteners made of carbon steel and alloy steel - Part 3: Flat washers with specified property classes (ISO 898-3:2018)

Caractéristiques mécaniques des fixations
en acier au carbone et en acier allié - Partie
3: Rondelles de forme plane de classes de
qualité spécifiées (ISO 898-3:2018)

Mechanische Eigenschaften von
Verbindungselementen aus Kohlenstoffstahl
und legiertem Stahl - Teil 3: Flache Scheiben mit
festgelegten Festigkeitsklassen (ISO 898-3:2018)

This European Standard was approved by CEN on 16 May 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN ISO 898-3:2018) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 "Fasteners" the secretariat of which is held by BSI.

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 December 2018, and conflicting national standards shall be withdrawn at the latest by December 2018.

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

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 898-3:2018 has been approved by CEN as EN ISO 898-3:2018 without any modification.

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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).

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).

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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 2, *Fasteners*.

A list of all parts in the ISO 898 series can be found on the ISO website.

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Introduction

ISO 898 consists of the following parts, under the general title "*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*
- *Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread*
- *Part 5: Set screws and similar threaded fasteners with specified hardness classes — Coarse thread and fine pitch thread*
- *Part 7: Torsional test and minimum torques for bolts and screws with nominal diameters 1 mm to 10 mm*

This document in the ISO 898 series provides a single point of reference for flat washers, in order to standardize market expectations for users, distributors and manufacturers.

This document only deals with flat washers made of carbon steel or alloy steel.

Washers made of stainless steel are not addressed in this document due to their different characteristics and test methods.

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Mechanical properties of fasteners made of carbon steel and alloy steel —

Part 3: Flat washers with specified property classes

1 Scope

This document specifies mechanical and physical properties of flat washers, designed to be used in bolted joints in combination with bolts, screws, studs and nuts with a specified property class in accordance with ISO 898-1 and ISO 898-2.

NOTE 1 These types of washers can also be used with other fasteners such as screws forming their own mating thread.

Washers that conform to the requirements of this document are evaluated at an ambient temperature range of 10 °C to 35 °C. They might not retain the specified mechanical and physical properties at elevated temperatures and/or lower temperatures.

NOTE 2 Washers conforming to the requirements of this document are used in applications ranging from -50 °C to +150 °C. Users are advised to consult an experienced fastener expert for temperatures outside this range and up to a maximum temperature of +300 °C when determining appropriate choices, or for critical applications.

This document is applicable to the following flat captive and non-captive washers made of carbon steel or alloy steel, with thickness from 0,2 mm to 12 mm:

- plain washers (with or without knurls, ribs or chamfers);
- square washers;
- square hole washers;
- shaped plates.

It does not specify requirements for the following properties:

- corrosion resistance;
- weldability.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1891-4, *Fasteners — Terminology — Part 4: Controls, inspection, delivery, acceptance and quality*

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

ISO 10644, *Screw and washer assemblies made of steel with plain washers — Washer hardness classes 200 HV and 300 HV*