BS EN ISO 7093-1:2000

Incorporating Corrigendum No. 1

Plain washers—Large series—

Part 1: Product grade A

The European Standard EN ISO 7093-1:2000 has the status of a British Standard

 $ICS\ 21.060.30$



National foreword

This British Standard is the official English language version of EN ISO 7093-1:2000. It is identical with ISO 7093-1:2000, including corrigendum February 2001.

The UK participation in its preparation was entrusted to Technical Committee FME/9, Bolts, nuts and accessories (+QA & hose clamps), to Subcommittee FME/9/6, General purpose fasteners and accessories, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

Cross-references

Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international pblications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO page, pages ii and iii, a blank page, pages 1 to 5, the annex ZA page, an inside back cover and a back cover.

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his British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 September 2001

Amendments issued since publication

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2000

EN ISO 7093-1

ICS 21.060.30

English version

Plain washers - Large series - Part 1: Product grade A (ISO 7093-1:2000)

Rondelles plates - Série large - Partie 1: Grade A (ISO 7093-1:2000)

Flache Scheiben - Große Reihe - Teil 1: Produktklasse A (ISO 7093-1:2000)

This European Standard was approved by CEN on 1 June 2000.

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EUROPEAN COMMITTEE FOR STANDARDIZATION COMITÉ EUROPÉEN DE NORMALISATION EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of the International Standard ISO 7093-1:2000 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 December 2000, and conflicting national standards shall be withdrawn at the latest by December 2000.

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

Endorsement notice

The text of the International Standard ISO 7093-1:2000 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to International Standards are listed in annex ZA (normative).

INTERNATIONAL STANDARD

ISO 7093-1:2000 ISO 7093-1

First edition 2000-06-01

Corrected and reprinted 2001-02-01

Plain washers — Large series —

Part 1: **Product grade A**

Rondelles plates — Série large — Partie 1: Grade A



EN ISO 7093-1:2000

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 part of ISO 7093 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7093-1 was prepared by Technical Committee ISO/TC 2, Fasteners.

This first edition of ISO 7093-1, together with ISO 7093-2, cancels and replaces ISO 7093:1983, which has been technically revised.

ISO 7093 consists of the following parts, under the general title *Plain washers — Large series*:

- Part 1: Product grade A
- Part 2: Product grade C

Plain washers — Large series —

Part 1:

Product grade A

1 Scope

This part of ISO 7093 specifies the characteristics of large-series, product-grade-A plain washers in the 200 HV and 300 HV hardness classes and of nominal sizes (nominal thread diameters) ranging from 3 mm to 36 mm inclusive.

Washers conforming to this part of ISO 7093 are intended for use in cases where soft material pieces are to be clamped or where there are large clearance holes in the workpiece. Nevertheless, in the latter case, the suitability of the washer thickness should be checked.

Washers of hardness class 200 HV are suitable for

- hexagon bolts and screws of product grades A and B in property classes up to and including 8.8;
- hexagon nuts of product grades A and B in property classes up to and including 8;
- hexagon bolts, screws and nuts of stainless steel of similar chemical composition;
- case-hardened thread rolling screws.

Washers of hardness class 300 HV are suitable for

- hexagon bolts and screws of product grades A and B in property classes up to and including 10.9;
- hexagon nuts of product grades A and B in property classes up to and including 10.

If dimensions other than those listed in this part of ISO 7093 are required, they should be selected from those given in ISO 887.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 887:—1), Plain washers for metric bolts, screws and nuts for general purposes — General plan.

ISO 3269:2000, Fasteners — Acceptance inspection.

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

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 6507-1:1997, Metallic materials — Vickers hardness test — Part 1: Test method.

ISO 10683:—2), Fasteners — Non-electrolytically applied zinc flake coatings.

3 Dimensions

See Figure 1 and Tables 1 and 2.

Dimensions in millimetres, surface roughness values in micrometres

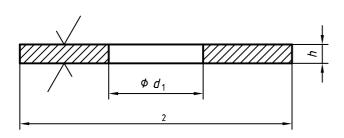


Figure 1 — Dimensions

¹⁾ To be published. (Revision of ISO 887:1983)

²⁾ To be published.

Table 1 — Preferred dimensions

Dimensions in millimetres

Nominal size	Clearan	ice hole	Outside diameter		Thickness		
(Nominal	d_1		d_2		h		
thread	nom.	max.	nom.	min.	nom.	max.	min.
diameter, d)	(min.)		(max.)				
3	3,20	3,38	9,00	8,64	0,8	0,9	0,7
4	4,30	4,48	12,00	11,57	1	1,1	0,9
5	5,30	5,48	15,00	14,57	1	1,1	0,9
6	6,40	6,62	18,00	17,57	1,6	1,8	1,4
8	8,40	8,62	24,00	23,48	2	2,2	1,8
10	10,50	10,77	30,00	29,48	2,5	2,7	2,3
12	13,00	13,27	37,00	36,38	3	3,3	2,7
16	17,00	17,27	50,00	49,38	3	3,3	2,7
20	21,00	21,33	60,00	59,26	4	4,3	3,7
24	25,00	25,52	72,0	70,8	5	5,6	4,4
30	33,00	33,62	92,0	90,6	6	6,6	5,4
36	39,00	39,62	110,0	108,6	8	9	7

Table 2 — Non-preferred dimensions

Dimensions in millimetres

Nominal size	Clearance hole		Outside diameter		Thickness		
(Nominal	d_1		d_2		h		
thread	nom.	max.	nom.	min.	nom.	max.	min.
diameter, d)	(min.)		(max.)				
3,5	3,70	3,88	11,00	10,57	0,8	0,9	0,7
14	15,00	15,27	44,00	43,38	3	3,3	2,7
18	19,00	19,33	56,00	55,26	4	4,3	3,7
22	23,00	23,52	66,0	64,8	5	5,6	4,4
27	30,00	30,52	85,0	83,6	6	6,6	5,4
33	36,00	36,62	105,0	103,6	6	6,6	5,4

4 Requirements and International Standards of reference

See Table 3.

Table 3 — Specifications and International Standards of reference

Material ^a		St	Stainless steel			
	Grade ^b			A2 F1 C1 A4 C4		
	International Standard		ISO 3506-1			
Mechanical properties	Hardness class	200 HV	200 HV			
	Hardness range ^d	200 HV to 300 HV	300 HV to 370 HV	200 HV to 300 HV		
Tolerances	Product grade		Α			
	International Standard		ISO 4759-3			
Surface finish		Plain: i.e. washers to be supplied protective lubricant or with customer and supplier. Requirements for electroplating Requirements for non-electrolyth covered in ISO 10683. For hardened and tempered washers as they shall be suitably treated coating to obviate detrimental half tolerances shall apply prior coating.	Plain: i.e. washers shall be supplied in natural finish.			
Workmanship		Parts shall be free of irregular protruding burrs shall appear or				
Acceptability		Acceptance procedure covered in ISO 3269.				

Other metallic materials as agreed between customer and supplier.

Test force: HV 10 for nominal thickness 0,6 < $h \le$ 1,2 mm;

HV 30 for nominal thickness h > 1,2 mm.

b Related to chemical composition only.

C Hardened and tempered.

d Hardness testing according to ISO 6507-1.

5 Designation

EXAMPLE 1 A large-series, product-grade-A plain washer made of steel, of nominal size 8 mm and hardness class 200 HV is designated as follows:

Washer ISO 7093-1-8-200 HV

EXAMPLE 2 A large-series, product-grade-A plain washer made of grade A2 stainless steel, of nominal size 8 mm and hardness class 200 HV is designated as follows:

Washer ISO 7093-1-8-200 HV-A2

Annex ZA (normative) Normative references to international publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

Publication Ye	ar <u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 3506-1 19	Mechanical properties of corrosion-resistant stainless-steel fasteners - Part 1: Bolts, screws and studs	EN ISO 3506-1	1997
ISO 4042 19	9 Fasteners - Electroplated coatings	EN ISO 4042	1999
ISO 4759-3 20	OO Tolerances for fasteners - Part 3: Plain washers for bolts, screws and nuts - Products grades A and C	EN ISO 4759-3	2000
ISO 6507-1 19	Metallic materials - Vickers hardness test - Part 1: Test method	EN ISO 6507-1	1997

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