

Plain washers – Small series

Product grade A

(ISO 7092 : 2000)

English version of DIN EN ISO 7092

DIN**EN ISO 7092**

ICS 21.060.30

Supersedes DIN 433-1 and
DIN 433-2, March 1990 editions.Flache Scheiben – Kleine Reihe – Produktklasse A
(ISO 7092 : 2000)**European Standard EN ISO 7092 : 2000 has the status of a DIN Standard.***A comma is used as the decimal marker.***National foreword**

This standard has been published in accordance with a decision taken by CEN/TC 185 'Threaded and non-threaded mechanical fasteners and accessories' to adopt, without alteration, International Standard ISO 7092 as a European Standard.

The responsible German body involved in its preparation was the *Normenausschuss Mechanische Verbindungselemente* (Fasteners Standards Committee), Technical Committee *Scheiben und Ringe*.

The DIN Standards corresponding to the International Standards referred to in clause 2 of the EN are as follows:

ISO Standard	DIN Standard
ISO 887	DIN EN ISO 887
ISO 3269	DIN EN ISO 3269
ISO 3506-1	DIN EN ISO 3506-1
ISO 4042	DIN EN ISO 4042
ISO 4759-3	DIN EN ISO 4759-3
ISO 6507-1	DIN EN ISO 6507-1
ISO 10683	DIN EN ISO 10683*)

Amendments

DIN 433-1 and 433-2, March 1990 editions, have been superseded by the specifications of EN ISO 7092, November 2000 edition, which is identical to ISO 7092.

Previous editions

DIN 433: 1921-01, 1923-03, 1936-10, 1943-05, 1946-04, 1954-01, 1972-03; DIN 433-1: 1990-03;
DIN 433-2: 1990-03

*) Currently at draft stage.

Continued overleaf.
EN comprises 6 pages.

National Annex NA

Standards referred to

(and not included in **Normative references** and **Annex ZA**)

- DIN EN ISO 887 Plain washers for metric bolts, screws and nuts for general purposes – General plan (ISO 887 : 2000)
- DIN EN ISO 3269 Fasteners – Acceptance inspection (ISO 3269 : 2000)
- DIN EN ISO 3506-1 Mechanical properties of corrosion-resistant stainless steel fasteners – Part 1: Bolts, screws and studs (ISO 3506-1 : 1997)
- DIN EN ISO 4042 Fasteners – Electroplated coatings (ISO 4042 : 1999)
- DIN EN ISO 4759-3 Tolerances for fasteners – Part 3: Plain washers for bolts, screws and nuts – Product grades A and C (ISO 4759-3 : 2000)
- DIN EN ISO 6507-1 Metallic materials – Vickers hardness test – Part 1: Test method (ISO 6507-1 : 1997)
- DIN EN ISO 10683 Fasteners – Non-electrolytically applied zinc flake coatings (ISO/DIS 10683 : 1999)*

*) Currently at draft stage.

English version

Plain washers – Small series

Product grade A
(ISO 7092 : 2000)

Rondelles plates – Série étroite –
Grade A (ISO 7092 : 2000)

Flache Scheiben – Kleine Reihe –
Produktklasse A (ISO 7092 : 2000)

This European Standard was approved by CEN on 2000-06-01.

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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

Foreword

International Standard

ISO 7092 : 2000 Plain washers – Small series – Product grade A, which was prepared by ISO/TC 2 'Fasteners' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 185 'Threaded and non-threaded mechanical fasteners and accessories', the Secretariat of which is held by DIN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by December 2000 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 7092 : 2000 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

1 Scope

This International Standard specifies the characteristics of small-series, product-grade-A plain washers in the 200 HV and 300 HV hardness classes and of nominal sizes (nominal thread diameters) ranging from 1,6 mm to 36 mm inclusive.

Washers of hardness class 200 HV are suitable for

- cheese head screws in property classes up to and including 8.8, or made of stainless steel;
- hexagon socket head cap screws in property classes up to and including 8.8, or made of stainless steel;
- hexalobular socket head cap screws in property classes up to and including 8.8, or made of stainless steel;
- case-hardened thread rolling screws with cheese heads.

Washers of hardness class 300 HV are suitable for

- hexagon socket head cap screws in property classes up to and including 10.9;
- hexalobular socket head cap screws in property classes up to and including 10.9.

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

When soft material pieces are clamped, or large clearance holes in the workpiece are used, the user should check the technical suitability of this type of washer.

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 887:2000, *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—¹⁾, *Fasteners — Non-electrolytically applied zinc flake coatings.*

3 Dimensions

See Figure 1 and Tables 1 and 2.

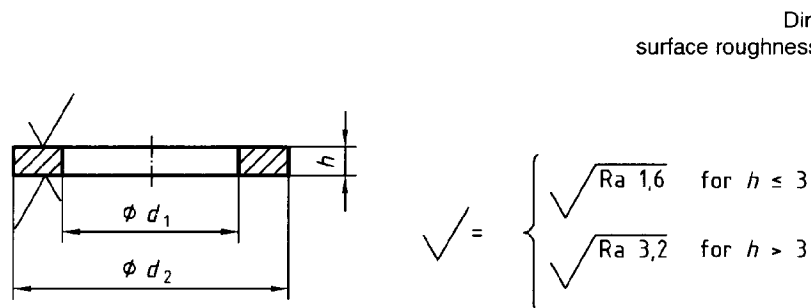


Figure 1 — Dimensions

1) To be published.

Table 1 — Preferred dimensions

Dimensions in millimetres

Nominal size (Nominal thread diameter, d)	Clearance hole		Outside diameter		Thickness		
	d_1		d_2		h		
	nom. (min.)	max.	nom. (max.)	min.	nom.	max.	min.
1,6	1,70	1,84	3,5	3,2	0,3	0,35	0,25
2	2,20	2,34	4,5	4,2	0,3	0,35	0,25
2,5	2,70	2,84	5,0	4,7	0,5	0,55	0,45
3	3,20	3,38	6,0	5,7	0,5	0,55	0,45
4	4,30	4,48	8,00	7,64	0,5	0,55	0,45
5	5,30	5,48	9,00	8,64	1	1,1	0,9
6	6,40	6,62	11,00	10,57	1,6	1,8	1,4
8	8,40	8,62	15,00	14,57	1,6	1,8	1,4
10	10,50	10,77	18,00	17,57	1,6	1,8	1,4
12	13,00	13,27	20,00	19,48	2	2,2	1,8
16	17,00	17,27	28,00	27,48	2,5	2,7	2,3
20	21,00	21,33	34,00	33,38	3	3,3	2,7
24	25,00	25,33	39,00	38,38	4	4,3	3,7
30	31,00	31,39	50,00	49,38	4	4,3	3,7
36	37,00	37,62	60,0	58,8	5	5,6	4,4

Table 2 — Non-preferred dimensions

Dimensions in millimetres

Nominal size (Nominal thread diameter, d)	Clearance hole		Outside diameter		Thickness		
	d_1		d_2		h		
	nom. (min.)	max.	nom. (max.)	min.	nom.	max.	min.
3,5	3,70	3,88	7,00	6,64	0,5	0,55	0,45
14	15,00	15,27	24,00	23,48	2,5	2,7	2,3
18	19,00	19,33	30,00	29,48	3	3,3	2,7
22	23,00	23,33	37,00	36,38	3	3,3	2,7
27	28,00	28,33	44,00	43,38	4	4,3	3,7
33	34,00	34,62	56,0	54,8	5	5,6	4,4

4 Requirements and International Standards of reference

See Table 3.

Table 3 — Specifications and International Standards of reference

Material ^a	Steel		Stainless steel	
	Grade ^b		A2 F1 C1 A4 C4	
	International Standard		ISO 3506-1	
Mechanical properties	Hardness class	200 HV	300 HV ^c	
	Hardness range ^d	200 HV to 300 HV	300 HV to 370 HV	
Tolerances	Product grade	A		
	International Standard	ISO 4759-3		
Surface finish	<p>Plain: i.e. washers to be supplied in natural finish, treated with a protective lubricant or with other coatings as agreed by customer and supplier.</p> <p>Requirements for electroplating covered in ISO 4042.</p> <p>Requirements for non-electrolytically applied zinc flake coatings covered in ISO 10683.</p> <p>For hardened and tempered washers, appropriate plating or coating processes should be employed to avoid hydrogen embrittlement. When washers are electroplated or phosphated, they shall be suitably treated immediately after plating or coating to obviate detrimental hydrogen embrittlement.</p> <p>All tolerances shall apply prior to the application of a plating or coating.</p>		<p>Plain: i.e. washers shall be supplied in natural finish.</p>	
Workmanship	Parts shall be free of irregularities or detrimental defects. No protruding burrs shall appear on the washer.			
Acceptability	Acceptance procedure covered in ISO 3269.			
<p>^a Other metallic materials as agreed between customer and supplier.</p> <p>^b Related to chemical composition only.</p> <p>^c Hardened and tempered.</p> <p>^d Hardness testing according to ISO 6507-1.</p> <p>Test force: HV 2 for nominal thickness $h \leq 0,6$ mm</p> <p>HV 10 for nominal thickness $0,6 < h \leq 1,2$ mm</p> <p>HV 30 for nominal thickness $h > 1,2$ mm</p>				

5 Designation

EXAMPLE 1 A small-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 7092-8-200 HV

EXAMPLE 2 A small 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 7092-8-200 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 3506-1	1997	Mechanical properties of corrosion-resistant stainless-steel fasteners - Part 1: Bolts, screws and studs	EN ISO 3506-1	1997
ISO 4042	1999	Fasteners - Electroplated coatings	EN ISO 4042	1999
ISO 4759-3	2000	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	1997	Metallic materials - Vickers hardness test - Part 1: Test method	EN ISO 6507-1	1997