


	Plain washers for screw and washer assemblies – Small, normal and large series Product grade A (ISO 10673 : 1998) English version of DIN EN ISO 10673	<div style="text-align: center;">  EN ISO 10673 </div>
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ICS 21.060.30

Supersedes DIN 6902,
December 1990 edition.

Descriptors: Screws, washers.

Flache Scheiben für Kombi-Schrauben – Kleine, normale und große
Reihe – Produktklasse A (ISO 10673 : 1998)**European Standard EN ISO 10673 : 1998 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 to adopt, without alteration, International Standard ISO 10673 as a European Standard.

The responsible German body involved in its preparation was the *Normenausschuß Mechanische Verbindungselemente* (Fasteners Standards Committee).

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

ISO Standard	DIN Standard
ISO 3269	DIN ISO 3269
ISO 4042	DIN ISO 4042
ISO 10644	DIN EN ISO 10644

Amendments

DIN 6902, December 1990 edition, has been superseded by the specifications of EN ISO 10673.

Previous editions

DIN 6902: 1966-09, 1972-12, 1990-12.

National Annex NA**Standard referred to**

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

DIN EN ISO 10644 Screw and washer assemblies with plain washers – Washer hardness classes 200 HV and 300 HV (ISO 10644 : 1998)

EN comprises 7 pages.

**EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM**

EN ISO 10673

July 1998

ICS 21.060.30

Descriptors: Screws, washers.

English version

**Plain washers for screw and washer assemblies –
Small, normal and large series**

Product grade A
(ISO 10673 : 1998)

Rondelles plates pour vis à rondelle
plate incorporée – Séries étroite,
normale et large – Grade A
(ISO 10673 : 1998)

Flache Scheiben für Kombi-Schrauben –
Kleine, normale und große Reihe –
Produktklasse A (ISO 10673 : 1998)

This European Standard was approved by CEN on 1998-06-19.

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 10673 : 1998 Plain washers for screw and washer assemblies – Small, normal and large 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 January 1999 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 10673 : 1998 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 plain steel washers, small, normal and large series, of product grade A with hardness classes 200 HV and 300 HV for metric screw and washer assemblies according to ISO 10644.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3269:1988, *Fasteners — Acceptance inspection*.

ISO 4042:—¹⁾, *Fasteners — Electroplated coatings*.

ISO 4759-3:1991, *Tolerances for fasteners — Part 3: Plain washers for bolts, screws and nuts with nominal thread diameters from 1 mm up to and including 150 mm — Product grades A and C*.

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

ISO 10644:1998, *Screw and washer assemblies with plain washers — Washer hardness classes 200 HV and 300 HV*.

3 Classification

Washers of product grade A for metric screw and washer assemblies are classified into three types:

- type S: small series, preferably for hexagon socket head cap screws and for cheese head screws.
- type N: normal series, preferably for hexagon head screws.
- type L: large series, preferably for hexagon head screws.

1) To be published. (Revision of ISO 4042:1989)

4 Dimensions

4.1 Washers type S (small series)

See figure 1 and table 1.

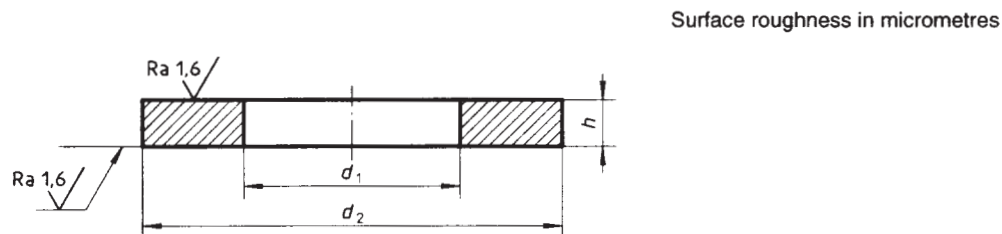


Figure 1

Table 1

Dimensions in millimetres

Nominal size (Nominal thread diameter, d)	Clearance hole		Outside diameter		Thickness		
	nom. (min.)	max.	nom. (max.)	min.	nom.	max.	min.
2	1,75	1,85	4,5	4,2	0,6	0,65	0,55
2,5	2,25	2,35	5	4,7	0,6	0,65	0,55
3	2,75	2,85	6	5,7	0,6	0,65	0,55
3,5	3,2	3,32	7	6,64	0,8	0,85	0,75
4	3,6	3,72	8	7,64	0,8	0,85	0,75
5	4,55	4,67	9	8,64	1	1,06	0,94
6	5,5	5,62	11	10,57	1,6	1,68	1,52
8	7,4	7,55	15	14,57	1,6	1,68	1,52
10	9,3	9,52	18	17,57	2	2,09	1,91
12	11	11,27	20	19,48	2	2,09	1,91

4.2 Washers type N (normal series)

See figure 2 and table 2.

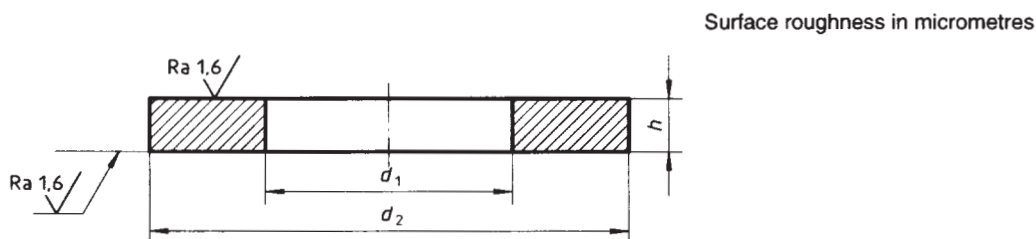


Figure 2

Table 2

Dimensions in millimetres

Nominal size (Nominal thread diameter, d)	Clearance hole d_1		Outside diameter d_2		Thickness h		
	nom. (min.)	max.	nom. (max.)	min.	nom.	max.	min.
2	1,75	1,85	5	4,7	0,6	0,65	0,55
2,5	2,25	2,35	6	5,7	0,6	0,65	0,55
3	2,75	2,85	7	6,64	0,6	0,65	0,55
3,5	3,2	3,32	8	7,64	0,8	0,85	0,75
4	3,6	3,72	9	8,64	0,8	0,85	0,75
5	4,55	4,67	10	9,64	1	1,06	0,94
6	5,5	5,62	12	11,57	1,6	1,68	1,52
8	7,4	7,55	16	15,57	1,6	1,68	1,52
10	9,3	9,52	20	19,48	2	2,09	1,91
12	11	11,27	24	23,48	2,5	2,6	2,4

4.3 Washers type L (large series)

See figure 3 and table 3.

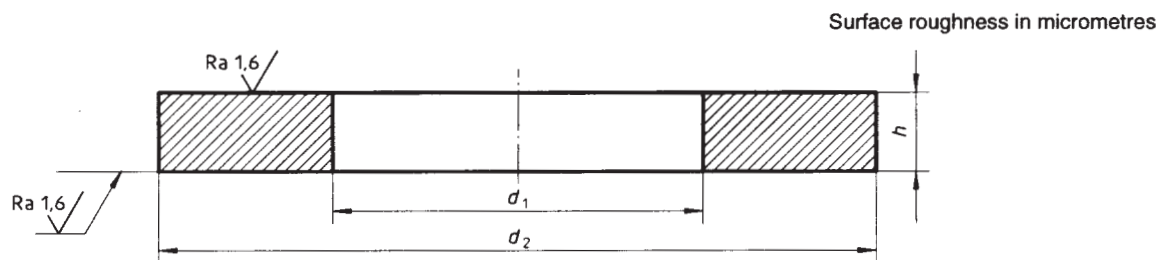


Figure 3

Table 3

Dimensions in millimetres

Nominal size (Nominal thread diameter, d)	Clearance hole d_1		Outside diameter d_2		Thickness h		
	nom. (min.)	max.	nom. (max.)	min.	nom.	max.	min.
2	1,75	1,85	6	5,7	0,6	0,65	0,55
2,5	2,25	2,35	8	7,64	0,6	0,65	0,55
3	2,75	2,85	9	8,64	0,8	0,85	0,75
3,5	3,2	3,32	11	10,57	0,8	0,85	0,75
4	3,6	3,72	12	11,57	1	1,06	0,94
5	4,55	4,67	15	14,57	1	1,06	0,94
6	5,5	5,62	18	17,57	1,6	1,68	1,52
8	7,4	7,55	24	23,48	2	2,09	1,91
10	9,3	9,52	30	29,48	2,5	2,6	2,4
12	11	11,27	37	36,38	3	3,11	2,89

5 Requirements and reference International Standards

See table 4.

Table 4

Material ¹⁾		Steel	
Mechanical properties	Hardness class	200 HV	300 HV
	Hardness range ²⁾	200 HV to 300 HV	300 HV to 370 HV
Tolerances	Product grade	A ³⁾	
	International Standard	ISO 4759-3	
Finish	Plain, i.e. washers to be supplied in natural finish, treated with a protective lubricant or with other coatings as agreed between customer and supplier. Requirements for electroplating are covered in ISO 4042. All tolerances shall apply prior to the application of a plating or coating.		
Workmanship	Parts shall be uniform in quality and free of irregularities or detrimental defects. No protruding burrs shall appear on the washer.		
Acceptability	For the acceptance procedure see ISO 3269.		
1) Other materials as agreed between customer and supplier. 2) Hardness testing according to ISO 6507-1. Test force: HV 2 for nominal thicknesses $h \leq 0,6$ mm; HV 10 for nominal thicknesses $0,6 \text{ mm} < h \leq 1,2$ mm; HV 30 for nominal thicknesses $h > 1,2$ mm. 3) Product grade A does not apply to the tolerances of the clearance hole d_1 , and the thickness h .			

6 Designation

EXAMPLE:

A plain steel washer for screw and washer assemblies, type N (normal series), of nominal size 8 mm, hardness class 200 HV is designated as follows:

Washer ISO 10673 - N - 8 - 200 HV

Annex A (informative)

Bibliography

[1] ISO 6507-2:1997, *Metallic materials — Vickers hardness test — Part 2: Verification of testing machines.*

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 6507-1	1997	Metallic materials - Vickers hardness test - Part 1: Test method	EN ISO 6507-1	1997
ISO 10644	1998	Screw and washer assemblies with plain washers - Washer hardness classes 200 HV and 300 HV	EN ISO 10644	1998