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October 1992

Plain washers for use with clevis pins, product grade A (ISO 8738 : 1986) English version of DIN EN 28 738	DIN EN 28 738
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This standard incorporates the English version of ISO 8738.

Scheiben für Bolzen; Produktklasse A
(ISO 8738 : 1986)

Supersedes DIN 1440,
July 1974 edition.

European Standard EN 28 738 : 1992 has the status of a DIN Standard.

A comma is used as the decimal marker.

National foreword

The publication of this standard is in keeping with a decision made by CEN/TC 185 to adopt, without alteration, a series of ISO Standards covering clevis pins and washers for use with clevis pins as European Standards. The responsible German body involved in their publication is the *Normenausschuß Mechanische Verbindungselemente* (Fasteners Standards Committee).

As a consequence, all DIN Standards covering such pins and washers have been superseded by the corresponding DIN EN Standards (see table below).

EN Standard	DIN EN Standard	Title	Previous DIN Standard
22 340	22 340	Clevis pins without head	1443
22 341	22 341	Clevis pins with head	1444
28 738	28 738	Plain washers for use with clevis pins; product grade A	1440

See National appendix for guideline values for the mass of washers not given in the European Standard.

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

ISO Standard DIN Standard

ISO 2081 DIN 50 961

ISO 3269 DIN ISO 3269 (at present at the stage of draft)

ISO 4759-3 DIN 522

The DIN 4000-3-1 tabular layout of article characteristics applies for washers as covered here.

Continued overleaf.
EN comprises 5 pages.

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Standards referred to

(and not included in References)

- DIN 522 Metal washers; technical delivery conditions
DIN 4000 Part 3 Tabular layout of article characteristics for plain washers and lock washers
DIN 50 961 Chromating of zinc and cadmium coatings on iron and steel

Previous editions

DIN LON 252: 07.26; DIN 1440: 07.28x, 07.74.

Amendments

In comparison with DIN 1440, July 1974 edition, the following amendments have been made.

- a) Some sizes have been dropped and some values of d_2 amended.
- c) The values of h have been amended for the nominal sizes of 5 mm, 45 mm, 55 mm, 60 mm and 100 mm.
- d) The surface roughness and the material hardness have been specified.
- e) The standard designation has been changed.

Guideline values for the mass of washers have been given in a National appendix.

International Patent Classification

F 16 B 43/00

1 Scope and field of application

This International Standard specifies the characteristics of plain washers for clevis pins according to ISO 2340 and ISO 2341.

Plain washers in accordance with this International Standard shall be used on the cotter pin end only.

2 References

ISO 2081, *Metallic coatings — Electroplated coatings of zinc on iron or steel.*

ISO 2340, *Clevis pins without head.*

ISO 2341, *Clevis pins with head.*

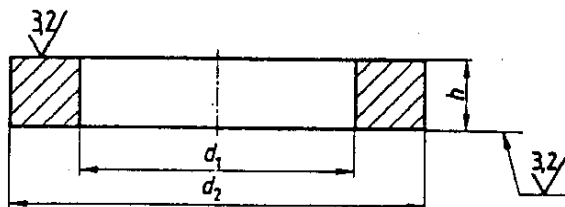
ISO 3269, *Fasteners — Acceptance inspection.*

ISO 4520, *Chromate conversion coatings on electroplated zinc and cadmium coatings.*

ISO 4759/3, *Tolerances for fasteners — Part 3 : Washers for metric bolts, screws and nuts with thread diameters from 1 up to and including 150 mm — Product grades A and C.*

3 Dimensions

Surface roughness values in micrometres



Dimensions in millimetres

Nominal size d	Hole diameter d_1		Outside diameter d_2		Thickness h		
	nom. (min.)	max.	nom. (max.)	min.	nom.	max.	min.
3	3	3,14	6	5,70	0,8	0,9	0,7
4	4	4,18	8	7,64	0,8	0,9	0,7
5	5	5,18	10	9,64	1	1,1	0,9
6	6	6,18	12	11,57	1,6	1,8	1,4
8	8	8,22	15	14,57	2	2,2	1,8
10	10	10,22	18	17,57	2,5	2,7	2,3
12	12	12,27	20	19,48	3	3,3	2,7
14	14	14,27	22	21,48	3	3,3	2,7
16	16	16,27	24	23,48	3	3,3	2,7
18	18	18,27	28	27,48	4	4,3	3,7
20	20	20,33	30	29,48	4	4,3	3,7
22	22	22,33	34	33,38	4	4,3	3,7
24	24	24,33	37	36,38	4	4,3	3,7
27	27	27,52	39	38	5	5,6	4,4
30	30	30,52	44	43	5	5,6	4,4
33	33	33,62	47	46	5	5,6	4,4
36	36	36,62	50	49	6	6,6	5,4
40	40	40,62	56	54,8	6	6,6	5,4
45	45	45,62	60	58,8	6	6,6	5,4
50	50	50,62	66	64,8	8	9	7
55	55	55,74	72	70,8	8	9	7
60	60	60,74	78	76,8	10	11	9
70	70	70,74	92	90,6	10	11	9
80	80	80,74	98	96,6	12	13,2	10,8
90	90	90,87	110	108,6	12	13,2	10,8
100	100	100,87	120	118,6	12	13,2	10,8

4 Specifications and reference International Standards

Material	St = Steel, hardness 160 to 250 HV (class 160 HV). Other materials as agreed between customer and supplier.
Tolerances	Product grade A to ISO 4759/3. All tolerances shall apply prior to the application of a plating or coating.
Surface finish	Plain, i.e. washers to be supplied in natural finish, treated with a rust-preventative lubricant, unless otherwise specified by agreement between customer and supplier. Preferred coatings are black oxide, phosphate coating or zinc plating with chromate conversion coating (see ISO 2081 and ISO 4520). Other coatings as agreed between customer and supplier.
Workmanship	Parts shall be uniform in quality and free of irregularities or detrimental defects. No burrs shall appear on any part of the washer.
Acceptability	The acceptance procedure is covered in ISO 3269.

5 Designation

Example for the designation of a plain washer with nominal size 8, property class 160HV :

Washer ISO 8738 - 8 - 160HV

National appendix (informative)

Mass of washers

The values given are guideline values.

Nominal size, <i>d</i>	Approximate mass (7,85 kg/dm ³), in kg per 1000 units
3	0,13
4	0,23
5	0,36
6	1,05
8	1,98
10	3,45
12	4,74
14	5,33
16	5,92
18	11,3
20	12,3
22	16,6
24	19,6
27	24,4
30	31,9
33	34,5
36	44,5
40	56,8
45	58,3
50	91,5
55	106
60	153
70	220
80	237
90	296
100	326