

## Plain washers — Normal series — Product grade C

### 1 Scope

This International Standard specifies the characteristics of normal-series, product-grade-C plain washers in the 100 HV hardness class and of nominal sizes (nominal thread diameters) ranging from 1,6 mm to 64 mm inclusive.

Washers of hardness class 100 HV are suitable for

- hexagon bolts and screws of product grade C in property classes up to and including 6.8;
- hexagon nuts of product grade C in property classes up to and including 6;
- case-hardened thread rolling screws.

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 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—<sup>1)</sup>, *Fasteners — Non-electrolytically applied zinc flake coatings.*

## 3 Dimensions

See Figure 1 and Tables 1 and 2.

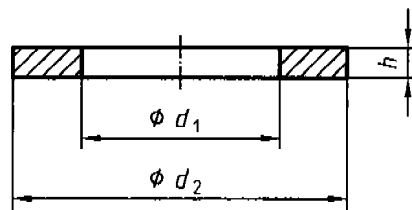


Figure 1 — Dimensions

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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	1,80	2,05	4,00	3,25	0,3	0,4	0,2
2	2,40	2,65	5,00	4,25	0,3	0,4	0,2
2,5	2,90	3,15	6,00	5,25	0,5	0,6	0,4
3	3,4	3,7	7,0	6,1	0,5	0,6	0,4
4	4,5	4,8	9,0	8,1	0,8	1,0	0,6
5	5,5	5,8	10,0	9,1	1	1,2	0,8
6	6,60	6,96	12,0	10,9	1,6	1,9	1,3
8	9,00	9,36	16,0	14,9	1,6	1,9	1,3
10	11,00	11,43	20,0	18,7	2	2,3	1,7
12	13,50	13,93	24,0	22,7	2,5	2,8	2,2
16	17,50	17,93	30,0	28,7	3	3,6	2,4
20	22,00	22,52	37,0	35,4	3	3,6	2,4
24	26,00	26,52	44,0	42,4	4	4,6	3,4
30	33,00	33,62	56,0	54,1	4	4,6	3,4
36	39	40	66,0	64,1	5	6	4
42	45	46	78,0	76,1	8	9,2	6,8
48	52,0	53,2	92,0	89,8	8	9,2	6,8
56	62,0	63,2	105,0	102,8	10	11,2	8,8
64	70,0	71,2	115,0	112,8	10	11,2	8,8

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	3,9	4,2	8	7,1	0,5	0,6	0,4
14	15,5	15,93	28	26,7	2,5	2,8	2,2
18	20	20,43	34	32,4	3	3,6	2,4
22	24	24,52	39	37,4	3	3,6	2,4
27	30	30,52	50	48,4	4	4,6	3,4
33	36	37	60	58,1	5	6	4
39	42	43	72	70,1	6	7	5
45	48	49	85	82,8	8	9,2	6,8
52	56	57,2	98	95,8	8	9,2	6,8
60	66	67,2	110	107,8	10	11,2	8,8

## 4 Requirements and International Standards of reference

See Table 3.

**Table 3 — Specifications and International Standards of reference**

<b>Material</b> <sup>a</sup>	Steel	
<b>Mechanical properties</b>	Hardness class	100 HV
	Hardness range <sup>b</sup>	100 HV to 200 HV
<b>Tolerances</b>	Product grade	C
	International Standard	ISO 4759-3
<b>Surface finish</b>	<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>All tolerances shall apply prior to the application of a plating or coating.</p>	
<b>Workmanship</b>	Parts shall be free of irregularities or detrimental defects. No protruding burrs shall appear on the washer.	
<b>Acceptability</b>	Acceptance procedure covered in ISO 3269.	
<p><sup>a</sup> Other metallic materials as agreed between customer and supplier.</p> <p><sup>b</sup> Hardness testing according to ISO 6507-1.</p> <p>Test force:   HV 2       for nominal thickness <math>h \leq 0,6</math> mm</p> <p>                  HV 10      for nominal thickness <math>0,6 &lt; h \leq 1,2</math> mm</p> <p>                  HV 30      for nominal thickness <math>h &gt; 1,2</math> mm</p>		

## 5 Designation

**EXAMPLE** A normal-series, product-grade-C plain washer made of steel, of nominal size 8 mm and hardness class 100 HV is designated as follows:

**Washer ISO 7091-8-100 HV**