British Standard

BRITISH STANDARD

BS 4320:1968

This Standard is confirmed.
See the BSI Catalogue for details.
April 1998

Specification for

Metal washers for general engineering purposes metric series

UDC 621.882.4:669

Co-operating organizations

The Mechanical Engineering Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

Associated Offices' Technical Committee
Association of Consulting Engineers
Association of Mining, Electrical and Mechanical Engineers
Board of Trade
British Chemical Plant Manufacturers' Association
British Compressed Air Society
British Electrical and Allied Manufacturers' Association*
British Gear Manufactures' Association
British Internal Combustion Engine Manufacturers' Association
British Mechanical Engineering Federation
British Pump Manufacturers' Association
British Steel Industry*
Crown Agents for Oversea Governments and Administrations
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Engineering Equipment Users' Association*
Gas Council
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Institution of Heating and Ventilating Engineers
Institution of Mechanical Engineers
Institution of Mechanical Engineers (Automobile Division)
Institution of Production Engineers*
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The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Agricultural Engineers Association
Association of Hydraulic Equipment Manufacturers
Black Bolt and Nut Association of Great Britain
British Bolt, Nut, Screw and Rivet Federation
British Constructional Steelwork Association
British Cycle and Motor Cycle Industries Association Ltd.
British Railways Board
Council of British Manufacturers of Petroleum Equipment
Electronic Engineering Association
Fasteners and Turned Parts Institute
Institute of Iron and Steel Wire Manufacturers
Ministry of Defence, Navy Department
Post Office
Precision Bolt and Nut Institute
Rolled Thread Screw Association
Scientific Instrument Manufacturers' Association
Society of Motor Manufacturers and Traders Limited
Washer Manufacturers' Association of Great Britain
Individual manufacturers

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee, and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 23 May, 1968

The following BSI references relate to the work on this standard:
Committee reference MEE/60
MEE/60/6
Draft for comment 67/26973

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Amendments issued since publication

Amd. No.	Date	Comments

Contents

Foreword

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 9,000, fully indexed and with a note of the contents of each, will be found in the BSI Catalogue which may be purchased from BSI Sales Department. The Catalogue may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards.

BS 21, *Pipe threads.*

BS 265, *Cold rolled brass sheet, strip and foil. Common brass.*

BS 1449, *Steel plate, sheet and strip;*

BS 1449-3B, *Cold rolled mild and carbon steel strip.*

BS 1580, *Unified screw threads.*

BS 1706, *Electroplated coatings of cadmium and zinc on iron and steel.*

BS 3643, *ISO metric screw threads.*

BS 3692, *Dimensions of ISO metric precision hexagon bolts, screws and nuts.*

BS 4183, *Machine screws and machine screw nuts. Metric series.*

BS 4190, *ISO metric black hexagon bolts, screws and nuts.*

This British Standard has been prepared under the authority of the Mechanical Engineering Industry Standards Committee, arising out of the decision taken in November 1965 to adopt the ISO metric thread system in the United Kingdom (see Appendix A).

The complete standard specifies both bright and black washers suitable for use with ISO metric bolts, screws and nuts—specified in the various metric fastener standards referred to below. The nominal dimensions specified for these washers have been selected from ISO Draft Recommendation No. 940[1)] and various other draft proposals being considered internationally by Technical Committee ISO/TC 2, "Bolts, nuts and accessories".

Pending the consideration of tolerances for washers within ISO/TC 2, the BSI Committee responsible decided to adopt, in the interim, the tolerances specified in German standard DIN 522. Attention is drawn to the fact that these tolerances are in certain cases considerably greater, on a size for size basis, than those specified in the parallel inch standard BS 3410. They do however allow the manufacture of these washers from SWG materials, which should prove advantageous, especially from an economic point of view, during the transition period prior to the general availability of metric sheet materials.

The washers are basically divided into three categories of size, i.e. "normal", "large", and "extra large" diameter metric series.

The "normal diameter series" is suitable for use with hexagon headed bolts, screws and nuts to BS 3692, "Dimensions of ISO metric precision hexagon bolts, screws and nuts" and to BS 4190, "ISO metric black hexagon bolts, screws and nuts" or with metric machine screws and machine screw nuts to BS 4183, "Machine screws and machine screw nuts. Metric series".

The "large diameter series" is suitable for use in cases where the next larger size of hexagon is used for a particular diameter rather than the normal nut or bolt hexagon size given in ISO/R 272[2)]. It may also be useful in cases where a greater bearing area is required.

[1)] ISO/DR 940, "Washers for hexagon bolts and nuts. Metric series".

[2)] ISO Recommendation 272, "Hexagon bolts and nuts, widths across flats, heights of head, thicknesses of nuts".

In line with current British practice a "light range" of bright washers has been provided in Section 1 of this standard, which has thicknesses approximately 60 % of the "normal range" thicknesses.

An "extra large diameter series" of washers with outside diameters three times the nominal bolt diameter, has been provided in Section 2 of this standard, which deals with black metal washers.

The question of metric series taper washers, round washers with square holes and square washers with round holes has yet to be considered either nationally or internationally, but the U.K. is initiating investigations in this field, which will, of course, be dependent to some extent upon the position in relation to metric stock materials and sections.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 10, an inside back cover and a back cover.

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Scope

This British Standard specifies requirements for metal washers for general engineering purposes, for use with ISO metric bolts, screws and nuts. Bright metal washers are dealt with in Section 1, and black metal washers in Section 2.

1 Bright metal washers

1.1 General

Section 1 of this British Standard relates to bright metal washers for use with ISO metric bolts, screws and nuts. General requirements for materials and finish are given.

Dimensions appear in two tables as follows.

Table 1. "Normal diameter metric series", in two thickness ranges for bolts M 1·0 to M 39 (Forms A and B).

Table 2. "Large diameter metric series", in two thickness ranges for bolts M 4 to M 39 (Forms C and D).

1.2 Material

1.2.1 Steel washers shall be made from Cold Rolled Strip CS4 in the hard condition in accordance with BS 1449-3B[3)].

1.2.2 Brass washers shall be made from material CZ.108 in the hard condition in accordance with BS 265[4)].

1.2.3 If the purchaser requires the washers to be manufactured from steel or brass in any other condition, or of another material, he shall specify his requirements in his enquiry or order.

1.3 Finish

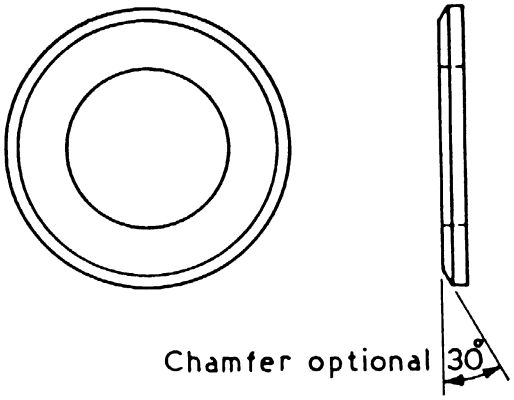
1.3.1 The washers shall be reasonably flat and free from burrs. Standard washers will normally be supplied unchamfered.

1.3.2 If washers are required chamfered, as shown below, this should be specified by the purchaser in his enquiry or order.

1.4 Coating

If the washers are required to have a protective or decorative finish, this shall be specified by the purchaser in his enquiry or order and reference shall be made to any appropriate British Standard.

NOTE The purchaser should give details of the thickness of plating required in accordance with the provisions of the appropriate British Standard, e.g., state BS classification number for cadmium or zinc plating to BS 1706, "Electroplated coatings of cadmium and zinc on iron and steel".



1.5 Dimensions

The dimensions of bright washers shall be in accordance with Table 1 and Table 2.

NOTE The inclusion of dimensional data in this standard is not intended to imply that all the products described are stock production sizes. Purchasers are requested to consult with the manufacturers concerning lists of stock production sizes.

1.6 Designation for enquiry and ordering purposes

1.6.1 ***Information to be given.*** When designating bright steel washers — metric series for the purpose of an enquiry or order, the following information shall be given.

1) General product description, i.e. "Bright washers".

2) Nominal size of bolt or screw, e.g. "M 5".

3) Designated form, e.g. "Form A" (see Table 1 and Table 2).

4) Details of any chamfering (if required).

5) The number of this British Standard, i.e. BS 4320.

6) Details of coating (if required), in accordance with the appropriate British Standard, giving thickness classification where applicable.

1.6.2 ***Examples***

1) Bright washers, normal diameter metric series (Table 1), normal range thickness; to suit 12 mm diameter bolts or screws, would be designated.

"Bright washers M 12 (Form A) to BS 4320".

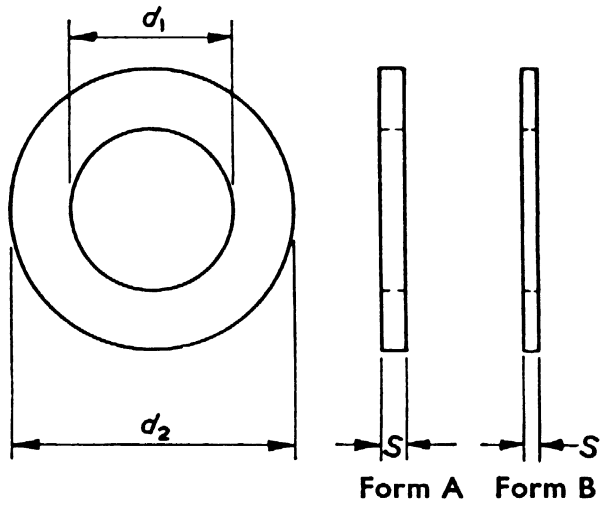
2) Bright washers, large diameter metric series (Table 2), light range thickness, chamfered, cadmium plated; to suit 5 mm diameter bolts or screws could be designated.

"Bright washers M 5 (Form D) chamfered to BS 4320, cadmium plated to Cd2, BS 1706."

[3)] BS 1449, "Steel plate, sheet and strip", Part 3B, "Cold rolled mild and carbon steel strip".

[4)] BS 265, "Cold rolled brass sheet, strip and foil. Common brass".

Table 1 — Bright washers — Normal diameter. Metric series (Forms A and B)

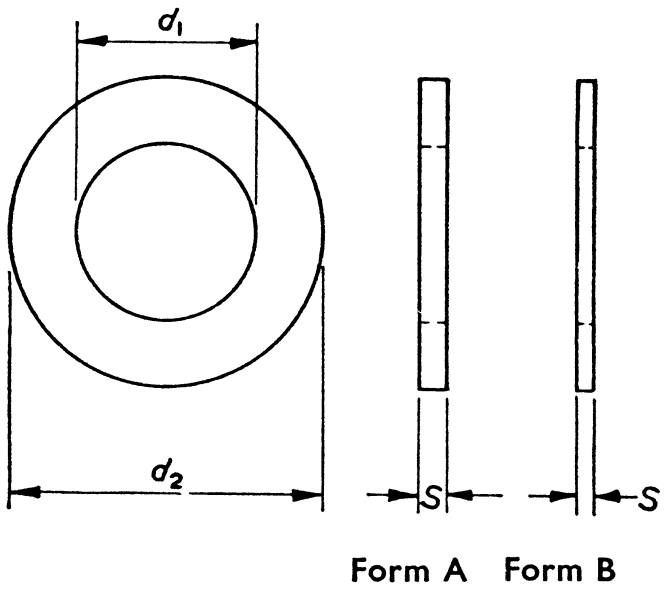


Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13
Nominal size of bolt or screw	Inside diameter d_1			Outside diameter d_2			Thickness s					
							Form A (Normal range)			Form B (Light range)		
	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.
M 1·0	1·1	1·25	1·1	2·5	2·5	2·3	0·3	0·4	0·2	—	—	—
M 1·2	1·3	1·45	1·3	3·0	3·0	2·8	0·3	0·4	0·2	—	—	—
(M 1·4)	1·5	1·65	1·5	3·0	3·0	2·8	0·3	0·4	0·2	—	—	—
M 1·6	1·7	1·85	1·7	4·0	4·0	3·7	0·3	0·4	0·2	—	—	—
M 2·0	2·2	2·35	2·2	5·0	5·0	4·7	0·3	0·4	0·2	—	—	—
(M 2·2)	2·4	2·55	2·4	5·0	5·0	4·7	0·5	0·6	0·4	—	—	—
M 2·5	2·7	2·85	2·7	6·5	6·5	6·2	0·5	0·6	0·4	—	—	—
M 3	3·2	3·4	3·2	7	7	6·7	0·5	0·6	0·4	—	—	—
(M 3·5)	3·7	3·9	3·7	7	7	6·7	0·5	0·6	0·4	—	—	—
M 4	4·3	4·5	4·3	9	9	8·7	0·8	0·9	0·7	—	—	—
(M 4·5)	4·8	5·0	4·8	9	9	8·7	0·8	0·9	0·7	—	—	—
M 5	5·3	5·5	5·3	10	10	9·7	1·0	1·1	0·9	—	—	—
M 6	6·4	6·7	6·4	12·5	12·5	12·1	1·6	1·8	1·4	0·8	0·9	0·7

continued on next page

Table 1 — Bright washers — Normal diameter. Metric series (Forms A and B) *(continued)*

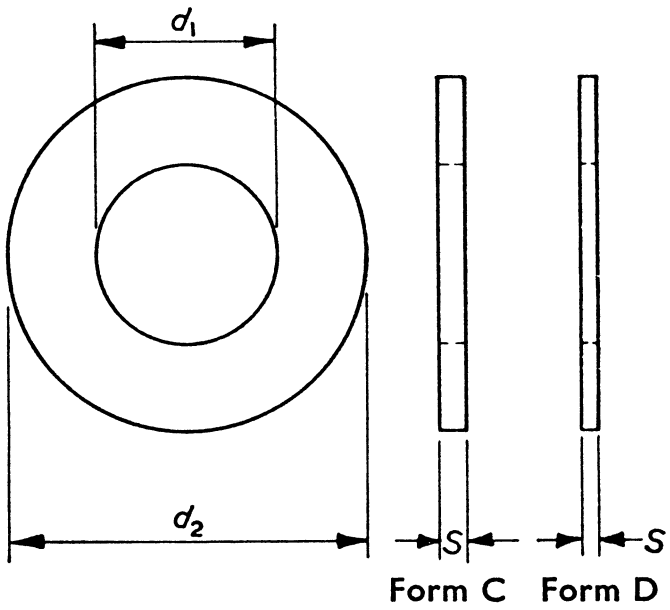


Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13
Nominal size of bolt or screw	Inside diameter d_1			Outside diameter d_2			Thickness s					
							Form A (Normal range)			Form B (Light range)		
	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.
(M 7)	7·4	7·7	7·4	14	14	13·6	1·6	1·8	1·4	0·8	0·9	0·7
M 8	8·4	8·7	8·4	17	17	16·6	1·6	1·8	1·4	1·0	1·1	0·9
M 10	10·5	10·9	10·5	21	21	20·5	2·0	2·2	1·8	1·25	1·45	1·05
M 12	13·0	13·4	13·0	24	24	23·5	2·5	2·7	2·3	1·6	1·80	1·40
(M 14)	15·0	15·4	15·0	28	28	27·5	2·5	2·7	2·3	1·6	1·8	1·4
M 16	17·0	17·4	17·0	30	30	29·5	3·0	3·3	2·7	2·0	2·2	1·8
(M 18)	19·0	19·5	19·0	34	34	33·2	3·0	3·3	2·7	2·0	2·2	1·8
M 20	21	21·5	21	37	37	36·2	3·0	3·3	2·7	2·0	2·2	1·8
(M 22)	23	23·5	23	39	39	38·2	3·0	3·3	2·7	2·0	2·2	1·8
M 24	25	25·5	25	44	44	43·2	4·0	4·3	3·7	2·5	2·7	2·3
(M 27)	28	28·5	28	50	50	49·2	4·0	4·3	3·7	2·5	2·7	2·3
M 30	31	31·6	31	56	56	55·0	4·0	4·3	3·7	2·5	2·7	2·3
(M 33)	34	34·6	34	60	60	59·0	5·0	5·6	4·4	3·0	3·3	2·7
M 36	37	37·6	37	66	66	65·0	5·0	5·6	4·4	3·0	3·3	2·7
(M 39)	40	40·6	40	72	72	71·0	6·0	6·6	5·4	3·0	3·3	2·7

Sizes shown in brackets are non-preferred.

Table 2 — Bright washers — Large diameter. Metric series (Forms C and D)



Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13
Nominal size of bolt or screw	Inside diameter d_1			Outside diameter d_2			Thickness s					
							Form C (Normal range)			Form D (Light range)		
	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.
M 4	4·3	4·5	4·3	10·0	10·0	9·7	0·8	0·9	0·7	—	—	—
M 5	5·3	5·5	5·3	12·5	12·5	12·1	1·0	1·1	0·9	—	—	—
M 6	6·4	6·7	6·4	14	14	13·6	1·6	1·8	1·4	0·8	0·9	0·7
M 8	8·4	8·7	8·4	21	21	20·5	1·6	1·8	1·4	1·0	1·1	0·9
M 10	10·5	10·9	10·5	24	24	23·5	2·0	2·2	1·8	1·25	1·45	1·05
M 12	13·0	13·4	13·0	28	28	27·5	2·5	2·7	2·3	1·6	1·8	1·4
(M 14)	15·0	15·4	15	30	30	29·5	2·5	2·7	2·3	1·6	1·8	1·4
M 16	17·0	17·4	17	34	34	33·2	3·0	3·3	2·7	2·0	2·2	1·8
(M 18)	19·0	19·5	19	37	37	36·2	3·0	3·3	2·7	2·0	2·2	1·8
M 20	21	21·5	21	39	39	38·2	3·0	3·3	2·7	2·0	2·2	1·8
(M 22)	23	23·5	23	44	44	43·2	3·0	3·3	2·7	2·0	2·2	1·8
M 24	25	25·5	25	50	50	49·2	4·0	4·3	3·7	2·5	2·7	2·3
(M 27)	28	28·5	28	56	56	55	4·0	4·3	3·7	2·5	2·7	2·3
M 30	31	31·6	31	60	60	59	4·0	4·3	3·7	2·5	2·7	2·3
(M 33)	34	34·6	34	66	66	65	5·0	5·6	4·4	3·0	3·3	2·7
M 36	37	37·6	37	72	72	71	5·0	5·6	4·4	3·0	3·3	2·7
(M 39)	40	40·6	40	77	77	76	6·0	6·6	5·4	3·0	3·3	2·7

Sizes shown in brackets are non-preferred.

2 Black metal washers

2.1 General

Section 2 of this British Standard relates to black steel washers for use with ISO metric bolts, screws and nuts. General requirements for materials and finish are given.

Dimensions appear in three tables as follows.

Table 3. Normal diameter series for bolts M 5 to M 68 (Form E).

Table 4. Large diameter series for bolts M 8 to M 39 (Form F).

Table 5. Extra large diameter series for bolts M 5 to M 39 (Form G).

NOTE 1 The washers specified in this section of the standard are not suitable for use with the fasteners covered by standards relating to high strength friction grip bolts for structural engineering which include their own provision for washers.

NOTE 2 It is considered that the range of nominal sizes included in this section of the standard is adequate for most of the applications for which this series is likely to be employed, but for the convenience of users requiring larger sizes, further information is provided in Appendix B.

2.2 Material

Unless otherwise specified, steel washers shall be made from mild steel.

2.3 Finish

The faces of the washers shall be reasonably flat, smooth and free from burrs.

2.4 Coating

If the washers are required to have a protective finish, this shall be specified by the purchaser in his enquiry or order and reference shall be made to any appropriate British Standard.

NOTE The purchaser should give details of the thickness of plating required in accordance with the provisions of the appropriate British Standard, e.g. state BS classification number for cadmium or zinc plating to BS 1706, "Electroplated coatings of cadmium and zinc on iron and steel".

2.5 Dimensions

The dimensions of normal, large and extra large diameter series washers shall be in accordance with Table 3, Table 4 and Table 5 respectively.

NOTE The inclusion of dimensional data in this standard is not intended to imply that all the products described are stock production sizes. Purchasers are requested to consult with the manufacturers concerning lists of stock production sizes.

2.6 Designation for enquiry and ordering purposes

2.6.1 ***Information to be given.*** When designating black steel washers—metric series for the purpose of an enquiry or order, the following information shall be given.

1) General product description, i.e. "Black washers".

2) Nominal size of bolt or screw, e.g. "M 20".

3) Designated form, e.g. "Form E" (see Table 3, Table 4 and Table 5).

4) The number of this British Standard, i.e. BS 4320.

5) Details of coating (if required), in accordance with the appropriate British Standard, giving thickness classification where applicable.

2.6.2 ***Examples***

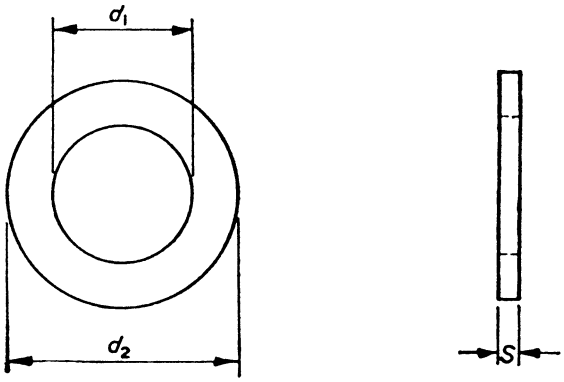
1) Black washers, normal diameter metric series (Table 3); to suit 20 mm diameter bolts or screws, would be designated.

"Black washers M 20 (Form E) to BS 4320".

2) Black washers, extra large diameter metric series (Table 5), zinc plated; to suit 16 mm diameter bolts and screws, could be designated.

"Black washers M 16 (Form G) to BS 4320, zinc plated to Zn3, BS 1706".

Table 3 — Black washers — Normal diameter. Metric series (Form E)

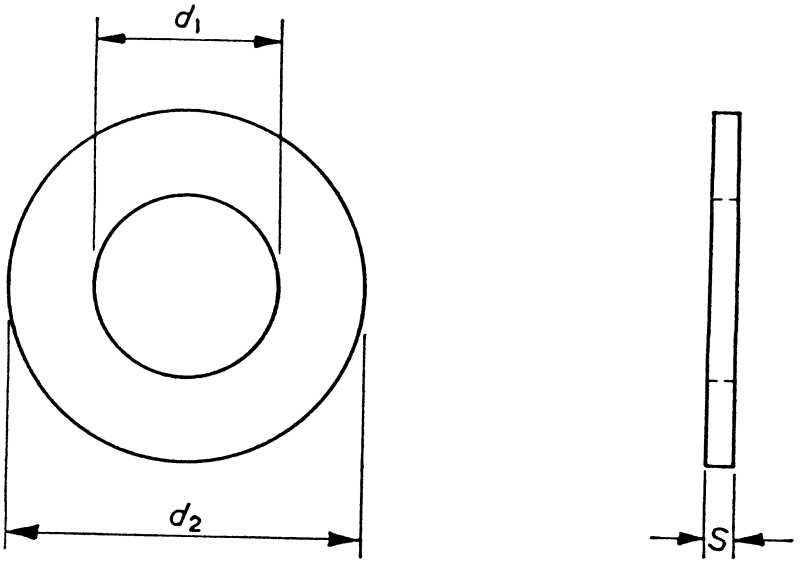


Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10
Nominal size of bolt or screw	Inside diameter d_1			Outside diameter d_2			Thickness s		
	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.
M 5	5·5	5·8	5·5	10·0	10·0	9·2	1·0	1·2	0·8
M 6	6·6	7·0	6·6	12·5	12·5	11·7	1·6	1·9	1·3
(M 7)	7·6	8·0	7·6	14·0	14·0	13·2	1·6	1·9	1·3
M 8	9·0	9·4	9·0	17	17	16·2	1·6	1·9	1·3
M 10	11·0	11·5	11·0	21	21	20·2	2·0	2·3	1·7
M 12	14	14·5	14	24	24	23·2	2·5	2·8	2·2
(M 14)	16	16·5	16	28	28	27·2	2·5	2·8	2·2
M 16	18	18·5	18	30	30	29·2	3·0	3·6	2·4
(M 18)	20	20·6	20	34	34	32·8	3·0	3·6	2·4
M 20	22	22·6	22	37	37	35·8	3·0	3·6	2·4
(M 22)	24	24·6	24	39	39	37·8	3·0	3·6	2·4
M 24	26	26·6	26	44	44	42·8	4	4·6	3·4
(M 27)	30	30·6	30	50	50	48·8	4	4·6	3·4
M 30	33	33·8	33	56	56	54·5	4	4·6	3·4
(M 33)	36	36·8	36	60	60	58·5	5	6·0	4·0
M 36	39	39·8	39	66	66	64·5	5	6·0	4·0
(M 39)	42	42·8	42	72	72	70·5	6	7·0	5·0
M 42	45	45·8	45	78	78	76·5	7	8·2	5·8
(M 45)	48	48·8	48	85	85	83	7	8·2	5·8
M 48	52	53	52	92	92	90	8	9·2	6·8
(M 52)	56	57	56	98	98	96	8	9·2	6·8
M 56	62	63	62	105	105	103	9	10·2	7·8
(M 60)	66	67	66	110	110	108	9	10·2	7·8
M 64	70	71	70	115	115	113	9	10·2	7·8
(M 68)	74	75	74	120	120	118	10	11·2	8·8

Sizes shown in brackets are non-preferred.

Table 4 — Black washers — Large diameter. Metric series (Form F)

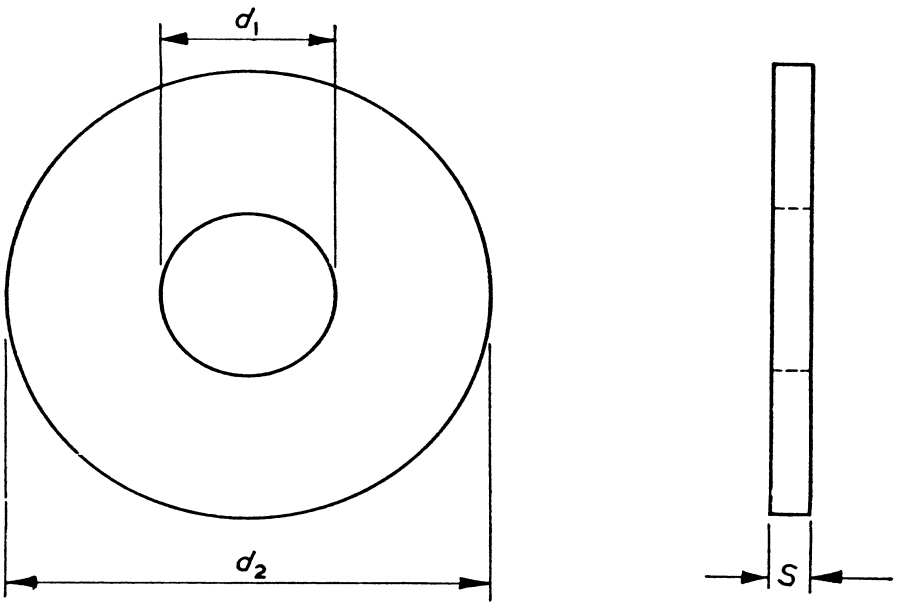


Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10
Nominal size of bolt or screw	**Inside diameter** d_1			**Outside diameter** d_2			**Thickness** s		
	nom.	**max.**	**min.**	**nom.**	**max.**	**min.**	**nom.**	**max.**	**min.**
M 8	9	9·4	9·0	21	21	20·2	1·6	1·9	1·3
M 10	11	11·5	11	24	24	23·2	2	2·3	1·7
M 12	14	14·5	14	28	28	27·2	2·5	2·8	2·2
(M 14)	16	16·5	16	30	30	29·2	2·5	2·8	2·2
M 16	18	18·5	18	34	34	32·8	3	3·6	2·4
(M 18)	20	20·6	20	37	37	35·8	3	3·6	2·4
M 20	22	22·6	22	39	39	37·8	3	3·6	2·4
(M 22)	24	24·6	24	44	44	42·8	3	3·6	2·4
M 24	26	26·6	26	50	50	48·8	4	4·6	3·4
(M 27)	30	30·6	30	56	56	54·5	4	4·6	3·4
M 30	33	33·8	33	60	60	58·5	4	4·6	3·4
(M 33)	36	36·8	36	66	66	64·5	5	6·0	4
M 36	39	39·8	39	72	72	70·5	5	6·0	4
(M 39)	42	42·8	42	77	77	75·5	6	7	5

Sizes shown in brackets are non-preferred.

Table 5 — Black washers — Extra large diameter. Metric series (Form G)



Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10
Nominal size of bolt or screw	Inside diameter d_1			Outside diameter d_2			Thickness s		
	nom.	max.	min.	nom.	max.	min.	nom.	max.	min.
M 5	5·5	5·8	5·5	15	15	14·2	1·6	1·9	1·3
M 6	6·6	7·0	6·6	18	18	17·2	2	2·3	1·7
(M 7)	7·6	8·0	7·6	21	21	20·2	2	2·3	1·7
M 8	9	9·4	9·0	24	24	23·2	2	2·3	1·7
M 10	11	11·5	11·0	30	30	29·2	2·5	2·8	2·2
M 12	14	14·5	14·0	36	36	34·8	3	3·6	2·4
(M 14)	16	16·5	16·0	42	42	40·8	3	3·6	2·4
M 16	18	18·5	18	48	48	46·8	4	4·6	3·4
(M 18)	20	20·6	20	54	54	52·5	4	4·6	3·4
M 20	22	22·6	22	60	60	58·5	5	6·0	4
(M 22)	24	24·6	24	66	66	64·5	5	6·0	4
M 24	26	26·6	26	72	72	70·5	6	7	5
(M 27)	30	30·6	30	81	81	79	6	7	5
M 30	33	33·8	33	90	90	88	8	9·2	6·8
(M 33)	36	36·8	36	99	99	97	8	9·2	6·8
M 36	39	39·8	39	108	108	106	10	11·2	8·8
(M 39)	42	42·8	42	117	117	115	10	11·2	8·8

Sizes shown in brackets are non-preferred.

Appendix A BSI Policy statement on screw threads and the metric system

The major sectors of British industry were represented at a conference organized by the BSI on 23rd November, 1965. They gave their approval to a policy statement which urged British firms to regard the traditional screw thread systems — Whitworth, B.A. and B.S.F. — as obsolescent, and to make the internationally-agreed ISO metric thread their first choice (with the ISO Unified thread as second choice) for all future designs.

Prior to the conference the statement had been endorsed by the Mechanical Engineering Industry Standards Committee, the Engineering Divisional Council and the General Council of BSI.

The following is the text of the policy statement.

> "On 24th May, 1965 the Right Hon. Douglas Jay, the President of the Board of Trade, announced in Parliament that it would be desirable for this country to change to the metric system. An extract from his statement is given below.
>
> "... British industries on a broadening front should adopt metric units sector by sector, until that system can become in time the primary system of weights and measures for the country as a whole ... the Government hope that within ten years the greater part of the country's industry will have effected the change ..."

The national need for increased exports coupled with maximum efficiency and economy of production lies behind the above statement and makes it essential to give urgent and serious consideration to the screw thread situation in the United Kingdom.

After many years' work the International Organization for Standardization (ISO) has reached agreement on ISO Recommendations for general purpose screw threads. This agreement will enable the industries of the world to align the usage of screw threads and to minimize the present diversities of practice.

The ISO Recommendations comprise a system of ISO metric threads[5)] and a system of ISO inch threads[6)]. The ISO inch threads are the same as the existing Unified threads.

IN VIEW OF THE WORLD TREND TOWARDS THE METRIC SYSTEM, AND HAVING PARTICULAR REGARD TO THE DECLARED U.K. NATIONAL POLICY FOR ITS ADOPTION, IT IS STRONGLY RECOMMENDED THAT BRITISH INDUSTRY SHOULD ADOPT THE ISO METRIC SCREW THREAD SYSTEM.

Although it is appreciated that some of those sections of industry already using ISO inch (Unified) screw threads may find it necessary, for various reasons, to continue with their use for some time, Whitworth and B.A. threads should be superseded by ISO metric threads in preference to an intermediate change to ISO inch threads.

NOTE Threads on pipes will continue to be BSP[7)] which have been adopted as the ISO pipe thread and which are covered in ISO Recommendation R7, "Pipe threads for gas list tubes and screwed fittings where pressure-tight joints are made on the threads (⅛ in to 6 in)".

[5)] BS 3643, "ISO metric screw threads".

[6)] BS 1580, "Unified screw threads".

[7)] BS 21, "Pipe threads".

Appendix B Sizes greater than 68 mm diameter

Although it is considered that the range of nominal sizes included is adequate for most of the applications for which standard metric washers are required, information is provided in Table 6 for the convenience of users requiring larger sizes.

Table 6 — Nominal dimensions for sizes greater than M 68

Dimensions in millimetres

1	2	3	4
Nominal size of bolt or screw	**Inside diameter** d_1	**Outside diameter** d_2	**Thickness** s
M 72	78	125	10
(M 76)	82	135	10
M 80	86	140	12
(M 85)	91	145	12
M 90	96	160	12
(M 95)	101	165	12
M 100	107	175	14
(M 105)	112	180	14
M 110	117	185	14
(M 115)	122	200	14
(M 120)	127	210	16
M 125	132	220	16
(M 130)	137	230	16
M 140	147	240	18
M 150	158	250	18

NOTE 1 Sizes shown in brackets are non-preferred.

NOTE 2 The inclusion of dimensional data in this standard is not intended to imply that all the products described are stock production sizes. Purchasers are requested to consult with the manufacturers concerning lists of stock production sizes.

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