



No. 190—1924.

British Engineering Standards Association.

(Incorporated 1918.)

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE

BY

THE INSTITUTION OF CIVIL ENGINEERS.
THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

DIMENSIONS

FOR

BRITISH STANDARD WHITWORTH (B.S.W.)

BRIGHT HEXAGON BOLTS, SET-SCREWS AND NUTS,

SPLIT-PINS, WASHERS AND STUDS.

(Superseding portions of Report No. 28—1908, Nuts, Bolt Heads
and Spanners.)

LONDON:

PUBLISHED FOR THE ASSOCIATION BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, LONDON, E.C. 4;
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Standards Association of Australia,

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THIS BRITISH STANDARD SPECIFICATION

HAS BEEN ENDORSED AS

AUSTRALIAN STANDARD SPECIFICATION No. B48 - 1932

Without Amendment.

The following Government Departments and Scientific and Industrial Organisations were officially represented upon the Sectional Committee, Sub-Committee and Panel entrusted with the preparation of this Specification:—

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Office of Works.
General Post Office.
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Society of Motor Manufacturers and Traders, Ltd.
Machine Tool Trades Association.
British Tube Association.
Brass and Copper Tube Association.
British Waterworks Association.
Bright Bolt and Nut Manufacturers' Association.
British Screwing Tackle Manufacturers' Association.

This Specification was first issued in Chart form in August, 1924. It was adopted in its present form by the Sectional Committee on Machine Parts, their Gauging and Nomenclature, in January, 1925, and approved on behalf of the Main Committee on February 2nd, 1925.

NOTE.

In order to keep abreast of progress in the Industries concerned, the British Standard Specifications are subjected to periodical review.

Suggestions for improvements, addressed to the Secretary, British Engineering Standards Association, 28, Victoria Street, London, S.W. 1, will be welcomed at all times. They will be recorded, and in due course brought to the notice of the Committees charged with the revision of the Specifications to which they refer.

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CONTENTS.

Foreword	PAGE
								3

GENERAL NOTES.

1. Nominal Size	5
2. Screw Threads	5
3. Width across Flats	5
4. Tensile Strength	...	...	...	...	...	...	...	5
5. British Standard Stock Lengths	...	...	...	...	...	...	...	5

NOTES TO TABLE 1.

1. Chamfering...	...	...	...	...	...	...	...	6
2. Diameter of Bolt	...	...	...	...	...	...	...	6
3. Minimum Length of Thread	...	...	...	...	...	...	...	6
4. Bolt Lengths	...	...	...	...	...	...	...	6
5. Set-screw Lengths	...	...	...	...	...	...	...	6
6. Split-pin Holes	...	...	...	...	...	...	...	6

NOTES TO TABLE 2.

1. Chamfering...	...	...	...	...	...	...	...	8
2. Lengths of Bolts when using Slotted and Castle Nuts	...	...	...	...	...	...	...	8
3. Form of Slot	...	...	...	...	...	...	...	8

NOTES TO TABLE 3.

1. Chamfering...	10
------------------	-----	-----	-----	-----	-----	-----	-----	----

FIGURES.

Fig. 1. B.S.W. Hexagon Bolt	...	...	...	...	...	...	...	6
Fig. 2. B.S.W. Hexagon Screw-set	...	...	...	...	...	...	...	6
Fig. 3. B.S.W. Hexagon Nut	...	...	...	...	...	...	...	6
Fig. 4. B.S.W. Hexagon Lock-nut	...	...	...	...	...	...	...	6
Fig. 5. B.S.W. Hexagon Slotted Nut	...	...	...	...	...	...	...	8
Fig. 6. B.S.W. Hexagon Castle Nut	...	...	...	...	...	...	...	8
Fig. 7. B.S.W. Split-pin	...	...	...	...	...	...	...	10
Fig. 8. B.S.W. Washer	...	...	...	...	...	...	...	10
Fig. 9. B.S.W. Stud	...	...	...	...	...	...	...	10

TABLES.

Table 1. Dimensions of B.S.W. Hexagon Bolts, Set-screws, Nuts and Lock Nuts	...	...	...	...	...	...	...	7
Table 2. Dimensions of B.S.W. Hexagon Slotted Nuts and Castle Nuts	...	...	...	...	...	...	...	9
Table 3. Dimensions of B.S.W. Split-pins and Washers	...	...	...	...	...	...	...	11
Table 4. British Standard Stock Lengths for B.S.W. Bright Steel Hexagon Bolts, Set-screws and Studs	...	...	...	...	...	...	...	12

FOREWORD.

This Specification contains tables giving the general dimensions for British Standard Whitworth Bright Hexagon Bolts, Set-screws, Nuts, Lock Nuts, Castle Nuts and Slotted Nuts, Split-pins, Washers and Studs up to and including 2-inch nominal size and to this extent supersedes Table 1 of Publication No. 28-1908, Nuts, Bolt Heads and Spanners. The Specification also supersedes the parts of Publication No. 28, including Table 4, which deal with Castle Nuts.

The Specification also includes a table in which are set out the standard lengths of Bolts, Set-screws and Studs which Bolt and Nut manufacturers in general carry in stock, in nominal sizes up to and including 1 inch.

The dimensions for B.S.W. Bolts, Nuts, etc., above 2 inches are under consideration.

This Specification is also issued in the form of an unmounted varnished Chart, 21 ins. x 33 ins. Publication No. 190 C-1924, price 1/3 post free.

(5)

Note.—The Association desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the Articles herein referred to, but does not purport to include all the necessary provisions of a Contract.

DIMENSIONS

FOR

**BRITISH STANDARD WHITWORTH (B.S.W.)
BRIGHT HEXAGON BOLTS, SET-SCREWS AND NUTS
SPLIT-PINS, WASHERS AND STUDS.**

5

GENERAL NOTES.

10

1. *Nominal Size.*—The nominal size given in Column 1 of the tables in this Specification is also the maximum size of the unthreaded portion of the bolt, set-screw or stud.

2. *Screw Threads.*—All Bolts, Set-screws, Nuts and Studs supplied as B.S.W. Bright Bolts, Set-screws, etc., in addition to 15 conforming with the dimensions given in the tables of this Specification, shall have their screw threads in accordance with Tables 2 and 3 of B.E.S.A. Publication No. 92-1919 (formerly C.L. 7270), B.S. Whitworth Screw Threads and their Tolerances, 20 as far as they apply.

3. *Width across Flats* (Dimension B).—The widths given are the British Standard widths for B.S.W. Bolt Heads, Set-screw Heads and Nuts. In cases where for any reason a smaller width across flats is preferred, the Association recommends the use of bolts, set-screws and nuts, the widths of which are equal 25 to those of the next smaller B.S.W. bolt size.

4. *Tensile Strength.*—Unless otherwise specified, all B.S.W. Bright Steel Bolts, Set-screws and Studs shall have a tensile strength of not less than 28 tons per square inch.

5. *British Standard Stock Lengths.*—The British Standard 30 lengths of Bolts, Set-screws and Studs which makers in general are prepared to supply from stock are given in Table 4, page 12.

B.S.W. HEXAGON BOLTS, SET-SCREWS, NUTS AND LOCK NUTS.

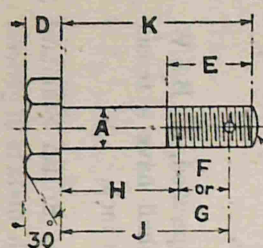


Fig. 1. B.S.W. Bolt.

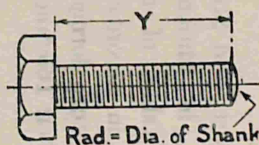
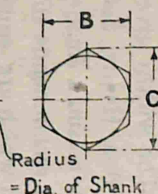


Fig. 2. B.S.W. Set-screw.

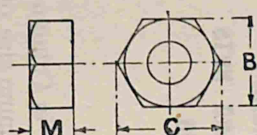


Fig. 3. B.S.W. Nut.

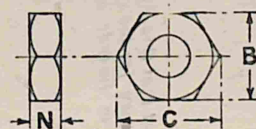


Fig. 4. B.S.W. Lock Nut.

NOTES TO TABLE I.

1. *Chamfering*.—All B.S.W. Bright Hexagon Bolt-heads, Set-screw-heads, and Nuts shall have a chamfer of approximately 30° on their upper faces and all B.S.W. Lock Nuts shall be similarly chamfered on both faces.

2. †*Diameter of Bolt* (Dimension A).—This is the diameter of the unthreaded portion of the Bolt. The tolerances permitted on this dimension are given in Col. 8, *e.g.*, the diameter of a 1 inch B.S.W. Bright Bolt must lie between 1 inch and 0.992 inch.

3. ‡Minimum Length of Thread (Dimension E).—The lengths given are the minimum lengths, measured from the first full thread, to which, under reasonable pressure, a B.S.W. Bright nut can be screwed down.
These lengths apply only to B.S.W. bolts.

4. **Bolt Lengths** (Dimensions F, G, H, J, and K).—To ascertain dimension J (the length of a bolt from the head to the centre of the split-pin hole) dimension H (the thickness of the piece or pieces to be clamped), must be added to dimension F when using a slotted nut and to dimension G when using a castle nut, *i.e.*,

For a slotted nut $J = H + F$.

For a castle nut $J = H + G$.

To ascertain dimension K (the full length of a bolt), the thickness of the Nut (or Nuts) and Washer to be used must be added to dimension H, *e.g.*,

When using an ordinary nut and washer $K = H + M + X$. (For dimension X see Table 3.)

British Standard Stock Lengths are given in Table 4, page 12.

5. *Set-screw Lengths*.—Dimension Y is measured from the face of the head to the end of the parallel part of the screwed portion. British Standard Stock Lengths are given in Table 4, page 12.

6. *Split-pin Holes*.—The split-pin hole is shown in Fig. 1 so that certain dimensions may be indicated. Bolts are not supplied with split-pin holes unless so ordered; if split-pin holes are required, dimension J should be stated with the order.

C.B. (M) 5506.

British Engineering Standards Association.

BRITISH STANDARD SPECIFICATION

FOR

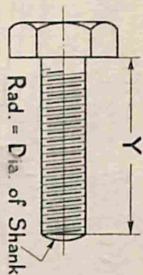
BRITISH STANDARD WHITWORTH (B.S.W.)
BRIGHT HEXAGON BOLTS, SET-SCREWS AND
NUTS, SPLIT-PINS, WASHERS AND STUDS.

(No. 190-1924.)

ALTERATION TO B.S.W. SET-SCREW. (TABLE I)

(June, 1928.)

The following diagram is to be substituted for Fig. 2, page 6—



and the following Note added after Note 5, page 6—

“5 (a). *Length of Thread of Set-Screws*.—The set-screws shall be threaded to within a distance from the head not exceeding three times the pitch for nominal sizes up to and including $\frac{1}{2}$ in. and twice the pitch for nominal sizes above $\frac{1}{2}$ in.”

(B.S. SPECN. NO. 190—1924, P. 6.)

Normal Size Max Dia of 1	A
	*
1	
1	
1	
*1	
1	
*1	
1	
2	

B.S.W. HEXAGON SLOTTED NUTS AND CASTLE NUTS.

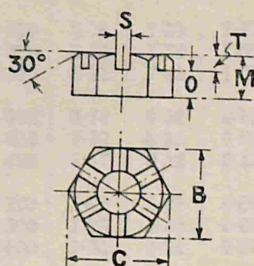


Fig. 5. B.S.W. Slotted Nut.

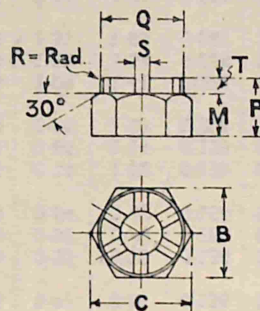


Fig. 6. B.S.W. Castle Nut.

NOTES TO TABLE 2.

1. *Chamfering*.—All B.S.W. Bright Hexagon Slotted Nuts shall have a chamfer of approximately 30° on their upper faces and the hexagonal portion of B.S.W. castle nuts where it joins the castellated portion shall be similarly chamfered.

2. *Lengths of Bolts when using Slotted and Castle Nuts*.—(See Table I.)—To ascertain dimension J (the length of a bolt from the head to the centre of the split-pin hole), dimension H (the thickness of the piece or pieces to be clamped) must be added to dimension F (Table 1) when using a slotted nut and to dimension G (Table 1) when using a castle nut, i.e.,

For a slotted nut $J = H + F$.

For castle nut $J = H + G$.

3. *Form of Slot*.—The corners at the bottom of the slots may be sharp, as shown in Figs. 5 and 6, or rounded.

TABLE 2.
DIMENSIONS OF B.S.W. HEXAGON SLOTTED NUTS AND CASTLE NUTS.
All dimensions are in inches.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nominal Size.	B.S.W. Slotted Nuts.				B.S.W. Castle Nuts.							B.S.W. Slotted and Castle Nuts.	
	Thickness.		Face of Nut to Bottom of Slot.		Thickness of Hexagon, and from Face of Nut to Bottom of Slot.		Total Thickness.		Castellated Portion.			Approximate Dimensions of Slot.	
									Diameter.		Approx. Radius.	Width.	Depth.
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.			
A	M		O		M		P		Q		R	S	T
1/4	0.240	0.250	0.146	0.156	0.240	0.250	0.334	0.344	0.500	0.510	0.05	0.084	0.094
5/16	0.302	0.312	0.208	0.218	0.302	0.312	0.396	0.406	0.575	0.585	0.05	0.084	0.094
3/8	0.365	0.375	0.225	0.235	0.365	0.375	0.505	0.515	0.685	0.695	0.06	0.125	0.140
7/16	0.427	0.437	0.287	0.297	0.427	0.437	0.567	0.577	0.795	0.805	0.06	0.125	0.140
1/2	0.490	0.500	0.303	0.313	0.490	0.500	0.677	0.687	0.895	0.905	0.06	0.165	0.187
5/8	0.552	0.562	0.365	0.375	0.552	0.562	0.739	0.749	0.985	0.995	0.07	0.165	0.187
3/4	0.615	0.625	0.428	0.438	0.615	0.625	0.802	0.812	1.065	1.085	0.07	0.165	0.187
* 7/8	0.677	0.687	0.443	0.453	0.677	0.687	0.911	0.921	1.165	1.185	0.08	0.208	0.234
1	0.740	0.750	0.506	0.516	0.740	0.750	0.974	0.984	1.265	1.285	0.08	0.208	0.234
1 1/8	0.865	0.875	0.585	0.595	0.865	0.875	1.145	1.155	1.445	1.465	0.09	0.250	0.280
1 1/4	0.990	1.000	0.710	0.720	0.990	1.000	1.270	1.280	1.635	1.655	0.09	0.250	0.280
1 1/2	1.105	1.125	0.777	0.797	1.105	1.125	1.433	1.453	1.825	1.845	0.10	0.290	0.328
1 3/4	1.230	1.250	0.902	0.922	1.230	1.250	1.558	1.578	2.015	2.035	0.11	0.290	0.328
* 1 7/8	1.355	1.375	1.027	1.047	1.355	1.375	1.683	1.703	2.180	2.200	0.12	0.290	0.328
2	1.480	1.500	1.105	1.125	1.480	1.500	1.855	1.875	2.370	2.390	0.13	0.333	0.375
* 2 1/8	1.605	1.625	1.230	1.250	1.605	1.625	1.980	2.000	2.535	2.555	0.14	0.333	0.375
2 1/4	1.730	1.750	1.262	1.282	1.730	1.750	2.198	2.218	2.715	2.735	0.14	0.416	0.468
2 1/2	1.980	2.000	1.418	1.438	1.980	2.000	2.542	2.562	3.105	3.125	0.15	0.500	0.562

* The Association recommends that for general use these sizes be dispensed with.

B.S.W. SPLIT-PINS AND WASHERS.

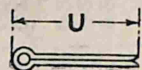


Fig. 7. B.S.W. Split-Pin.

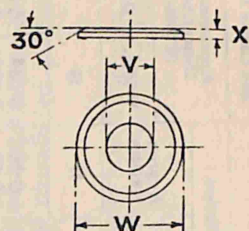


Fig. 8. B.S.W. Washer.

NOTES TO TABLE III.

1. *Chamfering*.—B.S.W. Bright Washers when chamfered shall have a chamfer of approximately 30° .

B.S.W. STUDS.

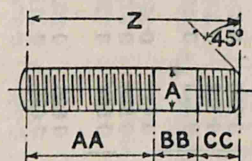


Fig. 9. B.S.W. Stud.

Overall Length (dimension Z) is measured from the first thread of the long end to the flat face of the short end. British Standard Stock Lengths are given in Table 4, page 12.

Long End (dimension AA) is screwed for a length equal 10 to the overall length less twice the diameter, measured from the first to the last full thread. The point shall have a radius equal to the diameter of the stud.

Plain Part (dimension BB) is equal to the diameter of the stud. 15

Short End (dimension CC) is screwed for a length equal to the diameter of the stud, measured from the flat end of the stud to the lead of the thread, *i.e.*, to the point where the thread disappears.

C.C. (ME) 8045.

September, 1932.

British Standards Institution.

BRITISH STANDARDS SPECIFICATION

FOR

BRITISH STANDARD WHITWORTH (B.S.W.)
BRIGHT HEXAGON BOLTS, SET-SCREWS AND NUTS, SPLIT-PINS,
WASHERS AND STUDS.
(No. 190—1924.)

AMENDMENT TO THE FIGURES FOR LENGTH OF SPLIT-PIN
IN COLUMN 3 OF TABLE 3.

PAGE 11.

TABLE 3.

DIMENSIONS OF B.S.W. SPLIT-PINS AND WASHERS.

All dimensions are in inches.

1	2
Nominal Size.	Overall Length.
A	U
$\frac{1}{4}$	1
$\frac{5}{16}$	1
$\frac{3}{8}$	$1\frac{1}{4}$
$\frac{7}{16}$	$1\frac{1}{4}$
$\frac{1}{2}$	$1\frac{1}{2}$
$\frac{9}{16}$	$1\frac{1}{2}$
$\frac{5}{8}$	$1\frac{3}{4}$
$\frac{11}{16}$	2
$\frac{3}{4}$	2
$\frac{7}{8}$	$2\frac{1}{4}$
1	$2\frac{1}{2}$
$1\frac{1}{8}$	$2\frac{3}{4}$
$1\frac{1}{4}$	3
$1\frac{3}{8}$	$3\frac{1}{4}$
$1\frac{1}{2}$	$3\frac{1}{2}$
$1\frac{5}{8}$	$3\frac{3}{4}$
$1\frac{3}{4}$	4
2	$4\frac{3}{4}$

(11)

TABLE 3.

DIMENSIONS OF B.S.W. SPLIT-PINS AND WASHERS.

All dimensions are in inches.

1	2	3	4	5	6	7	8	9
Nominal Size.	B.S.W. Split-pins.		B.S.W. Washers.					
	Diameter.	Overall Length.	Diameter of Hole.		Outside Diameter.		Thickness.	
			Min.	Max.	Min.	Max.	Min.	Max.
A		U	V		W		X	
$\frac{1}{4}$	$\frac{1}{16}$	$\frac{3}{4}$	0.265	0.270	0.620	0.625	0.054	0.056
$\frac{5}{16}$	$\frac{1}{16}$	$\frac{3}{4}$	0.328	0.333	0.745	0.750	0.070	0.072
$\frac{3}{8}$	$\frac{3}{32}$	1	0.390	0.395	0.870	0.875	0.070	0.072
$\frac{7}{16}$	$\frac{3}{32}$	$1\frac{1}{8}$	0.453	0.458	0.995	1.000	0.090	0.092
$\frac{1}{2}$	$\frac{1}{8}$	$1\frac{1}{4}$	0.515	0.520	1.120	1.125	0.090	0.092
$\frac{9}{16}$	$\frac{1}{8}$	$1\frac{3}{8}$	0.588	0.593	1.240	1.250	0.100	0.104
$\frac{5}{8}$	$\frac{1}{8}$	$1\frac{1}{2}$	0.651	0.656	1.365	1.375	0.112	0.116
$*1\frac{1}{16}$	$\frac{5}{32}$	$1\frac{1}{2}$	0.713	0.718	1.490	1.500	0.124	0.128
$\frac{3}{4}$	$\frac{5}{32}$	$1\frac{5}{8}$	0.776	0.781	1.615	1.625	0.140	0.144
$\frac{7}{8}$	$\frac{3}{16}$	2	0.901	0.906	1.865	1.875	0.140	0.144
1	$\frac{3}{16}$	$2\frac{1}{8}$	1.026	1.031	2.115	2.125	0.156	0.160
$1\frac{1}{8}$	$\frac{7}{32}$	$2\frac{1}{4}$	1.151	1.156	2.360	2.375	0.172	0.176
$1\frac{1}{4}$	$\frac{7}{32}$	$2\frac{3}{8}$	1.276	1.281	2.610	2.625	0.172	0.176
$*1\frac{3}{8}$	$\frac{7}{32}$	$2\frac{1}{2}$	1.401	1.406	2.860	2.875	0.188	0.192
$1\frac{1}{2}$	$\frac{1}{4}$	$2\frac{3}{4}$	1.526	1.531	3.093	3.125	0.188	0.192
$*1\frac{5}{8}$	$\frac{1}{4}$	3	1.651	1.656	3.343	3.375	0.208	0.212
$1\frac{3}{4}$	$\frac{5}{16}$	$3\frac{1}{4}$	1.776	1.781	3.593	3.625	0.208	0.212
2	$\frac{3}{8}$	$3\frac{1}{2}$	2.026	2.031	4.093	4.125	0.208	0.212

* The Association recommends that for general use these sizes be dispensed with.

Fig. 7.

1. C.
shall have

Overa
thread of
Standard

Long
to the ove
first to th
equal to t

Plain
stud.

Short
to the dia
stud to th
disappear

(12)

TABLE 4.

BRITISH STANDARD STOCK LENGTHS
FOR
B.S.W. BRIGHT STEEL HEXAGON BOLTS,
SET-SCREWS AND STUDS.

5

NOMINAL SIZES.	STOCK LENGTHS (IN INCHES).																											
	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/2	5	5 1/2	6			
IN. 1/4																												
5/16																												
3/8																												
7/16																												
1/2																												
9/16																												
5/8																												
3/4																												
7/8																												
1																												

Stock Lengths are indicated as follows:—

Bolts (See K, Fig. 1) ... _____
Set-screws (See Y, Fig. 2) _____
Studs (See Z, Fig. 9) - - - - -

- NOTES.—1. Intermediate lengths and larger diameters are not 10 regarded as stock sizes.
2. Unless otherwise specified, all B.S.W. Bright Steel Bolts, Set-screws and Studs shall have a tensile strength of not less than 28 tons per square inch.

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