

Specification for

Wood screws

Co-operating organizations

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

- Aluminium Federation*
- British Ironfounders' Association
- British Lock and Latch Manufacturers' Association
- British Plastics Federation
- British Waterworks Association
- Cast Butt Hinge Manufacturers' Association
- Copper Development Association*
- D.S.I.R. — Building Research Station
- Guild of Architectural Ironmongers
- Institution of Municipal Engineers
- London County Council
- Metal Window Association, Ltd.
- Ministry of Public Building and Works
- National Brassfoundry Association
- National Federation of Builders' and Plumbers' Merchants*
- National Federation of Building Trades Employers*
- National Federation of Ironmongers*
- Royal Institute of British Architects*
- The Royal Institution of Chartered Surveyors
- Zinc Development Association

The 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:

- Amalgamated Society of Woodworkers
- British Furniture Manufacturers Federated Associations
- D.S.I.R. — Forest Products Research Laboratory
- Institute of Iron & Steel Wire Manufacturers
- Steel Nail Association
- Timber Research & Development Association
- An individual manufacturer of wood screws.

This British Standard, having been approved by the Hardware and Ironmongery Industry Standards Committee and endorsed by the Chairman of the Building Divisional Council, was published under the authority of the General Council on 4 July 1963

© BSI 03-2000

First published February 1945
First revision May 1952
Second revision June 1963

The following BSI references relate to the work on this standard:
Committee reference HIB/10
Draft for comment D62/9592

ISBN 0 580 35953 0

Amendments issued since publication

Amd. No.	Date of issue	Comments
5467	February 1965	
1462	June 1974	Indicated by a sideline in the margin

Contents

	Page
Co-operating organizations	Inside front cover
Foreword	iii
1 Scope	1
2 Material	1
3 Dimensions	2
4 Tolerance on length	2
5 Threads	2
6 Standard sizes	2
7 Finish	2
8 Designation for ordering	2
Appendix A Finishes for wood screws	26
Appendix B Recess penetration gauging	27
Appendix C Metric slot widths	33
Figure 1	3
Figure 2	9
Figure 3	14
Figure 4	17
Figure 5 — Enlarged views of head	17
Figure 6	20
Figure 7 — Enlarged views of head	20
Figure 8	23
Figure 9 — Enlarged views of head	23
Figure 10 — Recess penetration gauge	28
Figure 11 — Gauge point enlarged	29
Figure 12 — Gauge body	31
Figure 13 — Connection piece	32
Table 1 — Slotted countersunk head wood screws	3
Table 1M — Metric equivalents of Table 1	4
Table 2 — Steel	5
Table 3 — Brass	6
Table 4 — Stainless steel	7
Table 5 — Aluminium	7
Table 6 — Silicon bronze	8
Table 7 — Nickel-copper alloy	8
Table 8 — Slotted round head wood screws	9
Table 8M — Metric equivalents of Table 8	10
Table 9 — Steel	11
Table 10 — Brass	12
Table 11 — Stainless steel	13
Table 12 — Aluminium	13
Table 13 — Silicon bronze	13
Table 14 — Slotted raised countersunk head wood screws	14
Table 14M — Metric equivalents of Table 14	15
Table 15 — Steel	16
Table 16 — Brass	16
Table 17 — Stainless steel	16
Table 18 — Aluminium	16
Table 19 — Silicon bronze	16

	Page
Table 20 — Recessed countersunk head wood screws	17
Table 20M — Metric equivalents of Table 20	18
Table 21 — Steel	19
Table 22 — Brass	19
Table 23 — Recessed round head wood screws	20
Table 23M — Metric equivalents of Table 23	21
Table 24 — Steel	22
Table 25 — Brass	22
Table 26 — Recessed raised countersunk head wood screws	23
Table 26M — Metric equivalents of Table 26	24
Table 27 — Steel	25
Table 28 — Brass	25

Foreword

This standard makes reference to the following British Standards:

BS 18, *Tensile testing of metals*.

BS 729, *Zinc coatings on iron and steel articles. Part 2: Sherardized coatings*.

BS 1224, *Electroplated coatings of nickel and chromium*.

BS 1448, *Nomenclature of decorative metallic finishes*.

BS 1473, *Wrought aluminium and aluminium alloys. Rivet, bolt and screw stock for forging*.

BS 1554, *Rust, acid and heat resisting wire*.

BS 1615, *Anodic oxidation coatings on aluminium*.

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

BS 1872, *Electroplated coatings of tin*.

BS 2873, *Schedule of copper and copper alloy wire*.

BS 3075, *Nickel and nickel alloys: wire*.

BS 3189, *Phosphate treatment of iron and steel for protection against corrosion*.

This British Standard has been brought into line with current manufacturing methods and embodies changes designed to bring closer together the practices of the wood screw industries of the United Kingdom, Europe and the United States of America.

The principal changes in this revision are:

- 1) The elimination of “gunmetal” and nickel silver wood screws.
- 2) The inclusion of silicon bronze and nickel-copper alloy wood screws.
- 3) The further limitation of standard size ranges, mainly by eliminating 2/0 and 11 screw gauges and by deleting some of the fringe sizes.
- 4) The slight modification of the shape of the heads of round head wood screws.
- 5) The supersession of hot dip galvanized finish by bright plated finishes.
- 6) The incorporation of tables listing standard sizes of recessed head wood screws.
- 7) The addition of an appendix setting out the method of gauging the recess penetration of recessed head wood screws.

Reference is made in Clause 2, Material, to the mechanical testing of wire test pieces in accordance with BS 18¹⁾. In the revision of BS 18¹⁾, published in October 1962, the recommended gauge length for the elongation test is now $5.65\sqrt{\text{Area}}^2)$ in place of the previous $4\sqrt{\text{Area}}^2)$; the screw industry is, therefore, considering the practicability of adopting the $5.65\sqrt{\text{Area}}^2)$ proportion.

It is expected that in due course the International Organization for Standardization (ISO) will undertake work on the co-ordination of national standards for wood screws.

¹⁾ BS 18, “*Tensile testing of metals*”.

²⁾ In BS 18:1962, the symbol S_0 is used to denote the original cross-sectional area of the test piece.

NOTE 1 Metric equivalents are given for the British units in this standard: the figures in British units are to be regarded as the standard. The metric conversions are approximate. More accurate conversions should be based on the tables in BS 350, "*Conversion factors and tables*".

NOTE 2 In place of the customary but incorrect use of the ton as a unit of force, the unit called the ton-force (abbreviation tonf) has been used in this standard. It is that force which, when acting on a body of mass one ton, gives it an acceleration equal to that of standard gravity.

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 33 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for slotted head wood screws manufactured to the dimensions specified in Table 1, Table 8 and Table 14 from any of the materials specified in Clause 2. It also specifies a limited range of recessed head wood screws manufactured from steel and brass only to the dimensions specified in Table 20, Table 23 and Table 26. A method of checking the recess penetration of recessed head wood screws is shown in Appendix B.

2 Material

a) *General*. Wood screws are generally manufactured from cold-drawn wire. The mechanical tests shall be carried out on unmachined wire test pieces prior to the manufacture of the wood screws.

Where wood screws are heat-treated [see Clause 2 e)] the mechanical tests shall be carried out on unmachined wire test pieces which have been heat-treated with the wood screws.

All mechanical tests shall be carried out in accordance with BS 18³⁾ but in all cases the elongation shall be calculated on a gauge length of $4\sqrt{\text{Area}}$ ⁴⁾.

NOTE See third paragraph of the Foreword.

b) *Steel*. The steel wire shall have the following mechanical properties:

Diameter	Tensile strength (minimum)		Elongation (minimum)
	tonf/in ²	kgf/mm ²	
Up to and including 16 screw gauge	35	55	13
18 screw gauge and over	30	47	13

c) *Brass*.

i) *Chemical composition*. The brass wire shall have the chemical composition of either alloy CZ108 or alloy CZ106 of BS 2873⁵⁾.

ii) *Mechanical properties*. The brass wire shall have the following mechanical properties:

Tensile strength (minimum)		Elongation (minimum)
tonf/in ²	kgf/mm ²	per cent
27	43	15

d) *Stainless steel*. The stainless steel wire shall conform to any of the En58 series of specifications in BS 1554⁶⁾.

e) *Aluminium*. The aluminium wire shall comply with Specification HB15 in BS 1473⁷⁾. The screws shall be fully heat-treated and the test pieces shall have the following mechanical properties:

0.1 per cent proof stress (minimum)		Tensile strength (minimum)	
tonf/in ²	kgf/mm ²	tonf/in ²	kgf/mm ²
24	38	28	44

Aluminium wood screws for use involving exposure to severe corrosive conditions, in particular to the action of sea water, shall be made of aluminium wire complying with Specification NB6 in BS 1473⁷⁾.

NOTE Wood screws in NB6 alloy have a minimum tensile strength of 20 tonf/in² (31 kgf/mm²) and require driving holes for successful use. Wood screws in this material are not as readily available as wood screws in HB15 alloy and may require to be specially made.

f) *Silicon bronze*.

i) *Chemical composition*. The silicon bronze wire shall have the chemical composition of alloy CS101 of BS 2873⁸⁾.

ii) *Mechanical properties*. The silicon bronze wire shall have the following mechanical properties:

Tensile strength (minimum)		Elongation (minimum)
tonf/in ²	kgf/mm ²	per cent
27	43	15

g) *Nickel-copper alloy*.

i) *Chemical composition*. The nickel-copper alloy wire shall have the chemical composition of alloy NA13 of BS 3075⁹⁾.

³⁾ BS 18, "Tensile testing of metals".

⁴⁾ In BS 18:1962, the symbol S_0 is used to denote the original cross-sectional area of the test section.

⁵⁾ BS 2873, "Schedule of copper and copper alloy wire".

⁶⁾ BS 1554, "Rust, acid and heat resisting steel wire".

⁷⁾ BS 1473, "Wrought aluminium and aluminium alloys. Rivet, bolt and screw stock for forging".

⁸⁾ BS 2873 "Schedule of copper and copper alloy wires".

⁹⁾ BS 3075, "Nickel and nickel alloys: wire".

ii) *Mechanical properties.* The nickel-copper alloy wire shall have the following mechanical properties:

Tensile strength (minimum)		Elongation (minimum)
tonf/in ²	kgf/mm ²	per cent
32	50	30

3 Dimensions

Slotted head wood screws shall conform to the dimensions and tolerances specified in Table 1, Table 8 and Table 14 and Clauses 4 and 5. Recessed head wood screws shall conform to the dimensions and tolerances specified in Table 20, Table 23 and Table 26 and Clauses 4 and 5.

All wood screws shall be gimlet pointed and the heads shall be concentric with the shank. Slots and recesses shall be clean, free from burrs, and on visual inspection shall be central with the head.

4 Tolerance on length

The permissible tolerance on the nominal length of wood screws shall be as follows:

Nominal length	Tolerance on length
in	in
$\frac{1}{8}$ up to and including $\frac{3}{16}$	+ 0 – 0.015
Above $\frac{3}{16}$ up to and including $\frac{5}{16}$	+ 0 – 0.020
Above $\frac{5}{16}$ up to and including $\frac{3}{4}$	+ 0 – 0.025
Above $\frac{3}{4}$ up to and including $1\frac{1}{2}$	+ 0 – $\frac{1}{32}$
Above $1\frac{1}{2}$ up to and including $2\frac{1}{2}$	+ 0 – $\frac{3}{64}$
Above $2\frac{1}{2}$	+ 0 – $\frac{1}{16}$

Metric equivalents:

Nominal length	Tolerance on length
mm	mm
3 up to and including 4.75	+ 0 – 0.4
Above 4.75 up to and including 8	+ 0 – 0.5
Above 8 up to and including 19	+ 0 – 0.6
Above 19 up to and including 38	+ 0 – 0.8
Above 38 up to and including 64	+ 0 – 1.2
Above 64	+ 0 – 1.6

5 Threads

Threads shall be clean and the depth of thread, measured at a distance of $1\frac{1}{2}$ – 2 nominal diameters from the point shall be not less than the following:

Size of screw	Depth of thread (minimum)		Size of screw	Depth of thread (minimum)	
Screw gauge	in	mm	Screw gauge	in	mm
0	0.008	0.20	10	0.026	0.66
1	0.009	0.23	12	0.030	0.76
2	0.010	0.25	14	0.034	0.86
3	0.012	0.30	16	0.038	0.97
4	0.013	0.33	18	0.041	1.04
5	0.016	0.41	20	0.045	1.14
6	0.018	0.46	24	0.053	1.35
7	0.020	0.51	28	0.061	1.55
8	0.022	0.56	32	0.069	1.75
9	0.024	0.61			

6 Standard sizes

The standard sizes of slotted head wood screws shall be as specified in Table 2 to Table 7, Table 9 to Table 13 and Table 15 to Table 19 inclusive. The standard sizes of recessed head wood screws shall be as specified in Table 21, Table 22, Table 24, Table 25, Table 27 and Table 28.

7 Finish

The various finishes, both protective and decorative, in which wood screws are supplied shall be as given in Appendix A.

8 Designation for ordering

When designating wood screws for the purpose of an enquiry or an order, the following information shall be given:

- Material
- Style of head and whether slotted or recessed
- Length and diameter (in screw gauge), e.g. $1\frac{1}{2}$ in $\times$ 8 s.g.
- British Standard number
- Details of plating required (if any)

For example:

- Steel, slotted countersunk head wood screws, $1\frac{1}{2}$ in $\times$ 8 s.g. to BS 1210.
- Brass, recessed round head wood screws, $\frac{3}{4}$ in $\times$ 10 s.g. to BS 1210, nickel-chromium plated.

Table 1 — Slotted countersunk head wood screws
(for standard sizes, see Table 2 to Table 7)

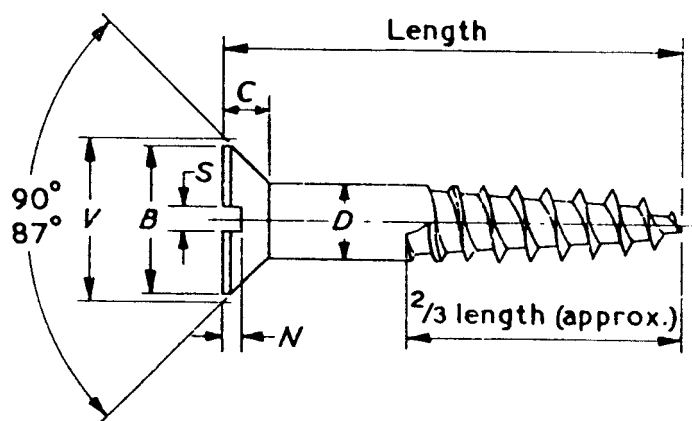


Figure 1

1	2	3	4	5	6	7	8	9	10	11	12
Size of screw and diameter of unthreaded shank				Number of threads per inch	Diameter of head		Depth of head C ^b	Slot			
Screw gauge	D				V ^a	B		Width S		Depth N ^c	
	Nom.	Max.	Min.			Max.	Min.	Max.	Max.	Min.	Nom.
	in	in	in		in	in	in	in	in	in	in
0	0.060	0.061	0.058	30	0.126	0.120	0.114	0.035	0.023	0.016	0.017
1	0.070	0.073	0.067	28	0.147	0.140	0.133	0.041	0.028	0.021	0.019
2	0.082	0.085	0.078	26	0.174	0.164	0.156	0.048	0.033	0.026	0.021
3	0.094	0.097	0.090	24	0.199	0.188	0.179	0.055	0.038	0.030	0.024
4	0.108	0.113	0.104	22	0.230	0.216	0.205	0.064	0.040	0.032	0.026
5	0.122	0.127	0.117	20	0.261	0.244	0.232	0.073	0.045	0.035	0.032
6	0.136	0.141	0.131	18	0.291	0.272	0.258	0.082	0.050	0.040	0.036
7	0.150	0.155	0.145	16	0.323	0.300	0.285	0.091	0.050	0.040	0.039
8	0.164	0.169	0.159	14	0.353	0.328	0.312	0.100	0.055	0.045	0.042
9	0.178	0.183	0.173	12	0.384	0.356	0.338	0.109	0.055	0.045	0.045
10	0.192	0.197	0.186	12	0.414	0.384	0.365	0.117	0.060	0.050	0.047
12	0.220	0.225	0.212	10	0.476	0.440	0.418	0.135	0.065	0.055	0.053
14	0.248	0.253	0.238	9	0.538	0.496	0.472	0.153	0.075	0.065	0.058
16	0.276	0.281	0.266	8	0.599	0.552	0.524	0.170	0.075	0.065	0.069
18	0.304	0.309	0.294	7½	0.660	0.608	0.578	0.188	0.085	0.075	0.074
20	0.332	0.337	0.322	7	0.721	0.664	0.631	0.205	0.085	0.075	0.079
24	0.388	0.393	0.378	6	0.845	0.776	0.737	0.241	0.095	0.085	0.090
28	0.444	0.449	0.434	5½	0.967	0.888	0.844	0.276	0.105	0.095	0.101
32	0.500	0.505	0.490	5	1.088	1.000	0.950	0.310	0.105	0.095	0.112

^a The dimensions for "V" are the theoretical diameters of head to sharp corners and are given for design purposes only.

^b The maximum depth of head "C" on a nominal size shank is given for the convenience of users only.

^c The dimension "N" is measured from the top of the head to the point at which the slot breaks through.

TABLE 1M — Metric equivalents of Table 1

NOTE The metric conversions are approximate; the figures in British units in Table 1 are to be regarded as the standard.

1	2	3	4	5	6	7	8	9	10	11	12
Size of screw and diameter of unthreaded shank				Number of threads per cm	Diameter of head			Depth of head C ^b	Slot		
Screw gauge	D				V ^a	B			Max.	Width S	
	Nom.	Max.	Min.			Max.	Min.	Max.		Min.	Nom.
	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm
0	1.52	1.55	1.47	12	3.20	3.05	2.90	0.89	0.58	0.41	0.43
1	1.78	1.85	1.70	11	3.73	3.56	3.38	1.04	0.71	0.53	0.48
2	2.08	2.16	1.98	10	4.42	4.17	3.96	1.22	0.84	0.66	0.53
3	2.39	2.46	2.29	9½	5.05	4.78	4.55	1.40	0.97	0.76	0.61
4	2.74	2.87	2.64	8½	5.84	5.49	5.21	1.63	1.02	0.81	0.66
5	3.10	3.23	2.97	8	6.63	6.20	5.89	1.85	1.14	0.89	0.81
6	3.45	3.58	3.33	7	7.39	6.91	6.55	2.08	1.27	1.02	0.91
7	3.81	3.94	3.68	6½	8.20	7.62	7.24	2.31	1.27	1.02	0.99
8	4.17	4.29	4.04	5½	8.97	8.33	7.92	2.54	1.40	1.14	1.07
9	4.52	4.65	4.39	4½	9.75	9.04	8.59	2.77	1.40	1.14	1.14
10	4.88	5.00	4.72	4½	10.52	9.75	9.27	2.97	1.52	1.27	1.19
12	5.59	5.72	5.38	4	12.09	11.18	10.62	3.43	1.65	1.40	1.35
14	6.30	6.43	6.05	3½	13.67	12.60	11.99	3.89	1.91	1.65	1.47
16	7.01	7.14	6.76	3	15.21	14.02	13.31	4.32	1.91	1.65	1.75
18	7.72	7.85	7.47	3	16.76	15.44	14.68	4.78	2.16	1.91	1.88
20	8.43	8.56	8.18	2½	18.31	16.87	16.03	5.21	2.16	1.91	2.01
24	9.86	9.98	9.60	2½	21.46	19.71	18.72	6.12	2.41	2.16	2.29
28	11.28	11.40	11.02	2	24.56	22.56	21.44	7.01	2.67	2.41	2.57
32	12.70	12.83	12.45	2	27.64	25.40	24.13	7.87	2.67	2.41	2.84

^a The dimensions for “V” are the theoretical diameters of head to sharp corners and are given for design purposes only.

^b The maximum depth of head “C” on a nominal size shank is given for the convenience of users only.

^c Dimension “N” is measured from the top of the head to the point at which the slot breaks through.

Table 2 — Standard sizes of steel slotted countersunk head wood screws

Length		Screw gauge														
in	mm															
$\frac{3}{16}$	4.8	1														
$\frac{1}{4}$	6.4	0	1	2	3	4	5									
$\frac{5}{16}$	7.9	1		2	3	4	5	6								
$\frac{3}{8}$	9.5	0	1	2	3	4	5	6	7	8						
$\frac{7}{16}$	11.1						4	6								
$\frac{1}{2}$	12.7	0	1	2	3	4	5	6	7	8	9	10				
$\frac{5}{8}$	15.9	1		2	3	4	5	6	7	8	9	10	12			
$\frac{3}{4}$	19.1				2	3	4	5	6	7	8	9	10	12	14	
$\frac{7}{8}$	22.2				3	4	5	6	7	8	9	10	12	14		
1	25.4				2	3	4	5	6	7	8	9	10	12	14 16	
$1\frac{1}{4}$	31.8					4	5	6	7	8	9	10	12	14 16	18	
$1\frac{1}{2}$	38.1					4	5	6	7	8	9	10	12	14 16	18 20	
$1\frac{3}{4}$	44.5					4	5	6	7	8	9	10	12	14 16	18	
2	50.8					4	5	6	7	8	9	10	12	14 16	18 20	
$2\frac{1}{4}$	57.2							6	7	8	9	10	12	14 16		
$2\frac{1}{2}$	63.5							6	7	8	9	10	12	14 16	18 20	
$2\frac{3}{4}$	69.9							6	8		10		12	14 16		
3	76.2							6	7	8	9	10	12	14 16	18 20	
$3\frac{1}{4}$	82.6											10	12	14		
$3\frac{1}{2}$	88.9									8	10		12	14	16 18	
4	101.6									8	10		12	14	16 18 20	
$4\frac{1}{2}$	114.3											10	12	14 16	20	
5	127.0											10	12	14 16	18 20	
6	152.4											12 14 16 18				

Preferred standard sizes, in bold type, should be used whenever possible, as they are the sizes normally stocked.

Supplementary standard sizes, in light type, are less likely to be obtained from local stockists than the preferred standard sizes shown in bold type.

Table 3 — Standard sizes of brass slotted countersunk head wood screws

Length		Screw gauge													
in	mm														
$\frac{1}{4}$	6.4	0	1	2	3	4		6							
$\frac{5}{16}$	7.9	0	1	2	3	4									
$\frac{3}{8}$	9.5	0	1	2	3	4	5	6		8					
$\frac{1}{2}$	12.7	0	1	2	3	4	5	6	7	8		10			
$\frac{5}{8}$	15.9			2	3	4	5	6	7	8	9	10			
$\frac{3}{4}$	19.1			2	3	4	5	6	7	8	9	10	12		
$\frac{7}{8}$	22.2					4	5	6	7	8	9	10	12		
1	25.4				3	4	5	6	7	8	9	10	12	14	
$1\frac{1}{4}$	31.8					4	5	6	7	8	9	10	12	14	16
$1\frac{1}{2}$	38.1					4	5	6	7	8	9	10	12	14	16 18
$1\frac{3}{4}$	44.5							6	7	8	9	10	12	14	
2	50.8						5	6	7	8	9	10	12	14	16 18 20
$2\frac{1}{4}$	57.2									8	9	10	12	14	16
$2\frac{1}{2}$	63.5							6		8	9	10	12	14	16 18
$2\frac{3}{4}$	69.9									8			12		
3	76.2									8		10	12	14	16 18 20
$3\frac{1}{2}$	88.9											10	12	14	16 20
4	101.6											10	12	14	16 20

Preferred standard sizes, in bold type, should be used whenever possible, as they are the sizes normally stocked.

Supplementary standard sizes, in light type, are less likely to be obtained from local stockists than the preferred standard sizes shown in bold type.