

CONFIRMED
NOVEMBER 1979

Specification for

Steel conduit and fittings —

For electrical wiring

UDC 621.315.67

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- Malleable Ironfounders' Association
- National Register of Electrical Installation Contractors

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Foreword

This British Standard requires reference to the following:

BS 84:1940, *Screw threads of , Whitworth Form.*

BS 580, *Trichloroethylene.*

BS 729-2.

BS 3382-2.

This revision of the 1933 edition of BS 31 was undertaken principally with a view to clarifying the position of the lugs relative to the spout outlets in small circular boxes. Clauses 2 and 19, and Figure 5 have therefore been amended. Table 9, giving dimensions of entry bushes, has also been slightly modified.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 28 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.

NOTE This Specification does not necessarily apply to boxes specially designed to take switches and wall-sockets, but it is recommended that the dimensions of spouts and screw threads in this Specification should be adopted for such boxes.

In order to avoid misconceptions with regard to designations hitherto used, it is desirable that the terms adopted in this Specification be carefully adhered to.

1 a. *Conduit*. Two classes of steel conduit for electrical wiring are recognised as standard :

Class A. Plain.

Class B. Screwed.

Class A consists of light-gauge conduit of the thicknesses and dimensions given in Table 1. Class A conduit is either close-joint, brazed, welded or solid drawn. The method of joining the lengths of tubing is by means of a coupler in the form of an external sleeve having some form of positive continuity connection.

In the close-joint tubes the edges of the steel strip, although brought tightly together in the process of manufacture, are not metallurgically joined in any way.

Class B consists of heavy-gauge conduit of the thicknesses and dimensions given in Table 1. Class B conduit is either welded or solid drawn. Both ends of the conduit are screwed.

The ends of all conduit, Classes A and B, shall be reamed.

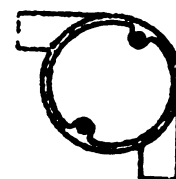
b. *Fittings*. Two classes of fittings are recognised as standard, namely, Screwed and Non-Screwed, the difference being only in respect of whether the fitting is threaded for use with screwed Class B conduit, or is bored out for use with Class A conduit, or heavy-gauge conduit if supplied non-screwed to special order. Non-screwed fittings shall be provided with some form of continuity joint such that ample and permanent electrical continuity and mechanical rigidity are ensured. The electrical continuity shall be such as to comply with the test given in Clause 40.

c. *Circular Boxes*. Circular boxes shall be designated as follows:

*Back Outlet



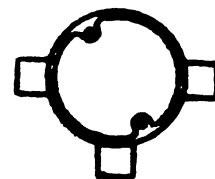
Angle, tangent entries



Terminal



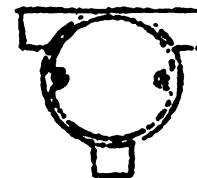
Three-way



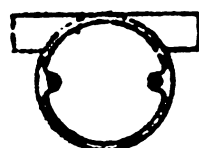
Through



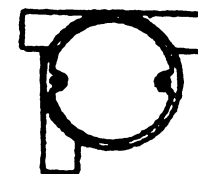
Three-way, tangent entries



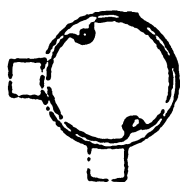
Through, tangent entries



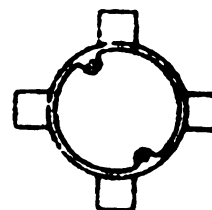
Three-way, corner inspection (left- or right-hand)



Angle



Four-way, intersection



These boxes are supplied with covers of the following materials as required: steel, malleable cast iron or fibre (see Clause 22).

NOTE A "Back Outlet" box is also a "Terminal" box, but the word "Terminal" has been reserved for a box with one entry at the side. A box fitted with two entries, one at the side and one at the back, should be referred to as a "Terminal Box with Back Outlet".

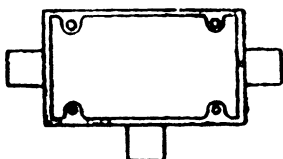
d. Tangent Entry Boxes. Any of the above boxes may be of the tangent-entry type if desired, but, if so, they shall conform to the general dimensions specified for the corresponding radial-entry type of box.

e. Oblong boxes. Oblong boxes shall be designated as follows:

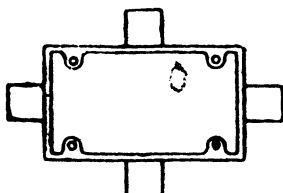
Through



Tee



Intersection



These boxes are supplied with covers of the following materials as required: steel, malleable cast iron or fibre (see Clause 22).

2 Material and method of manufacture

Steel conduit shall be either close-joint, brazed, welded or solid drawn as ordered, and shall be of mild steel and free from burrs and internal roughness.

The conduit fittings shall be made of steel or malleable cast iron except where otherwise specified herein.

All steel shall have a tensile strength of not less than 18 tons nor more than 24 tons per square inch of section, and an elongation of not less than 15 per cent in a length of 8 in. Malleable iron castings shall be well annealed and free from internal projections.

All conduit and fittings shall be adequately protected against corrosion both inside and outside and shall be classified according to the type of protection applied as follows :

Class 1. Light protection both inside and outside.

EXAMPLE: priming paint.

Class 2. Medium protection both inside and outside.

EXAMPLE: stoved enamel air-drying paint.

Class 3. Medium/Heavy protection. Inside as Class 2,
Outside as Class 4.

EXAMPLE: stoved enamel inside. Sherardised
outside.

Class 4. Heavy protection both inside and outside.

EXAMPLE: hot-dip zinc coating sherardising.

The class of finish shall be indelibly marked on each length of conduit, near to one end. The inscription thereon shall be easily legible.

Screw threads shall be free from enamel and are excluded from the requirements for protection against corrosion. The materials and protective coatings shall comply with the tests given in Clauses 35 to 38 of this standard. For Class 3 conduit and fittings, the inside and outside protective coatings shall separately comply with the relevant tests of Clause 38. Conduit and fittings may be split to the extent considered necessary to allow adequate examination of their interior surfaces.

The inside edges of all openings through which it is intended that cable shall pass shall be smoothly rounded in order to prevent abrasion of the cable.

3 Screw threads

Screw threads on conduit couplers and fittings (except as otherwise specified in Table 2 and Figure 5, Figure 6 and Figure 7) shall be of Whitworth form as defined in BS 84. Right-hand threads shall be used and the number of threads per inch shall be as stated in Table A and Table B.

Tolerances are allowed on the screw threads in accordance with the figures stated in Table A and Table B. The gauges for testing these threads shall be in accordance with Appendix A.

4 Outside diameter of conduit

The conduit shall be manufactured to and designated by the respective outside diameters given in Table 1. The tolerances to be allowed on the outside diameter of Class A conduit, before application of the protective coating shall be + 0.001 in., – 0.005 in.

In the case of Class B conduit the outside diameter shall be allowed to vary from 0.001 in. above the nominal size to the minimum dimension allowed for the full diameter of the screw thread, as stated in Table A.

5 Length of conduit

The conduit shall be manufactured in straight lengths of from ten to fifteen feet, and one coupler shall be supplied with each length of screwed conduit.

6 Length of thread

The length of thread on the ends of the conduit shall be in accordance with the dimensions given in Table 1.

7 Thickness of conduit

The conduit shall be manufactured to the respective thicknesses given in Table 1.

The average thickness of steel conduit shall be determined by weighing not less than one hundred feet (100 ft.). The weight shall fall within plus or minus 8 per cent of the figures given in Table 1.

8 Thickness of fittings

For all fittings made out of *tube*, the minimum thickness of the fittings shall be equal to that of the corresponding conduit with which they are used. (See Table 1 and Table 2.) In no case shall “close joint” tube be used for these fittings.

For all *cast* fittings, the minimum thickness of the machined part measured at the root of the thread shall be as follows :

For sizes up to and including 1 in. diameter conduit	$\frac{1}{16}$ in.
For sizes from $1\frac{1}{4}$ in. up to 2 in. diameter conduit	$\frac{3}{32}$ in.
For $2\frac{1}{2}$ in. diameter conduit	$\frac{1}{8}$ in.

9 Length of recessed portion in plain fittings

The minimum length of recessed portion in plain fittings, i.e., the length machined out to allow of the admission of the conduit, shall be in accordance with the dimensions given in Table 2.

10 Thread in screwed fittings¹⁾

The internal thread in the ends of screwed fittings shall be screwed parallel to the axes of the fittings to within a tolerance of $\frac{1}{8}$ in. in 1 ft.

The minimum length of the screwed portion shall be the same as the minimum length of recessed portion in plain fittings, and the maximum length shall be in accordance with the dimensions given in Table 2.

If a shoulder be introduced at the inner end of the screwed portion, the bore shall be not less than the internal diameter of the corresponding conduit.

The thickness of metal at the root of the thread in steel fittings shall be not less than that allowed for screwed conduit of corresponding size, as determined from the minimum thickness (Table 1) and the depth of thread (Table A, col. 4).

11 Plain couplers

The minimum length of plain couplers shall be in accordance with the dimensions given in Table 2. The couplers shall comply with the test given in Clause 40.

12 Screwed couplers

Screwed couplers shall be screwed inside throughout their entire length. Their minimum length shall be in accordance with the dimensions given in Table 2.

13 Running Couplers

The standard length of running couplers shall be 6 in. long for conduit up to and including 1 in. diameter, and 9 in. long for conduit from $1\frac{1}{4}$ in. to $2\frac{1}{2}$ in. diameter inclusive. (See Table 2.)

The minimum length of the long screwed portion of the conduit shall be equal to the length of the screwed coupler with which it is supplied, plus the thickness of lock-nut, plus $\frac{3}{16}$ in.

¹⁾ Fittings screwed in accordance with this Specification will not permit of the conduit being screwed right through to the interior of the fitting. It will be noted that the length of the unthreaded portion of the spouts of boxes is defined by the dimension for the projection of spout from the outside of the box (Table 4, dimension D) and the maximum length of the threaded portion of the spouts (Table 2).

Table A — Limiting sizes and tolerances for screw threads on conduit (Class B)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Nominal outside diameter	Number of threads per inch	Pitch	Nominal depth of thread	Tolerances (see Note)		Full diameter			Effective diameter			Core diameter		
				Pitch	Angle	Maximum	Tolerance	Minimum	Maximum	Tolerance	Minimum	Maximum	Tolerance	Minimum
in.		in.	in.	in.	degree	in.	in.	in.	in.	in.	in.	in.	in.	in.
$1/2$	18	0.055 56	0.035 55	0.001 8	6.1	0.500 0	0.010 6	0.489 4	0.464 4	0.007 1	0.457 3	0.428 9	0.014 1	0.414 8
$5/8$	18	0.055 56	0.035 55	0.001 8	6.1	0.625 0	0.010 6	0.614 4	0.589 4	0.007 1	0.582 3	0.553 9	0.014 1	0.539 8
$3/4$	16	0.062 50	0.040 00	0.002 0	5.7	0.750 0	0.011 3	0.738 7	0.710 0	0.007 5	0.702 5	0.670 0	0.015 0	0.655 0
1	16	0.062 50	0.040 00	0.002 0	5.7	1.000 0	0.011 3	0.988 7	0.960 0	0.007 5	0.952 5	0.920 0	0.015 0	0.905 0
$1 1/4$	16	0.062 50	0.040 00	0.002 0	5.7	1.250 0	0.011 3	1.238 7	1.210 0	0.007 5	1.202 5	1.170 0	0.015 0	1.155 0
$1 1/2$	14	0.071 43	0.045 75	0.002 1	5.3	1.500 0	0.012 0	1.488 0	1.454 3	0.008 0	1.446 3	1.408 5	0.016 0	1.392 5
2	14	0.071 43	0.045 75	0.002 1	5.3	2.000 0	0.012 0	1.988 0	1.954 3	0.008 0	1.946 3	1.908 5	0.016 0	1.892 5
	14	0.071 43	0.045 75	0.002 1	5.3	2.500 0	0.012 0	2.488 0	2.454 3	0.008 0	2.446 3	2.408 5	0.016 0	2.392 5

NOTE Columns 5 and 6 give, for information, the errors in pitch per length of thread engaged and in angle respectively, each of which can be compensated by *half* the tolerance on effective diameter given in column 11. The angle tolerance refers to the sum of the errors on the two half-angles of the thread (nominally $27 \frac{1}{2}^\circ$) taken regardless of sign. The errors in pitch and angle shown in the Table may therefore exist together, provided the effective diameter has the minimum value given in column 12. Subject to the same condition, the permissible error in pitch may be increased up to double the values shown in column 5, provided the error in angle is correspondingly reduced, and *vice-versa*.