BS 4568-1:1970 (Alternate Standard to BS 31:1940)

GENERAL

- BS 4568-1:1970 is similar to BS 31:1940 “Steel Conduit and Fittings for Electrical Wiring”.
- Conduits and fittings described in this standard are alternate to those standards in BS 31. During the preparation of this standard full consideration was given to proposals for revision needed to BS 31 and where needed changes accordingly have been made.
- This standard specifies both plain and screwed conduit and fittings.
- The thickness of the conduit however in some cases been reduced for that specified in BS-31 for conduit of similar external diameter owing to the employment of 60 degree thread on tube based on the ISO thread form.
- BS 4568-1 standard has been divided into two parts.

a) Steel conduit, bends and coupler
b) Steel conduit fittings and components.

- In both parts range of conduit diameter ranges from 16 mm to 32 mm outside diameter

BS 4568-1:1970	BS 31:1940
GENERAL: In this British standard the requirements are given for steel conduits and for conduits fittings or mellable cast iron which are used for protection of cables in electrical insulation. **CLASSIFICATION:** Conduits and fittings are classified according to : • Plain conduits and fittings • Screwed conduits and fittings Further classification of conduits according to the type of corrosion protection applied: **Class 1: Light** Protection on both sides **Class 2: Medium** Protection on both sides inside and outside **Class 3:Medium Heavy** Protection inside as class 2 and outside as class 4 **Class 4: heavy** Protection both inside and outside.	**GENERAL:** In this British standard Conduits shall be of mild steel. Steel shall have a tensile strength of 18 tons not more than 24 tons per square inch of section and an elongation not less than 15 percent in a length of 8 inch. **CLASSIFICATION:** There are two classes of steel conduits for electrical wiring • Class A: Plain • CLASS B:Screwed Class A consists of light gauge conduit thickness and dimension. this conduit is either close joint, brazed or solid drawn Class B consists of heavy gauge conduit of the thickness and dimension. it is also either welded or solid drawn. Classes are further classified according to corrosion protection applied: **Class 1: Light** Protection on both sides **Class 2: Medium** Protection on both sides inside and outside **Class 3:Medium Heavy** Protection inside as class 2 and outside as class 4 **Class 4: heavy** Protection both inside and outside

MARKING:

Conduits should be marked as:

- The name or mark of the maker.
- The number of British standard
- The class of finish.

Class of finish shall be marked in a way that it will be impossible to remove it. Marking should be on each length of conduit, near to one end. The marking should be easily readable.

Test for durability of marking:

Durability must be checked by rubbing the marking by hand for 15 seconds with a piece of cloth soaked with water and again for 15 seconds with a piece of cloth soaked with petroleum spirit. after the test the marking shall remain easily readable.

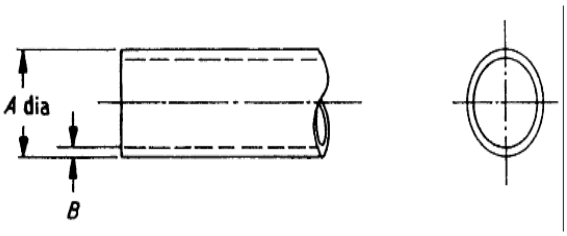
DIMENSIONS:

The outside diameter, wall thickness and tolerances for the manufacture of conduit.

TABLE:

Standard sheet No 1 and Standard sheet No 2

Material	Conduit, light gauge (Plain)	Standard Sheet 1
Steel		



Nominal size	Dimensions (mm)			Weight (g/m)			
	A		B	Class 1, 2 and 3		Class 4	
	Min.	Max.		Min.	Max.	Min.	Max.
16	15.7	16.0	1.0 ± 0.10	324	405	355	470
20	19.7	20.0	1.0 ± 0.10	416	515	457	597
25	24.6	25.0	1.2 ± 0.15	598	784	649	887
32	31.6	32.0	1.2 ± 0.15	796	1 006	861	1 139

Preferred length of conduit 4.0 m. Minimum 3.0 m. Maximum 4.0 m.

Standard Sheet No 1

MARKING:

Class of finish shall be marked in a way that it will be impossible to remove it. Marking should be on each length of conduit, near to one end. The marking should be easily readable.

DIMENSIONS:

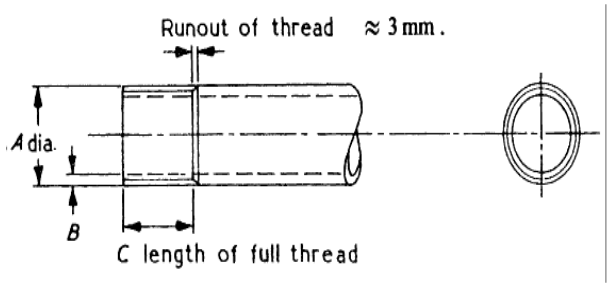
The outside diameter for the conduit under which it will be manufactured.

TABLE No:1

Table 1 – Standard dimensions and weight of steel conduit

Conduit (outside diameter), size of ... in.		½	⅜	¾	1	1¼	1½	2	2½
Threads per inch		18	18	16	16	16	14	14	14
Maximum length of thread on ends	in.	7/16	½	9/16	11/16	¾	15/16	15/16	1 1/16
Minimum length of thread on ends	in.	⅜	7/16	½	⅝	11/16	¾	⅞	1
Nominal thickness – Class A (plain)	in	.040	.040	.048	.048	.056	.064	.064	.072
Minimum thickness – Class A (plain)	in.	.036	.036	.044	.044	.052	.060	.060	.068
Nominal thickness – Class B (screwed)	in.	.056	.056	.064	.064	.064	.072	.080	.080
Minimum thickness – Class B (screwed)	in.	.052	.052	.060	.060	.060	.068	.076	.076
Calculated weight per 100 ft., in lb., before enamelling, galvanising or sherardising, and not including couplers.	Class A (plain)	20	26	37	50	73	100	135	191
	Class B (screwed)	27	34	47	64	81	110	164	207

Material	Conduit, heavy gauge (Screwed or plain)	Standard Sheet
Steel		2



Nominal size	Dimensions (mm)					Weights (g/m)			
	A		B	C		Class 1, 2 and 3		Class 4	
	Min.	Max.		Min.	Max.	Min.	Max.	Min.	Max.
16	15.7	16.0	1.4 ± 0.10	11.5	13.5	452	531	483	594
20	19.7	20.0	1.6 ± 0.15	13.0	15.0	643	783	682	862
25	24.6	25.0	1.6 ± 0.15	16.0	18.0	811	995	860	1 095
32	31.6	32.0	1.6 ± 0.15	18.0	20.0	1 069	1 301	1 133	1 432

Preferred length of conduit 4.0 m. Minimum 3.0 m. Maximum 4.0 m.

Standard Sheet No 2

Tests for dimension:

- external diameter
- ovality
- screw threads
- wall thickness

TOLEREANCES:

All dimension in standard sheet except those tolerances are specified or maxima or minima are given ,the nominal dimensions are subject to tolereance of plus minus 5%.

LENGTH OF CONDUIT:

The conduit should be manufactured in a staright length of ten to fifteen and one coupler shall be supplied with each length of screwed conduit.

LENGTH OF THREAD:

the length of thread on the end of the conduit shall be in accordance of Table 1.

THICKNESS OF CONDUIT:

The conduit shall be manufactured with respective thickness as mentioned in table 1

The average thickness of steel conduit shall be determined by weighing not less than one hundred feet .the weight shall be fall within plus or minus 8 percent of the figures in table 1.

Test for dimensions:

- Conduit outside diameter
- Conduit thickness
- Fittings inside diameter, thickness
- Conduit,coupler,fittings-Accuracy of screwing

TOLEREANCES:

Class A conduit: Tolerance for outer diameter
Before application of protective coating shall be +0.001 in –0.005 inch.

Class B conduit:Tolereance for outer diameter hall be vary from 0.001 above the nominal size to minimum dimension allowed for the full diameter of the screw thread as in table A

CONSTRUCTION:

Conduits shall be solid drawn or seamed by welding. They shall show no appreciable unevenness and their interior ends shall be free from burrs. fins which damage the cable.

Test :

The sample must be cut into short pieces and if necessary, these shall be cut longitudinally. Slight protrusions from welded seams shall be neglected if they are unlikely to cause damage to cables.

MECHANICAL PROPERTIES OF CONDUITS:

Conduits when bent shall show no cracks and shall not be deformed to such an extent that they are damaged when drawing in.

Test:

The conduits are bend through 90 degree using a bend tool having a radius equal to six times the nominal size.

For conduits not exceeding the nominal size of 25mm,a bending tool shall be used and which are exceeding nominal size of 25mm bending machine shall be used,

For conduits with welded seams ,six samples shall be tested ,three with seam outside of bend and three with seam of flank.

After the test, neither the basic material of conduit, nor any coating of conduit with medium or heavy protection ,shall show any cracks which are easily visible.

The bend conduit shall be held in vertical plane and bend being symmetrically disposed in relation to horizontal. It shall then be possible to roll a polished steel ball having a diameter as specified in table .

TEST FOR CORROISON:

Light protection: Samples of conduit with light protection shall be slowly bend round a smooth cylindrical mandrel having a radius equal to

1) Ten times the normal conduit diameter for conduit not exceeding a nominal diameter of 25mm.
2) Twelve times the nominal diameter for other conduits.

A sheet of cardboard or like that about 3 mm thick shall be placed between the conduit and mandrel. After this test coating of conduit shall show no damage. Fittings shall be inspected for completeness of covering by protective coating

TABLE A:

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	1
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	Mini
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	0.41
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	0.53
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	0.65
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	0.90
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	1.15
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	1.39
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	1.89
	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	2.39

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 *ha/f* the tolerance on effe 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 1/2°) 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 condi 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*.

TEST FOR CORROISON:

The test for corrosion is same as in BS 4568-1:1970

Light protection: Samples of conduit with light protection shall be slowly bend round a smooth cylindrical mandrel having a radius equal to

1) Ten times the normal conduit diameter for conduit not exceeding a nominal diameter of 25mm.
2) Twelve times the nominal diameter for other conduits.

A sheet of cardboard or like that about 3 mm thick shall be placed

both inside and outside. **Medium protection:** Samples of conduit shall be bend ,cleaned with a piece of wadding soaked in benzene and then dried. the bend solution of 0.75% potassium ferricyanide and 0.25% ammonium persulphate in water and a quantity about 0.1%of suitable wetting agent ,for instance a sodium salt of alkylnaphthaline sulphonic acid shall be added. **Heavy protection**: Samples of conduit shall be bend ,degreased by immersion in trichloroethylene in accordance with BS 580 for 10 minutes and wiped dry with a piece of soft cloth. They shall then be immersed in a 2% solution of sulphuric acid in water for 15 seconds, thoroughly cleaned in running water and again wiped dry with a piece of soft cloth. The bend part shall then be immersed in a solution of copper sulphate in distilled water, having a specific gravity of 1.186 at 20 degree.	between the conduit and mandrel. After this test coating of conduit shall show no damage. Fittings shall be inspected for completeness of covering by protective coating both inside and outside. **Medium protection:** Samples of conduit shall be bend, cleaned with a piece of wadding soaked in benzene and then dried. the bend solution of 0.75% potassium ferricyanide and 0.25% ammonium persulphate in water and a quantity about 0.1%of suitable wetting agent ,for instance a sodium salt of alkylnaphthaline sulphonic acid shall be added. **Heavy protection**: Samples of conduit shall be bend ,degreased by immersion in trichloroethylene in accordance with BS 580 for 10 minutes and wiped dry with a piece of soft cloth. They shall then be immersed in a 2% solution of sulphuric acid in water for 15 seconds, thoroughly cleaned in running water and again wiped dry with a piece of soft cloth. The bend part shall then be immersed in a solution of copper sulphate in distilled water, having a specific gravity of 1.186 at 20 degree.