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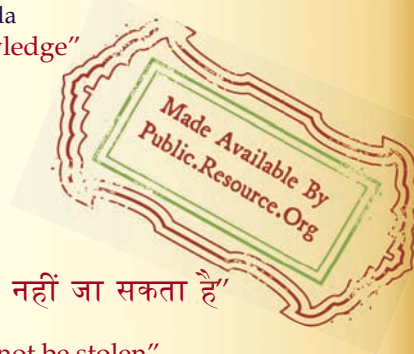
IS 12943 (1990): Brass glands for PVC cables [ETD 9: Power Cables]



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भारतीय मानक

पी. वी. सी. केबलों के लिए पीतल ग्लैंड — विशिष्ट

Indian Standard

**BRASS GLANDS FOR PVC CABLES —
SPECIFICATION**

UDC 621.315.687.6

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 4

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 23 March 1990, after the draft finalized by the Power Cables Sectional Committee had been approved by the Electrotechnical Division Council.

Development of brass glands has been undertaken by several manufacturers in the country. This standard has been prepared to rationalize the sizes of such glands suitable for thermoplastic cables.

The object of this standard is to specify the envelope dimensions of brass glands. All vital dimensions are shown in the drawing. These dimensions have been worked out to give adequate clearance to facilitate the entry of cables.

The glands suitable for a particular overall diameter of cable should be selected in accordance with Table 1. As far as possible, various sizes of cables are covered under single type of gland.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

1 SCOPE

1.1 This standard covers requirements and dimensions for single compression brass glands for PVC cables of voltage grade up to and including 3.3 kV.

1.2 These glands are for general purpose applications for indoor use. The brass glands if used with suitable coating such as cadmium coating, can be used for other applications.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
1885 (Part 32) : 1971	Electrotechnical vocabulary: Part 32 Cables, conductors and accessories for electricity supply
2147 : 1962	Degrees of protection pro- vided by enclosures for low- voltage switchgear and controlgear
4218 (in parts)	ISO metric screw threads

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1885 (Part 32):1971 shall apply.

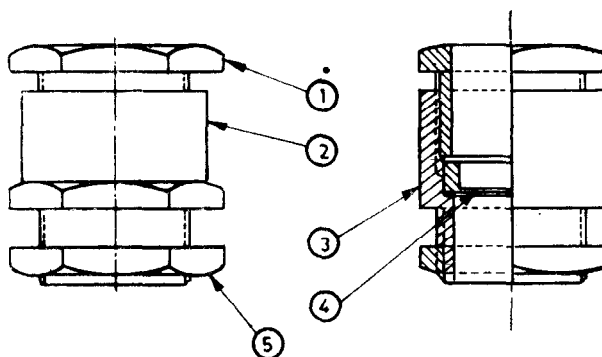
4 MATERIALS AND CONSTRUCTION

4.1 General

The general construction of the glands is shown diagrammatically in Fig. 1. It mainly consists of the following parts:

- Compression nut,
- Gland body with hexagonal head,
- Rubber ring,
- Washers, and
- Check nut.

4.1.1 To ensure proper earthing, the cable glands shall be fitted with an earthing tag. The dimensions of the earthing tag are given in Annex A.



<i>Sl No.</i>	<i>Part</i>	<i>Quantity</i>
1	Compression nut	1
2	Gland body	1
3	Rubber ring	1
4	Washer	3
5	Check nut	1

FIG. 1 GENERAL ARRANGEMENT OF CABLE GLAND

4.1.2 Details of gland assembly with cable are shown in Fig. 2.

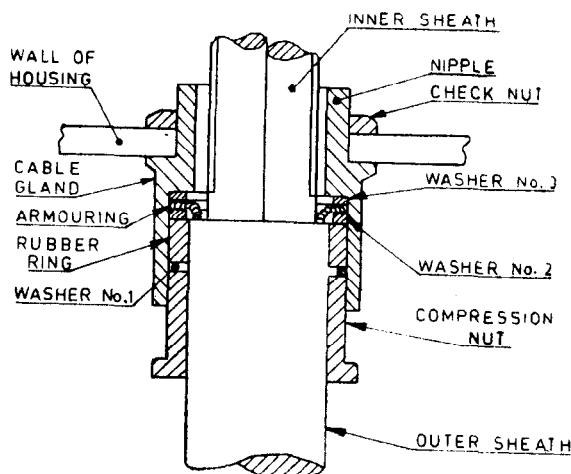


FIG. 2 CABLE GLAND ASSEMBLY

4.2 Materials

Gland body shall be made out of brass castings and machined to the final sizes. If required by the purchaser, gland parts may be nickel plated. The thickness of the nickel plating where provided shall be not less than 10 micrometers (microns).

4.2.1 The composition of the brass shall be as under:

Copper	55 percent, <i>Min</i>
Impurities	5 percent, <i>Max</i>
Zinc	Balance

4.2.2 Rubber ring shall be made of synthetic rubber with a shore hardness of 55 to 60.

4.3 Construction

4.3.1 The nipples are normally threaded. These shall be metric threads of 1.5 pitch as per IS 4218 (in parts).

4.3.2 Rubber rings are made by moulding as per drawing in Table 1.

4.3.3 Those parts of the gland that have to be tightened or held during installation shall be hexagonal or have hexagons formed on them. All externally projecting edges and corners of gland components shall be rounded to reduce the danger of injury in handling or after installation but care shall be taken not to impair the fit of spanners on hexagonal parts. Internal edges shall be rounded to prevent damage to the cable.

4.3.4 Finish

The metal parts shall be free from blow holes and surface shall be machined smooth. All edges shall be deburred and then nickel plated in cases where required.

5 TESTS

5.1 The tests specified in this standard are type as well as acceptance tests.

5.1.1 A recommendatory sampling for acceptance tests is given in Annex B.

5.2 Proof Torque Test

The gland shall be assembled and tested as described in Annex C, at the appropriate proof torque given in Table 2. There shall be no noticeable damage on dismantling after the test.

NOTE — This test is designed to prove that the mechanical strength of the gland is adequate to meet conditions encountered in use. Any distortion of the seals may be ignored for purpose of this test.

5.3 Tensile Test

The gland shall be assembled and tested as described in Annex D, the mandrel diameter and the test load being as specified in Table 2.

5.3.1 The distance through which the mandrel moves during the test period of 6 hours shall

not exceed 6 mm.

5.4 Electrical Continuity Test

This test shall be carried out on glands used for armoured cables only. The gland shall meet the requirements given in 5.4.1, when tested as given in Annex E.

5.4.1 Electrical resistance before heating between the earth bond attachments, if used or between the test blocks shall not exceed twice the resistance of the armour. Electrical resistance measured after the three heating cycles shall not exceed the initial value(s) by more than 10 percent or 25 micro ohms which ever is greater.

5.5 Seal Test

The seal test shall be carried out as per IS 2147 : 1962, for the degree of protection IP60.

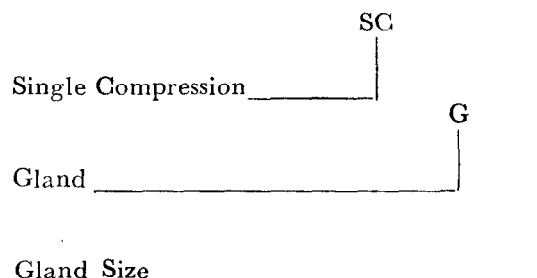
6 DIMENSIONS

6.1 The dimensions of the gland and rubber ring shall be as given in Table 1.

7 TYPE DESIGNATION

7.1 Type designation for the cable glands shall be as given below:

Example: SCG1



8 PACKING AND MARKING

8.1 The gland shall be suitably packed in a carton.

8.2 The carton shall contain the following information on it:

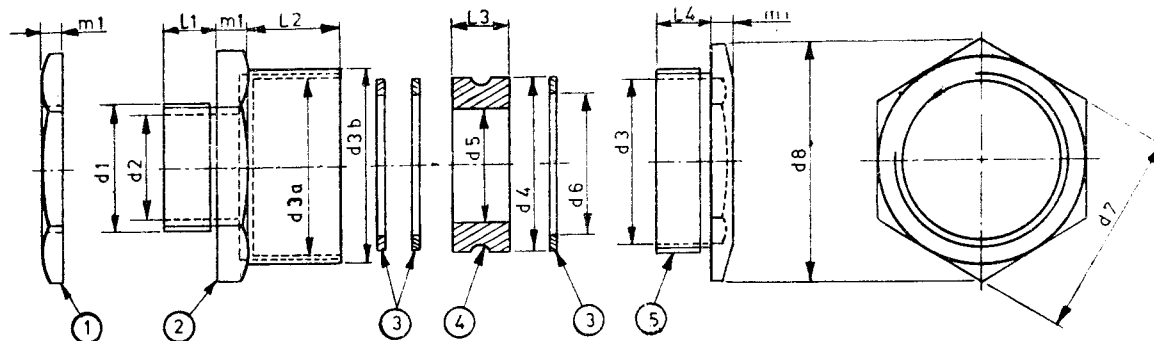
- Name of the manufacturer, and
- Type designation of gland.

9 APPLICATION

9.1 These glands can be used for termination in different types of equipment where cable entry holes of adequate sizes are provided. The nipple portion is inserted in the hole and the gland is fixed by means of a check nut (see Fig. 3).

Table 1 Brass Glands for Neat Dust Proof Cable Entry (Armoured/Unarmoured)

(Clause 4.3.2 and 6.1)



Sl No.	Name of Part	Qty.
1	Check nut	1
2	Gland body	1
3	Washer	3
4	Outer seal ring grooved	1
5	Compression ring	1

NOTES

1 All dimensions in millimetres.

2 Tolerance ± 1.0 mm.

	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
d_1	16	16	20	20	25	25	32	40	40	50	50	63	63	75	75	82	90	100	110	125
d_2	12	12	15	15	20.5	20.5	27	34	34	44	44	55	55	66	67	73	81	91	100	113
d_3	16	18.5	18.5	24	24	28.5	33	37	41	47	52	61.5	65	71	76	82	91	98	107	118
d_{3a}	18.5	21	21	26.5	26.5	31.5	36	40.5	45.5	52	58	66.5	70	77	82	88.5	98	106	115	128
d_4	18	20.5	20.5	26	26	31	35	39.5	44.5	51	57	66	69	76	81	87.5	97	105	114	127
d_5	12	15	15	18	20	24	28	32	37	42	48	54	60	66	72	78	84	92	100	115
d_6	12.5	15.5	15.5	20	20	25	29	33	37	43	49	56	60	67	72	79	85	93	101	116
d_7	22	25	25	30	31.5	35	40	46	50	58	65	73	77	85	90	97	108	117	127	142
d_8	25.5	29	29	34.5	36	40	46	53	57.5	67	75	84	89	98	104	112	124	135	146	164
L_1	9	9	9	9.5	9.5	10	12	12	12	13	13	14	14	15	15	17	19	20	25	25
L_2	15	15.5	15.5	18	18	18.5	19.5	21.5	22	24.5	25	25	26	27	27	28.5	30	32	32	32
L_3	8	9	9	10	10	11	12	13	14	16	16	17	17	18	18	18	20	20	20	20
L_4	9	9	9	10	10	11	11	12	13	15	15	15	15	17	17	18	20	20	20	20
d_{m1}	3	3.5	3.5	3.5	3.5	4	4	4	4.5	5	5	6	6	7	7	7.5	8	8	9	10
d_{3b}	21.5	24	24	29.5	29.5	34.5	39.5	44	49.5	57	63.5	72	76	84	89	96	106	115	125	140
OD (Min)	9	12	12	15	16	20	24	28	33	38	43	49	55	61	67	73	79	85	93	101
OD (Max)	12	15	15	18	20	24	28	32	37	42	48	54	60	66	72	78	84	92	100	115

Table 2 Test Requirements for Cable Glands
(*Clauses 5.2, 5.3, C-3, D-3, D-4 and E-2*)

Gland Designation	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG	SCG
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Maximum cable dia mm	12	15	15	18	20	24	28	32	37	42	48	54	60	66	72	78	84	92	100
Proof torque Nm	65	65	65	65	65	65	95	95	110	130	165	165	195	195	195	230	230	230	230
Dia of test mandrel mm	9.5	12.5	12.5	15	17.5	21	25	29	33	39	44	50	55	61	69	74	80	87	95
Tensile test load N	36	36	36	44	44	54	60	80	89	98	107	116	124	133	133	140	150	150	150

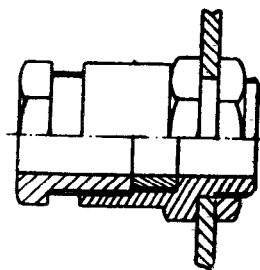


FIG. 3 FIXING WITH CHECK NUT

9.1.1 Alternatively, these glands can also be fixed to the equipment where the cable entry hole is provided with threads in accordance

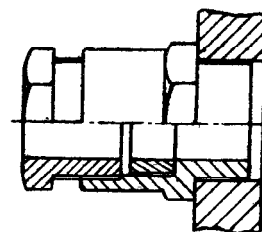
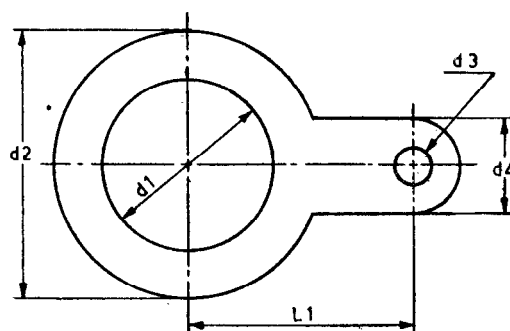


FIG. 4 DIRECT FIXING

ANNEX A

(Clause 4.1.1)

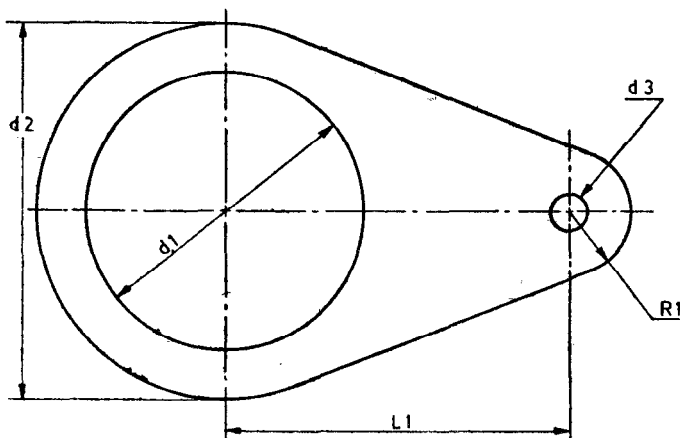
A-1 EARTHING TAG FOR CABLE GLANDS UP TO 50 mm ENTRY THREAD



Sl No.	Size	d_1	d_2	d_3	d_4	L_1
1	16	16.5	24.5	7.0	13.0	24.5
2	20	20.5	29.0	7.0	13.0	26.5
3	25	26.0	36.0	7.0	13.0	32.5
4	32	32.5	44.0	7.0	16.0	40.5
5	40	40.5	52.5	7.0	16.0	45.0
6	50	51.0	64.0	7.0	16.0	50.0

NOTES

- 1 All dimensions in mm.
- 2 Tolerance : ± 1.0 mm.
- 3 Material : brass sheet.
- 4 Size indicates the suitability of earthing tag for cable gland entry thread, for example, size 20 is suitable for gland having entry thread of 20 mm.

A-2 EARTHING TAG FOR CABLE GLANDS ABOVE 50 mm ENTRY THREAD

<i>Sl No.</i>	<i>Size</i>	<i>d₁</i>	<i>d₂</i>	<i>d₃</i>	<i>R₁</i>	<i>L₁</i>
1	63	64.0	78.0	10.5	11.5	59.0
2	75	76.0	94.0	10.5	12.0	76.0
3	82	83.0	101.0	10.5	12.0	88.0
4	90	90.0	109.0	10.5	12.0	101.5
5	100	102.0	122.0	10.5	12.0	107.0

NOTES

- 1 All dimensions are in mm.
- 2 Tolerance: ± 1.0 mm.
- 3 Material: brass sheet.

ANNEX B

(Clause 5.1.1)

RECOMMENDED SAMPLING PLAN**B-1 LOT**

B-1.1 In any consignment, all the brass glands of the same type and manufactured by the same factory, during the same period and using the same material shall constitute a lot.

B-2 SCALE OF SAMPLING

B-2.1 Samples shall be taken from each lot and tested for conformity.

B-2.2 The number of brass glands to be selected from each lot shall be in accordance with col 1 and 2 as indicated below. These samples shall be taken at random.

*Lot Size**Sample Size**Permissible No. of Defective*

Up to 500	5	0
501 to 1 000	8	1
1 001 and above	15	2

B-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-3.1 All the brass glands selected, shall be checked for dimensions and other acceptance tests. Brass glands failing to meet any of the requirements given in the standard, shall be called defective. If the number of defectives found is less than or equal to the permissible number given in 3, the lot shall be declared as conforming to these tests, otherwise not.

ANNEX C

(Clause 5.2)

PROOF TORQUE TEST

C-1 The gland sample shall be in a clean, new condition and without lubricant.

C-2 The threaded fixing component of the gland shall be screwed into a suitable tapped hole in a substantial block of steel, the thickness of the block being greater than the length of the thread on the threaded fixing component, and the hole passing right through the block. It is important that the hole should be bored

square to the face of the block.

C-3 The gland shall then be assembled with a shock piece of the appropriate kind of cable of any diameter within the range of gland. The gland shall be tightened with a manually operated torque spanner to the required proof torque (see Table 2), the spanner being applied first to the main body of the gland and then to each successive hexagonal component. Dismantle the gland and examine it.

ANNEX D

(Clause 5.3)

TENSILE TEST

D-1 This test is intended to ensure that the gland will secure the cable effectively, not to demonstrate that the gland will sustain a load at the test value.

D-2 The gland sample shall be in a clean, new condition.

D-3 The gland shall be mounted as shown in Fig. 5. A clean, dry, polished cylindrical mild steel mandrel, of the diameter specified in Table 2 and any convenient length, shall be secured in the gland by tightening the gland with a torque specified in Table 2. The mandrel carries a platform on which weights may be placed.

D-4 The mandrel shall be marked so that any movement relative to the gland can easily be detected. It shall then be loaded with weights until the total load of the mandrel, platform and weights is in accordance with Table 2. The load shall be maintained for 6 h. At the end of this period, the distance, if any, through which the mandrel has moved relative to the gland shall be measured.

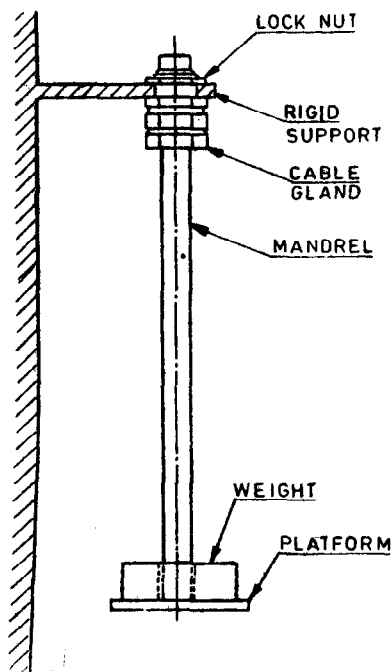


FIG. 5 TENSILE TEST FOR GLAND

ANNEX E

(Clause 5.4)

ELECTRICAL CONTINUITY TEST

E-1 Two glands of each size and type shall be submitted to the test. The glands shall be in a clean, new condition and without lubricant. No adjustment shall be made thereto during the test.

E-2 The test shall be made with one of the pair of glands fitted to each end of an approximately 300 mm length of the appropriate kind of cable, the diameter of the cable (over the inner sheath) shall be the nearest size above the

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