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British Standard

Mechanical cable glands

Part 1. Specification for metallic glands

Garnitures mécaniques d'étanchéité
Partie 1. Garnitures métalliques — Spécifications

Mechanische Kabelflansche
Teil 1. Metallische Kabelflansche

British Standards Institution

Foreword

This new edition of this Part of BS 6121 has been prepared under the direction of the General Electrotechnical Engineering Standards Policy Committee. The previous 1987 edition* was a revision of BS 6121 : 1973 which was a metric revision of BS 4121 : 1967. Both of these standards have been withdrawn. This edition introduces technical changes to bring the standard up-to-date but it does not reflect a full review of the standard, which will be undertaken in due course. This standard specifies a range of metallic cable glands dimensionally standardized to a sufficient extent to ensure the interchangeability of glands of similar type and size made by different manufacturers. It provides for mechanical glands with International Organization for Standardization (ISO) metric threads as specified in BS 3643 on the threaded fixing component, such as are used with elastomer-insulated and PVC-insulated cables. To avoid restricting development, only dimensions essential to the interchangeability of the whole gland are specified, and no attempt has been made to secure interchangeability of components and cable cutting dimensions between different makes.

Glands suitable for use with flameproof enclosures are no longer included in this standard; reference should be made to BS 5501. Also, the original seal test has been replaced by a test based on BS 5490 or BS 5420 for IP66.

Attention is drawn to appendix A, which lists the information to be supplied by the purchaser when ordering the glands.

Part 2 of this standard will give requirements and tests for non-metallic glands.

It is intended to publish two further Parts to BS 6121. Part 3 will be a specification for composite glands manufactured from a combination of both metallic and polymeric components; and Part 4 will provide a code of practice for all types of mechanical cable glands specified in Parts 1, 2 and 3.

All amendments to the 1987 edition are indicated by a line in the margin.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

* Now withdrawn.

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Specification

1 Scope

This Part of BS 6121 specifies requirements for limiting dimensions, marking, materials, construction and type tests for metallic mechanical cable glands. It provides for interchangeability between complete glands of different makes, but not between component parts.

The glands are particularly suitable for use with cables complying with the following British Standards, but the range of glands specified does not completely cover all the cables included in these standards.

BS 5467	Specification for armoured cables with thermosetting insulation for electricity supply
BS 6004	Specification for PVC-insulated cables (non-armoured) for electric power and lighting
BS 6007	Specification for rubber-insulated cables for electric power and lighting
BS 6116	Specification for elastomer-insulated flexible trailing cables for quarries and miscellaneous mines
BS 6346	Specification for PVC-insulated cables for electricity supply
BS 6480	Specification for impregnated paper-insulated lead or lead alloy sheathed electric cables of rated voltages up to and including 33 000 V
BS 6500	Specification for insulated flexible cords and cables
BS 6622	Specification for cables with extruded cross-linked polyethylene or ethylene propylene rubber insulation for rated voltages from 3800/6600 V up to 19 000/33 000 V
BS 6724	Specification for armoured cables for electricity supply having thermosetting insulation with low emission of smoke and corrosive gases when affected by fire
BS 6883*	Specification for elastomer-insulated cables for fixed wiring in ships

The glands are also suitable for use with certain cables of generally similar type not included in these British Standards.

A locknut is not regarded as part of a cable gland. Locknuts are therefore outside the scope of this standard.

NOTE 1. The information to be supplied by the purchaser when ordering is given in appendix A.

NOTE 2. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

NOTE. See figure 1.

For the purposes of this Part of BS 6121, the definitions given in BS 4727 : Part 2 : Group 08 apply, together with the following.

2.1 cable gland. A device designed to attach and secure the end of a cable to the equipment by means suitable for the type and description of cable for which it is designed, including provision for making electrical connection to the armour or braid and lead or aluminium sheath of the cable, if any.

NOTE. Type A glands may also be used for sealing cables passing through bulkheads or gland plates.

2.2 mechanical cable gland. A cable gland in which the cable is secured and any necessary electrical continuity is provided by mechanical means, without a plumber's wiped joint.

2.3 sealed gland. A gland having a seal so constructed as to exclude dust and water under the conditions prescribed in appendix F (IP66 test).

2.4 threaded fixing component. The part of a cable gland designed for attaching it to the casing of the apparatus to which the cable is to be connected. It is provided with an external thread which either engages in a similarly threaded hole in the casing of the apparatus, or is inserted through a plain hole in the casing and secured by means of a locknut inside the casing.

2.5 inner sheath of a cable. That sheath to which it may be required to establish an internal seal or bond.

NOTE. In some British Standards this component is referred to as the bedding or inner covering.

2.6 outer sheath of a cable. An elastomeric or plastics envelope applied to the outside of an electric cable.

2.7 protrusion. The distance which the gland protrudes outside the apparatus casing when the gland is assembled with the largest cable for which it is designed, and with each hexagonal component tightened to the proof torque specified in the appropriate table.

2.8 insulated adaptor. A component which provides electrical insulation between the gland and the casing of the appliance. In addition it may cater for a change of thread type, size or material between the gland and the appliance.

3 Types of gland

The basic designations of the glands are as follows.

Type A1. For unarmoured cable with an elastomeric or plastics outer sheath, where the function of the gland is to secure the outer sheath of the cable.

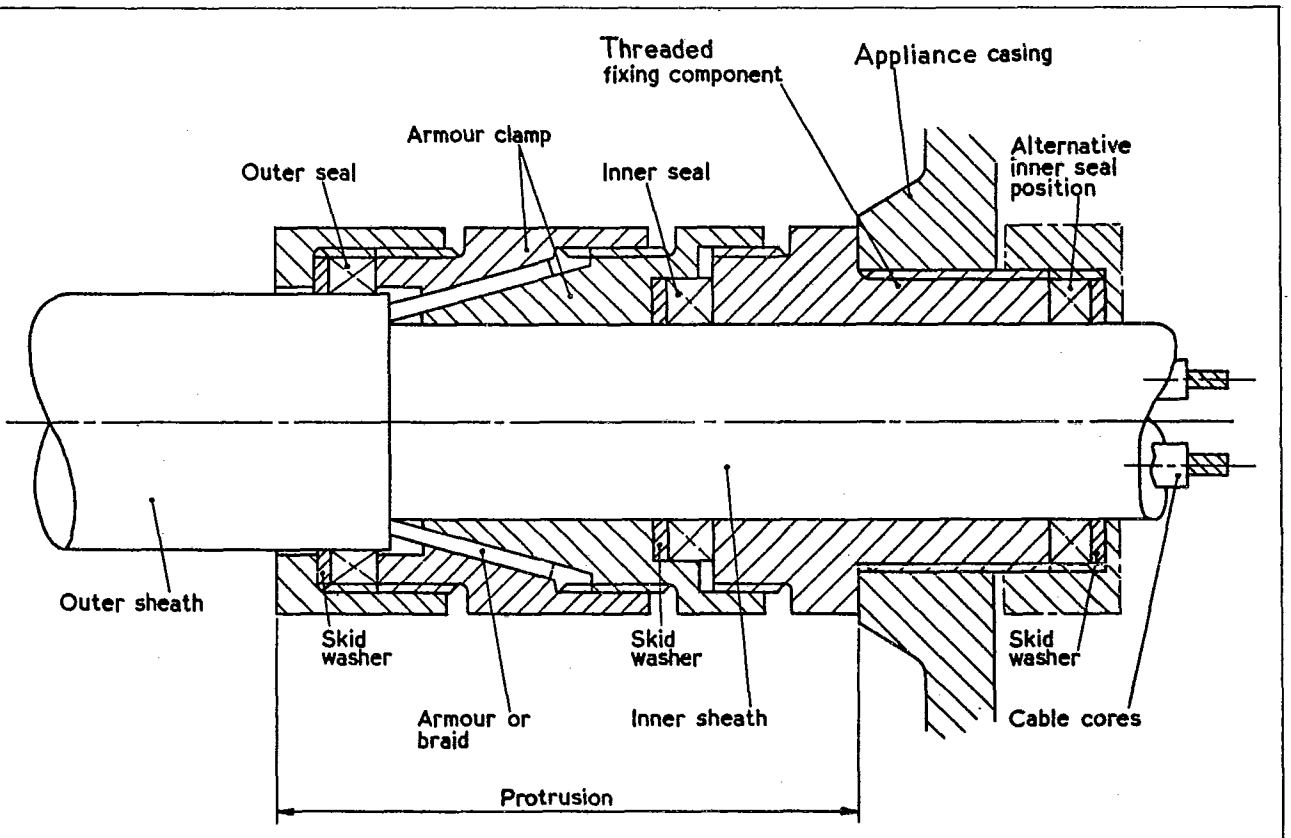
Type A2. As type A1, but with an IP66 seal between the outer sheath and gland.

Type A3. As type A1, but with an electrical bond for the metallic inner sheath.

Type A4. As type A2, but with an electrical bond for the metallic inner sheath.

Type B. For armoured or wire braided cable, where the function of the gland is to secure the armour or metallic braid and to provide electrical continuity between such

*The glands covered by this Part of BS 6121 will not necessarily comply with the tests for watertightness required for ships' installations.



NOTE. This figure illustrates the terms used in this standard and does not represent an actual design.

Figure 1. General construction of mechanical cable gland

armour or braid and the threaded fixing component of the gland.

Type C. For armoured or wire braided cable with elastomeric or plastics outer sheath. As type B, but with an IP66 seal between outer sheath and gland.

Type D1. For armoured or wire braided cable with an extruded elastomeric or plastics inner sheath. As type B, but with an IP66 seal between the inner sheath and threaded fixing component.

Type D2. As type D1, but with an electrical bond for the metallic inner sheath.

Type E1. For armoured or wire braided cable with an extruded elastomeric or plastics inner sheath and elastomeric or plastics outer sheath. As type B, but with IP66 seals between the outer sheath and gland and between the inner sheath and threaded fixing component.

Type E2. As type E1, but with an electrical bond for the metallic inner sheath.

Glands of type B, C, D1, E1 and E2 suitable for armoured or wire braided types of protection shall be identified by a suffix, added to the type designation, to indicate the type of protection for which the gland is suitable. The suffix for each type of protection shall be as follows.

Single wire armoured	W
Pliable wire armoured flexible	T
Wire braided	X
Aluminium strip armoured	Y
Double steel tape armoured	Z

If a gland is suitable for more than one type of protection, all of the relevant suffixes shall be used.

NOTE 1. The following are examples of type designations.

Type A2. A gland for unarmoured cable, with an IP66 seal between the outer sheath and gland.

Type BW. An armour clamp without a watertight seal, for single wire armoured cable.

Type CT. A gland for pliable wire armoured flexible cable, with an IP66 seal between the outer sheath and gland.

Type E2X. A gland for wire braided cable with an electrical bond for the metallic inner sheath.

NOTE 2. Glands containing inner seals are only intended for use on extruded inner sheaths.

4 Sizes of gland

The size designations, of which there are 12, and the range of sizes for each type are shown in tables 1 to 6, the suffix 'S' denoting smaller bore.

5 Marking

An appropriate part of the gland shall be legibly and permanently marked with the following particulars:

(a) the number of this standard, i.e. BS 6121 : Part 1*;

(b) the size designation of the gland (see clause **4**);

(c) whenever possible, the type of the gland and the appropriate suffix (see clause **3**).

Where appropriate the outer packaging of the gland shall be marked with an 'R' to indicate the inclusion of a compound seal.

6 Materials and construction (see figure 1)

6.1 Materials

All parts of the gland, except sealing devices, insulated adaptors and skid washers shall be made of metal in accordance with the appropriate British Standard.

Glands to be used with aluminium sheathed or aluminium armoured cables shall be manufactured from a material which will ensure freedom from corrosion arising from electrolytic action.

NOTE. It is important to select a basic material and a finish which are suitable for the situation in which the gland is to be installed. Gland materials should be compatible with the sheathing and armour materials.

6.2 Construction

6.2.1 *General.* 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 or chamfered to reduce the danger of injury in handling or after installation, but chamfering of hexagonal parts shall be such that **7.5** is complied with. Internal edges shall be chamfered to prevent damage of the cable.

Each gland shall be capable of being attached to and earthed to the appropriate apparatus through a single circular hole of the appropriate diameter. The clamping of cable armour shall be achieved by means of parts concentric with the cable, without the use of auxiliary bolts, clamps or clips.

NOTE. Provision of an earth bond attachment is not applicable to type A1 and A2 glands. The earth bond size needs to be stated when ordering (see appendix A).

Skid washers shall be incorporated in the design where rotatable portions of the gland would otherwise be in immediate contact with non-metallic seals.

The face of the gland which is to be clamped against the apparatus casing shall be machined normally to the axis of the gland.

6.2.2 *Earth bond attachment.* If an earth bond attachment is to be included, the gland shall be provided with a means of connecting to it a flexible stranded or strip earth bond. This earth bond attachment shall be such that the connection can be made at any position around the gland external to the casing of the apparatus to which the gland is attached. Adequate electrical continuity shall be ensured between the earth bond attachment, the body of the gland, the threaded fixing component and the armour of the cable, compliance being checked in accordance with **8.5**.

6.2.3 *Sealing devices.* Sealing devices, except where a bond has to be made onto a metallic sheath, shall consist of an oil resistant elastomeric compound or compound seal complying with **8.6**. If a metal-to-metal seal of any design is used with a metallic sheath, it shall comply with **8.6**. When used with a gland and cable of the appropriate size, the sealing device shall not damage the insulation or sheath of the cable. Compliance shall be checked by visual examination.

7 Dimensions

7.1 Threaded fixing component

7.1.1 *Thread.* The thread on the threaded fixing component shall be the ISO metric thread in accordance with BS 3643 for all sizes of gland, but other forms complying with national or international standards (e.g. DIN 40 430, Federal Standard H.28) are permissible provided the glands meet all the other requirements of this standard.

The nominal size of the thread shall be one of the values given in tables 1 to 6.

7.1.2 *Length.* The length of thread on the threaded fixing component shall be not less than the appropriate value given in tables 1 to 6. The thread shall have no undercut.

7.2 Bore

The bore diameter of the threaded fixing component shall be in accordance with tables 1 to 6, as appropriate, subject to a tolerance of +0.3 mm for glands of conduit size 25 mm and below and a tolerance of +0.5 mm for glands of conduit size 32 mm and above.

*Marking BS 6121 : Part 1 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

7.3 Protrusion

NOTE. This clause does not apply to glands for pliable wire armoured flexible cables (type suffix T).

The protrusion of a gland from the mounting face shall not exceed the appropriate value of the gland given in tables 1 to 6.

7.4 Gland maximum diameter across corners

The diameter of an imaginary cylinder, coaxial with the gland and enclosing it, shall not exceed the appropriate maximum value given in tables 1 to 6.

7.5 Dimensions across flats of hexagons

Every hexagonal part shall fit one of the spanners listed in BS 192.

7.6 Armour

Glands for use with armoured cables shall be suitable for the appropriate sizes of armour, as shown in table 2, 3, 4 or 6.

7.7 Screening

Glands for use with wire braided cables shall be suitable for the appropriate size of braiding wire, as shown in table 5.

7.8 Cable overall diameter

The gland shall be capable of accommodating cable of the appropriate maximum overall diameter, as shown in tables 1 to 6.

8 Type tests

8.1 General

No gland shall be adjusted during the test.

NOTE. The type tests are for proving the design.

8.2 Proof torque test

All types of gland shall undergo this test. There shall be no damage on dismantling after the gland has been tested as described in appendix B.

NOTE. This test is designed to prove that the mechanical strength of the gland is adequate to meet the conditions encountered in use.

8.3 Load test for type A glands

Gland types A1, A2, A3 and A4 only shall undergo this test. When the gland is tested as described in appendix C, the distance through which the mandrel moves shall not exceed 6 mm.

NOTE. This test determines whether the gland will secure the cable effectively, and is not intended to demonstrate that the gland will sustain the test load.

8.4 Armour clamp tensile test

All glands except types A, BX, CX, D1X, D2X, E1X, E2X and all double steel tape armour types (suffix Z) shall undergo this test.

The armour wires shall not slip under the armour clamps after the specified tensile load has been applied in accordance with appendix D.

NOTE. All suffix X and Z glands are not necessarily designed to carry a tensile load, and are not tested for this condition.

8.5 Electrical continuity test

All glands except types A1 and A2 shall undergo this test.

The gland shall be tested in accordance with appendix E; the electrical continuity is deemed to be ensured if the following apply.

(a) Before heating, the electrical resistance between the earth bond attachments, if used, or between the test blocks, does not exceed twice the resistance of the armour or wire braid, or metallic sheath for types A3 and A4, of the cable approximately 300 mm long used in the test.

NOTE. The conductance of the metal sheath is ignored in tests on types D2 and E2.

(b) The electrical resistance measured after the three heating cycles does not exceed the initial value by more than 10 % or 25 μΩ, whichever is the greater.

NOTE. Where provided, means for bonding on to a metallic cable sheath may be combined with or be independent of the pressure-tight seal.

8.6 Tests on sealing devices

8.6.1 *Seal test.* Prepare and test gland types A2, A4, C, D1, D2, E1 and E2 in accordance, respectively, with appendix F and BS 5490 or BS 5420 for IP66 degree of protection.

The requirements for IP66 in BS 5490 or BS 5420 shall be met for both inner and outer seals. When tested in accordance with **8.9** of BS 5490 : 1977, there shall be no ingress of water.

8.6.2 *Compression set.* When tested in accordance with BS 903 : Part A6, using a method A, type 1 test piece, a temperature of 70 ± 1 °C during the compression period and a recovery period 10 min, the compression set shall be not greater than 25 %.

Compound seals shall not be tested.

8.6.3 *Hardness.* The change in hardness between the values obtained before and after accelerated ageing shall be not greater than 15 % as follows.

Age the material under test in an oven with air circulation such that the test pieces are heated for 7 days at 100 ± 2 °C. Prepare the test pieces in accordance with BS 903 : Part A26.

Condition the aged pieces at 20 ± 2 °C for 24 h and test in accordance with BS 903 : Part A26.

Compound seals shall not be tested.

8.6.4 *Ageing test for compound seals.* When tested as follows, glands assembled with unaged and aged compound seals shall comply with the requirements for IP66 in BS 5490 or BS 5420.

Mix the compound and use half of the quantity to form a seal using the appropriate gland. Then prepare the gland in accordance with appendix F (excluding the first paragraph), and test in accordance with BS 5490 or BS 5420 for IP66 degree of protection.

Use the remaining quantity of compound to form a seal on a second similar gland, assemble the gland on to a mandrel and age for seven days at 100 ± 2 °C. At the conclusion of the ageing period, prepare and test the gland as described in the preceding paragraph.

8.7 Insulated adaptor test

When subjected to the proof torque test given in appendix **G.1** the adaptor shall not be damaged.

When the gland/adaptor assembly is tested in accordance with **G.2**, the adaptor shall withstand the tensile load and, after dismantling, shall show no sign of damage.

There shall be no breakdown of insulation when the gland/adaptor assembly is tested as given in appendix **G.3**.

NOTE. The test values for sheath test voltage or design armour voltage under fault condition given in **G.3** will be used, unless otherwise specified by the purchaser (see appendix A).

Insulated adaptors shall show no sign of damage after the specified radial load has been applied in accordance with **G.4**.

Table 1. Glands for unarmoured cables (types A1, A2, A3 and A4)

Size designation		16*	20S	20	25	32	40	50S	50	63S	63	75S	75
Nominal thread size X 1.5p – 6g, mm		M16	M20	M20	M25	M32	M40	M50	M50	M63	M63	M75	M75
Minimum length of thread on threaded fixing component, mm		10	10	10	10	10	15	15	15	15	15	15	15
Bore† (threaded fixing component), mm		8.7	11.7	14.0	20.0	26.3	32.2	38.2	44.1	50.1	56.0	62.0	68.0
Maximum protrusion from mounting face	Types A1 and A2, mm	23	23	23	25	30	33	39	39	39	39	39	39
	Types A3 and A4, mm	30	30	35	35	40	40	43	43	45	48	48	48
Gland maximum diameter across corners, mm		26	32	38	51	55	70	97	97	108	108	137	137
Maximum overall diameter of cable, mm	Types A1 and A2, mm	8.5	11.5	13.5	19.5	25.5	32.0	37.0	43.0	50.0	55.0	61.0	67.0
	Types A3 and A4, mm	13.2	15.8	20.8	27.2	33.5	39.9	46.3	52.6	58.9	65.3	71.6	78.0
Proof torque, N·m		65	65	65	95	110	130	165	165	195	195	230	230
Minimum diameter of metallic sheath, types A3 and A4		3.5	8.4	11.4	13.7	19.5	25.8	31.7	37.7	43.6	49.6	55.5	61.5
Diameter of test mandrel† and minimum diameter of cable	Cable clamp/outer seal, types A1 and A2, mm	3.5	8.0	11.0	13.0	19.0	25.0	31.5	36.5	42.5	48.5	54.5	60.5
	Cable clamp/outer seal, types A3 and A4, mm	8.4	12.9	15.5	20.3	26.7	33.0	39.4	45.8	52.1	58.4	64.8	71.1
Tensile test load, N		36	44.5	53.4	62.3	71.2	80.1	89	98	107	116	124	133

*This size gland is available with a M20 entry thread.

†Subject to the following tolerances:

+0.5 mm for glands of size 32 and above;

+0.3 mm for glands of size 25 and below.

Table 2. Glands for single wire armoured cables (types BW, CW, D1W, D2W, E1W and E2W)

Size designation		16*	20S	20	25	32	40	50S	50	63S	63	75S	75
Nominal thread size X 1.5p – 6g, mm		M16	M20	M20	M25	M32	M40	M50	M50	M63	M63	M75	M75
Minimum length of thread on threaded fixing component, mm		10	10	10	10	10	15	15	15	15	15	15	15
Bore† (threaded fixing component), mm		8.7	11.7	14.0	20.0	26.3	32.2	38.2	44.1	50.1	56.0	62.0	68.0
Maximum under armour diameter, mm		8.6	11.6	13.9	19.9	26.2	32.1	38.1	44.0	50.0	55.9	61.9	67.9
Maximum protrusion from mounting face	Types B and D, mm	43	43	43	43	50	55	65	65	75	75	85	85
	Types C and E, mm	55	55	55	70	70	70	75	75	85	85	105	105
Gland maximum diameter across corners, mm		26	32	38	51	55	70	97	97	108	108	137	137
Armour wire diameter, mm		0.9	0.9 or 1.25	0.9 or 1.25	1.25 or 1.6	1.6 or 2.0	1.6 or 2.0	2.0 or 2.5	2.0 or 2.5	2.5	2.5	2.5	2.5
Maximum overall diameter of cable, mm		13.2	15.8	20.8	27.2	33.5	39.9	46.3	52.6	58.9	65.3	71.6	78.0
Proof torque, N·m		65	65	65	95	110	130	165	165	195	195	230	230
Diameter of test mandrel† and minimum diameter of cable	Inner seal, mm	3.5	8.0	11.0	13.0	19.0	25.0	31.5	36.5	42.5	48.5	54.5	60.5
	Outer seal, mm	8.4	12.9	15.5	20.3	26.7	33.0	39.4	45.7	52.1	58.4	64.8	71.1
Slip test load, kN		2.7	2.7	2.7	3.33	4.41	6.62	6.62	6.62	6.62	6.62	8.83	8.83

*This size gland is available with a M20 entry thread.

†Subject to the following tolerances:

+0.5 mm for glands of size 32 and above;

+0.3 mm for glands of size 25 and below.

Table 3. Glands for pliable wire armoured flexible cables (types BT, CT, D1T, D2T, E1T and E2T)

Size designation		16*	20S	20	25	32	40	50S	50	63S	63	75S	75
Nominal thread size × 1.5p – 6g, mm		M16	M20	M20	M25	M32	M40	M50	M50	M63	M63	M75	M75
Minimum length of thread on threaded fixing component, mm		10	10	10	10	10	15	15	15	15	15	15	15
Bore† (threaded fixing component), mm		8.7	11.7	14.0	20.0	26.3	32.2	38.2	44.1	50.1	56.0	62.0	68.0
Maximum under armour diameter, mm		8.6	11.6	13.9	19.9	26.2	32.1	38.1	44.0	50.0	55.9	61.9	67.9
Maximum protrusion from mounting face	Types B and D, mm	43	43	43	43	50	55	65	65	75	75	85	85
	Types C and E, mm	55	55	55	70	70	70	75	75	85	85	105	105
Gland maximum diameter across corners, mm		26	32	38	51	55	70	97	97	108	108	137	137
Maximum overall diameter of cable, mm		13.2	15.8	20.8	27.2	33.5	39.9	46.3	52.6	58.9	65.3	71.6	78.0
Proof torque, N·m		65	65	65	95	110	130	165	165	195	195	230	230
Diameter of test mandrel† and minimum diameter of cable	Inner seal, mm	3.5	8.0	11.0	13.0	19.0	25.0	31.5	36.5	42.5	48.5	54.5	60.5
	Outer seal, mm	8.4	12.9	15.5	20.3	26.7	33.0	39.4	45.7	52.1	58.4	64.8	71.1
Slip test load, kN		2.7	2.7	2.7	3.33	4.41	6.62	6.62	6.62	6.62	6.62	8.83	8.83

*This size gland is available with a M20 entry thread.

†Subject to the following tolerances:

+0.5 mm for glands of size 32 and above;

+0.3 mm for glands of size 25 and below.

Table 4. Glands for aluminium strip armoured cables (types BY, CY, D1Y and E1Y)

Size designation		20S	20	25	32	40	50S	50	63S	63	75S
Nominal thread size X 1.5p — 6g, mm		M20	M20	M25	M32	M40	M50	M50	M63	M63	M75
Minimum length of thread on threaded fixing component, mm		10	10	10	10	15	15	15	15	15	15
Bore* (threaded fixing component), mm		11.7	14.0	20.0	26.3	32.2	38.2	44.1	50.1	56.0	62.0
Maximum under armour diameter, mm		11.6	13.9	19.9	26.2	32.1	38.1	44.0	50.0	55.9	61.9
Maximum protrusion from mounting face	Types B and D, mm	43	43	43	50	55	65	65	75	75	85
	Types C and E, mm	55	55	70	70	70	75	75	85	85	105
Gland maximum diameter across corners, mm		32	38	51	55	70	97	97	108	108	137
Armour strip thickness, mm		0.6	0.6	0.6	0.6 or 1.0	1.0 or 1.4	1.4	1.4 or 1.8	1.8	1.8	1.8
Maximum overall diameter of cable, mm		15.3	19.1	26.5	33.5	39.5	46.0	52.5	58.5	64.5	71.6
Proof torque, N·m		65	65	95	110	130	165	165	195	195	230
Diameter of test mandrel* and minimum diameter of cable	Inner seal, mm	8.0	11.0	13.0	19.0	25.0	31.5	36.5	42.5	48.5	54.5
	Outer seal, mm	12.5	15.0	18.8	26.0	33.0	39.0	45.5	52.0	58.0	64.0
Slip test load, kN		2.7	2.7	3.33	4.41	6.62	6.62	6.62	6.62	6.62	8.83

*Subject to the following tolerances:

+0.5 mm for glands of size 32 and above;

+0.3 mm for glands of size 25 and below.

Table 5. Glands for braided screened flexible cords (types BX, CX, D1X, D2X, E1X and E2X)

Size designation		16*	20S	20	25	32	40	50S	50	63S	63	75S	75
Nominal thread size × 1.5p – 6g, mm		M16	M20	M20	M25	M32	M40	M50	M50	M63	M63	M75	M75
Minimum length of thread on threaded fixing component, mm		10	10	10	10	10	15	15	15	15	15	15	15
Bore† (threaded fixing component), mm		8.7	11.7	14.0	20.0	26.3	32.2	38.2	44.1	50.1	56.0	62.0	68.0
Maximum under armour diameter, mm		8.6	11.6	13.9	19.9	26.2	32.1	38.1	44.0	50.0	55.9	61.9	67.9
Maximum protrusion from mounting face	Types B and D, mm	43	43	43	43	50	55	65	65	75	75	85	85
	Types C and E, mm	55	55	55	70	70	70	75	75	85	85	105	105
Gland maximum diameter across corners, mm		26	32	38	51	55	70	97	97	108	108	137	137
Screen wire diameter, mm		Details to be given with the order.											
Maximum overall diameter of cable, mm		13.2	15.8	20.8	27.2	33.5	39.9	46.3	52.6	58.9	65.3	71.6	78.0
Proof torque, N·m		65	65	65	95	110	130	165	165	195	195	230	230
Diameter of test mandrel† and minimum diameter of cable	Inner seal, mm	3.5	8.0	11.0	13.0	19.0	25.0	31.5	36.5	42.5	48.5	54.5	60.5
	Outer seal, mm	8.4	12.9	15.5	20.3	26.7	33.0	39.4	45.7	52.1	58.4	64.8	71.1

*This size gland is available with a M20 entry thread.

†Subject to the following tolerances:

+0.5 mm for glands of size 32 and above;

+0.3 mm for glands of size 25 and below.

Table 6. Glands for double steel tape armoured cables (types A3Z, A4Z, BZ, CZ, D1Z, D2Z, E1Z and E2Z)

Size designation		16*	20S	20	25	32	40	50S	50	63S	63	75S	75
Nominal thread size × 1.5p — 6g, mm		M16	M20	M20	M25	M32	M40	M50	M50	M63	M63	M75	M75
Minimum length of thread on threaded fixing component, mm		10	10	10	10	10	15	15	15	15	15	15	15
Bore† (threaded fixing component), mm		8.7	11.7	14.0	20.0	26.3	32.2	38.2	44.1	50.1	56.0	62.0	68.0
Maximum under armour diameter, mm		8.6	11.6	13.9	19.9	26.2	32.1	38.1	44.0	50.0	55.9	61.9	67.9
Maximum protrusion from mounting face	Types B and D, mm	43	43	43	43	50	55	65	65	75	75	85	85
	Types C and E, mm	55	55	55	70	70	70	75	75	85	85	105	105
Gland maximum diameter across corners, mm		26	32	38	51	55	70	97	97	108	108	137	137
Armour tape thickness, mm (each layer)	min.	0.15	0.15	0.15	0.15	0.15	0.2	0.2	0.5	0.5	0.5	0.5	0.5
	max.	0.35	0.35	0.5	0.5	0.55	0.6	0.6	0.8	0.8	0.8	1.0	1.0
Maximum overall diameter of cable, mm		13.2	15.8	20.8	27.2	33.5	39.9	46.3	52.6	58.9	65.3	71.6	78.0
Proof torque, N·m		65	65	65	95	110	130	165	165	195	195	230	230
Diameter of test mandrel† and minimum diameter of cable	Inner seal, mm	3.5	8.0	11.0	13.0	19.0	25.0	31.5	36.5	42.5	48.5	54.5	60.5
	Outer seal, mm	8.4	12.9	15.5	20.3	26.7	33.0	39.4	45.7	52.1	58.4	64.8	71.1

*This size gland is available with a M20 entry thread.

†Subject to the following tolerances:

+0.5 mm for glands of size 32 and above;

+0.3 mm for glands of size 25 and below.

Appendices

Appendix A. Information to be supplied when ordering

When ordering, purchasers should give the following information:

(a) the number of this British Standard, i.e. BS 6121 : Part 1;

(b) the type and size of gland (see clauses **3** and **4**);

(c) the number of the British Standard cable specification, if applicable;

(d) the type, size and voltage rating of the cable;

(e) the actual diameter of the cable over the inner sheath, if any;

(f) the actual overall diameter of the cable;

(g) the size and type of the armour or screen wires of the cable, if any;

(h) whether an earth bond attachment is required* and if so, its size;

(i) details of any special environmental conditions, including enclosure material;

(j) the type of seal required (compound or elastomeric);

(k) braided wire details for glands complying with table 5;

(l) for glands in accordance with table 1, 2 or 5, whether a size 16 gland with M20 thread is acceptable;

(m) for insulated adaptors, the required voltage withstand if it is to exceed the test values given in **G.3**.

NOTE. Locknuts are not regarded as being part of the cable gland. The number and type required should therefore be specified by the purchaser when ordering.

Appendix B. Proof torque test

Test one gland of each size and type. The gland shall be clean, new and without lubricant.

Screw the threaded fixing component of the gland into a suitably tapped hole in a substantial block of steel. The thickness of the block shall be greater than the length of the thread on the component, and the hole pass right through the block.

NOTE. It is important that the hole is bored square to the face of the block.

Assemble the gland with a short piece of the appropriate kind of cable of any diameter within the range of the gland. Tighten the gland with a manually operated torque spanner to the appropriate proof torque given in tables 1 to 6; apply the spanner first to the main body of the gland and then to each successive hexagonal component. Dismantle the gland and examine it. Ignore any seal distortion.

Appendix C. Load test for type A glands

Test one gland of each size and type. The gland shall be clean, new and without lubricant.

Mount the gland as shown in figure 2. Secure a cylindrical low carbon steel mandrel, of the diameter specified in table 1 and any convenient length, in the gland; do this by tightening the gland with a torque spanner to a torque equal to 50 % of the proof torque specified in table 1. The mandrel, which shall be clean, dry and polished, shall carry a platform on which weights may be placed.

Mark the mandrel so that any movement relative to the gland can easily be detected. Load the mandrel with weights until the total tensile load of the mandrel, platform and weights is in accordance with table 1. Maintain the load for 6 h. Measure at the end of this period, the distance, if any, through which the mandrel has moved relative to the gland.

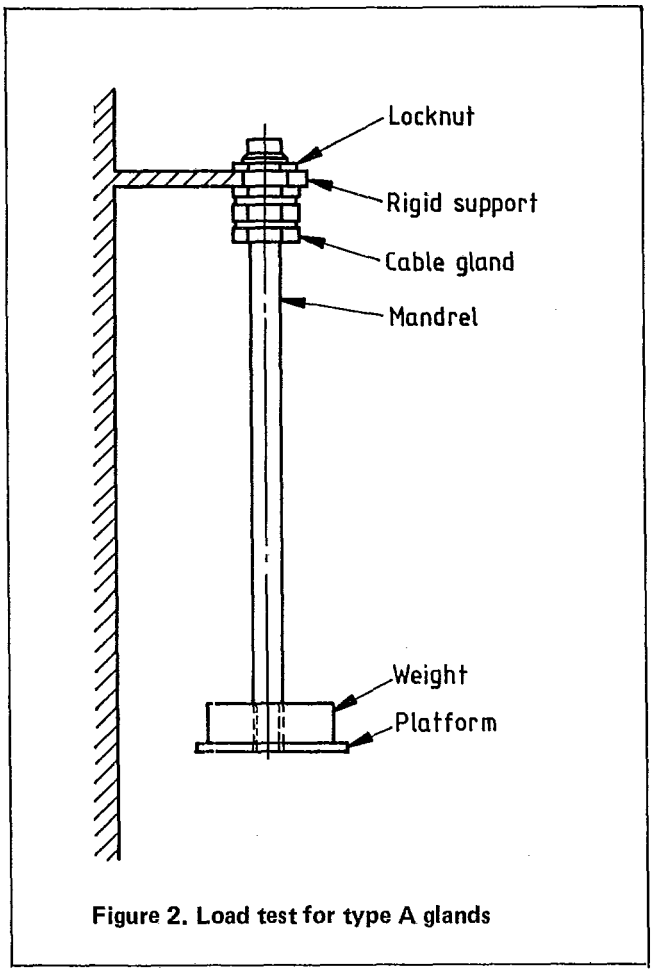


Figure 2. Load test for type A glands

*Not applicable to type A1 and type A2 glands.

Appendix D. Armour clamp tensile test

Test two glands of each type and size. The glands shall be clean, new and without lubricant.

Do the test with each pair of glands fitted to opposite ends of a cable approximately 300 mm long. The diameter of the cable underneath the armour shall be the nearest size above the diameter of the test mandrel specified in table 2, 3 or 4.

Tighten the two glands to the proof torque specified for the glands in the relevant table.

Attach the two glands to the draw-bars of the tensile testing machine and apply a tensile load of the appropriate value given in table 2, 3 or 4. Maintain the load for 2 min.

Observe any slip of the armour wires under either clamp.

If the glands are suitable for use with more than one size of armour, carry out separate tests for each size of armour.

Appendix E. Electrical continuity test

Test two glands of each size and type. The glands shall be clean, new and without lubricant.

Fit one of the pair of glands to each end of the appropriate kind of cable, which shall be approximately 300 mm long; the diameter of the cable (over the inner sheath) shall be the nearest size above the appropriate diameter of the test mandrel specified in tables 1 to 6.

Screw the threaded fixing component of each gland into a suitably tapped hole in a substantial block of low carbon steel. The thickness of the block shall be greater than the length of the thread on the component, and the hole shall pass right through the block.

Tighten each gland to 50 % of the proof torque given in the relevant table.

Measure the electrical resistance between the two earth bond attachments, if used, or between the two low carbon steel blocks.

Heat the test assembly uniformly in an oven to either 130 ± 5 °C or, for type A3, A4, D2 and E2 glands, 80 ± 5 °C. Remove the assembly and allow to cool naturally throughout to ambient temperature. Apply this cycle of heating and cooling three times.

Measure the electrical resistance again between the same points as before.

If glands suitable for use with more than one size of armour or wire braid, carry out separate tests for each size.

Appendix F. Seal test

Test one gland of each size and type, and test inner and outer gland seals separately.

The glands shall be clean, new and without lubricant.

Fit the gland into a suitable enclosure, and seal the interface between the gland and the enclosure sealed using a suitable washer or thread sealant. Seal into the gland a polished cylindrical metal mandrel, of the appropriate diameter specified in tables 1 to 6, by tightening the gland to 50 % of the relevant proof torque. Where necessary, substitute a packing for the armour or braid in the armour clamping component.

Appendix G. Tests for insulated adaptors

G.1 Proof torque test

Do the test on one insulated adaptor fitted to an appropriate gland using the method given in appendix B.

G.2 Armour clamp tensile test

Do the test on two insulated adaptors fitted to appropriate glands using the method given in appendix D.

NOTE. Suitable connecting devices to locate the adaptors onto the tensile testing machine draw-bars may be used.

G.3 Voltage withstand test

Do the test on one adaptor and the appropriate gland. Assemble the gland with an adaptor into a metallic enclosure. Apply a voltage of 2 kV a.c. or 3 kV d.c. across the adaptor for 1 min. Carry out the test at not less than 80 % humidity and at a temperature which causes visible condensation. Record the humidity and temperature (for record purposes only).

G.4 Radial load test for insulated adaptors

Test one insulated adaptor of each size.

Mount the adaptor in a suitable gland plate as shown in figure 3. Tighten a suitable gland into the adaptor to enable the radial torque to be applied. Insert into the gland a mandrel of appropriate size, ensuring that the mandrel end does not enter the adaptor. Make arrangements to suspend weights from the mandrel.

Apply the radial load given in table 7 to the adaptor.

NOTE. For the purpose of this test the adaptor size is taken to be the size of gland that it can receive.

When calculating the radial torque to be applied assume that the weight of the mandrel itself acts halfway along its length. Apply the load for not less than 5 min.

Finally, dismantle the assembly and inspect the insulated adaptor for signs of damage.