British Standard

BRITISH STANDARD

BS 6121-3: 1990

Mechanical cable glands —

Part 3: Specification for special corrosion resistant glands

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Cables and Insulation Standards Policy Committee (CIL/-) to Technical Committee CIL/20, upon which the following bodies were represented:

Aluminium Federation
Association of Consulting Engineers
Association of Manufacturers of Domestic Electrical Appliances
British Approvals Service for Electric Cables
British Cable Makers' Confederation
British Plastics Federation
British Railways Board
British Shipbuilders
British Steel Industry
British Telecommunications plc
Department of the Environment (Property Services Agency)
Department of Trade and Industry (Consumer Safety Unit, CA Division)
ERA Technology Ltd.
Electricity Association
Engineering Equipment and Materials Users' Association
Institution of Electrical Engineers
London Regional Transport

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Electrical Insulation Equipment Manufacturers Association (BEAMA Ltd.)
Electrical, Electronic, Telecommunications and Plumbing Union
Engineering Industries Association
Gland Manufacturers Technical Committee
Lighting Industry Federation Ltd.

This British Standard, having been prepared under the direction of the Cables and Insulation Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 30 November 1990

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Contents

Foreword

This Part of BS 6121 has been prepared under the direction of the Cables and Insulation Standards Policy Committee.

Other Parts of the standard are as follows.

— *Part 1: gives requirements and tests for metallic cable glands;*

— *Part 2: gives requirements and tests for polymeric cable glands;*

— *Part 4: will give requirements for insulated cable glands;*

— *Part 5: will be a code of practice for selection, installation and inspection of cable glands used in electrical installation.*

This Part of BS 6121 gives requirements and tests for special corrosion resistant glands manufactured from all metal components or a combination of both metallic and polymeric components. It also specifies a range of glands dimensionally standardized to a sufficient extent to ensure that glands of similar type and size made by different manufacturers are interchangeable. The standard describes mechanical glands with ISO metric thread as specified in BS 3643 on the threaded fixing component, such as are used with elastomer-insulated and PVC- insulated cables. Thread forms based on other international standards are accepted. To avoid restricting development, only dimensions essential to the interchangeability of the gland as a whole are specified and no attempt has been made to secure interchangeability of components between different makes.

Glands suitable for use with flameproof and/or explosion proof enclosures are not included in this standard. Reference should be made to BS 5501.

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 and ii, pages 1 to 20, an inside back cover 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 Part of BS 6121 specifies limiting dimensions, marking, materials, construction and type tests for special corrosion resistant mechanical cable glands. The glands may be assembled from corrosion resistant metallic components, or a combination of both metallic and polymeric components. This standard 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 cables with thermosetting insulation for electricity supply for rated voltages of up to and including 600/1 000 V and up to and including 1 900/3 300 V.*

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 3 800/6 600 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*[1)].

The glands are also suitable for use with certain cables of generally similar types 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

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

2.1
cable gland

a device designed to attach and secure the end of the 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 AK2 and/or AK4 glands may also be used to seal 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 recourse to a plumber's wiped joint

2.3
corrosion resistant cable gland

a mechanical cable gland designed from metallic and/or non-metallic materials to meet the criteria of a cable gland resistant to corrosion from the corrosive agents specified in this standard

2.4
sealed gland

a gland having a seal so constructed as to exclude dust and water under the conditions prescribed

2.5
threaded fixing component

the part of the cable gland designed for attaching it to the casing of the equipment 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 secured in a plain hole by means of a locknut or threaded earth-tag inside the casing

2.6
inner sheath of a cable

that sheath to which it may be required to establish an inner seal or bond with the gland

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

[1)] The glands covered by this standard will not necessarily meet the tests for watertightness required for installation in ships.

2.7
outer sheath

a polymeric envelope applied to the outside of an electric cable

2.8
protrusion

the distance which the gland protrudes outside the equipment casing when the gland is assembled with the largest cable for which it is designed, and with the seal compression nut tightened to the specified proof torque

2.9
compound seal

a seal produced by filling the cable interstices with a suitable compound

3 Types of gland

The basic designations of the glands shall be as Follows.

Type AK2. For unarmoured cables with an elastomer or plastics outer sheath where the function of the gland is to secure the outer sheath of the cable. The gland incorporates an IP66 seal or seals between the outer sheath and the gland.

Type AK4. As type AK2, but with an electrical bond for a metallic inner sheath.

Type CK. For armoured or wire braided cable with an elastomeric or plastics outer sheath, where the function of the gland is to secure the armour or metallic braid and to provide electrical continuity between such armour or braid and the threaded fixing component of the gland. The gland is also fitted with an IP66 seal between the outer sheath and gland.

Type EK1. For armoured or wire braided cable with an extruded elastomeric or plastics inner sheath and elastomeric or plastics outer sheath, where the function of the gland is to secure the armour or metallic braid, and to provide electrical continuity between such armour or braid and the threaded fixing component of the gland. The gland is also fitted with an IP66 seal between the outer sheath and gland and between the inner sheath and threaded fixing component.

Type EK2. As type EK1, but with an electrical bond for a metallic inner sheath.

Glands of types CK, EK1 and EK2 shall also be identified by a suffix indicating the type of cable for which the gland is suitable. The suffix for each type of armour or braid 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 armour or braid, all of the relevant suffixes shall be used.

NOTE 1 The following are examples of type designations.
Type AK2. A gland for unarmoured cable, with an IP66 seal between the outer sheath and gland.
Type CKT. A gland for pliable wire armoured flexible cable, with an IP66 seal between the outer sheath and gland.
Type EK2X. 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 and the range of sizes for each type shall be as given in Table 1 to Table 6, the suffix "S" denoting the 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 British Standard, i.e. BS 6121-3[2)];

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 printing is used for marking the gland, the permanency of identification shall be checked by inspection and by rubbing the mark by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit after which the marking shall remain legible.

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

[2)] Marking BS 6121-3 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.

6 Materials and construction
(see Figure 1)

6.1 Materials

No restriction shall be placed on the type of materials used in the construction of the corrosion resistant cable gland, provided the gland is capable of meeting the test requirements of the 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 1 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 material.

NOTE 2 Attention is drawn to the fact that no polymeric material is completely resistant to solvents, oils and gases.

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 the equipment through a single circular hole of a size to suit the gland type. 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.

Where rotating parts of the gland are metallic, skid washers or other means shall be provided to prevent rotation of seals during compression.

The face of the gland which is to be clamped against the equipment casing shall be made so that the face is normal to the axis of the gland.

These glands shall be suitable for use within the safe temperature range of – 20 °C to 90 °C.

6.2.2 *Earth bond attachment*

If an earth bond attachment is fitted, the gland shall be provided with a means of connecting to it a flexible stranded or strip earth bond.

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 **8.6**.

NOTE Provision of an earth bond attachment is not applicable to type AK2 glands. The earth bond size needs to be stated when ordering (see Appendix A).

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 **8.7**. If a metal-to-metal seal of any design is used with a metallic sheath, it shall comply with **8.7**. 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 other requirements of this standard.

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

7.1.2 *Length*

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

7.2 Bore

The bore diameter of the threaded fixing component shall be in accordance with Table 1 to Table 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.

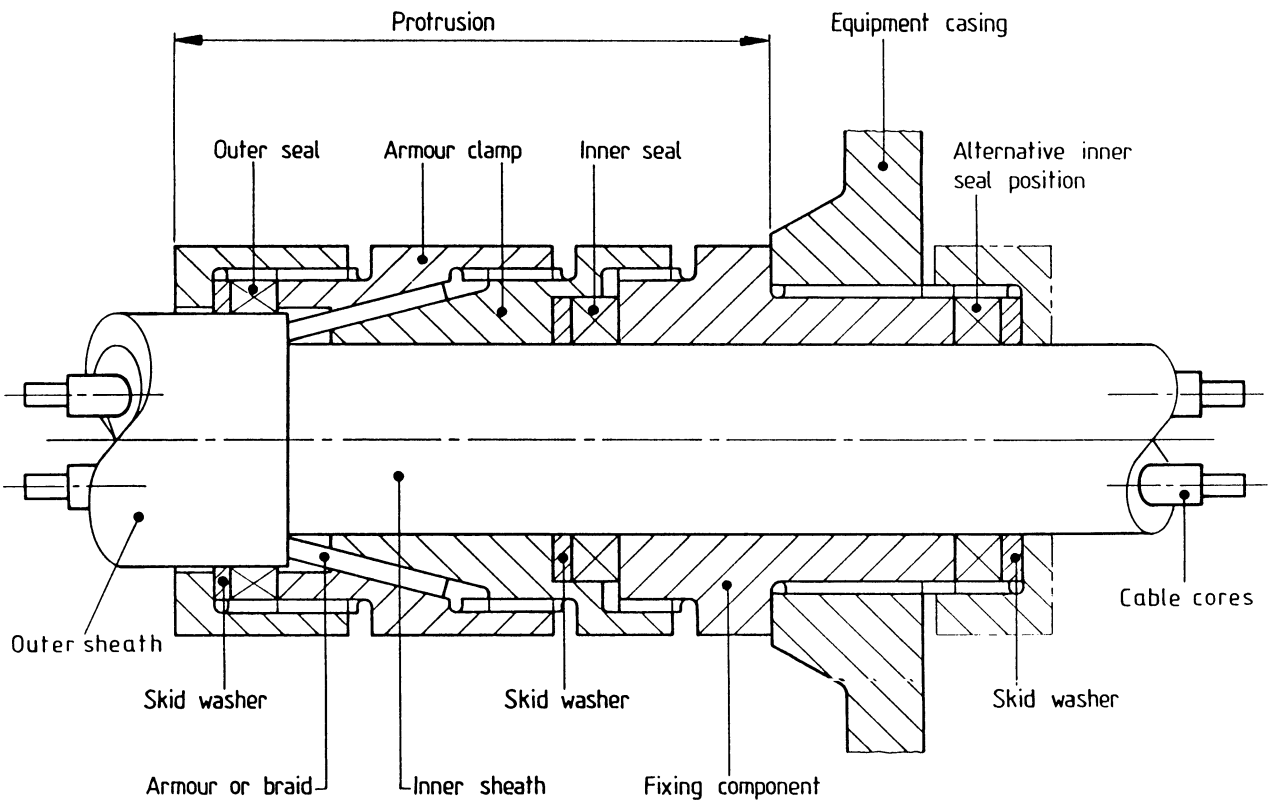
7.3 Protrusion

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 for the gland given in Table 1 to Table 6, when the cable gland is assembled on the plug-gauge or a mandrel of the same diameter as the maximum cable size and the threaded fixing component is tightened to the proof torque.

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 Table 1 to Table 6.



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

7.5 Dimensions across flats of hexagons

All hexagonal parts 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 given in Table 2, Table 3, Table 4 or Table 6.

7.7 Wire braiding

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

7.8 Cable overall diameter

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

8 Type tests

8.1 General

No gland shall be adjusted during the test.

NOTE The type tests are for proving the design.

Tests shall be made at an ambient temperature of 20 ± 15 °C unless otherwise specified in the details for the particular test.

8.2 Temperature conditioning

Prior to proceeding with the tests detailed in **8.3** to **8.6** the composite cable glands for tests shall be subjected to a temperature conditioning cycle as described in Appendix B.

NOTE The procedure in Appendix B is designed to condition the polymeric cable glands for test, considerably reduce the water absorption characteristics and produce a proof condition for the tests specified in this standard resulting from material strength reduction, temperature effects and also the removal of the water absorption characteristics.

The tests specified in **8.3** to **8.6** shall be carried out within 48 h of this temperature conditioning.

8.3 Proof torque test

8.3.1 *At ambient temperature*

All types of gland shall undergo this test. There shall be no damage to the threads and no detrimental effect to the hexagon on dismantling with a spanner after the test when the gland is assembled and tested as described in Appendix C.

NOTE 1 Any distortion of the seals can be ignored for the purpose of this test.

NOTE 2 This test is designed to prove that the mechanical strength of the gland is adequate to meet conditions encountered in use.

8.3.2 *At low temperature*

For composite glands only the test described in **8.3.1** shall be repeated with the gland at a temperature of – 5 °C.

8.4 Load test for type AK glands

The distance through which the mandrel moves during the test period shall not exceed 6 mm when the gland is assembled and tested as described in Appendix D.

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.

8.5 Armour clamp tensile test

All glands bearing the suffixes "W" and "Y" shall undergo this test.

The armour wires shall not slip in the armour clamp when tested in accordance with Appendix E.

8.6 Electrical continuity test

All glands except type AK2 shall undergo this test. The glands shall be tested in accordance with Appendix E and the electrical continuity is deemed to be ensured if the following apply.

a) Electrical resistance before heating between the earth bond attachments, if used, or between the test blocks, does not exceed twice the resistance of the armour of wire braid, or metallic sheath for type AK4, of the 300 mm length of cable used in the test.

b) The electrical resistance measured after three heating cycles does not exceed the initial value by more than 10 % or 25 $\mu\Omega$ 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.

8.7 Tests on sealing devices

8.7.1 *Seal test*

Prepare and test gland types AK2, AK4, CK, E1K, and E2K in accordance with Appendix G and also in accordance with BS 5490 (or BS 5420) where IP66 degree of protection applies.

The requirements for IP66 in BS 5490 (or BS 5420) shall be met for cable glands which incorporate inner or outer seals, or a combination of both.

When tested in accordance with **8.8** of BS 5490:1977 there shall be no ingress of water or dust.

8.7.2 *Compression set*

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

Compound seals shall not be tested.

8.7.3 *Hardness*

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

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

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

Compound seals shall not be tested.

8.7.4 *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 G (excluding **G.1**), and test in accordance with BS 5490 (or BS 5420) where IP66 degree of protection applies.

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.

8.8 Radial load test

NOTE This test applies to composite glands only.

There shall be no visible damage to the gland on dismantling after test when the gland is assembled and tested as described in Appendix H.

8.9 Endurance test

NOTE 1 This test applies to composite glands only.

NOTE 2 This test is intended to provide an indication of minimum service life of the cable glands when subjected to normal oxidative degradation in the presence of ultraviolet radiation and humidity.

The glands shall be considered satisfactory if all samples pass each of the tests in Appendix J.

NOTE 3 The endurance test is not intended to reflect the reduction in working life due to factors resulting from environmental pollution by atmospheric chemicals.

8.10 Flammability test

NOTE 1 This test applies to composite glands only.
NOTE 2 This test is intended solely to measure and describe the flammability properties of the material used in the cable gland in response to heat and flame under controlled laboratory conditions.

8.10.1 *Test specimens*

Test specimens shall be in the form of small bars as detailed in **K.3**. A set of five specimens shall be prepared for each size and type of material to be tested.

8.10.2 *Test method*

Each set of five test specimens shall be conditioned as described in **K.4**, and then tested in accordance with **K.5**.

8.10.3 *Performance requirements*

8.10.3.1 The material shall not:

a) burn with flaming combustion for more than 30 s after both applications of the test flame given in **K.5.4**;

b) have a total flaming combustion time exceeding 250 s for the 10 flame applications for each test of five specimens;

c) have any specimens that burn with flaming or glowing combustion up to the holding clamp.

NOTE Specimens are permitted to drip flaming particles which burn only briefly.

8.10.3.2 An additional five specimens shall be tested if either:

a) only one specimen from a set of five specimens fails to comply with the requirements of **8.10.3.1**; or

b) the total number of seconds of flaming is in the range of 251 s to 25 s.

All specimens from this second set of tests shall comply with the requirements of **8.10.3.1** in order that the material shall be considered satisfactory.

8.11 Corrosion test

NOTE 1 This test is intended to provide an indication of maximum service life under corrosion conditions.
NOTE 2 The method described uses a representative range of corrosive media to endeavour to achieve the widest range of corrosive environmental conditions anticipated during the installation life of the cable glands.

8.11.1 *Test specimens*

Test specimens shall be in the form of the following.

a) One gland per size and type not subject to corrosion testing, for test reference purposes.

b) Sixteen glands per size and type to be subjected to corrosion testing (see **L.2.2**).

8.11.2 *Test method*

Each test gland shall be tested in accordance with Appendix L.

8.11.3 *Compliance requirements*

After carrying out the test specified in **8.11.2** the following shall apply.

a) There shall be no noticeable crystalline growths on the surface of any plastics encapsulation of the cable gland.

b) There shall be no noticeable surface cracking or potential movement of metallic parts within any plastics encapsulation of the cable gland, which may affect the gland performance.

c) There shall be no visible dimensional differences between the test gland and its equivalent untested reference gland.

d) The electrical resistance shall not exceed the initial value by more than 10 % or 25 $\mu\Omega$ whichever is the greater.

8.12 Salt spray (fog) test

NOTE This test is intended to provide an indication of maximum service life in salt laden air.

8.12.1 *Test specimens*

Test specimens shall be in the form of the following.

a) One gland per size and type not subject to salt spray testing, for test reference purposes.

b) Two glands per size and type to be subjected to salt spray testing.

8.12.2 *Preparation*

The test samples for types CK, EK1 and EK2 shall be prepared in accordance with Appendix F. Gland types AK2 and AK4 shall be assembled in accordance with **F.2** and **F.4**.

8.12.3 *Test method*

8.12.3.1 *Gland types CK, EK1 and EK2.* The following shall apply.

a) Each gland shall be tested in accordance with **F.5**.

b) Each gland shall be tested in accordance with BS 2782-5:Method 551A with a test duration of 2 weeks.

c) Each gland shall be sprayed with tap water until all traces of salt are removed.

d) Each gland shall be subjected to the heat cycles given in **F.6** and subsequently shall have the electrical resistance measured in accordance with **F.7**.

8.12.3.2 *Gland types AK2 and AK4.* The following shall apply.

a) Each gland shall be tested in accordance with BS 2782-5: Method 551A with a test duration of 2 weeks.

b) Each gland shall be sprayed with tap water until all traces of salt are removed.

8.12.4 ***Performance requirements***

After carrying out the tests specified in **8.12.3** the following shall apply.

a) There shall be no noticeable crystalline growths on the surface of any plastics encapsulation of the cable gland.

b) There shall be no noticeable surface cracking or potential movement of metallic parts within any plastics encapsulation of the cable gland, which may affect the gland performance.

c) There shall be no visible dimensional differences between the test gland and its equivalent untested reference gland.

Table 1 — Glands for unarmoured cables (types AK2 and AK4)

Size designation		16[a]	20S	20	25	32	40	50S	50	63S	63	75S	75
Thread size × **1.5*p*** – **6g, mm** (see BS 3643-2)		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[b] (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
Maximum protrusion from mounting face, mm	**Type AK2**	23	23	23	25	30	33	39	39	39	39	39	39
	Type AK4	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	**Type AK2**	8.5	11.5	13.5	19.5	25.5	32.0	37.0	43.0	50.0	55.0	61.0	67
	Type AK4	13.2	15.8	20.8	27.2	33.5	39.9	46.3	52.6	58.9	65.3	71.6	78
Proof torque, N · m		65	65	65	95	110	130	165	165	195	195	230	230
Minimum diameter of metallic sheath Type AK4, mm		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[b] and minimum diameter of cable	**Cable clamp/outer seal Type AK2, 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 Type AK4, 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

[a] This size gland is available with an M20 entry thread.
[b] 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 CKW, EK1W and EK2W)

Size designation		16[a]	20S	20	25	32	40	50S	50	63S	63	75S	75
Thread size × 1.5p – 6g, mm (see BS 3643-2)		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[b] (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
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
Maximum protrusion from mounting face, 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
Proof torque, N · m		65	65	65	95	110	130	165	165	195	195	230	230
Diameter of test mandrel[b] 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

[a] This size gland is available with an M20 entry thread.
[b] 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 CKT, EK1T and EK2T)

Size designation		16[a]	20S[a]	20[a]	25	32	40	50S	50	63S	63	75S	75
Thread size × 1.5p – 6g, mm (see BS 3643-2)		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[b] (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
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[b] 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	45.8	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

[a] It is essential that armour wire diameters are given with the order.

[b] 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 CKY and EK1Y)

Size designation		20S	20	25	32	40	50S	50	63S	63	75S
Thread size × 1.5p – 6g, mm (see BS 3643-2)		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[a] (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 protrusion from mounting face, mm		55	55	70	70	70	75	75	85	85	105
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
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		15.8	20.8	27.2	33.5	39.9	46.3	52.6	58.9	64.3	71.6
Proof torque, N · m		65	65	95	110	130	165	165	195	195	230
Diameter of test mandrel[a] 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	12.9	15.5	20.3	26.7	33.0	39.4	45.7	52.1	58.4	64.8
Slip test load, kN		2.7	2.7	3.33	4.41	6.62	6.62	6.62	6.62	6.62	8.83

[a] 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 wire braided flexible cords (types CKX, EK1X and EK2X)

Size designation		16[a]	20S	20	25	32	40	50S	50	63S	63	75S	75
Thread size × 1.5p – 6g, mm (see BS 3643-2)		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[b] (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, 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
Wire braid diameter of cable, mm		Details to be given with 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[b] 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

[a] This size gland is available with an M20 entry thread.
[b] 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 CKZ, EK1Z and EK2Z)

Size designation		16[a]	20S	20	25	32	40	50S	50	63S	63	75S	75
Thread size × **1.5*p*** – **6g, mm** (see BS 3643-2)		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[b] (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, 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[b] 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

[a] This size gland is available with an M20 entry thread.
[b] 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.

Appendix A Information to be supplied when ordering

When ordering, purchasers should give the following the information:

a) the number of this British Standard, i.e. BS 6121-3;

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

c) the number of this 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, Table 2 or Table 5, whether a size 16 gland with an M20 thread is acceptable.

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 Temperature conditioning for tests

Ensure that the cable glands are of each size and type and of a quantity sufficient to meet the test series specified in this standard.

Place all the cable glands if an oven and maintain at a temperature of 120 ± 2 °C for 2 h, then remove and allow to cool to room temperature.

NOTE Remove seal and skid washer, if present, prior to temperature conditioning.

Appendix C Proof torque test

Test one gland of each size and type which is in a clean, new condition and without lubricant.

Screw the threaded fixing component of the gland into a suitable tapped hole in a block of non-ferrous metal, the thickness of the block being greater than the length of the thread on the threaded fixing component, and the hole passing right the block. Where a locknut is provided carry out tests with the gland mounted on a drilled gland plate of appropriate thickness. It is important that the hole should be bored square to the face of the block.

Assemble the gland on a mandrel of the appropriate diameter given Table 1. Tighten the gland with a manually operated torque spanner to the required proof torque (see Table 1), the spanner being applied first to the main body of the gland and then to each successive hexagonal component. Dismantle the gland with an appropriate spanner and examine it.

Appendix D Load test

Test one gland of each size and type which is in a clean, new condition and without lubricant.

Mount the gland as shown in Figure 2. Secure a clean, dry polished cylindrical non-ferrous metal mandrel, of the diameter given Table 1 and any convenient length, in the gland by tightening the gland with a torque spanner to a value of torque equal to 50 % of the proof torque given in Table 1 to Table 6. The mandrel carries 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 the weights until the total load of the mandrel, platform and weights is an accordance with Table 1 to Table 6. 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.

Appendix E Armour clamp tensile test

Test two glands of each type and size which are clean, new and without lubricant.

Do the test with each pair of glands fitted to opposite ends of a cable approximately 300 mm long. Ensure that the diameter of the cable underneath the armour is the nearest size above the diameter of the test mandrel given in Table 2, Table 3 or Table 4.

Tighten the two glands to the proof torque given 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, Table 3 or Table 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 F Electrical continuity test

F.1 Test two glands of each size and type which are clean, new and without lubricant.

F.2 Fit one of the pair of glands to each end of the appropriate kind of cable, which is approximately 300 mm long. Ensure that the diameter of the cable (over the inner sheath) is the nearest size above the appropriate diameter of the test mandrel given in Table 1 to Table 6.

F.3 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 being greater than the length of the thread on the component, and the hole passing right through the block.

F.4 Tighten each gland to 50 % of the proof torque given in the relevant table.

F.5 Measure the electrical resistance between the two earth bond attachments, if used, or between the two low carbon steel blocks.

F.6 Heat the test assembly uniformly in an oven to either 130 ± 5 °C or, for type AK4 and EK2 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.

F.7 Measure the electrical resistance again between the same points as before.

F.8 If glands are suitable for use with more than one size of armour or wire braid, carry out separate tests for each size.

Appendix G Seal test

G.1 Test one gland of each size and type, and test inner and outer gland seals separately.

G.2 Ensure that the glands are clean, new and without lubricant.

G.3 Fit the gland into a suitable enclosure, and seal the interface between the gland and the enclosure using a suitable washer or thread sealant. Seal into the gland a polished cylindrical metal mandrel, of the appropriate diameter given in Table 1 to Table 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.

G.4 Ensure that test glands meet the requirements of IP66 in accordance with BS 5490 (or BS 5420).

Appendix H Radial load test

Test one gland of each type and size.

Mount the gland in a suitable rigid support (gland plate) as shown in Figure 3. Fasten the gland to the gland plate using the correct gland nut. Attach a mandrel with a diameter approximately equal to the maximum diameter of the cable given in Table 1 to Table 6, to the gland in such a manner that when assembled the mandrel does not enter the plane of the rigid support (gland plate). Make arrangements to suspend weights from the mandrel.

Apply the radial load given in Table 1 to Table 6 to the gland. When calculating the radial load to be applied assume that the weight of the mandrel itself acts halfway along its length. Apply the load for a period of not less than 5 min.

After the test dismantle the assembly and inspect the gland for signs of damage.

Appendix J Endurance test

J.1 General

Select four cable glands, two from the largest size and two from the smallest size from the size range being tested.

J.2 Proof torque test

Mount the cable glands on non-ferrous blocks and assemble on a mandrel of the appropriate diameter given in Table 1 to Table 6.

Tighten the gland with a manually operated torque spanner to the required proof torque given in Table 1 to Table 6.

Place the glands in an ultraviolet weatherometer and incline them to allow water to drain. Subject them to 500 alternate 4 h cycles of ultraviolet light and 100 % relative humidity at temperatures of 70 °C and 40 °C respectively. Ensure the spectral energy distribution of the lamps is as given for lamp E in BS 2782-5:Method 540B:1982.

After ageing ensure that the cable glands withstand the appropriate proof torque given in Table 1 to Table 6.

J.3 Load test

Mount the cable glands in a rigid support as shown in Figure 2, and tighten to 50 % of the appropriate proof torque value given in Table 1 to Table 6.

After ageing as detailed in **J.2**, subject the glands to the load test given in Appendix D.

J.4 Radial load test

Mount the glands in suitable non-ferrous gland plates as shown in Figure 3.

After ageing as detailed in **J.2**, subject the glands to the radial load test given in Appendix H.

Appendix K Flammability test

K.1 General

This test is intended to be performed on the polymeric materials used to manufacture composite glands and is intended to serve as an indication of the acceptability of the material with respect to flammability. Ensure the materials are in the form of small bar specimens as detailed in **K.3**.

K.2 Apparatus

K.2.1 *Test chamber,* fitted with a laboratory hood or similar enclosure to exclude forced or induced draught.

NOTE An enclosed laboratory hood with a heat resistant glass window and an exhaust fan for removing the products of combustion is recommended.

K.2.2 *Bunsen burner or Timill burner,* having a tube with a length of 80 mm to 100 mm and an inside diameter of 9.5 mm. The tube shall not be equipped with end attachments (e.g. a stabilizer).

K.2.3 *Ring stand,* with clamps or equivalent and adjustable for vertical positioning of the specimens.

K.2.4 *Gas supply,* with suitable regulator and meter for uniform gas flow.

NOTE Natural gas having a heat content of approximately 37×10^6 J/m^3 has been found to give satisfactory results.

K.2.5 *Stopwatch,* or other suitable timing device.

K.2.6 *Desiccator,* containing anhydrous calcium chloride.

K.2.7 *Conditioning chamber,* capable of being maintained at a temperature of 23 ± 2 °C and a relative humidity of 50 ± 1 %.

K.2.8 *Circulating air oven,* capable of being maintained at a temperature of 70 ± 1 °C.

K.3 Specimens

K.3.1 *Size*

Test specimens, 125 mm in length by 12.5 mm in width in the maximum and minimum thicknesses covering the range to be considered, are to be tested. Specimens tested by this method are limited to a maximum thickness of 12.5 mm. Specimens of intermediate thicknesses in the range are also to be provided and may be tested if the results obtained on the maximum and minimum thicknesses indicate a need. Intermediate thicknesses are not to exceed increments of 3 mm. The specimens are to comply with the following:

a) maximum width of 13 mm;

b) maximum radius on the corners of 1.25 mm;

c) the edges are to be smooth.

K.3.2 *Type*

If the material to be considered is in a range of colours, melt flows, or reinforcement contents, specimens representing those ranges are also to be provided.

Specimens in the natural (if used in this colour) and in the most heavily pigmented light and dark colours are to be provided and considered representative of the colour range, if the burning characteristics are essentially the same. An additional set of specimens is to be provided in the highest organic pigment loading, unless the most heavily pigmented light and dark colours include the highest organic pigment level. When certain colour pigments, e.g. red, yellow, are known by experience to have particularly critical effects, specimens in these colours are also to be provided.

Specimens in the extremes of the melt flows and reinforcement contents are to be provided and considered representative of the range, if the burning characteristics are essentially the same. If the burning characteristics of the specimens are not representative of the range, evaluation is to be limited to the material in the colours, melt flows, and reinforcement contents tested, or additional specimens in intermediate colours, melt flows, and reinforcement contents are to be provided for tests.

K.4 Conditioning

Prior to testing, condition the specimens as follows:

a) condition one set of each size and type of material in a conditioning chamber (**K.2.7**) for a minimum duration of 48 h at 23 ± 2 °C and relative humidity of 50 ± 5 %;

b) condition one set of each size and type of material in a circulating air oven (**K.2.8**) for a duration of 168 h at 70 ± 1 °C and then cool the specimens in the desiccator (**K.2.6**), for a minimum duration of 4 h at room temperature.

K.5 Procedure

K.5.1 Place the ring stand and specimen in the test chamber (**K.2.1**).

K.5.2 Support each specimen from the upper 6.4 mm of the specimen, with the longitudinal axis vertical, by the clamp on the ring stand so that the lower end of the specimen is 9.5 mm above the top of the burner tube.

K.5.3 Remove the burner from the specimen, ignite it and then adjust it to produce a blue flame 19 mm high.

NOTE The flame may be obtained by first adjusting the gas supply and the air ports of the burner until a 19 mm yellow-tipped blue flame is produced and then increasing the air supply until the yellow tip disappears.

The height of the flame is then measured again and corrected if necessary.

K.5.4 Place the flame centrally under the lower end of the specimen and allow the remain for 10 s. Withdraw the flame to a minimum distance of 150 mm. Use the stopwatch (**K.2.5**) to note the duration of flaming of the specimen. When flaming of the specimen ceases, immediately place the flame under the specimen again. After 10 s, withdraw the flame again and record the duration of flaming and glowing.

K.5.5 If the specimen drops molten or flaming material during either flame application, tilt the burner to an angle up to 45° and also slightly withdraw the flame from the specimen to avoid material dripping into the tube of the burner. The 9.5 mm distance between the bottom of the specimen and the top of the burner tube is to be maintained during the flame application. Any molten strings of the material are to be ignored, and the flame is to be applied to the major portion of the specimen.

K.6 Test report

The test report shall include the following:

a) duration of flaming after first flame application;

b) duration of flaming after second flame application;

c) duration of flaming plus glowing after second flame application;

d) whether or not specimens burn up to the holding clamp.

Appendix L Corrosion test

L.1 General

This test is intended to be performed on two new mid range cable glands of each type, and carried out at an ambient temperature of 20 ± 15 °C and is intended to serve as an indication of the acceptability of the material with regard to corrosion.

One of the pair of glands is fitted to each end of the appropriate kind of cable, which is approximately 300 mm long; the diameter of the cable (over the inner sheath) being the nearest size above the appropriate diameter of the mandrel given in Table 1 to Table 6.

L.2 Apparatus and reagents

L.2.1 *Sealed jar or container*; of sufficient volume to accept a number of cable glands for combined test purposes.

L.2.2 *Corrosive media*, consisting of the following test solutions. Use sufficient quantities for total immersion of the gland samples.

Acetic acid: glacial 100 % pure

Ammonia: aqueous solution 28 % by volume

1,1,1-Trichloroethane: 100 % pure

Chlorine: aqueous solution 50 % by volume

Fuel oil: 100 % pure

Hydrochloric acid: aqueous solution 25 % by volume

Oxalic acid: aqueous solution 25 % by mass

Sulphuric acid: aqueous solution 28 % by mass

L.3 Procedure

Totally immerse each test assembly (consisting of two glands and a length of cable) of each type submitted for test in each of the corrosive media given in **L.2.2** for a period of 100 h. Use new glands for each solution.

After this immersion period, remove the glands and leave them to dry for 24 h at ambient temperature.

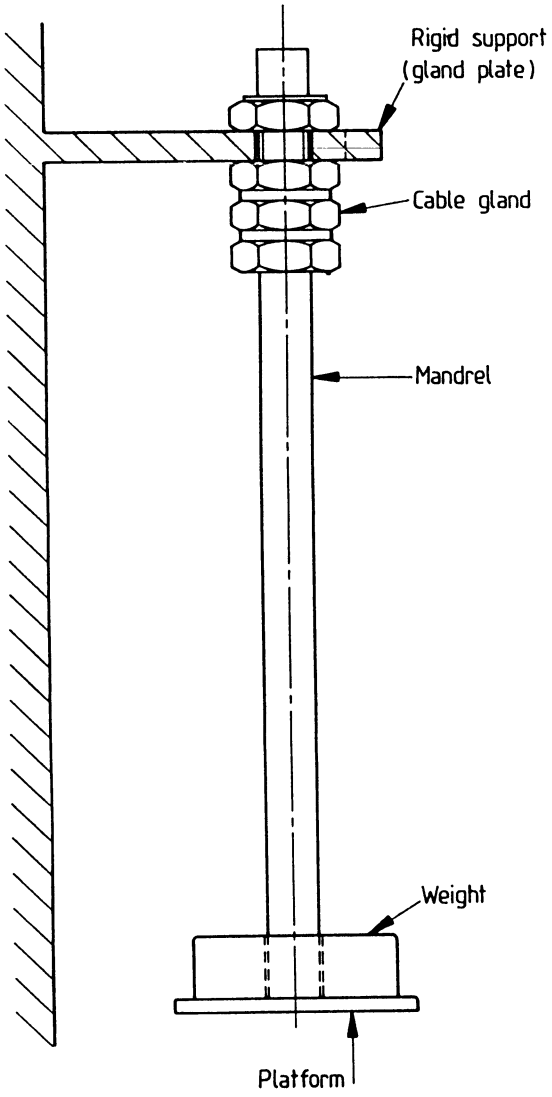
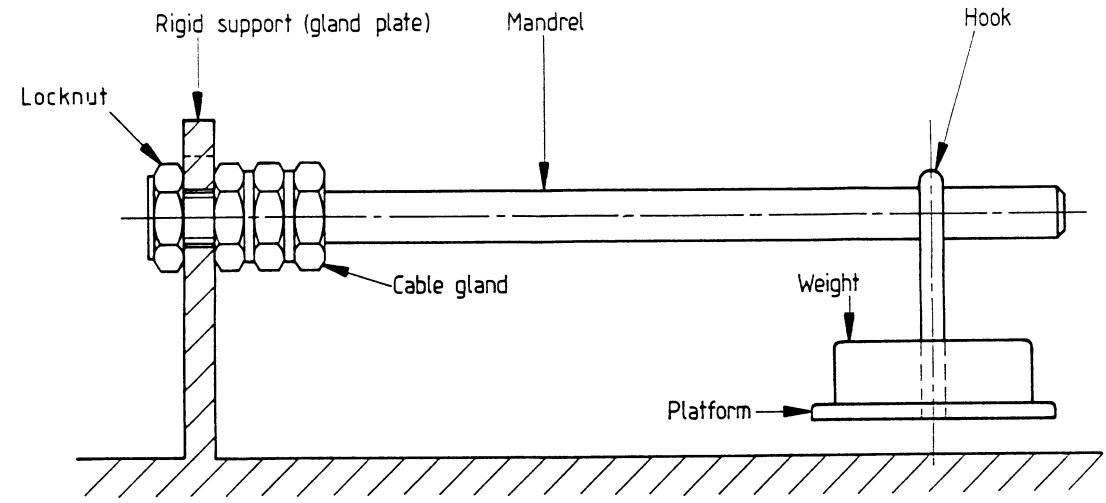


Figure 2 — Load test for type AK glands



NOTE It is essential that the mandrel does not enter the plane of the rigid support.

Figure 3 — Radial load test

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Publications referred to

BS 192, *Specification for open-ended wrenches.*

BS 903, *Methods of testing vulcanized rubber.*

BS 903-A6, *Determination of compression set after constant strain.*

BS 903-A26, *Determination of hardness.*

BS 2782, *Methods of testing plastics.*

BS 2782-5, *Optical and colour properties, weathering.*

BS 2782:Method 540B, *Methods of exposure to laboratory light sources, (xenon arc lamp, enclosed carbon arc lamp, open-flame carbon arc lamp, fluorescent tube lamps) .*

BS 2782:Method 551A, *Determination of the effects of exposure to damp heat, water spray and salt mist.*

BS 3643, *ISO metric screw threads.*

BS 3643-1, *Principles and basic data.*

BS 3643-2, *Specification for selected limits of size.*

BS 4727, *Glossary of electrotechnical, power, telecommunication, electronics, lighting and colour terms.*

BS 4727-2, *Terms particular to power engineering.*

BS 4727:Group 08, *Electric cable terminology.*

BS 5420, *Specification for degrees of protection of enclosures of switchgear and controlgear for voltages up to and including 1 000 V a.c. and 1 200 V d.c..*

BS 5467, *Specification for cables with thermosetting insulation for electricity supply for rated voltages of up to and including 600/1 000 V and up to and including 1 900/3 300 V.*

BS 5490, *Specification for classification of degrees of protection provided by enclosures.*

BS 5501, *Electrical apparatus for potentially explosive atmospheres*[3] .

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 cables and cords.*

BS 6622, *Specification for cables with extruded cross-linked polyethylene or ethylene propylene rubber insulation for rated voltages from 3 800/6 600 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.*

DIN 40 430, *Steel conduit thread dimensions*[4].

Fed-Std H.28, *Screw thread standards for Federal Services*[4].

[3] Referred to in the foreword only

[4] Available from BSI Sales Departments, BSI, Linford Wood, Milton Keynes Mk14 6LE.

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