BRITISH STANDARD

BS 6121-1:2005

Mechanical cable glands —

Part 1: Armour glands — Requirements and test methods

ICS 21.140

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee GEL/20, Electric cables, to Subcommittee GEL/20/11/1, Cable glands, upon which the following bodies were represented:

BEAMA Ltd. Council for Electrical Equipment

BEAMA Installation Ltd.

British Approvals Service for Cables

British Cables Association

Gland Manufacturers' Technical Committee

Co-opted members

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 21 February 2005

First published as BS 6121 February 1973
Second edition December 1987
Third edition January 1990
Fourth edition February 2005

The following BSI references relate to the work on this British Standard:
Committee reference GEL/20/11/1
Draft for comment 98/263249 DC

ISBN 0 580 45374 X

Amendments issued since publication

Amd. No.	Date	Comments

Contents

Foreword

This part of BS 6121 has been prepared by Subcommittee GEL/20/11/1. Together with BS EN 50262:1999, it supersedes BS 6121-1:1989 which is withdrawn.

This revision of BS 6121-1 covers only armour glands, which are outside the scope of BS EN 50262 because they do not provide a seal.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its 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 5 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

1 Scope

This part of BS 6121 specifies performance requirements for armour glands for use with armoured cables.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 21:1985 including Amendment 1:1990, *Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions).*

BS 31:1940 including Amendments 1:1965, 2:1967, 3:1969, 4:1970 and 5:1987, *Specification for steel conduit and fittings for electrical wiring.*

BS EN 50262:1999 including Amendments 1:2001 and 2:2004, *Cable glands for electrical installations.*

BS EN 60423:1995, *Conduits for electrical purposes — Outside diameters of conduits for electrical installations and threads for conduits and fittings.*

BS EN 60529:1992 including Amendments 1:1993 and 2:2000, *Degrees of protection provided by enclosures (IP code).*

BS EN ISO 228-1:2003, *Pipe threads where pressure tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation.*

BS ISO 965-3, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads.*

ANSI/ASME B1.20.1:1983, *Pipe threads, general purpose (inch).*

3 Terms and definitions

For the purposes of this part of BS 6121, the terms and definitions given in BS EN 50262:1999 and the following apply.

3.1
armour gland
device which anchors the armour of an armoured cable at the cable entry point of an enclosure and provides an electrical connection to the armour, but which does not provide a seal

4 Requirements

4.1 Construction

4.1.1 *General*

Armour glands shall not have any internal sharp edges, which might cause damage to any cables, flexible cables or insulated conductors which pass through them in service.

Those parts of an armour gland that are used for tightening or for holding during installation shall be of hexagonal form.

External projecting edges and corners of armour gland components shall be smooth and free from burrs.

4.1.2 *Entry thread*

The entry thread of metric armour glands in sizes up to M75 shall be constructed in accordance with BS EN 60423:1995, Table 1. For sizes greater than M75 the entry thread shall be constructed in accordance with BS ISO 965-3 and with a thread pitch of 1.5 mm, 2 mm or 3 mm.

The entry thread of non-metric armour glands shall be in accordance with one of the following standards:

— BS 31:1940;

— BS EN ISO 228-1:2003;

— BS 21:1985;

or shall be of one of the following types:

— NPSM conforming to ANSI/ASME B1.20.1:1983;

— NPT conforming to ANSI/ASME B1.20.1:1983.

4.2 Performance

NOTE Armour glands specified in this standard are, in normal use, considered to be passive in respect of electromagnetic emission and immunity, so no requirements for these parameters are specified.

4.2.1 *Mechanical performance*

NOTE The test sequence is given in **5.4**.

4.2.1.1 *Cable retention*

After testing in accordance with BS EN 50262:1999, **10.4.1**, but using the force specified in Table 1, the cable shall not have moved relative to either of the glands by more than 3 mm at the end of a 5 min test.

Table 1 — Forces for cable retention test

Cable diameter mm	Force N
>4 ≤8	640
>8 ≤11	880
>11 ≤16	1 280
>16 ≤23	1 840
>23 ≤31	2 480
>31 ≤43	3 440
>43 ≤55	4 400
>55 ≤70	5 600
>70	80D[a]
[a] D is the actual cable diameter in millimetres (mm).	

4.2.1.2 *Resistance to impact*

After being assembled on a piece of cable having the smallest armour thickness in the range for which the gland is suitable, as stated in the information supplied by the manufacturer, and being subjected to the test specified in BS EN 50262:1999, **9.4**, using the impact values applicable to the impact category that the gland is claimed to be, as stated by the manufacturer, the armour gland shall show no visible signs of damage.

4.2.1.3 *Resistance to excess torque*

For armour glands that are assembled by being screwed together, after being assembled on a piece of cable having the largest armour thickness in the range for which the gland is suitable, as stated in the information supplied by the manufacturer, using a torque 1.5 times the installation torque given in the manufacturer's instructions, the armour gland shall show no visible signs of damage.

4.2.2 *Electrical performance*

NOTE The test sequence is given in **5.4**.

4.2.2.1 *Equipotential bonding*

When armour glands which are claimed by the manufacturer to provide equipotential bonding are tested in accordance with BS EN 50262:1999, **10.1**, in no case shall the resistance exceed 0.1 Ω.

4.2.2.2 *Electrical connection to metallic layer(s) of cable*

When armour glands are tested in accordance with BS EN 50262:1999, **10.2**, the resistance between the gland and the armour shall not exceed 0.1 Ω.

When armour glands which are claimed by the manufacturer to provide an electrical connection to metallic layer(s) of the cable other than the armour are tested in accordance with BS EN 50262:1999, **10.2**, the resistance between the gland and each metallic layer of the cable other than the armour shall not exceed 0.1 Ω.

4.2.2.3 *Insulation resistance*

When armour glands which are claimed by the manufacturer to have insulating characteristics are conditioned in accordance with BS EN 50262:1999, **10.3.1**, and then tested in accordance with BS EN 50262:1999, **10.3.2**, the insulation resistance shall be not less than 5 MΩ.

4.2.2.4 *Protective connection to earth*

When armour glands which are claimed to have a protective connection to earth are tested in accordance with BS EN 50262:1999, **10.4.2**, using the current specified for the relevant category of gland as given in BS EN 50262:1999, Table 5, for 1 s, the following requirements shall be met.

— During the test, the flow of current shall not be interrupted.

— After the test there shall be a contact resistance between the armour close to the gland and the earthing connections, measured with a source of at least 10 A, of 0.1 Ω or less.

— After the test the gland shall not exhibit any cracks visible to normal or corrected vision without magnification and shall not have any loose parts or show evidence of deformation.

4.2.3 *Resistance to environmental factors*

NOTE The test sequence is given in **5.4**.

4.2.3.1 *Ingress protection*

Armour glands shall provide a minimum degree of protection of IP2X when tested in accordance with BS EN 60529:1992.

4.2.3.2 *Resistance to abnormal heat*

When exposed non-metallic parts of the armour gland are tested in accordance with BS EN 50262:1999, **12.2**:

— there shall be no flame or glowing which does not extinguish within 30 s after removing the glowwire;

— there shall be no ignition of the tissue paper or scorching of the board.

4.2.3.3 *Resistance to salt and sulfur dioxide laden atmospheres*

When armour glands, other than armour glands made wholly of stainless steel or brass, which are claimed to be resistant to salt and sulfur dioxide laden atmospheres, are tested in accordance with BS EN 50262:1999, **12.3**, the glands shall show no visible signs of corrosion.

21 February 2005

5 Test samples, test conditions and test schedule

5.1 General

Unless otherwise specified for a particular test, tests shall be carried out on armour glands assembled and mounted in accordance with the manufacturer's instructions.

There shall be no adjustment between or during the tests.

NOTE Re-mounting of the sample between tests is not considered to be adjustment.

5.2 Temperature

Unless otherwise specified for a particular test, the tests shall be carried out at an ambient temperature of (20 ± 5) °C.

5.3 Number of samples

Unless otherwise specified for a particular test, three samples shall be subjected to the relevant tests in accordance with Table 2.

When a range of armour glands is being tested which differ only in size, three samples each of the largest and the smallest sizes and one sample each of all other sizes of the range shall be subjected to the relevant tests.

5.4 Test schedule

The tests shall be carried out in accordance with the schedule given in Table 2.

Table 2 — Test samples and test schedule

Sample group	Test sequence	Subclause
A	Marking	**6.1**
	Equipotential bonding	**4.2.2.1**
	Resistance to abnormal heat	**4.2.3.2**
B	Cable retention (minimum armour thickness)	**4.2.1.1**
	Resistance to impact	**4.2.1.2**
	Ingress protection	**4.2.3.1**
C	Cable retention (maximum armour thickness)	**4.2.1.1**
	Resistance to excess torque	**4.2.1.3**
	Ingress protection	**4.2.3.1**
D	Electrical connection to metallic layer(s) of cable	**4.2.2.2**
E	Cable retention (minimum and maximum armour thickness)	**4.2.1.1**
	Protective connection to earth	**4.2.2.4**
F	Insulation resistance	**4.2.2.3**
G	Resistance to salt and sulfur dioxide laden atmospheres	**4.2.3.3**

5.5 Clearance holes in test apparatus

Unless otherwise specified by the manufacturer or supplier, the diameter of clearance holes used in test apparatus shall be calculated in accordance with the following formula:

$$d = t + 0.5^{+0.2}_{-0.4}$$

where

d is the clearance hole diameter, in millimetres (mm);

t is the maximum diameter of the entry thread, in millimetres (mm).

5.6 Repeat testing in the event of failure

If any single specimen fails a test, that test and any preceding one which might have influenced the results of the test shall be repeated. Repeat tests shall be made in the required sequence on a full set of three specimens of the relevant size. If all the specimens pass the repeat tests, the item shall be deemed to conform to the standard. If one specimen fails the repeat tests, the item shall be deemed not to conform to the standard.

6 Marking and information

6.1 Marking

Each armour gland shall be marked in accordance with BS EN 50262:1999, **7.1**.

Non-metric armour glands shall also be marked with the entry thread size and type.

NOTE An example of this would be: ½″ NPT.

After testing in accordance with BS EN 50262:1999, **7.2**, the marking on the armour glands shall be legible when viewed with normal or corrected vision without magnification.

After the glands have been subjected to testing in accordance with the schedule specified in **5.4**, the marking shall remain legible.

6.2 Information

The manufacturer shall provide with each package of armour glands an information sheet giving at least the following information:

a) the cable acceptance range (i.e. the maximum cable diameter and the minimum and maximum armour thickness with which the gland can be used);

b) the installation torque for glands that are assembled by being screwed together;

c) entry thread length;

d) impact category;

e) instructions for safe assembly of the armour gland;

f) entry thread specification (if not metric);

g) if the gland provides equipotential bonding;

h) if the gland provides an electrical connection to metallic layer(s) of the cable other than the armour;

i) if the gland has insulating characteristics;

j) if the gland provides a protective connection to earth, and if so the category;

k) the degree of ingress protection provided;

l) if the gland is resistant to salt and sulfur dioxide laden atmospheres.

NOTE An example of item f) would be: ANSI/ASME B1.20.1:1983.

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL