

LV and MV accessories for power cables with rated voltage from 0.6/1 kV ($U_m = 1.2$ kV) up to and including 20.8/36 kV ($U_m = 42$ kV) —

**Part 4: Test requirements for MV
accessories —**

**Section 4.1: Accessories for cables with
extruded insulation**

(Implementation of part of HD 629.1)

ICS 29.060.20; 29.120.20

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 (formerly GEL/20/7), Cable accessories, upon which the following bodies were represented:

- Association of Consulting Engineers
- BEAMA Electrical Cable and Conductor Accessory Manufacturers' Association
- British Approvals Service for Cables
- British Cables Association
- Electrical Contractors' Association
- Electrical Installation Equipment Manufacturers' Association (BEAMA Ltd.)
- Electricity Association
- ERA Technology Ltd.
- Institution of Lighting Engineers
- London Underground Ltd.
- Railway Industries Association

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 August 1998

© BSI 2 May 2003

Amendments issued since publication

Amd. No.	Date	Comments
13899	2 May 2003	See foreword

The following BSI references relate to the work on this standard:
Committee reference GEL/20/11
Draft for comment 93/205204 DC

ISBN 0 580 29567 2

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Operating conditions	1
5 Requirements	2
6 Test assemblies	2
7 Type testing	3
8 Test results	4
Annex A (informative) Identification form for a test cable (see Note to 6.1)	13
Bibliography	15
Figure 1 — Test arrangements for terminations	10
Figure 2 — Test arrangements for joints	11
Figure 3 — Test arrangements for stop ends	12
Figure A.1 — Identification of a test cable	13
Table 1 — Summary of approvals for different cable insulations	4
Table 2 — Indoor terminations for extruded insulation cables (including shrouded terminations) (see Figure 1)	5
Table 3 — Outdoor terminations for extruded insulation cables (see Figure 1)	6
Table 4 — Joints for extruded insulation cables (see Figure 2)	7
Table 5 — Stop ends for extruded insulation cables (see Figure 3)	8
Table 6 — Additional tests for conformity of non-circular conductor profile and/or insulation screen (see 7.2.2 and 7.2.4)	8
Table 7 — Additional tests for conformity of smallest and largest cable cross-section (see 7.2.1)	9
Table 8 — Summary of test voltages and requirements (see 7.5)	9

Foreword

BS 7888 was prepared by Technical Subcommittee GEL/20/11. It implements the nationally applicable parts of Harmonization Documents HD 623, 628, 629.1 and 629.2 published by the European Committee for Electrotechnical Standardization (CENELEC) in accordance with the decision of the CENELEC Technical Board.

BS 7888 applies to accessories for power cables with rated voltage U_0/U from 0.6/1 kV ($U_m = 1.2$ kV) up to and including 20.8/36 kV ($U_m = 42$ kV) and is published as a series of separate parts and sections, as listed in the foreword to BS 7888-1.

BS 7888-4.1 implements the relevant requirements of HD 629.1 and is to be read in conjunction with BS 7888-1 and BS 7888-2.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to text carry the number of the amendment. For example, text altered by amendment no. 1 is indicated by **A1** **A1**.

WARNING. The methods of test referred to in this British Standard do not detail all precautions necessary to meet the requirements of the Health and Safety at Work, etc., Act 1974. Attention should be paid to any appropriate safety precautions and the tests should only be performed by authorized personnel.

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 15 and a back cover.

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

1 Scope

This British Standard specifies performance requirements, verified by type testing, for cable accessories that are for use on extruded insulation power cables specified in BS 7870-4.

The accessories covered by this standard are as follows:

- indoor and outdoor terminations of all designs, including terminal boxes;
- straight joints, branch joints and stop ends of all designs, suitable for use underground or in air.

Neither accessories for special applications such as submarine cables, ships cables or hazardous situations (explosive environments, fire resistant cables or seismic conditions) nor transition joints connecting extruded insulation cables (BS 7870-4) to paper insulated cables (BS 7894) fall within the scope of this section of BS 7888.

NOTE Transition joints for connecting extruded insulation cables to paper insulated cables are dealt with in BS 7888-4.2.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of BS 7888. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 4579-1, *Specification for performance of mechanical and compression joints in electric cable and wire connectors — Part 1: Compression joints in copper conductors.*

BS 4579-3, *Specification for performance of mechanical and compression joints in electric cable and wire connectors — Part 3: Mechanical and compression joints in aluminium conductors.*

BS 7821-2.2, *Three phase oil-immersed distribution transformers, 50 Hz, from 50 to 2 500 kVA with highest voltage for equipment not exceeding 36 kV — Part 2: Distribution transformers with cable boxes on the high voltage and/or low voltage side — Section 2.2: Cable boxes of type 1 for use on distribution transformers meeting the requirements of BS 7821-2.1.*

BS 7870-4 (all sections), *LV and MV polymeric insulated cables for use by distribution and generation utilities — Part 4: Specification for distribution cables with extruded insulation for rated voltages of 11 kV and 33 kV.*

BS 7888-2, *LV and MV accessories for power cables with rated voltage from 0.6/1 kV ($U_m = 1.2$ kV) up to and including 20.8/36 kV ($U_m = 42$ kV) — Part 2: Methods of test.*

BS 7888-4.2, *LV and MV accessories for power cables with rated voltage from 0.6/1 kV ($U_m = 1.2$ kV) up to and including 20.8/36 kV ($U_m = 42$ kV) — Part 4: Test requirements for MV accessories — Section 4.2: Accessories for cables with impregnated paper insulation.*

BS 7894, *MV impregnated paper insulated cables of rated voltage 6.35/11 kV, 12.7/22 kV and 19/33 kV for distribution utilities.*

[A1] BS 7933, *Electric cables — Accessories — Material characterization.* [A1]

3 Terms and definitions

For the purposes of this section of BS 7888, the definitions given in BS 7888-1:1998, Clause 3 apply.

4 Operating conditions

4.1 General

The service operating conditions of accessories shall be compatible with the service operating conditions of the cable.

4.2 Rated voltage

The rated voltages U_0/U (U_m) of the accessories covered by this standard are 3.8/6.6(7.2) kV; 6.35/11(12) kV; 12.7/22(24) kV; 19/33(36) kV, where:

- U_0 is the rated power-frequency voltage between conductor and earth or metallic screen, for which the cable is designed;
- U is the rated power-frequency voltage between conductors for which the accessory may be used;
- U_m is the maximum value of the highest system voltage for which the cable accessory may be used.

4.3 Current rating

The continuous current rating of a termination or joint for extruded insulation power cables shall be in accordance with the appropriate cable specified in BS 7870-4 and shall be suitable for operation at the rated current and under short-circuit fault conditions at the temperatures stated therein.

5 Requirements

5.1 General

Accessories within the scope of this British Standard shall be type tested in accordance with Clause 7 for conformity to the requirements given in Table 2, Table 3, Table 4, Table 5, Table 6, Table 7 and Table 8, as appropriate.

All the test samples shall meet the requirements of the relevant test sequence.

NOTE Accessories which the manufacturer can demonstrate to have provided satisfactory service experience do not need to be type tested.

A1 The publication of this standard does not invalidate existing approvals. However, products approved to such earlier standards or specifications shall not claim approval to this standard unless specifically tested to it. **A1**

5.2 Immersion requirements for joints and stop ends

Joints and stop ends shall be tested in accordance with Clauses 5, 9 and 15 of BS 7888-2:1998 for their ability to withstand a head of water of 1 m.

Where a branch joint is being tested, only the main cable shall carry heating current.

5.3 **A1** Dynamic short-circuit performance

In respect of short-circuit performance, accessories shall be classed as:

- | | |
|---------|--|
| Class 1 | Three core accessories designed for peak currents above 63 kA and including 80 kA.
The test current shall be 80 kA peak. |
| Class 2 | Three core and single core accessories designed for peak currents above 80 kA up to and including 100 kA.
The test current shall be 100 kA peak. |
| Class 3 | Three core and single core accessories designed for peak currents above 100 kA up to and including 125 kA.
The test current shall be 125 kA peak. A1 |

6 Test assemblies

6.1 Cables

The cables used for testing shall conform to BS 7870-4.

NOTE It is recommended that the test cables be identified using the form illustrated in Annex A.

6.2 Connectors

Connectors used within the accessory shall conform to BS 4579-1 and BS 4579-3, as appropriate.

6.3 Cable cross-section

Unless otherwise specified, the cable cross-section shall be 120 mm², 150 mm² or 185 mm².