

Specification for

**Cold-pour resin-based
compound for use as
a filling medium in
terminating cables in
enclosures for voltages
not exceeding 11 kV for
use in coal mines**

Confirmed
January 2011

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Mining and Quarrying Requisites Standards Policy Committee (MQE/-) to Technical Committee MQE/14, upon which the following bodies were represented:

- Association of British Mining Equipment Companies
- British Cable Makers' Confederation
- British Coal Corporation
- Council for Electrical Equipment for Flammable Atmospheres (BEAMA Ltd.)
- Health and Safety Executive
- Institution of Mining Electrical and Mining Mechanical Engineers
- Rotating Electrical Machines Association (BEAMA Ltd.)
- Transmission and Distribution Association (BEAMA Ltd.)

This British Standard, having been prepared under the direction of the Mining and Quarrying Requisites Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 31 December 1990

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The following BSI references relate to the work on this standard:
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Amendments issued since publication

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Foreword

This British Standard has been prepared under the direction of the Mining and Quarrying Requisites Standards Policy Committee. It covers the requirements for a resin-based compound used as a cold-pour filling medium and provides for an alternative to the bituminous compounds specified in BS 1858. Such a compound is supplied in a kit form capable of being used above or below ground. Purchasers ordering in accordance with this standard are advised to specify in their purchasing contract that the manufacturer operates a quality system in compliance with the appropriate Part of BS 5750, or suitable equivalent, to ensure themselves that products claimed to comply with this standard consistently achieve the required level of quality.

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

Enquiries as to the availability of third party certification schemes will be forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

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. Attention is drawn to the Health and Safety at Work etc. Act 1974, the Mines and Quarries Act 1954, the Regulations made under these Acts, and also any other appropriate statutory requirements or byelaws. These place responsibility for complying with certain specific safety requirements on the manufacturer and the user. The address of the recognized certification authority in the United Kingdom for Group I (coal mining) apparatus for flameproof purposes is as follows:

Health and Safety Executive
Mining Equipment Certification Service
Harpur Hill
Buxton
Derbyshire SK17 9JN

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, 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 British Standard specifies the form of supply, properties and type tests for a resin-based compound supplied in kit form, suitable as a cold-pour filling medium when terminating electric cables in enclosures primarily used in mines; in particular, but not exclusively, for cable couplers complying with BS 3454, BS 3905 and BS 7019.

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

2 Form of supply

2.1 The compound shall be supplied in kit form which shall have a declared "use by" date and a minimum shelf life of 12 months. The kit shall consist of matched quantities of constituents supplied in a single container capable of being used as a mixing vessel. The kit shall contain the storage, mixing, safe use and disposal instructions, any necessary disposable protective clothing for use and, where applicable, a mixing implement.

NOTE 1 The manufacturer should ensure that all the packages in which the compound constituents are supplied, and the information given in these packages, comply with the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984, where applicable.

NOTE 2 The manufacturer should make available all such information concerning the compound as will enable the purchaser to use the constituents in a safe manner in accordance with the requirements of the Health and Safety at Work, etc. Act 1974 and to dispose of unwanted compound and used containers in accordance with the requirements of the Control of Pollution Act 1974.

2.2 When the container is metallic, the material shall be one of the following:

- a) a corrosion resistant ferrous alloy; or
- b) a non-ferrous metal, other than aluminium, magnesium, or titanium; or
- c) an alloy containing the metals aluminium, magnesium, titanium, either singly or in combinations, providing that the total content of these three constituents does not exceed 15 % by mass of the alloy and the combined content of magnesium and titanium does not exceed 6 % by mass of the alloy.

NOTE These limits have been imposed to avoid the hazards of incendive sparking due to friction between rusted steel or iron and the metals referred to.

3 General properties of the compound

NOTE The manufacturer is to provide, when required, data on the properties of the compound and its constituent parts as given in Appendix B. A requirement for a data sheet should be specified on the enquiry and/or order.

3.1 The compound shall comply with clause 4.

NOTE The compound should be compatible with the component parts of the cable terminating system and it is incumbent upon the purchaser to consult the manufacturer to ensure compatibility.

3.2 When constituent parts of the compound are added together in the proportions supplied by the manufacturer, and following his instructions, they shall be capable of being mixed and poured throughout the ambient temperature range -5°C to $+40^{\circ}\text{C}$.

NOTE The compound will be more difficult to pour and require longer curing times at the lower end of the temperature range. Appendix A gives guidance on pouring and curing.

3.3 The maximum temperature of the exothermic reaction resulting from mixing when tested in accordance with item c) of 6.3.1 of BS 6910-1:1988 shall not exceed 80°C .

3.4 Polyurethane resin filling systems shall have a vapour pressure of less than 6.66×10^{-3} Pa (5×10^{-5} mmHg) measured at 25°C .

NOTE Isocyanates are basic constituents used in the production of polyurethanes and are covered by the Control of Substances Hazardous to Health (COSHH) Regulations 1988. The concentration of isocyanate in the atmosphere arising from polyurethane resin filling systems when used in accordance with the supplier's recommendations should not exceed the maximum exposure limits specified in the current Health and Safety Guidance Note EH40 "Occupational Exposure Limits".

4 Type tests

4.1 Material property tests

4.1.1 General

Type tests on prepared samples of the compound shall be carried out in accordance with 4.1.2 to 4.1.8.

4.1.2 Insulation resistance

Using a cell as shown in Figure 1, the insulation resistance of the mixed compound shall be determined between 9 min and 11 min after the addition of the hardener at an ambient temperature of $22 \pm 2^{\circ}\text{C}$.

The insulation resistance at 12 kV d.c. shall be not less than 100 M Ω .