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Specification for

**Single-phase street lighting
fuses (cut-outs) for
low-voltage public electricity
distribution systems —
25 A rating for highway power
supplies and street furniture**

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- Association of Manufacturers of Power Generating Systems
- BEAMA Electrical Cable and Conductor Accessory Manufacturers' Association
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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
Specification	
1 General	1
1.1 Scope	1
1.2 <i>Vacant</i>	1
1.3 References	1
2 Definitions	1
3 Classification	2
4 Characteristics	2
4.1 General	2
4.2 Type of equipment	2
4.3 Rated and limiting values for the main circuit	2
5 Product information	3
5.1 Nature of information	3
5.2 Marking	3
6 Normal service and mounting conditions	3
6.1 Normal service conditions	3
6.2 <i>Vacant</i>	3
6.3 Mounting	3
7 Constructional and performance requirements	3
7.1 Constructional requirements	3
7.2 Performance requirements	8
8 Tests	8
8.1 Kinds of tests	8
8.2 Conformity with constructional requirements	8
8.3 Performance	9
Tables	
101 Classification of fuse-units	2
102 Terminals: number and disposition	7
103 Type tests	11
104 Maximum temperature-rise at rated current	12
Figures	
101 Typical pillar and lug terminals	4
102 Fuse-links for street lighting fuses	5
103 Time current zones for 6 A, 16 A and 25 A fuse-links	6
104 Time current zones for 10 A and 20 A fuse-links	6
105 Ball pressure test apparatus	10
106 Apparatus for impact test	10
107 Diagrams of electrical load cycling test rigs for test 6	15
List of references	Inside back cover

Foreword

This British Standard has been prepared by Subcommittee PEL/17/2. It is based on the Electricity Association Technical Specification 12-19, and has been updated to reflect current practice and standards. It supersedes BS 7654 : 1993 which is withdrawn.

This standard was originally submitted to the European Committee for Electrotechnical Standardization (CENELEC) under the Vilamoura Procedure, but in the absence of interest from other national committees it was derogated to the United Kingdom for publication as a national standard.

This standard is to be read in conjunction with BS EN 60947-1 : 1992 and therefore, for ease of cross-reference, it has clause numbering following the style of BS EN 60947-1. Subclauses, tables, or figures which are additional to those in BS EN 60947-1 are numbered starting from 101.

Additional information on requirements and tests, etc. for equipment for use by lighting and highway authorities has been incorporated into this second edition of BS 7654.

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 16, an inside back cover and a back cover.

Specification

1 General

1.1 Scope

This British Standard specifies the requirements for street lighting fuse-units (cut-outs) of 25 A rating for the protection of power supplies to highway lighting and street furniture. The fuse-units (cut-outs) are for use on single-phase, or one phase of a three-phase low-voltage public electricity supply system with a maximum voltage up to 440 V a.c. and at a frequency of 50 Hz, the neutral being effectively earthed. The fuse-units may also be used on distribution systems owned by lighting and highway authorities.

The provisions of the general rules dealt with in BS EN 60947-1 are applicable to this standard when specifically called for.

NOTE. Clauses and subclauses, tables, figures and appendices of the general rules thus applicable are identified by reference to BS EN 60947-1, for example 1.2.3 of BS EN 60947-1, table 1 of BS EN 60947-1 or appendix A of BS EN 60947-1.

1.2 Vacant

1.3 References

1.3.1 Normative references

This British Standard incorporates by dated or updated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed on the inside back cover. For a dated reference, only the edition cited applies; any subsequent amendments to or revisions of the publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the publication applies together with any amendments.

1.3.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

2 Definitions

For the purposes of this British Standard, the definitions given in BS EN 60947-1 : 1992 apply, together with the following which have been reproduced from BS 3456 : Part 201 : 1990, BS 4727 : Part 2 : Group 06 : 1985 and BS EN 60269-1 : 1994.

2.1 fuse-base (fuse-mount) (2.1.2 of BS EN 60269-1 : 1994)

The fixed part of a fuse provided with terminals for connection to the system. The fuse-base comprises all the parts necessary for installation.

The part of a fuse (including the fuse-elements) intended to be replaced after the fuse has operated.

2.2 fuse (206 8001 of BS 4727 : Group 2.06 : 1985)

A device that, by fusion of one or more of its specifically designed and proportioned components, opens the circuit in which it is inserted by breaking the current when this exceeds a given value for a sufficient time. The fuse comprises all the parts that form the complete device.

2.3 fuse-carrier contact (2.1.5 of BS EN 60269-1 : 1994)

A conducting part of a fuse-carrier connected to a fuse-link contact and designed to engage with a fuse-base contact.

2.4 fuse-link contact (2.1.8 of BS EN 60269-1 : 1994)

A conducting part of a fuse-link designed to engage with a fuse-base contact or with a fuse-carrier contact.

2.5 fuse-base contact (fuse-mount contact) (2.1.3 of BS EN 60269-1 : 1994)

A conducting part of a fuse-base connected to a terminal designed to engage with a fuse-carrier contact or with a fuse-link contact.

2.6 basic insulation (2.2.12 of BS 3456 : Part 201 : 1990)

The insulation applied to live parts to provide basic protection against electric shock.

2.7 supplementary insulation (2.2.13 of BS 3456 : Part 201 : 1990)

An independent insulation applied in addition to the basic insulation in order to ensure protection against electric shock in the event of a failure of the basic insulation.

2.8 double insulation (2.2.14 of BS 3456 : Part 201 : 1990)

Insulation comprising both basic insulation and supplementary insulation.

2.9 reinforced insulation (2.2.11 of BS 3456 : Part 201 : 1990)

A single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation under the conditions specified in this standard.

NOTE. The term insulation system does not imply that the insulation must be one homogeneous piece. It may comprise several layers which cannot be tested singly as supplementary or basic insulation.

2.10 fuseway

A fuseway within a fuse-unit is an outgoing circuit in which the protective device is a fuse that is connected to a pole of the system of distribution fed into the fuse-unit.

2.11 integral fuse-carrier and neutral/earth cover.

The removable part of a fuse-unit designed to carry a fuse-link(s) having an integral extension cover plate which shields the fuseway(s) and neutral and earth or neutral/earth terminals when it is inserted into the fuse-unit.

3 Classification

The fuse-unit type shall be classified in accordance with table 101.

4 Characteristics

Clause 4 of BS EN 60947-1 applies only in relation to the following characteristics, and with deletions and additions to the subclauses as indicated:

Rated operational voltage U_e

Rated insulation voltage U_i

Rated impulse withstand voltage U_{imp}

Rated uninterrupted current I_u

Rated frequency

Rated conditional short-circuit current

4.1 General

Subclause 4.1 of BS EN 60947-1 applies.

4.2 Type of equipment

Subclause 4.2 of BS EN 60947-1 applies.

4.3 Rated and limiting values for the main circuit

Subclause 4.3 of BS EN 60947-1 applies modified as follows:

Deletions:

4.3.2.1 Conventional free air thermal current (I_{th})

4.3.2.2 Conventional enclosed thermal current (I_{the})

4.3.4 Rated duties

4.3.5 Normal load and overload characteristics

4.3.6 Short-circuit characteristics

Additions:

4.3.2.4.101 Fuse-units

A fuse-unit shall be capable of carrying current up to its rated uninterrupted current of 25 A, and the currents associated with the operation under fault conditions of any fuse-link which the fuse-units are designed to accommodate. In addition, the incoming phase and neutral terminal assemblies shall be capable of carrying twice the rated uninterrupted current to allow service looping.

Table 101. Classification of fuse-units					
Classification	Incoming terminal type	Separate neutral and earth terminals	Combined neutral and earth terminals	Number of fuseways	Poles
Type 1	Pillar	Yes	No	One	Single
Type 1L	Lug				
Type 2	Pillar	No	Yes		
Type 2L	Lug				
Type 3	Pillar	No	Yes	Two	
Type 3L	Lug				
Type 4	Pillar	Yes	No	One	Double
Type 4L	Lug				
Type 5	Pillar	No	Yes		
Type 5L	Lug				
Type 6	Pillar	Yes	No	Two	
Type 6L	Lug				
NOTE 1. The fuse-unit includes a cable termination cover which may be separate from, or integral with, the fuse-base.					
NOTE 2. A double-pole type of fuse-unit provides disconnection of the outgoing phase and neutral terminals from the incoming phase and neutral terminals.					
NOTE 3. All fuse-units are provided with pillar type terminals for the connection of outgoing conductors, unless otherwise agreed between manufacturer and user.					

5 Product information

5.1 Nature of information

Subclause 5.1 of BS EN 60947-1 applies with the following modification.

Characteristics:

Delete the text and substitute the following:

- rated operational voltage (U_e) 250 V a.c. (see 4.3.1.1);
- rated uninterrupted current (I_n) (see 4.3.2.4.101);
- the value of the rated frequency ~ 50 Hz;
- rated insulation voltage (U_i) 440 V a.c. r.m.s.;
- rated impulse withstand voltage (U_{imp}) 6 kV;
- rated conditional short-circuit current 16 kA a.c. r.m.s. (see 7.1.2.101);
- IP code (see appendix C of BS EN 60947-1 and 7.1.11);
- pollution degree 3.

5.2 Marking

The fuse-carrier shall be clearly and permanently marked in accordance with BS EN 60269-1, and shall be identified with its appropriate fuse-base and cable termination cover.

6 Normal service and mounting conditions

6.1 Normal service conditions

Subclause 6.1 of BS EN 60947-1 applies with the following modification and addition:

6.1.1 Ambient air temperature

Modification:

The requirements for the lower limit of the ambient temperatures are as follows.

For outdoor installed low-voltage switchgear and controlgear assemblies, the lower limit of the ambient air temperature shall be -25°C in accordance with BS EN 60439-1.

6.1.3.2 Pollution degree

Addition:

The fuse-units shall be suitable for operation in a pollution degree 3 environment.

6.2 Vacant

6.3 Mounting

Fuse-units shall be capable of being fixed to a 12 mm thick mounting board manufactured from material which is substantially non-hygroscopic and rot-resistant, by a minimum of two corrosion-proof, cross-head screws. Suitable screws shall be supplied with the fuse-unit.

7 Constructional and performance requirements

7.1 Constructional requirements

7.1.1 Materials

Subclause 7.1.1 of BS EN 60947-1 applies with the following addition.

For Class II appliances utilizing reinforced insulation, the insulating integral enclosure shall be in accordance with BS 3456 : Part 201

For all types of fuse-units, the materials shall have thermal properties which shall be verified in accordance with 8.2.1.101 to 8.2.103 and shall have a comparative tracking index (CTI), in accordance with BS 5901, of not less than 500.

7.1.2 Current carrying parts and their connections

Subclause 7.1.2 of BS EN 60947-1 applies with the following addition.

7.1.2.101 Fuse-carriers

The fuse carriers shall be suitable for accepting fuse-links up to 25 A rating which conform to the general requirements of BS EN 60269-1 and to the requirements of figures 101, 102, 103 and 104 of this standard.

The means provided for clamping the fuse-link shall not affect the requirement for constant pressure to be maintained between fuse-carrier contacts and fuse-base contacts.

Undue force shall not be required to withdraw the fuse-carriers from fuse-bases.

If the fuse-carrier dismantles to receive the fuse-link, the fixing components shall be captive, to facilitate reassembly.

Fuse-carrier contacts shall be fabricated from high conductivity copper, or equally suitable copper alloys.

Fuse-carriers shall have a rated uninterrupted current of 25 A and shall fit the fuse-bases in accordance with 7.1.2.102.

For types 1 and 2, it shall be possible to fit the fuse-carrier correctly to the fuse-base either way up, unless intentional asymmetry is obvious.

For types 3, 4, 5 and 6, it shall only be possible to fit the integral fuse-carrier and neutral earth cover to the fuse-base in the correct position.

For types 4, 5 and 6, it shall not be possible to fit the specified fuse-link in the neutral position.

7.1.2.102 Fuse-bases

Fuse-bases shall be suitable for use with fuse-carriers conforming to 7.1.2.101.

7.1.3 Clearances and creepage distances

The minimum distance for clearance and creepage shall be 6 mm.