
British Standard
Luminaires

Part 102. Particular requirements

**Section 102.51 Specification for luminaires with
type of protection N**

Luminaires

Partie 102. Règles particulières

Section 102.51 Luminaires à protection de type N — Spécifications

Leuchten

Teil 102. Besondere Anforderungen

Abschnitt 102.51 Leuchten der Schutzstufe N

Foreword

This British Standard has been prepared under the direction of the Electrical Illumination Standards Committee. It is a revision of BS 4533 : Section 2.1 : 1976 which is withdrawn.

This new Section is part of the general revision of BS 4533 which has been based closely on IEC Publication 598 'Luminaires'. However, the IEC does not plan to produce a section dealing with luminaires with type of protection N and this Section has been produced as the first of Sections starting at 51 whereas other Sections of Part 102 derived from IEC 598 : Part 2 use the same number as the equivalent international Sections.

This Section differs from Section 2.1 : 1976 in that it only specifies the requirements for luminaires with type of protection type N which are additional to the requirements for compliance with Sections 102.1, 102.2, 102.3, 102.5 or 102.22.

The standard is based on limitations of surface temperature and the use of components which:

- (a) are non-sparking in normal operation;
- (b) if they produce arcs or sparks capable of igniting a flammable atmosphere, are protected by enclosed-break, sealed, hermetically sealed or encapsulated devices or devices protected by one of the protection concepts Ex o, p, q or d.
- (c) in the case of hot surfaces, are protected by a restricted breathing enclosure.

Such luminaires may be categorized as group II apparatus as defined in BS 5345 : Part 1.

Certification. Attention is drawn to the Health and Safety at Work Act 1974, the Factories Act 1961, the Regulations made under these Acts, and other related statutory requirements or Byelaws. These place responsibility for complying with specific safety requirements on the manufacturer and the user. The usual way of demonstrating compliance with those requirements relating to the protection of electrical apparatus for use in potentially explosive atmospheres is the production of a certificate issued by a recognized certification authority. Further information is provided in BS 5345 and CP 1003.

For Group II (non-mining) apparatus the recognized authority for the certification and approval of electrical equipment for use in hazardous areas in the United Kingdom is:

Health and Safety Executive
BASEEFA
Harpur Hill
Buxton,
Derbyshire SL17 9JN

There are other recognized authorities in other countries.

Compliance with a British Standard does not of itself confer immunity from legal obligations.



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Luminaires
Part 102. Particular requirements
Section 102.51 Specification for luminaires
with type of protection N

Revised text

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Foreword

Delete the note referring to certification and substitute the following.

'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.'

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Clause B.6 Thermal tests

Delete paragraph 6 beginning 'This test is performed . . .' and substitute the following.

'This test is performed at the highest rated input frequency (or lowest if this produces a higher temperature rise within the ignitor) at 1.1 times the maximum rated supply voltage to the ignitor. For ignitors without a cut-out device, this is a continuous energization test. For ignitors with a cut-out device, the ignitor is operated on successive occasions with 15 s allowed between starting attempts.'

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Specification

51.1 Scope

This Section of BS 4533 specifies the additional requirements for type of protection N to be applied to luminaires that already comply with Sections 102.1, 102.2, 102.3, 102.5 or 102.22.

This Section does not apply to luminaires using low pressure sodium vapour lamps.

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

51.2 General requirements

The general requirements of the relevant Section of BS 4533 : Part 102 apply together with the additional requirements of this Section.

NOTE. If certification is sought, it is not intended that the certifying authority should check compliance with the relevant Section of BS 4533 : Part 102 but the manufacturer should declare that the luminaire does comply with the requirements of the relevant Section.

Each sample luminaire shall withstand all the relevant tests of this Section. In order to reduce the time of testing and to allow for any tests that may be destructive, the manufacturer may submit additional luminaires or parts of luminaires provided that these are in the same materials as the original sample and the results of the test are considered to be the same as if carried out on a single sample.

51.3 Definitions

For the purposes of this Section of BS 4533, the definitions given in section one of BS 4533 : Part 101 : 1981 apply, together with the following.

51.3.1 type of protection N. A type of protection applied to electrical apparatus such that, in normal operation, it is not capable of igniting a surrounding explosive atmosphere and a fault capable of causing ignition is not likely to occur.

51.3.2 enclosure. The external casing protecting the electrical and mechanical parts of the luminaire.

NOTE. The term excludes cables.

51.3.3 restricted breathing enclosure. An enclosure that is not hermetically sealed but is designed to prevent or restrict the entry of gases.

51.3.4 non-sparking device. A device constructed to minimize the risk of occurrence of arcs, sparks or hot spots capable of creating an ignition hazard during normal use. Normal use excludes the removal or insertion of components with the circuit energized.

51.3.5 enclosed-break device. A device in which the electrical make-and-break contact is within an enclosure that will withstand an internal explosion of the flammable gas or vapour that may enter it, without suffering damage and without communicating the internal explosion to the external flammable gas or vapour.

51.3.6 sealed device. A device so constructed that it cannot be opened during normal service and is sealed to effectively prevent entry of an external atmosphere.

51.3.7 hermetically sealed device. A sealed device in which the seal is made by fusion, e.g. soldering, brazing, welding or the fusion of glass to metal.

51.3.8 encapsulated device. A device in which the internal parts are completely immersed in thermosetting resin.

51.3.9 maximum surface temperature. The highest temperature that is attained in service under the most unfavourable conditions (including the recognized abnormal operation and fault conditions) by any part or surface of an electrical luminaire complying with this Section of BS 4533 which is able to produce an ignition of the surrounding atmosphere.

NOTE. For restricted breathing enclosures the surface to be considered is the external surface. For unrestricted breathing enclosures, surfaces within the enclosure are equally important if the explosive atmosphere has access to them.

51.4 Classification

The classification requirements of the relevant section of BS 4533 : Part 101 apply together with the following.

51.4.1 Luminaires shall additionally be classified as 'restricted breathing' if they incorporate a restricted breathing enclosure.

51.4.2 Luminaires shall additionally be classified with respect to their temperature class (as shown in table 1) or to their maximum surface temperature, referred to the declared maximum ambient temperature (t_a).

NOTE 1. Users are warned that a type N luminaire should not be operated in an ambient temperature in excess of t_a even for a short time.

NOTE 2. If a maximum surface temperature differing from those quoted in table 1 is selected, the temperature adopted is indicated on the luminaire (see 51.5.1(c)).

Table 1. Temperature class	
Temperature class	Maximum surface temperature
	°C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

51.5 Marking

The marking requirements of the relevant section of BS 4533 : Part 101 apply together with the following.

51.5.1 The following additional information shall be distinctly and durably marked on the luminaire in a position where it can be seen without dismantling the luminaire.

- (a) The symbol for type of protection Ex N.
- (b) The group symbol II for non-sparking luminaires or the sub-group IIA, IIB or IIC, if this is necessary for the type of protection of a component or components within the luminaire.
- (c) The symbol indicating the temperature class (e.g. T3) or the maximum surface temperature in °C (e.g. 190 °C), or both. When the marking includes both, the temperature class shall be given last in brackets (e.g. 190 °C (T3)).
- (d) The maximum ambient temperature (t_a) for which the luminaire is suitable.
- (e) The words 'restricted breathing' on restricted breathing luminaires.

Items (a), (b) and (c) shall be marked in that sequence, e.g. Ex N II T3.

NOTE. If the appropriate authority has certified that the luminaire complies with this Section of BS 4533, the relevant certification marking and certificate number may be added.

51.5.2 The following additional information shall be marked on the luminaire, on a label attached to it, or on the accompanying technical data.

- (a) An indication of the size and thread of entry holes.
- (b) If the temperature of the insulation of the incoming supply cable is expected to exceed 70 °C at the point of entry to the luminaire, a warning to this effect.

51.6 Construction

The construction requirements of the relevant section of BS 4533 : Part 101 apply together with the following.

51.6.1 Restricted breathing

In addition to the requirements for protection against the ingress of dust and moisture specified in 51.13, the enclosure may also be of the restricted breathing type. Such restricted breathing luminaires shall be capable of meeting the requirement of 51.13.2.

51.6.2 Housing of lamp

The whole of the lamp(s) shall be housed within the luminaire.

51.6.3 Component protection

Components within the luminaire shall be non-sparking in normal operation or they shall be protected by one or more of the following means:

- (a) enclosed-break device;
- (b) sealed device;

- (c) hermetically sealed device;
- (d) encapsulated device;
- (e) any suitable type of protection, e.g. flameproof enclosure.

The use of certain types of protection, e.g. flameproof enclosures, may result in apparatus sub-grouping for which the luminaire shall be marked (see 51.5.1(b)).

51.6.4 Cable entry

Where cable entry is by clearance hole, the luminaire shall be so designed that there is sufficient clearance on both sides of this hole for a threaded entry device secured by a heavy nut (4.4 mm minimum thickness) on each side of the enclosure. Restricted breathing luminaires shall be supplied with a suitable sealing ring(s) for use with cable entries.

51.6.5 Suspension point

The suspension point(s) in restricted breathing luminaires shall be so designed that the luminaire can pass the test for restricted breathing whether or not it is mounted and any gaskets and/or special components necessary for this purpose shall be supplied with the luminaire.

51.6.6 Safety

51.6.6.1 General. Lampholders, in addition to complying with the safety and interchangeability requirements of the relevant British Standard, shall be of the non-sparking type such that by construction, the risk of the occurrence of any arc, spark or hot spot capable of igniting a surrounding explosive atmosphere during normal operation is minimized.

NOTE 1. Normal operation does not include the removal and insertion of lamps when their circuits are energized.

NOTE 2. Although not essential to the requirements of this standard, enclosed-break lampholders may be specified for use in certain circumstances. Requirements for enclosed-break lampholders are specified in appendix A.

51.6.6.2 Bayonet non-sparking lampholders. Bayonet non-sparking lampholders shall incorporate spring contacts so designed that the springs are not the means of carrying the current. The connecting wires and their insulation shall not be damaged when the lamp is inserted or removed. In addition, the lampholders shall comply with the safety and interchangeability requirements of BS 5024 : Part 1 when mounted in the luminaire.

NOTE. Bayonet lampholders should be designed so as to minimize movement of the lamps that could give rise to sparking under conditions of vibration.

51.6.6.3 Screw non-sparking lampholders. Screw non-sparking lampholders shall comply with the safety and interchangeability requirements of BS 5042 : Part 2 when mounted in the luminaire. They shall also be designed to prevent the lamp becoming loose in the holder, for example, under conditions of temperature change or vibration. Compliance shall be checked by the following test.

Test. A test lamp cap complying with BS 5042 : Part 2 is fully inserted into the lampholder applying a torque as given in table 2.