BS EN 62532:2011

BSI Standards Publication

Fluorescent induction lamps — Safety specifications

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 62532:2011. It is identical to IEC 62532:2011.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and Related Equipment, to Subcommittee CPL/34/1, Electric lamps.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 63580 9

ICS 29.140.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2011.

Amendments issued since publication

Amd. No.	Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62532

May 2011

ICS 29.140.30

English version

Fluorescent induction lamps - Safety specifications
(IEC 62532:2011)

Lampes à fluorescence à induction - Spécifications de sécurité
(CEI 62532:2011)

Leuchtstoff-Induktionslampen - Sicherheitsanforderungen
(IEC 62532:2011)

This European Standard was approved by CENELEC on 2011-03-07. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62532:2011 E

Foreword

The text of document 34A/1422/FDIS, future edition 1 of IEC 62532, prepared by SC 34A, Lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62532 on 2011-03-07.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-12-07
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-03-07

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62532:2011 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60112:2003	NOTE	Harmonized as EN 60112:2003 (not modified).
IEC 60529:1989	NOTE	Harmonized as EN 60529:1991 (not modified).
IEC 60664-1:2007	NOTE	Harmonized as EN 60664-1:2007 (not modified).
IEC 61199:1999	NOTE	Harmonized as EN 61199:1999 (not modified).
IEC 62471:2006	NOTE	Harmonized as EN 62471:2008 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60061	-	Lamp caps and holders together with gauges for the control of interchangeability and safety	-	-
IEC 60360	1998	Standard method of measurement of lamp cap temperature rise	EN 60360	1998
IEC 60598-1 (mod)	2008	Luminaires - Part 1: General requirements and tests	EN 60598-1 + A11	2008 2009
IEC 60695-2-10	-	Fire hazard testing - Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	EN 60695-2-10	-
IEC 60695-2-11	-	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	-
IEC 60901	-	Single-capped fluorescent lamps - Performance specifications	EN 60901	-
IEC 61347-1 (mod)	-	Lamp controlgear - Part 1: General and safety requirements	EN 61347-1	-

CONTENTS

FLUORESCENT INDUCTION LAMPS – SAFETY SPECIFICATIONS

1 Scope

This International Standard specifies the safety requirements for fluorescent induction lamps for general lighting purposes.

It also specifies the method a manufacturer should use to show compliance with the requirements of this standard on the basis of whole production appraisal in association with his test records on finished products. This method can also be applied for certification purposes.

Details of a batch test procedure, which can be used to make limited assessment of batches, are also given in this standard.

The schematic drawings of the systems are shown in Annex A.

NOTE Self-ballasted induction lamps (where the discharge vessel, the power coupler and the control gear are integrated in the same product) are excluded from the scope of this standard.

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.

IEC 60061, *Lamp caps and holders together with gauges for the control of interchangeability and safety*

IEC 60360:1998, *Standard method of measurement of lamp cap temperature rise*

IEC 60598-1:2008, *Luminaires – Part 1: General requirements and tests*

IEC 60901, *Single-capped fluorescent lamps. Performance specifications*

IEC 60695-2-10, *Fire Hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 61347-1, *Lamp control gear – Part 1: General and safety requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
induction lamp
assembly of a low pressure mercury discharge vessel and an inductive power coupler

3.2
discharge vessel *(closed containment description)*
vessel containing at least a low pressure mercury vapour, which will be energized by means of the inductive coupler

NOTE 1 The ultra violet radiation from the resulting discharge is converted by a layer of fluorescent material into visible light.

NOTE 2 The discharge vessel may have means of mechanical fixation to position it to the inductive power coupler.

3.3
inductive power coupler
component to transform high frequency electrical energy, by means of induction, in order to energize the low pressure mercury in the discharge vessel

NOTE 1 The component includes electrical connection.

NOTE 2 The inductive power coupler can contain a means to fixate and position the discharge vessel.

3.4
mechanical interface
means to fixate and position the induction lamp

3.5
internally coupled induction lamp
induction lamp where the coupler is partly surrounded by the discharge vessel

3.6
externally coupled induction lamp
induction lamp where the discharge vessel is partly surrounded by the coupler

3.7
group
lamps having the same electrical characteristics and physical dimensions

3.8
type
lamps of the same group having the same photometric and colour characteristics

3.9
family
lamp groups which have common features of materials, components, and/or method of processing

3.10
nominal wattage
wattage used to designate the lamp

3.11
working voltage
highest RMS voltage which may occur across any insulation at rated supply voltage, transients being neglected, in open-circuit conditions or during normal operation

3.12
equilibrium temperature
steady-state temperature of a lamp reached after a sufficient operating time

3.13
design test
test made on a sample for the purpose of checking compliance of the design of a family, group or a number of groups with the requirements of the relevant clause

3.14
periodic test
test, or series of tests, repeated at intervals in order to check that a product does not deviate in certain respects from the given design

3.15
running test
test repeated at frequent intervals to provide data for assessment

3.16
batch
all lamps of one family and/or group and identified as such and put forward at one time for test or checking compliance

3.17
whole production
production during a period of twelve months of all types of lamps within the scope of this standard and nominated in a list of the manufacturer for inclusion in the certificate

4 Safety requirements

4.1 General

In this document, the term “lamp” stands for “induction lamp”.

Lamps shall be so designed and constructed that in normal use they present no danger to the user or the surroundings if operated with a ballast complying with IEC 61347-1.

In general, compliance is checked by carrying out all the tests specified.

All plastic materials shall meet all safety requirements of this standard after exposure to UV and temperature over the claimed lifetime of the lamp. Any accelerated test shall correspond to the real lifetime effect. The allowed temperature range for the use of the lamp as given by the lamp manufacturer or responsible vendor shall be noticed.

Plastic material which is directly exposed to UV by the lamp shall be tested at a wavelength of 254 nm. UV irradiance, temperature and testing time are under consideration.

Schematic drawings of the construction of internally and externally coupled induction lamps are given in Annex A.

4.2 Marking

4.2.1 Marking of the lamps

The following information shall be legibly and durably marked on the lamps:

a) mark of origin (this may take the form of a trade mark, the manufacturer's name or the name of the responsible vendor);
b) the nominal wattage (marked "W" or "watts") or any other indication which identifies the lamp.

4.2.2 Requirements

Compliance is checked by the following:

a) presence and legibility of the marking by visual inspection;

b) durability of marking by applying the following test on unused lamps.

The area of the marking on the lamp shall be rubbed by hand with a smooth cloth damped with water for a period of 15 s.

After this test, the marking shall still be legible.

4.3 Requirements for mechanical and electrical connections

4.3.1 Construction and assembly of the lamp

The construction shall be such that the whole assembly remains safe during and after operation.

Wiring and cables shall be so situated or protected that they cannot be damaged by sharp edges, rivets, screws and similar components. Wiring and cables shall not be twisted through an angle exceeding 360°.

Compliance is checked by visual inspection.

Minimum bending radius, as specified in the manufacturer's documentation, of the applied cables and wiring should be observed.

Compliance is checked by measurement of the radii.

4.3.2 Requirements for electrical connections

Electrical connections shall have adequate electrical performance and mechanical strength.

Compliance is checked by carrying out the same kind of tests as given in section 15 of IEC 60598-1.

4.3.3 Caps and holders

If applicable, the requirements of IEC 60061 apply.

4.4 Insulation resistance

4.4.1 Test method to determine insulation resistance after humidity treatment

Wrap a copper foil around the lamp and connect it to metal parts if any. For schematic drawing, see Annex c. The lamp shall be conditioned for 48 h in a cabinet containing air with a relative humidity between 91 % and 95 %. The temperature of the air, t, is maintained within 1 °C of any convenient value between 20 °C and 30 °C.

Before being placed in the humidity cabinet, the lamp wrapped with copper foil is brought to a temperature between t and (t + 4) °C.

Before the insulation test, visible drops of water, if any, are removed by means of blotting paper.

Immediately after the moisture treatment, the insulation resistance shall be measured with a d.c. voltage of 500 V, 1 min after application of the voltage.

4.4.2 Requirement for the insulation resistance

The insulation resistance between the foil and all lamp connections connected together shall not be less than 2 MΩ.

4.5 Electric strength

4.5.1 Test method to determine the electric strength

Immediately after the insulation resistance test, the same parts as those referred to in 4.4 shall withstand the test voltage of 4.5.2.

The high-voltage transformer used for the test shall be so designed that when the output terminals are short-circuited after the output voltage has been adjusted to the appropriate test voltage, the output current is at least 200 mA.

The overcurrent relay shall not trip when the output current is less than 100 mA.

The r.m.s. value of the test voltage applied shall be measured to within ±3 %.

The metal foil referred to in 4.4 shall be placed so that no flashover occurs at the edges of the insulation.

4.5.2 Requirement for the electric strength

Compliance is checked with a test voltage of substantially sine-wave form, see Table 1, with a frequency of 50 Hz or 60 Hz and applied for 1 min. Initially, not more than half the prescribed voltage shall be applied; it shall then be raised rapidly to the full value. The working voltage shall be given in the manufacturer's documentation.

Table 1 – Requirements for the electric strength

Working voltage *U*	**Test voltage** V
Up to and including 42 V	500
Above 42 V up to and including 1 000 V	$2U + 1\,000$

4.5.3 Compliance

No flashover or breakdown shall occur during the test.

Glow discharges without a drop in voltage are neglected.

4.6 Parts which can become accidentally live

4.6.1 Metal parts intended to be insulated

Metal parts, if any, intended to be insulated from live parts shall not be or become live.

4.6.2 Live parts that project from the lamp

With the exception of the electrical connection, no live part shall project from any part of the lamp.

4.6.3 Methods to show compliance

Compliance is checked by a suitable measuring system, which may include visual inspection where appropriate. It shall be safeguarded that during assembly damage to insulation cannot occur.

4.7 Resistance to heat and fire

The lamp shall be sufficiently resistant to heat.

Compliance is checked by the test in Annex E.

4.8 Creepage distances and clearances for lamps

The same requirements apply as in section 11 of IEC 60598-1.

4.9 Temperature rise of the measuring points

The values and measurement methods of the maximum temperature rises of the measuring points are given in Annex F.

4.10 Endurance

Under consideration.

4.11 UV radiation

The specific effective radiant UV power emitted by the lamp shall not exceed the value of 2 mW/klm. For reflector lamps, it shall not exceed the value of 2 mW/(m^2klx).

NOTE 1 In IEC 62471, exposure limits are given as effective irradiance values (unit:W/m^2) and for risk group classification, the values for general lighting lamps are reported at an illuminance level of 500 lx. The borderline for risk group exempt is 0,001 W/m^2 at an illuminance level of 500 lx. This means the specific value, related to the illuminance, is 0,001 divided by 500 in W/(m^2 lx), which is 2 mW/(m^2klx). Since lx = lm/m^2 this equals 2 mW/klm specific UV power.

NOTE 2 Compliance is checked by spectroradiometric measurement, under the same conditions as for the lamp's electrical and photometric characteristics as given in IEC 60901 or in Annex B of the forthcoming performance standard for induction lamps.

4.12 Information for luminaire design

The luminaire manufacturer should observe the maximum temperature(s) specified in Annex B.

4.13 Information for ballast design

The ballast manufacturer should observe the requirements in Annex D.

5 Assessment

Under consideration.

Annex A
(informative)

Schematic drawings of induction lamps

To clarify the construction of an internally and an externally coupled induction lamp, schematic drawings are given in Figures A.1 to A.3.

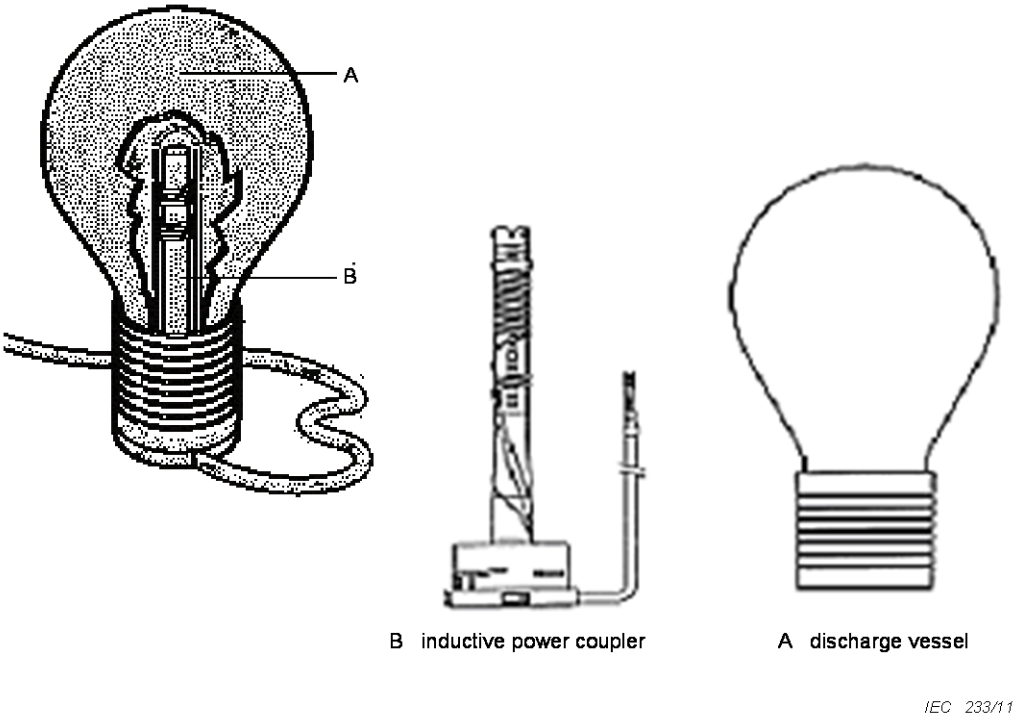

Figure A.1 – Schematic drawing of an internal coupled induction lamp (operating frequency 2 500 kHz to 3 000 kHz)

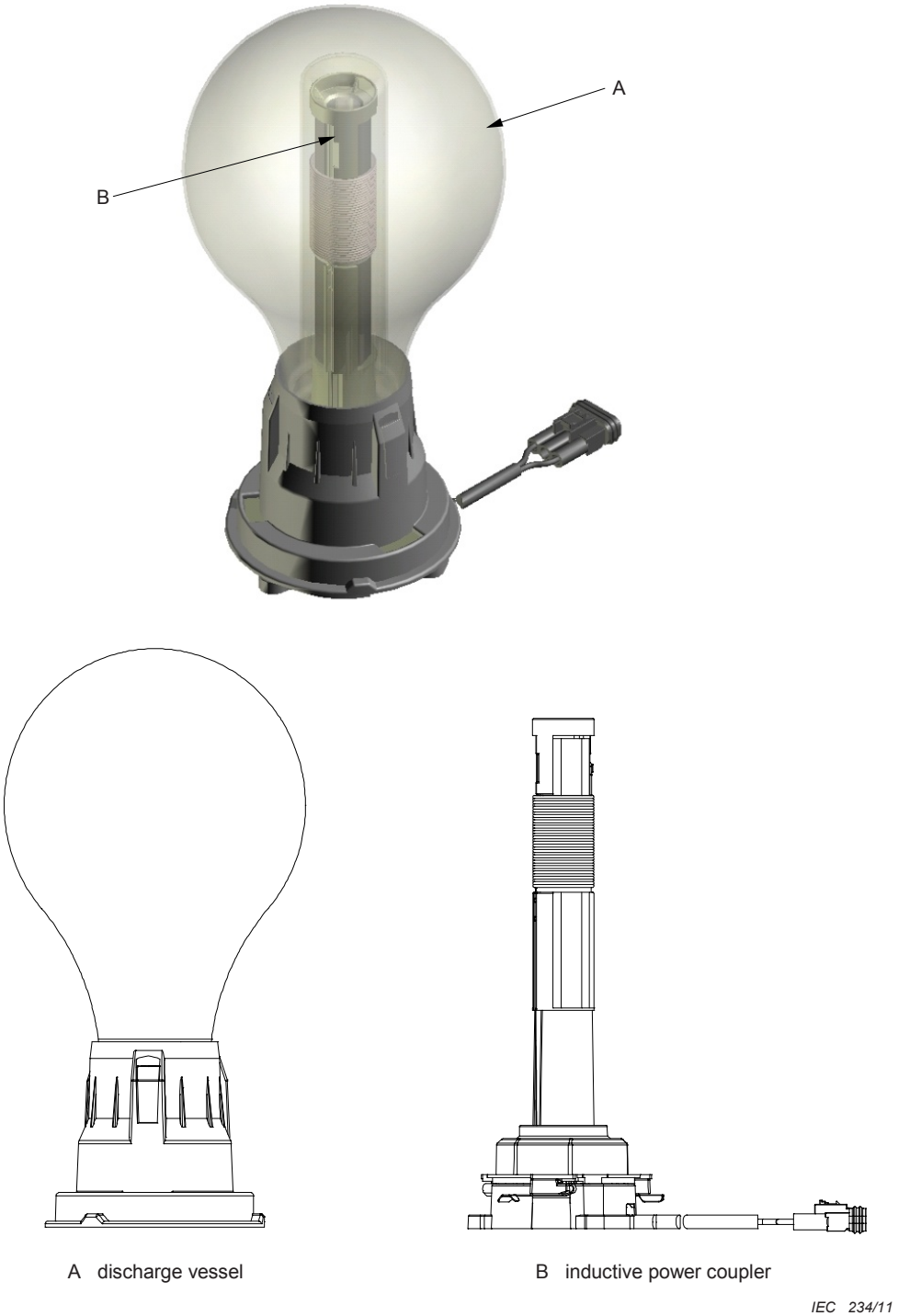

Figure A.2 – Schematic drawing of an internal coupled induction lamp (operating frequency 120 kHz to 145 kHz)

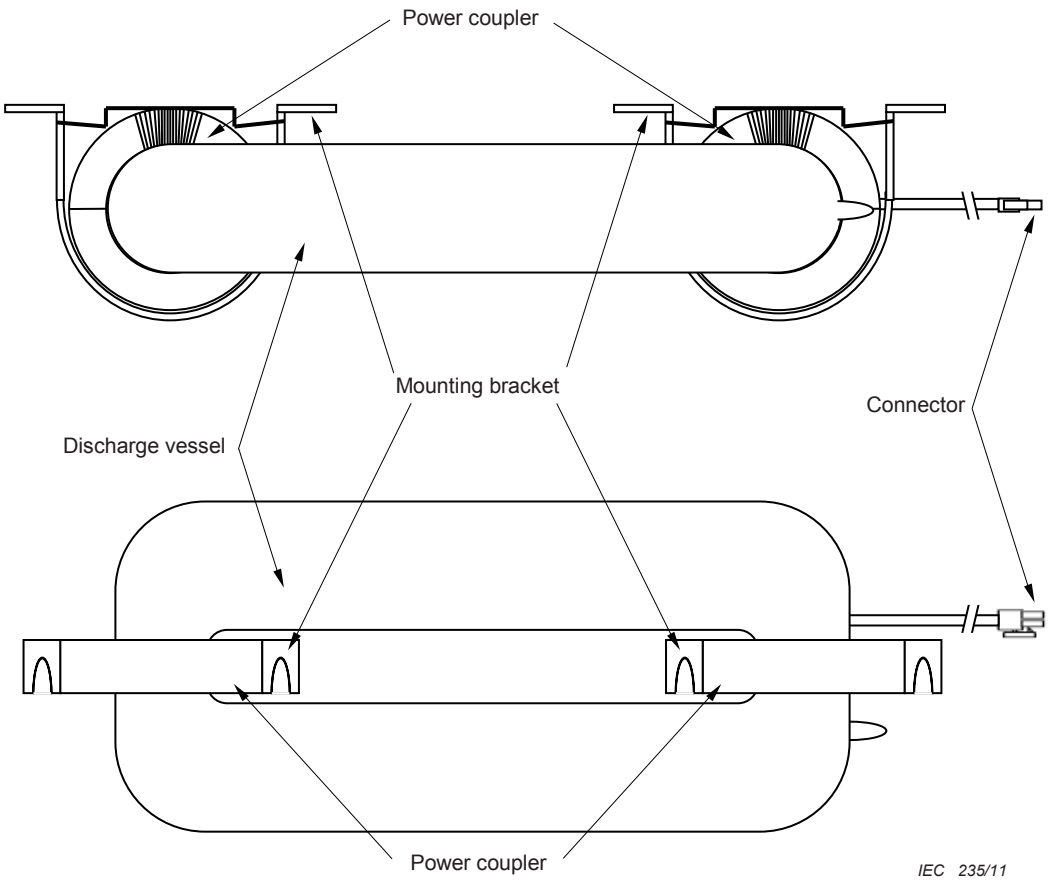

Figure A.3 – Schematic drawing of an external coupled induction lamp (operating frequency 225 kHz to 275 kHz)

Annex B
(informative)

Information for luminaire design

To ensure safe lamp operation, it is essential to observe the following recommendations.

– Maximum temperature at the measurement point(s) under operating conditions

The luminaire designer should ensure that the temperature at the measurement point(s), under operating conditions, should not exceed the maximum temperature value as given in Table B.1.

Table B.1 – Maximum temperature at measurement point(s) under operating condition

Lamp type	Frequency kHz	Maximum operating temperature at the measurement point
Internally coupled induction lamp - 55 W	2 500 to 3 000	105 °C (see Annex F)
Internally coupled induction lamp - 85 W	2 500 to 3 000	105 °C (see Annex F)
Internally coupled induction lamp - 165 W	2 500 to 3 000	105 °C (see Annex F)
Internally coupled induction lamp - 30 W	120 to 145	95 °C (see Annex F)
Internally coupled induction lamp - 50 W	120 to 145	95 °C (see Annex F)
Internally coupled induction lamp - 150 W	120 to 145	95 °C (see Annex F)
Internally coupled induction lamp - 240 W	120 to 145	95 °C (see Annex F)
Externally coupled induction lamp - 70 W	225 to 275	150 °C/150 °C point 1 / 2 (see Annex F)
Externally coupled induction lamp - 100 W	225 to 275	150 °C/150 °C point 1 / 2 (see Annex F)
Externally coupled induction lamp - 150 W	225 to 275	150 °C/150 °C point 1 / 2 (see Annex F)

– Specific effective radiant UV power

The specific effective radiant UV power of the lamp should not exceed 2 mW/klm.

NOTE The effective power of the UV radiation is obtained by weighting the spectral power distribution of ht lamp with the UV hazard function $S_{uv}(\lambda)$. Information about the relevant UV hazard function is given in IEC 62471. It only relates to possible hazards regarding UV exposure of human being. It does not deal with the possible influence of optical radiation on materials, like mechanical damage or discoloration.

Annex C
(normative)

Schematic drawings for insulation resistance test

This annex gives schematic drawings of the test set-up for measuring the insulation resistance as described in Subclause 4.4.

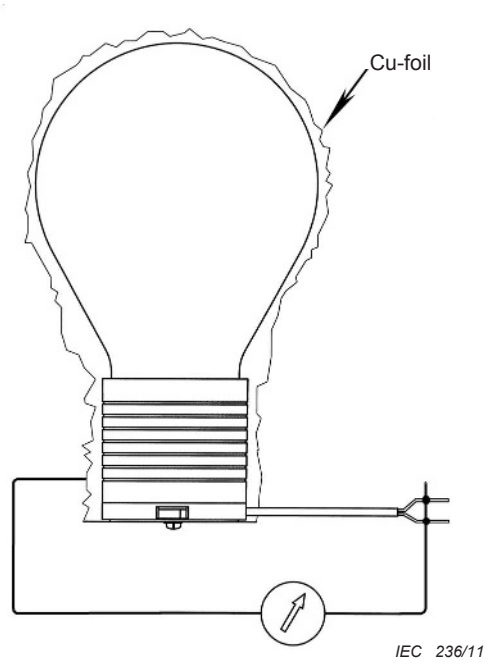

Figure C.1 – Test set up for measurement insulation resistance of internal coupled induction lamp

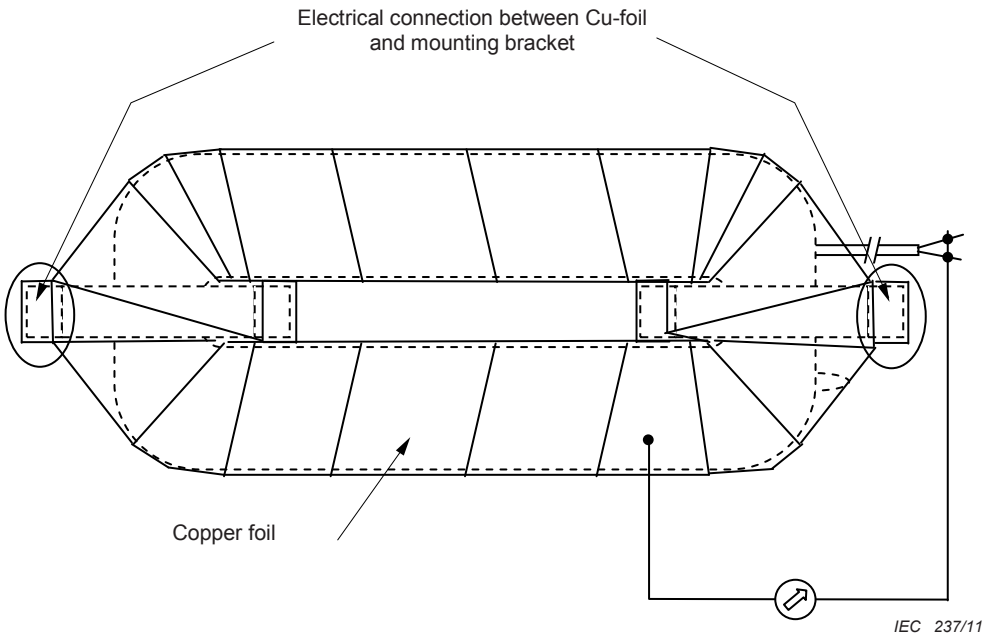

Figure C.2 – Test set up for measurement of insulation resistance external coupled induction lamp

Annex D
(informative)

Information for ballast design

To ensure safe lamp operation, it is essential to observe the following recommendations.

– Time limitation for high voltages

  Under no condition the working voltage should exceed the values given in Table D.1 for a period longer than 2 s.

– Working voltage

  The working voltage of the ballast should not exceed the maximum allowable voltages between any lamp terminals and any lamp terminal and ground as given in Table D.1.

Table D.1 – Maximum operating voltage of induction lamps between lamp terminals and between lamp terminals and ground

Lamp type	Frequency kHz	Maximum operating voltage between any lamp terminals and between any lamp terminal and ground V_{rms}
Internally coupled induction lamp - 55 W	2 500 to 3 000	300
Internally coupled induction lamp - 85 W	2 500 to 3 000	300
Internally coupled induction lamp - 165 W	2 500 to 3 000	350
Internally coupled induction lamp - 30 W	120 to 145	300
Internally coupled induction lamp - 50 W	120 to 145	350
Internally coupled induction lamp - 150 W	120 to 145	450
Internally coupled induction lamp - 240 W	120 to 145	350
Externally coupled induction lamp - 70 W	225 to 275	300
Externally coupled induction lamp - 100 W	225 to 275	300
Externally coupled induction lamp - 150 W	225 to 275	300

If the voltage is not given in Table D.1, a reference should be made in the manufacturer's documentation.

– Maximum voltage between the lamp terminals

  The peak voltage between the lamp terminals should under no circumstances exceed the values in the Table D.2.

  NOTE It should be noted that the cables and wires between lamp connector and discharge vessel are part of the lamp.

Table D.2 – Maximum voltage between lamp terminals

Lamp type	Frequency kHz	Maximum peak voltage between lamp terminals* V_{peak}
Internally coupled induction lamp - 55 W	2 500 to 3 000	1 500
Internally coupled induction lamp - 85 W	2 500 to 3 000	1 500
Internally coupled induction lamp - 165 W	2 500 to 3 000	1 500
Internally coupled induction lamp - 30 W	120 to 145	2 500
Internally coupled induction lamp - 50 W	120 to 145	2 500
Internally coupled induction lamp - 150 W	120 to 145	2 500
Internally coupled induction lamp - 240 W	120 to 145	2 500
Externally coupled induction lamp - 70 W	225 to 275	2 000
Externally coupled induction lamp - 100 W	225 to 275	2 000
Externally coupled induction lamp - 150 W	225 to 275	2 000
* Not to be measured against ground.		

Annex E
(normative)

Information for thermal test

E.1 Check for the system

Samples shall be tested for a period of 168 h in a heating cabinet with a temperature of Table E.1.

Table E.1 – Heating test temperature levels

Lamp type	Frequency kHz	Temperature of the heating cabinet °C
Internally coupled induction lamp - 55 W	2 500 to 3 000	105 °C
Internally coupled induction lamp - 85 W	2 500 to 3 000	105 °C
Internally coupled induction lamp - 165 W	2 500 to 3 000	105 °C
Internally coupled induction lamp - 30 W	120 to 145	95 °C
Internally coupled induction lamp - 50 W	120 to 145	95 °C
Internally coupled induction lamp - 150 W	120 to 145	95 °C
Internally coupled induction lamp - 240 W	120 to 145	95 °C
Externally coupled induction lamp - 70 W	225 to 275	150 °C*
Externally coupled induction lamp - 100 W	225 to 275	150 °C*
Externally coupled induction lamp - 150 W	225 to 275	150 °C*
* During the test, the connector should stay outside the heating cabinet.		

Compliance is checked at the end of the test. The samples shall not have undergone any change impairing their future safety, especially in the following respects:

– reduction in the protection against electric shock as required for:
  - insulation resistance (4.4);
  - electric strength. (4.5);
– loosening of mechanical and electrical interface, cracks, swelling and shrinking as determined by visual inspection.

At the end of the test, the dimensions shall comply with the requirements for mechanical and electrical connections. (4.3).

E.2 Check for the plastic parts of the lamp

Insulating material of lamps shall be resistant to abnormal heat and to fire.

Compliance is checked by the following test.

Parts are subjected to a test using a nickel-chromium glow-wire heated to 650 °C. The test apparatus shall be that described in IEC 60695-2-10.

The method of test shall be according IEC 60695-2-11.

The sample to be tested shall be mounted vertically on the carriage and pressed against the glow wire tip with a force of 1 N, preferably 15 mm or more from the upper edge of the sample. The penetration of the glow-wire into the sample shall be mechanically limited to 7 mm. After 30 s, the sample shall be withdrawn from contact with the glow-wire tip.

Any flame or glowing of the sample shall extinguish within 30 s of withdrawing the glow-wire and any burning or molten drops shall not ignite a piece of tissue paper consisting of five layers, spread out horizontally 200 mm ± 5 mm below the sample.

The glow-wire temperature and heating current shall be constant for 1 min prior to commencing the test. Care shall be taken to ensure that heat radiation does not influence the sample during this period. The glow-wire tip temperature shall be measured by means of a sheathed fine-wire thermocouple constructed and calibrated as described in IEC 60695-2-10.

NOTE Precautions should be taken to safeguard the health of personnel conducting tests against risks of

– explosion or fire;

– inhalation of smoke and/or toxic products;

– toxic residues.

Annex F
(normative)

Values and method of measurement of the maximum temperature rise of the measurement points

F.1 Test method

This test method describes how to establish the equilibrium temperature of the temperature measurement points.

The test shall be carried out in draft free air at a temperature of 25 °± 2 °C which shall not vary by more than 1 °C during the test.

The measuring accuracy should be ±1 °C.

The thermocouples to be used are described in IEC 60360 Clause 7.

The minimum operating time for each lamp before measurement shall be 120 min. The equilibrium temperature has been reached when the temperature at the measuring point doesn't change by more than 1 °C/h over a period of at least 15 min.

The test is conducted operating the lamp with a reference ballast.

F.2 Values of maximum allowed temperature rise of the measurement points

F.2.1 Maximum temperature rise of the lamp temperature test points

Table F.1 gives the maximum temperature rise of the lamp temperature test points.

Table F.1 – Maximum temperature rise of the lamp temperature test points

Lamp type	Frequency KHz	Lamp power to test temperature rise of the mechanical interface W	Maximum allowed temperature rise Point 1 °C	Maximum allowed temperature rise Point 2 °C
Internally coupled induction lamp - 55 W	2 500 to 3 000	50 ± 4 %	80	NA
Internally coupled induction lamp - 85 W	2 500 to 3 000	80 ± 4 %	80	NA
Internally coupled induction lamp - 165 W	2 500 to 3 000	150 ± 4 %	80	NA
Internally coupled induction lamp - 30 W	120 to 145	30 ± 4 %	85	NA
Internally coupled induction lamp - 50 W	120 to 145	50 ± 4 %	85	NA
Internally coupled induction lamp - 150 W	120 to 145	150 ± 4 %	85	NA
Internally coupled induction lamp - 240 W	120 to 145	240 ± 4 %	85	NA
Externally coupled induction lamp - 70 W	225 to 275	75 ± 4 %	95	85
Externally coupled induction lamp - 100 W	225 to 275	100 ± 4 %	95	85

Lamp type	Frequency KHz	Lamp power to test temperature rise of the mechanical interface W	Maximum allowed temperature rise Point 1 °C	Maximum allowed temperature rise Point 2 °C
Externally coupled induction lamp - 150 W	225 to 275	150 ± 4 %	95	85
NA: Not applicable.				

F.2.2 Test condition to measure temperature on the temperature test point of an internal coupled lamp

Figure F.1 shows the temperature test point of an internal coupled induction lamp (operating frequency 2 500 kHz to 3 000 kHz); Figure F.2 shows the temperature test point of an internal coupled induction lamp (operating frequency 120 kHz to 145 kHz).

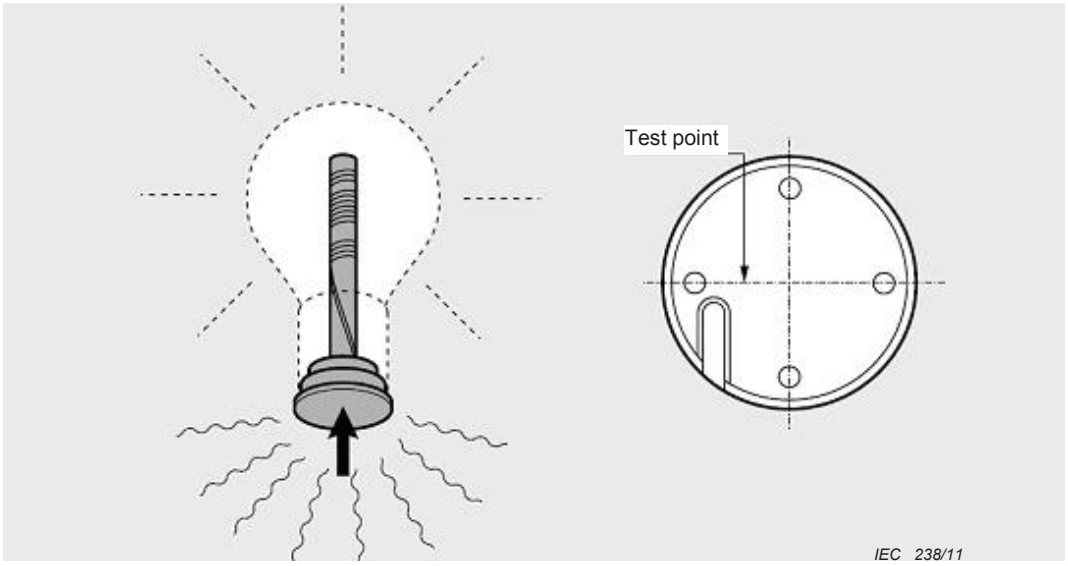

Figure F.1 – Temperature test point of internal coupled induction lamp (operating frequency 2 500 kHz to 3 000 kHz)

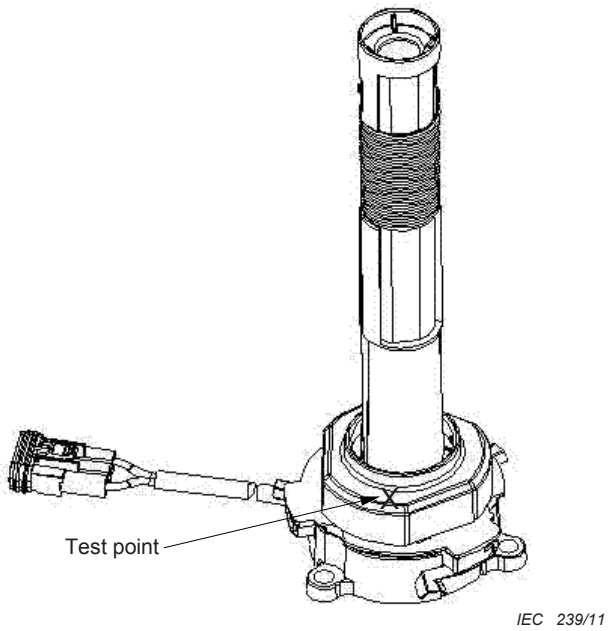

Figure F.2 – Temperature test point of internal coupled induction lamp (operating frequency 120 kHz to 145 kHz)

The internal coupled lamp is tested base down with anodized aluminium heat sinks. Dimensions of the heat sink are given in Table F.2.

Table F.2 – Dimensions of the heat sink of internally coupled induction lamps

Lamp type	Frequency KHz	Heat sink dimensions mm*mm*mm
Internally coupled induction lamp - 55 W	2 500 to 3 000	85*85*2
Internally coupled induction lamp - 85 W	2 500 to 3 000	150*150*2
Internally coupled induction lamp - 165 W	2 500 to 3 000	140*140*2
Internally coupled induction lamp - 30 W	120 to 145	117*117*2
Internally coupled induction lamp - 50 W	120 to 145	140*140*2
Internally coupled induction lamp - 150 W	120 to 145	300*150*3
Internally coupled induction lamp - 240 W	120 to 145	420*210*3

F.2.3 Test condition to measure temperature on the temperature test point of an external coupled lamp (operating frequency 225 kHz to 275 kHz)

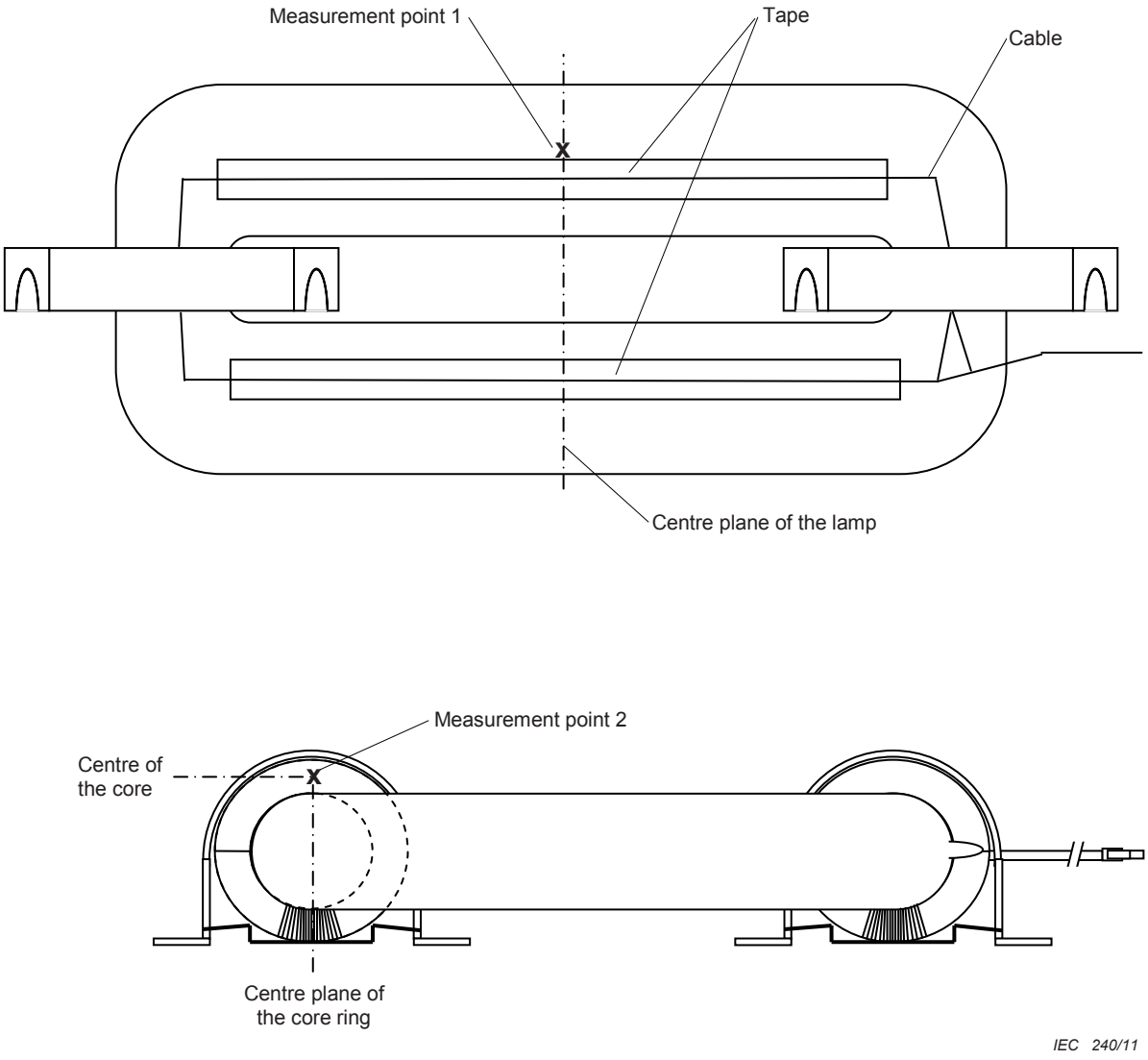

Figure F.3 – Temperature test points of external coupled induction lamp (operating frequency 225 kHz to 275 kHz)

Figure F.3 shows the temperature test points of an external coupled induction lamp (operating frequency 225 kHz to 275 kHz).

During the test, there is a no heat sink to the lamp allowed.

Bibliography

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61199:1999, *Single-capped fluorescent lamps – Safety specifications*

IEC 62471:2006, *Photobiological safety of lamps and lamp systems*

_____

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™