

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Single-capped fluorescent lamps – Safety specifications

Lampes à fluorescence à culot unique – Spécifications de sécurité

IEC 61199:2011

<https://standards.iteh.ai/catalog/standards/sist/c2ccf2e0-2382-43d1-9fc6-43fd96c8f0c/iec-61199-2011>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2011 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

[IEC 61199:2011](#)

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch
Tél.: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Single-capped fluorescent lamps – Safety specifications

Lampes à fluorescence à culot unique – Spécifications de sécurité

[IEC 61199:2011](#)

<https://standards.iteh.ai/catalog/standards/sist/c2ccf2e0-2382-43d1-9fc6-43fd96c8f0c/iec-61199-2011>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

X

ICS 29.140.30

ISBN 978-2-88912-570-8

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references.....	8
3 Terms and definitions.....	8
4 Safety requirements.....	10
4.1 General.....	10
4.2 Marking.....	10
4.3 Mechanical requirements for caps.....	10
4.3.1 Construction and assembly.....	10
4.3.2 Dimensional requirements for caps.....	10
4.3.3 Pin connections and keying configurations.....	11
4.4 Insulation resistance.....	11
4.5 Electric strength.....	11
4.6 Parts which can become accidentally live.....	11
4.7 Resistance to heat and fire.....	12
4.8 Creepage distance for caps.....	13
4.9 Lamp cap temperature rise.....	13
4.10 Radio interference suppression capacitors.....	14
4.10.1 General.....	14
4.10.2 Moisture resistance.....	14
4.10.3 Resistance to flame and ignition.....	15
4.11 UV radiation.....	15
4.12 Information for luminaire design.....	15
4.13 Information for ballast design.....	15
4.14 Information for lampholder design.....	15
5 Assessment.....	15
5.1 General.....	15
5.2 Whole production assessment by means of the manufacturer's records.....	16
5.3 Assessment of the manufacturer's records of particular tests.....	20
5.4 Rejection conditions of batches.....	20
5.5 Sampling procedures for whole production testing.....	21
5.6 Sampling procedures for batch testing.....	21
Annex A (normative) Tests for assessing caps for construction and assembly.....	23
Annex B (normative) Maximum lamp cap temperature rise values and method of measurement.....	24
Annex C (informative) Information for luminaire design.....	30
Annex D (normative) Conditions of compliance for design tests.....	32
Annex E (normative) Cathode connection configurations.....	33
Annex F (normative) Normal and abnormal lamp operation, lamp non-interchangeability requirements.....	35
Annex G (normative) Information for thermal tests.....	37
Annex H (informative) Information for ballast design.....	38
Annex I (informative) Information for lampholder design.....	39
Bibliography.....	41

Figure 1 – Places where to measure the temperature	14
Figure B.1 – Example for a test circuit for the measurement of the cap temperature rise at maximum discharge current and maximum SoS.....	25
Figure B.2 – Examples where to measure the temperature according to Clause B.2.....	27
Figure E.1 – Where to connect the cathodes of different caps.....	34
Figure G.1 – Ball-pressure apparatus	37
Table 1 – Sheet references of IEC 60061	7
Table 2 – Grouping of test records – Sampling and acceptable quality levels (AQL)	17
Table 3 – Acceptance numbers AQL = 0,65 %	18
Table 4 – Acceptance numbers AQL = 2,5 %	19
Table 5 – Batch sample size and rejection number	21
Table B.1 – Maximum cap temperature rise, lamps with internal or external starter (test at abnormal operating conditions).....	28
Table B.2 – Maximum cap temperature rise, lamps for starterless operation (test at normal operating conditions)	29
Table C.1 – Maximum cap temperature, lamps with internal or external starter (test at abnormal operating conditions).....	30
Table C.2 – Maximum cap temperature, lamps for starterless operation (test at normal operating conditions)	31
Table F.1 – Maximum allowable currents and rated lamp power.....	36
Table G.1 – Test temperatures.....	37
Table I.1 – Temperature point.....	39
Table I.2 – Maximum temperatures related to lampholder design	40

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SINGLE-CAPPED FLUORESCENT LAMPS –
SAFETY SPECIFICATIONS**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61199 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
34A/1468/FDIS	34A/1493/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This third edition cancels and replaces the second edition published in 1999. It constitutes a technical revision. Main technical changes are the introduction of requirements for high frequency operation, a new temperature measurement position and few new cap-holder fits.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC 61199:2011](#)

<https://standards.iteh.ai/catalog/standards/sist/c2ccf2e0-2382-43d1-9fc6-43fd96c8f0c/iec-61199-2011>

INTRODUCTION

For the ease of measurement, a new location for measuring the maximum cap temperature and maximum cap temperature rise has been introduced with this third edition of this standard, resulting in new temperature values. However, the design of lampholders is based on the traditional measurement location. Therefore, a new Annex I has been introduced, providing the previous methods and values for those lamp types and kinds of lamp operation, which have been already covered in the previous edition of this standard. For lamps, which are operated by means of an electronic ballast however, also a new measurement method and temperature limits are given.

Special attention has been given to the requirements related to high frequency operation, not covered in the previous edition.

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

[IEC 61199:2011](#)

<https://standards.iteh.ai/catalog/standards/sist/c2ccf2e0-2382-43d1-9fc6-43fd96c8f0c/iec-61199-2011>

SINGLE-CAPPED FLUORESCENT LAMPS – SAFETY SPECIFICATIONS

1 Scope

This International Standard specifies the safety requirements for single-capped fluorescent lamps for general lighting purposes of all groups having caps according to Table 1.

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.

NOTE Compliance with this standard concerns only safety criteria and does not take into account the performance of single-capped fluorescent lamps for general lighting purposes with respect to luminous flux, colour, starting and operational characteristics. For this information, readers are referred to IEC 60901.

Table 1 – Sheet references of IEC 60061

Cap type	Sheet numbers	
	IEC 60061-1 Lamp caps	IEC 60061-3 Cap gauges
2G7	7004-102	7006-102
2GX7	7004-103	7006-102
2G8	7004-141	7006-141, 141H, 141J, 141K
GR8	7004-68	7006-68A, 68B, 68E
G10q	7004-54	7006-79
GR10q	7004-77	7006-77A, 68B, 68E
GU10q	7004-123	7006-123, 123A
GX10q	7004-84	7006-79, 84, 84A and 84B
GY10q	7004-85	7006-79, 85 and 85A
GZ10q	7004-124	7006-79
2G10	7004-118	7006-118
2G11	7004-82	7006-82
2GX11-1	7004-82A	7006-82F, 82G, 82H
2GX13	7004-125	7006-125A, 125B
G23	7004-69	7006-69
GX23	7004-86	7006-86
G24, GX24	7004-78	7006-78
GZ24q	*	*
GX32	7004-87	7006-87

* to be developed.

It may be expected that lamps which comply with this standard will operate safely at supply voltages between 90 % and 110 % of rated supply voltage of the used ballast and when operated with a ballast complying with IEC 61347-2-3 or IEC 61347-2-8 with a starting device complying with IEC 60155 (if applicable) and in a luminaire complying with IEC 60598-1.

2 Normative references

The following reference 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 reference document (including any amendments) applies.

IEC 60061-1 *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60061-2, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 2: Lampholders*

IEC 60061-3, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 3: Gauges*

IEC 60061-4, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 4: Guidelines and general information*

IEC 60155, *Glow-starters for fluorescent lamps*

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

IEC 60410, *Sampling plans and procedures for inspection by attributes*

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

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

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

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

IEC 61347-2-3, *Lamp control gear – Part 2-3: Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps*

IEC 61347-2-8, *Lamp control gear – Part 2-8: Particular requirements for ballasts for fluorescent lamps*

3 Terms and definitions

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

3.1

single-capped fluorescent lamp

low-pressure mercury discharge lamp having a single cap in which most of the light from the lamp is emitted by a layer of fluorescent material excited by the ultraviolet radiation from the discharge

3.2

group

lamps having the same electrical and cathode characteristics, the same physical dimensions and the same starting method

**3.3
type**

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

**3.4
family**

lamp groups which are distinguished by common features of materials, components, tube diameter and/or method of processing

**3.5
nominal value**

approximate quantity value used to designate or identify a lamp

**3.6
rated value**

quantity value for a characteristic of a lamp for specified operating conditions

The value and the conditions are specified in this standard, or assigned by the manufacturer or responsible vendor.

**3.7
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

**3.8
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 [IEC 61199:2011](https://standards.iteh.ai/catalog/standards/sist/c2ccf2e0-2382-43d1-9fc6-43fd96c8f0c/iec-61199-2011)

<https://standards.iteh.ai/catalog/standards/sist/c2ccf2e0-2382-43d1-9fc6-43fd96c8f0c/iec-61199-2011>

**3.9
running test**

test repeated at frequent intervals to provide data for assessment

**3.10
batch**

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

**3.11
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

**3.12
SoS value**

abbreviation for the “sum of the squares” (SoS) of the two currents through the two lead wires at a lamp electrode

The currents are measured as r.m.s. values. The lead current at one electrode coil, which gets the higher r.m.s. current value is called I_{LH} (“lead high”), the lead current with the lower r.m.s. value is called I_{LL} (“lead low”). The values of the two currents have to be squared and added (SoS = $I_{LH}^2 + I_{LL}^2$).

3.13**specific effective radiant UV power**

effective power of the UV radiation of a lamp related to its luminous flux

Unit: mW/klm

NOTE The effective power of the UV radiation is obtained by weighting the spectral power distribution of the 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 beings. It does not deal with the possible influence of optical radiation on materials, like mechanical damage or discoloration.

4 Safety requirements**4.1 General**

Lamps shall be so designed and constructed that in normal use they present no danger to the user or the surroundings.

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

4.2 Marking

4.2.1 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 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 dampened with water for a period of 15 s.

After this test, the marking shall still be legible.

4.3 Mechanical requirements for caps**4.3.1 Construction and assembly**

Caps shall be so constructed and assembled to the tube(s) that the whole assembly remains intact and attached during and after operation. In case of lamps with G10q, GZ10q and 2GX13 caps, the caps shall be capable of being rotated like described in Annex A.

Compliance is checked by carrying out the tests given in Annex A.

At the end of the tests, the caps shall show no damage that impairs safety.

4.3.2 Dimensional requirements for caps

4.3.2.1 Lamps shall use standardized caps in accordance with the dimensional requirements of IEC 60061-1.

4.3.2.2 Compliance is checked by using the gauges shown in Table 1.

4.3.3 Pin connections and keying configurations

4.3.3.1 Pin connections

The connection of lamp cathodes to the pins of caps having four pins shall conform to the requirements shown in Annex E for the relevant cap.

Compliance is checked by electrical continuity tests between relevant pins and/or by visual inspection.

4.3.3.2 Key configuration

For those cap types incorporating keys which ensure non-interchangeability with similar lamp types, the caps shall conform to the cap/key version given in the relevant lamp data sheet of IEC 60901. Annex F gives guidance to which cap/key shall be used when designing lamps to operate on a certain ballast.

Compliance is checked by a suitable measuring system and/or visual inspection.

4.4 Insulation resistance

4.4.1 The insulation resistance between the metal parts, if any, of the cap and all pins connected together shall not be less than 2 M Ω .

4.4.2 Compliance is checked by measurement with suitable test equipment using a d.c. voltage of 500 V.

In the case of caps made entirely from insulating material, the test is made between all pins connected together and metal foil wrapped over those surfaces that are accessible when the cap has been connected to a lampholder with minimum shrouding dimensions, as given in IEC 60061-2.

4.5 Electric strength

4.5.1 The insulation between the same parts as those referred to in 4.4 shall withstand the test voltage of 4.5.2. No flash-over or breakdown shall occur during the test.

4.5.2 Compliance is checked with a 1 500 V a.c. voltage of substantially sine-wave form, 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.

Glow discharges without a drop in voltage are neglected.

4.6 Parts which can become accidentally live

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

4.6.2 With the exception of cap pins, no live part shall project from any part of the cap.

4.6.3 Compliance is checked by a suitable measuring system which may include visual inspection where appropriate. In addition, there shall be regular daily checks of the equipment or a verification of the effectiveness of the inspection. See 5.5.4.

4.7 Resistance to heat and fire

4.7.1 Insulating material of caps shall be sufficiently resistant to heat.

4.7.2 Compliance is checked by the following tests.

4.7.2.1 Samples are tested for a period of 168 h in a heating cabinet at a temperature as given in Annex G.

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 in 4.4 and 4.5;
- loosening of cap pins, cracks, swelling and shrinking as determined by visual inspection.

At the end of the test, the dimensions shall comply with the requirements of 4.3.2.

4.7.2.2 Samples are subjected to a ball-pressure test by means of the apparatus shown in Figure G.1.

The surface of the part under test is placed in the horizontal position and a steel ball of 5 mm diameter is pressed against this surface by a force of 20 N. If the surface under test bends, the part where the ball presses shall be supported.

The test shall be made in a heating cabinet at a temperature of $125\text{ °C} \pm 5\text{ °C}$.

After 1 h, the ball shall be removed and the diameter of the impression measured. This diameter shall not exceed 2 mm.

The test shall not be made on parts of ceramic material.

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

4.7.4 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 sample to be tested is 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 is mechanically limited to 7 mm. After 30 s the sample is 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 $200\text{ mm} \pm 5\text{ mm}$ 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 is 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.

4.8 Creepage distance for caps

4.8.1 The minimum creepage distance between contact pins and the metal parts (if any) of the cap shall be in accordance with the requirements in IEC 60061-4, sheet 7007-6. Relevant cap standard sheet numbers of IEC 60061-1 are given in Table 1.

4.8.2 Compliance is checked by measurement in the most onerous position.

4.9 Lamp cap temperature rise

4.9.1 The lamp cap temperature rise above ambient temperature shall not exceed the relevant value given in Table B.1 and Table B.2.

4.9.2 The test procedure is specified in Annex B.

4.9.3 Conditions of compliance are given in Clause D.4.

4.9.4 Where it can be shown that one lamp group produces the highest cap temperature rise for a given lamp family, only tests on this one lamp group are necessary to show compliance of all identically capped lamps.

NOTE There is a correlation between the highest temperature on the cap surface as given in Annex C and the temperature on a point at the side surface of the cap, closer to the lamp reference plane, which is given in Annex I. The point on the side surface of the cap is described in Table I.1. The maximum temperature which can be expected at that point is given in Table I.2. An example for the location of the 2 points for temperature measurement is shown in Figure 1.