

INTERNATIONAL STANDARD

Lampholders for tubular fluorescent lamps and starterholders



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2017 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.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

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

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

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 It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

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

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

INTERNATIONAL STANDARD

Lampholders for tubular fluorescent lamps and starterholders

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.140.10

ISBN 978-2-8322-4430-2

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 General requirement.....	12
5 General conditions for tests	13
6 Electrical rating	14
7 Classification.....	14
8 Marking	15
9 Protection against electric shock	17
10 Terminals	19
11 Construction	21
12 Resistance to dust and moisture.....	26
13 Insulation resistance and electric strength	27
14 Endurance	28
15 Mechanical strength	29
16 Screws, current-carrying parts and connections.....	31
17 Creepage distances and clearances	33
18 Resistance to heat, fire and tracking.....	35
19 Resistance to excessive residual stresses (season cracking) and to rusting	40
Annex A (normative) Examples of lampholders covered by IEC 60400	86
Annex B (normative) Season cracking/corrosion test	87
B.1 General.....	87
B.2 Test cabinet.....	87
B.3 Test solution	87
B.4 Test procedure.....	88
Annex C (informative) Protection against electric shock – Explanatory details for the installation of lampholders according to 9.2	89
Annex D (informative) Clauses containing new or more stringent requirements with respect to the previous edition	90
Bibliography.....	91
Figure 1 – Mounting jig for the testing of lampholders	41
Figure 2 – Mounting sheet	42
Figure 3 – Fixture for the testing of lampholder flexibility	43
Figure 4 – Test caps G5, GX5 and G13	44
Figure 5 – Impact test apparatus and mounting support.....	46
Figure 6 – Test cap for the test of Clause 14 for lampholders 2GX13.....	47
Figure 7 – Ball-pressure apparatus	48
Figure 8 – Bracket for fixing lampholders for the impact test	48
Figure 9 – Test cap and test assembly for testing of resistance to heat of lampholders G13, G5 and GX5 with T marking.....	50
Figure 10 – Dimensions of starterholder and holder	52

Figure 11 – “Go” plug gauges for starterholders	53
Figure 12 – Plug gauge for starterholders for testing contact making and retention	54
Figure 13 – Special plug gauge for starterholders for testing contact making	55
Figure 14 – Test cap for the test of Clause 14 for lampholders G5 and GX5	56
Figure 15 – Test cap for the test of Clause 14 for lampholders G13	56
Figure 16 – Test cap for the test of Clause 14 for lampholders 2G13	57
Figure 17 – Test cap for the test of Clause 14 for lampholders G20	57
Figure 18 – Test cap for the test of Clause 14 for lampholders Fa6.....	57
Figure 19 – Test cap for the test of Clause 14 for lampholders G10q, GU10q and GZ10q	58
Figure 20 – Test cap for the test of Clause 14 for lampholders Fa8.....	58
Figure 21 – Test starter for the test of Clause 14	59
Figure 22 – Test cap for the test of Clause 14 for lampholders R17d	60
Figure 23 – Test cap for the test of Clause 14 for lampholders 2G11	61
Figure 24 – Test cap for the test of Clause 14 for lampholders G23 and GX23.....	62
Figure 25 – Test cap for the test of Clause 14 for lampholders GR8.....	63
Figure 26 – Test cap for the test of Clause 14 for lampholders GR10q.....	63
Figure 27 – Test cap for the test of Clause 14 for lampholders GX10q and GY10q.....	64
Figure 28 – Test cap for the test of Clause 14 for lampholders G24, GX24 and GY24	65
Figure 29 – Test cap for the test of Clause 14 for lampholders G32 and GY32.....	66
Figure 30 – Test cap for the test of 18.1 for lampholders G23	67
Figure 31 – Test cap for the test of 18.1 for lampholders GR8	68
Figure 32 – Test cap for the test of 18.1 for lampholders GR10q.....	69
Figure 33 – Test cap for the test of 18.1 for lampholders GX10q.....	70
Figure 34 – Test cap for the test of 18.1 for lampholders GY10q.....	71
Figure 35 – Test cap for the test of 18.1 for lampholders 2G11	72
Figure 36 – Test cap for the test of 18.1 for lampholders GX23.....	73
Figure 37 – Test cap for the test of 18.1 for lampholders G24, GX24 and GY24 (1 of 2).....	74
Figure 38 – Test cap for the test of 18.1 for lampholders G32, GX32 and GY32 (1 of 2).....	76
Figure 39 – Test cap for the test of Clause 14 for lampholders 2G8	78
Figure 40 – Test cap for the test of Clause 14 for lampholders GX53.....	79
Figure 41 – Standard test finger (according to IEC 60529:2014)	80
Figure 42 – Test cap for the test of Clause 14 for lampholders W4.3x8.5d	81
Figure 43 – Test cap for the test of Clause 14 for lampholders GR14q.....	82
Figure 44 – Test cap for the test of Clause 14 for lampholders G28d	83
Figure 45 – Test cap for the test of Clause 14 for lampholders 2GX11	84
Figure 46 – Test probes for checking gasket sleeves on lampholders for higher IP protection	85
Figure C.1 – Examples of lampholders	89
Table 1 – Minimum values of insulation resistance.....	27
Table 2 – Torque tests on screws	31
Table 3 – Minimum distances for AC sinusoidal voltages up to 30 kHz – Impulse withstand category II.....	34

Table 4 – Minimum distances for rated ignition voltages or equivalent peak voltage U_p	35
Table A.1 – Examples of lampholders covered by IEC 60400	86
Table B.1 – pH adjustment.....	87

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LAMPHOLDERS FOR TUBULAR FLUORESCENT
LAMPS AND STARTERHOLDERS****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 60400 has been prepared by subcommittee 34B: Lamp caps and holders, of IEC technical committee 34: Lamps and related equipment.

This eighth edition cancels and replaces the seventh edition published in 2008, Amendment 1:2011 and Amendment 2:2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) alignment with ISO/IEC drafting rules;
- b) renumbering of clauses, tables and figures.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
34B/1900/FDIS	34B/1911/RVD

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

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

In this standard, the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type;*
- notes: in smaller roman type.

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

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

A bilingual version of this publication may be issued at a later date.

LAMPHOLDERS FOR TUBULAR FLUORESCENT LAMPS AND STARTERHOLDERS

1 Scope

This document states the technical and dimensional requirements for lampholders for tubular fluorescent lamps and for starterholders, and the methods of test to be used in determining the safety and the fit of the lamps in the lampholders and the starters in the starterholders.

This document covers independent lampholders and lampholders for building-in, used with tubular fluorescent lamps provided with caps as listed in Annex A, and independent starterholders and starterholders for building-in, used with starters in accordance with IEC 60155, intended for use in AC circuits where the working voltage does not exceed 1 000 V r.m.s.

This document also covers lampholders for single-capped tubular fluorescent lamps integrated in an outer shell and dome similar to Edison screw lampholders (e.g. for G23 and G24 capped lamps). Such lampholders are tested in accordance with the following clauses and subclauses of IEC 60238: 9.4; 9.5; 9.6; 10.3; 11.7; 12; 13.2; 13.5; 13.6; 13.7; 14; 16.3; 16.4; 16.5 and 16.9.

This document also covers lampholders which are integral with a luminaire or intended to be built into appliances. It covers the requirements for the lampholder only. For all other requirements, such as protection against electric shock in the area of the terminals, the requirements of the relevant appliance standard are applicable and tested after building into the appropriate equipment, when that equipment is tested according to its own standard. Lampholders for use by luminaire manufacturers only are not for retail sale.

This document also applies, as far as is reasonable, to lampholders and starterholders other than the types explicitly mentioned above and to lamp connectors.

Where the term "holder" is used in this document, both lampholders and starterholders are intended.

Where the term "bi-pin lampholder" is used, lampholders for wedged caps are also intended.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60061-2, *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 60068-2-75:2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*
IEC 60112:2003/AMD1:2009

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60352-1:1997, *Solderless connections – Part 1: Wrapped connections – General requirements, test methods and practical guidance*

IEC 60399, *Barrel thread for lampholders with shade holder ring*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

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

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-11-5:2016 *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

ISO 4046-4:2016, *Paper, board, pulps and related terms – Vocabulary – Part 4: Paper and board grades and converted products*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

rated voltage

voltage declared by the manufacturer to indicate the highest working voltage for which the holder is intended

3.2

working voltage

highest r.m.s. voltage which may occur across any insulation, transients being disregarded, both when the lamp or starter is operating under normal conditions and when the lamp or starter is removed

3.3

flexible lampholders for linear double-capped fluorescent lamps

pair of lampholders in which the base of each holder is rigidly mounted in the luminaire but which has one or both of the lampholders so designed as to allow axial movement of the contacts to provide compensation for variations in lamp lengths and, where necessary, to permit insertion and removal of the lamp

Note 1 to entry: In case of doubt as to whether a lampholder G5, GX5 or G13 provides the required axial movement of the contacts, a test with the device shown in Figure 3 can be carried out.