

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Luminaire –
Part 2-11: Particular requirements – Aquarium luminaire

Luminaire –
Partie 2-11: Exigences particulières – Luminaire pour aquarium

<https://standards.iteh.ai/catalog/standards/sist/ccaf65c1-9e9b-4d8b-83c5-7171ccc58f7b/iec-60598-2-11-2013>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2022 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11
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 corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

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 It also gives information on projects, replaced and withdrawn publications.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 once a month by email.

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: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) 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 IEC

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

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 60598-2-11

Edition 2.1 2022-07
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Luminaire –
Part 2-11: Particular requirements – Aquarium luminaire

Luminaire –
Partie 2-11: Exigences particulières – Luminaire pour aquarium

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.140.40

ISBN 978-2-8322-3969-8

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

REDLINE VERSION

VERSION REDLINE



Luminaire – iTeh STANDARD PREVIEW
Part 2-11: Particular requirements – Aquarium luminaire
(standards.iteh.ai)

Luminaire –
Partie 2-11: Exigences particulières – Luminaire pour aquarium

<https://standards.iteh.ai/catalog/standards/sist/ccaf65c1-9e9b-4d8b-83c5-7171ccc58f7b/iec-60598-2-11-2013>

CONTENTS

FOREWORD	3
INTRODUCTION	5
11.1 Scope	6
11.2 Normative references	6
11.3 General test requirements	6
11.4 Terms and definitions	6
11.5 Classification of luminaires	7
11.6 Marking	7
11.7 Construction	8
11.8 Creepage distances and clearances	9
11.9 Provisions for earthing	9
11.10 Terminals and electrical connections	9
11.11 External and internal wiring	9
11.12 Protection against electric shock	9
11.13 Endurance tests and thermal tests	9
11.14 Resistance to dust, solid objects and moisture	10
11.15 Insulation resistance and electric strength	10
11.16 Resistance to heat, fire and tracking	10
Annex A (normative) Requirements for the protective shield to be fitted to luminaires using metal halide lamps for protective measures against UV radiation	11
Figure 1 – Minimum distance from water level symbol	7
Table 1 – Markings	7

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LUMINAIRES –

Part 2-11: Particular requirements – Aquarium luminaires

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.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60598-2-11 edition 2.1 contains the second edition (2013-05) [documents 34D/1046/FDIS and 34D/1089/RVD] and its amendment 1 (2022-07) [documents 34D/1612/CDV and 34D/1632/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60598-2-11 has been prepared by subcommittee 34D: Luminaires, of IEC technical committee 34: Lamps and related equipment.

This standard is to be read in conjunction with IEC 60598-1.

This second edition constitutes a technical revision.

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

- a) Subclause 11.1, change of the scope to open the standard for all kinds of electrical light sources.
- b) Subclause 11.4.2, change of the definition in order to clarify non-permanently attached aquarium luminaire.
- c) Subclause 11.11.3, for indoor operated aquarium luminaire, change of the size of external cable to at least 0,75 mm² instead of 1,0 mm² in the former edition.

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

A list of all the parts in the IEC 60598 series, published under the general title *Luminaires* can be found on the IEC website.

NOTE In this standard, the following print types are used:

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

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Aquarium luminaires are predominantly used on the topside of an aquarium tank to achieve an effective illumination and are, therefore, very close to the water inside the tank. Because constant refilling of water is required as a consequence of evaporation and regular servicing, e.g. feeding the fish, it is necessary to open the top cover or to remove the aquarium luminaire frequently in order to have a good and sufficient access to the water surface.

The requirements of this standard are necessary to prevent any dangerous contact between current-carrying parts of the aquarium luminaire and the water inside the tank during refilling or maintenance. Another aspect is to prevent any accidental immersion of the aquarium luminaire into the water.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 60598-2-11:2013](https://standards.iteh.ai/catalog/standards/sist/ccaf65c1-9e9b-4d8b-83c5-7171ccc58f7b/iec-60598-2-11-2013)

<https://standards.iteh.ai/catalog/standards/sist/ccaf65c1-9e9b-4d8b-83c5-7171ccc58f7b/iec-60598-2-11-2013>

LUMINAIRES –

Part 2-11: Particular requirements – Aquarium luminaires

11.1 Scope

This part of the IEC 60598 series specifies requirements for household aquarium luminaires incorporating electric light sources on supply voltages not exceeding 1 000 V.

NOTE In the U.S., electrical equipment used on or in aquariums must be supplied by voltages not exceeding 300 V.

11.2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

11.3 General test requirements

The provisions of Section 0 of IEC 60598-1 apply. The tests described in each appropriate section of IEC 60598-1 shall be carried out in the order listed in this part of IEC 60598-2.

11.4 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60598-1, as well as the following apply.

11.4.1

aquarium luminaire

luminaire intended to illuminate the inside of an aquarium and which is placed in close proximity of the top of the tank or in/on the tank

11.4.2

non-permanently attached aquarium luminaire

luminaire which can be positioned on top of an aquarium tank, or on a removable top cover frame or on a fixed top cover frame, and which is removable by hand; a luminaire which must be detached from the aquarium for lamp replacement and/or for maintenance is considered as a non-permanently attached luminaire

Note 1 to entry: Non-permanently attached aquarium luminaires can contain provisions for fixing.

11.4.3

permanently attached aquarium luminaire

luminaire which is mounted on the tank of the aquarium or on a fixed top cover frame of the aquarium and which is only removable by the use of a tool

Note 1 to entry: Luminaires and their parts can be mounted separately by the user.

11.4.4

independently suspended aquarium luminaire

luminaire (pendant), not permanently attached to the tank

11.4.5

removable top cover frame

outside frame which is mounted on the top of the aquarium tank and may be removed by hand

Note 1 to entry: A removable top cover frame can contain other parts necessary for fixing additional accessories.

11.4.6

fixed top cover frame

outside frame which is fixed on top of the aquarium tank, and the removal of which is only possible by use of a tool

Note 1 to entry: A fixed top cover frame can contain parts necessary for fixing additional accessories.

11.4.7

aquarium

complete system, including a tank, an aquarium luminaire and if applicable a top cover frame

11.5 Classification of luminaires

Aquarium luminaires shall be classified in accordance with the provisions of Section 2 of IEC 60598-1.

Aquarium luminaires are referred to as luminaires in this document.

11.6 Marking

IEC 60598-2-11:2013

[https://standards.iteh.ai/catalog/standards/sist/ccaf65c1-9e9b-4d8b-83c5-7171ccc58f7b/iec-](https://standards.iteh.ai/catalog/standards/sist/ccaf65c1-9e9b-4d8b-83c5-7171ccc58f7b/iec-60598-2-11-2013)

The provisions of Section 3 of IEC 60598-1 apply, together with the following requirements (see Table 1).

Table 1 – Markings

Markings belonging to a)	Markings belonging to b)	Markings belonging to c)
		11.6.1 Distance 11.6.2 External parts 11.6.3 Disconnect supply
a), b) and c) refer to the categories of markings outlined in 3.2 of IEC 60598-1.		

11.6.1 Information shall be provided and/or the following symbol (see Figure 1) concerning the minimum distance from the luminaire to the maximum water level of the aquarium shall be marked on the luminaire if there are possibilities (based on the design of the aquarium) of the water reaching the luminaire. The minimum distance shall be at least 15 mm.

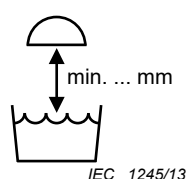


Figure 1 – Minimum distance from water level symbol

11.6.2 Portable external parts, e.g. ballast units, shall be marked with a warning based on the following wording: "Shall not be positioned on or into the cover frame", if the protection against ingress of moisture is lower than IPX7.

11.6.3 ~~Aquarium luminaires~~ Where the luminaire is foreseen to be opened for maintenance, it shall be marked with an outside visible instruction based on the following wording: "Disconnect supply before opening the luminaire for maintenance".

11.6.4 If the permanently attached luminaire is delivered separately from the aquarium and intended for direct mounting on the wall of the tank, the manufacturer has to give an information in the instructions regarding the permissible thickness of the wall of the aquarium tank.

11.7 Construction

The provisions of Section 4 of IEC 60598-1 apply, together with the requirements of 11.7.1 to 11.7.5 of this part of IEC 60598-2.

11.7.1 Non-permanently attached ~~aquarium~~ luminaires shall have protection against ingress of moisture of at least IPX7. Only class III ~~aquarium~~ luminaires where the working voltage does not exceed 12 V ~~r.m.s.~~ RMS or 30 V ripple free ~~d.c.~~ DC can be positioned in contact with or submersed in water.

11.7.2 Permanently attached luminaires shall have protection against ingress of moisture of at least IPX7 with the following exception.

If a permanently attached ~~aquarium~~ luminaire is used in an aquarium provided with suitable drainage apertures or a cut off mechanism, all surfaces which are located at least 15 mm above the maximum water level reached in case of overfilling shall be at least IPX4.

For the other surfaces of ~~the~~ permanently attached luminaires, the protection against ingress of moisture can be reduced to at least IPX2, if the following situations apply. During refilling, any contact between water splashes and hazardous part of the ~~aquarium~~ luminaire shall be prevented by the position of the luminaire.

11.7.3 Portable external parts mounted in the supply cable, for example switches or ballast units, need not comply with the IP rating of the luminaire if the cable length between the luminaire and electrical part is at least 1,0 m and the cable length between those electrical parts and the supply connector is not greater than 0,5 m.

11.7.4 Provision shall be made to prevent a permanently attached ~~aquarium~~ luminaire (see 11.4.3 – Note 1 to entry) becoming unfixed.

Compliance shall be checked by the following test.

For a permanently attached luminaire which is intended for direct mounting on the wall of the tank, a force is applied to the fixing mechanism for 1 min in the most onerous direction. During the test, the fixing mechanism is mounted on test aquarium "walls" made of ordinary window glass, with the minimum and maximum thickness as specified by the manufacturer. The fixing mechanism shall not start moving on the glass at a pull of 20 N.

11.7.5 If the luminaire is fitted with a switch, the switch shall be a double pole disconnection construction, except for class III luminaires.

11.8 Creepage distances and clearances

The provisions of Section 11 of IEC 60598-1 apply. Luminaires of this part of IEC 60598-2 are intended for use in applications in line with impulse withstand category II.

11.9 Provisions for earthing

The provisions of Section 7 of IEC 60598-1 apply.

11.10 Terminals and electrical connections

The provisions of Sections 14 and 15 of IEC 60598-1 apply.

11.11 External and internal wiring

The provisions of Section 5 of IEC 60598-1 apply, together with the requirements of 11.11.1 to 11.11.3 of this part of IEC 60598-2.

11.11.1 ~~Aquarium~~ Luminaires shall be provided with a fixed flexible cable and a plug for connection to the power supply. The length of the cable shall be at least 1,5 m, unless the requirements of 11.7.3 apply.

11.11.2 The plug of the power supply cord of ~~an aquarium~~ a luminaire is not required to have the same degree of protection as the luminaire if different from IP2X.

11.11.3 For ~~aquarium~~ luminaires other than ordinary, if the luminaire has been clearly specified as suitable for indoor use only, flexible cables or cords used as a means of connection to the supply can be made from PVC (like for ordinary luminaires) and the nominal cross-sectional area of the conductors shall be not less than 0,75 mm². For SELV cables or cords, the requirements in IEC 60598-1 are applicable.

11.12 Protection against electric shock

The provisions of Section 8 of IEC 60598-1 apply.

11.13 Endurance tests and thermal tests

The provisions of Section 12 of IEC 60598-1 apply, together with the requirements of 11.13.1 and 11.13.2 of this part of IEC 60598-2.

11.13.1 ~~Aquarium~~ Luminaires shall be subjected to the relevant tests of 12.4, 12.5, 12.6 and 12.7 of IEC 60598-1 after the test(s) of 9.2 but before the test(s) of 9.3 of Section 9 of IEC 60598-1 as specified in 11.14 of this part of IEC 60598-2.

11.13.2 A 20 mm thick matt black painted wooden board is used to represent the maximum possible water level. A matt black painted 20 mm-wide wooden frame is placed onto the board to provide the spacing between the water and the luminaire according to ~~11.5.1~~ 11.6.1. The aquarium cover frame, fully assembled with its luminaire, is then laid onto the matt black wooden frame.

11.14 Resistance to dust, solid objects and moisture

The provisions of Section 9 of IEC 60598-1 apply, together with the requirements of 11.14.1 and 11.14.2 of this part of IEC 60598-2.

11.14.1 The order of tests specified in Section 9 of IEC 60598-1 shall be in accordance with 11.13 of this part of IEC 60598-2.

11.14.2 The test according to IPX2 shall be performed in the position of the luminaire, in which the top of the aquarium is fully covered (closed position) and the permanently attached ~~aquarium~~ luminaire is in the normal operating position.

The test according to IPX4 shall be performed in the position of the permanently attached ~~aquarium~~ luminaire, in which the maximum distance to the water is given (opened position). During the IPX4 test all surfaces which are designed for IPX2 rating ~~can be covered during the IPX4 tests~~ shall be protected from water contact using additional covers.

11.15 Insulation resistance and electric strength

The provisions of Section 10 of IEC 60598-1 apply.

11.16 Resistance to heat, fire and tracking

The provisions of Section 13 of IEC 60598-1 apply.

Annex A
(normative)

**Requirements for the protective shield to be fitted
to luminaires using metal halide lamps
for protective measures against UV radiation**

Annex P of IEC 60598-1 applies, except for the inside of the aquarium.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 60598-2-11:2013

<https://standards.iteh.ai/catalog/standards/sist/ccaf65c1-9e9b-4d8b-83c5-7171ccc58f7b/iec-60598-2-11-2013>