

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Luminaires – **iTeh STANDARD PREVIEW**
Part 2-11: Particular requirements – Aquarium luminaires
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Luminaires –
Partie 2-11: Exigences particulières – Luminaires pour aquarium

IEC 60598-2-11:2013

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LUMINAIRES –

**Part 2-11: Particular requirements –
Aquarium luminaires**

FOREWORD

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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 cancels and replaces the first edition published in 2005. This 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.

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

FDIS	Report on voting
34D/1046/FDIS	34D/1089/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 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 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

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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.

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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

IEC 60598-2-11:2013

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 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 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

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

11.6 Marking

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.

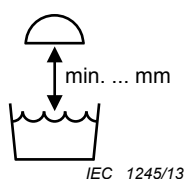


Figure 1 – Minimum distance from water level symbol

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 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. or 30 V ripple free d.c. 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 luminaire, 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 unfixated.

Compliance shall be checked by the following test.

For a 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 luminaire is not required to have the same degree of protection as the luminaire if different from IP2X.

11.11.3 For aquarium luminaries 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.

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 and 12.6 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. The aquarium cover frame, fully assembled with its luminaire, is then laid onto the matt black wooden frame.