

## מנורות: מנורות לאקווריון

Luminaires: Aquarium luminaires

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תקן זה, למעט השינויים והתוספות המצוינים בו, זהה לתקן

של הנציבות הבין-לאומית לאלקטרוטכניקה

IEC 60598-2-11 - First edition: 2005-05

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**מילות מפתח:**

אקווריון (לנוי), הארקה, בטיחות חשמל, נורות פלואורניות, מנורות, מתח נמוך.

**Descriptors:**

aquaria (ornamental), earthing, electrical safety, fluorescent lamps, luminaires, low voltage.

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- ת"י 20 חלק 2.3 - מנורות : מנורות לתאורת כבישים ורחובות
- ת"י 20 חלק 2.4 - מנורות : מנורות מיטלטלות למטרות כלליות
- ת"י 20 חלק 2.5 - מנורות : מנורות הצפה
- ת"י 20 חלק 2.6 - מנורות : מנורות בעלות שנאי מובנה לנורות עם נימת להט
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- ת"י 20 חלק 2.24 - מנורות : מנורות בעלות טמפרטורת שטח פנים מוגבלת
- ת"י 20 חלק 2.25 - מנורות : מנורות לשימוש באתרים רפואיים של בתי חולים ומרפאות

**חלות התקן (סעיף 11.1 של התקן הבין-לאומי בשינויים ובתוספות)**

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### **הערה כללית:**

בכל מקום בתקן הבין-לאומי שיש בו הפניה לתקן הבין-לאומי IEC 60598-1, חלה במקומה הפניה לתקן הישראלי ת"י 20 חלק 1: מנורות: דרישות כלליות ובדיקות.

**NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD**

**CEI  
IEC**

**60598-2-11**

Première édition  
First edition  
2005-05

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**Luminaire –**

**Partie 2-11:  
Règles particulières –  
Luminaire pour aquarium**

**Luminaire –**

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

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## 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.

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

FDIS	Report on voting
34D/833/FDIS	34D/839/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.



This publication is intended to be read in conjunction with IEC 60598-1: *Luminaires – Part 1: General requirements and tests*. It was established on the basis of the sixth edition of that standard.

Part 2 of IEC 60598, consists of the following parts<sup>1</sup> under the general title *Luminaires – Part 1: General requirements and tests*:

Part 2-1: *Fixed general purpose luminaires*

Part 2-2: *Recessed luminaires*

Part 2-3: *Luminaires for road and street lighting*

Part 2-4: *Portable general purpose luminaires*

Part 2-5: *Floodlights*

Part 2-6: *Luminaires with built-in transformers for filament lamps*

Part 2-7: *Portable luminaires for garden use*

Part 2-8: *Handlamps*

Part 2-9: *Photo and film luminaires (non-professional)*

Part 2-10: *Portable luminaires for children*

Part 2-17: *Luminaires for stage lighting, television and film studios (outdoor and indoor)*

Part 2-18: *Luminaires for swimming pools and similar applications*

Part 2-19: *Air-handling luminaires (safety requirements)*

Part 2-20: *Lighting chains*

Part 2-22: *Luminaires for emergency lighting*

Part 2-23: *Extra low voltage lighting systems for filament lamps*

Part 2-24: *Luminaires with limited surface temperatures*

Part 2-25: *Luminaires for use in clinical areas of hospitals and health care buildings*

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

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<sup>1</sup> Other parts are under consideration.

## 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 of the constant refilling of water as a consequence of evaporation and regular servicing, e.g. feeding the fish, it is necessary to open the cover above 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.

## LUMINAIRES –

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

#### 11.1 Scope

This part of IEC 60598 specifies requirements for household aquarium luminaires for use with tungsten filament, tubular fluorescent or other discharge lamps on supply voltages not exceeding 1 000 V.

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

#### 11.2 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.

#### 11.3 Definitions

For the purpose of this document the definitions given in IEC 60598-1 together with the following definitions apply:

##### 11.3.1

##### **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

##### 11.3.2

##### **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

NOTE Non-permanently attached aquarium luminaires might contain provisions for fixing.

##### 11.3.3

##### **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 Luminaires and their parts may be mounted separately by the user.

##### 11.3.4

##### **independently suspended aquarium luminaire**

luminaire (pendant), not permanently attached to the tank

##### 11.3.5

##### **removable top cover frame**

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

NOTE A removable top cover frame can contain other parts necessary for fixing additional accessories.

**11.3.6****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 A fixed top cover frame might contain parts necessary for fixing additional accessories.

**11.3.7****aquarium**

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

**11.4 Classification of luminaires**

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

**11.5 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)
		11.5.1 Distance
		11.5.2 External parts
		11.5.3 Disconnect supply
NOTE a), b) and c) refer to the categories of markings outlined in 3.2 of IEC 60598-1.		

**11.5.1** Information shall be provided and/or the following symbol (see Figure 1) concerning the minimum distance to the maximum water level of the aquarium shall be marked on the luminaire if it is possible (by the design of the aquarium) that water can reach the luminaire. The minimum distance shall be at least 15 mm.



**Figure 1 – Minimum distance from water level symbol**

**11.5.2** 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.

**11.5.3** Aquarium luminaires shall be marked with an outside visible instruction based on the following wording: "Disconnect supply before opening the luminaire for maintenance".

**11.5.4** 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.

## 11.6 Construction

The provisions of Section 4 of IEC 60598-1 apply, together with the requirements of 11.6.1 to 11.6.5.

**11.6.1** Non-permanently attached aquarium luminaires shall have protection against ingress of moisture of at least IPX7. Only class III non-permanently attached aquarium luminaires where the working voltage does not exceed 12 V r.m.s. can be positioned in contact with or submersible in water.

**11.6.2** If it is necessary to remove a permanently attached aquarium luminaire or the fixed top cover frame for maintenance of the aquarium, or for replacement of the lamp, or if the tank does not have suitable drainage apertures or a cut-off mechanism, the luminaire shall have a protection against ingress of moisture of at least IPX7.

A suitable drainage aperture will prevent overflowing of the tank and immersion of a luminaire and will maintain the maximum water level of the tank at a distance to the luminaire of at least 15 mm.

If a permanently attached aquarium luminaire, in compliance with the previous paragraph is used in a tank with suitable drainage apertures or a cut off mechanism, the protection against ingress of moisture shall be at least IP X4 for all surfaces of the luminaire which face the water. For the other surfaces of the luminaire the protection against ingress of moisture can be reduced to at least IP X2, if one of the following situations apply:

- the whole of the top of the tank is covered, and the luminaire is in its intended operating position (closed tank);
- during refilling, the permanently attached aquarium luminaire has to be moved to a position where a 10x10cm minimum access to the water is given (open tank);
- during refilling, by the position of the luminaire, water splashes are prevented from making contact with the surface of the luminaire.

**11.6.3** 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.

**11.6.4** Provision shall be made to prevent a permanently attached aquarium luminaire (see 11.3.3 – note) becoming unfixd.

Compliance shall be by the following test.

For a luminaire which is intended for direct mounting of 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.

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

### **11.7 Creepage distances and clearances**

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

### **11.8 Provisions for earthing**

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

### **11.9 Terminals and electrical connections**

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

### **11.10 External and internal wiring**

The provisions of Section 5 of IEC 60598-1 apply, together with the requirements of 11.10.1 to 11.10.3.

**11.10.1** 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 11.6.3 apply.

**11.10.2** 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 other than IP2X.

**11.10.3** 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 (as per ordinary luminaires).

### **11.11 Protection against electric shock**

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

### **11.12 Endurance tests and thermal tests**

The provisions of Section 12 of IEC 60598-1 apply, together with the requirements of 11.12.1 and 11.12.2

**11.12.1** Aquarium luminaires shall be subjected to the relevant tests of Clauses 12.4, 12.5 and 12.6 of IEC 60598-1 after the test(s) of Clause 9.2 but before the test(s) of Clause 9.3 of Section 9 of IEC 60598-1 as specified in Clause 11.13 of this part of IEC 60598-2.

**11.12.2** 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 subclause 11.5.1. The aquarium cover frame, fully assembled with its luminaire, is then laid onto the matt black wooden frame.

### **11.13 Resistance to dust, solid objects and moisture**

The provisions of Section 9 of IEC 60598-1 apply, together with the requirements of 11.13.1 and 11.13.2.

**11.13.1** The order of tests specified in Section 9 of IEC 60598-1 shall be in accordance with Clause 11.12 of this part of IEC 60598.

**11.13.2** 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). All surfaces which are designed for IPX2 rating can be covered during the IPX4 tests.

### **11.14 Insulation resistance and electric strength**

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

### **11.15 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.

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