



Test Report issued under the responsibility of:



TEST REPORT
IEC 60598-2-1
Luminaires
Part 2: Particular requirements
Section 1: Fixed general purpose luminaires

Report Number..... : R0422023_2_01

Date of issue..... : 2024-01-24

Total number of pages : 65

Name of Testing Laboratory

preparing the Report



Analytical S.r.l. CBTL of DEKRA Certification B.V., The Netherlands

Via dei Cadolingi 6, int 6/7

50018 Scandicci (FI)

Italy

Applicant's name : T.S.E. S.R.L.

Address..... : Via Filippo Turati, 25 - 05100 Terni (TR) - Italy

Test specification:

Standard : IEC 60598-2-1:2020 used in conjunction with IEC 60598-1:2020

Test procedure : CB Scheme

Non-standard test method : N/A

TRF template used..... : IECEE OD-2020-F1:2021, Ed.1.4

Test Report Form No. : IEC60598_2_1I

Test Report Form(s) Originator : Intertek Semko AB

Master TRF : Dated 2022-04-14

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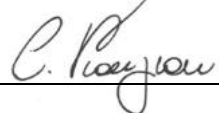
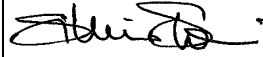
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Test item description :	Fixed general purpose LED luminaire	
Trade Mark(s)		
Manufacturer	T.S.E. S.R.L.	
Model/Type reference	GRANTORINO #-#-#-#-#-#-66/68-TLC0-#-#	
Ratings	100-240 Vac, 50-60 Hz, Class II, IP66/IP68 (2 bar) $t_a = 75\text{ }^{\circ}\text{C}$; Max 170 W $t_a = 120\text{ }^{\circ}\text{C}$; Max 38 W	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	Analytical S.r.l. CBTL of DEKRA Certification B.V., The Netherlands
Testing location/ address :		Via dei Cadolingi 6, int 6/7 50018 Scandicci (FI) Italy
Tested by (name, function, signature) :		Cosimo Pianigiani (ENG) 
Approved by (name, function, signature) ... :		Silvia Storai (REW) 
☐	Testing procedure: CTF Stage 1:	
Testing location/ address :		
Tested by (name, function, signature) :		
Approved by (name, function, signature) ... :		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address :		
Tested by (name + signature)		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) ... :		
☐	Testing procedure: CTF Stage 3:	
☐	Testing procedure: CTF Stage 4:	
Testing location/ address :		
Tested by (name, function, signature) :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) ... :		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

- **Attachment 1: European group deviations and national differences according to EN IEC 60598-2-1:2021 used in conjunction with EN IEC 60598-1:2021 + AMD11:2022: attachment report no. R0422023_2_01 Att1 (2 pages)**
- **Attachment 2: Qualilab S.r.l. report no. 616-QL23-R16 ver.0 according to IEC/TR 62778:2014 issued on 2023-06-02 (5 pages) (LED TSE-104 - Citizen)**
- **Attachment 3: Qualilab S.r.l. report no. 1600-QL23-R01 ver.0 according to IEC/TR 62778:2014 issued on 2023-12-20 (5 pages) (LED LUMILEDS LUXEON 70x70)**

Summary of testing:**Tests performed (name of test and test clause):**

Tests performed on luminaire model
GRANTORINO 1ESC3-0780-104-0800-AZ01-5K0-
1UP32-C60P-66/68-TLC0-INT-AC:

Clause	Requirement test	Verdict
(3.4)	Test of marking	Pass
(4.12.1)	Screws and connections (mechanical) and glands testing	Pass
(4.12.4)	Locked connection	Pass
(4.13.1)	Mechanical strength tests	Pass
(4.13.3)	Straight test finger	Pass
(4.14.1)	Suspensions and means of adjustment	Pass
(11)	Creepage distances and clearances	Pass
(5.2.10)	Cord anchorage	Pass
(8.2.5)	Protection against electric shock	Pass
(8.2.7)	Capacitor discharge	Pass
(12.3)	Endurance test	Pass
(12.4)	Thermal test	Pass
(9.2.2)	IP6X test	Pass
(9.2.7)	IPX6 test	Pass
(9.3)	Humidity test 48 h	Pass
(10.2.1)	Insulation resistance test	Pass
(10.2.2)	Electric strength test	Pass
1.15 (10.3)	Leakage current testing	Pass

Testing location:

Analytical S.r.l. CBTL of DEKRA Certification B.V.,
The Netherlands
Via dei Cadolingi 6, int 6/7
50018 Scandicci (FI)
Italy

Tests performed on luminaire model
GRANTORINO 1ESC3-0780-104-0800-LD03-4K0-
1UP32-C60P-66/68-TLC0-INT-AC:

Clause	Requirement test	Verdict
(4.13.1)	Mechanical strength tests	Pass
(4.14.1)	Suspensions and means of adjustment	Pass
(5.2.10)	Cord anchorage	Pass
(8.2.5)	Protection against electric shock	Pass
(8.2.7)	Capacitor discharge	Pass
(12.3)	Endurance test	Pass
(12.4)	Thermal test	Pass
(9.2.2)	IP6X test	Pass
(9.2.7)	IPX6 test	Pass
(9.2.9)	IPX8 test	Pass
(9.3)	Humidity test 48 h	Pass

Tests performed on luminaire model
GRANTORINO 1ESC3-0780-104-0220-AZ01-
5K0-1EX32-C60P-66/68-TLC0-INT-DC:

Clause	Requirement test	Verdict
(4.13.1)	Mechanical strength tests	Pass
(4.14.1)	Suspensions and means of adjustment	Pass
(8.2.5)	Protection against electric shock	Pass
(12.3)	Endurance test	Pass
(12.4)	Thermal test	Pass

Test performed on LED modules according to
IEC 62031

(Clause numbers between brackets refer to
clauses in IEC 61347-1)

Clause	Requirement test	Verdict
11 (11)	Moisture resistance and insulation	Pass
12 (12)	Electric strength	Pass
13 (14)	Fault conditions	Pass

Following tests are representative for all
luminaires series GRANTORINO #-#-#-#-#-#-#-
66/68-TLC0-#-#.

Summary of compliance with National Differences:**List of countries addressed: EU Group differences**

☒ The product fulfils the requirements of EN IEC 60598-2-1:2021 used in conjunction with EN IEC 60598-1:2021 + AMD11:2022.

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other:... (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

In this report the accuracy method "procedure 2" of the IEC GUIDE 115 and the Instrument Accuracy Limits of the IECEE OD 5014 are being used)

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

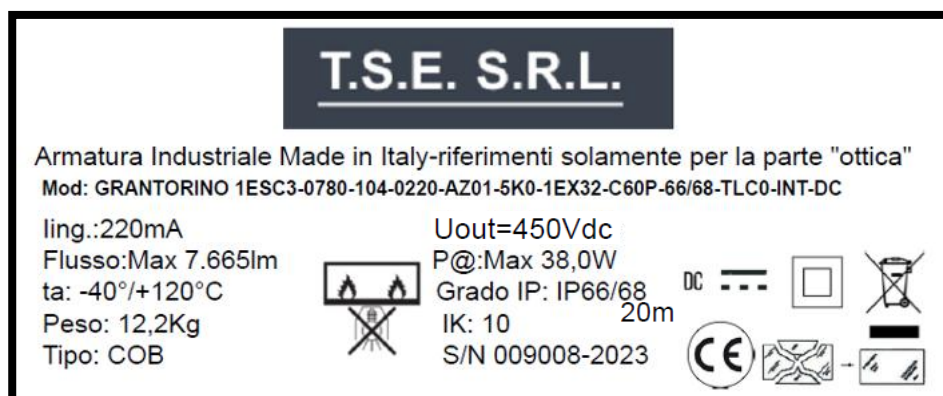
Copy of Marking Plate of Luminaire model
GRANTORINO 1ESC3-0780-104-0800-AZ01-5K0-1UP32-C60P-66/68-TLC0-INT-AC:



Copy of Marking Plate of Luminaire model
GRANTORINO 1ESC3-0780-104-0800-LD03-4K0-1UP32-C60P-66/68-TLC0-INT-AC:



Copy of Marking Plate of Luminaire model
GRANTORINO 1ESC3-0780-104-0220-AZ01-5K0-1EX32-C60P-66/68-TLC0-INT-DC:



Test item particulars.....: Fixed general purpose LED luminaire	
Classification of installation and use.....: Fixed general purpose LED luminaire, class II, IP66/IP68, for normal use, suitable for direct mounting on normally flammable surfaces	
Supply Connection Supply cable	
Possible test case verdicts: - test case does not apply to the test object..... : N/A - test object does meet the requirement..... : P (Pass) - test object does not meet the requirement..... : F (Fail)	
Testing..... :	
Date of receipt of test item 2023-04-03	
Date (s) of performance of tests 2023-04-03 – 2023-12-22	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☒ comma / ☐ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60598-2-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided :	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) : T.S.E. S.R.L. Strada di Collescipoli, 55 05100 Terni (TR) - Italy	

General product information and other remarks:

Luminaires model GRANTORINO #-#-#-#-#-#-66/68-TLC0-#-# are Class II, IP66/68 (2 bar), fixed general purpose LED luminaire.

Luminaires are identified by the following code:

GRANTORINO	#	-	#	-	#	-	#	-	#	-	#	-	#	-	#	-	66/68	-	TLC0	-	#	-	#
I	II		III		IV		V		VI		VII		VIII		IX		X		XI		XII		XIII

I – Series

GRANTORINO

II – Mechanical type

1ESC0 = Type R18496

1ESC1 = Type AR1304

1ESC2 = 468Z

1ESC3 = HS405

1ESC4 = R21930

III – Length

= Numeric combination that identifies the length of the appliance (Maximum of 0780 mm)

IV – LED modules

101 = 1 LED module

102 = 2 LED modules

103 = 3 LED modules

104 = 4 LED modules

V – LED Current

= Numeric value that identifies the supply current of the LED module
(Maximum 0800 mA @ 75°C and Maximum 220mA @ 120 °C)

VI – LED type

LD03 = LED Lumileds 7070

AZ01 = LED Citizen

VII – Colour temperature

= Numeric value that identifies the kelvin grade between 2700K – 5700K

VIII – LED Driver

1UP32 = uPowerTek 320 W

1EX32 = No driver provided

IX – Optic

M18 = Optic LEDIL CS15870 2x6

C121 = Optic TorreFaro

M4 = Optic outdoor

C90 = Optic 90°

C60P = Optic 60°

X – IP grade

66/68 = IP 66/68

XI – Remote control

TLC0 = No remote control

XII – Type of use

INT = Indoor

OUT = Outdoor

XIII – Ambient temperature

DC = -40°C / +125°C (Only for luminaires with code position VIII – LED Driver = 1EX32)

AC = -30°C / +75°C

LED modules are no replaceable light sources (self-hardening resin used for thermal purposes and to provide IP protection).

LED modules have been evaluated according to standard IEC/TR 62778:2014, IEC 62031:2018 and EN 62031:2020; test results are shown in list of attached reports.

The connection to the AC/DC mains can be performed with connecting leads (the manufacturer provides information for suitable terminal block used in final installation).

A supplementary test according to standards IEC/EN 60068-2-75 and IEC/TR 62696 has been performed to verify the IK10 (20 J) rating of luminaires. Top side, bottom side, lateral side, and glass cover have been verified and the test was successful.

Luminaires suitable for installation at 120 °C are not provided with a LED control gear.

A suitable type of LED control gear is declared in manufacturer instruction.

Luminaires suitable for installation at 75 °C are provided with a LED control gear potted in the body.

Dimensions:

780 x 260 x 310 mm (12,0 kg)

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.4 (0)	GENERAL TEST REQUIREMENTS		
1.4 (0.3)	More sections applicable..... :	Yes ☐ No ☒ Section/s:	—
1.4 (0.5)	Components	(see Annex 1)	—
1.4 (0.7)	Information for luminaire design in light sources standards		—
1.4 (0.7.2)	Light source safety standard	IEC 62031:2018 and IEC/TR 62778:2014	—
	Luminaire design in the light source safety standard		N/A

1.5 (2)	CLASSIFICATION OF LUMINAIRES		
1.5 (2.2)	Type of protection	Class II	P
1.5 (2.3)	Degree of protection..... :	IP66/68	—
1.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes ☐ No ☒	—
1.5 (2.5)	Luminaire for normal use	Yes ☒ No ☐	—
	Luminaire for rough service	Yes ☐ No ☒	—

1.6 (3)	MARKING		
1.6 (3.2)	Mandatory markings		P
	Position of the marking	Marked on unit.	P
	Format of symbols/text	Graphical symbols > 5 mm, letters and numerals > 2 mm	P
1.6 (3.3)	Additional information	Manufacturer's instructions: information for a proper installation, use and maintenance	P
	Language of instructions	Will be in the final destination language. English and Italian reviewed	P
1.6 (3.3.1)	Combination luminaires	Not a combination luminaire	N/A
1.6 (3.3.2)	Nominal frequency in Hz	50-60 Hz	P
1.6 (3.3.3)	Operating temperature	On marking	P
1.6 (3.3.5)	Wiring diagram	See manufacturer's instructions	P
1.6 (3.3.6)	Special conditions	No looping-in	N/A
1.6 (3.3.7)	Metal halide lamp luminaire – warning	Not this type	N/A
1.6 (3.3.8)	Limitation for semi-luminaires	Not a semi-luminaire	N/A
1.6 (3.3.9)	Power factor and supply current	See manufacturer's instructions	P
1.6 (3.3.10)	Suitability for use indoors	Indoor use only	N/A
1.6 (3.3.11)	Luminaires with remote control	Not this type	N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (3.3.12)	Clip-mounted luminaire – warning	Not this type	N/A
1.6 (3.3.13)	Specifications of protective shields	See manufacturer's instructions	P
1.6 (3.3.14)	Symbol for nature of supply	AC supply symbol on the marking and on manufacturer's instructions	P
1.6 (3.3.15)	Rated current of socket outlet	No socket outlet	N/A
1.6 (3.3.16)	Rough service luminaire	Not a rough service luminaire	N/A
1.6 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Sentence for type Z present on manufacturer's instructions	P
1.6 (3.3.18)	Non-ordinary luminaires with PVC cable	Rubber	N/A
1.6 (3.3.19)	Protective conductor current in instruction if applicable		N/A
1.6 (3.3.20)	Provided with information if not intended to be mounted within arm's reach	Not this type	N/A
1.6 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non replaceable light source information provided on manufacturer's instructions	P
1.6 (3.3.22)	Controllable luminaires, classification of insulation provided	Not a controllable luminaire	N/A
1.6 (3.3.23)	Luminaires without control gear provided with necessary information for selection of appropriate component	Suitable information provided in manufacturer's instruction for selection of suitable LED controlgear	P
1.6 (3.3.24)	If not supplied with terminal block, information on the packaging	See manufacturer's instructions	P
1.6 (3.3.25)	Luminaires employing light sources emitting UV on mains wiring, information provided	Not this type	N/A
1.6 (3.3.26)	Wall mounted luminaire using external flexible cable or cord longer than 0.3 m, information provided	See manufacturer's instructions	P
1.6 (3.4)	Test with water	15 s test with water	P
	Test with hexane	15 s test with hexane	P
	Legible after test	Marking labels are legible	P
	Label attached	Markings labels are not easily removable and show no curling	P

1.7 (4)	CONSTRUCTION		
1.7 (4.2)	Components replaceable without difficulty	No replaceable components	P
1.7 (4.3)	Wireways smooth and free from sharp edges	Smooth and free from sharp edges	P
1.7 (4.4)	Lamp holders		N/A
1.7 (4.4.1)	Integral lamp holder	No lampholder	N/A
1.7 (4.4.2)	Wiring connection		N/A
1.7 (4.4.3)	Lamp holder for end-to-end mounting		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7 (4.4.4)	Positioning		N/A
	- pressure test (N)		—
	After test the lamp holder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lamp holder the lamp holder has not moved from its position and show no permanent deformation		N/A
	- bending test (N)		—
	After test the lamp holder has not moved from its position and show no permanent deformation		N/A
1.7 (4.4.5)	Peak pulse voltage		N/A
1.7 (4.4.6)	Centre contact		N/A
1.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
1.7 (4.4.8)	Lamp connectors		N/A
1.7 (4.4.9)	Caps and bases correctly used		N/A
1.7 (4.4.10)	Light source for lamp holder or connection according IEC 60061 not connected another way		N/A
1.7 (4.5)	Starter holders		N/A
	Starter holder in luminaires other than class II	No starter holder	N/A
	Starter holder class II construction		N/A
1.7 (4.6)	Terminal blocks		P
	Tails		P
	Unsecured blocks		N/A
1.7 (4.7)	Terminals and supply connections		P
1.7 (4.7.1)	Contact to metal parts	Fixed class II luminaires not frequently adjusted	N/A
1.7 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
1.7 (4.7.3)	Terminals for supply conductors		P
1.7 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor	No welded connections	N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N/A
1.7 (4.7.4)	Terminals other than supply connection	See Annex 1	P
1.7 (4.7.5)	Heat-resistant wiring/sleeves	External wiring suitable for temperatures reached inside the luminaire (See Annex 2)	N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7 (4.7.6)	Multi-pole plug	No plug	N/A
	- test at 30 N		N/A
1.7 (4.8)	Switches		N/A
	- adequate rating	No switches	N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
1.7 (4.9)	Insulating lining and sleeves		N/A
1.7 (4.9.1)	Retainment	Not used	N/A
	Method of fixing		N/A
1.7 (4.9.2)	Insulated linings and sleeves:		N/A
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C)		N/A
1.7 (4.10)	Double or reinforced insulation		P
1.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation	Luminaire in compliance with class II construction	P
	Safe installation fixed luminaires		P
	Capacitors and switches		N/A
1.7 (4.10.2)	Assembly gaps:		N/A
	- not coincidental	No assembly gaps	N/A
	- no straight access with test probe		N/A
1.7 (4.10.3)	Retainment of insulation:		N/A
	- fixed	Not this type	N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lamp holder		N/A
1.7 (4.10.4)	Protective impedance device		N/A
	Basic and supplementary insulation bridged by resistor(s) or appropriate capacitor		N/A
	Double or reinforced insulation bridged by at least two separate resistors in series or appropriate capacitor(s)		N/A
	Capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.2 of IEC 60065		N/A
1.7 (4.11)	Electrical connections and current-carrying parts		P
1.7 (4.11.1)	Contact pressure	No contact pressure	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7 (4.11.2)	Screws:		P
	- self-tapping screws	Used	P
	- thread-cutting screws	Not present	N/A
1.7 (4.11.3)	Screw locking:		P
	- spring washer	Spring washer used near mechanical connections	P
	- rivets	Used to fix LED controlgear in position	P
1.7 (4.11.4)	Material of current-carrying parts	See Annex 1	P
1.7 (4.11.5)	No contact to wood or mounting surface	Current carrying parts not in contact with mounting surface. No wood	P
1.7 (4.11.6)	Electro-mechanical contact systems	No electro-mechanical contact systems	N/A
1.7 (4.12)	Screws and connections (mechanical) and glands		P
1.7 (4.12.1)	Screws not made of soft metal	Not made of soft metal	P
	Screws of insulating material	Not present	N/A
	Torque test: torque (Nm); part..... :	Eyebolt fixing luminaire: diam 8,0 mm, tested: 8,0 Nm	P
	Torque test: torque (Nm); part..... :	Screw fixing wall mount: diam 8,0 mm, tested: 8,0 Nm	P
	Torque test: torque (Nm); part..... :	Screw fixing cable tray mount: diam 8,0 mm, tested: 8,0 Nm	P
	Torque test: torque (Nm); part..... :	Screw fixing pole mount: diam 8,0 mm, tested: 8,0 Nm	P
	Torque test: torque (Nm); part..... :	Screw fixing lateral cover: diam 5,0 mm, tested: 2,0 Nm	P
	Torque test: torque (Nm); part..... :	Screw fixing LED module: diam 5,0 mm, tested: 2,0 Nm	P
1.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal	No such screws	N/A
1.7 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm)	No fixed arms	N/A
	- lamp holder; torque (Nm)	No lampholder	N/A
	- push-button switches; torque 0,8 Nm	No switches	N/A
1.7 (4.12.5)	Screwed glands; force (Nm)..... :	Screwed gland fixing supply cable: 6,25 Nm Screwed gland fixing dimming cable: 4,0 Nm	P
1.7 (4.13)	Mechanical strength		P
1.7 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)	No fragile parts	N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- other parts; energy (Nm)..... :	(Level 1 impact level) According to IEC/TR 62696:2011-04 the following parts of the luminaire have been tested: Enclosure: 20 J (IK10) Glass cover: 20 J (IK10) Bracket: 20 J (IK10)	P
	1) live parts	No damages	P
	2) linings	No damages	P
	3) protection	No damages	P
	4) covers	No damages	P
1.7 (4.13.2)	Metal parts have adequate mechanical strength		P
1.7 (4.13.3)	Straight test finger	30 N applied on enclosure	P
1.7 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher	Not a rough service luminaire	N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
1.7 (4.13.6)	Tumbling barrel		N/A
1.7 (4.14)	Suspensions, fixings and means of adjusting		P
1.7 (4.14.1)	Mechanical load:		P
	A) four times the weight	Eyebolt version: 46,0 kg applied for 1 h Cable tray version: 46,0 kg applied for 1 h Pole version: 46,0 kg applied for 1 h Ceiling/Wall support version: 30,0 kg applied for 1 h	P
	B) torque 2,5 Nm	Not this type	N/A
	C) bracket arm; bending moment (Nm) :		N/A
	D) load track-mounted luminaires	Not this type	N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) :	Not this type	N/A
	Metal rod. diameter (mm) :	Not this type	N/A
	Fixed luminaire or independent control gear without fixing devices	Not this type	N/A
1.7 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) :	Not suspended with flexible cables	—

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Stress in conductors (N/mm ²)		N/A
	Mass (kg) of semi-luminaire		N/A
	Bending moment (Nm) of semi-luminaire		N/A
1.7 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles.....	Not this type	N/A
	- strands broken		N/A
	- electric strength test afterwards		N/A
1.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
1.7 (4.14.5)	Guide pulleys		N/A
1.7 (4.14.6)	Strain on socket-outlets		N/A
1.7 (4.15)	Flammable materials		N/A
	- glow-wire test 650°C	See Test Table 1.15 (13.3.2)	N/A
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- thermal protection		N/A
	- electronic circuits exempted		N/A
1.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
1.7 (4.16)	Luminaires for mounting on normally flammable surfaces		P
	No lamp control gear	LED controlgear used	N/A
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N/A
1.7 (4.16.1)	Lamp control gear spacing:		P
	- spacing 35 mm	> 35 mm	P
	- spacing 10 mm		N/A
1.7 (4.16.2)	Thermal protection:		P
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear	110 °C marked	P
1.7 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
1.7 (4.17)	Drain holes		N/A
	Clearance at least 5 mm	No drain holes	N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7 (4.18)	Resistance to corrosion		N/A
1.7 (4.18.1)	- rust-resistance		N/A
1.7 (4.18.2)	- season cracking in copper	Not present	N/A
1.7 (4.18.3)	- corrosion of aluminium		N/A
1.7 (4.19)	Ignitors compatible with ballast	No ignitors	N/A
1.7 (4.20)	Rough service vibration	Not this type	N/A
1.7 (4.21)	Protective shield		N/A
1.7 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps	LED luminaire	N/A
	Shield of glass if tungsten halogen lamps		N/A
1.7 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
1.7 (4.21.3)	No direct path		N/A
1.7 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
1.7 (4.22)	Attachments to lamps not cause overheating or damage		N/A
1.7 (4.23)	Semi-luminaires comply Class II		N/A
1.7 (4.24)	Photobiological hazards		P
1.7 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
1.7 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778	Risk Group 1 Unlimited: See Qualilab S.r.l. test report no. 616-QL23-R16 ver.0 issued on 2023-06-02 and Qualilab S.r.l. report no. 1600-QL23-R01 ver.0 according to IEC/TR 62778:2014 issued on 2023-12-20. (Laboratory Accreditation number: 1235 – ACCREDIA)	—
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2 .. :	RG1 Unlimited	N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
1.7 (4.25)	Mechanical hazard		P
	No sharp point or edges		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7 (4.26)	Short-circuit protection		N/A
1.7 (4.26.1)	Adequate means of uninsulated accessible SELV / PELV parts	No uninsulated accessible SELV parts	N/A
1.7 (4.26.2)	Short-circuit test with test chain according 4.26.3:		N/A
	Supply source ES1 PSE		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
1.7 (4.27)	Terminal blocks with integrated screwless protective earthing contacts		N/A
	Test according Annex V	Not used	N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
1.7 (4.28)	Fixing of thermal sensing control		N/A
	Not plug-in or easily replaceable type	Not used	N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C) :		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
1.7 (4.29)	Luminaires with non-replaceable light source		P
	Not possible to replace light source	Not possible to replace light source: Hard resin used for thermal and IP purposes	P
	Live part not accessible after parts have been opened by hand or tools	Luminaire sealed with hard resin	N/A
1.7 (4.30)	Luminaires with non-user replaceable light source		N/A
	If protective cover provide protection against electric shock and marked with "caution, electric shock risk" symbol:		N/A
	At least one fixing means requiring use of tool		N/A
1.7 (4.31)	Insulation between circuits		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7 (4.31.1)	SELV or PELV circuits		N/A
	Used SELV/PELV source	No SELV circuits	N/A
	Voltage $\leq$ ELV		N/A
	Insulating of SELV/PELV circuits from LV supply		N/A
	Insulating of SELV/PELV circuits from other non SELV/PELV circuits		N/A
	Insulating of SELV/PELV circuits from FELV		N/A
	Insulating of SELV/PELV circuits from other SELV/PELV circuits		N/A
	SELV/PELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to make any electrical contact with socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
1.7 (4.31.2)	FELV circuits		N/A
	Used FELV source	FELV circuits not under investigation. Separately approved LED controlgear	N/A
	Voltage $\leq$ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to make any electrical contact with socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets have protective conductor contact		N/A
1.7 (4.31.3)	Other circuits		P
	Other circuits insulated from accessible parts according Table X.1	LED controlgear output insulated from LV supply by double insulation	P
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together	Class II luminaires	N/A
	- test according 7.2.3		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- slave luminaire constructed as class I		N/A
1.7 (4.32)	Overvoltage protective devices		N/A
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires	Class II luminaire	N/A
	- only connected to protective earth		N/A
1.6 (4.33)	Luminaire powered via information technology communication cabling		N/A
	Requirements for Class III luminaire	Not this type	N/A
	Rated voltage within the range of ES1 and does not exceed maximum voltage of used connector		N/A
	Luminaire does not create any hazard from overvoltage	(see Annex 2)	N/A
1.6 (4.34)	Electromagnetic fields (EMF)		P
	No harmful electromagnetic fields	Luminaires evaluated according to Annex H of IEC 62493:2015	P
1.6 (4.35)	Protection against moving fan blades		N/A
	Test with a standard test finger	No fan blades	N/A
	Test with test probe acc. to Figure 13 (IEC 61032) for portable luminaire		N/A
	Blades rounded with radius ≥ 0.5 mm and:		N/A
	-hardness less than D60 Shore		N/A
	-peripheral speed less than 15 m/s		N/A
	-input power of fan ≤ 2 W at rated voltage		N/A
1.6 (4.36)	Track-mounted luminaires		N/A
	Test in accordance with Annex A of IEC60570:2003/AMD2:2019	Not this type	N/A

1.8 (11)	CREEPAGE DISTANCES AND CLEARANCES		
1.8 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—
	Category III according Annex U		N/A
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
1.8 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 1.8 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N/A
	- Controlgear marked with $\hat{U}_{OUT}$ and f_{UOUT} according IEC 61347-1, clause 7.1, item w		N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347		N/A
1.8 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 1.8 (11.2) I	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with U_P		N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347		N/A

1.9 (7)	PROVISION FOR EARTHING		
1.9 (7.2.1 + 7.2.3)	Accessible metal parts	Class II luminaire	N/A
	Metal parts in contact with supporting surface		N/A
	Resistance $< 0,5 \Omega$:		N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Protective earth makes contact first		N/A
	Terminal blocks with integrated screwless protective earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		N/A
1.9 (7.2.2 + 7.2.3)	Protective earth continuity in joints, etc.		N/A
1.9 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
1.9 (7.2.5)	Protective earth terminal integral part of connector socket		N/A
1.9 (7.2.6)	Protective earth terminal adjacent to mains terminals		N/A
1.9 (7.2.7)	Electrolytic corrosion of the protective earth terminal		N/A
1.9 (7.2.8)	Material of protective earth terminal		N/A
	Contact surface bare metal		N/A
1.9 (7.2.10)	Class II luminaire for looping-in	Not for looping-in	N/A
	Double or reinforced insulation to functional earth		N/A
1.9 (7.2.11)	Protective earthing core coloured green-yellow		N/A
	Length of protective earthing conductor		N/A
1.9 (7.2.12)	PELV circuit connected to protective earth for functional purpose		N/A

1.10 (14)	SCREW TERMINALS		
	Separately approved; component list		N/A
	Part of the luminaire	(see Annex 3)	N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.10 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		
	Separately approved; component list..... :	(see Annex 1)	P
	Part of the luminaire :	(see Annex 4)	P
1.11 (5)	EXTERNAL AND INTERNAL WIRING		
1.11 (5.2)	Supply connection and external wiring		P
1.11 (5.2.1)	Means of connection :	Supply cable	P
	Outdoor luminaire has not PVC insulated external wiring if not Class III or SELV/PELV circuits ≤ 25 V AC/60 V DC/25 V peak interrupted DC voltage with frequency 10Hz -200 Hz or protected from outdoor environment	Rubber	N/A
1.11 (5.2.2)	Type of cable..... :	H05RN-F (Supply cable of separately approved LED controlgear) FG4G4 (Supply cable of DC version)	P
	Nominal cross-sectional area (mm ²) :	2 x 1,0	P
	Cables equal to IEC 60227 or IEC 60245	Cable supplied by the manufacturer complies with EN 50525, equivalent to IEC 60227 and IEC 60245 (See Annex 1)	P
1.11 (5.2.3)	Type of attachment, X, Y or Z	Type Z attachment	P
1.11 (5.2.5)	Type Z not connected to screws		P
1.11 (5.2.6)	Cable entries:		P
	- suitable for introduction	Suitable	P
	- adequate degree of protection	Compatible with IP66/IP68 rating	P
1.11 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.11 (5.2.8)	Insulating bushings:		P
	- suitably fixed	Fixed	P
	- material in bushings		P
	- material not likely to deteriorate		P
	- tubes or guards made of insulating material		N/A
1.11 (5.2.9)	Locking of screwed bushings	Fixed class II luminaires, not adjustable	N/A
1.11 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion	No abrasion	P
	- clear how to be effective	Clear how to be effective	P
	- no mechanical or thermal stress	It's not possible to push the supply cord into the luminaire	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- no tying of cables into knots etc.	No tying or knots	P
	- insulating material or lining	Insulating material	P
1.11 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed	Type Z	N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
1.11 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Adequate	P
1.11 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe	Impossible to push cable	P
	- pull test: 25 times; pull (N) :	60	P
	- torque test: torque (Nm) :	0,25	P
	- displacement ≤ 2 mm	< 1 mm	P
	- no movement of conductors	No movement	P
	- no damage of cable or cord	No damage	P
	- function independent of electrical connection	Independent	P
1.11 (5.2.10.4)	Luminaire with/designed for use with supply cord with maximum current of 2A:		N/A
	- Ordinary Class III luminaire supplied with SELV $\leq 25V$ RMS/60V DC	Cord anchorage provided	N/A
	- Ordinary Class III luminaire supplied with PELV $\leq 12V$ RMS/30V DC		N/A
	- Other than ordinary Class III luminaire supplied with voltage $\leq 12V$ RMS/30V DC		N/A
	Pull test of 30N		N/A
1.11 (5.2.11)	External wiring passing into luminaire	External wiring in compliance with requirements for internal wiring	N/A
1.11 (5.2.12)	Looping-in terminals	Not for looping-in	N/A
1.11 (5.2.13)	Wire ends not tinned	Not tinned	N/A
	Wire ends tinned: no cold flow		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.11 (5.2.14)	Mains plug same protection	No plug	N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
1.11 (5.2.15)	Connectors for Class III luminaires (IEC 60603 or IEC 62680)	Class II luminaires	N/A
1.11 (5.2.16)	Appliance inlets (IEC 60320)	Not used	N/A
	Installation couplers (IEC 61535)	Not used	N/A
	Appliance inlet or connector systems (IEC 61984)	Not used	N/A
1.11 (5.2.17)	No standardized interconnecting cables properly assembled	LED module wiring (See Annex 1)	P
1.11 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083	No plug	N/A
	- other standard		N/A
1.11 (5.3)	Internal wiring		P
1.11 (5.3.1)	Internal wiring of suitable size and type	Part of H05RN-F: 1,0 mm ² (Supply cable) Part of H05RN-F: 1,0 mm ² (Dimmer cable) FG4G4: 1,0 mm ² (Supply cable of DC version) FEP + FEP: 0,5 mm ² (LED module wiring) (See Annex 1)	P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A)	No socket outlet	N/A
	- temperatures	(see Annex 2)	N/A
	Green-yellow for protective earth only		N/A
1.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm ²).....	Part of H05RN-F: 1,0 mm ² (Supply cable)	P
	Insulation thickness (mm)	0,6	P
	Extra insulation added where necessary		N/A
1.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Cross-sectional area (mm ²).....	FEP + FEP: 0,5 mm ² (LED module wiring)	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.11 (5.3.1.3)	Double or reinforced insulation for class II		P
1.11 (5.3.1.4)	Conductors without insulation	Not used	N/A
1.11 (5.3.1.5)	SELV/PELV current-carrying parts	Insulated	P
1.11 (5.3.1.6)	Insulation thickness other than PVC or rubber	FEP used	P
1.11 (5.3.2)	Sharp edges etc.	No sharp edges	P
	No moving parts of switches etc.	No switches	N/A
	Joints, raising/lowering devices	Not present	N/A
	Telescopic tubes etc.	Not present	N/A
	No twisting over 360°	No twisting over 360°	P
1.11 (5.3.3)	Insulating bushings:		P
	- suitable fixed	Fixed	P
	- material in bushings	Plastic	P
	- material not likely to deteriorate	Not likely to deteriorate	P
	- cables with protective sheath		N/A
1.11 (5.3.4)	Joints and junctions effectively insulated		P
1.11 (5.3.5)	Strain on internal wiring	No strain	P
1.11 (5.3.6)	Wire carriers	Fixed class II luminaires, not adjustable	N/A
1.11 (5.3.7)	Wire ends not tinned	Not tinned	P
	Wire ends tinned: no cold flow	Wire ends not tinned	N/A
1.11 (5.4)	Test to determine suitability of conductors having a reduced cross-sectional area		N/A
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2		N/A
	No damage to luminaire wiring after test		N/A

1.12 (8)	PROTECTION AGAINST ELECTRIC SHOCK		
1.12 (8.2.1)	Live parts not accessible	Live parts not accessible when the luminaire is installed and wired as in normal use. Luminaire cannot be opened as it's filled with self-hardening resin for thermal and IP purposes. Light source has been evaluated as non-replaceable light source. All covers left in position during inspection of Clause 8.	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Basic insulated parts not used on the outer surface without appropriate protection	Not used	N/A
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires	Not accessible	P
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires	No basic insulated parts	N/A
	Lamp and starter holders in portable and adjustable luminaires comply with double or reinforced insulation requirements	Not present	N/A
	Basic insulation only accessible under lamp or starter replacement	Non-replaceable light source. No starter.	N/A
	Protection in any position	Protected	P
	Double-ended tungsten filament lamp	Not this type	N/A
	Insulation lacquer not reliable		N/A
	Double-ended high-pressure discharge lamp	Not this type	N/A
	Relevant warning according to 3.2.18 fitted to the luminaire	Not this type	N/A
1.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position	Not this type	N/A
1.12 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible	No basic insulated metal parts	P
	- required insulation from live parts in compliance with Table X.1	Not accessible	P
	- glass protective shields not used as supplementary insulation	Not used	P
1.12 (8.2.3.b)	BC lamp holder of metal in class I luminaires shall be connected to protective earth	No lampholders	N/A
1.12 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :	No exposed current carrying parts	N/A
	- voltage under load/ no-load DC (V)..... :		N/A
	- interrupted DC voltage (V)		N/A
	- touch current if applicable (mA)		N/A
	One conductive part insulated if required		N/A
	Other than ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :		N/A
	- voltage under load/ no-load DC (V)..... :		N/A
	- interrupted DC voltage (V)		N/A
	Class III luminaire only for connection to SELV/PELV		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.12 (8.2.3.d)	PELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :	No PELV circuits	N/A
	- voltage under load/ no-load DC (V)..... :		N/A
	Other than ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :		N/A
	- voltage under load/ no-load DC (V)..... :		N/A
	One pole insulated if required		N/A
1.12 (8.2.4)	Portable luminaire has protection independent of supporting surface	Not this type	N/A
1.12 (8.2.5)	Compliance with the standard test finger or relevant probe	Verified	P
1.12 (8.2.6)	Covers reliably secured		P
1.12 (8.2.7)	Luminaire other than below with capacitor > 0,5 μ F not exceed 50 V 1 min after disconnection	V lower than 10 V in t = 63,0 ms	P
	Portable luminaire with capacitor > 0,1 μ F (0.25) not exceed 34 V 1 s after disconnection		N/A
	Other luminaires with capacitor > 0,1 μ F (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N/A

1.13 (12)	ENDURANCE TEST AND THERMAL TEST		
1.13 (-)	If IP > IP 20 relevant test of (12.4), (12.5), (12.6) and (12.7) after (9.2) before (9.3) as specified in 1.14		—
1.13 (12.2)	Selection of lamps and ballasts		—
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Control gear if separate and not supplied	(Control gear used see Annex 2)	—
1.13 (12.3)	Endurance test		P
	a) mounting-position	Fixed	—
	b) test temperature (°C)	85 °C (Luminaire provided with LED controlgear) 130 °C (DC supplied luminaire not equipped with LED controlgear)	—
	c) total duration (h)	240 (10 cycles of 24 h each)	—
	d) supply voltage (V)	264	—
	d) if not equipped with control gear, constant voltage/current (V) or (A)	DC version not equipped with controlgear. Supplied at 220 mA _{DC}	—
1.13 (12.3.1d)	d) Class III luminaires powered via information technology communication cable:		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- voltage under normal operation (V).....:	Class II luminaires	—
	- voltage under abnormal operation (V).....:		—
	e) luminaire ceases to operate		—
	f) luminaire with constant light output function		N/A
1.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system	No track system	N/A
	- marking legible		P
	- no cracks, deformation etc.		P
1.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
1.13 (12.5)	Thermal test (abnormal operation)		N/A
1.13 (12.6)	Thermal test (failed lamp control gear condition):		N/A
1.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		—
	- case of abnormal conditions		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un		—
	- measured mounting surface temperature (°C) at 1,1 Un		N/A
	- calculated mounting surface temperature (°C)		N/A
	- track-mounted luminaires		N/A
1.13 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C)		N/A
	- track-mounted luminaires		N/A
1.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
1.13 (12.7.1)	Luminaire without temperature sensing control		N/A
1.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		—

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- Ballast failure at supply voltage (V)		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un		—
	- calculated temperature of fixing point/exposed part (°C)		—
	Ball-pressure test	See Test Table 1.15 (13.2.1)	N/A
1.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un		—
	- calculated temperature of fixing point/exposed part (°C)		—
	Ball-pressure test	See Test Table 1.15 (13.2.1)	N/A
1.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
1.13 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link	Yes ☐ No ☐	—
	- manual reset cut-out	Yes ☐ No ☐	—
	- auto reset cut-out	Yes ☐ No ☐	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/ exposed part (°C):		—
	Ball-pressure test:	See Test Table 1.15 (13.2.1)	N/A

1.14 (9)	RESISTANCE TO DUST AND MOISTURE	
1.14 (-)	If IP > IP 20 the order of tests as specified in clause 1.12	P
1.14 (9.2)	Tests for ingress of dust, solid objects and moisture:	P
	- classification according to IP	IP66/IP68 (2 bar)
	- mounting position during test	As in normal use

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- fixing screws tightened; torque (Nm) :	Screwed glands of supply cable: 4,16 Nm Screwed glands of dimmer cable: 2,7 Nm	—
	- tests according to clauses..... :	9.2.2, 9.2.7 and 9.2.9	—
	- electric strength test afterwards	No flashover or break down	P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire	No deposit of talcum powder	P
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard	No trace of water	P
	c.1) For luminaires without drain holes – no water entry	No water entry	P
	c.2) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight, pressure watertight, high pressure and temperature water jet-proof or high pressure and cold water jet-proof luminaire	No water observed (test performed at 2,6 bar)	P
	e) no contact with live parts (IP 2X)		NA
	e) no entry into enclosure (IP 3X and IP 4X)		N/A
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N/A
	f) no trace of water on part of lamp requiring protection from splashing water		N/A
	g) no damage of protective shield or glass envelope	No damage	P
1.14 (9.3)	Humidity test 48 h	48 hours: 28 °C @ 93% R.H. No damages	P

1.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		
1.15 (10.2.1)	Insulation resistance test	Limit 2 MΩ (Basic insulation) Limit 2 MΩ (Supplementary insulation) Limit 4 MΩ (Double or reinforced)	P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø :	Supply cord covered by metal foil	—
	Insulation resistance (MΩ):		N/A
	SELV/PELV:		N/A
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface..... :		N/A
	- between current-carrying parts and metal parts of the luminaire :		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 :		N/A
	Other than SELV/PELV:		P
	- between live parts of different polarity :	Separately approved LED controlgears (See Annex 1)	P
	- between live parts and mounting surface :	> 3 GΩ (Double)	P
	- between live parts and metal parts :	> 3 GΩ (Double)	P
	- between live parts of different polarity through action of a switch..... :	No switch	N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	> 3 GΩ (Supplementary)	P
	- Insulation bushings as described in Section 5 :	> 3 GΩ (Supplementary)	P
1.15 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V): Maximum working voltage considered for LED module: 450 V _{DC} 1480 Vac @ 50 Hz (Basic insulation evaluated on LED module wiring) 1480 Vac @ 50 Hz (Supplementary insulation) 2960 Vac @ 50 Hz (Double or reinforced insulation)		P
	SELV/PELV:		N/A
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface..... :		N/A
	- between current-carrying parts and metal parts of the luminaire :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 :		N/A
	Other than SELV/PELV:		P
	- between live parts of different polarity :	Separately approved LED controlgears (See Annex 1)	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- between live parts and mounting surface :	No flashover or breakdowns (Double) 2380 V _{AC} tested on LED modules (According to requirements of Annex X: Supplementary insulation complying with U _{out} plus LV _{supply})	P
	- between live parts and metal parts :	No flashover or breakdowns (Double) No flashover or breakdowns (Double) 2380 V _{AC} tested on LED modules (According to requirements of Annex X: Supplementary insulation complying with U _{out} plus LV _{supply})	P
	- between live parts of different polarity through action of a switch :	No switch	N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts :	No flashover or breakdowns (Supplementary)	P
	- Insulation bushings as described in Section 5 :	No flashover or breakdowns (Supplementary)	P
1.15 (10.3)	Touch current (mA)..... :	Test condition: 240 Vac @ 60 Hz: 0,12 mA (limit 0,7 mA)	P
	Protective conductor current (mA)..... :		N/A

1.16 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		
1.16 (13.2.1)	Ball-pressure test :	See Test Table 1.16 (13.2.1)	N/A
1.16 (13.3.1)	Needle-flame test (10 s) :	See Test Table 1.16 (13.3.1)	N/A
1.16 (13.3.2)	Glow-wire test (650°C) :	See Test Table 1.16 (13.3.2)	N/A
1.16 (13.4)	Proof tracking test (IEC 60112) :	Non ordinary luminaires protected against dust and moisture	N/A

IEC 60598-2-1							
Clause	Requirement + Test				Result - Remark		Verdict
1.8 (11.2)	TABLE I: Creepage distances and clearances						P
	Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages						P
	Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*						P
	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:	B	-*	1,5 mm	11.1.B	-*	2,5 mm	11.1.A
Working voltage (V)					240 V		—
PTI					< 600 ☒ ≥ 600 ☐		—
Pulse voltage or U_P if applicable (kV)					-		—
Supplementary information: Distance between live parts of different polarity measured on input side of luminaire. As the luminaire is provided with leads, creepage distances is not under evaluation (Separately approved LED controlgear).							
Distance 2:	R	-*	3,0 mm	11.1.B	-*	5,0 mm	11.1.A
Working voltage (V)					240 V		—
PTI					< 600 ☒ ≥ 600 ☐		—
Pulse voltage or U_P if applicable (kV)					-		—
Supplementary information: Distance between live parts and metal parts/mounting surface measured on input side of luminaire. As the luminaire is provided with leads, creepage distances is not under evaluation (Separately approved LED controlgear).							
Distance 3:	B	> 3,9 mm	3,0 mm	11.1.B	> 2,94 mm	2,26 mm	11.1.A
Working voltage (V)					450 V _{DC}		—
PTI					< 600 ☐ ≥ 600 ☒		—
Pulse voltage or U_P if applicable (kV)					-		—
Supplementary information: Distance between active parts measured on LED module.							
Distance 4:	S	3,4 mm	3,0 mm	11.1.B	3,4 mm	2,26 mm	11.1.A
Working voltage (V)					450 V _{DC}		—
PTI					< 600 ☐ ≥ 600 ☒		—
Pulse voltage or U_P if applicable (kV)					-		—
Supplementary information: Distance between active parts and metal parts of the luminaire measured near LED modules. According to NOTE of Annex M: It has been considered a Basic insulation provided between primary and secondary circuits of separately approved LED controlgear. As a consequence, a supplementary insulation has been required for the compliance of Clause 11.2.							
Distance 5:	S	> 1,95 mm	1,5 mm	11.1.B	> 3,25	2,5 mm	11.1.A
Working voltage (V)					240 V		—
PTI					< 600 ☒ ≥ 600 ☐		—
Pulse voltage or U_P if applicable (kV)					-		—
Supplementary information: Distance between The outer surface of a flexible cord or cable and an accessible metal part to which it is secured by means of a cord grip, cable carrier or clip of insulating material.							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced. See also IEC 60598-1 Annex M.

IEC 60598-2-1							
Clause	Requirement + Test				Result - Remark		Verdict
1.8 (11.2)	TABLE II: Creepage distances and clearances						N/A
Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages							
Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2							
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:							
Working voltage (V)							—
Frequency if applicable (kHz)							—
PTI					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)							—
Supplementary information:							
Distance 2:							
Working voltage (V)							—
Frequency if applicable (kHz)							—
PTI					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)							—
Supplementary information:							
Distance 3:							
Working voltage (V)							—
Frequency if applicable (kHz)							—
PTI					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)							—
Supplementary information:							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced.

IEC 60598-2-1				
Clause	Requirement + Test		Result - Remark	Verdict
1.16 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics			N/A
Allowed impression diameter (mm) :		2		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Supplementary information:				

1.16 (13.3.1)	TABLE: Needle-flame test				N/A
Object/ Part No./ Material		Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)
Supplementary information:					

1.16 (13.3.2)	TABLE: Glow-wire test				N/A
Glow wire temperature			650°C		—
Object/ Part No./ Material		Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)
Supplementary information:					

1.16 (13.4)	TABLE: Proof tracking test				N/A
Test voltage PTI			175 V		—
Object/ Part No./ Material		Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens		Verdict
Supplementary information: Separately approved PCB (See Annex 2)					

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1		TABLE: Critical components information (Declared by The Manufacturer)					P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
LED controlgear	B	HANGZHOU YOUTE POWER CO., LTD (uPowerTek)	BLD-320-C105-DND-A00000	Input: 220-240 V~, 50/60 Hz, tc= 90° C, IP67, Uout = 450 V _{DC} 1,05 A, 183-421 V _{DC}	EN 61347-2-13:2014, EN 61347-2-13:2014/A1:2017, EN 61347-1:2015, EN 61347-1:2015/A1:2021, EN IEC 62384:2020	ENEC15 (ENEC-04377)	
LED module PCB	A/D	VENTEC ELECTRONICS (SUZHOU) CO LTD	VT-4B3	Single Layer metal base printed wiring boards, 0,14 mm, 130°C, V-0, PTI≥600	ANSI/UL 746E, ANSI/UL 94, ANSI/UL 746F	cURus (E214381)	
LED Chip	C	Citizen	CLU058-1825C4	5700 K max, Tested @ 200 mA (120 °C)	Applicable parts of IEC/EN 62031 Applicable parts of IEC/TR 62778	Tested in appliance Test Report no. 616-QL23-R16 ver.0 issued on 2023-06-02 (Qualilab S.r.l.)	
LED Chip	C/D	LUMILEDS	LUXEON 70 70	5700 K max, Tested @ 200 mA (120 °C)	Applicable parts of IEC/EN 62031 Applicable parts of IEC/TR 62778	Tested in appliance Qualilab S.r.l. report no. 1600-QL23-R01 ver.0 according to IEC/TR 62778:2014 issued on 2023-12-20	

IEC 60598-2-1						
Clause	Requirement + Test			Result - Remark		Verdict
Screwless terminals	C	WAGO Kontakttechnik GmbH & Co. KG	2060-451/998-404	630 V, 12,5 A, 105 °C	Applicable parts of IEC/EN 62031 Applicable parts of IEC/EN 60598-1 EN IEC 60947-7-4:2019	Tested in appliance Tested in appliance KEMA KEUR (71-114208)
Resin	C	Elantas	Elan-tron MC622 LV/W 360	155 °C max, 4000 V, V-0	Applicable parts of IEC/EN 60598-1	Tested in appliance
LED module wiring	A	Industria Cavel S.r.l.	FF50RSV#T	FEP, 300/300V, 180 °C, 0,5 mm ²	DIN VDE 0250 Applicable parts of IEC/EN 60598-1	VDE (107600) VDE 7022 Tested in appliance
External wiring	A	BericaCavi S.p.a.	SIHF - FG4G4	Silicone, 300/500V, 180 °C, 2 x 1,0 mm ²	Applicable parts of IEC/EN 60598-1	Tested in appliance
Supplementary information: ¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039. The codes above have the following meaning: A - The component is replaceable with another one, also certified, with equivalent characteristics B - The component is replaceable if authorised by the test house C - Integrated component tested together with the appliance D - Alternative component						

IEC 60598-2-1								
Clause	Requirement + Test				Result - Remark		Verdict	
ANNEX 2	TABLE: Thermal tests of Section 12							
	Type reference				GRANTORINO 1ESC3-0780-104-0800-AZ01-5K0-1UP32-C60P-66/68-TLC0-INT-AC		—	
	Lamp used.....				No. 4 LED modules model MPCB-70x70x16M0067-V2		—	
	Lamp control gear used				BLD-320-C105-DND-A00000		—	
	Mounting position of luminaire				Normal		—	
	Supply wattage (W)				171,7 W @ 240 V 171 W @ 254,4 V		—	
	Supply current (A)				0,76 A @ 240 V 0,72 A @ 254,4 V		—	
	Temperatures in test 1 - 4 below are corrected for ta (°C)				75		—	
	- abnormal operating mode						—	
1.13 (12.4)	- test 1: rated voltage				240 Vac		—	
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current				254,4 Vac		—	
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage						—	
	Through wiring or looping-in wiring loaded by a current of A during the test						—	
1.13 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current or 130/150% of rated input voltage						—	
Temperature measurements (°C)								
Part		Ambient	Cl. 12.4 – normal				Cl. 12.5 – abnormal	
			test 1	test 2	test 3	limit	test 4	limit
Mounting surface		75	-	78	-	90	-	-
Supply cable near screwed gland		75	-	79	-	90	-	-
LED Controlgear tc point		75	82	-	-	90	-	-
Line		75	-	76	-	90	-	-
Faston		75	-	76	-	90	-	-
LED module wiring		75	-	90	-	180	-	-
LED module screwless terminals		75	-	83	-	105	-	-
LED module		75	-	93	-	130	-	-
Supplementary information:								

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Type reference	GRANTORINO 1ESC3-0780-104-0220-AZ01-5K0-1EX32-C60P-66/68-TLC0-INT-DC	—				
	Lamp used.....	No. 4 LED modules model CLU058-1825C4	—				
	Lamp control gear used	-	—				
	Mounting position of luminaire	Normal position	—				
	Supply wattage (W)	41,5 W @ 188,6 V _{DC}	—				
	Supply current (A)	0,22 A @ 188,6 V _{DC}	—				
	Temperatures in test 1 - 4 below are corrected for ta (°C)	120	—				
	- abnormal operating mode		—				
1.13 (12.4)	- test 1: rated voltage		—				
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current	220 mA _{DC}	—				
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage		—				
	Through wiring or looping-in wiring loaded by a current of A during the test		—				
1.13 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current or 130/150% of rated input voltage		—				
Temperature measurements (°C)							
Part	Ambient	Cl. 12.4 – normal				Cl. 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
LED module	12	-	133*	-	130	-	-
LED module wiring	120	-	131	-	180	-	-
Supplementary information: *The allowance of 5 °C is made to take into account the inevitable variability of temperature measurements in luminaires.							

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX 3	Screw terminals (part of the luminaire)		
(14)	SCREW TERMINALS		N/A
(14.2)	Type of terminal..... :	No screw terminals	—
	Rated current (A) :	No screw terminals	—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm ²)..... :	No screw terminals	—
(14.3.3)	Conductor space (mm)..... :	No screw terminals	N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) :	No screw terminals	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) :	No screw terminals	N/A
	Torque (Nm) :	No screw terminals	N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N) :	No screw terminals	N/A
(14.4.8)	Without undue damage		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX 4	Screwless terminals (part of the luminaire)		
(15)	SCREWLESS TERMINALS		N/A
(15.2)	Type of terminal..... :		—
	Rated current (A)..... :		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples) :		N/A
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples) :		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples) :		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples)..... :		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples)..... :		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) :		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) :		N/A
(15.6)	Terminals and connections for external wiring		N/A
(15.6.1)	Conductors		N/A
	Terminal size and rating		N/A
15.6.2	Mechanical tests		N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) :		N/A
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N) :		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
(15.6.3)	Electrical tests		N/A
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N/A

(15.6.3.1) (15.6.3.2)	TABLE: Contact resistance test / Heating tests										N/A
	Voltage drop (mV) after 1 h										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										
	Voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV) :										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV) :										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV) :										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV) :										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
Supplementary information:											

Appendix 1	List of test equipment used
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List of test equipment used:

<i>Clause</i>	<i>Measurement / testing</i>	<i>Testing / measuring equipment / material used</i>	<i>Expire Calibration date</i>
-	Laboratory thermo-hygrometric measurement	473 – Data logger, Delta Ohm, HD206-1	2024-03-28
(3.4)	Test of Marking	MR-0019 – n-Esano RP	2024-07-31
		433 – Timer, Hanhart, Prisma 400	2024-01-26
(4.12)	Screws and connections (mechanical) and glands testing	370 – Test screwdriver, Stahville, Torsiometer 760/30	2025-03-09
		369 – Test screwdriver, Stahville, Torsiometer 760/7,5	2025-03-09
		215 – Test spanner, Torqueleader, ADS4	2025-03-09
		261 – Test spanner, Beta, 608/C2	2025-03-30
		308 – Digital calliper, Mitutoyo, Absolute Digimatic	2025-09-29
(4.13.1)	Mechanical strength tests	780 – Impact Test Hammer, PTL-Instruments GmbH, MP-F22.50	2024-03-28
		455 – Impact test apparatus 20J IK10	2024-10-05
		796 – Mechanical Test Bench with Polyamide	Not under calibration
		797 – IK Test Guide Structure	Not under calibration
		494 – Hard wood support	Not under calibration
		753 – Digital inclinometer, Neoteck, NTK034	2024-03-21
		757 – Meter, Stanley, FatMax	ICO
(4.13.3)	Straight test finger	58 – Straight unjointed test finger, ATE, 032	2026-09-18
		348 – Dynamometer, Chatillon, DFM 50	2024-05-28
(4.14.1)	Suspensions and means of adjustment	784 – Scale World Weight, BA100-16	2024-05-30
		433 – Timer, Hanhart, Prisma 400	2024-01-26
		348 – Dynamometer, Chatillon, DFM 50	2024-05-28
		Metal plates	Not under calibration

Appendix 1 List of test equipment used			
(11)	Creepage distances and clearances	308 – Digital calliper, Mitutoyo, Absolute Digimatic	2025-09-29
		766 – Oscilloscope, Teledyne, T3DSO2502A	2024-02-22
(5.2.10.3)	Pull and torque tests on cord anchorage	348 – Dynamometer, Chatillon, DFM 50	2024-05-28
		206 – Test spanner, Torqueleader, TT50 SD	2025-03-09
		308 – Digital calliper, Mitutoyo, Absolute Digimatic	2025-09-29
(8.2.5)	Protection against electric shock	422 – Standard test finger, PTL, P.10.14	2026-08-09
(8.2.7)	Capacitor discharge	766 – Oscilloscope, Teledyne, T3DSO2502A	2024-02-22
		560 – Stabilized Power Supply, MCB S.r.l., SMM05-R	Not under calibration
		776 – High voltage probe, Tektronix, P6015A	2024-02-22
(12.3)	Endurance test	23 – Draught-proof enclosure, A.T.S. Galbusera, AOM	2024-02-06
		539 – Stabilized Power Supply, Agilent, 6813B	Not under calibration
		586 – Powermeter, Yokogawa, 2534-10	2023-12-19
(12.4)	Thermal test	23 – Draught-proof enclosure, A.T.S. Galbusera, AOM	2024-02-06
		539 – Stabilized Power Supply, Agilent, 6813B	Not under calibration
		586 – Powermeter, HIOKI, PW3337	2025-01-10
		419 – Data acquisition/Switch unit, Agilent Technologies, 34970A	2024-09-25
		420 – 20-channel multiplexer, Agilent Technologies, 34901A	2024-09-25
		430 – 20-channel multiplexer, Agilent Technologies, 34901A	2024-09-25
(9.2.2)	IP6X test	367 – Apparatus for proving protection against dust, A.T.S. Galbusera, 03.02-C	2024-09-01
		370 – Test screwdriver, Stahville, Torsiometer 760/30	2025-03-09
		308 – Digital calliper, Mitutoyo, Absolute Digimatic	2025-09-29
		576 – High voltage transformer, Schleich, GLP1-g 340	2023-12-13
		433 – Timer, Hanhart, Prisma 400	2024-01-26
		369 – Test screwdriver, Stahville, Torsiometer 760/7,5	2025-03-09
		461 – Thermometer, Hioki, 8430/20	2024-06-19
(9.2.7)	IPX6 test	514 – IPX6 nozzle, A.T.S. Galbusera, 03.23	ICO
		226 – 20-130 l/min flowmeter, A.T.S. Galbusera, D7	2024-03-15
		757 – Meter, Stanley, FatMax	ICO
		576 – High voltage transformer, Schleich, GLP1-g 340	2023-12-13
		433 – Timer, Hanhart, Prisma 400	2024-01-26
		370 – Test screwdriver, Stahville, Torsiometer 760/30	2025-03-09
		369 – Test screwdriver, Stahville, Torsiometer 760/7,5	2025-03-09
		461 – Thermometer, Hioki, 8430/20	2024-06-19
(9.2.9)	IPX8 test	433 – Timer, Hanhart, Prisma 400	2024-01-26
		300 – Pressure Gauge (SALMOIRAGHI - MX1E - dn 100 - 1/4" NPT730)	2024-05-31
		405 - IPX8 Tank	Not under calibration

Appendix 1 List of test equipment used			
(9.3)	Humidity test	429 – Climatic Chamber, Angelantoni, Challenge 1200 C	2023-11-18
(10.2.1)	Insulation resistance test	402 – Megaohmmeter, Metriso, 500D	2023-12-06
		433 – Timer, Hanhart, Prisma 400	2024-01-26
		429 – Climatic Chamber, Angelantoni, Challenge 1200 C	2023-11-18
(10.2.2)	Electric strength test	576 – High voltage transformer, Schleich, GLP1-g 340	2023-12-13
		429 – Climatic Chamber, Angelantoni, Challenge 1200 C	2023-11-18
(10.3)	Leakage current testing	570 – Measuring network FIG. 4 IEC 60990:1999, Rossbauer Electronics, Perception, Reaction network	2024-10-13
		18 – Insulation transformer, LEF, TM 400/230	Not under calibration
		766 – Oscilloscope, Teledyne, T3DSO2502A	2024-09-14
		560 – Stabilized Power Supply, MCB S.r.l., SMM05-R	Not under calibration
		577 – PCC network, Rossbauer Electronics, Fig G.4 of IEC/EN 60598-1	Not under calibration
		707 – 1:1 Probe, GW Instek, GTP-350A-2	2024-10-13
14 (14)	Fault Condition and Overpower	461 – Thermometer, Hioki, 8430/20	2024-06-19
		433 – Timer, Hanhart, Prisma 400	2024-01-26
		MR-0008 – Tissue paper	Not under calibration
		146 – Current probe, Hioki, 3264	2024-09-11
		429 – Climatic Chamber, Angelantoni, Challenge 1200 C	2024-11-18
		153 – Multimeter, HP, 34401A	2024-03-09
		237 – DC Power supply, HP, HP6010A	Not under calibration

Appendix 2	Photographs
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Fig. 1: Model GRANTORINO 1ESC3-0780-104-0800-AZ01-5K0-1UP32-C60P-66/68-TLC0-INT-AC

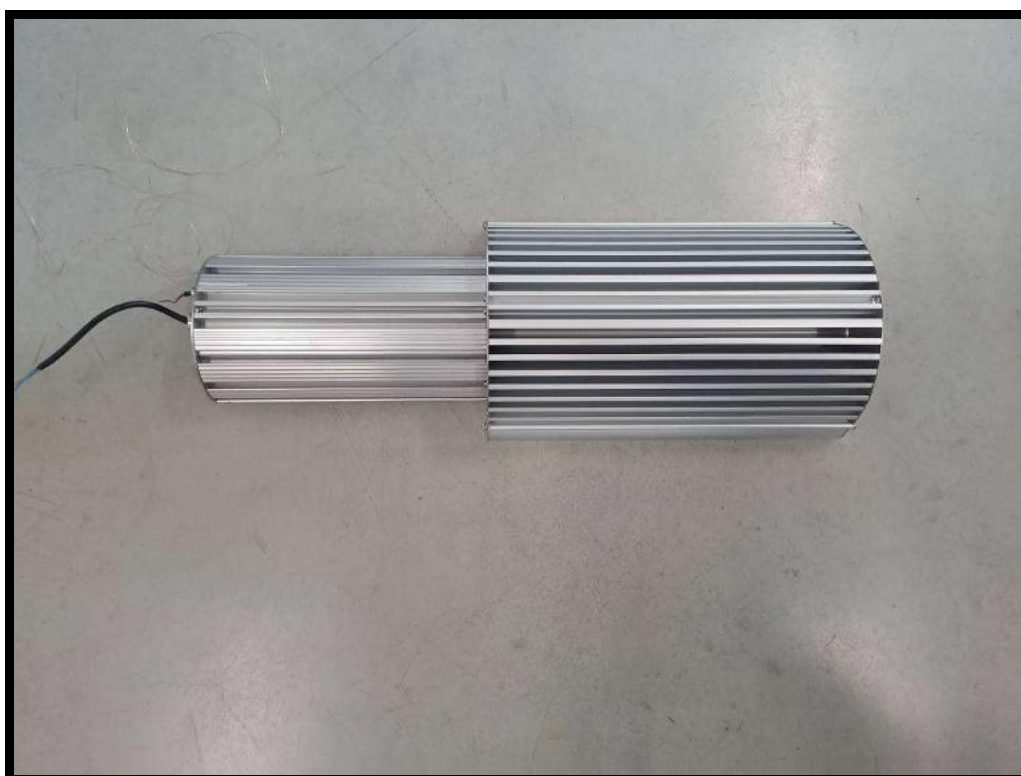


Fig. 2: Model GRANTORINO 1ESC3-0780-104-0800-AZ01-5K0-1UP32-C60P-66/68-TLC0-INT-AC

Appendix 2	Photographs
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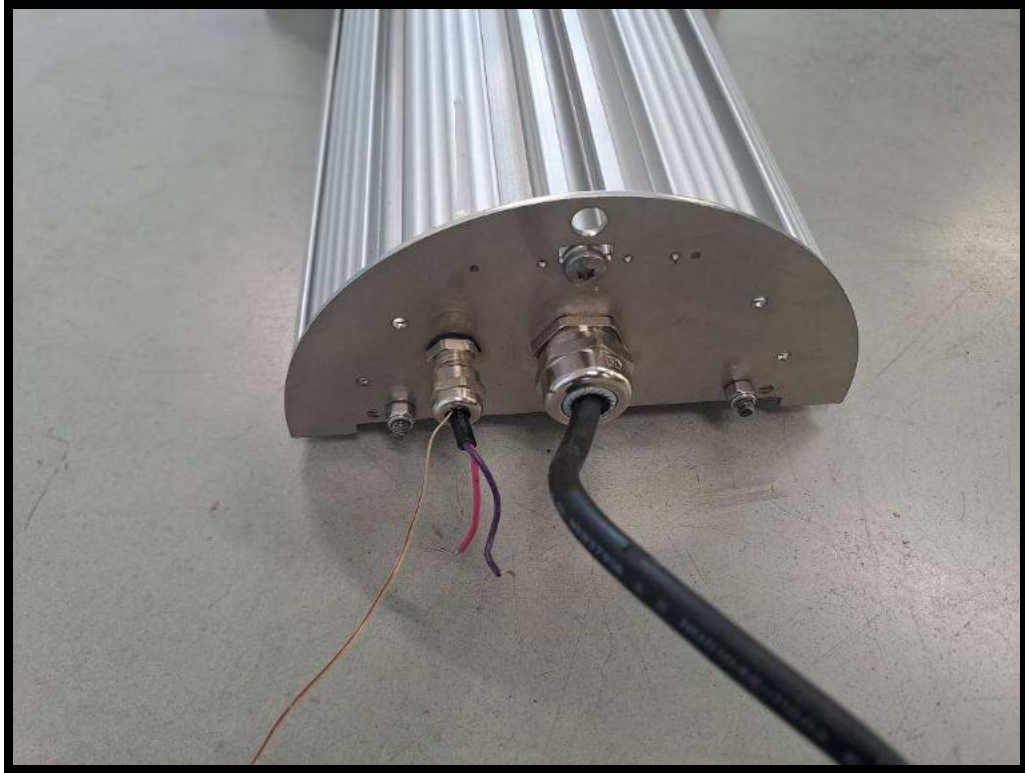


Fig. 3: Cord anchorage

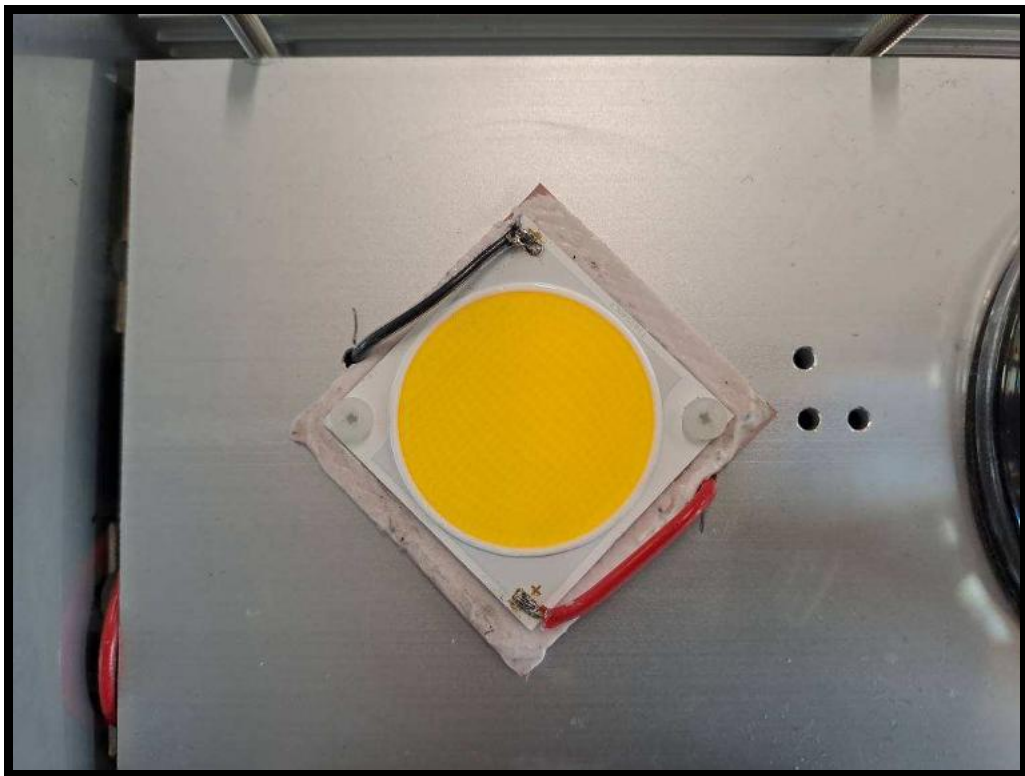


Fig. 4: LED Chip model CLU058-1825C4

Appendix 2	Photographs
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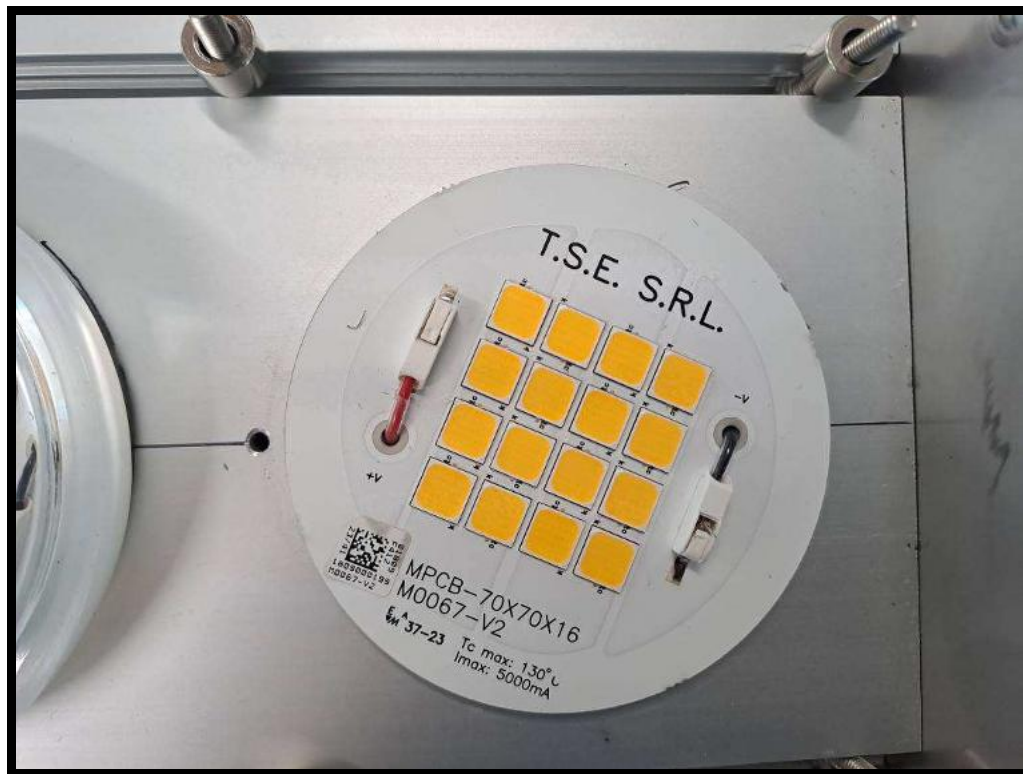


Fig. 5: LED Chip model LUXEON 7070

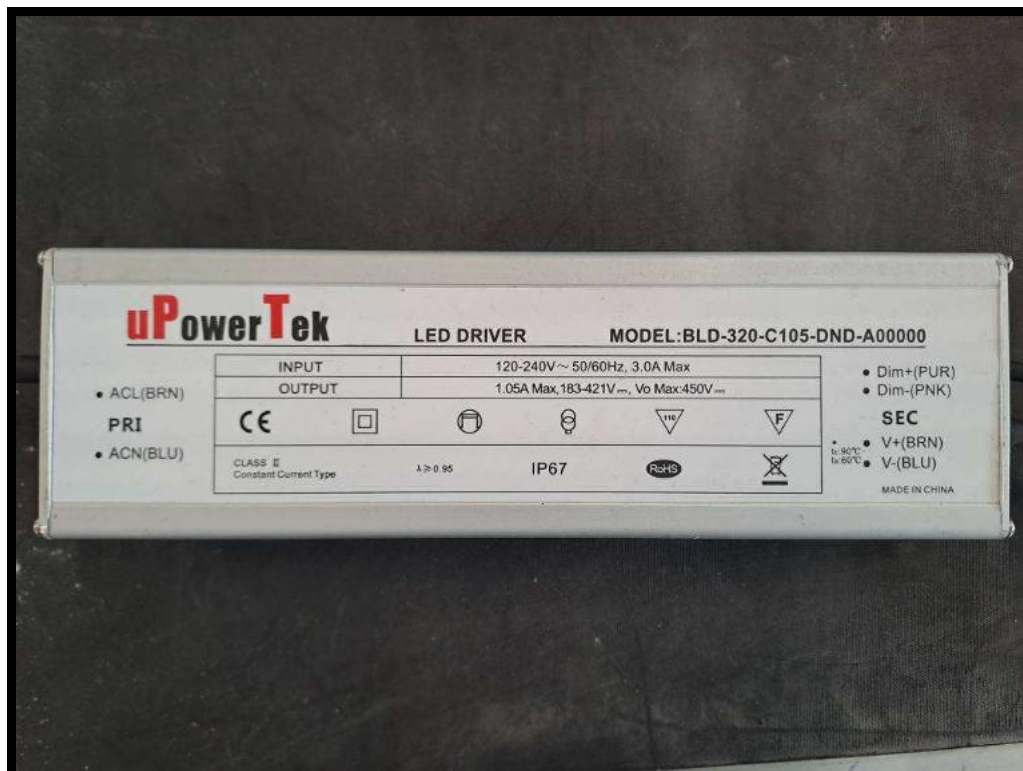


Fig. 6: Driver

Appendix 2	Photographs
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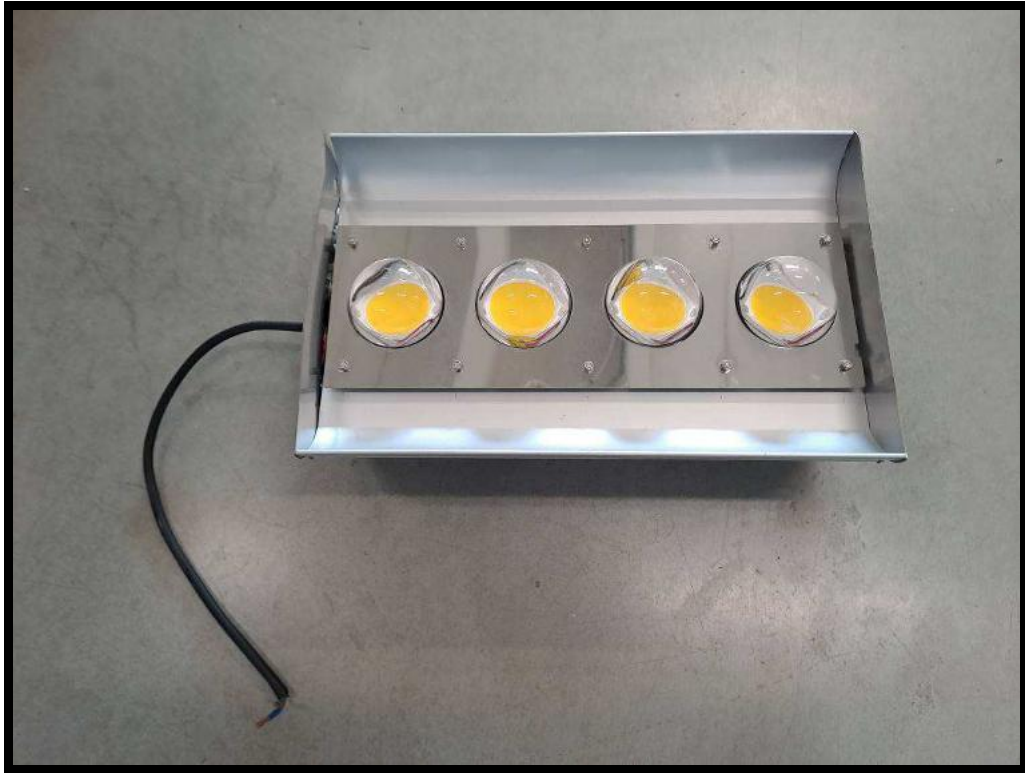


Fig. 7: Model GRANTORINO 1ESC3-0780-104-0220-AZ01-5K0-1EX32-C60P-66/68-TLC0-INT-DC

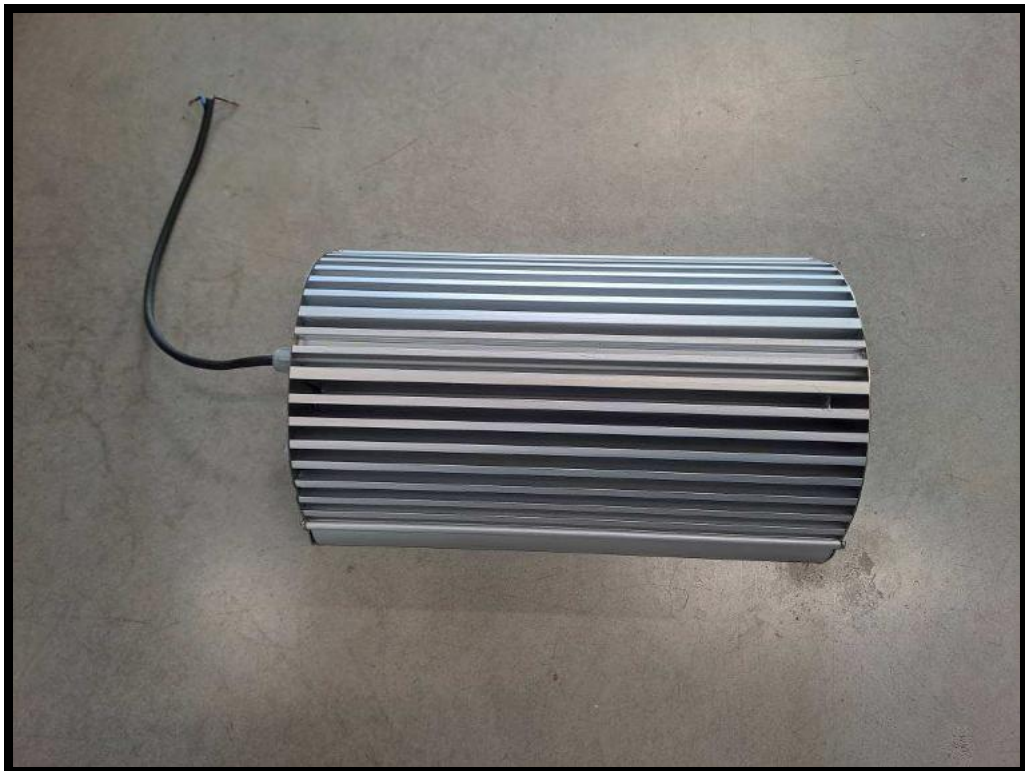


Fig. 8: Model GRANTORINO 1ESC3-0780-104-0220-AZ01-5K0-1EX32-C60P-66/68-TLC0-INT-DC

Appendix 2	Photographs
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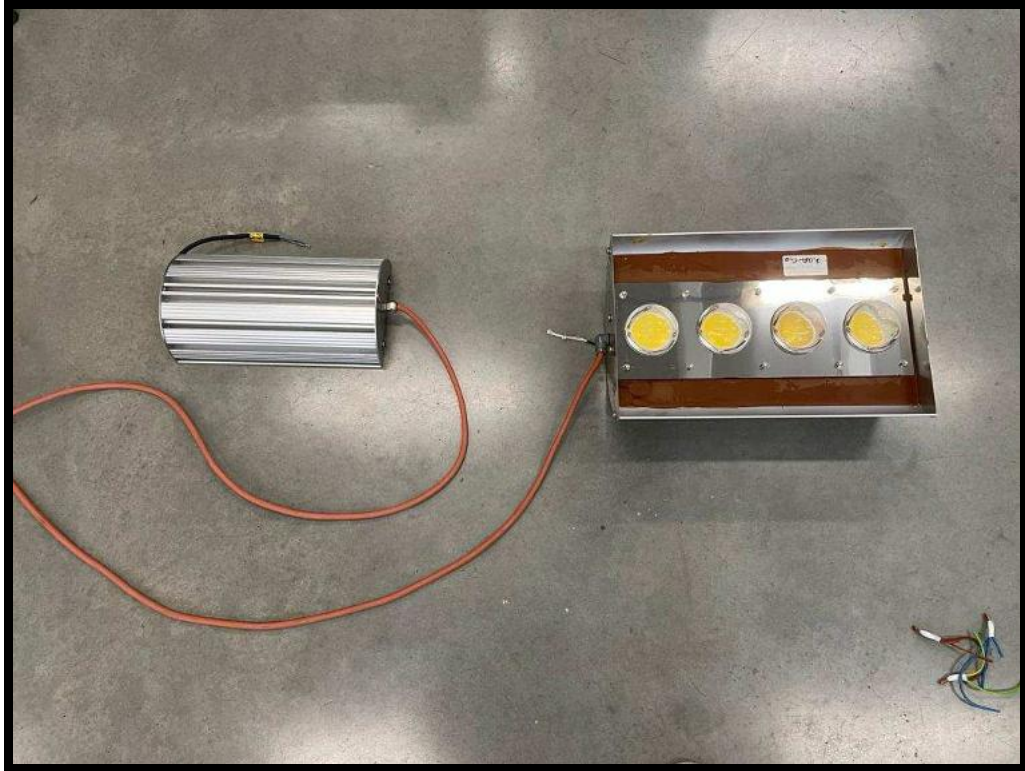


Fig. 9: Model GRANTORINO 1ESC3-0780-104-0800-LD03-4K0-1UP32-C60P-66/68-TLC0-INT-AC

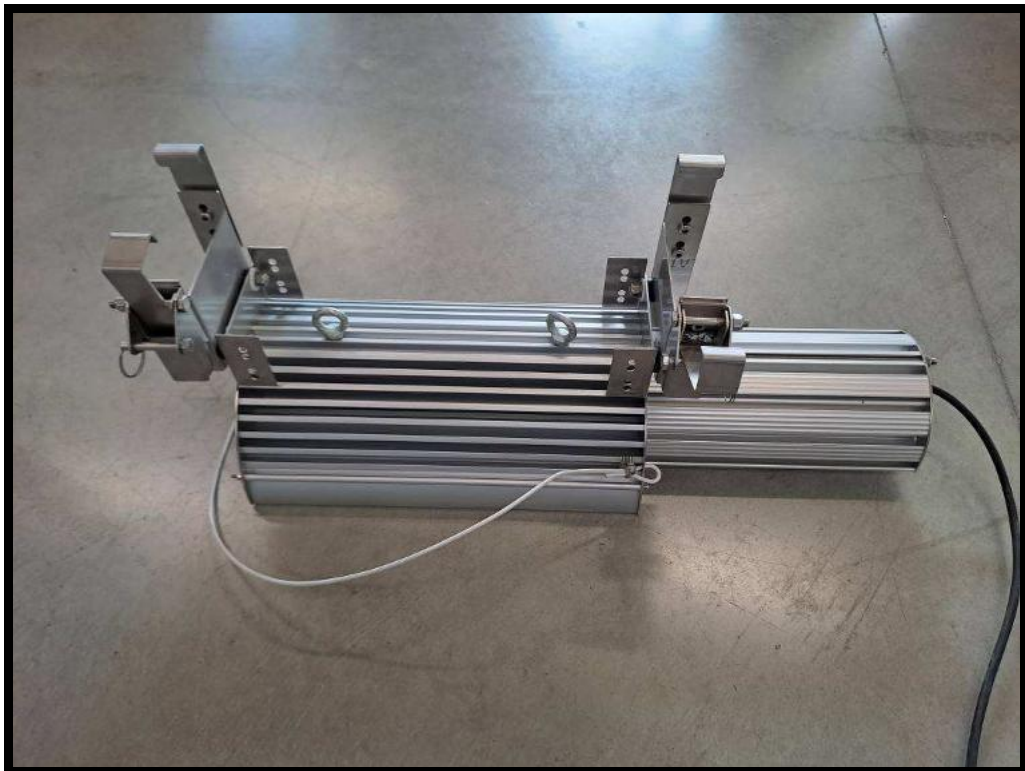


Fig. 10: Alternative mounting

Appendix 2	Photographs
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Fig. 11: Alternative mounting



Fig. 12: Alternative mounting

Appendix 2	Photographs
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Fig. 13: Alternative mechanical type



Fig. 14: Alternative mechanical type

Appendix 3 Manufacturer's Instructions

T.S.E. S.R.L.**GRANTORINO**

GRANTORINO-1ESC3-104-AZ01-29klm

*Made in Italy*

Lampione ad uso industriale con corpo centrale in alluminio estruso serie EN AW-6060 T5, flange laterali inox. La disponibilità di un'ampia gamma di configurazioni e curve fotometriche permette al progettista di realizzare ogni nuovo impianto di illuminazione nel rispetto delle normative vigenti e delle performance previste.

Il flusso luminoso disponibile è di **29.556 lm** con **173,9 lm/W di sistema**.

I punti di eccellenza sono rappresentati da:

- sorgenti luminose COB, della migliore qualità ad oggi disponibili con elevata resa cromatica (CRI);
- efficienze di lumen/Watt di sistema;
- lenti in vetro proprietarie a elevato rendimento, 94%;
- meccaniche di dimensioni e materiali che garantiscono una dissipazione ottimale con ingombri e pesi estremamente contenuti.
- grado di impermeabilizzazione IP 66/68 (2 bar)
- grado di resistenza agli urti IK 10;
- piena operatività con temperature ambiente comprese tra -30°C e +75°C;
- teleregolazione in automatico tramite boa a terra e con comando da locale e remoto integrati in ottica "Smart City" (opzionali);
- Se il cavo flessibile esterno di questo apparecchio viene danneggiato, l'apparecchio deve essere sostituito;
- Se la sorgente luminosa di questo apparecchio raggiunge il suo fine vita, l'apparecchio deve essere sostituito;
- progettati e costruiti in Italia.

Datasheet GRANTORINO-1ESC3-104-AZ01-29klm

Rev.001 03/2023

Pagina 1 di 3

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Appendix 3 Manufacturer's Instructions

CARATTERISTICHE TECNICHE

Tutti i valori sono riferiti a $T_a = 25^{\circ}\text{C}$ con tolleranza $\pm 7\%$.

Modello	GRANTORINO-1ESC3-104-AZ01-29klm		
Impiego	Illuminazione industriale		
Flusso luminoso di sistema in funzione della temperatura di colore	29.556 lm @ 5.000K	29.397 lm @ 4.000K	28.365 lm @ 3.000K
Potenza totale assorbita	170 W		
Alimentazione	100-240 Vac a 50-60 Hz		
Fattore di Potenza	$\geq 0,95$ @ 230 Vac		
Efficienza di Sistema	$\geq 87\%$		
Umidità relativa	10% - 100%		
Temperatura di esercizio	-30°C $+75^{\circ}\text{C}$		
Grado di protezione	IP 66/68 (2 bar)		
Grado di resistenza agli urti	IK 10		
Indice di resa cromatica (CRI)	≥ 70 @ 5.000K		≥ 70 @ 4.000K - 3.000K
Mantenimento del flusso luminoso (L70)	>300.000 ore @ $T_a = 25^{\circ}\text{C}$, 500mA		
Protezioni sezione alimentazione	Classe II; Corto Circuito (SCP); Sovraccarico (OLP); Sovratensione (OVP); Sovratemperatura (OTP)		
Rispondenza a Normative di sicurezza	CE - Direttiva 2014/30/UE per le EMC e 2011/35/UE per la bassa tensione; IEC / TR 62778:2014; IEC 60598-2-1:1979/AMD1:1987; IEC 60598-1:2014; IEC 62031:2014; EN 62031:2015.		
Solido fotometrico	Vedi catalogo		
Meccanica	Alluminio ossidato e flange inox		
Attacco	Vedi catalogo		
Dimensioni (mm)	780(L) x 260(W) x 310(H)		
Peso	12 Kg		
Garanzia	5 anni		



CODICE PRODOTTO PER EFFETTUARE L'ORDINE

GRANTORINO-1ESC3-780-104-800-AZ01-5K0-1UP32-C60P-66/68-TLC0-INT-AC

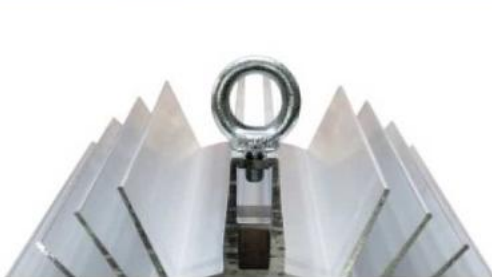
Appendix 3	Manufacturer's Instructions
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DETTAGLI MECCANICA



- Viti per il fissaggio del corpo del lampione: 15 Nm
- Viti per il fissaggio dell'attacco del lampione: 60 Nm

TIPOLOGIA ATTACCO



Datasheet GRANTORINO-1ESC3-104-AZ01-29klm

Rev.001 03/2023

Pagina 3 di 3

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T.S.E. S.R.L.



+39 0744 303280



info@tsesrl.it



www.tsesrl.it



Via Filippo Turati, 25
05100 TERNI (TR)
Italia

P.IVA 02085970677

Appendix 3 Manufacturer's Instructions

T.S.E. S.R.L.**GRANTORINO**

GRANTORINO-1ESC3-104-AZ01-7klm

*Made in Italy*

Lampione ad uso industriale con corpo centrale in alluminio estruso serie EN AW-6060 T5, flange laterali inox. La disponibilità di un'ampia gamma di configurazioni e curve fotometriche permette al progettista di realizzare ogni nuovo impianto di illuminazione nel rispetto delle normative vigenti e delle performance previste.

Il flusso luminoso disponibile è di **7.068 lm** con **186,0 lm/W di sistema**.

I punti di eccellenza sono rappresentati da:

- sorgenti luminose COB, della migliore qualità ad oggi disponibili con elevata resa cromatica (CRI);
- efficienze di lumen/Watt di sistema;
- lenti in vetro proprietarie a elevato rendimento, 94%;
- meccaniche di dimensioni e materiali che garantiscono una dissipazione ottimale con ingombri e pesi estremamente contenuti.
- grado di impermeabilizzazione IP 66/68 (2 bar);
- grado di resistenza agli urti IK 10;
- piena operatività con temperature ambiente comprese tra -40°C e +120°C;
- teleregolazione in automatico tramite boa a terra e con comando da locale e remoto integrati in ottica "Smart City" (opzionali);
- Se il cavo flessibile esterno di questo apparecchio viene danneggiato, l'apparecchio deve essere sostituito;
 - Se la sorgente luminosa di questo apparecchio raggiunge il suo fine vita, l'apparecchio deve essere sostituito;
- L'apparecchio deve essere alimentato da un driver separatamente approvato in accordo allo standard IEC 61347-2-13 e IEC 61347-1, protetto dal cortocircuito, dalle sovracorrenti e con una tensione di alimentazione massima di 450 VDC.
- progettati e costruiti in Italia.

Datasheet GRANTORINO-1ESC3-104-AZ01-7klm

Rev.001 03/2023

Pagina 1 di 3

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Appendix 3	Manufacturer's Instructions
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CARATTERISTICHE TECNICHE

Tutti i valori sono riferiti a $T_a = 25^\circ\text{C}$ con tolleranza $\pm 7\%$.

Modello	GRANTORINO-1ESC3-104-AZ01-7klm		
Impiego	Illuminazione industriale		
Flusso luminoso di sistema in funzione della temperatura di colore	7.068 lm @ 5.000K	7.030 lm @ 4.000K	6.783 lm @ 3.000K
Potenza totale assorbita	38 W		
Tensione di Alimentazione	Vout 450 Vdc Max		
Corrente di Alimentazione	220 mA		
Efficienza di Sistema	$\geq 87\%$		
Umidità relativa	10% - 100%		
Temperatura di esercizio	-40°C $+120^\circ\text{C}$		
Grado di protezione	IP 66/68 (2 bar)		
Grado di resistenza agli urti	IK 10		
Indice di resa cromatica (CRI)	≥ 70 @ 5.000K		≥ 70 @ 4.000K - 3.000K
Mantenimento del flusso luminoso (L70)	>300.000 ore @ $T_a = 25^\circ\text{C}$, 500mA		
Protezioni sezione alimentazione	Classe II; Corto Circuito (SCP); Sovraccarico (OLP); Sovratensione (OVP); Sovratemperatura (OTP)		
Rispondenza a Normative di sicurezza	CE - Direttiva 2014/30/UE per le EMC e 2011/35/UE per la bassa tensione; IEC / TR 62778:2014; IEC 60598-2-1:1979/AMD1:1987; IEC 60598-1:2014; IEC 62031:2014; EN 62031:2015.		
Solido fotometrico	Vedi catalogo		
Meccanica	Alluminio ossidato e flange inox		
Attacco	Vedi catalogo		
Dimensioni (mm)	780(L) x 260(W) x 310(H)		
Peso	12 Kg		
Garanzia	5 anni		



CODICE PRODOTTO PER EFFETTUARE L'ORDINE

GRANTORINO-1ESC3-780-104-220-AZ01-5K0-1EX32-C60P-66/68-TLC0-INT-DC

Appendix 3	Manufacturer's Instructions
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DETTAGLI MECCANICA**DETTAGLI CONNETTORE**

- Connettore circolare tipo" Hirschmann, maschio, serie CA, M22, 3 + PE poli per Montaggio su cavo
- Viti per il fissaggio del corpo del lampione: 15 Nm
- Viti per il fissaggio dell'attacco del lampione: 60 Nm

TIPOLOGIA ATTACCO

Datasheet GRANTORINO-1ESC3-104-AZ01-7klm

Rev.001 03/2023

Pagina 3 di 3

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T.S.E. S.R.L.

+39 0744 303280

info@tsesrl.it

www.tsesrl.it

Via Filippo Turati, 25
05100 TERNI (TR)
Italia

P.IVA 02085970677

Appendix 4		Evaluation according to requirements of EN IEC 62031:2020/A11:2021	
IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		
4.2	Classification		
	Built-in module :	Yes ☐ No ☒	—
	Independent module..... :	Yes ☐ No ☒	—
	Integral module :	Yes ☒ No ☐	—
4.6	Independent modules comply with requirements in IEC 60598-1:2014/AMD1:2017		N/A
4.8	Modules with integrated controlgear providing SELV comply with requirements according to IEC 61347-1:2015/AMD1:2017 clause L.5 to L.11.		N/A
6	MARKING		
6.2	Contents of marking for built-in and for independent LED modules		N/A
	a) mark of origin	Integral LED module	N/A
	b) model number, type reference		N/A
	c1) constant voltage module; rated supply voltage and supply frequency		N/A
	c2) constant current module; rated supply current and supply frequency		N/A
	d) rated power		N/A
	e) indication of connections, wiring diagram		N/A
	f) value of tc and place on the module		N/A
	g) Ethr if required		N/A
	h) symbol for built-in modules		N/A
	i) heat transfer temperature td		N/A
	j) power for heat-conduction Pd		N/A
	k) working voltage for insulation		N/A
6.3	Location of marking for built-in LED modules		N/A
	- marking of a) and b) in 6.2 on the modules		N/A
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		N/A
6.4	Location of marking for independent LED modules		N/A
	- marking of a), b), c) and f) in 6.2 on the modules		N/A
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		N/A
6.5	Marking of integral LED modules		P
	- information in 6.2 a) to g) in data sheet, leaflet or website		P
6.6	Durable and legibility of marking		N/A

Appendix 4		Evaluation according to requirements of EN IEC 62031:2020/A11:2021	
IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

	- marking on the LED module legible after test with water	No marking	N/A
	- marking not on the LED module legible		N/A

7	TERMINALS		
7.1	Integral terminals		P
	Screw terminals comply with section 14 of IEC 60598-1	No terminals	N/A
	Screwless terminals comply with section 15 of IEC 60598-1	Separately approved Terminals	P
7.2	Terminals other than integral terminals		N/A
	Separately approved; component list	No terminals	N/A
	Ratings suit the conditions		N/A
	Satisfy additional relevant requirements of this standard		N/A

8 (9)	EARTHING		
- (9.1)	Provisions for protective earthing		N/A
	Terminal complying with clause 8		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
	Test according 7.2.3 of IEC 60598-1		N/A
- (9.2)	Provision for functional earthing		N/A
	Comply with clause 8 and 9.1		N/A
	Functional earth insulated from live parts by double or reinforced insulation		N/A
- (9.3)	Lamp controlgear with conductors for protective earthing by tracks on printed circuit board		N/A
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$:	Not used	N/A
- (9.4)	Earthing of built-in lamp controlgear		N/A

Appendix 4		Evaluation according to requirements of EN IEC 62031:2020/A11:2021	
IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	Earthing via independent controlgear		N/A
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent	Class II	N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7		N/A
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A

9 (10)		PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS	
- (10.1)	Controlgear protected against accidental contact with live parts		N/A
- (A2)	Voltage measured with 50 k Ω		N/A
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impedance device		N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		N/A
- (10.2)	Capacitors $> 0,5 \mu\text{F}$: voltage after 1 min (V): < 50 V :		N/A
- (10.3)	Controlgear providing SELV		N/A
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N/A
	No connection between output circuit and the body or protective earthing circuit		N/A
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N/A
	SELV outputs separated from earth by at least basic insulation		N/A
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		N/A

Appendix 4		Evaluation according to requirements of EN IEC 62031:2020/A11:2021	
IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (10.4)	Accessible conductive parts in SELV circuits		N/A
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N/A
	If output voltage > 25 V r.m.s. or > 60 V d.c.;; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. :		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A

11 (11)	MOISTURE RESISTANCE AND INSULATION		
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (M Ω):		P
	For basic insulation ≥ 2 M Ω	> 3 G Ω	P
	For double or reinforced insulation ≥ 4 M Ω	> 3 G Ω	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A

12 (12)	ELECTRIC STRENGTH		
	Immediately after clause 11 electric strength test for 1 min	Performed	P
	Basic insulation for SELV, test voltage 500 V		P
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N/A
	Basic insulation, 2U + 1000 V	450 V working voltage considered	P
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V	450 V working voltage considered	P
	No flashover or breakdown	No flashover or breakdown	P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A

Appendix 4		Evaluation according to requirements of EN IEC 62031:2020/A11:2021	
IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
13 (14)	FAULT CONDITIONS		
- (14)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material	No flames or molten material	P
	- does not produce flammable gases	No flammable gases	P
	- protection against accidental contact not impaired	Not impaired	P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	Verified	P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)		N/A
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices		N/A
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile		N/A
- (14.4)	Short-circuit across electrolytic capacitors		N/A
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1\text{ M}\Omega$:	> 3 G Ω	P
	No flammable gases	No flammable gases	P
	No accessible parts have become live	No live parts	P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		N/A
13.2	Overpower condition		P
	Module withstands overpower condition >15 min.	Tested for 15 min @ 150% of rated power: Citizen: 59,1 W Lumileds: 65 W	P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	No fire, smoke or flammable gas is produced	No fire, smoke or flammable gas produced	P
	Molten material does not ignite tissue paper, spread below the module	No molten material	P

Appendix 4	Evaluation according to requirements of EN IEC 62031:2020/A11:2021		
IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
13 (14)	TABLE: tests of fault conditions		
Part	Simulated fault	Hazard	
LED module	Short-Circuit; LED shut off;	No	

- End Of Test Report -