SUMMARY of testing

Document reference Number. ..... :	**CN245GLT 001**
Date of issue..... :	2024-09-24
Issued by (name, function, signature):	Jing Zheng, PE
Testing procedure..... :	☐ ENEC ☐ CCA NTR ☒ ENEC based on IECEE CBTC with number: JPTUV-164104
Testing location..... :	☒ ENEC/CCA Test Laboratory ☐ E-CTF Stage 1 ☐ E-CTF Stage 2 ☐ E-CTF Stage 3
Applicant..... :	MIC Optoelectronic Co.,Ltd
Address..... :	2nd floor,Third Building, 97# AiNan Road,LongDong, BaoLong Street, LongGang District, Shenzhen, Guangdong, P.R. China
Manufacturer ..... :	MIC Optoelectronic Co.,Ltd
Address..... :	2nd floor,Third Building, 97# AiNan Road,LongDong, BaoLong Street, LongGang District, Shenzhen, Guangdong, P.R. China
Product ..... :	LED Flood Light
Model/Type reference..... :	See general product information
Trademark ..... :	MIC
Ratings..... :	AC 100-277V, 50/60Hz, Class I, IP66, ta 45°C, details see General product information
Certification Scheme..... :	☒ ENEC ☐ CCA ☐ Other: _____
Standard(s)..... :	EN 60598-2-3:2003+A1:2011 used in conjunction with EN IEC 60598-1:2021 + A11:2022

☐ The text of the a.m. European Standard was approved by CENELEC is equivalent with the corresponding IEC Publication.

☒ The text of the a.m. European Standard was approved by CENELEC with agreed common modifications and is not equivalent with the corresponding IEC Publication. An EU Deviation Addendum has to be issued.

This document links the following reports below:

☒ IEC Test Report Number..... :	CN245GLT 001, CN24XBA1 001(CB)
☒ EU Deviation Addendum..... :	Attachment 1 of CN245GLT 001
☒ OSM Decision Sheets..... :	See below OSM Decision Sheets

Issuing organization: (ENEC/CCA CB or TL)	**TÜV Rheinland / CCIC (Ningbo) Co., Ltd.**
Issued by (name, function, signature):	Zeen Xu, Authorizer
Date:	2024-09-24

OSM Decision Sheet(s) taken into consideration:

Clause	Subject	OSM Decision Sheet No.
General	Insulation class MCPCB material used for LED modules	OSM-LUM DSH 1086A
3.6.5.1 5.6.8.1	Luminaires for road and flood lighting Floodlights	OSM-LUM DSH 2048A
12	Luminaires provided with LEDs	OSM-LUM DSH 0919B
12 – Table 12.2	Temperature limits for rubber cables	DSH 0921
9.2	IP 6X	DSH 2003A
9.2	Torque for fixing screws of covers	DSH 0906A
8.2.1	Luminaires with LEDs	DSH 0896
0.5	Components	DSH 0402A

TEST REPORT
IEC 60598-2-3
Luminaires
Part 2: Particular requirements
Section 3: Luminaires for road and flood lighting

Report Number..... :	CN245GLT 001
Date of issue..... :	See cover page
Total number of pages.....	45 pages
Name of Testing Laboratory preparing the Report..... :	TÜV Rheinland / CCIC (Ningbo) Co., Ltd. 3F, Building C13, R&D Park, No.32 Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China.
Applicant's name..... :	MIC Optoelectronic Co.,Ltd
Address..... :	2nd floor,Third Building, 97# AiNan Road,LongDong, BaoLong Street, LongGang District, Shenzhen, Guangdong, P.R. China
Test specification:	
Standard..... :	IEC 60598-2-3:2002, IEC 60598-2-3:2002/AMD1:2011 used in conjunction with IEC 60598-1:2020
Test procedure..... :	ENEC approval
Non-standard test method..... :	N/A
TRF template used..... :	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No..... :	IEC60598_2_3M
Test Report Form(s) Originator ... :	Intertek Semko AB
Master TRF..... :	2021-11-01

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description.....:	LED Flood Light
Trade Mark(s).....:	MIC
Manufacturer.....:	Same as applicant's name & address
Model/Type reference.....:	See General Product Information.
Ratings.....:	100-277V~, 50/60Hz, Class I, IP66, ta45°C, details see General product information

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.	
Testing location/ address .....:		3F, Building C13, R&D Park, No.32 Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R. China.	
Tested by (name, function, signature).....:		See cover page	
Approved by (name, function, signature) :		See cover page	
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address .....:		N/A	
Tested by (name, function, signature).....:		N/A	
Approved by (name, function, signature) :		N/A	
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address .....:		N/A	
Tested by (name + signature).....:		N/A	
Witnessed by (name, function, signature):		N/A	
Approved by (name, function, signature) :		N/A	
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address .....:		N/A	
Tested by (name, function, signature).....:		N/A	
Witnessed by (name, function, signature):		N/A	
Approved by (name, function, signature) :		N/A	
Supervised by (name, function, signature):		N/A	

List of Attachments (including a total number of pages in each attachment):
Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES. (2 pages)
Attachment 2: Photo document. (8 pages)
Attachment 3: Measurement equipment list, 1 page.

Summary of testing: This ENEC report bases on CB report CN24XBA1 001 (issued CB certificate JPTUV-164104). In this report, only Construction and Creepage distance & clearance and Protection against electric shock were check on sample. Other test data refer to previous CB report and apply for ENEC approval.

Tests performed (name of test and test clause):	**Testing location:**
Full tests were performed on model MSL-F300 was selected to check Clauses of Construction (except for Cl4.14.1, Cl4.24.2, Cl 3.6.1 (-),Cl 3.6.3.1 (-)) and Protection against electric shock and Creepage distance & clearance, other data refer to original CB report. And structures for LED driver and LED module have been checked.	CBTL: Shenzhen Southern LCS Compliance Testing Laboratory Ltd. 101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China ENEC-TL: TÜV Rheinland/CCIC(Ningbo) Co., Ltd 3F, Building C13, R&D Park, No.32, Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, China

Summary of compliance with National Differences (List of countries addressed):

EU Group Differences

☒ The product fulfils the requirements of EN 60598-2-3:2003+A1:2011 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.

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.

Location: sticking on the external surface of luminaire.

Label located on the supply cord:

AC-L: Brown
AC-N: Blue
: Yellow-Green

 : "caution, electric shock risk" symbol, height of this mark is 15mm. Attached on the glass cover or translucent cover.

Notes:

1. Other models are same as above, except model name and rating.
2. The name and address of importer will be marked on the final products.

Test item particulars ..... :	LED Flood Light
Classification of installation and use ..... :	Class I and IP66 for outdoor use only
Supply Connection ..... :	Supply cord
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.....:	2024-09-10
Date (s) of performance of tests.....:	2024-09-11 to 2024-09-19

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 IECEE 02:

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)..... : Same as applicant's name & address

General product information and other remarks:

Product: LED Flood Light
Ratings: 100-277V~, 50/60Hz, Class I, ta=45°C, IP66, IK08(this rating covered by this test report is the luminaire up to the NEMA socket and its short-cap. Device connected to the socket may affect the compliance of the full system and is not covered by this test report), suitable for direct mounting on normally flammable surfaces and for outdoor use only.

1. All models have same appearance and construction, but different size, power and LED driver.
2. All models max. mounting height: 15m.
3. All models use same type LED chip with CCT 2700-6500K.

Model list:

Model No.	Input current	Power	LED quantity	LED driver model No.	Dimension (LxWxH) / Weight	Maximum projected area
MFL-G1440	14,4A	1440W	552pcs	X6-240M	649x861x132mm/33,6kg	0,559m^2
MFL-G1200	12A	1200W	460pcs		649x729x132mm/27,2kg	0,473m^2
MFL-G960	9,6A	960W	368pcs		649x597x132mm/18kg	0,387m^2
MFL-G720	7,2A	720W	276pcs		649x475x132mm/16,8kg	0,297m^2
MFL-G480	4,8A	480W	184pcs		362x597x132mm/11kg	0,216m^2
MFL-G360	3,6A	360W	138pcs		362x475x132mm/7,3kg	0,172m^2
MFL-G240	2,4A	240W	92pcs		362x343x132mm/5,6kg	0,124m^2
MFL-G120	1,2A	120W	46pcs	X6-150M	310x116x132mm/2,8kg	0,036m^2

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.2 (0)	**GENERAL TEST REQUIREMENTS**		P
3.2 (0.3)	More sections applicable..... :	Yes ☐ No ☒ Section/s:	—
3.2 (0.5)	Components	(see Annex 1)	—
3.2 (0.7)	**Information for luminaire design in light sources standards**		—
3.2 (0.7.2)	Light source safety standard ..... :	IEC TR 62778:2014 EN IEC 62031: 2020+A11:2021	—
	Luminaire design in the light source safety standard		P
3.4 (2)	**CLASSIFICATION OF LUMINAIRES**		P
3.4 (2.2)	Type of protection ..... :	Class I	P
3.4 (2.3)	Degree of protection..... :	IP66	P
3.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces ..... :	Yes ☒ No ☐	—
3.4 (2.5)	Luminaire for normal use ..... :	Yes ☒ No ☐	—
	Luminaire for rough service ..... :	Yes ☐ No ☒	—
3.4 (-)	Modes of installation of road or Flood lighting		—
	a) on a pipe	Yes ☐ No ☒	—
	b) on a mast arm	Yes ☒ No ☐	—
	c) on a post top	Yes ☒ No ☐	—
	d) on span or suspension wires	Yes ☐ No ☒	—
	e) on a wall	Yes ☐ No ☒	—
3.6 (4)	**CONSTRUCTION**		P
3.6 (4.2)	Components replaceable without difficulty		P
3.6 (4.3)	Wireways smooth and free from sharp edges		P
3.6 (4.4)	**Lampholders**		N/A
3.6 (4.4.1)	Integral lampholder		N/A
3.6 (4.4.2)	Wiring connection		N/A
3.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
3.6 (4.4.4)	Positioning		N/A
	- pressure test (N) ..... :		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) ..... :		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
3.6 (4.4.5)	Peak pulse voltage		N/A
3.6 (4.4.6)	Centre contact		N/A
3.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
3.6 (4.4.8)	Lamp connectors		N/A
3.6 (4.4.9)	Caps and bases correctly used		N/A
3.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
3.6 (4.5)	**Starter holders**		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
3.6 (4.6)	**Terminal blocks**		N/A
	Tails		N/A
	Unsecured blocks		N/A
3.6 (4.7)	**Terminals and supply connections**		P
3.6 (4.7.1)	Contact to metal parts		N/A
3.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
3.6 (4.7.3)	Terminals for supply conductors		P
3.6 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		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
3.6 (4.7.4)	Terminals other than supply connection		P
3.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
3.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.8)	**Switches**		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
3.6 (4.9)	**Insulating lining and sleeves**		N/A
3.6 (4.9.1)	Retainment		N/A
	Method of fixing ..... :		N/A
3.6 (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
3.6 (4.10)	**Double or reinforced insulation**		P
3.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		P
	Capacitors and switches		N/A
3.6 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
3.6 (4.10.3)	Retainment of insulation:		P
	- fixed	Shorting cap	P
	- unable to be replaced; luminaire inoperative	Glass cover	P
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
3.6 (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 appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
3.6 (4.11)	**Electrical connections and current-carrying parts**		**P**

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.11.1)	Contact pressure		P
3.6 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
3.6 (4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N/A
3.6 (4.11.4)	Material of current-carrying parts		P
3.6 (4.11.5)	No contact to wood or mounting surface		P
3.6 (4.11.6)	Electro-mechanical contact systems		P
3.6 (4.12)	**Screws and connections (mechanical) and glands**		**P**
3.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :	Fixed LED driver: 1,2Nm	P
	Torque test: torque (Nm); part ..... :	Fixed plastics lens: 0,5Nm	P
	Torque test: torque (Nm); part ..... :	Fixed glass cover: 1,2Nm	P
	Torque test: torque (Nm); part ..... :	Fixed mounting bracket:8,0Nm	P
	Torque test: torque (Nm); part ..... :	Fixed screw terminal: 1,2Nm	P
	Torque test: torque (Nm); part ..... :	Fixed earth terminal: 0,5Nm	P
3.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		P
3.6 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm)..... :		N/A
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm..... :		N/A
3.6 (4.12.5)	Screwed glands; force (Nm)..... :	Moulded plastic glands: 3,25Nm	P
3.6 (4.13)	**Mechanical strength**		**P**
3.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)..... :		N/A
	- other parts; energy (Nm) ..... :	Metal enclosure and glass cover: 0,7Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection	Continue to afford the degree of protection	P
	4) covers	No breaking	P
3.6 (4.13.2)	Metal parts have adequate mechanical strength		P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.13.3)	Straight test finger	30N	P
3.6 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		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
3.6 (4.13.6)	Tumbling barrel		N/A
3.6 (4.14)	**Suspensions, fixings and means of adjusting**		**P**
3.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	For model MFL-G480: 4×11Kg=44Kg	P
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)..... :		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... :		N/A
	Metal rod. diameter (mm) ..... :		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
3.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) ..... :		—
	Stress in conductors (N/mm²) ..... :		N/A
	Mass (kg) of semi-luminaire ..... :		N/A
	Bending moment (Nm) of semi-luminaire ..... :		N/A
3.6 (4.14.3)	Adjusting devices:		P
	- flexing test; number of cycles ..... :	45 cycles	P
	- strands broken..... :	No broken	P
	- electric strength test afterwards		P
3.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
3.6 (4.14.5)	Guide pulleys		N/A
3.6 (4.14.6)	Strain on socket-outlets		N/A
3.6 (4.15)	**Flammable materials**		P
	- glow-wire test 650°C..... :	See Test Table 3.15 (13.3.2)	P
	- spacing ≥30 mm		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
3.6 (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
3.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		N/A
	No lamp control gear ..... :	(compliance with Section 12) Electrical controlgear used	N/A
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N/A
3.6 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
3.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
3.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
3.6 (4.17)	**Drain holes**		N/A
	Clearance at least 5 mm		N/A
3.6 (4.18)	**Resistance to corrosion**		**P**
3.6 (4.18.1)	- rust-resistance		P
3.6 (4.18.2)	- season cracking in copper		N/A
3.6 (4.18.3)	- corrosion of aluminium		P
3.6 (4.19)	Ignitors compatible with ballast		N/A
3.6 (4.20)	Rough service vibration		N/A
3.6 (4.21)	**Protective shield**		N/A
3.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
3.6 (4.21.3)	No direct path		N/A
3.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment ..... :	See Test Table 3.15 (13.3.2)	N/A
3.6 (4.22)	Attachments to lamps not cause overheating or damage		N/A
3.6 (4.23)	Semi-luminaires comply Class II		N/A
3.6 (4.24)	**Photobiological hazards**		**P**
3.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
3.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 ..... :	RG1 unlimited	—
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2.. :		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/TR 62778		N/A
3.6 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
3.6 (4.26)	**Short-circuit protection**		N/A
3.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
3.6 (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
3.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		N/A
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	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
3.6 (4.28)	**Fixing of thermal sensing control**		N/A
	Not plug-in or easily replaceable type		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
3.6 (4.29)	**Luminaires with non-replaceable light source**		N/A
	Not possible to replace light source		N/A
	Live part not accessible after parts have been opened by hand or tools		N/A
3.6 (4.30)	**Luminaires with non-user replaceable light source**		**P**
	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		P
3.6 (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		N/A
3.6 (4.31.1)	SELV or PELV circuits		P
	Used SELV/PELV source		P
	Voltage ≤ ELV		P
	Insulating of SELV/PELV circuits from LV supply		P
	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

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	SELV/PELV circuits insulated from accessible parts according Table X.1		P
	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
3.6 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage ≤ 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 does not have protective conductor contact		N/A
3.6 (4.31.3)	Other circuits		N/A
	Other circuits insulated from accessible parts according Table X.1		N/A
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together		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
	- slave luminaire constructed as class I		N/A
3.6 (4.32)	**Overvoltage protective devices**		P
	Comply with IEC 61643-11		P
	External to controlgear and connected to earth:		P
	- only in fixed luminaires		P
	- only connected to protective earth		P
3.6 (4.33)	**Luminaire powered via information technology communication cabling**		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirements for Class III luminaire		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
3.6 (4.34)	**Electromagnetic fields (EMF)**		P
	No harmful electromagnetic fields	According to clause 4.2.2 of IEC/EN 62493:2015+A1: 2022, this product is a LED light source to comply with the requirement of IEC/EN 62493:2015+A1:2022 and without testing.	P
3.6 (4.35)	**Protection against moving fan blades**		N/A
	Test with a standard test finger		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
3.6 (4.36)	**Track-mounted luminaires**		N/A
	Test in accordance with Annex A of IEC60570:2003/AMD2:2019		N/A
3.6.1 (-)	At least IP X3 or X5 respectively. IP .....:	IP66	P
	Column-integrated luminaires:		N/A
	- parts below 2,5 m. IP .....:		N/A
	- parts above 2,5 m. IP .....:		N/A
3.6.2 (-)	Suspension on span wires		N/A
3.6.3 (-)	Means for attaching the luminaire or external parts to its support appropriate to the weight		P
3.6.3.1 (-)	Static load test		P
	- drag coefficient .....:	1,2	P
	- loaded area (m²) .....:	For model MFL-G480: 0,22 m²	P
	- used load (N).....:	377,6N	P
	- measured deformation (cm/m) .....:	0	P
	- no rotation		P
3.6.4 (-)	Adjustable lampholders		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6.5 (-)	Luminaires installed above 5 m, glass covers shall be:		P
	a) glass that fractures into small pieces (test according to 3.6.5.1), or		N/A
	b) glass having a high impact shock resistance (test according to 3.6.5.2), or		N/A
	c) protected by any means to retain glass fragments		N/A
	For tunnel luminaires 3.6.5.1 apply		N/A
	Method of protection declared by the manufacturer		N/A
3.6.5.1 (-)	Protection by the use of glass that fractures into small pieces		P
	- number of particles is more than 40 .....:	60pcs	P
3.6.5.2 (-)	Protection by the use of high impact resistant glass		N/A
3.6.5.2.1 (-)	Glass covers have high mechanical strength		N/A
	Test according IEC 62262 with test apparatus according IEC 60068-2-75 with impact energy of 5J on preconditioned sample		N/A
3.6.5.2.2 (-)	Glass covers not break into large pieces		N/A
	- test according 3.6.5.1, number of particles is more than 20.....:		N/A
3.6.6 (-)	Connection compartment of column-integrated luminaire		N/A
	- provides adequate space		N/A
	- means for attachment		N/A
	- means for attachment of metal corrosion-resistant		N/A
3.6.7 (-)	Compliance with ISO standard or other.....:		N/A
3.6.8 (-)	Doors of column-integrated luminaires:		N/A
	- corrosion-resistant		N/A
	- opening only possible for an authorized person		N/A
	- impact test 5 Nm		N/A
	- sample show no damage		N/A
3.6.9 (-)	Column-integrated luminaire:		N/A
	- dimension of the cable entry slot (mm) .....:		N/A
	- cable path from the slot to the connection compartment (mm) .....:		N/A
	- cable path free from obstruction that might cause abrasion of the cable		N/A

3.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		P
3.7 (11.2)	Creepage distances and clearances.....:	See Table 3.7 (11.2)	P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Impulse withstand category (Normal category II) (Category III Annex U, Table U.1)	Category II ☒ Category III ☐	—
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
3.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 3.7 (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	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with U_P	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A

3.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
3.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		P
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
3.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
3.11 (8.2.3.a)	Class II luminaire:		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		N/A
	- glass protective shields not used as supplementary insulation		N/A
3.11 (8.2.3.b)	BC lamp holder of metal in class I luminaires shall be connected to protective earth		N/A
3.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	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
	- 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		N/A
	Class III luminaire not provided with means for protective earthing		N/A
3.11 (8.2.3.d)	PELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :		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
3.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
3.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
3.11 (8.2.6)	Covers reliably secured		P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection	0V after 1 min	P
	Portable luminaire with capacitor > 0,1 μF (0.25) not exceed 34 V 1 s after disconnection		N/A
	Other luminaires with capacitor > 0,1 μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N/A

3.7 (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	1,7	0,8	11.1.B	1,7	1,4	11.1.A	
Working voltage (V).....:					Max.80VDC			—
PTI.....:					< 600 ☒ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:					--			—
Supplementary information: Between trace of LED board and accessible metal parts/screws fixed LED module.								
Distance 2:	B	11	1,5	11.1.B	11	2,5	11.1.A	
Working voltage (V).....:					277V			—
PTI.....:					< 600 ☒ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:					--			—
Supplementary information: Between live part and accessible metal parts by screwless terminal (black)/ mounting surface.								
Distance 3:	--	--	--	--	--	--	--	
Working voltage (V).....:					--			—
PTI.....:					< 600 ☐ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:					--			—
Supplementary information: --								

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

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.7 (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 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information					P
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Supply cord	B	Dong Guan Recheer Electric Wire & Cable Co., Ltd.	H05RN-F	300/500V; 3 x 1,0mm^2	EN 50525-2-21	VDE 40015173
Input wire of LED driver	B	Guangdong Rifeng Electrical Cable Co., Ltd.	H05RN-F	300/500V; 3 x 1,0mm^2	EN 50525-2-21	VDE 40015999
Output wire of LED driver	B	Guangdong Rifeng Electrical Cable Co., Ltd.	H05RN-F	300/500V; 2 x 1,0mm^2	EN 50525-2-21	VDE 40015999
Dimming wire of LED driver	B	Yong Hao Electrical Industry Co., Ltd.	H03VV-F	300/500V, 2 x 0,5mm^2	EN 50525-2-21	VDE 40027125
Earth wire	C	KUNSHAN XINGHONGM ENG ELECTRONIC CO LTD	1015	300V; 20AWG; 105°C	EN 60598-2-3 EN IEC 60598-1	UL E315421 Tested with appliance
Input wire of NEMA socket	C	DONG GUAN SHENG PAI ELECTRIC WIRE & CABLE CO LTD	3239	Min 20AWG, 60000Vdc, 105°C	EN 60598-2-3 EN IEC 60598-1	UL E347603 Tested with appliance
Coupler terminal	B	Ningbo Jinwei Electrical Technology Co., Ltd.	JN002(female part); JN002(male part)	400V, 16A	EN 61984	VDE 40038746
Screwless terminal	B	WAGO KONTAKTTECHNIK GMBH & CO. KG	222-412	0,2 to 2,5mm²/400V, 24A	EN 60998-1 EN 60998-2-2	UL Certificate: ENEC-01360
Class-end connector	C	HEAVY POWER CO LTD	CE2	PC	EN 60598-2-3 EN IEC 60598-1	UL EE113650 Tested with appliance
Heat-shrinkable tubing for Class-end connector	C	DEEM Electronic & Electric Material Co., LTD	DM-D31/D41	600V, 125°C	EN 60598-2-3 EN IEC 60598-1	UL E493462 Tested with appliance

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

LED lens	C	TEIJIN POLYCARBONATE CHINA LTD	L-1250U(#)(f1), L-1250V(#)(f1), L-1250Z(#)(f1)	HB; 115°C	EN 60598-2-3 EN IEC 60598-1	UL E245526 Tested with appliance
Reflector	C	MITSUBISHI ENGINEERING-PLASTICS CORP	S-3000+(f1)	HB; 115°C	EN 60598-2-3 EN IEC 60598-1	UL E41179 Tested with appliance
Glass cover	C	MIC Optoelectronic Co.,Ltd	GLA	-40°C to 200°C; Δt:200°C	EN 60598-2-3 EN IEC 60598-1	Tested with appliance
LED PCB	C	Huizhou Sanlicheng Technology Co Ltd	YSL-L1	V-0; 130°C	EN 60598-2-3 EN IEC 60598-1	UL E479275 Tested with appliance
LED	C	LUXEON	L150-6570502400000	5050; If:1240mA; Vf: 24V; CCT 2700-6000K	IEC TR 62778	Tested with appliance
NEMA socket and its Shorting cap	B	Zhejiang Qicheng Electrical Equipment Co., Ltd.	LC-10K(male) LC-10R/5 (female)	480VAC, 50/60Hz, Max.15A, -40°C~100°C	IEC 61984	SGS CB: FI-43492
Surge protective device	B	Guangdong ZP Lightning Protection Technology Co., Ltd.	ZP-LED-P10D	Un:100~277VAC Uc:320VAC; 50/60Hz; In:10kV; Uoc:10kV; Isccr: 300A; Up: 1,3kV (L-N and L/N-GND); ta:85°C; IP67	IEC 61643-11 EN 61643-11	TÜV Rh Mark R 50516300 001
LED driver	B	Shen Zhen MOSO Electronics Technology Co., Ltd.	X6-320M062	Input: 100-277VAC; 50/60Hz; Max. 4,2A; Output: 38-62VDC; Max. 80VDC; 0,75-7,5A; 320W; ta. 50ºC(Input 100-200V~); ta. 60ºC(Input 200-277V~) tc. 90ºC, Constant current; Class I; IP67; SELV; Independent	EN 61347-1 EN 61347-2-13 EN IEC 62384	TUV Rh ENEC HN 69290094 0002

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

LED driver	B	SHENZHEN MOSO ELECTRONICS TECHNOLOGY CO., LTD	X6-150M	Input: 100-277VAC; 50/60Hz; 2,0A; Output: 20-41VDC; Max.50VDC;0,54-5,4A; 150W; ta 50ºC(Input 120-200V~); ta 55ºC(Input 200-277V~); tc 90ºC Constant current; Class I; IP67; SELV; Independent	EN 61347-1 EN 61347-2-13 EN IEC 62384	TUV SUD ENEC U6 077716 0300 Rev. 02
LED driver	B	SHENZHEN MOSO ELECTRONICS TECHNOLOGY CO., LTD	X6 240M	Input: 100-277VAC; 50/60Hz; 3,3A; Output: 20-41VDC; Max.50VDC;0,75-7,5A; 240W; ta 50ºC(Input 100-200V~); ta 60ºC(Input 200-277V~); tc 90ºC Constant current; Class I; IP67; SELV; Independent	EN 61347-1 EN 61347-2-13 EN IEC 62384	TUV SUD ENEC U6 077716 0300 Rev. 02

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

[2)] Components license available upon request.

IEC60598_2_3M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT **IEC 60598-2-3** **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** Luminaires Part 2: Particular requirements Section 3: Luminaires for road and Flood lighting			
Differences according to..... :	EN 60598-2-3:2003 + A1:2011 used in conjunction with EN IEC 60598-1:2021 + A11:2022		
TRF template used ..... :	IECEE OD-2020-F2:2020, Ed. 1.1		
Attachment Form No..... :	EU_GD_IEC60598_2_3M		
Attachment Originator..... :	UL(Demko)		
Master Attachment..... :	2022-05-24		
	CENELEC COMMON MODIFICATIONS (EN)		P
3.5 (3)	**MARKING**		P
3.5 (3.2.12)	Note 4 deleted		N/A
3.6 (4)	**CONSTRUCTION**		P
4.7 (4.11.6)	Electro-mechanical contact systems: electric strength test at 1 500 V		P
3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		P
3.10 (5.2.2)	Cables equal to EN 50525 (all parts)		P
	Paragraph 2 deleted		P
	Replace table 5.1 – Supply cord		P
3.12 (12)	**ENDURANCE TESTS AND THERMAL TESTS**		P
3.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		N/A
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		N/A
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(5.2.1)	CY, DK, FI, UK: type of plug		N/A
(5.2.18)	DK: socket-outlets		N/A
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		N/A
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A

IEC60598_2_3M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	FR: Safety requirements for high buildings *(Decree of 30 December 2011 on safety regulations for the construction of high-rise buildings and their protection against fire and panic risks; Section VIII; Article GH 48, Lighting)* Glow-wire test for outer parts of luminaires:		N/A
	- 850°C for luminaires in stairways and horizontal travel paths		N/A
	- 650°C for indoor luminaires		N/A
	UK: Requirements according to United Kingdom Building Regulation		N/A

Photo document

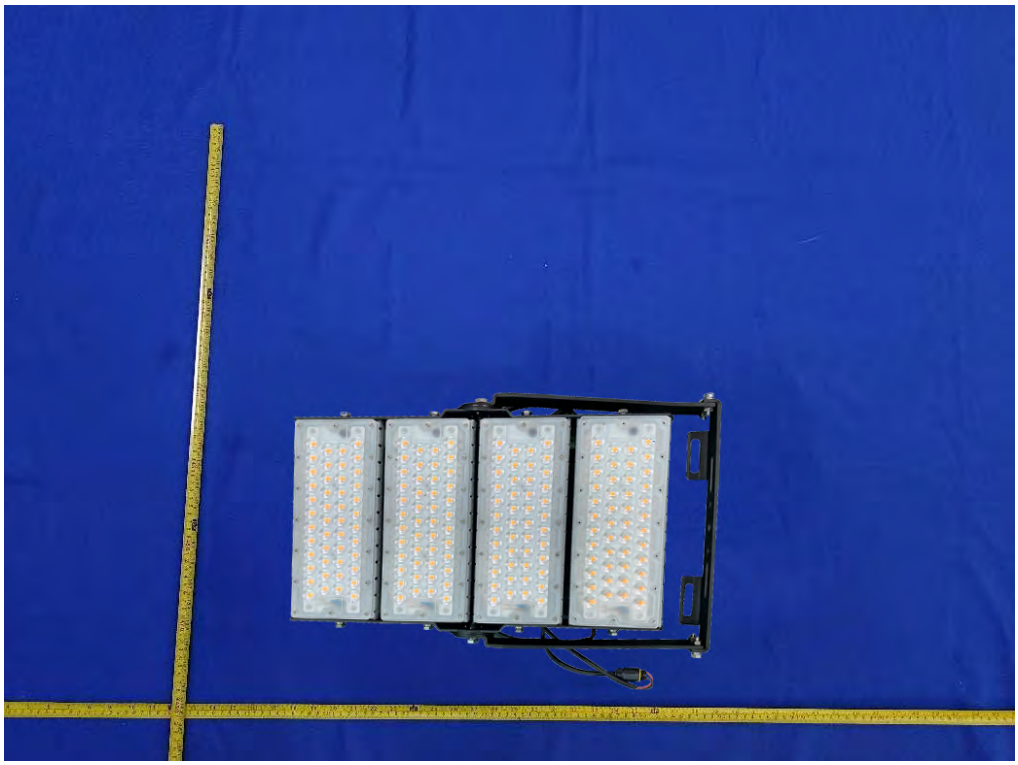

Figure 1.: Front view of model MFL-G480

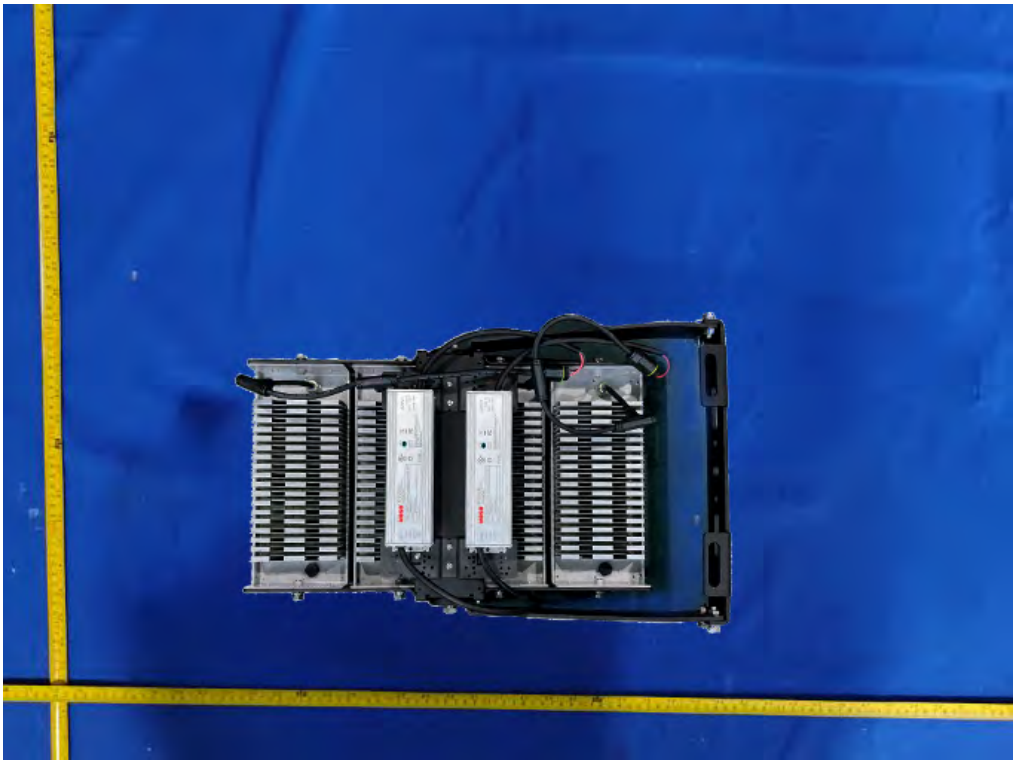

Figure 2.: Base view of model MFL-G480

Photo document

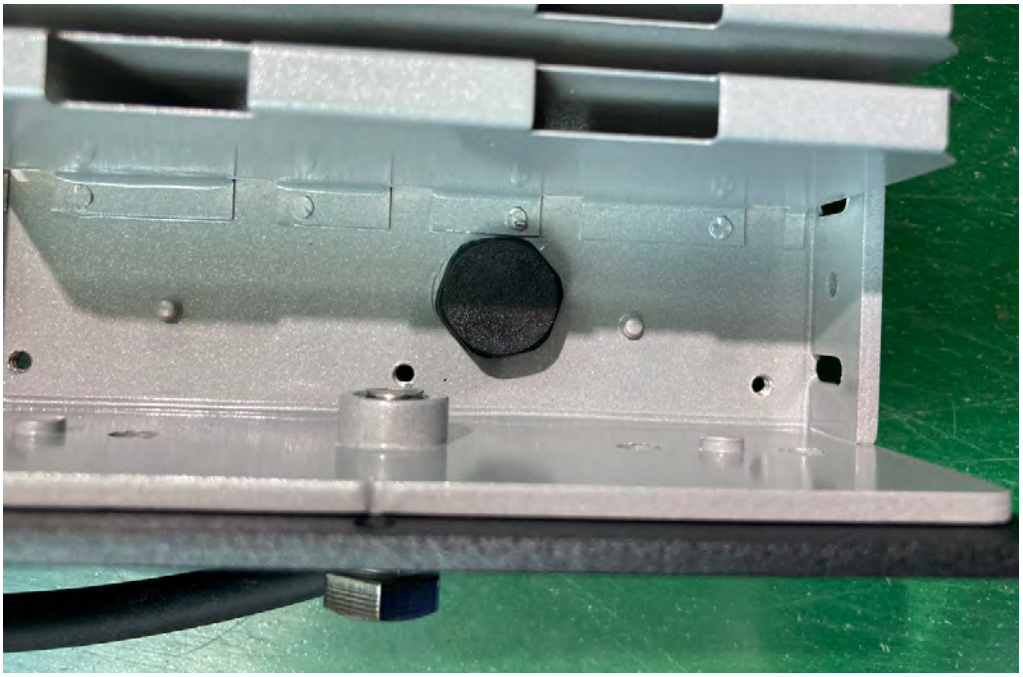

Figure 3.: Internal view of model MFL-G480

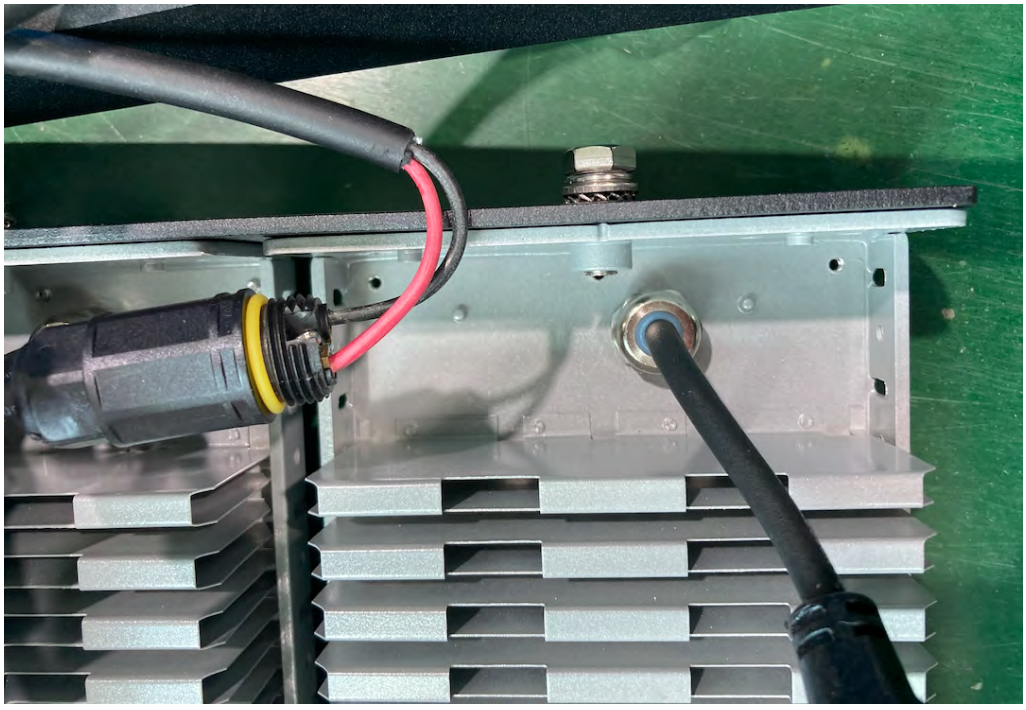

Figure 4.: Internal view of model MFL-G480

Photo document

Figure 5.: Internal view of model MFL-G480

Figure 6.: Internal view of model MFL-G480

Photo document

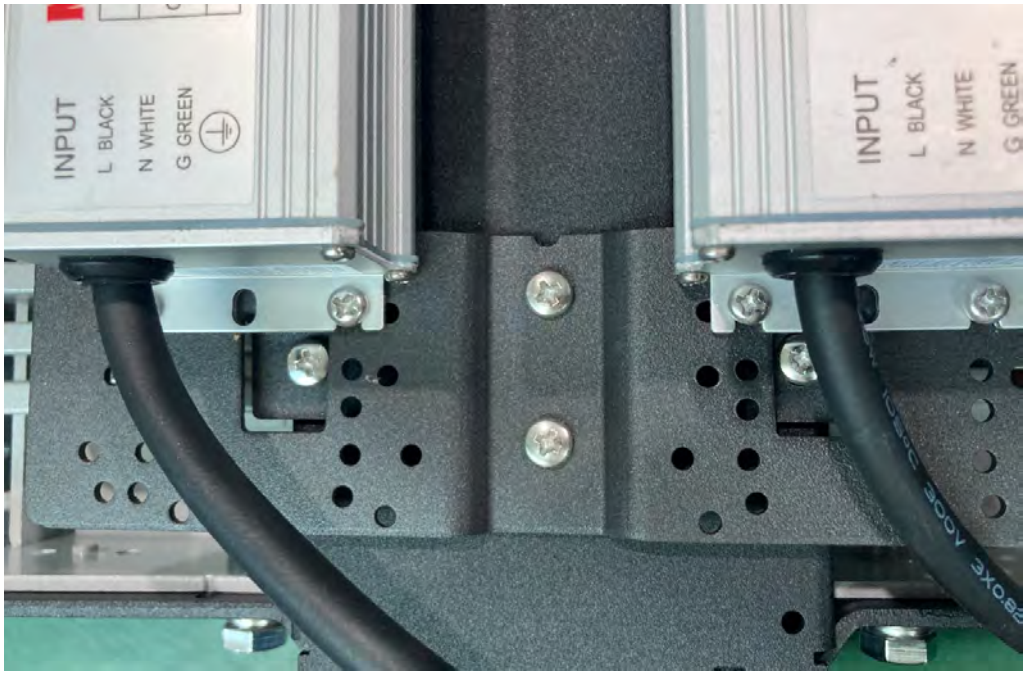

Figure 7.: Earth view of model MFL-G480

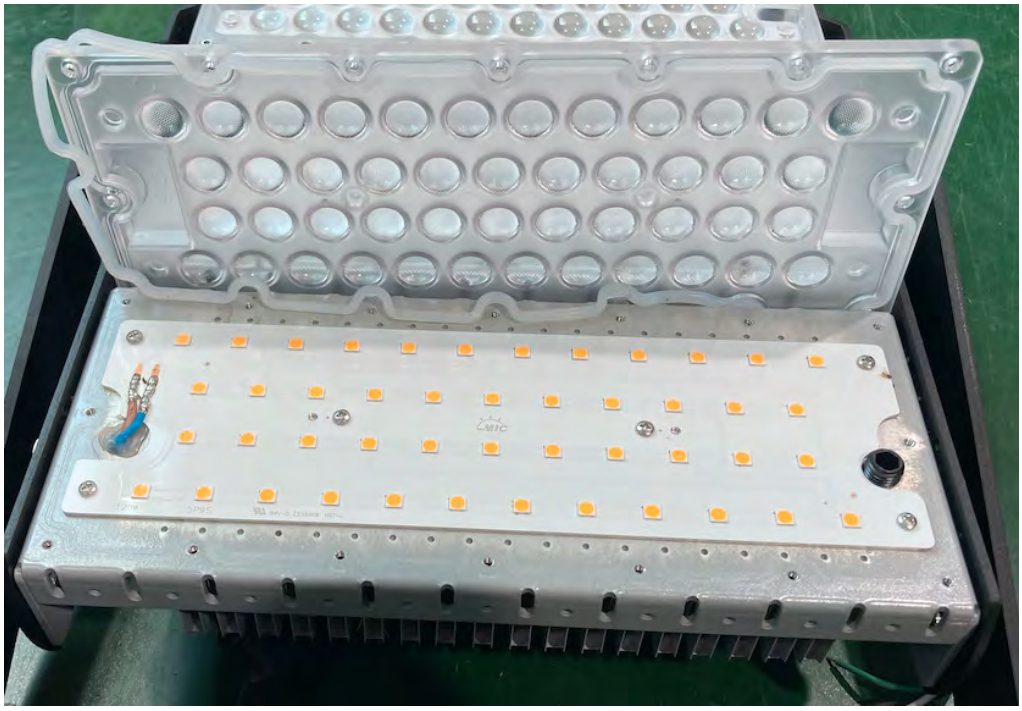

Figure 8.: Internal view of model MFL-G480

Photo document

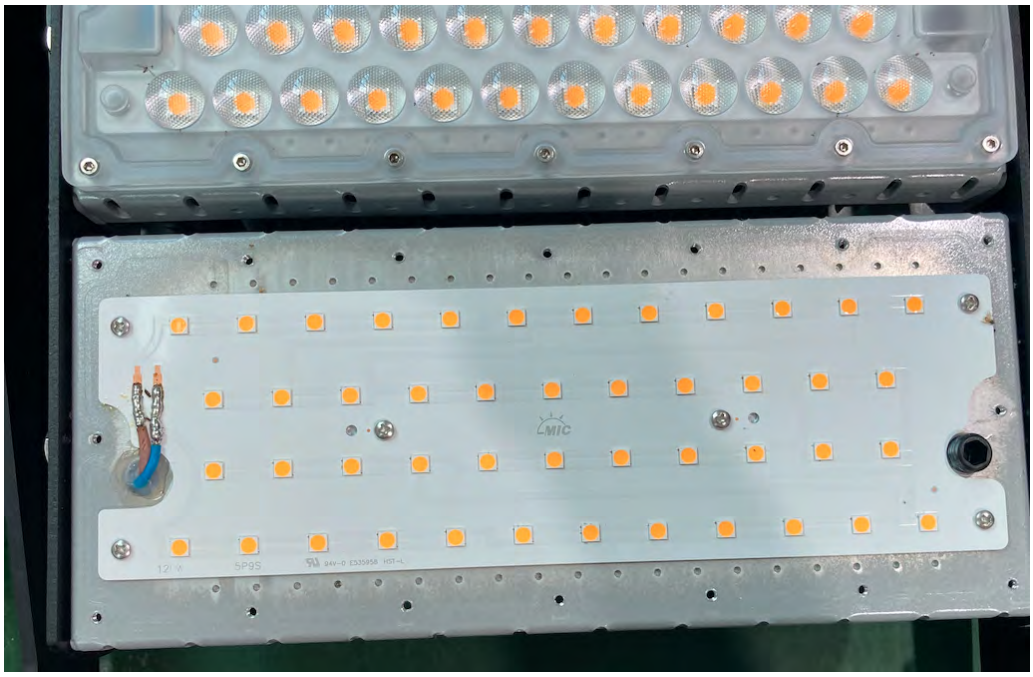

Figure 9.: Earth view of model MFL-G480

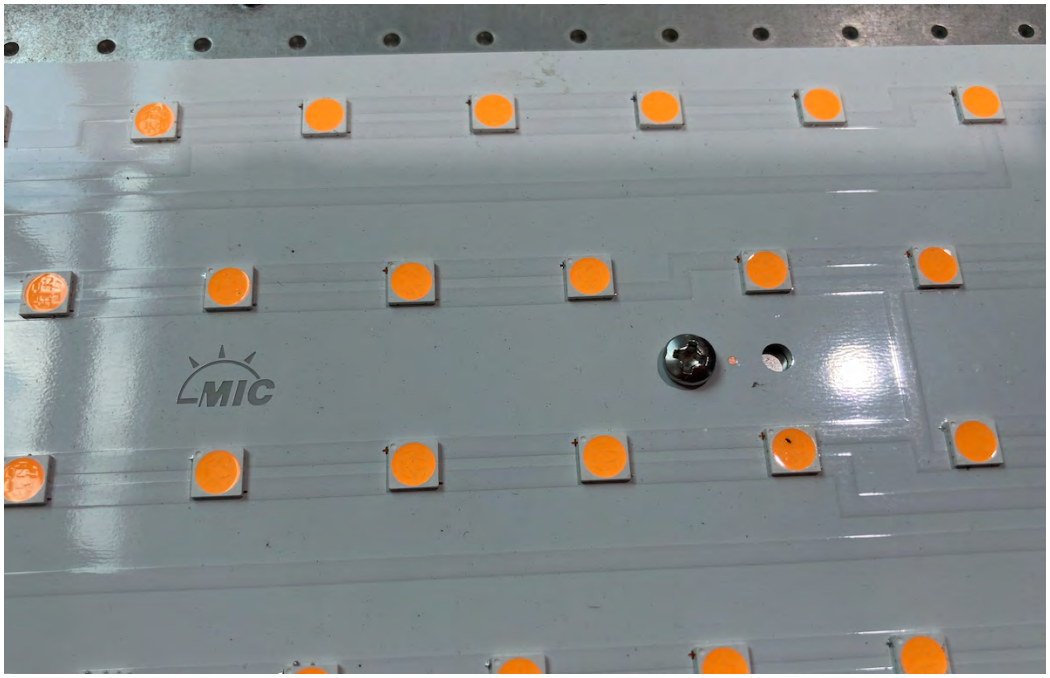

Figure 10.: Internal view of model MFL-G480

Photo document

Figure 11.: Internal view of model MFL-G480

TÜVRheinland®
Precisely Right.

Measurement Equipment List

Service Start Date 11.09.2024
Service End Date 19.09.2024

Cost Center 183
Deliverable/Report Number CN245GLT 001
AMEL ID 0180305003A00010

Client MIC Optoelectronic Co.,Ltd
Product LED Flood Light
Comment A003811618

Equip.	Description	Model	Manufacturer	Last Date DD.MM.YYYY	Due Date DD.MM.YYYY
G1809430	Digital power meter	WT210	YOKOGAWA	06.03.2024	06.03.2025
9038327	Digital display caliper	91511	SATA	25.09.2023	25.09.2024
G1809482	Impact hammer	F22.50	PTL	20.12.2023	20.12.2024
G1828658	Torque screw driver	RTD260CN	TOHNICHI	23.04.2024	23.04.2025

* No entry for devices that are not subject to regular calibration or require initial verification/calibration only.

where required, Signature: _____