

APPLICATION REPORT

On Behalf of

Tea-Energy China Limited

LED SLIM FLOODLIGHT

Model: FLD-XXX-YY-AA-BB, FLD-050-ND-NW-03(XXX-Stands for Power(050-50W), YY-Stands for Dimmability(ND-Not Dimmable, D-Dimmable), AA-Stands for color temperature (CW-Cool White, NW-Natural White, WW-Warm White), BB-Stands for Flow Code(00-99)).

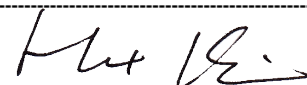
**Prepared For : Tea-Energy China Limited
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**Prepared By : Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of Test : October 03, 2014 – October 15, 2014

Date of Report : October 15, 2014

Report Number : LCS1412030150S

TEST REPORT**EN 60598-2-5****Luminaires****Part 2: Particular requirements****Section Five – Floodlights****Report reference No.**.....: LCS1412030150S**Tested by**(name + signature): Liberal Li**Approved by**(name +signature).....: Hart Qiu**Date of issue**: October 15, 2014**Contents**: 52 pages**Testing laboratory****Name**.....: Shenzhen LCS Compliance Testing Laboratory Ltd.**Address**: 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China**Testing location**: As above**Client****Name**: Tea-Energy China Limited**Address**: 4th Floor, 0100029 Building, Xiawei Industrial Zone, Xiahu Community, Guanlan Town, Longhua District, Shenzhen, China**Manufacturer****Name**.....: Tea-Energy China Limited**Address**.....: 4th Floor, 0100029 Building, Xiawei Industrial Zone, Xiahu Community, Guanlan Town, Longhua District, Shenzhen, China**Test specification****Standard**: EN 60598-2-5: 1998(see also EN 60598-1: 2008+ A11: 2009 & EN 62471: 2008 & EN 62031: 2008+A1: 2013 & EN 62493: 2010)**Test procedure**: Compliance with EN 60598-2-5: 1998(see also EN 60598-1: 2008+ A11: 2009 & EN 62471: 2008 & EN 62031: 2008+A1: 2013 & EN 62493: 2010)**Non-standard test method**: N/A**Test item Description**: LED SLIM FLOODLIGHT**Trade Mark**: QALEDO**Model and/or type reference**.....: FLD-XXX-YY-AA-BB, FLD-050-ND-NW-03(XXX-Stands for Power(050-50W), YY-Stands for Dimmability(ND-Not Dimmable, D-Dimmable), AA-Stands for color temperature(CW-Cool White, NW-Natural White, WW-Warm White), BB-Stands for Flow Code(00-99)).**Rating(s)**.....: 85V-265V~, 50/60Hz, 50W, IP65

Test item particulars

Classification of installation and use: Class I
 Supply Connection: Supply cord

Test case verdicts

Test case does not apply to the test object : N(N/A)
 Test item does meet the requirement: P(Pass)
 Test item does not meet the requirement ...: F(Fail)

Testing

Date of receipt of test item.....: October 05, 2014
 Date(s) of performance of test.....: October 05, 2014 – October 15, 2014

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item tested.

Clause numbers between brackets refer to clauses in IEC 60598-1 (EN 60598-1).

"(see remark #)" refers to a remark appended to the report.

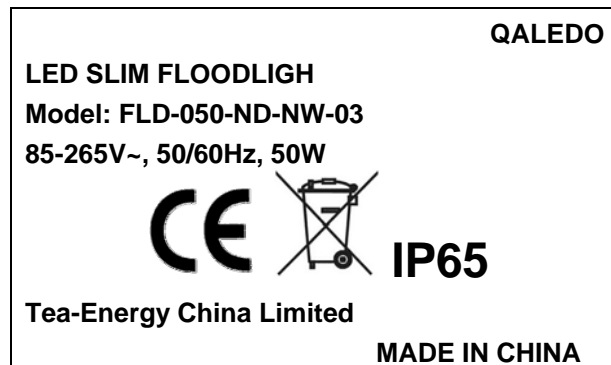
"(see Annex #)" refers to an annex appended to the report.

Throughout this report a comma is used as the decimal separator.

General product information

1. All models are similar except their model name and appearance and power. And all tests were conducted on FLD-050-ND-NW-03.
2. The laboratory ambient for testing: 24.0-26.0°C, 60%-73%R.H.
3. This report includes Attachment No. 1: Report of EN 62471.(The EN 62471 isn't include in CNAS.)
 Attachment No. 2: Report of EN 62031.
 Attachment 3: 2 pages of product photos.

Copy of marking plate:



Label testing:

Rubbing for 15 s with a piece of cloth soaked with water. And a further 15 s with a piece of cloth soaked with petroleum.

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict

5.2 (0)	GENERAL TEST REQUIREMENTS		P
5.2 (0.1)	Information for luminaires design considered	Yes [<input checked="" type="checkbox"/>] No [<input type="checkbox"/>]	P
5.2 (0.3)	More sections applicable	85-265V~	P

5.4 (2)	CLASSIFICATION		P
5.4 (2.2)	Type of protection	Class I	P
5.4 (2.3)	Degree of protection	IP65	P
5.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Fixed luminaire	P
	Luminaire not suitable for direct mounting on normally flammable surfaces	No	N
5.4 (2.5)	Luminaire for normal use	Yes	P
	Luminaire for rough service	No	N

5.5 (3)	MARKING		P
5.5 (3.2)	Markings on luminaires	See marking label	P
	Position of the marking	Bottom of the product	P
	Format of symbols/text	The height of symbols more than 5mm, text more than 2mm	P
5.5 (-)	Additional information		P
	Language of instructions	In English	P
	a) Operating position, if not universal.		N
	b) Weight and overall dimensions of the floodlight.		P
	c) Maximum projected area of the floodlight.		P
	d) Range of mounting heights.		P
	e) Suitability for use indoors.		N
5.5 (3.3.1)	Combination luminaires	Not combination luminaire	N
5.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
5.5 (3.3.3)	Operating temperature		N
5.5 (3.3.4)	Symbol or warning notice		N
5.5 (3.3.5)	Wiring diagram		N
5.5 (3.3.6)	Special conditions	No such special conditions	N
5.5 (3.3.7)	Metal halid lamp luminaire – warning		N
5.5 (3.3.8)	Limitation for semi-luminaires		N
5.5 (3.3.9)	Power factor and supply current		N
5.5 (3.3.10)	Suitability for use indoors		N

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
5.5 (3.3.11)	Luminaires with remote control	Not such construction	N
5.5 (3.3.12)	Clip-mounted luminaire - warning		N
5.5 (3.3.13)	Specifications of protective shields		N
5.5 (3.3.14)	Symbol for nature of supply	~	P
5.5 (3.3.15)	Rated current of socket outlet	No socket outlet	N
5.5 (3.3.16)	Rough service luminaire	Normal service luminaire	N
5.5 (3.3.17)	Mounting instruction for type Y, Type Z and some type X attachments	Type Y	P
5.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N
5.5 (3.3.19)	Protective conductor current in instruction if applicable		N
5.5 (3.3.20)	Provided with information if not intended to be mounted within arms reach		N
5.5 (3.4)	Test with water	15s	P
	Test with hexane	15s	P
	Legible after test	Still legible.	P
	Label attached	Still attached.	P

5.6 (4)	CONSTRUCTION		P
5.6 (4.2)	Components replaceable without difficulty		N
5.6 (4.3)	Wire ways smooth and free from sharp edges		P
5.6 (4.4)	Lamp holders	No lamp holder	N
5.6 (4.4.1)	Integral lamp holder		N
5.6 (4.4.2)	Wiring connection		N
5.6 (4.4.3)	Lamp holder for end-to-end mounting		N
5.6 (4.4.4)	Positioning		N
	- pressure test (N).....:		N
	After test the lamp holder comply with relevant standard sheets and show no damage		N
	After test on singal-capped lamp holder the lamp holder have not moved form its position and show no permanent deformation		N
	- bending test (N).....:		N
	After test the lamp holder have not moved from its position and show no permanent deformation		N
5.6 (4.4.5)	Peak pulse voltage	No ignitors	N
5.6 (4.4.6)	Centre contact	No ignitors	N
5.6 (4.4.7)	Parts in rough service luminaires resistant to tracking	Not for rough service	N

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
5.6 (4.4.8)	Lamp connectors	No lamp connector	N
5.6 (4.4.9)	Caps and bases correctly used		N
5.6 (4.5)	Starter holders	No starter holders	N
	Starter holder in luminaries other than Class II		N
	Starter holder Class II construction		N
5.6 (4.6)	Terminal blocks		N
	Tails		N
	Unsecured blocks		N
5.6 (4.7)	Terminals and supply connections		N
5.6 (4.7.1)	Contact to metal parts		N
5.6 (4.7.2)	Location stranded wires		N
	8 mm test live conductor		N
	8 mm test earth conductor		N
5.6 (4.7.3)	Terminals for supply conductors		N
5.6 (4.7.3.1)	Welded connections		N
	- stranded or solid conductor		N
	- spot welding		N
	- welding between wires		N
	- type Z attachment		N
	- mechanical test according to 15.8.2		N
	- electrical test according to 15.9		N
	- heat test according to 15.9.2.3 and 15.9.2.4		N
5.6 (4.7.4)	Terminals other than supply connection		N
5.6 (4.7.5)	Heat-resistant wiring/sleeves		P
5.6 (4.7.6)	Multi-pole plug		N
	- test at 30 N		N
5.6 (4.8)	Switches:	No switches	N
	- adequate rating		N
	- adequate fixing		N
	- polarized supply		N
	- Compliance with 61058-1 for electronic switches		N
5.6 (4.9)	Insulating lining and sleeves		P
5.6 (4.9.1)	Retainment		P
	Method of fixing.....:		N
5.6 (4.9.2)	Insulated linings and sleeves	Insulation sleeves	P

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	Resistant to temperature >20°C to the wire temperature or		N
	a) & c) Insulation resistance and electric strength	Comply with requirements	P
	b) Ageing test. Temperature (°C).....:		N
5.6 (4.10)	Insulation of Class II luminaires		N
5.6 (4.10.1)	No contact, mounting surface - accessible metal parts - wiring of basic insulation		N
	Safe installation fixed luminaires		N
	Capacitors and switches		N
	Interference suppression capacitors according to IEC 60384-14		N
5.6 (4.10.2)	Assembly gaps:	No such assembly gaps	N
	- not coincidental		N
	- no straight access with test probe		N
5.6 (4.10.3)	Retainment of insulation:		N
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
5.6 (4.11)	Electrical connections		P
5.6 (4.11.1)	Contact pressure	No pressure transmitted to the insulating material	N
5.6 (4.11.2)	Screws		P
	- Self-tapping screws		P
	- thread-cutting screws		N
5.6 (4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets	No rivet provided	N
5.6 (4.11.4)	Material of current-carrying parts	> 50% copper	P
5.6 (4.11.5)	No contact to wood or mounting surface	No wood	P
5.6 (4.11.6)	Electro-mechanical contact systems	No such construction	N
5.6 (4.12)	Mechanical connections and glands		P
5.6 (4.12.1)	Screw not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part	Fixed LED driver; 2.84mm, 0.4Nm	P
	Torque test: torque (Nm); part		N
	Torque test: torque (Nm); part		N

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
5.6 (4.12.2)	Screw with diameter < 3 mm screw into metal		P
5.6 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm)		N
	- lampholder; torque (Nm)		N
	- push-button switches; torque (Nm)	No such switches	N
5.6 (4.12.5)	Screwed glands; force (N)		N
5.6 (4.13)	Mechanical strength		P
5.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)	0.5Nm for glasses enclosure	P
	- other parts; energy (Nm)	0.7Nm for metal enclosure	P
	1) live parts	Inaccessible	P
	2) linings	No linings provided	P
	3) protection	Metal enclosure	P
	4) covers	No such covers	N
5.6 (4.13.2)	Metal parts enclosing live parts shall have adequate mechanical strength		P
5.6 (4.13.3)	Straight test finger	30N	P
5.6 (4.13.4)	Rough service luminaires	Normal service luminaires	P
	IP 54 or higher		N
	a) fixed		P
	b) hand-held		N
	c) delivered with a stand		N
	d) for temporary installations and suitable for mounting on a stand		N
5.6 (4.13.6)	Tumbling barrel		N
5.6 (4.14)	Suspensions and adjusting devices		P
5.6 (4.14.1)	Mechanical load:		P
	A) four times the weight		P
	B) torque 2.5 Nm		N
	C) bracket arm; force (N)		N
	D) load track-mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve; thickness (mm)		N
	metal rod; diameter (mm)		N
5.6 (4.14.2)	Load to flexible cables:		N
	mass (kg)		N
	stress in conductors (N/mm ²)		N
	Mass (kg) of semi-luminaires		N

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	Bending moment (Nm) of semi-luminaires :		N
5.6 (4.14.3)	Adjusting devices:		P
	- flexing test; number of cycles		N
	- strands broken		N
	- electric strength test afterwards		N
5.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors	No such tubes	N
5.6 (4.14.5)	Guide pulleys	No such construction	N
5.6 (4.14.6)	Strain on socket-outlets	Not such unit	N
5.6 (4.15)	Flammable materials:		P
	- glow-wire test 650°C		P
	- spacing ≥ 30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		N
	- thermal protection		N
	- electronic circuits exempted		N
5.6 (4.15.2)	Luminaires made of thermoplastic material		N
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
5.6 (4.16)	Luminaires for mounting on normally flammable surfaces		N
	No lamp control gear		N
5.6 (4.16.1)	Lamp control gear shall spacing:		P
	- spacing 10 mm		P
	- spacing 35 mm		N
5.6 (4.16.2)	Thermal protection:		N
	- in lamp control gear		N
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
5.6 (4.16.3)	Design to satisfy the test of 12.6		N
5.6 (4.17)	Drain holes	No drain holes	N
	Clearance at least 5 mm		N
5.6 (4.18)	Resistance to corrosion:		P
5.6 (4.18.1)	- rust-resistance	Painted with rust-resistance material	P

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
5.6 (4.18.2)	- season cracking in copper		N
5.6 (4.18.3)	- corrosion of aluminium	No aluminium used	N
5.6 (4.19)	Igniters compatible with ballast	No igniters used	N
5.6 (4.20)	Rough service vibration	Not such appliance	N
5.6 (4.21)	Protective shield		N
5.6 (4.21.1)	Shield fitted		N
	Shield of glass if tungsten halogen lamps		N
5.6 (4.21.2)	Particles from a shattering lamp not impair safety		N
5.6 (4.21.3)	No direct path		N
5.6 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment		N
5.6 (4.22)	Attachments to lamps	No such attachments	N
5.6 (4.23)	Semi-luminaires comply with Class II	Not such appliance	N
5.6 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)	No such appliance	N
5.6 (4.25)	No sharp point edges	No sharp points or edges	P
5.6 (4.26)	Short-circuit protection		N
5.6 (4.26.1)	Uninsulated accessible SELV parts		N
5.6 (4.26.2)	Short circuit test		N
5.6 (4.26.3)	Test chain according to figure 29		N
5.6.1(-)	Floodlights for use outdoors shall have protection against the ingress of moisture at least equivalent to IPX3.	IP65	P
5.6.2(-)	Lampholder brackets and lamp supports where used shall withstand normal usage throughout the life of the floodlight. They shall accept and retain lamps which are within the dimensional tolerances stated in the appropriate IEC publication where applicable, and locate the lamp or lamps in the designed relationship to the optical control devices in the floodlight.		N
5.6.3(-)	When provision is made for alternative sizes of lamps or light centre positions, the adjusting means shall be positive and firmly retained in the selected position.		N
5.6.4(-)	Refractors, reflectors or any other light controlling components shall be so marked or constructed that they can be fitted or replaced only in the correct relationship to the light source.		N
5.6.5(-)	The means for attaching the floodlight to its support shall be appropriate to the weight of the floodlight.	Mounting earth surface	N

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	For floodlights for use above ground level outdoors, the connection shall withstand wind speeds of 150 km/h on the projected surface of the floodlight assembly without undue deflection.		N
	Parts of floodlights for mounting heights 3 m or higher which are fixed other than with at least two devices,	<3m	N
5.6.6(-)	Where means for angular adjustment are provided, there shall be provision for positive locking after any such adjustments have been effected.		P
5.6.7(-)	Floodlights for use outdoors shall be resistant to the vibrations which may occur during normal use.		P
5.6.8(-)	Glass covers shall either consist of a glass that fractures into small pieces, or shall be provided with a guard of sufficiently small mesh or the use of a film-coated glass that retains glass fragments.		P

5.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V)	85-265V~	P
	Voltage form	Sinusoidal [<input checked="" type="checkbox"/>] Non-sinusoidal []	P
	PTI	< 600 [<input checked="" type="checkbox"/>] ≥ 600 []	P
	Impulse withstand category (normal category II) (category III annex U)	Category II	P
	Rated pulse voltage (kV)	<2.0kV	P
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)	cl>3.0mm, limit: 1.6mm cr>3.0mm, limit: 2.7mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm)	cl>3.6mm, limit: 1.6mm cr>4.2mm, limit: 2.7mm	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm)		N
	(4) Outer surface of cable where it is clamp and metal parts: cr (mm); cl (mm)		N
	(5)not used		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm)	cl>3.6mm, limit: 1.6mm cr>4.2mm, limit: 2.7mm	P

5.8 (7)	PROVISION FOR EARTHING		P
5.8 (7.2.1 + 7.2.3)	Accessible Metal parts		P
	metal parts in contact with supporting surface		P
	Resistance < 0.5Ω	0.05Ω	P
	Self-tapping screws used		P

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	Thread-forming screws		N
	Thread-forming screws used in a grove		N
	Earth marks contact first		P
5.8 (7.2.2 +7.2.3)	Earth continuity in joints etc.		P
5.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
5.8 (7.2.5)	Earth terminal integral part of Connector socket		N
5.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
5.8 (7.2.7)	Electrolytic Corrosion of the earth terminal	Ordinary luminaire.	P
5.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
5.8 (7.2.10)	Class II luminaire for looping-in		N
	Double or reinforced insulation to functional earth		N
5.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P
5.9 (14)	SCREW TERMINALS		--
	Separately approved: component list		N
	Part of the luminaire		N
5.9 (15)	SCREWLESS TERMINALS		--
	Separately approved: component list		N
	Part of the luminaire		N
5.10 (5)	EXTERNAL AND INTERNAL WIRING		P
5.10 (5.2)	Supply connection and external wiring		P
5.10 (5.2.1)	Means of connection.....:	Supply cord	P
5.10 (5.2.2)	Type of cable	H05VV-F	P
	Nominal cross-section area (mm ²)	3x1.0mm ²	P
	Cables equal to IEC 60227 and IEC 60245		N
5.10 (5.2.3)	Type of attachment, X ,Y or Z	Type Y	P
5.10 (5.2.5)	Type Z not connected to screws		N
5.10 (5.2.6)	Cable entries		P

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	- suitable for introduction		P
	- adequate degree of protection		P
5.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
5.10 (5.2.8)	Insulating bushings:		P
	- suitably fixed		P
	- material in bushings		P
	- material not likely to deteriorate		N
	- tubes or guard made of insulating material		N
5.10 (5.2.9)	Locking of screw bushings		N
5.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		N
	- insulating material or lining		N
5.10 (5.2.10.1)	Cord anchorage for type X attachment cord		N
	a) at least one part fixed		N
	b) types of cable		N
	c) no damaging of the cable		N
	d) whole cable can be mounted		N
	e) no touching of clamping screws		N
	f) metal screw not directly on cable		N
	g) replacement without special tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorage		N
5.10 (5.2.10.2)	Adequate cord anchorages for type Y and type Z attachments	Type Y	P
5.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N)	60N	P
	- torque test: torque (Nm)	0.25Nm	P
	- displacement ≤ 2 mm	0.9mm	P
	- no movement of conductors		P

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	- no damage of cable or cord		P
5.10 (5.2.11)	External wiring passing into luminaire		P
5.10 (5.2.12)	Looping-in terminals	Not looping-in appliance	N
5.10 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N
5.10 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
5.10 (5.2.16)	Appliance inlets (IEC 60320)	No appliance inlet	N
	Appliance couplers of class II type		N
5.10 (5.2.17)	No standardized in interconnecting cables assembled		P
5.10 (5.2.18)	Used plug in accordance with		N
	- IEC 60083		N
	- other standard		N
5.10 (5.3)	Internal wiring		P
5.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A).....:		N
	- temperatures:		N
	Green-yellow for earth only		P
5.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-Sectional area (mm ²)	>0.5 mm ²	P
	Insulation thickness	>0.6mm	P
	Extra insulation added where necessary		N
5.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limited device		N
	Adequate cross-section area and insulation thickness		N
5.10 (5.3.1.3)	Double or reinforced insulation for class II	Class I appliance.	N
5.10 (5.3.1.4)	Conductors without insulation		N
5.10 (5.3.1.5)	SELV current-carrying parts		P
5.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
5.10 (5.3.2)	Sharp edges etc.		N
	No moving parts of switches etc.		N
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		N
5.10 (5.3.3)	Insulating bushings		P
	- suitable fixed		P
	- material in bushings		P
	- material not likely to deteriorate		N
	- cables with protective sheath		N
5.10 (5.3.4)	Joints and Junctions effectively insulated		N
5.10 (5.3.5)	Strain on internal wiring		P
5.10 (5.3.6)	Wire carriers		N
5.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N

5.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
5.11 (8.2.1)	Live parts not accessible with standard test finger	After installed, live parts enclosed by earthed metal enclosure	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 and adjustable luminaires		N
	Basic insulated parts not accessible with ø50mm probe from outside, within arms reach, on wall-mounted luminaires		N
	Lamp and starholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under lamp or starter replacement		N
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high pressure discharge lamp		N
	Relevant warming according to 3.2.18 fitted to the luminaire		N

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Clause	Requirement - Test	Result - Remark	Verdict
5.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position	Fixed luminaire	N
5.11 (8.2.3 a)	Class II luminaire:	Class I luminaire	N
	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulated not accessible other than during starter or lamp replacement		N
	- glass protective shields not used as supplementary insulation		N
5.11 (8.2.3b)	BC lampholder of metal in class I luminaires shall be earthed		N
5.11 (8.2.3c)	Class III luminaires with expose SELV parts:	Class I luminaire	N
	Ordinary luminaire :		N
	- touch current		N
	- no-load voltage		N
	- other than ordinary luminaire:		N
	- nominal voltage		N
5.11 (8.2.4)	Portable luminaire:		N
	- protection independent of supporting surface		N
	- terminal block completely covered		N
5.11 (8.2.5)	Compliance with the standard test finger or relevant probe		N
5.11 (8.2.6)	Covers reliably secured	Cover not removable without tool	P
5.11 (8.2.7)	Discharging of capacitors >0.5 μ F		N
	Portable plug connected luminaire with capacitor		N
	Discharge device on or within capacitor		N
	Discharge device mounted separately		N
5.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
5.12 (12.3)	Endurance test:		P
	- mounting-position	In draught-proof enclosure	P
	- test temperature (°C)	35°C	P
	- total duration (h)	240hrs. Totally 10 cycles, each 24h, the first 6 cycles in normal operation, the 7th cycle in abnormal operation.	P
	- supply voltage: Un factor; calculated voltage (V)	265V X1.1	P

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	- lamp used	LED lamp	P
5.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
5.12 (12.4)	Thermal test (normal operation)	(see table 12.4)	P
5.12 (12.5)	Thermal test (abnormal operation)		P
	Short-circuit of starter contacts		N
	Lamps removed and not replaced		P
5.12 (12.6)	Thermal test (failed lamp control gear condition):		N
5.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		N
	- case of abnormal conditions		N
	- electronic ballast		N
	- measured winding temperature (°C): at 1.1 Un		N
	- measured mounting surface temperature (°C): at 1,1 Un		N
	- calculated mounting surface temperature(°C)		N
	- track-mounted luminaires		N
5.12 (12.6.2)	Temperature sensing control:		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- track-mounted luminaires		N
5.12 (12.7)	Thermal test (failed ballast or transformer in plastic luminaires):		N
5.12 (12.7.1)	Luminaire without temperature sensing control		N
5.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N
	Test method 12.7.1.1 or Annex V		N
	Test according to 12.7.1.1:		N
	- case of abnormal conditions		N
	- Ballast failure at supply voltage (V)		N
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
	Test according to Annex V:		N

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	- case of abnormal conditions		N
	- measured winding temperature (°C): at 1.1 Un..... :		N
	- measured temperature of fixing point/exposed part (°C): at 1.1Un..... :		N
	- calculated temperature of fixing point/exposed part (°C)		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N
	- part tested; temperature (°C)..... :		N
5.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N
	- case of abnormal conditions		N
	- measured winding temperature (°C): at 1.1 Un..... :		N
	- measured temperature of fixing point/exposed part (°C): at 1.1 Un..... :		N
	- calculated temperature of fixing point/exposed part (°C) :		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N
	- part tested; temperature (°C)..... :		N
5.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions		N
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
5.12 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- case of abnormal conditions		N
	-highest measured temperature of fixing point/exposed part (°C):..... :		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N
	- part tested; temperature (°C)..... :		N
5.12.1	When applying the limits in the tables 12-1 to 12-6 of section 12 of IEC 60598-1 to floodlights for use outdoors, 10 °C shall be deducted from the temperatures measured on the floodlight in the test enclosure to allow for the effects of natural air movement		P

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict

	which occur in the working environment of the floodlight.		
--	---	--	--

5.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
5.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP	IP65	P
	- mounting position during test		P
	- fixing screws tightened; torque (Nm)		P
	- tests according to clauses		P
	- electric strength		P
	a) no deposit in dust-proof luminaire		N
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N
	d) i) For luminaires without drain holes – no water entry		P
	d) ii) For luminaires with drain holes – no hazardous water entry		N
	e) no water in watertight luminaire		N
	f) no contact with live parts (IP 2X)		N
	f) no entry into enclosure (IP 3X and IP 4X)		N
	f) no contact with live parts (IP3X and IP4X)		N
	g) no trace of water on part of lamp requiring protection from splashing water		N
	h) no damage of protective shield or glass envelope		N
5.13 (9.3)	Humidity test 48h	Relative humidity 93%, temperature 25°C, 48h, followed by electric strength test	P

5.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
5.14 (10.2.1)	Insulation resistance test:		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø.....	Class I	P
	Insulation resistance:		P
	SELV:		N
	- between current-carrying parts of different polarity.....		N
	- between current-carrying parts and mounting surface		N
	- between current-carrying parts and metal		N

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Clause	Requirement - Test	Result - Remark	Verdict
	parts of the luminaire :		
	Other than SELV:		P
	- between live parts of different polarity :	> 100MΩ, Limited 2MΩ	P
	- between live parts and mounting surface :	> 100MΩ, Limited 2MΩ	P
	- between live parts and metal parts..... :	> 100MΩ, Limited 2MΩ	P
	- between live parts of different polarity through action of a switch :	No such switch	N
5.14 (10.2.2)	Electric strength test:		P
	Dummy lamp		N
	Luminaires with ignitors after 24 h test		N
	Luminaires with manual ignitors		N
	Test voltage (V):		P
	SELV:		N
	- between current-carrying parts of different polarity..... :		N
	- between current-carrying parts and mounting surface :		N
	- between current-carrying parts and metal parts of the luminaire :		N
	Other than SELV:		P
	- between live parts of different polarity :	1530Vac, 1min, No damage	P
	- between live parts and mounting surface :	1530Vac, 1min, No damage	P
	- between live parts and metal parts..... :	1530Vac, 1min, No damage	P
5.14 (10.3)	Touch current (mA) :	0.35mA<3.5mA	P
5.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
5.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C) :	Enclosure of LED driver, 125°C, 0.9mm, Limit: 2mm	P
	- part tested; temperature (°C) :		N
5.15 (13.3.1)	Needle flame test (10 s):		P
	- part tested :	Enclosure of LED driver, No burning	P
	- part tested :		N
5.15 (13.3.2)	Glow-wire test (650 °C):		P
	- part tested :	Enclosure of LED driver, No burning	P
	- part tested :		N
5.15 (13.4.2)	Tracking test: part tested :		N
1.5 (3)	CENELEC COMMON MODIFICATIONS (EN)		--

EN 60598-2-5			
Clause	Requirement - Test	Result - Remark	Verdict
	MARKING		--
1.5.(3.3.301)	Adequate warning on the package		—
1.10 (5)	EXTERNAL AND INTERNAL WIRING		—
1.10 (5.2.1)	Connecting leads		N
	- without a means for connection to the supply		N
	- terminal block specified		N
	- relevant information provided		N
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2,12 and 13.2 of Part 1		N
1.10 (5.2.2)	Cables equal to HD21 S2 or HD22 S2		N
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		N
(3.3)	DK: power supply cord with label		N
	IT: warning label on Class 0 luminaire		N
(4.5.1)	DK: socket-outlets		N
(5.2.1)	CY, DK, FI, SE, GB: type of plug		N
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		N
(4&5)	FR: Shuttered socket-outlets 10/16A		N
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N
(13.3.2)	FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public or 960°C for luminaires in emergency exits		N
ANNEX 5	EMF		P
	The tested product also complies to the requirements of EN 62493: 2010		--
	Limit.....0.85	Measured max.:.....0.14	P

Tables

ANNEX 1	Components					P
Object/part No.	Code	Manufacturer/trade mark	Type/model	Technical data	Standard	Mark(s) of conformity
Power cord	B	Shenzhen Tongyuan Industrial Co., Ltd.	H05VV-F	300V, 105°C 3X1.0 mm ²	DIN VDE 0281-5	VDE 101980
Internal wiring	B	Dongguan Liuquan Electrical Products Co., Ltd.	1330	18AWG, 105°C, 300V	UL 758	UL E327087
LED driver	B	Shenzhen Xiezheng Electronics Co., Ltd	XZ-CG60B	Input: 85-265V~, 50/60Hz, Output: DC30.6V, 1.49A	EN 61347-1 EN 61347-2-13	CE

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 authorized by the test house

C – Integrated component tested together with the appliance

D – Alternative component

ANNEX 2	Temperature measurements, thermal tests of Section 12		P
	Type reference	FLD-050-ND-NW-03	P
	Lamp used	LED lamp	P
	Lamp control gear used.....	--	P
	Mounting position of luminaire.....	Fixed mounted	P
	Supply wattage (W)	50.7W	P
	Supply current (A)	0.206A	P
	Calculated power factor.....	0.932	P
	Table: measured temperatures corrected for $t_a = 25^\circ\text{C}$:		P
	- abnormal operating mode.....		N
	- test 1: rated voltage.....		N
	- test 2: 1.06 times rated voltage or 1,05 times Rated wattage	1.06X265V normal operation	P
	- test 3: Load on wiring to socket-outlet, 1.06 times voltage or 1.05 times wattage	--	N
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage	1.1X265V	P
	Through wiring or looping-in wiring loaded by current of A during the test	--	N
Temperature(°C) of part	Clause 12.4 – normal		Clause 12.5 – abnormal

Tables

	Test 1	Test 2	Test 3	Limits(°C)	Test 4	Limit (°C)
Power cord	--	43.3	--	80	44.1	80
Internal wire	--	52.3	--	105	53.1	105
Surface 1m distance from lamp	--	57.6	--	90	60.4	90
Enclosure of LED driver	--	65.5	--	90	67.2	90
Ambient	--	25.2	--	--	25.1	--

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

ANNEX 4:	Screwless terminals		--
(15)	SCREWLESS TERMINALS		--
(15.2)	Type of terminal :		—
	Rated current (A) :		—

Tables

(15.3.1)	Material		N							
(15.3.2)	Clamping		N							
(15.3.3)	Stop		N							
(15.3.4)	Unprepared conductors		N							
(15.3.5)	Pressure on insulating material		N							
(15.3.6)	Clear connection method		N							
(15.3.7)	Clamping independently		N							
(15.3.8)	Fixed in position		N							
(15.3.10)	Conductor size		N							
	Type of conductor		N							
(15.5.1)	Terminals internal wiring		N							
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples)		N							
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples)		N							
	Insertion force not exceeding 50 N		N							
(15.5.2)	Permanent connections: pull-off test (20 N)		N							
(15.6)	Electrical tests		--							
	Voltage drop (mV) after 1 h (4 samples).... :		N							
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples) :		N							
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples)..... :		N							
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) :		N							
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) :		N							
(15.7)	Terminals external wiring		N							
	Terminal size and rating		N							
(15.8.1)	Pull test spring-type terminals (4 samples); pull (N)		N							
	Pull test pin or tab terminals (4 samples); pull (N)		N							
(15.9)	Contact resistance test		N							
	Voltage drop (mV) after 1 h		N							
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									

Tables

	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)										

Attachment No.1

TEST REPORT	
EN 62471	
Photobiological safety of lamps and lamp systems	
Report reference No..	See report EN 60598-2-5
Tested by(name + signature).....	See report EN 60598-2-5
Approved by(name + signature) ...	See report EN 60598-2-5
Date of issue	See report EN 60598-2-5
Contents.....	See report EN 60598-2-5
Testing laboratory	
Name	See report EN 60598-2-5
Address.....	See report EN 60598-2-5
Testing location	See report EN 60598-2-5
Client	
Name	See report EN 60598-2-5
Address	See report EN 60598-2-5
Manufacturer	
Name	See report EN 60598-2-5
Address	See report EN 60598-2-5
Test specification	
Standard.....	EN 62471: 2008
Test procedure	Compliance with EN 62471: 2008
Non-standard test method	N/A
Test item Description	See report EN 60598-2-5
Trademark	See report EN 60598-2-5
Model and/or type reference	See report EN 60598-2-5
Rating(s).....	See report EN 60598-2-5

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
1	SCOPE		P
	More sections applicable	Yes [✓] No []	—
4	EXPOSURE LIMITS		P
4.1	General		P
	The exposure limits in this standard apply to continuous sources where the exposure duration is not less than 0,01 ms and not more than any 8-hour period, and should be used as guides in the control of exposure. The values should not be regarded as precisely defined lines between safe and unsafe levels.		P
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds 104 cd•m ⁻² .	See clause 4.3	P
4.2	Specific factors involved in the determination and application of retinal exposure limits		N
4.2.1	Pupil diameter		P
4.2.2	Angular subtense of source and measurement field-of-view		P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye	LED light source	N
	The limits for exposure to ultraviolet radiation incident upon the unprotected skin or eye apply to exposure within any 8-hour period.		N
	To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broadband source, the effective integrated spectral irradiance, E_s , of the light source shall not exceed the levels defined by:		N
	$E_s \bullet t = \sum_{200}^{400} \sum_t E_{\lambda}(\lambda, t) \bullet S_{UV}(\lambda) \Delta t \bullet \Delta \lambda$ $J \bullet m^{-2}$		N
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		N
	$t_{max} = \frac{30}{E_s}$		N
4.3.2	Near-UV hazard exposure limit for the eye		N

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed 10000 Jm^{-2} for exposure times less than 1000 s. For exposure times greater than 1000 s (approximately 16 minutes) the UV-A irradiance for the unprotected eye, EUVA, shall not exceed 10 Wm^{-2} .		N
	$E_{\text{SUV}} \bullet t = \sum_{315}^{400} \sum_t E_{\lambda}(\lambda, t) \bullet \Delta t \bullet \Delta \lambda \leq 10000 \text{ Jm}^{-2} (t < 1000 \text{ s})$		N
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for times less than 1000 s, shall be computed by:		N
	$t_{\text{max}} \leq \frac{1000}{E_{\text{UVA}}} \text{ s}$		N
4.3.3	Retinal blue light hazard exposure limit		P
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, $B(\lambda)$, i.e., the blue light weighted radiance, LB, shall not exceed the levels defined by:		P
	$L_B \bullet t = \sum_{300}^{700} \sum_t L_{\lambda}(\lambda, t) \bullet B_{(\lambda)} \bullet \Delta t \bullet \Delta \lambda \leq 10^6 \text{ Jm}^{-2} \bullet \text{sr}^{-1}$	(for $t \leq 10^4 \text{ s}$)	N
	$L_B = \sum_{300}^{700} L_{\lambda} \bullet B_{(\lambda)} \bullet \Delta \lambda \leq 100 \text{ Wm}^{-2} \bullet \text{sr}^{-1}$	For $t > 10^4 \text{ s}$	P
4.3.4	Retinal blue light hazard exposure limit - small source		P
	Thus the spectral irradiance at the eye E_{λ} , weighted against the blue-light hazard function $B(\lambda)$ (see Table 4.2) shall not exceed the levels defined by:		N
	$E_B \bullet t = \sum_{300}^{700} \sum_t E_{\lambda}(\lambda, t) \bullet B(\lambda) \bullet \Delta t \bullet \Delta \lambda \leq 100$	(for $t \geq 100 \text{ s}$)	N
	$E_B = \sum_{300}^{700} E_{\lambda} \bullet B(\lambda) \bullet \Delta \lambda \leq 1$	For $t \leq 100 \text{ s}$	N
4.3.5	Retinal thermal hazard exposure limit		N

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, L_{λ} , weighted by the burn hazard weighting function $B(\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		N
	$L_R = \sum_{380}^{1400} L_{\lambda} \cdot B(\lambda) \cdot \Delta\lambda \leq \frac{50000}{\alpha \cdot t^{0.25}} \text{ J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	$10\text{us} \leq t \leq 10\text{s}$	N
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		P
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, L_{IR} , as viewed by the eye for exposure times greater than 10 s shall be limited to:		P
	$L_{IR} = \sum_{780}^{1400} L_{\lambda} \cdot B(\lambda) \cdot \Delta\lambda \leq \frac{6000}{\alpha} \text{ J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	$t > 10\text{s}$	P
4.3.7	Infrared radiation hazard exposure limits for the eye		N
	To avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, E_{IR} , over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		N
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 1800 \cdot t^{-0.75} \text{ W} \cdot \text{m}^{-2}$	$T \leq 1000\text{s}$	N
	For times greater than 1000 s the limit becomes:		N
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 100 \text{ W} \cdot \text{m}^{-2}$	$T > 1000\text{s}$	N
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		P
	$E_H \cdot t = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta\lambda \leq 20000 \cdot t^{0.25}$		P
5	MEASUREMENT OF LAMPS AND LAMP SYSTEMS		P
5.1	Measurement conditions		P

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning).....:		P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment.....:		P
	For specific test conditions, see the appropriate IEC lamp standard or in the absence of such standards, the appropriate national standards or manufacturer's recommendations.		P
5.1.3	Extraneous radiation.....:		N
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		P
5.1.4	Lamp operation.....:		P
	Operation of the test lamp shall be provided in accordance with:		P
	--the appropriate IEC lamp standard.		P
	--the lamp manufacturer's recommendation		P
5.1.5	Lamp system operation.....:		P
	The power source for operation of the test lamp shall be provided in accordance with		P
	--the appropriate IEC standard.		P
	-- the lamp manufacturer's recommendation		N
5.2	Measurement procedure		P
5.2.1	Irradiance measurements.....:		P
	minimum input aperture diameter of 7 mm		N
	maximum input aperture diameter of 50 mm		P
	The measurement shall be made in that position of the beam giving the maximum reading.		P
	The measurement instrument is adequate calibrated		P
5.2.2	Radiance measurements.....:		P
5.2.2.1	Standard method		P
	The measurement made with an optical system		P

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
	The instrument shall be calibrated to read in absolute incident radiant power per unit receiving area and per unit solid angle of acceptance averaged over the field of view (FOV) of the instrument.		P
5.2.2.2	Alternative method.....:		P
	Alternative to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements		
5.2.3	Measurement of source size.....:		P
	The determination of α , the angle subtended by a source, requires the determination of the 50% emission point of the source		P
5.2.4	Pulse width measurement for pulsed sources.....:		N
	The determination of Δt , the nominal pulse duration of a source, requires the determination of the time during which the emission is $> 50\%$ of its peak value.		N
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations.....:		P
	The standardized interpolated values, use linear interpolation on the log of given values to obtain intermediate point at the wavelength intervals desired.	See table 4.1	P
5.3.2	Calculations.....:		P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty.....:		P
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	See annex C	P
6	LAMP CLASSIFICATION		P
	For the purposes of this standard it was decided that the values shall be reported as follows:		N
	for lamps intended for general lighting service (GLS), the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm;		P

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
	for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm.		N
6.1	Continuous wave lamps	Class I Laser Product	P
6.1.1	Exempt group		P
	The exempt group are lamps, which does not pose any photobiological. This requirement is met by any lamp that does not pose		P
	--an actinic ultraviolet hazard (<i>Es</i>) within 8-hours exposure (30000 s), nor		N
	--a near-UV hazard (<i>EUVA</i>) within 1000 s, (about 16 min) nor		N
	--a retinal blue-light hazard (<i>LB</i>) within 10000 s (about 2,8 h), nor		P
	--a retinal thermal hazard (<i>LR</i>) within 10 s, nor		P
	--an infrared radiation hazard for the eye (<i>EIR</i>) within 1000 s.		N
6.1.2	Risk Group 1 (Low-Risk)		N
	In this group are lamps, which exceeds the limited for the except group but that does not pose:		N
	--an actinic ultraviolet hazard (<i>Es</i>) within 10000 s, nor		N
	--a near ultraviolet hazard (<i>EUVA</i>) within 300 s, nor		N
	--a retinal blue-light hazard (<i>LB</i>) within 100 s, nor		N
	--a retinal thermal hazard (<i>LR</i>) within 10 s, nor		N
	--an infrared radiation hazard for the eye (<i>EIR</i>) within 100 s.		N
	Lamps that emit infrared radiation without a strong visual stimulus (i.e., less than 10 $\text{cd}\cdot\text{m}^{-2}$) and do not pose a near-infrared retinal hazard (<i>LIR</i>), within 100 s are in Risk Group 1 (Low-Risk).		N
6.1.3	Risk Group 2 (Moderate-Risk)		N
	This requirement is met by any lamp that exceeds the limits for risk Group 1, but that does not pose:		N
	--an actinic ultraviolet hazard (<i>Es</i>) within 1000 s exposure, nor		N
	--a near ultraviolet hazard (<i>EUVA</i>) within 100 s, nor		N
	--a retinal blue-light hazard (<i>LB</i>) within 0,25 s (aversion response), nor		N
	--a retinal thermal hazard (<i>LR</i>) within 0,25 s (aversion response), nor		N
	--an infrared radiation hazard for the eye (<i>EIR</i>) within 10 s.		N

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
	Lamps that emit infrared radiation without a strong visual stimulus (i.e., less than $10 \text{ cd}\cdot\text{m}^{-2}$) and do not pose a near infrared retinal hazard (LIR) within 10 s are in Risk Group 2 (Moderate-Risk).		N
6.1.4	Risk Group 3 (High-Risk)		N
	Lamps which exceed the limits for Risk Group 2 (Moderate-Risk) are in Risk Group 3 (High-Risk).		N
6.2	Pulsed lamps		N
	Pulsed lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 second.		N
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer		N
	The risk group determination of the lamp being tested shall be made as follows:		N
	-- A lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk).		N
	-- For single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL shall be classified as belonging to the Exempt Group.		N
	-- For repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the Continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission.		N
ANNEX A	SUMMARY OF BIOLOGICAL EFFECTS		--
	Bioeffect datasheet #1: Infrared cataract		N
A.1	Bioeffect: INFRARED CATARACT also known as "industrial heat cataract", "furnaceman's cataract", or "glassblower's cataract".		N
A.1.1	Organ/Site: Eye/Crystalline Lens.		N
A.1.2	Spectral range: 700 nm to 1400 nm and possibly to 3000 nm.		N
A.1.3	Peak of action spectrum: Not known; probably between 900-1000 nm.		N
A.1.4	State of knowledge: Limited threshold data available for acute cataract for rabbit at 1064 nm (Wolbarsht, 1992) and IR-A region (Pitts and Cullen, 1981); no data for man. Degree of additivity and action spectrum unknown. Good epidemiological evidence (Lydahl, 1984).		N

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
A.1.5	Time course: Noticeable clouding of the lens generally following years of chronic high-level exposure, the elapsed time depending upon how much difference between exposure and threshold, heavy exposures producing reaction in shortest time.		N
A.1.6	Mechanism: Generally presumed to be thermal, although recent evidence suggests possible photochemical reaction - details not understood. The lens may be heated either from direct irradiation (Vogt, 1919) or by conductive heating from the heated iris (Goldman, 1983).		N
A.1.7	Symptoms: Clouding of vision.		N
A.1.8	Needed information: Action spectrum, if existent, for acute and for effects of concomitant ultraviolet radiation exposure; additivity of multiple exposures, and the possibility of delayed effects from recurrent exposures.		N
A.1.9	Experience with lamps: Accidental injury is not known, even from exposure to heat lamps. Limited population exposed.		N
A.1.10	Key references		N

	Bioeffect datasheet #2		--
A.2	Bioeffect		P
A.2.1	Organ/Site		P
A.2.2	Spectral range		P
A.2.3	Peak of action spectrum		P
A.2.4	State of knowledge		P
A.2.5	Time course		P
A.2.6	Mechanism		P
A.2.7	Symptoms		P
A.2.8	Needed information		P
A.2.9	Experience with lamps		P
A.2.10	Key references		P
	Bioeffect datasheet #3		--
A.3	Bioeffect		N
A.3.1	Organ/Site		N
A.3.2	Spectral range		N
A.3.3	Peak of action spectrum		N
A.3.4	State of knowledge		N

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
A.3.5	Time course		N
A.3.6	Mechanism		N
A.3.7	Symptoms		N
A.3.8	Needed information		N
A.3.9	Experience with lamps		N
A.3.10	Key references		N
	Bioeffect datasheet #4		--
A.4	Bioeffect		N
A.4.1	Organ/Site		N
A.4.2	Spectral range		N
A.4.3	Peak of action spectrum		N
A.4.4	State of knowledge		N
A.4.5	Time course		N
A.4.6	Mechanism		N
A.4.7	Symptoms		N
A.3.8	Needed information		N
A.4.9	Experience with lamps		N
A.4.10	Key references		N
	Bioeffect datasheet #5		--
A.5	Bioeffect		N
A.5.1	Organ/Site		N
A.5.2	Spectral range		N
A.5.3	Peak of action spectrum		N
A.5.4	State of knowledge		N
A.5.5	Time course		N
A.5.6	Mechanism		N
A.5.7	Symptoms		N
A.5.8	Needed information		N
A.5.9	Experience with lamps		N
A.5.10	Key references		N
ANNEX B	MEASUREMENT METHOD		N
B.1	Instrumentation		N
B.1.1	Double monochromator: Recommended instrument		N
B.1.2	Broadband detectors		N
B.2	Instrument limitations		N
B.2.1	Noise equivalent irradiance		N
B.2.2	Instrument spectral response		N

EN 62471			
Clause	Requirement - Test	Result - Remark	Verdict
B.2.3	Wavelength accuracy		N
B.2.4	Stray radiant power		N
B.2.5	Input optics for spectral irradiance measurements: Recommendation		N
B.2.6	Linearity		N
B.3	Calibration sources		N
ANNEX C	UNCERTAINTY ANALYSIS		P
ANNEX D	GENERAL REFERENCES		P
ANNEX ZA	Normative references to international publications with their corresponding European publications		N
ANNEX ZB	EXPOSURE LIMITS (EL'S)	See ANNEX ZB above	P

Tables

Table 4.1		Spectral weighting function for assessing ultraviolet hazards for skin and eye.		P
Wavelength ¹ λ , nm	UV hazard function SUV(λ)	Wavelength λ , nm	UV hazard function SUV(λ)	
200	0,030	313*	0,006	
205	0,051	315	0,003	
210	0,075	316	0,0024	
215	0,095	317	0,0020	
220	0,120	318	0,0016	
225	0,150	319	0,0012	
230	0,190	320	0,0010	
235	0,240	322	0,00067	
240	0,300	323	0,00054	
245	0,360	325	0,00050	
250	0,430	328	0,00044	
254*	0,500	330	0,00041	
255	0,520	333*	0,00037	
260	0,650	335	0,00034	
265	0,810	340	0,00028	
270	1,000	345	0,00024	
275	0,960	350	0,00020	
280	0,960	350	0,00020	
285	0,880	355	0,00016	
290	0,770	360	0,00013	
295	0,540	370	0,00009	
297*	0,460	375	0,000077	
300	0,300	380	0,000064	
303*	0,120	385	0,000053	
305	0,060	390	0,000044	
308	0,026	395	0,000036	
310	0,015	400	0,000030	
1 Wavelengths chosen are representative: other values should be obtained by logarithmic interpolation at intermediate wavelengths.				
* Emission lines of a mercury discharge spectrum.				

Tables

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources.		P
Wavelength nm	Blue-light hazard function $B(\lambda)$	Burn hazard function $R(\lambda)$	
300	0,01	--	
305	0,01	--	
310	0,01	--	
315	0,01	--	
320	0,01	--	
325	0,01	--	
330	0,01	--	
335	0,01	--	
340	0,01	--	
345	0,01	--	
350	0,01	--	
355	0,01	--	
360	0,01	--	
365	0,01	--	
370	0,01	--	
375	0,01	--	
380	0,01	0,1	
385	0,013	0,13	
390	0,025	0,25	
395	0,05	0,5	
400	0,10	1,0	
405	0,20	2,0	
410	0,40	4,0	
415	0,80	8,0	
420	0,90	9,0	
425	0,95	9,5	
430	0,98	9,8	
435	1,00	10,0	
440	1,00	10,0	
445	0,97	9,7	
450	0,94	9,4	
455	0,90	9,0	
460	0,80	8,0	
465	0,70	7,0	
470	0,62	6,2	
475	0,55	5,5	

Tables

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources.		P
480	0,45	4,5	
485	0,40	4,0	
490	0,22	2,2	
495	0,16	1,6	
500-600	$10^{[(450-\lambda)/50]}$	1,0	
600-700	0,001	1,0	
700-1050	--	$10^{[(700-\lambda)/500]}$	
1050-1150	--	0,2	
1150-1200	--	$0,2 \cdot 10^{0,02(1150-\lambda)}$	
1200-1400	--	0,02	

Table 5.4	Summary of the ELs for the surface of the skin or cornea (irradiance based values)				P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of constant irradiance $W \cdot m^{-2}$
Actinic UV skin & eye	$E_s = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	≤ 1000 > 1000	1,4 (80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	≤ 100 > 100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 – 3000	≤ 1000 > 1000	1,4 (80)	18000/t ^{0,75} 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2 sr	20000/t ^{0,75}

Table 5.5	Summary of the ELs for the retina (radiance based values)				P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in terms of constant irradiance $W \cdot m^{-2} \cdot sr^{-1}$
Blue light	$L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	0,25 – 10 10-100 100-10000 ≥ 10000	$0,011 \cdot \sqrt{(t/10)}$ 0,011 $0,0011 \cdot \sqrt{t}$ 0,1	106/t 106/t 106/t 100
Retinal thermal	$L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	380 – 1400	< 0,25 0,25 – 10	0,0017 $0,011 \cdot \sqrt{(t/10)}$	$50000/(\alpha \cdot t^{0,25})$ $50000/(\alpha \cdot t^{0,25})$
Retinal thermal (weak visual stimulus)	$L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	780 – 1400	> 10	0,011	6000/α

Tables

Table 6.6		Emission limits for risk groups of continuous wave lamps.				P
Risk	Action spectrum	Symbol	Emission limits			Units
			Exempt	Low risk	Mod risk	
Actinic UV	$S_{UV}(\lambda)$	E_S	0,001	0,003	0,03	$W \cdot m^{-2}$
Near UV		E_{UVA}	10	33	100	$W \cdot m^{-2}$
Blue light	$B(\lambda)$	L_B	100	10000	4000000	$W \cdot m^{-2} \cdot sr^{-1}$
Blue light, small source	$B(\lambda)$	E_B	1,0*	1,0	400	$W \cdot m^{-2}$
Retinal thermal	$R(\lambda)$	L_R	28000/ α	28000/ α	71000/ α	$W \cdot m^{-2} \cdot sr^{-1}$
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	6000/ α	6000/ α	6000/ α	$W \cdot m^{-2} \cdot sr^{-1}$
IR radiation, eye		E_{IR}	100	570	3200	$W \cdot m^{-2}$
<p>* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.</p> <p>** Involves evaluation of non-GLS source</p>						

Attachment No.2

TEST REPORT EN 62031 Lamp controlgear Part 1: General and safety requirements Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules	
Report reference No.	See report EN 60598-2-5
Tested by (name + signature)	See report EN 60598-2-5
Approved by (name + signature)	See report EN 60598-2-5
Date of issue	See report EN 60598-2-5
Contents	See report EN 60598-2-5
Testing laboratory	
Name	See report EN 60598-2-5
Address	See report EN 60598-2-5
Testing location	See report EN 60598-2-5
Client	
Name	See report EN 60598-2-5
Address	See report EN 60598-2-5
Manufacturer	
Name	See report EN 60598-2-5
Address	See report EN 60598-2-5
Test specification	
Standard	EN 62031: 2008+A1: 2013
Test procedure	Compliance with EN 62031: 2008+A1: 2013
Non-standard test method	N/A
Test item Description	
Trademark	See report EN 60598-2-5
Model and/or type reference	See report EN 60598-2-5
Rating(s)	DC30.6V, 1.49A

EN 62031			
Clause	Requirement - Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		---
4.1	Modules shall be so designed and constructed that in normal use (see manufacturer's instruction) they operate without danger to the user or surroundings:		P
4.2	For LED modules, all electrical measurements, unless otherwise specified, shall be carried out at voltage limits (min/max), current limits (min/max) or power limits (min/max) and minimum frequency, in a draught-free room at the temperature limits of the allowed range specified by the manufacturer. Unless the manufacturer indicates the most critical combination, all combinations (min/max) of voltage/current/power and temperature shall be tested.		P
4.3	For self-ballasted LED modules, the electrical measurements shall be carried out at the tolerance limit values of the marked supply voltage.		P
4.4	Integral modules not having their own enclosure shall be treated as integral components of luminaires as defined in IEC 60598-1, Clause 0.5. They shall be tested assembled in the luminaire, and as far as applicable with the present standard.		N
4.5	Independent modules shall comply, in addition to this standard, with the requirements of relevant clauses of IEC 60598-1, where these requirements are not already covered in this standard.		P
4.6	If the module is a factory sealed unit, it shall not be opened for any tests. In the case of doubt based on the inspection of the module and the examination of the circuit diagram, and in agreement with the manufacturer or responsible vendor, such specially prepared modules shall be submitted for testing so that a fault condition can be simulated.	Sealed	P
5	GENERAL TEST REQUIREMENTS		---
5.1	Tests according to this standard are type tests		P
5.2	Unless otherwise specified, the tests are carried out at an ambient temperature of 10°C to 30°C		P

EN 62031			
Clause	Requirement - Test	Result - Remark	Verdict
5.3	Unless otherwise specified, the type test is carried out on one sample consisting of one or more items submitted for the purpose of the type test.		P
5.4	If the light output has detectably changed, the module shall not be used for further tests.		P
5.5	For SELV-operated LED modules, the requirements of IEC 61347-2-13, Annex I, apply additionally.		N
6	CLASSIFICATION		---
	Independent		N
	Built-in		N
	Integral		P
7	MARKING		---
7.1	Mandatory marking for built-in or independent modules		N
	a) Mark of origin (trade mark, manufacturer's name or name of the responsible vendor/supplier).		N
	b) Model number or type reference of the manufacturer.		N
	c) Either the - If the LED module requires a stable voltage(s), the rated supply voltage or voltage range, both together with the supply frequency shall be marked. Marking of the rated supply current(s) is voluntary. - If the LED module requires a stable current, the rated supply current(s) or current range, both together with the supply frequency shall be marked. Marking of the rated supply voltage(s) is voluntary.	DC30.6V, 1.49A	N
	d) Nominal power.	50W	N
	e) Indication of position and purpose of the connections where it is necessary for safety. In case of connecting wires, a clear indication shall be given in a wiring diagram.		N
	f) Value of t_c . If this relates to a certain place on the LED module, this place shall be indicated or specified in the manufacturer's literature.		N
	g) For eye protection, see requirements of IEC 62471.	See EN 62471 report	N

EN 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	h) Built-in modules shall be marked in order to separate them from independent modules. The mark shall be located on the packaging or on the module itself.		N
	i) The heat transfer temperature t_d (if the LED module is provided with a cap enabling the insertion and the withdrawal without the use of tools and reliant on heat-conduction to the luminaire).		N
	k) Working voltage at which the insulation is designed.		N
7.2	Location of marking		---
	Items a), b), c) and f) of 7.1 shall be marked on the module.		P
	Items d), e), g), h), i) and j) shall be marked legible on the LED module or on the LED module data sheet. Item k) should be in the manufacturer's literature.		P
	For integral modules, no marking is required, but the information given in 7.1 a) to g) shall be provided in the technical literature of the manufacturer.		N
7.3	Durability and legibility of marking		P
	Rubbing 15 s water, 15 s petroleum; marking legible		P
8 (14)	SCREW TERMINALS		N
	Separately approved: component list	See annex 1	N
	Part of the luminaire	See annex 3	N
8 (15)	SCREWLESS TERMINALS and electrical connections		N
	Separately approved: component list	See annex 1	N
	Part of the luminaire	See annex 4	N

EN 62031			
Clause	Requirement - Test	Result - Remark	Verdict

9	PROVISION FOR EARTHING		P
	External metal parts connected to the earth terminal:	See report of EN 60598-2-5	P
	- compliance with 7.2.1 in EN 60598-1		P
	Test with a current of 10 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω): $< 0,5 \Omega$		P
	Protective earth, symbol		P
	Terminal complying with clause 8 in Part 1		P
	Locked against loosening and not possible to loosen by hand		P
	Not possible to loosen clamping means unintentionally on screwless terminals		P
	Earthing via means of fixing		N
	Earthing terminal only used for the earthing of the control gear		N
	All parts of material minimizing the danger of electrolytic corrosion		P

	Made of brass or equivalent material		P
	Contact surface bare metal		N
	Conductors by tracks on printed circuit boards:		N
	- a.c. current of 25 A for 1 min between earthing terminal and accessible metal parts		N
	- compliance with clause 7.2.1 in EN 60598-1		N

10	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		N
10.1	Ballast protected against accidental contact with live parts		N
A1	Current measured according to EN 60990, figure 4 and clause 7.1: max. 0,7 mA (peak) or 2,0 mA d.c., for $f \geq 1000$ Hz max. 70 mA		N
A2	Voltage at 50 k Ω (V): max. 34 V (peak)		N
	Lacquer or enamel not considered to be adequate protection		N
	Adequate mechanical strength on parts providing protection		N
10.2	Capacitors $> 0,5 \mu\text{F}$: voltage after 1 min (V): < 50 V		N

11	MOISTURE RESISTANCE AND INSULATION		P
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EN 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ): ≥ 2 MΩ	Refer to table 11	P
	The leakage current shall not exceed the values shown in figure 2 when measured in accordance with annex I	Refer to table 11	P

12	ELECTRIC STRENGTH		P
	Immediately after clause 11 electric strength test for 1 min	Refer to table 12	P
	Working voltage ≤ 50 V, test voltage 500 V	DC30.6V, 1.49A	P
	Working voltage > 50 V, test voltage (V): 2U + 1000 V		N
	Reinforced insulation, test voltage (V):		N
	No flashover or breakdown		P

13	Fault conditions		---
	Windings of ballasts shall have adequate thermal endurance	No such parts	N
13.1	General		N
	When operated under fault conditions the ballast: - does not emit flames or molten material	No such parts	N
	- does not produce flammable gases		N
	- protection against accidental contact not impaired		N
	Thermally protected ballasts does not exceed the marked temperature value	Not thermally protected ballasts	N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		N
	Short-circuit of creepage distances and clearances if less than specified in clause 18 (except between live parts and accessible metal parts)	Refer to table 14	N
	Short-circuit or interruption of semiconductor devices	Refer to table 14	N
	Short-circuit across insulation consisting of lacquer, enamel or textile	Refer to table 14	N
	Short-circuit across electrolytic capacitors	Refer to table 14	N
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite	No ignition	N
13.2	Overpower condition		N

EN 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	The test shall be started at an ambient temperature as specified in Annex A.		N
	The module shall be switched on and the power monitored (at the input side) The voltage or the current shall be increased until 150 % of the rated power is reached . The test shall be continued until the module is thermally stabilised. A stable condition is reached, if the temperature does not change by more than 5 K in 1 h. The temperature shall be measured in the tc point. The module shall withstand the overpower condition for at least 15 min, the time period of which can lie within the stabilisation period if the temperature change is ≤ 5 K.		N
	If the module contains an automatic protective device or circuit which limits the power, it is subjected to a 15 min operation at this limit. If the device or circuit effectively limits the power over this period, the module has passed the test, provided the compliance (4.1 and last paragraph of 13.2) is fulfilled.		N
	After finalising the overpower mode, the module is operated under normal conditions until thermally being stable.		N
	A module fails safe if no fire, smoke or flammable gas is produced and if the 15 min overpower condition has been withstood. To check whether molten material might present a safety hazard, a tissue paper, as specified in 4.187 of ISO 4046-4, spread below the module shall not ignite.		N

15	Construction		P
	Wood, cotton, silk, paper and similar fibrous material shall not be used as insulation.		P

16	Creepage distances and clearances		P
	Working voltage (V)	DC30.6V	P
	Voltage form	Sinusoidal [] Non-sinusoidal [$\sqrt{\quad}$]	P
	PTI	< 600 [$\sqrt{\quad}$] > 600 []	P
	Impulse withstand category (normal category II) (category III annex U)	Normal category II	P
	Rated pulse voltage (kV)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)	cl>2.0mm, limit: 0.2mm cr>2.0mm, limit: 1.2mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm)	cl>3.2mm, limit: 0.2mm cr>3.2mm, limit: 1.2mm	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm)		N
	(4) Outer surface of cable where it is clamp and metal parts: cr (mm); cl (mm)		N
	(5)not used		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm)	cl>3.2mm, limit: 0.2mm cr>3.2mm, limit: 1.2mm	P

17	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		P
17 (4.11)	Electrical connections		P
17(4.11.1)	Contact pressure	No pressure transmitted to the insulating material	P
17 (4.11.2)	Screws:		P
	- Self-tapping screws		P
	- thread-cutting screws		N
17 (4.11.3)	Screw locking:		P
	- spring washer		N
	- rivets	No rivet provided	N
17 (4.11.4)	Material of current-carrying parts	> 50% copper	P
17 (4.11.5)	No contact to wood or mounting surface	No wood	P
17 (4.11.6)	Electro-mechanical contact systems	No such construction	N
17 (4.12)	Mechanical connections and glands		N
17 (4.12.1)	Screw not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part	See report EN 60598-2-5	P
	Torque test: torque (Nm); part		N
17 (4.12.2)	Screw with diameter < 3 mm screw into metal		P
17 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm)		N
	- lampholder; torque (Nm)		N
	- push-button switches; torque (Nm)	No such switches	N
1.6 (4.12.5)	Screwed glands; force (N) :		N

18	RESISTANCE TO HEAT, FIRE AND TRACKING		---
18.1	Parts of insulating material retaining live parts in position, ball-pressure test:		N
	- part; test temperature (°C)		N
18.2	Printed boards in accordance with IEC 60249-1, 4.3		N

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Clause	Requirement - Test	Result - Remark	Verdict
18.3	External parts of insulating material preventing electric shock glow-wire test 650 °C		P
18.4	Parts of insulating material retaining live parts in position, needle-flame test 10 s:		N
	- flame extinguished within 30 s		N
	- no flaming drops igniting tissue paper		N
18.5	Tracking test	Ordinary	N
19	RESISTANCE TO CORROSION		---
	Rust protection:		P
	-10% solution of ammonium chloride in water		N
	- adequate varnish on the outer surface		P
20	Information for luminaire design		---
	Information is given in Annex D.		N
21	Heat management		---
21.1	General		N
	Clause 21 is applicable for exchangeable modules. It is not applicable for non-exchangeable modules. Exchangeability is safeguarded by means of a cap or base and a lampholder. Precondition is that a heat conducting thermal interface to the luminaire is needed for keeping the temperature below the rated maximum temperature t_c .		N
21.2	Heat-conducting foil and paste		N
	For the purpose of heat-transfer from the LED module to the luminaire, the use of a heatconducting foil can be necessary. Any heat-conducting foil shall be delivered within the LED module packaging.		N
21.3	Heat protection (under consideration)		N
	LED modules shall be equipped with a device that cuts the power off or reduces it when t_c is exceeded.		N
21.4	Construction		N
	The heat-conduction from the LED module to the luminaire, the electrical connection and the mechanical holding in the cap/holder system should be separate unless the contrary is proven safe (under consideration).		N

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Clause	Requirement - Test	Result - Remark	Verdict
Annex D	Information for luminaire design		--
D.1	General		N
	For safe operation of these LED modules, it is essential to observe the recommendations of this annex.		N
D.2	Design freedom		N
	A diagrammatic cross section of an LED module fixed by means of a lampholder to a luminaire with the locations for temperature measurements (t_a , t_c , t_d , t_j and t_l) and thermal resistances ($R_{th, module}$, $R_{th, luminaire}$ and $R_{th, ambient}$) is given with Figure D.1.		N
D.3	Testing in the luminaire		N
	The knowledge of t_d and P_d as provided by the LED module manufacturer, of the geometry and the surface properties of the cap and of the t_a of the luminaire to be designed, will allow for designing a luminaire that will most probably keep the t_c of the LED module. However, testing in the luminaire if the luminaires does so will still be necessary.		N

Tables

Table 11(a)		Humidity test				P
Test condition:		Temperature	Relative Humidity	Duration	Breakdown (Y/N)	
		25°C	93%	48 hours	N	
Test points			Measured insulation		Limited insulation	
Between	To					
+ & -	Enclosure		>100MΩ		1MΩ	

Table 11(b)		Touch current measurement (mA)				N
Condition		Normal		Reverse		
Model No.		ON	OFF	ON	OFF	

Table 12	Electric strength				P
Test points			Test voltage	Results	
Between	To				
+ & -	Enclosure		500V~	No breakdown	

Table 13		Tests of fault conditions				N
Part	Simulated fault	Test result			Hazard	

Table 16		Creepage distances and clearances						P
		Minimum distances for a.c. (50/60 Hz) sinusoidal voltages						P
RMS working voltage (V) not exceeding		50	150	250	500	750	1000	
1 minimum distances between live parts of different polarity. Specify the value measured.		>3.2	--	--	--	--	--	
2 minimum distances between live parts and accessible parts which are permanently fixed to the ballast, including screws or devices for fixing covers or fixing the ballast to its support. Specify the value measured.		>2.0	--	--	--	--	--	
- required creepage distances (mm), insulation PTI ≥ 600		0,6	1,4	1,7	3	4	5,5	
- required creepage distances (mm), insulation PTI < 600		1,2	1,6	2,5	5	8	10	
- required clearances (mm)		0,2	1,4	1,7	3	4	5,5	
3 minimum distances between live parts and a flat supporting surface or a loose metal cover, if any, if the construction does not ensure that the values under 2 above are maintained under the most unfavourable circumstances		--	--	--	--	--	--	
- required clearances (mm)		2	3,2	3,6	4,8	6	8	
		Minimum distances for non-sinusoidal pulse voltages						N
rated pulse voltage (peak kV)		2,0	2,5	3,0	4,0	5,0	6,0	8,0

Tables

required minimum distances, clearances (mm)	1,0	1,5	2	3	4	5,5	8
Specify the value measured							
rated pulse voltage (peak kV)	10	12	15	20	25	30	40
required minimum distances, clearances (mm)	11	14	18	25	33	40	60
Specify the value measured							
rated pulse voltage (peak kV)	50	60	80	100	-	-	-
required minimum distances, clearances (mm)	75	90	130	170	-	-	-
Specify the value measured							

ATTACHMENT 3

Photo Documentation

View:
Model:
FLD-050-ND-
NW-03

☒General
☐Front
☐Rear
☐Internal
☐Top
☐Bottom
☐PWB



Figure 1

View:

☐General
☐Front
☐Rear
☒Internal
☐Top
☐Bottom
☐PWB

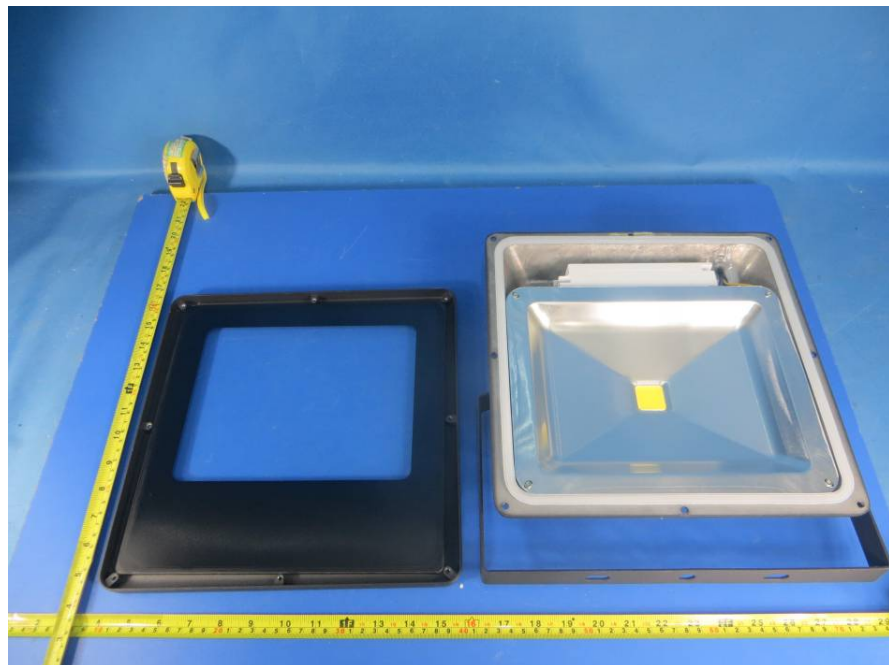


Figure 2

ATTACHMENT 3

Photo Documentation

View:

- ☐ General
- ☐ Front
- ☐ Rear
- ☒ Internal
- ☐ Top
- ☐ Bottom
- ☐ PWB

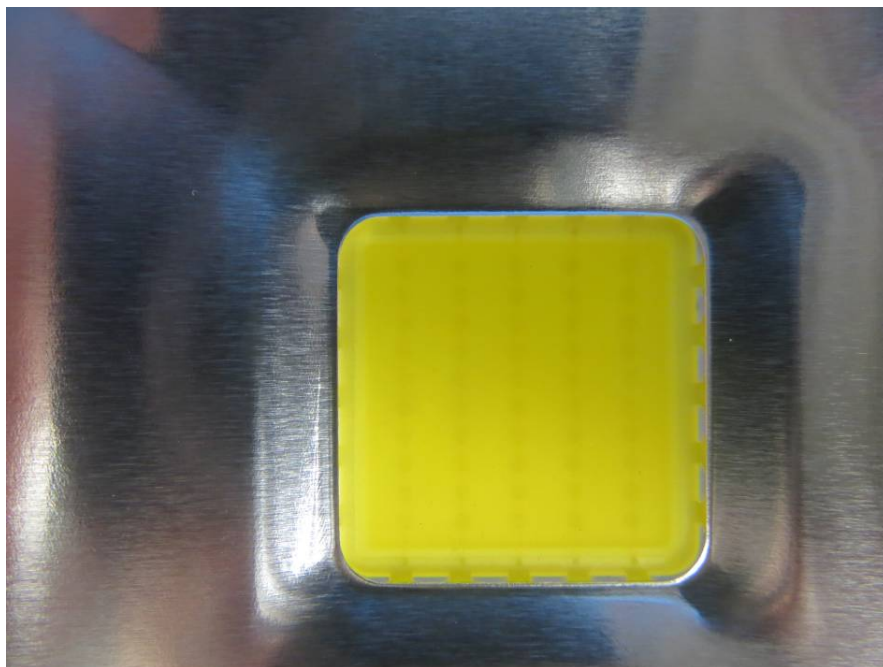


Figure 3