Ref. Certif. No.
DE 2-019777

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product Produit	LED downlight
Name and address of the applicant Nom et adresse du demandeur	SHENZHEN KING WATT OPTO-ELECTRONICS CO.,LTD. Bld A1,Zhongtai IT Park No. 2 of Dezheng Road,Shilongzai Block Shiyan Town,Bao´an District, Shenzhen, China
Name and address of the manufacturer Nom et adresse du fabricant	SHENZHEN KING WATT OPTO-ELECTRONICS CO.,LTD. Bld A1,Zhongtai IT Park No. 2 of Dezheng Road,Shilongzai Block Shiyan Town,Bao´an District, Shenzhen, China
Name and address of the factory Nom et adresse de l'usine Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la 2ème page	SHENZHEN KING WATT OPTO-ELECTRONICS CO.,LTD. Bld A1,Zhongtai IT Park No. 2 of Dezheng Road,Shilongzai Block Shiyan Town,Bao´an District, Shenzhen, China
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	AC 100-240V or AC 220-240V; 50/60Hz; IP20; Class II; ta:35°C For other ratings, see test report.
Trade mark (if any) Marque de fabrique (si elle existe)	KWT
Model/type Ref. Ref. de type	For model names, see test report.
Additional information (if necessary may also be reported on page 2) Les Information complémentaire (si nécessaire, peuvent être indiqués sur la 2ème page)	-see also test report ref. no. 17052937 001.
	PUBLICATION **EDITION**
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60598-1:2008 IEC 60598-2-2:2011 for national deviations see test report
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue une partie de ce Certificat	17052937 001

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification

TÜVRheinland®

TÜV Rheinland LGA Products GmbH
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Mail: cert-validity@de.tuv.com
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TÜV Rheinland LGA Products GmbH TÜVRheinland® Zertifizierungsstelle

Date: 07.01.2016 Signature: Dipl.-Ing. (FH) C. Nasca

10/061 12.09

TÜV Rheinland (China) Ltd.
Member of TÜV Rheinland Group

TÜVRheinland®
Precisely Right.

SHENZHEN KING WATT OPTO-ELECTRONICS CO.,LTD.

Bld A1,Zhongtai IT Park No. 2
of Dezheng Road, Shilongzai Block,
Shiyan Town, Bao´an District, Shenzhen,
China

Date : 2016-01-07
Our ref. : awa ZD
Your ref.: 0164046605

Ref : CB Certificate Germany

Type of Equipment: LED downlight
Model Designation: See Certificate
Certificate No. : DE 2-019777 01
Report No. : 17052937 001

Dear Ladies and Gentlemen,

Thank you very much for your interest in our services.

Please find enclosed your certification documents.

We appreciate your support and would like to offer our assistance in the approval of your future products though our extensive range of technical services. Please feel free to contact us whatever your requirements may be.

With kind regards,

Certification Body

Dipl.-Ing. (FH) C. Nasca

Enclosure

TÜV Rheinland (China) Ltd.
莱茵检测认证服务（中国）有限公司
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Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 60598-2-2
Luminaires
Part 2: Particular requirements:
Section Two – Recessed luminaires

Report Number.....:	17052937 001
Date of issue.....:	2015-01-06
Total number of pages	74
Applicant's name .....:	SHENZHN KING WATT OPTO-ELECTRONICS CO., LTD.
Address.....:	Bld A1, Zhongtai IT Park No.2 of Dezheng Road, Shilongzai Block, Shiyan Town, Bao'an District, Shenzhen, China
Test specification:	
Standard .....:	IEC 60598-2-2(ed.3):2011 used in conjunction with IEC 60598-1(ed.7):2008
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No. .....:	IEC60598_2_2C
Test Report Form(s) Originator....:	Intertek Semko AB
Master TRF .....:	2013-02

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description.....:	LED downlight
Trade Mark.....:	See marking plate
Manufacturer .....:	Same as applicant
Model/Type reference.....:	See model list
Ratings.....:	See model list

Testing procedure and testing location:	
☒ **CB Testing Laboratory:**	TÜV Rheinland (Shenzhen) Co., Ltd.
Testing location/ address ..... :	East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA
☐ **Associated CB Laboratory:**	
Testing location/ address ..... :	
Tested by (name + signature) ..... :	Archer Sun
Approved by (+ signature) ..... :	Winston Chen
☐ Testing procedure: TMP	
Testing location/ address ..... :	
Tested by (name + signature) ..... :	
Approved by (+ signature) ..... :	
☐ Testing procedure: WMT	
Testing location/ address ..... :	
Tested by (name + signature) ..... :	
Witnessed by (+ signature) ..... :	
Approved by (+ signature) ..... :	
☐ Testing procedure: SMT	
Testing location/ address ..... :	
Tested by (name + signature) ..... :	
Approved by (+ signature) ..... :	
Supervised by (+ signature) ..... :	

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

Attachment 1: 15 pages of photos.

Summary of testing:

Tests performed (name of test and test clause):

Besides full tests of IEC 60598-2-2:2011 used in conjunction with IEC 60598-1:2008, this report include:

-Annex 5: European group differences and national differences

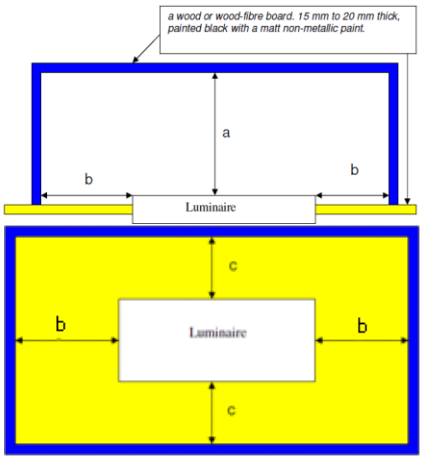
-Annex 6: Differences between IEC 60598-1:2008, and AS/NZS 60598.1:2013

-Annex 7: Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 69598.2.2:2001

-Annex 8: Test according to IEC/EN 62031+A1

-Annex 9: Tests of IEC/EN 62471

Remark 1:
During heating test, fix the luminaire to a ceiling, a box as following cover the luminaire, b=c=100cm, a=100 cm.



Remark 2:

DLC1070-A840, DLC0650-A850, DLC0638-A850, DLD0850C-850, DLD0845A-865, DLD0425-850 were performed the differences tests.

Testing location:

TÜV Rheinland (Shenzhen) Co., Ltd.

East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA

Summary of compliance with National Differences:

List of countries addressed: DE, AU

DE= Germany

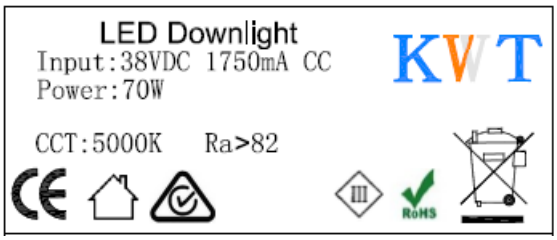
AU=Australia

NZ=New Zealand

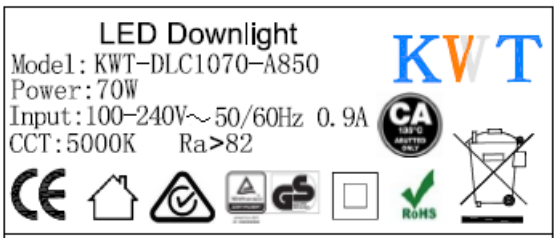
☒ The product fulfils the requirements of EN 60598-1:2008+A11:2009, EN 60598-2-2:2012, AS/NZS 60598.1:2013, AS/NZS 60598.2.2:2001.

Copy of marking plate

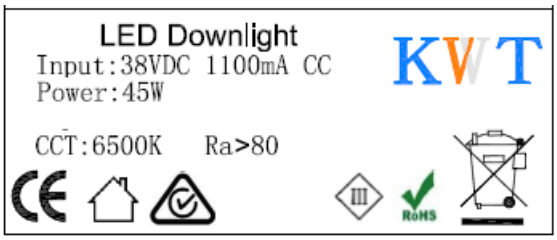
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



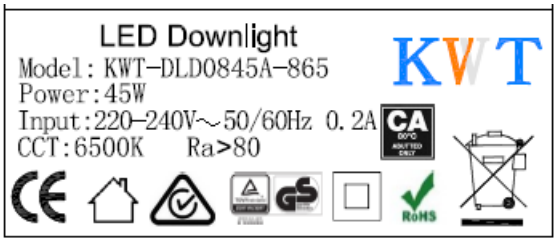
Label for downlight



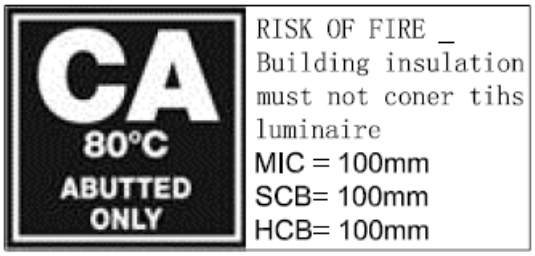
label for package



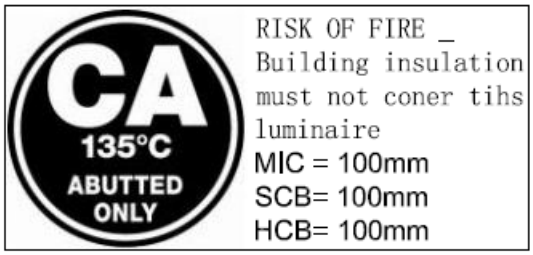
Label for downlight



label for package



Symbol for CA80



Symbol for CA135

Symbol for luminaires not suitable for covering with thermally insulating material

Cord tag for Australia or New Zealand market

Note: other models labels are the same design, except model name or symbol bearing.

Test item particulars ..... :	
Classification of installation and use ..... :	LED Recessed luminaires
Supply Connection ..... :	Power cords
..... :	
..... :	
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 ..... :	2015-10-08
Date (s) of performance of tests..... :	2015-10-08 to 2016-01-06

General remarks:

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 testing laboratory.
"(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.

Clause numbers between brackets refer to clauses in IEC 60598-1

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) ..... :	SHENZHEN KING WATT OPTO-ELECTRONICS CO., LTD. Bld A1, Zhongtai IT Park No.2 of Dezheng Road, Shilongzai Block, Shiyan Town, Bao'an District, Shenzhen, China

General product information:

1. LED downlight, Class II, ta=35°C, IP20, suitable for mounting on normal flammable surface, and not suitable to be covered with thermal resistance material.
2. For DLC series and DLD0835C-icct, DLD0850C-icct are classified CA 135 luminaire, others are CA 80 luminaires.
3. All models supplied by approved independent SELV LED driver.
4. All models can be painted with white, black or silver color.
5. All models are equipped with the same kind of LED chip, but CCT. is 2700K, 3000K, 3500K, 4000K, or 5000K.

Model list

Light Model	Rating	Rated Power(W)	Main part dimension	Cut dimension	LED Type
DLC0622-qicct	AC 220-240 V, 50/60Hz	22	Φ190×153	Φ175	CITIZEN COB
DLC0628-qicct		28			
DLC0638-qicct		38	Φ190×168		
DLC0650-qicct		50	Φ190×188		
DLC0660-qicct	AC 100-240 V, 50/60Hz	60	Φ190×208		
DLC0670-qicct		70			
DLC0822-qicct	AC 220-240 V, 50/60Hz	22	Φ230×157	Φ215	
DLC0828-qicct		28			
DLC0838-qicct		38	Φ230×172		
DLC0850-qicct		50	Φ230×192		
DLC0860-qicct	AC 100-240 V, 50/60Hz	60	Φ230×212		
DLC1022-qicct	AC 220-240 V, 50/60Hz	22	Φ280×188	Φ245	
DLC1028-qicct		28			
DLC1038-qicct		38	Φ280×203		
DLC1050-qicct		50	Φ280×223		
DLC1060-qicct	AC 100-240 V, 50/60Hz	60	Φ280×243		
DLC1070-qicct		70			
DLC1022-Dicct	AC 220-240 V, 50/60Hz	22	Φ280×160	Φ260	
DLC1028-Dicct		28			
DLC1038-Dicct		38	Φ280×175		
DLC1050-Dicct		50	Φ280×195		
DLC1060-Dicct	AC 100-240 V, 50/60Hz	60	Φ280×215		
DLC1070-Dicct		70			

Continued

DLD0416q-icct	AC 220-240 V, 50/60Hz	16	Φ145×92	Φ125	LM561B
DLD0420q-icct		20			
DLD0425q-icct		25			
DLD0415C-icct		15	Φ145×92		CITIZEN COB
DLD0420C-icct		20			
DLD0425C-icct		25			
DLD0618q-icct		18	Φ200×110	Φ175	LM561B
DLD0625q-icct		25			
DLD0632q-icct		32			
DLD0625C-icct		25			CITIZEN COB
DLD0635C-icct		35			
DLD0825q-icct		25	Φ230×118	Φ215	LM561B
DLD0832q-icct		32			
DLD0845q-icct		45			
DLD0825C-icct		25			CITIZEN COB
DLD0835C-icct		35			
DLD0850C-icct		50			

Remark:

q = A or B, means outline appearance. A means one reflector, B means double reflector.

i = 8 or 9, means LED chip color rendering index. 8 means ≥80, 9 means ≥90

cc=27, 30, 35, 40 or 50, means LED chip CCT., 27 means 2700K, 30 means 3000K, 35 means 3500K, 40 means 4000K and 50 means 5000K.

t = F, T, D or A, T means TRIAC dimming method, F means not suitable for dimmable, D means DALI dimming method, A means 1-10V dimming method

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.3 (0)	**GENERAL TEST REQUIREMENTS**		—
2.3 (0.1)	Information for luminaire design considered	Standard Yes ☒ No ☐	—
2.3 (0.3)	More sections applicable .....:	Yes ☐ No ☒	—
2.5 (2)	**CLASSIFICATION**		—
2.5 (2.2)	Type of protection ..... :	Class II	—
2.5 (2.3)	Degree of protection..... :	IP20	—
2.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces ..... :	Yes ☒ No ☐	—
2.5 (2.5)	Luminaire for normal use ..... :	Yes ☒ No ☐	—
	Luminaire for rough service ..... :	Yes ☐ No ☒	—
2.6 (3)	**MARKING**		—
2.6 (3.2)	Mandatory markings		P
	Position of the marking	On the enclosure	P
	Format of symbols/text	See marking plate	P
2.6 (3.3)	Additional information		P
	Language of instructions	English and German	P
2.6 (3.3.1)	Combination luminaires		N/A
2.6 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
2.6 (3.3.3)	Operating temperature		N/A
2.6 (3.3.4)	Symbol or warning notice		N/A
2.6 (3.3.5)	Wiring diagram		N/A
2.6 (3.3.6)	Special conditions		N/A
2.6 (3.3.7)	Metal halide lamp luminaire – warning		N/A
2.6 (3.3.8)	Limitation for semi-luminaires		N/A
2.6 (3.3.9)	Power factor and supply current		P
2.6 (3.3.10)	Suitability for use indoors		P
2.6 (3.3.11)	Luminaires with remote control		N/A
2.6 (3.3.12)	Clip-mounted luminaire – warning		N/A
2.6 (3.3.13)	Specifications of protective shields		N/A
2.6 (3.3.14)	Symbol for nature of supply	~	P
2.6 (3.3.15)	Rated current of socket outlet		N/A
2.6 (3.3.16)	Rough service luminaire		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.6 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Y	P
2.6 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
2.6 (3.3.19)	Protective conductor current in instruction if applicable		N/A
2.6 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
2.6 (3.4)	Test with water	Rubbing for 15 s	P
	Test with hexane	Rubbing for 15 s	P
	Legible after test		P
	Label attached		P
2.7 (4)	**CONSTRUCTION**		—
2.7 (4.2)	Components replaceable without difficulty		P
2.7 (4.3)	Wireways smooth and free from sharp edges		P
2.7 (4.4)	Lampholders		—
2.7 (4.4.1)	Integral lampholder	Integral LED module	N/A
2.7 (4.4.2)	Wiring connection		N/A
2.7 (4.4.3)	Lampholder for end-to-end mounting		N/A
2.7 (4.4.4)	Positioning		N/A
	- pressure test (N) .....:		N/A
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) .....:		N/A
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
2.7 (4.4.5)	Peak pulse voltage		N/A
2.7 (4.4.6)	Centre contact		N/A
2.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
2.7 (4.4.8)	Lamp connectors		N/A
2.7 (4.4.9)	Caps and bases correctly used		N/A
2.7 (4.5)	Starter holders		—
	Starter holder in luminaires other than class II		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Starter holder class II construction		N/A
2.7 (4.6)	Terminal blocks		—
	Tails		N/A
	Unsecured blocks		N/A
2.7 (4.7)	Terminals and supply connections		—
2.7 (4.7.1)	Contact to metal parts		N/A
2.7 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
2.7 (4.7.3)	Terminals for supply conductors		N/A
2.7 (4.7.3.1)	Welded connections:		—
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		N/A
	- electrical test according to 15.9		N/A
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
2.7 (4.7.4)	Terminals other than supply connection	Screwless or soldered connection	P
2.7 (4.7.5)	Heat-resistant wiring/sleeves		N/A
2.7 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
2.7 (4.8)	Switches:		—
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with 61058-1 for electronic switches		N/A
2.7 (4.9)	Insulating lining and sleeves		—
2.7 (4.9.1)	Retainement		P
	Method of fixing ..... :	Form a part of luminaire	P
2.7 (4.9.2)	Insulated linings and sleeves		—
	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

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.7 (4.10)	Insulation of Class II luminaires		—
2.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
2.7 (4.10.2)	Assembly gaps:		—
	- not coincidental		P
	- no straight access with test probe		P
2.7 (4.10.3)	Retainment of insulation:		—
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
2.7 (4.11)	Electrical connections		—
2.7 (4.11.1)	Contact pressure		P
2.7 (4.11.2)	Screws:		—
	- self-tapping screws		P
	- thread-cutting screws		N/A
2.7 (4.11.3)	Screw locking:		—
	- spring washer		N/A
	- rivets		N/A
2.7 (4.11.4)	Material of current-carrying parts		P
2.7 (4.11.5)	No contact to wood or mounting surface		P
2.7 (4.11.6)	Electro-mechanical contact systems	For connector	P
2.7 (4.12)	Mechanical connections and glands		—
2.7 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :	0,5Nm for anchorage screw	P
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
2.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
2.7 (4.12.4)	Locked connections:		—
	- fixed arms; torque (Nm)..... :		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm..... :		N/A
2.7 (4.12.5)	Screwed glands; force (Nm) ..... :		N/A
2.7 (4.13)	Mechanical strength		—
2.7 (4.13.1)	Impact tests:		—
	- fragile parts; energy (Nm)..... :		N/A
	- other parts; energy (Nm) ..... :	0,35Nm	P
	1) live parts		P
	2) linings		P
	3) protection		P
	4) covers		P
2.7 (4.13.3)	Straight test finger		P
2.7 (4.13.4)	Rough service luminaires		—
	- 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
2.7 (4.13.6)	Tumbling barrel		N/A
2.7 (4.14)	Suspensions and adjusting devices		—
2.7 (4.14.1)	Mechanical load:		P
	A) four times the weight	Max. 1,74Kg x 4=6,94 Kg	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
2.7 (4.14.2)	Load to flexible cables		—
	Mass (kg) ..... :		N/A
	Stress in conductors (N/mm²) ..... :		N/A
	Mass (kg) of semi-luminaire ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Bending moment (Nm) of semi-luminaire .....:		N/A
2.7 (4.14.3)	Adjusting devices:		—
	- flexing test; number of cycles .....:	150 times	P
	- strands broken		P
	- electric strength test afterwards		P
2.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
2.7 (4.14.5)	Guide pulleys		N/A
2.7 (4.14.6)	Strain on socket-outlets		N/A
2.7 (4.15)	Flammable materials:		—
	- glow-wire test 650 °C		N/A
	- spacing ≥ 30 mm		N/A
	- 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		P
2.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		—
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
2.7 (4.16)	Luminaires for mounting on normally flammable surfaces		—
	No lamp control gear	(compliance with Section 12)	N/A
2.7 (4.16.1)	Lamp control gear spacing:		—
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
2.7 (4.16.2)	Thermal protection:		—
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
2.7 (4.16.3)	Design to satisfy the test of 12.6	(see 12.6)	N/A
2.7 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.7 (4.18)	Resistance to corrosion:		—
2.7 (4.18.1)	- rust-resistance		N/A
2.7 (4.18.2)	- season cracking in copper		N/A
2.7 (4.18.3)	- corrosion of aluminium		N/A
2.7 (4.19)	Ignitors compatible with ballast		N/A
2.7 (4.20)	Rough service vibration		N/A
2.7 (4.21)	Protective shield:		—
2.7 (4.21.1)	Shield fitted		N/A
	Shield of glass if tungsten halogen lamps		N/A
2.7 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
2.7 (4.21.3)	No direct path		N/A
2.7 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
2.7 (4.22)	Attachments to lamps		N/A
2.7 (4.23)	Semi-luminaires comply Class II		N/A
2.7 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)		N/A
2.7 (4.25)	No sharp point or edges		P
2.7 (4.26)	Short-circuit protection:		—
2.7 (4.26.1)	Uninsulated accessible SELV parts		N/A
2.7 (4.26.2)	Short-circuit test		N/A
2.7 (4.26.3)	Test chain according to Figure 29		N/A
2.7 (4.27)	Terminal blocks with integrated screwless earthing contacts tested according Annex V		—
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A

2.8 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		—
	Working voltage (V) ..... :	100-240VAC or 220-240VAC	—
	Voltage form	Sinusoidal ☒ Non-sinusoidal ☐	—
	PTI	< 600 ☒ ≥ 600 ☐	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II ☒ Category III ☐	—
	Rated pulse voltage (kV) ..... :	2,5kV	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) ..... :	Approved LED driver used	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) ..... :	Approved LED driver used	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm) ..... :		N/A
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm)..... :		N/A
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) ..... :	Approved LED driver used	P
2.9 (7)	**PROVISION FOR EARTHING**		—
2.9 (7.2.1 + 7.2.3)	Accessible metal parts		N/A
	Metal parts in contact with supporting surface		N/A
	Resistance < 0,5 Ω ..... :		N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Earth makes contact first		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
2.9 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		N/A
2.9 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
2.9 (7.2.5)	Earth terminal integral part of connector socket		N/A
2.9 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
2.9 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
2.9 (7.2.8)	Material of earth terminal		N/A
	Contact surface bare metal		N/A
2.9 (7.2.10)	Class II luminaire for looping-in		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Double or reinforced insulation to functional earth		N/A
2.9 (7.2.11)	Earthing core coloured green-yellow		N/A
	Length of earth conductor		N/A
2.10 (14)	**SCREW TERMINALS**		—
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 3)	N/A
2.10 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		—
	Separately approved; component list	(see Annex 1)	P
	Part of the luminaire	Screwless or soldered connection	P
2.11 (5)	**EXTERNAL AND INTERNAL WIRING**		—
2.11 (5.2)	Supply connection and external wiring		
2.11 (5.2.1)	Means of connection.....:	Power cord	P
2.11 (5.2.2)	Type of cable .....:	H03VVH2-F	P
	Nominal cross-sectional area (mm²).....:	3 × 0,75mm2	P
	Cables equal to IEC 60227 or IEC 60245	IEC 60227	P
2.11 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
2.11 (5.2.5)	Type Z not connected to screws		N/A
2.11 (5.2.6)	Cable entries:		—
	- suitable for introduction		P
	- adequate degree of protection		P
2.11 (5.2.7)	Cable entries through rigid material have rounded edges		P
2.11 (5.2.8)	Insulating bushings:		—
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
2.11 (5.2.9)	Locking of screwed bushings		N/A
2.11 (5.2.10)	Cord anchorage:		—
	- covering protected from abrasion		P
	- clear how to be effective		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
2.11 (5.2.10.1)	Cord anchorage for type X attachment:		—
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
2.11 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
2.11 (5.2.10.3)	Tests:		—
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) ..... :	60N	P
	- torque test: torque (Nm) ..... :	0,25Nm	P
	- displacement ≤ 2 mm	1,1mm	P
	- no movement of conductors		P
	- no damage of cable or cord		P
2.11 (5.2.11)	External wiring passing into luminaire		P
2.11 (5.2.12)	Looping-in terminals		N/A
2.11 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
2.11 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
2.11 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
2.11 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
2.11 (5.2.18)	Used plug in accordance with		—
	- IEC 60083		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- other standard		N/A
2.11 (5.3)	Internal wiring		—
2.11 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		—
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A) ..... :		N/A
	- temperatures ..... :	(see Annex 2)	N/A
	Green-yellow for earth only		N/A
2.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		—
	Cross-sectional area (mm²) ..... :		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
2.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		—
	Adequate cross-sectional area and insulation thickness		P
2.11 (5.3.1.3)	Double or reinforced insulation for class II		N/A
2.11 (5.3.1.4)	Conductors without insulation		N/A
2.11 (5.3.1.5)	SELV current-carrying parts		N/A
2.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
2.11 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		N/A
2.11 (5.3.3)	Insulating bushings:		—
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
2.11 (5.3.4)	Joints and junctions effectively insulated		N/A
2.11 (5.3.5)	Strain on internal wiring		P
2.11 (5.3.6)	Wire carriers		N/A
2.11 (5.3.7)	Wire ends not tinned		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Wire ends tinned: no cold flow		N/A
2.12 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		—
2.12 (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 and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, within arm's reach, on wall-mounted luminaires		N/A
	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		N/A
	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
2.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
2.12 (8.2.3.a)	Class II luminaire:		—
	- 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
2.12 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
2.12 (8.2.3.c)	Class III luminaires with exposed SELV parts:		—
	Ordinary luminaire:		—
	- touch current ..... :		N/A
	- no-load voltage ..... :		N/A
	Other than ordinary luminaire:		—
	- nominal voltage ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.12 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
2.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
2.12 (8.2.6)	Covers reliably secured		P
2.12 (8.2.7)	Discharging of capacitors ≥ 0,5 μF	<0,5 μF	N/A
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A
2.13 (12)	**ENDURANCE TEST AND THERMAL TEST**		—
2.13 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 2.14		—
2.13 (12.3)	Endurance test:		—
	- mounting-position ..... :	In the black testing box	—
	- test temperature (°C) ..... :	45°C	—
	- total duration (h) ..... :	240 h	—
	- supply voltage: Un factor; calculated voltage (V):	253 V	—
	- lamp used ..... :	Integrated LED module	—
2.13 (12.3.2)	After endurance test:		—
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
2.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
2.13 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
2.13 (12.6)	Thermal test (failed lamp control gear condition):		—
2.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions..... :		—
	- electronic lamp control gear		
	- measured winding temperature (°C): at 1,1 Un . :		—
	- measured mounting surface temperature (°C) at 1,1 Un ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- calculated mounting surface temperature (°C) .. :		N/A
	- track-mounted luminaires		N/A
2.13 (12.6.2)	Temperature sensing control		—
	- case of abnormal conditions..... :		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C)... :		N/A
	- track-mounted luminaires		N/A
2.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		—
2.13 (12.7.1)	Luminaire without temperature sensing control		—
2.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		—
	Test method 12.7.1.1 or Annex W ..... :		—
	Test according to 12.7.1.1:		—
	- case of abnormal conditions		—
	- Ballast failure at supply voltage (V) ..... :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		—
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un.. :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... :		—
	- calculated temperature of fixing point/exposed part (°C) ..... :		—
	Ball-pressure test:		—
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
2.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		—
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un.. :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- calculated temperature of fixing point/exposed part (°C) ..... :		—
	Ball-pressure test:		—
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
2.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
2.13 (12.7.2)	Luminaire with temperature sensing control		—
	- thermal link	Yes ☐ No ☐	—
	- manual reset cut-out	Yes ☐ No ☐	—
	- auto reset cut-out	Yes ☐ No ☐	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part (°C):..... :		—
	Ball-pressure test:		—
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
2.13.1 (-)	Wiring, for connection to the supply, not reach unsafe temperature		—
	- measured temperature of the cable (°C) ..... :	Max. 41,6°C	P

2.14 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		—
2.14 (-)	If IP > IP 20 the order of the test specified in clause 2.13		—
2.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		—
	- classification according to IP ..... :	IP20	—
	- mounting position during test ..... :	In the black testing box	—
	- fixing screws tightened; torque (Nm)..... :		—
	- tests according to clauses ..... :	Cl.9.2.0	—
	- electric strength test afterwards		N/A
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	d) i) For luminaires without drain holes – no water entry		N/A
	d) ii) For luminaires with drain holes – no hazardous water entry		N/A
	e) no water in watertight luminaire		N/A
	f) no contact with live parts (IP 2X)		P
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A
	g) no trace of water on part of lamp requiring protection from splashing water		N/A
	h) no damage of protective shield or glass envelope		N/A
2.14 (9.3)	Humidity test 48 h	25ºC, RH.: 93%	P
2.15 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		—
2.15 (10.2.1)	Insulation resistance test		—
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....:		—
	Insulation resistance (MΩ)		—
	SELV:		—
	- between current-carrying parts of different polarity .....:		N/A
	- between current-carrying parts and mounting surface .....:	Min. 100 MΩ> 1 MΩ	P
	- between current-carrying parts and metal parts of the luminaire .....:	Min. 100 MΩ> 1 MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....:	Min. 100 MΩ> 1 MΩ	P
	- Insulation bushings as described in Section 5 ..:		N/A
	Other than SELV:		—
	- between live parts of different polarity.....:	Min. 100 MΩ> 2 MΩ	P
	- between live parts and mounting surface.....:	Min. 100 MΩ> 2 MΩ	P
	- between live parts and metal parts.....:	Min. 100 MΩ> 2 MΩ	P
	- between live parts of different polarity through action of a switch .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts ..... :		N/A
	- Insulation bushings as described in Section 5 .. :		N/A
2.15 (10.2.2)	Electric strength test		—
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V):		N/A
	SELV:		—
	- between current-carrying parts of different polarity ..... :		N/A
	- between current-carrying parts and mounting surface ..... :	500V	P
	- between current-carrying parts and metal parts of the luminaire ..... :	500V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts ..... :	500V	P
	- Insulation bushings as described in Section 5 .. :		N/A
	Other than SELV:		—
	- between live parts of different polarity..... :	Approved LED driver used	P
	- between live parts and mounting surface..... :	2920V	P
	- between live parts and metal parts..... :	2920V	P
	- between live parts of different polarity through action of a switch ..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts ..... :		N/A
	- Insulation bushings as described in Section 5 .. :		N/A
2.15 (10.3)	Touch current or protective conductor current (mA) ..... :	Touch current: Max.0,012 mA < 0,7 mA	P

2.16 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		—
2.16 (13.2.1)	Ball-pressure test:		
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
2.16 (13.3.1)	Needle flame test (10 s):		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- part tested.....:		N/A
	- part tested.....:		N/A
2.16 (13.3.2)	Glow-wire test (650°C):		—
	- part tested.....:	LED cover: no flame, no drop	P
	- part tested.....:	connector: no flame, no drop	P
2.16 (13.4.1)	Tracking test:		—
	- part tested.....:		N/A
	- part tested.....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 1: components	

object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Power cable for LED driver	B	Top Resources	H03VVH2-F	2×0,75mm^2	DIN VDE 0281-5	VDE 096273
Alternative	D	Guangdong KaiHua Electric Appliance Co., Ltd,	H03VVH2-F	2×0,75mm^2	--	VDE 40001903
Alternative	D	Guangdong KaiHua Electric Appliance Co., Ltd,	H03VVH2-F	2×0,75mm^2	AS/NZS 3191	NSW18304
LED driver output cable	B	Zhongshan Luoka	H03VV-F	2×0,75mm^2	--	VDE 40034861
Driver for DLCyy22-qicc (yy=06,08, 10)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 30W 400-650mA Trcc SR	Input: 220-240VAC, 30W; output: 27-38VDC, U-OUT:42VDC, Constant current 520mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLD0420-qicc	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 30W 400-650mA Trcc SR	Input: 220-240VAC, 30W; output: 27-38VDC, U-OUT:42VDC, Constant current 480mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLDyy25-qicc (yy=04,06, 08)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 30W 400-650mA Trcc SR	Input: 220-240VAC, 30W; output: 27-38VDC, U-OUT:42VDC, Constant current 650mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLCyy28-qicc (yy=06,08, 10)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 40W 650-820mA Trcc SR	Input: 220-240VAC, 40W; output: 27-38VDC, Constant current 680mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311

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

Driver for DLCyy38-qicc (yy=06,08, 10)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 40W 650-820mA Trcc SR	Input: 220-240VAC, 40W; output: 27-38VDC, Constant current 820mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLDyy32-qicc (yy=06,08)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 40W 650-820mA Trcc SR	Input: 220-240VAC, 40W; output: 27-38VDC, Constant current 750mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLDyy35-qicc (yy=06,08)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 40W 650-820mA Trcc SR	Input: 220-240VAC, 40W; output: 27-38VDC, Constant current 820mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLD0415-qicc	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 21W 300-450mA Trcc SR	Input: 220-240VAC, 21W; output: 27-38VDC, Constant current 380mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLD0416-qicc	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 21W 300-450mA Trcc SR	Input: 220-240VAC, 21W; output: 27-38VDC, Constant current 400mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLD0618-qicc	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 21W 300-450mA Trcc SR	Input: 220-240VAC, 21W; output: 27-38VDC, Constant current 450mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLD0845-qicc	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 53W 1000-1200mA Trcc SR	Input: 220-240VAC, 53W; output: 27-38VDC, Constant current 1100mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLCyy50-qicc (yy=06,08, 10) DLD0850-qicc	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 53W 1000-1200mA Trcc SR	Input: 220-240VAC, 53W; output: 27-38VDC, Constant current 1200mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311

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

Driver for DLCyy60-qicc (yy=06,08, 10)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 80W 1200-1800mA Aecc SR	Input: 100-240VAC, 80W; output: 27-38VDC, Constant current 1500mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Driver for DLCyy70-qicc (yy=06, 10)	B	Shenzhen King Watt Opto-Electronics Co., Ltd	KWT Driver 80W 1200-1800mA Aecc SR	Input: 100-240VAC, 80W; output: 27-38VDC, Constant current 1750mA; ta: 50°C, tc: 90°C	IEC/EN 61347-1; IEC/EN 61347-2-13	TUV R 50324311
Components for lamp						
luminaire input cable	B	Zhongshan Luoka	H03VV-F	2×0,75mm^2	--	VDE 40034861
Alternative	D	Top Resources	H03VV-F	2×0,75mm^2	--	VDE 96273
DC connector	C	Shenzhen city wan qi plastic material co ., ltd	--	PVC	--	Tested with appliance
LED chip	C	CITIZEN ELECTRONICS CO., LTD	CLL, CLU	33-38VDC, 1,8Amax; CCT:2700-5000K, Ra>80; White light	--	Tested with appliance
LED chip	C	Samsung, Inc	LM561B	2,9-3,2VDC, 150mAmax; CCT:2700-6000K, Ra>80; White light	--	Tested with appliance
LED cover	B,C	TEIJIN CHEMICALS LTD	LN-2250	V-0; 115°C	--	UL E50075 +Tested with appliance

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

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

	ANNEX 2: temperature measurements, thermal tests of Section 12	

	Type reference .....:	DLC1070-A840	—
	Lamp used.....:	Integrated LED chip	—
	Lamp control gear used .....:	See Annex 1	—
	Mounting position of luminaire .....:	In the black testing box	—
	Supply wattage (W).....:	69,6W	—
	Supply current (A) .....:	0,286A	—
	Calculated power factor .....:	50Hz	—
	Table: measured temperatures corrected for ta = 35C:		
	- abnormal operating mode.....:	1)Short-circuited output of LED driver 2)The test box is then completely filled with glass wool insulation	—
	- test 1: rated voltage .....:	240V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:	-	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	--	37,1	--	90 ºC	--	--
tc of LED driver	--	52,5	--	90 ºC	--	--
Output wire of LED driver	--	53,1	--	85 ºC	--	--
Connector	--	39,0	--	Ref.	--	--
LED module PCB	--	107,8	--	130 ºC	--	--
LED cover	--	88,8	--	Ref.	--	--
T1 of test box	--	47,5	--	90 ºC	37,7	90 ºC
T2 of test box	--	45,3	--	90 ºC	36,6	90 ºC
T3 at luminaire rim	--	43,7	--	90 ºC	45,2	90 ºC
T4 at luminaire body	--	94,6	--	135 ºC	121,3	150 ºC
Mounting surface	--	87,9	--	90 ºC	118,3	130 ºC

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

Lighted object(10cm)	--	36,2	--	90 ºC	--	--	

	Type reference .....:	DLC0650-A850	—
	Lamp used.....:	With integrated LED chip	—
	Lamp control gear used .....:	See Annex 1	—
	Mounting position of luminaire .....:	On the black testing board	—
	Supply wattage (W).....:	49,6W	—
	Supply current (A) .....:	0,196A	—
	Calculated power factor .....:	--	—
	Table: measured temperatures corrected for ta =35 °C:		—
	- abnormal operating mode .....:	1)Short-circuited output of LED driver 2)The test box is then completely filled with glass wool insulation	—
	- test 1: rated voltage .....:	240V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:	-	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	-	37,6	-	90 ºC	-	-
tc of LED driver	-	46,9	-	90 ºC	-	-
Output wire of LED driver	-	42,9	-	85 ºC	-	-
Connector	-	38,8	-	Ref.	-	-
LED module PCB	-	105,8	-	130 ºC	-	-
LED cover	-	87,7	-	Ref.	-	-
Test box (T1)	-	36,9	-	90 ºC	38,0	90 ºC
Test box (T2)	-	40,9	-	90 ºC	46,0	90 ºC
Luminaire rim (T3)	-	39,9	-	90 ºC	45,6	90 ºC
Luminaire body (T4)	-	92,3	-	135 ºC	119,4	150 ºC

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Clause	Requirement + Test	Result - Remark	Verdict

Mounting surface	-	87,9	-	90 ºC	103,0	130 ºC
Lighted object(10cm)	-	36,9	-	90 ºC	-	-

	Type reference .....:	DLC0638-A850	—
	Lamp used.....:	With integrated LED chip	—
	Lamp control gear used .....:	See annex 1	—
	Mounting position of luminaire .....:	On the black testing board	—
	Supply wattage (W).....:	38,6 W	—
	Supply current (A) .....:	0,154 A	—
	Calculated power factor .....:	--	—
	Table: measured temperatures corrected for ta =35 °C:		—
	- abnormal operating mode .....:	1)Short-circuited output of LED driver 2)The test box is then completely filled with glass wool insulation	—
	- test 1: rated voltage .....:	240V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:	-	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	-	41,6	-	90 ºC	-	-
tc of LED driver	-	47,8	-	90 ºC	-	-
Output wire of LED driver	-	46,6	-	85 ºC	-	-
Connector	-	36,4	-	Ref.	-	-
LED module PCB	-	101,6	-	130 ºC	-	-
LED cover	-	75,8	-	Ref.	-	-
Test box (T1)	-	40,3	-	90 ºC	42,0	90 ºC
Test box (T2)	-	39,3	-	90 ºC	45,3	90 ºC
Luminaire rim (T3)	-	42,3	-	90 ºC	46,8	90 ºC

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Clause	Requirement + Test	Result - Remark	Verdict

Luminaire body (T4)	-	69,1	-	135 ºC	115,6	150 ºC
Mounting surface	-	68,1	-	90 ºC	113,1	130 ºC
Lighted object(10cm)	-	36,4	-	90 ºC	-	-

	Type reference .....:	DLD0850C-850	—
	Lamp used.....:	With integrated LED chip	—
	Lamp control gear used .....:	See annex 1	—
	Mounting position of luminaire .....:	On the black testing board	—
	Supply wattage (W).....:	49,0 W	—
	Supply current (A) .....:	0,196 A	—
	Calculated power factor .....:	--	—
	Table: measured temperatures corrected for ta =35 °C:		—
	- abnormal operating mode .....:	1)Short-circuited output of LED driver 2)The test box is then completely filled with glass wool insulation	—
	- test 1: rated voltage .....:	240V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:	-	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	-	37,3	-	90 ºC	-	-
tc of LED driver	-	53,4	-	90 ºC	-	-
Output wire of LED driver	-	45,9	-	85 ºC	-	-
Connector	-	41,0	-	Ref.	-	-
LED module PCB	-	97,6	-	130 ºC	-	-
LED cover	-	72,8	-	Ref.	-	-
Test box (T1)	-	42,4	-	90 ºC	43,7	90 ºC
Test box (T2)	-	45,2	-	90 ºC	46,2	90 ºC

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Clause	Requirement + Test	Result - Remark	Verdict

Luminaire rim (T3)	-	55,0	-	90 ºC	56,7	90 ºC
Luminaire body (T4)	-	80,1	-	135 ºC	92,5	150 ºC
Mounting surface	-	84,1	-	90 ºC	94,7	130 ºC
Lighted object(10cm)	-	36,4	-	90 ºC	-	-

	Type reference .....:	DLD0845A-865	—
	Lamp used.....:	With integrated LED chip	—
	Lamp control gear used .....:	See annex 1	—
	Mounting position of luminaire .....:	On the black testing board	—
	Supply wattage (W).....:	44,4 W	—
	Supply current (A) .....:	0,178 A	—
	Calculated power factor .....:	--	—
	Table: measured temperatures corrected for ta = 35°C:		—
	- abnormal operating mode .....:	1)Short-circuited output of LED driver 2)The test box is then completely filled with glass wool insulation	—
	- test 1: rated voltage .....:	240V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:	-	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	-	36,9	-	90 ºC	-	-
tc of LED driver	-	51,3	-	90 ºC	-	-
Output wire of LED driver	-	40,1	-	85 ºC	-	-
Connector	-	36,6	-	Ref.	-	-
LED module PCB	-	70,3	-	130 ºC	-	-
LED cover	-	56,3	-	Ref.	-	-
Test box (T1)	-	38,9	-	90 ºC	41,8	90 ºC

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Clause	Requirement + Test	Result - Remark	Verdict

Test box (T2)	-	39,1	-	90 ºC	39,5	90 ºC
Luminaire rim (T3)	-	43,1	-	90 ºC	43,7	90 ºC
Luminaire body (T4)	-	60,3	-	80 ºC	81,2	90 ºC
Mounting surface	-	60,0	-	90 ºC	81,4	130 ºC
Lighted object(10cm)	-	36,7	-	90 ºC	-	-

	Type reference .....:	DLD0425-850	—
	Lamp used.....:	With integrated LED chip	—
	Lamp control gear used .....:	See annex 1	—
	Mounting position of luminaire .....:	On the black testing board	—
	Supply wattage (W).....:	26,0 W	—
	Supply current (A) .....:	0,104 A	—
	Calculated power factor .....:	--	—
	Table: measured temperatures corrected for ta = 35°C:		—
	- abnormal operating mode .....:	1)Short-circuited output of LED driver 2)The test box is then completely filled with glass wool insulation	—
	- test 1: rated voltage .....:	240V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:	-	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Power cord	-	36,5	-	90 ºC	-	-
tc of LED driver	-	45,4	-	90 ºC	-	-
Output wire of LED driver	-	38,5	-	85 ºC	-	-
Connector	-	36,1	-	Ref.	-	-
LED module PCB	-	60,1	-	130 ºC	-	-
LED cover	-	55,5	-	Ref.	-	-

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Clause	Requirement + Test	Result - Remark	Verdict

Test box (T1)	-	36,0	-	90 ºC	37,1	90 ºC
Test box (T2)	-	36,2	-	90 ºC	37,9	90 ºC
Luminaire rim (T3)	-	48,5	-	90 ºC	73,7	90 ºC
Luminaire body (T4)	-	55,0	-	80 ºC	86,0	90 ºC
Mounting surface	-	57,0	-	90 ºC	85,0	130 ºC
Lighted object(10cm)	-	36,8	-	90 ºC	-	-

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 3: screw terminals (part of the luminaire)	

(14)	**SCREW TERMINALS**		N/A
(14.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm²).....:		N/A
(14.3.3)	Conductor space (mm).....:		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) ..:		N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) .....:		N/A
	Torque (Nm).....:		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N).....:		N/A
(14.4.8)	Without undue damage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 4: screwless terminals (part of the luminaire)	

(15)	**SCREWLESS TERMINALS**		—
(15.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	Terminals internal wiring		N/A
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples)….:		N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples)……:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.6)	Electrical tests		—
	Voltage drop (mV) after 1 h (4 samples).....:		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles.....:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....:		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....:		N/A
(15.7)	Terminals external wiring		N/A
	Terminal size and rating		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

(15.8.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) .....:		N/A
	Pull test pin or tab terminals (4 samples); pull (N) .....:		N/A
(15.9)	Contact resistance test		—
	Voltage drop (mV) after 1 h		—

terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop of two inseparable joints									
	Voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV) ..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV) ..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV) ..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV) ..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

ANNEX 5:	EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES	

ATTACHMENT TO TEST REPORT IEC 60598-2-2
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Luminaires
Part 2: Particular requirements:
Section Two – Recessed luminaires

Differences according .....:	EN 60598-2-2:2012 used in conjunction with EN 60598-1:2008 + A11:2009
Annex Form No.....:	EU_GD_IEC60598_2_2C
Annex Form Originator .....:	IMQ S.p.A.
Master Annex Form.....:	2013-02

	CENELEC COMMON MODIFICATIONS (EN)	—

2.5 (3)	**MARKING**		—
2.5 (3.3.101)	Adequate warning on the package		N/A

2.6 (4)	**CONSTRUCTION**		—
2.6 (4.11.6)	Electro-mechanical contact systems		P

2.10 (5)	**EXTERNAL AND INTERNAL WIRING**		—
2.10 (5.2.1)	Connecting leads		N/A
	- without a means for connection to the supply		N/A
	- terminal block specified		N/A
	- relevant information provided		N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		N/A
2.10 (5.2.2)	Cables equal to HD21 S2 or HD22 S2		P

2.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		—
2.12 (12.4.2c)	Thermal test (normal operation)		P

ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		—
(3.3)	DK: power supply cord with label		N/A
	IT: warning label on Class 0 luminaire		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug		N/A

ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		—
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
(13.3)	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/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N/A

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict

0.1	Add the following text at the end of Clause 0.1:		P
	Where the term “lamp” is used in this Standard, it is taken to include electric light sources. LED light sources are subject to the same test parameters as “other discharge lamps”.		P
	NOTE It is recommended that portable, rechargeable, battery operated luminaires comply with AS/NZS 60335.1, Annex B. In addition, portable, rechargeable, battery operated luminaires with lithium ion batteries should have overvoltage protection.		N/A
0.2	Add the following normative references:		P
	AS/NZS 3112, Approval and test specification—plugs and socket-outlets AS/NZS 3133, Approval and test specification—Air-break switches AS/NZS 3191, Electric flexible cords AS/NZS 60695.11.10, Fire hazard testing—Part 11.10: Test flames—50 W horizontal and vertical flame test methods (IEC 60695-11-10:1999, IDT) AS/NZS 61535, Installation couplers intended for permanent connection in fixed installations (IEC 61535, Ed. 1.0 (2009) MOD) IEC 61048, Auxilaries for lamps—Capacitors for use in tubular fluorescent and other discharge lamp circuits—General and safety requirements IEC 61049, Auxilaries for lamps—Capacitors for use in tubular fluorescent and other discharge lamp circuits—Performance requirements IEC 61995-1, Devices for the connection of luminaires for household and similar purposes—Part 1: General		P
0.5	*Add* the following paragraph after the title:		P
	Throughout this document, where there is a relevant Australian/New Zealand Standard, it replaces the IEC Standard unless otherwise specified.		P
0.5.2A	*Add* the following new Clause after Clause 0.5.2:		P
	0.5.2A Capacitors Capacitors shall comply with Clause 4.2A.		N/A

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
1.2	*Add* the following new definitions after 1.2.86:		P
	1.2.87 **installation coupler** connecting device consisting of an installation female connector and an installation male connector provided with retaining means for permanent connection not intended to be engaged or disengaged under load nor to be engaged or disengaged other than during first installation, during maintenance of the wiring system or during re-configuration of the wiring system **1.2.88** **installation male connector** load side portion of an installation coupler which contains the male contacts **1.2.89** **installation female connector** supply side portion of an installation coupler which contains the female contacts **1.2.90** **installation coupler system** family of installation couplers consisting of one or more installation female connectors compatible by mechanical coding features with one or more installation male connectors, with the same ratings produced according to the specification of one manufacturer		P
2.2	At the end of Clause 2.2, *add* the following paragraph:		N/A
	Class 0 luminaires are not allowed in Australia or New Zealand.		N/A
TABLE 3.1	*Move* Item 3.2.21 from the centre column to the right hand column.		P
3.2.12	Add the following paragraph after Note 3: In Australia, luminaires for household use and similar with supply cords which are not fitted with a plug shall be marked with a cord tag with the symbol for “must be installed by a licensed electrician”. (Refer to Figure ZZ1).  FIGURE ZZ1 MUST BE INSTALLED BY A LICENSED ELECTRICIAN		P

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
3.3	*Add* the following text after the second paragraph:		P
	In Australia and New Zealand, instructions and other texts required by this Standard shall be written in English. *Compliance is checked by inspection.*		P
3.3.7	*Delete* Clause 3.3.7 and *replace* with the following:		N/A
	3.3.7 Luminaires for use with metal halide lamps shall be provided with instructions that state the substance of the following: To avoid potential unsafe lamp failure, the luminaire shall be switched off for at least 30 minutes at least once a week. In addition, the luminaire shall be operated: — complete with its protective shield; or — with a double jacketed lamp.		N/A
3.3.10	*Delete* Clause 3.3.10.		P
3.3.21	*Add* the following new Clause:		N/A
	3.3.21 The instructions shall contain details related to components in the luminaire that require replacement as part of a maintenance program.		N/A
4.8	*Add* the following paragraph after the third paragraph:		N/A
	Switches that indicate an off position shall have contacts with an air break and comply with AS/NZS 3133 or AS/NZS 61058.1.		N/A
4.2A	*Add* the following new Clause after Clause 4.2:		N/A
	4.2A Capacitors shall be of a type to ensure that any capacitor failure results in a failsafe outcome (i.e. the capacitor type will fail in the open-circuit mode only and is protected against fire or shock hazard). Capacitors shall be not less than Type B capacitors with metal body and break action protection in accordance with IEC 61048 and IEC 61049. A capacitor complying with ANCI/EIA-456-A shall comply with IEC 61049 and IEC 61048:2006 excluding the endurance test of 18.1.1. NOTE Capacitors of Class S2 (formerly referred to as P2) of IEC 60252 (all parts) do not meet the safety requirements of a Type B capacitor. In addition, capacitors shall have a minimum voltage rating of 250 V at a temperature rating of 100 °C or 280 V at a temperature rating of		N/A

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	85 °C. Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or for voltage dividing, shall comply with IEC 60384-14.		
5.2.1	1. Delete the first paragraph and replace with the following:		P
	Luminaires shall be provided with only one of the following means of connection and isolation to the supply. Fixed luminaires: — device for the connection of luminaires; — terminals; plug for engagement with socket-outlets; — connecting lead (tails); — supply cord and plug; — adapter for engagement with supply tracks; — appliance inlet; — installation coupler; — luminaire coupler; Portable luminaires: — supply cord with plug; — appliance inlet. Track-mounted luminaires: — adaptor; — connector.		P
	2. Delete the second and third paragraph.		P
5.2.2	1. Delete the first paragraph and replace with the following:		P
	Supply cords used as a means of connection to the supply, when supplied by the luminaire manufacturer, shall be at least equal in their mechanical and electrical properties to those specified in IEC 60227 and IEC 60245, as indicated in Table 5.1, or AS/NZS 3191, and shall be capable of withstanding, without deterioration, the highest temperature to which they may be exposed under normal conditions of use.		P

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict

	2. Table 5.1, *delete* rows 4 and 5 and *replace* with the following:		N/A
	<table><tr><td>Luminaires which are other than ordinary Portable rough service luminaires</td><td>60245 IEC 57</td><td>60227 IEC 53</td></tr><tr><td>Portable rough service luminaires</td><td>60245 IEC 66</td><td>PVC insulated and sheathed heavy duty flexible cord</td></tr></table>		N/A
	3. Delete the third paragraph and replace with the following:		P
	To provide adequate mechanical strength, the nominal cross-sectional area of the conductors shall be not less than: — 0,75 mm^2; — 1,0 mm^2 for portable rough service luminaires.		P
5.2.16	*Add* the following text at the end of Clause 5.2.16:		N/A
	Class II luminaires for fixed wiring incorporating an appliance coupler shall not have means to allow further luminaires to be connected, including looping in by cascading. Luminaire couplers incorporated with the luminaire shall comply with IEC 61995-1.		N/A
5.2.18	*Delete* Clause 5.2.18 and *replace* with the following:		N/A
	5.2.18 All portable luminaires with a flexible supply cord shall be fitted with a plug complying with AS/NZS 3112. Other luminaires with flexible cords shall be fitted with a plug complying with AS/NZS 3112, unless they have the warning allowed by Clause 3.2.12.		N/A
5.2.19	*Add* the following new Clause:		N/A
	5.2.19 Installation couplers incorporated within luminaires shall comply with the requirements of AS/NZS 61535. Luminaires incorporating installation couplers may have means to allow further luminaires to be connected by cascading provided the through wiring is rated for the current rating of the installation coupler.		N/A
5.3.1	1. Delete the third paragraph and replace with the following:		N/A
	Internal wires coloured green, yellow or		N/A

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	green/yellow combination shall be used for making protective earth connections only. Functional earth connections shall not be made by wires coloured green, yellow or green/yellow combination.		
	2. Add the following new Note:		N/A
	NOTE 3 Internal wires of other colours are not precluded from making protective earthing connections.		N/A
7.2.11	Delete the third paragraph and replace with the following:		N/A
	All conductors, whether internal or external, coloured green, yellow or green/yellow combination, shall only be connected to an earthing terminal.		N/A
8.2.1	Delete the first paragraph and Note 1 and replace with the following:		P
	Luminaires shall be so constructed that their live parts and basic insulation are not accessible when the luminaire has been installed and wired as in normal use. Live parts shall not be accessible when the luminaire is opened as necessary for replacing lamps, replaceable light sources or (replaceable) starters, even if the operation cannot be achieved by hand. NOTE Examples of parts with basic insulation are cables intended for internal wiring, controlgear for building-in etc. This does not apply to the non-current - carrying parts of caps which comply with the relevant IEC safety standard. Where a protective cover is used over a non-user-replaceable light source to provide protection against electric shock, and the cover is marked with the “caution, electric shock risk” symbol in accordance with IEC 60417-6042, the cover shall be left in place during the tests and inspections detailed by Section 8 of this Standard. The cover shall be held securely in position by fixings requiring the use of a tool for their removal, and at least two independent fixings shall be used.		P
12.1	*Add* the following new Note after Table 12.1:		P
	NOTE Luminaire manufacturers should consider the maximum ambient air temperature in the vicinity of components		P

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	such as starting devices and electronic ballasts or converters. Component performance specifications advise manufacturers to mark or supply life data as maximum ambient air temperature based on 50,000 hrs. This t-life is often marked as t_a and is the temperature of the air in the vicinity of the component and is not related to the luminaire t_a. As such, luminaire manufacturers should measure air temperature in the vicinity of such components, within the luminaire, as even those complying with their t_c point measurements can still fail prematurely if t-life is exceeded.		
13.3	Delete Clause 13.3 and replace with the following:		P
	13.3 Resistance to flame and ignition Parts of non-metallic material shall be resistant to flame and ignition. *For materials other than ceramic, compliance is checked by the tests of 13.3.1 and 13.3.2, 13.3.3 and 13.3.4, as appropriate.* This requirement does not apply to decorative trims, knobs, wiring insulation and other parts not likely to be ignited or to propagate flames from inside the luminaire. This Clause applies to all parts, including components, even if they have been tested to their own standard. **13.3.1** *Parts of non-metallic material supporting connections shall withstand the following test*: *Parts are subject to a test using a nickel-chromium glow-wire.* *The test apparatus and test procedure shall be those described in AS/NZS 60695.2.10.* *The glow wire is heated to 750 °C and applied to the test sample for 30 s.* *For all tests, any flame or glowing of the sample shall extinguish within 30 s of withdrawing the glow-wire, and any burning or molten drop shall not ignite a single layer of tissue paper specified in 4.187 of ISO 4046-4:2002, spread out horizontally 200 mm ± 5 mm below the sample.* **13.3.2** *All other parts of non-metallic* material shall withstand the following test:		P

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	Parts are subject to a test using a nickel-chromium glow-wire. The test apparatus and test procedure shall be those described in AS/NZS 60695.2.10. The glow wire is heated to 650 °C and applied to the test sample for 30 s. For all tests, any flame or glowing of the sample shall extinguish within 30 s of withdrawing the glow-wire, and any burning or molten drop shall not ignite a single layer of tissue paper specified in 4.187 of ISO 4046-4:2002, spread out horizontally 200 mm ± 5 mm below the sample. **13.3.3** During the application of the 750 °C glow wire test of Clause 13.3.1, if a flame is produced that persists for longer than 2 s, the luminaire is further tested as follows: The needle-flame test of AS/NZS 60695.11.5 is applied to non-metallic parts that encroach within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm above the point of application of the glow wire. The needle flame is applied to the test sample for 30 s. Parts shielded by a barrier that meets the needle-flame test of AS/NZS 60695.11.5 are not tested. NOTE This requires the needle flame to be applied to all parts likely to be impinged upon by the glow-wire flame within the hypothetical envelope of a vertical cylinder positioned above the point of application of the glow-wire. This applies to all parts unless there is a barrier that passes the needle-flame test and is within the cylinder and would protect the part from the glow-wire flame. The duration of burning shall not exceed 30 s after removal of the test flame and any burning drop shall not ignite the underlying parts or tissue paper specified in 4.187 of ISO 4046-4:2002, spread out horizontally 200 mm ± 5 mm below the sample. The needle-flame test is not carried out on parts that are made of material classified as V-0 or V-1 according to		

ANNEX 6	Differences between IEC 60598-1:2008 and AS/NZS 60598.1:2013.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	AS/NZS 60695.11.10. The sample of material classified in accordance with AS/NZS 60695.11.10 shall be no thicker than the relevant part. **13.3.4** PCBs in luminaires shall be subject to the needle-flame test of AS/NZS 60695.11.5. The needle flame shall be applied for 30 seconds to an edge of the PCB at least 10 mm from a corner. The duration of burning shall not exceed 15 s after removal of the needle flame and any burning droplets shall not ignite the tissue paper placed underneath the PCB. The needle-flame test is not carried out on PCBs made of material that is V-0 rated according to AS/NZS 60695.11.10.		
Bibliography	*Add* the following reference:		N/A
	AS/NZS 60335.1, Household and similar electrical appliances—Safety, Part 1: General requirements (IEC 60335-1 Ed 5, MOD) IEC 60252, AC motor capacitors (all parts)		N/A

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
1	*Replace the text by the following:* Specifies requirements for recessed luminaires incorporating electric light sources for operation from supply voltages up to 1000 V. This section does not apply to air-handling or liquid-cooled luminaires.		P
2.2	*Add the following third paragraph:* If a luminaire needs a cover (or barrier) to comply with this Standard, it shall be specific to the luminaire model and shall be supplied with the luminaire by the luminaire manufacturer. During testing, the luminaire/cover combination is to be tested as a unit, that is as a luminaire.		P
2.3	*Replace the text by the following:* For the purposes of this section, the definitions of section 1 of IEC 60598-1 and the following apply. **2.3.1 "C" Closed recessed luminaire** A recessed luminaire in which the area that is open between the front and the back is not more than 5 % of the area of the hole cut in the mounting surface into which the luminaire is mounted. **2.3.2 "CA" (Closed and abutted allowing side contact with insulation) recessed luminaire** A closed recessed luminaire that allows building insulation to come into contact with its sides. **2.3.3 "NON IC" (No contact and no covering with insulation) recessed luminaire** A recessed luminaire, which because of its characteristics, may be unsafe if it comes into contact with building insulation and is not allowed to do so. **2.3.4 "IC" (Insulation contact) recessed luminaire** A closed luminaire that allows building insulation to come into contact with its sides and to cover it. **2.3.5 "IC-F" (Insulation contact – fire resistant) recessed luminaire** A closed luminaire that allows building insulation to come into contact with its sides and to cover it and has resistance to heat, fire and tracking.		P

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	2.3.6 MIC – Minimum insulation clearance Minimum distance as specified by the luminaire manufacturer between the top of any building insulation and the building element above it. **2.3.7 SCB – Side clearance to building element** Minimum distance between the side of the recessed luminaire and any building element as specified in AS/NZS 3000 or as specified by the luminaire manufacturer. **2.3.8 HCB – Height clearance to building element** Minimum distance as specified by the luminaire manufacturer between the top of the recessed luminaire and any building element above it. **2.3.9 SCI – Side clearance to insulation** Minimum distance as specified by the luminaire manufacturer between the recessed luminaire and any building insulation. **2.3.10 Building insulation** Thermal, acoustic or similar insulation. **2.3.11 Loose fill insulation** Building insulation that is in the form of small particles or fibres that are blown into place.		
2.4	*Replace the text by the following:* Luminaires shall be classified in accordance with the provisions of IEC 60598.1 and the following. **2.4.1 Classification according to the degree of contact between the luminaire and building insulation around it** Recessed luminaires shall be classified according to their suitability to be in contact with building insulation. They shall be classified as one of the following: a) IC-F – building insulation that can safely be continuously exposed to 90°C allowed to abut and cover the luminaire. b) IC – building insulation that can safely be continuously exposed to 90°C allowed to abut and cover the luminaire. c) CA 80 – building insulation that can safely be continuously exposed to 90°C allowed to abut the luminaire. d) CA 135 – building insulation that can safely be continuously exposed to temperatures up to 150°C allowed to abut the luminaire.		P

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	e) NON IC – luminaire not suitable for covering or abutting with building insulation		
2.5	*Delete the existing clause 2.5.1.* *Add the following seven new subclauses:* **2.5.1 Insulating ceiling IC-F mark, symbol**  continuously to 90°C may abut or cover the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible. The following information shall be included in the manufacturer's instructions: **RISK OF FIRE –** Required clearance from structural members and building elements SCB = mm HCB = mm **2.5.2 Insulating ceiling IC mark, symbol**  Type IC recessed luminaire where building insulation that can safely be exposed continuously to temperatures up to 90°C may abut and cover the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible. The following information shall be included in the manufacturer's instructions: **RISK OF FIRE –** Required clearance from structural members and building elements SCB = mm HCB = mm **2.5.3 Insulating ceiling CA 80 mark, symbol**  Type CA 80, closed abutted, recessed luminaire where fixed, building insulating material that can safely be exposed continuously to temperatures up to 90°C must not cover but may closely abut the sides of the		P

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict

luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible.

The following information shall be included in the manufacturer's instructions:

RISK OF FIRE – Building insulation must not cover this luminaire

MIC = mm SCB = mm
HCB = mm

Where the MIC is greater than 25 mm the MIC dimension shall be included on a label.

2.5.4 Insulating ceiling CA 135 mark,

symbol 

Type CA 135, closed abutted, recessed luminaire where fixed, building insulating material that can safely be exposed continuously to temperatures up to 150°C must not cover but may closely abut the sides of the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible.

The following information shall be included in the manufacturer's instructions:

RISK OF FIRE – Building insulation must not cover this luminaire

MIC = mm SCB = mm
HCB = mm

Where the MIC is greater than 25 mm the MIC dimension shall be included on a label.

2.5.5 Insulating ceiling NON IC mark,

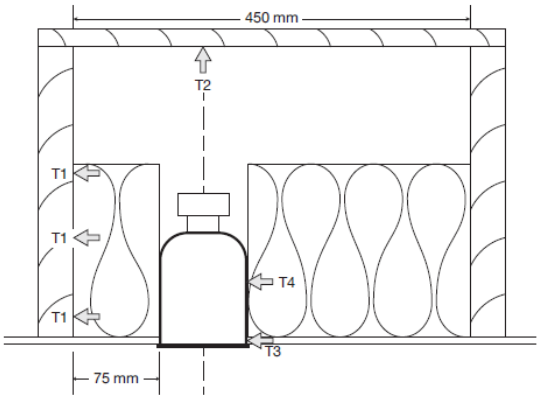
symbol 

Recessed luminaire where building insulating material must not cover or come into contact with any part of the luminaire. The symbol shall be permanently marked on the back of the fitting, be clearly visible, at least 20 mm high and clearly legible.

The following information shall be included in

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	the manufacturer's instructions: **RISK OF FIRE –** Shall not be installed in residential installations MIC = mm SCB = mm HCB = mm Where the SCI is greater than 100 mm the SCI and MIC dimensions shall be included on a label. **2.5.6 Restriction on use of luminaires** All recessed luminaires not marked with one of the symbols for IC-F, IC, CA80 or CA135 shall be marked NON IC and shall have a warning notice on an attached label or given in the manufacturer's instruction leaflet supplied with the luminaire, that the luminaire shall, under no circumstances be covered or abutted with building insulation or be installed in a residential installation. **2.5.7 Luminaires supplied with control gear** For luminaires supplied with control gear, pictorial diagrams showing safe installation of the control gear above or below building insulation shall be included in the manufacturer's instructions		
2.6	*Add the following three new subclauses after Table 1:* **2.6.1 Thermal protectors** If thermal protectors are used to meet the requirements of Annex ZA they shall comply with the safety requirements specified in IEC 60730-1. The number of cycles of operation declared for 6.10 and 6.11 of IEC 60730-1 shall be not less than: — self-resetting thermal cut-outs ---------- 10,000 — voltage maintained non-self-resetting thermal cut-outs --- 1,000 — other non-self-resetting thermal cut-outs ---------- 30 NOTE – Thermal protectors may be used to prevent maximum temperatures being exceeded during the tests of Annex ZA. **2.6.2 Protection against building insulation contact for Type IC-F IC, CA 80 and CA 135 recessed luminaires** For recessed luminaires classified as IC-F, IC,		P

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	CA 80 and CA 135 there shall be adequate protection against building insulation contacting the lampholder or the lamp and causing risk of fire. For IC-F recessed luminaires compliance is determined by applying the test of clause 13.2 for first characteristic numeral 4 of IEC 60529. Additionally, there shall be no openings in horizontal surfaces, or surfaces within 20 degrees of the horizontal, on the top of the recessed luminaire. For IC, CA 80 and CA 135 recessed luminaires compliance is determined by applying the test probe 1 of IEC 61032 with a force of 3N ± 10% to all surfaces and all openings excluding the opening for the light output. The temperature of any part of the reflector, bracketry, body, lamp or lampholder which the probe contacts shall not exceed 80°C for IC and CA 80 type luminaires or 135°C for CA 135 type luminaires. For Type IC recessed luminaires that do not have a thermal protector it shall not be possible for the test probe to contact the lamp or the lampholder. **2.6.3 Building insulation abutting or covering luminaires** Building insulation that abuts or covers a recessed luminaire, or is part of a recessed luminaire, or is within 100 mm horizontally of a luminaire shall: a) Maintain its dimensions and structural integrity when exposed to the maximum surface temperature of the class of luminaire, being 150°C in the case of CA-135 luminaires and 90°C in the case of IC-F, IC and CA-80 luminaires; b) When intended to be in contact with IC, CA 80 and CA 135 recessed luminaires, withstand a 30 s needle flame test carried out in accordance with IEC 60695.11.5 with the flame applied to all surfaces of the sample. Loose fill insulation is not permitted to abut or cover luminaires unless specifically allowed by the luminaire manufacturer. Manufacturers shall specify types and/or characteristics of insulation that are safe for use with the luminaire.		
2.10	*Add the following after the third paragraph:* For IC-F recessed luminaires the tests of 2.12 shall be conducted with two supply cables		N/A

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	fitted.		
2.12	*Add the following after the existing paragraph:* For Type IC-F, IC, CA 80 and CA 135 recessed luminaires the requirements of Annex ZA also apply.		P
Annex ZA	*Add the following new Annex:* **Annex ZA** (Normative) **ZA.1** Type IC-F, IC, CA 80 and CA 135 recessed luminaires shall be subjected to the following tests and operated as described in clause 12.4.1 of IEC 60598.1. The test shall be conducted on a separate sample to that used for the tests of IEC 60598.1. **ZA.2** The test sample is mounted in a wooden test box with internal dimensions 1200 mm (L) x 450 mm (W) by 300 mm (H) and a base thickness of 15 to 20 mm. The test sample is mounted 75 mm from one wall and centrally in the other horizontal dimension. See figure ZA.1.  **Figure ZA.1 – Test box for Type IC-F, IC, CA 80 and CA 135 luminaires** **ZA.3** For CA 80 and CA 135 luminaires the test box is filled with a single piece of approximately 200 mm thick glass wool thermal insulation having a thermal resistivity (R-value) of 3.2 such that it closely abuts the test sample without compressing or deforming the insulation. For IC-F and IC luminaires the test box is completely filled with glass wool thermal insulation fully contacting the luminaire.		P

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict

ZA.4

Three thermocouples, T1, are mounted on the side of the test box 75 mm from the test sample at the hottest locations. The thermocouples shall be in a vertical plane through the centreline of the test sample.

One thermocouple, T2, is positioned on the ceiling of the test box directly above the test sample at the hottest location and a further thermocouple, T3, is positioned on the mounting ring.

ZA.5 Normal test

The test sample is fitted with the hottest recommended lamp and the test sample operated for six hours or until the fixture has stabilised thermally.

During the test the hottest point on the outer surface of the test sample where it is abutted by insulation (for example, the reflector, bracketry or body) shall be determined, T4, and the temperature measured.

The maximum temperature at any thermocouple shall not exceed the values in table ZA.1.

Additionally, the limits of table 12.1 of IEC 60958.1 shall not be exceeded during the test.

Table ZA.1 – Normal test – Maximum thermocouple temperatures

Thermocouple reference (figure ZA.1)	IC-F	IC	CA80	CA135
T1, T2, T3	90°C	90°C	90°C	90°C
T4	80°C	80°C	80°C	135°C

Thermal protectors shall not operate during the test.

ZA.6 Abnormal test 1

The test box is then completely filled with glass wool insulation and the tests repeated.

The maximum temperature of any thermocouple shall not exceed the values in table ZA.2.

Table ZA.2 – Abnormal test 1 – Maximum thermocouple temperatures

Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict

T1, T2, T3	90°C	90°C	90°C	90°C	
T4	90°C	90°C	90°C	150°C	

If a thermal protector operates during this test, the test is repeated on a second sample. This second test shall be terminated in the same mode unless the test is otherwise satisfactorily completed.

ZA.7 Replacement lamps test

All luminaires with E27 or B22 lampholders shall meet one of the following requirements;

a) The luminaires uses thermal protection to comply with the abnormal test of ZA.6;

b) The luminaire is provided with a warning label as per ZA.8;

c) The luminaire design does not accept any other lamp type or wattage than that specified by the manufacturer; or

d) The luminaire complies with the test of ZA.7.1.

ZA7.1

The test sample shall be fitted with a 100 W test lamp and operated for six hours.

The maximum temperature at any thermocouple shall not exceed the values in table ZA.2 during the entire test except that if a thermal protector is fitted it shall operate within one hour and the maximum temperature at any thermocouple shall not exceed the values in table ZA.3 during the entire test.

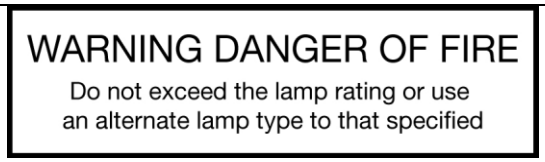
Table ZA.3 – Abnormal test 2 – Maximum thermocouple temperatures

Thermocouple reference (figure ZA.1)	IC-F	IC	CA 80	CA 135
T1, T2, T3	110°C	110°C	110°C	10°C
T4	110°C	110°C	110°C	150°C

After all the above tests that are relevant the luminaire shall withstand the tests of Section 10 of IEC 60598.1.

ZA.8 Wrong lamp warning label

A durable label of a size and with the substance of the wording depicted in figure ZA.2 shall be affixed to the luminaire such that it is clearly visible when a replacement lamp is being fitted. The lettering shall be black on a yellow background.

ANNEX 7	Differences between IEC 60598-2-2 Ed 2.1 and AS/NZS 60598.2.2:2001 + Amd A.		Verdict
Clause	Requirement – Test	Result - Remark	Verdict
	 **Figure ZA.2 – Wrong lamp warning label**		

Annex 8	**LED modules for general lighting —Safety specifications IEC 62031:2008+ A1:2012, EN 62031:2008+ A1:2013**		P
Clause	Requirement – Test	Result - Remark	Verdict
13.2	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		P
	During the tests, tissue paper, spread below module, does not ignite		P
14	**Conformity testing during manufacture**	Tested as a part of luminaire	**P**
17	**Screws, current-carrying parts and connections**		—
	The requirements of IEC 61347-1, Clause 17, apply.		N/A

Annex 9	**Photobiological safety of lamps and lamp systems were classified according to standard IEC 62471:2006, EN 62471: 2008 and EU directive 2006/25/EC, IEC/TR 62778:2012.**		
Clause	Requirement + Test	Result – Remark	Verdict
4	**EXPOSURE LIMITS**		P
4.1	General		P
	The exposure limits in this standard 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		P
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds 10^4 cd·m^{-2}	see clause 4.3	N/A
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye	(See appended test data)	N/A
	The exposure limit for effective radiant exposure is 30 J·m^{-2} within any 8-hour period	(See appended test data)	N/A
	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/A
	$E_s \cdot t = \sum_{200}^{400} \sum_{t} E_\lambda(\lambda,t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 30$ J·m^{-2}		N/A
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		N/A
	$t_{max} = \frac{30}{E_s}$ s		N/A
4.3.2	Near-UV hazard exposure limit for eye		N/A
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed 10000 J·m^{-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, E_{UVA}, shall not exceed 10 W·m^{-2}.		N/A
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		N/A
	$t_{max} \le \frac{10\,000}{E_{UVA}}$ s		N/A
4.3.3	Retinal blue light hazard exposure limit		P

Annex 9	**Photobiological safety of lamps and lamp systems were classified according to standard IEC 62471:2006, EN 62471: 2008 and EU directive 2006/25/EC, IEC/TR 62778:2012.**		
Clause	Requirement + Test	Result – Remark	Verdict
	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(λ), i.e., the blue-light weighted radiance , L_B, shall not exceed the levels defined by:		P
	$L_B \cdot t = \sum_{300}^{700} \sum_{t} L_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 10^6$ $J \cdot m^{-2} \cdot sr^{-1}$	for t ≤ 10^4 s $t_{max} = \frac{10^6}{L_B}$	N/A
	$L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 100$ $W \cdot m^{-2} \cdot sr^{-1}$	for t > 10^4 s	P
4.3.4	Retinal blue light hazard exposure limit - small source		N/A
	Thus the spectral irradiance at the eye E_λ, weighted against the blue-light hazard function B(λ) shall not exceed the levels defined by:	see table 4.2	N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_{t} E_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 100$ $J \cdot m^{-2}$	for t ≤ 100 s	N/A
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 1$ $W \cdot m^{-2}$	for t > 100 s	N/A
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, L_λ, weighted by the burn hazard weighting function $R(_\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{50\,000}{\alpha \cdot t^{0,25}}$ $W \cdot m^{-2} \cdot sr^{-1}$	(10 µs ≤ t ≤ 10 s)	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		N/A
	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:	(See appended test data)	N/A
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{6\,000}{\alpha}$ $W \cdot m^{-2} \cdot sr^{-1}$	t > 10 s	N/A
4.3.7	Infrared radiation hazard exposure limits for the eye		N/A
	The 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/A

Annex 9	**Photobiological safety of lamps and lamp systems were classified according to standard IEC 62471:2006, EN 62471: 2008 and EU directive 2006/25/EC, IEC/TR 62778:2012.**		
Clause	Requirement + Test	Result – Remark	Verdict
	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \le 18000 \cdot t^{-0,75}$ $W \cdot m^{-2}$	t ≤ 1000 s	N/A
	For times greater than 1000 s the limit becomes:		N/A
	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \le 100$ $W \cdot m^{-2}$	t > 1000 s	N/A
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
	$E_H \cdot t = \sum_{380}^{3000} \sum_{t} E_\lambda(\lambda,t) \cdot \Delta t \cdot \Delta\lambda \le 20000 \cdot t^{0,25}$ $J \cdot m^{-2}$		P
5	**MEASUREMENT OF LAMPS AND LAMP SYSTEMS**		P
5.1	Measurement conditions		P
	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)	Sample was stable after being operated with 1 hour.	P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment	(See appended test data)	P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.		P
5.1.3	Extraneous radiation		P
	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	LED recessed luminaire	P
	Operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC lamp standard, or		N/A
	– the 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, or		N/A
	– the manufacturer' s recommendation		P

Annex 9	**Photobiological safety of lamps and lamp systems were classified according to standard IEC 62471:2006, EN 62471: 2008 and EU directive 2006/25/EC, IEC/TR 62778:2012.**		
Clause	Requirement + Test	Result – Remark	Verdict
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P
	Minimum aperture diameter 7mm.		P
	Maximum aperture diameter 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 measurements made with an optical system.		P
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.		P
5.2.2.2	Alternative method		N/A
	Alternatively 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.		N/A
5.2.3	Measurement of source size	(See appended test data)	P
	The determination of α, the angle subtended by a source, requires the determination of the 50% emission points of the source.		P
5.2.4	Pulse width measurement for pulsed sources	CW	N/A
	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/A
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points 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

Annex 9	**Photobiological safety of lamps and lamp systems were classified according to standard IEC 62471:2006, EN 62471: 2008 and EU directive 2006/25/EC, IEC/TR 62778:2012.**		
Clause	Requirement + Test	Result – Remark	Verdict
6	**LAMP CLASSIFICATION**		P
	For the purposes of this standard it was decided that the values shall be reported as follows:	see table 6.1	P
	– for lamps intended for general lighting service, 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	DLD0845A-865: 2,05m DLC0670-A850: 4,96m	P
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm		N/A
6.1	Continuous wave lamps		P
6.1.1	Except Group		P
	In the except group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	– an actinic ultraviolet hazard (E_S) within 8-hours exposure (30000 s), nor		N/A
	– a near-UV hazard (E_{UVA}) within 1000 s, (about 16 min), nor		N/A
	– a retinal blue-light hazard (L_B) within 10000 s (about 2,8 h), nor		P
	– a retinal thermal hazard (L_R) within 10 s, nor		P
	– an infrared radiation hazard for the eye (E_{IR}) within 1000 s		N/A
6.1.2	Risk Group 1 (Low-Risk)		N/A
	In this group are lamps, which exceeds the limits for the except group but that does not pose:		N/A
	– an actinic ultraviolet hazard (E_S) within 10000 s, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 300 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 100 s, nor		N/A
	– a retinal thermal hazard (L_R) within 10 s, nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 100 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		N/A
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		N/A

Annex 9	**Photobiological safety of lamps and lamp systems were classified according to standard IEC 62471:2006, EN 62471: 2008 and EU directive 2006/25/EC, IEC/TR 62778:2012.**		
Clause	Requirement + Test	Result – Remark	Verdict
	– an actinic ultraviolet hazard (E_S) within 1000 s exposure, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 100 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 0,25 s (aversion response), nor		N/A
	– a retinal thermal hazard (L_R) within 0,25 s (aversion response), nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 10 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 10 s are in Risk Group 2.		N/A
6.1.4	Risk Group 3 (High-Risk)		N/A
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		N/A
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N/A
	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N/A
	– 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/A

Table 4.1	Spectral weighting function for assessing ultraviolet hazards for skin and eye	P

Wavelength[1] λ, nm	**UV hazard function $S_{UV}(\lambda)$**	**Wavelength λ, nm**	**UV hazard function $S_{UV}(\lambda)$**
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*	0,880	355	0,00016
285	0,770	360	0,00013
290	0,640	365*	0,00011
295	0,540	370	0,000093
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.

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources	P

Wavelength nm	**Blue-light hazard function B (λ)**	**Burn hazard function R (λ)**
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
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	2π 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 radiance $W \cdot m^{-2} \cdot sr^{-1}$)**
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	$10^6/t$ $10^6/t$ $10^6/t$ 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

Table 6.1	Emission limits for risk groups of continuous wave lamps DLC0670-A850 5000K	P

Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	--	0,003	--	0,03	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	--	33	--	100	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	4,169E+01	10000	--	4000000	--
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*****	--	1,0	--	400	--
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α***	3,783E+03	28000/α	--	71000/α	--
Retinal thermal, weak visual stimulus******	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α***	--	6000/α	--	6000/α	--
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	570	--	3200	--

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source
*** α = 33,67 mrad

Table 6.1	Emission limits for risk groups of continuous wave lamps DLD0845A-865 6500K	P

Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	--	0,003	--	0,03	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	--	33	--	100	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	5,015E+01	10000	--	4000000	--
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0	--	400	--
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α***	1,148E+03	28000/α	--	71000/α	--
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α***	--	6000/α	--	6000/α	--
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	570	--	3200	--

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source
*** α = 85,93 mrad

ATTACHMENT TO TEST REPORT IEC 62471 **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** Photobiological safety of lamps and lamps systems	
Differences according to.....:	EN 62471:2008
Attachment Form No.....:	EU_GD_IEC62471A
Attachment Originator .....:	IMQ S.p.A.
Master Attachment.....:	2009-07

	CENELEC COMMON MODIFICATIONS (EN)		P
4	**EXPOSURE LIMITS**		P
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB		—
	Clause 4 replaced by the following:		P
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in IEC 62471:2006	See appended Table 6.1	P
4.1	General		P
	First paragraph deleted		—

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) DLC0670-A850 5000K	P

Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	--	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	--	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	4,994E+01	10000	--	4000000	--
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0	--	400	--
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α***	1,145E+03	28000/α	--	71000/α	--
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	570	-	3200	-

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source
*** α = 85,93 mrad

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) DLD0845A-865 6500K	P

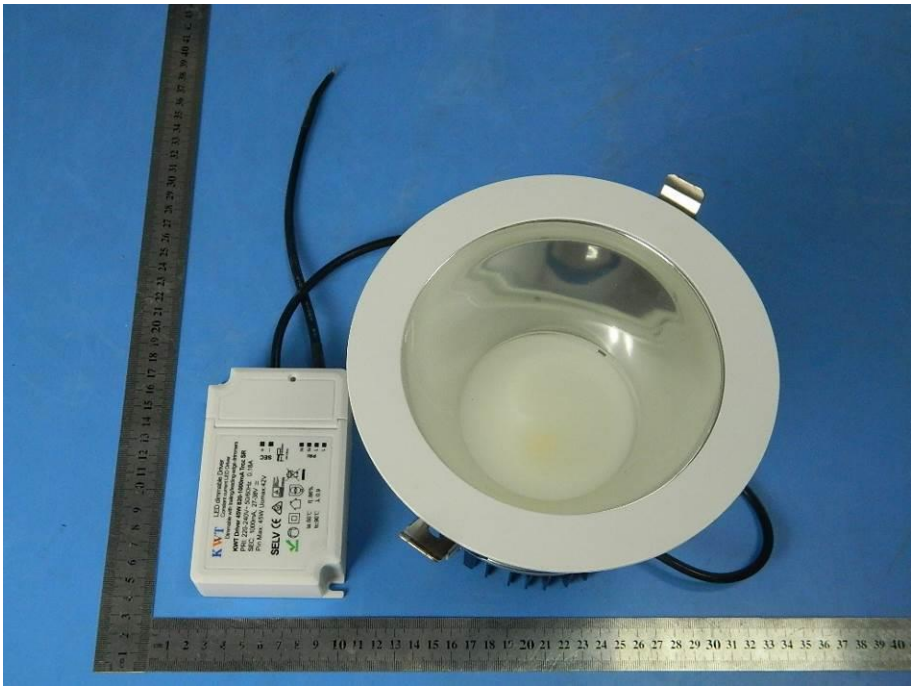
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	--	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	--	--	--	--	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	4,153E+01	10000	--	4000000	--
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	--	1,0	--	400	--
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α***	3,773E+03	28000/α	--	71000/α	--
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	--				
				6000/α 0,011≤ α ≤ 0,1	--				
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	570	-	3200	-

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source
*** α =33,67 mrad

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

Product: LED Downlight

Type Designation: See report

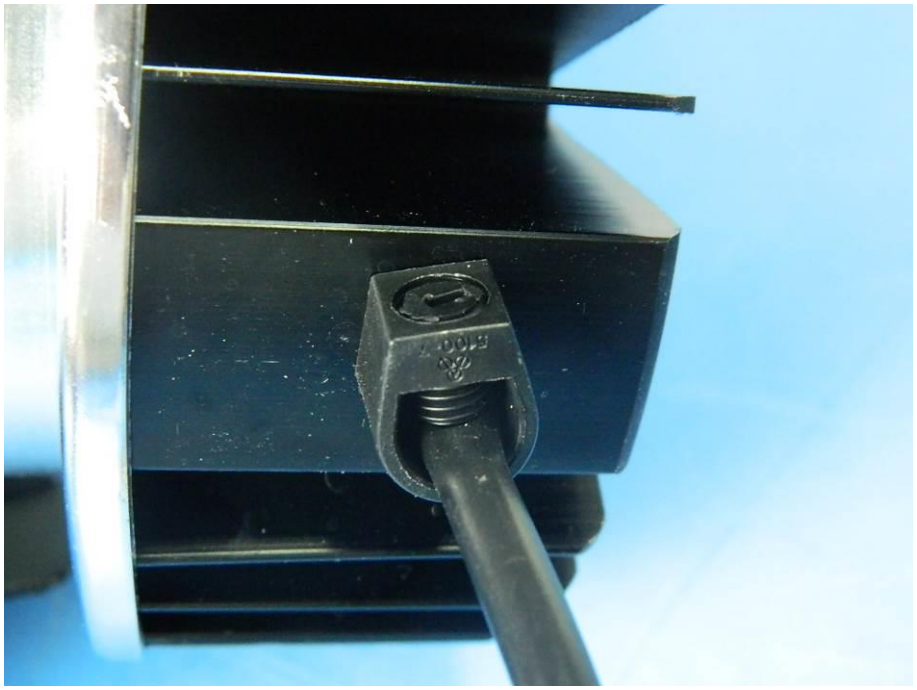


Picture 1: DCLC638-A850 front view

Picture 2: DCLC638-A850 rear view

Product: LED Downlight

Type Designation: See report

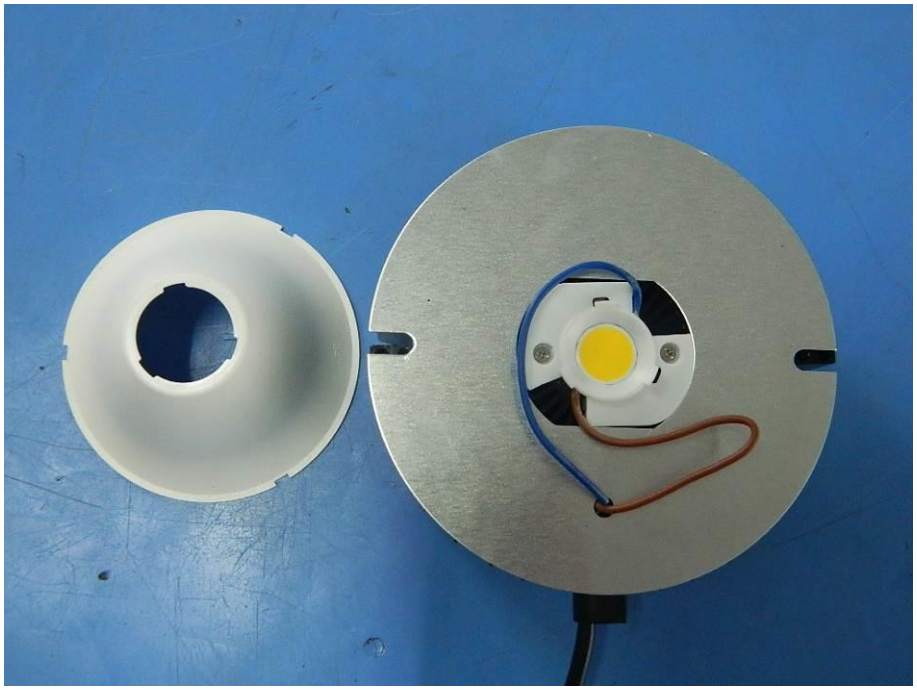


Picture 3: DCLC638-A850 anchorage view

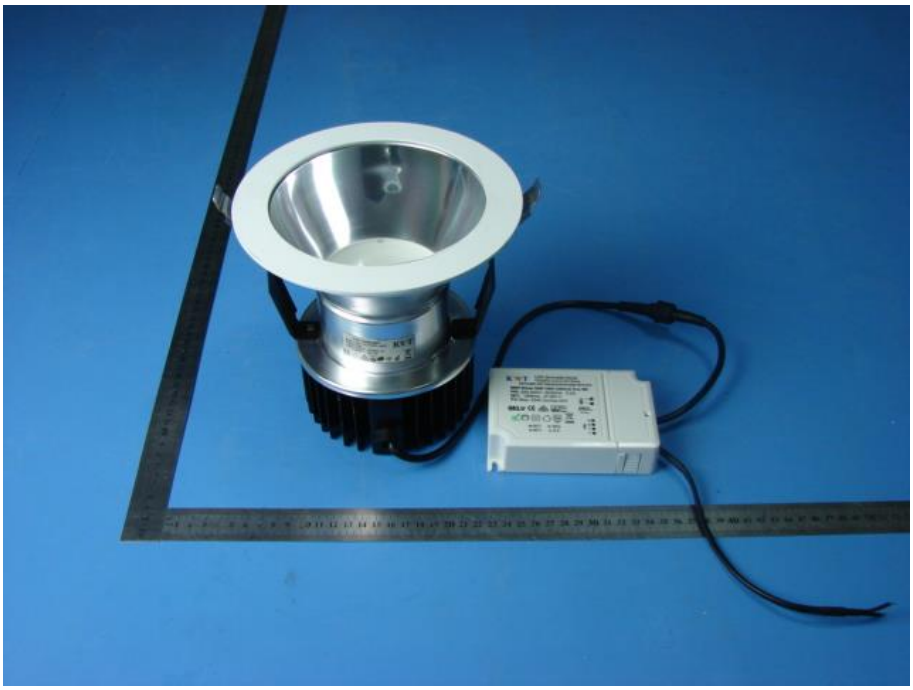
Picture 4: DCLC638-A850 connector view

Product: LED Downlight

Type Designation: See report



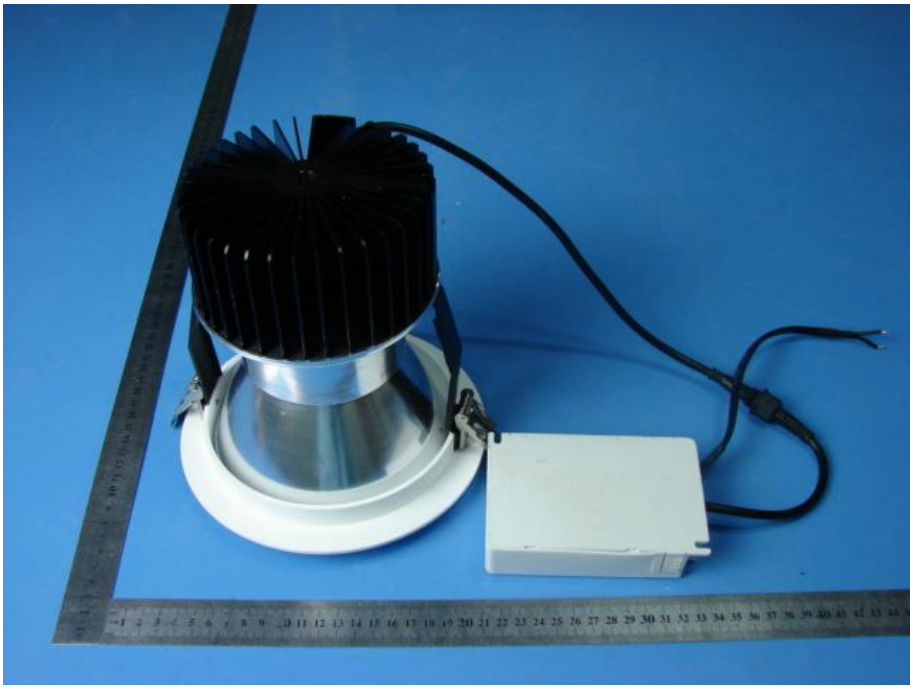
Picture 5: DCLC638-A850 LED module view



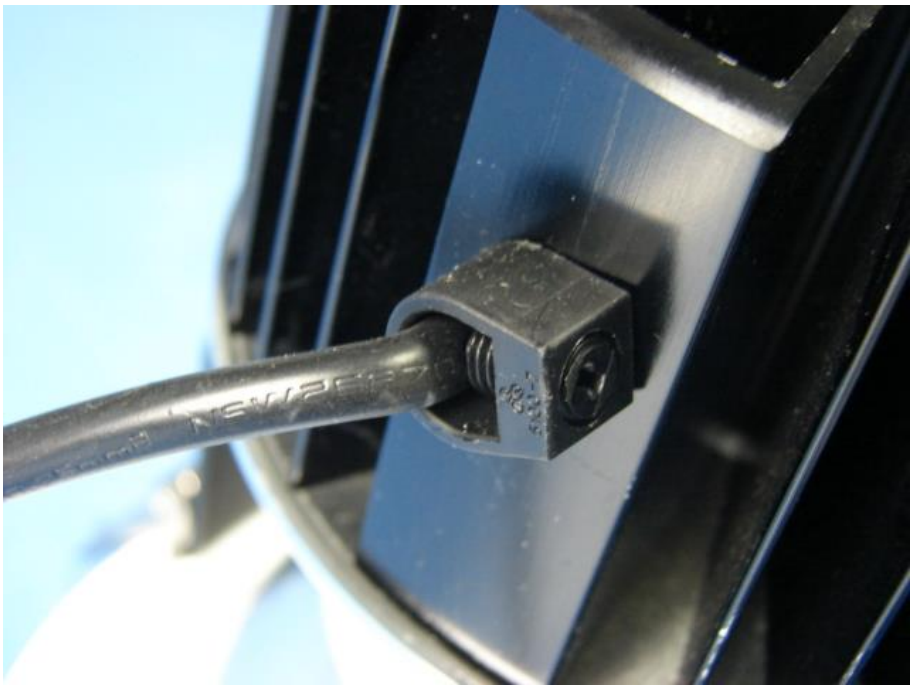
Picture 6: DLC0650-A850 whole view

Product: LED Downlight

Type Designation: See report



Picture 7: DLC0650-A850 rear view



Picture 8: DLC0650-A850 anchorage view

Product: LED Downlight

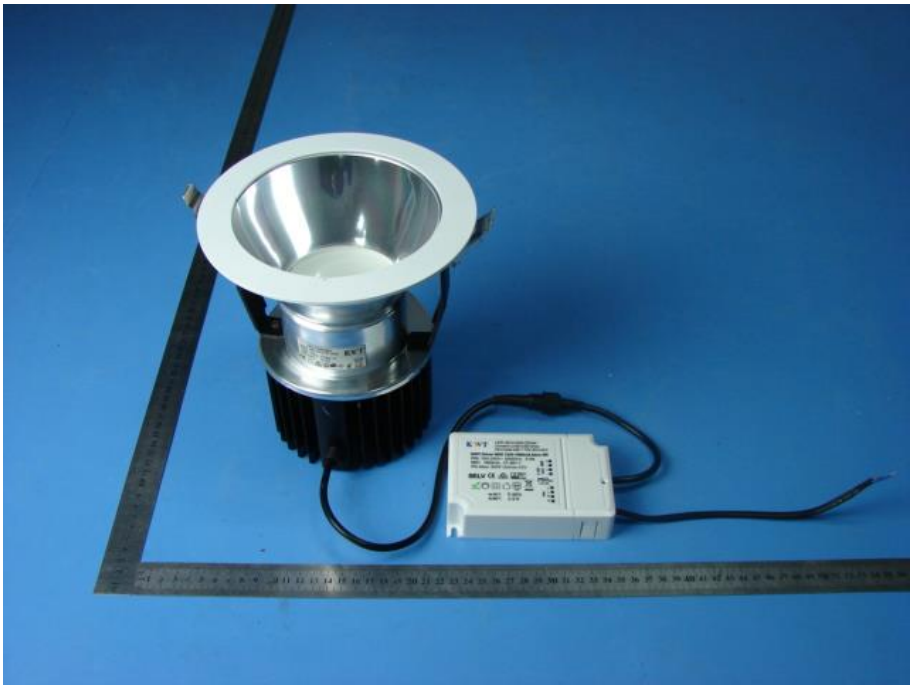
Type Designation: See report

Picture 9: DLC0650-A850 connector view

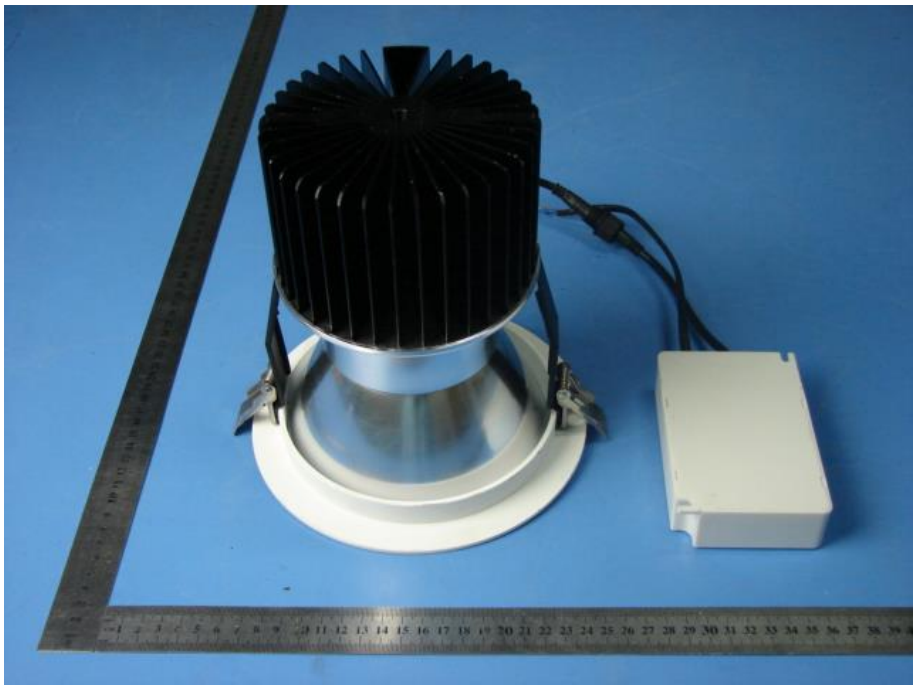
Picture 10: DLC0650-A850 LED module view

Product: LED Downlight

Type Designation: See report



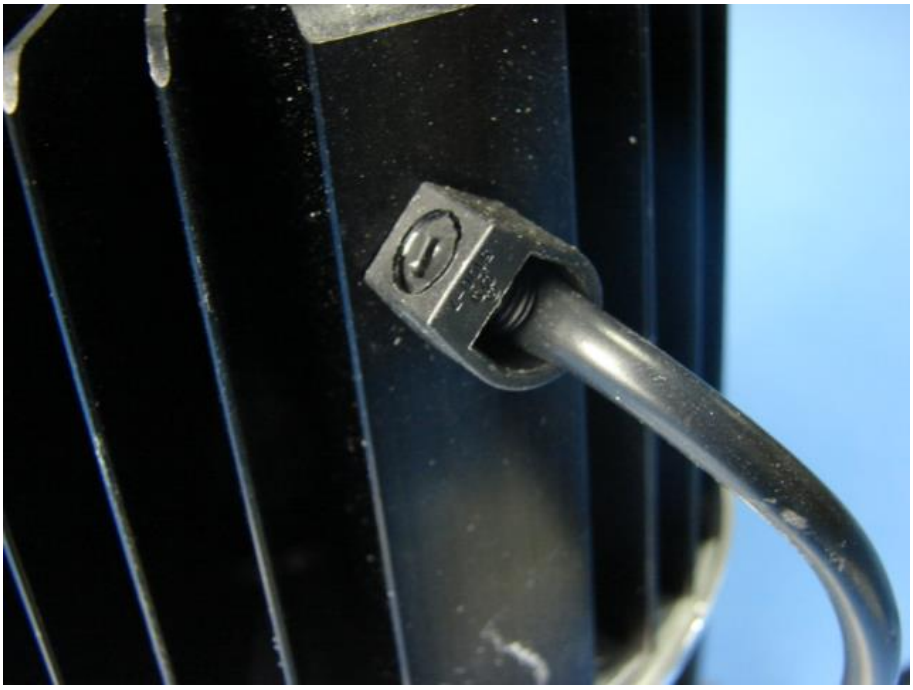
Picture 11: DLC1070-A840 whole view



Picture 12: DLC1070-A840 rear view

Product: LED Downlight

Type Designation: See report



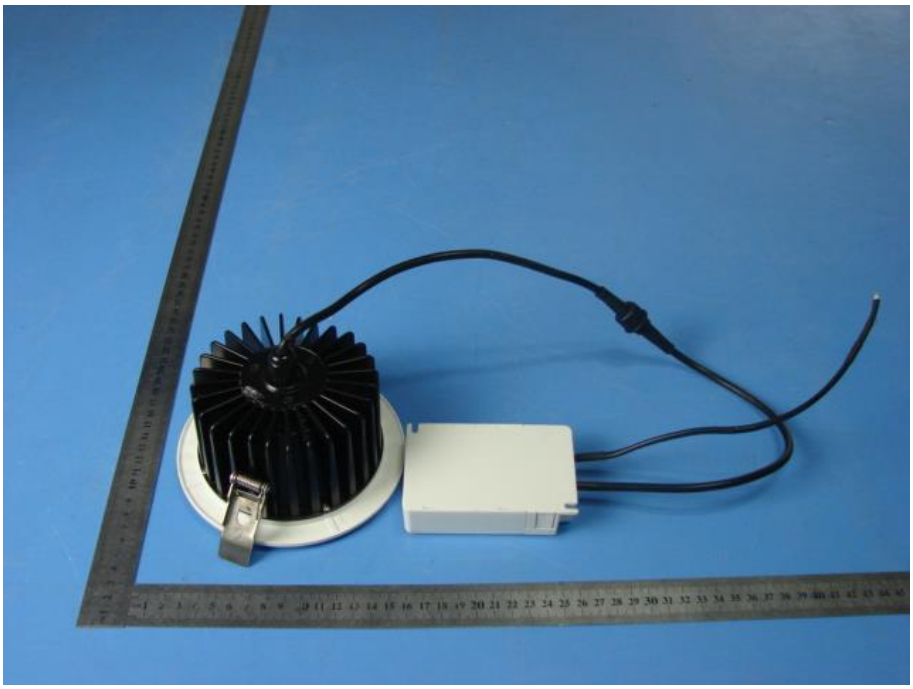
Picture 13: DLC1070-A840 anchorage view

Picture 14: DLC1070-A840 LED module view

Product: LED Downlight

Type Designation: See report

Picture 15: DLD0425C-850 whole view



Picture 16: DLD0425C-850 rear view

Product: LED Downlight

Type Designation: See report

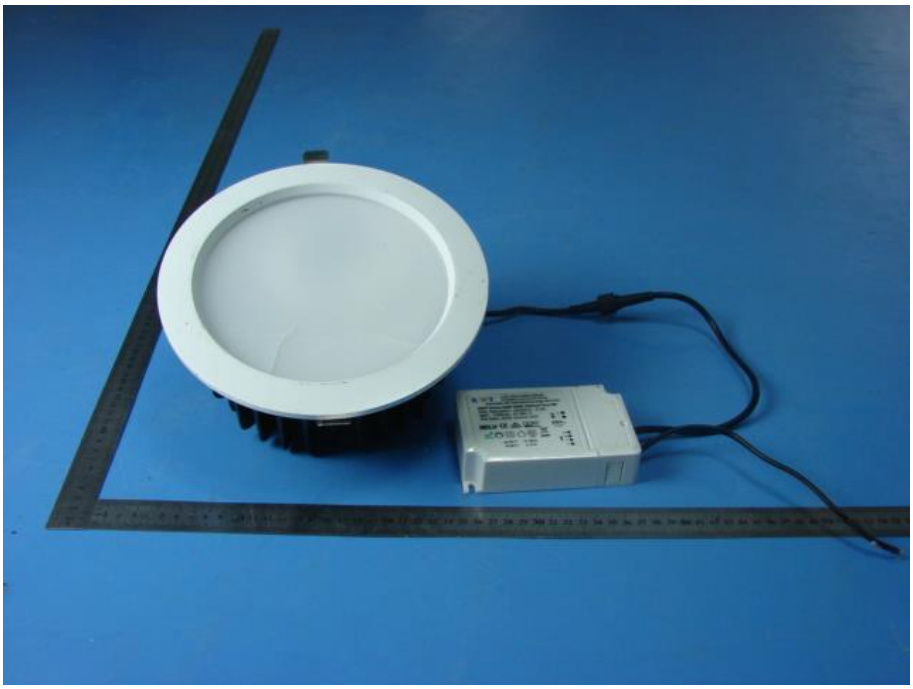
Picture 17: DLD0425C-850 connector view

Picture 18: DLD0425C-850 gland view

Product: LED Downlight

Type Designation: See report

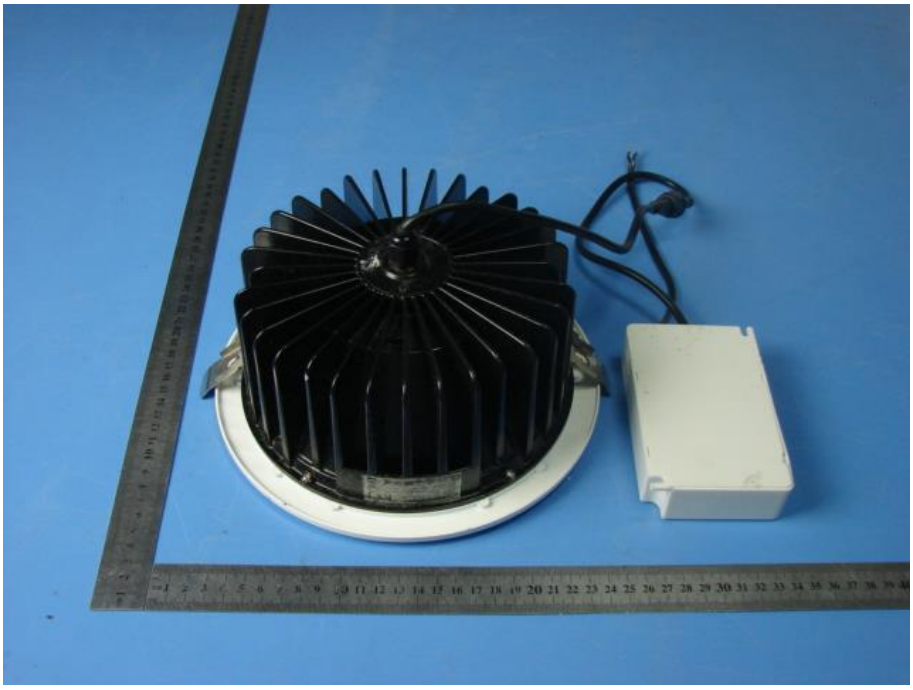
Picture 19: DLD0425C-850 LED module view



Picture 20: DLD0845A-865 front view

Product: LED Downlight

Type Designation: See report



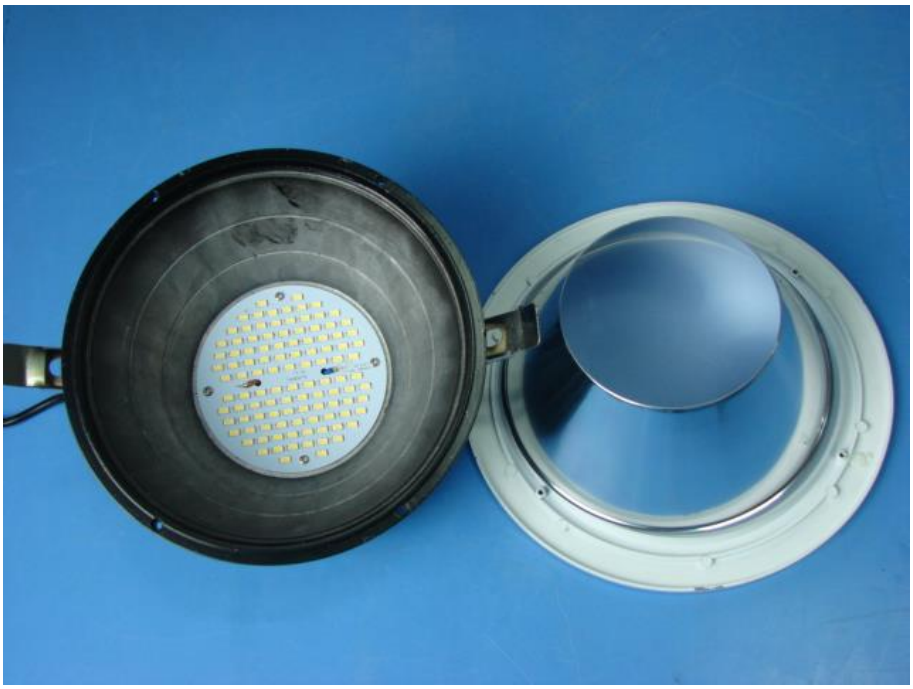
Picture 21: DLD0845A-865 rear view

Picture 22: DLD0845A-865 gland view

Product: LED Downlight

Type Designation: See report

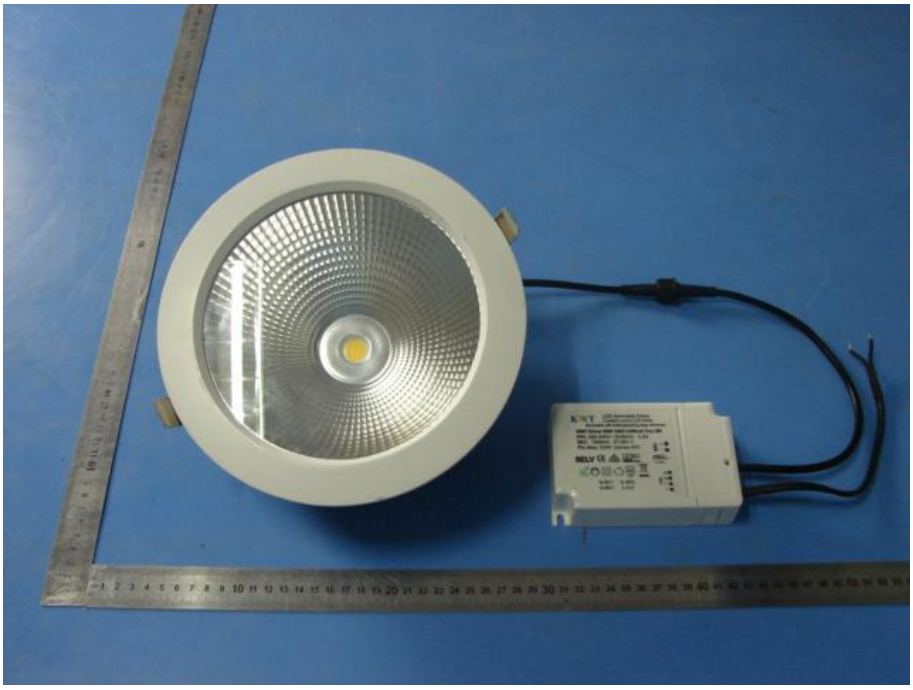
Picture 23: DLD0845A-865 connector view



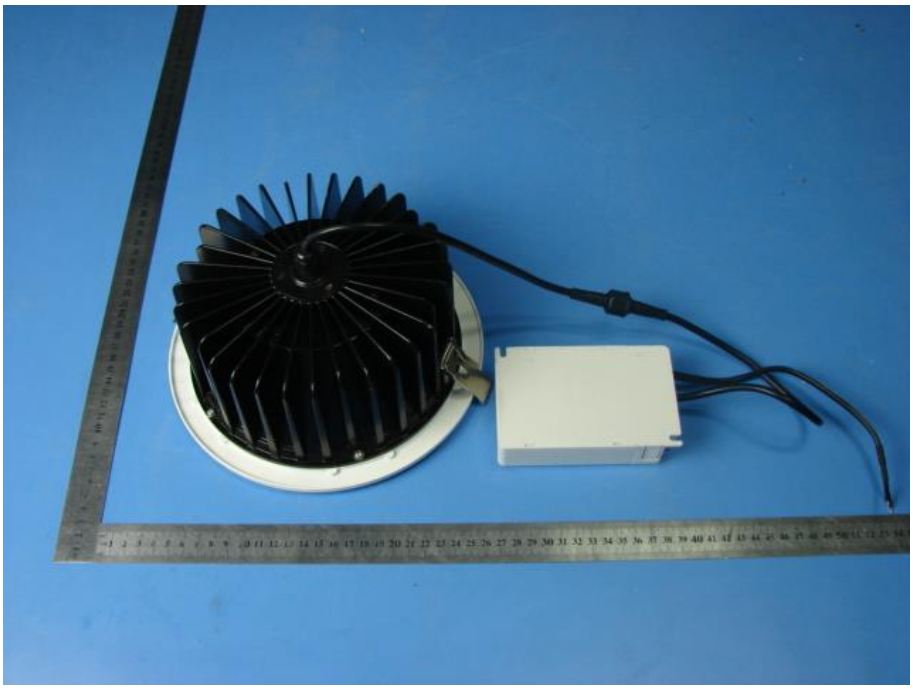
Picture 24: DLD0845A-865 LED module view

Product: LED Downlight

Type Designation: See report



Picture 25: DLD0850C-850 front view



Picture 26: DLD0850C-850 rear view

Product: LED Downlight

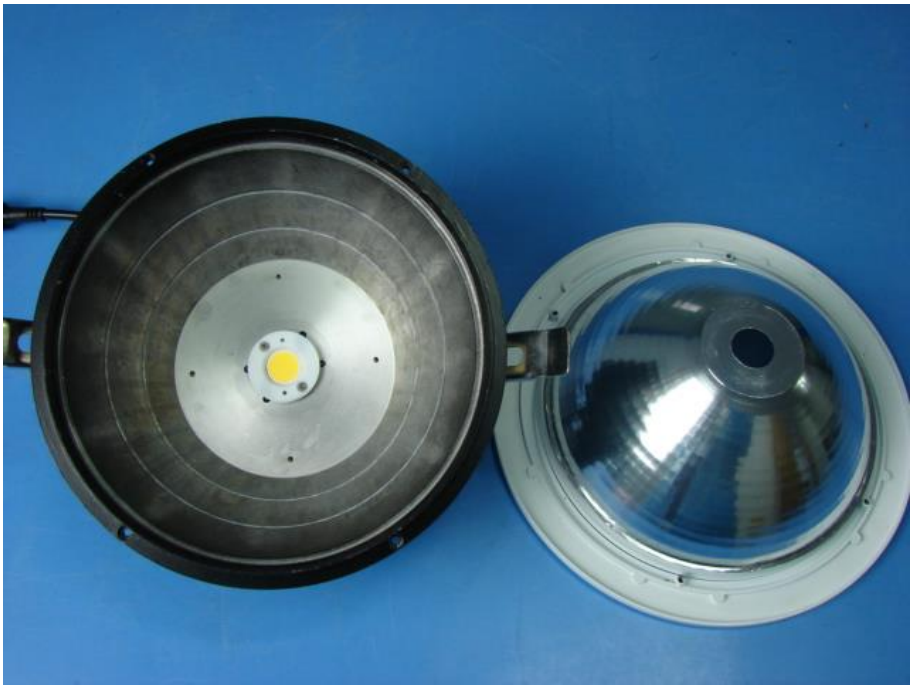
Type Designation: See report

Picture 27: DLD0850C-850 gland view

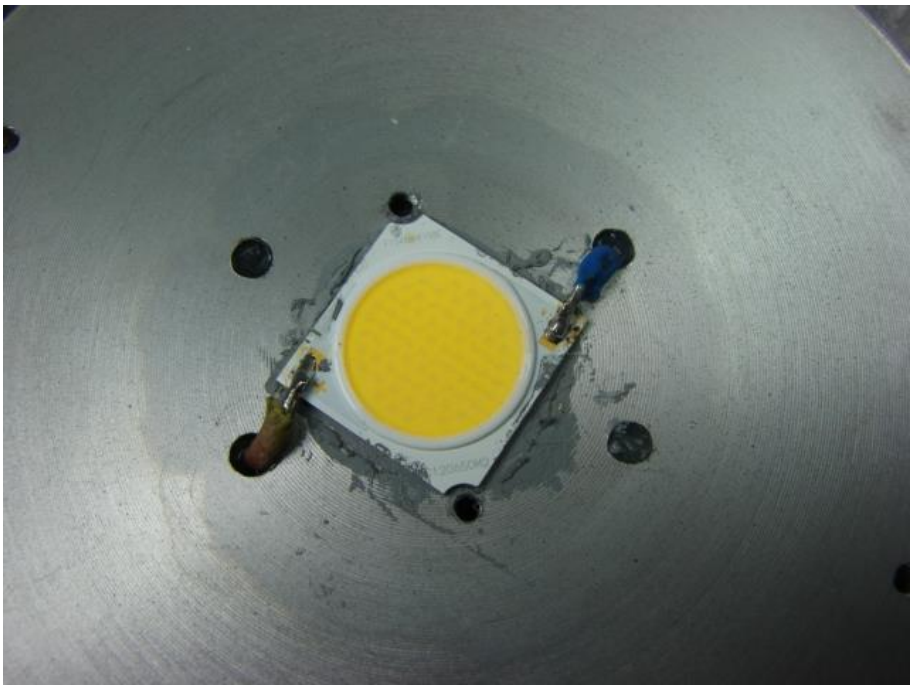
Picture 28: DLD0850C-850 connector view

Product: LED Downlight

Type Designation: See report



Picture 29: DLD0850C-850 LED module view



Picture 30: DLD0850C-850 LED detail view