Prüfbericht - Nr.: 11021810 001

Test Report No.:

Auftraggeber: *Client:*	SILQ (Malaysia) Sdn Bhd. (870706-T) 149, Jalan Sultan Azlan Shah Taman Perindustrian Bayan Lepas Fasa 1 (FTZ), Bayan Lepas, Pulau Pinang 11900, Malaysia
Gegenstand der Prüfung: *Test item:*	LED Down Light
Bezeichnung: *Identification:*	See page 1 of report
Serien-Nr.: *Serial No.:*	Engineering sample
Wareneingangs-Nr.: *Receipt No.:*	TCH28131
Eingangsdatum: *Date of receipt:*	18.08.2010
Prüfort: *Testing location:*	TÜV Rheinland Taiwan Ltd., Taichung Laboratory No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya Township Taichung County, 428 Taichung, Taiwan
Prüfgrundlage: *Test specification:*	EN 60598-1:2008 EN 60598-2-2:1996+A1:1997 EN 61347-1:2008 EN 61347-2-13:2006
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland Taiwan Ltd., Taichung Laboratory No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya Township Taichung County, 428 Taichung, Taiwan

geprüft/ *tested by:*

27 Oct. 2010 Julia Lai / Project Manager (TÜV Rheinland Taiwan Ltd.)

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

kontrolliert/ *reviewed by:*

26. Oct. 2010 Jordan Wu / Assistant Manager

Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges/ *Other Aspects:*

This report consists of this cover page and 34 page to EN 60598-1:2008, EN 60598-2-2:1996+A1:1997 and 16 page to EN 61347-1:2008, EN 61347-2-13:2006 for acceptance test of built-in LED power supply circuits.

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

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TEST REPORT

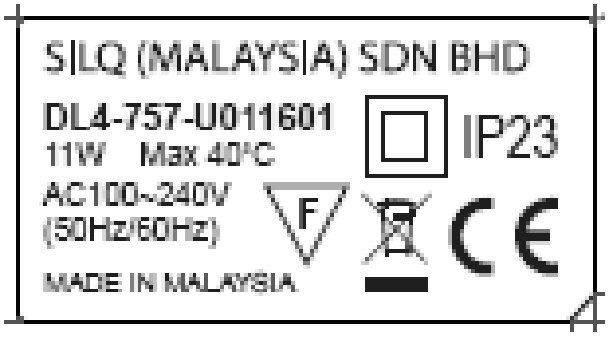
EN 60598-2-2

Part 2: Particular requirements

Section Two – Recessed luminaires

Report Reference No.....:	11021810 001	
Tested by (name+signature) .....:	See cover page	.....
Witnessed by (name+signature) .....:		.....
Supervised by (name+signature) .....:		.....
Approved by (name+signature).....:	See cover page	.....
Date of issue.....:	See cover page	
Testing Laboratory.....:	TÜV Rheinland Taiwan Ltd., Taichung Laboratory	
Address .....:	No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya Township Taichung County, 428 Taichung, Taiwan	
Testing address.....:	Same as above	
Applicant's name.....:	SILQ (Malaysia) Sdn Bhd. (870706-T)	
Address .....:	149, Jalan Sultan Azlan Shah Taman Perindustrian Bayan Lepas Fasa 1 (FTZ), Bayan Lepas, Pulau Pinang 11900, Malaysia	
Test specification:		
Standard .....:	EN 60598-2-2:1996+A1:1997 used in conjunction with EN 60598-1:2008	
Test procedure .....:	LVD report	
Procedure deviation .....:	German Deviation	
Non-standard test method……..:	N/A	
Test item description .....:	LED Down Light	
Trade Mark .....:	SILQ (MALAYSIA) SDN BHD	
Manufacturer .....:	Same as applicant	
Address .....:	Same as applicant	
Model/Type reference .....:	DL4-757-U011601, DL4-830-U011601, DL5-757-U014601 DL5-830-U014601, DL6-757-U021601, DL6-830-U021601	
Ratings .....:	AC100-240V, 50/60Hz DL4-757-U011601, DL4-830-U011601: 11W DL5-757-U014601, DL5-830-U014601: 14W DL6-757-U021601, DL6-830-U021601: 21W	

Copy of marking plate: representative model DL4-757-U011601



Summary of testing:

Specified maximum operating ambient temperature is 40°C.

The LED controlgears are additionally tested according to EN 61347-2-13.
Additionally evaluated according to EN 61347-2-13: 2006 for LED electronic control circuit incorporated in the lamps. Refer to Appendix 1 report for the evaluation.

Models DL4-757-U011601 and DL6-757-U021601 are selected as main tested models.

All models are additionally evaluated according to EN 62471:2008, photobiological safety of lamps and lamp systems, these LED luminaires are classified as exempt group. (TUV Report no. 10030062 001)

Possible test case verdicts:

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

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.
List of test equipment must be kept on file and available for review.
Throughout this report a comma (point) is used as the decimal separator.
In this report requirements valid for EN only are marked with (EN).

Factory(ies):
IQ Group Sdn Bhd.
149, Jalan Sultan Azlan Shah, Taman Perindustrian Bayan Lepas,
Fasa 1 (FTZ), Bayan Lepas, 11900 Pulau Pianang, Malaysia

General product information:

Tested appliance is recessed LED down light for installation to the ceiling. Detail means and steps for installation and wire connection are listed in the usre's manual.

Tested appliances are recessed LED lamps with built-in LED controlgear which is additional tested according to EN61347-2-13 as in appendix 1 report.

Differences between all models are as follows.
1. Rated wattage is different. (listed in page 1)
2. Color temperature of LED is different, models DL4-757-U011601, DL5-757-U014601 and DL6-757-U021601 are cool white (5700K), while models DL4-830-U011601, DL5-830-U014601 and DL6-830-U021601 are warm white (3000K).
3. Number of used LED is different. DL4-757-U011601 and DL4-830-U011601 use 9 pcs of LED, DL5-757-U014601 and DL5-830-U014601 use 12 pcs of LED, DL6-757-U021601 and DL6-830-U021601 use 18 pcs of LED.
4. Circuits of built-in LED power supply is different. DL4-757-U011601 and DL4-830-U011601 use same circuit and PCB layout, while DL5-757-U014601, DL5-830-U014601, DL6-757-U021601 and DL6-830-U021601 use same circuit and PCB layout (only few components with different values)
5. Dimension of construction.

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict

2.1 (0)	**SCOPE**		**P**
2.2 (0.1)	Intormation for luminaire disigend concerned .....:	Standard Yes ☐ No ☒	—
2.2 (0.3)	More sections applicable .....:	Yes ☒ No ☐ EN 61347-2-13: 2006 for LED electronic control circuit incorporated in the lamps	—

2.4 (2)	**CLASSIFICATION**		**P**
2.4 (2.2)	Type of protection .....:	Class II	—
2.4 (2.3)	Degree of protection .....:	IP 23	—
2.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces.....:	Yes ☒ No ☐	—
	Luminaire not suitable for direct mounting on normally flammable surfaces.....:	Yes ☐ No ☒	—
2.4 (2.5)	Luminaire for normal use .....:	Yes ☒ No ☐	—
	Luminaire for rough service .....:	Yes ☐ No ☒	—

2.5 (3)	**MARKING**		**P**
2.5.1 (-)	Warning notice, if not suitable for insulating ceiling	Statement is in user's manual	P
2.5 (3.2)	Mandatory markings		P
	Position of the marking	On the bottom enclosure	P
	Format of symbols/text		P
2.5 (3.3)	Additional information		P
	Language of instructions	English language	P
2.5 (3.3.1)	Combination luminaires		N/A
2.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
2.5 (3.3.3)	Operating temperatures	40°C	P
2.5 (3.3.4)	Symbol or warning notice		N/A
2.5 (3.3.5)	Wiring diagram		N/A
2.5 (3.3.6)	Special conditions		N/A
2.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
2.5 (3.3.8)	Limitation for semi-luminaires		N/A
2.5 (3.3.9)	Power factor and supply current		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.5 (3.3.10)	Suitability for use indoor	Statement is in user's manual	P
2.5 (3.3.11)	Luminaires with remote control		N/A
2.5 (3.3.12)	Clip-mounted luminaire-warning		N/A
2.5 (3.3.13)	Specifications of protective shields		N/A
2.5 (3.3.14)	Symbol for nature of supply		N/A
2.5 (3.3.15)	Rated current of socket outlet		N/A
2.5 (3.3.16)	Rough service luminaire		N/A
2.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Only terminal block provided for the connection to fixed wiring	N/A
2.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
2.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
2.5 (3.3.20)	Provided with information if not intended to be mounted within arms reach		N/A
2.5 (3.3.101)	Adequate warning on the package (EN)		N/A
2.5 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P

2.6 (4)	**CONSTRUCTION**		**P**
2.6 (4.2)	Components replaceable without difficulty	No replaceable components exist	N/A
2.6 (4.3)	Wireways smooth and free form sharp edges		P
2.6 (4.4)	Lampholders		N/A
2.6 (4.4.1)	Integral lampholder	No lampholder	N/A
2.6 (4.4.2)	Wiring connection		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
2.6 (4.4.4)	Positioning		N/A
	- pressure test (N) ..... :		N/A
	- bending test (Nm) ..... :		N/A
2.6 (4.4.5)	Peak pulse voltage		N/A
2.6 (4.4.6)	Centre contact		N/A
2.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
2.6 (4.4.8)	Lamp connectors	No lamp connector	N/A
2.6 (4.4.9)	Caps and bases correctly used		N/A
2.6 (4.5)	Starter holders		N/A
	Starter holders in luminaires other than class II	No starter holder	N/A
	Starter holder class II construction		N/A
2.6 (4.6)	Terminal blocks		P
	Tails		P
	Unsecured blocks		N/A
2.6 (4.7)	Terminals and supply connections		P
2.6 (4.7.1)	Contact to metal parts		P
2.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		N/A
2.6 (4.7.3)	Terminals for supply conductors		P
2.6 (4.7.3.1)	Welded connections:		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		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
2.6 (4.7.4)	Terminals other than supply connection		N/A
2.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
2.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.6 (4.8)	Switches:		N/A
	- adequate rating	No switch	N/A
	- adequate fixing		N/A
	- polarized supply		N/A
2.6 (4.9)	Insulating lining and sleeves		N/A
2.6 (4.9.1)	Retainment		N/A
	Method of fixing .....:		N/A
2.6 (4.9.2)	Insulated linings and sleeves		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C) .....:		N/A
2.6 (4.10)	Insulation of Class II luminaires		P
2.6 (4.10.1)	No contact, mounting surface - accessible metal parts - wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		P
	Interference suppression capacitors according to IEC 60384-14		P
2.6 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
2.6 (4.10.3)	Retainment of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
2.6 (4.11)	Electrical connections		P
2.6 (4.11.1)	Contact pressure		P
2.6 (4.11.2)	Screws:		N/A
	- self-tapping screws	Only machine type screw used in approved terminals	N/A
	- thread-cutting screws		N/A
	- at least two self-tapping screws		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.6 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
2.6 (4.11.4)	Material of current-carrying parts		P
2.6 (4.11.5)	No contact to wood	No wood part	P
2.6 (4.11.6)	Electro-mechanical contact systems	No such system	N/A
2.6 (4.12)	Mechanical connections and glands		P
2.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :	0.8 Nm applied on fixing scrxing screw of enclosure	P
2.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
2.6 (4.12.4)	Locked connections:		P
	- fixed arms; torque (Nm)..... :		N/A
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm..... :		N/A
2.6 (4.12.5)	Screwed glands; force (N) ..... :		N/A
2.6 (4.13)	Mechanical strength		P
2.6 (4.13.1)	Impact tests:		P
2.6.1 (-)	- recessed parts providing protection against electric shock; energy (Nm)..... :	0.35 Nm for recessed parts	P
	- other recessed parts; energy (Nm)..... :	0.35 Nm for non-recessed parts	P
2.6 (4.13.1)	- fragile parts; energy (Nm)..... :		N/A
	- other parts; energy (Nm) ..... :		N/A
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.6 (4.13.3)	Straight test finger		P
2.6 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher	Not for rough service	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
2.6 (4.13.6)	Tumbling barrel		N/A
2.6 (4.14)	Suspensions and adjusting devices		N/A
2.6 (4.14.1)	Mechanical load:		N/A
	A) four times the weight		N/A
	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
2.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....:		N/A
	Stress in conductors (N/mm²).....:		N/A
	Semi-luminaires - mass (kg).....:		N/A
	Semi-luminaires - bending moment (Nm).....:		N/A
2.6 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles .....:	No adjusting device	N/A
	- strands broken		N/A
	- electric strength test afterwards		N/A
2.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors	No telescopic tube	N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.6 (4.14.5)	Guide pulleys	No guide pulley	N/A
2.6 (4.14.6)	Strain on socket-outlets	No socket-outlet	N/A
2.6 (4.15)	Flammable materials:		P
	- glow-wire test 650 °C	For front lens	P
	- 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		N/A
1.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
2.6 (4.16)	Luminaires for mounting on normally flammable surfaces		P
	No lamp control gear	Electronic lamp control gear used	N/A
2.6 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm	Electronic lamp control gear used	N/A
	- spacing 10 mm		N/A
2.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
2.6 (4.16.3)	"F" curve measured		N/A
2.6 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
2.6 (4.18)	Resistance to corrosion:		P

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.6 (4.18.1)	- rust-resistance		P
2.6 (4.18.2)	- season cracking in copper		N/A
2.6 (4.18.3)	- corrosion of aluminium		N/A
2.6 (4.19)	Ignitors compatible with ballast	No ignitor	N/A
2.6 (4.20)	Rough service vibration		N/A
2.6 (4.21)	Protective shield:		N/A
2.6 (4.21.1)	Shield fitted		N/A
	Shield of glass if tungsten halogen lamps		N/A
2.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
2.6 (4.21.3)	No direct path		N/A
2.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
2.6 (4.22)	Attachments to lamps	No attachment to lamps	N/A
2.6 (4.23)	Semi-luminaires comply class II		N/A
2.6 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)	Not tungsten halogen lamps and metal halide lamps	N/A
2.6 (4.25)	No sharp point or edges		P
2.6 (4.26)	Short-circuit protection:		N/A
2.6 (4.26.1)	Uninsulated accessible SELV parts		N/A
2.6 (4.26.2)	Short-circuit test		N/A
2.6 (4.26.3)	Test chain according to Figure 29		N/A
2.6 (4.27)	Terminal blocks with integrated screwless earthing contacts		N/A
	Mounted in accordance with requirements specified by the manufacturer		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
2.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
	Working voltage (V) .....:	AC100-240V	—
	Voltage form	Sinusoidal ☒ Non-sinusoidal ☐	— —
	PTI	< 600 ☒ ≥ 600 ☐	—
	Rated pulse voltage (kV)		—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm).....:	For DL5 and DL6 series, Cr 4.6mm > 2.5mm Cl 4.6mm > 1.5mm between input L/N wires Cr 2.7mm > 2.5mm Cl 2.7mm > 1.5mm between fuse traces of different polarity For DL4 series, Cr 5.9mm > 2.5mm Cl 5.9mm > 1.5mm between input L/N wires Cr 2.7mm > 2.5mm Cl 2.7mm > 1.5mm between fuse traces of different polarity	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm).....:	For DL5 and DL6 series, Cr 6.7mm > 5mm, Cl 6.7mm > 3mm between live parts on PCB and external enclosure For DL4 series, Cr 5.9mm > 5mm, Cl 5.9mm > 3mm between live parts on PCB and external enclosure	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm) .....:	For DL5 and DL6 series, Cr 4.7mm > 3.6mm, Cl 4.7mm > 3.6mm between basic insulated L/N wires and external enclosure For DL4 series Cr 3.8mm > 3.6mm, Cl 3.8mm > 3.6mm between basic insulated L/N wires and external enclosure	P
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm).....:		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
	(5) Not used		--
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) ..... :	For DL5 and DL6 series, Cr 6.7mm > 5mm, Cl 6.7mm > 3mm between live parts on PCB and supporting surface For DL4 series Cr 5.9mm > 5mm, Cl 5.9mm > 3mm between live parts on PCB and supporting surface	P

2.8 (7)	**PROVISION FOR EARTHING**		**N/A**
2.8 (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
	Two 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
2.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		N/A
2.8 (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
2.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
2.8 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
2.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
2.8 (7.2.8)	Material of earth terminal		N/A
	Contact surface bare metal		N/A
2.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
2.8 (7.2.11)	Earthing core coloured green-yellow		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
	Length of earth conductor		N/A
2.9 (14)	**SCREW TERMINALS**		**P**
	Separately approved; component list	(see annex 1)	P
	Part of the luminaire		N/A
2.9 (15)	**SCREWLESS TERMINALS**		**N/A**
	Separately approved; component list		N/A
	Part of the luminaire		N/A
2.10 (5)	**EXTERNAL AND INTERNAL WIRING**		**P**
2.10 (5.2)	Supply connection and external wiring		P
2.10 (5.2.1)	Means of connection.....:	Terminal block provided	P
	Connecting leads (EN)		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)	Type of cable .....:	Only terminal block provided for the connection to fixed wiring	N/A
	Cables equal to HD21 S2 or HD22 S2 (EN)		N/A
	Nominal cross-sectional area (mm²).....:		N/A
2.10 (5.2.3)	Type of attachment, X, Y or Z		N/A
2.10 (5.2.5)	Type Z not connected to screws		N/A
2.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
2.10 (5.2.7)	Cable entries through rigid material have rounded edges	No sharp edges exist in cable entries	P

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Cl.	Requirement – Test	Result	Verdict
2.10 (5.2.8)	Insulating bushings:		N/A
	- 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
2.10 (5.2.9)	Locking of screwed bushings		N/A
2.10 (5.2.10)	Cord anchorage:		N/A
	- covering protected from abrasion		N/A
	- clear how to be effective		N/A
	- no mechanical or thermal stress		N/A
	- no tying of cables into knots etc.		N/A
	- insulating material or lining		N/A
2.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	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
2.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
2.10 (5.2.10.3)	Tests:		N/A
	- impossible to push cable; unsafe		N/A
	- pull test: 25 times; pull (N) ..... :		N/A
	- torque test: torque (Nm) ..... :		N/A
	- displacement ≤ 2 mm		N/A
	- no movement of conductors		N/A
	- no damage of cable or cord		N/A

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Cl.	Requirement – Test	Result	Verdict
2.10 (5.2.11)	External wiring passing into luminaire		N/A
2.10 (5.2.12)	Looping-in terminals		P
2.10 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
2.10 (5.2.14)	Mains plug same protection	Plug not provided	N/A
	Class III luminaire plug		N/A
2.10 (5.2.15)	Colour code low voltage (EN)		N/A
2.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
2.10 (5.2.17)	Non standardized interconnecting cables properly assembled		N/A
2.10 (5.2.18)	Used plug in accordance with:		N/A
	- IEC 60083		N/A
	- other standard		N/A
2.10 (5.3)	Internal wiring		P
2.10 (5.3.1)	Internal wiring of suitable size and type	Input wires to PCB: Min. 20AWG, 600V, 105°C Wires to LED: Min. 24AWG, 300V, 80°C	P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A)..... :		N/A
	- temperatures..... :		N/A
	Green-yellow for earth only	No earth connection, no Green-yellow wire	N/A
2.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm²) ..... :		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A

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Cl.	Requirement – Test	Result	Verdict
2.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Adequate cross-sectional area and insulation thickness		N/A
2.10 (5.3.1.3)	Double or reinforced insulation for class II		P
2.10 (5.3.1.4)	Conductors without insulation		N/A
2.10 (5.3.1.5)	SELV current-carrying parts		P
2.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
2.10 (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°		P
2.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
2.10 (5.3.4)	Joints and junctions effectively insulated		N/A
2.10 (5.3.5)	Strain on internal wiring		N/A
2.10 (5.3.6)	Wire carriers		N/A
2.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		P

2.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		**P**
2.11 (8.2.1)	Live parts not accessible		P

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Cl.	Requirement – Test	Result	Verdict
	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	Not portable and adjustable luminaires	N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, within arms reach, on wall-mounted luminaires		N/A
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements	Not portable and adjustable luminaires	N/A
	Basic insulation only accessible under lamp or starter replacement	Non-replaceable LED lamp used	N/A
	Protection in any position		P
	Double-ended tungsten filament lamp	Not double-ended tungsten filament lamp	N/A
	Insulation lacquer not reliable		N/A
	Double-ended high pressure discharge lamp	Not double-ended high pressure discharge lamp	N/A
	Relevant warning according to 3.2.18 fitted to the luminaire	Luminaire without ignitor	N/A
2.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position	Fixed luminaires	N/A
2.11 (8.2.3 a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement	Non replaceable LED bulb	N/A
	- basic insulation not accessible other than during starter or lamp replacement	Non replaceable LED bulb	N/A
	- glass protective shields not used as supplementary insulation		N/A
2.11 (8.2.3 b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
2.11 (8.2.3 c)	Class III luminaires with exposed SELV parts:		N/A
	Ordinary luminaire:		N/A
	- touch current .....:		N/A
	- no-load voltage .....:		N/A
	Other than ordinary luminaire:		
	- nominal voltage .....:		N/A

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Cl.	Requirement – Test	Result	Verdict
2.11 (8.2.4)	Portable luminaire:		N/A
	- protection independent of supporting surface		N/A
	- terminal block completely covered		N/A
2.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
2.11 (8.2.6)	Covers reliably secured		P
	Cover fixing is not dependent on screws and whose removal is by a force in an perpendicular direction to mounting surface, shall comply with following test		N/A
	When the opening of the cover will give access to basic insulated parts - force 20 N		N/A
	When the opening of the cover will give access to live parts - force 80N		N/A
2.11 (8.2.7)	Discharging of capacitors ≥ 0,5 μF	Less than 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

2.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		**P**
2.12 (12.3)	Endurance test:		P
	- mounting-position ..... :	Mounted according to manual	—
	- test temperature (°C) ..... :	50 °C	—
	- total duration (h) ..... :	240h	—
	- supply voltage: Un factor; calculated voltage (V)	AC 240Vx1.1	—
	- lamp used ..... :	Led	—
2.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P

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Cl.	Requirement – Test	Result	Verdict
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
2.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
2.12 (12.5)	Thermal test (abnormal operation)	Additional fault condition test is conducted for LED driver, see report of EN 61347-2-13	N/A
2.12 (12.6)	Thermal test (failed lamp control gear condition):		N/A
2.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) .....:		—
	- case of abnormal conditions.....:	Additional fault condition test is conducted for LED driver, see report of EN 61347-2-13	—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un...:		—
	- measured mounting surface temperature (°C): at 1,1 Un:		N/A
	- calculated mounting surface temperature (°C)....:		N/A
	- track-mounted luminaires		N/A
2.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions.....:		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C): ..:		N/A
	- track-mounted luminaires		N/A
2.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
2.12 (12.7.1)	Luminaire without temperature sensing control		N/A
2.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex V.....:		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		—

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Cl.	Requirement – Test	Result	Verdict
	- Ballast failure at supply voltage (V) .....:		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex V:		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un..:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C).....:		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C).....:		N/A
	- part tested; temperature (°C).....:		N/A
2.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un..:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C).....:		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C).....:		N/A
	- part tested; temperature (°C).....:		N/A
2.12 (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
2.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link	Yes ☐ No ☐	—
	- manual reset cut-out	Yes ☐ No ☐	—

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Cl.	Requirement – Test	Result	Verdict
	- auto reset cut-out	Yes ☐ No ☐	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part (°C): ..... :		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
2.13 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		**P**
2.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP ..... :	IP 23	—
	- mounting position during test..... :	Within recessed box	—
	- fixing screws tightened; torque (Nm)..... :	No fixing screw	—
	- tests according to clauses ..... :	C9.2.0 & C9.2.4	—
	- electric strength test afterwards	See 10.2.2	P
	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 where it could become a hazard		P
	d) i) For luminaires without drain holes – no water entry		P
	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 (IP 3X and IP 4X)		N/A
	g) no trace of water on part of lamp requiring protection from splashing water		P
	h) no damage of protective shield or glass envelope		N/A
2.13 (9.3)	Humidity test 48 h		P
2.14 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		**P**

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Cl.	Requirement – Test	Result	Verdict
2.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....:	Cable covered by metal foil	-
	Insulation resistance (MΩ):		P
	SELV:		P
	- between current-carrying parts of different polarity .....:	>100 MΩ	P
	- between current-carrying parts and mounting surface .....:	>100 MΩ	P
	- between current-carrying parts and metal parts of the luminaire .....:	>100 MΩ	P
	Other than SELV:		P
	- between live parts of different polarity.....:	1000 MΩ	P
	- between live parts and mounting surface.....:	1000 MΩ	P
	- between live parts and metal parts.....:	1000 MΩ	P
	- between live parts of different polarity through action of a switch .....:		N/A
2.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V):		P
	SELV:		P
	- between current-carrying parts of different polarity:	500V	P
	- between current-carrying parts and mounting surface .....:	500V	P
	- between current-carrying parts and metal parts of the luminaire .....:	500V	P
	Other than SELV:		P
	- between live parts of different polarity.....:	3710V	P
	- between live parts and mounting surface.....:	3710V	P
	- between live parts and metal parts.....:	3710V	P
	- between live parts of different polarity through action of a switch .....:		N/A

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Cl.	Requirement – Test	Result	Verdict
2.14 (10.3.1)	Touch current (mA).....:	Worse cases selected for test DL4-757-U011601: 18.8uA DL6-757-U021601: 28.8uA	P

2.15 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**P**
2.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C).....:	For plastic bottom enclosure; 82°C, diameter of impression is 0.4 mm < 2 mm	P
2.15 (13.3.1)	Needle flame test (10 s):		N/A
	- part tested.....:		N/A
2.15 (13.3.2)	Glow-wire test (650°C):		P
	- part tested.....:	plastic bottom enclosure	P
	- part tested.....:	Front lens	P
2.15 (13.4.1)	Tracking test: part tested .....:		N/A

ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		**P**
(2.2)	Class 0 not accepted		P
(3.3)	DK: power supply cord with label	Not applied for DK	N/A
	IT: warning label on Class 0 luminaire		N/A
(4.5.1)	DK: socket-outlets	Not applied for DK	N/A
(4.5.1)	FR: socket-outlets	Not applied for FR	N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug	Not applied for FR CY, DK, FI, SE, GB	N/A

ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		**P**
(13.3)	DK: Needle flame test during 30 s	Not applied for DK	N/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation	Not applied for GB	N/A

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Cl.	Requirement – Test	Result	Verdict
(13.3.2)	FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public or 960°C for luminaires in emergency exits	Not applied for FR	N/A

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Cl.	Requirement – Test	Result	Verdict

	ANNEX 1: components	**P**

object/part No.	Manufac-turer/trademark	type/model	technical data	standard	mark(s) of conformity[1])
LED bulb	Luxeon Rebel	LXML-PWC1-0100	Cool white, 1W	---	---
	Luxeon Rebel	LXM3-PW71	Warm white, 1W	---	---
Terminal Block	Wago	293-553	AC450V, 24A, 0.5-2.5 mm²	EN 60998-1:1993+A1 EN 60998-2-2:1993	VDE
Input wire to PCB	Various manufacturer	UL1015	Min. 20AWG, 600V, 105°C	--	UL
Power supply output wire to LED	Various manufacturer	UL1007	Min. 24AWG, 300V, 80°C	---	UL
X1 Capacitor	Cheng Tung Ind. Co.	CTX	AC300V, 0.1uF, 100℃	EN 60384-14:2005	VDE
Y1 capacitor	TDK Corp.	CD	AC400V, 2200pF/125℃	EN 60384-14:2005	VDE
Current fuse	Conquer Electronics Co.	MSF	AC250V, 3.15A	EN 60127-1:2006 EN 60127-3:1996+A2	VDE
Varistor (MOV)	Centra Science Corp.	CNR10D471K	Max. AC680V, 25A	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE
Photo coupler (U2)	Sharp Corp.	PC817	dti. >0.4mm, ext. cr. 8mm, int. cr. 4.8mm	DIN EN 60747-5-2, IEC/EN 60950-1	VDE
PCB	Various manufacturer	---	Flame Class V-0, 105℃	--	UL
Material for front cover (Lens)	Teijin	PC L-1225Z	Flame Class V-2, 115℃	--	UL
Insulating material for bottom enclosure	Teijin	PC LN-1250G	Flame Class V-0, 115℃	--	UL

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Cl.	Requirement – Test	Result	Verdict

Transformer T1 (for DL4 series)	Comax Tech. Ltd.	FEF020010025H	Class B, 130°C	---	---
Transformer T1 (for DL5 & DL6 series)	Comax Tech. Ltd.	FEF025010040H-PF	Class B, 130°C	---	---
Bobbin Material for Transformer T1	Chang Chun Plastics Co., Ltd.	T375J, T-355J, T-373J	Phenolic, min. V-0, 150°C.	UL 94	UL
Triple Insulated Wire (used for transformer secondary winding)	Furukawa Electric Co., Ltd.	TEX-B	130°C.	IEC/EN 60950-1	VDE
	Dah Jin Tech. Co., Ltd.	TLW-B	130°C	IEC/EN 60950-1	VDE
[1]) an asterisk indicates a mark which assures the agreed level of surveillance					

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Cl.	Requirement – Test	Result	Verdict
	ANNEX 2: temperature measurements, thermal tests of Section 12		**P**
	Type reference ..... :	1) DL4-757-U011601 2) DL6-757-U021601	—
	Lamp used ..... :	Led	—
	Lamp control gear used ..... :	Electronic control gear	—
	Mounting position of luminaire ..... :	Recessed to ceiling, mounted according to manual	—
	Supply wattage (W) ..... :	1) 11W 2) 21W	—
	Supply current (A) ..... :	-------	—
	Calculated power factor ..... :	-------	—
	Table: measured temperatures corrected for ta = 40 °C:		
	- abnormal operating mode ..... :	Not applicable	—
	- test 1: rated voltage ..... :	Not applicable	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :	a)100V x 1.06 b)240V x 1.06	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	Not applicable	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :	Not applicable	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	Not applicable	—

temperature (°C) of part	clause 12.4 - normal				clause 12.5 - abnormal	
DL4-757-U011601 condition a)	test 1	test 2	test 3	limits	test 4	limit
Input L wire near fuse	--	46.3	--	90	--	--
X1 capacitor C2	--	55.7	--	100	--	--
Capacitor C13	--	62.6	--	105	--	--
Y1 Capacitor C10	--	63.6	--	125	--	--
PCB under Q3	--	58.6	--	105	--	--

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Cl.	Requirement – Test	Result	Verdict

Winding of transformer T1	--	67.2	--	120	--	--
Varistor Z1 near transformer	--	48.7	--	85	--	--
U2 body	--	60.8	--	--	--	--
Power supply output wire near PCB	--	56.7	--	80	--	--
Inside enclosure near transformer	--	51.9	--	115	--	--
Power supply output wire near LED	--	54.5	--	80	--	--
Internal surface of front cover of LED	--	80.4	--	90	--	--
Mounting surface	--	47.3	--	90	--	--
Lighted surface	--	41.8	--	90	--	--
Ambient	--	40	--	--	--	--
DL4-757-U011601 condition b)	test 1	test 2	test 3	limits	test 4	limit
Input L wire near fuse	--	49.1	--	90	--	--
X1 capacitor C2	--	62.3	--	100	--	--
Capacitor C13	--	63.2	--	105	--	--
Y1 Capacitor C10	--	66.4	--	125	--	--
PCB under Q3	--	67.5	--	105	--	--
Winding of transformer T1	--	71	--	120	--	--
Varistor Z1 near transformer	--	53.7	--	85	--	--
U2 body	--	63.6	--	--	--	--
Power supply output wire near PCB	--	57.1	--	80	--	--
Inside enclosure near transformer	--	54.4	--	115	--	--
Power supply output wire near LED	--	54.7	--	80	--	--
Internal surface of front cover of LED	--	79.8	--	90	--	--
Mounting surface	--	47.4	--	90	--	--

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Cl.	Requirement – Test	Result	Verdict

Lighted surface	--	41.5	--	90	--	--
Ambient	--	40	--	--	--	--
DL6-757-U021601, condition a)	test 1	test 2	test 3	limits	test 4	limit
Input wire near transformer	--	57.1	--	90	--	--
X1 capacitor C2	--	62.9	--	100	--	--
Capacitor C13 near D7	--	55.4	--	105	--	--
Y1 Capacitor C22	--	59	--	125	--	--
PCB under Q3	--	63.7	--	105	--	--
Winding of transformer T1	--	65	--	100	--	--
Varistor Z1 near transformer	--	62.2	--	85	--	--
U2 body	--	52.2	--	125	--	--
Power supply output wire near PCB	--	49.2	--	130	--	--
Inside enclosure near heat sink of Q3	--	56.1	--	115	--	--
Power supply output wire near LED	--	55.8	--	80	--	--
Internal surface of front cover of LED	--	65.2	--	90	--	--
Mounting surface	--	46.7	--	90	--	--
Lighted surface	--	42.3	--	90	--	--
Ambient	--	40	--	--	--	--
DL6-757-U021601, condition b)	test 1	test 2	test 3	limits	test 4	limit
Input wire near transformer	--	57.6	--	90	--	--
X1 capacitor C2	--	61.6	--	100	--	--
Capacitor C13 near D7	--	55.8	--	105	--	--
Y1 Capacitor C22	--	61.3	--	125	--	--
PCB under Q3	--	71.7	--	105	--	--
Winding of transformer T1	--	67.1	--	120	--	--

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Cl.	Requirement – Test	Result	Verdict

Varistor Z1 near transformer	--	63.5	--	85	--	--
U2 body	--	53.9	--	--	--	--
Power supply output wire near PCB	--	49.6	--	80	--	--
Inside enclosure near heat sink of Q3	--	56.8	--	115	--	--
Power supply output wire near LED	--	56	--	80	--	--
Internal surface of front cover of LED	--	65.6	--	90	--	--
Mounting surface	--	46.9	--	90	--	--
Lighted surface	--	42.4	--	90	--	--
Ambient	--	40	--	--	--	--

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Cl.	Requirement – Test	Result	Verdict

	ANNEX 3: screw terminals (part of the luminaire)	**N/A**

(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

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict

	ANNEX 4: screwless terminals (part of the luminaire)	**N/A**

(15)	**SCREWLESS TERMINALS**		**N/A**
(15.2)	Type of terminal ..... :		—
	Rated current (A) ..... :		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	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
(15.5.2)	Permanent connections: pull-off test (20 N)		N/A
(15.6)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples) ..... :		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles ..... :		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples) ..... :		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples) ..... :		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) ..... :		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) ..... :		N/A
(15.7)	Terminals external wiring		N/A
	Terminal size and rating		N/A

EN 60598-2-2			
Cl.	Requirement – Test	Result	Verdict
(15.8.1)	Pull test spring-type terminals or weded connections (4 samples); pull (N) .....:		N/A
`	Pull test pin or tab terminals (4 samples); pull (N) .....:		N/A
(15.9)	Contact resistance test		N/A
	Voltage drop (mV) after 1 h		N/A

terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

	Voltage drop of two inseparable joints		N/A
	Voltage drop after 10th alt. 25th cycle		N/A
	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		N/A
	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		N/A
	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		N/A
	Max. allowed voltage drop (mV) .....:		—

terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

TÜVRheinland®

Appendix 1 for report 11021810 001
TEST REPORT
EN 61347-2-13
Part 2: Particular requirements
Section Thirteen – d.c. or a.c. supplied electronic controlgear for LED modules

Report Reference No. .....:	11021810 001
Date of issue .....:	See cover sheet
Total number of pages .....:	See cover sheet
CB Testing Laboratory.....:	TÜV Rheinland Taiwan Ltd., Taichung Laboratory
Address .....:	No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya Township Taichung County, 428 Taichung, Taiwan
Applicant's name.....:	SILQ (Malaysia) Sdn Bhd. (870706-T)
Address .....:	149, Jalan Sultan Azlan Shah, Taman Perindustrian Bayan Lepas, Fasa 1 (FTZ), Bayan Lepas, 11900 Pulau Pianang, Malaysia
Test specification:	
Standard.....:	EN 61347-2-13:2006 used in conjunction with EN 61347-1:2008
Test procedure .....:	TÜV Rheinland-Acceptance test
Non-standard test method……..:	N/A
Test Report Form No.....:	IEC61347_2_13B
TRF Originator.....:	Intertek Semko AB
Master TRF .....:	Dated 2007-11

Test item description .....:	Built-in LED power supply
Trade Mark .....:	N/A (partial circuit of luminaire)
Manufacturer .....:	Same as applicant
Model/Type reference .....:	N/A (partial circuit of luminaire)

Ratings .....:	Pri: AC100-240V, 50/60Hz, Sec: For circuit of luminaire DL4-757-U011601 & DL4-830-U011601: 9W, max. 29.7Vdc, 350mA For circuit of luminaire DL5-757-U014601, DL5-830-U014601: 12W, max. 39.6Vdc, 350mA For circuit of luminaire DL6-757-U021601, DL6-830-U021601: 18W, max. 59.4Vdc, 350mA

Testing procedure and testing location:	
☒ **CB Testing Laboratory**:	TÜV Rheinland Taiwan Ltd., Taichung Laboratory
Testing location/ address ..... :	No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya Township Taichung County, 428 Taichung, Taiwan
☐ **Associated CB Laboratory:**	
Testing location/ address ..... :	
Tested by (name + signature)..... :	See cover page
Approved by (+ signature)..... :	See cover page
☐ Testing procedure: TMP	
Tested by (name + signature)..... :	
Approved by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: WMT	
Tested by (name + signature)..... :	
Witnessed by (+ signature) ..... :	
Approved by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: SMT	
Tested by (name + signature)..... :	
Approved by (+ signature)..... :	
Supervised by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: RMT	
Tested by (name + signature)..... :	
Approved by (+ signature)..... :	
Supervised by (+ signature)..... :	
Testing location/ address ..... :	

Summary of testing:	
Tests performed (name of test and test clause): The test conditions in this report are performed with max. output load condition. Specified maximum operating ambient temperature is 40°C. This report is for acceptance test of built-in LED power supply circuits used in recessed luminaire DL4 series, DL5 series and DL6 series. Only partial tests in following sub-clauses were considered to be necessary. Clause 8, Clause 11, Clause 12, Clause 14, Clause 16, Clause 17, Clause 18, Clause 20.	**Testing location:** TÜV Rheinland Taiwan Ltd. Taichung Laboratory No. 9, Ln. 36, Sec. 3, Minsheng Rd., Daya Township Taichung County, 428 Taichung, Taiwan
Summary of compliance with National Differences: N/A	

Copy of marking plate: N/A (partial circuit of luminaire)

Test item particulars ..... :	Built-in LED power supply
..... :	Terminal block provided for input connection

Possible test case verdicts:

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

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 61347-1.

Factory(ies):

IQ Group Sdn Bhd.
149, Jalan Sultan Azlan Shah, Taman Perindustrian Bayan Lepas,
Fasa 1 (FTZ), Bayan Lepas, 11900 Pulau Pianang, Malaysia

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
8 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**P**
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	The current flowing between the part concerned and earth is measured and does not exceed 0,7 mA (peak) or 2 mA d.c. ..... :	DL4-757-U011601 Between output (+) and earth: 0.45mA Between output (-) and earth: 0.43mA DL6-757-U021601 Between output (+) and earth: 0.42mA Between output (-) and earth: 0.42mA	P
- (A2)	For frequencies above 1 kHz, the current does not exceed 0,7 mA (peak) multiplied by the value of the frequency in kilohertz or 70 mA (peak) ..... :		N/A
- (A3)	The voltage between the part concerned and any accessible part is measured and does not exceed 34 V (peak) ..... :		N/A
- (10.1)	Lacquer or enamel not used for protection or insulation	Not used	P
	Adequate mechanical strength on parts providing protection		P
- (10.2)	Capacitors > 0,5 µF: voltage after 1 min (V): < 50 V:	Less than 0.5 uF	N/A
8.1 (-)	SELV-equivalent controlgear accessible parts are insulated from live parts by double or reinforced insulation according 8.6 and 13.1 in IEC 60065	The accessible parts are insulated from live parts by double or reinforced insulation.	P
8.2 (-)	Exposed terminals of SELV or SELV-equivalent controlgear are allowed if: - the rated or maximum output voltage does not exceeding 25 V r.m.s. - the no-load output voltage does not exceed 30 V r.m.s. or 33 √2 V peak	No exposed terminals.	N/A
	Insulated terminals if rated output voltage >25 V	No exposed terminals.	N/A

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	One capacitor Y1 or two capacitors Y2 of the same values used in series between SELV or SELV-equivalent output and primary circuits - Capacitor complying with IEC 60384-14 - Other components bridging the separating transformer complying with IEC 60065, clause 14	One Y1 capacitor complying with IEC 60384-14 is connected between primary circuit and secondary circuit.	P
11 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	≥ 2 MΩ for basic insulation ..... :	Humidity treatment performed after storage 48 h at 93% and 25°C. Different polarity (L-N): 9999MΩ (Fuse opened)	P
	≥ 4 MΩ for double or reinforced insulation ..... :	L, N together and body: 9999MΩ SELV and body: 4345MΩ	P
11 (-)	Adequate insulation between input and output terminals not bounded together in SELV-equivalent controlgear	Between input and output: 9999MΩ	P
12 (12)	**ELECTRIC STRENGTH**		**P**
	Immediately after clause 11 electric strength test for 1 min		P
	Working voltage ≤ 42 V, test voltage 500 V	SELV-body: AC 500V	P
	Working voltage > 42 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	Class II	P
	Supplementary insulation, 2U + 1750 V		P
	Double or reinforced insulation, 4U + 2750 V	Primary-SELV: AC 3710V Primary-body: AC 3710V	P
	No flashover or breakdown		P
	Windings in separating transformers in SELV-equivalent control gear according to 14.3.2 of EN 60065		P

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
14 (14)	**FAULT CONDITIONS**		**P**
	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)		P
	Distances on printed boards provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	P
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	After the tests the insulation resistance with d.c. 500 V (MΩ) are ≥ 1 MΩ .....:	More than 1 MΩ	P
	After the tests the accessible parts has not become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
	Temperature declared thermally protected controlgear fulfil the requirements in Annex C		P
16	**ABNORMAL CONDITIONS**		**P**
	Safety not impaired when the controlgear is operated at any voltage between 90% and 110% of rated voltage		P
16.1	Control gear which are of the constant voltage output type:		—

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	a) No LED module inserted		N/A
	b) Double LED modules or equivalent load connected to the output terminals		N/A
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)		N/A
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		N/A
16.2	Control gear which are of the constant current output type:		—
	a) No LED module connected	(see appended table)	P
	b) Double the LED modules or equivalent load connected in series to the output terminals	(see appended table)	P
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)	(see appended table)	P
	Maximum output voltage not exceeded		P
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced	Compliance checked.	P

17 (15)	**CONSTRUCTION**		**P**
- (15.1)	Wood, cotton, silk, paper and similar fibrous material not used as insulation	No such materials	P
- (15.2)	Printed boards used as internal connections complies with clause 14 of IEC 61347-1		P
	Socket-outlet in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906	No socket-outlet used	N/A
	Not possible to engage plugs accepted by socket-outlet in the output circuit with socket-outlets complying with IEC 60083 and IEC 60906		N/A

18 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
	Creepage distances and clearances according to Table 3 and 4, as appropriate	(see appended table)	P
	Printed boards see clause 14 of IEC 61347-1		P
	Insulating lining of metallic enclosures	With insulating enclosure.	N/A

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
20 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**P**
20 (18.1)	Parts of insulating material retaining live parts in position, ball-pressure test:		P
	- part; test temperature (°C) .....:	For plastic enclosure; 82°C, diameter of impression is Ø 0.4 mm < 2 mm	P
20 (18.2)	Printed boards in accordance with IEC 60249-1, 4.3		P
20 (18.3)	External parts of insulating material preventing electric shock glow-wire test 650 °C	For plastic enclosure	P
20 (18.4)	Parts of insulating material retaining live parts in position, needle-flame test 10 s:		N/A
	- flame extinguished within 30 s		N/A
	- no flaming drops igniting tissue paper		N/A

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

14	**TABLE: tests of fault conditions**	**P**
Model: DL6-757-U021601 : at 264V, 50Hz, 23.3W, 91mA (output: 52.1V, 345mA)		
Part	Simulated fault	Hazard
C3	Short-circuited. No operation. F1 opened immediately (input current: 8mA)	NO
C4	Short-circuited. Power shutdown (input current: 57-61mA, output: 45V, 0A). Unable to recover after removal of fault	NO
C13	Short-circuited. Normal operation to output oscillating for 12 minutes (Input current form 0.27A to 0.13A), 1 minute after, no operation, R11, R12, R14, R16 and Pad damaged. Input current decreased to 0.01A.	NO
D4	Short-circuited. Normal operation (input current: 101mA, output: 49.4V, 92mA)	NO
D6	Short-circuited. Power shutdown (input current: 20mA, output: 22.8-23.7V, 0A). Normal operation after removal of fault.	NO
Two pins of D1	Short-circuited. No operation. F1 opened immediately (input current: 8mA)	NO
G& D of Q3	Short-circuited. No operation. F1 opened immediately, R11-12, R14, R15-16, C8 and Pad damaged (input current: 8mA)	NO
Pin 1 & pin 2 of IC U1	Short-circuited. Power shutdown (input current: 17mA, output: 0.15V, 0A). Normal operation after removal of fault.	NO
Pin 6 & pin 7 of IC U1	Short-circuited. Power shutdown (input current: 17mA, output: 0.47V, 0A). Normal operation after removal of fault.	NO
Pin 1 & pin 2 of IC U2	Short-circuited. Normal operation. Input current form 0.26A to 0.23A (output form 55V to 54V, 0.83A to 0.79A) for forty minutes. Highest temperature at: T1 winding about 90°C, ambient: 26°C. Normal operation after removal of fault.	NO
Pin 3 & pin 4 of IC U2	Short-circuited. Power shutdown. input current: 18mA	NO
No load	Unit shutdown (output: 60.7V~63V)	NO
Output short circuit	Unit oscillating to no operation for 4 minutes. F1 opened immediately, R11-12, R14, R16, C8 and Pad damaged. Input current form 0.13A to 0.01A. Highest temperature at: T1 winding about 126.3°C, ambient: 40°C.	NO

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

18 (16)	**TABLE: creepage distances and clearances**					**P**
	Minimum distances for a.c. (50/60 Hz) sinusoidal voltages					
RMS working voltage (V) not exceeding	50	150	250	500	750	1000
a) between live parts of different polarity. Specify the value measured.			See EN60598-2-2 report			
b) between live parts and accessible metal parts which are permanently fixed to the lamp control gear, including screws or devices for fixing covers or fixing the lamp control gear to its support. Specify the value measured.			N/A			
c) for ballasts declared not to rely on the luminaire enclosure for protection against electric shock – between live parts and the outer accessible surface of insulating parts. Specify the value measured.			N/A			
- required creepage distances (mm)						
– Basic insulation PTI ≥ 600	0,6	0,8	1,5	3	4	5,5
< 600	1,2	1,6	**2,5**	5	8	10
	–	–	--	–	–	–
– Supplementary insulation PTI ≥ 600	–	0,8	1,5	3	4	5,5
< 600	–	1,6	**2,5**	5	8	10
	–	–	N/A	–	–	–
– Reinforced insulation	–	3,2 [c]	**5** [c]	6	8	11
	–	–	See below table 18	–	–	–
- required clearances (mm)						
– Basic insulation	0,2	0,8	**1,5**	3	4	5,5
	–	–	--	–	–	–
– Supplementary insulation	–	0,8	**1,5**	3	4	5,5
	–	–	N/A	–	–	–
– Reinforced insulation	–	1,6	**3**	6	8	11

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

	–	–	See below table 18	–	–	–	
Minimum distances for non-sinusoidal pulse voltages							
rated pulse voltage (peak kV)	2,0	2,5	3,0	4,0	5,0	6,0	8,0
required minimum distances, clearances (mm)	1,0	1,5	2	3	4	5,5	8
Specify the value measured	-	-	-	-	-	-	-
rated pulse voltage (peak kV)	10	12	15	20	25	30	40
required minimum distances, clearances (mm)	11	14	18	25	33	40	60
Specify the value measured	-	-	-	-	-	-	-
rated pulse voltage (peak kV)	50	60	80	100	-	-	-
required minimum distances, clearances (mm)	75	90	130	170	-	-	-
Specify the value measured	-	-	-	-	-	-	-

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict

18 (16)	**TABLE: creepage distances and clearances measurements:**				**P**
Clearance cl and creepage distance cr at/of:	Ur.m.s.(V)	required cl (mm)	cl (mm)	required cr (mm)	cr (mm)
For circuit of luminaire DL4-757-U011601 & DL4-830-U011601					
Primary traces to secondary traces (primary photocoupler to secondary photocoupler)	240	3.0	6.4	5.0	6.7
Primary winding and secondary winding of transformer	240	3.0	9.1	5.0	9.1
For circuit of luminaire DL5-757-U014601, DL5-830-U014601, DL6-757-U021601 and DL6-830-U021601					
Primary traces to secondary traces (pads for primary input wire to capacitor C14 in secondary)	240	3.0	5.0	5.0	6.7
Primary winding and secondary winding of transformer	240	3.0	12.1	5.0	12.1

EN 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
A	**ANNEX A (NORMATIVE), TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK**		**P**
A.2	See clause 8 A.2 in this Test Report		P
A.3	See clause 8 A.3 in this Test Report		N/A

Measuring and Test Equipment List for :

Customer:	**IQ Group Sdn. Bhd. (Representative Office)**
Description:	LED Downlight,please provide to us

Job Number:	**0113135879**	**Report#:**	1102181a 001

ID#	Type	Model	Calib. until
04-2000-0254	Temperature Chamber	GPO-090	31/03/2011
04-2003-0309	Programmable Humidity Chamber	GTH-800-00	27/10/2011
04-2004-0334	Datalogger	SK-L200TH	05/09/2011
04-2004-0359	Digital Power Meter	CP-310	04/05/2011
04-2005-0375	Digital caliper	500-196	19/11/2012
04-2005-0401	Oscilloscope Probe	P5100	-
04-2005-0402	Digital Phosphor Oscilloscope	TDS3012B	19/07/2011
04-2005-0405	Mobile Corder	MV220	07/01/2011
04-2005-0407	Mobile Corder	MV220	29/04/2011
04-2005-0425	AC Power source	6205	-
04-2005-0426	Programmable Humidity Chamber	H-TH-2SP-C	19/05/2011
04-2005-0468	Water proof tester	N/A	28/03/2011
04-2008-0556	Electrical Safety Compliance Analyzer	7452	29/09/2011
04-2009-0573	Torque Driver	40FTD2-S	14/03/2011
04-2010-0603	Ball pressure apparatus	BPT-1	05/04/2011
04-2010-0612	Touch Current Tester	7630	22/07/2011
04-2010-0614	Thermal meter (endurance room)	CTU-600S	-
04-92-0040	IMPACT TESTER	F22.50	26/10/2011
04-94-0054	Glow Wire Test	4100	29/11/2010
04-95-0105	TEMPERATURE HUMIDITY METER	CR-21	12/04/2011
04-96-0166	ON-OFF CYCLE TESTER	N.A	-
1115	Stopwatch	108	12/03/2011

Checked By : JHO OCT 21 2010 Checked