

<b>SANS (IEC) 60598-2-1</b> <b>Luminaires</b> <b>Part 2: Particular requirements:</b> <b>Section One – Fixed general purpose luminaires</b>	
Report Reference No. ....	2330/FE746
Tested by .....	P Hattingh Test Officer
Checked by .....	E Struthers Test Officer
Approved by .....	T Fourie Technical Signatory
Date of issue .....	2012-12-11
This report is based on a blank test report that was prepared by SGS Fimke Ltd using information obtained from the TRF originator (see below).	
Testing Laboratory Name .....	Lighting Technology
Address .....	Private Bag X191
Testing location .....	Pretoria, 0001
Applicant's name .....	ELEXPERS (PTY) LTD
Address .....	P.O. Box 4069
.....	RANDBURG, 2125, ZA
Summary of test results.....	The luminaire <b>complied</b> with the requirements of standard SANS 60598-2-1:1979 and standard SANS 60598-1:2009 for which it was tested.
<b>Test specification:</b>	
Standard.....	SANS 60598-2-1:1979 used in conjunction with SANS 60598-1:2009
Non-standard test method.....	N/A
Test Report Form No. ....	IEC60598_2_1B
Test Report Form(s) Originator .....	Intertek Semko AB
Master TRF .....	2009-03
Test item description .....	LED Highbay
Trade Mark.....	ELEXPERS (PTY) LTD
Manufacturer .....	ELEXPERS (PTY) LTD
Model/Type reference .....	EL-HB001
Ratings .....	Primary: 230 Vac, single-phase, 50 Hz Secondary: 48 Volt DC, 100 W
<b>Possible test case verdicts:</b>	
- 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) Test item/clause not tested..... NT (Not tested) Accreditation..... SANAS Accredited Testing Laboratory No. T0085	

**Testing .....**Date of receipt of test item ..... **2012-10-29**Date (s) of performance of tests ..... **2012-10-29 to 2012-12-08****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 is used as the decimal separator.

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

**Copy of the marking plate:****REMARKS:**

**Measured power factor : 0,92**

**The sample was received in a condition suitable for testing.**

TRF No.: I598201D

TRF originator: SEMKO

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

<b>1.2 (0)</b>	<b>GENERAL TEST REQUIREMENTS</b>		
1.2 (0.1)	Information for luminaire design considered	Standard Yes	—
1.2 (0.3)	More sections applicable.....	No	—

<b>1.4 (2)</b>	<b>CLASSIFICATION</b>		
1.4 (2.2)	Type of protection (Class 0 excluded) .....	Class I	—
1.4 (2.3)	Degree of protection (Requirement: Ordinary) .....	IP 20	—
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces .....	Yes	—
	Luminaire not suitable for direct mounting on normally flammable surfaces .....	No	—
1.4 (2.5)	Luminaire for normal use .....	Yes	—
	Luminaire for rough service .....	No	—

<b>1.5 (3)</b>	<b>MARKING</b>		
1.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
1.5 (3.3)	Additional information		—
	Language of instructions	English	P
1.5 (3.3.1)	Combination luminaires		N/A
1.5 (3.3.2)	Nominal frequency in Hz	50 Hz	P
1.5 (3.3.3)	Operating temperature		N/A
1.5 (3.3.4)	Symbol or warning notice		N/A
1.5 (3.3.5)	Wiring diagram		N/A
1.5 (3.3.6)	Special conditions		N/A
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
1.5 (3.3.8)	Limitation for semi-luminaires		N/A
1.5 (3.3.9)	Power factor and supply current		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.5 (3.3.10)	Suitability for use indoors		N/A
1.5 (3.3.11)	Luminaires with remote control		N/A
1.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
1.5 (3.3.13)	Specifications of protective shields		N/A
1.5 (3.3.14)	Symbol for nature of supply		N/A
1.5 (3.3.15)	Rated current of socket outlet		N/A
1.5 (3.3.16)	Rough service luminaire		N/A
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		N/A
1.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
1.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
1.5 (3.3.20)	Provided with information if not intended to be mounted within arms reach		N/A
1.5 (3.4)	Test with water	15 sec	P
	Test with hexane	15 sec	P
	Legible after test		P
	Label attached		P

<b>1.6 (4)</b>	<b>CONSTRUCTION</b>		
1.6 (4.2)	Components replaceable without difficulty		P
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	Lampholders		—
1.6 (4.4.1)	Integral lampholder		N/A
1.6 (4.4.2)	Wiring connection		N/A
1.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
1.6 (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

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Clause	Requirement + Test	Result - Remark	Verdict
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) .....		N/A
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
1.6 (4.4.5)	Peak pulse voltage		N/A
1.6 (4.4.6)	Centre contact		N/A
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
1.6 (4.4.8)	Lamp connectors		N/A
1.6 (4.4.9)	Caps and bases correctly used		N/A
1.6 (4.5)	Starter holders		—
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
1.6 (4.6)	Terminal blocks		—
	Tails		N/A
	Unsecured blocks		N/A
1.6 (4.7)	Terminals and supply connections		—
1.6 (4.7.1)	Contact to metal parts		N/A
1.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
1.6 (4.7.3)	Terminals for supply conductors		P
1.6 (4.7.3.1)	Welded connections:	No 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
1.6 (4.7.4)	Terminals other than supply connection		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
1.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
1.6 (4.8)	Switches:		—
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with 61058-1 for electronic switches		N/A
1.6 (4.9)	Insulating lining and sleeves		—
1.6 (4.9.1)	Retainment		N/A
	Method of fixing ..... :		N/A
1.6 (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
1.6 (4.10)	Insulation of Class II luminaires		—
1.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
1.6 (4.10.2)	Assembly gaps:		—
	- not coincidental		N/A
	- no straight access with test probe		N/A
1.6 (4.10.3)	Retainment of insulation:		—
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.11)	Electrical connections		—
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		—
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
1.6 (4.11.3)	Screw locking:		—
	- spring washer		P
	- rivets		N/A
1.6 (4.11.4)	Material of current-carrying parts	Copper	P
1.6 (4.11.5)	No contact to wood or mounting surface	No wood	N/A
1.6 (4.11.6)	Electro-mechanical contact systems		N/A
1.6 (4.12)	Mechanical connections and glands		—
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part..... :		N/A
	Torque test: torque (Nm); part..... :		N/A
	Torque test: torque (Nm); part..... :		N/A
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
1.6 (4.12.4)	Locked connections:		—
	- fixed arms; torque (Nm) ..... :		N/A
	- lampholder; torque (Nm) ..... :		N/A
	- push-button switches; torque 0,8 Nm ..... :		N/A
1.6 (4.12.5)	Screwed glands; force (Nm)..... :		N/A
1.6 (4.13)	Mechanical strength		—
1.6 (4.13.1)	Impact tests:		—
	- fragile parts; energy (Nm) ..... :		N/A
	- other parts; energy (Nm)..... :	LED driver housing; 0,35 Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P

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Clause	Requirement + Test	Result - Remark	Verdict
	4) covers		P
1.6 (4.13.3)	Straight test finger		P
1.6 (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
1.6 (4.13.6)	Tumbling barrel		N/A
1.6 (4.14)	Suspensions and adjusting devices		—
1.6 (4.14.1)	Mechanical load:		—
	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
1.6 (4.14.2)	Load to flexible cables		—
	Mass (kg) .....		N/A
	Stress in conductors (N/mm <sup>2</sup> ) .....		N/A
	Mass (kg) of semi-luminaire .....		N/A
	Bending moment (Nm) of semi-luminaire .....		N/A
1.6 (4.14.3)	Adjusting devices:		—
	- flexing test; number of cycles..... :		N/A
	- strands broken		N/A
	- electric strength test afterwards		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
1.6 (4.14.5)	Guide pulleys		N/A
1.6 (4.14.6)	Strain on socket-outlets		N/A
1.6 (4.15)	Flammable materials:		—
	- glow-wire test 650 °C		N/A
	- spacing $\geq$ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- thermal protection		N/A
	- electronic circuits exempted		N/A
1.6 (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
1.6 (4.16)	Luminaires for mounting on normally flammable surfaces		—
	No lamp control gear	(compliance with Section 12)	N/A
1.6 (4.16.1)	Lamp control gear spacing:		—
	- spacing 35 mm		P
	- spacing 10 mm		N/A
1.6 (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
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see 12.6)	N/A
1.6 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
1.6 (4.18)	Resistance to corrosion:		—

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Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.18.1)	- rust-resistance		N/A
1.6 (4.18.2)	- season cracking in copper		N/A
1.6 (4.18.3)	- corrosion of aluminium		N/A
1.6 (4.19)	Igniters compatible with ballast		N/A
1.6 (4.20)	Rough service vibration		N/A
1.6 (4.21)	Protective shield:		—
1.6 (4.21.1)	Shield fitted		N/A
	Shield of glass if tungsten halogen lamps		N/A
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
1.6 (4.21.3)	No direct path		N/A
1.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
1.6 (4.22)	Attachments to lamps		N/A
1.6 (4.23)	Semi-luminaires comply Class II		N/A
1.6 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)		N/A
1.6 (4.25)	No sharp point or edges		P
1.6 (4.26)	Short-circuit protection:		—
1.6 (4.26.1)	Uninsulated accessible SELV parts		N/A
1.6 (4.26.2)	Short-circuit test		N/A
1.6 (4.26.3)	Test chain according to Figure 29		N/A

<b>1.7 (11)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		
	Working voltage (V) .....	250 V	—
	Voltage form	Sinusoidal	—
	PTI	< 600	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II	—
	Rated pulse voltage (kV) .....	-	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....	Cr = 23,1 mm Cl = 14,3 mm	P

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Clause	Requirement + Test	Result - Remark	Verdict
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) .....	Cr > 10 mm Cl > 10 mm	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
	(5) Not used		—
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) .....	Cr > 20 mm Cl > 20 mm	P

1.8 (7)	PROVISION FOR EARTHING		
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 $\Omega$	0,02 $\Omega$	P
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a groove		N/A
	Earth makes contact first		N/A
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		P
1.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
1.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
1.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
1.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A

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1.8 (7.2.11)	Earthing core coloured green-yellow		N/A
	Length of earth conductor		N/A

1.9 (14)	SCREW TERMINALS		
	Separately approved; component list	(see Annex 1)	P
	Part of the luminaire	(see Annex 3)	N/A

1.9 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 4)	N/A

1.10 (5)	EXTERNAL AND INTERNAL WIRING		
1.10 (5.2)	Supply connection and external wiring		—
1.10 (5.2.1)	Means of connection .....	Terminal block	P
1.10 (5.2.2)	Type of cable .....		N/A
	Nominal cross-sectional area (mm <sup>2</sup> ) .....		N/A
	Cables equal to IEC 60227 or IEC 60245		N/A
1.10 (5.2.3)	Type of attachment, X, Y or Z		N/A
1.10 (5.2.5)	Type Z not connected to screws		N/A
1.10 (5.2.6)	Cable entries:		—
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.10 (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
1.10 (5.2.9)	Locking of screwed bushings		N/A

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1.10 (5.2.10)	Cord anchorage:		—
	- 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
1.10 (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
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
1.10 (5.2.10.3)	Tests:		—
	- impossible to push cable; unsafe		N/A
	- pull test: 25 times; pull (N)..... :		N/A
	- torque test: torque (Nm)..... :		N/A
	- displacement $\leq 2$ mm		N/A
	- no movement of conductors		N/A
	- no damage of cable or cord		N/A
1.10 (5.2.11)	External wiring passing into luminaire		N/A
1.10 (5.2.12)	Looping-in terminals		N/A
1.10 (5.2.13)	Wire ends not tinned	No supply cable	N/A
	Wire ends tinned: no cold flow		N/A

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
1.10 (5.2.18)	Used plug in accordance with		—
	- IEC 60083		N/A
	- other standard		N/A
1.10 (5.3)	Internal wiring		—
1.10 (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
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		—
	Cross-sectional area (mm <sup>2</sup> )..... : 0,83 mm <sup>2</sup>		P
	Insulation thickness	0,6 mm	P
	Extra insulation added where necessary		N/A
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		—
	Adequate cross-sectional area and insulation thickness		N/A
1.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
1.10 (5.3.1.4)	Conductors without insulation		N/A
1.10 (5.3.1.5)	SELV current-carrying parts		N/A
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
1.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Telescopic tubes etc.		N/A
	No twisting over 360°		N/A
1.10 (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
1.10 (5.3.4)	Joints and junctions effectively insulated		N/A
1.10 (5.3.5)	Strain on internal wiring		N/A
1.10 (5.3.6)	Wire carriers		N/A
1.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		P

<b>1.11 (8)</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		—
1.11 (8.2.1)	Live parts not accessible with standard test finger		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 arms 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		P
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
1.11 (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
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
1.11 (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
1.11 (8.2.4)	Portable luminaire:		—
	- protection independent of supporting surface		N/A
	- terminal block completely covered		N/A
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		P
1.11 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$		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

<b>1.12 (12)</b>	<b>ENDURANCE TEST AND THERMAL TEST</b>		
1.12 (12.3)	Endurance test:		—
	- mounting-position .....	Normal use	—

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- test temperature (°C)..... :	35°C ± 2°C	—
	- total duration (h) ..... :	240	—
	- supply voltage: Un factor; calculated voltage (V):	254 V	—
	- lamp used..... :	LED light source	—
1.12 (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
1.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
1.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	N/A
1.12 (12.6)	Thermal test (failed lamp control gear condition):		—
1.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions ..... :		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un :		—
	- measured mounting surface temperature (°C) at 1,1 Un ..... :		N/A
	- calculated mounting surface temperature (°C) .. :		N/A
	- track-mounted luminaires		N/A
1.12 (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
1.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		—

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.12 (12.7.1)	Luminaire <b>without</b> temperature sensing control		N/A
1.12 (12.7.1.1)	Luminaire <b>with</b> fluorescent lamp $\leq 70W$		N/A
	Test method 12.7.1.1 or Annex V .....		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		—
	- 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
1.12 (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
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers $\leq 10 VA$		N/A

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- case of abnormal conditions		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
1.12 (12.7.2)	Luminaire with temperature sensing control		—
	- thermal link	No	—
	- manual reset cut-out	No	—
	- auto reset cut-out	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

<b>1.13 (9)</b>	<b>RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE</b>		
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		—
	- classification according to IP..... : IP 20		—
	- mounting position during test ..... : Normal use		—
	- fixing screws tightened; torque (Nm) ..... : -		—
	- tests according to clauses..... : 9.2		—
	- electric strength test afterwards		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 SELV parts or where it could become a hazard		N/A
	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

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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
1.13 (9.3)	Humidity test 48 h		P

<b>1.14 (10)</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		
1.14 (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)	2 MΩ	—
	SELV:		—
	- between current-carrying parts of different polarity .....		N/A
	- 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:		—
	- between live parts of different polarity .....		N/A
	- between live parts and mounting surface .....	> 100 MΩ	P
	- between live parts and metal parts .....	> 100 MΩ	P
	- between live parts of different polarity through action of a switch .....		N/A
1.14 (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:		—

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- between current-carrying parts of different polarity .....		N/A
	- between current-carrying parts and mounting surface .....	500 V	P
	- between current-carrying parts and metal parts of the luminaire .....	500 V	P
	Other than SELV:		—
	- between live parts of different polarity .....		N/A
	- between live parts and mounting surface .....	1460 V	P
	- between live parts and metal parts .....	1460 V	P
	- between live parts of different polarity through action of a switch .....		N/A
1.14 (10.3)	Touch current (mA) .....	0,048 mA	P

<b>1.15 (13)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		
1.15 (13.2.1)	Ball-pressure test:		—
	- part tested; temperature (°C) .....	Terminal block; 125°C	P
	- part tested; temperature (°C) .....		N/A
1.15 (13.3.1)	Needle flame test (10 s):		—
	- part tested .....		N/A
	- part tested .....		N/A
1.15 (13.3.2)	Glow-wire test (650°C):		—
	- part tested .....		N/A
	- part tested .....		N/A
1.15 (13.4.1)	Tracking test: part tested .....		N/A

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

ANNEX 1: components
---------------------

object/part No	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
LED driver	C	AEC	EP100D548A67	See Annex A	—	—
LED module	C	Osram	1212	—	—	—
Lampholder	C	WACO	E40 WACO55	500 V, 16 A	—	—
Terminal Block	C	TEKOX	PILLAR	600 V, 750 V	—	CE, VDE, RU

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

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

ANNEX 2: temperature measurements, thermal tests of Section 12

	Type reference.....	EL-HB001	—
	Lamp used .....	LED light source	—
	Lamp control gear used .....	LED driver (EP100D548A67)	—
	Mounting position of luminaire .....	Normal use	—
	Supply wattage (W) .....	102 W	—
	Supply current (A).....	0,48 A	—
	Power factor.....	0,92	—
	Table: measured temperatures corrected for $t_a = 25\text{ }^{\circ}\text{C}$ :		—
	- abnormal operating mode.....	N/A	—
	- test 1: rated voltage .....	230 V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage .....	244 V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....	N/A	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage .....	N/A	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....	N/A	—

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

temperature (°C) of part	Clause 12 4 – normal				Clause 12 5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
LED driver	57,9	—	—	—	—	—
SELV wiring	—	34,1	—	90	—	—
Terminal block	—	34,7	—	85	—	—
Lampholder	—	33,1	—	165	—	—
LED module	—	174,8	—	—	—	—
Heatsink	—	47,9	—	—	—	—

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

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

<b>(14)</b>	<b>SCREW TERMINALS</b>		
(14.2)	Type of terminal .....	Pillar	—
	Rated current (A) .....	N/A	—
(14.3.2.1)	One or more conductors		P
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		P
	Cross-sectional area (mm <sup>2</sup> ) .....	14,5 mm <sup>2</sup>	P
(14.3.3)	Conductor space (mm) .....	4,3 mm	P
(14.4)	Mechanical tests		—
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		P
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread)...	M 3,5	P
	External wiring		P
	No soft metal		P
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) .....	3,4 mm	P
	Torque (Nm) .....	0,8 Nm	P
(14.4.7)	Between metal surfaces		P
	Lug terminal		P
	Mantle terminal		N/A
	Pull test; pull (N) .....	60 Nm	P
(14.4.8)	Without undue damage		P

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IEC 60598-2-1			
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
(15.5.2)	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

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IEC 60598-2-1										
Clause	Requirement + Test					Result - Remark				Verdict
	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
(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									N/A
Terminal	1	2	3	4	5	6	7	8	9	10
Voltage drop (mV)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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TRF originator: SEMKO

This test was performed by SABS Commercial (Pty) Ltd.

This report relates only to the specific sample(s) tested as identified herein. It does not imply SABS approval of the quality and/or performance of the item(s) in question and the test results do not apply to any similar item that has not been tested.

(Refer also to the complete conditions printed on the back of official test reports.)

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

**ANNEX A**  
**PHOTOGRAPHS OF THE SAMPLE**



TRF No.: I598201D

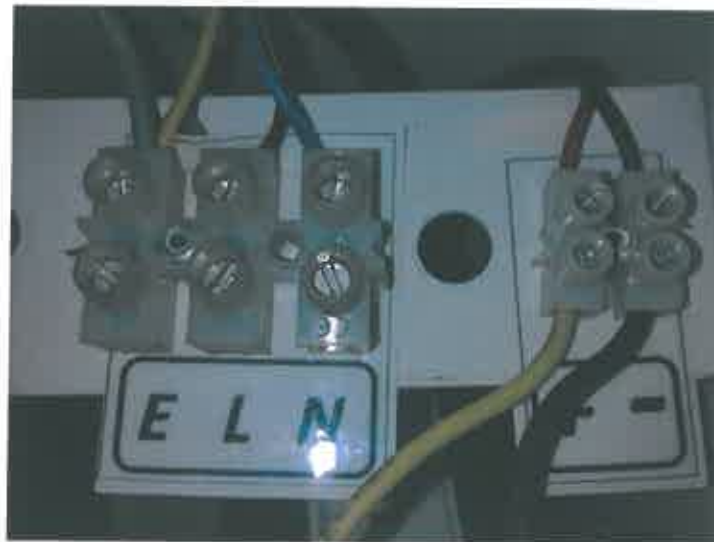
TRF originator: SEMKO

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



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



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