



Test Report issued under the responsibility of:



**TEST REPORT  
IEC 62031  
LED modules for general lighting – Safety specifications**

**Report**

**Report Number**..... : 206560-AS1-2 ( PA: 4196171 )  
**Date of issue** ..... : 2015-02-13  
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**Applicant's name**..... : **James Industry Group CO.,LTD**  
**Address** ..... : 130-132 Des Voeux Road; Tai Sang Bank Building 12/FL, Room 1205; CENTRAL; Hong Kong Island; HONG KONG

**Test specification:**

**Standard** ..... : IEC 62031 (First Edition):2008 + A1:2012  
**Test procedure**..... : Component testing  
**Non-standard test method**.....: N/A

**Test Report Form No.**..... : IEC62031B  
**Test Report Form(s) Originator**.... : Intertek Semko AB  
**Master TRF** ..... : 2013-10

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

**Test item description**..... : Integral LED-Module  
**Trade Mark**..... : **JAMES**  
**Manufacturer** ..... : 130-132 Des Voeux Road; Tai Sang Bank Building 12/FL, Room 1205; CENTRAL; Hong Kong Island; HONG KONG  
**James Industry Group CO.,LTD**  
**Model/Type reference**..... : 2835-1160X8X1.0MM-5S28P; 2835-580X8X1.0MM – 6S16P  
**Ratings**..... : 36 V DC SELV; 1,6 A

Testing procedure and testing location:	
<input checked="" type="checkbox"/> <b>CB Testing Laboratory:</b>	<b>VDE</b> Prüf- und Zertifizierungsinstitut GmbH <b>VDE</b> Testing and Certification Institute
Testing location/ address..... :	Section AS1 Merianstrasse 28, D-63069 Offenbach, Germany
<input type="checkbox"/> <b>Associated CB Laboratory:</b>	
Testing location/ address..... :	
Tested by (name + signature) .....	Boris Thelen 
Approved by (+ signature) .....	Klaus Franke 
<hr/>	
<input type="checkbox"/> Testing procedure: TMP	
Testing location/ address..... :	
Tested by (name + signature) .....	
Approved by (+ signature) .....	
<hr/>	
<input type="checkbox"/> Testing procedure: WMT	
Testing location/ address..... :	
Tested by (name + signature) .....	
Witnessed by (+ signature)..... :	
Approved by (+ signature) .....	
<hr/>	
<input type="checkbox"/> Testing procedure: SMT	
Testing location/ address..... :	
Tested by (name + signature) .....	
Approved by (+ signature) .....	
Supervised by (+ signature) .....	
<hr/>	

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

**Attachment : List of the applied measurement instruments and testing means ( 1 page )**

**Summary of testing:**

All relevant tests performed.

**Tests performed (name of test and test clause):**

All relevant tests performed at:

**Testing location:**

**VDE** Prüf- und Zertifizierungsinstitut GmbH  
**VDE** *Testing and Certification Institute*

Section AS1  
 Merianstrasse 28, D-63069 Offenbach, Germany

**Summary of compliance with National Differences:**

List of countries addressed:

The product fulfils the requirements of:

**DIN EN 62031 (VDE 0715-5):2013-09; EN 62031:2008+A1:2013**

**Copy of marking plate**

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



<b>Test item particulars</b> .....:	
Classification of installation and use.....:	Integral LED module
Supply Connection.....:	Soldering pad
.....:	
.....:	
<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)
<b>Testing</b> .....	
Date of receipt of test item.....:	Not relevant
Date (s) of performance of tests .....	2015-02-03...2015-02-12

**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

**Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:**

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :  Yes  Not applicable

When differences exist; they shall be identified in the General product information section.

**Name and address of factory (ies) .....** : 130-132 Des Voeux Road; Tai Sang Bank Building  
12/FL, Room 1205; CENTRAL; Hong Kong Island;  
HONG KONG

**General product information:**

The integral constant current LED-Modules are powered by controlgear regarding SELV supply 36 V DC.

The LED-Modules mentioned below are integrated in a class III luminaire and they are directly fixed on the cooling device (touchable) of the luminaire without further insulation.

**Test samples:**

Type	Working Voltage (DC ; SELV)	Input current	CCT
2835-580X8X1.0MM-6S16P	36 V DC	1600 mA	6700 K max
2835-1160X8X1.0MM-5S28P	36 V DC	1600 mA	6700 K max

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

<b>4</b>			
<b>4.4</b>	<b>GENERAL REQUIREMENTS</b>		
4.5	Integral modules tested assembled in the luminaire		P
	Independent modules complies with requirements in IEC 60598-1		N/A

<b>5</b>	<b>GENERAL TEST REQUIREMENTS</b>		
5.5	SELV-operated LED modules comply with Annex I of IEC 61347-2-13	(see Annex 1)	N/A
	General conditions for tests in Annex A	(see Annex A)	P

<b>6</b>	<b>CLASSIFICATION</b>		
	Built-in module .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Independent module .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Integral module .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	For Integral module; Note to 1.2.1 in IEC 60598-1 applies.		—

<b>7</b>	<b>MARKING</b>		
7.1	Mandatory markings		
	a) mark of origin		P
	b) model number, type reference		P
	c1) constant voltage module; rated supply voltage and supply frequency		N/A
	c2) constant current module; rated supply current and supply frequency		P
	d) nominal power		P
	e) indication of connections, wiring diagram		P
	f) value of $t_c$ and place on the module		P
	g) eye protection	RG 0	P
	h) symbol for built-in modules		N/A
	i) heat transfer temperature $t_d$		N/A
	j) power for heat-conduction $P_d$		N/A
	k) working voltage for insulation		N/A

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<b>IEC 62031</b>			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	Location of marking		P
	- marking of a), b), c) and f)		N/A
	- marking of d), e), g), h), i) and j)		N/A
	- marking of k)		N/A
	- integral modules a) to g) in literature		P
7.3	Durable and legibility of marking		P
	- marking of a), b), c) and f) legible after test with water		P
	- marking of d) to j) inspection of compliance		N/A

<b>8</b>	<b>TERMINALS</b>		
	Screw terminals according section 14 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 3)	N/A
	Screwless terminals according section 15 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 4)	N/A
	Connectors according IEC 60838-2-2:		N/A
	Separately approved; component list	(see Annex 2)	N/A

<b>9 (9)</b>	<b>PROVISION FOR PROTECTIVE EARTHING</b>		
- (9.1)	Provisions for protective earthing		N/A
	Terminal complying with clause 8		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A



IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (9.2)	Provision for functional earthing		N/A
	Comply with clause 8 and 9.1		N/A
- (9.3)	Earth contact via the track on the printed board		N/A
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance ( $\Omega$ ) at $\geq 10$ A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$ .....		N/A
- (9.4)	Earthing of built-in lamp controlgear		N/A
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	Earthing via independent controlgear		N/A
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm <sup>2</sup> and of copper or equivalent		N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7		N/A
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	Test with a current of 25 A between input and output earth terminals; measured resistance ( $\Omega$ ) between earthing terminal and each of the accessible metal parts at $\geq 10$ A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$ .....		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A

10 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		
- (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. ....	Shall be evaluated in the luminaire	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) .....	Shall be evaluated in the luminaire	P
- (A3)	The voltage between the part concerned and any accessible part is measured and does not exceed 34 V (peak) .....	Shall be evaluated in the luminaire	P

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IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (10.1)	Lacquer or enamel not used for protection or insulation		P
	Adequate mechanical strength on parts providing protection		P
- (10.2)	Capacitors > 0,5 $\mu$ F: voltage after 1 min (V): < 50 V .....		N/A
- (10.3)	Controlgear providing SELV		N/A
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N/A
	No connection between output circuit and the body or protective earthing circuit		N/A
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N/A
	SELV outputs separated by at least basic insulation		N/A
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		N/A
- (10.4)	Accessible conductive parts in SELV circuits		P
	Output voltage under load $\leq 25$ V r.m.s. or $\leq 60$ V d.c.	$\leq 60$ V d.c.	P
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output $\leq 35$ V peak or $\leq 60$ V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. ....	Depending on controlgear used	N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A

<b>11 (11)</b>	<b>MOISTURE RESISTANCE AND INSULATION</b>		
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (M $\Omega$ ):		P

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	For basic insulation $\geq 2 \text{ M}\Omega$ .....	Measured: $> 10 \text{ M}\Omega$	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$ .....		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A

12 (12)	ELECTRIC STRENGTH		
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		P
	Working voltage $\leq 50 \text{ V}$ , test voltage 500 V		N/A
	Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$ , test voltage (V):		N/A
	Basic insulation, $2U + 1000 \text{ V}$		N/A
	Supplementary insulation, $2U + 1000 \text{ V}$		N/A
	Double or reinforced insulation, $4U + 2000 \text{ V}$		N/A
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A

13 (14)	FAULT CONDITIONS		
- (14)	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)	(see appended table)	P

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Creepage distances on printed boards less than specified in clause 16 in Part 1 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)	N/A
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	N/A
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1 \text{ M}\Omega$ ..... : $> 10 \text{ M}\Omega$		P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		—
13.2	Module withstands overpower condition $>15$ min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	During the tests, tissue paper, spread below module, does not ignite		P
<b>15</b>	<b>CONSTRUCTION</b>		
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P

<b>16</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		
	Creepage and distances and clearances in compliance with IEC 60598-1		P
	Working voltage (V) .....	36,0 V DC SELV	—
	Voltage form	Sinusoidal <input type="checkbox"/> Non-sinusoidal <input checked="" type="checkbox"/>	—
	PTI	< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/>	—
	Rated pulse voltage (kV).....		—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) :	No values specified according to cl. 11 of the IEC 60598-1:2014	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm).....	No values specified according to cl. 11 of the IEC 60598-1:2014	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).....	No values specified according to cl. 11 of the IEC 60598-1:2014	P
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm).....	No values specified according to cl. 11 of the IEC 60598-1:2014	P

<b>17 (17)</b>	<b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>		
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		N/A
(4.11)	Electrical connections		N/A
(4.11.1)	Contact pressure		N/A
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		N/A
(4.11.5)	No contact to wood or mounting surface		N/A
(4.11.6)	Electro-mechanical contact systems		N/A

(4.12)	Mechanical connections and glands	N/A
(4.12.1)	Screws not made of soft metal	N/A
	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
(4.12.2)	Screws with diameter < 3 mm screwed into metal	N/A
(4.12.4)	Locked connections:	N/A
	- fixed arms; torque (Nm) .....	N/A
	- lampholder; torque (Nm) .....	N/A
	- push-button switches; torque 0,8 Nm .....	N/A
(4.12.5)	Screwed glands; force (Nm) .....	N/A

<b>18 (18)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>	
	Resistance to Heat, Fire and Tracking in compliance with IEC 61347-1 (clause numbers between parentheses refer to IEC 61347-1)	N/A
(18.1)	Ball-pressure test:	N/A
	- part tested; temperature (°C) .....	N/A
	- part tested; temperature (°C) .....	N/A
(18.2)	Test of printed boards	N/A
	- part tested .....	N/A
	- part tested .....	N/A
(18.3)	Glow-wire test (650°C):	N/A
	- part tested .....	N/A
	- part tested .....	N/A
(18.4)	Needle flame test (10 s):	N/A
	- part tested .....	N/A
	- part tested .....	N/A
(18.5)	Tracking test:	N/A
	- part tested .....	N/A
	- part tested .....	N/A

<b>19 (19)</b>	<b>RESISTANCE TO CORROSION</b>	N/A
	Rust protection:	N/A
	- test according 4.18.1 of IEC 60598-1	N/A
	- adequate varnish on the outer surface	N/A

<b>20</b>	<b>INFORMATION FOR LUMINAIRE DESIGN</b>	
	Information in Annex D	—

<b>21</b>	<b>HEAT MANAGEMENT</b>		
21.1	General		N/A
	Exchangeability is safeguarded by cap or base		N/A
21.2	Heat-conducting foil and paste		N/A
	Heat-conducting foil delivered with the module if necessary		N/A
21.4	Construction		N/A
	Electrical connection and mechanical holding are separate		N/A

<b>14</b>	<b>TABLE: tests of fault conditions</b>	<b>P</b>
Part	Simulated fault	Hazard
LED-Module	Short circuit creepage distance	YES/NO
LED	Short circuit	YES/NO
		YES/NO

<b>A</b>	<b>ANNEX A - TESTS</b>		
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P

	<b>ANNEX 1: SELV-operated LED modules</b>		
	ANNEX I of IEC 61347-2-13:		N/A
<b>I.3</b>	<b>Classification</b>		N/A
I.3.1	Class I	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	Class II	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
I.3.2	a) non-inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	b) non-inherently open circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	c) inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	d) inherently open circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	e) fail safe controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	f) non-short-circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	g) non-open-circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
<b>I.4</b>	<b>Marking</b>		N/A
	Adequate symbols are used		N/A
<b>I.5</b>	<b>Protection against electric shock</b>		N/A
I.5.1	No connection between output winding and body		N/A
	No connection between output winding and protective earthing circuit		N/A
I.5.2	Input and output circuits electrically separated from each other		N/A
I.5.2.1	Insulation between input and output winding of the HF-transformer consists of double or reinforced insulation		N/A
	Class II: insulation between input/output and body consists of double or reinforced insulation		N/A
	Class I: insulation between input and body consists of basic and between output and body supplementary insulation		N/A



I.5.2.2	Insulation between input and output winding via the core consists of double or reinforced insulation		N/A
	Insulation between cord and windings of the HD-transformer consists of basic insulation		N/A
I.5.2.3	Serrated tape, additional layer		N/A
I.5.2.4	Class I controlgear for fixed connection provided with basic insulation plus protective screening comply with the following conditions:		N/A
	a) Insulation between the input winding and the protective screen complies with the requirements for basic insulation		N/A
	b) Insulation between the protective screen and the output winding complies with the requirements for basic insulation		N/A
	c) Metal screen consists of a metal foil or of a wire		N/A
	d) Metal screen so arranged that both edges cannot simultaneously touch a magnetic core		N/A
	e) Metal screen and its lead-out wire have a cross-section sufficient to ensure that an overload device will open the circuit before the screen is destroyed		N/A
	f) Lead-out wire sufficiently fixed to the metal screen		N/A
<b>I.6</b>	<b>Heating</b>		N/A
I.6.1	No excessive temperatures in normal use		N/A
	Used material classified as Class .....		—
	Stated value of $t_a$ .....		—
I.6.2	Temperature rises (Upri: 1.06 time supply rated voltage)		
	Determined temperature rises in windings: - Primary (K) ..... - Limit max (K) ..... - Secondary (K) ..... - Limit max (K) .....		N/A
	After the test:		N/A
	- no connections have worked loose		N/A
	- no reduction of creepage distances and clearances		N/A
	- no flow of sealing compound		N/A
	- no operation of protecting devices		N/A
	- electric strength test between input and output windings		N/A

I.6.3	Cycling test (10 cycles):	N/A
I.6.3.1	- heat run at (K) .....	N/A
I.6.3.2	- moisture treatment 48 h	N/A
I.6.3.3	- vibration test 1 h; 1,5 g	N/A
I.6.3.4	After the tests:	
	- insulation resistance $\geq 2, 4$ or $5 \text{ M}\Omega$	N/A
	- dielectric strength test for 2 min. at 35 % of specified value in table I.6	N/A
	- Current or the ohmic component does not deviates by more than 30 %	N/A
<b>I.7</b>	<b>Short-circuit and overload protection</b>	N/A
I.7.1	Upri: 1.06 times rated voltage or 0.94 and 1.06 times rated supply voltage (V) .....	N/A
I.7.2 I.7.3 I.7.4	Determined temperature rise in windings and on other parts:	N/A
	- test according to Clause .....	N/A
	- Primary winding (K) .....	N/A
	- Limit max (K) .....	N/A
	- Secondary winding (K) .....	N/A
	- Limit max (K) .....	N/A
	- External enclosure $\leq 80$ (K) .....	N/A
	- Rubber insulation of wiring $\leq 60$ (K) .....	N/A
	- PVC insulation of wiring $\leq 60$ (K) .....	N/A
	- Supports $\leq 80$ (K) .....	N/A
I.7.5	Fail-safe convertors	N/A
I.7.5.1	- Upri: 1.06 times rated supply voltage ..... V:	—
	- Isec: 1.5 times rated output current ..... A:	—
	- time until steady-state conditions t1 (h) .....	—
	- time until failure t2 (h): $\leq t1$ ; $\leq 5$ h.....	N/A
I.7.5.2	During the test:	N/A
	- no flames, molten material, etc.	N/A
	- temperature rise of enclosure $\leq 150$ K	N/A
	- temperature rise of plywood support $\leq 100$ K	N/A
	After the test:	N/A
	- electric strength (test voltage; 35 % of specified value); no flashover or breakdown for primary-to-secondary and for primary-to-body	N/A

	- live parts not accessible by test finger through holes of enclosure		N/A
<b>I.8</b>	<b>Insulation resistance and electric strength</b>		N/A
I.8.1	Conditioned 48 h between 91 % and 95 %		N/A
I.8.2	Adequate insulation (500 V d.c. for 1 min) between:		N/A
	Live parts and the body -for basic insulation not less than 2 MΩ .....		N/A
	Live parts and the body -for reinforced insulation not less than 4 MΩ .....		N/A
	Input- and output circuits not less than 5 MΩ .....		N/A
	Metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ .....		N/A
	Metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....		N/A
I.8.3	Electric strength test:		N/A
	1) Between live parts of input circuits and live parts of output circuits .....		N/A
	2) Over basic or supplementary insulation between:		N/A
	a) live parts which are or may become of different polarity .....		N/A
	b) live parts and body if intended to be connected to protective earth .....		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord .....		N/A
	d) live parts and an intermediate metal part .....		N/A
	e) intermediate metal parts and the body .....		N/A
	3) Over reinforced insulation between the body and live parts .....		N/A
	No flashover or breakdown occurred		N/A
<b>I.9</b>	<b>Construction</b>		N/A
I.9.1	Comply with all requirements		N/A
I.9.2	The distance between input and output terminals shall not be less than 25 mm .....		N/A
<b>I.10</b>	<b>Components</b>		N/A
I.10.1	Socket-outlets in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906-1		N/A
I.10.2	Self-resetting protective devices shall not be used unless it is certain that there will be no hazards		N/A

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	Compliance is checked by connecting the convertor for 48 h at 1.06 times the rated voltage with the output short-circuited		N/A
<b>I.11</b>	<b>Creepage distances and clearances</b>		N/A
	1. Insulation between input and output circuits:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	2. Insulation between adjacent <u>input</u> circuits: measured values $\geq$ specified values (mm) .....		N/A
	2. Insulation between adjacent <u>output</u> circuits: measured values $\geq$ specified values (mm) .....		N/A
	3. Insulation between terminals for external connection:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	4. Basic or supplementary insulation:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	5. Reinforced insulation: measured values $\geq$ specified values (mm) .....		N/A
	6. Distance through insulation:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	d) measured values $\geq$ specified values (mm) .....		N/A

	<b>ANNEX 2: components</b>	P
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object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
LED	C	HANGKE	2835	2700 K – 6700 K; RG 0	IEC/EN 62471	Tested in appliance

The codes above have the following meaning:

- A - The component is replaceable with another one, also certified, with equivalent characteristics
- B - The component is replaceable if authorised by the test house
- C - Integrated component tested together with the appliance
- D - Alternative component

	<b>ANNEX 3: screw terminals (part of the luminaire)</b>	
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<b>(14)</b>	<b>SCREW TERMINALS</b>		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 (mm <sup>2</sup> ) .....		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)..	M	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

	<b>ANNEX 4: screwless terminals (part of the luminaire)</b>	
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<b>(15)</b>	<b>SCREWLESS TERMINALS</b>		
(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)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:		N/A
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples).....:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.6)	Electrical tests		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

(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										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)											



<b>Attachment 3: List of the applied measurement instruments and testing means</b>				
Clause:	Inventory-No.	Instrument	Type	Manufacturer
	2000320	KRIECH- /LUFTSTRECKENLEH RENSATZ	N.N.	GEHRISCH
	1070215	WATTMETER	WT500	YOKOGAWA
	1200270	SMARTDAC + STANDARD	GP10	YOKOGAWA
	1060728	DIGITAL- MULTIMETER	U1252B	AGILENT TECHNOLOGIES
	1100071	DIGITAL- OSZILLOSKOP	54622A	AGILENT TECHNOLOGIES
	5220230	ABLEITSTROMBOX	EN60990	VDE
	2040656	MESSSCHIEBER DIGITAL	500-184-20	MITUTOYO

End of testreport