

**APPLICATION FOR LOW VOLTAGE DIRECTIVE**

**On Behalf of**

**Hebei I.T.(Shanghai) CO., LTD.**

**LED Daylight Lamp**

**Model: T8-W6-220V-604-D, T8-W3-220V-604-D,  
T8-W6-220V-1214-D, T8-W3-220V-1214-D,**

**Prepared For : Hebei I.T.(Shanghai) CO., LTD.**

**No.1200, Pu dong Ave, 200135 Shanghai, China**

**Prepared By : Most Technology Service Co., Ltd.**

**No. 5, 2nd Langshan Road, North District, Hi-tech  
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**Date of Test : Dec. 05-18, 2007**

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**Report Number : MTS/JKC/7120596**

**LVD Report**  
**EN 60598-1+EN 60598-2-1**  
**Luminaires---**

**Part 1: General requirements and tests of luminaries**  
**Part 2: Particular requirements**  
**Section 1: Fixed general purpose luminaires**

Testing laboratory .....	Most Technology Service Co., Ltd.
Address .....	No. 5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China
Testing location .....	No. 5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China
Applicant .....	Hebei I.T.(Shanghai) Co., Ltd.
Address .....	No.1200 Pu dong Ave, 200135 Shanghai, China
Standard .....	EN 60598-1:2004, EN 60598-2-1:1989
Test Result .....	Compliance with EN 60598-1:2004, EN 60598-2-1:1989
Procedure deviation .....	N.A.
Non-standard test method .....	N.A.
Type of test object .....	LED Daylight Lamp
Trademark .....	N.A.
Model/type reference .....	T8-W6-220V-604-D
Rating .....	220-240V~, 50Hz, 7W
Manufacturer .....	Hebei I.T.(Shanghai) Co., Ltd.
Address .....	No.1200, Pu dong Ave, 200135 Shanghai, China
Test item particulars :	
Class of equipment .....	Class II
Equipment mobility .....	Fixed
Protection against ingress of water .....	IP20

## General remarks

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

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

"(see appended table)" refers to a table appended to the report.

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

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

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

### **Remark :**

1. All models are same except exterior, power and model name.
2. All tests were conducted on T8-W6-220V-604-D unless otherwise indicated.

### **Copy of marking plate:**

(See appendix 5)

<b>Possible test case verdicts :</b>	
test case does not apply to the test object .....	: N (.A.)
test object does meet the requirement .....	: P(ass)
test object does not meet the requirement .....	: F(ail)
<b>Name and address of the testing laboratory :</b> <u>Most Technology Service Co., Ltd.</u> <u>No. 5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China</u>	
<b>Reported by :</b>	<p><i>Jack</i> _____ Signature</p> <p>Dec. 20, 2007 Date</p> <p>Jack Chen / Project Engineer Name and Title</p>
<b>Approved by :</b>	<p><i>[Signature]</i> _____ Signature</p> <p>Dec. 20, 2007 Date</p> <p>Yvette Zhou / Manager Name and Title</p> 

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1.4	CLASSIFICATION OF LUMINAIRES		P
	The provisions of Section Two of Publication EN 60598-1 also apply		P
2.2	Classification according to type of protection against electric shock	Class II	P
	Luminaires only have a single classification		P
	Semi-luminaires shall comply with Class II requirements without being marked with Class II symbol	Not semi-luminaire	N
	Track-mounted luminaires shall not be Class 0		N
2.3	Classification according to IP number system of IEC529	IP20	P
2.4	Classification according to the material of supporting surface for which the luminaire is designed :		P
	– Fixed luminaires suitable for mounting on non-combustible materials only		N
	– Fixed suitable for mounting on normally flammable surfaces luminaires		P
2.5	Classification according to the circumstances of use :		P
	– For normal use		P
	– For rough services	(Required symbol)	N

1.5	MARKING		P
	The provisions of Section Three of Publication EN 60598-1 also apply		P
3.2	Marking on luminaires		P
	Markings (information and locations) on luminaires shall be in accordance with conditions a) b) c) of the standard and table 3.1		P
	Height of graphical symbol shall be min. 5mm expected as permitted		P
	Height of letters and numerals shall be min. 2mm		P
	Markings for combination luminaires shall be appropriated	Not combination luminaire	N
	Electro-mechanical contact system shall be marked with rated current in the base plate		N
3.2.1	Mark of origin	See marking label	P
3.2.2	Rated voltage(s) (if other than 250V)	AC 220-240V~	P
	Rated voltage for portable class III type shall be marked on outside of the luminaire		N
3.2.3	The rated ambient if other than 25°C		N

3.2.4	Symbol for class II, if applicable	Class II	P
3.2.5	Symbol for class III, if applicable		N
3.2.6	IP rating, if applicable (other than IP20)		N
	Lowest IP number to be marked if different numbers apply		--
3.2.7	Model or type reference	LMP-T8W-220V-588-01	P
3.2.8	Rated wattage or number of lamps and type	7W	P
3.2.9	" F " mark if applicable	Refer to marking label	P
3.2.10	Information for special lamps		N
3.2.11	Warning against the use of cool-beam lamps		N
3.2.12	Termination to be marked "L" if required for safety		N
	Earthing terminal marked with earth symbol	Class II	N
	Luminaires with non-detachable cable without plug must fitted with label regarding proper connection	No such cable	N
	Terminals of ELV d.c. supplied fluorescent luminaires properly marked (see standard)		N
3.2.13	Symbol for min. distance from lighted objects		N
	Symbol and explanation given either on luminaire or in instruction sheet		--
3.2.14	Symbol for rough service luminaires	Not for rough service	N
3.2.15	Symbol for luminaires designed for use with bowl mirror lamps		N
3.2.16	Marking for luminaires incorporating a glass protective shield (see standard for content)	See marking label	P
3.2.17	The maximum number of luminaires that may be interconnected by looping-in.		N
3.2.18	Warning symbol or notice for luminaires with ignitors for use with double-ended high pressure discharge lamps		N
3.3	Any extra details that are necessary to ensure proper installation, use and maintenance shall be provided		P
	Language of instructions	English	P
3.3.1	Temperature and IP rating for combination luminaires		N
3.3.2	Nominal frequency in Hertz (Note Hz not HZ)	50Hz	P
3.3.3	Operating temperatures of		N
	a) windings $t_w$		N
	b) capacitor $t_c$		N
	c) insulation of cables (if $> 90^\circ\text{C}$ )		N
	d) spacing requirement		N
3.3.4	A warning notice (if "F" mark not applicable)	F mark used	N

3.3.5	Wiring diagram (except for permitted)		P
3.3.6	Special conditions for looping-in (if suitable)	Not looping-in luminaire	N
3.3.7	Warning notice for using metal halide lamps		N
3.3.8	The limitations of use or application of semi-luminaires		N
3.3.9	Information on the power factor and supply current were given and marked as specified		N
3.3.10	Suitability for use "indoors"		P
	Ambient temperature (if applicable)	Not specified	N
3.3.11	Luminaires using remote control gear marked with the range of lamps designed for use	No remote control gear	N
3.3.12	Warning for clip-mounted luminaires if not suitable for mounting on tubular material	Not clip-mounted luminaires	N
3.3.13	Specifications of all protective shields (if applicable)		P
3.3.14	Symbol for nature of supply (if necessary for correct operation)	~	P
3.3.15	Rated current and rated voltage for incorporated socket outlet (if less than rated value)		N
3.3.16	Information about rough service luminaires concerning :		N
	– The connection to IPX4 rated socket outlets		--
	– The correct mounting method		--
	– The correct fixing to stand (if supplied)		--
	– If stand not supplied, the information regarding max. height and information regarding stability		--
3.3.17	Mounting instruction for type Y, type Z and some type X attachments		N
3.3.18	Non-ordinary luminaires with PVC cable		N
3.3.101	Where the terminal block not supplied with the luminaire, the packaging need add wording		N
3.4	Test of marking		P
	After the rubbing test :		P
	– marking still legible		P
	– marking labels not be easily removable		P
	– marking labels showed no curling		P

1.6	CONSTRUCTION		P
	The provisions of Section Four of Publication EN 60598-1 also apply		P
4.2	Replaceable parts can be replaced without difficulty and without impairing safety	No such part.	N

4.3	Wireways shall be smooth and free from sharp edges and the like	No wireway used.	N
	Parts such as metal set screws and pointed screws shall not protrude into wireways		N
4.4	Lampholders		P
4.4.1	Electrical safety of integral lampholders shall be equivalent to the luminaire as a whole with lampholders and lamps in position	Not integral lampholder	N
	Integral lampholders, when mounted in luminaire, shall comply with the requirements specified in the appropriate lampholder standards		N
4.4.2	Connection of wiring to integral lampholder shall be reliable		N
4.4.3	Luminaire for tubular fluorescent lamps shall be so designed that the lamp may be changed in the middle of a row		N
	Changing of any lamp for multi-lamp luminaires for tubular fluorescent lamps not impair security of others		N
4.4.4	Lampholders which are put into position by the user shall be capable of easy and correct positioning		N
	Distance between the pair of fixed lampholders for tubular fluorescent lamp shall either comply with IEC61-2 or instructions of lamp holder manufacturer		N
	Fixing device have adequate mechanical strength when tested as specified		N
i	Pressure / torque test for lampholder for fluorescent lamp		N
	Applied pressure :		--
	No moment, no deformation, lamp can retain in its intended position		--
ii	Bending test for mounting brackets for ES or BC lampholders		N
	Applied bending moment :		--
4.4.5	For luminaires with ignitors, the peak pulse voltage not greater than the specified type of lampholders	No ignitor	N
	Measured peak pulse voltage (V).....:		--
4.4.6	For luminaires with ignitors incorporated Edison lampholders, supply of the pulse voltage shall be connected to the centre contact of the lampholder	No ignitor	N
4.4.7	Insulating parts of lampholders and plugs incorporated in rough service luminaires resistant to tracking	Not for rough service	N
4.4.8	Lamp connectors shall comply with requirements for lamp holders	No such connectors	N



	Means for retaining lamp have to be provided by other parts of the luminaires		N
4.5	Starter holders in luminaires other than class II shall accept starters which comply with IEC155	No starter	N
	Class II luminaires may require starters of class II construction		N
	Accessible starter holder of Class II luminaires shall accept only those complying with the requirements for starters for class II giving in IEC155		N
4.6	Terminal blocks, if required, the adequate space shall be provided within the luminaires	No terminal block used	N
	Dimension of terminal block comply with manufacturer's instruction or specified in the standard		N
4.7.1	Accessible metal parts shall not become live due to a detached wire or screw		P
4.7.2	Supply terminals shall be so located and shielded that an escaped strand cannot make connection between live parts and accessible metal parts		N
	- 8 mm test live conductor		N
	- 8 mm test earth conductor		N
4.7.3	Supply terminal shall be suitable for connection by means of screws, nut or equally effective devices		N
4.7.4	Terminals, other than those for supply connection, which not covered by separate standards for components, comply with Section 14 or 15	No such terminal	N
	Terminals of lampholders, switches and similar parts shall have dimensions adequate for the purpose		N
	Such terminals shall not be used for the connection of external wiring		N
4.7.5	The luminaire shall be provided with a connection at the point of entry of the external wiring of supply cable if it is unsuitable for the temperatures reached inside the luminaire		N
	Heat-resisting parts supplied with the luminaire		N
4.7.6	If electrical connections are made by a multi-pole plug and socket, unsafe connections shall be prevented	No such plug and socket provided with the luminaire	N
4.8	Switches were adequately rated and fixed that they cannot be removed by hand		N
	Switches may be used in flexible cables or cords and in lampholders if ordinary unless switches are IP rated to suit luminaire IP		N
	Luminaires using polarized supply and has a single-pole on/off switch, the switch is wired into the live side of the supply of the side other than		N

	identified as neutral conductor		
4.9.1	Insulating linings and sleeves shall be reliably retained in position		P
4.9.2	Insulating linings and sleeves have adequate mechanical, electrical and thermal strength		P
	Tests for sleeve if temp. exceeds its rating by 20°C :	Not exceed the value given	N
	a) and c) insulation resistance and electric strength		N
	b) ageing test for 240h		N
4.10.1	Contact between accessible metal parts and wiring with basic insulation only shall be prevented (for Class II luminaires)		P
	Shock protection must not be impaired as a result of installation (For Class II fixed luminaires)		P
	Capacitors shall not be connected between live parts and body (for Class II luminaires) except for RFI suppression capacitor		P
	RFI suppression capacitors used shall comply with IEC384-14		N
4.10.2	Assembly gap >0.3mm in supplementary insulation shall not be coincidental with any such gap in basic insulation		N
	Assembly gap >0.3mm in reinforced insulation shall not give straight access to live parts		N
	Openings in double or reinforced insulation shall not give straight access to live parts when tested with conical pin of test probe		N
4.10.3	Parts serving as supplementary or reinforced insulation in class II luminaires shall:		P
	– be adequately fixed that they cannot be removed without being seriously damaged		P
	– or be unable to be replaced in an incorrect position		P
	Sleeves and insulated linings shall be retained in position by positive means		P
4.11.1	Electrical contact pressure not transmitted through insulation material other than ceramic, pure mica or equivalent, unless shrinkage compensated		N
4.11.2	Self-tapping screws not used for the connection of current-carrying parts unless connection meeting the appropriate requirement		N
	Thread-cutting screw shall not be used for the interconnection of current-carrying parts of metal which is soft or liable to creep		N
	Self-tapping screws used to provide earth continuity connection shall not be disturbed in normal use and at least two screws are used for each connection		N

4.11.3	Screws and rivets which serve as electrical as well as mechanical connections shall be locked against loosening		N
	Sealing compound which softens on heating provides satisfactory locking only for screw connection not subject to torsion in normal use		N
4.11.4	Current-carrying are parts made of copper or other suitable material	No other current carrying parts except for cable etc.	P
	Current-carrying parts are resistant to or protected against corrosion		P
4.11.5	Live parts are not in direct contact with wood		N
4.11.6	Electro-mechanical contact systems withstand the electrical stresses occurring in normal use	No such contact systems	N
4.12.1	Screws and mechanical connections withstand mechanical stresses occurring in normal use		N
	Screws shall not be made of a metal which is soft or liable to creep		N
	Screws operated for maintenance shall not be of insulating material if their replacement by metal screw impairs supplementary or reinforced insulation		N
	Screws to withstand tightening and loosening tests as specified		N
4.12.2	Screws transmitting contact pressure or which are operated when mounting or connecting the luminaires and having nominal diameter less than 3mm screw shall into metal		N
4.12.4	Screwed and other fixed connections shall not work loose through torsion, bending stresses, vibration etc. which may occur in normal use		N
	Fixed arms and suspension tubes are securely attached		N
4.12.5	Screwed glands shall comply with the test		N
4.13.1	Luminaires shall have adequate mechanical strength to withstand rough handling expected in normal use		P
	Luminaires shall withstand the impact test as specified		P
4.13.2	Metal parts enclosing live parts shall have adequate mechanical strength	Plastic enclosure.	N
4.13.3	Metal parts shall not touch live parts when pressed with 30N by test finger		N
	– Covers not be excessively deformed		N
	– Creepage and clearances not impaired		N
4.13.4	Rough service luminaires shall be :		N
	– At least IP54		--

	- Not be of class 0 construction		--
	Rough service luminaires shall have adequate mechanical strength and stability		N
	Fixing means of the stands shall have adequate mechanical strength		N
	Fixed and portable rough service luminaires withstand steel ball impact test (3 samples)	Not rough service luminaire	N
	Fixed and portable rough service luminaires for outdoor use shall additionally withstand steel ball impact test (3 samples) after -5°C / 3h treatment		N
	Hand-held rough service luminaires withstand four drops from a height of 1m on to a concrete floor		N
	Luminaires with stand shall not overturn at 6° from vertical		N
	Additional test at 15°		N
	If luminaire fall down at 15°, the luminaire shall withstand four times of impact resulting from overturning		N
	Fixation means of stand shall withstand 4 times the weight of the luminaires		N
	Mass of luminaires .....		--
	Weight of suspension.....		--
	Luminaires fell down at 15° shall withstand thermal test per 12.5.1 at most unfavourable position		N
	Luminaire for temporary installation and suitable for mounting on a stand shall withstand the impact test as specified		N
4.13.5	Not used		N
4.13.6	Plug-ballast/transformers and mains socket-outlet-mounted luminaries have adequate mechanical strength		P
4.14.1	Mechanical suspensions have adequate factors of safety when tested as specified		N
	A) four times the weight		N
	B) torque 2.5Nm		N
	C) bracket arm; force (N).....		N
	D) load track-mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve; thickness (mm) .....		N
	F) clip-mounted luminaires, test with metal rod; diameter (mm) .....		N
4.14.2	Mass of luminaires suspended by flexible cables or cord not exceeding 5kg		N
	Stress in the conductors of flexible cables or cords suspending pendants not exceeding 15N/mm <sup>2</sup>		N

	Luminaire of mass exceeding 5kg and intended to be suspended : tension not applied to the conductors		N
	Semi-luminaires intended for connection to Edison screw or bayonet lampholders : the mass and effective bending moment not exceeding the maximum value specified in table 4.4		N
	Bending moment..... :		N
4.14.3	Adjustable devices comply with specified requirements		N
	Max. angle of moment ..... :		-
	Bending test as specified :		N
	Bending angle (from vertical)..... :		-
	No. of cycles of operations..... :		-
	After the test :		N
	- not more than 50% of the strands in a conductor broken		N
	- no any serious damage to the insulation of the flexible cord		N
	- cable or cord comply with requirements of insulation resistance		N
	- cable or cord comply with requirements of dielectric strength test		N
4.14.4	Cords passing through telescopic tubes not be fixed to the outer tube		P
	Means provided for avoiding strain on the conductors at the terminals		P
4.14.5	Guide pulleys for flexible cords be of adequate dimension to prevent damage to the cords by excessive bending	No guide pulley	N
	Grooves in the pulleys are well rounded		N
	Diameter of the pulley at the bottom of the groove at least three time the diameter of the cord		N
	Accessible metal pulleys shall be earthed		N
	No. of cycles of operations..... :		N
4.14.6	Plug-ballast/transformer and mains socket-outlet-mounted luminaires shall not impose undue strain on socket-outlet		N
4.15.1	Covers, shades and similar parts not having an insulation function and that do not withstand the glow-wire test at 650 °C shall		N
	- be adequately spaced from any heated parts of the luminaires		N
	- have suitable fastenings or supporting devices to maintain this spacing		N

	Spacing from heated parts shall be not less than 30mm; unless		N
	Screen used (unless material provided with an effective barrier to burning drops) and		N
	– at least spaced from heated part by 3mm		N
	– spacer complies with needle-flame test of 13.3.1		N
	– shall have no holes		N
	– has a height and a length at least equal to the dimensions of the heated parts		N
	Materials which burn fiercely are not used (not apply to specified small parts)	Such as wiring clips	N
	Spacing not required to specified electronic circuits.	The current is considered	N
	Spacing not required if temperature sensor provided.		N
4.15.2	Luminaires made of thermoplastic materials withstand temperature rises due to fault in ballast or transformer and electronic devices		N
4.16	Luminaires marked with the “ F ” symbol shall not overheat the mounting surface due to the failure of a component		P
4.16.1	The lamp control gear shall be adequately spaced from the mounting surface as specified	No control gear used	N
	Necessary air space is automatically obtained when mounted as in normal use		N
4.16.2	Luminaires shall incorporate a temperature sensing control to limit the temperature of the mounting surface to a safe value		N
	Temperature sensing control may be external or part of the ballast/transformer		N
	May be self-resetting, manually operated or a “one shot” thermal link		N
	It shall not be of the plug-in type		N
	It shall be kept in a fixed position with regard to the ballast/transformer		N
4.16.3	Luminaires not complying with spacing requirements of 4.16.1 and not incorporating thermal cut-outs specified in 4.16.2 shall withstand the tests of clause 12.6		N
4.17	Drain holes to be provided to allow draining of water accumulated inside the luminaires	No drain holes	N
4.18.1	Ferrous parts of other than ordinary luminaires shall be adequately protected against rusting when tested as specified		N
4.18.2	Contacts and other parts made of rolled copper or copper alloy sheet shall be free from stress		N

	corrosion		
4.18.3	Parts of aluminium or aluminium alloy other than ordinary luminaires shall be resistant to corrosion		N
4.19	Igniters shall be electrically compatible with the associated ballast in the luminaire	No igniters	N
4.20	Rough service luminaires shall withstand the vibration test as specified	Not for rough service	N
	No loosening of parts which could impair safety after test		N
4.21.1	Luminaires using tungsten halogen lamp without an integral outer envelope shall be fitted with a protective shield except the lamp meeting the requirement as specified		N
4.21.2	Lamp compartment shall be designed so that particles from shattering lamp cannot impair the safety of the luminaire		N
4.21.3	There shall be no opening through which the shattered lamp can leave the luminaire by a direct path, including the rear		N
4.21.4	Protective covers withstand the impact test of clause 4.13.1 (for fragile parts)		P
	Parts of lamp compartment which are made of insulating material comply with tests of 13.3.2		N
4.22	Luminaires shall not incorporate attachments to lamps which might cause overheating or damage of the lamp, lamp cap or lampholder		N
	Attachment to fluorescent lamps shall only be approved by manufacturer and total weight not exceed the allowable limit		N
4.23	Semi-luminaires comply with all requirements for Class II	Not semi-luminaire	N
4.24	Luminaires incorporating metal halide lamps not emitting excessive UV radiation		N
4.25	Luminaires shall have no mechanical hazards during installation, normal use or maintenance		P
4.26.1	Adequate means provided to prevent unintended short-circuiting of uninsulated accessible SELV parts of opposite polarity		N
4.26.2	Test chain not melt and no overheating on any parts when tested		N

1.7	CREEPAGE DISTANCES AND CLEARANCES		P
	The provisions of Section Eleven of Publication EN 60598-1 also apply		P
11.2	Live parts and adjacent metal parts shall be adequately spaced		P



	Creepage distances and clearances not less than the values given in table 11.1 and 11.3 (11.2 and 11.4 if > IPX1)	Insulation gluewater be used between PCB to metal board.	P
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1.8	PROVISIONS FOR EARTHING		N
	The provisions of Section Seven of Publication EN 60598-1 also apply		N
7.2.1	Accessible metal part of Class I luminaires shall be permanently and reliably connected to earth	Class II luminaires	N
	Inaccessible metal parts which may be live due to insulation fault and in contact with supporting surface shall be reliably earthed		N
	Earthing connection shall be of low resistance		N
	Self-tapping screws shall not be used for earth connection unless they comply with the specified requirements		N
	Thread-forming screws shall not be used for earth connection unless they comply with requirements of section 14		N
	Class I luminaires with detachable parts, earth connection shall be make first and break last		N
7.2.2	Good electrical contact of earth connection shall be ensured in adjustable joints, etc.		N
7.2.3	Earthing resistance measurements		N
7.2.4	Earthing terminals shall comply with 4.7.3		N
	Earth connection shall be locked against accidental loosening		N
	Screw terminals not possible to loosen the clamping means by hand		N
	Screwless terminals not possible to loosen the clamping means unintentionally		N
7.2.5	Earth contact shall be an integral part of the socket connector (if used)		N
7.2.6	When using supply cable or non-detachable flexible cord, earth terminal shall be adjacent to the mains terminals		N
7.2.7	All parts of earthing terminals shall be prevent from corrosion (other than ordinary)		N
7.2.8	Earth terminal shall be made of brass or other non-rusting metal and shall be of bare metal		N
7.2.9	Compliance checked by test and inspection		N
7.2.10	Class II luminaires designed for looping-in, earthing terminal which is not terminating in the luminaire shall be insulated from accessible metal parts by double insulation	Not for looping-in	N



7.2.11	Supply flexible cord shall have an earthing core coloured green-yellow		N
	Green-yellow core of flexible cable shall be correctly connected		N
	Green-yellow conductors shall only be connected to an earthing terminals		N
	Current-carry conductors shall becomes taut before earthing conductor		N

1.9.1	TERMINALS		N
	The provisions of Section Fourteen and Fifteen of Publication EN 60598-1 also apply except that spring-type screwless terminals of type b shown in figure 19 of publication EN 60598-1 shall not be used		N
14	Screw terminals		N
14.2	Type of terminal..... :		-
	Rated current (A)..... :		-
14.3.2.1	One or more conductors		N
14.3.2.2	Special preparation		N
14.3.2.3	Cross-sectional area (mm <sup>2</sup> ) ..... :		N
14.3.3	Terminals shall allow proper connection of copper conductors of nominal cross-sectional area according to rated current specified in Table 14.2		N
14.3.4	Terminals shall provide adequate connection of the conductors		N
14.4	Mechanical tests		N
14.4.1	Pillar terminals shall comply with dimensional requirement given in figure 12		N
	Mantle terminals shall comply with dimensional requirement given in figure 16		N
14.4.2	Conductors shall not slip out during tightening of clamping means		N
14.4.3	Terminal sizes up to and including 5 shall allow the conductor to be connected without special preparation		N
14.4.4	Terminals shall have adequate mechanical strength		N
	Screws and nuts shall have metric ISO thread		N
	Terminals for external wiring shall not fix any other components (except as permitted)		N
	Screws shall not be of metal which is soft or liable to creep		N
14.4.5	Terminals shall be resistant to corrosion		N
14.4.6	Terminals shall be fixed to the luminaire or to a terminal block		N

	Terminals shall not work loose when clamping means are tightened or loosened		N
	Internal wiring not subjected to stress, creepage and clearances not reduced		N
	Terminals withstand the tightening and loosening test according to Table 14.4		N
14.4.7	Terminals shall clamp the conductor reliably between metal surfaces		N
	For lug terminals, spring washer, etc. shall be provided and clamping surface shall be smooth		N
	For mantle terminal the bottom of the conductor space shall be slightly rounded		N
14.4.8	Terminals shall clamp the conductor without undue damage to the conductor		N

1.9.2	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		N
15	Screwless terminals		N
15.2	Type of terminal..... :		-
	Rated current (A)..... :		-
15.3.1	Parts of terminals or connections for carrying current made of adequate material a specified		N
15.3.2	Terminals and connections clamp the conductor with sufficient pressure and without undue damage to the conductor		N
	Conductors shall be clamped between metal surfaces except for specified		N
	Insulation piercing terminals are acceptable only if :		N
	- used in the SELV circuits ; or		N
	- used as permanent, non-rewireable connections in other luminaires		N
15.3.3	Terminals designed that when the conductor had been adequately inserted, further insertion of its ends is prevented by a stop		N
15.3.4	Terminals shall accept non-prepared conductors (other than those for lead assemblies)		N
15.3.5	Electrical contact pressure not transmitting through insulating material unless there is sufficient resilience in the metallic parts to compensate for shrinking of the insulating material		N
15.3.6	It is clear in which way the connection of the conductor to, and the disconnection from, spring-type non-permanent screwless terminals is effected		N
	The disconnection of a conductors shall :		N

	– require an operation other than a pull of the conductor ; and		N
	– be such that it can be made by hand or with the aid of a simple, generally available device		N
15.3.7	Terminals for connection to several conductors under spring clamps shall clamp each conductor independently		N
	Terminals designed for non-permanent connections shall be possible to withdraw the conductors together or separately		N
15.3.8	Terminals shall be adequately fixed to the equipment or to a terminal block or otherwise fixed in position		N
	Terminals not work loose when conductors are inserted or withdrawn		N
15.3.9	Terminals and connections withstand the mechanical, electrical and thermal stresses occurring in normal use		N
15.3.10	Manufacturers shall state the conductor size or sizes for which the component is designed and the type of the conductor		N
	The provisions of sub-clauses 15.5 to 15.6 applicable to Terminals and Connections for Internal Wiring		N
15.5	Mechanical tests		N
	Terminals and connections have adequate mechanical strength		N
15.5.1	Non-permanent connections		N
15.5.1.1	Spring-type terminals withstand of pull force of 4N for 1 minute with specified conductors inserted		N
	– Conductors not moved from the terminal		N
	– neither the terminal nor conductor undergo any alteration impairing further use		N
15.5.1.2	Pin or tab and receptacle type connections withstand of pull force of 4N for 1 minute with specified conductors inserted		N
	– Conductors not moved from the terminal		N
	– neither the terminal nor conductor undergo any alteration impairing further use		N
	Maximum force for application or insertion of the terminals not exceeding 50N		N
	Measured insertion force .....		N
	Measured disconnecting force.....		N
15.5.2	Permanent connections		N
	Connections remained fully effective when a pull-off force of 20N was applied for 1 min.		N
15.6	Electrical tests		N

	Terminals and connections have adequate electrical performance		N
15.6.1	Contact resistance test		N
15.6.1.1	Spring-type terminals tested as specified and measured voltage drop not exceeding 15mV		N
15.6.1.2	Pin or tab and receptacles tested as specified and measured voltage drop not exceeding 15mV		N
15.6.1.3	Each terminal with its conductor is loaded with the test current (a.c. or d.c.) and after 1 h, the voltage drop across the terminal, still at the test current, is measured.		N
15.6.2	Heating tests		N
	Terminals subjected to the ageing test as specified according to the current rating		N
	Voltage drop measured according to 15.6.1 and not exceeding the specified values after the ageing test		N
15.6.2.3	Insulating materials which the conductors were tightened against the surface shall not be deformed during the heating tests		N
15.7	Conductors		N
	Spring-type terminals suitable for the connection of rigid conductors with the nominal cross-sectional area given in table 15.1		N
15.8	Mechanical tests		N
	Terminals and connections have adequate mechanical strength		N
15.8.1	Spring-type terminals withstand of pull force according to table 15.2 for 1 minute with specified conductors inserted		N
	Maximum rated current of terminal (A) .....		N
	Pulling force (N).....		N
	After the test :		N
	– Conducts not moved from the terminal		N
	– neither the terminal nor conductor undergo any alteration impairing further use		N
15.8.2	Pin or tab and receptacle type connections withstand of pull force according to table 15.2 for 1 minute with specified conductor inserted		N
	– Conducts not moved from the terminal		N
	– neither the terminal nor conductor undergo any alteration impairing further use		N
15.9	Terminals and connections have adequate electrical performance		N
15.9.1	Contact resistance test		N

15.9.1.1	Spring-type terminals tested as specified and measured voltage drop not exceeding 15mV		N
15.9.1.2	Pin or tab and receptacles tested as specified and measured voltage drop not exceeding 15mV		N
15.9.2	Heating tests		N
	Terminals subjected to the ageing test as specified according to the current rating		N
	Voltage drop measured according to 15.9.1 and not exceeding the specified values after the ageing test		N
15.9.2.5	Insulating materials which the conductors were tightened against the surface shall not be deformed during the heating tests		N

1.10	EXTERNAL AND INTERNAL WIRING		P
	The provisions of Section Five of Publication EN 60598-1 also apply		P
5.2.1	Luminaires provided with correct means of connection to the supply as specified		P
	Type of connection.....: Appliance inlets		P
	Portable luminaires intended for wall mounting and incorporating junction box and cord anchorage not delivering with non-detachable cord shall be provide with detailed mounting instructions	Not portable	N
5.2.2	Non-detachable flexible cables and cords comply the requirements specified in table 5.1		N
	If the luminaire is provided with a 10/16A socket-outlet the cord shall be at least 1.5mm <sup>2</sup>	No such cord	N
5.2.3	Replacement of non-detachable cords do not require special purpose tools (for rewirable luminaires)		N
5.2.4	Compliance with the requirements of Sub-clause 5.2.1 and 5.2.3 is checked by inspection		P
5.2.5	For non-rewirable luminaires, the electrical connection of cord are not made by means of screws		N
5.2.6	Cable entries are suitable for the introduction of the conduit or the protective covering of the cord so that the cores are completely protected		N
	Cable entries shall provide the degree of protection against dust or moisture in accordance with the classification of the luminaire when the conduit and cord is fitted		N
5.2.7	Cable entries of external cord shall have smoothly rounded edge of minimum radius of 0.5mm		N
5.2.8	Openings provided with tough bushings of		N

	insulating with smoothly rounded edges where flexible cables or cords pass through accessible metal or metal parts in contact therewith in Class II luminaires, in adjustable or in portable luminaires other than those for wall mounting		
	Bushings so fixed that they cannot be easily removed		N
	Bushings which deteriorate with age not used in openings with sharp edges		N
	Tubes or other guards provided for the protection of flexible cables or cords at the entry to the luminaire shall be made of insulating material		N
	Helical metal springs and similar components are not guards		N
5.2.9	Bushings which screw into the luminaires locked in position		N
5.2.10	Cord anchorage shall be provided such that the conductors are relieved from strain and twisting, and such that their covering is protected from abrasion		N
	It shall be clear how the relief from strain and twisting is obtained		N
	It shall be impossible to push the cord into the luminaire to such an extent that the cord is subjected to undue mechanical or thermal stress		N
	Cord anchorage shall be of insulating material or to be provided with a fixed insulating lining		N
	Cord anchorage shall be such that :		N
	– at least one part is fixed to the luminaire		N
	– suitable for different type of cords		N
	– do not damage the cord in normal use		N
	– the whole cord including its covering is capable to be mounted into the cord anchorage		N
	– the cord does not touch metal clamping screws		N
	– the cord is not clamped by a metal screw which bears directly on the cord		N
	– replacement of cord does not require the use of a tool specially designed for this purpose		N
	Glands not used as cord anchorage in portable or adjustable luminaires unless they have provision for clamping all types or sizes of cables and cords which might be used for the supply connection	No Glands used	N
	Anchorage of labyrinth type only used if it is evident from design or by means of marking how the flexible cable cord is to be mounted	Not labyrinth type	N
5.2.10.1	Pull and torque test for cord anchorage		N
	After the test :		N

	– no displacement of cable or cord by more than 2mm		N
	– no noticeable movement of the conductors in the terminals		N
	– no damage of the cable or cord		N
5.2.11	External wiring passes into the luminaires shall comply with the requirements of internal wiring		N
5.2.12	Fixed luminaires for looping-in provided with terminals intended for maintaining the electrical continuity of supply cables feeding the luminaire but not terminating in it	Not for looping-in	N
5.2.13	Tinning acceptable but no additional solder to be applied unless a means is provided ensuring that clamped connections cannot work loose owing to cold flow of the solder		P
5.2.14	Plug supplied with the luminaire has the same degree of shock protection as the luminaire		N
	Class III luminaire shall not be provided with a plug which permits connection with a socket-outlet according to IEC83		N
5.2.15	Connecting leads of ELV d.c. supplied fluorescent luminaires shall be colour coded red and black (for +ve and –ve)		N
5.2.16	Appliance inlet shall comply with IEC320		P
	Looping-in of luminaires shall be achieved by appliance couplers		N
	Couplers of class II type for looping-in shall not accept class I type plug	Not for looping-in	N
	Class II type for looping-in may be achieved using screw or screwless terminals	Not for looping-in	N
5.3.1	Internal wiring shall have adequate cross-sectional area and insulation		P
	– nominal cross-sectional area of conductor not less than 0.5mm <sup>2</sup>		N
	– nominal insulation thickness not less than 0.6mm if of rubber or PVC		N
	The insulation must be capable of withstanding the maximum temperature to which it is subjected in normal use without deterioration		P
	Sleeves to protect hot spots are suitable		P
	If internal wiring of fixed luminaires for through-wiring acts as part of the fixed wiring then the conductor shall be of copper with not less than 1.5mm <sup>2</sup> cross sectional area		N
	If special cables or sleeve are necessary the through wiring shall be factory assembled and shall comply with 3.3.3 c)		P



5.3.2	Internal wiring shall be protected against damage by :		P
	– sharp edges, rivets, screws and similar components	Heat extension tube used.	P
	– moving parts of switches, joints, raising or lowering device		P
	– telescopic tubes and similar parts		P
	Wiring cannot be twisted through an angle exceeding 360°		N
5.3.3	Openings to be provided with tough bushings of insulating material with smoothly rounded edges where the internal wiring passes through metal parts in Class II luminaires, in portable luminaires other than those for wall mounting		N
	Bushings of material likely to deteriorate with age not used in openings with sharp edges	No such openings and bushings	N
	If cable entry is smooth and wiring will not move, a sheath is acceptable.		N
5.3.4	Joints and junctions in internal wiring, excluding terminations on components, shall be easily accessible and provided with an insulating covering no less effective than the insulation of the wiring		P
5.3.5	Internal wiring that passes out of the luminaire and may be subjected to strain shall comply with the requirements for external wiring	No such cord	N
	This does not apply if there is less than 80 mm outside the luminaire		N
	For luminaires other than ordinary, all external wiring to comply with requirements of external wiring		N
5.3.6	Wiring of adjustable luminaires shall be fixed to prevent rubbing against metal parts		N
5.3.7	Tinning acceptable but no additional solder to be applied unless a means is provided ensuring that clamped connections cannot work loose owing to cold flow of the solder		N

1.11	PROTECTION AGAINST ELECTRIC SHOCK		P
	The provisions of Section Eight of Publication EN 60598-1 also apply		P
8.2.1	Live parts not accessible when the luminaire is installed and wired as in normal use and it is opened as necessary for replacing lamps		P
	Protection against electric shock independent of the position of mounting and adjustment of the luminaire		P



	Protection shall be maintained after removal of parts removable by hand	No such part	N
	Covers that cannot be removed by a single action by one hand are not removed	Cover been fixed by screw.	P
	Covers that have to be removed to change lamps are removed.		N
	Luminaires with ignitors intended for use with double ended high pressure discharge lamp that voltage measured exceeding 34V peak :	No ignitors	N
	– the ignitor shall only be active if the lamp is fully inserted ; or		N
	– warning according to 3.2.18 a) or b) fitted to the luminaire		N
8.2.2	Protection against electric shock in portable luminaires is maintained after movable parts have been placed in the most unfavourable position	Fixed luminaire	N
8.2.3	For Class II luminaires :		P
	– if insulation-encased, accessible parts shall be insulated from live parts by double or reinforced insulation or the like		P
	– if metal-encased, accessible parts shall be insulated from live parts by double or reinforced insulation or the like		P
	– Parts only with basic insulation between live parts may only be accessible during starter or lamp replacement	No such parts	N
	– Glass protective shield glasses which have to be removed during lamp replacement not be regarded as supplementary insulation	No such protective shield	N
	Class II luminaires incorporating bayonet lampholders shall either :	No bayonet lampholder used	N
	– lamp cap not accessible to the standard test finger when assembled as in normal use		N
	– be provided with a metal lampholder which is earthed		N
8.2.4	Portable luminaires with non-detachable cords shall have protection against electrical shock independent of supporting surface	Not portable luminaire	N
	Terminal blocks of portable luminaires shall be completely covered		N
8.2.5	Compliance of clause 8.2.1 to 8.2.4 is checked by inspection and with the standard test finger specified in IEC529	No remove part.	N
8.2.6	Covers and other parts providing protection against electric shock shall have adequate mechanical strength and will not work loose		P
8.2.7	Luminaires incorporating a capacitor larger than 0.5uF shall be provided with discharge device such		N

	that 1 min. after disconnection from the supply, the rated voltage does not exceed 50V		
	Portable luminaires connected to the supply by means of a plug or the like and incorporating a capacitor larger than 0.1uF (or 0.25uF if rated voltage less than 150V), 1 second after disconnection from the supply, voltage between plug pins not to exceed 34V		N
	Luminaires (other than portable) connected to the supply by means of a plug or the like and incorporating a capacitor larger than 0.1uF (or 0.25uF if rated voltage less than 150V), 5 seconds after disconnection from the supply, voltage between plug pins not to exceed 60V r.m.s		N

1.12	ENDURANCE TESTS AND THERMAL TESTS		P
	The provisions of Section Twelve of Publication EN 60598-1 also apply		P
12.3	Endurance test		P
	Test voltage (V) .....	:	P
	Ambient temperature (°C) .....	35±2°C	P
	Test duration .....	168h	P
	Abnormal condition applied for 7 <sup>th</sup> cycle .....	Rectifying effect	N
12.4	Thermal test (normal operation)	See table 1.12	P
12.5	Thermal test (abnormal operation)		P
12.6	Thermal test (failed ballast or transformer conditions)		N
12.7	Thermal test in regard to fault conditions in ballasts/transformers or electronic devices in plastic luminaires		N

1.13	RESISTANCE TO DUST AND MOISTURE		P
	The provisions of Section Nine of Publication EN 60598-1 also apply		P
9.2	The enclosure of a luminaire provided the degree of protection against ingress of dust, solid objects and moisture in accordance with IP numbers marked on the luminaire	IP20	P
	After the tests according to 9.2.0 to 9.2.8 or appropriate tests in IEC529 :		P
	– No contact with live parts by relevant test probes (for solid-object-proof luminaires)		P
	– No trace of water shall be found on live parts or on insulation		N
9.2.0	IP2X luminaries are tested with test finger specify by IEC529		P

	Test for IP3X and IP4X		N
9.2.1	Dust-proof luminaires (first characteristic IP numeral 5 or higher) shall be tested in a dust chamber similar to that shown in Figure 6)		N
9.2.2	Drip-proof luminaires (second characteristic IP numeral 1) are subjected for 10 min to an artificial rainfall of 3 mm/min, falling vertically from a height of 200 mm above the top of the luminaire		N
9.2.3	Rain-proof luminaires (second characteristic IP numeral 3) are sprayed with water for 10 min by means of a spray apparatus as shown in Figure 7		N
9.2.4	Splash-proof luminaires (second characteristic IP numeral 4) are sprayed from every direction with water for 10 min by means of the spray apparatus shown in Figure 7		N
9.2.5	Jet-proof luminaires (second characteristic IP numeral 5) are switched off and immediately subjected to a water jet for 15 min from all directions by means of a hose having a nozzle with the shape and dimensions shown in Figure 8		N
9.2.6	Powerful water jet-proof luminaires (second characteristic IP numeral 6) are switched off and immediately subjected to a water jet for 3 min		N
9.2.7	Watertight luminaires (second characteristic IP numeral 7) are switched off and immediately immersed for 30 min in water		N
9.2.8	Pressure watertight luminaires (second characteristic IP numeral 8) are heated either by switching on the lamp or by other suitable means		N
9.3	Humidity test	48h, 93%, 25	
	No damage found after the test		P
	For luminaires with an IP classification greater than IP20, the order of the test specified in section 9 of EN 60598-1 shall be as specified in 4.12 of this section of IEC 60598-2		N

1.14	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
	The provisions of Section Ten of Publication EN 60598-1 also apply		P
10.2.1	Insulation resistance test		P
10.2.2	Electric strength test	See table 1.14	P
10.3	Leakage current of the luminaire between each pole of the supply source and the body shall not exceed the specified limits	< 0.5mA(max)	P