Code of product in Lab :	**F-051**		
LAB DATA		**بيانات المختبر**	
Laboratory name	**اسم المختبر**	Saudi Inspection & Testing Co.(SAITCO)	
Address	**العنوان**	1st Industrial Area, St. No.4,5,6,7-Riyadh	
Country	**الدولة**	Saudi Arabia	
Client Data		بيانات العميل	
Sample Date in	**تاريخ استلام العينة**	19-01-2024	
Date or period of tests	**تاريخ / فترة الاختبار**	19-01-2024	20-01-2024
Date of report issue	**تاريخ اصدار التقرير**	20-01-2024	
Laboratory test report number	**رقم التقرير بالمختبر**	E-P-240008	
Client Name	**اسم العميل**	Suzhou Opple Lighting Co.,Ltd	
Client Address	**عنوان العميل**	China	
Client Reference No. /Date	**مرجع العميل**	--	
No of received Samples	**عدد العينات المستلمة**	6	
Sample Data		بيانات العينة	
Product description	**وصف المنتج**	Fixed Luminaire	
Brand name or trademark	**العلامة التجارية**	OPPLE	
Type or reference	**النوع / المرجع**	LED HC260 13W White	
Country of Origin	**بلد الصنع**	China	
Type of Driver	**مزود الجهد**	**☑ Internal** **داخلى☑**	**☐ External** **خارجي☐**
Luminaries type	**نوع الانارة**	**☑Directional** ***مباشر☑***	**☐Non-Directional** ***غير مباشر☐***
Manufacture\ Factory Name	**اسم المصنع**	**Suzhou Opple Lighting Co.,Ltd**	
Manufacture\ Factory Address	**عنوان المصنع**	**China**	
Products Category	**تصنيف المنتج**	Particular requirements: Fixed luminaires.	
Standard / TR No.	**رقم المواصفة / اللائحة**	IEC 60598-2-1:2020 IEC 60598-1:2020 RLV SASO 2902:2018 +Amd1:2021	**--**
Test case verdicts		**حالات الحكم على نتيجة الاختبار**	
Conformity to articles tested		**☒Yes**	**☐No**
Test case does not apply to the test object		***Not Applicable***	***N/A***
Test item does meet the requirement		***Pass***	***P***
Test item does not meet the requirement		***Fail***	***F***

Technical Lab supervisor / Manager

1.5 (2)	**CLASSIFICATION OF LUMINAIRE**			
(2.1)	Luminaires are classified according to the type of protection against electric shock, the degree of protection against ingress of dust, solid objects and moisture, the material of the supporting surface and the circumstances of use.			P
2.2	Luminaires shall be classified according to the type of protection against electric shock provided, as class I, class II or class III (see definitions in Section 1).		Class II	P
	Luminaires shall have only a single classification. For example, for a luminaire with a built-in extra-low-voltage transformer with provision for protective earthing, the luminaire shall be classified as class I and no part of the luminaire shall be classified as class III even though the lamp compartment is separated by a barrier from the transformer compartment.			P
2.3	Luminaires shall be classified in accordance with the "IP number" system of classification described in IEC 60529.		-	N/A
2.4	Luminaires shall be classified according to suitability for direct mounting on normally flammable surfaces or suitability for mounting on non-combustible surfaces			P
1.6	**MARKING**			**-**
(3.2)	The following information shall be distinctly and durably marked on the luminaire (see Table 3.1). Each marking in Table 3.1 shall be read with the corresponding subclause as detailed in the table.			P
(3.2)	Marking to be observed when replacing lamps or other replaceable components shall be visible on the outside of the luminaire (except the mounting side) or behind a cover which is removed during lamp or other component replacement and with the lamp removed.			N/A
	Marking to be observed during installation shall be visible during installation on the outside of the luminaire or behind a cover or part which is removed during installation.			P
	Marking to be observed after installation shall be visible with the luminaire assembled and installed as for normal use and with the lamp in place.			P
(3.4)	The durability of the marking is checked by trying to remove it by rubbing lightly for 15 s with a piece of cloth soaked with water and, after drying, for a further 15 s with a piece of cloth soaked with petroleum spirit and by inspection after the tests detailed in Section 12 have been completed.			P
(3.4)	After the test, the marking shall be legible, marking labels shall not be easily removable and they shall show no curling.			P
(3.2.1)	Mark of origin	Country	China	P
		Trademark	OPPLE	P
(3.2.2)	Rated voltage(s) in volts		220-240V	P
	Portable class III luminaires shall be marked with the rated voltage on the outside of the luminaire.			N/A

	Luminaires with built-in transformers or convertors, shall be marked with the nominal voltage and/or current of the light source to ensure correct replacement. This marking shall be positioned in accordance with 3.2.8.		N/A
	Where marking is provided in accordance with 3.2.25 or 3.2.26, additional marking of the rated voltage is not required.		N/A
	Luminaires supplied via an external PSE shall have a marked rated voltage, which is within the voltage range of the values given in Table Y.2, for the chosen communication cable/connectors.		N/A
(3.2.3)	The rated maximum ambient temperature ta, if other than 25 °C		N/A
(3.2.4)	Class II symbol if applicable		P
	For portable luminaires provided with a supply cord, the symbol for class II construction, if applicable, shall be on the outside of the luminaire.		N/A
	The class II symbol shall not be applied to semi-luminaires.		N/A
(3.2.5)	Class III symbol if applicable	-	N/A
(3.2.6)	IP number for degree of protection against dust, solid objects and moisture	-	N/A
	Marking of IP20 on ordinary luminaires is not required.		N/A
(3.2.7)	Maker's model number or type reference	LED HC260 13W White	P
(3.2.8)	Luminaires shall be marked with information for the maximum rated light source power or maximum input power according to 3.2.8.1, 3.2.8.2 and 3.2.8.3.	13W	P
3.2.8.1	Luminaires for tungsten filament lamps shall be marked with the maximum rated wattage and number of lamps.		N/A
	Marking of maximum rated wattage for luminaires for tungsten filament lamps with more than one lampholder may be in the form: "*n* × MAX... W", *n* being the number of lampholders.		N/A
3.2.8.2	Luminaires designed for non-replaceable or non-user replaceable light sources shall be marked with the rated input power of the luminaire.	Led 13W	P
3.2.8.3	For all other luminaires, rated wattage of the lamp or the designation as indicated on the lamp data sheet of the type or types of lamp for which the luminaire is designed. Where the lamp wattage alone is insufficient, the number of lamps and the type shall also be given.		N/A
(3.2.9) (598-1)	Luminaires not suitable for direct mounting on normally flammable surfaces (suitable only for mounting on non-combustible surfaces		N/A
	Luminaires not suitable for covering with thermally insulating material ……	-	N/A
	The symbol shall be explained on the luminaire or in the manufacturer's instructions provided with the luminaire		N/A
	Minimum size of 25mm	-	N/A
	According to MOCI no need to verdict any size of the symbol		
3.2.10(598-1)	Information concerning special lamps, if applicable.		N/A

	In particular, this applies to the symbols (see Figure 1) for luminaires for use with high pressure sodium lamps having either an internal starting device or requiring an external ignitor where the lamp is required to be marked with the same symbol according to IEC 60662.		N/A
3.2.11(598-1)	Symbol (see Figure 1), if applicable, for luminaires for lamps of similar shape to "cool beam" lamps but where the use of a dichroic reflectorized "cool beam" lamp might impair safety.		N/A
(3.2.12) (598-1)	Except for type Z attachments, terminations shall be marked to identify live, neutral and earth in case of connection of the luminaire to the supply mains to ensure safe and satisfactory operation	Type Y	P
	Symbols, when applied, indicating mains supply terminations shall be according to IEC 60417.		N/A
	The earthing termination shall be marked by the relevant symbol of IEC 60417 only.	-	N/A
	Leads (tails) and terminations used for the connection to extra-low voltage DC supplies shall indicate their intended connection choosing one of the below mentioned combination (see Table 3.2):		N/A
	Luminaires with supply cords which are not fitted with a plug shall include with the manufacturer's instructions any information necessary to ensure safe connection, e.g. deviations from the national standardized colour coding of the cores where this does not create the possibility of an unsafe situation during installation, use or maintenance.		P
3.2.13(598-1)	Symbol (see Figure 1) for minimum distance from lighted objects, if applicable, for luminaires which might otherwise overheat the lighted objects due to, for example, the applied lamp type, the shape of the reflector, the adjustability of the mounting means or the location of mounting as indicated in the installations instructions.		N/A
	The minimum distance marked shall be determined by the temperature test described in item j) of 12.4.1.		N/A
	The distance is measured on the optical axis of the luminaire from that part of the luminaire or lamp which is nearest to the lighted object.		N/A
	The symbol for minimum distance and explanation of its meaning shall also be given either on the luminaire or in the instructions with the luminaire.		N/A
3.2.14(598-1)	Symbol (see Figure 1), if applicable, for rough service luminaires.		N/A
3.2.15(598-1)	Symbol (see Figure 1), if applicable, for luminaires which are designed for use with bowl mirror lamps.		N/A
3.2.16(598-1)	Luminaires incorporating a protective shield shall be marked as follows:		N/A
	"Replace any cracked protective shield" or		N/A
	With the symbol (see Figure 1).		N/A
3.2.17(598-1)	The maximum number of luminaires that may be interconnected or the maximum total current that may be drawn by means of couplers provided for looping-in connection to the mains supply. For fixed luminaires, this information may alternatively be provided within the installation instructions.		N/A

3.2.18(598-1)	A warning symbol or notice for luminaires with ignitors intended for use with double ended high pressure discharge lamps and luminaires with double-capped Fa8 tubular lamps if the voltage measured according to Figure 26 exceeds 34 V peak.		N/A
	a.) Warning symbol in accordance with IEC 60417-5036 (2002-10) visible during replacement of the lamp. The symbol shall be explained on the luminaire or in the manufacturer's instructions provided with the luminaire, or		N/A
	b.) A warning notice near to the holder of a replaceable ignitor or replaceable switching element, if any: "Attention, remove replaceable device before replacement of lamp. After lamp replacement reinsert replaceable device".		N/A
3.2.19(598-1)	Symbol (see Figure 1) for luminaires which are designed to be used only with self-shielded tungsten halogen lamps or self-shielded metal halide lamps.		N/A
3.2.20(598-1)	Where necessary, the means of adjustment where not obvious, needs to be identified.		N/A
3.2.21(598-1)	The relevant symbol (see Figure 1) for luminaires not suitable for covering with thermally insulated material. The symbol shall be explained on the luminaire or in the manufacturer's instructions provided with the luminaire. See Table N.1. The minimum size of the symbol shall be 25 mm for each side.		N/A
	NOTE A warning notice and symbol is required when a luminaire is not suitable for covering with thermally insulated material.		N/A
3.2.22(598-1)	Symbol (see Figure 1 from IEC 61558-1), if applicable, for luminaires with internal replaceable fuses. Such a luminaire shall, in addition, be provided with information regarding the rated current (in A or mA) of the fuse. Where the time/current characteristic of the fuse is important for safety, the rating and type of any fuse shall be marked on the holder or in the proximity of the fuse in accordance with what is stated in the relevant fuse standard.		N/A
3.2.23(598-1)	Warning symbol "Do not stare at the operating light source" (see Figure 1) for portable and handheld luminaires that have been classified as having a threshold illuminance *E*thr in accordance with IEC TR 62778. This marking shall be visible as detailed by condition 'c' of Clause 3.2 and Table 3.1. In addition, the symbol should be positioned so that it can be read without looking into the operating light source. This requirement is applicable only when *E*thr is reached at a distance further than 200 mm from the luminaire.		N/A
3.2.24(598-1)	Where required for protection against electric shock, covers fixed over non-user replaceable light sources shall be marked with the 'caution, risk of electric shock' symbol given by IEC 60417-6042:2010-11. The minimum height of this symbol shall be 15 mm (see Figure 1).		P
3.2.25(598-1)	Rated constant input voltage when a luminaire is operated from a constant voltage controlgear not provided with the luminaire.		N/A

3.2.26(598-1)	Rated constant input current when the luminaire is operated from a constant current controlgear not provided with the luminaire. Luminaires supplied with constant current shall also be marked with the highest allowed *U*out value of the controlgear.			N/A
3.2.27(598-1)	For luminaires operating a LED light source and containing built-in controlgear, the maximum rated electrical output characteristics from the controlgear (e.g. current for constant current controlgear), for which the luminaire has been designed, shall be marked as required in the first column of Table 3.1 belonging to item a). For luminaires incorporating a constant light output function, this marking shall indicate the maximum operating conditions for which the luminaire has been designed. For luminaires using external independent controlgear delivered with the luminaire, this marking shall be visible according to the second column of Table 3.1 belonging to item b).			P
	NOTE This marking is additional to any information already marked on the controlgear.			N/A
3.3(598-1)	In addition to the above marking, all details which are necessary to ensure proper installation, use and maintenance shall be given either on the luminaire, semi-luminaire or on built-in ballasts or in the manufacturer's instructions provided with the luminaire, for instance:			P
	Written instructions related to safety shall be in a language which is acceptable in the country in which the equipment is to be installed.	**Marking**	English	P
		Manual	English and Arabic	P
(3.3.1)(598-1)	For combination luminaires, the permissible ambient temperature, the class of protection or the protection against ingress of dust, solid objects and moisture of an alternative part if not at least equal to that of the basic luminaire.			N/A
(3.3.2)(598-1)	Nominal frequency		50/60Hz	P
(3.3.3)(598-1)	Operating temperatures			N/A
	a.) The rated maximum operating temperature (of a winding) *t*w in degrees Celsius.			N/A
	b.) The rated maximum operating temperature (of a capacitor) *t*c in degrees Celsius.			N/A
	c.) The maximum temperature to which the insulation of supply cables and interconnecting cables will be subjected within the luminaire under the most unfavourable conditions of normal operation, if in excess of 90 °C (see note c to Table 12.2 relating to unsleeved fixed wiring). The symbol to indicate this requirement is given in Figure 1.			N/A
	d.) Spacing requirements to be observed during installation.			N/A
3.3.4(598-1)	Not used			N/A
(3.3.5)(598-1)	A wiring diagram, except where the luminaire is suitable for direct connection to the mains supply			N/A
3.3.6(598-1)	Special conditions for which the luminaire, including the ballast, is suitable, for instance, whether or not the luminaire is intended for looping-in.			N/A

(3.3.7)(598-1)	Luminaires provided with metal halide lamps shall, if applicable, be provided with the following warning notice:		N/A
	The luminaire shall only be used complete with its protective shield		N/A
3.3.8(598-1)	The manufacturer of semi-luminaires shall supply information on limitations of use of such devices, particularly where overheating may be caused by the position or thermal distribution of the replaceable light source being different from the light sources they will replace.		N/A
3.3.9(598-1)	In addition, the manufacturer shall be prepared to supply information on the power factor and the supply current.		N/A
	For connections suitable for both resistive and inductive loads, the rated current for the inductive load shall be indicated between brackets and shall immediately follow the rated current for the resistive load. The marking may accordingly be as follows:		N/A
	$3(1)$A 250 V or $3(1)/250$ or $\frac{3(1)}{250}$		N/A
3.3.10(598-1)	Suitability for use "indoors" including the related ambient temperature.		P
3.3.11(598-1)	For luminaires using remote control gear, the range of lamps for which the luminaire is designed.		N/A
3.3.12(598-1)	For clip-mounted luminaires, a warning when the luminaire is not suitable for mounting on tubular material.		N/A
3.3.13(598-1)	The manufacturer shall provide the specifications of all protective shields.		N/A
(3.3.14)(598-1)	Where necessary for correct operation, the luminaire shall be marked with the symbol for nature of supply (see Figure 1).		P
3.3.15(598-1)	The rated current at rated voltage shall be declared by the manufacturer for any socket outlet incorporated in the luminaire, if less than the rated value.		N/A
3.3.16(598-1)	The information about rough service luminaires concerning:		N/A
	– the connection to IPX4 rated socket outlets;		N/A
	– the correct mounting taking into account the temporary installation;		N/A
	– the correct fixing to a stand, and also where the stand is not supplied with the luminaire, the maximum height of a possible stand, and its required stability by the indication of the number and minimum length of the legs.		N/A
(3.3.17)(598-1)	For luminaires with type X, Y or Z attachments, the mounting instructions shall contain the substance of the following information		P
	– for type X attachments having a specially prepared cord		N/A
	If the external flexible cable or cord of this luminaire is damaged, it shall be replaced by a special cord or cord exclusively available from the manufacturer or his service agent.	-	N/A
	for type Y attachments		P

	If the external flexible cable or cord of this luminaire is damaged, it shall be exclusively replaced by the manufacturer or his service agent or a similar qualified person in order to avoid a hazard		P
	– for type Z attachments		N/A
	The external flexible cable or cord of this luminaire cannot be replaced; if the cord is damaged, the luminaire shall be destroyed		N/A
3.3.18(598-1)	Luminaires which are other than ordinary, provided with a PVC supply cord, shall be provided with information about the intended use, i.e. “For indoor use only”.		N/A
3.3.19(598-1)	For Class I luminaires having a supply current > 20 A, which generate a protective conductor current greater than 10 mA and intended for permanent connection, the protective conductor current shall be clearly stated in the manufacturers’ instructions.		N/A
3.3.19(598-1)	For luminaires which generate a protective conductor current greater than 10 mA and intended for permanent connection, the protective conductor current shall be clearly stated in the manufacturers’ instructions.		N/A
3.3.20(598-1)	Wall mounted, settable and adjustable luminaires not intended to be mounted within arm's reach shall be provided with information to advise their correct installation, i.e. "Only to be installed outside arm's reach".		N/A
3.3.21(598-1)	For luminaires with non-replaceable and non-user replaceable light source, the instruction sheet shall contain the substance of the following information:		P
	– For non-replaceable light sources: "The light source of this luminaire is not replaceable; when the light source reaches its end of life the whole luminaire shall be replaced";		N/A
	– For non-user replaceable light sources: "The light source contained in this luminaire shall only be replaced by the manufacturer or his service agent or a similar qualified person".		P
3.3.22(598-1)	For controllable luminaires the classification of insulation that has been maintained between LV supply and control conductors shall be provided (e.g. basic insulation, reinforced insulation).		N/A
3.3.23(598-1)	Luminaires delivered without controlgear shall be provided with the necessary information for the selection of the appropriate component (in particular the maximum wiring distance and size between controlgear and luminaire), together with the highest allowed *U*out value of the controlgear and the maximum *U*p or equivalent peak voltage *U*p where pulse voltages are used. In addition, the classification of insulation of the external controlgear that has been maintained between LV supply and secondary output shall be provided if there is a need for at least basic insulation.		N/A
	– For luminaires that require no insulation between LV supply and output of the external controlgear no additional information is required.		N/A
	– For luminaires that require basic insulation between the primary and secondary part of the controlgear the substance of the following information is required:		N/A

	– For luminaires that are not classified as Class III but require double or reinforced insulation between the primary and secondary part of the controlgear the substance of the following information is required: External controlgear shall provide at least double or reinforced insulation between LV supply and output.		N/A
	– For luminaires that are classified as Class III, an indication that the controlgear shall be SELV/PELV is required, except where exposed parts have a voltage higher than 12 V AC or 30 V DC, where an indication that the controlgear shall be SELV only is required.		N/A
3.3.24(598-1)	Where the terminal block is not supplied with the luminaire, the packaging shall contain the following wording: "Terminal block not included. Installation must be performed by a qualified person."		P
3.3.25	Luminaire manufacturers shall provide information about the protection for on-site mains wiring for luminaires employing light sources that emit UV on the mains wiring insulation. The information shall contain the substance of the following:		N/A
	"For installation, the use of additional UV resistant sleeves is required for on-site mains supply cables which are not UV resistant (in particular some halogen-free low smoke cable)."		N/A
3.3.26	For fixed wall mounted and portable wall mounted luminaires using an external flexible cable or cord longer than 30 cm, the manufacturer's instructions shall include the substance of the following wording: "To reduce the risk of strangulation the flexible wiring connected to this luminaire shall be effectively fixed to the wall if the wiring is within arm's reach".		N/A

1.9 (7.2)	**PROVISION FOR EARTHING**		
7.1(598-1)	This section specifies requirements, where applicable, for the earthing of luminaires.	-	N/A
7.2(598-1	**Provision for earthing**	-	N/A
7.2.1**(598-1**	Metal parts of class I luminaires which are accessible when the luminaire has been mounted, or is opened for replacement of a replaceable light source or replaceable starter or for cleaning purposes, and which may become live in the event of an insulation fault, shall be permanently and reliably connected to a protective earthing terminal or protective earthing contact.	-	N/A
	Metal parts screened from live parts by metal parts which are connected to the protective earthing terminal or protective earthing contact, and metal parts separated from live parts by double insulation or by reinforced insulation, are not, for the purpose of this requirement, regarded as likely to become live in the event of an insulation fault.	-	N/A
	NOTE 1 If a lamp breaks during a re-lamping operation, the breakage is not regarded as an insulation fault according to 7.2.1, as the lamp in this sense is not considered to be a part of the luminaire (see 0.4.2 and 8.2.3 item a) for clarification).		N/A
	Metal parts of luminaires which may become live in the event of an insulation fault and which are not accessible when the luminaire has been mounted, but are liable to come into contact with the supporting surface, shall be	-	N/A

	permanently and reliably connected to an earthing terminal.		
	NOTE 2 The earthing of starters and lamp caps is not a requirement but earthing of lamp caps may be necessary as a starting aid.		N/A
	The protective earthing connections shall be of low resistance.		N/A
	Self-tapping screws may be used to provide earthing continuity, provided they comply with the requirements given in 4.12.1		N/A
	Thread-forming screws may be used to provide earthing.		N/A
	A thread forming screw used in a groove of a metallic material could provide earth continuity for a luminaire if all the tests required within this standard regarding earthing connection were passed. See Figure 30.		N/A
	For class I luminaires with detachable parts provided with connectors or similar connection devices, the protective earth connection shall be made before the current-carrying contacts are made and the current-carrying contacts shall separate before the protective earth connection is broken..		N/A
	For terminal blocks with integrated screwless protective earthing contacts, the additional tests of Annex V are to be applied. It is allowed to earth built-in controlgear by means of fixing the controlgear to earthed metal parts of the luminaire. Connection to protective earthing of the luminaire via the built-in controlgear is not allowed.		N/A
7.2.2**(598-1**	Surfaces in adjustable joints, telescopic tubes, etc., providing earthing continuity, shall be such that a good electrical contact is ensured.		N/A
7.2.3**(598-1**	Compliance with the requirements of 7.2.1 and 7.2.2 is checked by inspection and, for protective earth, by the following test.		N/A
	A current of at least 10 A, derived from a source with a no-load voltage not exceeding 12 V, shall be passed between the earthing terminal or earthing contact and each of the accessible metal parts in turn.		N/A
	The voltage drop between the earthing terminal or earthing contact and the accessible metal part shall be measured and the resistance calculated from the current and the voltage drop. In no case shall the resistance exceed 0,5 Ω. When type testing, the current shall be applied for a period of at least 1 min.		N/A
	NOTE In the case of a luminaire with a supply cord, the earthing contact is at the plug or supply end of the flexible cable or cord.		N/A
7.2.4**(598-1**	Protective Earthing terminals shall comply with the requirements of 4.7.3. The connection shall be adequately locked against accidental loosening.		N/A
	For screw terminals, it shall not be possible to loosen the clamping means by hand.		N/A
	For screwless terminals, it shall not be possible to loosen the clamping means unintentionally.		N/A
	Compliance is checked by inspection, by manual test and by the tests specified in 4.7.3.		N/A
	NOTE In general, the designs commonly used for current-carrying terminals provide sufficient resilience to		N/A

	comply with this requirement; for other designs, special provisions, such as the use of an adequately resilient part which is not likely to be removed inadvertently, can be necessary.		
	For terminal blocks with integrated screwless earthing contacts, the additional tests of Annex V apply.		N/A
7.2.5**(598-1**	For a luminaire provided with a connector socket for a mains supply, the earth contact shall be an integral part of the socket.		N/A
7.2.6**(598-1**	For a luminaire to be connected to supply cables (fixed wiring) or to a supply cord, the earth terminal shall be adjacent to the mains terminal.		N/A
	NOTE Luminaires may be provided with type X or Y attachments.		N/A
7.2.7**(598-1**	For luminaires which are other than ordinary luminaires, all parts of an earth terminal shall be such as to minimize the danger of electrolytic corrosion resulting from contact with the earth conductor or any other metal in contact with them.		N/A
7.2.8**(598-1**	Either the screw or the other part of the protective earth terminal shall be made of brass or other non-rusting metal or a material with a non-rusting surface and the contact surfaces shall be of bare metal..		N/A
7.2.9**(598-1**	*Compliance with the requirements of 7.2.5 to 7.2.8 is checked by inspection and by manual test.*		N/A
7.2.10**(598-1**	If a fixed class II luminaire designed for looping-in is provided with internal terminal(s) for maintaining the electrical continuity of an earthing conductor not terminating in the luminaire, this(these) terminal(s) shall be insulated from accessible metal parts by double insulation or reinforced insulation.		N/A
	A fixed connected class II luminaire may have an earth connection for functional purposes, for example for looping in, to assist the starting of a lamp or to avoid radio interference. The functional earth circuit shall be separated from live parts by double or reinforced insulation.		N/A
	Compliance is checked by inspection.		N/A
7.2.11**(598-1**	When a class I luminaire is supplied with a supply cord, this cord shall have an earthing core colored green-yellow.		N/A
	The green-yellow core of a supply cord shall be connected to the earthing terminal of the luminaire and to the earthing contact of the plug if one is attached.		N/A
	All conductors, whether internal or external, which are identified by the green and yellow colour combination shall only be connected to an earthing terminal.		N/A
	For luminaires with supply cords, the arrangement of the terminals, or the length of the conductors between the cord anchorage and the terminals, shall be such that, should the cable or cord move out of the cord anchorage, the current-carrying conductor becomes taut before the earthing conductor.		N/A
	Compliance is checked by inspection.		N/A

7.2.12**(598-1**	Where a PELV circuit is connected to a protective earth for functional purposes, this circuit shall not be used for interconnection with other luminaires to avoid overload of the circuit conductor.		N/A
	NOTE The overload of the conductor can be caused by fault current coming from a different point of the earth circuit of a building to earth.		N/A

1.14 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		
9.1	**General**		N/A
	This section specifies the requirements and tests for luminaires classified as resistant to dust, solid objects and moisture in accordance with Section 2, including ordinary luminaires.		N/A
9.2	**Tests for ingress of dust, solid objects and moisture**		N/A
	The enclosure of a luminaire shall provide the degree of protection against ingress of dust, solid objects and moisture in accordance with the classification of the luminaire and the IP number marked on the luminaire.		N/A
	NOTE 1 The tests for the ingress of dust, solid objects and moisture specified in this standard are not all identical to the tests in IEC 60529 because of the technical characteristics of luminaires. An explanation of the IP numbering system is given in Annex J.		N/A
	Compliance is checked by the appropriate tests specified in 9.2.0 to 9.2.9, and for other IP ratings by the appropriate tests specified in IEC 60529.		N/A
	Before the tests for the second characteristic numeral, with the exception of IPX8, the luminaire complete with lamp(s) shall be switched on and brought to a stable operating temperature at rated voltage.		N/A
	The water for the tests shall be at a temperature of 15 °C ± 10 °C except for IPX9 where the temperature shall be 80 °C (±5 °C) or 15 °C (±10 °C) following the marking of the luminaire.		N/A
	Luminaires shall be mounted and wired as in normal use and placed in the most unfavourable position, complete with their protective translucent covers, if any, for the tests of 9.2.0 to 9.2.11.		N/A
	Where connection is made by a plug or a similar device, then this shall be regarded as part of the complete luminaire and shall be included in the tests and similarly for any separate control gear.		N/A
	For tests of 9.2.3 to 9.2.11, a fixed luminaire intended for mounting with its body in contact with a surface shall be tested with an expanded metal spacer interposed between the luminaire and the mounting surface. The spacer shall be at least equal in overall size to the projection of the luminaire, and have dimensions as follows:		N/A

	Long way of mesh 10 mm to 20 mm Short way of mesh 4 mm to 7 mm Strand width 1,5 mm to 2 mm Strand thickness 0,3 mm to 0,5 mm Overall thickness 1,8 mm to 3 mm		N/A
	Luminaires having provision for draining water by means of drain holes shall be mounted with the lowest drain hole open unless otherwise specified in the manufacturer's installation instructions.		N/A
	If the installation instructions indicate that a drip-proof luminaire is for ceiling or under-canopy mounting, the luminaire shall be attached to the underside of a flat board or plate which extends 10 mm beyond that part of the luminaire perimeter in contact with the mounting surface.		N/A
	For recessed luminaires, the parts in the recess and the parts protruding from the recess shall each be tested according to their IP classification as indicated in the manufacturer's mounting instructions. A box encapsulating the part in the recess may be necessary for the tests of 9.2.4 to 9.2.11.		N/A
	NOTE 2 The claimed IP rating is only applicable to the enclosure of the luminaire. In the case of a recessed luminaire, the IP rating of the luminaire does not protect the integrity of any seals outside of the luminaire, e.g. between the lower and upper parts of the ceiling.		N/A
	For IP2X luminaires, the enclosure denotes that part of the luminaire containing the main part other than the lamp and optical controls.		N/A
	NOTE 3 Since luminaires have no hazardous moving parts, the level of safety as specified in IEC 60529 is achieved.		N/A
	Portable luminaires, wired as in normal use, shall be placed in the most unfavourable position of normal use.		N/A
	Glands, if any, shall be tightened with a torque equal to two-thirds of that applied to glands in the test of 4.12.5.		N/A
	Fixing screws of covers, other than hand-operated fixing screws of glass covers, shall be tightened with a torque equal to two-thirds of that specified in Table 4.1.		N/A
	Screwed lids shall be tightened with a torque having a value in newton meters numerically equal to one-tenth of the nominal diameter of the screw thread in millimeters. Screws fixing other caps shall be tightened with a torque equal to two-thirds of that specified in Table 4.1.		N/A
	After completion of the tests, the luminaire shall withstand the electric strength test specified in Section 10, and inspection shall show:		N/A
	a) no deposit of talcum powder in dust-proof luminaires, such that, if the powder were conductive, the insulation would fail to meet the requirements of this standard;		N/A
	b) no deposit of talcum powder inside enclosures for dust-tight luminaires;		N/A

	c) no trace of water on electrical connections, current carrying parts or on insulation where it could become a hazard for the user or surroundings, for example where it could reduce the creepage distances below the values specified in Section 11; the only exception to this is for SELV or PELV conductors where the voltage under load does not exceed 12 V peak interrupted DC voltage for frequencies between 10 Hz and 200 Hz, 12 V RMS or 30 V ripple free DC and the conductors are protected from corrosion.		N/A
	NOTE 4 Some aspects of protection against corrosion are covered by Clause 4.18. 1) For luminaires without drain holes, there shall be no water entry. NOTE 5 Care is taken not to mistake condensation for water entry. 2) For luminaires with drain holes, water entry including condensation is allowed during the tests if it can drain out effectively and provided it does not reduce the creepage and clearance distances below the minimum levels specified in this document;		N/A
	d) no trace of water having entered in any part of a watertight or pressure watertight luminaire or high pressure and temperature water jet-proof luminaire or high pressure and cold water jet-proof luminaire;		N/A
	e) no contact permitted with live parts by the relevant test probe for first characteristic IP numeral 2; no entry into the luminaire enclosure by the relevant test probe for first characteristic IP numerals 3 and 4; for luminaires with drain holes in accordance with Clause 4.17 and luminaires with ventilation slots for forced cooling, no contact with live parts is permitted through the drain holes and ventilation slots with the relevant test probe for the first characteristic IP numerals 3 and 4;		N/A
	f) no trace of water on any part of a lamp requiring protection from splashing water as indicated in the "information for luminaire design" section of the applicable lamp standard;		N/A
	g) no damage, for example, cracking or breakage of a protective shield or glass envelope, such that safety or protection against the ingress of moisture is impaired.		N/A
9.2.0	**Tests**		N/A
	Solid-object-proof luminaires (first characteristic IP numeral 2) shall be tested with the standard test finger specified in IEC 60529 in accordance with the requirements of Sections 8 and 11.		N/A
	Luminaires with first characteristic IP numeral 2 are not required to be tested with the sphere specified in IEC 60529.		N/A
	Solid-object-proof luminaires (first characteristic IP numerals 3 and 4) shall be tested at every possible point (excluding gaskets) with a probe in accordance with test probe C or D of IEC 61032, applied with a force as specified in Table 9.1:		N/A

	The end of the probe wire shall be cut at right angles to its length and be free from burrs.		N/A
9.2.1	Dust-proof luminaires (first characteristic IP numeral 5) shall be tested in a dust chamber similar to that shown in Figure 6, in which talcum powder is maintained in suspension by an air current. The chamber shall contain 2 kg of powder for every cubic metre of its volume. The talcum powder used shall be able to pass through a square-meshed sieve whose nominal wire diameter is 50 µm and whose nominal free distance between wires is 75 µm. It shall not have been used for more than 20 tests.		N/A
	The test shall proceed as follows:		N/A
	a) The luminaire is suspended outside the dust chamber and operated at rated supply voltage until operating temperature is achieved.		N/A
	b) The luminaire, whilst still operating, is placed with the minimum disturbance in the dust chamber.		N/A
	c) The door of the dust chamber is closed.		N/A
	d) The fan/blower causing the talcum powder to be in suspension is switched on.		N/A
	e) After 1 min, the luminaire is switched off and allowed to cool for 3 h whilst the talcum powder remains in suspension.		N/A
	NOTE The 1 min interval between switching on the fan/blower and switching off the luminaire is to ensure that the talcum powder is properly in suspension around the luminaire during initial cooling, which is most important with smaller luminaires. The luminaire is operated initially as in item a) to ensure the test chamber is not overheated.		N/A
9.2.2	Dust-tight luminaires (first characteristic IP numeral 6) are tested in accordance with 9.2.1.		N/A
9.2.3	Drip-proof luminaires		N/A
9.2.3.1	Drip-proof luminaires (second characteristic IP numeral 1) are subjected for 10 min to an artificial rainfall of 0 5 1 0+ , mm/min, falling vertically from a height of 200 mm above the top of the luminaire.		N/A
9.2.3.2	Drip-proof luminaires (second characteristic IP numeral 2) are subjected for 10 min to an artificial rainfall of 0 5 3 0+ , mm/min, falling vertically from a height of 200 mm above the top of the luminaire, when the luminaire is in the most onerous position and tilted at any angle up to 15° on either side of the vertical.		N/A
9.2.4	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. The radius of the semicircular tube shall be as small as possible and compatible with the size and position of the luminaire.		N/A
	The tube shall be perforated so that jets of water are directed towards the centre of the circle and the water flow rate at the inlet of the apparatus shall be approximately 0,07 l/min with a tolerance of ±5 % per hole multiplied by the number of holes (approximately 80 kN/m2).		N/A

	The tube shall be caused to oscillate through an angle of 120°, 60° on either side of the vertical, the time for one complete oscillation (2 □□120°) being about 4 s.		N/A
	The luminaire shall be mounted above the pivot line of the tube so that the ends of the luminaire receive adequate coverage from the jets. The luminaire shall be turned about its vertical axis during the test at a rate of 1 r/min.		N/A
	After this 10 min period, the luminaire shall be switched off and allowed to cool naturally whilst the water spray is continued for a further 10 min.		N/A
	NOTE In Japan, the oscillating tube test and the spray nozzle test as specified in IEC 60529 are accepted.		N/A
9.2.5	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 and described in 9.2.4. The luminaire shall be mounted under the pivot line of the tube so that the ends of the luminaire receive adequate coverage from the jets.		N/A
	The tube shall be caused to oscillate through an angle of almost 360°, 180° on either side of the vertical, the time for one complete oscillation (2 □□360°) being about 12 s. The luminaire shall be turned about its vertical axis during the test at a rate of 1 r/min.		N/A
	The support for the equipment under test shall be grid shaped in order to avoid acting as a baffle. After this 10 min period, the luminaire shall be switched off and allowed to cool naturally whilst the water spray is continued for a further 10 min.		N/A
	NOTE In Japan, the oscillating tube test and the spray nozzle test as specified in IEC 60529 are accepted.		N/A
9.2.6	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. The nozzle shall be held 3 m away the sample.		N/A
	The water pressure at the nozzle shall be adjusted to achieve a water flow rate of 12,5 l/min with a tolerance of ±5 % (approximately 30 kN/m2).		N/A
9.2.7	Powerful water jet-proof luminaires (second characteristic IP numeral 6) are switched off and immediately subjected to a water jet for 3 min from all directions by means of a hose having a nozzle with the shape and dimensions shown in Figure 8. The nozzle shall be held 3 m away from the sample.		N/A
	The water pressure at the nozzle shall be adjusted to achieve a water flow rate of 100 l/min with a tolerance of ±5 % (approximately 100 kN/m2).		N/A

9.2.8	Watertight luminaires (second characteristic IP numeral 7) are switched off and immediately immersed for 30 min in water, so that there is at least 150 mm of water above the top of the luminaire and the lowest portion is subjected to at least 1 m head of water. Luminaires shall be held in position by their normal fixing means. Luminaires for tubular fluorescent lamps shall be positioned horizontally, with the diffuser upwards, 1 m below the water surface.		N/A
	NOTE This treatment is not sufficiently severe for luminaires intended for operation under water.		N/A
9.2.9	Pressure watertight luminaires (second characteristic IP numeral 8) are heated either by switching on the lamp or by other suitable means, so that the temperature of the luminaire enclosure exceeds that of the water in the test tank by between 5 °C and 10 °C.		N/A
	The luminaire shall then be switched off and subjected to a water pressure of 1,3 times that pressure which corresponds to the rated maximum immersion depth for a period of 30 min.		N/A
9.2.10	High pressure and temperature water jet-proof luminaires (second characteristic IP numeral 9 (80 °C)) are switched off and immediately subjected to the high pressure and high temperature water jet. The test is made by spraying the luminaire with a stream of hot water from a standard test nozzle as described in IEC 60529. The water for the tests shall be at a temperature of (80 ± 5) °C. For small enclosures (largest dimension less than 250 mm), the test duration is in total 2 min. For large enclosures (largest dimension greater than or equal to 250 mm), the test duration is 1 min/m2 of the calculated surface area of the enclosure (excluding any mounting surface), with a minimum duration of 3 min.		N/A
9.2.11	High pressure and cold water jet-proof luminaires (second characteristic IP numeral 9 (15 °C) are switched off and immediately subjected to the high pressure and cold temperature water jet. The test is made by spraying the luminaire with a stream of water from a standard test nozzle as described in IEC 60529. The water for the tests shall be at a temperature of (15 ± 10) °C. For small enclosures (largest dimension less than 250 mm), the test duration is in total 2 min. For large enclosures (largest dimension greater than or equal to 250 mm), the test duration is 1 min/m2 of the calculated surface area of the enclosure (excluding any mounting surface), with a minimum duration of 3 min.		N/A
9.3	**Humidity test**	-	-
	All luminaires shall be humidity-proof where humid conditions may occur in normal use.		P
	Compliance is checked by the humidity treatment described in 9.3.1, followed immediately by the tests of Section 10.		P
	Cable entries, if any, shall be left open; if knock-outs are provided, one of them shall be opened.		N/A

	Parts which can be removed by hand (e.g. electrical components, covers, protective glasses.), shall be removed and subjected, if necessary, to the humidity treatment with the main part.		N/A
9.3.1	The luminaire is placed in the most unfavourable position of normal use, in a humidity cabinet containing air with a relative humidity maintained between 91 % and 95 %. The temperature of the air at all places where samples can be located shall be maintained within 1 °C of any convenient value "t" between 20 °C and 30 °C.	30°C, 95 % R.H.	P
	Before being placed in the humidity cabinet, the sample shall be brought to a temperature between "t" and (t + 4) °C. The sample shall be kept in the cabinet for 48 h.		P
	NOTE In most cases, the sample may be brought to the specified temperature between "t" and (t + 4) °C by keeping it in a room at this temperature for at least 4 h before the humidity treatment.		P
	In order to achieve the specified conditions within the cabinet, it is necessary to ensure constant circulation of the air within and in general to use a cabinet which is thermally insulated.		P

1.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH			
(10.2.1)	Insulation resistance test		---	---
	Insulation resistance R between:	Required R (MΩ)	R (MΩ)	---
	-Between live parts of different polarity	1	>99.99	P
	-Between live parts and metal parts of the luminaire	1	>99.99	P
	-Double insulation	2	>99.9	P
	-SELV	1	-	N/A
(10.2.2)	Electric strength test			
	Test voltage applied between:	Test voltage V (r.m.s)	Breakdown (Yes/No)	---
	-Between live parts of different polarity	1480	No	P
	-Between Live parts and Metal parts	1480	No	P
	-Double Insulation	2960	No	P
	-SELV	500	-	N/A
(10.3)	Leakage current (mA)	Limit (mA)	Measured (mA)	---
	Class II luminaire	0.7mA	18.11µA	P
	Class I luminaire with plug (≤16 A)	-	-	N/A
	Class I (for permanent connection)	-	-	N/A

1.13(12)	ENDURANCE TEST AND THERMAL TEST			
(12.4)	Thermal test (normal operation)			P
	Test voltage (V)=1.06*rated voltage :		254.4V	-
	Ambient (°C) :		25°C	-
	The monitored point	Result	Max. Limit	-
Sample 1	Insulation of wiring	33.1	90	P
	Enclosure of luminaire	40.2	75	P
	Mounting surface	40.6	90	P
Sample 2	Insulation of wiring	30.8	90	P
	Enclosure of luminaire	40.9	75	P
	Mounting surface	41.7	90	P

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Clause	**Requirement-Test**	**Result-Remarks**	**Verdict**
7	**Marking**		**-**
7.1	Marking shall be clear and durable	One set	N/A
	Trade mark, manufacturer's name or name of the responsible vendor / supplier.	-	N/A
	Model number or type reference of the manufacturer	-	N/A
	Symbol for independent lamp control gear if applicable. 	-	N/A
	Correlation between replaceable and interchangeable parts		N/A
	Rated supply voltage, , voltage range	-	N/A
	supply frequency	-	N/A
	supply current(s)	-	N/A
	Symbol of the earthing terminal (if any)		N/A
	Any output terminal and earth, if applicable		N/A
	Wiring diagram indicating the position and purpose of terminals.		N/A
	Value of tc		N/A
	Symbol for temperature declared, thermally protected controlgear 		N/A
	for constant voltage types: rated output power and rated output voltage.		N/A
	for constant current types: rated output power and output current.		N/A
	if applicable: an indication that the control gear is suitable for operation with LED modules only		N/A
7.2	**Information to be provided (if applicable)**		N/A
	Indication that the lamp controlgear does not rely upon the luminaire enclosure for protection against accidental contact with live parts.		N/A
	Indication of the cross-section of conductors for which the terminals, if any, are suitable. Symbol: relevant value(s) in square millimetres (mm²) followed by a small square.		N/A
	The lamp type and rated wattage or wattage range for which the lamp control gear is suitable, or		N/A
	the designation as indicated on the lamp data sheet of the type(s) of lamp(s) for which the lamp control gear is designed.		N/A
	mention whether the control gear has mains-connected windings		N/A
	mention that they are SELV-equivalent control gear, if applicable.		N/A

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Clause	Requirement-Test	Result-Remarks	Verdict
4	**Requirements for Non-directional / directional lamps, control gears and luminaires**		
4.1	**Energy efficiency requirements**		
	Lamps listed in **Annex A** of this Standard shall comply with the energy efficiency requirements specified in Annex C for non-directional lamps and Annex E for directional lamps.	Annex E	P
	For Incandescent, Halogen, and CFLi with luminous flux above or equal to 12,000 lumens the tests and criteria described in SASO 2870 apply		N/A
	For LED lamps, tests and criteria described in SASO 2870 apply.		N/A
	Energy efficiency classes and the methods of calculating the EEI for lamps are also detailed in Annex C for non-directional lamps and Annex E for directional lamps.		P
	Ballasts and control gears shall comply with the Energy Efficiency Requirements specified in Annex H.		N/A
	Luminaires in the scope of this standard (integrated luminaires) shall comply with energy efficiency requirements expressed in Annex M of this standard.		P
	Annex A – Regulated products in the scope of this standard		P
	This Standard establishes requirements for the placing on the market of the below listed lamp types, and of control gears (ballasts) able to operate such lamps, even when they are integrated into other energy-using products This Standard is applicable to lamps and luminaires with a luminous flux above 60 lumens.		P
	A.2 Luminaires		
	This standard establishes requirements for the placing on the market of the below list of with integrated luminaires (provided with non-replaceable lamps) which are designated under the categories:		P
	Directional integrated luminaires		P
	Non-directional luminaires		N\A
	Annex M – Energy efficiency for (integrated) luminaires		
	M.1 Types of luminaires		

M.1 - Types of luminaires

Definitions for the different types of luminaires are presented in Clause 3
Luminaires within the scope of this standard (integrated luminaires) are characterized as direct or indirect lighting sources depending of the beam angle of the light emission.

For information only, luminaires can be identified per type of use as expressed in Table 34

Table 34: Use types for luminaires (informative)

Terms	Description	Content
LT_1	General (artificial) lighting	Lighting designed to provide an uniform level of illumination
LT_2	Local lighting	Lighting designed to provide designed level of illumination over a specific area surrounding with lower illumination from spilled light source(s)
LT_3	Accent lighting	Lighting that calls attention or adds interest to a particular object or unusual feature or interest of a room. Highlights, emphasizes illumination with a strong light from behind in order to embrace depth or to separate the object from the background, sidelights is highlights coming from the side.
LT_4	Task lighting	Lighting designed to provide a strong illumination for visually demanding activities. It needs to be glare-free. Effective task lighting enhances visual clarity and keeps the eyes from getting tired.
LT_5	Ambient lighting	An ambient source of light that washes the room with a glow. It flattens an interior and creates very little shadow.
LT_6	Aesthetic lighting	Lighting as a piece of art. A neon sculpture would be purely decorative and illustrates aesthetic lighting.
LT_7	Natural lighting	Lighting provided without any artificial lighting sources

LT_1 — P

M.2 – Minimum efficacy for luminaires

M.2 - Minimum Efficacy for luminaires

The minimum energy efficacy for luminaires are reported in Table 35, depending on the total power of the luminaires.

Table 35: Minimum energy efficacy for (MEPS) Luminaires

Power of the luminaire	Minimum value for efficacy
P_{rated} < 15 W	≥ 65 Lumen/Watt
P_{rated} ≥ 15 W	≥ 70 Lumen/Watt

See table — P

M.3 – Energy efficiency Index for luminaires (EEI)

The energy efficiency for luminaires is calculated as for the EEI for lamps of the same category (directional or non-directional) according respectively to Annex C for non-directional luminaires and E for directional luminaires, based on illuminance (Lumen) and Power deducted from the Energy Efficacy.	-	P
or the calculation of the energy efficiency index (EEI) of a model, its corrected (electric) power Pcor for any control gear losses is compared with its reference power Pref (based on the luminous flux emitted).		N/A
The EEI is calculated as follows and rounded to three decimal places:		P
EEI = Pcor / Pref	0.162	P
Pcor (without control gear)= rated power (Prated)	13	P
For models with external control gear Pcor is the rated power (P_{rated}) corrected in accordance with the corrections factors listed below:		N/A
The rated power (P_{rated}) of the lamps/luminaires is measured at their nominal input voltage.		P
Correction factors presented in Table 36 apply to moderated the electric power of the luminaires		P
Correction factor cumulative with those expressed in		P

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	annex C for indirect lamps and Annex E for direct lamps.		
	Pref is the reference power obtained from the useful luminous flux of the model (Φuse) by the formula:		P
	Φuse<1300 lumen: Pref = 0.88√Φuse +0.049 x Φuse	79.96	P
	Φuse ≥ 1300 lumen: Pref = 0.07341x Φuse		N/A
	For non-directional lamps, the useful luminous flux (Φuse) is the total rated luminous flux (Φ)		N/A
	M.4 - Classification of Energy Efficiency Index for (integrated luminaires (EEI)		
	This clause only for the measured value no need to verdict (P,F or N) except if it exceed allowable limit at this case F		P
	The energy efficiency rating of luminaires shall be determined on the basis of their energy efficiency index (EEI) as outlined in **Table 37.**		P
	Table 37: Energy efficiency classes for luminaires Energy efficiency index (EEI) / Energy efficiency class (Arabic) / Equivalent energy efficiency class (English) EEI ≤ 0.11 / ا / A 0.11 < EEI ≤ 0.13 / ب / B 0.13 < EEI ≤ 0.18 / ج / C 0.18 < EEI ≤ 0.24 / د / D 0.24 < EEI ≤ 0.50 / هـ / E 0.50 < EEI ≤ 0.95 / و / F 0.95 < EEI ≤ 1.75 / ز / G *Note: For labelling purposes, the Arabic letters shall be used. The equivalent English version is only provided for informational purposes*		P
4.2	**Functionality requirements**		
	Integrated luminaires listed in **Annex A** shall comply with requirements specified in **Annex D, F and M, when applicable.**		P
	Annex D – Functionality and endurance requirements for non-directional lamps and luminaires		
	D.3 – Functionality and Endurance requirements for non-directional LED lamps **and luminaires**		N/A
	D.3 - Functionality and endurance requirements for non-directional LED lamps and luminaires *Table 13: Functionality and endurance requirements for non-directional LED lamps and luminaires* Parameter / Performance required Lamp survival factor at 6,000 h / ≥ 0.90 Lumen Maintenance at 6,000 h / ≥ 0.80 Number of switching cycles before failure / ≥ 15,000 if rated lamp life ≥ 30,000 h otherwise: ≥ half the rated lamp life expressed in hours Starting time / < 0.5 s Lamp warm-up time to 95 % Φ / < 2 s Premature failure rate / ≤ 5.0 % at 1,000 h Color rendering (Ra) / ≥ 80 ≥ 65 if the lamp is intended for outdoor or industrial applications Color consistency / Variation of chromaticity coordinates within a six-step MacAdam ellipse or less. Lamp displacement factor (Df) with integrated control gear and integrated luminaires / P ≤ 2 W: no requirement 2 W < P ≤ 5 W: Df ≥ 0.4 5 W < P ≤ 25 W: Df ≥ 0.7(1) P > 25 W: Df ≥ 0.9 (1) During one year after date of enforcement Df ≥ 0.5 is accepted for lamps with 5 W < P ≤ 25 W		N/A
	Annex F – Functionality requirements for directional LED lamps **and integrated luminaires**		

	The lamp functionality requirements are outlined in **table 18** for directional LED lamps and integrated luminaires. For the purpose of testing the number of times the lamp can be switched on and off before failure, the switching cycle shall consist of periods comprising 1 minute on and 3 minutes off or 5 minutes on and 5 minutes off. For the purposes of testing lamp lifetime, lamp survival factor, lumen maintenance and premature failure, the standard switching cycle shall be used.		P
	Add Before table 18 (2902:2021) Lumen maintenance and survival factors values at 6000 h shall meet the limits in table 18 in accordance with IEC 62722 or IES LM 84 and shall be submitted in registration system. In case IEC 62717 or IES LM 80 or test report is available then, Lumen maintenance and survival factors values at 2000 h are accepted and shall meet the limits in the table 18 in accordance with IEC 62722 or IES LM 84.		P
	Table 18: Functionality and endurance requirements for directional LED lamps and integrated luminaires Parameter / Requirements: Lamp survival factor at 6,000 h: ≥ 0.90 Lumen Maintenance at 6,000 h: ≥ 0.80 Number of switching cycles before failure: ≥ 15,000 if rated lamp life ≥ 30,000 h otherwise: ≥ half the rated lamp life expressed in hours Starting time: < 0.5 s Premature failure rate: ≤ 5.0 % at 1,000 h Color rendering (Ra): ≥ 80; ≥ 65 if the lamp is intended for outdoor or industrial applications Color consistency: Variation of chromaticity coordinates within a six-step MacAdam ellipse or less. Lamp displacement factor (Df) for lamps with integrated control gear and integrated luminaires: P ≤ 2 W: no requirement; 2 W < P ≤ 5 W: Df > 0.4; 5 W < P ≤ 25 W: Df > 0.7(1); P > 25 W: Df > 0.9; (1) during one year after date of enforcement Df ≥ 0.5 is accepted for lamps with 5 W < P ≤ 25 W		P
4.3	**Marking requirements**		
	Instruction manuals supplied with products and available on website shall be:		P
	Cautionary and/or any safety warnings for the direct user or consumer shall be in the Arabic and English language.		P
	International accepted pictograms are permitted instead of verbally expressed language.		P
	Available on a Website (English only is permitted).		P
	Lamps, ballasts and **luminaires** listed in **Annex A** of this Standard shall comply with the **marking requirements specified in Annex G** (directional lamps, non-directional lamps and **luminaires**) and Annex H.2 (ballasts / control gears).	-	P
2902 (2021) replacement	"Special purpose" products (Annex B.1) do not need to comply with the marking requirements specified in Annex G. Instead, the following information shall be clearly and prominently indicated on their packaging and in all forms of product information accompanying		N/A

SAITCO ,First Industrial City area ,Riyadh Station area beside dry customs St.4,5,6,7 Building No.2433 , Riyadh 11427, PO 27711 , Tel : +966 11 2043000,Fax +966 1 2042888, www saitco com.sa

	the lamp when it is placed on the market:		
	□ Brand Name		N/A
	□ Model number		N/A
	□ Rated power(Watt)		N/A
	□ Rated Voltage (Voltage)		N/A
	□ Rated Lumen(Lumen)		N/A
	□ Rated color temperature (Kelvin)		N/A
	□ Country of origin		N/A
	□ Their intended purpose		N/A
	Products listed in Annex B.1.2 shall fulfill the documentation and information requirements specified for them in the same Annex.		N/A

ANNEX G	**Marking requirements for non-directional and directional lamps**		
2902(2021)	**ANNEX Title correction:** Marking requirements for non-directional and directional lamps and luminaire.		
G.1	**Information to be displayed on the lamp itself.**		-
2902(2021)	For lamps other than high-intensity discharge lamps, the following shall be printed on the bulb with non-removable ink:		P
	□ Brand name	OPPLE	P
	□ Input voltage *	220-240V	P
	□ Rated power (Watt)	13W	P
	□ Country of origin	China	P
G.2	**Information to be visibly displayed to end-users, prior to their purchase, on the packaging and on free access websites**		-
2902(2021)	**Title correction:** Information to be visibly displayed to end-users, prior to their purchase and on the packaging.		-
2902(2021)	The information does not need to use the exact wording on the list below. It may be displayed in the form of graphs, drawings or symbols rather than text		-
	The information in paragraphs (a) to (p) below shall be visibly displayed on the packaging if the product is intended to be displayed to the end-users	-	P
	a. Brand name;	OPPLE	P
	b. Model number;	LED HC260 13W White	P
	c. Country of origin;	China	P
	d. Rated voltage and rated frequency;	220-240V 50/60Hz	P
	e. Rated luminous flux (Lumen);	1050	P
	f. Rated Efficacy (Lumen/Watt);	81	P
	g. Rated power (Watt);	13W	P
	h. Rated beam angle in degrees (only for directional lamps);	100	P
	i. Lamp displacement factor (only for LED lamps with integrated control gear);	0.9	P
	j. Rated life time of the lamp in hours;	15000	P
	k. Rated Color temperature, as a value in Kelvins, expressed graphically or in words;	5700K	P
	l. Number of switching cycles before premature failure (only for LED lamps or if claimed by the manufacturer for other type of lamps);	50000	P
	m. Rated Color rendering index (Ra);	> 90	P
	n. Stating all hazardous material contained in the	marked	P

	lamp/luminaire, as relevant;		
	o. A warning if the lamp cannot be dimmed or can be dimmed only on specific dimmers; in the latter case, a list of compatible dimmers shall be also provided on the manufacturer's website or any other form the manufacturer deems appropriate	marked	P
	p. Following information are optional:		N/A
	- Lamp type: directional or non-directional		N/A
	- Color consistency (only for LED lamps);		N/A
	- Lumen maintenance factor at the end of the nominal life;	-	N/A
	- Warm-up time up to 60 % of the full light output (may be indicated as 'instant full light' if less than 1 second), when relevant;		N/A
	- If designed for optimum use in non-standard conditions (such as ambient temperature Ta ≠ 25 °C or specific thermal management is necessary), provide information on those conditions;		N/A
	- Rated peak intensity in candela (cd), when available;		N/A
	An equivalence claim involving the power of a replaced lamp type may be displayed only if the lamp type is listed in Part 1 - Table 13 and if the luminous flux of the lamp in a 90° cone (Φ□□°) is not lower than the corresponding reference luminous flux in Part 1 - Table 13 The reference luminous flux shall be multiplied by the correction factor in Part 1 - Table 14. For LED lamps, it shall be in addition multiplied by the correction factor in Part 1 - Table 15. The intermediate values of both the luminous flux and the claimed equivalent lamp.		N/A
	For LED lamps, if intended for use in outdoor or industrial applications, an indication to this effect;		N/A
	Lamp dimensions in millimeters (length and largest diameter);		N/A
	- Actual values of all hazardous material contained in the lamp/luminaire		N/A
	q. Following information shall be displayed on free-access websites or in any other form the manufacturer deems appropriate:		N/A
	- how to clean lamp debris in case of accidental lamp breakage and disposal of lamp at the end of life, when relevant;		N/A
	- About actual values of the hazardous content, when relevant		N/A
G.3 (new clause)2902 2021	**Information on control gear and ballast**		-
	For control gear and ballast, the following shall be printed on the product and packaging:		-
	- Brand name;		N/A
	- Model number;		N/A
	- Country of origin;		N/A
	- Rated voltage and rated frequency;		N/A
	- Rated efficiency %		N/A
	- Rated input power (Watt);		N/A

	- Rated power factor		N/A
	- Rated ambient temperature (Ta) and Rated case		N/A
	- Temperature (Tc)		N/A

4.4	**Energy efficiency label**	-	-
	Lamps and integrated luminaires in the scope of this standard shall have label printed directly on the individual packaging of the product.		N/A
4.5	**Hazardous chemicals: Substance restrictions for lamps and control gears**		
	The following products are exempted from requirements on hazardous substances (Clause 4.5) • Luminaires • Control gears		N/A

ANNEX N – Criteria for market surveillance	
The enforcer may draw a sample of batch of a minimum of twenty (20) lamps or ten (10) luminaires of the same model from the same manufacturer, where possible obtained in equal proportion from four randomly selected sources, unless specified otherwise in Table 38.	
The model shall be considered to comply with the requirements laid down in this Standard if:	
• The lamps in the batch are accompanied by the required and correct product information,	
• All parameters listed in Table 38 are met.	
Parameter	**Procedure**
Energy efficiency index1	Compliance: The Energy Efficiency Index (EEI) value for lamps in the scope of this Standard shall be less than or equal to the specified values in Tables 2 and 8, when calculated at both rated and average tested power and luminous flux. Furthermore, the average EEI of the sample tested should be not higher than 10% of the rated EEI, and each lamp in the sample should have an EEI value within 10% of the sample's average EEI. For Luminaires the MEPS for Energy Efficacy shall be respected for each product; furthermore, the average efficacy of the sample tested should not be lower 10% of the rated efficacy (in Lumen/W), and each luminaire in the sample should have an efficacy value within 10% of the sample's average efficacy. Non-compliance: otherwise
Lamp survival factor at 6000 h (for LED lamps only)	The test shall end □ when the required number of hours is met, or □ when more than two lamps fail, whichever occurs first Compliance: a maximum of two out of every 20 lamps in the test batch may fail before the required number of hours Non-compliance: otherwise
Number of switching cycles before failure	The test shall end when the required number of switching cycles is reached, or when more than one out of every 20 lamps in the test batch have reached the end of their life, whichever occurs first Compliance: at least 19 of every 20 lamps in the batch have no failure after the required number of switching cycles is reached Non-compliance: otherwise
Starting time	Compliance: the average starting time of the lamps in the test batch is not higher than the required starting time plus 10 %, and no lamp in the sample batch has a starting time longer than two times the required starting time Non-compliance: otherwise
Lamp warm-up time to 60 % Φ	Compliance: the average warm-up time of the lamps in the test batch is not higher than the required warm-up time plus 10%, and no lamp in the sample batch has a warm-up time that exceeds the required warm-up time multiplied by 1.5

1 The tolerances for variation indicated above relate only to the verification of the measured parameters by the authorities and shall not be used by the supplier as an allowed tolerance on the values in the technical documentation to achieve a more efficient energy class. The declared values shall not be more favorable for the supplier than the values reported in the technical documentation. Non-compliance: otherwise	
Premature failure rate	The test shall end □ when the required number of hours is met, or □ When more than one lamp fails, whichever occurs first Compliance: a maximum of one out of every 20 lamps in the test batch fails before the required number of hours Non-compliance: otherwise
Color rendering (Ra)	Compliance: the average Ra of the lamps in the test batch is not lower than three points below the required value, and no lamp in the test batch has a Ra value that is more than 3,9 points below the required value Non-compliance: otherwise
Lumen maintenance at end of life and rated lifetime (for LED lamps only)	For these purposes, 'end of life' shall mean the point in time when only 50 % of the lamps are projected to survive or when the average lumen maintenance of the batch is projected to fall below 70 %, whichever is projected to occur first Compliance: the lumen maintenance at end of life and the lifetime values obtained by extrapolation from the lamp survival factor and from the average lumen maintenance of the lamps in the test batch at 6000 h are not lower than respectively the lumen maintenance and the rated lifetime values declared in the product information minus 10 % Non-compliance: otherwise
Equivalence claims for retrofit lamps according to Annex G	If only the equivalence claim is verified for compliance, it is sufficient to test 10 lamps, where possible obtained approximately in equal proportion from four randomly selected sources Compliance: the average results of the lamps in the test batch do not vary from the limit, threshold or declared values by more than 10 % Non-compliance: otherwise
Beam angle	Compliance: the average results of the lamps in the test batch do not vary from the declared beam angle by more than 25 % and the beam angle value of each individual lamp in the test batch does not deviate by more than 25 % of the rated value Non-compliance: otherwise
Peak intensity	Compliance: the peak intensity of each individual lamp in the test batch is not less than 75 % of the rated intensity of the model Non-compliance: otherwise
Other parameters	Compliance: the average results of the lamps in the test batch do not vary from the limit, threshold or declared values by more than 10 %. Non-compliance: otherwise

If a model within the registered family of product fails, the registration of all models under the same family of product will be automatically canceled

M.2 - Minimum Efficacy for luminaires

The minimum energy efficacy for luminaires are reported in Table 35, depending on the total power of the luminaires.

Table 35: Minimum energy efficacy for (MEPS) Luminaires

Power of the luminaire	Minimum value for efficacy	Measured value	Verdict
Prated < 15 W	≥ 65 Lumen/Watt	79.55	P
Prated ≥ 15 W	≥ 70 Lumen/Watt	--	N/A

M.4 - Classification of Energy Efficiency Index for (integrated luminaires (EEI)		
Number of sample	Measured EEI	Measured EEI class
1	0.16	C
2	0.16	C
3	0.17	C
4	0.16	C
5	0.17	C

	Energy efficiency classes for luminaire		
Table 37	EEI ≤ 0.11	أ	A
	0.11< EEI ≤ 0.13	ب	B
	0.13< EEI ≤ 0.18	ج	C
	0.18< EEI ≤ 0.24	**د**	**D**
	0.24 < EEI ≤0.50	ه	E
	0.50 <EEI ≤0.95	و	F
	0.95 <EEI ≤1.75	ز	G
	Note: For labelling purposes, the Arabic letters should be used. The equivalent English version is only provided for informational purposes		

Annex D – Functionality and endurance requirements for non- directional lamps and luminaires

D.3 – Functionality and Endurance requirements for non-directional LED lamps and luminaires

Add Before table 13 (2902:2021)	Lumen maintenance and survival factors values at 6000 h shall meet the limits in table 13 in accordance with IEC 62722 or IES LM 84 and shall be submitted in registration system. In case IEC 62717 or IES LM 80 test report is available then, Lumen maintenance and survival factors values at 2000 h are accepted and shall meet the limits in the table 13 in accordance with IEC 62722 or IES LM 84.

Table 13: Functionality and endurance requirements for non-directional LED lamps and luminaires			
Functionality parameter	Requirement	Result(s)	-
Lamp survival factor at 6000h	≥0.90	--	N/A
Lumen Maintenance at 6 000h	≥0.80	--	N/A
Number of switching cycles before failure	≥15 000 if rated lamp life ≥30000h otherwise:	--	N/A
	≥half the rated lamp life expressed in hours	--	N/A
Starting time	< 0.5s	--	N/A
Lamp warm-up time to 95 % Φ	< 2 s	--	N/A
Premature failure rate	≤5.0% at 1 000h	--	N/A
Color rendering (Ra)	≥80 / ≥65 if the lamp is intended for outdoor or industrial applications	--	N/A
Color consistency	Variation of chromaticity coordinates within a six-step Mac Adam ellipse or less.	--	N/A
Lamp displacement factor (Df) with integrated control gear	P ≤ 2W : no requirement	--	N/A
	2W < P ≤5W : DF ≥ 0.4	--	N/A
	5 W < P ≤ 25W : DF ≥ 0.7	--	N/A
	P > 25W : DF ≥ 0.9	--	N/A

Annex F Functionality requirements for directional lamps and integrated Luminaires

Table 18: Functionality and endurance requirements for directional LED lamps and integrated luminaires			
Functionality parameter	Requirement	Result(s)	-
Lamp survival factor at 6 000h	≥0.90	≥0.90	P
Lumen Maintenance at 6 000h	≥0.80	≥0.80	P
Number of switching cycles before failure	≥15 000 if rated lamp life ≥30000h otherwise:	15000	P
	≥half the rated lamp life expressed in hours		N/A
Starting time	< 0.5s	0.276	N/A
Premature failure rate	≤5.0% at 1 000h		P
Color rendering (Ra)	≥80 ≥65 if the lamp is intended for outdoor or industrial applications	-	P
Color consistency	Variation of chromaticity coordinates within a six-step Mac Adam ellipse or less.		N/A
Lamp displacement factor (Df) for lamps with integrated control gear	P ≤ 2W : no requirement		N/A
	2W < P ≤5W : DF > 0.4		N/A
	5W < P ≤ 25W : DF > 0.7		P
	P > 25W : DF > 0.9		N/A

Parameter (Measured value)								
No. of sample	**Power (W)**	**Luminous Flux (lm)**	**CCT (Color temperature)**	**CRI (Ra)**	**Beam Angle**	**EEI**	**EEL**	**Power Factor**
1	12.13	965.0	5736	91.3	112.2	0.16	C	0.50
2	12.14	975.8	5754	91.9	112.2	0.16	C	0.497
3	12.55	973.6	5722	92.0	112.3	0.17	C	0.505
4	12.11	967.5	5712	92.0	112.3	0.16	C	0.491
5	12.28	953.2	5756	91.7	112.4	0.17	C	0.503
Average	**12.20**	**967.0**	**5736**	**91.8**	**112.3**	**0.16**	**C**	**0.499**

Annex N Criteria for market surveillance (table 38)				
Parameter	**Rated**	**Measured (average)**	**Limit**	**Verdict**
Energy Efficacy	81	79.26lm/w	Min. 10% rated efficacy	P
Color rendering (Ra)	> 90	91.8	Min. -3, Max. +3.9	P
Beam angle	100	112.3	±25% rated beam angle	P
Peak intensity		--	Min. 75% rated intensity	-
Lamp displacement factor	0.91	0.89	±10% rated	P
Color temperature	5700K	5736	±10% rated 5130-6270	P
Color consistency	-	-	±10% rated	-
Power	13	12.2	+10% rated	P
Luminous Flux	1050	967.0	-10% rated	P
Calculated Rated EEI	0.16	0.16	±10% rated	P

Table 13: Functionality and endurance requirements for non-directional LED lamps and luminaires								
No. of sample	Test Voltage (V)	Luminous Flux (lm)		Lumen Maintenance (%)	Premature failure rate	Lamp survival Factor	Ra	DF
		Initial	**6000H**	**6000H**	**At 1000H**	**6000H**	**6000H**	**6000H**
1	230	965.0	919.9	95.3	Pass	Pass	91.3	0.72
2	230	975.8	844.7	86.5	Pass	Pass	91.9	0.73
3	230	973.6	914.0	93.87	Pass	Pass	92.0	0.71
4	230	967.5	839.0	86.7	Pass	Pass	92.0	0.71
5	230	953.2	862.7	90.5	Pass	Pass	91.7	0.71
Average	**230**	**967.02**	**876.06**	**90.574**	**-**	**-**	**91.7**	**0.796**

Remarks:

Photo no.1 (Marking)

Model Number	LED HC260 13W White
Luminous Flux (lm)	1050
Rated Power (W)	13
Efficacy (lm/W)	81
Df	0.9
Life Time (H)	15000
Color Temperature (K)	5700
Switching Cycle (X)	50000
Color Rendering (Ra)	90
Beam Angle (°)	100
Type	direct

Photo no.2 (General view)


OPPLE LIGHTING
BRIGHTER & CLEANER
WHITE
13W
CEILING LIGHT


OPPLE
RGO


OPPLE
13W

Photo no.4 (Photometric results)

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Report No.: EC240005-1 Test Time: 1/19/2024 11:16

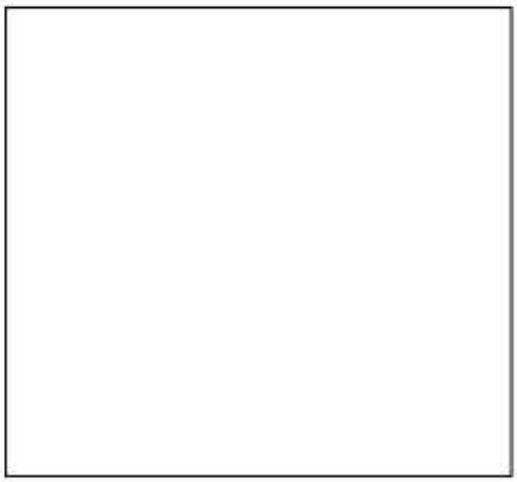
Luminaire Property

Luminaire Manufacturer:
Luminaire Category: Fixed luminaire
Luminaire Description: LED HC260 13W White
Lamp Catalog: OPPLE
Lamp Description: 220-240V 50/60Hz 13W 5700K
Number of Lamps: 1 Lumens per Lamp: -
Luminous Length (mm): - Luminous Width (mm): -
Luminous Height (mm): - Voltage: 230.2 V
Current: 0.105 A Power: 12.13 W
Power Factor: 0.501

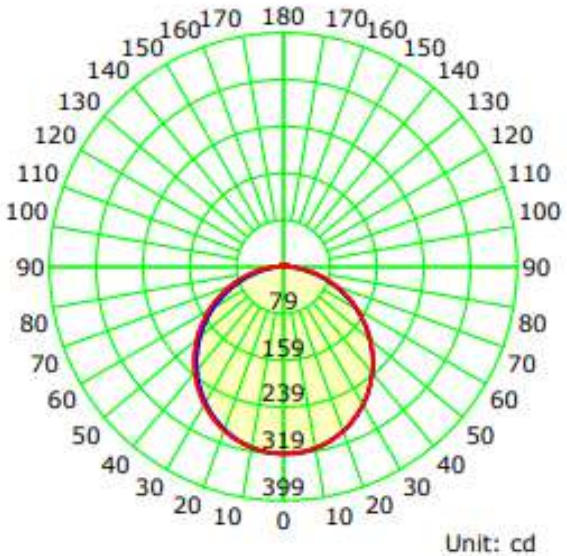
Photometric Results

CIE Class: Direct Total Rated Lamp Lumens: 965.0 lm
Measurement Flux: 965 lm Efficiency: 100%
Downward Ratio: 97% Upward Ratio: 3%
Field Angle(C0/C180,C90/C270,C45/C225,C135/315): 163.7, 168.2, 166.6, 166.6
Beam Angle(C0/C180,C90/C270,C45/C225,C135/315): 112.2, 114.7, 113.3, 113.5
Luminaire Efficacy Rating (LER): 79.60 Central Intensity: 319.3 cd
Max. Intensity: 319.36 cd Pos of Max. Intensity: H0 V1
S/MH(C0/C180): 1.25 S/MH(C90/C270): 1.26

Picture Of Luminaire



Luminous Intensity Distribution Curve



Unit: cd

C Plane (°):0.0-360.0: 30.0 Gamma Plane (°):0.0-180.0:1.0
Test Lab: SAITCO Ltd., Guangzhou Office Test Device: LSG-5000
Test Type: TYPE C Distance: 15.882 m [K=1.0000]
Temperature: 22.0 Humidity: 67
Operator: Saitco China Inspector:

Photo no.5 (Photometric results)

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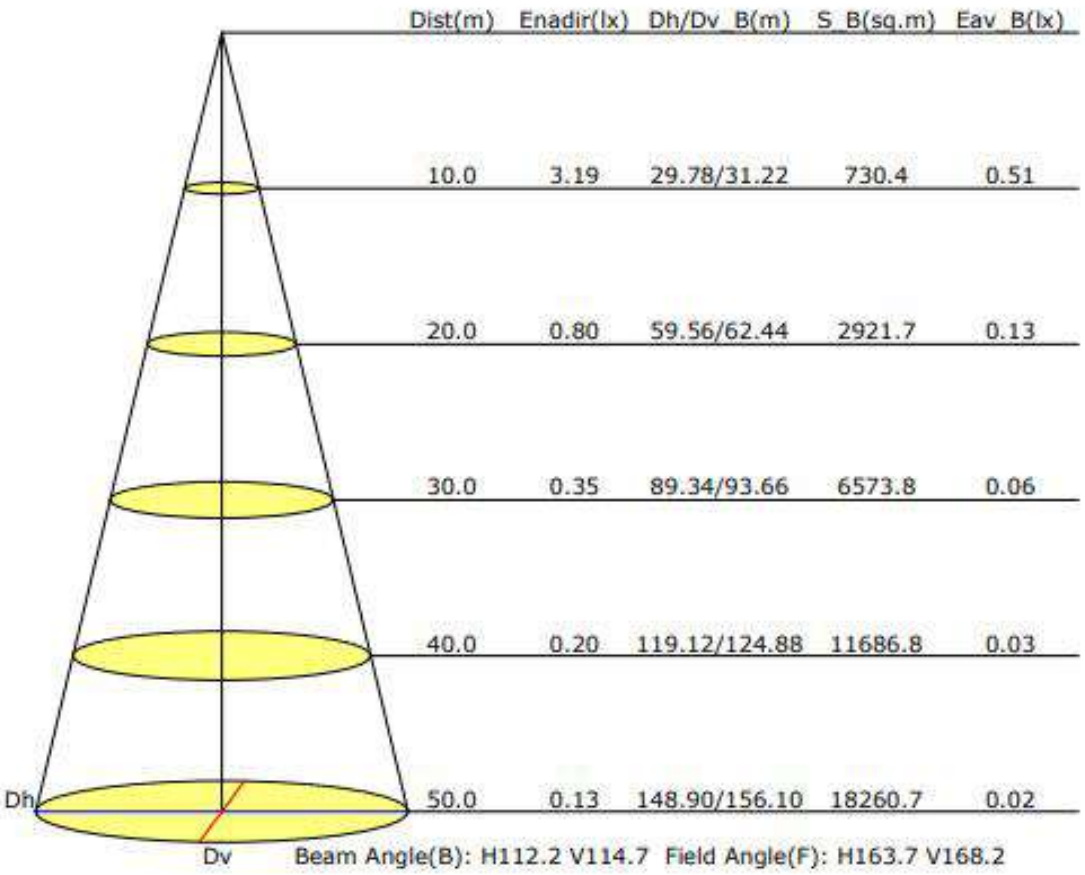
Illuminance at a Distance



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.6 (Photometric results)

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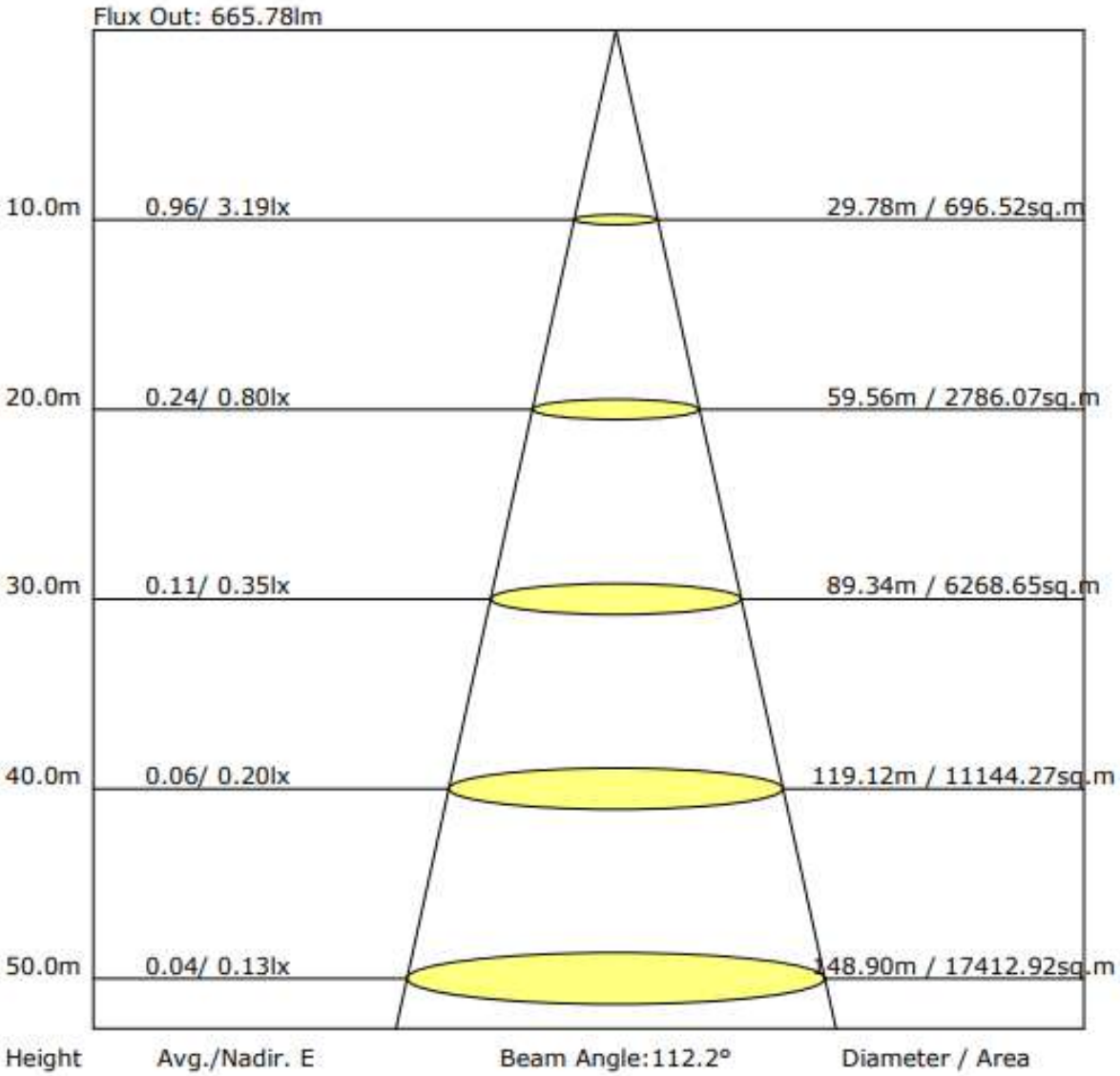
The Average Illuminance Effective Figure



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.7 (Photometric results)

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Color Properties

Chromaticity Coordinate: x=0.3274 y=0.3316 u(u')=0.2071 v=0.3146 v'=0.4719
Correlated Color Temperature: Tc=5736K (duv=-0.00262)

Measurement Flux: 965.0lm, PAR: 3.186W, PPF: 14.497umol/s

Peak Wavelength: 455nm
Dominant Wavelength: 497.8nm
EEI: 0.16

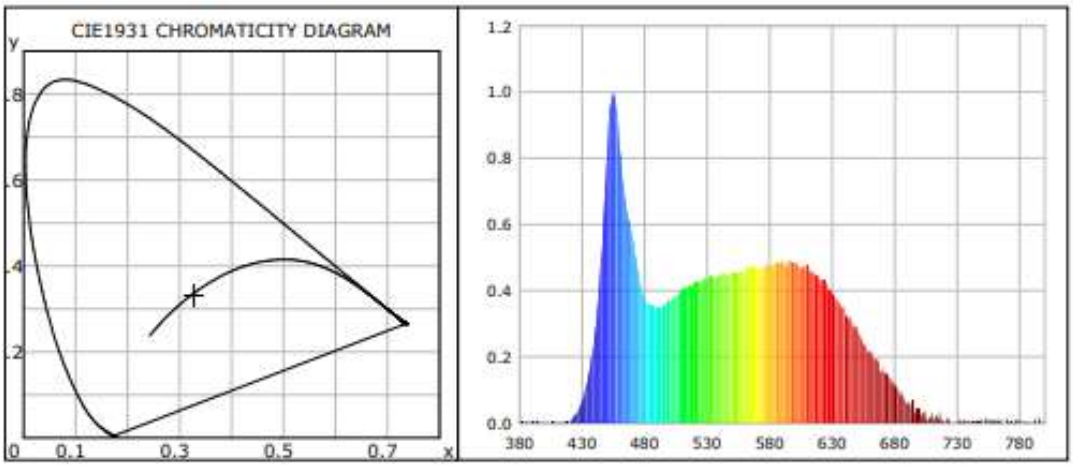
Half Bandwidth: 27.9nm
Color Purity: 0.021
Energy Efficiency Class: C (SASO 2902:2018)

Color Ratio: R=0.164 G=0.770 B=0.066

TM30: Rf=85, Rg=96

Color Render Index: Ra= 91.3
R1 =93.7 R2 =97.7 R3 =95.7 R4 =89.4 R5 =92.0 R6 =92.2 R7 =88.2 R8 =81.6
R9 =57.6 R10=96.7 R11=91.1 R12=69.8 R13=97.1 R14=99.0 R15=92.5

Color Quality Scale: Qa= 88.2 Qf= 88.1 Qp= 88.4 Qg= 95.6
Q1 =85.7 Q2 =97.1 Q3 =86.5 Q4 =80.3 Q5 =83.7 Q6 =86.7 Q7 =92.8 Q8 =94.2
Q9 =99.0 Q10=95.3 Q11=91.0 Q12=89.2 Q13=88.8 Q14=85.2 Q15=85.9



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.8 (Photometric results)

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Report No.: EC240005-2 Test Time: 1/19/2024 11:57

Luminaire Property

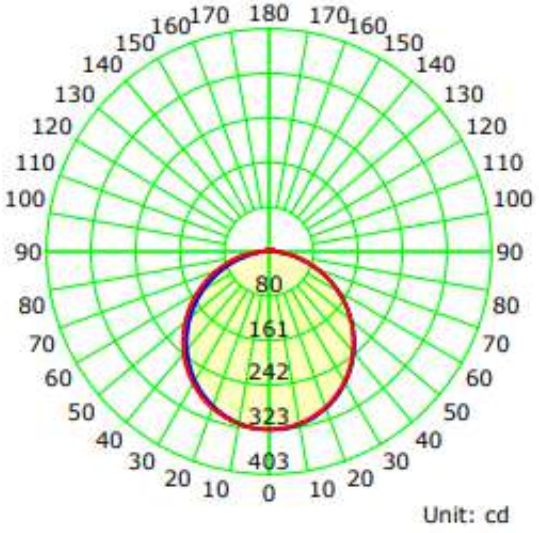
Luminaire Manufacturer:
Luminaire Category: Fixed luminaire
Luminaire Description: LED HC260 13W White
Lamp Catalog: OPPLE
Lamp Description: 220-240V 50/60Hz 13W 5700K
Number of Lamps: 1 Lumens per Lamp: -
Luminous Length (mm): - Luminous Width (mm): -
Luminous Height (mm): - Voltage: 229.9 V
Current: 0.106 A Power: 12.14 W
Power Factor: 0.497

Photometric Results

CIE Class: Direct Total Rated Lamp Lumens: 975.8 lm
Measurement Flux: 975.8 lm Efficiency: 100%
Downward Ratio: 97% Upward Ratio: 3%
Field Angle(C0/C180,C90/C270,C45/C225,C135/315): 163.4, 168.0, 166.5, 166.6
Beam Angle(C0/C180,C90/C270,C45/C225,C135/315): 112.2, 114.8, 113.3, 113.6
Luminaire Efficacy Rating (LER): 80.43 Central Intensity: 323 cd
Max. Intensity: 323 cd Pos of Max. Intensity: H0 V0
S/MH(C0/C180): 1.25 S/MH(C90/C270): 1.27

Picture Of Luminaire

Luminous Intensity Distribution Curve



Unit: cd

C Plane (°):0.0-360.0: 30.0 Gamma Plane (°):0.0-180.0:1.0
Test Lab: SAITCO Ltd., Guangzhou Office Test Device: LSG-5000
Test Type: TYPE C Distance: 15.882 m [K=1.0000]
Temperature: 22.0 Humidity: 67
Operator: Saitco China Inspector:

Photo no.9 (Photometric results)

SAITCO GUANGZHOU CO LTD.
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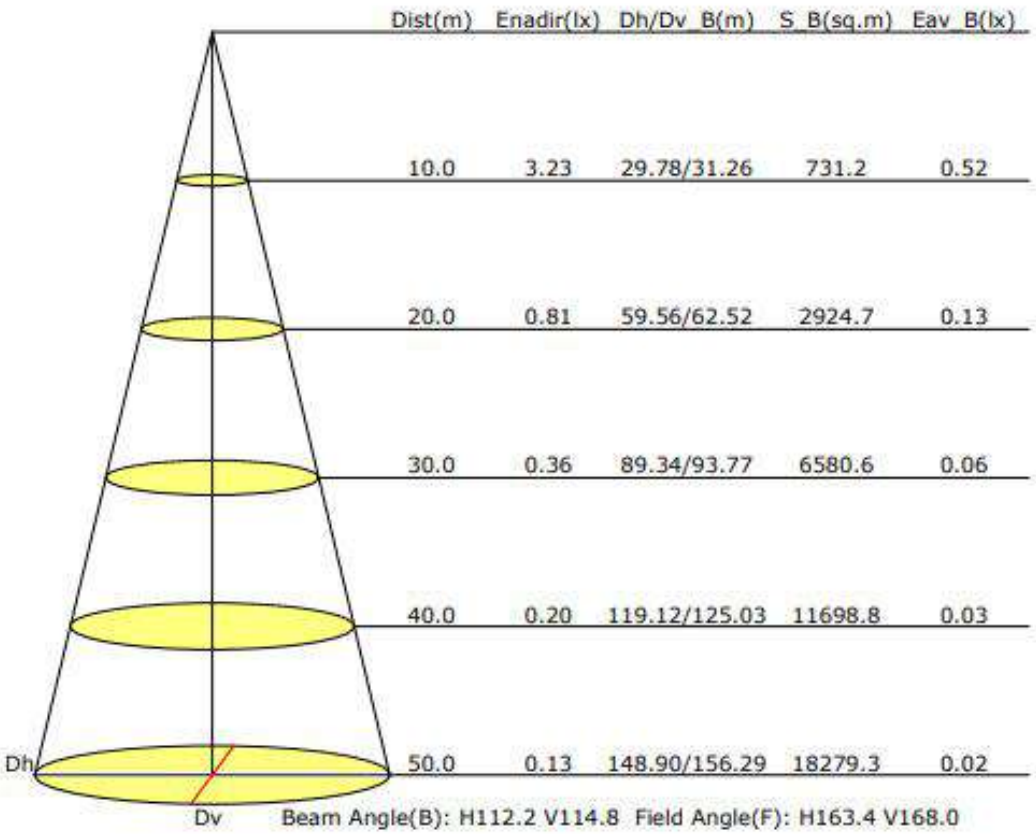
Illuminance at a Distance



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.10 (Photometric results)

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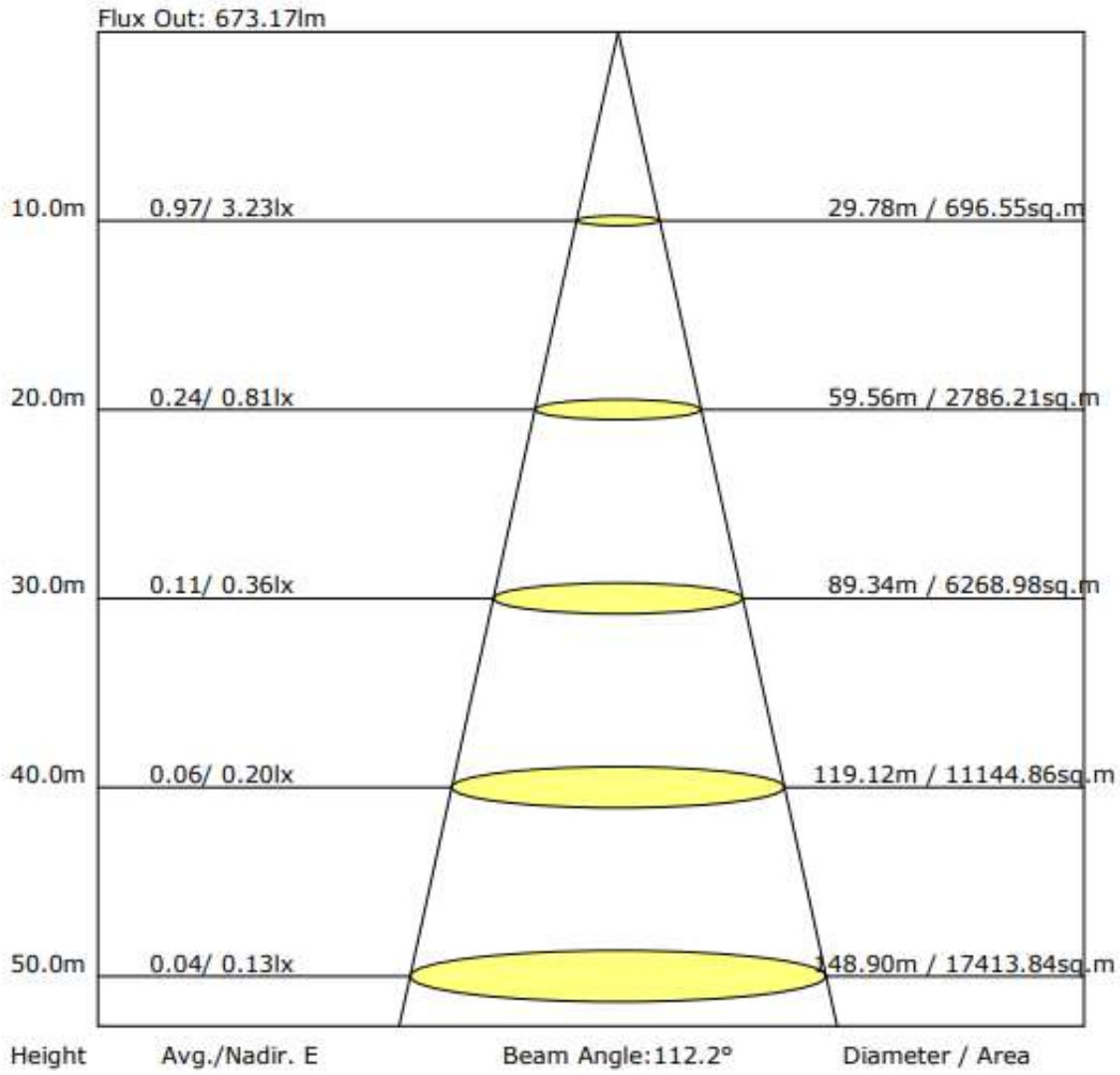
The Average Illuminance Effective Figure



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.11 (Photometric results)

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Color Properties

Chromaticity Coordinate: x=0.3272 y=0.3283 u(u')=0.2082 v=0.3134 v'=0.4701
Correlated Color Temperature: Tc=5754K (duv=-0.00426)

Measurement Flux: 975.8lm, PAR: 3.293W, PPF: 15.021umol/s

Peak Wavelength: 455nm
Dominant Wavelength: 480.2nm
EEI: 0.16

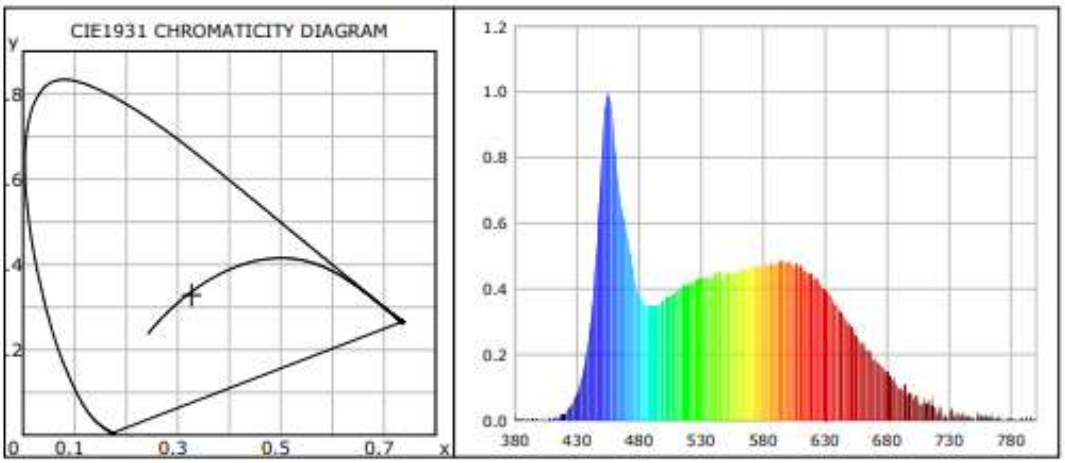
Half Bandwidth: 28.2nm
Color Purity: 0.025
Energy Efficiency Class: C (SASO 2902:2018)

Color Ratio: R=0.167 G=0.767 B=0.067

TM30: Rf=86, Rg=96

Color Render Index: Ra= 91.9
R1 =94.5 R2 =96.9 R3 =95.8 R4 =90.6 R5 =92.8 R6 =91.8 R7 =89.0 R8 =84.3
R9 =65.7 R10=96.5 R11=92.1 R12=71.1 R13=97.2 R14=99.2 R15=94.8

Color Quality Scale: Qa= 88.8 Qf= 88.6 Qp= 89.3 Qg= 96.6
Q1 =87.3 Q2 =97.5 Q3 =86.5 Q4 =80.5 Q5 =84.1 Q6 =87.5 Q7 =93.9 Q8 =94.9
Q9 =99.0 Q10=95.2 Q11=90.8 Q12=89.0 Q13=88.7 Q14=87.1 Q15=87.6



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.12 (Photometric results)

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Report No.: EC240005-3 Test Time: 1/19/2024 13:19

Luminaire Property

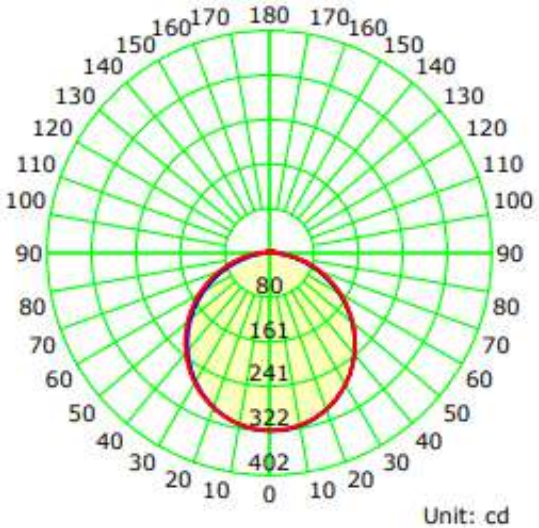
Luminaire Manufacturer:
Luminaire Category: Fixed luminaire
Luminaire Description: LED HC260 13W White
Lamp Catalog: OPPLE
Lamp Description: 220-240V 50/60Hz 13W 5700K
Number of Lamps: 1
Lumens per Lamp: -
Luminous Length (mm): -
Luminous Width (mm): -
Luminous Height (mm): -
Voltage: 230.7 V
Current: 0.107 A
Power: 12.55 W
Power Factor: 0.505

Photometric Results

CIE Class: Direct
Total Rated Lamp Lumens: 973.6 lm
Measurement Flux: 973.6 lm
Efficiency: 100%
Downward Ratio: 97%
Upward Ratio: 3%
Field Angle(C0/C180,C90/C270,C45/C225,C135/315): 163.5, 168.2, 166.5, 166.7
Beam Angle(C0/C180,C90/C270,C45/C225,C135/315): 112.3, 114.9, 113.4, 113.7
Luminaire Efficacy Rating (LER): 77.63
Central Intensity: 322.1 cd
Max. Intensity: 322.2 cd
Pos of Max. Intensity: H0 V1
S/MH(C0/C180): 1.25
S/MH(C90/C270): 1.27

Picture Of Luminaire

Luminous Intensity Distribution Curve



Unit: cd

C Plane (°):0.0-360.0: 30.0
Gamma Plane (°):0.0-180.0:1.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Device: LSG-5000
Test Type: TYPE C
Distance: 15.882 m [K=1.0000]
Temperature: 22.0
Humidity: 67
Operator: Saitco China
Inspector:

Photo no.13 (Photometric results)

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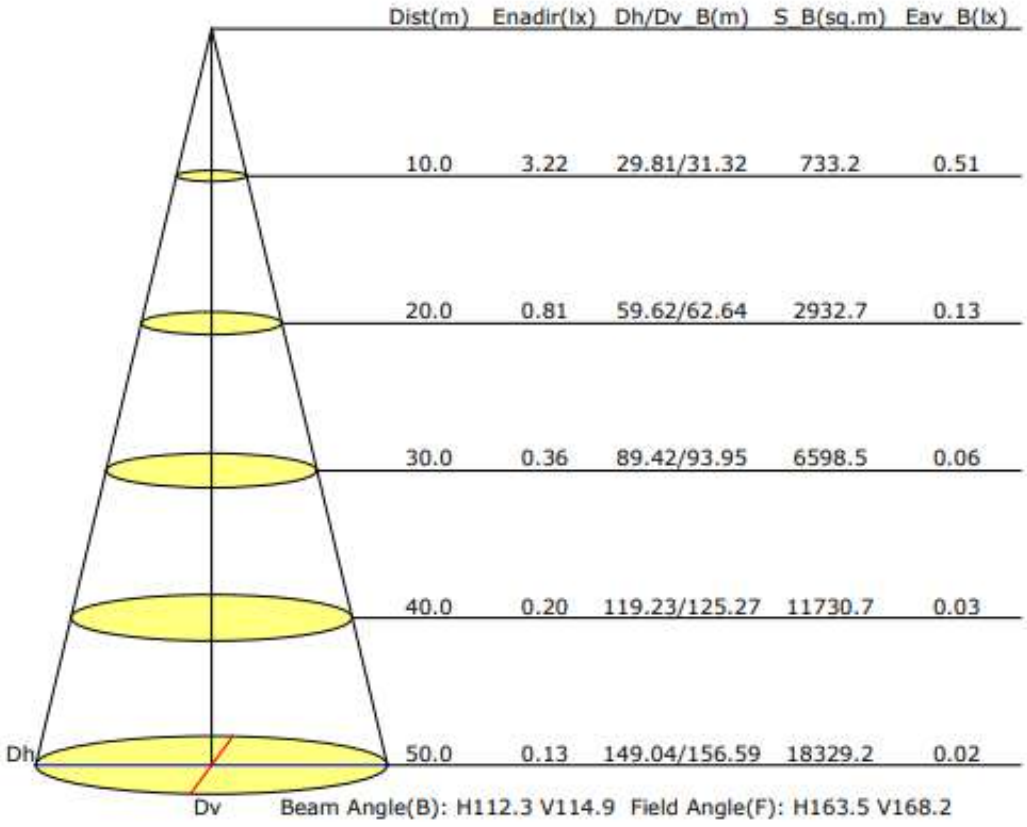
Illuminance at a Distance



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.14 (Photometric results)

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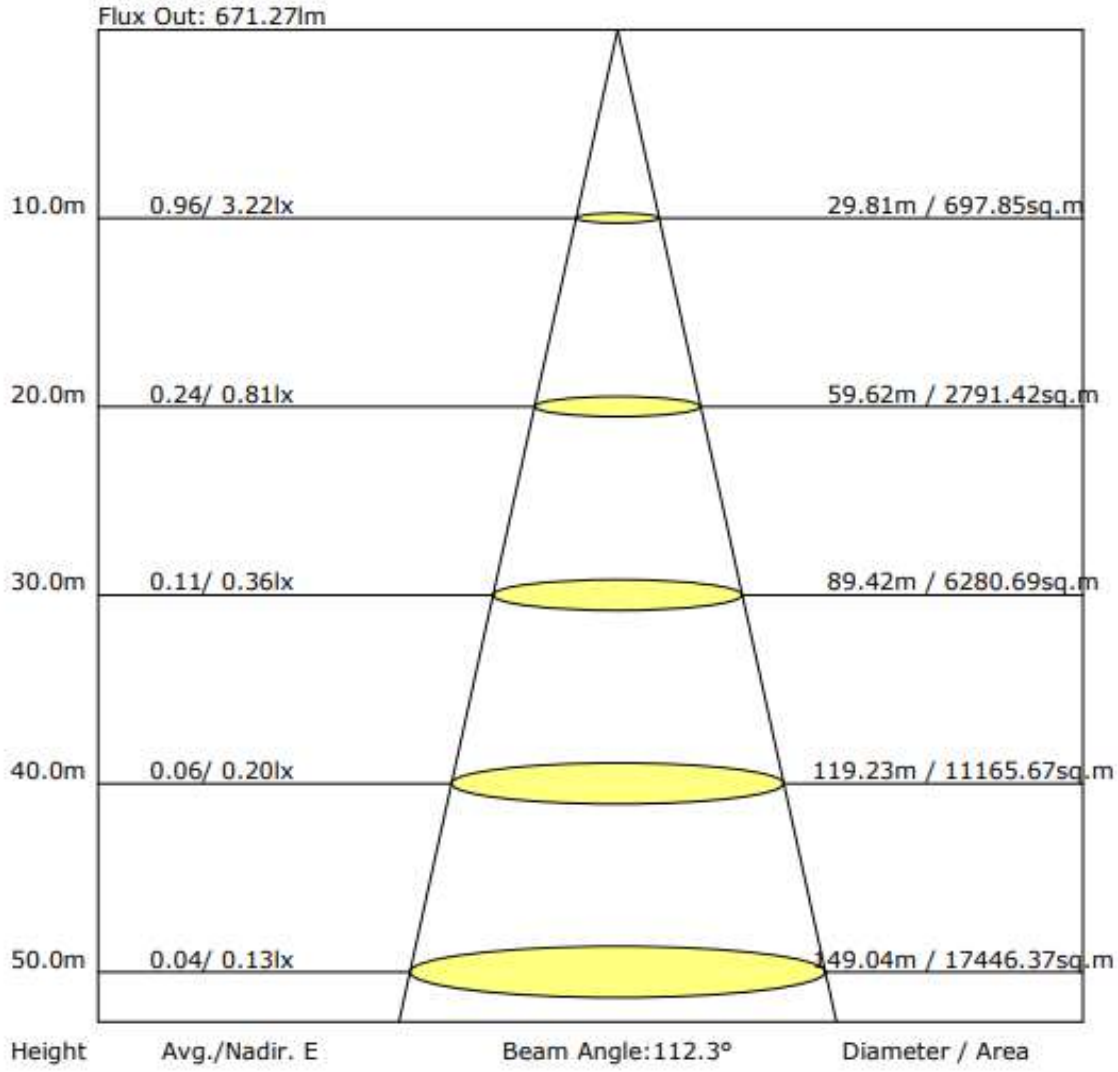
The Average Illuminance Effective Figure



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.15 (Photometric results)

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Color Properties

Chromaticity Coordinate: x=0.3279 y=0.3267 u(u')=0.2093 v=0.3129 v'=0.4693
Correlated Color Temperature: Tc=5722K (duv=-0.00544)

Measurement Flux: 973.6lm, PAR: 3.301W, PPF: 15.064umol/s

Peak Wavelength: 455nm
Dominant Wavelength: 472.6nm
EEI: 0.17

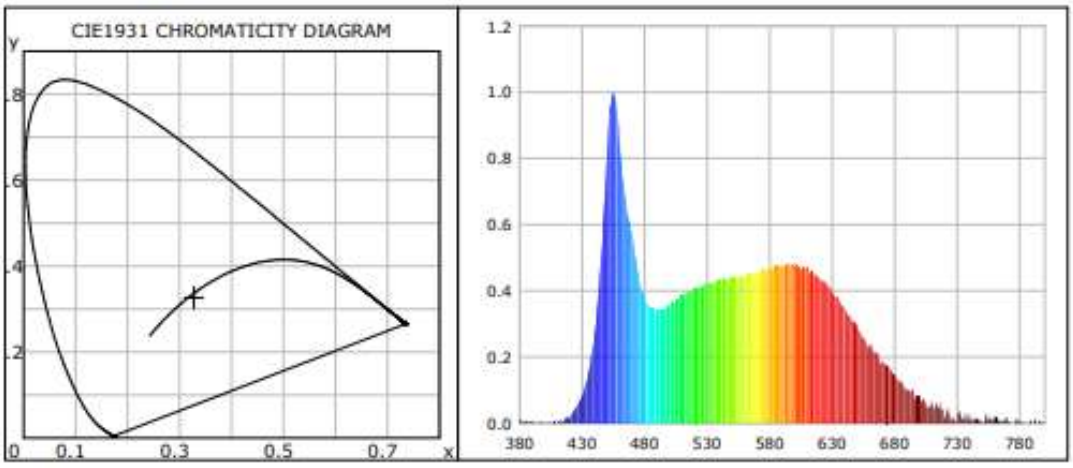
Half Bandwidth: 27.9nm
Color Purity: 0.025
Energy Efficiency Class: C (SASO 2902:2018)

Color Ratio: R=0.168 G=0.765 B=0.067

TM30: Rf=86, Rg=97

Color Render Index: Ra= 92.0
R1 =94.6 R2 =96.3 R3 =95.8 R4 =91.3 R5 =93.0 R6 =91.3 R7 =89.0 R8 =85.0
R9 =68.4 R10=95.8 R11=92.8 R12=71.5 R13=96.8 R14=99.3 R15=95.8

Color Quality Scale: Qa= 88.8 Qf= 88.5 Qp= 89.7 Qg= 97.1
Q1 =87.8 Q2 =97.8 Q3 =86.1 Q4 =80.3 Q5 =84.3 Q6 =87.9 Q7 =94.5 Q8 =95.1
Q9 =98.8 Q10=94.9 Q11=90.5 Q12=88.5 Q13=88.3 Q14=87.5 Q15=88.1



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.16 (Photometric results)

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Report No.: EC240005-4 Test Time: 1/19/2024 13:59

Luminaire Property

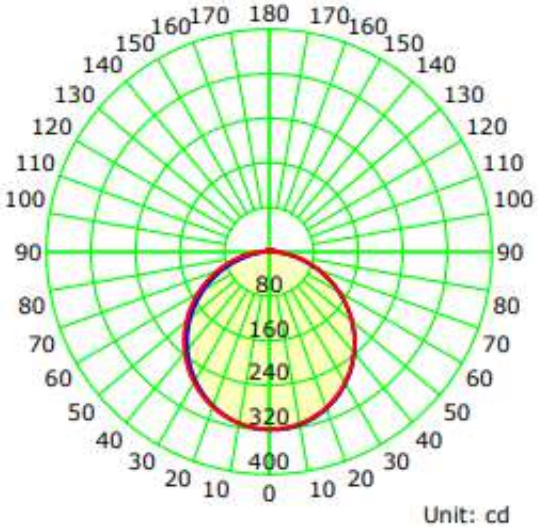
Luminaire Manufacturer:
Luminaire Category: Fixed luminaire
Luminaire Description: LED HC260 13W White
Lamp Catalog: OPPLE
Lamp Description: 220-240V 50/60Hz 13W 5700K
Number of Lamps: 1 Lumens per Lamp: -
Luminous Length (mm): - Luminous Width (mm): -
Luminous Height (mm): - Voltage: 230.7 V
Current: 0.107 A Power: 12.11 W
Power Factor: 0.491

Photometric Results

CIE Class: Direct Total Rated Lamp Lumens: 967.5 lm
Measurement Flux: 967.5 lm Efficiency: 100%
Downward Ratio: 97% Upward Ratio: 3%
Field Angle(C0/C180,C90/C270,C45/C225,C135/315): 163.5, 168.1, 166.5, 166.6
Beam Angle(C0/C180,C90/C270,C45/C225,C135/315): 112.3, 114.9, 113.3, 113.6
Luminaire Efficacy Rating (LER): 79.94 Central Intensity: 320.51 cd
Max. Intensity: 320.61 cd Pos of Max. Intensity: H0 V1
S/MH(C0/C180): 1.25 S/MH(C90/C270): 1.27

Picture Of Luminaire

Luminous Intensity Distribution Curve



Unit: cd

C Plane (°):0.0-360.0: 30.0 Gamma Plane (°):0.0-180.0:1.0
Test Lab: SAITCO Ltd., Guangzhou Office Test Device: LSG-5000
Test Type: TYPE C Distance: 15.882 m [K=1.0000]
Temperature: 22.0 Humidity: 67
Operator: Saitco China Inspector:

Photo no.17 (Photometric results)

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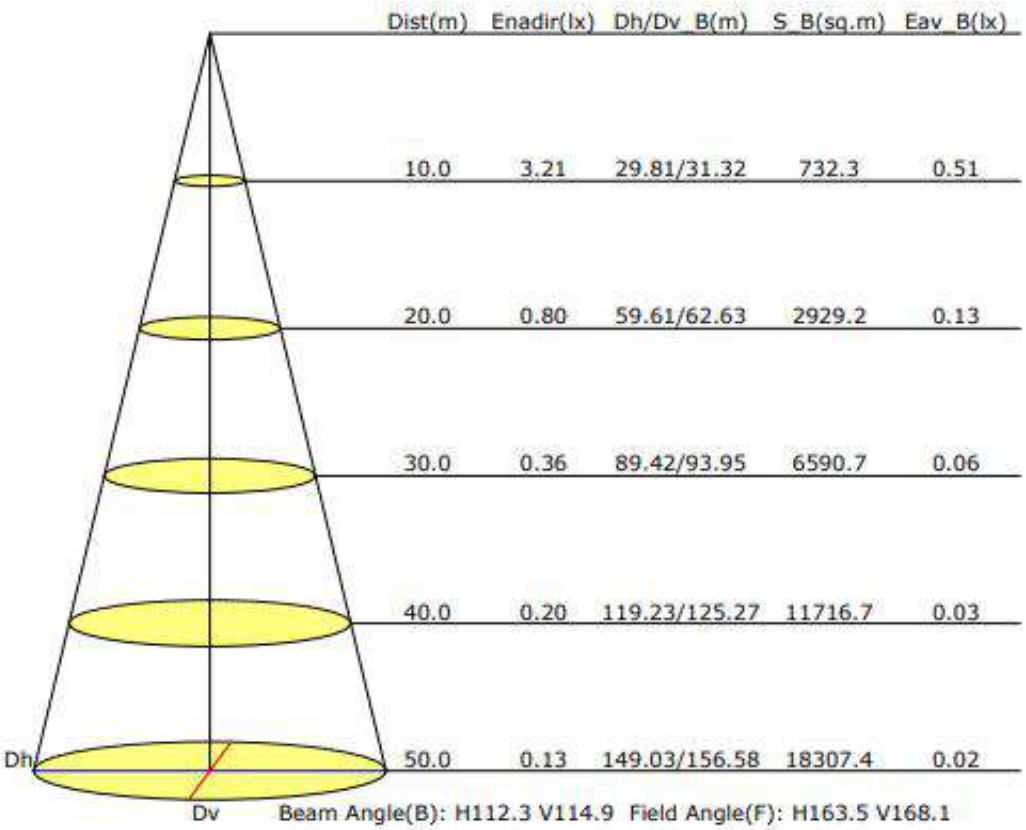
Illuminance at a Distance



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.18 (Photometric results)

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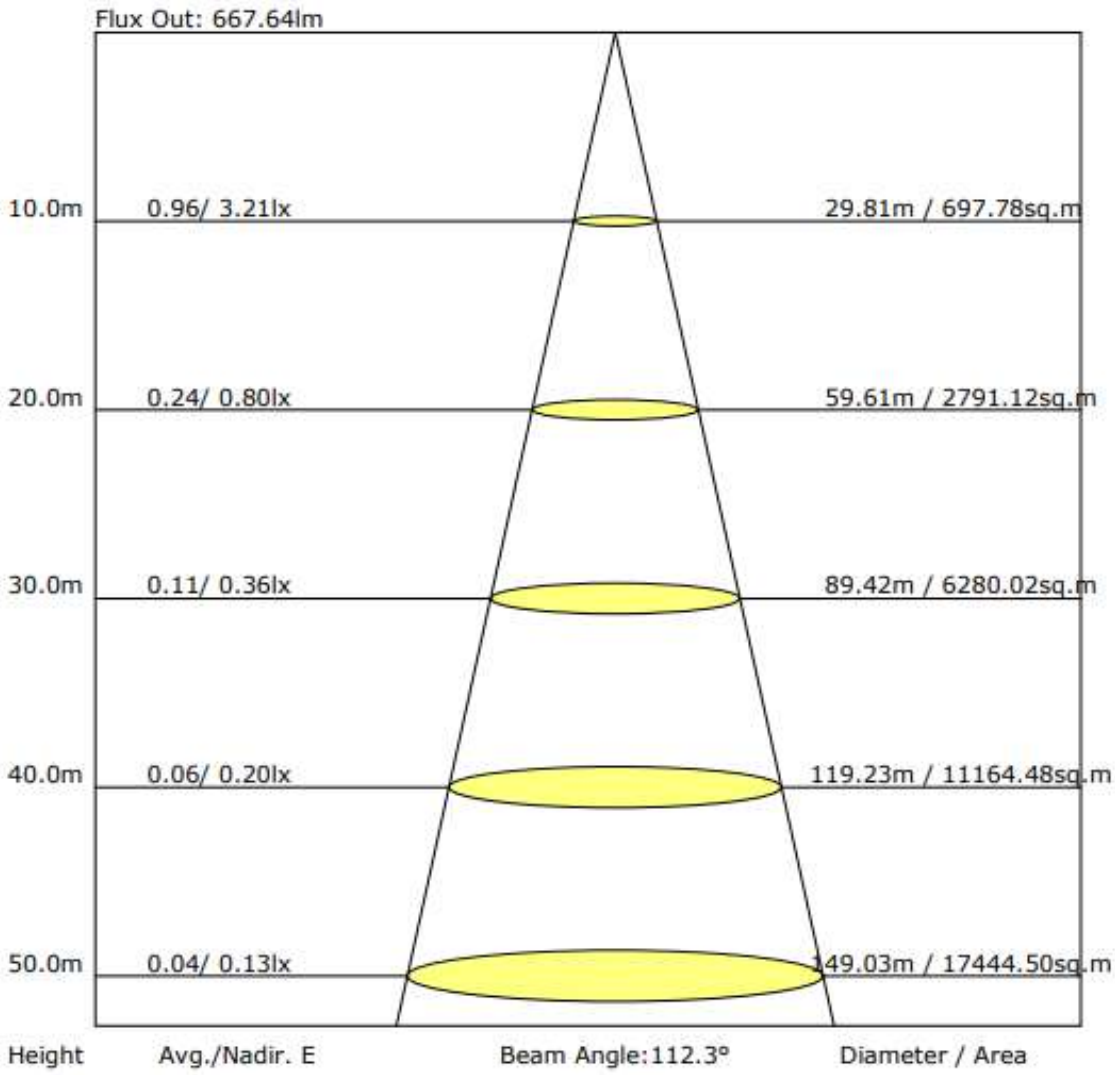
The Average Illuminance Effective Figure



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.19 (Photometric results)

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Color Properties

Chromaticity Coordinate: x=0.3280 y=0.3287 u(u')=0.2087 v=0.3136 v'=0.4704
Correlated Color Temperature: Tc=5712K (duv=-0.00448)

Measurement Flux: 967.5lm, PAR: 3.264W, PPF: 14.899umol/s

Peak Wavelength: 455nm
Dominant Wavelength: 479.1nm
EEI: 0.16

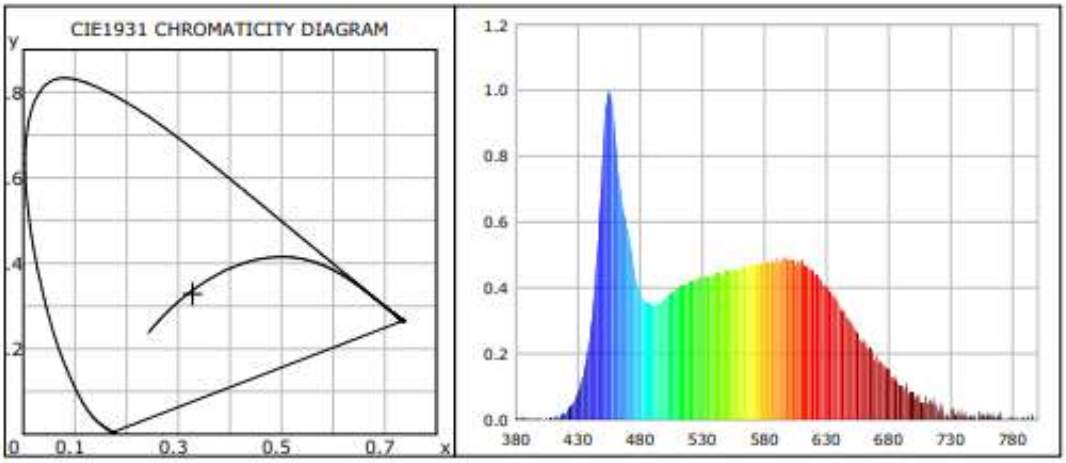
Half Bandwidth: 28.3nm
Color Purity: 0.022
Energy Efficiency Class: C (SASO 2902:2018)

Color Ratio: R=0.167 G=0.766 B=0.066

TM30: Rf=86, Rg=97

Color Render Index: Ra= 92.0
R1 =94.6 R2 =96.8 R3 =95.8 R4 =90.8 R5 =92.9 R6 =91.7 R7 =89.0 R8 =84.3
R9 =66.0 R10=96.4 R11=92.4 R12=71.4 R13=97.2 R14=99.2 R15=95.0

Color Quality Scale: Qa= 88.9 Qf= 88.6 Qp= 89.5 Qg= 96.7
Q1 =87.4 Q2 =97.6 Q3 =86.5 Q4 =80.7 Q5 =84.4 Q6 =87.7 Q7 =94.1 Q8 =94.9
Q9 =99.1 Q10=95.2 Q11=90.9 Q12=88.9 Q13=88.7 Q14=87.2 Q15=87.7



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.20 (Photometric results)

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Report No.: EC240005-5 Test Time: 1/19/2024 14:47

Luminaire Property

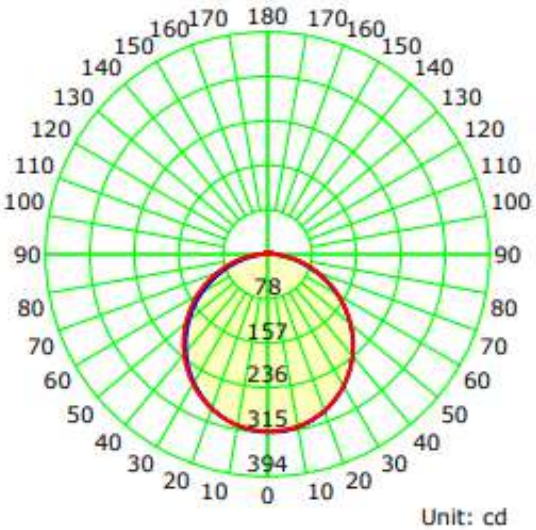
Luminaire Manufacturer:
Luminaire Category: Fixed luminaire
Luminaire Description: LED HC260 13W White
Lamp Catalog: OPPLE
Lamp Description: 220-240V 50/60Hz 13W 5700K
Number of Lamps: 1 Lumens per Lamp: -
Luminous Length (mm): - Luminous Width (mm): -
Luminous Height (mm): - Voltage: 230.0 V
Current: 0.106 A Power: 12.28 W
Power Factor: 0.503

Photometric Results

CIE Class: Direct Total Rated Lamp Lumens: 953.2 lm
Measurement Flux: 953.2 lm Efficiency: 100%
Downward Ratio: 97% Upward Ratio: 3%
Field Angle(C0/C180,C90/C270,C45/C225,C135/315): 163.7, 168.2, 166.6, 166.6
Beam Angle(C0/C180,C90/C270,C45/C225,C135/315): 112.4, 115.0, 113.5, 113.7
Luminaire Efficacy Rating (LER): 77.67 Central Intensity: 315.16 cd
Max. Intensity: 315.3 cd Pos of Max. Intensity: H0 V1
S/MH(C0/C180): 1.26 S/MH(C90/C270): 1.27

Picture Of Luminaire

Luminous Intensity Distribution Curve



Unit: cd

C Plane (°):0.0-360.0: 30.0 Gamma Plane (°):0.0-180.0:1.0 C270
Test Lab: SAITCO Ltd., Guangzhou Office Test Device: LSG-5000
Test Type: TYPE C Distance: 15.882 m [K=1.0000]
Temperature: 22.0 Humidity: 67
Operator: Saitco China Inspector:

Photo no.21 (Photometric results)

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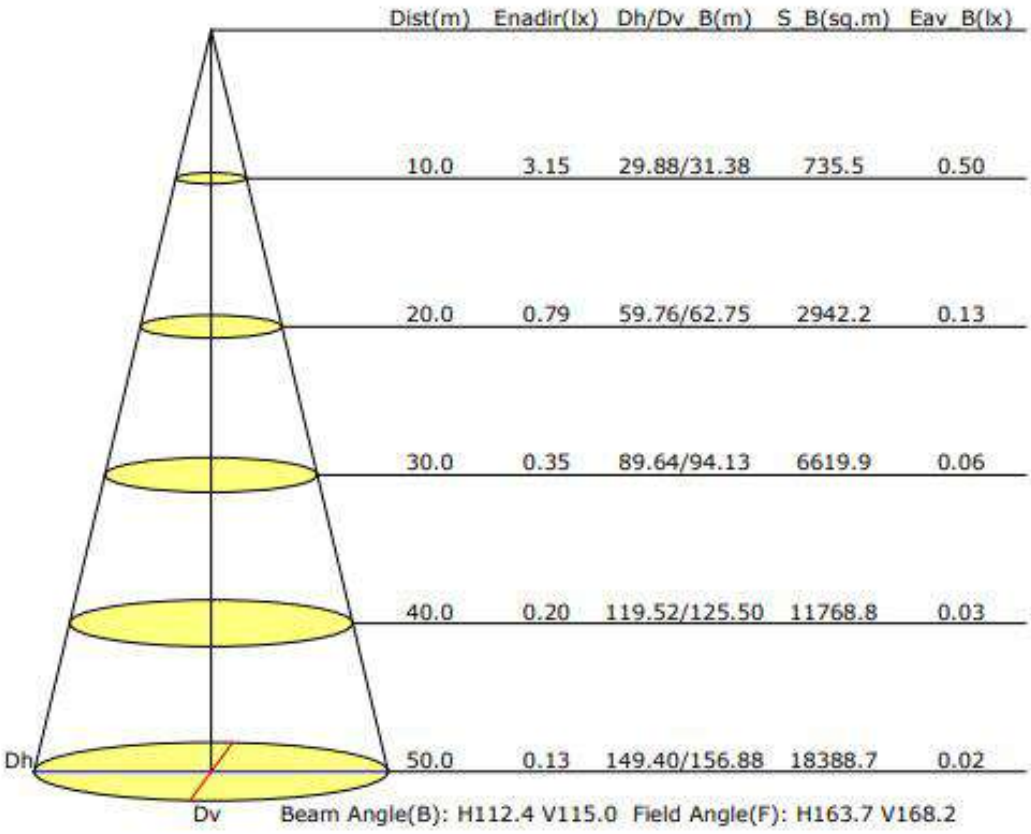
Illuminance at a Distance



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.22 (Photometric results)

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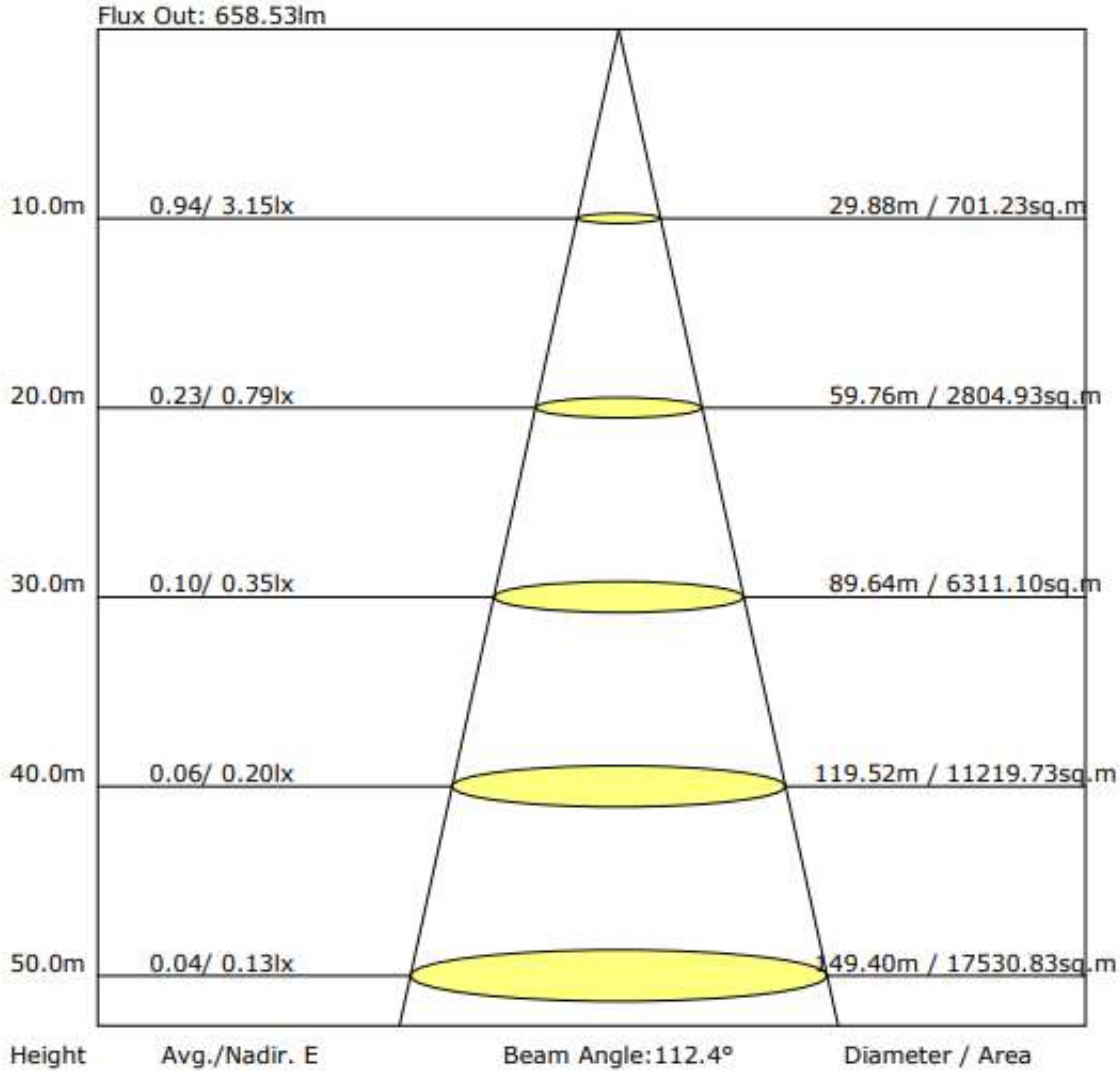
The Average Illuminance Effective Figure



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Photo no.23 (Photometric results)

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Color Properties

Chromaticity Coordinate: x=0.3271 y=0.3316 u(u')=0.2068 v=0.3146 v'=0.4718
Correlated Color Temperature: Tc=5756K (duv=-0.00246)

Measurement Flux: 953.2lm, PAR: 3.192W, PPF: 14.561umol/s

Peak Wavelength: 455nm
Dominant Wavelength: 488.2nm
EEI: 0.17

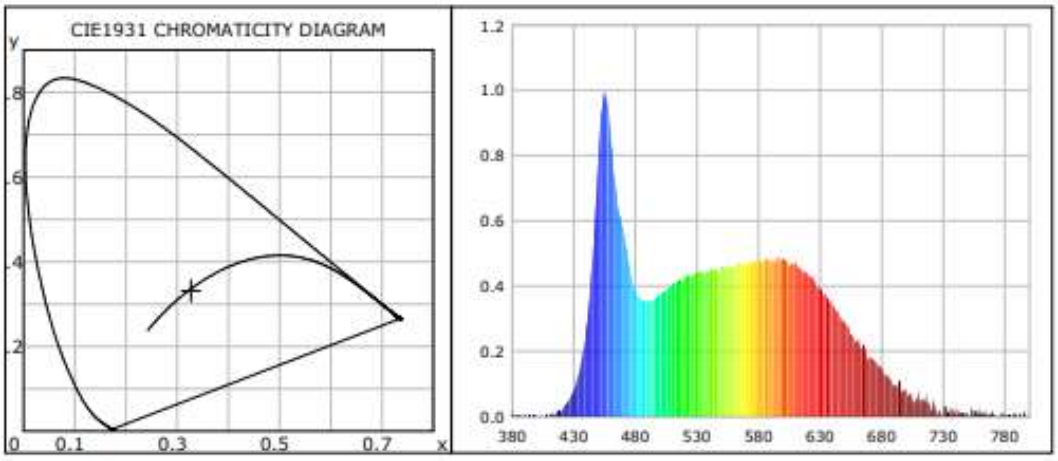
Half Bandwidth: 28.0nm
Color Purity: 0.022
Energy Efficiency Class: C (SASO 2902:2018)

Color Ratio: R=0.164 G=0.770 B=0.067

TM30: Rf=86, Rg=96

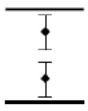
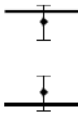
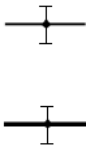
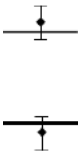
Color Render Index: Ra= 91.7
R1 =94.0 R2 =97.7 R3 =95.7 R4 =89.5 R5 =92.2 R6 =92.4 R7 =88.7 R8 =82.8
R9 =61.2 R10=97.0 R11=91.1 R12=70.5 R13=97.3 R14=99.0 R15=93.1

Color Quality Scale: Qa= 88.7 Qf= 88.6 Qp= 88.8 Qg= 95.8
Q1 =86.4 Q2 =97.1 Q3 =87.1 Q4 =80.9 Q5 =84.0 Q6 =86.8 Q7 =92.9 Q8 =94.4
Q9 =99.1 Q10=95.6 Q11=91.4 Q12=89.6 Q13=89.2 Q14=86.3 Q15=86.9



C Plane (°):0.0-360.0: 30.0
Test Lab: SAITCO Ltd., Guangzhou Office
Test Type: TYPE C
Temperature: 22.0
Operator: Saitco China

Gamma Plane (°):0.0-180.0:1.0
Test Device: LSG-5000
Distance: 15.882 m [K=1.0000]
Humidity: 67
Inspector:

Conformity Decision is usually included in the report, unless the agreement states otherwise by the client.					
Results Notes: The acceptance criterion is based on :		A-The relevant TR Requirements ☐		B-The relevant standard specifications ☐	
		C- Manufacturer's manual (product technical data sheet)☐		D- Customer requirements ☐	
Acceptance Rule is based on:		**Special Case**	**Rejection Rule (Failing)is based on:**		
A- The measured value (+) measurement uncertainty value is less than the maximum required to criteria of acceptance. B- The measured value (-) measurement uncertainty value is greater than the minimum required to criteria of acceptance.	Accept when a confidence level of less than 95% is acceptable	May be accept if: Measured result ≤ the upper limit Measured result ≥lower limit May be rejected if : measured value < the upper limit measured result >lower limit	Rejectwhen a confidence level of less than 95% is acceptable	A- The measured value (+) measurement uncertainty value is greater than the maximum required to criteria of acceptance. B- The measured value (-) measurement uncertainty value is less than the minimum required to criteria of acceptance.	
					
♦ = measurement result with agreed method			I = uncertainty interval of agreed method		

☑ The sample passed all the above-mentioned tests in accordance with the requirements of the product

☐ The sample passed all the tests mentioned above in accordance with the requirements for the product, except for the …… test where the measured value does not meet the requirements of the product mentioned in the attached standard specifications.

The result is for the sample referred to in the report, which has been tested only and is only representative of itself.

Accreditation statues :	**All tests are accredit : ☐**	**All tests are accredit except: ……**

REMARK :
SOFT COPY OF THE CONTROL TEST RESULT SHEET IS AUDITED BY THE LAB SUPERVISOR

	Inspected by	Lab supervisor/ Reviewer	Technical Manager
Name			
Sign			
Date	**20/01/2024**	**20/01/2024**	**20/01/2024**

"End of Report"

SAITCO
Saudi Inspection & Testing Co
الشركة السعودية للفحص والاختبار
مختبر المنتجات الكهربائية والالكترونية
Electrical & Electronic Lab.
إعتماد رقم N-T-00047 ت.41