LED SEMPIONE 120W - TEST REPORT

Gamma di apparecchi a LED per illuminazione di aree urbane. Ideale per l'illuminazione di strade, parcheggi, aree residenziali.

Installazione: attacco palo in alluminio pressofuso idoneo per pali di diametro min. 55mm - max. 65mm, orientabile da ± 0 a ± 20°.

Corpo e telaio: in alluminio pressofuso UNI 5076 verniciato con polvere termoindurente poliestere.

Imbocco a palo: in alluminio pressofuso UNI 5076, verniciato con polvere termoindurente poliestere, con goniometro graduato per un corretto puntamento del fascio luminoso.

Verniciatura: di tipo poliestere eseguita a polvere, resistente agli agenti atmosferici e alla corrosione e garantita per 1.200 ore in nebbia salina (ISO 9227). Colore Grigio RAL9007

Schermo: vetro temperato di spessore 4mm resistente agli shock termici e agli urti.

Sorgente: LED SAMSUNG SEOUL

Temperatura di colore: 4000K; altre temperature di colore a richiesta (2200K - 2700K - 3000K - 5000K - Consegna 60 giorni).

Protezione alle sovratensioni inclusa:
Modo differenziale 6kV (L-N)
Modo comune 8kV (L-GND, N-GND, L&N-GND)

A richiesta: versione con protezione maggiorata (10kV) contro gli impulsi aggiungendo il cod. RO0640/N.

Driver: incorporato
Fattore di potenza ≥0,98.

Norme di riferimento: IEC 61000-4-5; EN60598-1; EN60598-2-1; EN62471; EN62031; EN60598-2-3; EN61547

Range of LED luminaires to light up urban areas. Suitable for roads, car parks and residential areas lighting.

Installation: *pole attachment in die cast aluminium suitable for poles with a diameter of min. 55mm - max. 65mm, that can be pivoted ± 0 to ± 20°.*

Housing and frame: *made by UNI 5076 die-cast aluminum, coated with polyester thermoset powder.*

Pole entrance: *made by UNI 5076 die-cast aluminum, coated with polyester thermoset powder, with graduated goniometer to allow the correct orientation of light beam.*

Coating: *coated with powdered polyester, resistant to atmospheric agents, corrosion and guaranteed for 1.200 hours in saline mist (ISO 9227).*
Grey RAL 9007 color.

Shield: *tempered glass with 4mm thickness resistant to thermal shocks and collisions.*

Light source: *LED* SAMSUNG SEOUL

Color temperature: *4000K; other color temperatures available on demand (2200K - 2700K - 3000K - 5000K. Delivery time: 60 days)*

Protection against overvoltages included:
Differential mode 6kV (L-N)
Standard mode 8kV (L - GND, N-GND, L&N-GND).

On demand: *this version with greater protection (10kV) with code RO0640/N.*

Driver: *included*
Power factor ≥0,98

Standard reference: *IEC 61000-4-5; EN60598-1; EN60598-2-1; EN62471; EN62031; EN60598-2-3; EN61547*

La certificazione fotometrica dei nostri apparecchi viene sempre effettuata da un istituto esterno. Efficienza luminosa e "lm Output" sono quindi il risultato di tale istituto.

The photometric certification of our appliances is always carried out by an external institute. Luminous efficiency and "lm Output" are therefore the result of this institute.

A richiesta - *On demand*

0-10V

DYNA control
Pag. 8

WIRELESS
Pag. 9

INDICE - INDEX

Scheda tecnica - *Data sheet*	Pag. 3
LED Sempione 120W - Catalogo - *Catalogue*	Pag. 4 - 9
Dichiarazione CE - *EC Declaration*	Pag. 10
Dichiarazione RoHS - *RoHS Declaration*	Pag. 11
Dichiarazione WEE - *WEE Declaration*	Pag. 12
Certificato ENEC - *ENEC Certificate*	Pag. 13 - 14
Certificato di Test CB - *CB Test Certificate*	Pag. 15 - 17
Certificato NEMKO - *NEMKO Certificate*	Pag. 18 - 19
Sicurezza - *Safety* - IP Test Report	Pag. 20 - 97
Sicurezza fotobiologica - *Photobiological safety*	Pag. 98 - 145
IK Test Report	Pag. 146 - 155
Compatibilità elettromagnetica - *Electromagnetic compatibility*	Pag. 156 - 197
Vibration Test Report	Pag. 198 - 218
Data sheet of LED and LM80	Pag. 219 - 283
Fotometrie - *Photometer* - LM79 - LM82 - TM21	Pag. 284 - 335
Nebbia salina Test Report - *Salt spray test report*	Pag. 336 - 374

SCHEDA TECNICA PRODOTTO - *DATA SHEET*

Processing: 19/05/2020

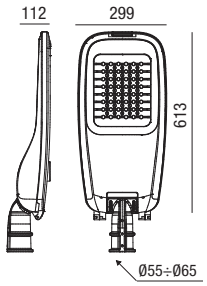
Articolo: LED Sempione - CELL - 120W

Codice: 36200 - 36200/3K

IP66 | IK09 | CRI >70 | +50 C° -40 | 850° | 17 | RoHS compliance | TECEE | LOW FLICKER | RG0

Caratteristiche meccaniche - *Mechanical features*

Corpo - *Body:*	Alluminio stampato - *Moulded aluminium*
Cornice - *Frame:*	Alluminio stampato - *Moulded aluminium*
Colore - *Colour:*	Grigio RAL 9007 - *Grey RAL 9007*
Lenti - *Lenses:*	PMMA stampato - *Moulded PMMA*
Schermo - *Shield:*	Vetro temperato - *Tempered glass*
Viteria - *Screws:*	INOX AISI 304
Dissipazione - *Dissipation:*	Statica - *Static*
Peso - *Weight:*	6,00 Kg

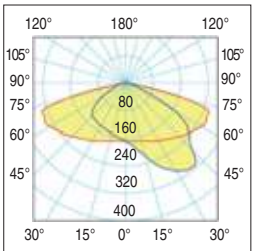


Caratteristiche elettriche - *Electrical features*

Alimentazione - *Power supply:*	220-240V ac - 50/60Hz
Potenza - *Power:*	126W
Fattore di potenza - *Power factor:*	> 0,98
Corrente di spunto - *Inrush current:*	50A - 200µS
Efficienza - *Efficiency:*	92%
Filtro antidisturbo - *Noise filter:*	EN 55015
Alimentatore - *Driver:*	PHILIPS XTANIUM - Incluso - *Included*
Aspettativa di vita - *Life expectation:*	100.000h (L90/B10)
Indice Mac Adam - *Mac Adam index:*	3
Rischio fotobiologico - *Photobiological risk:*	RG0
Protezione sovratensioni - *Surge protection:*	8KV - Differential mode
	6KV - Common mode

Caratteristiche illuminotecniche - *Photometric features*

Tipo di LED - *LED type:*	LED SMD 5050 - SEOUL
Flusso luminoso - *Luminous flux:*	14.474 Lm
Lm/W:	121
CCT:	4.000 K (on demand 3.000 K)
Ottica secondaria - *Secondary optic:*	ST (Street light)



ST/CDL
Stradale - *Street optic*

Accessori - *Accessories*

Cod. RO0640/N - Surge protector (non incluso)

DYNA SYSTEM

DALI o 0-10V

WIRELESS

NEMA SOCKET

Conforme alle seguenti norme - *Complyng with the following standards*

Sicurezza - *Safety:*	Generale - *General:*	EN 60598-1
	Particolari - *Particular:*	EN 60598-2-1
	Moduli LED - *LED modules:*	EN 62031+A1
Sicurezza fotobiologica - *Photobiological safety*		EN 62471 (Risk exempt)
Esposizione umana ai campi elettromagnetici - Human exposure to electromagnetic fields:		EN 62493
Immunità EMC - *EMC immunity:*		EN 61547
Compatibilità elettromagnetica - *Electromagnetic compatibility:*		EN 61000-3-3
Limiti di emissioni armoniche - *Limits of harmonic emissions:*		EN 61000-3-2

Relco S.r.l — Via delle Azalee, 60/A — Buccinasco - Milano - Italia
Tel. +39 02 4886161 r.a — www.relcogroup.com

LED Minisempione - LED Sempione - LED Maxisempione - LED Megasempione

Aspettativa di vita del LED

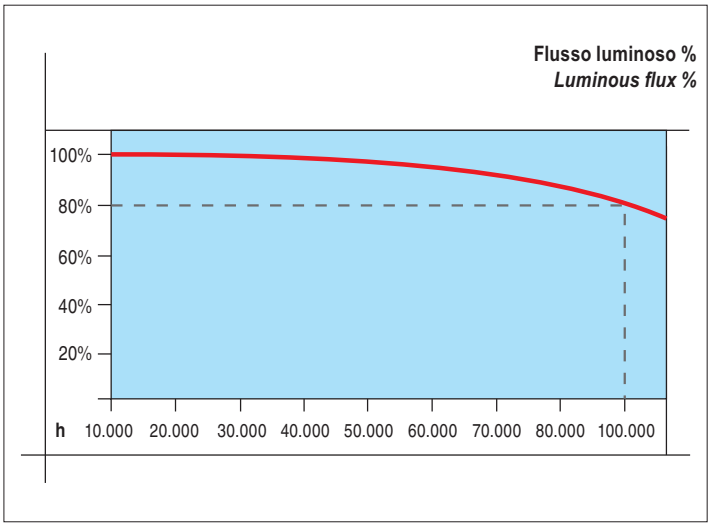
Al contrario delle lampade tradizionali, non tendono a spegnersi improvvisamente esaurita la loro vita utile, ma diminuiscono lentamente il loro flusso iniziale fino ad esaurirsi. Il LED non si rompe (se non per difettosità), ma si determina un decadimento continuo. Il calo del flusso del LED, definito come vita utile, è rappresentato dalla sigla L80 (vedi grafico), che significa flusso al 80%. Il valore "B", seguito da un valore compreso tra 10 e 50, indica la qualità del componente utilizzato, definendo la percentuale di LED che allo scadere delle 100.000 ore non mantiene le caratteristiche dichiarate.

LED service life expectancy

Unlike traditional lamps, they do not tend to go out suddenly at the end of their useful life, but slowly decrease in flux until they expire. The LED does not break (unless it is defective), but declines gradually in performance. The drop in LED flux, defined as the useful life, is represented by the acronym L80 (see graph), which means flux at 80%. Value "B" followed by a value between 10 and 50 indicates the quality of the component being used, defining the percentage of LED that does not maintain the declared characteristics when the 100,000 hours have elapsed.

LED: mantenimento del flusso luminoso - TM21 (compreso fine del ciclo di vita)
LED: maintenance of the lighting flux - TM21 *(including end of life cycle)*

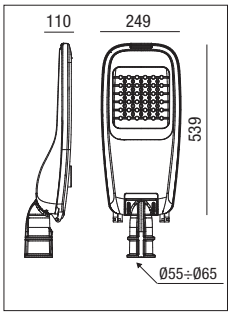
	n° LED	W	L80B10 @ta: +25°C	L80B10 @ta: +45°C	L90B10 @ta: +25°C	L90B10 @ta: +45°C
LED Minisempione	128	50	> 100.000 h	> 100.000 h	70.000 h	50.000 h
	128	75				
LED Sempione	192	95	> 100.000 h	> 100.000 h	70.000 h	50.000 h
	192	120				
LED Maxisempione	320	160	> 100.000 h	> 100.000 h	70.000 h	50.000 h
	80	210				
LED Megasempione	144	250	> 100.000 h	> 100.000 h	70.000 h	50.000 h
	144	300				



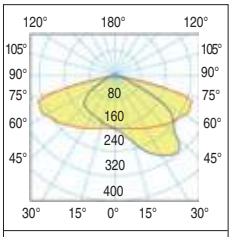
I modelli della serie LED Sempione sono conformi alle prove di vibrazione, secondo la **Norma EN 60598-1 certificata da Ente esterno: Illuminazione stradale - Vibrazione degli apparecchi di illuminazione**

The models of the LED Sempione series comply with vibration tests, according to the ***EN 60598-1 standard certified by the external body: Street lighting - Vibration of lighting fixtures***

LED Minisempione

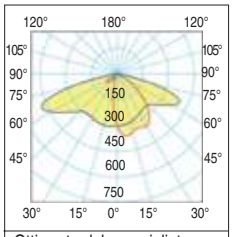


Ottica di serie
Standard optic

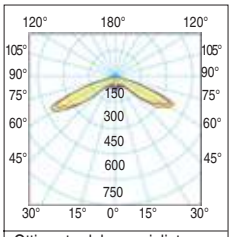


ST/CDL
Stradale - *Street optic*

Ottiche a richiesta
Optics on demand



Ottica stradale consigliata per strade con pista ciclabile
Road optics recommended for roads with cycle tracks



Ottica stradale consigliata per illuminazione parchi
Road optics recommended for lighting in parks

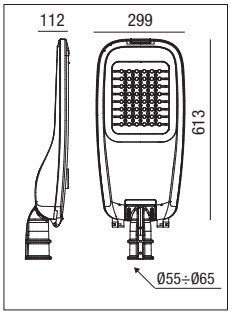
220-240 Vac | 110 Vac a richiesta on demand | 50/60 Hz | IP66 | IK09 | CRI >70 | +45 C° -30 | 850°

0,37m² | IECEE | DRIVER INCLUDED MULTIPOWER | DRIVER INCLUDED RIPPLE FREE | LOW FLICKER

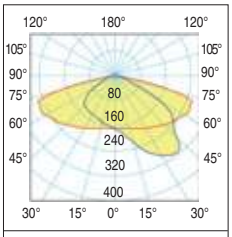
RG0 | RoHS compliance

	colour	W	Led SMD	Optic	K	nominal lm tc = 25°C	lm output	lm/W	pcs	Kg	CELL	Euro
0-10V	G	20	N° 128 led 3030	ST	4000	3.450	3.000	150	1	5,00	36000/20S	205,00
0-10V	G	30	N° 128 led 3030	ST	4000	5.200	4.500	150	1	5,00	36000/30S	210,00
0-10V	G	40	N° 128 led 3030	ST	4000	6.900	6.000	150	1	5,00	36000/40S	215,00
0-10V	G	50	N° 128 led 3030	ST	4000	8.250	7.500	150	1	5,00	36000S	220,00
0-10V	G	60	N° 128 led 3030	ST	4000	10.350	9.000	150	1	5,00	36001/60S	255,00
0-10V	G	75	N° 128 led 3030	ST	4000	12.400	11.250	150	1	5,00	36001S	260,00
0-10V	G	50	N° 128 led 3030	ST	3000	7.840	7.250	145	1	5,00	36000/3KS	220,00
0-10V	G	75	N° 128 led 3030	ST	3000	11.780	10.900	145	1	5,00	36001/3KS	260,00

LED Sempione

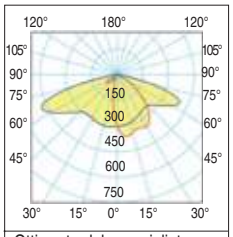


Ottica di serie
Standard optic

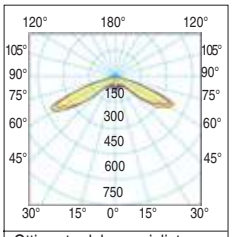


ST/CDL
Stradale - *Street optic*

Ottiche a richiesta
Optics on demand



Ottica stradale consigliata per strade con pista ciclabile
Road optics recommended for roads with cycle tracks



Ottica stradale consigliata per illuminazione parchi
Road optics recommended for lighting in parks

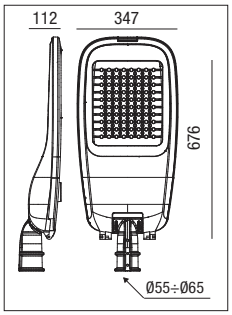
220-240 Vac | 110 Vac a richiesta on demand | 50/60 Hz | IP66 | IK09 | CRI >70 | +45 C° -30 | 850°

0,37m² | IECEE | DRIVER INCLUDED MULTIPOWER | DRIVER INCLUDED RIPPLE FREE | LOW FLICKER

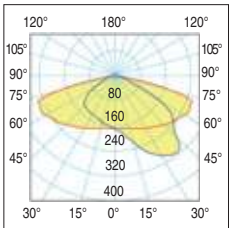
RG0 | RoHS compliance

	colour	W	Led SMD	Optic	K	nominal lm tc = 25°C	lm output	lm/W	pcs	Kg	CELL	Euro
0-10V	G	95	N° 192 led 3030	ST	4000	15.650	14.250	150	1	6,00	36100S	310,00
	G	120	N° 48 led 5050	ST	4000	18.500	16.800	140	1	6,00	36200	320,00
0-10V	G	95	N° 192 led 3030	ST	3000	14.870	13.800	145	1	6,00	36100/3KS	310,00
	G	120	N° 48 led 5050	ST	3000	17.800	16.200	135	1	6,00	36200/3K	320,00

LED Maxisempione

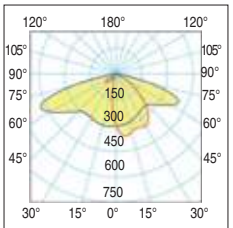


Ottica di serie
Standard optic

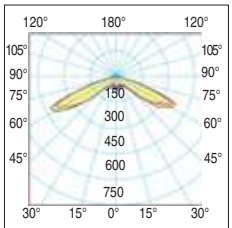


ST/CDL
Stradale - *Street optic*

Ottiche a richiesta
Optics on demand



Ottica stradale consigliata per strade con pista ciclabile
Road optics recommended for roads with cycle tracks



Ottica stradale consigliata per illuminazione parchi
Road optics recommended for lighting in parks

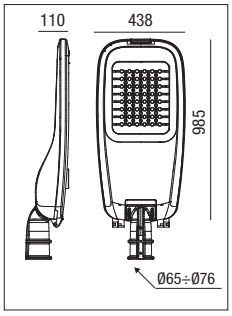
220-240 Vac | 110 Vac a richiesta on demand | 50/60 Hz | IP66 | IK09 | CRI >70 | +45 C° -30 | 850°

DRIVER INCLUDED MULTIPOWER | DRIVER INCLUDED RIPPLE FREE | LOW FLICKER | RG0 | RoHS compliance

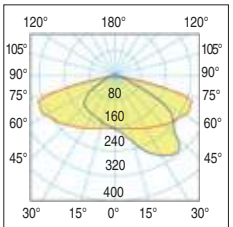
	colour	W	Led SMD	Optic	K	nominal lm tc = 25°C	lm output	lm/W	pcs	Kg	CELL	Euro
0-10V	G	160	N° 320 led 3030	ST	4000	26.400	24.000	150	1	7,00	36250S	400,00
	G	210	N° 80 led 5050	ST	4000	30.000	27.300	130	1	7,00	36251	440,00
0-10V	G	160	N° 320 led 3030	ST	3000	25.000	23.200	145	1	7,00	36250/3KS	400,00
	G	210	N° 80 led 5050	ST	3000	28.900	26.250	125	1	7,00	36251/3K	440,00

LED Megasempione

NEW

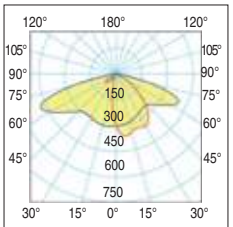


Ottica di serie
Standard optic

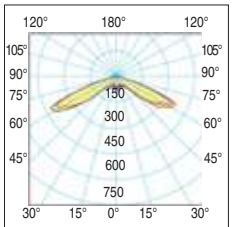


ST/CDL
Stradale - *Street optic*

Ottiche a richiesta
Optics on demand



Ottica stradale consigliata per strade con pista ciclabile
Road optics recommended for roads with cycle tracks



Ottica stradale consigliata per illuminazione parchi
Road optics recommended for lighting in parks

220-240 Vac | 110 Vac a richiesta on demand | 50/60 Hz | IP66 | IK09 | CRI >70 | +45 C° -30

Pending | DRIVER INCLUDED MULTIPOWER | DRIVER INCLUDED RIPPLE FREE | LOW FLICKER | RoHS compliance | RG0

colour	W	Led SMD	Optic	K	nominal lm tc = 25°C	lm output	lm/W	pcs	Kg	CELL	Euro
G	250	N° 144 LED 5050	ST	4000	39.000	30.500	122	1	15,30	36601	800,00
G	300	N° 144 LED 5050	ST	4000	47.250	36.850	119	1	15,50	36600	900,00
G	250	N° 144 LED 5050	ST	3000	39.000	30.500	122	1	15,30	36601/3K	800,00
G	300	N° 144 LED 5050	ST	3000	47.250	36.850	119	1	15,50	36600/3K	900,00

LED Minisempione - LED Sempione - LED Maxisempione - LED Megasempione

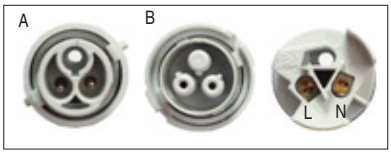
Dettagli
Details

Completo di dispositivo anticondensa.
Pressacavo con valvola di compensazione e riciclo dell'aria

Complete with anti-condensate device.
Cable gland with valve for compensation and circulation of air.

Completo di sezionatore di linea in doppio isolamento che interrompe l'alimentazione elettrica all'apertura della copertura.
Complete with *line disconnector in double insulation that interrupts the power supply when the cover is opened.*

Il LED Driver è sempre certificato
The Driver LED is always certified



Completo di connettore **IP68** per una rapida installazione -
Complete with IP68 *connector*
for quick installation

A richiesta: verniciatura resistente a 2.000 ore di esposizione alla nebbia salina in accordo alla norma ISO 9227 certificato da Ente esterno.
On request: *painting resistant to 2,000 hours of exposure to salt spray in accordance with ISO 9227 certified by an external body.*

Ottiche: realizzate in PMMA reistente ai raggi UV
Optics: *made in PMMA resistant to UV radiation*

Nel LED Driver è incluso il dispositivo di controllo della temperatura all'interno dell'apparecchio con ripristino automatico. Protezione contro gli impulsi conforme alla Norma EN 61547.

The LED driver includes the temperature control device inside the device with automatic reset.
Impulse protection in accordance with EN 61547.

Accessorio non incluso
Not included accessory

Code: RO0640/N
Euro: 16,00
Dispositivo di protezione conforme alla Norma EN 61547 contro i fenomeni impulsivi atto a proteggere il modulo LED e il relativo alimentatore: classe II (a richiesta protezione fino a 10kV)
Protection device in compliance with the EN 61547 standard to counteract the impulsive phenomena designed to protect the LED module and the relative power supply: class II (protection up to 10kV available on request)

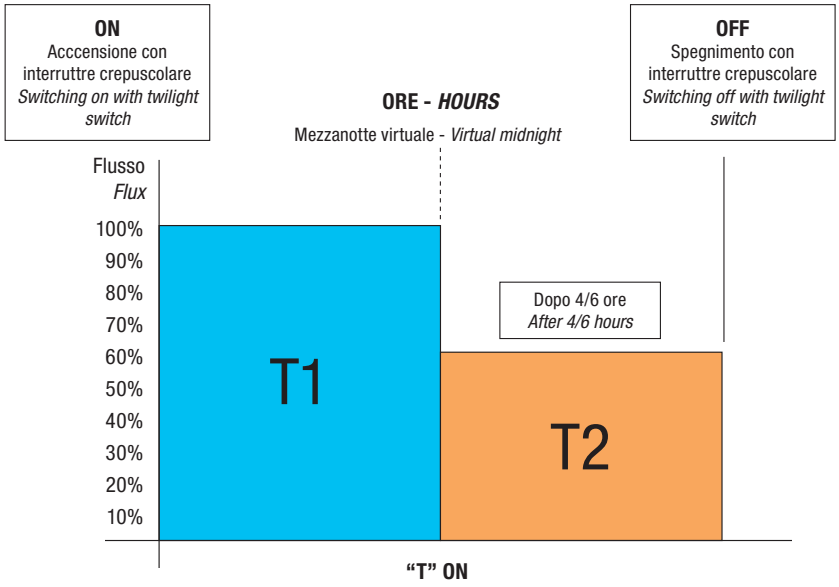
Gestione del punto luce per un ulteriore risparmio di energia (richiedere preventivo) - *Management of the lighting point for further energy savings (Request a quotation)*			
Regolazione 1÷10V ***1÷10V control***	**Mezzanotte virtuale** ***Virtual midnight***	**Nema Socket**	**Telegestione sistema Wi-Fi (da concordare)** ***Wi-Fi system remote management (to be agreed)***
Possibilità di regolazione 10% - 100% con sistema 1÷10V *Possibility of adjustment 10% - 100% with 1-10V system*	Sistema con riduzione automatica del flusso *System with automatic flux reduction*	Predisposizione sul corpo dell'apparecchio. Ideale per la gestione autonoma locale tramite sensori o da remoto dell'illuminazione *For installation on the body of the appliance. Ideal for autonomous management of the lighting, either locally with sensors or remotely*	Sistema di controllo, gestione consumi e diagnosi dell'impianto con tecnologia Wi-Fi *Control system, consumption management and diagnosis of the system with Wi-Fi technology*

DYNA control - Mezzanotte virtuale - *Virtual midnight*

DYNA CONTROL è un sistema automatico di controllo del flusso luminoso delle lamapade. Il sistema entra in funzione alla prima accensione calcolando per 3 giorni i tempi di accensione, il quarto giorno il sistema in modo autonomo calcola la mezzanotte virtuale eseguendo una regolazione del flusso regolando la lampada come indicato sullo schema di Fig. 1; per i primi tre giorni quindi il sistema manterrà le lampade accese al 100%, nel tempo di accensione dell'impianto, il quarto giorno entrerà in funzione il sistema DYNA CONTROL gestendo in modo autonomo il flusso luminoso garantendo così un notevole risparmio energetico.
Accensioni inferiori ad 1 ora (es. manutenzione) verranno ignorate ed il sistema non entra in funzione, per accensioni da 1 a 4 ore (es. anomalia impianto) o superiori alle 23 ore (es. impianto sempre acceso), il sistema resetta il timer quindi ricomincerà a contare per i primi 3 giorni e successivamente riprenderà il funzionamento automatico.

DYNA CONTROL is an automatic system to control lamp brightness. The system starts working when first switched-on calculating switch-on times for 3 days, on the fourth day the system autonomously calculates the virtual midnight, adjusting the brightness of the lamp as indicated in fig.1. Therefore, for the first three days the system will keep the lamps on at 100%, during system switch-on, on the fourth day, the DYNA CONTROL system will start operating autonomously, controlling the lamp's brightness, thus ensuring significant energy savings.
Switch-on of less than 1 hour (ex. for maintenance) will be ignored and the system will not operate. For switch-on times from 1 to 4 hours (ex. system anomaly) or over 23 hours (ex. system always on), the system resets the timer and will restart counting for the first 3 days and then resume to automatic operation.

Fig. 1
Esempio applicativo 2 steps - *Application example 2 steps*



T1 =100% Flusso luminoso - *Luminous flux*	
T2 = 70% Flusso luminoso - *Luminous flux*	

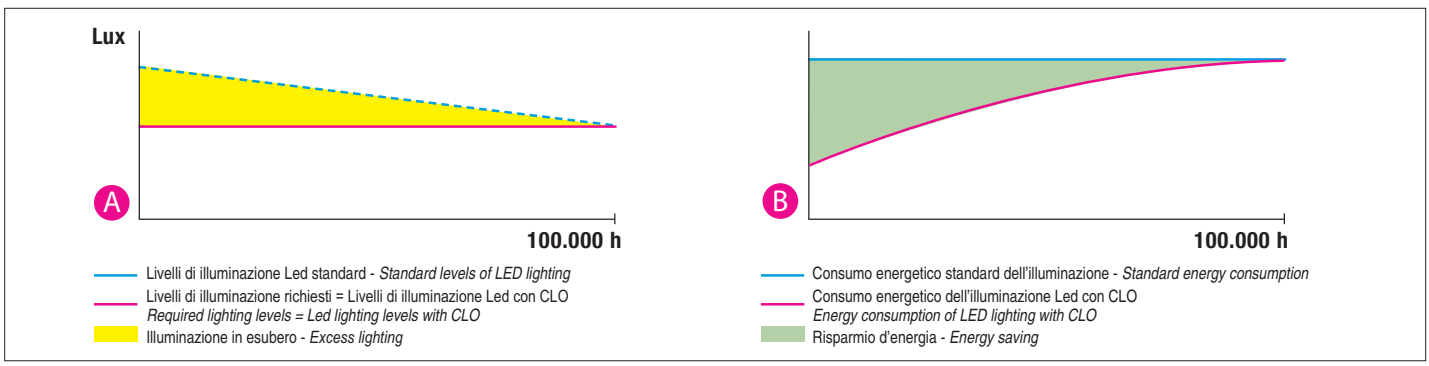
Minimo tempo di accensione per funzionamento automatico 4 ore (3 giorni).
Accensioni di 1 ora ignorate.
Accensioni da 1 a 4 ore oppure superiori alle 23 ore resettano il sistema.

The minimum ignition time for automatic operation is 4 hours (three days).
Ignitions 1 hour ignored.
Switching from 1 to 4 hours or higher with 23 hours reset the system.

CLO - Constant Light Output

Tutte le fonti di luce (anche i LED) hanno una riduzione della produzione di luce nel corso del tempo. Per garantire il minimo richiesto di livelli di luce in un impianto, la maggior parte dei progetti di illuminazione sono calcolate in base al livello di luce alla fine della vita utile della lampada (di norma il punto L70: 70% dei Lumen iniziali). Ciò significa che il sistema consuma più potenza del necessario, sprecando in media 15% di energia durante la sua vita **(Fig. A)**.
L'emissione luminosa funzionalità costante (CLO) compensa questa perdita di luce, in modo che i LED siano in grado di fornire sempre il livello di luce necessaria.
L'alimentatore può essere programmato per erogare corrente costante ad un livello ridotto per un nuovo apparecchio, ed aumentare gradualmente compensando il decadimento del flusso luminoso, Ciò influisce positivamente sulla vita della sorgente luminosa, sul risparmio energetico, prolungando la durata del sistema.
La regolazione della potenza erogata viene fatta in base al contatore delle ore di esercizio. Ad intervalli di tempo di 4.000 ore, il sistema incrementa la corrente del corrispondente valore di decadimento del flusso luminoso indicato dai costruttori della sorgente luminosa. In questo modo il flusso luminoso dell'apparecchio rimane costante per tutta la sua vita.

All light sources (including LEDs) produce less light over time. In order to guarantee the minimum required levels of light of a system, most lighting projects are planned taking into account the level of light at the end of the useful life of the lamp (normally point L70: 70% of initial lumen output). This means that the system consumes more power than necessary, wasting on average 15% of energy throughout its life **(Fig. A)**.
The constant lumen output (CLO) compensates for this loss of light to ensure that the LEDs supply the required level of light at all times.
The power supply unit can be programmed to supply direct current at a reduced level for a new appliance, and to gradually increase this to compensate for the decline in luminous flux. This positively increases the lifespan of the light source and of the system, while ensuring energy savings.
The supply of power is adapted according to the operating hours counter.
After every 4,000 hours, the system increases the current in proportion to the decrease in the luminous flux indicated by the manufacturers of the light source. In this way, the luminous flux of the appliance remains constant during its entire life-span.



Smart City

Sistema di comunicazione Wireless e cablato di Relco
Servizi su misura
Possibilità di co-implementazione di diverse tecnologie
Programmazione e controllo da remoto mediante gateway in loco
Monitoraggio in tempo reale dello stato del sistema e raccolta dati
Idoneità al relamping per il risparmio energetico
Ideale per applicazioni commerciali, industriali ed ambienti esterni

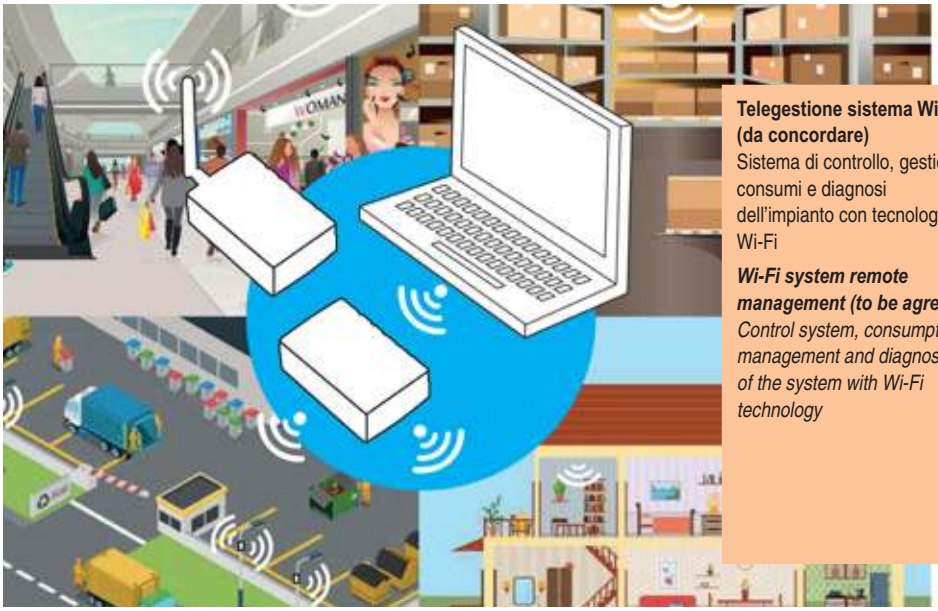
ZD-Light è un sistema estremamente efficiente, che combina soluzioni tecnologiche di prima qualità per il telecontrollo di luci e di oggetti IoT. Grazie ad un'interfaccia utente intuitiva (pagina web o APP) il nostro sistema può monitorare, controllare e gestire le installazioni luminose, dalla singola lampada al network nel suo insieme.
Basato sulla tecnologia mesh mqtt, ZD-Light permette di coprire vaste aree mentre il protocollo standard ZigBee 3.0 lo rende estremamente versatile in termini di compatibilità con una pluralità di dispositivi. Il sistema è pensato per fornire soluzioni ad hoc sulla base delle necessità del singolo Cliente. ZD-Light copre una vasta gamma di applicazioni, che spaziano dalle aree commerciali agli edifici, dai capannoni industriali ai giardini pubblici, a città, strade e tunnel.
Impiegando diversi componenti è possibile gestire la luce a 360°, effettuare misurazioni di specifici parametri ambientali come l'inquinamento atmosferico, monitorare lo stato delle lampade (temperatura di funzionamento, consumi, eventuali difetti meccanici che potrebbero provocare danni ecc.) ed implementando sensori di movimento, creare heat map finalizzate alla definizione delle maggiori aree di concentrazione delle persone. La programmazione dinamica della luce permette la gestione automatica del flusso luminoso della lampada in specifici intervalli di tempo. La funzione CLO consente di mantenere costante il flusso luminoso per tutta la durata di vita del prodotto, bilanciando elettronicamente la riduzione dell'efficienza tipica dei LED. Tutte le informazioni raccolte possono essere archiviate a gestire in loco o da remoto via Cloud.

Messa in opera e installazione del sistema non incluse nel prezzo.

Relco Wireless and wired communication system
Customised services
Possibility of co-implementing different technologies
Remote programming and control via on-site gateways
Real-time monitoring of the system status and data collection
Feasibility of relamping for energy saving
Ideal for commercial, industrial and outdoor applications

ZD-Light is an extremely efficient system that combines first-class technological solutions for the remote control of lights and IoT objects. Thanks to an intuitive user interface (web page or APP) our system can monitor, control and manage light installations, from a single lamp to a network as a whole.
Based on MQTT mesh technology, ZD-Light allows large areas to be covered, whereas the standard ZigBee 3.0 protocol makes it extremely versatile in terms of compatibility with a variety of devices. The system is designed to provide ad hoc solutions based on the requirements of the individual Customer.
ZD-Light covers a wide range of applications, which range from commercial areas to buildings, from industrial warehouses to public gardens, to cities, roads and tunnels.
The light can be fully controlled by using different components, while measuring specific environmental parameters, such as atmospheric pollution, and monitoring the status of the lamps (operating temperature, consumption, any mechanical defects that could cause damage, etc.) and implementing movement sensors, creating heat maps aimed at defining the main areas of concentration of people.
The dynamic programming of the light allows the luminous flux of the lamp to be automatically controlled in specific time intervals. The CLO function allows the luminous flux to be kept constant throughout the life cycle of the product, balancing the efficiency reduction typical of LEDs electronically.
All collected information can be stored to be managed on site or remotely via Cloud.

Installation and start-up of the system not included in the price



Telegestione sistema Wi-Fi (da concordare)
Sistema di controllo, gestione consumi e diagnosi dell'impianto con tecnologia Wi-Fi

Wi-Fi system remote management (to be agreed)
Control system, consumption management and diagnosis of the system with Wi-Fi technology

Nema Socket

Gli apparecchi della serie LED Sempione sono predisposti di presa Nema socket che fornisce un collegamento elettrico e meccanico tra il sensore e l'apparecchio. La presa è realizzata in policarbonato ed è completa di guarnizione per garantire il grado IP dell'apparecchio; inoltre, grazie alla sua struttura smontabile, è possibile installarla direttamente sul corpo dell'apparecchio (evitando l'accesso alle parti interneo) senza l'uso di attrezzi; questo faciliterà conseguentemente anche la manutenzione da fare in futuro. La presa Nema Socket è predisposta di 5/7 poli: 3 poli per il collegamento elettrico, i 2/4 poli rimanenti per il segnale 1-10V o DALI; si integra perfettamente con tutti i sistemi "smart" che consentono di monitorare l'illuminazione da remoto. L'ideale utilizzo della presa Nema Socket è negli impianti di illuminazione stradale (pubbliche o private), piste pedonali e ciclabili, viali interni a scuole, ospedali, siti industriali e arredo urbano in generale in cui è importante un controllo "smart" dell'illuminzione.

The Sempione LED series appliances are fitted with a Nema socket tha t provides an electrical and mechanical connection between the sensor and the appliance. The socket is made of polycarbonate and is complete with a gasket to guarantee the IP rating of the appliance; furthermore, thanks to its removable structure, it is possible to install it directly on the body of the appliance (avoiding access to internal parts) without using any tool; this will also facilitate future maintenance. The Nema Socket is designed for 5-7 poles: 3 poles for the electrical connection, and the 2-4 remaining poles for the 1-10V or DALI signal; it integrates perfectly with all the "smart" systems that allow remote light monitoring
The ideal use of the Nema Socket is in street lighting systems (public or private), pedestrian and bicycle lanes, lanes in school grounds, hospitals, industrial sites and urban furniture in general where "smart" lighting control is important.

Predisposizione sul corpo dell'apparecchio. Ideale per la gestione autonoma locale tramite sensori o da remoto dell'illuminazione

For installation on the body of the appliance. Ideal for autonomous management of the lighting, either locally with sensors or remotely

Vantaggi
- Facile da installare, non necessita dell'uso di attrezzi
- Rotazione completa (355°)
- Robusti contatti con blocco di chiusura ad avvitamento per garantire un'interconnessione di potenza.
- La presa viene fornita pre-terminata con conduttori per una facile integrazione in impianti nuovi o esistenti.
- Compatibile con fotocellule DIMM (standard ANSI) per la connessione tra fotocellula e apparecchio di illuminazione.
- Può essere fornita con due o quattro contatti di dimmeraggio a supporto dei protocolli di dimmerazione a uno o due canali.

Advantages
- *Easy to install, it does not require tools to be used*
- *Complete rotation (355°)*
- *Strong contacts with screw closure to guarantee power interconnection.*
- *The socket is supplied pre-terminated with conductors to be easily integrated into new or existing systems.*
- *Compatible with DIMM photocells (ANSI standard) for connection between the photocell and lighting appliance.*
- *It can be supplied with two or four dimming contacts which support one or two channel dimming protocols.*

Relco S.r.l.
Direzione e uffici
Via delle Azalee, 6/A
20090 Buccinasco, Milano
Tel. +39 02.48.86.16.1 r.a.
Fax +39 02.45.71.22.70
Cap.Soc. € 100.000 i.v.
C.F. e Partita IVA
Iscrizione Reg. Imprese Milano
IT 12080570158
N°identificazione CEE
IT 12080570158
R.A.E.E. IT08020000000670
Azienda Certificata
www.relcogroup.com

EC DECLARATION OF CONFORMITY

The company RELCO S.r.l declares under his liability that the product:

LED SEMPIONE (cod. 36200; 36200/3K)

to which this declaration refers, is compliant to the following standards:

EN60598-1 : 2015 ;
EN60598-1 : 2015/AC : 2015 ;
EN60598-1 : 2015/AC : 2016 ;
EN60598-1 : 2015/AC : 2017-05 ;
EN60598-2-3 : 2003 + A1 : 2011;
EN62031: 2008 +A1: 2013;
EN62471: 2008;
EN55015: 2013 + A1;
EN61000-3-2: 2014 ;
EN61000-3-3 : 2013;
EN61547 : 2009;
EN62493 : 2015 ;
EN50581 : 2012.

So, it meets the requirements of the applicable directives:

2014/35/EU: Low Voltage directive
2014/30/EU: Electromagnetic compatibility directive

Furthermore, the product is compliant to the European directives:

2011/65/EU;
2009/125/EC and subsequent regulations: 1194/2012/UE, 1428/2015/UE.

Latest two digits of the year of the CE certification: 19

Buccinasco, 18/05/2020

RELCO S.r.l.
Via Delle Azalee, 6/A
20090 BUCCINASCO (MI)
P. IVA: 12080570158

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DECLARATION OF CONFORMITY TO THE DIRECTIVE 2011/65/EU (RoHS II) AND COMMISSION DELEGATED DIRECTIVE (EU) 2015/863 of 31 March 2015 (RoHS3) amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

The company Relco S.r.l. declares under his liability that the product manufactured and or marketed does not contain (except within the threshold values specified in this Directive) the following chemicals:

- Cadmium(Cd)

- Mercury

- Lead(Pb)

- Hexavalent chromium (Cr6+)

- Polybrominated biphenyls (PBB)

- Polybrominated diphenyl ethers (PBDE)

- Bis(2-Ethylhexyl) phthalate (DEHP)

- Benzyl butyl phthalate (BBP)

- Dibutyl phthalate (DBP)

- Diisobutyl phthalate (DIBP)

Furthermore the products are compliant to the standard: EN50581: 2012.

Buccinasco 07/02/2019

RELCO S.r.l.
Via Delle Azalee, 6/A
20090 BUCCINASCO (MI)
P. IVA: 12080570158

Relco S.r.l.
Direzione e uffici

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R.A.E.E. IT08020000000670

Azienda
Certificata

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Declaration of WEEE Conformity

Supplier registration number: R.A.E.E. IT08020000000670

The European Community WEEE directive deals with the disposal of Waste Electrical and Electronic Equipment at the end of its useful life. The aims of the directive are to minimize the amount of material entering this waste stream and to provide funding for treatment facilities in order to maximize recovery and recycling.

Relco's obligation as a supplier is to ensure the correct disposal of Electrical and Electronic Equipment (EEE) we produce when it reaches the end of its useful life and becomes waste.

Our customers to arrange for the return of Relco S.r.l. manufactured WEEE have to contact the company Ecolight Servizi S.r.l. Via Monte Rosa, 96 20149 Milano Italy (www.ecolightservizi.it).

RELCO S.r.l.
Via Delle Azalee, 6/A
20090 BUCCINASCO (MI)
P. IVA: 12080570158

ENEC

NO4517

Order No. 377848

Licence for use of the here shown ENEC conformity mark :

Based on:

Agreement on the use of a commonly agreed Mark on Conformity for equipment complying with European Standards as of 12 November 1991 (in short ENEC Agreement), as revised latest by ENEC group April 16. 1997.

Nemko hereby grants the following manufacturer as licensee the right to affix this ENEC mark on the product(s) specified below.

Product	LED Streetlight
Applicant	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Manufacturer	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Factory	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy ☐ See next page(s)
Ratings	220 or 180 W, 220-240 V~, 50/60 Hz
Trade mark	Relco (Relco Components & Lighting)
Model / Type Ref.	LED MAXISEMPIONE series
Principal characteristics	Cl.II, IP66, IK09, 4000 K, ta 40 °C, distance from lighted objects 1 m. See test report for product code involved. ☐ See next page(s)

A sample of the product was tested and found to be in conformity with LITE EN 60598-1:2015;A1 EN 60598-2-3:2003;A1

The conditions for this licence are that the ENEC-marked products conform with the applicable Standard(s) as stated in the Test Report with Order No: 377848 and that Articles 8 and 9 of the ENEC Agreement are fulfilled by the manufacturer. The mark signifies the compliance of the completed products with these conditions. Further information is given in the attached Annex, which forms an obligatory part of this licence document. This licence has been issued under the presumption and conditional on the fact that the licensee holds all necessary legal rights with regard to the product presented for testing and certification.

Additional model(s) ☑ See next page(s)

Date of issue 03-03-2020

Jiyea Gim

Jiyea Gim
Certification Department

Nemko AS
Philip Pedersens vei 11, 1366 Lysaker, Norway
TEL +47 22 96 03 30 EMAIL info@nemko.com
ENTERPRISE NUMBER NO974404532

ENEC

NO4517

Order No. 377848

Licence for use of the here shown ENEC conformity mark :

Product	LED Streetlight
Pos. No	1
Model / Type Ref.	LED MINISEMPIONE series
Trade mark (if different from page 1)	
Rating	75 or 50 or 60 or 40 or 30 or 20 W, 220-240 V~, 50/60 Hz
Principal characteristics	Cl.II, IP66, IK09, 4000 K, ta 45 °C, distance from lighted objects 1 m. See test report for product code involved.

Product	LED Streetlight
Pos. No	2
Model / Type Ref.	LED SEMPIONE series
Trade mark (if different from page 1)	
Rating	120 or 95 W, 220-240 V~, 50/60 Hz
Principal characteristics	Cl.II, IP66, IK09, 4000 K, ta 45 °C, distance from lighted objects 1 m. See test report for product code involved.

Date of issue 03-03-2020

Jiyea Gim

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TEL +47 22 96 03 30 EMAIL info@nemko.com
ENTERPRISE NUMBER NO974404532

Ref. Certif. No.

NO110763

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI DACCEPTATION MUTUELLE DE CERTIFICATS DESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product Produit	LED Streetlight
Name and address of the applicant Nom et adresse du demandeur	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Name and address of the manufacturer Nom et adresse du fabricant	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Name and address of the factory Nom et adresse de l'usine	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la deuxième page	☐ Additional information on page 2
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	220 or 180 W, 220-240 V~, 50/60 Hz Cl.II, IP66, IK09, 4000 K, ta 40 °C, distance from lighted objects 1 m.
Trademark (if any) Marque de fabrique (si elle existe)	Relco (Relco Components & Lighting)
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	
Model / Type Ref. Ref. De type	LED MAXISEMPIONE series
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la deuxième page	See test report for product code involved. ☐ Additional information on page 2
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60598-1:2014, IEC 60598-1:2014/AMD1:2017 IEC 60598-2-3:2002, IEC 60598-2-3:2002/AMD1:2011
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport dessais numéro de référence qui constitue partie de ce Certificat	377848

This CB Test Certificate is issued by the National Certification Body
Ce Certificat dessai OC est établi par l'Organisme **National de Certification**

Nemko

Philip Pedersen vei 11,
NO-1366 Lysaker, Norway

Date: 03-03-2020

Signature: Jiyea Gim
Certification Department

Ref. Certif. No.

NO110764

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI DACCEPTATION MUTUELLE DE CERTIFICATS DESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product Produit	LED Streetlight
Name and address of the applicant Nom et adresse du demandeur	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Name and address of the manufacturer Nom et adresse du fabricant	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Name and address of the factory Nom et adresse de l'usine	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la deuxième page	☐ Additional information on page 2
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	120 or 95 W, 220-240 V~, 50/60 Hz Cl.II, IP66, IK09, 4000 K, ta 45 °C, distance from lighted objects 1 m.
Trademark (if any) Marque de fabrique (si elle existe)	Relco (Relco Components & Lighting)
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	
Model / Type Ref. Ref. De type	LED SEMPIONE series
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la deuxième page	See test report for product code involved. ☐ Additional information on page 2
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60598-1:2014, IEC 60598-1:2014/AMD1:2017 IEC 60598-2-3:2002, IEC 60598-2-3:2002/AMD1:2011
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport dessais numéro de référence qui constitue partie de ce Certificat	377848

This CB Test Certificate is issued by the National Certification Body
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Nemko

Philip Pedersen vei 11,
NO-1366 Lysaker, Norway

Date: 03-03-2020

Signature: Jiyea Gim
Certification Department

Ref. Certif. No.

NO110765

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI DACCEPTATION MUTUELLE DE CERTIFICATS DESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product Produit	LED Streetlight
Name and address of the applicant Nom et adresse du demandeur	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Name and address of the manufacturer Nom et adresse du fabricant	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Name and address of the factory Nom et adresse de l'usine	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la deuxième page	☐ Additional information on page 2
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	75 or 50 or 60 or 40 or 30 or 20 W, 220-240 V~, 50/60 Hz Cl.II, IP66, IK09, 4000 K, ta 45 °C, distance from lighted objects 1 m.
Trademark (if any) Marque de fabrique (si elle existe)	Relco (Relco Components & Lighting)
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	
Model / Type Ref. Ref. De type	LED MINISEMPIONE series
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la deuxième page	See test report for product code involved. ☐ Additional information on page 2
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60598-1:2014, IEC 60598-1:2014/AMD1:2017 IEC 60598-2-3:2002, IEC 60598-2-3:2002/AMD1:2011
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport dessais numéro de référence qui constitue partie de ce Certificat	377848

This CB Test Certificate is issued by the National Certification Body
Ce Certificat dessai OC est établi par l'Organisme **National de Certification**

Nemko

Philip Pedersen vei 11,
NO-1366 Lysaker, Norway

Date: 03-03-2020

Signature: Jiyea Gim
Certification Department

CERTIFICATE

No. P20224310

Order No. 377848

Product	LED Streetlight
Applicant	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Manufacturer	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Factory	Relco Srl Via delle Azalee 6/A 20090 Buccinasco (MI) Italy
Ratings	220 or 180 W, 220-240 V~, 50/60 Hz
Trade mark	Relco (Components & Lighting)
Model / Type Ref.	LED MAXISEMPIONE series
Principal characteristics	Cl.II, IP66, IK09, 4000 K, ta 40 °C, distance from lighted objects 1 m. See test report for product code involved.
A sample of the product was tested and found to be in conformity with	LITE: EN 60598-1:2015;A1 EN 60598-2-3:2003;A1 EMC: EN 55015:2013;A1 EN 61547:2009 EN 61000-3-2:2014 EN 61000-3-3:2013
Validity	This certificate documents conformity with the standards shown, and also applies as license for use of Nemkos name and certification mark. The certificate and license is valid as long as the applicable conditions are complied with, and provided that any changes to the product are notified to Nemko for acceptance prior to implementation. New standards or amendments to the standards may imply that the product design must be updated and/or that re-testing and re-certification is necessary.
Additional information	
Additional model(s)	(2) See page 2

Date of issue 03-03-2020

Jiyea Gim

Jiyea Gim
Certification Department

Nemko AS
Philip Pedersens vei 11, 1366 Lysaker, Norway
TEL +47 22 96 03 30 EMAIL info@nemko.com
ENTERPRISE NUMBER NO974404532

Additional model(s)

Product	LED Streetlight
Pos. No	1
Model / Type Ref.	LED SEMPIONE series
Trade mark (if different from page 1)	
Rating	120 or 95 W, 220-240 V~, 50/60 Hz
Principal characteristics	Cl.II, IP66, IK09, 4000 K, ta 45 °C, distance from lighted objects 1 m. See test report for product code involved.

Product	LED Streetlight
Pos. No	2
Model / Type Ref.	LED MINISEMPIONE series
Trade mark (if different from page 1)	
Rating	75 or 50 or 60 or 40 or 30 or 20 W, 220-240 V~, 50/60 Hz
Principal characteristics	Cl.II, IP66, IK09, 4000 K, ta 45 °C, distance from lighted objects 1 m. See test report for product code involved.

Date of issue 03-03-2020

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ENTERPRISE NUMBER NO974404532

TEST REPORT
IEC 60598-2-3
Luminaires
Part 2: Particular requirements
Section 3: Luminaires for road and street lighting

Report Number.....:	377848
Date of issue.....:	2020-02-28
Total number of pages .....:	78 (included attachments)
Name of Testing Laboratory preparing the Report .....:	Nemko S.p.A.
Applicant's name .....:	**Relco Srl**
Address.....:	Via delle Azalee 6/A - 20090 Buccinasco (MI) - Italy
Test specification:	
Standard.....:	IEC 60598-2-3:2002, AMD1:2011 used in conjunction with IEC 60598-1:2014, AMD1:2017
Test procedure .....:	CB Scheme
Non-standard test method .....:	N/A
Test Report Form No. .....:	IEC60598_2_3L
Test Report Form(s) Originator ....:	Intertek Semko AB
Master TRF.....:	Dated 2018-03-09

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

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Test item description..... :	LED Streetlight
Trade Mark..... :	Relco (Relco Components&Lighting)
Manufacturer ..... :	same as Applicant
Model/Type reference..... :	LED MAXISEMPIONE Cod. 36251; LED MAXISEMPIONE Cod. 36251/3K; LED MAXISEMPIONE Cod. 36250; LED MAXISEMPIONE Cod. 36250/3K (see page 9 for variants)
Ratings..... :	210 or 160 W, 220-240 V~, 50/60 Hz, Cl.II, IP66, IK09, 4000 K, t_a 40 °C, distance from lighted objects 1 m (see page 9 for variants)

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	Nemko S.p.A.	
Testing location/ address ..... :		Via del Carroccio, 4 – 20853 Biassono (MB) – Italy	
Tested by (name, function, signature)..... :		Cristian Simone (Project Handler)	Simone Cristian
Approved by (name, function, signature) .. :		Tore Ledaal (Verifier)	Tore Ledaal
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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

ATTACHMENT 1: European Group Differences and National Differences (1 pages)
ATTACHMENT 2: Additional tests for integral LED module according to EN 62031:2008+A1:2013+A2:2015 (12 pages)
ATTACHMENT 3: Photo documentation (8 pages)
ATTACHMENT 4: Best Measurement capability (3 pages)

Summary of testing:

Photo-biological tests according IEC/EN 62471 were performed and the luminaire has been classified as Exempt Group. See test report 377848TRFHO for details.
Blue light hazard tests according to IEC TR 62778 were performed and the luminaire were classified as Risk Group 1 unlimited, see test report 377848-4TRFPHO.

Mechanical impact test according to EN 62262 were performed and the luminaire fulfilled the requirement of rating IK09, see test report 387146-3TRFEnvEx.

EMC test report test according to EN 55015 (2013) + A1 (2015) – EN 61547 (2009) + EN 61000-3-2 (2014) – EN 61000-3-3 (2013) were performed and the luminaire fulfilled the requirement, see test report 377848TRFEMC

Tests performed (name of test and test clause):

All relevant tests performed on model:

LED MAXISEMPIONE Cod 36251

Partially tests performed on models:

LED MAXISEMPIONE Cod. 36250

LED SEMPIONE Cod. 36200

LED MINISEMPIONE Cod. 36001

The following Nemko technical procedures were also applied during testing:
- WML0177: General routines for using instruments at Nemko.
- WML1002: Measurement Uncertainty – Policy and Statement.

Equipment used for testing is recorded and saved into the company archive as file 377848INS. It will be made available on request.

Unless different values are declared in the test case, following ambient conditions apply for the tests:
- Ambient temperature 18-30 °C
- Relative Humidity: 30-70 %
- Atmospheric Pressure: 860-1060 hPa

Statement of the measurement uncertainty:
See attachment 4 for best measurement capability.

Testing location:

Nemko S.p.A.
Via del Carroccio, 4 - 20853 Biassono (MB) – Italy

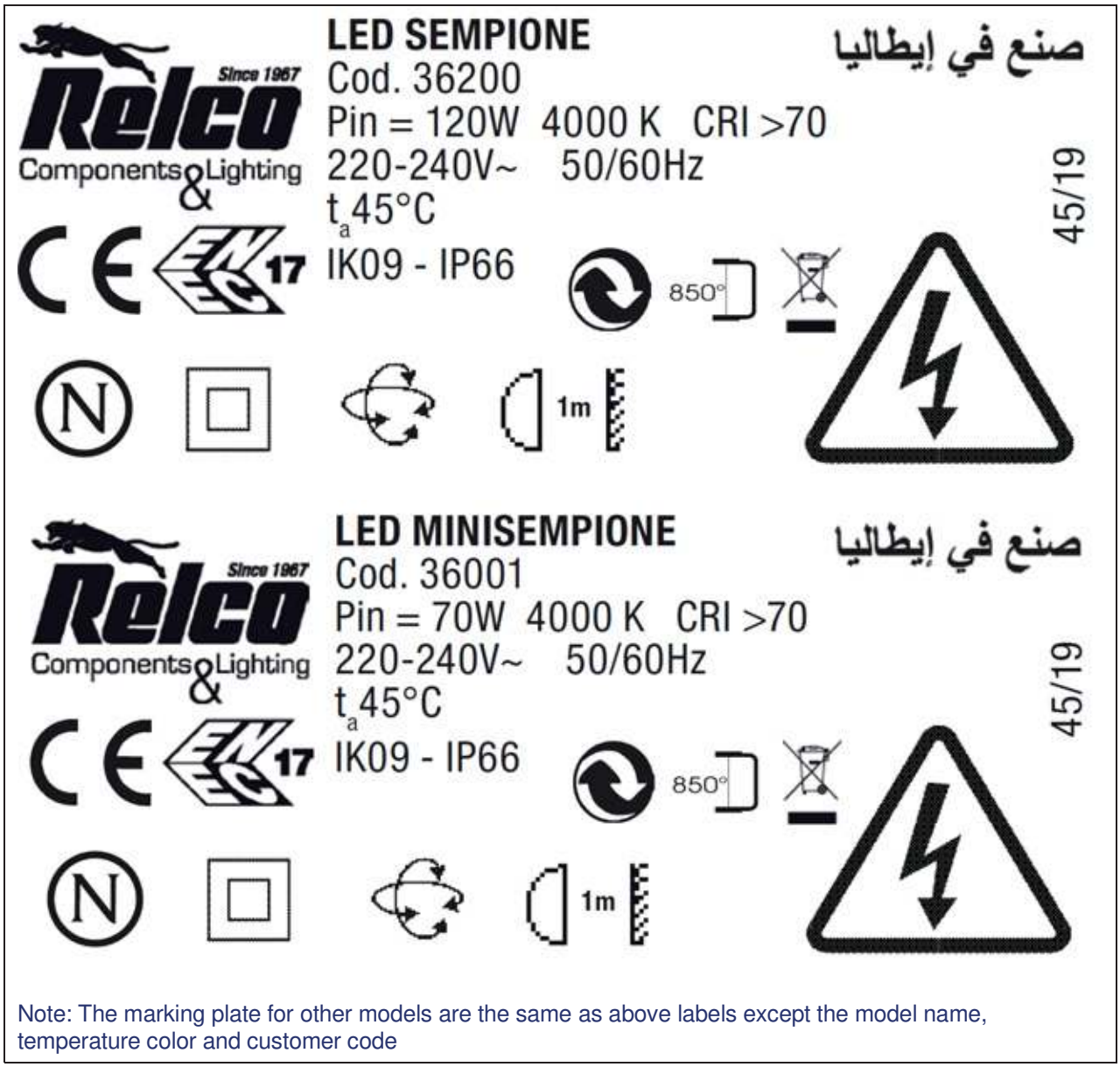
Summary of compliance with National Differences:

List of countries addressed:
All CENELEC member countries.

☒ The product fulfils the requirements of EN 60598-2-3: 2003 + A1:2011 used in conjunction with EN 60598-1:2015 + A1:2018

Copy of marking plate:

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



Note: The marking plate for other models are the same as above labels except the model name, temperature color and customer code

Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	The measurement uncertainty was calculated for each test and quantity listed in this test report, according to IEC Guide 115 and other specific test standard and is documented in Nemko Spa working manual WML1002.
Assessment of conformity	The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report: P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit. F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Test item particulars..... :	LED streetlight
Classification of installation and use..... :	Fixed on a mast arm or post top for normal outdoors use
Supply Connection ..... :	Supply cord (type Y attachment) incorporating connector
..... :	
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing..... :	
Date of receipt of test item ..... :	2019-10-01
Date (s) of performance of tests ..... :	2019-10-01-2019-10-30
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. The phase of sampling/collection is carried out by manufacturer **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.** **Clause numbers between brackets refer to clauses in IEC 60598-1**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	Nextronics S.A.R.L. Lot n. 6 Z.I. El Agba, 2087 Tunis, Tunisia

General product information:

The LED streetlight under test consist of:

- Light source: integral LED matrix;
- Controlgear: built-in type with double/reinforced insulation input to output, constant current
- body: steel structure incorporating aluminium heatsink;
- Glazing: tempered glass.
- Mast arm or post top

List of models and their differences:

Model	Product code	Rated Wattage (W)	Control gears	Type of LED	Ambient temperature (°C)	Output current setting (mA)
LED MAXISEMPIONE	36251	210	2 x Xitanium 150W 0,70A 1-10V 230V S240 sXt or SIRIO 150/300-1050 BILEVEL BI 220-240 Vac 50-60 Hz	LH508A	t_a 40	900
LED MAXISEMPIONE	36251/3K	210	2 x Xitanium 150W 0,70A 1-10V 230V S240 sXt or SIRIO 150/300-1050 BILEVEL BI 220-240 Vac 50-60 Hz	LH508A	t_a 40	900
LED MAXISEMPIONE	36250	160	Xitanium 150W 0.2-0,70A 1-10V 230V S240 sXt or TCI MILANO IN LED 165 W/350-1050 4P	LM301 H	t_a 40	660
LED MAXISEMPIONE	36250/3K	160	Xitanium 150W 0.2-0,70A 1-10V 230V S240 sXt or TCI MILANO IN LED 165 W/350-1050 4P	LM301 H	t_a 40	660
Variants:						
LED SEMPIONE	36200	120	TCI MILANO 1 PN 110 W Cod. 145003 or SIRIO 150/300-1050	LH508A	t_a 45	800

			BILEVEL BI 220-240 Vac 50-60 Hz			
LED SEMPIONE	36200/3K	120	TCI MILANO 1 PN 110 W Cod. 145003 or SIRIO 150/300-1050 BILEVEL BI 220-240 Vac 50-60 Hz	LH508A	t_a 45	800
LED SEMPIONE	36100	95	TCI MILANO 1 PN 110 W Cod. 145003 or SIRIO 150/300-1050 BILEVEL BI 220-240 Vac 50-60 Hz	LM301 H	t_a 45	650
LED SEMPIONE	36100/3K	95	TCI MILANO 1 PN 110 W Cod. 145003 or SIRIO 150/300-1050 BILEVEL BI 220-240 Vac 50-60 Hz	LM301 H	t_a 45	650
LED MINISEMPIONE	36001	75	TCI MILANO 1 PN 75 W Cod. 145002 or Xitanium 75 W 1-10 V 230 V C165 Sxt	LM301 H	t_a 45	700
LED MINISEMPIONE	36001/3K	75	TCI MILANO 1 PN 75 W Cod. 145002 or Xitanium 75 W 1-10 V 230 V C165 Sxt	LM301 H	t_a 45	700
LED MINISEMPIONE	36000	50	TCI MILANO 1 PN 75 W Cod. 145002 or Xitanium 75 W 1-10 V 230 V C165 Sxt	LM301 H	t_a 45	500
LED MINISEMPIONE	36000/3K	50	TCI MILANO 1 PN 75 W Cod. 145002 or Xitanium 75 W 1-10 V 230 V C165 Sxt	LM301 H	t_a 45	500
LED MINISEMPIONE	36001/60	60	TCI MILANO 1 PN 75 W Cod. 145002	LM301 H	t_a 45	630

			or Xitanium 75 W 1-10 V 230 V C165 Sxt			
LED MINISEMPIONE	36000/40	40	TCI MILANO 1 PN 75 W Cod. 145002 or Xitanium 75 W 1-10 V 230 V C165 Sxt	LM301 H	t_a 45	410
LED MINISEMPIONE	36000/30	30	TCI MILANO 1 PN 75 W Cod. 145002 or Xitanium 75 W 1-10 V 230 V C165 Sxt	LM301 H	t_a 45	325
LED MINISEMPIONE	36000/20	20	TCI MILANO 1 PN 75 W Cod. 145002 or Xitanium 75 W 1-10 V 230 V C165 Sxt	LM301 H	t_a 45	220

S/n of models tested:

LED MAXISEMPIONE Cod 36251: 1/8 Assigned by Nemko Spa
LED MAXISEMPIONE Cod. 36250: 3/8 Assigned by Nemko Spa
LED SEMPIONE Cod. 36200: 7/8 Assigned by Nemko Spa
LED MINISEMPIONE Cod. 36001: 4/8 Assigned by Nemko Spa

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.2 (0)	**GENERAL TEST REQUIREMENTS**		P
3.2 (0.3)	More sections applicable ..... :	Yes ☒ No ☐ Section/s:	—
3.2 (0.5)	Components	(see Annex 1)	—
3.2 (0.7)	**Information for luminaire design in light sources standards**		—
3.2 (0.7.2)	Light source safety standard ..... :	IEC 62031	—
	Luminaire design in the light source safety standard		P

3.4 (2)	**CLASSIFICATION OF LUMINAIRES**		P
3.4 (2.2)	Type of protection .....:	Class II	P
3.4 (2.3)	Degree of protection .....:	IP66	—
3.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces.....:	Yes ☒ No ☐	—
3.4 (2.5)	Luminaire for normal use .....:	Yes ☒ No ☐	—
	Luminaire for rough service .....:	Yes ☐ No ☒	—
3.4 (-)	Modes of installation of road or street lighting		—
	a) on a pipe	Yes ☐ No ☒	—
	b) on a mast arm	Yes ☒ No ☐	—
	c) on a post top	Yes ☒ No ☐	—
	d) on span or suspension wires	Yes ☐ No ☒	—
	e) on a wall	Yes ☐ No ☒	—

3.5 (3)	**MARKING**		P
3.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
3.5 (3.3)	Additional information	Instruction manual	P
	Language of instructions	Italian and English versions checked	P
3.5 (3.3.1)	Combination luminaires		N/A
3.5 (3.3.2)	Nominal frequency in Hz	50/60 Hz	P
3.5 (3.3.3)	Operating temperature	t_a 40 °C (for all models MAXISEMPIONE) t_a 45 °C (for all models SEMPIONE and MINISEMPIONE)	P
3.5 (3.3.5)	Wiring diagram		N/A

TRF No. IEC60598_2_3L

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.5 (3.3.6)	Special conditions	In instruction manual.	P
3.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
3.5 (3.3.8)	Limitation for semi-luminaires		N/A
3.5 (3.3.9)	Power factor and supply current		N/A
3.5 (3.3.10)	Suitability for use indoors		P
3.5 (3.3.11)	Luminaires with remote control		N/A
3.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
3.5 (3.3.13)	Specifications of protective shields		N/A
3.5 (3.3.14)	Symbol for nature of supply	~ IEC 60417-5032 symbol marked on label.	P
3.5 (3.3.15)	Rated current of socket outlet		N/A
3.5 (3.3.16)	Rough service luminaire		N/A
3.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		P
3.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
3.5 (3.3.19)	Protective conductor current in instruction if applicable	Class II	N/A
3.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
3.5 (3.3.21)	Non-replaceable and non-user replaceable light sources information provided	Non- user replaceable	P
3.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
3.5 (3.3.23)	Luminaire without controlgear provided with necessary information for selection of appropriate component		N/A
3.5 (3.3.24)	If not supplied with terminal block, information on the packaging		N/A
3.5 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P
3.5 (-)	Additional information in instruction leaflet		P
	a) Design attitude	Post top or on a mast arm	P
	b) Weight	7 kg	P
	c) Overall dimensions	676 mm x 347 mm x 112 mm	P
	d) Maximum projected area if applicable	0.37 m^2	P
	e) Cross-sectional area of wires if applicable		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	f) Suitability for indoors use		N/A
	g) Dimensions of the compartment		N/A
	h) Torque setting to be applied to bolts or screws	In instruction manual for details	P
	i) Maximum mounting height	Up to 15 m	P
3.6 (4)	**CONSTRUCTION**		P
3.6 (4.2)	Components replaceable without difficulty	Replacement by manufacturer or hid service agent only	P
3.6 (4.3)	Wireways smooth and free from sharp edges		P
3.6 (4.4)	**Lampholders**		N/A
3.6 (4.4.1)	Integral lampholder		N/A
3.6 (4.4.2)	Wiring connection		N/A
3.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
3.6 (4.4.4)	Positioning		N/A
	- pressure test (N) .....:		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) .....:		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
3.6 (4.4.5)	Peak pulse voltage		N/A
3.6 (4.4.6)	Centre contact		N/A
3.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
3.6 (4.4.8)	Lamp connectors		N/A
3.6 (4.4.9)	Caps and bases correctly used		N/A
3.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
3.6 (4.5)	**Starter holders**		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
3.6 (4.6)	**Terminal blocks**		N/A
	Tails		N/A
	Unsecured blocks		N/A
3.6 (4.7)	**Terminals and supply connections**		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.7.1)	Contact to metal parts		N/A
3.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		N/A
3.6 (4.7.3)	Terminals for supply conductors		P
3.6 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N/A
3.6 (4.7.4)	Terminals other than supply connection	Approved connector used in LED module part	P
3.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
3.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
3.6 (4.8)	**Switches**		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
3.6 (4.9)	**Insulating lining and sleeves**		P
3.6 (4.9.1)	Retainment	Only for mechanical use	P
	Method of fixing.....:	Heating shrinkable tubing covered tied cable	P
3.6 (4.9.2)	Insulated linings and sleeves:		P
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength	a)>100 MΩ (2 MΩ) c) 1480 V	P
	b) Ageing test. Temperature (°C).....:	50 °C + 20 °C	P
3.6 (4.10)	**Double or reinforced insulation**		**P**
3.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Safe installation fixed luminaires		P
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
3.6 (4.10.2)	Assembly gaps:		P
	- not coincidental		P
	- no straight access with test probe		P
3.6 (4.10.3)	Retainment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		P
	- lining in lampholder		N/A
3.6 (4.10.4)	Protective impedance device		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
3.6 (4.11)	**Electrical connections and current-carrying parts**		**P**
3.6 (4.11.1)	Contact pressure		P
3.6 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
3.6 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
3.6 (4.11.4)	Material of current-carrying parts		P
3.6 (4.11.5)	No contact to wood or mounting surface		P
3.6 (4.11.6)	Electro-mechanical contact systems		N/A
3.6 (4.12)	**Screws and connections (mechanical) and glands**		**P**
3.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		P
	Torque test: torque (Nm); part .....:	7.85 mm: 8.0; screws at system adjusting pipe and pole fixing screws	P

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Torque test: torque (Nm); part .....:	4.0 mm; 1.2; screws at glass frame and knife switch switch	P
	Torque test: torque (Nm); part .....:	3.0 mm; 0.5; screws used for fixing LED module and cord anchorage	P
	Torque test: torque (Nm); part .....:		N/A
3.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
3.6 (4.12.4)	Locked connections:		P
	- fixed arms; torque (Nm) .....:	2.5 Nm	P
	- lampholder; torque (Nm).....:		N/A
	- push-button switches; torque 0,8 Nm .....:		N/A
3.6 (4.12.5)	Screwed glands; force (Nm) .....:	M 16; 5 (plastic material)	P
3.6 (4.13)	**Mechanical strength**		**P**
3.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) .....:	Glass protection; 0.5	P
	- other parts; energy (Nm).....:	Metal enclosure; 0.7	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
3.6 (4.13.2)	Metal parts have adequate mechanical strength		P
3.6 (4.13.3)	Straight test finger	30 N	P
3.6 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
3.6 (4.13.6)	Tumbling barrel		N/A
3.6 (4.14)	**Suspensions, fixings and means of adjusting**		**P**
3.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	4 x 7 kg = 24 kg	P
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm) .....:		N/A
	D) load track-mounted luminaires		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....:		N/A
	Metal rod. diameter (mm) .....:		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
3.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....:		—
	Stress in conductors (N/mm²) .....:		N/A
	Mass (kg) of semi-luminaire .....:		N/A
	Bending moment (Nm) of semi-luminaire .....:		N/A
3.6 (4.14.3)	Adjusting devices:		P
	- flexing test; number of cycles .....:	45	P
	- strands broken .....:	No strand broken	P
	- electric strength test afterwards		P
3.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
3.6 (4.14.5)	Guide pulleys		N/A
3.6 (4.14.6)	Strain on socket-outlets		N/A
3.6 (4.15)	**Flammable materials**		N/A
	- glow-wire test 650°C.....:		N/A
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- thermal protection		N/A
	- electronic circuits exempted		N/A
3.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
3.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		**P**
	No lamp control gear.....:	Electronic controlgear (compliance with Section 12)	P
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N/A
3.6 (4.16.1)	Lamp control gear spacing:		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
3.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
3.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
3.6 (4.17)	**Drain holes**		N/A
	Clearance at least 5 mm		N/A
3.6 (4.18)	**Resistance to corrosion**		**P**
3.6 (4.18.1)	- rust-resistance		P
3.6 (4.18.2)	- season cracking in copper		P
3.6 (4.18.3)	- corrosion of aluminium		N/A
3.6 (4.19)	Ignitors compatible with ballast		N/A
3.6 (4.20)	Rough service vibration		N/A
3.6 (4.21)	**Protective shield**		N/A
3.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
3.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
3.6 (4.21.3)	No direct path		N/A
3.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment .....:	See Test Table 3.15 (13.3.2)	N/A
3.6 (4.22)	Attachments to lamps not cause overheating or damage		N/A
3.6 (4.23)	Semi-luminaires comply Class II		N/A
3.6 (4.24)	**Photobiological hazards**		**P**
3.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
3.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 .....:	RG1 unlimited	—
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2...:		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
3.6 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
3.6 (4.26)	**Short-circuit protection**		N/A
3.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
3.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
3.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		N/A
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
3.6 (4.28)	**Fixing of thermal sensing control**		N/A
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C) .....:		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
3.6 (4.29)	**Luminaires with non-replaceable light source**		N/A
	Not possible to replace light source		N/A
	Live part not accessible after parts have been opened by hand or tools		N/A
3.6 (4.30)	**Luminaires with non-user replaceable light source**		**P**

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		P
	Minimum two fixing means		P
3.6 (4.31)	**Insulation between circuits**		**P**
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
3.6 (4.31.1)	SELV circuits		N/A
	Used SELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of SELV circuits from LV supply		N/A
	Insulating of SELV circuits from other non SELV circuits		N/A
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		N/A
	SELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.3)	Other circuits		P
	Other circuits insulated from accessible parts according Table X.1		P

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		P
	- conductive parts are connected together		P
	- test according 7.2.3		P
	- conductive part not cause an electric shock in case of an insulation fault		P
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
3.6 (4.32)	**Overvoltage protective devices**		N/A
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A
3.6.1 (-)	At least IP X3 or X5 respectively. IP .....:		P
	Column-integrated luminaires:		N/A
	- parts below 2,5 m. IP .....:		N/A
	- parts above 2,5 m. IP .....:		N/A
3.6.2 (-)	Suspension on span wires		N/A
3.6.3 (-)	Means for attaching the luminaire or external parts to its support appropriate to the weight		P
3.6.3.1 (-)	Static load test		P
	- drag coefficient .....:	1.2	P
	- loaded area (m²) .....:	In instruction manual. 0.37	P
	- used load (N) .....:	735 N	P
	- measured deformation (cm/m) .....:	No deformation	P
	- no rotation	No rotation	P
3.6.4 (-)	Adjustable lampholders		N/A
3.6.5 (-)	Luminaires installed above 5 m, glass covers shall be:		P
	a) glass that fractures into small pieces (test according to 3.6.5.1), or		N/A
	b) glass having a high impact shock resistance (test according to 3.6.5.2), or		P
	c) protected by any means to retain glass fragments		N/A
	For tunnel luminaires 3.6.5.1 apply		N/A
	Method of protection declared by the manufacturer		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6.5.1 (-)	Protection by the use of glass that fractures into small pieces		N/A
	- number of particles is more than 40 .....:		N/A
3.6.5.2 (-)	Protection by the use of high impact resistant glass		P
3.6.5.2.1 (-)	Glass covers have high mechanical strength		P
	Test according IEC 62262 with test apparatus according IEC 60068-2-75 with impact energy of 5J on preconditioned sample		P
3.6.5.2.2 (-)	Glass covers not break into large pieces		P
	- test according 3.6.5.1, number of particles is more than 20 .....:	By the use of high impact resistant glass. IK09, particles measured = 60	P
3.6.6 (-)	Connection compartment of column-integrated luminaire		N/A
	- provides adequate space		N/A
	- means for attachment		N/A
	- means for attachment of metal corrosion-resistant		N/A
3.6.7 (-)	Compliance with ISO standard or other.....:		N/A
3.6.8 (-)	Doors of column-integrated luminaires:		N/A
	- corrosion-resistant		N/A
	- opening only possible for an authorized person		N/A
	- impact test 5 Nm		N/A
	- sample show no damage		N/A
3.6.9 (-)	Column-integrated luminaire:		N/A
	- dimension of the cable entry slot (mm).....:		N/A
	- cable path from the slot to the connection compartment (mm) .....:		N/A
	- cable path free from obstruction that might cause abrasion of the cable		N/A

3.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		P
3.7 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—
	Category III according Annex U		P
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		P
3.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		P
	- Controlgear marked with $\hat{U}_{OUT}$ and f_{UOUT} according IEC 61347-1, clause 7.1, item w	Frequencies above 30 kHz only inside separately approved controlgear.	P

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	N/A
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with U_P	Frequencies above 30 kHz only inside separately approved controlgear.	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.8 (7)	**PROVISION FOR EARTHING**		N/A
3.8 (7.2.1 + 7.2.3)	Accessible metal parts		N/A
	Metal parts in contact with supporting surface		N/A
	Resistance < 0,5 Ω .....:		N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Earth makes contact first		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		N/A
3.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		N/A
3.8 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
3.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
3.8 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
3.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
3.8 (7.2.8)	Material of earth terminal		N/A
	Contact surface bare metal		N/A
3.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
3.8 (7.2.11)	Earthing core coloured green-yellow		N/A
	Length of earth conductor		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.8.1 (-)	Attachment prevented from rotation		N/A
3.9 (14)	**SCREW TERMINALS**		P
	Separately approved; component list	Installation coupler, see Annex 1	P
	Part of the luminaire	Knife switch, see Annex 3	P
3.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		
	Separately approved; component list .....:	Connector of LED, see Annex 1	P
	Part of the luminaire.....:	(see Annex 4)	N/A
3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		P
3.10 (5.2)	**Supply connection and external wiring**		**P**
3.10 (5.2.1)	Means of connection.....:	Supply cable with separately approved connector. (see Annex 1)	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N/A
3.10 (5.2.2)	Type of cable .....:	H05RN-F	P
	Nominal cross-sectional area (mm²).....:	2 x 1 mm²	P
	Cables equal to IEC 60227 or IEC 60245	60245IEC 66	P
3.10 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
3.10 (5.2.5)	Type Z not connected to screws		N/A
3.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
3.10 (5.2.7)	Cable entries through rigid material have rounded edges		N/A
3.10 (5.2.8)	Insulating bushings:		P
	- suitably fixed	Plastic gland	P
	- material in bushings		P
	- material not likely to deteriorate		P
	- tubes or guards made of insulating material		N/A
3.10 (5.2.9)	Locking of screwed bushings		P
3.10 (5.2.10)	Cord anchorage:		P

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
3.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
3.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type Y	P
3.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) .....:	60	P
	- torque test: torque (Nm).....:	0.25	P
	- displacement ≤ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		P
3.10 (5.2.11)	External wiring passing into luminaire		P
3.10 (5.2.12)	Looping-in terminals		N/A
3.10 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
3.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard	Connector in compliance with IEC 61984	P
3.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
3.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
3.10 (5.3)	**Internal wiring**		**P**
3.10 (5.3.1)	Internal wiring of suitable size and type	FEP + FEP, 0.5 and 0.75 mm², double insulation	P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A) .....:		N/A
	- temperatures.....:	(see Annex 2)	N/A
	Green-yellow for earth only		N/A
3.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm²) .....:		N/A
	Insulation thickness (mm) .....:		N/A
	Extra insulation added where necessary		N/A
3.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Cross-sectional area (mm²) .....:		N/A
3.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
3.10 (5.3.1.4)	Conductors without insulation		N/A
3.10 (5.3.1.5)	SELV current-carrying parts		N/A
3.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
3.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Telescopic tubes etc.		N/A
	No twisting over 360°		N/A
3.10 (5.3.3)	Insulating bushings:		P
	- suitable fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- cables with protective sheath		N/A
3.10 (5.3.4)	Joints and junctions effectively insulated		N/A
3.10 (5.3.5)	Strain on internal wiring		N/A
3.10 (5.3.6)	Wire carriers		N/A
3.10 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
3.10 (5.4)	**Test to determine suitability of conductors having a reduced cross-sectional area**		**P**
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	see Annex 2	P
	No damage to luminaire wiring after test		P
3.10.1 (-)	Cord anchorage if applicable		P
	- pull test: 25 times; pull (N) ..... :	60	P
	- torque test: torque (Nm)..... :	0.25	P

3.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
3.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		P
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		N/A
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Double-ended high-pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
3.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
3.11 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		N/A
3.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
3.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load (V) .....:		N/A
	- no-load voltage (V) .....:		N/A
	- touch current if applicable (mA) .....:		N/A
	One conductive part insulated if required		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage (V) .....:		N/A
	Class III luminaire only for connection to SELV		N/A
	Class III luminaire not provided with means for protective earthing		N/A
3.11 (8.2.4)	Portable luminaire has protection independent of supporting surface		N/A
3.11 (8.2.5)	Compliance with the standard test finger or relevant probe		N/A
3.11 (8.2.6)	Covers reliably secured		P
3.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 µF not exceed 50 V 1 min after disconnection		P
	Portable luminaire with capacitor > 0,1 µF (0.25) not exceed 34 V 1 s after disconnection		N/A
	Other luminaires with capacitor > 0,1 µF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
3.12.2 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 3.13		—
3.12 (12.2)	**Selection of lamps and ballasts**		—
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—
3.12 (12.3)	**Endurance test**		**P**
	a) mounting-position .....:	Post top	—
	b) test temperature (°C) .....:	50 for all models MAXISEMPIONE 55 for all models SEMPIONE and MINISEMPIONE	—
	c) total duration (h) .....:	240	—
	d) supply voltage (V) .....:	1.1 x 240 V = 264 V	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) .....:		—
	e) luminaire ceases to operate		—
3.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
3.12 (12.4)	**Thermal test (normal operation)**	(see Annex 2)	P
3.12 (12.5)	**Thermal test (abnormal operation)**	(see Annex 2)	P
3.12 (12.6)	**Thermal test (failed lamp control gear condition):**		N/A
3.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) .....:		—
	- case of abnormal conditions.....:		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un .....:		—
	- measured mounting surface temperature (°C) at 1,1 Un .....:		N/A
	- calculated mounting surface temperature (°C) .....:		N/A
	- track-mounted luminaires		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions.....:		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) .....:		N/A
	- track-mounted luminaires		N/A
3.12 (12.7)	**Thermal test (failed lamp control gear in plastic luminaires):**		N/A
3.12 (12.7.1)	Luminaire without temperature sensing control		N/A
3.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W .....:		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions.....:		—
	- Ballast failure at supply voltage (V) .....:		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions.....:		—
	- measured winding temperature (°C): at 1,1 Un.....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C).....:		—
	Ball-pressure test.....:	See Test Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions.....:		—
	- measured winding temperature (°C): at 1,1 Un.....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C).....:		—
	Ball-pressure test.....:	See Test Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- case of abnormal conditions.....:		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
3.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link .....:	Yes ☐ No ☐	—
	- manual reset cut-out.....:	Yes ☐ No ☐	—
	- auto reset cut-out.....:	Yes ☐ No ☐	—
	- case of abnormal conditions.....:		—
	- highest measured temperature of fixing point/ exposed part (°C):.....:		—
	Ball-pressure test: .....:	See Test Table 3.15 (13.2.1)	
3.12.1 (-)	Temperature reduction if for outdoor use only		P
3.12.2 (-)	(See above)		—
3.12.3 (-)	Glass covers used within the thermal limits declared by the glass manufacturer	280 °C	P

3.13 (9)	**RESISTANCE TO DUST AND MOISTURE**		P
3.13.1 (-)	If IP > IP 20 the order of tests as specified in clause 3.12		P
3.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....:	IP66	—
	- mounting position during test.....:	As the normal use	—
	- fixing screws tightened; torque (Nm) .....:	cable used for test is indicated in manual instruction	—
	- tests according to clauses .....:	9.2.2; 9.2.7	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		P
	c.1) For luminaires without drain holes – no water entry		P
	c.2) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight or pressure watertight luminaire		N/A
	e) no contact with live parts (IP 2X)		N/A
	e) no entry into enclosure (IP 3X and IP 4X)		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N/A
	f) no trace of water on part of lamp requiring protection from splashing water		N/A
	g) no damage of protective shield or glass envelope		P
3.13 (9.3)	Humidity test 48 h	95°C 25 %	P

3.14 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
3.14 (10.2.1)	Insulation resistance test		
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....:	Cable covered by metal foil.	—
	Insulation resistance (MΩ) .....:	> 4 MΩ	—
	SELV		N/A
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface .....:		N/A
	- between current-carrying parts and metal parts of the luminaire .....:		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....:		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
	Other than SELV		P
	- between live parts of different polarity .....:	> 100 MΩ	P
	- between live parts and mounting surface .....:	> 100 MΩ	P
	- between live parts and metal parts .....:	> 100 MΩ	P
	- between live parts of different polarity through action of a switch .....:		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....:	> 100 MΩ	P
	- Insulation bushings as described in Section 5 ..... :	> 100 MΩ	P
3.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V).....:		N/A
	SELV		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface .....:		N/A
	- between current-carrying parts and metal parts of the luminaire .....:		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....:		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
	Other than SELV		P
	- between live parts of different polarity .....:	1480 V	P
	- between live parts and mounting surface .....:	2960 V (Primary to accessible parts) 3280 V (Secondary to accessible)	P
	- between live parts and metal parts .....:	2960 V (Primary to metal parts) 1640 V (Secondary to metal parts)	P
	- between live parts of different polarity through action of a switch .....:		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....:		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
3.14 (10.3)	Touch current or protective conductor current (mA).:	0.339 mA_{peak} (limit: 0.7 mA_{peak})	P

3.15 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
3.15 (13.2.1)	Ball-pressure test ..... :	See Test Table 3.15 (13.2.1)	N/A
3.15 (13.3.1)	Needle-flame test (10 s)..... :	See Test Table 3.15 (13.3.1)	N/A
3.15 (13.3.2)	Glow-wire test (650°C)..... :	See Test Table 3.15 (13.3.2)	N/A
3.15 (13.4)	Proof tracking test (IEC 60112) ..... :	See Test Table 3.15 (13.4)	N/A

5.7 (11.2)	**TABLE: Creepage distances and clearances**						**P**
	Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages						
	Applicable part of IEC 60598-1 Table 11.1* and 11.2*						
	Insulation type **	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Distance 1:	B	3.7	1.5	11.1	5.1	2.5	11.1
Working voltage (V) ..... :					240		—
PTI ..... :					< 600 ☒ ≥ 600 ☐		—
Pulse voltage if applicable (kV) ..... :							—
Supplementary information: Current-carrying parts of different polarity							
Distance 2:	B	3.7	1.5	11.1	5.1	2.5	11.1
Working voltage (V) ..... :					240		—
PTI ..... :					< 600 ☒ ≥ 600 ☐		—
Pulse voltage if applicable (kV) ..... :							—
Supplementary information: Current-carrying parts (input circuits) and accessible parts							
Distance 3:	B	3.7	1.5	11.1	5.1	2.5	11.1
Working voltage (V) ..... :					240		—
PTI ..... :					< 600 ☒ ≥ 600 ☐		—
Pulse voltage if applicable (kV) ..... :							—
Supplementary information: Output circuits and accessible parts							
Distance 4:	R	7.2	3	11.1	8.8	5	11.1
Working voltage (V) ..... :					320 V (max output of the controlgear)		—
PTI ..... :					< 600 ☒ ≥ 600 ☐		—
Pulse voltage if applicable (kV) ..... :							—
Supplementary information: Between input and output							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced. See also IEC 60598-1 Annex M.

3.7 (11.2)	TABLE II: Creepage distances and clearances						N/A
Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages							
Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2							
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:							
Working voltage (V) ..... :							—
Frequency if applicable (kHz) ..... :							—
PTI ..... :					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :							—
Supplementary information:							

TRF No. IEC60598_2_3L

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Distance 2:							
Working voltage (V)....:							—
Frequency if applicable (kHz)....:							—
PTI....:	< 600 ☐ ≥ 600 ☐						—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:							—
Supplementary information:							
Distance 3:							
Working voltage (V)....:							—
Frequency if applicable (kHz)....:							—
PTI....:	< 600 ☐ ≥ 600 ☐						—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:							—
Supplementary information:							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced.

3.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics		N/A
Allowed impression diameter (mm) .....:	2		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
Supplementary information:			

3.15 (13.3.1)	TABLE: Needle-flame test (IEC 60695-11-5)				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information:					

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.15 (13.3.2)	TABLE: Glow-wire test (IEC 60695-2-11)				N/A
Glow wire temperature .....:		650°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)		Verdict
Supplementary information:					

3.15 (13.4)	TABLE: Proof tracking test (IEC 60112)				N/A
Test voltage PTI .....:		175 V			—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
Supplementary information:					

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information					P
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity**
LED MAXISEMPIONE						
Supply connector	A	STUCCHI	3702/V-2P	16 A, 250 V, T110, IP66/68	EN 61984	IMQ
External cable	A	ELETTROBRESCIA	H05RN-F	300/500 V 2 x 1 mm^2 T90	EN 50525-2-21	IMQ DAT95003177
Gland	C	WKK	M16 B	M16 x 1.5 T90	IEC/EN 60598-1 IEC/EN 60598-2-3	Tested in appliance
Internal wiring (Controlgear – Knife switch)	C	EMC COLOSIO	TD17	FEP+FEP 300/300 V 0.75 mm^2 T180	IEC/EN 60598-1 IEC/EN 60598-2-3	Tested in appliance
Sleeves for mechanical protection	C	RTE	GVS series	Silicon glass, diameter 4 mm,1500 V, T250	IEC/EN 60598-1 IEC/EN 60598-2-3	Tested in appliance
Internal wiring (LED)	C	EMC COLOSIO	TE10	FEP+FEP 300/300 V 0.5 mm^2 T180	IEC/EN 60598-1 IEC/EN 60598-2-3	Tested in appliance
Cord anchorage	C	L.C. RELCO	62002000	Polycarbonate	IEC/EN 60598-1 IEC/EN 60598-2-3	Tested in appliance
Knife switch	C	SINEYi	M29M	450 V, 16 A, T110 Class II	IEC/EN 61984	TUV SUD Cert. No.:B150992724002

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

LED Control Gear	B	Philips Lighting B.V	Xitanium 150W 0.70A 1-10V 230V S240 sXt	Input: Max. 150 W 220-240 Vac 0.8-0.67A 50/60 Hz. Output: 100-214 V, 700mA, Uout max 320 V tc 85 °C ta +55 °C Built-in control gear with protective separation (reinforced insulation between input and output)	EN 61347-1 EN 61347-2-13 EN 62384	ENEC 05 Cert. No.:219366 201
LED Control Gear	B	T.C.I	SIRIO 150/200-700 BILEVEL BI 220-240 Vac 50-60 Hz	Input: Max. 121 W 220-240 Vac 0.77A 50/60 Hz. Output:150 W Uout max= 290 V, 200-700mA, max tc 80 °C Built-in control gear with protective separation (reinforced insulation between input and output)	EN 61347-1 EN 61347-2-13 EN 62384	ENEC 05 Cert. No.:81-108919

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

LED Control Gear	D	TCI	TCI MILANO IN LED 165 W/350-1050 4P	Input: 220-240 Vac 1 50/60 Hz. Output:165 W Uout max= 300 V, 120-1050 mA, max tc 85 °C Built-in control gear with protective separation (reinforced insulation between input and output)	EN 61347-1 EN 61347-2-13 EN 62384	ENEC 10 Cert. No.:DE1-61295
LEDs Matrix	C	SAMSUNG	LH508A+	Forward Current: 880 mA @ Forward Voltage: 6.4 Vmax, T100,3000/4000 K	IEC/EN 62031 IEC/EN 60598-1 IEC/EN 60598-2-3 IEC/EN 62471 IEC/TR 62778	Tested as component by Nemko Spa See test report 377848-2TRFPHOand test report 377848-3TRFPHO
LEDs Matrix	C	SAMSUNG	LM301H	Forward Current: 200 mA Forward Voltage: 2.7 Vmax, T85, 3000/4000 K	IEC/EN 62031 IEC/EN 60598-1 IEC/EN 60598-2-3 IEC/EN 62471 IEC/TR 62778	Tested as component by Nemko Spa See test report 377848-2TRFPHOand test report 377848-3TRFPHO
PCB for LED module	C	Finest Printed Circuit Board Ltd	LDT-AL	Min Thickness 1.6 mm, V-0, T90	IEC/EN 60598-1 IEC/EN 60598-2-3 UL 796	*UL (E337137), Tested in appliance

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Connector for the LED module	B	WAGO	2060-402	130 V, 9 A, 0.75 mm² rigid and flexible, T105	IEC/EN 60998-1 IEC/EN 60998-2-2 IEC/EN 60598-1	KEMA-KEUR
Glass cover	C	PALEARI FRATELLI	Soda lime silicate float glass	Thickness 4 mm T280	IEC/EN 60598-1 IEC/EN 60598-2-3	Tested in appliance
LED SEMPIONE (only components differents)						
LED Control Gear	B	TCI	MILANOinLED 110W/200-1050 4PN	Input: 220-240 Vac 50/60 Hz. Output:110 W Uout max= 250 V, 200-1050 mA, max tc 85 °C Built-in control gear with protective separation (reinforced insulation between input and output)	EN 61347-1 EN 61347-2-13 EN 62384	ENEC 10 Cert. No.:DE1-61294
LED Control Gear	D	T.C.I	SIRIO 150/300-1050 BILEVEL BI 220-240 Vac 50-60 Hz	Input: 220-240 Vac 0.77A 50/60 Hz. Output:150 W Uout max= 290 V, 300-1050 mA, max tc 80 °C Built-in control gear with protective separation (reinforced insulation between input and output)	EN 61347-1 EN 61347-2-13 EN 62384	ENEC 05 Cert. No.:81-108919
LED MINSEMPIONE						

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

LED Control Gear	B	Philips Lighting B.V	Xitanium 75W 0.7A 1-10V 230V C165 sXt	Input: Max. 84 W 220-240 Vac 0.4-0.34A 50/60 Hz. Output:75 W 52-107 V, 700mA, max 160 V tc 85 °C ta +55 °C Built-in controlgear with protective separation (reinforced insulation between input and output)	EN 61347-1 EN 61347-2-13 EN 62384	ENEC 05 Cert. No.:219707 801
LED Control Gear	B	TCI	MILANOinLED 110W/200-1050 4PN	Input: 220-240 Vac 50/60 Hz. Output:110 W Uout max= 250 V, 200-1050 mA, max tc 85 °C Built-in control gear with protective separation (reinforced insulation between input and output)	EN 61347-1 EN 61347-2-13 EN 62384	ENEC 10 Cert. No.:DE1-61294

Supplementary information:

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2a	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	**LED MAXISEMPIONE** (Cod. 36251)	—
	Lamp used ..... :	Enclosed LEDs	—
	Lamp control gear used ..... :	2 x Xitanium 150W 0,70A 1-10V 230V S240 sXt	—
	Mounting position of luminaire ..... :	Pipe mounted	—
	Supply wattage (W)..... :	test 1: 218.3 test 2: 217.2	—
	Supply current (A) ..... :	test 1: 0.961 test 2: 0.951	—
	Calculated power factor ..... :	test 1: 0.942 test 2: 0.923	—
	Table: measured temperatures corrected for ta = 40°C:		P
	- abnormal operating mode..... :	LED controlgear output short circuited	—
	- test 1: rated voltage ..... :	240 V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	254.4 V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	—	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage..... :	264 V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	—	—

Temperature measurements (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
tc LED Control gear	40	70	72	—	85	—	—
Disconnecting switch	40	39	39	—	110	—	—
External wire	40	49	50	—	90	—	—
LED	40	96	97	—	100	—	—
LED's cable	40	73	75	—	180	—	—
Connector for LED module	40	77	78	—	105	—	—

EN 60598-2-3							
Clause	Requirement + Test				Result - Remark		Verdict

Internal wire T180 (CG – knife switch)	40	51	53	—	180	—	—
Sleeves	40	49	50		250	—	
PCB	40	87	88	—	90	—	—
Lighted surface (0.5 m)	40	35	35	—	90	—	—
Mounting surface	40	36	36	—	90	—	—

Supplementary information:

*) For all the measured temperatures indicated in this table, it has been applied the reduction of 10°C foreseen in § 3.12.1 of IEC/EN 60598-2-3.

The controlgear unit is protected when subjected to the s-c of the output, therefore there is no further temperature was measured.

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2b	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	LED MAXISEMPIONE Cod. 36250	—
	Lamp used ..... :	Enclosed LEDs	—
	Lamp control gear used ..... :	MILANOinLED 110W/200-1050 4PN	—
	Mounting position of luminaire ..... :	Pipe mounted	—
	Supply wattage (W)..... :	test 1: 176.1 test 2: 171.3	—
	Supply current (A) ..... :	test 1: 0.76 test 2:0.71	—
	Calculated power factor ..... :	test 1: 0.963 test 2: 0.947	—
	Table: measured temperatures corrected for ta = 45°C:		P
	- abnormal operating mode..... :	LED controlgear output short circuited	—
	- test 1: rated voltage ..... :	240 V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	254.4 V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	—	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage..... :	264 V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	—	—

Temperature measurements (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
tc LED Control Gear	45	60	63	—	85	—	—
Disconnecting switch	45	38	39	—	110	—	—
External wire	45	47	49	—	90	—	—
LED	45	93	94	—	100	—	—
LED's cable	45	72	74	—	180	—	—
Connector for LED module	45	74	77	—	105	—	—

EN 60598-2-3							
Clause	Requirement + Test				Result - Remark		Verdict

Internal wire T180 (CG – knife switch)	45	50	52	—	180	—	—
Sleeves	45	47	48		250	—	
PCB	45	71	74	—	90	—	—
Lighted surface (1 m)	45	33	34	—	90	—	—
Mounting surface	45	34	34	—	90	—	—
Supplementary information: *) For all the measured temperatures indicated in this table, it has been applied the reduction of 10°C foreseen in § 3.12.1 of IEC/EN 60598-2-3. The controlgear unit is protected when subjected to the s-c of the output, therefore there is no further temperature was measured.							

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2c	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	LED SEMPIONE Cod. 36200	—
	Lamp used ..... :	Enclosed LEDs	—
	Lamp control gear used ..... :	SIRIO 150/200-700 BILEVEL BI 220-240 Vac 50-60 Hz	—
	Mounting position of luminaire ..... :	Pipe mounted	—
	Supply wattage (W)..... :	test 1: 116.3 test 2: 115	—
	Supply current (A) ..... :	test 1: 0.52 test 2:0.49	—
	Calculated power factor ..... :	test 1: 0.928 test 2: 0.906	—
	Table: measured temperatures corrected for ta = 45°C:		P
	- abnormal operating mode..... :	LED controlgear output short circuited	—
	- test 1: rated voltage ..... :	240 V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	254.4 V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	—	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage..... :	264 V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	—	—

Temperature measurements (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
tc LED Control Gear	45	64	66	—	80	—	—
Disconnecting switch	45	35	36	—	110	—	—
External wire	45	44	46	—	90	—	—
LED	45	73	74	—	100	—	—
LED's cable	45	62	64	—	180	—	—
Connector for LED module	45	64	67	—	105	—	—

EN 60598-2-3							
Clause	Requirement + Test				Result - Remark		Verdict

Internal wire T180 (CG – knife switch)	45	50	52	—	180	—	—
Sleeves	45	45	46		250	—	
PCB	45	61	64	—	90	—	—
Lighted surface (1 m)	45	33	34	—	90	—	—
Mounting surface	45	34	34	—	90	—	—

Supplementary information:

*) For all the measured temperatures indicated in this table, it has been applied the reduction of 10°C foreseen in § 3.12.1 of IEC/EN 60598-2-3.

The controlgear unit is protected when subjected to the s-c of the output, therefore there is no further temperature was measured.

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2d	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	LED SEMPIONE Cod. 36200	—
	Lamp used ..... :	Enclosed LEDs	—
	Lamp control gear used ..... :	MILANOinLED 110W/200-1050 4PN	—
	Mounting position of luminaire ..... :	Pipe mounted	—
	Supply wattage (W)..... :	test 1: 118.3 test 2: 115.1	—
	Supply current (A) ..... :	test 1: 0.52 test 2:0.50	—
	Calculated power factor ..... :	test 1: 0.923 test 2: 0.903	—
	Table: measured temperatures corrected for ta = 45°C:		P
	- abnormal operating mode..... :	LED controlgear output short circuited	—
	- test 1: rated voltage ..... :	240 V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	254.4 V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	—	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage..... :	264 V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	—	—

Temperature measurements (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
tc LED Control Gear	45	58	61	—	85	—	—
Disconnecting switch	45	34	36	—	110	—	—
External wire	45	44	45	—	90	—	—
LED	45	73	75	—	100	—	—
LED's cable	45	65	66	—	180	—	—
Connector for LED module	45	64	67	—	105	—	—

EN 60598-2-3							
Clause	Requirement + Test				Result - Remark		Verdict

Internal wire T180 (CG – knife switch)	45	50	52	—	180	—	—
Sleeves	45	46	47		250	—	
PCB	45	70	71	—	90	—	—
Lighted surface (1 m)	45	33	34	—	90	—	—
Mounting surface	45	34	34	—	90	—	—

Supplementary information:

*) For all the measured temperatures indicated in this table, it has been applied the reduction of 10°C foreseen in § 3.12.1 of IEC/EN 60598-2-3.

The controlgear unit is protected when subjected to the s-c of the output, therefore there is no further temperature was measured.

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2e	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	LED MINISEMPIONE Cod. 36001	—
	Lamp used ..... :	Enclosed LEDs	—
	Lamp control gear used ..... :	Xitanium 75W 0.7A 1-10V 230V C165 sXt	—
	Mounting position of luminaire ..... :	Pipe mounted	—
	Supply wattage (W)..... :	test 1: 69 test 2: 68	—
	Supply current (A) ..... :	test 1: 0.52 test 2:0.50	—
	Calculated power factor ..... :	test 1: 0.923 test 2: 0.913	—
	Table: measured temperatures corrected for ta = 45°C:		P
	- abnormal operating mode..... :	LED controlgear output short circuited	—
	- test 1: rated voltage ..... :	240 V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	254.4 V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	—	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage..... :	264 V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	—	—

Temperature measurements (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
tc LED Control Gear	45	61	65	—	85	—	—
Disconnecting switch	45	34	36	—	110	—	—
External wire	45	44	45	—	90	—	—
LED	45	69	71	—	100	—	—
LED's cable	45	61	63	—	180	—	—
Connector for LED module	45	62	63	—	105	—	—

EN 60598-2-3							
Clause	Requirement + Test				Result - Remark		Verdict

Internal wire T180 (CG – knife switch)	45	49	50	—	180	—	—
Sleeves	45	47	48		250	—	
PCB	45	71	74	—	90	—	—
Lighted surface (1 m)	45	33	34	—	90	—	—
Mounting surface	45	32	33	—	90	—	—

Supplementary information:

*) For all the measured temperatures indicated in this table, it has been applied the reduction of 10°C foreseen in § 3.12.1 of IEC/EN 60598-2-3.

The controlgear unit is protected when subjected to the s-c of the output, therefore there is no further temperature was measured.

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 3	**Screw terminals (part of the luminaire)**		N/A
(14)	**SCREW TERMINALS**		N/A
(14.2)	Type of terminal ..... :		—
	Rated current (A) ..... :		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm²) ..... :		—
(14.3.3)	Conductor space (mm) ..... :		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread)..... :		N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) ..... :		N/A
	Torque (Nm)..... :		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N)..... :		N/A
(14.4.8)	Without undue damage		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 4	**Screwless terminals (part of the luminaire)**		**N/A**
(15)	**SCREWLESS TERMINALS**		**N/A**
(15.2)	Type of terminal ..... :		—
	Rated current (A) ..... :		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	Terminals internal wiring		N/A
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples) ..... :		N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples) ..... :		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples)..... :		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples) ..... :		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples) ..... :		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) ..... :		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) ..... :		N/A
(15.6)	Terminals external wiring		N/A
	Terminal size and rating		N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) ..... :		N/A

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

	Pull test pin or tab terminals (4 samples); pull (N) ..... :										N/A
(15.6.3.1)	**TABLE: Contact resistance test**										N/A
	Voltage drop (mV) after 1 h										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										
	Voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV).....:										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV).....:										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV).....:										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV).....:										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
Supplementary information: None											

(15.6.3.1) **(15.6.3.2)**	**TABLE: Contact resistance test / Heating tests**										
	Voltage drop (mV) after 1 h										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										
	Voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV).....:										—
terminal	1	2	3	4	5	6	7	8	9	10	

EN 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

voltage drop (mV)										
	Voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV).....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV).....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV).....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

IEC60598_2_3L ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT 1TO TEST REPORT **IEC 60598-2-3** **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** Luminaires Part 2: Particular requirements Section 3: Luminaires for road and street lighting			
Differences according to..... EN 60598-2-3:2003, AMD1:2011 used in conjunction with EN 60598-1:2015, AMD1:2018			
Annex Form No...... EU_GD_IEC60598_2_3L **Annex Form Originator**..... Intertek Semko AB **Master Annex Form**..... 2018-12-07			
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	CENELEC COMMON MODIFICATIONS (EN)		
3.6 (4)	**CONSTRUCTION**		
3.6 (4.11.6)	Electro-mechanical contact systems		
3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		
3.10 (5.2.2)	Cables equal to EN 50525		
	Replace table 5.1 – Supply cord		
3.12 (12)	**ENDURANCE TESTS AND THERMAL TESTS**		
3.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		
(3.3)	DK: power supply cords of class I luminaires with label		
(4.5.1)	DK: socket-outlets		
(5.2.1)	CY, DK, FI, GB: type of plug		
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		
(4 & 5)	FR: Shuttered socket-outlets 10/16A		
	FR: Safety requirements for high buildings *(Decree of 30 December 2011 on safety regulations for the construction of high-rise buildings and their protection against fire and panic risks; Section VIII; Article GH 48, Lighting)* Glow-wire test for outer parts of luminaires:		
	- 850°C for luminaires in stairways and horizontal travel paths		
	- 650°C for indoor luminaires		
	GB: Requirements according to United Kingdom Building Regulation		

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT 2: Additional tests for integral LED module according to IEC 62031:2008+A1:2012+A2:2014

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

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

6	**CLASSIFICATION**		**P**
	Built-in module .....:	Yes ☐ No ☒	—
	Independent module .....:	Yes ☐ No ☒	—
	Integral module .....:	Yes ☒ No ☐	—
	For Integral module; Note to 1.2.1 in IEC 60598-1 applies.		—

7	**MARKING**		N/A
7.1	**Mandatory markings for built-in or independent modules**		N/A
	a) mark of origin		N/A
	b) model number, type reference		N/A
	c1) constant voltage module; rated supply voltage and supply frequency		N/A
	c2) constant current module; rated supply current and supply frequency		N/A
	d) nominal power		N/A
	e) indication of connections, wiring diagram		N/A
	f) value of t_c and place on the module		N/A
	g) *E*thr if required		N/A
	h) symbol for built-in modules		N/A
	i) heat transfer temperature t_d		N/A
	j) power for heat-conduction P_d		N/A
	k) working voltage for insulation		N/A
7.2	**Location of marking**		N/A
	- marking of a), b), c) and f) on the modules		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- marking of d), e), g), h), i) and j) on the modules or data sheet		N/A
	- marking of k) in manufactures literature		N/A
	- integral modules a) to g) in literature		N/A
7.3	**Durable and legibility of marking**		N/A
	- marking of a), b), c) and f) legible after test with water		N/A
	- marking of d) to j) inspection of compliance		N/A

8	**TERMINALS**		**P**
	Screw terminals according section 14 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 3)	N/A
	Screwless terminals according section 15 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 4)	N/A
	Connectors according IEC 60838-2-2:		P
	Separately approved; component list	LED module connector, see annex 1	P

9 (9)	**PROVISION FOR PROTECTIVE EARTHING**		**N/A**

10 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS** **Note: It is relied on the luminaire for protection.**		**N/A**
- (10.1)	Controlgear protected against accidental contact with live parts		N/A
- (A2)	The current flowing between the part concerned and earth is measured and does not exceed 0,7 mA (peak) or 2 mA d.c. .....:		N/A
- (A2)	For frequencies above 1 kHz, the current does not exceed 0,7 mA (peak) multiplied by the value of the frequency in kilohertz or 70 mA (peak) .....:		N/A
- (A3)	The voltage between the part concerned and any accessible part is measured and does not exceed 34 V (peak).....:		N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (10.2)	Capacitors > 0,5 µF: voltage after 1 min (V): < 50 V ..... :		N/A
- (10.3)	Controlgear providing SELV		N/A
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N/A
	No connection between output circuit and the body or protective earthing circuit		N/A
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N/A
	SELV outputs separated by at least basic insulation		N/A
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		N/A
- (10.4)	Accessible conductive parts in SELV circuits		N/A
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N/A
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0.7 mA (peak) or 2 mA d.c. .....:		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A

11 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation ≥ 2 MΩ .....:	>100 MΩ	P
	For double or reinforced insulation ≥ 4 MΩ .....:		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

12 (12)	**ELECTRIC STRENGTH**		**P**
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	1640 V	P
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V		N/A
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A

13 (14)	**FAULT CONDITIONS**		**P**
- (14)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	N/A
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	N/A
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	LED	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	N/A
- (14.5)	After the tests has been carried out on three samples:		N/A
	The insulation resistance ≥ 1 MΩ .....:	> 100 MΩ	P
	No flammable gases		P
	No accessible parts have become live		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		N/A
- (14.6)	Relevant fault condition tests with high-power supply		N/A
13.2	**Overpower condition**		N/A
	Module withstands overpower condition >15 min.	P measured= 208.7 W (177.4+127.2) Vdc 0.695 A); 1.5 x Pn =1.5 x 208.7 W = 312 W	P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P
15	**CONSTRUCTION**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
16 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16)	Creepage and distances and clearances in compliance with IEC 61347-1	(see appended table)	P
	Insulating lining of metallic enclosures		N/A
	Basic insulation on printed boards tested according to clause 14		N/A
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in Table 16		N/A
	Creepage distances not less than minimum clearance		P
16 (-)	Conductive accessible parts in compliance with applicable parts of IEC 60598-1		P
17 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**P**
	Cl. 17 refer to Cl. 17 of IEC 61347-1 which refer to Cl. 4.11 and 4.12 of IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		—
(4.11)	**Electrical connections**		P
(4.11.1)	Contact pressure		N/A
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N/A
(4.12)	**Mechanical connections and glands**		N/A
(4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm) ..... :		N/A
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm ..... :		N/A
(4.12.5)	Screwed glands; force (Nm) ..... :		N/A

18 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**N/A**
- (18.1)	Ball-pressure test ..... :	See Test Table 18 (18.1)	N/A
- (18.3)	Glow-wire test (650°C) ..... :	See Test Table 18 (18.3)	N/A
- (18.4)	Needle-flame test (10 s) ..... :	See Test Table 18 (18.4)	N/A
- (18.5)	Proof tracking test ..... :	See Test Table 18 (18.5)	N/A

19 (19)	**RESISTANCE TO CORROSION**		**N/A**
	- test according 4.18.1 of IEC 60598-1		N/A
	- adequate varnish on the outer surface		N/A

20	**INFORMATION FOR LUMINAIRE DESIGN**		**N/A**
	Information in Annex D (informative)		—

21	**HEAT MANAGEMENT**		**N/A**
21.1	**General**		N/A
	Exchangeability is safeguarded by cap or base		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

21.2	**Heat-conducting foil and paste**		N/A
	Heat-conducting foil delivered with the module if necessary		N/A

22	**PHOTOBIOLOGICAL SAFETY**		**P**
22.1	**UV radiation**		N/A
	Luminous radiation not exceed 2mW/klm		N/A
22.2	**Blue light hazard**		**P**
	Assessed according to IEC TR 62778	See Nemko test report 377848-2TRFPHO	P
22.3	**Infrared radiation**		N/A
	Requirements for infrared radiation when required		N/A

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

13 (14)	**TABLE: tests of fault conditions**	**P**
Part	**Simulated fault**	**Hazard**
LED	Short-circuited: the equipment goes on working normally, LEDs are drive with constant current, no hazards	NO
LED	Open-circuited: in case of o-c of LED, the LEDs matrix stopped working. The rest of equipment works normally.	NO

16 (16)	**TABLES: Creepage distances and clearances**					**P**
Table 3	**Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages**					**P**
RMS working voltage (V) not exceeding	50	150	250	500	750	1000
Creepage distances						

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

Required basic insulation, PTI ≥ 600	0,6	0,8	1,5	3	4	5,5
Measured						
Required basic insulation, PTI < 600	1,2	1,6	2,5	5	8	10
Measured				5.5[1)] 5.5[2)]		
Required supplementary insulation PTI ≥ 600	-	0,8	1,5	3	4	5,5
Measured						
Required supplementary insulation PTI < 600	-	1,6	2,5	5	8	10
Measured						
Required reinforced insulation	-	3,2	5	6	8	11
Measured						
Clearances						
Required basic insulation	0,2	0,8	1,5	3	4	5,5
Measured				5.1[1)] 5.1[2)]		
Required supplementary insulation	-	0,8	1,5	3	4	5,5
Measured						
Required reinforced insulation	-	1,6	3	6	8	11
Measured						

Table 4	**Minimum distances (mm) for non-sinusoidal pulse voltages**						
Rated pulse voltage (peak kV)	2,0	2,5	3,0	4,0	5,0	6,0	8,0
Required clearances	1,0	1,5	2	3	4	5,5	8
Measured							
Rated pulse voltage (peak kV)	10	12	15	20	25	30	40
Required clearances	11	14	18	25	33	40	60
Measured							
Rated pulse voltage (peak kV)	50	60	80	100	-	-	-
Required clearances	75	90	130	170	-	-	-
Measured							

[1)] Current-carrying parts of different polarity
[2)] Current-carrying parts and accessible parts:
Double/reinforced insulation considered between input and output of LED control gear, so only a basic insulation has been considered between current currying parts of LED module and accessible parts/supporting surface according to Annex X of IEC 60598-1, since accessible metal parts are connected together by means of equipotential bonding.

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

18 (18.1)	TABLE: Ball Pressure Test of Thermoplastics			N/A
Allowed impression diameter (mm) .....:				—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Supplementary information: None				

18 (18.3)	TABLE: Glow-wire test				N/A
Glow wire temperature .....:		650°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No).....:					
Supplementary information: None					

18 (18.4)	TABLE: Needle-flame test				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information: None					

18 (18.5)	TABLE: Proof tracking test				N/A
Test voltage PTI .....:		175 V			—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
Supplementary information: None					

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	**SELV-operated LED modules**		**N/A**
	Cl. 5.5 refer to ANNEX I of IEC 61347-2-13 which refer to ANNEX L of IEC 61347-1 (clause numbers between parentheses refer to ANNEX L of IEC 61347-1)		—
(L.3)	**Classification**		N/A
	Class I	Yes ☐ No ☐	—
	Class II	Yes ☐ No ☐	—
	Class III	Yes ☐ No ☐	—
	non-inherently short circuit proof controlgear	Yes ☐ No ☐	—
	inherently short circuit proof controlgear	Yes ☐ No ☐	—
	fail safe controlgear	Yes ☐ No ☐	—
	non-short-circuit proof controlgear	Yes ☐ No ☐	—
(L.4)	**Marking**		N/A
	Adequate symbols are used		N/A
(L.5)	**Protection against electric shock**		N/A
	Comply with 9.2 of IEC 61558-1		N/A
(L.6)	**Heating**		N/A
	No excessive temperatures in normal use		N/A
	Value if capacitor tc marked ..... :		—
	Winding insulation classified as Class ..... :		—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		N/A
(L.7)	**Short-circuit and overload protection**		N/A
	Comply with tests of clause 15 of IEC 61558-1 with adjustments		N/A
(L.8)	**Insulation resistance and electric strength**		N/A
(L.8.1)	Conditioned 48 h between 91 % and 95 %		N/A
(L.8.2)	Insulation resistance		N/A
	Between input- and output circuits not less than 5 MΩ ..... :		N/A
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ ..... :		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ ..... :		N/A
(L.8.3)	Electric strength		N/A

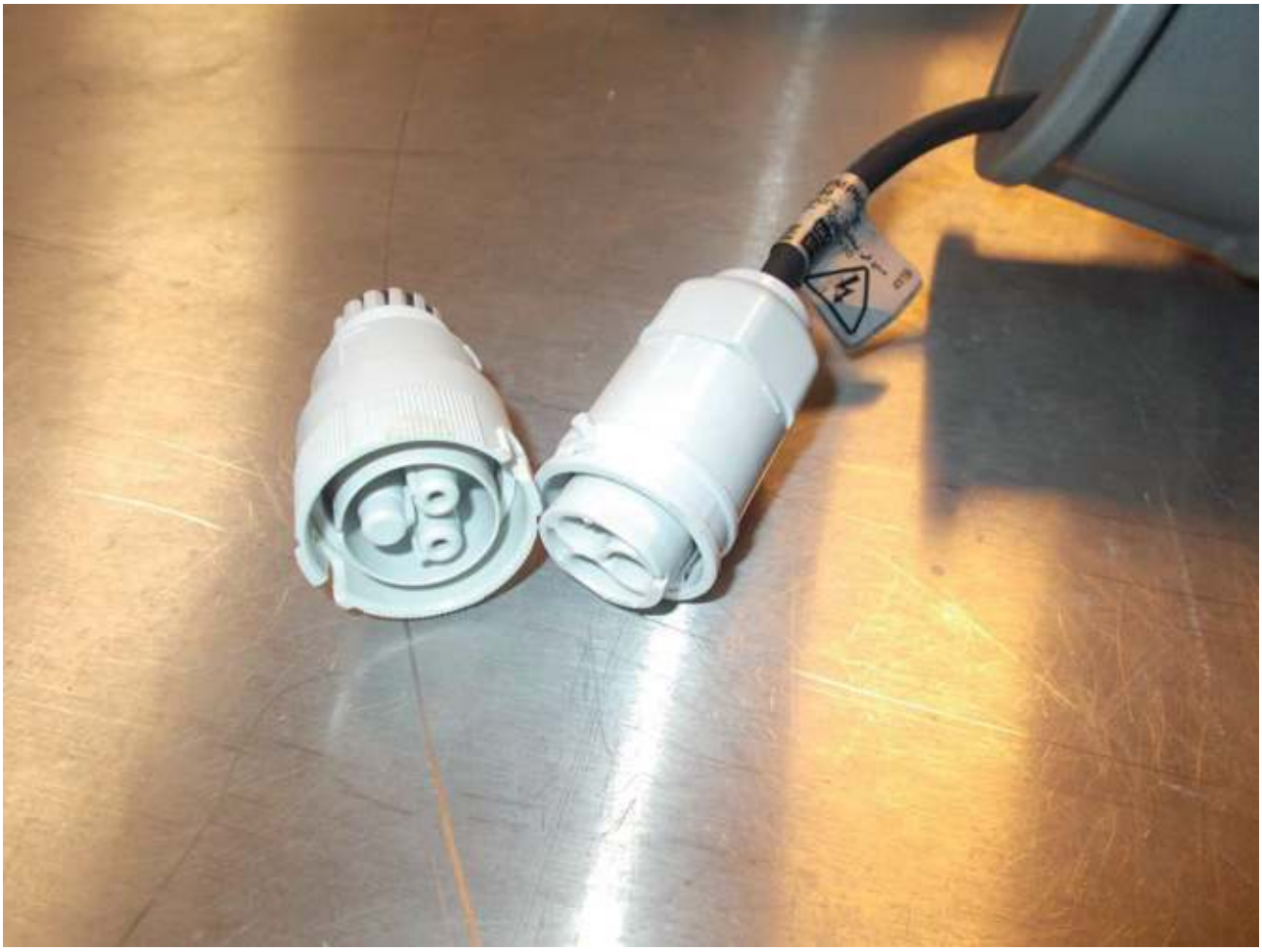
IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	1) Between live parts of input circuits and live parts of output circuits ..... :		N/A
	2) Over basic or supplementary insulation between:		N/A
	a) live parts having different polarity ..... :		N/A
	b) live parts and body if intended to be connected to protective earth ..... :		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord ..... :		N/A
	d) live parts and an intermediate metal part ..... :		N/A
	e) intermediate metal parts and the body ..... :		N/A
	f) each input circuit and all other input circuits ..... :		N/A
	3) Over reinforced insulation between the body and live parts ..... :		N/A
(L.9)	**Construction**		N/A
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		N/A
	HF transformer comply with 19 of IEC 61558-2-16		N/A
(L.10)	**Components**		N/A
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		N/A
(L.11)	**Creepage distances and clearances**		N/A
	1. Insulation between input and output circuits, basic insulation:		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	2. Insulation between input and output circuits, double or reinforced insulation:		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	3. Insulation between adjacent output circuits		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	4. Insulation between terminals for external connection:		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	5. Basic or supplementary insulation:		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	d) measured values ≥ specified values (mm) ..... :		N/A
	e) measured values ≥ specified values (mm) ..... :		N/A
	6. Reinforced insulation or insulation:		N/A
	Between body and output circuit: measured values ≥ specified values (mm) ..... :		N/A
	Between body and output circuit if provision against transient voltages: measured values ≥ specified values (mm) ..... :		N/A
	7. Distance through insulation:		N/A
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A

ATTACHMENT 3: Photo documentation

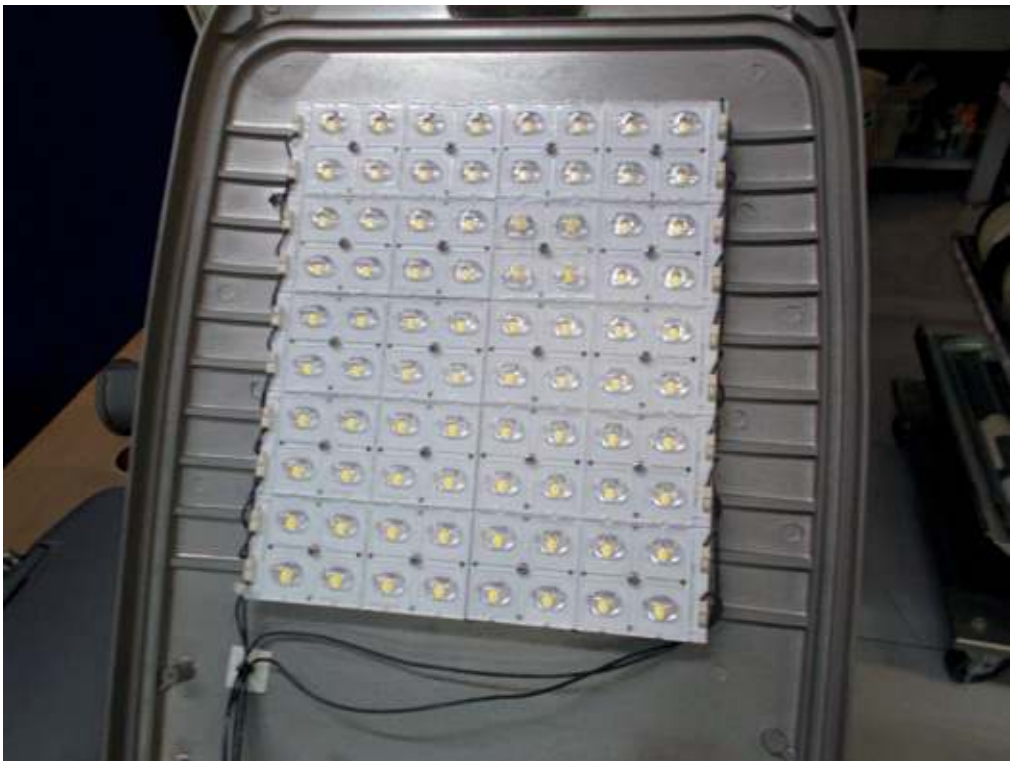
LED MAXISEMPIONE Cod 36251:

Pic.1: Front view



Pic.2: installation coupler

Pic.3: internal view



Pic.4: internal view

Pic.5: knife switch

Pic.6: gland

Pic.7: controlgear

LED MAXISEMPIONE Cod. 36250:

TRF No. IEC60598_2_3L

Pic.8: internal view

LED SEMPIONE Cod. 36200:

Pic.9: internal view

LED MINISEMPIONE Cod. 36001

Pic.10: internal view

LED MINISEMPIONE Cod. 36000:

Pic.11: internal view

ATTACHMENT 4: Best Measurement capability

Measurement uncertainty for Environmental and Safety testing

Test	Range	Measurement Uncertainty	Note
Environmental testing	Temperature -70 °C ÷ 180 °C	1.8 °C	(1)
	Relative Humidity 10 % ÷ 98 %	6 %	(1)
IP protection	Water flow 0.5 l/min ÷ 100 l/min	5 %	(1)
	Air flow	5 %	(1)
	Force 50 N, 30 N, 3 N, 1 N	10 %	(1)
	Dimensions 50 mm, 12.5 mm, 2.5 mm, 1 mm	0.05 mm	(1)
Construction verifications	AC/DC Voltage 10 mV ÷ 1000 V up to 5 kHz	1.5 %	(1)
	AC/DC Voltage 10 mV ÷ 1000 V 5÷100 kHz	2.5 %	(1)
	AC/DC Current 0.1 mA ÷ 5 A up to 1 kHz	1.5 %	(1)
	AC/DC Current 5 A ÷ 400 A up to 1 kHz	2.5 %	(1)
	Resistance 100 mΩ ÷ 10 MΩ	2.0 %	(1)
	Active/Apparent Power 200 mW ÷ 1 W	20 mW	(1)
	Active/Apparent Power 1 W ÷ 6 kW	3.0 %	(1)
	Power factor	0.05	(1)
	Frequency	0.2 %	(1)
	Dimensions 0 ÷ 200 mm	0.05 mm	(1)
	Dimensions 0.2 ÷ 200 m	0.5 %	(1)
	Force 0.2 ÷ 2.5 kN	3 %	(1)
	Torque 0.2 ÷ 200 Nm	5 %	(1)
	Weight 1 g ÷ 2 kg	1.0 % or 0.1 g	(1)
	Weight 2 kg ÷ 100 kg	2 %	(1)
Heating	Temperature 20 °C ÷ 400 °C	4.5 °C	(1)
Pressure measurement	Pressure -0.5 bar ÷ 700 bar	1.0 %	(1)
Temperature measurement	Temperature -40 °C ÷ 300 °C	2.0 °C	(1)
Protection against access to live parts	Dimensions 1 ÷ 1000 mm	0.08 mm or 0.3 %	(1)
	Force 0.2 ÷ 1000 N	3%	(1)
Power input and current	Active/Apparent Power 0.2 W ÷ 6 kW	20 mW or 3 %	(1)
	AC/DC Current 1 mA ÷ 5 A up to 1kHz	1.5 %	(1)
Leakage current	AC Current 0.01 mA ÷ 200 mA up to 5kHz	3.0 %	(1)
	AC Current 0.01 mA ÷ 200 mA 5kHz to 1MHz	10.0 %	(1)
Earth impedance	Impedance 1 mΩ ÷ 10 kΩ	3 mΩ or 4 %	(1)
Continuity resistance	AC 10 mΩ ÷ 2 Ω, 5A ÷ 32A	3 mΩ or 5 %	(1)
	AC 2 Ω ÷ 100 Ω, 100 mA or 200 mA	5 %	(1)
	DC 1 mΩ ÷ 1 kΩ, 0.01 A ÷ 10 A	5 %	(1)
Insulation resistance	10 kΩ ÷ 200 GΩ, 10 V ÷ 1000 V	3.0 %	(1)
	200 GΩ ÷ 1000 GΩ, 500 V ÷ 1000 V	10 %	(1)
Dielectric strength	AC Voltage 0.1 kV ÷ 5 kV (50 Hz or 60 Hz)	3.0 %	(1)
	DC Voltage 0.1 kV ÷ 6 kV	3.0 %	(1)
	AC/DC Current 0.1 mA ÷ 200 mA up to 1 kHz	5 %	(1)
Transients	Pulse voltage	10 %	(1)
Tracking test	Voltage, Current	1.5 %	(1)
	Drops - count	7	(1)

NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %.

Test	Range	Measurement Uncertainty	Note
Moisture resistance	See Environmental testing and IP protection		(1)
Overload protection	See Construction verifications and Heating		(1)
Abnormal operation	See Construction verifications and Heating		(1)
Mechanical strength Impact energy	Force 0.2 ÷ 2.5 kN Length 1 ÷ 1000 mm	See Construction verifications	(1)
Resistance to heat and fire(Ball pressure test)	See Environmental testing and Construction verifications		(1)
Resistance to heat and fire (Glow wire test)	Glow wire temperature	3 °C	(1)
Time Measurements	10 ms ÷ 8 h	1 %	(1)
Velocity Measurements	0 ÷ 5 m/s	5 %	(1)
Salt mist	See 60068-2-11	(2)	(1)
Vibration	5 Hz ÷ 2 kHz	5.0 %	(1)
Sound power/pressure level	31 Hz ÷ 4 kHz	3.0 dB	(1)
	4 kHz ÷ 10 kHz	6.0 dB	(1)
	A-weighted, C-weighted	2.0 dB	(1)

NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2 which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %.
(2) The instruments used for this test is according to the tolerances requested by the standard 60068-2-11

Test	Range	Measurement Uncertainty	Note
Radiance Blue light, Retinal thermal, Retinal thermal weak visual stimulus	0 ÷ 0.1 MW/(sr·m²) 300 ÷ 1400 nm	7.0 %	(1) (4)
	0.1 ÷ 100 MW/(sr·m²) 300 ÷ 1400 nm	8.0 %	
Luminance	0 ÷ 0.1 Mcd/m²	7.0 %	(1)
	0.1 ÷ 100 Mcd/m²	8.0 %	
Irradiance Actinic UV, Near UV, Blue light small source, IR radiation, eye	0 ÷ 0.1 MW/(m²) 200 ÷ 300 nm	9.2 %	(1) (5)
	0.1 ÷ 100 MW/(m²) 200 ÷ 300 nm	10.0 %	
	0 ÷ 0.1 MW/(m²) 300 ÷ 3000 nm	6.4 %	
	0.1 ÷ 100 MW/(m²) 300 ÷ 3000 nm	7.2 %	
Illuminance	0 ÷ 20 klx	4.0 %	(1)
Spectral Radiance	0 ÷ 0.1 MW/(sr·m²·nm) 300 ÷ 1400 nm	6.2 %	(1)
	0.1 ÷ 1 MW/(sr·m²·nm) 300 ÷ 1400 nm	7.0 %	
Spectral Irradiance	0 ÷ 0.1 MW/(m²·nm) 200 ÷ 300 nm	8.6 %	(1)
	0.1 ÷ 1 MW/(m²·nm) 200 ÷ 300 nm	9.2 %	
	0-0.1 MW/(m²·nm) 300 ÷ 3000nm	5.4 %	
	0.1 ÷ 1 MW/(m²·nm) 300 ÷ 3000 nm	6.4 %	
Radiant power Laser radiation Output power	350 ÷ 400 nm 950 ÷ 3000 nm 30 uW ÷ 30 W	9.0 %	(1), (2), (3)
	400 ÷ 950 nm 50 nW ÷ 3 W	4.6 %	(1), (2), (3)
Radiant energy Laser radiation	350 ÷ 400 nm 950 ÷ 3000 nm 20 uJ ÷ 2 J	9.0 %	(1), (2)
	400 ÷ 950 nm 20 uJ ÷ 2 J	4.6 %	(1), (2)
Wavelength	200 ÷ 3000 nm	4.5 %	(1)
Length in optical measurement	0 ÷ 20 mm	0.5 mm	(1)
	20 ÷ 200 mm	2 mm	
	0.2 ÷ 200 m	0.5 %	

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %

(2) In the standard 60825-1 laser radiation can indicate radiant power or radiant energy

(3) In the standard 60825-1 the radiant power can be called also output power

(4) The uncertainty value expressed in W/(m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

(5) The uncertainty value expressed in W/(sr·m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

TEST REPORT
IEC 62471
Photobiological safety of lamps and lamp systems

Report Reference No. ..... :	**377848-3TRFPHO**
Date of issue..... :	2020-03-12
Total number of pages ..... :	24
Name of Testing Laboratory preparing the Report..... :	**Nemko Spa** Via del Carroccio, 4 - 20853 Biassono (MB) – ITALY
Applicant's name ..... :	**Relco Srl**
Address..... :	Via delle Azalee, 6/A -20090- Buccinasco (MI) - Italy
Test specification:	
Standard ..... :	IEC 62471:2006
Test procedure ..... :	Testing
Non-standard test method……..:	N/A
Test Report Form No. ..... :	IEC62471
TRF Originator..... :	Nemko Spa
Master TRF ..... :	Dated 2019-09

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This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Test item description .....:	LED Streetlight
Trade Mark.....:	Relco ( )
Manufacturer.....:	L.C. Relco Spa Via delle Azalee 6/A - 20090 Buccinasco (MI) - Italy
Model/Type reference.....:	LED MAXISEMPIONE cod. 36250
Ratings.....:	180 W 220-240 V 50/60 Hz 4000 K

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒ **Testing Laboratory:**		
Testing location/ address ..... :	Nemko Spa, Via del Carroccio, 4 – Biassono (MB) – Italy	
Tested by (name, function, signature) ..... :	Oscar Segantin (Project Handler)	Segantin Oscar
Approved by (name, function, signature) .. :	Giulio Tassinari (Verifier)	
☐ **Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :		
Tested by (name, function, signature) ..... :		
Approved by (name, function, signature) .. :		
☐ **Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :		
Tested by (name + signature)..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
☐ **Testing procedure: CTF Stage 3:**		
☐ **Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :		
Tested by (name, function, signature) ..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
Supervised by (name, function, signature) :		

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

- Attachment 1: Best Measurement Capability (1 page)
- Attachment 2: European group differences and national differences (2 pages)
- Attachment 3: Labelling requirements of IEC/TR 62471-2 (2 pages)
- Attachment 4: Characteristics of lamps (1 page)
- Attachment 5: Photo documentation (2 pages)
- Attachment 6: Equipment used for testing (1 page)

Summary of testing:

The EuT is a LED streetlight with 80 LEDs. According to the standard, it has been considered as a general lighting service (GLS).

- The radiation measures are carried out at the distance of 500 lx as requested by the standard

Tests performed (name of test and test clause):

Cl. 4- Exposure Limits
Cl. 5- Measurement of lamp and lamp system
Cl. 6- Lamp classification

Note: The following Nemko technical procedures were also applied during testing:
- WML0177 General routines for using instruments at Nemko.
- WML1002: Measurement Uncertainty – Policy and Statement.
- WML0066: Procedure for measurement of Photobiological safety of lamps and lamp systems

Statement of the measurement uncertainty:

See Attachment 1 for best measurement uncertainty

Unless different values are declared in the test case, following ambient conditions apply for the tests:

- Ambient temperature 18-33 °C
- Relative Humidity 30-70 %
- Atmospheric Pressure 860-1060 hPa

Equipment used for testing is recorded and saved into Attachment 6 to this test report.

Testing location:

Nemko Spa
Via del Carroccio, 4 – 20853 Biassono (MB) –Italy
(for all tests)

Summary of compliance with National Differences (List of countries addressed):

- **European Countries**

☒ **The product fulfils the requirements of:**

- **EN 62471:2008**

Copy of marking plate:

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

Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	The measurement uncertainty was calculated for each test and quantity listed in this test report, according to IEC Guide 115 and other specific test standard and is documented in Nemko Spa working manual WML1002.
Assessment of conformity	The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report: P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit. F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Test item particulars ..... :	**Streetlight LED**
Tested lamp ..... :	☒ continuous wave lamps ☐ pulsed lamps
Tested lamp system ..... :	LEDs
Lamp classification group..... :	☒ exempt ☐ risk 1 ☐ risk 2 ☐ risk 3
Lamp cap ..... :	--
Bulb ..... :	--
Rated of the lamp ..... :	Refer to first page of this test report
Furthermore marking on the lamp ..... :	--
Seasoning of lamps according IEC standard ..... :	--
Used measurement instrument..... :	Monochromator with its optical accessories. See also Attachment 5.
Temperature by measurement ..... :	26 °C
Information for safety use..... :	None

Possible test case verdicts:

– **test case does not apply to the test object ..... :** N/A (not applicable)

– **test object does meet the requirement ..... :** P (Pass)

– **test object does not meet the requirement ..... :** F (Fail)

Testing:

Date of receipt of test item ..... : 2019-10-01

Date (s) of performance of tests..... : 2019-10-21

General remarks:

"The phase of sampling / collection of equipment under test is carried out by the customer."

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
The phase of sampling/collection is carried out by manufacturer.
Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

General product information and other remarks:

The equipment under test is a streetlight LED for general purpose composed by 10 module LEDs with 32 LEDs for each module (total 320 LEDs) manufactured by SAMSUNG model LM301, with street optic lens (characteristics of LED are described to attachment 4). Equipment has been supplied by a controlgear model Xitanium 150W 0.2-0.70A SI 230V S240 sXt manufactured by PHILIPS with ratings:

Input: 162 W 220-240 V, 50/60 Hz, 0,79 Amax

Output: 150 W 90-283 V 200-700 mA

S/n: 377848 "2/2 identified by Nemko"

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

4	**EXPOSURE LIMITS**		
4.1	General		P
	The exposure limits in this standard is not less than 0,01 ms and not more than any 8-hour period and should be used as guides in the control of exposure		P
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds 10^4 cd·m^{-2}	see clause 4.3	P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		P
	The exposure limit for effective radiant exposure is 30 J·m^{-2} within any 8-hour period		P
	To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broad-band source, the effective integrated spectral irradiance , E_S, of the light source shall not exceed the levels defined by:		P
	$E_s \cdot t = \sum_{200}^{400} \sum_{t} E_\lambda(\lambda,t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta\lambda \leq 30$ J·m^{-2}		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		P
	$t_{max} = \frac{30}{E_s}$ s		P
4.3.2	Near-UV hazard exposure limit for eye		P
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed 10000 J·m^{-2} for exposure times less than 1000 s. For exposure times greater than 1000 s (approximately 16 minutes) the UV-A irradiance for the unprotected eye, E_{UVA}, shall not exceed 10 W·m^{-2}.		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		P
	$t_{max} \leq \frac{10\,000}{E_{UVA}}$ s		P
4.3.3	Retinal blue light hazard exposure limit		P
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, B(λ), i.e., the blue-light weighted radiance , L_B, shall not exceed the levels defined by:		P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	$L_B \cdot t = \sum_{300}^{700} \sum_{t} L_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \leq 10^6$ $J \cdot m^{-2} \cdot sr^{-1}$	for t ≤ 10^4 s $t_{max} = \frac{10^6}{L_B}$	N/A
	$L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 100$ $W \cdot m^{-2} \cdot sr^{-1}$	for t > 10^4 s	P
4.3.4	Retinal blue light hazard exposure limit - small source		N/A
	Thus the spectral irradiance at the eye E_λ, weighted against the blue-light hazard function B(λ) shall not exceed the levels defined by:	see table 4.2	N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_{t} E_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \leq 100$ $J \cdot m^{-2}$	for t ≤ 100 s	N/A
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 1$ $W \cdot m^{-2}$	for t > 100 s	N/A
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, L_λ, weighted by the burn hazard weighting function R(λ) (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50\,000}{\alpha \cdot t^{0,25}}$ $W \cdot m^{-2} \cdot sr^{-1}$	(10 µs ≤ t ≤ 10 s)	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		N/A
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, L_{IR}, as viewed by the eye for exposure times greater than 10 s shall be limited to:		N/A
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{6\,000}{\alpha}$ $W \cdot m^{-2} \cdot sr^{-1}$	t > 10 s	N/A
4.3.7	Infrared radiation hazard exposure limits for the eye		P
	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, E_{IR}, over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		P
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \leq 18\,000 \cdot t^{-0,75}$ $W \cdot m^{-2}$	t ≤ 1000 s	N/A
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \leq 100$ $W \cdot m^{-2}$	t > 1000 s	P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:	Refer below:	P
	$E_H \cdot t = \sum_{380}^{3000} \sum_{t} E_\lambda(\lambda,t) \cdot \Delta t \cdot \Delta\lambda \leq 20\,000 \cdot t^{0,25}$ $J \cdot m^{-2}$	Limit value: 3560 W/m2 Measured: 1,5 W/m2	P
5	**MEASUREMENT OF LAMPS AND LAMP SYSTEMS**		-
5.1	Measurement conditions		P
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)		P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment	Refer below:	P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.	Considered.	P
5.1.3	Extraneous radiation	Refer below:	P
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.	Dark room	P
5.1.4	Lamp operation	Refer below:	P
	Operation of the test lamp shall be provided in accordance with:	Refer below:	P
	– the appropriate IEC lamp standard, or		N/A
	– the manufacturer' s recommendation		P
5.1.5	Lamp system operation	Refer below:	P
	The power source for operation of the test lamp shall be provided in accordance with:	Refer below:	P
	– the appropriate IEC standard, or		N/A
	– the manufacturer' s recommendation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measurements	Refer below:	P
	Minimum aperture diameter 7mm.		P
	Maximum aperture diameter 50 mm.		P
	The measurement shall be made in that position of the beam giving the maximum reading.		P
	The measurement instrument is adequate calibrated.		P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
5.2.2	Radiance measurements	Refer below:	P
5.2.2.1	Standard method	Refer below:	P
	The measurements made with an optical system.		P
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.		P
5.2.2.2	Alternative method	Refer below:	N/A
	Alternatively to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.		N/A
5.2.3	Measurement of source size	Refer below:	P
	The determination of α, the angle subtended by a source, requires the determination of the 50% emission points of the source.	Considered source size (LxH) 210X250 mm. α= 51,1 mrad	P
5.2.4	Pulse width measurement for pulsed sources		N/A
	The determination of Δt, the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N/A
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations	Refer below:	P
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired.	see table 4.1	P
5.3.2	Calculations	Refer below:	P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty	Refer below:	P
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	see Annex C in the norm	P
6	**LAMP CLASSIFICATION**		-
	For the purposes of this standard it was decided that the values shall be reported as follows:	see table 6.1	P
	– for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm	500 lx measured at 4,5 m	P
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at		N/A

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	a distance of 200 mm		
6.1	Continuous wave lamps		P
6.1.1	Except Group		P
	In the except group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	– an actinic ultraviolet hazard (E_S) within 8-hours exposure (30000 s), nor		P
	– a near-UV hazard (E_{UVA}) within 1000 s, (about 16 min), nor		P
	– a retinal blue-light hazard (L_B) within 10000 s (about 2,8 h), nor		P
	– a retinal thermal hazard (L_R) within 10 s, nor		P
	– an infrared radiation hazard for the eye (E_{IR}) within 1000 s		P
6.1.2	Risk Group 1 (Low-Risk)		N/A
	In this group are lamps, which exceeds the limits for the except group but that does not pose:		N/A
	– an actinic ultraviolet hazard (E_S) within 10000 s, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 300 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 100 s, nor		N/A
	– a retinal thermal hazard (L_R) within 10 s, nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 100 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		N/A
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		N/A
	– an actinic ultraviolet hazard (E_S) within 1000 s exposure, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 100 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 0,25 s (aversion response), nor		N/A
	– a retinal thermal hazard (L_R) within 0,25 s (aversion response), nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 10 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared reti-		N/A

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	nal hazard (L_{IR}), within 10 s are in Risk Group 2.		
6.1.4	Risk Group 3 (High-Risk)		N/A
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		N/A
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N/A
	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N/A
	– for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N/A
			N/A

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 4.1	Spectral weighting function for assessing ultraviolet hazards for skin and eye		-
Wavelength[1] λ, nm	**UV hazard function $S_{UV}(\lambda)$**	**Wavelength λ, nm**	**UV hazard function $S_{UV}(\lambda)$**
200	0,030	313*	0,006
205	0,051	315	0,003
210	0,075	316	0,0024
215	0,095	317	0,0020
220	0,120	318	0,0016
225	0,150	319	0,0012
230	0,190	320	0,0010
235	0,240	322	0,00067
240	0,300	323	0,00054
245	0,360	325	0,00050
250	0,430	328	0,00044
254*	0,500	330	0,00041
255	0,520	333*	0,00037
260	0,650	335	0,00034
265	0,810	340	0,00028
270	1,000	345	0,00024
275	0,960	350	0,00020
280*	0,880	355	0,00016
285	0,770	360	0,00013
290	0,640	365*	0,00011
295	0,540	370	0,000093
297*	0,460	375	0,000077
300	0,300	380	0,000064
303*	0,120	385	0,000053
305	0,060	390	0,000044
308	0,026	395	0,000036
310	0,015	400	0,000030

[1] Wavelengths chosen are representative: other values should be obtained by logarithmic interpolation at intermediate wavelengths.
* Emission lines of a mercury discharge spectrum.

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources	-

Wavelength nm	Blue-light hazard function B (λ)	Burn hazard function R (λ)
300	0,01	
305	0,01	
310	0,01	
315	0,01	
320	0,01	
325	0,01	
330	0,01	
335	0,01	
340	0,01	
345	0,01	
350	0,01	
355	0,01	
360	0,01	
365	0,01	
370	0,01	
375	0,01	
380	0,01	0,1
385	0,013	0,13
390	0,025	0,25
395	0,05	0,5
400	0,10	1,0
405	0,20	2,0
410	0,40	4,0
415	0,80	8,0
420	0,90	9,0
425	0,95	9,5
430	0,98	9,8
435	1,00	10,0
440	1,00	10,0
445	0,97	9,7
450	0,94	9,4
455	0,90	9,0
460	0,80	8,0
465	0,70	7,0
470	0,62	6,2
475	0,55	5,5
480	0,45	4,5
485	0,40	4,0
490	0,22	2,2
495	0,16	1,6
500-600	$10^{[(450-\lambda)/50]}$	1,0
600-700	0,001	1,0
700-1050		$10^{[(700-\lambda)/500]}$
1050-1150		0,2
1150-1200		$0,2 \cdot 10^{0,02(1150-\lambda)}$
1200-1400		0,02

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 5.4	Summary of the ELs for the surface of the skin or cornea (irradiance based values)				-
Hazard Name	**Relevant equation**	**Wavelength range nm**	**Exposure duration sec**	**Limiting aperture rad (deg)**	**EL in terms of constant irradiance W•m^{-2}**
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	≤1000 >1000	1,4 (80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	≤100 >100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 –3000	≤1000 >1000	1,4 (80)	18000/t ^{0,75} 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	20000/t ^{0,75}

Table 5.5	Summary of the ELs for the retina (radiance based values)				-
Hazard Name	**Relevant equation**	**Wavelength range nm**	**Exposure duration sec**	**Field of view radians**	**EL in terms of constant radiance W•m^{-2}•sr^{-1})**
Blue light	$L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	0,25 – 10 10-100 100-10000 ≥ 10000	0,011•√(t/10) 0,011 0,0011•√t 0,1	10^6/t 10^6/t 10^6/t 100
Retinal thermal	$L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	380 – 1400	< 0,25 0,25 – 10	0,0017 0,011•√(t/10)	50000/(α•t ^{0,25}) 50000/(α•t ^{0,25})
Retinal thermal (weak visual stimulus)	$L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	780 – 1400	> 10	0,011	6000/α

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	**0,00004**	0,003	-	0,03	-
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	**0,0**	33	-	100	-
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	**29,7**	10000	-	4000000	-
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	-	1,0	-	400	-
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α = 550000	**1570**	28000/α	-	71000/α	-
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	-	6000/α	-	6000/α	-
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	**0,0**	570	-	3200	-

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

ATTACHMENT 1: BEST MEASUREMENT UNCERTAINTY

Test	Range	Measurement Uncertainty	Note
Radiance Blue light, Retinal thermal, Retinal thermal weak visual stimulus	0 ÷ 0.1 MW/(sr·m²) 300 ÷ 1400 nm	7.0 %	(1) (4)
	0.1 ÷ 100 MW/(sr·m²) 300 ÷ 1400 nm	8.0 %	
Luminance	0 ÷ 0.1 Mcd/m²	7.0 %	(1)
	0.1 ÷ 100 Mcd/m²	8.0 %	
Irradiance Actinic UV, Near UV, Blue light small source, IR radiation, eye	0 ÷ 0.1 MW/(m²) 200 ÷ 300 nm	9.2 %	(1) (5)
	0.1 ÷ 100 MW/(m²) 200 ÷ 300 nm	10.0 %	
	0 ÷ 0.1 MW/(m²) 300 ÷ 3000 nm	6.4 %	
	0.1 ÷ 100 MW/(m²) 300 ÷ 3000 nm	7.2 %	
Illuminance	0 ÷ 20 klx	4.0 %	(1)
Spectral Radiance	0 ÷ 0.1 MW/(sr·m²·nm) 300 ÷ 1400 nm	6.2 %	(1)
	0.1 ÷ 1 MW/(sr·m²·nm) 300 ÷ 1400 nm	7.0 %	
Spectral Irradiance	0 ÷ 0.1 MW/(m²·nm) 200 ÷ 300 nm	8.6 %	(1)
	0.1 ÷ 1 MW/(m²·nm) 200 ÷ 300 nm	9.2 %	
	0-0.1 MW/(m²·nm) 300 ÷ 3000nm	5.4 %	
	0.1 ÷ 1 MW/(m²·nm) 300 ÷ 3000 nm	6.4 %	
Radiant power Laser radiation Output power	350 ÷ 400 nm 950 ÷ 3000 nm 30 uW ÷ 30 W	9.0 %	(1), (2), (3)
	400 ÷ 950 nm 50 nW ÷ 3 W	4.6 %	(1), (2), (3)
Radiant energy Laser radiation	350 ÷ 400 nm 950 ÷ 3000 nm 20 uJ ÷ 2 J	9.0 %	(1), (2)
	400 ÷ 950 nm 20 uJ ÷ 2 J	4.6 %	(1), (2)
Wavelength	200 ÷ 3000 nm	4.5 %	(1)
Length in optical measurement	0 ÷ 20 mm	0.5 mm	(1)
	20 ÷ 200 mm	2 mm	
	0.2 ÷ 200 m	0.5 %	

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %

(2) In the standard 60825-1 laser radiation can indicate radiant power or radiant energy

(3) In the standard 60825-1 the radiant power can be called also output power

(4) The uncertainty value expressed in W/(m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

(5) The uncertainty value expressed in W/(sr·m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

IEC62471A - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT 2 TO TEST REPORT IEC 62471
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Photobiological safety of lamps and lamps systems

Differences according to .....: EN 62471:2008

Attachment Form No. .....: EU_GD_IEC62471

Attachment Originator.....: Nemko Spa

Master Attachment .....: 2019-09

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	CENELEC COMMON MODIFICATIONS (EN)		P
4	**EXPOSURE LIMITS**		P
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB		—
	Clause 4 replaced by the following:		P
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in IEC 62471:2006	See appended Table 6.1	P
4.1	General		P
	First paragraph deleted		—

Table 6.1	Emission limits and evaluation based on EU Directive 2006/25/EC				P
Risk	Action spectrum	Symbol	Units	Limit (1)	Result (2)
Actinic UV	SUV(λ)	E_s	$W \cdot m^{-2}$	0,00104 (5)	**0,00004**
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,347 (5)	**0,0**
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$ s	$L_B = 100$ t > 10000 s	**L = 29,7 t ≥ 0**
				$L_B = 10^6/t$ t ≤ 10000 s	—
Blue light, small source (3)	B(λ)	E_B	$W \cdot m^{-2}$ s	$E_B = 0,01$ t > 10000 s	—
				$E_B = 100/t$ t ≤ 10000 s	—
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$ s	$L_R = 2,8 \cdot 10^4/\alpha$ t > 10 s	**L = 1570 t ≥ 0**
				$L_R = 5 \cdot 10^4/(\alpha \cdot t^{0,25})$ 10 µs ≤ t ≤ 10 s	—
				$L_R = 8,89 \cdot 10^5/\alpha$, t < 10 µs	—
Retinal thermal, weak visual stimulus (4)	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$ s	$L_{IR} = 6000/\alpha$ t > 10 s	—
				$L_{IR} = 5 \cdot 10^4/(\alpha \cdot t^{0,25})$ 10 µs ≤ t ≤ 10 s	—
				$L_{IR} = 8,89 \cdot 10^5/\alpha$ t < 10 µs	—
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$ s	$E_{IR} = 100$ t > 1000 s	**E = 0,0 t ≥ 0**
				$E_{IR} = 18000 \cdot t^{-0,75}$ t ≤ 1000 s	—

(1) α is expressed in radians.
(2) t is the exposure time of the lamp and is expressed in seconds; if t≥0 there is no limitation is the exposure.
(3) Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
(4) Involves evaluation of non-GLS source.
(5) The limits H_{eff} = 30 and H_{UVA}= 10^4 $J \cdot m^{-2}$ are converted in $W \cdot m^{-2}$ considering the exposure time of 8 hours.

NOTE The action functions: see Table 4.1 and Table 4.2
The applicable aperture diameters: see 4.2.1
The limitations for the angular subtenses: see 4.2.2
The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.

ATTACHMENT 3 TO TEST REPORT IEC/EN 62471
REQUIREMENT OF IEC/TR 62471-2
Photobiological safety of lamps and lamps systems – Part 2: Guidance on manufacturing requirement relating to non-laser optical radiation safety

Originator .....: Nemko S.p.A.
Date of issue .....: 2013 – 04

5.4	**Labelling required**	-

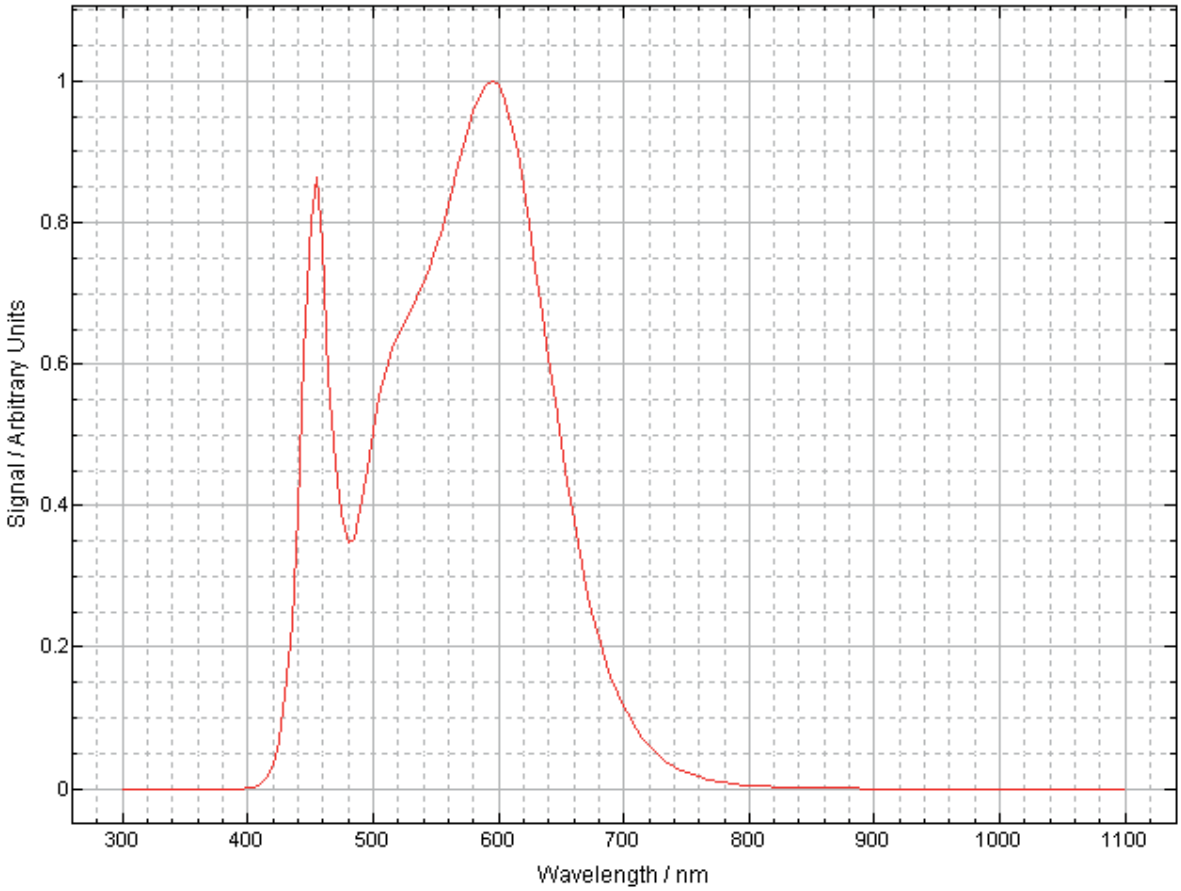
Exempt
No Labelling Required
Product tested against IEC62471

Table 1	Hazard-related risk group labelling of lamp systems			-
Hazard	**Exempt Risk Group**	**Risk Group 1**	**Risk Group 2**	**Risk Group 3**
Ultraviolet hazard 200nm to 400nm	**Not required**	NOTICE UV emitted from this product	CAUTION UV emitted from this product	WARNING UV emitted from this product
Retinal blue light hazard 300nm to 400nm	**Not required**	Not required	CAUTION Possibly hazardous optical radiation emitted from this product	WARNING Possibly hazardous optical radiation emitted from this product
Retinal blue light or thermal hazard 400nm to 780nm	**Not required**	Not required	CAUTION Possibly hazardous optical radiation emitted from this product	WARNING Possibly hazardous optical radiation emitted from this product
Cornea/lens infrared hazard 780nm to 3000nm	**Not required**	NOTICE IR emitted from this product	CAUTION IR emitted from this product	WARNING IR emitted from this product
Retinal thermal hazard weak visual stimulus 780nm to 1400nm	**Not required**	WARNING IR emitted from this product	WARNING IR emitted from this product	WARNING IR emitted from this product
Supplementary information: in bold explanation of labelling information and guidance on control measures				

Table 2	Explanation of labelling information and guidance on control measure			-
Hazard	**Exempt Risk Group**	**Risk Group 1**	**Risk Group 2**	**Risk Group 3**
Ultraviolet hazard 200nm to 400nm	**Not required**	Minimise exposure to eyes or skin. Use appropriate shielding.	Eye or skin irritation may result from exposure. Use appropriate shielding.	Avoid eye and skin exposure to unshielded product.
Retinal blue light hazard 300nm to 400nm	**Not required**	Not required	Do not stare at operating lamp. May be harmful to the eyes.	Do not look at operating lamp. Eye injury may result.
Retinal blue light or thermal hazard 400nm to 780nm	**Not required**	Not required	Do not stare at operating lamp. May be harmful to the eyes.	Do not look at operating lamp. Eye injury may result.
Cornea/lens infrared hazard 780nm to 3000nm	**Not required**	Use appropriate shielding or eye protection.	Avoid eye exposure. Use appropriate shielding or eye protection.	Avoid eye exposure. Use appropriate shielding or eye protection.
Retinal thermal hazard weak visual stimulus 780nm to 1400nm	**Not required**	Do not stare at operating lamp.	Do not stare at operating lamp.	Do not look at operating lamp.
Supplementary information: in bold explanation of labelling information and guidance on control measures				

ATTACHMENT 4: CHARACTERISTICS OF LAMP

Application / Function	Manufacturer trademark	Type / Model	Technical data	Standard	Mark(s) of conformity evidence of acceptance
LED	SAMSUNG	LM301H	V_F: 2,9 V_{max} I_F: 200 mA_{max} CRI 80 4000 K	IEC/EN 62471	Tested in appliance



Spectral measurement normalized

ATTACHMENT 5: PHOTO DOCUMENTATION

a)

b)

d)

e)

ATTACHMENT 6: EQUIPMENT USED FOR TESTING

MEASUREMENT EQUIPMENT			
Manufacturer	**Type of equipment**	**Type designation**	**Serial number**
Bentham instruments	Double monochromator	IDR300	12290
	Calibration lamp for irradiance measurement	CL6-H	12094/5
	Calibration lamp for irradiance measurements (UV)	CL7	12281/3
	Calibration lamp for radiance measurements	SRS12	12283/3
	Telescope for radiance measurements	TEL309	12280/3
	Illuminance detector	DH400_vl	12284/3
	Power supply	PSU605	12236/4
	Power supply	PSU705	12295
	Diffuser	DIFF_D7	12279/3
	Source Profiler	PSL_Profiler	12698/4
Other instruments	Tape	Stanley 8 m	30-457
	Distance meter	Bosch DLE70	005558860
	Multimeter	Fluke 8846	9673012
	Power supply	Philips	003926
	Data logger	Testo 176P1+0572 6174	41002029+206 38516

-End of Report-

TEST REPORT
IEC TR 62778
Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

Report Number.....:	**377848-1TRFPHO**
Date of issue.....:	2020-03-12
Total number of pages	12
Name of Testing Laboratory preparing the Report .....:	**Nemko Spa** Via del Carroccio, 4 - 20853 Biassono (MB) – ITALY
Applicant's name .....:	**Relco Srl**
Address.....:	Via delle Azalee 6/A 20090 Buccinasco (MI) – Italy
Test specification:	
Standard.....:	IEC TR 62778:2014 (Second Edition)
Test procedure .....:	Testing
Non-standard test method .....:	N/A
Test Report Form No. .....:	IEC62778A
Test Report Form(s) Originator ....:	TÜV SÜD Product Service GmbH
Master TRF .....:	Dated 2016-02

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

General disclaimer:

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This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Test item description..... :	LED Streetlight
Trade Mark..... :	Relco (Relco Components & Lighting)
Manufacturer ..... :	L.C. Relco Spa Via delle Azalee 6/A - 20090 Buccinasco (MI) - Italy
Model/Type reference..... :	LED MAXISEMPIONE cod. 36251
Ratings..... :	220 W 220-240 V 50/60 Hz 4000 K
s/n of model tested ..... :	377848 “1/1 identified by Nemko”

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**Testing Laboratory:**		
Testing location/ address ..... :		**Nemko Spa** Via del Carroccio, 4 – 20853 Biassono (MB) – Italy	
☐	**Associated Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :		Oscar Segantin (Project handler)	Segantin Oscar
Approved by (name, function, signature) .. :		Giulio Tassinari (Verifier)	Giulio Tassinari
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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

- Attachment 1: Best Measurement Capability (1 page)
- Attachment 2: Characteristics of lamps (1 page)
- Attachment 3: Photo documentation (2 pages)
- Attachment 4: Equipment used for testing (1 page)

Summary of testing:

The equipment under test is a LED streetlight.
The tests were performed with the following settings:

1- Distance of 200mm (IEC_62778)

Tests performed (name of test and test clause):

Cl. 8 – Risk Group classification

Note: The following Nemko technical procedures were also applied during testing:
- WML0177 General routines for using instruments at Nemko.
- WML1002: Measurement Uncertainty – Policy and Statement.
- WML0066: Procedure for measurement of Photobiological safety of lamps and lamp systems

Statement of the measurement uncertainty:

See Attachment 1 for best measurement uncertainty

Unless different values are declared in the test case, following ambient conditions apply for the tests:

- Ambient temperature 18-33 °C
- Relative Humidity 30-70 %
- Atmospheric Pressure 860-1060 hPa

Equipment used for testing is recorded and saved into Attachment 4 to this test report.

Testing location:

Nemko Spa
Via del Carroccio, 4 – 20853 Biassono (MB) –Italy
(for all tests)

Summary of compliance with National Differences (List of countries addressed):

- European countries (no deviation listed on IECEE website)

Copy of marking plate:

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

Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	The measurement uncertainty was calculated for each test and quantity listed in this test report, according to IEC Guide 115 and other specific test standard and is documented in Nemko Spa working manual WML1002.
Assessment of conformity	The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report: P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit. F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Test item particulars ..... :	**LED streetlight**
Product evaluated ..... :	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**
Rated voltage (V) ..... :	220-240 V
Rated current (mA) ..... :	Not declared (210 W marked)
Rated CCT (K) ..... :	4000 K
Rated Luminance (Mcd/m^2) ..... :	-
Component report data used ..... :	☒ **Not applicable** ☐ **LED package** ☐ **LED module** ☐ **Lamp** Report number: -
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A (Not applicated)
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item .....:	2019-10-01
Date (s) of performance of tests .....:	2019-10-02

General remarks:

"The phase of sampling / collection of equipment under test is carried out by the customer."
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
The phase of sampling/collection is carried out by manufacturer.
Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

-

Name and address of factory (ies) .....:	**Nextronics S.A.R.L.** Lot n. 6 Z.I. El Agba, 2087 Tunis, Tunisia

General product information:

The equipment under test is a streetlight LED for general purpose composed by 80 LEDs modules manufactured by SAMSUNG model LH508A+, with street optic lens (characteristics of LED are described to attachment 4). Equipment has been supplied by two controlgear model SIRIO 150/300-1050 BILEVEL BI manufactured by TCI with ratings:
Input: 220-240 V, 50/60 Hz, 0,77 Amax
Output: 150 W, 300-1050mA 180 V

S/n: 377848 "1/1 identified by Nemko"

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict
7	**MEASUREMENT INFORMATION FLOW**		**P**
7.1	**Basic flow**		**P**
	'Law of conservation of luminance' applied		P
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		P
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		P
7.2	**Conditions for the radiance measurement**		**P**
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied		N/A
7.3	**Special cases (I): Replacement by a lamp or LED module of another type**		**N/A**
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	**Special cases (II): Arrays and clusters of primary light sources**		N/A
	LED package is evaluated as ..... :	☐ RG0 unlimited ☐ RG1 unlimited	N/A
	E_{thr} of LED package applies to array		N/A
8	**RISK GROUP CLASSIFICATION**		**P**
	Risk group achieved:		P
	- .. Risk Group 0 unlimited		N/A
	- .. Risk Group 1 unlimited		N/A
	- E_{thr} ..... (lx) : Distance to reach RG1 ..... (m) :	996 3,5	P

	TABLE: Spectroradiometric measurement		P
	Measurement performed on:	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**	
	Model number ..... :	377848 “1-1 (Identified by Nemko Spa)	
	Test voltage (V) ..... :	240 V	—
	Test current (mA) ..... :	-	—
	Test frequency (Hz) ..... :	50 Hz	—
	Ambient, t (°C) ..... :	26	—
	Measurement distance ..... :	☒ 20 cm ☐ ... cm	—
	Source size ..... :	☒ Non-small ☐ Small : .... mm	—
	Field of view ..... :	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	N/A	See component datasheet
x/y colour coordinates			N/A	See component datasheet
Blue light hazard radiance	LB	W/(m2•sr1)	**6,9E05**	**RG2**
Blue light hazard irradiance	EB	W/m2	N/A	
Luminance	L	cd/m2	**6,9E08 cd/ m2**	
Illuminance	E	lx	N/A	

Supplementary information:

ATTACHMENT 1: BEST MEASUREMENT UNCERTAINTY

Test	Range	Measurement Uncertainty	Note
Radiance Blue light, Retinal thermal, Retinal thermal weak visual stimulus	0 ÷ 0.1 MW/(sr·m²) 300 ÷ 1400 nm	7.0 %	(1) (4)
	0.1 ÷ 100 MW/(sr·m²) 300 ÷ 1400 nm	8.0 %	
Luminance	0 ÷ 0.1 Mcd/m²	7.0 %	(1)
	0.1 ÷ 100 Mcd/m²	8.0 %	
Irradiance Actinic UV, Near UV, Blue light small source, IR radiation, eye	0 ÷ 0.1 MW/(m²) 200 ÷ 300 nm	9.2 %	(1) (5)
	0.1 ÷ 100 MW/(m²) 200 ÷ 300 nm	10.0 %	
	0 ÷ 0.1 MW/(m²) 300 ÷ 3000 nm	6.4 %	
	0.1 ÷ 100 MW/(m²) 300 ÷ 3000 nm	7.2 %	
Illuminance	0 ÷ 20 klx	4.0 %	(1)
Spectral Radiance	0 ÷ 0.1 MW/(sr·m²·nm) 300 ÷ 1400 nm	6.2 %	(1)
	0.1 ÷ 1 MW/(sr·m²·nm) 300 ÷ 1400 nm	7.0 %	
Spectral Irradiance	0 ÷ 0.1 MW/(m²·nm) 200 ÷ 300 nm	8.6 %	(1)
	0.1 ÷ 1 MW/(m²·nm) 200 ÷ 300 nm	9.2 %	
	0-0.1 MW/(m²·nm) 300 ÷ 3000nm	5.4 %	
	0.1 ÷ 1 MW/(m²·nm) 300 ÷ 3000 nm	6.4 %	
Radiant power Laser radiation Output power	350 ÷ 400 nm 950 ÷ 3000 nm 30 uW ÷ 30 W	9.0 %	(1), (2), (3)
	400 ÷ 950 nm 50 nW ÷ 3 W	4.6 %	(1), (2), (3)
Radiant energy Laser radiation	350 ÷ 400 nm 950 ÷ 3000 nm 20 uJ ÷ 2 J	9.0 %	(1), (2)
	400 ÷ 950 nm 20 uJ ÷ 2 J	4.6 %	(1), (2)
Wavelength	200 ÷ 3000 nm	4.5 %	(1)
Length in optical measurement	0 ÷ 20 mm	0.5 mm	(1)
	20 ÷ 200 mm	2 mm	
	0.2 ÷ 200 m	0.5 %	

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %

(2) In the standard 60825-1 laser radiation can indicate radiant power or radiant energy

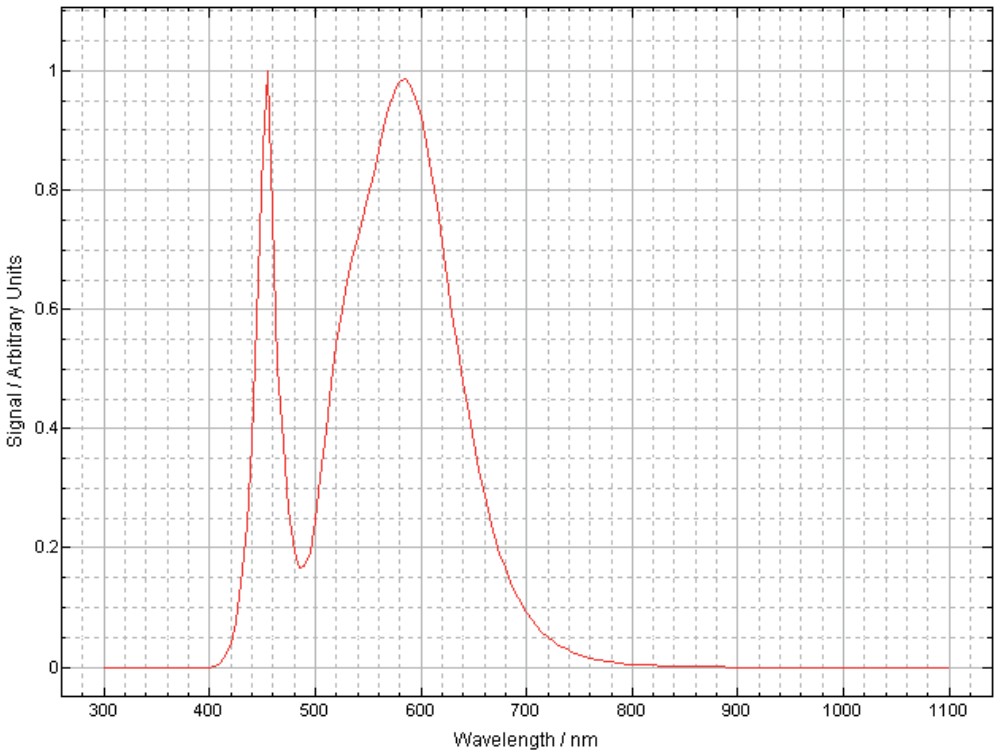
(3) In the standard 60825-1 the radiant power can be called also output power

(4) The uncertainty value expressed in W/(m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

(5) The uncertainty value expressed in W/(sr·m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

ATTACHMENT 2: CHARACTERISTICS OF LAMP

Application / Function	Manufacturer trademark	Type / Model	Technical data	Standard	Mark(s) of conformity evidence of acceptance
LED	SAMSUNG	LH508A+	VF: 6,4 Vmax IF: 880 mAmax CRI 70 4000 K	IEC 62778	Tested in appliance



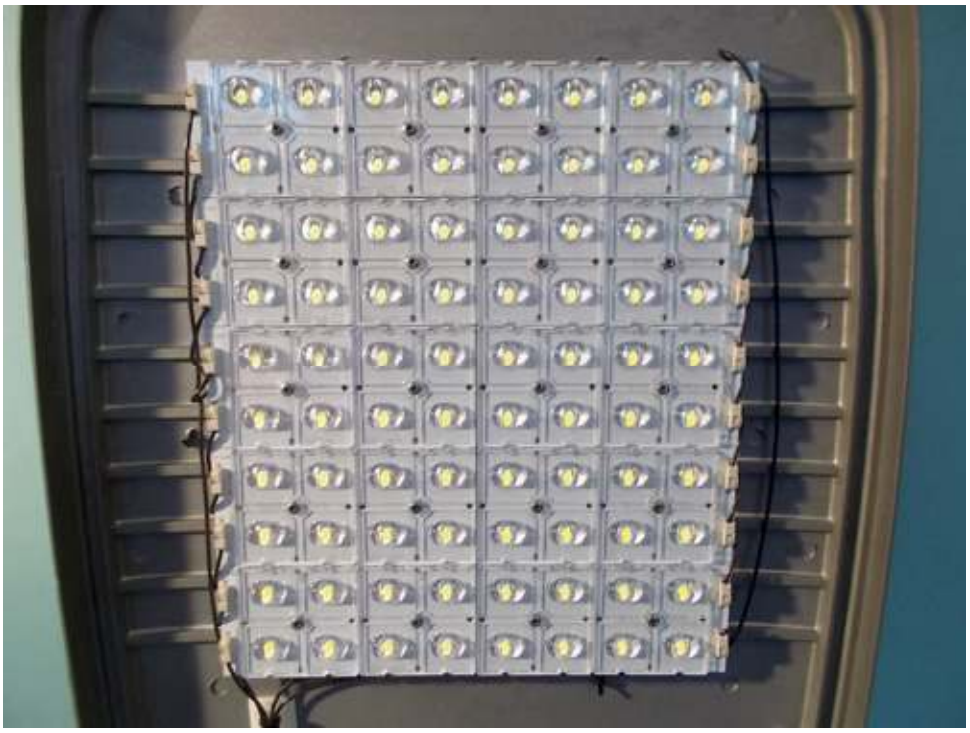
Spectral measurement normalized

ATTACHMENT 3: PHOTO DOCUMENTATION

a)

b)

d)



e)

ATTACHMENT 4: EQUIPMENT USED FOR TESTING

MEASUREMENT EQUIPMENT			
Manufacturer	**Type of equipment**	**Type designation**	**Serial number**
Bentham instruments	Double monochromator	IDR300	12290
	Calibration lamp for irradiance measurement	CL6-H	12094/5
	Calibration lamp for irradiance measurements (UV)	CL7	12281/3
	Calibration lamp for radiance measurements	SRS12	12283/3
	Telescope for radiance measurements	TEL309	12280/3
	Illuminance detector	DH400_vl	12284/3
	Power supply	PSU605	12236/4
	Power supply	PSU705	12295
	Diffuser	DIFF_D7	12279/3
	Source Profiler	PSL_Profiler	12698/4
Other instruments	Tape	Stanley 8 m	30-457
	Distance meter	Bosch DLE70	005558860
	Multimeter	Fluke 8846	9673012
	Power supply	Philips	003926
	Data logger	Testo 176P1+0572 6174	41002029+206 38516

END OF TEST REPORT

TEST REPORT
IEC TR 62778
Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

Report Number.....:	**377848-4TRFPHO**
Date of issue.....:	2020-03-12
Total number of pages	12
Name of Testing Laboratory preparing the Report .....:	**Nemko Spa** Via del Carroccio, 4 - 20853 Biassono (MB) – ITALY
Applicant's name .....:	**Relco Srl**
Address.....:	Via delle Azalee 6/A 20090 Buccinasco (MI) – Italy
Test specification:	
Standard.....:	IEC TR 62778:2014 (Second Edition)
Test procedure .....:	Testing
Non-standard test method .....:	N/A
Test Report Form No. .....:	IEC62778A
Test Report Form(s) Originator ....:	TÜV SÜD Product Service GmbH
Master TRF .....:	Dated 2016-02

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This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Test item description..... :	LED Streetlight
Trade Mark..... :	Relco (Relco Components & Lighting)
Manufacturer ..... :	L.C. Relco Spa Via delle Azalee 6/A - 20090 Buccinasco (MI) - Italy
Model/Type reference..... :	LED MAXISEMPIONE cod. 36250
Ratings..... :	180 W 220-240 V 50/60 Hz 4000 K
s/n of model tested ..... :	377848 “2/2 identified by Nemko”

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**Testing Laboratory:**		
Testing location/ address ..... :		**Nemko Spa** Via del Carroccio, 4 – 20853 Biassono (MB) – Italy	
☐	**Associated Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :		Oscar Segantin (Project handler)	Segantin Oscar
Approved by (name, function, signature) .. :		Giulio Tassinari (Verifier)	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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

- Attachment 1: Best Measurement Capability (1 page)
- Attachment 2: Characteristics of lamps (1 page)
- Attachment 3: Photo documentation (2 pages)
- Attachment 4: Equipment used for testing (1 page)

Summary of testing:

The equipment under test is a LED streetlight.
The tests were performed with the following settings:

1- Distance of 200mm (IEC_62778)

Tests performed (name of test and test clause):

Cl. 8 – Risk Group classification

Note: The following Nemko technical procedures were also applied during testing:
- WML0177 General routines for using instruments at Nemko.
- WML1002: Measurement Uncertainty – Policy and Statement.
- WML0066: Procedure for measurement of Photobiological safety of lamps and lamp systems

Statement of the measurement uncertainty:

See Attachment 1 for best measurement uncertainty

Unless different values are declared in the test case, following ambient conditions apply for the tests:

- Ambient temperature 18-33 °C
- Relative Humidity 30-70 %
- Atmospheric Pressure 860-1060 hPa

Equipment used for testing is recorded and saved into Attachment 4 to this test report.

Testing location:

Nemko Spa
Via del Carroccio, 4 – 20853 Biassono (MB) –Italy
(for all tests)

Summary of compliance with National Differences (List of countries addressed):

- European countries (no deviation listed on IECEE website)

Copy of marking plate:

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

Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	The measurement uncertainty was calculated for each test and quantity listed in this test report, according to IEC Guide 115 and other specific test standard and is documented in Nemko Spa working manual WML1002.
Assessment of conformity	The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report: P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit. F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Test item particulars ..... :	**LED streetlight**
Product evaluated ..... :	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**
Rated voltage (V) ..... :	220-240 V
Rated current (mA) ..... :	Not declared
Rated CCT (K) ..... :	4000 K
Rated Luminance (Mcd/m^2) ..... :	-
Component report data used ..... :	☒ **Not applicable** ☐ **LED package** ☐ **LED module** ☐ **Lamp** Report number: -
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A (Not applicated)
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item .....:	2019-10-01
Date (s) of performance of tests .....:	2019-10-21

General remarks:

"The phase of sampling / collection of equipment under test is carried out by the customer."

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
The phase of sampling/collection is carried out by manufacturer.
Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

-

Name and address of factory (ies) .....:	**Nextronics S.A.R.L.** Lot n. 6 Z.I. El Agba, 2087 Tunis, Tunisia

General product information:

The equipment under test is a streetlight LED for general purpose composed by 10 module LEDs with 32 LEDs for each module (total 320 LEDs) manufactured by SAMSUNG model LM301, with street optic lens (characteristics of LED are described to attachment 4). Equipment has been supplied by a controlgear model Xitanium 150W 0.2-0.70A SI 230V S240 sXt manufactured by PHILIPS with ratings:
Input: 162 W 220-240 V, 50/60 Hz, 0,79 Amax
Output: 150 W 90-283 V 200-700 mA

S/n: 377848 "2/2 identified by Nemko"

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict
7	**MEASUREMENT INFORMATION FLOW**		**P**
7.1	**Basic flow**		**P**
	'Law of conservation of luminance' applied		P
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		P
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		P
7.2	**Conditions for the radiance measurement**		**P**
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied		N/A
7.3	**Special cases (I): Replacement by a lamp or LED module of another type**		**N/A**
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	**Special cases (II): Arrays and clusters of primary light sources**		N/A
	LED package is evaluated as ..... :	☐ RG0 unlimited ☐ RG1 unlimited	N/A
	E_{thr} of LED package applies to array		N/A
8	**RISK GROUP CLASSIFICATION**		**P**
	Risk group achieved:		P
	- .. Risk Group 0 unlimited		N/A
	- .. Risk Group 1 unlimited		P
	- E_{thr} ..... (lx) : Distance to reach RG1 ..... (m) :	- -	N/A

	TABLE: Spectroradiometric measurement		P
	Measurement performed on:	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**	
	Model number ..... :	377848 “2-2 (Identified by Nemko Spa)	
	Test voltage (V) ..... :	230 V	—
	Test current (mA) ..... :	-	—
	Test frequency (Hz) ..... :	50 Hz	—
	Ambient, t (°C) ..... :	22	—
	Measurement distance ..... :	☒ 20 cm ☐ ... cm	—
	Source size ..... :	☒ Non-small ☐ Small : .... mm	—
	Field of view ..... :	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	N/A	See component datasheet
x/y colour coordinates			N/A	See component datasheet
Blue light hazard radiance	LB	W/(m2•sr1)	**1830**	**RG1**
Blue light hazard irradiance	EB	W/m2	N/A	
Luminance	L	cd/m2	**2,4E06**	
Illuminance	E	lx	N/A	

Supplementary information:

ATTACHMENT 1: BEST MEASUREMENT UNCERTAINTY

Test	Range	Measurement Uncertainty	Note
Radiance Blue light, Retinal thermal, Retinal thermal weak visual stimulus	0 ÷ 0.1 MW/(sr·m²) 300 ÷ 1400 nm	7.0 %	(1) (4)
	0.1 ÷ 100 MW/(sr·m²) 300 ÷ 1400 nm	8.0 %	
Luminance	0 ÷ 0.1 Mcd/m²	7.0 %	(1)
	0.1 ÷ 100 Mcd/m²	8.0 %	
Irradiance Actinic UV, Near UV, Blue light small source, IR radiation, eye	0 ÷ 0.1 MW/(m²) 200 ÷ 300 nm	9.2 %	(1) (5)
	0.1 ÷ 100 MW/(m²) 200 ÷ 300 nm	10.0 %	
	0 ÷ 0.1 MW/(m²) 300 ÷ 3000 nm	6.4 %	
	0.1 ÷ 100 MW/(m²) 300 ÷ 3000 nm	7.2 %	
Illuminance	0 ÷ 20 klx	4.0 %	(1)
Spectral Radiance	0 ÷ 0.1 MW/(sr·m²·nm) 300 ÷ 1400 nm	6.2 %	(1)
	0.1 ÷ 1 MW/(sr·m²·nm) 300 ÷ 1400 nm	7.0 %	
Spectral Irradiance	0 ÷ 0.1 MW/(m²·nm) 200 ÷ 300 nm	8.6 %	(1)
	0.1 ÷ 1 MW/(m²·nm) 200 ÷ 300 nm	9.2 %	
	0-0.1 MW/(m²·nm) 300 ÷ 3000nm	5.4 %	
	0.1 ÷ 1 MW/(m²·nm) 300 ÷ 3000 nm	6.4 %	
Radiant power Laser radiation Output power	350 ÷ 400 nm 950 ÷ 3000 nm 30 uW ÷ 30 W	9.0 %	(1), (2), (3)
	400 ÷ 950 nm 50 nW ÷ 3 W	4.6 %	(1), (2), (3)
Radiant energy Laser radiation	350 ÷ 400 nm 950 ÷ 3000 nm 20 uJ ÷ 2 J	9.0 %	(1), (2)
	400 ÷ 950 nm 20 uJ ÷ 2 J	4.6 %	(1), (2)
Wavelength	200 ÷ 3000 nm	4.5 %	(1)
Length in optical measurement	0 ÷ 20 mm	0.5 mm	(1)
	20 ÷ 200 mm	2 mm	
	0.2 ÷ 200 m	0.5 %	

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %

(2) In the standard 60825-1 laser radiation can indicate radiant power or radiant energy

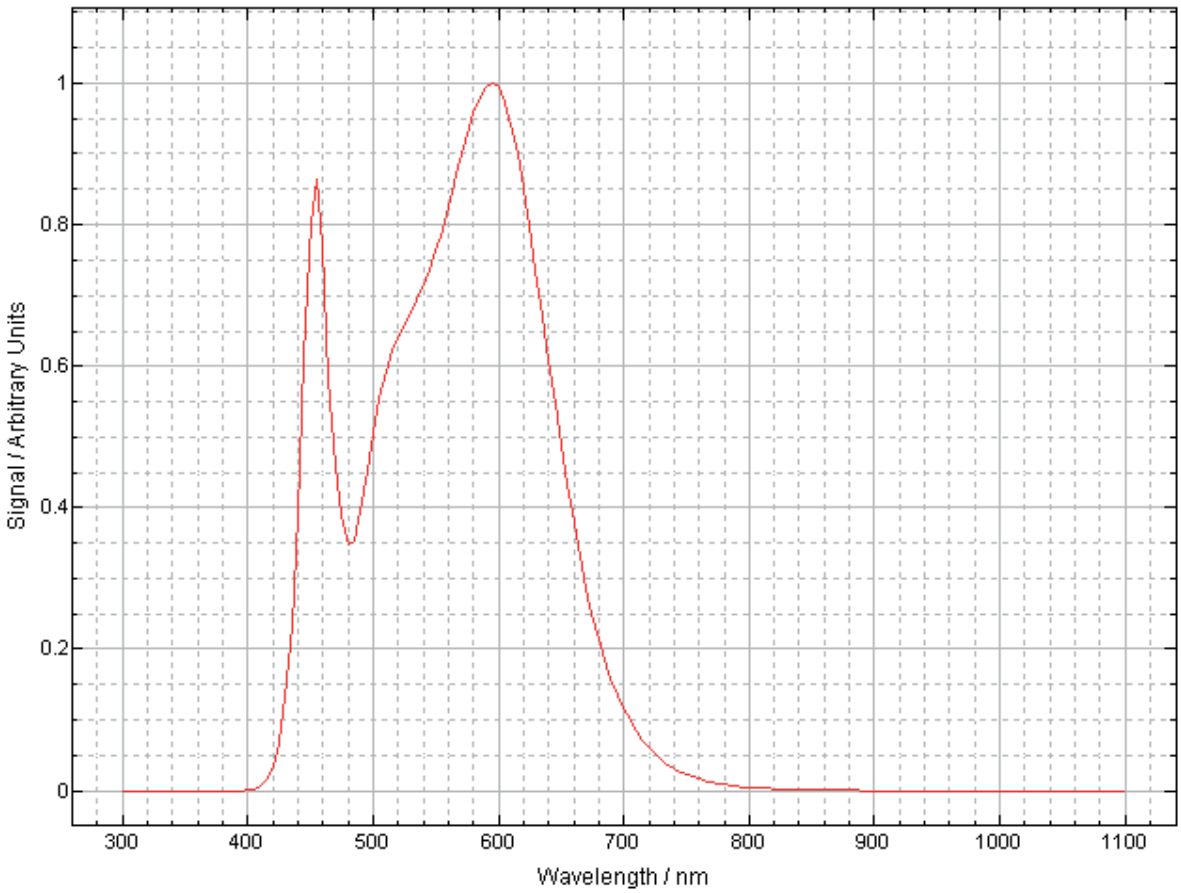
(3) In the standard 60825-1 the radiant power can be called also output power

(4) The uncertainty value expressed in W/(m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

(5) The uncertainty value expressed in W/(sr·m²) is the maximum value between the value measured and the limit stated in the standard (see IEC/EN62471) multiplied to the measurement uncertainty stated in the table

ATTACHMENT 2: CHARACTERISTICS OF LAMP

Application / Function	Manufacturer trademark	Type / Model	Technical data	Standard	Mark(s) of conformity evidence of acceptance
LED	SAMSUNG	LM301H	V_F: 2,9 V_{max} I_F: 200 mA_{max} CRI 80 4000 K	IEC 62778	Tested in appliance



Spectral measurement normalized

ATTACHMENT 3: PHOTO DOCUMENTATION

a)

b)

d)

e)

ATTACHMENT 4: EQUIPMENT USED FOR TESTING

MEASUREMENT EQUIPMENT			
Manufacturer	**Type of equipment**	**Type designation**	**Serial number**
Bentham instruments	Double monochromator	IDR300	12290
	Calibration lamp for irradiance measurement	CL6-H	12094/5
	Calibration lamp for irradiance measurements (UV)	CL7	12281/3
	Calibration lamp for radiance measurements	SRS12	12283/3
	Telescope for radiance measurements	TEL309	12280/3
	Illuminance detector	DH400_vl	12284/3
	Power supply	PSU605	12236/4
	Power supply	PSU705	12295
	Diffuser	DIFF_D7	12279/3
	Source Profiler	PSL_Profiler	12698/4
Other instruments	Tape	Stanley 8 m	30-457
	Distance meter	Bosch DLE70	005558860
	Multimeter	Fluke 8846	9673012
	Power supply	Philips	003926
	Data logger	Testo 176P1+0572 6174	41002029+206 38516

END OF TEST REPORT

TEST REPORT
IEC 62262: 2002
Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

Report Reference No.:	381746-3TRFEnvEx
Tested by (name, function and signature):	Cristian Simone (Project Handler)
Approved by (name, function and signature):	Roberto Giampaglia (Verifier)
Date of issue:	2020-02-26
Testing Laboratory:	**Nemko Spa.**
Address:	Via del Carroccio 4 I – 20853 Biassono (MB)
Testing location/ address:	Nemko Spa., Via del Carroccio 4 I - 20853 Biassono (MB)
Applicant's name:	**Relco Srl**
Address:	Via delle Azalee 6/A - 20090 Buccinasco (MI) - Italy
Test specification:	
Standard:	IEC 62262:2002
Non-standard test method:	N/A
Test Report Form No.:	TRF EN 60068-2-ENV
TRF Originator:	Nemko S.p.A.
Master TRF:	2017-03

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Test item description:	LED streetlight
Trade Mark:	Relco lighting ( )
Manufacturer:	same as Applicant
Model/Type reference:	1)LED MAXISEMPIONE Cod. 36251 2) LED MAXISPLUGA Cod.34509-5
Ratings:	210 W, 220-240 V~, 50/60 Hz, Cl.II, IP66, IK09, 4000 K, t_a 40 °C, distance from lighted objects 1 m

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The test report merely corresponds to the test sample.
The phase of sampling / collection of equipment under test is carried out by the customer.

This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Test Report No. :	381746-3TRFEnvEx

Short description of the EuT	Copy of marking plate
LED luminaires	

Number of tested samples:	1
Serial number:	1/3 assigned by Nemko Spa
Brand	Relco lighting
Manufacturer	**Relco Srl**
Model	LED MAXISEMPIONE Cod. 36251 LED MAXISPLUGA Cod.34509-5
Manufacturer year	-
Ratings	210 W, 220-240 V~, 50/60 Hz, Cl.II, IP66, IK09, 4000 K, t_a 40 °C, distance from lighted objects 1 m
Accessories and detachable parts included/ Mounted tool:	The EuT is composed by a unit, accessories as supplied in the appliance (EuT tested in the configuration supplied by manufacturer).
Other options included:	None
Testing	
Date of receipt of test sample:	2019-06-03
Testing commenced on:	2019-09-25
Testing concluded on:	2019-09-26

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

Throughout this report, a comma is used as the decimal separator.

Test Result according to the customer criteria of acceptance in § 4.4:	**Pass**

PROJECT HISTORY		
Report number	**Modification to the report / comments**	**Date**
381746-3TRFEnvEx	First release	2020-02-26
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REMARKS

Contents

1 TEST PERFORMED 4

2 TEST STANDARDS AND PROCEDURES 4

3 GENERAL REMARKS 4

3.1 ENVIRONMENTAL CONDITIONS 4
3.2 MEASUREMENT UNCERTAINTY 5

4 EQUIPMENT UNDER TEST 6

4.1 POWER SUPPLY SYSTEM UTILISED 6
4.2 EUT OPERATION MODE: 6
4.3 EUT CONFIGURATION: 6
4.4 ACCEPTANCE CRITERIA 6

5 TEST CONDITIONS AND RESULTS 7

MECHANICAL IMPACT IK09 7
5.3 PHOTOGRAPHS OF EQUIPMENT AFTER IK TEST 10

6 TEST EQUIPMENT 10

1 TEST PERFORMED

Tests performed to check degrees of protection provided by enclosures. The K09 tests were performed only on model LED MAXISEMPIONE Cod. 36251 beacaue the mounted glass ist the same.

2 TEST STANDARDS AND PROCEDURES

- **NEMKO WM L0177:**
  General routines for using instruments at Nemko
- **NEMKO WM L1002:**
  Measurement Uncertainty - Policy and Statement
- **IEC 62262:2002**
  Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

3 GENERAL REMARKS

The IK09 tests were performed in accordance with clauses 6.1 and 6.4 of IEC 62262. Acceptance criteria were as required on clause 6.5 of IEC 62262.

Note: Under customer request, the impact tests were performed on the same sample.

3.1 Environmental conditions

Unless different values are declared in the test case, following ambient conditions apply for the tests:

Ambient Temperature:	18 ÷ 33° C
Relative Humidity:	30 ÷ 70 %
Atmospheric pressure:	860 ÷ 1060 hPa

3.2 Measurement uncertainty

The measurement uncertainty was calculated for all measurements listed in this test report according to Nemko Spa Technical Procedure WM L1002 and is documented in the quality system acc. to EN 17025. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Nemko Spa laboratory is reported:

Test	Range	Measurement Uncertainty	Note
IP protection	Water flow 0.5l/min ÷ 100 l/min	5 %	(1)
	Air flow	5 %	(1)
	Force 50N, 30N, 3N, 1N	10 %	(1)
	Dimensions 50mm, 12.5mm, 2.5mm, 1mm	0.05mm	(1)
Construction verifications	Dimensions 0-200mm	0.05 mm	(1)
	Dimensions 0.2-200m	0.5%	(1)
Protection against access to live parts	Dimensions 1-1000mm	0.08 mm or 0.3%	(1)
	Force 0.2-1000N	3%	(1)
Time Measurements	10 ms ÷ 8 h	1%	(1)
Dielectric strength	AC Voltage 0.1 kV ÷ 5 kV (50Hz or 60Hz)	3.0%	(1)
	DC Voltage 0.1 kV ÷ 6 kV	3.0%	(1)
	AC/DC Current 0.1 mA ÷ 200 mA up to 1kHz	5%	(1)
Time Measurements	10 ms ÷ 8 h	1%	(1)

NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$ which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %

4 EQUIPMENT UNDER TEST

4.1 Power supply system utilised

Equipment not supplied during the tests.

4.2 EuT operation mode:

For the IK09 test E.u.T. was not operating.

4.3 EuT configuration:

The EUT has been tested as provided by customer.

Note: Under customer request, the impact tests were performed on the same sample.

Glas mounted: Manufacturer : PALEARI FRATELLI, model Soda lime silicate float glass

4.4 Acceptance Criteria

The test results shall be classified in terms of loss of protection or degradation of protection of the EuT, referred to a performance level defined by the standard and the relevant degree of protection.

Required performance level based on EN 62262 §6.5: Admissible damages not able to affect the continuity of the safety and reliability of the equipment.

5 TEST CONDITIONS AND RESULTS

Mechanical impact IK09

Test equipment: Vertical hammer
Number of impacts: 5
Position of impact: front + side

IK code	Impact energy J	Equivalent mass kg	Height of fall mm	IEC 60068-2-75 Striking elements
09	10	5	200	Fig. A.3

Instruments used: see section §6.

5.1.1 Description of the test location

Test location: Nemko Spa

5.1.2 Photo documentation of the test set-up

a)

b)

Figure 1: a) and b) The head mass

5.1.3 Test result

The requirements are: **Fulfilled**

Remarks and/or Deviations: At the end of test no damages has been found on the enclosure.

5.3 Photographs of equipment after IK test

a)

General view of the EuT after IK09 test

6 TEST EQUIPMENT

Equipment	Manufacturer	Model	Serial N°
Thermohygrometer data loggers	Testo	175-H2	20012380/305
Digital barometer	MSR Electronics GmbH	MSR145B	330080
Tape measure	Stanley	8 m	30-457
Weight for impact test	ATS	0.03, gr 5000	-

- END OF TEST REPORT -

TEST REPORT

Electromagnetic compatibility

Requirements for general lighting purposes equipment

Report Reference No.....:	377848TRFEMC		
Tested by (name, function and signature).....:	L. Bazzi	(project handler)	Bazzi Luca
Approved by (name, function and signature).....:	P. Barbieri	(verifier)	Barb
Date of issue.....:	2019-10-17		
Testing Laboratory.....:	**Nemko Spa**		
Address.....:	Via del Carroccio, 4 – 20853 Biassono (MB) – Italy		
Testing location	Nemko Spa		
Address.....:	Via del Carroccio, 4 – 20853 Biassono (MB) – Italy		
Applicant's name.....:	**Relco Srl**		
Address.....:	Via delle Azalee, 6/A -20090- Buccinasco (MI) - Italy		
Test specification:			
Standard.....:	EN 55015 (2013) + A1 (2015) – EN 61547 (2009) EN 61000-3-2 (2014) – EN 61000-3-3 (2013)		
	Full application of the standards	☒	
	Partial application of the standards	☐	
Test procedure.....:	Nemko WM L0077, WM L0177 and WM L1002		
Test Report Form No.....:	55015TRFEMC		
TRF Originator.....:	Nemko Spa		
Master TRF.....:	2014-02		

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Test item description..... :	**LED Streetlight**
Trade Mark.....:	Relco
Manufacturer.....:	Relco Spa
Address of manufacturer.....:	Via delle Azalee 6/A - 20090 Buccinasco (MI) - Italy
Model.....:	LED MAXISEMPIONE
Ratings.....:	210/160 W 220-240 V 50/60 Hz 4000 K and 3000 K

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The test report merely corresponds to the tested sample.
The phase of sampling / collection of equipment under test is carried out by the customer.

This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

Test Report No. : 377848TRFEMC	2019-10-17 Date of issue

Short description of the EuT	Copy of marking plate
The equipment under test is a streetlight LED for general purpose composed by 80 LEDs modules manufactured by SAMSUNG model LH508A+, with street optic lens (characteristics of LED are described to attachment 4). Equipment has been supplied by two controlgear model SIRIO 150/300-1050 BILEVEL BI manufactured by TCI	

Number of tested samples:	1
Serial number:	377848-1/1 (number assigned by Nemko Spa)
Lighting equipment type:	LED luminaire
Mounting system:	Suspended mounting with mounting bracket
Accessories and detachable parts included:	The E.U.T. is composed by one unit
Other options included:	-
Testing	
Date of receipt of test sample:	2019-10-15
Testing commenced on:	2019-10-16
Testing concluded on:	2019-10-17
Possible test case verdicts:	
test case does not apply to the test object:	N (Not applicable)
test object does meet the requirement:	P (Pass)
test object does not meet the requirement:	F (Fail)

Symbols used in this test report

☒ The crossed square indicates that the listed condition or equipment is applicable for this report.

☐ The empty square indicates that the listed condition or equipment is not applicable for this report.

Throughout this report point is used as decimal separator.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

Verdict according to the standards listed at page 5:	**Pass**

PROJECT HISTORY		
Report number	**Modification to the report / comments**	**Date**
377848TRFEMC	First release	2019-10-17
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--	--	--
--	--	--
REMARKS		

PRODUCT VARIANTS		
Variant model	**Difference against the main model**	**Additional test performed**
LED SEMPIONE	Rating: 95/120 W 220-240 V 50/60 Hz 4000 K and 3000 K	--
LED MINISEMPIONE	Rating: 50/75 W 220-240 V 50/60 Hz 4000 K and 3000 K	--
--	--	--
--	--	--
REMARKS		

Contents

1 TEST STANDARDS 5

2 SUMMARY OF TEST RESULTS 6

3 EQUIPMENT UNDER TEST 7

3.1 POWER SUPPLY SYSTEM UTILISED 7
3.2 EUT OPERATION MODES 7
3.3 EUT CONFIGURATION MODES 7
3.4 INPUT/OUTPUT PORTS 7
3.5 EQUIPMENT USED DURING TEST 8
3.6 PERFORMANCE LEVEL 8

4 TEST ENVIRONMENT 9

4.1 ADDRESS OF THE TEST LABORATORY 9
4.2 ENVIRONMENTAL CONDITIONS 9
4.3 TEST EQUIPMENT USED FOR THE MONITORING OF THE ENVIRONMENTAL CONDITIONS 9
4.4 STATEMENT OF THE MEASUREMENT UNCERTAINTY 9

5 TEST CONDITIONS AND RESULTS 11

5.1 RADIATED DISTURBANCE IN THE FREQUENCY RANGE 30 MHZ TO 300 MHZ 11
5.2 RADIATED DISTURBANCE IN THE FREQUENCY RANGE 9 KHZ TO 30 MHZ 14
5.3 TERMINAL DISTURBANCE VOLTAGES IN THE FREQUENCY RANGE 9 KHZ TO 30 MHZ 18
5.4 HARMONICS OF CURRENT 22
5.5 VOLTAGE CHANGES, VOLTAGE FLUCTUATIONS AND FLICKER 26
5.6 IMMUNITY TO RADIO-FREQUENCY ELECTROMAGNETIC FIELDS 28
5.7 IMMUNITY TO ELECTROSTATIC DISCHARGES 30
5.8 IMMUNITY TO INJECTED CURRENTS (RADIO-FREQUENCY COMMON MODE) 32
5.9 IMMUNITY TO FAST TRANSIENTS 34
5.10 IMMUNITY TO SURGES 36
5.11 IMMUNITY TO POWER FREQUENCY MAGNETIC FIELDS 38
5.12 IMMUNITY TO VOLTAGE DIPS AND SHORT INTERRUPTIONS 40

6 EUT PHOTOS 42

1 TEST STANDARDS

The tests were performed according to following standards and procedures.

NEMKO WM L0177: General routines for using instruments at Nemko

NEMKO WM L1002: Measurement Uncertainty - Policy and Statement

NEMKO WM L0077: General routines to perform EMC tests

EN 55015 (2013) + A1(2015)
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

EN 61547 (2009)
Equipment for general lighting purposes – EMC immunity requirements

EN 61000-3-2 (2014)
Electromagnetic compatibility (EMC) — Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

EN 61000-3-3 (2013)
Electromagnetic compatibility (EMC) -- Part 3-3: Limits — Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

The main standard(s) above contain(s) references to other standards, which are listed below.

EN 61000-4-2 (2009)
Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

EN 61000-4-3 (2006) + A1 (2008) + IS1 (2009)
Electromagnetic compatibility (EMC) -- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

EN 61000-4-4 (2004)
Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

EN 61000-4-5 (2006)
Electromagnetic compatibility (EMC) -- Part 4-5: Testing and measurement techniques - Surge immunity test

EN 61000-4-6 (2009)
Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

EN 61000-4-8 (1993) + A1 (2001)
Electromagnetic compatibility (EMC) -- Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test

EN 61000-4-11 (2004)
Electromagnetic compatibility (EMC) -- Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

2 SUMMARY OF TEST RESULTS

Emission		
Requirement – Test	**Frequency range**	**Verdict**
Radiated disturbance in the frequency range 30 MHz to 300 MHz	30 MHz to 300 MHz	P
Radiated disturbances in the frequency range 9 kHz to 30 MHz	9 kHz to 30 MHz	P
Disturbance voltages in the frequency range 9 kHz to 30 MHz	9 kHz to 30 MHz	P
Insertion Loss	150 kHz to 1605 kHz	N
Harmonic current emissions	0 kHz – 2 kHz	P
Voltage changes, voltage fluctuations and flicker	50 Hz	P
Immunity		
Requirement - Test	**Ref standard**	**Verdict**
Electrostatic discharges	EN 61000-4-2	P
Radio-frequency electromagnetic fields	EN 61000-4-3	P
Fast transients – Signal and control lines	EN 61000-4-4	N
Fast transients – I/O DC power ports	EN 61000-4-4	N
Fast transients – I/O AC power ports	EN 61000-4-4	P
Surges – Input AC power ports	EN 61000-4-5	P
Injected currents – Signal and control lines	EN 61000-4-6	N
Injected currents – I/O DC power ports	EN 61000-4-6	N
Injected currents – I/O AC power ports	EN 61000-4-6	P
Power frequency magnetic fields	EN 61000-4-8	P
Voltage dips – Input AC power ports	EN 61000-4-11	P
Voltage interruptions – Input AC power ports	EN 61000-4-11	P
GENERAL REMARKS		

3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage:	☒	230V/50 Hz / 1ϕ	☐	115V/60Hz / 1ϕ
	☐	400V/50 Hz 3PE	☐	400V/50 Hz 3NPE
	☐	12 VDC	☐	24 VDC

3.2 EuT operation modes

Mode	Description
1	Normal working

3.3 EuT configuration modes

Emission: the EuT was configured to measure its highest possible radiation level. The test modes selected are according to EuT instruction manual.

Immunity: the EuT was configured to have its highest possible susceptibility against tested phenomena. The test modes selected are according to EuT instruction manual.

Mode	Description
1	The EUT has been tested connected to the mains

3.4 Input/Output Ports

Port	Name	Type*	Cable Max. >3m	Cable Shielded	Description
0	Enclosure	N/E	—	—	—
1	Mains	AC	☐	☐	Two wires cable

*Note:

AC = AC Power Port DC = DC Power Port N/E = Non-Electrical

I/O = Signal/Control Input or Output Port TP = Telecommunication Ports

3.5 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
—	—	—	—	—

Note: * Use

EUT - Equipment Under Test

AE - Auxiliary/Associated Equipment (Not Subjected to Test)

SIM - Simulator (Not Subjected to Test)

3.6 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

☒	based on the used product standard
☐	based on the declaration of the manufacturer, requestor or purchaser

Performance criterion A
During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Representative parameter	Acceptable level of performance
A change of luminous intensity	Checked by visual observation

Performance criterion B
During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Representative parameter	Acceptable level of performance
A change of luminous intensity	Checked by visual observation

Performance criterion C
During and after the test, any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal, if necessary by temporary interruption of the mains supply and/or operating the regulating control. Additional requirement for lighting equipment incorporating a starting device: After the test, the lighting equipment is switched off. After half an hour, it is switched on again. The lighting equipment shall start and operate as intended.

Representative parameter	Acceptable level of performance
A change of luminous intensity	Checked by visual observation

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

Nemko Spa
Via del Carroccio, 4
20853 Biassono (MB) - Italy

Tests site/benches are in accordance with applicable standard/s, and have been utilized by Nemko Spa testing engineer(s).

4.2 Environmental conditions

Unless different values are declared in the test case, following ambient conditions apply for the tests:

Ambient temperature:	18÷33 °C
Relative Humidity:	30÷60 %
Atmospheric pressure:	980÷1060 hPa

4.3 Test equipment used for the monitoring of the environmental conditions

Equipment	Manufacturer	Model	Serial N°
Thermohygrometer data loggers	Testo	175-H2	20012380/305
Thermohygrometer data loggers	Testo	175-H2	38203337/703
Barometer	MSR	MSR145B	330080

4.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16-4-2 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the Nemko Spa Technical Procedure WML1002. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Hereafter the best measurement capability for Nemko Spa laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Disturbance 3m, 10m Chamber	Antenna distance 1m, 3m, 10m (30÷200) MHz	5.0 dB	(1)
	Antenna distance 1m, 3m, 10m (0.2÷6) GHz	5.2 dB	(1)
	Antenna distance 1m, 3m (6÷18) GHz	5.8 dB	(1)
	Antenna distance 1m, 3m (18÷40) GHz	7.2 dB	(1)

Test	Range	Measurement Uncertainty	Notes
Conducted Disturbance	9 kHz ÷ 150 kHz with AMN	3.8 dB	(1)
	150 kHz ÷ 30 MHz with AMN	3.4 dB	(1)
	150 kHz ÷ 30 MHz with AAN	4.6 dB	(1)
	9 kHz ÷ 30 MHz with voltage probe	2.9 dB	(1)
	9 kHz ÷ 30 MHz with current probe	2.9 dB	(1)
Clicks	9 kHz ÷ 150 kHz	3.8 dB	(1)
	150 kHz ÷ 30 MHz	3.4 dB	(1)
Disturbance Power	30 MHz ÷300 MHz	4.5 dB	(1)
Frequency	10 Hz ÷ 1 kHz	0.2%	(1)
	1kHz ÷ 40GHz	10-6	(1)
Harmonic Current Emission	50 Hz ÷ 2 kHz	2%	(1)
Voltage Fluctuation Emission	--	2%	(1)
Radiated Immunity 10m, 3m chambers	20 MHz ÷ 6 GHz	3.4 dB	(1)
Radiated Immunity TEM Cell	(0.01÷200) MHz	3.0 dB	(1)
Bulk Current	(1÷200) MHz	3.0 dB	(1)
Conducted RF Immunity	9 kHz ÷ 230 MHz	3.0 dB	(1)
ESD Immunity	Voltage, Current, Rise time, Duration	(2)	(1)
Burst Immunity	Voltage, frequency, burst period and duration, rise time and pulse width	(2)	(1)
Surge Immunity	Voltage, Current, Rise time, Duration	(2)	(1)
Dips Immunity	Amplitude	5%	(1)
	Duration	5%	
Magnetic Field Immunity	50 Hz	2.0dB	(1)
Damped Magnetic Field Immunity	100 kHz, 1 MHz	3 dB ampl. 10% freq.	(1)
Oscillatory Wave Immunity	Voltage, front time, frequency 100 kHz, 1 MHz	(2)	(1)
Low Frequency Immunity	15 Hz ÷ 150 kHz	2.2 dB	(1)
Automotive transients Immunity	Voltage, rise time, duration time Impulses 1, 2a, 2b, 3a, 3b and 4	(2)	(1)
Automotive transients Emission	Amplitude	10%	(1)
	Time	10%	
EMF	Lighting Equipment	26%	(1)
	Other Equipment	20%	

NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2 which has been derived from the assumed normal probability distribution with infinite degrees of freedom and for a coverage probability of 95 %;
(2) The instruments used for this immunity test is according to the tolerances requested by the applicable standard

5 TEST CONDITIONS AND RESULTS

5.1 Radiated disturbance in the frequency range 30 MHz to 300 MHz

5.1.1 Photo documentation of the test set-up

5.1.2 Test method

Measurements were made on a semi anechoic chamber. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 meters with the receiving antenna located at a fixed height (from 1 to 4 meter) in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receiving antenna height from 1 to 4 meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

5.1.3 Limits

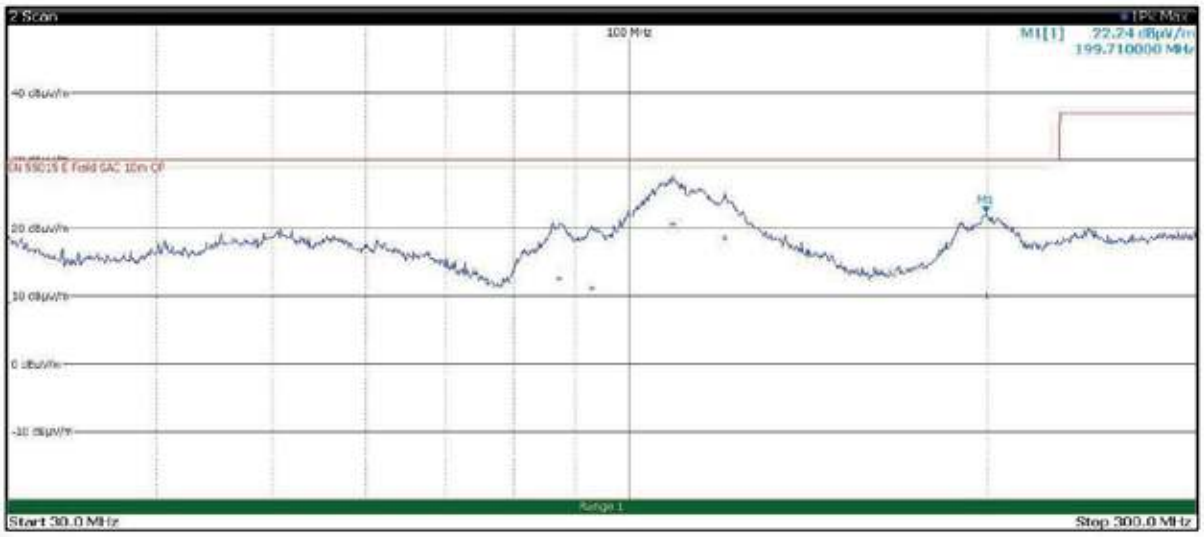
Frequency (MHz)	Limit (dBµV/m) - Quasi-Peak
30 TO 230	30
230 TO 300	37

5.1.4 Test result

Verdict:	☒ P ☐ F ☐ N
Frequency range:	30 MHz – 300 MHz
Kind of test site:	Semi anechoic chamber
Measurement distance:	10 m
Remarks:	

5.1.5 Test protocol

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -

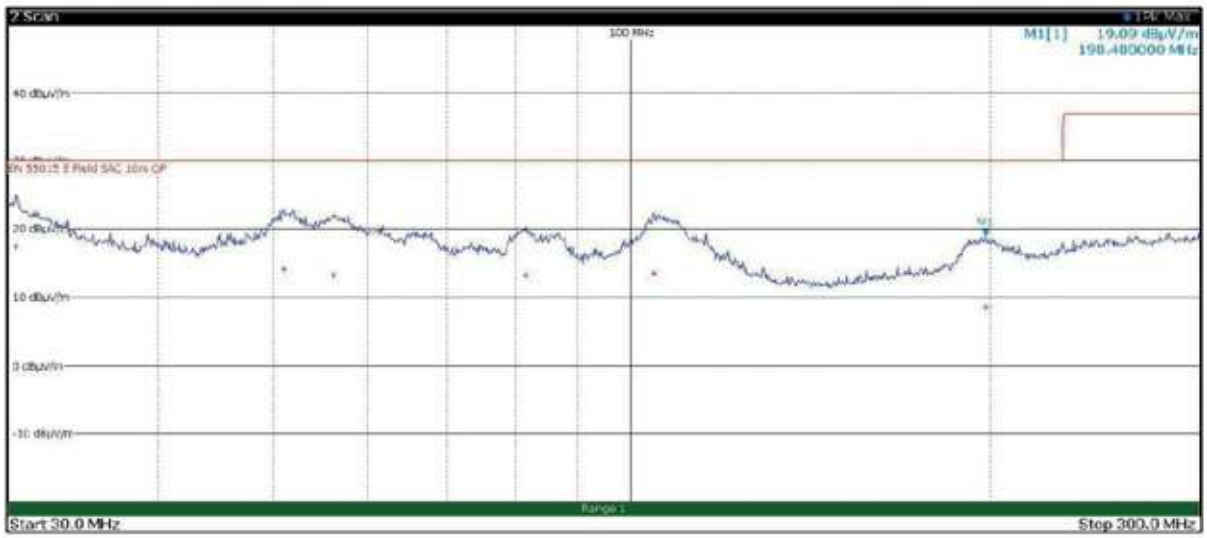


07:56:14 16.10.2019 Page 1/1

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.0000	9.2	30.0	-20.8	QP
87.3600	12.6	30.0	-17.4	QP
93.0000	11.1	30.0	-18.9	QP
108.6900	20.7	30.0	-9.3	QP
120.4200	18.6	30.0	-11.4	QP
199.8000	10.0	30.0	-20.0	QP

Antenna polarization: Vertical
Operation mode: 1
Configuration mode: 1
Remarks: -

Verdict: Pass



08:05:41 16.10.2019 Page 1/1

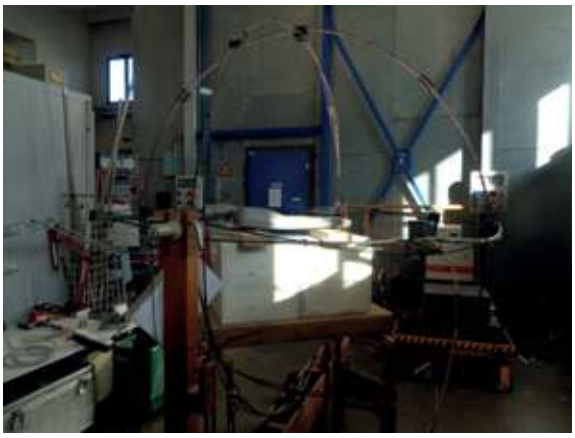
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.4500	17.4	30.0	-12.6	QP
51.0600	14.2	30.0	-15.8	QP
56.2200	13.2	30.0	-16.8	QP
81.5400	13.3	30.0	-16.7	QP
104.4900	13.6	30.0	-16.4	QP
198.4800	8.5	30.0	-21.5	QP

5.1.6 Test equipment used

Equipment	Manufacturer	Model	Serial No.
Trilog Broadband Antenna (25 ÷ 8000 MHz)	Schwarzbeck	VULB 9162	9162-025
EMI receiver (20 Hz ÷ 8 GHz)	R&S	ESU8	100202
Turntable 4,5t	Maturo	TT4.0-5T	2.527
Tilt antenna mast	Maturo	TAM4.0-E	10042
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530
Shielded room	Siemens	10m control room	1947

5.2 Radiated disturbance in the frequency range 9 kHz to 30 MHz

5.2.1 Photo documentation of the test set-up



5.2.2 Test method

The quasi-peak limits of the magnetic component of the radiated disturbance field strength in the frequency range 9 kHz to 30 MHz, measured as a current in 2 m, 3 m or 4 m loop antennas around the lighting equipment.

5.2.3 Limits

Frequency (MHz)	Limit (dBµA) - Quasi-Peak		
	2 m	3 m	4 m
0.009 TO 0.07	88	81	75
0.07 TO 0.15	88 TO 58*	81 TO 51*	75 TO 45*
0.15 TO 3.0	58 TO 22*	51 TO 15*	45 TO 9*
3.0 TO 30	22	15 TO 16**	9 TO 12**

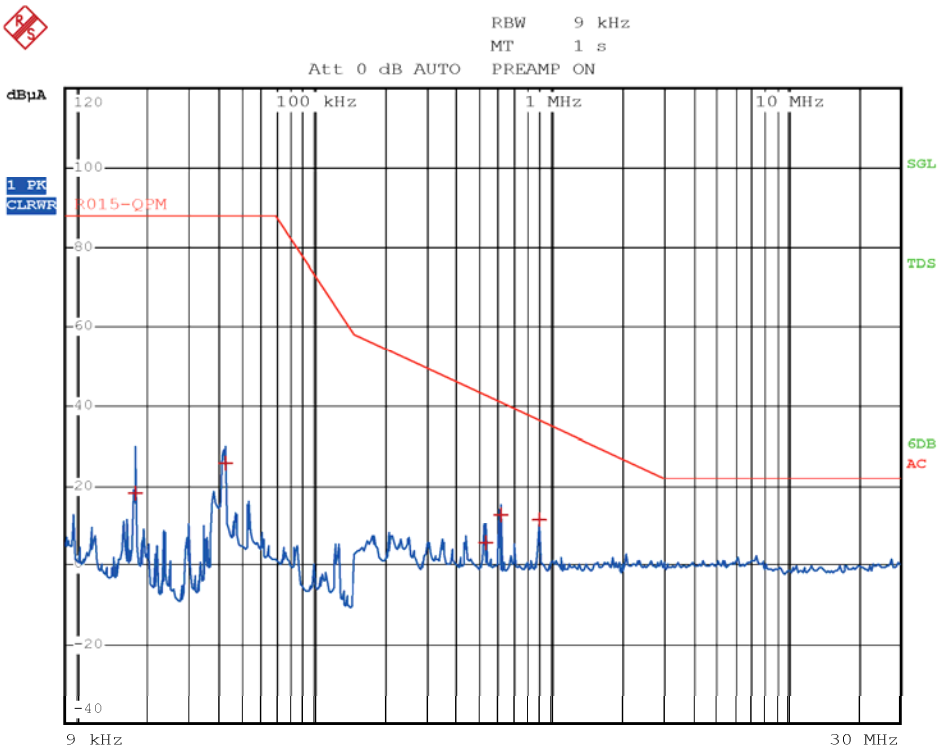
*The limits decrease linearly with the logarithm of the frequency
**The limits increase linearly with the logarithm of the frequency

5.2.4 Test result

Verdict:	☒ P ☐ F ☐ N
Frequency range:	0.009 MHz – 30 MHz
Kind of test site:	Laboratory
Remarks:	

5.2.5 Test protocol

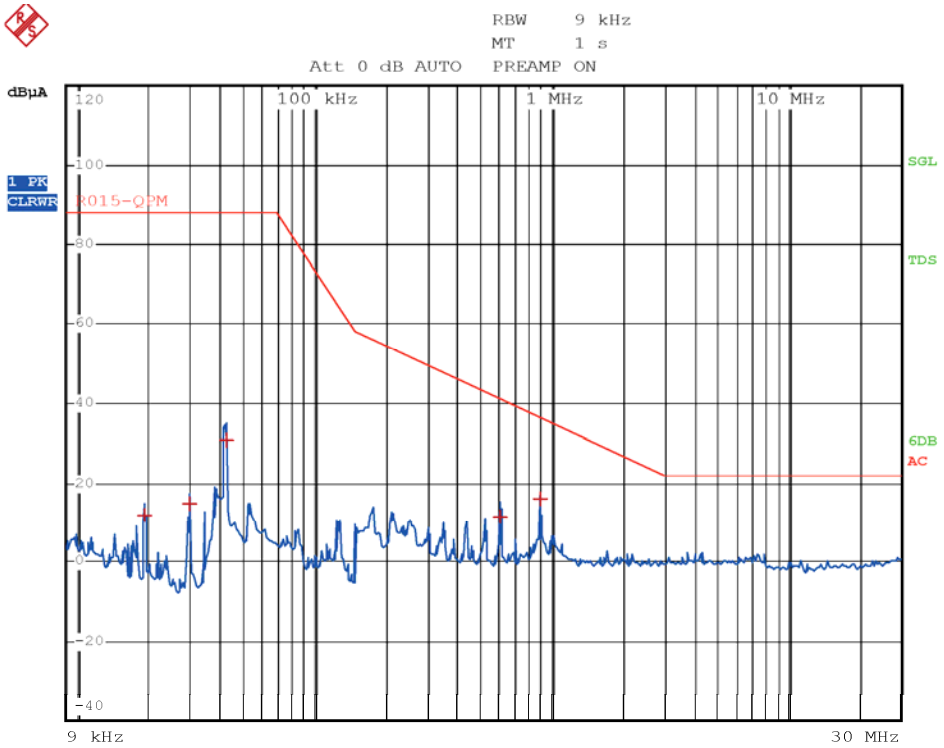
Antenna polarization: Axis 1 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -



Date: 16.OCT.2019 10:11:18

Frequency (MHz)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)	Detector
0.0177	18.3	88.0	-69.7	QP
0.0428	25.9	88.0	-62.1	QP
0.5300	5.6	42.8	-37.3	QP
0.6140	12.7	41.1	-28.3	QP
0.9020	11.4	36.4	-25.1	QP

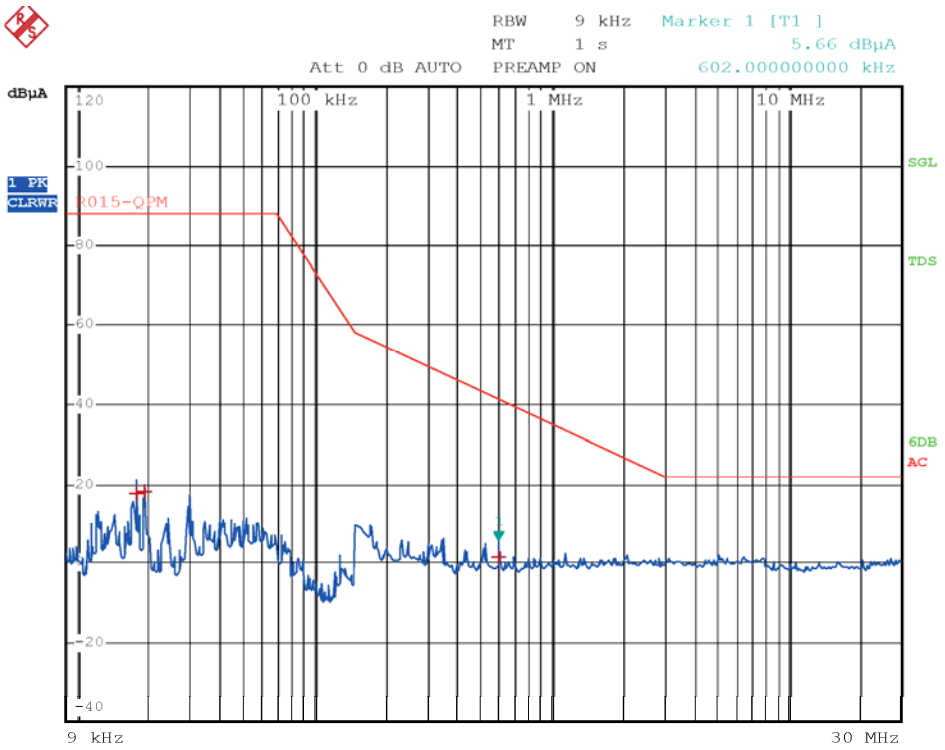
Antenna polarization: Axis 2 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -



Date: 16.OCT.2019 10:16:56

Frequency (MHz)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)	Detector
0.0192	12.0	88.0	-76.0	QP
0.0299	14.8	88.0	-73.2	QP
0.0428	30.7	88.0	-57.3	QP
0.6100	11.4	41.1	-29.7	QP
0.9020	16.1	36.4	-20.4	QP

Antenna polarization: Axis 3 Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -



Date: 16.OCT.2019 10:30:54

Frequency (MHz)	Level (dBµA/m)	Limit (dBµA/m)	Margin (dB)	Detector
0.0177	18.0	88.0	-70.0	QP
0.0192	18.4	88.0	-69.6	QP
0.6020	1.5	41.3	-39.8	QP

5.2.6 Test equipment used

Equipment	Manufacturer	Model	Serial No.
Triple loop antenna	R&S	HM020	836 950/006
EMI receiver 20 Hz ÷ 8 GHz	R&S	ESU8	100202
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530
Shielded room	Siemens	10m control room	1947

5.3 Terminal disturbance voltages in the frequency range 9 kHz to 30 MHz

5.3.1 Photo documentation of the test set-up

5.3.2 Test method

Measurements were made on a ground plane that extends 1-meter minimum beyond all sides of the system under test. All power was connected to the system through Line Impedance Stabilization Networks (LISN). Conducted voltage measurements on mains lines were made at the output of the LISN. Conducted voltage on load terminals were made by using a 1500 Ω probe. Measurement at control terminals shall be carried out by means of an impedance stabilization network as described in EN 55022. The ISN shall be bounded to ground.

5.3.3 Limits for mains terminals

Frequency (MHz)	Limit (dBµV)	
	Quasi-Peak	Average
0.009 TO 0.05	110	-
0.05 TO 0.15	90 to 80*	-
0.15 TO 0.50	66 to 56*	56 to 46*
0.50 TO 5	56	46
5 TO 30	60	50

*The limits decrease linearly with the logarithm of the frequency

5.3.4 Limits for load terminals

Frequency (MHz)	Limit (dBµV)	
	Quasi-Peak	Average
0.15 TO 0.50	80	70
0.50 TO 30	74	64

5.3.5 Limits for control terminals

Frequency (MHz)	Limit (dBµV)	
	Quasi-Peak	Average
0.15 TO 0.50	84 to 74*	74 to 64*
0.50 TO 30	74	64

*The limits decrease linearly with the logarithm of the frequency

5.3.6 Test result

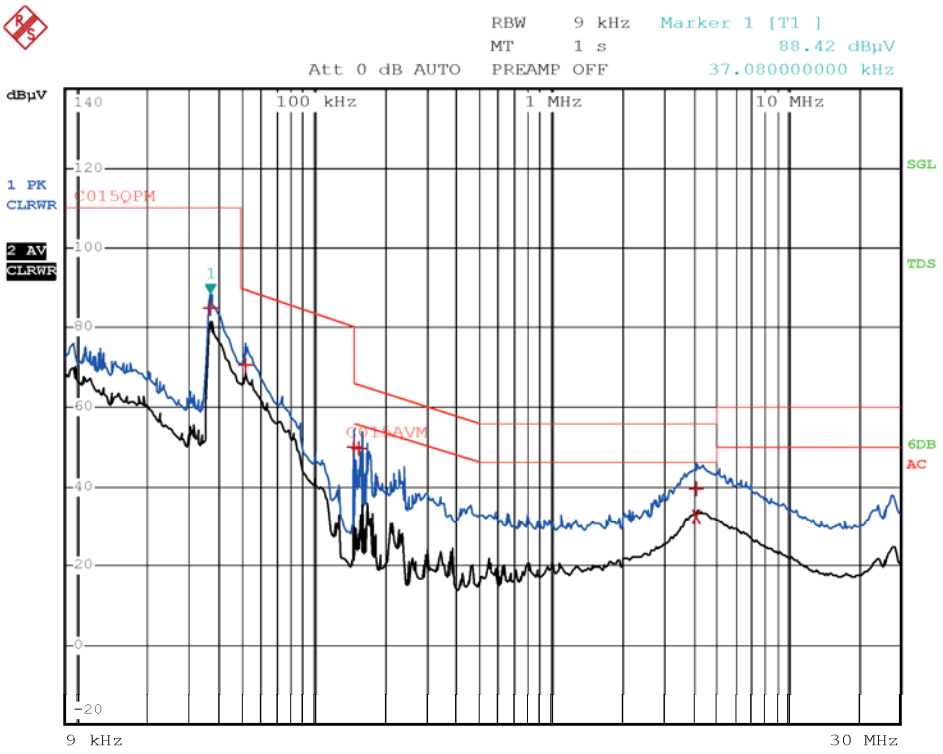
Verdict for mains terminals:	☒ P ☐ F ☐ N
Verdict for load terminals:	☐ P ☐ F ☒ N
Verdict for control terminals:	☐ P ☐ F ☒ N
Frequency range:	0.009 MHz – 30 MHz
Kind of test site:	Shielded room
Remarks:	

5.3.7 Test equipment used

Equipment	Manufacturer	Model	Serial N°
LISN 9 kHz ÷ 30 MHz	R&S	ESH2-Z5	872 460/041
EMI receiver 20 Hz ÷ 8 GHz	R&S	ESU8	100202
Shielded room	Siemens	Conducted emission test room	1862

5.3.8 Test protocol

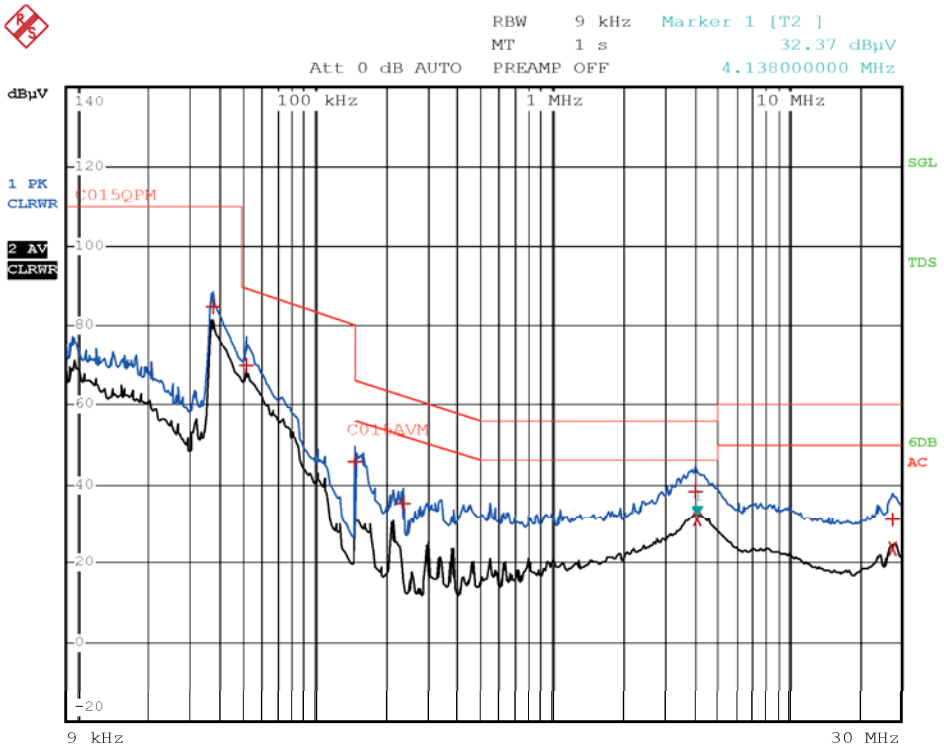
Test point: Phase line Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -



Date: 16.OCT.2019 09:14:44

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.0371	84.8	110.0	-25.2	QP
0.0522	70.5	89.6	-19.1	QP
0.1500	50.1	80.0	-29.9	QP
0.1580	49.5	65.6	-16.0	QP
4.1540	32.3	46.0	-13.7	Av
4.1580	39.6	56.0	-16.4	QP

Test point: Neutral line Verdict: Pass
Operation mode: 1
Configuration mode: 1
Remarks: -



Date: 16.OCT.2019 09:08:04

Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.0372	84.8	110.0	-25.2	QP
0.0519	69.5	89.7	-20.2	QP
0.1500	45.8	80.0	-34.2	QP
0.2340	35.4	62.3	-26.9	QP
4.0660	38.2	56.0	-17.8	QP
4.1380	31.1	46.0	-14.9	Av
27.5260	31.2	60.0	-28.8	QP
27.8060	23.5	50.0	-26.5	Av

5.4 Harmonics of current

5.4.1 Photo documentation of the test set-up

5.4.2 Test method according to EN 61000-3-2

This test consists on the measurement of harmonics components of the input current which may be produced by equipment having an input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.

5.4.3 Limits for Class C equipment with an active input power > 25 W

For lighting equipment having an active input power greater than 25 W, the harmonic currents shall not exceed the relative limits given in the following table:

Harmonic order (n)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	30 λ *
5	10
7	7
9	5
11 ≤ n ≤ 39	3
* λ is the circuit power factor	

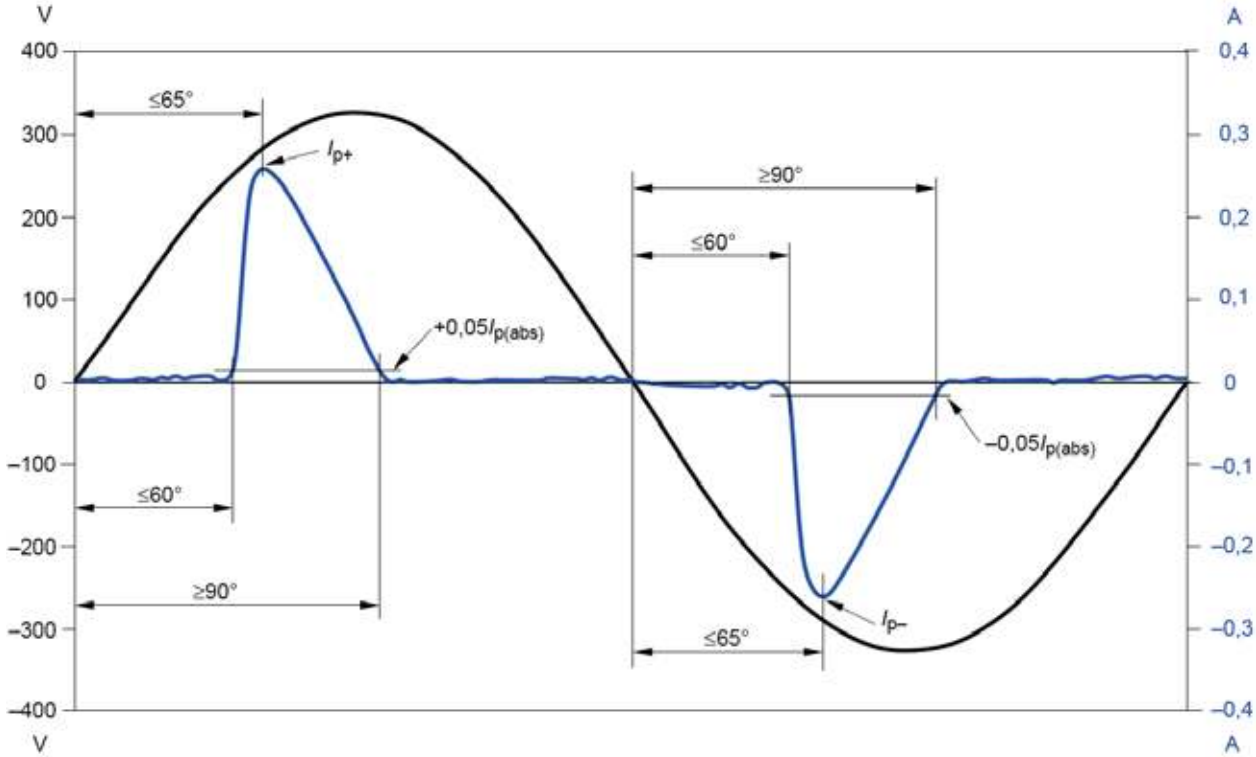
5.4.4 Limits for Class C equipment with an active input power < 25 W

Discharge lighting equipment having an active input power smaller than or equal to 25 W shall comply with one of the following two sets of requirements.

1) The harmonic currents shall not exceed the power-related limits of the following table:

Harmonic order (n)	Maximum permissible harmonic current per watt mA/W
3	3.4
5	1.9
7	1.0
9	0.5
11	0.35
13 ≤ n ≤ 39	3.85/n

2) The third harmonic current, expressed as a percentage of the fundamental current, shall not exceed 86 % and the fifth harmonic current shall not exceed 61 %. Also, the waveform of the input current shall be such that it reaches the 5 % current threshold before or at 60º, has its peak value before or at 65º and does not fall below the 5 % current threshold before 90º, referenced to any zero crossing of the fundamental supply voltage. The current threshold is 5 % of the highest absolute peak value that occurs in the measurement window, and the phase angle measurements are made on the cycle that includes this absolute peak value.



5.4.5 Test result

Verdict:	☒ P ☐ F ☐ N
Frequency range:	0 kHz – 2 kHz
Kind of test site:	Laboratory
Class:	C
Remarks:	

5.4.6 Test protocol

Operation mode: 1
Configuration mode: 1
Remarks: -

Verdict: Pass

Measured values			
Fundamental Current			
Line 1:	0.97 A		
Active input Power			
Line 1:	220.272 W *		
Circuit power factor			
Line 1:	0.977 *		

** Absolute value.*

Current Test Result

Average and Maximum harmonic current results									
Hn	Average (100% / 150% *)				Maximum (150%)				Harmonic Result
	Ieff [%]	of Limit [%]	Limit [%]	Result	Ieff [%]	of Limit [%]	Limit [%]	Result	
1	100.000				100.000				
2	0.072	3.623	2.000	n/a	0.102	3.410	3.000	n/a	n/a
3	9.513	32.463	29.305	PASS	9.577	21.788	43.957	PASS	PASS
4	0.082				0.113				
5	5.689	56.886	10.000	PASS	5.715	38.098	15.000	PASS	PASS
6	0.078				0.109				
7	3.686	52.663	7.000	PASS	3.699	35.227	10.500	PASS	PASS
8	0.074				0.109				
9	2.113	42.260	5.000	PASS	2.131	28.414	7.500	PASS	PASS
10	0.070				0.107				
11	1.116	37.191	3.000	PASS	1.132	25.164	4.500	PASS	PASS
12	0.070				0.104				
13	0.430	14.347	3.000	n/a	0.450	10.001	4.500	n/a	n/a
14	0.072				0.103				
15	0.100	3.340	3.000	n/a	0.132	2.938	4.500	n/a	n/a
16	0.074				0.104				

17	0.136	4.547	3.000	n/a	0.165	3.672	4.500	n/a	n/a
18	0.072				0.103				
19	0.193	6.448	3.000	n/a	0.229	5.089	4.500	n/a	n/a
20	0.075				0.106				
21	0.248	5.502	4.500	n/a	0.275	6.113	4.500	n/a	n/a
22	0.077				0.109				
23	0.176	3.920	4.500	n/a	0.202	4.482	4.500	n/a	n/a
24	0.120				0.152				
25	0.190	4.225	4.500	n/a	0.217	4.821	4.500	n/a	n/a
26	0.086				0.119				
27	0.307	6.823	4.500	n/a	0.374	8.317	4.500	n/a	n/a
28	0.080				0.112				
29	0.084	1.865	4.500	n/a	0.117	2.600	4.500	n/a	n/a
30	0.112				0.140				
31	0.155	3.455	4.500	n/a	0.183	4.070	4.500	n/a	n/a
32	0.072				0.103				
33	0.105	2.331	4.500	n/a	0.137	3.048	4.500	n/a	n/a
34	0.070				0.102				
35	0.197	4.374	4.500	n/a	0.220	4.884	4.500	n/a	n/a
36	0.072				0.106				
37	0.076	1.691	4.500	n/a	0.109	2.431	4.500	n/a	n/a
38	0.075				0.108				
39	0.178	3.947	4.500	n/a	0.205	4.556	4.500	n/a	n/a
40	0.077				0.107				

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.
** Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.*

5.4.7 Test equipment used

Equipment	Manufacturer	Model	Serial N°
Mains analyzer	EMTEST	DPA 500N	P1735202736
Power source	Elettrotest	TPS/M/6000	358 04/18

5.5 Voltage changes, voltage fluctuations and flicker

5.5.1 Photo documentation of the test set-up

5.5.2 Test method according to EN 61000-3-3

This test consists on the measurement of voltage changes, voltage fluctuations and flicker which may be produced by equipment having an input current ≤ 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.

5.5.3 Limits for low voltage AC mains port

The value of Pst shall be not greater than 1.0.
The value of Plt shall be not greater than 0.65.
The value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms.
The relative steady-state voltage change, dc shall not exceed 3.3 %.
The maximum relative voltage change dmax shall not exceed:

a) 4 % without additional conditions
b) 6 % for equipment which is switched manually, or switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption
c) 7 % for equipment which is attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as mowers, portable tools such as electric drills), or switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

5.5.4 Test result

Verdict:	☒ P ☐ F ☐ N
Frequency:	50 Hz
Kind of test site:	Laboratory
Remarks:	

5.5.5 Test protocol

Operation mode: 1
Configuration mode: 1
Remarks: -

Verdict: Pass

Flicker Measurements Settings		
Main line:	230V, 50Hz	
Flicker Meter:	230V / 50Hz	
Flicker Impedance:	Zref	
Observation Time:	1 × 10 min	
Measurements performed:	1	

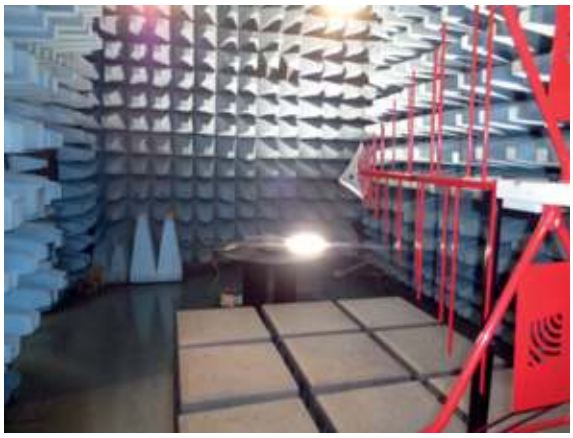
Flicker Measurements					
	P_{lt}	Max P_{st}	Max D_c	Max D_{max}	Max T_{max}
Line 1:	0.012	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

5.5.6 Test equipment used

Equipment	Manufacturer	Model	Serial N°
Mains analyzer	EMTEST	DPA 500N	P1735202736
Power source	Elettrotest	TPS/M/6000	358 04/18

5.6 Immunity to radio-frequency electromagnetic fields

5.6.1 Photo documentation of the test set-up



5.6.2 Test method according to EN 61000-4-3

The test allows estimating of the radiated immunity of electrical and electronic equipment to electromagnetic disturbances coming from intended radio-frequency (RF) transmitters in the frequency range 80 MHz to 1000 MHz. The interference is applied on the enclosure of the equipment by using transmitting antennas. Measurements are made in a fully anechoic chamber and the indicated field strength is pre-calibrated prior to placement of the system under test.

5.6.3 Test specification

Frequency range:	80 to 1000 MHz			
Field strength:	3 V/m			
EuT - antenna separation:	2.2 m			
Modulation:	AM with 80 % in depth and 1 kHz sine wave			
Frequency step:	1 % with 3 s dwell time			
Antenna polarisation:	horizontal		vertical	
Antenna position:	front	rear	left	right

5.6.4 Test result

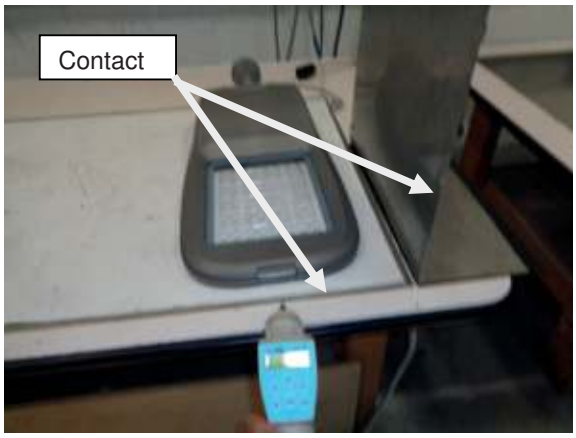
Verdict:	☒ P ☐ F ☐ N
Performance Criterion:	A
Operation mode:	1
Configuration mode:	1
Kind of test site:	Anechoic chamber
Remarks:	

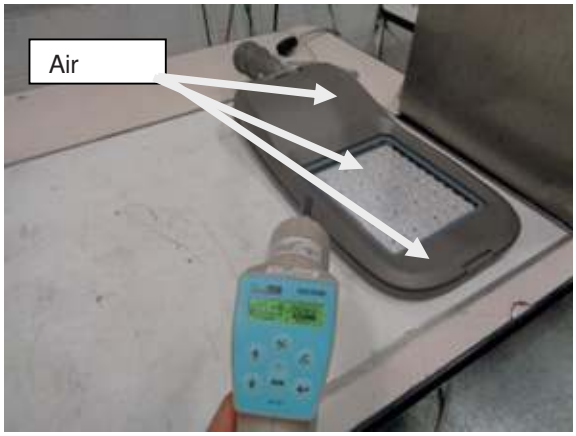
5.6.5 Test equipment used

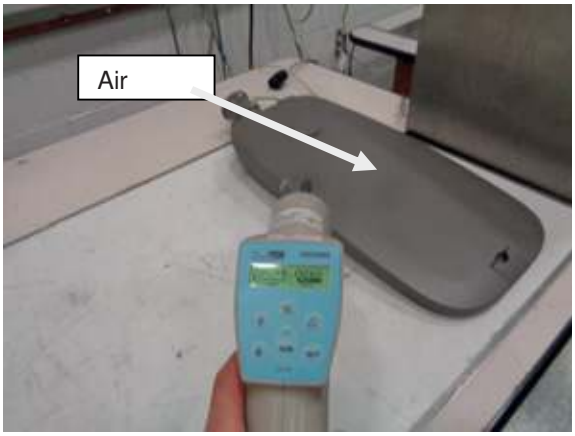
Equipment	Manufacturer	Model	Serial N°
Biconilog antenna (20 ÷ 6000 MHz)	ETS Lindgren	3142E	00213197
RF generator (10 ÷ 20000 MHz)	R&S	SMP22	839 762/107
Broadband amplifier (80 ÷ 1000 MHz)	R&S	BBA100	101163
Power sensor	R&S	NRP18AN	100987
Semi-anechoic chamber	Nemko	3m semi-anechoic chamber	70
Shielded room	Siemens	3m control room	3

5.7 Immunity to electrostatic discharges

5.7.1 Photo documentation of the test set-up







5.7.2 Test method according to EN 61000-4-2

The test is intended to demonstrate the immunity of equipment subjected to static electricity discharges from operators directly and to adjacent objects. The table-top equipment under test is placed on a wooden table, 0.8 m high, standing on the ground reference plane. A horizontal coupling plane (HCP) is placed on the table. The EUT and the cables are isolated from the coupling plane by an insulating support 0.5 mm thick. The floor standing equipment is isolated from the ground reference plane by an insulating support about 0.1 m thick. The vertical coupling plane (VCP) of dimensions 0.5 m x 0.5 m is placed parallel to, and positioned at a distance of 0.1 m from, the EUT. Air discharges are applied to non-metallic parts of the system. Contact discharges are applied to all accessible metallic parts. Discharges are also applied to the Horizontal and Vertical Coupling Planes.

5.7.3 Test specification

Contact discharge voltage:	4kV	
Air discharge voltage:	8kV	
Discharge impedance:	330 Ω / 150 pF	
Time between successive discharges:	≥ 1 s	
Number of discharges:	≥ 10	
Type of direct discharge:	air discharge	contact discharge
Type of indirect discharge:	contact discharge	
Polarity:	positive	negative

5.7.4 Test result

Discharge location	Type of discharge
Horizontal coupling plane (HCP)	Contact
Vertical coupling plane (VCP)	Contact
Accessible conductive parts of enclosure	Contact
Accessible Screws	Contact
Accessible non-conductive parts of enclosure	Air
Connector	Air
Transparent led protection	Air

Verdict:	☒ P ☐ F ☐ N
Performance Criterion:	B
Operation mode:	1
Configuration mode:	1
Kind of test site:	Laboratory
Remarks:	

5.7.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°
ESD Test system	EMC Partner	ESD3000	252

5.8 Immunity to injected currents (radio-frequency common mode)

5.8.1 Photo documentation of the test set-up

5.8.2 Test method according to EN 61000-4-6

The test allows estimating of the conducted immunity of electrical and electronic equipment to electromagnetic disturbances coming from intended radio-frequency (RF) transmitters in the frequency range 150 kHz to 80 MHz. The interference is applied on mains supply, signal line and earth connection ports by using coupling decoupling networks or a clamp. Measurements are made on a ground plane. The EUT was located 10cm above the reference ground plane and any associated I/O cables attached to the EUT are located between 30mm and 50mm above the ground plane. The indicated field is pre-calibrated prior to placement of the system under test.

5.8.3 Test specification

Frequency range:	0.15 MHz to 80 MHz
Test voltage:	3 V
Modulation:	AM with 80 % in depth and 1 KHz sine wave
Frequency step:	1 % with 3 s dwell time

5.8.4 Test result

Coupling point	Coupling and decoupling devices	Verdict
AC Mains	M2	P

Verdict:	☒ P ☐ F ☐ N
Performance Criterion:	A
Operation mode:	1
Configuration mode:	1
Kind of test site:	Laboratory
Remarks:	

5.8.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°
Coupling/decoupling network	EM Test	CDN M2 / M3	0307-16
RF Conducted immunity test equipment	EM Test	CWS500 CSI	V0710102305
Attenuator 6dB	EM Test	ATT6/75	0206-18
Shielded room	Siemens	Conducted immunity test room	68

5.9 Immunity to fast transients

5.9.1 Photo documentation of the test set-up

5.9.2 Test method according to EN 61000-4-4

The test is intended to demonstrate the immunity of equipment subjected to types of transient disturbances such as those originating from switching transients (interruption of inductive loads, relay contact bounce….). The bursts are applied on the mains supply port by using a coupling decoupling network and on signal and control lines ports by using a capacitive clamp. Measurements are made on a ground plane.

5.9.3 Test specification

AC power port	1 kV	
DC power port	0.5 kV	
Signal and control lines	0.5 kV	
Rise time/hold time	5/50 ns	
Burst frequency:	5.0 kHz	
Coupling duration:	≥ 120 s	
Polarity:	positive	negative

5.9.4 Test result

Coupling point	Level	Coupling devices	Verdict
AC Mains	1 kV	Network	P

Verdict:	☒ P ☐ F ☐ N
Performance Criterion:	B
Operation mode:	1
Configuration mode:	1
Kind of test site:	Laboratory
Remarks:	

5.9.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°
Multifunction generator	EMC partner	IMU 3000	F5-S-D-V-1505

5.10 Immunity to surges

5.10.1 Photo documentation of the test set-up

5.10.2 Test method according to EN 61000-4-5

The test allows estimating of the conducted immunity of electrical and electronic equipment to unidirectional surges caused by over voltages from switching and lighting transients. The interference is applied on symmetrical and unsymmetrical modes on mains supply port by using coupling decoupling network. Pulses shall be applied to the a.c. voltage wave as follows; five positive polarity pulses at the 90º phase angle, five negative polarity pulses at the 270º phase angle. Two test levels are given for different types of lighting equipment. Each surge was applied 60 seconds after the previous surge.

5.10.3 Test specification for AC power ports

Characteristics	Test levels		
	Device		
	Self-ballasted lamps and semi-luminaires	Luminaires and independent auxiliaries	
		Input power	
		≤25W	>25W
Wave-shape data	1.2/50 µs	1.2/50 µs	1.2/50 µs
Test level for line to line surge	±0.5 kV	±0.5 kV	±1.0 kV
Test level for line to ground surge	±1.0 kV	±1.0 kV	±2.0 kV

Number of surges:	5 Surges/Phase angle	
Source impedance	2 Ω + 18µF (line to line) and 12 Ω + 9µF (line to ground)	
Phase angle:	90°	270°
Repetition rate:	60 s	
Rise time:	1.2 µs	
Time to half value:	50 µs	
Polarity:	positive	negative

5.10.4 Test result

Coupling point	Level	Coupling network	Verdict
AC power port – line to line	0.5, 1 kV	2 Ω + 18µF	P
AC power port – line to ground	0.5, 1 kV and 2 kV	12 Ω + 9µF	P

Verdict:	☒ P ☐ F ☐ N
Performance Criterion:	C (B for Luminaire for emergency lighting)
Operation mode:	1
Configuration mode:	1
Kind of test site:	Laboratory
Remarks:	

5.10.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°
Multifunction generator	EMC partner	IMU 3000	F5-S-D-V-1505

5.11 Immunity to Power frequency magnetic fields

5.11.1 Photo documentation of the test set-up

5.11.2 Test method according to EN 61000-4-8

This test is intended to demonstrate the immunity of equipment when subjected to power frequency magnetic fields. The test magnetic field is obtained by a current flowing in an induction coil; the application of the test field to the EUT is by the immersion method.

5.11.3 Test specification

Test frequency:	50 Hz		
Continuous field intensity:	3 A/m		
Duration (Continuous field):	60 s each Axis		
Axis:	x-axis	y-axis	z-axis

5.11.4 Test result

Verdict:	☒ P ☐ F ☐ N
Performance Criterion:	A
Operation mode:	1
Configuration mode:	1
Kind of test site:	Helmholtz coils
Remarks:	

5.11.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°
Field strength meter Vac	Holaday	HI-3604	86265
Transformer 240/24 V 2.5 KVA	Eletras	220/24	2.459
Variac	RS	WCV 8E-1	3/122017
Helmholtz induction coil antenna	G.I.E.	IEC 1000-4-8	111962

5.12 Immunity to voltage dips and short interruptions

5.12.1 Photo documentation of the test set-up

5.12.2 Test method according to EN 61000-4-11

The test allows estimating of the conducted immunity of electrical and electronic equipment connected to low-voltage power supply networks for voltage dips and short interruptions. Testing is performed with the product connected directly to a generator capable of simulating the voltage drops and interrupts as described.

5.12.3 Test specification

Nominal Mains Voltage	230 Vac	
Rated frequency	50 Hz	
Number of voltage dips and interruptions	3	
Sync Angle	0°	
Test voltage level	70 %	0 %
Number of periods	10	0.5

5.12.4 Test result

	Level of reduction	Residual voltage	Duration	Performance criterion	Verdict
1	100%	0%	0.5 period	C	P
2	30%	70%	10 periods	B	P

Verdict:	☒ P ☐ F ☐ N
Performance Criterion:	B and C
Operation mode:	1
Configuration mode:	1
Kind of test site:	Laboratory
Remarks:	

5.12.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°
Multifunction generator	EMC partner	IMU 3000	F5-S-D-V-1505

6 EUT PHOTOS

End of report

Masate, February 10th, 2020

COVER PAGE

Elaborated for: RELCO Srl

Address: Via delle Azalee 6/A

20090 BUCCINASCO (MI)

Test begun on: February 10th, 2020

At presence of: Mr. Paolo PRESTIFILIPPO RELCO Srl

Performed by: Ing. Andrea PECCHIO

Elaborated by: Ing. Andrea PECCHIO

Approved by: Ing. Ermes TARALLO

Test performed in: Centrotecnica S.r.l.
Via F. Confalonieri, 23
20060
Masate (MI)

This document is distributed to:
RELCO SRL as above

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1. INDEX

1. INDEX 2

2. HARDWARE DESCRIPTION 3

2.1 ITEMS 3

2.2 FIXTURES 4

3. TEST METHOD 5

3.1 STANDARD 5

3.1.1 TESTS PROFILES 6

3.2 TEST SEQUENCE 7

4. TEST DESCRIPTION 7

4.1 HARDWARE PREPARATION 7

4.2 ACCELEROMETERS MOUNTING 7

4.3 GENERAL CONTROL AND MEASUREMENT STRATEGIES. CHANNELS AND TEST POINTS (T.P.) DESCRIPTION. 8

4.4 TEST PICTURES 9

4.4.1 Z AXIS SETUP 9

4.4.2 ACCELEROMETERS DETAIL 10

4.4.3 EUT AT TEST END 11

5. TEST HISTORY 13

6. CONCLUSION 14

7. USED FACILITIES AND CALIBRATION 15

Notes

EUT = Equipment Under Test

TP = Test Point

Date format = (dd/mm/yyyy)

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2. HARDWARE DESCRIPTION

2.1 ITEMS

The object to be tested in these tests is described in the following:

LED SEMPIONE
Part N.: 36200

Overall dimensions of unit:

Length:	613	mm
Width:	299	mm
Weight:	6	kg

Centrotecnica Code: P33119

The sampling has been performed at Client responsibility

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2.2 FIXTURES

To interface the unit to be tested to the test machine, the following fixtures have been used:

Fixture N.: LAB157 - 1001

Type: Plate
Material: Aluminium
Dimensions:
- Length: 335 mm
- Width: 600 mm
- Height: 20 mm

Mass: 11 kg
Mounting: M8 screws

Fixture N.: LAC68 - 1006

Type: Fixture per lampada
Material: Inox
Dimensions:
- Height: 130 mm

Mass: 2.8 kg
Mounting: 4 M8 screws

Fixture N.: LAB102 - 1000

Type: Expander
Material: Magnesium
Dimensions:
- Length: 600 mm
- Width: 600 mm
- Height: 192 mm

Mass: 50 kg
Mounting: 20 M8 screws

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3. TEST METHOD

According to Customer's Test Plan, the following specifications and test sequence have been applied:

3.1 STANDARD

These tests are aimed to impose to the item the following test levels:

REFERENCE STANDARD:	**IEC 60598-1:2014**
TEST LEVEL:	**§4.20 ROUGH SERVICE LUMINAIRE**
REFERENCE PROCEDURE	**IEC 60068-2-6:2007**
PROFILE:	S) SINE VIBRATION TEST

Reference laboratory test procedure: PT0901 issue 6

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3.1.1 TESTS PROFILES

S) SINE VIBRATION TEST

Test Parameters

Signal Plot Points: 256
Linear average number: 30
Drive limit (V Pk): 2
Measurement Strategy: Filter
Bandwidth (%): 25
Compression Rate: Fast
Sweeping Rate: 1 Oct/Min
Control Strategy: Single Channel
Initial drive (V): 0.005
Sweep Type: Logarithmic
Filter Type: Proportional Filter
Abort sensitivity: 0.44
Ramp Rate: Slow

Testing Profile

Frequency	Acceleration	Velocity	Displacement	Segment Type	High Abort	High Alarm	Low Alarm	Low Abort
10 Hz	0.140899 g	0.0219911 m/s	0.7 mm		6 dB	3 dB	-3 dB	-6 dB
				Const. Ampl.				
55 Hz	4.26219 g	0.120951 m/s	0.7 mm		6 dB	3 dB	-3 dB	-6 dB

Physical Quantity	Max. Profile Value
Acceleration (g)	4.2622 (Peak)
Pk Velocity (m/s)	0.12095
Peak-Peak Displacement (mm)	0.7

Run Schedule

12.19793 Sweeps; Start: 10Hz; Range: 10Hz to 55Hz; Level: 0.00dB;
Duration: 00:30:00 Sweeping Rate: 1 Oct/Min
Save signals to PC (Save results to PC)
My Report (Create Report(My Report))

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3.2 TEST SEQUENCE

Test Profile	Unit Axis*
S) SINE VIBRATION TEST	Z

* See following paragraph 4.4 for the reference test axes.

4. TEST DESCRIPTION

4.1 HARDWARE PREPARATION

For the test along vertical axis “pole” fixture LAC068-1006 has been used to keep the EUT in the natural mounting position.
EUT has been mounted on fixture LAC068-1006 and fixed with the two M8 screws present on the mounting body.
Fixture LAC068-1006 has then been fixed on the plate LAB 157 for the the test on the V864 slip table for the test in the longitudinal X axis and transversal Y axis .

Environmental Condition measured at the beginning of Test:
Temperature: 19.7 °C +/- 1°C
Relative Humidity : 36.2 %+/- 5%

4.2 ACCELEROMETERS MOUNTING

The accelerometers property of Centrotecnica have been mounted by way of dedicated biadhesive labels or cyanoacrylic glue or screw.
Accelerometers mounting procedure is in agreement with UNI ISO 5348 "Montaggio meccanico degli accelerometri" in the last edition.

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4.3 GENERAL CONTROL AND MEASUREMENT STRATEGIES. CHANNELS AND TEST POINTS (T.P.) DESCRIPTION.

One control accelerometer has been used to keep control of the test level imposed by the shaker.
One mono-axial accelerometer has been used to acquire the EUT response during the tests.
Pictures at para 4.4 and following table make clear the disposition of the Tests Points.

TEST POINT	POSITION	USED TO
TP1	Fixture Plate LAB1571001	Control the vibration level
TP2	EUT CoG	Measure the vibration level

The following table summarizes the measure channels features (see following paragraph 7 for the features of used accelerometers):

Input Channel Table vibration Controller setup

Location ID	Measurement Quantity	Unit	Sensitivity	Input Mode	High-Pass Filter Fc	Sensor S/N
TP1-CONTR-FIX	Acceleration	g	92.4767095 (mV/g)	IEPE	2.00 Hz	CPA 75
TP2-EUT-MEAS	Acceleration	g	10.46369555 (mV/g)	IEPE	2.00 Hz	CPA 151

Location ID	Channel Type	Max Sensor Range (V)	Input Range	Control Weighting	Integration / Differentiation
TP1-CONTR-FIX	Control	20.0000 (V)	Auto	N/A	No Integration
TP2-EUT-MEAS	Monitor	20.0000 (V)	Auto	N/A	No Integration

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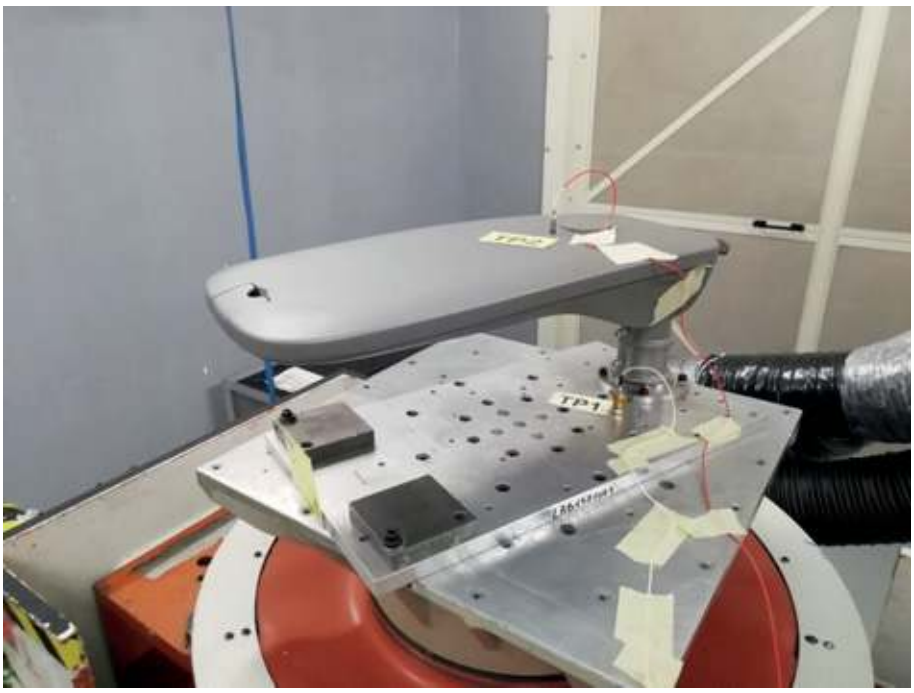
4.4 TEST PICTURES

4.4.1 Z AXIS SETUP



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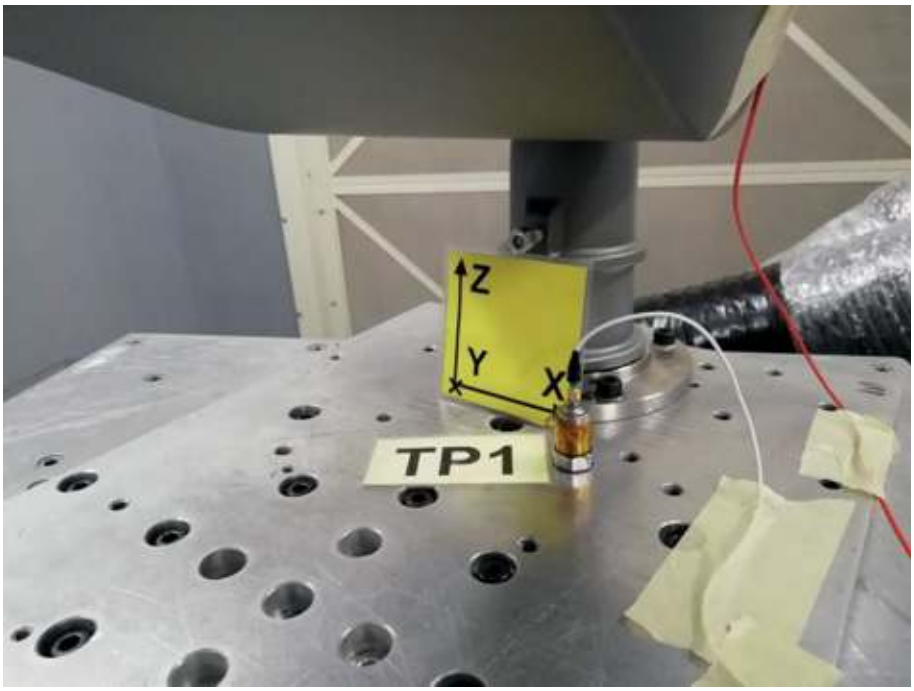
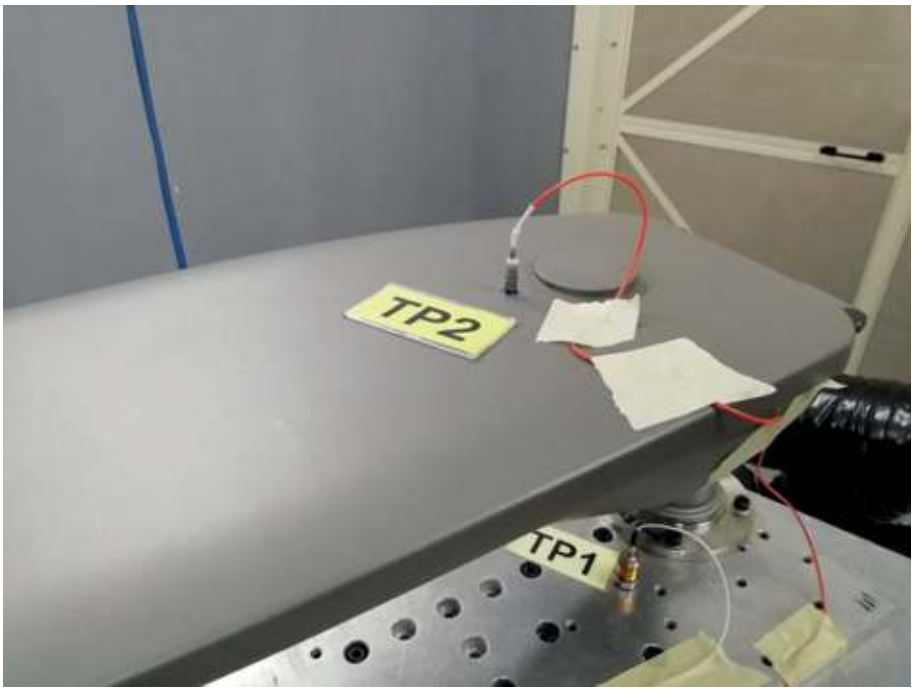
4.4.2 ACCELEROMETERS DETAIL





4.4.3 EUT AT TEST END

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5. TEST HISTORY

DATE	HOUR	RUN	AXIS	TEST PROFILE	NOTE
Feb. 10th '20	08.50				Customer with EUT arrival
					LDS 864 shaker rotating in vertical position
					Expander n.102 mounting on armature
					Fixture plate n. LAB 157 mounting on expander
					Fixture "pole" n. LAC 068-1006 mounting on LAB157 plate
					LAB 157 mounting on V824LS slip table
					EUT initial visual check
					EUT mounting on LAC 068-1006
					Accelerometers setting in TP1 and TP2
					Controller programming
	10.02	1	Z	S	Start of Sine vibration test
	10.32				End of Sine vibration test
					EUT visual check
					Accelerometers removing
					EUT removing
					EUT final visual check: no loosened parts found
					Fixtures removing
	12.20				End of test

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6. CONCLUSION

After having been subjected to vibration tests as described in this document a visual inspection, performed as per VD19679021REMS_CONFERMA TECNICA dated 04/02/2020 doesn't show any mechanical damage or loosened parts on item

LED SEMPIONE
Part N.: 36200

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7. USED FACILITIES AND CALIBRATION

Shaker

LDS Mod. V864-640/440 DPA20K S/N 14936

Control Instrumentation

CRYSTAL Mod. SPIDER 80X 8 CH S/N 2600960

LAST CALIBRATION : 04/03/2019
CAL. DUE DATE : 04/03/2020
CALIBRATED BY : CENTROTECNICA
CERTIFICATE N. : CT-RR-2019-002

Torque wrench

BETA Mod. 606/6 S/N 18602766

LAST CALIBRATION : 20/08/2019
CAL. DUE DATE : 20/08/2022
CALIBRATED BY : LAT 172
CERTIFICATE N. : C0119/19

Accelerometer

LABEL	MADE BY	MODEL	SERIAL NUM.	CALIB. DATE	CAL. DUE DATE	CERTIF. NUM.	SENSITIVITY	MASS
CPA151	PCB	353B18	LW211176	27/12/2019	27/12/2020	35830	1.067 mV/(m/s2)	
CPA075	Wilcoxon Reseach	726T	5637	27/12/2019	27/12/2020	35838	9.43 mV/(m/s2)	34 g

All accelerometers are calibrated by: CENTROTECNICA S.r.l.
CENTRO LAT N. 111

Thermoigrometer

PCE Mod. PCE - THB 40 S/N R061887

LAST CALIBRATION : 18/07/2018
CAL. DUE DATE : 18/07/2021
CALIBRATED BY : lat 123
CERTIFICATE N. : 18-SU-0865 18-SU-0869

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Vibration amplitude uncertainty

The measurement uncertainties stated in this document have been determined according to the ISO/IEC Guide 98 and to EA-4/02.
They have been estimated as expanded uncertainty obtained multiplying in the standard uncertainty by the coverage factor k=2 corresponding to a confidence level of about 95%.
The calculated uncertainty for acceleration is 10%.

Cross axis motion

The cross axis motion of the shaker has been measured and comply with test requirement of IEC 60068-2-6: 2007 par 4.1.2.1, IEC 60068-2-64:2008 par 4.3 and IEC 60068-2-27:2008 hereafter specified:
sine vibration – not exceed 50% up to 500Hz and 100% up to 2000 Hz
random vibration – not exceed -3db up to 500 Hz and 0 db up to 2000 Hz
rms value not exceed 50%
shock test - not exceed 30%
In case of large items the above values can be verified during test.

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ANNEXES

1.1 - Z AXIS - SINE VIBRATION TEST

The results described in the this test report attain exclusively to the items described in 2.1

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ANNEX 1.1

LED SEMPIONE

AXIS : Z

SINE VIBRATION TEST

(2 PLOTS)

The results described in the this test report attain exclusively to the items described in 2.1

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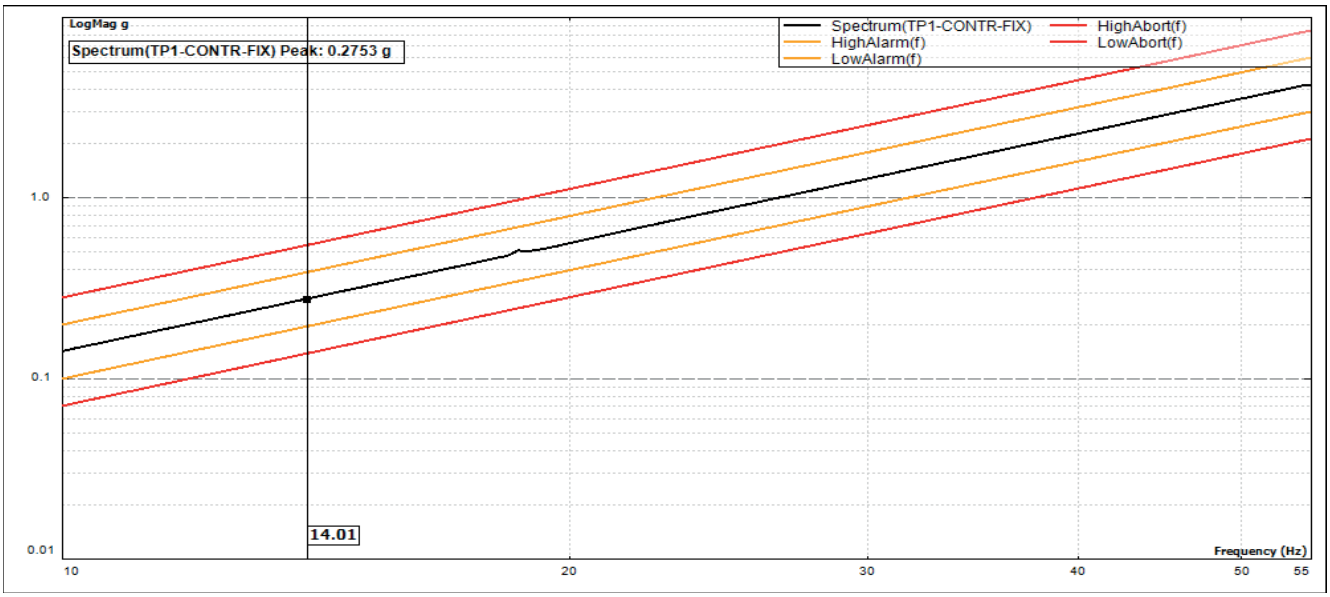
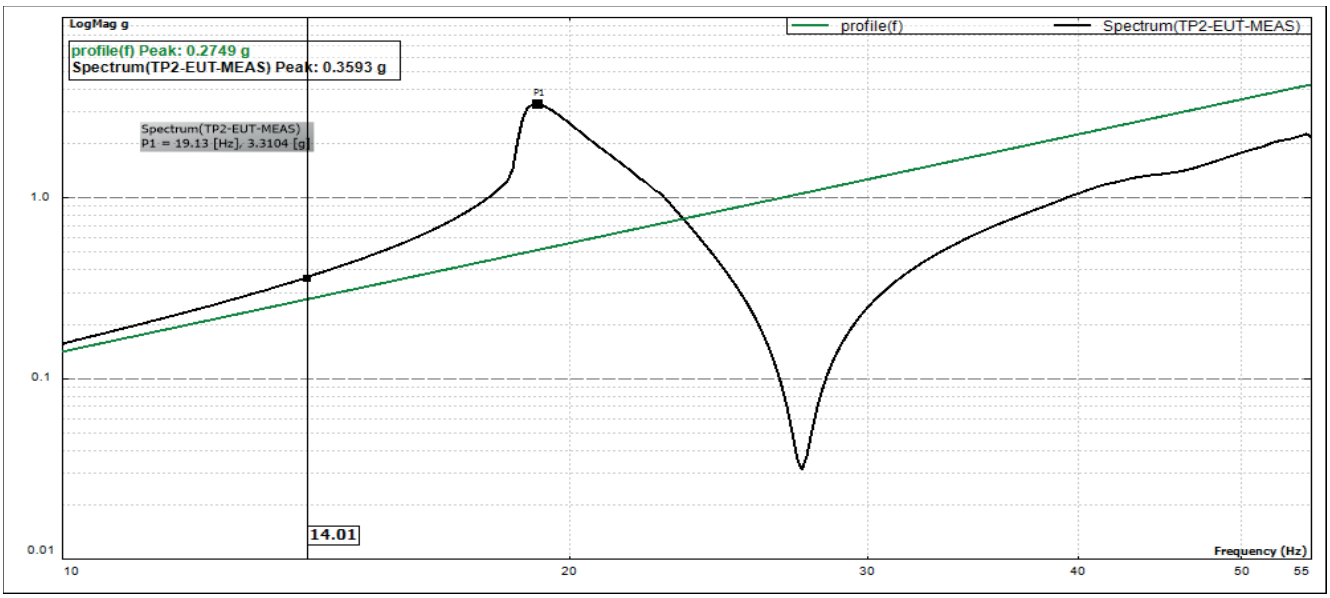
Report time: Feb-10-2020, 10:32:42 **Data measured at:** Feb-10-2020, 10:32:42
Test name: Z-SINE-TEST **Test type:** VCS (Swept Sine)
Test status: Test Running **Run folder:** 1.1_SINE_Z_1 Feb 10, 2020 10-02-16

(Spectrum(TP1-CONTR-FIX),HighAbort(f),HighAlarm(f),LowAbort(f), etc.[5])



Level: 0.0 dB **Control Pk:** 0.275 g **Target Pk:** 0.277 g
Remaining: 00:00:00 **Total elapsed:** 00:30:07 **Full level elapsed:** 00:30:00
Control Strategy: Single Channel **Sweeping Rate:** 1 Oct/Min **Sweep Number:** 13
Current Frequency: 14.01 Hz **Signal Plot Points:** 256**Sweep Type:** Logarithmic
Run Start Time: Feb-10-2020, 10:02:33

(profile(f),Spectrum(TP2-EUT-MEAS))



Level: 0.0 dB **Control Pk:** 0.275 g **Target Pk:** 0.277 g
Remaining: 00:00:00 **Total elapsed:** 00:30:07 **Full level elapsed:** 00:30:00
Control Strategy: Single Channel **Sweeping Rate:** 1 Oct/Min **Sweep Number:** 13
Current Frequency: 14.01 Hz **Signal Plot Points:** 256**Sweep Type:** Logarithmic
Run Start Time: Feb-10-2020, 10:02:33

REPORT END

The results described in the this test report attain exclusively to the items described in 2.1

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Superior high Flux for High Voltage System

High-Power LED - 5050 6V Series

S1W0-5050xx7006-00000000-00002

LM-80

RoHS

Product Brief

Description

- This White Colored surface-mount LED comes in standard package dimension. Package Size : 5.0x5.0x0.7mm
- It has a substrate made up of a molded plastic reflector sitting on top of a lead frame.
- The die is attached within the reflector cavity and the cavity is encapsulated by silicone.
- The package design coupled with careful selection of component materials allow these products to perform with high reliability

Features and Benefits

- High Intensity output and high luminance
- Designed for high voltage operation
- SMT solderable
- RoHS compliant
- Color coordinate: 2700K - 6500K

Key Applications

- General lighting
- Architectural lighting
- LED Bulbs
- Decorative / Pathway lighting

Table 1. Product Selection Table

Reference Code	Color	Nominal CCT	Part Number	CRI Min
STW0L8PA	Cool White	6500K	S1W0-5050657006-00000000-00002	70
		5700K	S1W0-5050577006-00000000-00002	
		5000K	S1W0-5050507006-00000000-00002	
	Neutral White	4000K	S1W0-5050407006-00000000-00002	
	Warm White	3500K	S1W0-5050357006-00000000-00002	
		3000K	S1W0-5050307006-00000000-00002	
		2700K	S1W0-5050277006-00000000-00002	

Table of Contents

Index

•	Product Brief	1
•	Table of Contents	2
•	Performance Characteristics	3
•	Characteristics Graph	4
•	Color Bin Structure	12
•	Mechanical Dimensions	17
•	Recommended Solder Pad	18
•	Reflow Soldering Characteristics	19
•	Emitter Tape & Reel Packaging	20
•	Product Nomenclature	22
•	Handling of Silicone Resin for LEDs	23
•	Precaution For Use	24
•	Company Information	27

Product Performance & Characterization Guide

Table 2. Characteristics, I_F=640mA, T_j=25ºC

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Forward Voltage	V_F	5.8	-	6.4	V
Luminous Flux	Φ_v[2]	550	-	750	lm
Correlated Color Temperature[3]	CCT	2,700	-	7,000	K
CRI[4]	Ra	70	-	80	-
Viewing Angle	2Θ1/2	-	120	-	deg.
Thermal resistance (J to S)[5]	$R\theta_{j\text{-}s}$	-	2.0	-	K/W
ESD Sensitivity(HBM)	-	Class 2 JEDEC JS-001-2017			

Table 3. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Forward Current	I_F	800	mA
Power Dissipation	P_D	5.0	W
Junction Temperature	T_j	125	ºC
Operating Temperature	T_{opr}	-40 ~ + 100	ºC
Storage Temperature	T_{stg}	-40 ~ + 100	ºC

Notes :

(1) Seoul Semiconductor maintains a tolerance of ±7% on flux and power measurements.

(2) Φ_V is the total luminous flux output as measured with an integrating sphere.

(3) Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.
Color coordinate : ±0.005, CCT ±5% tolerance.

(4) Tolerance is ±2.0 on CRI measurements.

- Calculated performance values are for reference only.
- All measurements were made under the standardized environment of Seoul Semiconductor.

Characteristics Graph

Fig 1. Color Spectrum, T_j=25℃, I_F=640mA

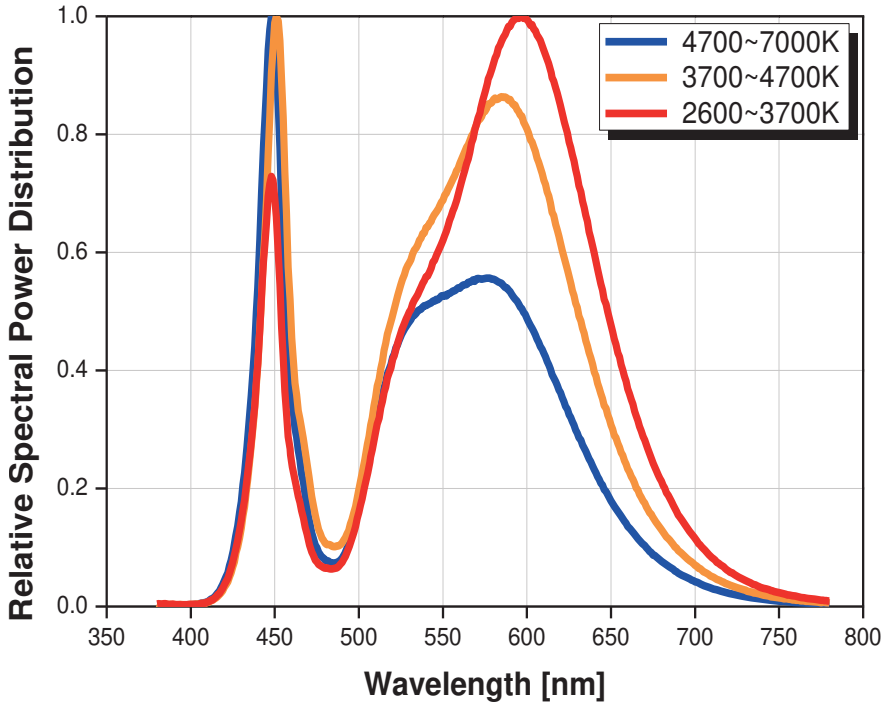
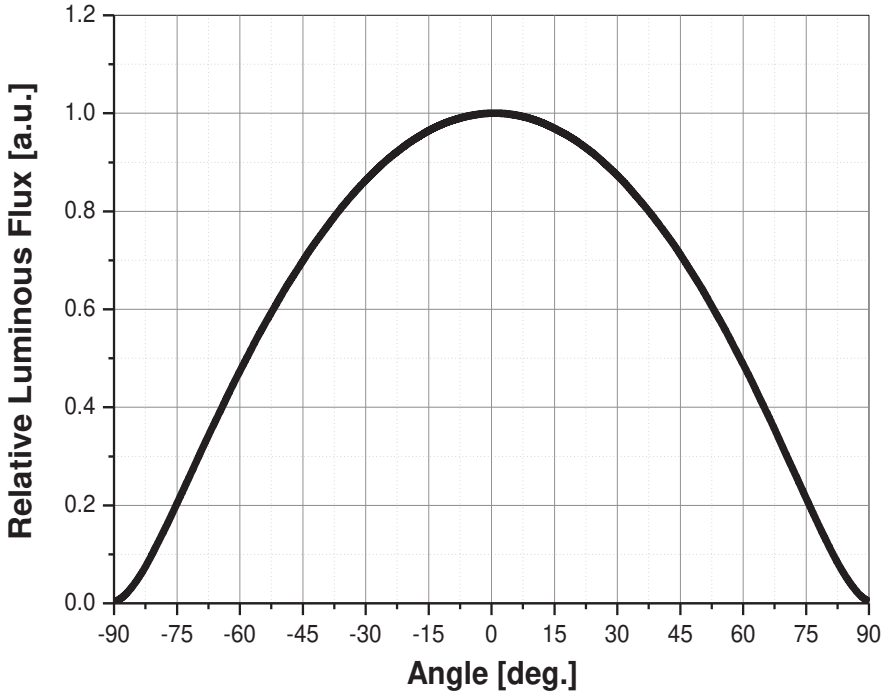


Fig 2. Radiant pattern, T_j=25℃, I_F=640mA



Characteristics Graph

Fig 3. Forward Voltage vs. Forward Current, T_j=25℃

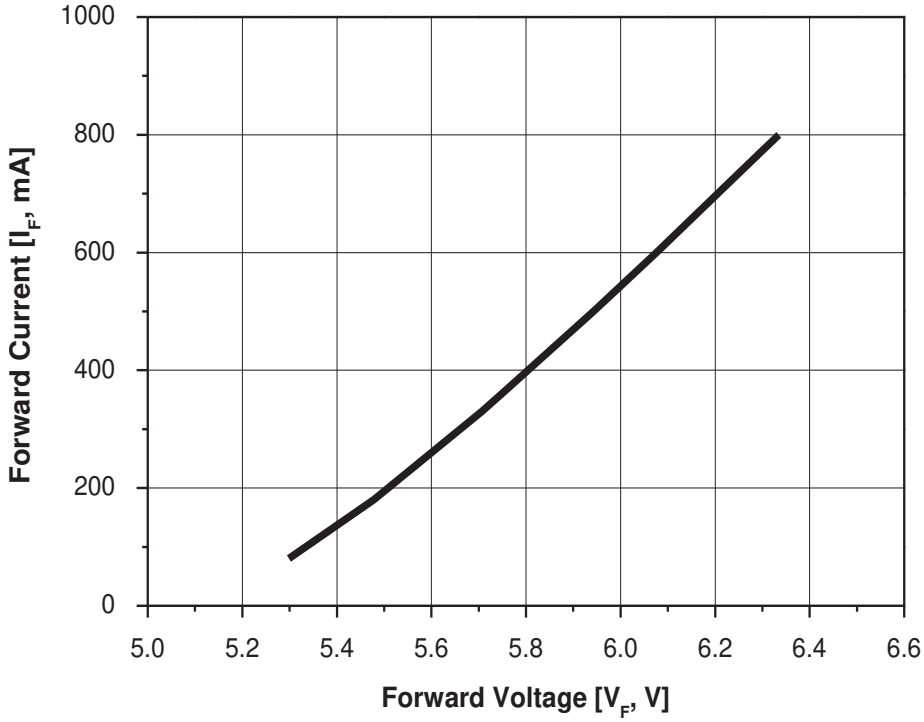
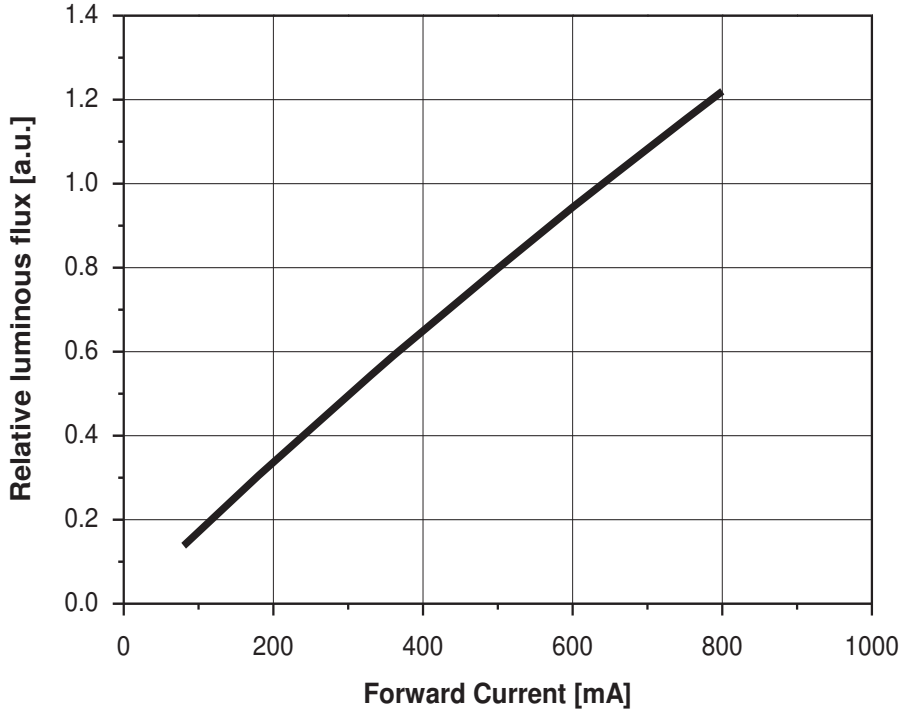
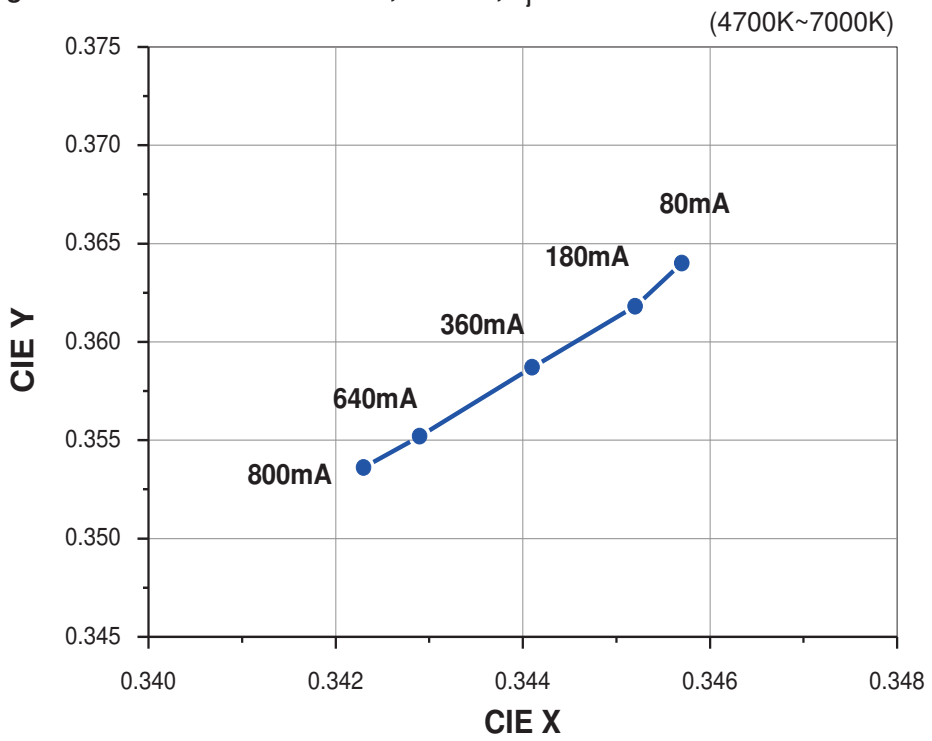


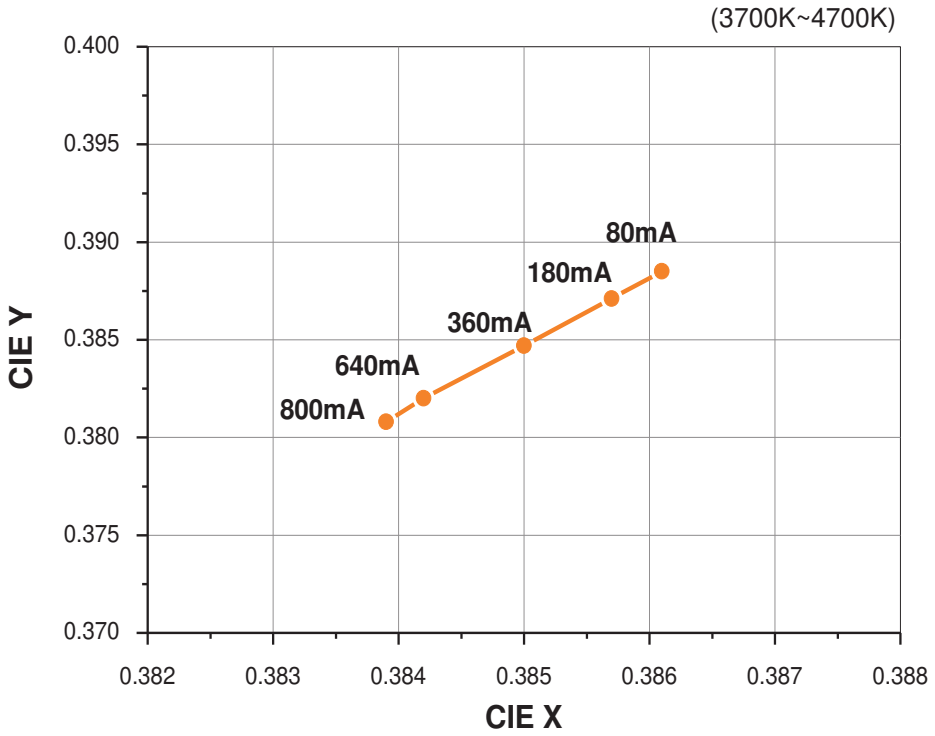
Fig 4. Forward Current vs. Relative Luminous Flux, T_j=25℃



Characteristics Graph

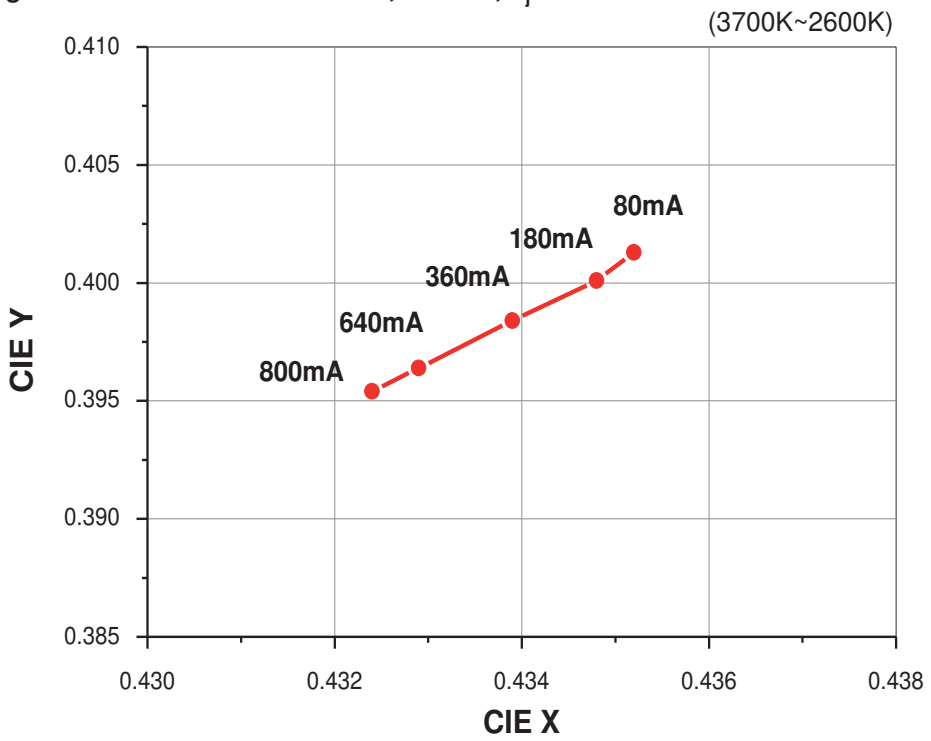
Fig 5. Forward Current vs. CIE X, Y Shift , T_j=25℃





Characteristics Graph

Fig 5. Forward Current vs. CIE X, Y Shift , T_j=25℃



Characteristics Graph

Fig 6. Relative Light Output vs. Junction Temperature, I_F=640mA

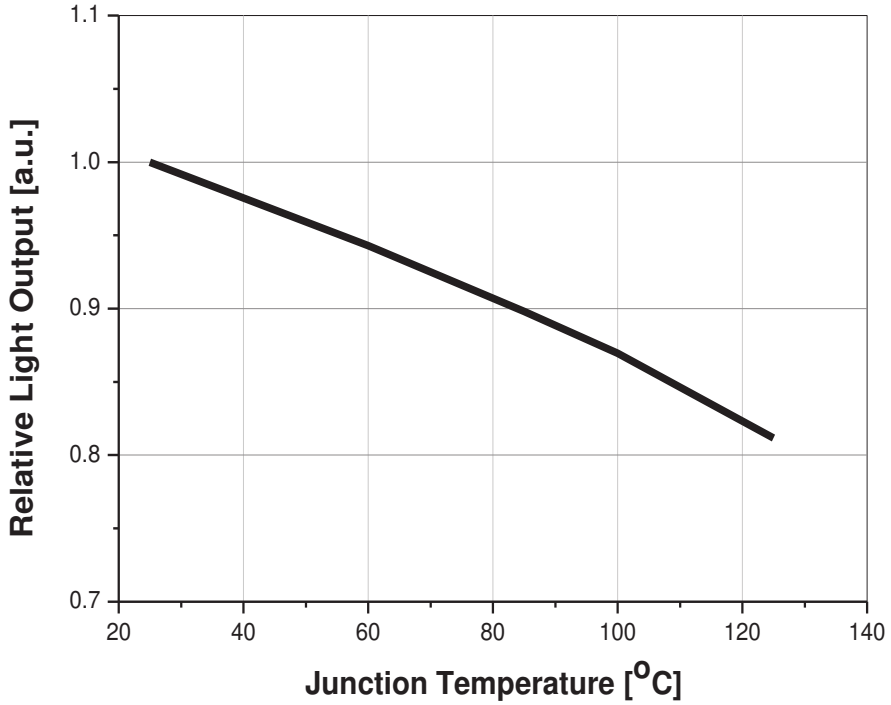
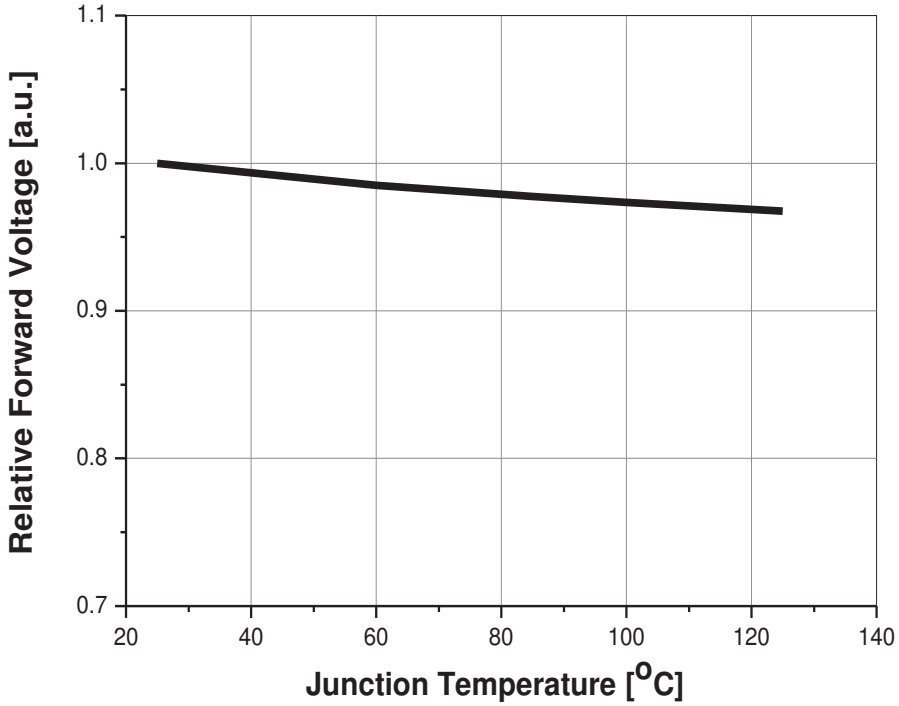
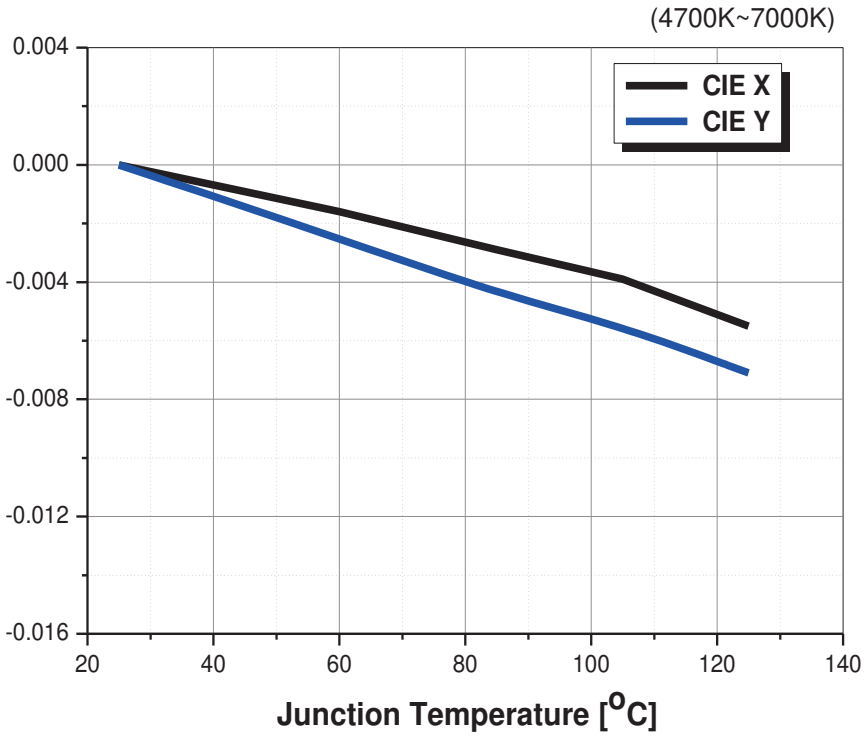


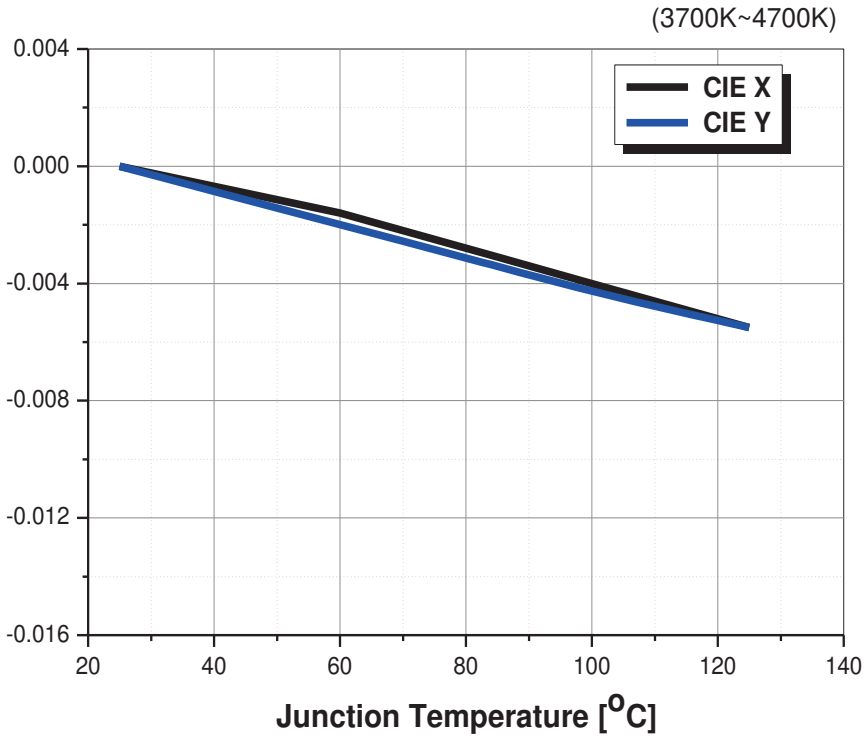
Fig 7. Relative Forward Voltage vs. Junction Temperature, I_F=640mA



Characteristics Graph

Fig 8. Junction Temp. vs. CIE X, Y Shift, I_F=640mA

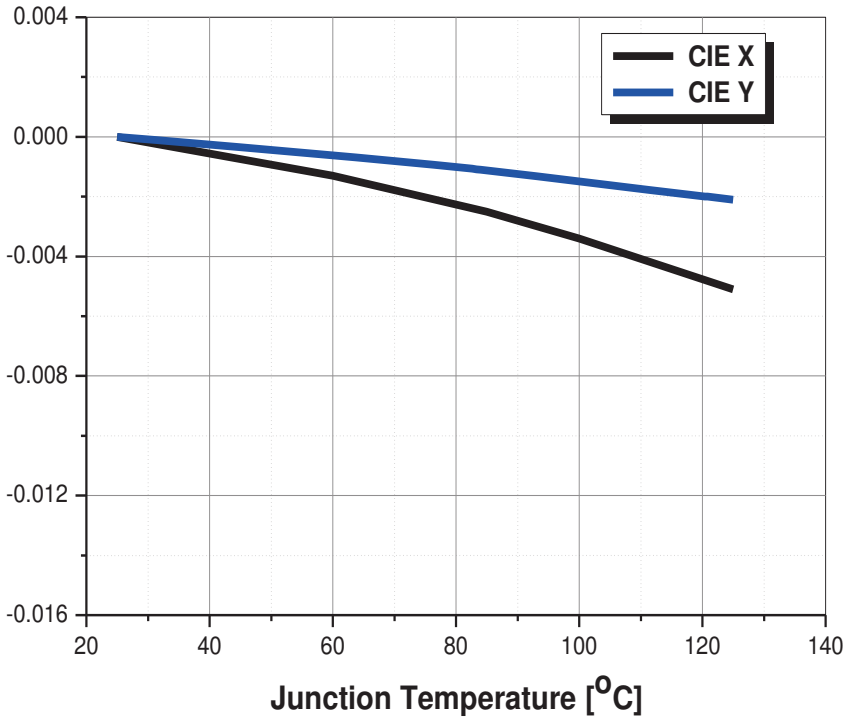




Characteristics Graph

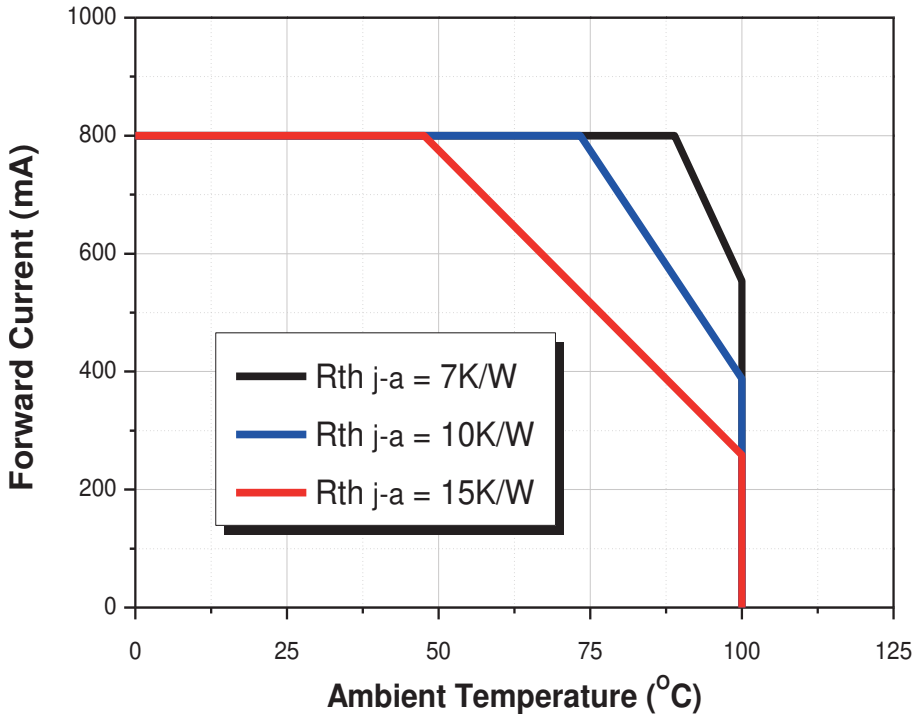
Fig 8. Junction Temp. vs. CIE X, Y Shift, I_F=640mA

(2600K~3700K)



Characteristics Graph

Fig 9. Maximum Forward Current vs. Ambient Temperature, T_j(max.)=125℃, I_F=800mA



Color Bin Structure

Table 4. Bin Code description

Part Number	Luminous Flux (lm) I_F=640mA, T_j=25℃			Color Chromaticity Coordinate I_F=640mA, T_j=85℃	Forward Voltage (V_f) I_F=640mA, T_j=25℃			CRI
	Bin Code	Min.	Max.		Bin Code	Min.	Max.	
S1W0-5050xx7006-00000000-00002	W1	550	600	Refer to page. 13~16	Y8	5.8	6.0	70
	W2	600	650		Z0	6.0	6.2	
	W3	650	700		Z2	6.2	6.4	
	W4	700	750					

Table 5. Luminous Flux & Forward Voltage rank distribution

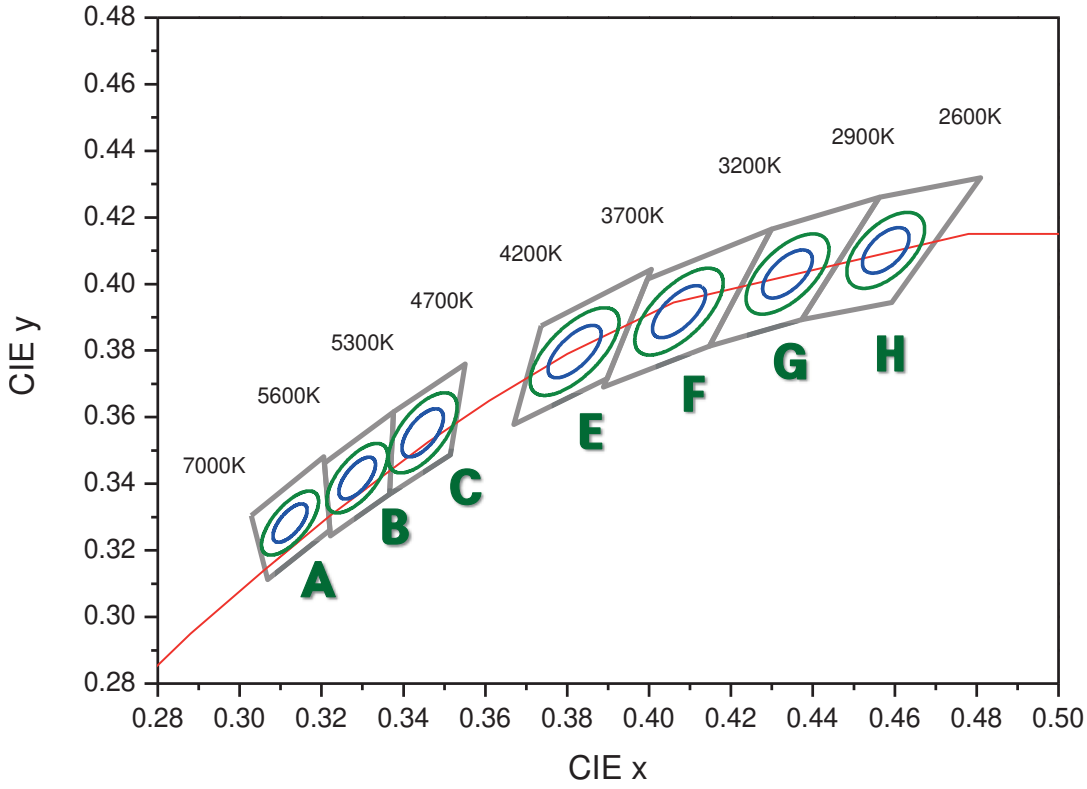
CCT	CIE	Flux Rank				VF Rank		
7000 ~ 6000K	A	W1	W2	W3	W4	Y8	Z0	Z2
6000 ~ 5300K	B	W1	W2	W3	W4	Y8	Z0	Z2
5300 ~ 4700K	C	W1	W2	W3	W4	Y8	Z0	Z2
4200 ~ 3700K	E	W1	W2	W3	W4	Y8	Z0	Z2
3700 ~ 3200K	F	W1	W2	W3	W4	Y8	Z0	Z2
3200 ~ 2900K	G	W1	W2	W3	W4	Y8	Z0	Z2
2900 ~ 2600K	H	W1	W2	W3	W4	Y8	Z0	Z2

Available ranks
Not yet available ranks

- All measurements were made under the standardized environment of Seoul Semiconductor.

Color Bin Structure

CIE Chromaticity Diagram T_j=85℃, I_F=640mA

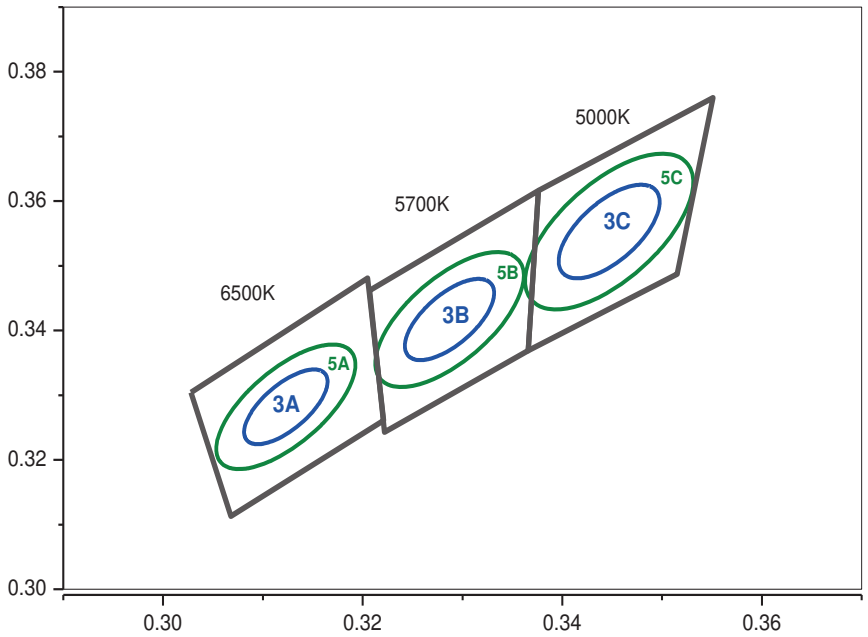


***Notes :**

- Energy Star binning applied to all 2600~7000K.
- Measurement Uncertainty of the Color Coordinates : ± 0.005

Color Bin Structure

CIE Chromaticity Diagram (Cool white), T_j=85℃, I_F=640mA

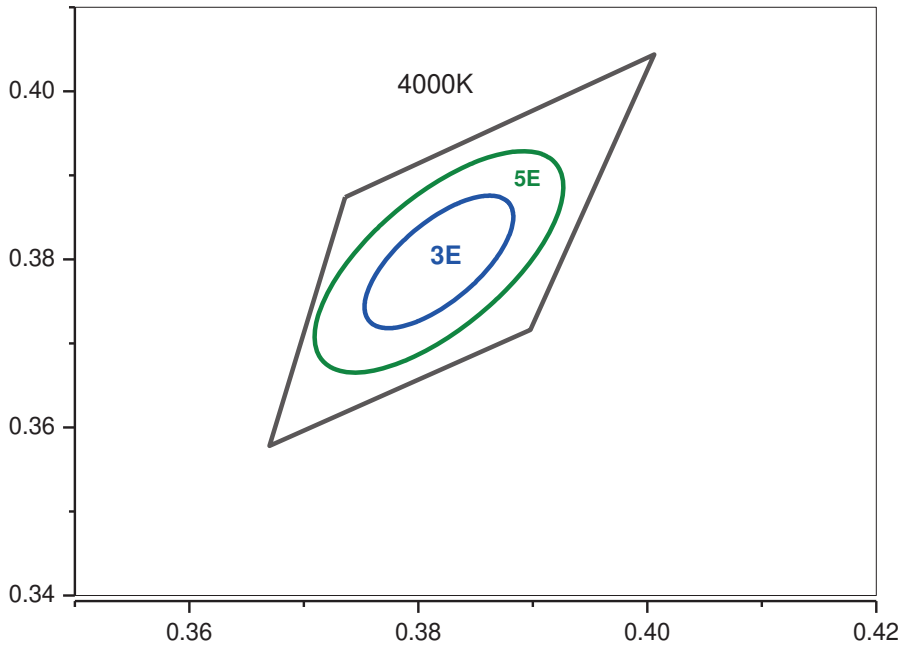


6500K 3Step		5700K 3Step		5000K 3Step	
3A		3B		3C	
Center point	0.3123 : 0.3282	Center point	0.3287 : 0.3417	Center point	0.3447 : 0.3553
Major Axis a	0.0066	Major Axis a	0.0071	Major Axis a	0.0081
Minor Axis b	0.0027	Minor Axis b	0.003	Minor Axis b	0.0035
Ellipse Rotation Angle	58	Ellipse Rotation Angle	59	Ellipse Rotation Angle	60

6500K 5Step		5700K 5Step		5000K 5Step	
5A		5B		5C	
Center point	0.3123 : 0.3282	Center point	0.3287 : 0.3417	Center point	0.3447 : 0.3553
Major Axis a	0.0110	Major Axis a	0.0118	Major Axis a	0.0135
Minor Axis b	0.0045	Minor Axis b	0.0050	Minor Axis b	0.0058
Ellipse Rotation Angle	58	Ellipse Rotation Angle	59	Ellipse Rotation Angle	60

Color Bin Structure

CIE Chromaticity Diagram (Neutral white), T_j=85℃, I_F=640mA



4000K 3Step

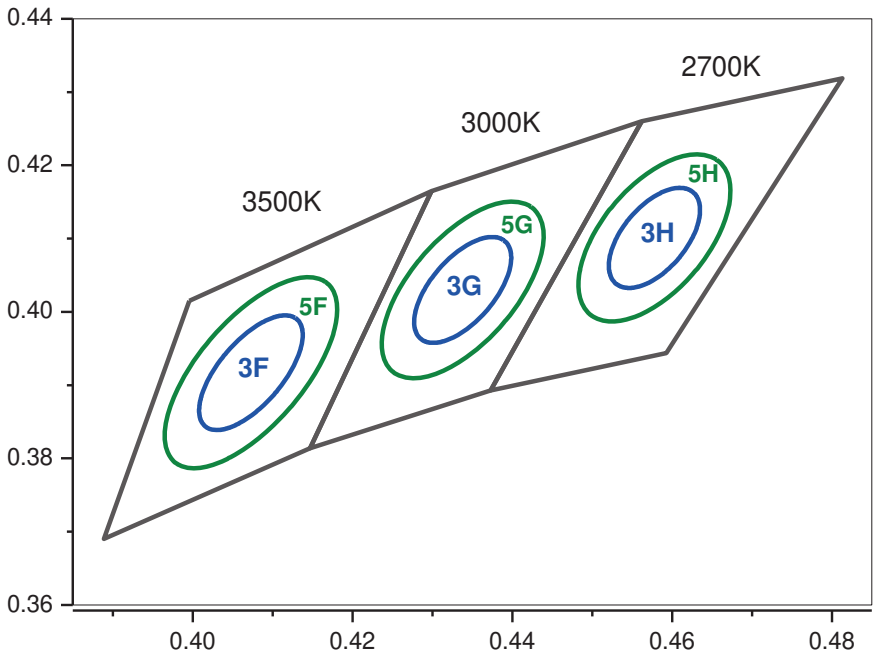
3E	
Center point	0.3818 : 0.3797
Major Axis a	0.00940
Minor Axis b	0.00400
Ellipse Rotation Angle	53

4000K 5Step

5E	
Center point	0.3818 : 0.3797
Major Axis a	0.0157
Minor Axis b	0.0067
Ellipse Rotation Angle	53

Color Bin Structure

CIE Chromaticity Diagram (Warm white), T_j=85℃, I_F=640mA

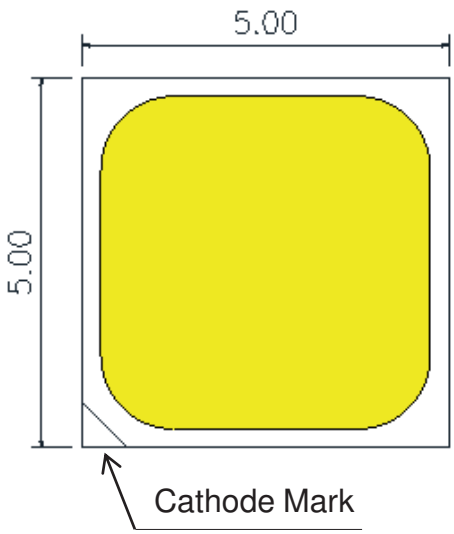


3500K 3Step		3000K 3Step		2700K 3Step	
3F		3G		3H	
Center point	0.4073 : 0.3917	Center point	0.4338 : 0.4030	Center point	0.4578 : 0.4101
Major Axis a	0.0093	Major Axis a	0.0085	Major Axis a	0.0079
Minor Axis b	0.0041	Minor Axis b	0.0041	Minor Axis b	0.0041
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53	Ellipse Rotation Angle	54

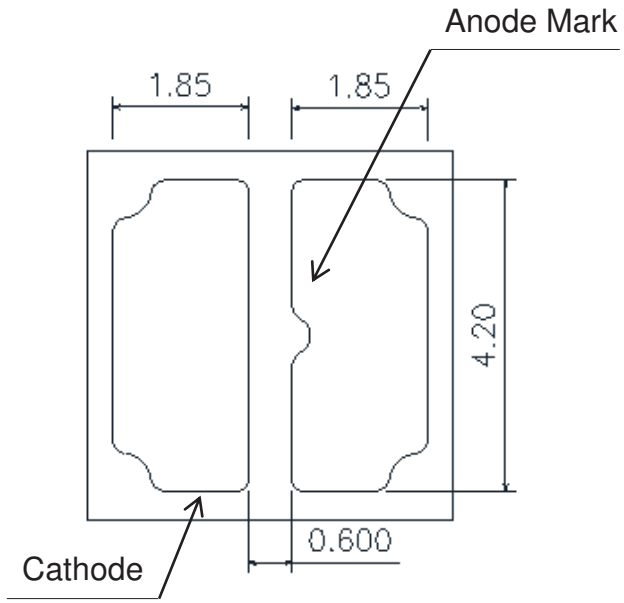
3500K 5Step		3000K 5Step		2700K 5Step	
5F		5G		5H	
Center point	0.4073 : 0.3917	Center point	0.4338 : 0.4030	Center point	0.4578 : 0.4101
Major Axis a	0.0155	Major Axis a	0.0142	Major Axis a	0.0132
Minor Axis b	0.0068	Minor Axis b	0.0068	Minor Axis b	0.0068
Ellipse Rotation Angle	53	Ellipse Rotation Angle	53	Ellipse Rotation Angle	54

Mechanical Dimensions

< Top View >



< Bottom View >

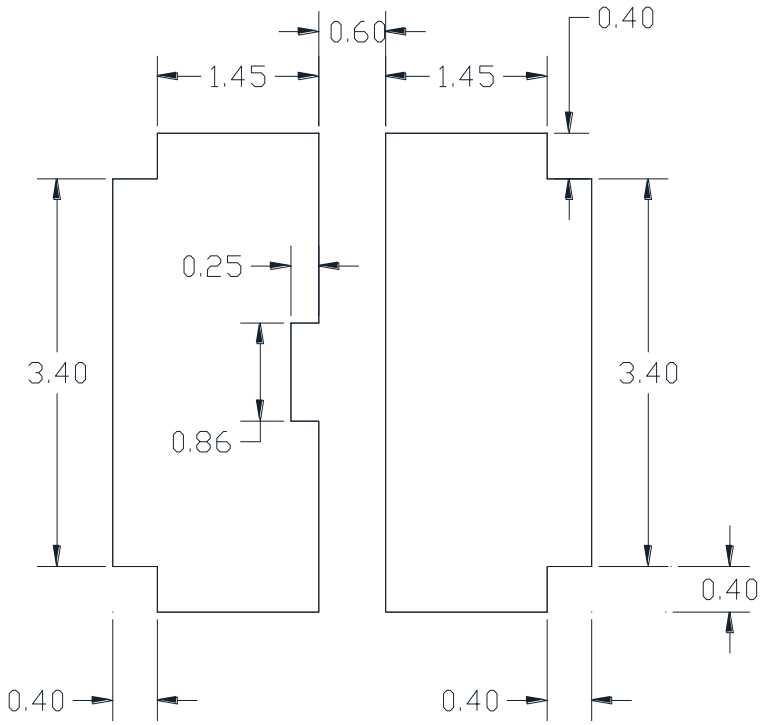


< Side view>

Notes :

(1) All dimensions are in millimeters.
(2) Scale : none
(3) Undefined tolerance is ±0.2mm

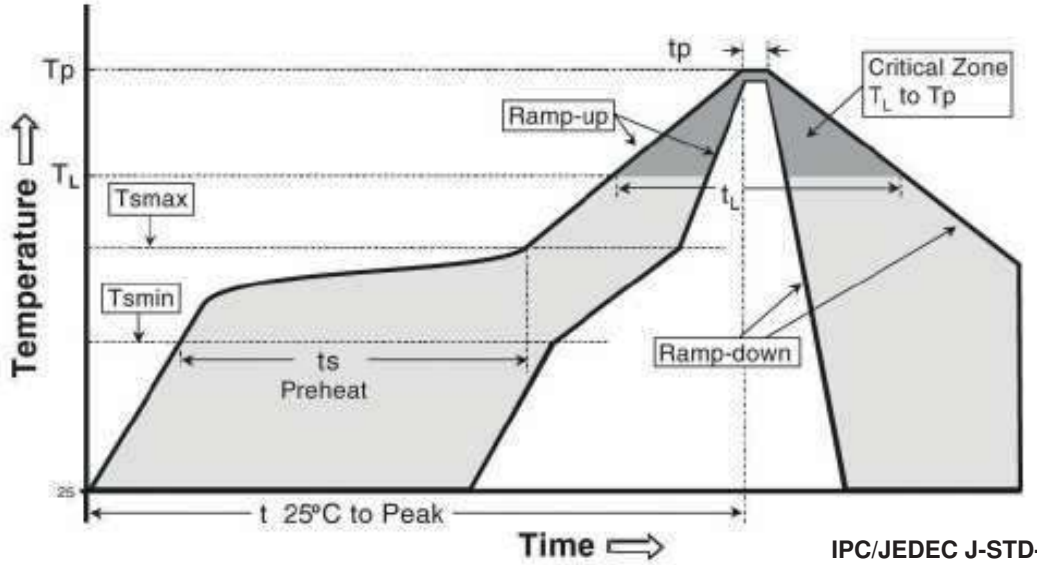
Recommended Solder Pad



Notes :

(1) All dimensions are in millimeters.
(2) Scale : none
(3) Undefined tolerance is ±0.2mm
(4) This drawing without tolerances are for reference only.

Reflow Soldering Characteristics



IPC/JEDEC J-STD-020

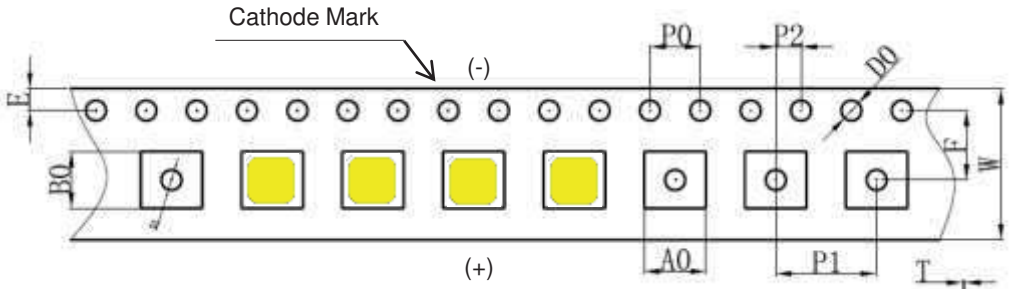
Table 7.

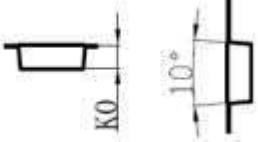
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_{smax} to T_p)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (T_{smin} to T_{smax}) (t_s)	 100 °C 150 °C 60-120 seconds	 150 °C 200 °C 60-180 seconds
Time maintained above: - Temperature (T_L) - Time (t_L)	 183 °C 60-150 seconds	 217 °C 60-150 seconds
Peak Temperature (T_p)	215℃	260℃
Time within 5°C of actual Peak Temperature (t_p)2	10-30 seconds	20-40 seconds
Ramp-down Rate	6 °C/second max.	6 °C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Caution

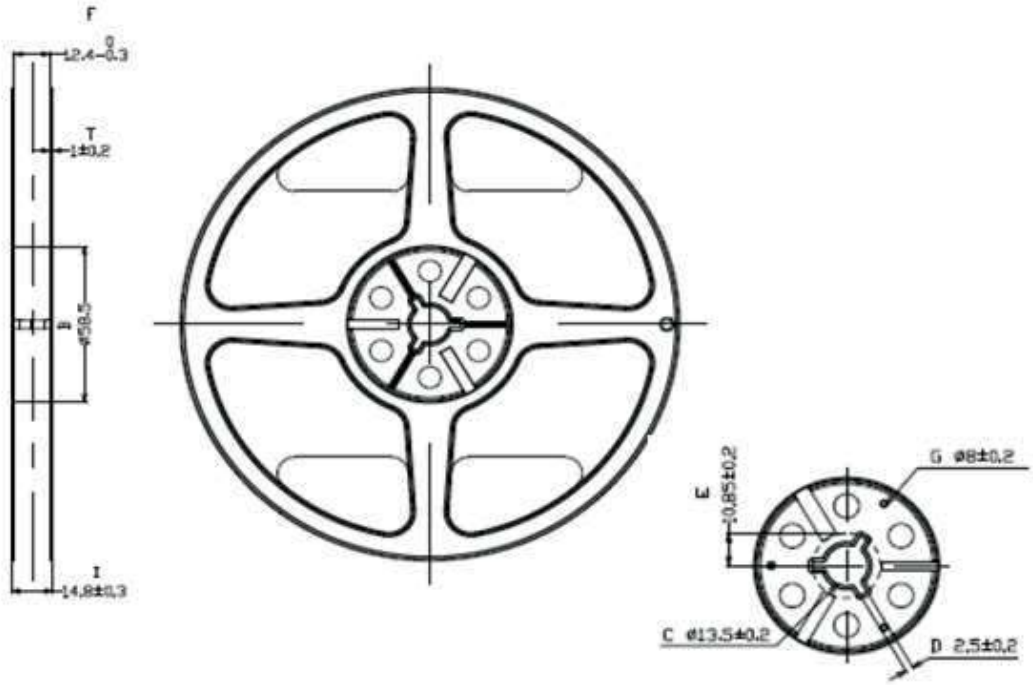
(1) Reflow soldering is recommended not to be done more than two times. In the case of more than 24 hours passed soldering after first, LEDs will be damaged.
(2) Repairs should not be done after the LEDs have been soldered. When repair is unavoidable, suitable tools must be used.
(3) Die slug is to be soldered.
(4) When soldering, do not put stress on the LEDs during heating.
(5) After soldering, do not warp the circuit board.

Emitter Tape & Reel Packaging





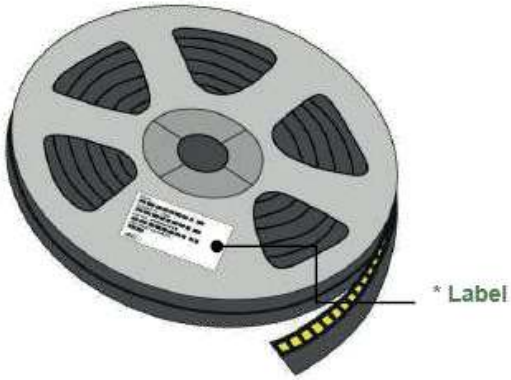
Symbol	W	T	K0	A0	B0	E
Dimension (mm)	12.00 ±0.10	0.30 ±0.30	0.95 ±0.10	5.30 ±0.10	5.30 ±0.10	1.75 ±0.10
Symbol	F	D0	D1	P0	P1	P2
Dimension (mm)	5.50 ±0.10	1.60 ±0.10	1.60 ±0.10	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10

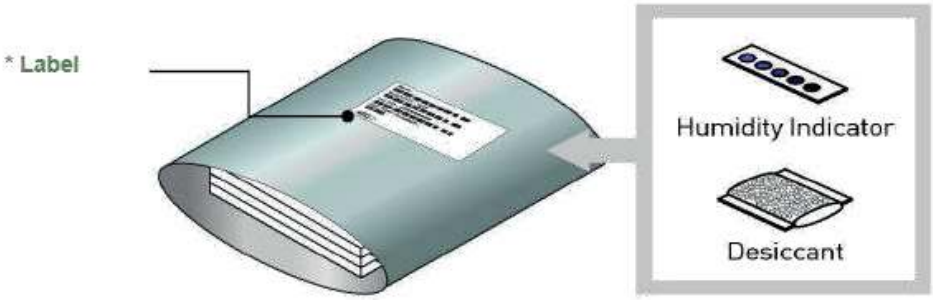


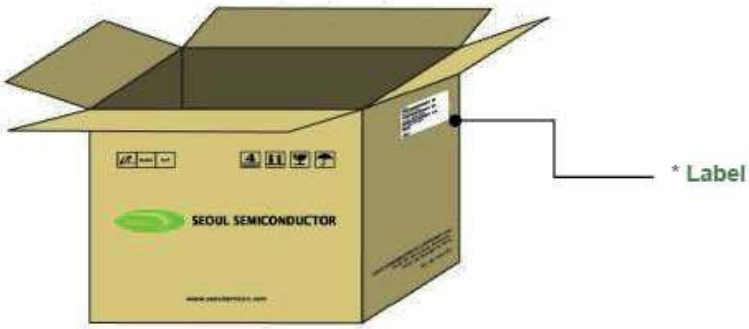
Notes :

(1) Quantity : 7 inch reel type (1,000 pcs / Reel ± 1pcs)
(2) Cumulative Tolerance : Cumulative Tolerance/10 pitches to be ±0.2mm
(3) Adhesion Strength of Cover Tape : Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at the angle of 10º to the carrier tape
(4) Package : P/N, Manufacturing data Code No. and quantity to be indicated on a damp proof Package.

Emitter Tape & Reel Packaging







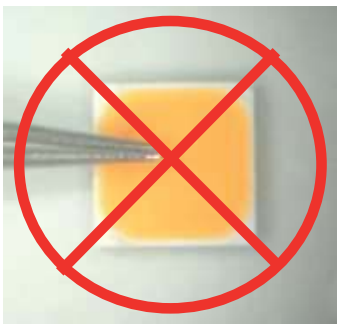
Product Nomenclature

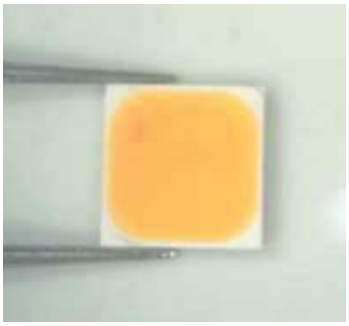
Table 8. Part Numbering System

Part Number Code	Description	Part Number	Value
X_1	Company	S	Seoul Semiconductor
X_2	Level of Integration	1	Discrete LED
X_3X_4	Technology	W0	White General
$X_5X_6X_7X_8$	Dimension	5050	5.0x5.0mm
X_9X_{10}	CCT	XX	65: 6500K 57: 5700K 50: 5000K 40: 4000K 35: 3500K 30: 3000K 27: 2700K
$X_{11}X_{12}$	CRI	70	CRI70
$X_{13}X_{14}$	Vf	06	
$X_{15}X_{16}X_{17}$	Characteristic code Flux Rank	000	
$X_{18}X_{19}X_{20}$	Characteristic code Vf Rank	000	
$X_{21}X_{22}$	Characteristic code Color Step	XX	00: Full 3S: 3step ellipse 5S: 5step ellipse
$X_{23}X_{24}$	Type	00	
$X_{25}X_{26}X_{27}$	Internal code	002	

Handling of Silicone Resin for LEDs

(1) During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.





(2) In general, LEDs should only be handled from the side. By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.

(3) When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented. This is assured by choosing a pick and place nozzle which is larger than the LED's reflector area.

(4) Silicone differs from materials conventionally used for the manufacturing of LEDs. These conditions must be considered during the handling of such devices. Compared to standard encapsulants, silicone is generally softer, and the surface is more likely to attract dust.

As mentioned previously, the increased sensitivity to dust requires special care during processing. In cases where a minimal level of dirt and dust particles cannot be guaranteed, a suitable cleaning solution must be applied to the surface after the soldering of components.

(5) SSC suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin.
Ultrasonic cleaning is not recommended. Ultrasonic cleaning may cause damage to the LED.

(6) Please do not mold this product into another resin (epoxy, urethane, etc) and do not handle this. product with acid or sulfur material in sealed space.

Precaution for Use

(1) Storage

To avoid the moisture penetration, we recommend store in a dry box with a desiccant . The recommended storage temperature range is 5℃ to 30℃ and a maximum humidity of RH50%.

(2) Use Precaution after Opening the Packaging

Use SMT techniques properly when you solder the LED as separation of the lens may affect the light output efficiency.

Pay attention to the following:

a. Recommend conditions after opening the package

- Sealing / Temperature : 5 ~ 40℃ Humidity : less than RH30%

b. If the package has been opened more than 4 week(MSL_2a) or the color of the desiccant changes, components should be dried for 10-12hr at 60±5℃

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.

(4) Do not rapidly cool device after soldering.

(5) Components should not be mounted on warped (non coplanar) portion of PCB.

(6) Radioactive exposure is not considered for the products listed here in.

(7) Gallium arsenide is used in some of the products listed in this publication. These products are dangerous if they are burned or shredded in the process of disposal. It is also dangerous to drink the liquid or inhale the gas generated by such products when chemically disposed of.

(8) This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When washing is required, IPA (Isopropyl Alcohol) should be used.

(9) When the LEDs are in operation the maximum current should be decided after measuring the package temperature.

(10) LEDs must be stored properly to maintain the device. If the LEDs are stored for 3 months or more after being shipped from Seoul Semiconductor. A sealed container with a nitrogen atmosphere should be used for storage.

(11) The appearance and specifications of the product may be modified for improvement without notice.

(12) Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.

Precaution for Use

(13) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues.

(14) The slug is electrically isolated.

(15) Attaching LEDs, do not use adhesives that outgas organic vapor.

(16) The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.

(17) LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). Below is a list of suggestions that Seoul Semiconductor purposes to minimize these effects.

a. ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is the defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LEDs may cause the product to demonstrate unusual characteristics such as:

- Increase in reverse leakage current lowered turn-on voltage
- Abnormal emissions from the LED at low current

The following recommendations are suggested to help minimize the potential for an ESD event.
One or more recommended work area suggestions:

- Ionizing fan setup
- ESD table/shelf mat made of conductive materials
- ESD safe storage containers

One or more personnel suggestion options:
- Antistatic wrist-strap
- Antistatic material shoes
- Antistatic clothes

Environmental controls:
- Humidity control (ESD gets worse in a dry environment)

Precaution for Use

b. EOS (Electrical Over Stress)

Electrical Over-Stress (EOS) is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device.
The effects from an EOS event can be noticed through product performance like:

- Changes to the performance of the LED package
  (If the damage is around the bond pad area and since the package is completely encapsulated the package may turn on but flicker show severe performance degradation.)
- Changes to the light output of the luminaire from component failure
- Components on the board not operating at determined drive power

Failure of performance from entire fixture due to changes in circuit voltage and current across total circuit causing trickle down failures. It is impossible to predict the failure mode of every LED exposed to electrical overstress as the failure modes have been investigated to vary, but there are some common signs that will indicate an EOS event has occurred:

- Damaged may be noticed to the bond wires (appearing similar to a blown fuse)
- Damage to the bond pads located on the emission surface of the LED package
  (shadowing can be noticed around the bond pads while viewing through a microscope)
- Anomalies noticed in the encapsulation and phosphor around the bond wires.
- This damage usually appears due to the thermal stress produced during the EOS event.

c. To help minimize the damage from an EOS event Seoul Semiconductor recommends utilizing:

- A surge protection circuit
- An appropriately rated over voltage protection device
- A current limiting device

Company Information

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Company Information

Seoul Semiconductor (www.SeoulSemicon.com) manufacturers and packages a wide selection of light emitting diodes (LEDs) for the automotive, general illumination/lighting, Home appliance, signage and back lighting markets. The company is the world's fifth largest LED supplier, holding more than 10,000 patents globally, while offering a wide range of LED technology and production capacity in areas such as "nPola", "Acrich", the world's first commercially produced AC LED, and "Acrich MJT - Multi-Junction Technology" a proprietary family of high-voltage LEDs.

The company's broad product portfolio includes a wide array of package and device choices such as Acrich and Acirch2, high-brightness LEDs, mid-power LEDs, side-view LEDs, and through-hole type LEDs as well as custom modules, displays, and sensors.

Legal Disclaimer

Information in this document is provided in connection with Seoul Semiconductor products. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Seoul Semiconductor hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party. The appearance and specifications of the product can be changed to improve the quality and/or performance without notice.

TEST REPORT

According to ANSI/IES LM-80-15
For

Seoul Semiconductor Co. Ltd

97-11, Sandan-ro 163beon-gil, Danwon-gu,
Ansan-si, Gyeonggi-do, Republic of Korea

Model: STW0L8PA (2700K)

Report Type: 9000 Hours Test Report	**Product Type:** LED Package
Test Engineer:	Pote Wang
Report Number:	RSZ190718514-10
Test Date:	2017-08-01 to 2018-11-26
Report Date:	2019-07-19
Reviewed By:	Blake Zhang / EE Engineer
Test Facility:	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588
Accreditation:	The IAS Accreditation Number TL-460.

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Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).
This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

1 - General Information 3
1.1 Description of LED Light Sources 3
1.2 Standards and Reference Documentations 5
1.3 Testing Equipment 5
1.4 Drive Level 6
1.5 Ambient Conditions for Maintenance Test 6
1.6 Photometric Measurement Method and Uncertainty 6
1.7 Statement of Traceability 6
1.8 Sample Set 7

2 - Summary of Test Result 9

3 - Test Data 11
3.1 Data Set 1, 55°C, 240mA (Lumen Maintenance) 11
3.2 Data Set 1, 55°C, 240mA (Forward Voltage) 12
3.3 Data Set 1, 55°C, 240mA (Chromaticity Shift) 13
3.4 Data Set 2, 85°C, 240mA (Lumen Maintenance) 14
3.5 Data Set 2, 85°C, 240mA (Forward Voltage) 15
3.6 Data Set 2, 85°C, 240mA (Chromaticity Shift) 16
3.7 Data Set 3, 105°C, 240mA (Lumen Maintenance) 17
3.8 Data Set 3, 105°C, 240mA (Forward Voltage) 18
3.9 Data Set 3, 105°C, 240mA (Chromaticity Shift) 19
3.10 Data Set 4, 55°C, 400mA (Lumen Maintenance) 20
3.11 Data Set 4, 55°C, 400mA (Forward Voltage) 21
3.12 Data Set 4, 55°C, 400mA (Chromaticity Shift) 22
3.13 Data Set 5, 85°C, 400mA (Lumen Maintenance) 23
3.14 Data Set 5, 85°C, 400mA (Forward Voltage) 24
3.15 Data Set 5, 85°C, 400mA (Chromaticity Shift) 25
3.16 Data Set 6, 105°C, 400mA (Lumen Maintenance) 26
3.17 Data Set 6, 105°C, 400mA (Forward Voltage) 27
3.18 Data Set 6, 105°C, 400mA (Chromaticity Shift) 28
3.19 Data Set 7, 55°C, 800mA (Lumen Maintenance) 29
3.20 Data Set 7, 55°C, 800mA (Forward Voltage) 30
3.21 Data Set 7, 55°C, 800mA (Chromaticity Shift) 31
3.22 Data Set 8, 85°C, 800mA (Lumen Maintenance) 32
3.23 Data Set 8, 85°C, 800mA (Forward Voltage) 33
3.24 Data Set 8, 85°C, 800mA (Chromaticity Shift) 34
3.25 Data Set 9, 105°C, 800mA (Lumen Maintenance) 35
3.26 Data Set 9, 105°C, 800mA (Forward Voltage) 36
3.27 Data Set 9, 105°C, 800mA (Chromaticity Shift) 37

4 - DUT Photo 38
4.1 Mechanical Dimensions 38
4.2 DUT Photo 38

FINAL

1 - General Information

1.1 Description of LED Light Sources

Sample Size:

225 PCS samples were received on 2017-11-10. The samples were numbered from 1 to 25, 26 to 50, 51 to 75, 76 to 100, 101 to 125, 126 to 150, 151 to 175, 176 to 200 and 201 to 225.

Manufacturer:	Seoul Semiconductor Co. Ltd
Part Number:	STW0L8PA (2700K)
Part Type:	LED Package
Nominal CCT:	2700K
Drive Level:	DC 240mA / DC 400mA / DC 800mA
Power:	1.344W / 2.32W / 4.96W
Average Current Density per LED die:	120.8mA/mm^2 @ DC 240mA / 201.3mA/mm^2 @ DC 400mA / 402.6mA @ DC 800mA
Average Power Density per LED die:	0.338W/mm^2 @ DC 240mA / 0.584W/mm^2 @ DC 400mA / 1.248W/mm^2 @ DC 800mA
CRI:	70
Die Spacing:	0.2mm

Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.
These manufacturing lots are picked to represent a wide parametric distribution.

Family products covered by this report:

According to *ENERGY STAR® Requirements for the Use of LM-80 Data*, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of *ENERGY STAR® Requirements for the Use of LM-80 Data* (September 28, 2017)

Series Name	Model Name	CCT(K)	Total Input Current (mA)	Power (W)	Power Density per PCB (W/mm^2)	Current Density per Die (mA/mm^2)	Die Spacing (mm)
EMC-5050	STW0L8PA(2200K)	2200	240	1.44	0.0576	120.78	0.2
	STW8L8PA (2200K)	2200	240	1.44	0.0576	120.78	0.2
	STW9L8PA (2200K)	2200	240	1.44	0.0576	120.78	0.2
	STW0L8PA(2700K)	2700	240	1.44	0.0576	120.78	0.2
	STW8L8PA (2700K)	2700	240	1.44	0.0576	120.78	0.2
	STW9L8PA (2700K)	2700	240	1.44	0.0576	120.78	0.2
	STW0L8PA (3000K)	3000	240	1.44	0.0576	120.78	0.2
	STW8L8PA (3000K)	3000	240	1.44	0.0576	120.78	0.2
	STW9L8PA (3000K)	3000	240	1.44	0.0576	120.78	0.2
	STW0L8PA (3500K)	3500	240	1.44	0.0576	120.78	0.2
	STW8L8PA (3500K)	3500	240	1.44	0.0576	120.78	0.2
	STW9L8PA (3500K)	3500	240	1.44	0.0576	120.78	0.2
	STW0L8PA (4000K)	4000	240	1.44	0.0576	120.78	0.2
	STW8L8PA (4000K)	4000	240	1.44	0.0576	120.78	0.2
	STW9L8PA (4000K)	4000	240	1.44	0.0576	120.78	0.2
	STW0L8PA (4500K)	4500	240	1.44	0.0576	120.78	0.2
	STW8L8PA (4500K)	4500	240	1.44	0.0576	120.78	0.2
	STW9L8PA (4500K)	4500	240	1.44	0.0576	120.78	0.2
	STW0L8PA (5000K)	5000	240	1.44	0.0576	120.78	0.2
	STW8L8PA (5000K)	5000	240	1.44	0.0576	120.78	0.2

Series Name	Model Name	CCT(K)	Total Input Current (mA)	Power (W)	Power Density per PCB (W/mm^2)	Current Density per Die (mA/mm^2)	Die Spacing (mm)
	STW9L8PA (5000K)	5000	240	1.44	0.0576	120.78	0.2
	STW0L8PA (5700K)	5700	240	1.44	0.0576	120.78	0.2
	STW8L8PA (5700K)	5700	240	1.44	0.0576	120.78	0.2
	STW9L8PA (5700K)	5700	240	1.44	0.0576	120.78	0.2
	STW0L8PA (6500K)	6500	240	1.44	0.0576	120.78	0.2
	STW8L8PA (6500K)	6500	240	1.44	0.0576	120.78	0.2
	STW9L8PA (6500K)	6500	240	1.44	0.0576	120.78	0.2
	STW0L8PA(2200K)	2200	400	2.4	0.096	201.3	0.2
	STW8L8PA (2200K)	2200	400	2.4	0.096	201.3	0.2
	STW9L8PA (2200K)	2200	400	2.4	0.096	201.3	0.2
	STW0L8PA(2700K)	2700	400	2.4	0.096	201.3	0.2
	STW8L8PA (2700K)	2700	400	2.4	0.096	201.3	0.2
	STW9L8PA (2700K)	2700	400	2.4	0.096	201.3	0.2
	STW0L8PA (3000K)	3000	400	2.4	0.096	201.3	0.2
	STW8L8PA (3000K)	3000	400	2.4	0.096	201.3	0.2
	STW9L8PA (3000K)	3000	400	2.4	0.096	201.3	0.2
	STW0L8PA (3500K)	3500	400	2.4	0.096	201.3	0.2
	STW8L8PA (3500K)	3500	400	2.4	0.096	201.3	0.2
	STW9L8PA (3500K)	3500	400	2.4	0.096	201.3	0.2
	STW0L8PA (4000K)	4000	400	2.4	0.096	201.3	0.2
	STW8L8PA (4000K)	4000	400	2.4	0.096	201.3	0.2
	STW9L8PA (4000K)	4000	400	2.4	0.096	201.3	0.2
	STW0L8PA (4500K)	4500	400	2.4	0.096	201.3	0.2
	STW8L8PA (4500K)	4500	400	2.4	0.096	201.3	0.2
	STW9L8PA (4500K)	4500	400	2.4	0.096	201.3	0.2
	STW0L8PA (5000K)	5000	400	2.4	0.096	201.3	0.2
	STW8L8PA (5000K)	5000	400	2.4	0.096	201.3	0.2
	STW9L8PA (5000K)	5000	400	2.4	0.096	201.3	0.2
	STW0L8PA (5700K)	5700	400	2.4	0.096	201.3	0.2
	STW8L8PA (5700K)	5700	400	2.4	0.096	201.3	0.2
	STW9L8PA (5700K)	5700	400	2.4	0.096	201.3	0.2
	STW0L8PA (6500K)	6500	400	2.4	0.096	201.3	0.2
	STW8L8PA (6500K)	6500	400	2.4	0.096	201.3	0.2
	STW9L8PA (6500K)	6500	400	2.4	0.096	201.3	0.2
	STW0L8PA(2200K)	2200	800	4.8	0.192	402.6	0.2
	STW8L8PA (2200K)	2200	800	4.8	0.192	402.6	0.2
	STW9L8PA (2200K)	2200	800	4.8	0.192	402.6	0.2
	STW0L8PA(2700K)	2700	800	4.8	0.192	402.6	0.2
	STW8L8PA (2700K)	2700	800	4.8	0.192	402.6	0.2
	STW9L8PA (2700K)	2700	800	4.8	0.192	402.6	0.2
	STW0L8PA (3000K)	3000	800	4.8	0.192	402.6	0.2
	STW8L8PA (3000K)	3000	800	4.8	0.192	402.6	0.2
	STW9L8PA (3000K)	3000	800	4.8	0.192	402.6	0.2
	STW0L8PA (3500K)	3500	800	4.8	0.192	402.6	0.2
	STW8L8PA (3500K)	3500	800	4.8	0.192	402.6	0.2

Series Name	Model Name	CCT(K)	Total Input Current (mA)	Power (W)	Power Density per PCB (W/mm^2)	Current Density per Die (mA/mm^2)	Die Spacing (mm)
	STW9L8PA (3500K)	3500	800	4.8	0.192	402.6	0.2
	STW0L8PA (4000K)	4000	800	4.8	0.192	402.6	0.2
	STW8L8PA (4000K)	4000	800	4.8	0.192	402.6	0.2
	STW9L8PA (4000K)	4000	800	4.8	0.192	402.6	0.2
	STW0L8PA (4500K)	4500	800	4.8	0.192	402.6	0.2
	STW8L8PA (4500K)	4500	800	4.8	0.192	402.6	0.2
	STW9L8PA (4500K)	4500	800	4.8	0.192	402.6	0.2
	STW0L8PA (5000K)	5000	800	4.8	0.192	402.6	0.2
	STW8L8PA (5000K)	5000	800	4.8	0.192	402.6	0.2
	STW9L8PA (5000K)	5000	800	4.8	0.192	402.6	0.2
	STW0L8PA (5700K)	5700	800	4.8	0.192	402.6	0.2
	STW8L8PA (5700K)	5700	800	4.8	0.192	402.6	0.2
	STW9L8PA (5700K)	5700	800	4.8	0.192	402.6	0.2
	STW0L8PA (6500K)	6500	800	4.8	0.192	402.6	0.2
	STW8L8PA (6500K)	6500	800	4.8	0.192	402.6	0.2
	STW9L8PA (6500K)	6500	800	4.8	0.192	402.6	0.2

Note:

1. The applicant Seoul Semiconductor Co. Ltd declares that their products with model STW0L8PA (2700K) are the same to the products in report# RSZ171110522-10 and is authorized by original applicant to use their test data.

2. All the data in previous report (RSZ171110522-10) is shared in this report.

1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR® Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

1.3 Testing Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
0.5m integrating sphere	EVERFINE	AIS-2	G185304TA1381172	2018-06-28	2019-06-28
LED Test Source	EVERFINE	LTS-300	P185616CD1371113	2018-06-28	2019-06-28
High Accuracy Arry Spectroradiometer	EVERFINE	HAAS-2000	P600674CM1381123	2018-06-28	2019-06-28
Standard Light Source	EVERFINE	D062	1011064	2018-01-15	2019-01-15
Multilayer aging machine	BACL	B2-270	20023	2018-03-13	2019-03-13
Multilayer aging machine	BACL	B2-270	20015	2018-03-13	2019-03-13
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060010	2018-03-26	2019-03-26
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090008	2018-06-15	2019-06-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11060002	2018-06-15	2019-06-15
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090007	2018-03-26	2019-03-26

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090005	2018-03-26	2019-03-26
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090006	2018-03-26	2019-03-26

1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within ±3% of the specified value of the manufacturer during maintenance test, and was within ±0.5% during photometric and electrical measurement test.

1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case (TMP_{LED}) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP_{LED} of the coldest LEDs were maintained at a temperature that was greater than or equal to 2°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within ±3% of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to 25°C ± 2°C, RH <65%.

1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate u'v'. 2π measurement was used and sample was drived by DC power supply. The forward current was regulated to within ±0.5% of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C ± 2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.

The uncertainty of the temperature is U=0.8671°C (K=2), at the 95% confidence level.

1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

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1.8 Sample Set

Data Set 1: 55°C, 240mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	240mA
Measurement Current:	240mA

Data Set 2: 85°C, 240mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	240mA
Measurement Current:	240mA

Data Set 3: 105°C, 240mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	240mA
Measurement Current:	240mA

Data Set 4: 55°C, 400mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	400mA
Measurement Current:	400mA

Data Set 5: 85°C, 400mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	400mA
Measurement Current:	400mA

Data Set 6: 105°C, 400mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	400mA
Measurement Current:	400mA

FINAL

Data Set 7: 55°C, 800mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>53°C
Ambient Temperature:	>50°C
Life Test Drive Current:	800mA
Measurement Current:	800mA

Data Set 8: 85°C, 800mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>83°C
Ambient Temperature:	>80°C
Life Test Drive Current:	800mA
Measurement Current:	800mA

Data Set 9: 105°C, 800mA:

Part Number:	STW0L8PA (2700K)
Number of Units:	25
Case Temperature:	>103°C
Ambient Temperature:	>100°C
Life Test Drive Current:	800mA
Measurement Current:	800mA

FINAL

2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	α	β	Reported TM-21 L_{70} Lifetime	Reported TM-21 L_{90}Lifetime
1	25	0	1000hrs	9000hrs	1.218E-06	1.000	>54000 Hours	>54000 Hours
2	25	0	1000hrs	9000hrs	1.412E-06	1.000	>54000 Hours	>54000 Hours
3	25	0	1000hrs	9000hrs	1.662E-06	1.001	>54000 Hours	>54000 Hours
4	25	0	1000hrs	9000hrs	1.608E-06	1.002	>54000 Hours	>54000 Hours
5	25	0	1000hrs	9000hrs	1.906E-06	1.002	>54000 Hours	>54000 Hours
6	25	0	1000hrs	9000hrs	2.375E-06	1.002	>54000 Hours	45000 Hours
7	25	0	1000hrs	9000hrs	1.798E-06	1.003	>54000 Hours	>54000 Hours
8	25	0	1000hrs	9000hrs	2.399E-06	1.003	>54000 Hours	45000 Hours
9	25	0	1000hrs	9000hrs	2.998E-06	1.005	>54000 Hours	37000 Hours

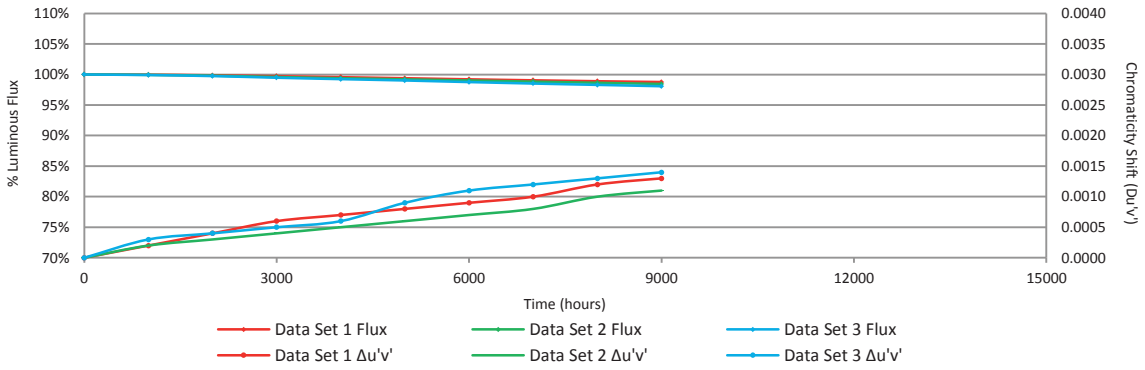
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

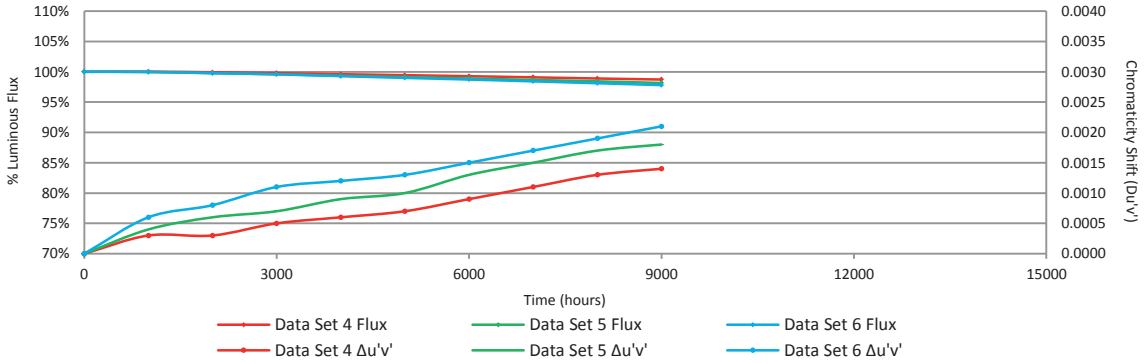
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	99.96%	99.83%	99.70%	99.56%	99.43%	99.29%	99.17%	99.06%	98.96%
2	99.94%	99.79%	99.63%	99.48%	99.33%	99.18%	99.04%	98.91%	98.78%
3	99.93%	99.76%	99.59%	99.42%	99.25%	99.07%	98.91%	98.75%	98.60%
4	99.97%	99.87%	99.72%	99.56%	99.39%	99.21%	99.05%	98.90%	98.77%
5	99.94%	99.81%	99.59%	99.39%	99.21%	99.02%	98.83%	98.64%	98.45%
6	99.91%	99.74%	99.47%	99.24%	99.02%	98.76%	98.52%	98.30%	98.08%
7	100.02%	99.92%	99.78%	99.60%	99.44%	99.27%	99.08%	98.89%	98.72%
8	99.98%	99.76%	99.58%	99.34%	99.12%	98.89%	98.65%	98.42%	98.15%
9	99.95%	99.78%	99.58%	99.28%	98.99%	98.72%	98.42%	98.11%	97.80%

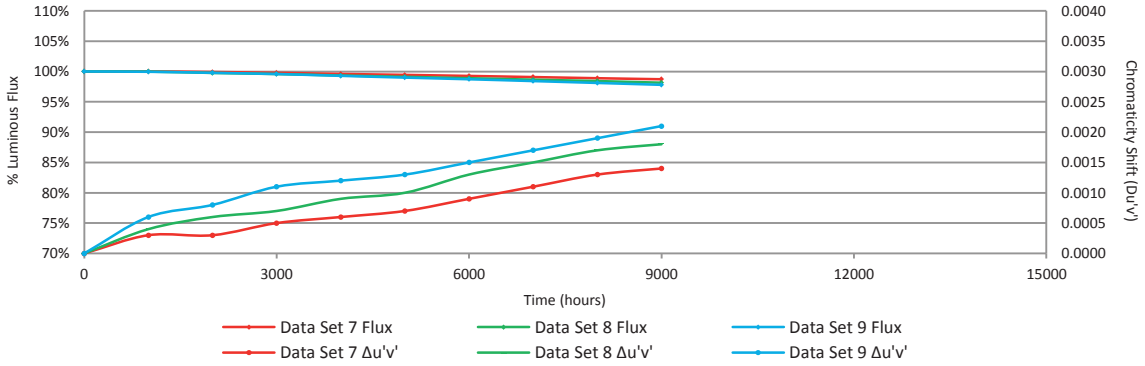
Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0010	0.0012	0.0013
2	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0010	0.0011
3	0.0003	0.0004	0.0005	0.0006	0.0009	0.0011	0.0012	0.0013	0.0014
4	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
5	0.0004	0.0005	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020
6	0.0006	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021
7	0.0003	0.0003	0.0005	0.0006	0.0007	0.0009	0.0011	0.0013	0.0014
8	0.0004	0.0006	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0018
9	0.0006	0.0008	0.0011	0.0012	0.0013	0.0015	0.0017	0.0019	0.0021

Average Lumen Maintenance and Chromaticity Shift VS. Time







3 - Test Data

3.1 Data Set 1, 55°C, 240mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	255.3	99.92	99.73	99.57	99.49	99.29	99.10	98.98	98.90	98.86
2	254.8	100.08	99.92	99.73	99.57	99.49	99.37	99.25	99.14	98.98
3	253.5	99.96	99.92	99.76	99.61	99.45	99.37	99.25	99.09	98.93
4	255.8	99.92	99.69	99.53	99.37	99.22	99.10	98.98	98.87	98.79
5	250.3	100.04	99.96	99.84	99.76	99.60	99.40	99.24	99.16	99.00
6	248.0	99.92	99.80	99.76	99.68	99.60	99.48	99.31	99.15	99.03
7	253.9	99.96	99.80	99.61	99.53	99.37	99.21	99.05	98.98	98.90
8	254.7	99.96	99.80	99.65	99.45	99.25	99.06	98.90	98.78	98.70
9	254.4	100.04	99.96	99.92	99.72	99.65	99.49	99.41	99.29	99.10
10	254.0	99.92	99.84	99.76	99.61	99.49	99.41	99.21	99.17	99.09
11	253.9	99.96	99.76	99.68	99.53	99.33	99.25	99.17	99.13	99.05
12	253.9	99.96	99.88	99.72	99.53	99.49	99.37	99.33	99.13	99.02
13	251.0	99.96	99.92	99.84	99.64	99.48	99.40	99.24	99.20	99.04
14	251.1	99.96	99.88	99.76	99.64	99.44	99.32	99.16	99.00	98.85
15	253.7	99.92	99.76	99.68	99.49	99.37	99.21	99.13	99.01	98.98
16	253.7	99.96	99.76	99.68	99.53	99.45	99.37	99.17	99.01	98.98
17	253.8	99.96	99.84	99.68	99.53	99.49	99.29	99.13	99.05	98.90
18	254.8	99.92	99.73	99.65	99.49	99.37	99.29	99.22	99.10	99.02
19	252.7	99.92	99.76	99.60	99.49	99.33	99.17	99.13	98.97	98.89
20	253.6	100.04	99.88	99.68	99.61	99.49	99.41	99.33	99.21	99.09
21	254.9	99.96	99.88	99.73	99.65	99.49	99.29	99.18	99.10	99.02
22	253.8	99.92	99.84	99.65	99.57	99.45	99.29	99.21	99.01	98.94
23	250.5	99.96	99.80	99.76	99.60	99.44	99.28	99.16	99.08	98.96
24	255.5	99.96	99.80	99.57	99.49	99.33	99.18	99.06	98.90	98.83
25	253.6	99.96	99.80	99.61	99.49	99.37	99.25	99.17	99.05	98.94
Avg.	253.4	99.96	99.83	99.70	99.56	99.43	99.29	99.17	99.06	98.96
Med.	253.8	99.96	99.80	99.68	99.53	99.45	99.29	99.17	99.08	98.98
st dev	1.9	0.04	0.07	0.09	0.09	0.11	0.12	0.12	0.12	0.10
Min.	248.0	99.92	99.69	99.53	99.37	99.22	99.06	98.90	98.78	98.70
Max.	255.8	100.08	99.96	99.92	99.76	99.65	99.49	99.41	99.29	99.10

FINAL

3.2 Data Set 1, 55°C, 240mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	5.618	5.642	5.614	5.617	5.613	5.628	5.674	5.631	5.601	5.630
2	5.599	5.592	5.631	5.600	5.592	5.609	5.609	5.616	5.612	5.610
3	5.609	5.608	5.640	5.608	5.604	5.712	5.615	5.621	5.621	5.618
4	5.609	5.608	5.726	5.604	5.600	5.613	5.612	5.619	5.620	5.617
5	5.630	5.600	5.636	5.604	5.608	5.618	5.613	5.616	5.614	5.624
6	5.593	5.592	5.631	5.608	5.596	5.611	5.610	5.613	5.612	5.609
7	5.591	5.596	5.633	5.596	5.596	5.614	5.608	5.614	5.608	5.606
8	5.591	5.596	5.625	5.596	5.596	5.605	5.604	5.607	5.604	5.600
9	5.607	5.592	5.627	5.600	5.596	5.608	5.606	5.610	5.610	5.603
10	5.599	5.604	5.632	5.604	5.600	5.615	5.611	5.613	5.619	5.619
11	5.599	5.604	5.638	5.596	5.600	5.609	5.613	5.611	5.617	5.618
12	5.630	5.617	5.658	5.604	5.608	5.633	5.610	5.604	5.631	5.617
13	5.593	5.613	5.639	5.613	5.608	5.563	5.614	5.603	5.633	5.615
14	5.591	5.600	5.629	5.596	5.600	5.610	5.607	5.607	5.608	5.609
15	5.586	5.588	5.624	5.596	5.592	5.599	5.600	5.603	5.605	5.603
16	5.601	5.600	5.641	5.604	5.604	5.618	5.620	5.618	5.617	5.620
17	5.593	5.596	5.632	5.604	5.600	5.611	5.606	5.611	5.611	5.609
18	5.601	5.608	5.638	5.625	5.625	5.643	5.623	5.621	5.622	5.637
19	5.599	5.600	5.637	5.604	5.604	5.614	5.616	5.614	5.606	5.616
20	5.597	5.625	5.692	5.613	5.604	5.619	5.615	5.619	5.614	5.619
21	5.645	5.600	5.627	5.596	5.588	5.602	5.602	5.613	5.606	5.646
22	5.599	5.650	5.630	5.596	5.596	5.608	5.604	5.606	5.604	5.611
23	5.595	5.596	5.631	5.604	5.600	5.613	5.605	5.611	5.610	5.610
24	5.595	5.596	5.627	5.596	5.592	5.603	5.604	5.606	5.604	5.604
25	5.593	5.646	5.655	5.600	5.596	5.617	5.606	5.676	5.607	5.612
Avg.	5.603	5.607	5.640	5.603	5.601	5.616	5.612	5.615	5.613	5.615
Med.	5.599	5.600	5.632	5.604	5.600	5.613	5.610	5.613	5.611	5.615
st dev	0.014	0.017	0.023	0.008	0.008	0.024	0.014	0.014	0.008	0.011
Min.	5.586	5.588	5.614	5.596	5.588	5.563	5.600	5.603	5.601	5.600
Max.	5.645	5.650	5.726	5.625	5.625	5.712	5.674	5.676	5.633	5.646

FINAL

3.3 Data Set 1, 55°C, 240mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2618	0.5280	2713	0.0001	0.0001	0.0002	0.0005	0.0005	0.0004	0.0008	0.0010	0.0013
2	0.2639	0.5294	2664	0.0002	0.0004	0.0006	0.0008	0.0008	0.0008	0.0010	0.0013	0.0015
3	0.2630	0.5294	2681	0.0001	0.0004	0.0006	0.0008	0.0011	0.0011	0.0011	0.0014	0.0017
4	0.2634	0.5282	2678	0.0001	0.0004	0.0006	0.0008	0.0011	0.0011	0.0010	0.0012	0.0015
5	0.2640	0.5293	2662	0.0002	0.0004	0.0006	0.0008	0.0011	0.0011	0.0012	0.0012	0.0015
6	0.2634	0.5287	2677	0.0003	0.0006	0.0010	0.0012	0.0012	0.0012	0.0013	0.0015	0.0018
7	0.2627	0.5287	2690	0.0005	0.0007	0.0005	0.0006	0.0007	0.0008	0.0011	0.0011	0.0010
8	0.2635	0.5281	2677	0.0004	0.0008	0.0009	0.0009	0.0012	0.0015	0.0017	0.0018	0.0020
9	0.2637	0.5298	2667	0.0002	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0015	0.0014
10	0.2633	0.5283	2681	0.0001	0.0004	0.0006	0.0009	0.0011	0.0010	0.0009	0.0009	0.0011
11	0.2626	0.5287	2693	0.0004	0.0006	0.0007	0.0010	0.0012	0.0014	0.0016	0.0017	0.0017
12	0.2628	0.5285	2689	0.0004	0.0004	0.0007	0.0007	0.0005	0.0006	0.0006	0.0008	0.0009
13	0.2619	0.5285	2708	0.0003	0.0003	0.0002	0.0004	0.0006	0.0006	0.0009	0.0011	0.0014
14	0.2618	0.5285	2709	0.0001	0.0004	0.0007	0.0007	0.0004	0.0005	0.0006	0.0005	0.0004
15	0.2625	0.5308	2686	0.0002	0.0003	0.0006	0.0008	0.0006	0.0007	0.0008	0.0007	0.0008
16	0.2627	0.5286	2691	0.0003	0.0005	0.0009	0.0010	0.0009	0.0010	0.0012	0.0012	0.0011
17	0.2633	0.5288	2678	0.0001	0.0002	0.0006	0.0006	0.0009	0.0011	0.0013	0.0013	0.0013
18	0.2636	0.5292	2670	0.0002	0.0004	0.0002	0.0004	0.0005	0.0006	0.0006	0.0007	0.0007
19	0.2639	0.5287	2667	0.0003	0.0002	0.0005	0.0006	0.0009	0.0011	0.0012	0.0011	0.0012
20	0.2627	0.5278	2695	0.0003	0.0004	0.0004	0.0007	0.0009	0.0009	0.0009	0.0013	0.0013
21	0.2639	0.5295	2664	0.0001	0.0003	0.0007	0.0008	0.0010	0.0011	0.0012	0.0012	0.0012
22	0.2637	0.5293	2668	0.0002	0.0001	0.0003	0.0006	0.0007	0.0010	0.0011	0.0015	0.0019
23	0.2622	0.5292	2699	0.0001	0.0002	0.0002	0.0001	0.0004	0.0005	0.0008	0.0010	0.0011
24	0.2634	0.5295	2673	0.0001	0.0002	0.0005	0.0008	0.0006	0.0008	0.0009	0.0011	0.0011
25	0.2625	0.5297	2692	0.0002	0.0002	0.0004	0.0005	0.0004	0.0004	0.0006	0.0010	0.0009
Avg.	0.2630	0.5289	2683	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0010	0.0012	0.0013
Med.	0.2633	0.5287	2681	0.0002	0.0004	0.0006	0.0008	0.0009	0.0010	0.0010	0.0012	0.0013
st dev	0.0007	0.0007	15	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0004
Min.	0.2618	0.5278	2662	0.0001	0.0001	0.0002	0.0001	0.0004	0.0004	0.0006	0.0005	0.0004
Max.	0.2640	0.5308	2713	0.0005	0.0008	0.0010	0.0012	0.0012	0.0015	0.0017	0.0018	0.0020

3.4 Data Set 2, 85°C, 240mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	251.8	99.96	99.80	99.60	99.44	99.25	99.13	98.97	98.89	98.81
27	255.3	100.04	99.92	99.76	99.61	99.45	99.26	99.10	99.02	98.90
28	254.5	99.92	99.84	99.65	99.45	99.29	99.14	98.98	98.94	98.82
29	254.3	100.04	99.84	99.76	99.57	99.41	99.25	99.13	98.94	98.74
30	253.1	99.92	99.84	99.76	99.57	99.41	99.33	99.13	99.01	98.85
31	254.1	99.96	99.76	99.57	99.45	99.33	99.13	98.98	98.86	98.74
32	251.0	100.08	100.00	99.80	99.68	99.56	99.40	99.20	99.12	99.00
33	251.6	99.92	99.76	99.56	99.40	99.24	99.09	98.89	98.77	98.57
34	256.2	99.96	99.84	99.65	99.49	99.38	99.18	99.14	99.06	98.99
35	251.1	99.92	99.72	99.64	99.56	99.40	99.24	99.08	98.88	98.81
36	254.4	99.96	99.88	99.72	99.65	99.57	99.33	99.25	99.17	99.06
37	257.1	99.96	99.81	99.61	99.42	99.26	99.07	99.03	98.87	98.72
38	256.1	99.92	99.69	99.53	99.34	99.14	99.02	98.91	98.67	98.56
39	251.4	100.04	99.96	99.80	99.60	99.40	99.24	99.12	98.97	98.89
40	251.0	99.88	99.68	99.52	99.36	99.24	99.04	98.88	98.73	98.57
41	249.4	100.04	99.84	99.68	99.48	99.28	99.16	99.04	98.84	98.76
42	256.1	99.92	99.73	99.53	99.30	99.14	98.98	98.79	98.59	98.48
43	252.7	99.84	99.68	99.49	99.41	99.21	99.05	98.93	98.73	98.54
44	253.8	99.96	99.80	99.68	99.53	99.33	99.17	99.05	98.90	98.74
45	254.4	99.88	99.69	99.57	99.41	99.33	99.25	99.21	99.14	99.06
46	255.3	99.92	99.73	99.61	99.41	99.29	99.18	99.02	98.86	98.67
47	252.7	99.92	99.76	99.64	99.53	99.33	99.17	99.05	98.93	98.81
48	254.3	99.88	99.69	99.49	99.33	99.21	99.17	99.02	98.94	98.78
49	255.8	99.84	99.73	99.61	99.45	99.37	99.26	99.06	98.98	98.87
50	253.2	99.88	99.80	99.61	99.53	99.41	99.21	99.13	98.97	98.82
Avg.	253.6	99.94	99.79	99.63	99.48	99.33	99.18	99.04	98.91	98.78
Med.	254.1	99.92	99.80	99.61	99.45	99.33	99.17	99.05	98.93	98.81
st dev	2.0	0.06	0.09	0.09	0.10	0.11	0.10	0.11	0.14	0.16
Min.	249.4	99.84	99.68	99.49	99.30	99.14	98.98	98.79	98.59	98.48
Max.	257.1	100.08	100.00	99.80	99.68	99.57	99.40	99.25	99.17	99.06

3.5 Data Set 2, 85°C, 240mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	5.620	5.634	5.600	5.596	5.604	5.610	5.611	5.613	5.609	5.619
27	5.599	5.628	5.600	5.596	5.596	5.607	5.607	5.607	5.602	5.612
28	5.597	5.602	5.596	5.600	5.592	5.697	5.593	5.597	5.606	5.616
29	5.586	5.625	5.592	5.596	5.592	5.602	5.597	5.603	5.604	5.609
30	5.591	5.628	5.596	5.596	5.596	5.611	5.606	5.608	5.603	5.613
31	5.597	5.630	5.604	5.596	5.604	5.619	5.608	5.606	5.606	5.617
32	5.591	5.633	5.600	5.600	5.596	5.619	5.606	5.608	5.603	5.620
33	5.593	5.627	5.596	5.592	5.592	5.697	5.607	5.603	5.602	5.610
34	5.597	5.632	5.596	5.604	5.600	5.717	5.608	5.609	5.610	5.643
35	5.614	5.640	5.692	5.613	5.613	5.647	5.617	5.614	5.616	5.619
36	5.586	5.620	5.588	5.596	5.583	5.658	5.597	5.597	5.602	5.608
37	5.622	5.663	5.633	5.629	5.629	5.642	5.643	5.644	5.640	5.650
38	5.601	5.644	5.613	5.617	5.617	5.627	5.635	5.622	5.624	5.627
39	5.595	5.634	5.600	5.600	5.604	5.622	5.614	5.613	5.615	5.615
40	5.599	5.631	5.604	5.604	5.600	5.595	5.610	5.609	5.613	5.614
41	5.599	5.650	5.608	5.621	5.604	5.617	5.617	5.616	5.621	5.619
42	5.591	5.631	5.592	5.592	5.592	5.604	5.603	5.607	5.610	5.610
43	5.616	5.665	5.613	5.613	5.617	5.622	5.619	5.619	5.624	5.621
44	5.595	5.684	5.613	5.600	5.600	5.607	5.596	5.607	5.608	5.597
45	5.597	5.627	5.692	5.596	5.596	5.612	5.605	5.610	5.609	5.612
46	5.630	5.630	5.596	5.608	5.596	5.606	5.610	5.609	5.614	5.611
47	5.609	5.648	5.621	5.621	5.621	5.627	5.624	5.628	5.629	5.630
48	5.609	5.654	5.625	5.617	5.617	5.627	5.619	5.626	5.619	5.627
49	5.601	5.635	5.604	5.604	5.604	5.617	5.614	5.620	5.617	5.619
50	5.603	5.642	5.617	5.663	5.608	5.623	5.619	5.653	5.620	5.621
Avg.	5.602	5.637	5.612	5.607	5.603	5.629	5.611	5.614	5.613	5.618
Med.	5.599	5.633	5.604	5.600	5.600	5.619	5.610	5.609	5.610	5.617
st dev	0.011	0.017	0.027	0.016	0.011	0.032	0.012	0.013	0.010	0.011
Min.	5.586	5.602	5.588	5.592	5.583	5.595	5.593	5.597	5.602	5.597
Max.	5.630	5.684	5.692	5.663	5.629	5.717	5.643	5.653	5.640	5.650

FINAL

3.6 Data Set 2, 85°C, 240mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2631	0.5300	2678	0.0001	0.0004	0.0006	0.0006	0.0005	0.0005	0.0008	0.0010	0.0011
27	0.2643	0.5300	2654	0.0002	0.0004	0.0005	0.0004	0.0005	0.0006	0.0008	0.0010	0.0012
28	0.2639	0.5290	2665	0.0002	0.0003	0.0006	0.0004	0.0005	0.0005	0.0008	0.0009	0.0011
29	0.2634	0.5291	2674	0.0000	0.0003	0.0005	0.0006	0.0005	0.0005	0.0007	0.0010	0.0011
30	0.2630	0.5288	2683	0.0001	0.0003	0.0005	0.0007	0.0006	0.0005	0.0007	0.0010	0.0012
31	0.2622	0.5303	2695	0.0003	0.0001	0.0002	0.0004	0.0003	0.0003	0.0005	0.0007	0.0008
32	0.2631	0.5291	2680	0.0002	0.0001	0.0003	0.0005	0.0006	0.0007	0.0008	0.0011	0.0012
33	0.2633	0.5280	2681	0.0002	0.0002	0.0001	0.0003	0.0004	0.0005	0.0007	0.0009	0.0010
34	0.2638	0.5287	2669	0.0002	0.0002	0.0001	0.0003	0.0006	0.0007	0.0008	0.0011	0.0012
35	0.2633	0.5295	2675	0.0004	0.0005	0.0004	0.0003	0.0002	0.0004	0.0006	0.0008	0.0009
36	0.2635	0.5307	2668	0.0001	0.0002	0.0002	0.0002	0.0005	0.0008	0.0007	0.0011	0.0012
37	0.2631	0.5290	2682	0.0001	0.0001	0.0004	0.0004	0.0004	0.0006	0.0006	0.0009	0.0011
38	0.2637	0.5287	2671	0.0002	0.0003	0.0004	0.0005	0.0005	0.0007	0.0005	0.0006	0.0007
39	0.2635	0.5293	2673	0.0001	0.0001	0.0002	0.0003	0.0006	0.0008	0.0009	0.0009	0.0009
40	0.2629	0.5283	2688	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0007	0.0006	0.0006
41	0.2629	0.5277	2691	0.0001	0.0002	0.0003	0.0004	0.0006	0.0007	0.0007	0.0008	0.0008
42	0.2635	0.5296	2670	0.0003	0.0004	0.0005	0.0005	0.0007	0.0007	0.0008	0.0007	0.0008
43	0.2640	0.5302	2659	0.0003	0.0004	0.0004	0.0005	0.0006	0.0007	0.0008	0.0007	0.0008
44	0.2632	0.5282	2683	0.0002	0.0006	0.0007	0.0009	0.0011	0.0010	0.0010	0.0010	0.0011
45	0.2628	0.5292	2686	0.0001	0.0001	0.0004	0.0004	0.0007	0.0008	0.0011	0.0011	0.0015
46	0.2638	0.5295	2665	0.0001	0.0003	0.0003	0.0006	0.0007	0.0009	0.0011	0.0012	0.0013
47	0.2637	0.5277	2673	0.0003	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0012	0.0013
48	0.2619	0.5283	2709	0.0002	0.0002	0.0004	0.0006	0.0008	0.0011	0.0013	0.0014	0.0014
49	0.2631	0.5303	2677	0.0002	0.0001	0.0002	0.0004	0.0007	0.0010	0.0014	0.0014	0.0015
50	0.2639	0.5287	2667	0.0002	0.0003	0.0003	0.0002	0.0005	0.0008	0.0012	0.0011	0.0013
Avg.	0.2633	0.5291	2677	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0010	0.0011
Med.	0.2633	0.5291	2675	0.0002	0.0003	0.0004	0.0004	0.0006	0.0007	0.0008	0.0010	0.0011
st dev	0.0005	0.0008	12	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2619	0.5277	2654	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0005	0.0006	0.0006
Max.	0.2643	0.5307	2709	0.0004	0.0006	0.0007	0.0009	0.0011	0.0011	0.0014	0.0014	0.0015

3.7 Data Set 3, 105°C, 240mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	250.4	99.92	99.76	99.56	99.36	99.16	99.04	98.88	98.72	98.56
52	254.0	99.96	99.72	99.53	99.33	99.13	98.98	98.82	98.66	98.50
53	243.4	99.92	99.71	99.59	99.47	99.34	99.26	99.10	98.93	98.73
54	247.6	99.96	99.84	99.68	99.52	99.35	99.19	99.11	98.91	98.71
55	249.0	99.92	99.76	99.60	99.44	99.36	99.20	99.04	98.92	98.84
56	252.3	99.92	99.76	99.72	99.64	99.45	99.37	99.21	99.09	98.97
57	255.4	99.96	99.77	99.65	99.57	99.45	99.33	99.18	99.10	98.90
58	256.5	99.92	99.73	99.53	99.34	99.18	98.95	98.87	98.71	98.64
59	253.4	99.88	99.80	99.72	99.53	99.45	99.29	99.13	98.93	98.82
60	256.0	99.96	99.73	99.61	99.49	99.34	99.14	98.95	98.83	98.75
61	254.2	99.96	99.84	99.69	99.49	99.29	99.13	99.06	98.90	98.78
62	256.8	99.92	99.84	99.65	99.45	99.26	99.03	98.83	98.71	98.56
63	251.5	99.96	99.76	99.56	99.32	99.13	98.89	98.69	98.49	98.37
64	252.5	99.92	99.76	99.64	99.49	99.37	99.13	98.97	98.73	98.57
65	256.6	99.96	99.77	99.65	99.45	99.26	99.03	98.79	98.60	98.44
66	251.9	99.84	99.72	99.60	99.36	99.21	99.05	98.85	98.69	98.53
67	254.2	99.92	99.72	99.57	99.37	99.13	98.90	98.74	98.58	98.39
68	253.5	100.04	99.88	99.68	99.45	99.29	99.13	98.93	98.78	98.58
69	255.6	99.92	99.77	99.53	99.41	99.26	99.02	98.83	98.59	98.36
70	252.3	99.84	99.64	99.48	99.33	99.09	98.85	98.69	98.53	98.34
71	255.5	99.96	99.73	99.53	99.37	99.22	99.06	98.86	98.67	98.51
72	254.3	99.96	99.76	99.57	99.33	99.10	98.86	98.66	98.43	98.27
73	255.7	99.92	99.73	99.49	99.34	99.14	98.90	98.79	98.71	98.51
74	254.5	99.92	99.69	99.45	99.29	99.14	99.02	98.90	98.78	98.66
75	254.7	99.88	99.73	99.53	99.37	99.18	99.02	98.94	98.78	98.59
Avg.	253.3	99.93	99.76	99.59	99.42	99.25	99.07	98.91	98.75	98.60
Med.	254.2	99.92	99.76	99.59	99.41	99.26	99.04	98.88	98.72	98.57
st dev	3.1	0.04	0.05	0.08	0.09	0.11	0.15	0.16	0.17	0.18
Min.	243.4	99.84	99.64	99.45	99.29	99.09	98.85	98.66	98.43	98.27
Max.	256.8	100.04	99.88	99.72	99.64	99.45	99.37	99.21	99.10	98.97

3.8 Data Set 3, 105°C, 240mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	5.591	5.628	5.600	5.600	5.600	5.608	5.605	5.608	5.609	5.605
52	5.597	5.630	5.600	5.604	5.604	5.617	5.609	5.612	5.612	5.612
53	5.595	5.629	5.604	5.600	5.596	5.610	5.607	5.608	5.610	5.611
54	5.589	5.630	5.600	5.654	5.600	5.611	5.610	5.613	5.614	5.613
55	5.601	5.633	5.604	5.600	5.600	5.614	5.659	5.616	5.615	5.612
56	5.599	5.638	5.600	5.604	5.600	5.667	5.723	5.612	5.618	5.611
57	5.595	5.630	5.600	5.596	5.596	5.604	5.610	5.621	5.615	5.614
58	5.603	5.745	5.608	5.604	5.604	5.616	5.595	5.621	5.551	5.622
59	5.597	5.626	5.600	5.596	5.596	5.607	5.607	5.607	5.607	5.606
60	5.620	5.623	5.596	5.596	5.600	5.610	5.610	5.611	5.613	5.613
61	5.599	5.636	5.604	5.604	5.608	5.610	5.612	5.619	5.618	5.614
62	5.593	5.625	5.596	5.596	5.592	5.608	5.610	5.605	5.610	5.605
63	5.597	5.682	5.600	5.600	5.600	5.660	5.611	5.618	5.620	5.617
64	5.601	5.623	5.583	5.592	5.592	5.599	5.600	5.603	5.600	5.603
65	5.591	5.630	5.596	5.609	5.604	5.607	5.608	5.609	5.609	5.607
66	5.601	5.638	5.596	5.600	5.608	5.609	5.605	5.616	5.690	5.611
67	5.632	5.633	5.596	5.600	5.592	5.608	5.605	5.614	5.621	5.600
68	5.597	5.635	5.604	5.604	5.604	5.612	5.615	5.614	5.614	5.614
69	5.597	5.630	5.600	5.596	5.600	5.678	5.610	5.609	5.613	5.608
70	5.599	5.634	5.600	5.608	5.604	5.609	5.612	5.614	5.614	5.615
71	5.593	5.628	5.604	5.592	5.592	5.602	5.606	5.608	5.606	5.635
72	5.632	5.671	5.638	5.633	5.629	5.643	5.643	5.652	5.652	5.651
73	5.586	5.625	5.596	5.596	5.588	5.597	5.599	5.603	5.607	5.600
74	5.595	5.643	5.613	5.604	5.605	5.615	5.616	5.663	5.619	5.628
75	5.580	5.622	5.592	5.588	5.588	5.597	5.677	5.602	5.602	5.598
Avg.	5.599	5.639	5.601	5.603	5.600	5.617	5.619	5.615	5.614	5.613
Med.	5.597	5.630	5.600	5.600	5.600	5.610	5.610	5.612	5.613	5.612
st dev	0.012	0.026	0.010	0.014	0.008	0.021	0.029	0.014	0.022	0.011
Min.	5.580	5.622	5.583	5.588	5.588	5.597	5.595	5.602	5.551	5.598
Max.	5.632	5.745	5.638	5.654	5.629	5.678	5.723	5.663	5.690	5.651

FINAL

3.9 Data Set 3, 105°C, 240mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	0.2632	0.5289	2680	0.0001	0.0004	0.0004	0.0005	0.0007	0.0011	0.0013	0.0013	0.0014
52	0.2637	0.5276	2675	0.0004	0.0004	0.0003	0.0002	0.0004	0.0005	0.0009	0.0010	0.0011
53	0.2635	0.5306	2668	0.0004	0.0004	0.0007	0.0007	0.0008	0.0008	0.0010	0.0013	0.0013
54	0.2616	0.5284	2714	0.0003	0.0008	0.0008	0.0007	0.0010	0.0013	0.0015	0.0017	0.0016
55	0.2628	0.5279	2693	0.0003	0.0004	0.0005	0.0009	0.0011	0.0014	0.0014	0.0012	0.0010
56	0.2637	0.5291	2670	0.0002	0.0002	0.0005	0.0006	0.0009	0.0011	0.0011	0.0010	0.0012
57	0.2636	0.5291	2671	0.0004	0.0003	0.0006	0.0008	0.0010	0.0012	0.0012	0.0012	0.0011
58	0.2624	0.5294	2694	0.0004	0.0004	0.0006	0.0008	0.0010	0.0014	0.0015	0.0013	0.0014
59	0.2619	0.5293	2704	0.0001	0.0001	0.0002	0.0004	0.0006	0.0007	0.0010	0.0009	0.0009
60	0.2626	0.5295	2690	0.0005	0.0005	0.0005	0.0005	0.0010	0.0012	0.0014	0.0014	0.0016
61	0.2635	0.5287	2674	0.0003	0.0004	0.0006	0.0006	0.0010	0.0012	0.0014	0.0017	0.0017
62	0.2629	0.5291	2684	0.0003	0.0005	0.0005	0.0007	0.0009	0.0011	0.0014	0.0017	0.0017
63	0.2624	0.5287	2697	0.0002	0.0003	0.0003	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016
64	0.2634	0.5292	2675	0.0005	0.0007	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0019
65	0.2633	0.5293	2676	0.0003	0.0004	0.0004	0.0005	0.0009	0.0011	0.0012	0.0015	0.0016
66	0.2637	0.5284	2672	0.0003	0.0006	0.0005	0.0006	0.0010	0.0012	0.0013	0.0017	0.0018
67	0.2625	0.5278	2699	0.0002	0.0003	0.0004	0.0006	0.0008	0.0010	0.0009	0.0009	0.0009
68	0.2632	0.5285	2680	0.0003	0.0004	0.0005	0.0005	0.0009	0.0010	0.0010	0.0011	0.0010
69	0.2630	0.5302	2678	0.0002	0.0003	0.0005	0.0005	0.0008	0.0011	0.0011	0.0013	0.0015
70	0.2629	0.5278	2689	0.0002	0.0004	0.0004	0.0008	0.0009	0.0010	0.0012	0.0013	0.0015
71	0.2630	0.5283	2687	0.0004	0.0006	0.0007	0.0007	0.0011	0.0013	0.0014	0.0016	0.0016
72	0.2631	0.5290	2681	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0011	0.0014	0.0014
73	0.2634	0.5299	2672	0.0003	0.0004	0.0004	0.0006	0.0008	0.0011	0.0014	0.0014	0.0016
74	0.2635	0.5292	2672	0.0001	0.0003	0.0004	0.0006	0.0006	0.0009	0.0010	0.0012	0.0012
75	0.2624	0.5298	2692	0.0001	0.0002	0.0004	0.0006	0.0006	0.0010	0.0011	0.0011	0.0013
Avg.	0.2630	0.5289	2683	0.0003	0.0004	0.0005	0.0006	0.0009	0.0011	0.0012	0.0013	0.0014
Med.	0.2631	0.5291	2680	0.0003	0.0004	0.0005	0.0006	0.0009	0.0011	0.0012	0.0013	0.0014
st dev	0.0006	0.0008	12	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003
Min.	0.2616	0.5276	2668	0.0001	0.0001	0.0002	0.0002	0.0004	0.0005	0.0009	0.0009	0.0009
Max.	0.2637	0.5306	2714	0.0005	0.0008	0.0008	0.0009	0.0011	0.0014	0.0015	0.0018	0.0019

FINAL

3.10 Data Set 4, 55°C, 400mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
76	407.6	99.98	99.90	99.78	99.68	99.48	99.29	99.07	98.95	98.80
77	410.9	99.90	99.81	99.61	99.46	99.20	99.03	98.88	98.81	98.76
78	405.9	99.98	99.83	99.66	99.38	99.19	98.84	98.74	98.67	98.52
79	408.6	99.85	99.80	99.61	99.44	99.29	99.05	98.75	98.48	98.41
80	405.1	99.68	99.53	99.43	99.21	99.06	98.96	98.82	98.69	98.62
81	408.7	99.95	99.90	99.83	99.66	99.56	99.31	99.09	98.87	98.75
82	413.5	99.81	99.71	99.54	99.40	99.18	99.01	98.84	98.69	98.48
83	409.3	99.80	99.73	99.66	99.44	99.24	99.02	98.88	98.75	98.68
84	410.5	99.68	99.54	99.46	99.27	99.15	99.00	98.86	98.66	98.47
85	405.0	99.60	99.53	99.26	99.14	98.99	98.81	98.62	98.49	98.42
86	409.9	99.54	99.41	99.17	99.00	98.88	98.71	98.46	98.19	98.05
87	407.4	99.83	99.75	99.61	99.41	99.24	99.14	98.99	98.87	98.72
88	410.0	99.61	99.51	99.44	99.27	99.07	98.88	98.71	98.59	98.41
89	409.5	99.98	99.90	99.76	99.61	99.41	99.27	99.05	98.97	98.83
90	403.7	100.02	99.88	99.68	99.55	99.31	99.06	98.96	98.74	98.61
91	414.8	100.31	100.14	99.90	99.69	99.57	99.40	99.32	99.20	99.04
92	406.1	100.12	100.05	99.80	99.63	99.43	99.31	99.24	99.11	98.94
93	407.3	99.88	99.80	99.68	99.58	99.41	99.24	99.07	98.92	98.80
94	409.5	100.15	100.07	99.83	99.71	99.56	99.37	99.24	99.07	98.90
95	411.0	100.07	99.98	99.88	99.76	99.64	99.54	99.39	99.27	99.12
96	407.3	100.39	100.29	100.22	100.07	99.93	99.83	99.71	99.58	99.48
97	407.7	100.29	100.17	100.07	99.95	99.85	99.71	99.53	99.44	99.34
98	412.3	100.29	100.12	99.95	99.83	99.66	99.54	99.42	99.35	99.22
99	411.5	100.27	100.07	99.95	99.88	99.73	99.56	99.49	99.37	99.25
100	412.4	100.32	100.24	100.15	99.95	99.71	99.42	99.22	98.79	98.62
Avg.	409.0	99.97	99.87	99.72	99.56	99.39	99.21	99.05	98.90	98.77
Med.	409.3	99.98	99.88	99.68	99.58	99.41	99.24	99.05	98.87	98.75
st dev	2.8	0.25	0.24	0.26	0.27	0.28	0.29	0.31	0.34	0.34
Min.	403.7	99.54	99.41	99.17	99.00	98.88	98.71	98.46	98.19	98.05
Max.	414.8	100.39	100.29	100.22	100.07	99.93	99.83	99.71	99.58	99.48

FINAL

3.11 Data Set 4, 55°C, 400mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
76	5.810	5.825	5.823	5.828	5.823	5.827	5.821	5.820	5.826	5.828
77	5.829	5.822	5.824	5.829	5.822	5.826	5.820	5.826	5.831	5.826
78	5.810	5.825	5.822	5.826	5.829	5.827	5.821	5.826	5.828	5.830
79	5.810	5.831	5.828	5.832	5.833	5.840	5.830	5.831	5.834	5.831
80	5.808	5.830	5.824	5.830	5.831	5.828	5.825	5.830	5.827	5.828
81	5.812	5.832	5.824	5.828	5.833	5.835	5.831	5.831	5.833	5.833
82	5.850	5.869	5.869	5.870	5.866	5.871	5.864	5.870	5.880	5.870
83	5.825	5.824	5.825	5.828	5.833	5.828	5.825	5.828	5.832	5.832
84	5.810	5.838	5.828	5.830	5.834	5.834	5.838	5.833	5.832	5.839
85	5.810	5.820	5.816	5.822	5.820	5.819	5.820	5.818	5.824	5.835
86	5.818	5.843	5.838	5.857	5.871	5.850	5.844	5.840	5.846	5.843
87	5.810	5.828	5.828	5.824	5.821	5.827	5.824	5.819	5.825	5.831
88	5.791	5.813	5.810	5.809	5.811	5.811	5.810	5.816	5.815	5.815
89	5.793	5.816	5.822	5.808	5.814	5.814	5.814	5.813	5.814	5.817
90	5.800	5.814	5.818	5.816	5.822	5.824	5.819	5.816	5.822	5.821
91	5.852	5.878	5.876	5.877	5.879	5.880	5.878	5.878	5.880	5.879
92	5.800	5.823	5.822	5.826	5.825	5.825	5.822	5.824	5.828	5.822
93	5.806	5.825	5.843	5.824	5.829	5.821	5.828	5.820	5.827	5.825
94	5.800	5.816	5.822	5.818	5.821	5.820	5.819	5.817	5.820	5.819
95	5.800	5.830	5.825	5.826	5.829	5.825	5.824	5.820	5.823	5.831
96	5.808	5.826	5.823	5.824	5.824	5.825	5.830	5.823	5.823	5.830
97	5.800	5.822	5.817	5.863	5.824	5.816	5.820	5.822	5.842	5.825
98	5.816	5.822	5.820	5.824	5.829	5.827	5.829	5.823	5.828	5.825
99	5.818	5.828	5.823	5.826	5.830	5.827	5.828	5.823	5.827	5.827
100	5.804	5.829	5.823	5.827	5.828	5.828	5.827	5.822	5.826	5.827
Avg.	5.812	5.829	5.828	5.831	5.831	5.830	5.828	5.828	5.832	5.832
Med.	5.810	5.825	5.823	5.826	5.829	5.827	5.825	5.823	5.827	5.828
st dev	0.015	0.015	0.015	0.017	0.017	0.016	0.015	0.015	0.016	0.014
Min.	5.791	5.813	5.810	5.808	5.811	5.811	5.810	5.813	5.814	5.815
Max.	5.852	5.878	5.876	5.877	5.879	5.880	5.878	5.878	5.880	5.879

FINAL

3.12 Data Set 4, 55°C, 400mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
76	0.2636	0.5280	2676	0.0004	0.0006	0.0007	0.0010	0.0014	0.0013	0.0015	0.0020	0.0020
77	0.2638	0.5283	2670	0.0005	0.0007	0.0006	0.0008	0.0013	0.0013	0.0013	0.0017	0.0015
78	0.2633	0.5285	2679	0.0005	0.0006	0.0006	0.0008	0.0012	0.0014	0.0016	0.0017	0.0016
79	0.2646	0.5284	2652	0.0005	0.0007	0.0004	0.0009	0.0010	0.0014	0.0016	0.0017	0.0019
80	0.2639	0.5279	2670	0.0005	0.0006	0.0004	0.0010	0.0010	0.0014	0.0015	0.0017	0.0020
81	0.2621	0.5283	2704	0.0003	0.0006	0.0008	0.0009	0.0011	0.0016	0.0018	0.0018	0.0022
82	0.2626	0.5293	2690	0.0002	0.0004	0.0010	0.0009	0.0012	0.0016	0.0021	0.0020	0.0020
83	0.2637	0.5275	2676	0.0004	0.0006	0.0007	0.0008	0.0011	0.0013	0.0017	0.0018	0.0019
84	0.2631	0.5285	2684	0.0002	0.0004	0.0008	0.0010	0.0012	0.0015	0.0019	0.0020	0.0023
85	0.2623	0.5288	2699	0.0002	0.0004	0.0007	0.0009	0.0010	0.0014	0.0018	0.0019	0.0021
86	0.2630	0.5281	2687	0.0002	0.0005	0.0008	0.0008	0.0009	0.0013	0.0015	0.0017	0.0018
87	0.2623	0.5299	2695	0.0002	0.0006	0.0007	0.0009	0.0009	0.0012	0.0014	0.0018	0.0016
88	0.2634	0.5284	2678	0.0001	0.0004	0.0009	0.0009	0.0012	0.0014	0.0011	0.0020	0.0018
89	0.2627	0.5285	2692	0.0001	0.0003	0.0009	0.0010	0.0012	0.0013	0.0013	0.0018	0.0021
90	0.2638	0.5295	2665	0.0003	0.0005	0.0009	0.0009	0.0011	0.0010	0.0011	0.0017	0.0016
91	0.2633	0.5270	2685	0.0004	0.0004	0.0006	0.0010	0.0011	0.0012	0.0012	0.0017	0.0019
92	0.2630	0.5281	2686	0.0003	0.0005	0.0006	0.0010	0.0011	0.0010	0.0012	0.0013	0.0018
93	0.2631	0.5274	2687	0.0002	0.0005	0.0008	0.0009	0.0010	0.0010	0.0011	0.0013	0.0014
94	0.2633	0.5288	2678	0.0004	0.0006	0.0005	0.0009	0.0012	0.0010	0.0011	0.0012	0.0018
95	0.2635	0.5292	2672	0.0004	0.0006	0.0006	0.0008	0.0012	0.0009	0.0009	0.0011	0.0016
96	0.2636	0.5296	2670	0.0004	0.0005	0.0005	0.0011	0.0013	0.0009	0.0014	0.0009	0.0020
97	0.2630	0.5284	2686	0.0001	0.0002	0.0009	0.0010	0.0011	0.0014	0.0018	0.0014	0.0021
98	0.2641	0.5293	2660	0.0004	0.0004	0.0006	0.0009	0.0012	0.0011	0.0014	0.0018	0.0018
99	0.2625	0.5291	2692	0.0002	0.0004	0.0006	0.0009	0.0011	0.0012	0.0015	0.0019	0.0019
100	0.2637	0.5297	2666	0.0003	0.0005	0.0007	0.0010	0.0013	0.0012	0.0015	0.0019	0.0020
Avg.	0.2633	0.5286	2680	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
Med.	0.2633	0.5285	2679	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
st dev	0.0006	0.0007	13	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0002
Min.	0.2621	0.5270	2652	0.0001	0.0002	0.0004	0.0008	0.0009	0.0009	0.0009	0.0009	0.0014
Max.	0.2646	0.5299	2704	0.0005	0.0007	0.0010	0.0011	0.0014	0.0016	0.0021	0.0020	0.0023

3.13 Data Set 5, 85°C, 400mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
101	407.9	99.83	99.73	99.61	99.46	99.41	99.31	99.24	98.97	98.77
102	411.8	99.15	98.98	98.83	98.74	98.52	98.47	98.42	98.25	98.20
103	403.7	99.98	99.85	99.73	99.55	99.28	99.03	98.89	98.64	98.44
104	406.8	99.85	99.73	99.53	99.39	99.14	98.84	98.57	98.30	97.98
105	411.6	100.07	99.98	99.68	99.34	99.27	99.22	99.05	98.91	98.81
106	407.7	100.27	100.17	99.83	99.61	99.41	99.14	99.09	98.95	98.70
107	408.7	99.41	99.29	99.12	98.87	98.78	98.73	98.61	98.36	98.21
108	410.1	100.12	99.93	99.71	99.41	99.15	99.02	98.73	98.59	98.17
109	403.7	99.50	99.46	99.23	98.93	98.84	98.69	98.39	98.14	98.07
110	407.4	100.05	99.88	99.71	99.48	99.34	99.02	98.90	98.70	98.36
111	413.3	100.10	99.98	99.76	99.64	99.47	99.30	99.06	98.84	98.48
112	409.9	100.34	100.17	99.98	99.83	99.71	99.54	99.39	99.34	99.19
113	410.4	100.24	100.15	99.95	99.68	99.46	99.27	99.07	98.81	98.71
114	409.6	99.78	99.71	99.54	99.19	99.10	98.88	98.73	98.54	98.29
115	410.0	99.80	99.66	99.54	99.44	99.24	99.00	98.71	98.61	98.27
116	409.8	99.46	99.41	99.24	98.98	98.83	98.56	98.24	98.00	97.80
117	408.5	99.83	99.68	99.44	99.27	99.02	98.80	98.58	98.41	98.12
118	408.5	100.10	99.95	99.71	99.56	99.41	99.17	99.00	98.82	98.70
119	409.1	100.39	100.15	99.83	99.76	99.54	99.44	99.22	99.07	98.97
120	405.5	100.25	100.02	99.83	99.68	99.56	99.48	99.33	98.99	98.74
121	405.7	100.15	100.02	99.83	99.68	99.36	99.11	98.72	98.40	98.32
122	401.5	99.90	99.83	99.53	99.33	99.03	98.93	98.66	98.48	98.33
123	410.8	99.85	99.78	99.44	99.27	98.95	98.83	98.56	98.49	98.42
124	414.3	99.81	99.73	99.52	99.28	99.16	98.84	98.77	98.60	98.55
125	408.1	100.27	100.02	99.61	99.46	99.26	99.00	98.87	98.80	98.70
Avg.	408.6	99.94	99.81	99.59	99.39	99.21	99.02	98.83	98.64	98.45
Med.	408.7	99.98	99.85	99.61	99.44	99.26	99.02	98.77	98.61	98.42
st dev	3.0	0.31	0.29	0.27	0.28	0.28	0.28	0.30	0.32	0.33
Min.	401.5	99.15	98.98	98.83	98.74	98.52	98.47	98.24	98.00	97.80
Max.	414.3	100.39	100.17	99.98	99.83	99.71	99.54	99.39	99.34	99.19

3.14 Data Set 5, 85°C, 400mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
101	5.862	5.831	5.831	5.830	5.834	5.831	5.834	5.831	5.833	5.829
102	5.812	5.820	5.831	5.840	5.822	5.826	5.827	5.826	5.824	5.826
103	5.802	5.822	5.823	5.817	5.823	5.820	5.825	5.820	5.822	5.821
104	5.816	5.834	5.829	5.831	5.837	5.831	5.829	5.835	5.833	5.835
105	5.810	5.832	5.828	5.827	5.834	5.831	5.837	5.834	5.839	5.835
106	5.808	5.831	5.833	5.829	5.827	5.823	5.827	5.825	5.828	5.841
107	5.797	5.834	5.819	5.815	5.820	5.814	5.818	5.817	5.823	5.817
108	5.879	5.828	5.824	5.830	5.827	5.844	5.831	5.825	5.827	5.825
109	5.808	5.835	5.881	5.825	5.833	5.831	5.829	5.832	5.837	5.828
110	5.810	5.832	5.845	5.829	5.832	5.831	5.831	5.825	5.833	5.832
111	5.808	5.827	5.826	5.830	5.826	5.829	5.832	5.827	5.827	5.831
112	5.814	5.829	5.830	5.827	5.830	5.823	5.830	5.830	5.830	5.832
113	5.812	5.835	5.833	5.829	5.827	5.829	5.837	5.831	5.833	5.837
114	5.839	5.840	5.843	5.838	5.841	5.838	5.841	5.844	5.842	5.842
115	5.896	5.834	5.832	5.839	5.837	5.831	5.840	5.833	5.833	5.835
116	5.806	5.835	5.838	5.829	5.838	5.830	5.837	5.834	5.834	5.833
117	5.802	5.825	5.839	5.818	5.822	5.822	5.823	5.824	5.826	5.824
118	5.806	5.834	5.830	5.832	5.833	5.831	5.830	5.838	5.830	5.842
119	5.820	5.839	5.839	5.842	5.842	5.842	5.844	5.838	5.833	5.838
120	5.808	5.828	5.827	5.829	5.829	5.825	5.831	5.824	5.830	5.829
121	5.804	5.828	5.828	5.833	5.828	5.827	5.830	5.833	5.827	5.831
122	5.800	5.822	5.827	5.822	5.826	5.819	5.821	5.821	5.824	5.821
123	5.802	5.824	5.815	5.820	5.826	5.824	5.827	5.825	5.826	5.825
124	5.839	5.862	5.863	5.865	5.863	5.864	5.868	5.862	5.864	5.865
125	5.806	5.830	5.825	6.196	6.118	6.044	5.831	5.832	6.176	6.065
Avg.	5.819	5.832	5.834	5.845	5.843	5.838	5.832	5.831	5.845	5.842
Med.	5.808	5.831	5.830	5.829	5.830	5.830	5.831	5.831	5.830	5.832
st dev	0.025	0.008	0.014	0.074	0.058	0.044	0.010	0.009	0.069	0.048
Min.	5.797	5.820	5.815	5.815	5.820	5.814	5.818	5.817	5.822	5.817
Max.	5.896	5.862	5.881	6.196	6.118	6.044	5.868	5.862	6.176	6.065

FINAL

3.15 Data Set 5, 85°C, 400mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
101	0.2644	0.5293	2655	0.0006	0.0005	0.0010	0.0009	0.0012	0.0009	0.0012	0.0015	0.0018
102	0.2625	0.5284	2696	0.0003	0.0004	0.0009	0.0009	0.0011	0.0013	0.0016	0.0018	0.0022
103	0.2624	0.5303	2691	0.0006	0.0007	0.0009	0.0008	0.0011	0.0008	0.0013	0.0016	0.0019
104	0.2632	0.5278	2683	0.0002	0.0003	0.0009	0.0009	0.0011	0.0011	0.0018	0.0017	0.0023
105	0.2629	0.5276	2690	0.0004	0.0004	0.0010	0.0009	0.0014	0.0012	0.0018	0.0019	0.0022
106	0.2633	0.5293	2676	0.0007	0.0007	0.0011	0.0010	0.0015	0.0013	0.0017	0.0019	0.0022
107	0.2622	0.5279	2704	0.0008	0.0007	0.0009	0.0011	0.0013	0.0018	0.0020	0.0021	0.0024
108	0.2641	0.5285	2663	0.0008	0.0008	0.0009	0.0009	0.0013	0.0016	0.0018	0.0020	0.0019
109	0.2616	0.5287	2714	0.0002	0.0004	0.0009	0.0011	0.0012	0.0016	0.0016	0.0020	0.0019
110	0.2629	0.5285	2687	0.0003	0.0004	0.0009	0.0010	0.0013	0.0016	0.0018	0.0020	0.0019
111	0.2645	0.5292	2651	0.0003	0.0004	0.0009	0.0011	0.0013	0.0015	0.0018	0.0021	0.0020
112	0.2630	0.5287	2684	0.0003	0.0005	0.0009	0.0009	0.0012	0.0015	0.0014	0.0018	0.0018
113	0.2636	0.5288	2673	0.0007	0.0008	0.0009	0.0010	0.0015	0.0013	0.0016	0.0020	0.0018
114	0.2641	0.5287	2663	0.0004	0.0007	0.0009	0.0009	0.0014	0.0016	0.0017	0.0016	0.0018
115	0.2637	0.5291	2669	0.0004	0.0007	0.0009	0.0008	0.0016	0.0013	0.0015	0.0016	0.0018
116	0.2628	0.5285	2689	0.0001	0.0003	0.0006	0.0012	0.0013	0.0021	0.0018	0.0019	0.0020
117	0.2630	0.5285	2685	0.0004	0.0005	0.0004	0.0010	0.0013	0.0017	0.0017	0.0017	0.0018
118	0.2633	0.5285	2680	0.0005	0.0006	0.0003	0.0010	0.0011	0.0016	0.0016	0.0015	0.0018
119	0.2633	0.5277	2683	0.0004	0.0005	0.0001	0.0009	0.0007	0.0016	0.0016	0.0016	0.0017
120	0.2632	0.5271	2686	0.0004	0.0004	0.0004	0.0009	0.0009	0.0019	0.0017	0.0018	0.0019
121	0.2637	0.5287	2670	0.0004	0.0006	0.0003	0.0008	0.0009	0.0013	0.0015	0.0014	0.0016
122	0.2632	0.5288	2680	0.0002	0.0004	0.0009	0.0010	0.0010	0.0011	0.0017	0.0018	0.0019
123	0.2640	0.5288	2663	0.0005	0.0006	0.0008	0.0011	0.0011	0.0009	0.0018	0.0016	0.0018
124	0.2617	0.5279	2714	0.0004	0.0006	0.0007	0.0009	0.0010	0.0010	0.0011	0.0016	0.0021
125	0.2626	0.5289	2693	0.0003	0.0005	0.0009	0.0010	0.0011	0.0011	0.0012	0.0018	0.0022
Avg.	0.2632	0.5286	2682	0.0004	0.0005	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020
Med.	0.2632	0.5287	2683	0.0004	0.0005	0.0009	0.0009	0.0012	0.0013	0.0017	0.0018	0.0019
st dev	0.0008	0.0007	16	0.0002	0.0002	0.0003	0.0001	0.0002	0.0003	0.0002	0.0002	0.0002
Min.	0.2616	0.5271	2651	0.0001	0.0003	0.0001	0.0008	0.0007	0.0008	0.0011	0.0014	0.0016
Max.	0.2645	0.5303	2714	0.0008	0.0008	0.0011	0.0012	0.0016	0.0021	0.0020	0.0021	0.0024

3.16 Data Set 6, 105°C, 400mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
126	414.6	100.02	99.83	99.61	99.52	99.40	99.23	99.08	98.99	98.75
127	403.4	99.75	99.63	99.38	99.31	99.13	98.98	98.81	98.61	98.36
128	410.0	99.98	99.88	99.68	99.44	99.20	98.95	98.80	98.63	98.51
129	411.7	99.68	99.51	99.27	99.20	99.13	98.91	98.57	98.32	98.11
130	409.1	99.80	99.66	99.46	99.32	99.10	98.85	98.58	98.26	98.02
131	412.2	99.64	99.59	99.30	98.98	98.91	98.62	98.42	98.11	97.77
132	409.0	100.02	99.93	99.63	99.34	99.12	99.02	98.73	98.58	98.39
133	405.9	100.20	100.10	99.98	99.66	99.36	99.14	98.99	98.87	98.69
134	413.7	100.10	99.98	99.76	99.59	99.30	98.98	98.74	98.43	98.24
135	414.9	100.07	99.95	99.78	99.61	99.35	98.94	98.84	98.63	98.39
136	405.6	100.42	100.20	100.07	99.95	99.78	99.56	99.29	99.09	99.04
137	413.5	99.85	99.69	99.52	99.44	99.27	98.94	98.60	98.48	98.33
138	410.9	100.05	99.88	99.63	99.46	99.34	99.29	99.08	98.93	98.71
139	413.1	100.07	99.88	99.54	99.37	99.20	99.06	98.72	98.67	98.47
140	411.2	99.95	99.73	99.49	99.39	99.05	98.78	98.74	98.54	98.39
141	407.9	99.90	99.71	99.36	99.19	99.12	98.87	98.60	98.53	98.36
142	410.8	99.83	99.66	99.34	99.00	98.86	98.61	98.32	98.27	97.96
143	404.4	99.83	99.68	99.55	99.38	99.18	99.09	98.96	98.62	98.44
144	409.1	100.10	99.85	99.54	99.19	98.95	98.68	98.41	98.31	98.00
145	407.3	99.98	99.75	99.39	99.17	98.92	98.55	98.33	97.94	97.59
146	409.8	99.71	99.51	99.34	98.98	98.83	98.71	98.49	98.12	98.02
147	408.8	99.71	99.51	99.07	98.63	98.24	97.85	97.46	97.33	97.16
148	414.0	99.76	99.59	99.08	98.53	98.09	97.73	97.32	96.86	96.55
149	415.3	99.59	99.37	98.87	98.41	97.93	97.40	96.99	96.60	96.29
150	409.6	99.63	99.54	99.22	99.02	98.68	98.22	98.05	97.66	97.39
Avg.	410.2	99.91	99.74	99.47	99.24	99.02	98.76	98.52	98.30	98.08
Med.	410.0	99.90	99.71	99.49	99.32	99.12	98.91	98.60	98.48	98.33
st dev	3.3	0.20	0.20	0.27	0.36	0.42	0.50	0.55	0.62	0.66
Min.	403.4	99.59	99.37	98.87	98.41	97.93	97.40	96.99	96.60	96.29
Max.	415.3	100.42	100.20	100.07	99.95	99.78	99.56	99.29	99.09	99.04

3.17 Data Set 6, 105°C, 400mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
126	5.797	5.817	5.822	5.822	5.819	5.819	5.827	5.820	5.822	5.816
127	5.806	5.829	5.833	5.831	5.831	5.830	5.839	5.828	5.826	5.837
128	5.795	5.820	5.826	5.817	5.818	5.821	5.821	5.822	5.820	5.824
129	5.810	5.830	5.848	5.832	5.832	5.828	5.837	5.834	5.834	5.840
130	5.808	5.821	5.850	5.826	5.832	5.824	5.829	5.826	5.823	5.834
131	5.793	5.820	5.832	5.817	5.822	5.820	5.821	5.819	5.824	5.829
132	5.814	5.833	5.844	5.835	5.842	5.835	5.845	5.840	5.834	5.897
133	5.806	5.825	5.838	5.824	5.828	5.825	5.829	5.827	5.832	5.841
134	5.814	5.835	5.834	5.838	5.835	5.827	5.839	5.833	5.839	5.833
135	5.820	5.827	5.825	5.828	5.872	5.824	5.830	5.831	5.827	5.826
136	5.800	5.817	5.820	5.824	5.821	5.820	5.824	5.820	5.821	5.847
137	5.860	5.876	5.877	5.884	5.884	5.881	5.883	5.877	5.884	5.875
138	5.802	5.821	5.826	5.828	5.826	5.826	5.824	5.825	5.826	5.823
139	5.800	5.834	5.822	5.886	5.914	5.822	5.829	5.825	5.822	5.822
140	5.812	5.826	5.828	5.833	5.830	6.286	5.832	5.833	5.831	5.833
141	5.806	5.823	5.822	5.823	5.827	5.826	5.827	5.827	5.835	5.824
142	5.797	5.821	5.830	5.831	5.830	5.827	5.822	5.826	5.830	5.827
143	5.818	5.828	5.830	5.830	5.833	5.829	5.827	5.833	5.831	5.825
144	5.804	5.820	5.834	5.827	5.830	5.826	5.842	5.824	5.825	5.823
145	5.802	6.362	5.828	6.081	6.235	5.845	5.921	5.910	5.956	5.831
146	5.804	5.821	5.832	5.829	5.831	5.826	5.831	5.829	5.827	5.827
147	5.802	5.811	5.816	5.815	5.813	5.815	5.810	5.815	5.818	5.810
148	5.808	5.820	5.823	5.827	5.824	5.822	5.823	5.825	5.823	5.827
149	5.835	5.855	5.861	5.860	5.861	5.853	5.855	5.872	5.860	5.854
150	5.808	5.826	5.831	5.827	5.833	5.825	5.827	5.832	5.830	5.829
Avg.	5.809	5.849	5.833	5.843	5.853	5.847	5.836	5.834	5.836	5.834
Med.	5.806	5.825	5.830	5.828	5.831	5.826	5.829	5.827	5.827	5.829
st dev	0.014	0.108	0.014	0.053	0.083	0.092	0.023	0.021	0.029	0.018
Min.	5.793	5.811	5.816	5.815	5.813	5.815	5.810	5.815	5.818	5.810
Max.	5.860	6.362	5.877	6.081	6.235	6.286	5.921	5.910	5.956	5.897

FINAL

3.18 Data Set 6, 105°C, 400mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
126	0.2639	0.5300	2662	0.0004	0.0004	0.0006	0.0010	0.0012	0.0010	0.0011	0.0015	0.0021
127	0.2630	0.5268	2692	0.0005	0.0006	0.0005	0.0009	0.0012	0.0012	0.0012	0.0016	0.0020
128	0.2622	0.5299	2697	0.0004	0.0005	0.0006	0.0010	0.0014	0.0014	0.0014	0.0017	0.0021
129	0.2631	0.5279	2686	0.0003	0.0005	0.0007	0.0009	0.0014	0.0016	0.0017	0.0020	0.0022
130	0.2627	0.5292	2689	0.0001	0.0002	0.0010	0.0008	0.0012	0.0013	0.0016	0.0019	0.0020
131	0.2631	0.5289	2682	0.0008	0.0006	0.0011	0.0010	0.0015	0.0016	0.0017	0.0021	0.0022
132	0.2635	0.5284	2675	0.0009	0.0009	0.0011	0.0010	0.0016	0.0014	0.0017	0.0021	0.0022
133	0.2637	0.5286	2671	0.0008	0.0008	0.0011	0.0009	0.0014	0.0016	0.0015	0.0019	0.0021
134	0.2631	0.5279	2685	0.0007	0.0007	0.0010	0.0008	0.0012	0.0014	0.0015	0.0020	0.0020
135	0.2621	0.5292	2700	0.0004	0.0006	0.0011	0.0010	0.0013	0.0016	0.0017	0.0021	0.0021
136	0.2635	0.5284	2675	0.0007	0.0009	0.0011	0.0010	0.0016	0.0019	0.0020	0.0024	0.0022
137	0.2642	0.5288	2661	0.0005	0.0008	0.0012	0.0010	0.0013	0.0017	0.0017	0.0022	0.0021
138	0.2628	0.5294	2686	0.0007	0.0008	0.0010	0.0011	0.0014	0.0018	0.0018	0.0023	0.0021
139	0.2638	0.5283	2669	0.0008	0.0009	0.0010	0.0010	0.0016	0.0019	0.0019	0.0024	0.0020
140	0.2630	0.5285	2686	0.0009	0.0009	0.0010	0.0011	0.0016	0.0017	0.0019	0.0022	0.0021
141	0.2630	0.5287	2684	0.0009	0.0008	0.0008	0.0009	0.0011	0.0015	0.0018	0.0017	0.0021
142	0.2632	0.5287	2681	0.0004	0.0006	0.0009	0.0009	0.0009	0.0013	0.0016	0.0016	0.0020
143	0.2633	0.5292	2677	0.0006	0.0008	0.0009	0.0008	0.0009	0.0013	0.0018	0.0015	0.0019
144	0.2624	0.5289	2695	0.0007	0.0008	0.0009	0.0010	0.0010	0.0016	0.0020	0.0017	0.0020
145	0.2625	0.5279	2698	0.0006	0.0007	0.0010	0.0011	0.0011	0.0015	0.0020	0.0016	0.0021
146	0.2632	0.5285	2681	0.0006	0.0007	0.0009	0.0010	0.0010	0.0015	0.0019	0.0015	0.0021
147	0.2629	0.5294	2685	0.0006	0.0006	0.0009	0.0008	0.0008	0.0012	0.0017	0.0013	0.0018
148	0.2634	0.5288	2675	0.0008	0.0008	0.0009	0.0010	0.0010	0.0016	0.0022	0.0017	0.0023
149	0.2622	0.5294	2698	0.0008	0.0008	0.0009	0.0014	0.0013	0.0015	0.0019	0.0016	0.0021
150	0.2629	0.5281	2688	0.0008	0.0007	0.0009	0.0013	0.0016	0.0013	0.0019	0.0019	0.0021
Avg.	0.2631	0.5287	2683	0.0006	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021
Med.	0.2631	0.5287	2685	0.0007	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021
st dev	0.0005	0.0007	11	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0003	0.0001
Min.	0.2621	0.5268	2661	0.0001	0.0002	0.0005	0.0008	0.0008	0.0010	0.0011	0.0013	0.0018
Max.	0.2642	0.5300	2700	0.0009	0.0009	0.0012	0.0014	0.0016	0.0019	0.0022	0.0024	0.0023

FINAL

3.19 Data Set 7, 55°C, 800mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
151	758.9	100.12	99.91	99.78	99.63	99.49	99.31	99.17	99.00	98.83
152	765.1	99.96	99.83	99.62	99.48	99.41	99.33	99.19	99.05	98.98
153	770.4	99.99	99.95	99.75	99.65	99.53	99.36	99.16	99.09	98.97
154	754.9	100.05	99.97	99.89	99.77	99.66	99.46	99.27	99.19	99.03
155	764.2	99.83	99.70	99.48	99.37	99.27	99.20	99.11	98.89	98.76
156	748.7	100.16	100.05	99.89	99.77	99.56	99.29	99.11	98.85	98.72
157	752.8	100.23	100.20	100.08	99.81	99.55	99.34	99.24	99.10	98.87
158	761.9	99.91	99.87	99.80	99.53	99.36	99.25	99.17	99.00	98.82
159	772.6	100.09	100.01	99.78	99.62	99.53	99.38	99.25	99.08	98.86
160	746.0	100.23	100.01	99.83	99.53	99.30	99.22	99.09	98.93	98.74
161	753.5	99.88	99.81	99.63	99.55	99.39	99.24	99.10	98.99	98.85
162	759.3	100.12	100.08	99.87	99.68	99.58	99.53	99.30	99.13	98.99
163	761.5	100.09	100.05	99.91	99.58	99.38	99.24	99.09	99.02	98.91
164	759.0	100.03	99.96	99.86	99.74	99.62	99.50	99.24	99.17	98.93
165	766.1	99.66	99.54	99.45	99.33	99.23	99.02	98.86	98.72	98.58
166	755.6	99.68	99.40	99.13	98.94	98.72	98.61	98.40	98.12	98.00
167	757.4	99.55	99.47	99.41	99.17	99.05	99.00	98.76	98.57	98.47
168	761.7	99.96	99.88	99.78	99.65	99.50	99.34	99.20	99.11	99.03
169	761.7	99.91	99.82	99.76	99.67	99.59	99.51	99.29	99.19	98.87
170	763.3	99.82	99.74	99.62	99.50	99.38	99.25	99.02	98.79	98.65
171	751.5	100.41	100.32	100.21	100.11	99.99	99.80	99.60	99.35	99.00
172	740.6	100.30	100.24	100.12	99.97	99.84	99.66	99.41	99.10	98.68
173	761.2	100.24	100.21	100.09	99.84	99.50	99.12	98.80	98.23	98.08
174	755.6	100.11	100.04	99.97	99.64	99.46	99.11	98.70	98.41	98.23
175	750.0	100.17	100.04	99.83	99.56	99.13	98.63	98.41	98.28	98.12
Avg.	758.1	100.02	99.92	99.78	99.60	99.44	99.27	99.08	98.89	98.72
Med.	759.0	100.05	99.96	99.80	99.63	99.49	99.29	99.16	99.00	98.83
st dev	7.4	0.21	0.23	0.24	0.24	0.25	0.27	0.28	0.33	0.31
Min.	740.6	99.55	99.40	99.13	98.94	98.72	98.61	98.40	98.12	98.00
Max.	772.6	100.41	100.32	100.21	100.11	99.99	99.80	99.60	99.35	99.03

FINAL

3.20 Data Set 7, 55°C, 800mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
151	6.274	6.300	6.294	6.299	6.297	6.294	6.302	6.299	6.291	6.294
152	6.278	6.294	6.288	6.290	6.292	6.295	6.291	6.291	6.289	6.293
153	6.276	6.293	6.290	6.296	6.287	6.294	6.297	6.296	6.287	6.294
154	6.282	6.288	6.284	6.343	6.290	6.298	6.298	6.292	6.286	6.296
155	6.272	6.308	6.280	6.282	6.282	6.286	6.285	6.288	6.282	6.293
156	6.278	6.301	6.297	6.320	6.298	6.298	6.301	6.311	6.292	6.303
157	6.276	6.295	6.290	6.291	6.270	6.294	6.296	6.298	6.286	6.295
158	6.276	6.291	6.291	6.294	6.291	6.290	6.291	6.294	6.291	6.291
159	6.295	6.312	6.309	6.315	6.320	6.317	6.316	6.316	6.311	6.319
160	6.267	6.271	6.270	6.288	6.276	6.271	6.273	6.279	6.275	6.280
161	6.290	6.300	6.288	6.292	6.286	6.290	6.289	6.292	6.284	6.290
162	6.276	6.288	6.291	6.290	6.284	6.293	6.292	6.292	6.288	6.290
163	6.274	6.283	6.282	6.293	6.291	6.290	6.288	6.291	6.289	6.294
164	6.284	6.303	6.300	6.314	6.303	6.312	6.303	6.305	6.305	6.299
165	6.280	6.285	6.294	6.292	6.312	6.283	6.288	6.287	6.309	6.309
166	6.282	6.296	6.291	6.295	6.300	6.294	6.297	6.299	6.294	6.298
167	6.282	6.293	6.289	6.295	6.292	6.293	6.296	6.296	6.293	6.295
168	6.272	6.287	6.283	6.303	6.279	6.291	6.287	6.288	6.285	6.286
169	6.280	6.295	6.289	6.281	6.302	6.300	6.299	6.298	6.294	6.298
170	6.286	6.300	6.299	6.303	6.300	6.297	6.300	6.305	6.303	6.303
171	6.263	6.283	6.275	6.287	6.285	6.286	6.309	6.304	6.298	6.289
172	6.255	6.276	6.267	6.271	6.265	6.271	6.270	6.271	6.271	6.272
173	6.272	6.291	6.291	6.295	6.294	6.294	6.298	6.296	6.295	6.290
174	6.276	6.305	6.284	6.300	6.295	6.295	6.287	6.286	6.292	6.291
175	6.255	6.267	6.262	6.268	6.264	6.269	6.268	6.262	6.266	6.266
Avg.	6.276	6.292	6.287	6.296	6.290	6.292	6.293	6.293	6.290	6.293
Med.	6.276	6.293	6.289	6.294	6.291	6.294	6.296	6.294	6.291	6.294
st dev	0.009	0.011	0.011	0.015	0.013	0.011	0.011	0.012	0.011	0.011
Min.	6.255	6.267	6.262	6.268	6.264	6.269	6.268	6.262	6.266	6.266
Max.	6.295	6.312	6.309	6.343	6.320	6.317	6.316	6.316	6.311	6.319

FINAL

3.21 Data Set 7, 55°C, 800mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
151	0.2625	0.5260	2706	0.0004	0.0007	0.0001	0.0009	0.0008	0.0014	0.0011	0.0014	0.0016
152	0.2637	0.5284	2672	0.0004	0.0004	0.0001	0.0010	0.0009	0.0014	0.0010	0.0014	0.0016
153	0.2624	0.5278	2700	0.0003	0.0004	0.0001	0.0007	0.0007	0.0010	0.0008	0.0011	0.0013
154	0.2623	0.5260	2710	0.0004	0.0003	0.0006	0.0009	0.0009	0.0012	0.0009	0.0012	0.0011
155	0.2628	0.5291	2688	0.0004	0.0003	0.0007	0.0009	0.0009	0.0012	0.0010	0.0013	0.0014
156	0.2625	0.5268	2702	0.0006	0.0004	0.0008	0.0011	0.0010	0.0014	0.0012	0.0015	0.0018
157	0.2628	0.5266	2698	0.0004	0.0003	0.0007	0.0009	0.0009	0.0010	0.0010	0.0013	0.0015
158	0.2635	0.5271	2680	0.0005	0.0002	0.0006	0.0009	0.0010	0.0010	0.0010	0.0012	0.0013
159	0.2620	0.5277	2708	0.0005	0.0003	0.0007	0.0010	0.0010	0.0010	0.0011	0.0014	0.0015
160	0.2629	0.5279	2690	0.0003	0.0004	0.0006	0.0009	0.0010	0.0009	0.0009	0.0012	0.0014
161	0.2624	0.5262	2706	0.0005	0.0004	0.0006	0.0009	0.0009	0.0010	0.0011	0.0013	0.0015
162	0.2636	0.5263	2681	0.0006	0.0004	0.0009	0.0009	0.0005	0.0013	0.0013	0.0016	0.0016
163	0.2632	0.5281	2684	0.0004	0.0004	0.0004	0.0007	0.0008	0.0011	0.0010	0.0012	0.0016
164	0.2626	0.5273	2699	0.0004	0.0002	0.0004	0.0004	0.0006	0.0010	0.0010	0.0012	0.0014
165	0.2619	0.5271	2712	0.0004	0.0003	0.0006	0.0002	0.0009	0.0009	0.0013	0.0015	0.0016
166	0.2632	0.5266	2688	0.0001	0.0003	0.0005	0.0001	0.0005	0.0007	0.0010	0.0012	0.0015
167	0.2630	0.5267	2692	0.0001	0.0002	0.0004	0.0001	0.0004	0.0007	0.0011	0.0013	0.0013
168	0.2638	0.5271	2674	0.0003	0.0004	0.0003	0.0004	0.0004	0.0003	0.0012	0.0011	0.0012
169	0.2636	0.5276	2676	0.0004	0.0003	0.0004	0.0004	0.0003	0.0004	0.0009	0.0011	0.0012
170	0.2625	0.5269	2702	0.0001	0.0004	0.0004	0.0006	0.0003	0.0002	0.0010	0.0011	0.0013
171	0.2641	0.5275	2667	0.0001	0.0004	0.0004	0.0004	0.0005	0.0004	0.0012	0.0011	0.0013
172	0.2634	0.5288	2676	0.0003	0.0003	0.0004	0.0005	0.0005	0.0004	0.0011	0.0012	0.0014
173	0.2632	0.5267	2688	0.0001	0.0004	0.0003	0.0004	0.0005	0.0004	0.0010	0.0010	0.0013
174	0.2640	0.5285	2666	0.0001	0.0002	0.0003	0.0003	0.0007	0.0006	0.0013	0.0011	0.0014
175	0.2628	0.5269	2696	0.0002	0.0003	0.0003	0.0003	0.0007	0.0006	0.0013	0.0012	0.0016
Avg.	0.2630	0.5273	2690	0.0003	0.0003	0.0005	0.0006	0.0007	0.0009	0.0011	0.0013	0.0014
Med.	0.2629	0.5271	2690	0.0004	0.0003	0.0004	0.0007	0.0007	0.0010	0.0010	0.0012	0.0014
st dev	0.0006	0.0009	14	0.0002	0.0001	0.0002	0.0003	0.0002	0.0004	0.0001	0.0001	0.0002
Min.	0.2619	0.5260	2666	0.0001	0.0002	0.0001	0.0001	0.0003	0.0002	0.0008	0.0010	0.0011
Max.	0.2641	0.5291	2712	0.0006	0.0007	0.0009	0.0011	0.0010	0.0014	0.0013	0.0016	0.0018

3.22 Data Set 8, 85°C, 800mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
176	746.3	99.93	99.69	99.50	99.41	99.18	99.09	98.82	98.50	98.39
177	763.9	99.40	99.27	99.18	98.98	98.81	98.48	98.27	98.17	98.04
178	760.2	99.50	99.22	99.14	98.88	98.67	98.49	98.32	98.25	98.13
179	764.3	100.01	99.70	99.61	99.53	99.24	99.15	98.91	98.63	98.43
180	755.7	100.37	100.19	100.13	100.03	99.89	99.76	99.60	99.30	99.11
181	770.7	100.13	99.97	99.79	99.69	99.51	99.39	99.16	98.97	98.61
182	750.3	100.27	100.04	99.91	99.67	99.49	99.28	99.04	98.75	98.41
183	775.4	100.10	99.81	99.63	99.26	99.16	98.90	98.67	98.32	98.07
184	713.5	99.80	99.50	99.38	99.33	99.13	98.85	98.58	98.26	98.09
185	770.0	99.56	99.27	99.18	99.08	98.94	98.66	98.44	98.35	98.18
186	760.2	99.62	99.41	99.37	99.30	99.21	98.93	98.75	98.61	98.26
187	752.7	99.87	99.65	99.59	99.40	99.19	99.11	98.83	98.55	98.35
188	769.3	100.04	99.87	99.71	99.65	99.39	99.16	98.83	98.52	98.35
189	766.0	100.34	100.18	100.09	99.78	99.58	99.22	99.07	98.85	98.56
190	756.0	100.30	100.20	100.15	99.81	99.40	99.21	98.92	98.69	98.32
191	751.3	99.99	99.80	99.53	99.07	98.98	98.62	98.43	98.31	98.06
192	761.2	100.08	99.74	99.58	99.37	99.05	98.88	98.73	98.55	98.19
193	751.8	100.25	100.03	99.89	99.51	99.08	98.91	98.58	98.46	98.20
194	755.1	99.87	99.75	99.15	98.74	98.25	97.88	97.51	97.21	97.06
195	751.5	100.13	99.99	99.69	99.63	99.20	98.91	98.56	98.07	97.79
196	768.7	99.62	99.25	98.92	98.58	98.37	98.00	97.71	97.45	97.11
197	752.1	100.07	99.84	99.45	99.08	99.02	98.82	98.64	98.38	98.03
198	762.9	100.25	100.08	99.86	99.54	99.33	99.03	98.83	98.75	98.34
199	756.1	100.09	99.76	99.39	99.10	98.85	98.66	98.36	98.17	97.67
200	764.3	100.03	99.82	99.58	99.20	99.04	98.91	98.73	98.35	98.01
Avg.	758.0	99.98	99.76	99.58	99.34	99.12	98.89	98.65	98.42	98.15
Med.	760.2	100.04	99.80	99.58	99.37	99.16	98.91	98.73	98.46	98.19
st dev	12.0	0.27	0.30	0.32	0.35	0.36	0.41	0.43	0.43	0.43
Min.	713.5	99.40	99.22	98.92	98.58	98.25	97.88	97.51	97.21	97.06
Max.	775.4	100.37	100.20	100.15	100.03	99.89	99.76	99.60	99.30	99.11

3.23 Data Set 8, 85°C, 800mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
176	6.257	6.272	6.269	6.277	6.274	6.272	6.274	6.271	6.273	6.276
177	6.282	6.289	6.295	6.297	6.286	6.296	6.295	6.293	6.291	6.290
178	6.290	6.292	6.291	6.298	6.291	6.294	6.291	6.290	6.289	6.289
179	6.288	6.292	6.294	6.303	6.299	6.296	6.294	6.297	6.294	6.296
180	6.286	6.294	6.301	6.312	6.294	6.321	6.302	6.299	6.298	6.306
181	6.290	6.306	6.300	6.323	6.306	6.309	6.307	6.308	6.300	6.306
182	6.284	6.295	6.300	6.298	6.298	6.297	6.303	6.298	6.299	6.305
183	6.290	6.300	6.305	6.298	6.346	6.308	6.308	6.302	6.310	6.310
184	6.261	6.280	6.278	6.278	6.280	6.276	6.274	6.282	6.279	6.282
185	6.274	6.277	6.283	6.284	6.285	6.280	6.276	6.282	6.284	6.287
186	6.269	6.285	6.291	6.296	6.294	6.293	6.292	6.299	6.294	6.298
187	6.267	6.267	6.264	6.272	6.264	6.266	6.267	6.263	6.266	6.271
188	6.269	6.284	6.279	6.295	6.295	6.287	6.287	6.286	6.284	6.287
189	6.278	6.305	6.260	6.314	6.306	6.327	6.309	6.310	6.300	6.306
190	6.276	6.294	6.291	6.298	6.300	6.292	6.290	6.294	6.291	6.292
191	6.251	6.263	6.266	6.268	6.271	6.271	6.266	6.269	6.268	6.272
192	6.288	6.296	6.299	6.306	6.308	6.307	6.300	6.304	6.305	6.308
193	6.280	6.298	6.317	6.310	6.301	6.308	6.307	6.300	6.300	6.309
194	6.276	6.283	6.288	6.292	6.294	6.290	6.292	6.289	6.287	6.289
195	6.280	6.279	6.283	6.289	6.285	6.287	6.290	6.291	6.289	6.291
196	6.269	6.288	6.286	6.291	6.285	6.289	6.287	6.284	6.284	6.287
197	6.249	6.261	6.261	6.268	6.267	6.261	6.265	6.266	6.267	6.270
198	6.274	6.288	6.317	6.295	6.295	6.296	6.296	6.298	6.294	6.297
199	6.265	6.269	6.277	6.274	6.273	6.279	6.274	6.275	6.276	6.276
200	6.280	6.290	6.297	6.297	6.348	6.302	6.296	6.296	6.294	6.295
Avg.	6.275	6.286	6.288	6.293	6.294	6.292	6.290	6.290	6.289	6.292
Med.	6.276	6.288	6.291	6.296	6.294	6.293	6.292	6.293	6.291	6.291
st dev	0.012	0.012	0.016	0.014	0.020	0.016	0.014	0.013	0.012	0.012
Min.	6.249	6.261	6.260	6.268	6.264	6.261	6.265	6.263	6.266	6.270
Max.	6.290	6.306	6.317	6.323	6.348	6.327	6.309	6.310	6.310	6.310

FINAL

3.24 Data Set 8, 85°C, 800mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
176	0.2616	0.5273	2720	0.0001	0.0002	0.0004	0.0006	0.0009	0.0006	0.0013	0.0012	0.0016
177	0.2633	0.5287	2679	0.0004	0.0003	0.0004	0.0008	0.0006	0.0011	0.0007	0.0010	0.0010
178	0.2633	0.5268	2686	0.0006	0.0004	0.0003	0.0006	0.0011	0.0014	0.0011	0.0015	0.0013
179	0.2627	0.5277	2695	0.0003	0.0004	0.0004	0.0008	0.0012	0.0014	0.0014	0.0016	0.0018
180	0.2624	0.5270	2703	0.0002	0.0004	0.0004	0.0007	0.0010	0.0014	0.0015	0.0017	0.0021
181	0.2632	0.5273	2685	0.0002	0.0004	0.0003	0.0007	0.0009	0.0013	0.0015	0.0017	0.0020
182	0.2626	0.5293	2690	0.0004	0.0002	0.0004	0.0005	0.0010	0.0011	0.0014	0.0015	0.0016
183	0.2628	0.5286	2688	0.0002	0.0005	0.0005	0.0009	0.0015	0.0014	0.0017	0.0017	0.0021
184	0.2627	0.5263	2700	0.0004	0.0003	0.0005	0.0010	0.0016	0.0015	0.0019	0.0019	0.0021
185	0.2641	0.5270	2668	0.0003	0.0004	0.0003	0.0009	0.0015	0.0015	0.0018	0.0017	0.0021
186	0.2625	0.5276	2698	0.0002	0.0004	0.0006	0.0011	0.0015	0.0013	0.0015	0.0017	0.0018
187	0.2627	0.5277	2695	0.0006	0.0004	0.0005	0.0007	0.0011	0.0013	0.0013	0.0016	0.0019
188	0.2636	0.5281	2674	0.0004	0.0005	0.0008	0.0011	0.0016	0.0016	0.0017	0.0019	0.0022
189	0.2634	0.5280	2679	0.0002	0.0007	0.0008	0.0010	0.0016	0.0016	0.0016	0.0018	0.0022
190	0.2635	0.5269	2681	0.0002	0.0007	0.0007	0.0010	0.0014	0.0013	0.0014	0.0017	0.0019
191	0.2641	0.5275	2666	0.0002	0.0008	0.0008	0.0010	0.0016	0.0013	0.0017	0.0018	0.0021
192	0.2631	0.5277	2687	0.0005	0.0007	0.0007	0.0009	0.0015	0.0012	0.0014	0.0017	0.0020
193	0.2612	0.5257	2734	0.0006	0.0009	0.0009	0.0011	0.0016	0.0014	0.0017	0.0019	0.0023
194	0.2621	0.5277	2707	0.0005	0.0008	0.0011	0.0011	0.0008	0.0013	0.0016	0.0018	0.0021
195	0.2635	0.5272	2679	0.0005	0.0009	0.0013	0.0013	0.0009	0.0016	0.0019	0.0021	0.0018
196	0.2634	0.5273	2681	0.0006	0.0009	0.0014	0.0011	0.0006	0.0012	0.0016	0.0017	0.0012
197	0.2626	0.5262	2703	0.0005	0.0007	0.0013	0.0011	0.0002	0.0013	0.0016	0.0018	0.0015
198	0.2646	0.5289	2652	0.0004	0.0005	0.0012	0.0008	0.0001	0.0011	0.0014	0.0017	0.0016
199	0.2638	0.5272	2673	0.0006	0.0008	0.0014	0.0010	0.0002	0.0013	0.0015	0.0017	0.0018
200	0.2625	0.5283	2696	0.0005	0.0008	0.0012	0.0010	0.0002	0.0012	0.0016	0.0017	0.0017
Avg.	0.2630	0.5275	2689	0.0004	0.0006	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0018
Med.	0.2631	0.5275	2687	0.0004	0.0005	0.0007	0.0010	0.0011	0.0013	0.0015	0.0017	0.0019
st dev	0.0008	0.0008	17	0.0002	0.0002	0.0004	0.0002	0.0005	0.0002	0.0003	0.0002	0.0003
Min.	0.2612	0.5257	2652	0.0001	0.0002	0.0003	0.0005	0.0001	0.0006	0.0007	0.0010	0.0010
Max.	0.2646	0.5293	2734	0.0006	0.0009	0.0014	0.0013	0.0016	0.0016	0.0019	0.0021	0.0023

FINAL

3.25 Data Set 9, 105°C, 800mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
201	752.3	100.25	100.21	99.88	99.55	99.22	99.08	98.92	98.88	98.52
202	768.2	99.53	99.51	99.28	99.06	98.80	98.62	98.31	98.11	97.81
203	746.9	100.32	100.05	99.81	99.42	99.25	99.18	98.86	98.43	97.90
204	755.2	100.04	99.79	99.74	99.51	99.17	98.93	98.56	98.29	97.97
205	762.2	99.88	99.74	99.30	99.02	98.79	98.67	98.33	98.22	98.12
206	770.0	99.71	99.58	99.39	99.25	98.99	98.61	98.48	98.22	98.06
207	751.4	99.97	99.83	99.45	99.35	99.08	98.62	98.23	97.91	97.83
208	764.7	99.90	99.59	99.56	99.32	99.06	98.74	98.60	98.29	97.83
209	757.3	100.03	99.96	99.82	99.51	99.08	98.75	98.46	98.16	97.93
210	761.7	99.76	99.51	99.23	98.79	98.35	97.95	97.76	97.56	97.45
211	769.2	99.74	99.53	99.27	98.88	98.76	98.62	98.32	97.98	97.56
212	759.4	99.96	99.72	99.41	98.96	98.79	98.62	98.53	98.26	98.02
213	763.8	99.84	99.75	99.54	99.24	98.91	98.60	98.27	97.83	97.46
214	757.4	99.76	99.70	99.59	99.27	99.08	98.79	98.42	97.94	97.60
215	763.7	99.59	99.50	99.36	99.12	98.86	98.47	98.38	98.02	97.58
216	768.1	99.56	99.45	99.34	99.18	98.95	98.58	98.33	97.81	97.54
217	764.7	99.88	99.66	99.44	99.12	98.82	98.74	98.50	98.12	97.80
218	761.8	100.26	100.12	99.97	99.67	99.38	99.09	98.95	98.57	98.28
219	756.9	100.18	99.83	99.75	99.52	99.19	99.04	98.74	98.48	97.98
220	744.7	100.21	100.01	99.99	99.70	99.38	98.90	98.50	98.35	97.78
221	771.8	99.95	99.90	99.64	99.52	99.08	98.73	98.17	97.85	97.65
222	761.9	99.95	99.80	99.53	99.04	98.77	98.46	97.97	97.62	97.30
223	759.7	100.25	100.03	99.79	99.09	98.82	98.50	98.26	98.01	97.51
224	750.3	100.19	99.75	99.65	99.55	99.25	99.07	98.60	98.11	97.92
225	765.7	100.10	99.88	99.75	99.33	98.85	98.52	98.05	97.64	97.57
Avg.	760.4	99.95	99.78	99.58	99.28	98.99	98.72	98.42	98.11	97.80
Med.	761.8	99.95	99.75	99.56	99.27	98.99	98.67	98.42	98.11	97.81
st dev	7.2	0.23	0.21	0.23	0.25	0.24	0.27	0.28	0.31	0.28
Min.	744.7	99.53	99.45	99.23	98.79	98.35	97.95	97.76	97.56	97.30
Max.	771.8	100.32	100.21	99.99	99.70	99.38	99.18	98.95	98.88	98.52

3.26 Data Set 9, 105°C, 800mA (Forward Voltage)

No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
201	6.244	6.267	6.297	6.291	6.278	6.267	6.268	6.269	6.264	6.270
202	6.301	6.308	6.316	6.319	6.301	6.318	6.321	6.313	6.316	6.317
203	6.276	6.286	6.286	6.295	6.293	6.308	6.292	6.284	6.287	6.291
204	6.295	6.302	6.301	6.297	6.299	6.300	6.299	6.293	6.303	6.303
205	6.276	6.294	6.291	6.296	6.293	6.298	6.291	6.293	6.291	6.313
206	6.282	6.291	6.293	6.296	6.290	6.291	6.290	6.288	6.285	6.297
207	6.265	6.279	6.286	6.282	6.284	6.286	6.279	6.276	6.280	6.297
208	6.276	6.285	6.283	6.294	6.290	6.288	6.287	6.284	6.285	6.285
209	6.278	6.271	6.275	6.282	6.283	6.282	6.280	6.280	6.278	6.282
210	6.295	6.307	6.308	6.309	6.309	6.309	6.307	6.309	6.309	6.311
211	6.276	6.291	6.289	6.291	6.276	6.303	6.290	6.288	6.289	6.353
212	6.280	6.284	6.290	6.296	6.315	6.332	6.289	6.290	6.289	6.290
213	6.274	6.288	6.285	6.294	6.280	6.290	6.284	6.283	6.283	6.290
214	6.280	6.292	6.297	6.300	6.300	6.300	6.296	6.295	6.297	6.298
215	6.261	6.273	6.275	6.290	6.278	6.288	6.280	6.275	6.287	6.280
216	6.284	6.295	6.300	6.302	6.298	6.303	6.296	6.300	6.300	6.303
217	6.295	6.305	6.308	6.313	6.315	6.311	6.309	6.308	6.311	6.316
218	6.276	6.295	6.336	6.307	6.342	6.291	6.288	6.300	6.293	6.291
219	6.263	6.280	6.297	6.277	6.280	6.284	6.278	6.277	6.276	6.270
220	6.242	6.257	6.265	6.265	6.263	6.275	6.270	6.260	6.263	6.275
221	6.272	6.280	6.279	6.275	6.324	6.293	6.291	6.283	6.322	6.293
222	6.259	6.274	6.260	6.277	6.275	6.280	6.271	6.274	6.273	6.279
223	6.274	6.291	6.297	6.270	6.296	6.295	6.285	6.285	6.280	6.284
224	6.249	6.280	6.267	6.274	6.265	6.269	6.259	6.264	6.262	6.263
225	6.280	6.294	6.299	6.296	6.300	6.300	6.295	6.288	6.292	6.300
Avg.	6.274	6.287	6.291	6.292	6.293	6.294	6.288	6.286	6.289	6.294
Med.	6.276	6.288	6.291	6.294	6.293	6.293	6.289	6.285	6.287	6.291
st dev	0.015	0.013	0.017	0.014	0.018	0.015	0.014	0.013	0.016	0.019
Min.	6.242	6.257	6.260	6.265	6.263	6.267	6.259	6.260	6.262	6.263
Max.	6.301	6.308	6.336	6.319	6.342	6.332	6.321	6.313	6.322	6.353

FINAL

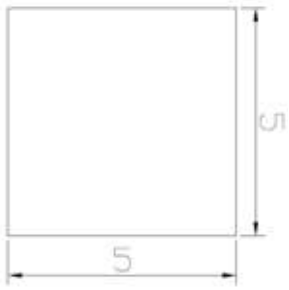
3.27 Data Set 9, 105°C, 800mA (Chromaticity Shift)

No.	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
201	0.2629	0.5275	2691	0.0006	0.0006	0.0013	0.0011	0.0015	0.0012	0.0015	0.0019	0.0020
202	0.2636	0.5266	2681	0.0007	0.0008	0.0015	0.0013	0.0017	0.0014	0.0017	0.0019	0.0020
203	0.2622	0.5272	2708	0.0004	0.0007	0.0011	0.0008	0.0013	0.0012	0.0016	0.0017	0.0018
204	0.2622	0.5280	2704	0.0006	0.0008	0.0011	0.0009	0.0015	0.0013	0.0019	0.0018	0.0018
205	0.2622	0.5282	2704	0.0006	0.0009	0.0012	0.0011	0.0016	0.0013	0.0020	0.0019	0.0022
206	0.2632	0.5270	2687	0.0005	0.0007	0.0009	0.0009	0.0013	0.0012	0.0018	0.0017	0.0018
207	0.2620	0.5266	2712	0.0007	0.0008	0.0010	0.0011	0.0015	0.0013	0.0016	0.0017	0.0020
208	0.2636	0.5268	2679	0.0007	0.0009	0.0013	0.0013	0.0017	0.0015	0.0020	0.0020	0.0023
209	0.2632	0.5268	2688	0.0005	0.0008	0.0009	0.0009	0.0014	0.0014	0.0015	0.0017	0.0021
210	0.2630	0.5270	2690	0.0006	0.0008	0.0010	0.0011	0.0012	0.0015	0.0016	0.0018	0.0022
211	0.2639	0.5268	2674	0.0005	0.0007	0.0011	0.0010	0.0013	0.0014	0.0017	0.0018	0.0022
212	0.2634	0.5264	2685	0.0005	0.0007	0.0008	0.0011	0.0011	0.0016	0.0016	0.0020	0.0021
213	0.2648	0.5285	2649	0.0005	0.0007	0.0010	0.0013	0.0012	0.0017	0.0017	0.0021	0.0022
214	0.2631	0.5271	2688	0.0006	0.0009	0.0009	0.0012	0.0011	0.0016	0.0015	0.0018	0.0020
215	0.2644	0.5275	2662	0.0005	0.0007	0.0009	0.0012	0.0013	0.0017	0.0016	0.0020	0.0020
216	0.2631	0.5268	2691	0.0005	0.0009	0.0009	0.0013	0.0012	0.0017	0.0017	0.0019	0.0021
217	0.2625	0.5287	2694	0.0007	0.0010	0.0011	0.0014	0.0013	0.0020	0.0019	0.0021	0.0023
218	0.2629	0.5276	2691	0.0006	0.0008	0.0011	0.0013	0.0013	0.0018	0.0017	0.0021	0.0021
219	0.2630	0.5272	2691	0.0006	0.0008	0.0009	0.0013	0.0013	0.0018	0.0015	0.0019	0.0021
220	0.2638	0.5281	2669	0.0004	0.0007	0.0009	0.0013	0.0011	0.0016	0.0015	0.0019	0.0018
221	0.2623	0.5277	2703	0.0006	0.0009	0.0012	0.0014	0.0011	0.0018	0.0017	0.0021	0.0022
222	0.2626	0.5265	2701	0.0006	0.0009	0.0011	0.0016	0.0014	0.0018	0.0017	0.0020	0.0021
223	0.2640	0.5275	2669	0.0006	0.0008	0.0011	0.0013	0.0013	0.0016	0.0014	0.0017	0.0017
224	0.2630	0.5272	2691	0.0004	0.0006	0.0010	0.0015	0.0014	0.0016	0.0015	0.0019	0.0020
225	0.2631	0.5272	2688	0.0006	0.0009	0.0011	0.0015	0.0014	0.0012	0.0017	0.0020	0.0021
Avg.	0.2631	0.5273	2688	0.0006	0.0008	0.0011	0.0012	0.0013	0.0015	0.0017	0.0019	0.0021
Med.	0.2631	0.5272	2690	0.0006	0.0008	0.0011	0.0013	0.0013	0.0016	0.0017	0.0019	0.0021
st dev	0.0007	0.0006	15	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0002
Min.	0.2620	0.5264	2649	0.0004	0.0006	0.0008	0.0008	0.0011	0.0012	0.0014	0.0017	0.0017
Max.	0.2648	0.5287	2712	0.0007	0.0010	0.0015	0.0016	0.0017	0.0020	0.0020	0.0021	0.0023

FINAL

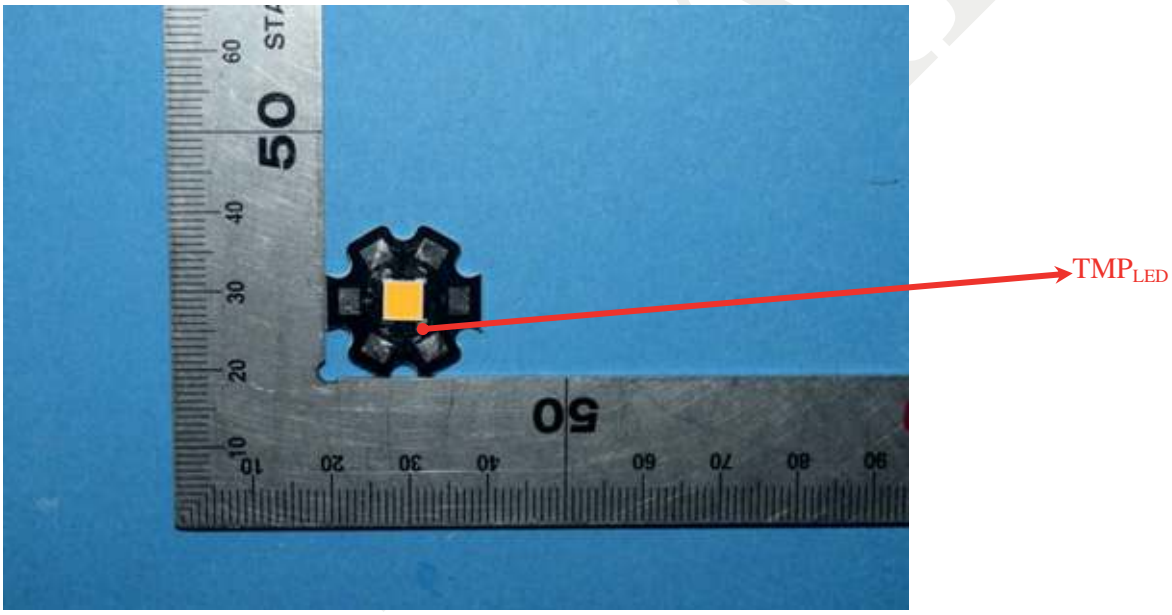
4 - DUT Photo

4.1 Mechanical Dimensions



All dimensions are in millimeter

4.2 DUT Photo



**********END OF REPORT**********

TEST REPORT Nr. 339-QL20-R01 ver. 0

Addresses Indirizzi		
Applicant Richiedente	Relco Srl - Via delle Azalee, 6/A - 20090 - Buccinasco (MI)- Italy	
Manufacturer Produttore	Same as applicant/Come il richiedente	
Dates and authorization Date e autorizzazioni		
Report Date Data emissione rapporto di prova	22/04/2020	
Total number of pages Numero totale pagine	Test Report/Rapporto di prova	5
	Annex/Annesso "photometric result"	39
Written by Preparato da	Claudio Conforti	
Authorized by Autorizzato da	Ing. Michele Peschiera	
Sample under test (data declared by the applicant and under applicant's responsibility) Dispositivo sottoposto a prova (Dati forniti dal richiedente e sotto la sua responsabilità)		
Sample description Descrizione dispositivo	LED luminaire/Apparecchio di illuminazione a LED	
Type Modello	LED SEMPIONE	
Light source Sorgente luminosa	N° 48 Leds model 5050 Seoul Semiconductor 4000 K Code: S1W0-5050407006-00000000-0000	
Secondary optic Ottica secondaria	L036 - LENTE STRAD. 4 LED mm25.4 alt. LT-20020-20220 (DK5050-120x60-TII-M)	
Power supply Alimentazione	AC 230 V, 50 Hz	
Driver model Modello alimentatore	Philips Xitanium XiLP 150 W 0,3-1,0 A S1230V S240 sXt Code 9290009629	
Single led supply current Corrente sul singolo led	400 mA	
Relevant Dimensions Dimensioni rilevanti	Length x Width x Height [mm] Lunghezza x Larghezza x Altezza [mm]	740 x 290 x 100
Luminous area dimensions Dimensioni area luminosa		240 x 190 x 0

The test results and observations indicated in this test report refer exclusively to the samples tested. It is not permitted to transfer the results to other systems or configurations. The publication or duplication of this test report with enclosures, or Part of this test report or enclosures, without a written consent of the test laboratory is not permitted. The test laboratory not assumes any liability to any party for any loss, expense or damage occasioned by the use of this report. Any use of the laboratories name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by the test laboratory. In case of a multilingual test report, the English version is the only official version.
I risultati e le osservazioni indicate in questo rapporto di prova sono riferite esclusivamente ai campioni testati. Non è permesso utilizzare i risultati e le osservazioni di questo rapporto di prova per altri sistemi o configurazioni. Non è permessa la pubblicazione o la duplicazione completa o parziale di questo rapporto di prova e dei suoi allegati senza un consenso scritto da parte del laboratorio di prova. Il laboratorio di prova non si assume responsabilità nei confronti di terzi per danni o eventuali costi derivanti dall'utilizzo dei dati presenti in questo rapporto di prova. Ogni uso del nome del laboratorio di prova e dei suoi marchi per la vendita o per pubblicizzare il prodotto testato deve essere prima approvato in forma scritta dal laboratorio di prova. In caso di rapporti di prova con più lingue, la versione inglese è da considerarsi quella ufficiale.

Applicable standards Norme applicabili	
	IES LM-79-19, EN13032-4:2015+A1:2019, EN13032-1:2004+A1:2012

Test Setup Setup di prova	
Place of test Luogo di prova	Qualilab Srl - Via Trento, 87 - 25020 - Capriano del Colle (BS) - Italy
Test instrument Strumento di misura	Type C mirror photogoniometer/Fotogoniometro Tipo C LMT GO-DS 2000 ref. N° QL-IN-001 Powermeter/Wattmetro YOKOGAWA WT2010 ref. N° QL-IN-006 Temperature-Humidity sensor/Sensore di temperatura-umidità TESTO 174H ref. N° QL-IN-181 Spectrometer/Spettrometro Bentham IDR300-PSL ref.N° QL-IN-009
Photometric distance Distanza fotometrica	15,84 m
Aging and stabilization time Invecchiam. e tempo di stabilizzazione	0 hours, >1 hours
Test date photom. measurem. Data prove fotometriche	21/04/2020
Test date colour measurement Data prove colorimetriche	21/04/2020
Test ambient temperature Temperatura ambiente durante la prova	25,0 °C ± 1,0 °C. Ambient temperature registrations available on request Le registrazioni delle temperature ambientali sono disponibili su richiesta
Power supply characteristics Caratteristiche alimentazione	According to IES LM-79-19 § 5.1 In accordo a IES LM-79-19 § 5.1
Relative position to the coordinate system (according to EN13032-4) Posizione relative rispetto al Sistema di coordinate (in accordo a EN13032-4)	 C = 90° - 270° C = 0° - 180° G = 90°
Color measurement procedure Procedura misura colore	As spatially averaged values, numerically averaging the goniospectroradiometric data/Come media pesata, mediando i dati del goniospettroradiometro

Test Name **Identificazione prova**	**Result** **Esito**
Total Luminous flux measurement (IES LM-79-19 § 7, EN13032-04:2015+A1:2019 § 6.2) Flusso luminoso totale (IES LM-79-19 § 7, EN13032-04:2015+A1:2019 § 6.2)	14474 lm
Luminous efficacy (IES LM-79-19 § 11, EN13032-04:2015+A1:2019 § 6.4) Efficacia luminosa (IES LM-79-19 § 11, EN13032-04:2015+A1:2019 § 6.4)	121 lm/W
Luminous intensity distribution (IES LM-79-19 § 8, EN13032-04:2015+A1:2019 § 6.5) Distribuzione intensità luminosa (IES LM-79-19 § 8, EN13032-04: 2015+A1:2019 § 6.5)	See annex "photometric results" Vedi appendice "photometric results"
Average chromaticity coordinates (IES LM-79-19 § 9) Coordinate cromatiche medie (IES LM-79-19 § 9)	x = 0,3776 y = 0,3778
Spatial non uniformity of chromaticity/ Angular colour uniformity $\Delta u'v'$ (IES LM-79-19 § 9, EN13032-04:2015+A1:2019 §7.1.4) Disomogeneità del colore/ Uniformità angolare del colore $\Delta u'v'$ (IES LM-79-19 § 9, EN13032-04:2015+A1:2019 §7.1.4)	u' = 0,2228 v' = 0,5016 $\Delta u'v'$ = 0,0212
Correlated colour temperature - CCT (IES LM-79-19 § 9, EN13032-04:2015+A1:2019 §7.1.2) Temperatura colore - CCT (IES LM-79-19 § 9, EN13032-04: 2015+A1:2019 § 7.1.2)	4085 K
Colour rendering index - R_a (IES LM-79-19 § 9, EN13032-04: 2015+A1:2019 §7.1.3) Indice di resa cromatica - R_a (IES LM-79-19 § 9, EN13032-04: 2015+A1:2019 § 7.1.3)	72
Electrical protocol (*U, I, P, PF*) Protocollo Elettrico (*U, I, P, PF*)	See annex "photometric results" Vedi appendice "photometric results"

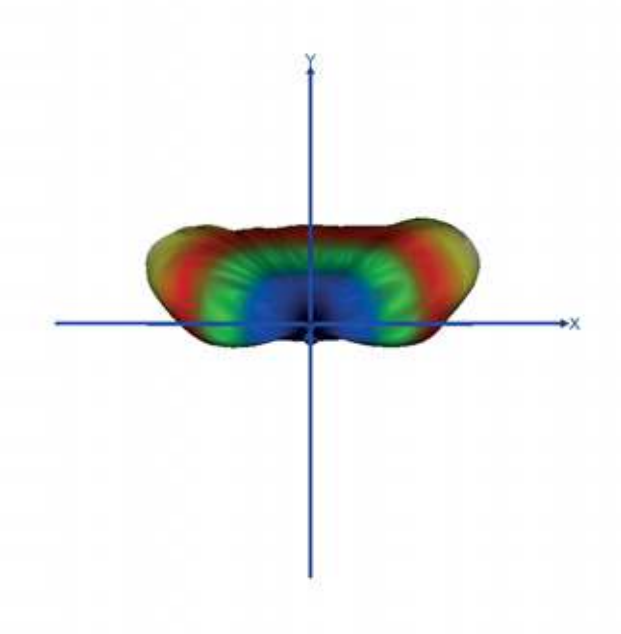
Uncertainty Incertezza	
Photometric parameter Parametri fotometrici	Luminous flux and intensity: 2,5 % Luminous efficacy: 2,8 % Flusso e intensità luminosa, Efficacia luminosa
Sample mounting precision Precisione montaggio dispositivo	±0,5°
Average chromaticity coordin. Coordinate cromatiche medie	x = ±0,0007; y = ±0,0009
Correlated colour temperature Temperatura colore	±21 K
Colour rendering index (R_a) Indice di resa cromatica	1
Angular colour uniform. $\Delta u'v'$ Uniformità angolare del colore	±0,0009
Electrical parameter Parametri elettrici	Wattage: 0,17 %, Voltage: 0,01 %, Current: 0,13 %, Power factor: 0,40 % Potenza, Tensione, Corrente, Fattore di potenza
Statement Dichiarazione	The measured value (y) and the associated expanded uncertainty (U) represent the interval ($y \pm U$) which contains the value of the measured quantity with a probability of approximately 95 % and a coverage factor k = 2. The values of the annex "photometric results" have the maximum significant figures managed by the measurement software. In the annex "photometric results" *C* and *G* are measured in [°]. Il valore misurato (y) e l'incertezza estesa associata (U) rappresentano l'intervallo ($y \pm U$) che contiene il valore della grandezza misurata con una probabilità di circa il 95 % e un fattore di copertura k = 2. I valori dell'appendice "photometric results" sono riportati con il massimo numero di cifre significative gestite dal software della strumentazione. Nell'appendice "photometric results" *C* e *G* sono misurati in [°]

Photographs
Foto

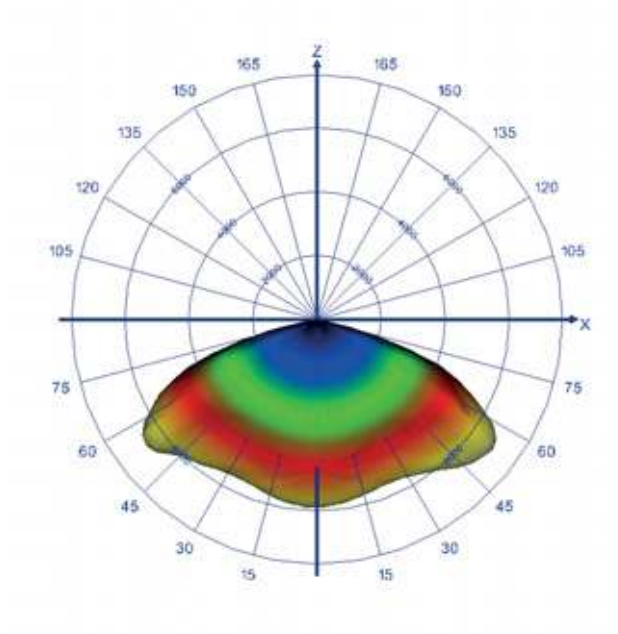
3D Light intensity distribution

Distribuzione 3d intensità luminosa

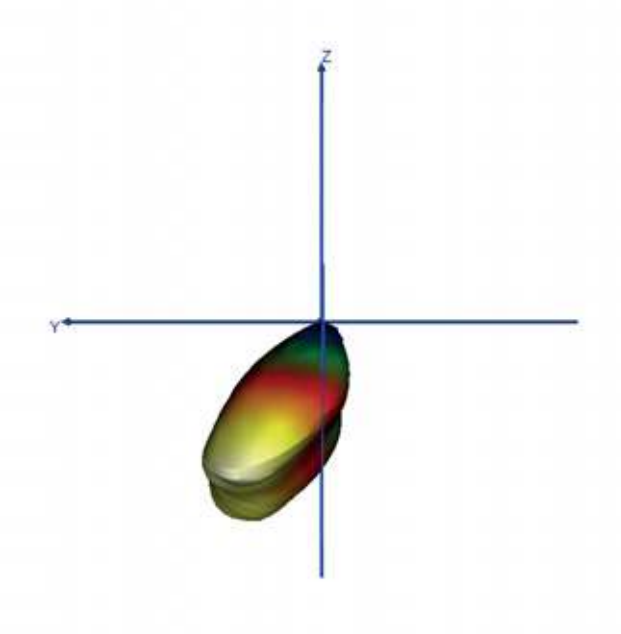
TOP



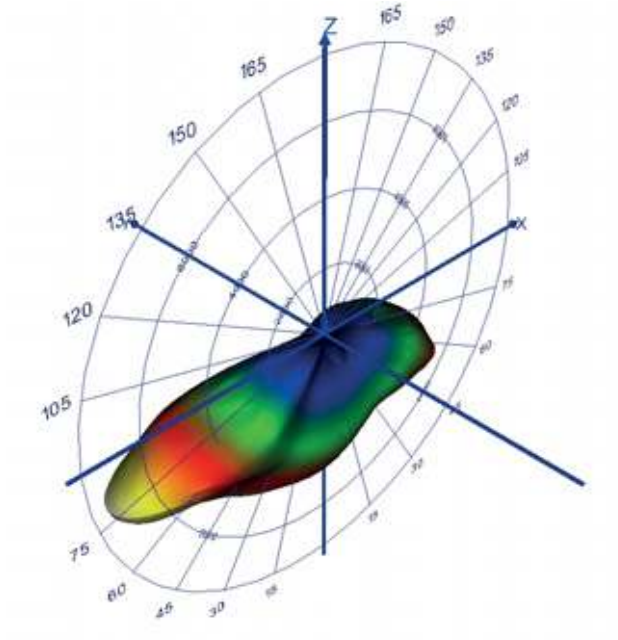
FRONT



SIDE



SW



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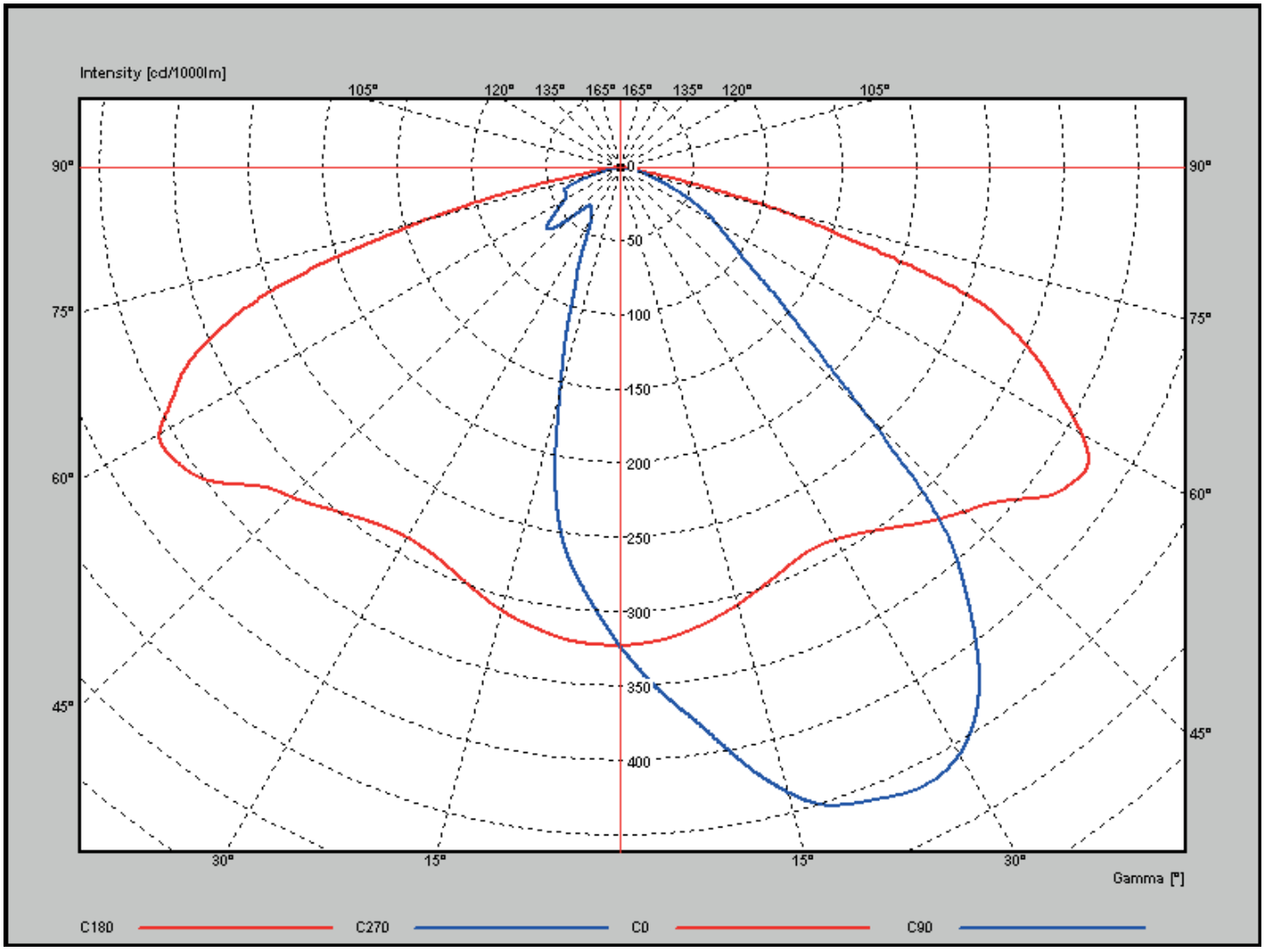
PHOTOMETRIC RESULTS

Sample Number	339-QL20-S01	**Report Number**	339-QL20-R01
Date:	21/04/2020 10.06.37	**Manufacturer**	RELCO
Flux:	14474 lm	**Efficacy:**	121 lm/W
Av. Voltage:	229,96 V	**Av. Current:**	0,525 A
Av. Power Factor:	0,9903	**Av. Power:**	119,6 W

Polar diagram RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110



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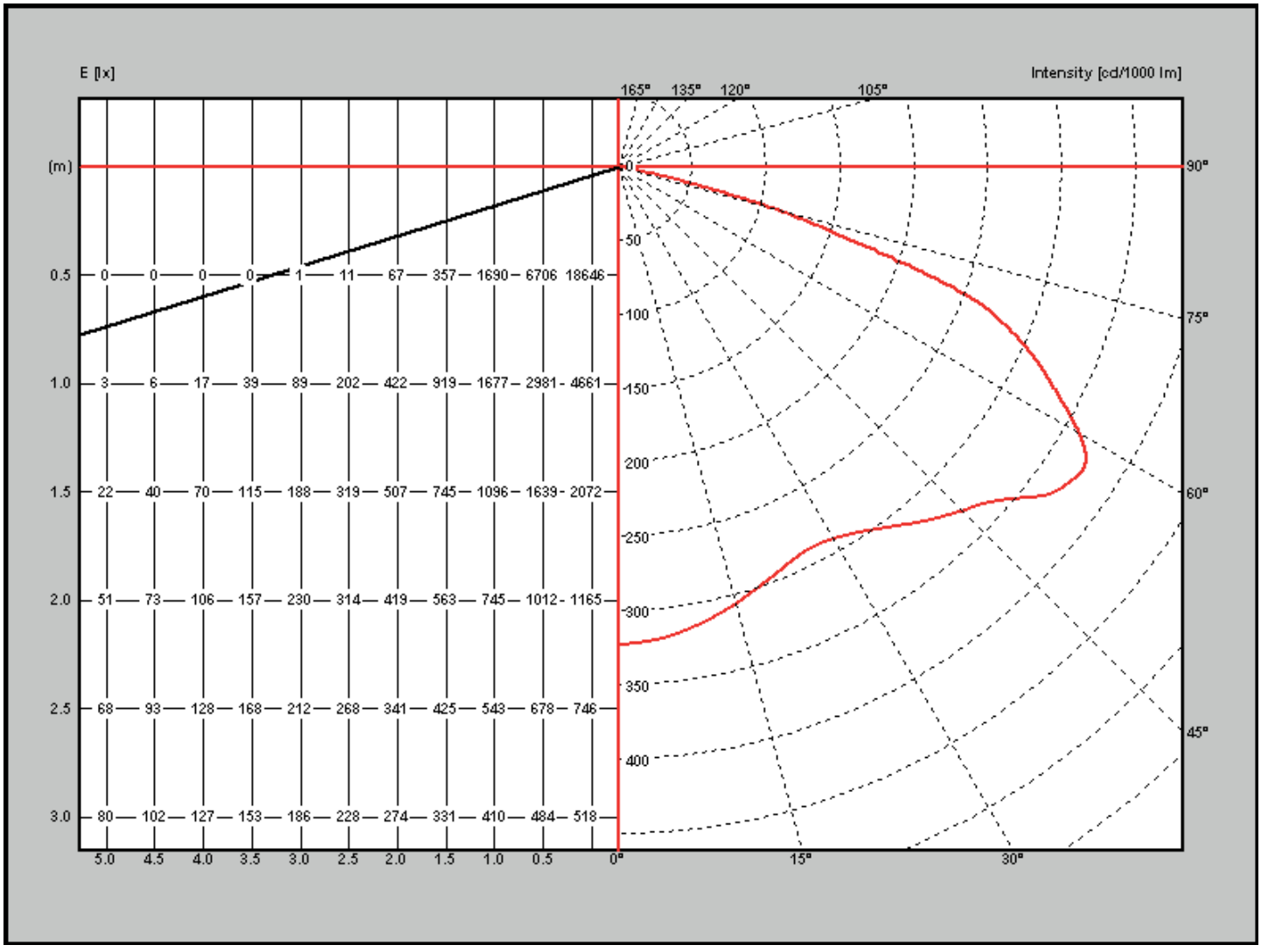
Av. Power Factor:	0,9903	**Av. Power:**	119,6 W

Illuminance and Intensity diagram RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110



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PHOTOMETRIC RESULTS

Sample Number	339-QL20-S01	**Report Number**	339-QL20-R01
Date:	21/04/2020 10.06.37	**Manufacturer**	RELCO
Flux:	14474 lm	**Efficacy:**	121 lm/W
Av. Voltage:	229,96 V	**Av. Current:**	0,525 A
Av. Power Factor:	0,9903	**Av. Power:**	119,6 W

Zonal flux RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

Gamma [°]	Imin [cd/klm]	Imax [cd/klm]	Imean [cd/klm]	Zonal flux [lm]	Sum. zonal flux [lm]	Rel. zonal flux [%]	Sum. rel. zonal flux [%]
0,0	322,05	322,05	322,05	0	0	0,00	0,00
2,5	302,49	340,14	321,20	28	28	0,19	0,19
5,0	283,77	357,53	319,96	83	111	0,57	0,77
7,5	264,43	373,92	318,12	138	249	0,95	1,72
10,0	238,35	394,06	315,40	191	440	1,32	3,04
12,5	199,39	415,98	310,72	242	682	1,67	4,71
15,0	153,80	435,19	303,61	290	972	2,00	6,72
17,5	121,30	449,71	296,36	333	1305	2,30	9,02
20,0	89,32	455,70	288,49	373	1678	2,58	11,59
22,5	72,30	459,93	281,42	410	2088	2,83	14,43
25,0	53,93	463,45	274,84	444	2532	3,07	17,50
27,5	42,19	463,08	269,18	477	3010	3,30	20,79
30,0	37,43	456,79	264,78	510	3519	3,52	24,31
32,5	34,54	448,89	261,32	541	4061	3,74	28,05
35,0	32,83	449,86	258,28	573	4633	3,96	32,01
37,5	32,66	453,10	254,94	602	5235	4,16	36,17
40,0	33,63	459,31	251,34	629	5864	4,34	40,51
42,5	32,40	470,41	247,20	652	6516	4,51	45,02
45,0	31,12	487,24	240,37	669	7185	4,62	49,64
47,5	29,97	505,64	234,25	680	7865	4,70	54,34
50,0	29,45	517,92	230,08	693	8558	4,79	59,13
52,5	29,63	521,91	224,52	703	9261	4,86	63,99
55,0	30,15	529,19	215,85	705	9966	4,87	68,85
57,5	30,15	518,52	204,88	694	10660	4,79	73,65
60,0	28,93	483,77	190,64	671	11331	4,63	78,28
62,5	26,62	434,03	173,85	634	11965	4,38	82,66
65,0	24,15	403,34	156,68	588	12553	4,06	86,73
67,5	21,84	364,36	139,19	537	13090	3,71	90,44
70,0	18,83	327,43	117,20	474	13564	3,28	93,71
72,5	15,43	269,82	86,28	382	13946	2,64	96,35
75,0	9,19	190,88	54,58	268	14215	1,85	98,21
77,5	0,19	116,15	27,52	158	14373	1,09	99,30
80,0	0,02	42,63	9,17	71	14444	0,49	99,79
82,5	0,01	8,20	2,34	23	14467	0,16	99,95
85,0	0,00	1,52	0,48	6	14472	0,04	99,99

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Zonal flux RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

Gamma [°]	Imin [cd/klm]	Imax [cd/klm]	Imean [cd/klm]	Zonal flux [lm]	Sum. zonal flux [lm]	Rel. zonal flux [%]	Sum. rel. zonal flux [%]
87,5	0,00	0,25	0,12	1	14474	0,01	100,00
90,0	0,00	0,00	0,00	0	14474	0,00	100,00
91,0	0,00	0,00	0,00	0	14474	0,00	100,00
92,0	0,00	0,00	0,00	0	14474	0,00	100,00
93,0	0,00	0,00	0,00	0	14474	0,00	100,00
94,0	0,00	0,00	0,00	0	14474	0,00	100,00
95,0	0,00	0,00	0,00	0	14474	0,00	100,00
100,0	0,00	0,00	0,00	0	14474	0,00	100,00
110,0	0,00	0,00	0,00	0	14474	0,00	100,00
120,0	0,00	0,00	0,00	0	14474	0,00	100,00
130,0	0,00	0,00	0,00	0	14474	0,00	100,00
140,0	0,00	0,00	0,00	0	14474	0,00	100,00
150,0	0,00	0,00	0,00	0	14474	0,00	100,00
160,0	0,00	0,00	0,00	0	14474	0,00	100,00
170,0	0,00	0,00	0,00	0	14474	0,00	100,00
180,0	0,00	0,00	0,00	0	14474	0,00	100,00

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PHOTOMETRIC RESULTS

Sample Number	339-QL20-S01	**Report Number**	339-QL20-R01
Date:	21/04/2020 10.06.37	**Manufacturer**	RELCO
Flux:	14474 lm	**Efficacy:**	121 lm/W
Av. Voltage:	229,96 V	**Av. Current:**	0,525 A
Av. Power Factor:	0,9903	**Av. Power:**	119,6 W

Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	0,0	2,5	5,0	7,5	10,0	12,5	15,0	17,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	320,83	321,53	322,40	323,26	323,78	324,65	325,34	326,05
5,0	319,26	320,32	322,05	323,44	324,65	326,55	328,29	330,04
7,5	316,30	318,25	320,33	322,57	324,65	327,41	330,02	332,47
10,0	312,82	315,14	318,08	321,19	324,30	327,93	331,06	334,21
12,5	308,81	311,85	315,49	319,29	323,26	327,58	331,06	335,07
15,0	304,63	308,57	312,73	317,56	322,23	327,07	331,23	336,46
17,5	300,09	304,94	309,97	315,65	321,19	326,89	331,75	338,20
20,0	295,74	301,14	307,04	313,58	319,63	326,03	332,10	339,24
22,5	291,73	297,85	304,62	311,85	318,94	326,20	333,31	340,98
25,0	288,42	295,43	302,72	310,81	318,60	327,07	334,87	343,41
27,5	287,55	295,26	303,24	311,85	320,67	330,00	338,68	348,27
30,0	289,29	297,68	306,35	315,65	325,34	335,36	344,92	355,91
32,5	293,12	302,00	311,35	321,53	331,91	342,80	353,41	365,63
35,0	298,70	308,22	318,60	329,49	340,55	352,30	364,15	378,13
37,5	305,32	315,48	326,54	338,31	350,23	362,85	376,10	391,32
40,0	312,99	323,61	335,51	348,17	361,12	374,78	389,44	405,56
42,5	320,31	331,21	343,97	357,68	371,49	386,19	402,26	419,45
45,0	327,63	339,34	353,46	368,58	383,94	400,53	418,20	436,29
47,5	335,47	348,85	365,03	382,07	399,32	418,34	437,78	457,12
50,0	348,02	363,54	381,77	400,75	419,55	440,12	459,95	478,48
52,5	363,18	380,31	400,75	422,02	442,89	463,80	482,65	498,27
55,0	370,67	388,78	409,73	431,88	452,91	473,83	492,52	507,47
57,5	373,29	388,78	407,31	428,25	449,11	470,03	489,06	503,83
60,0	358,82	370,63	388,15	411,13	434,42	456,03	472,43	481,26
62,5	334,95	345,74	361,92	382,94	403,13	419,20	430,15	434,03
65,0	311,95	322,05	335,34	352,32	368,21	381,35	391,00	394,10
67,5	284,76	292,49	302,72	316,69	328,97	339,69	348,73	352,61
70,0	242,76	248,93	257,68	271,03	282,81	292,67	300,92	305,91
72,5	166,43	170,10	177,08	188,70	199,84	209,69	220,19	230,21
75,0	106,48	108,91	113,39	121,25	129,31	136,39	141,88	146,70
77,5	40,15	42,96	45,98	50,64	56,41	62,56	69,11	75,30
80,0	6,95	8,00	9,34	10,76	12,50	14,35	16,58	18,09
82,5	1,30	1,40	1,53	1,76	1,99	2,24	2,53	3,04
85,0	0,39	0,41	0,44	0,47	0,50	0,53	0,56	0,58
87,5	0,08	0,09	0,10	0,12	0,13	0,14	0,16	0,17
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	0,0	2,5	5,0	7,5	10,0	12,5	15,0	17,5
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	20,0	22,5	25,0	27,5	30,0	32,5	35,0	37,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	326,75	327,79	328,63	329,16	330,03	330,54	331,03	331,57
5,0	331,79	333,69	335,20	336,27	337,67	338,85	339,84	340,91
7,5	334,92	337,51	339,35	341,12	343,22	345,25	346,92	348,86
10,0	337,53	340,81	343,50	346,15	348,95	351,83	354,17	356,99
12,5	339,79	344,29	348,00	351,35	355,02	358,24	361,08	364,60
15,0	342,05	347,41	351,80	355,68	360,05	364,47	368,33	373,25
17,5	344,49	350,54	355,43	360,71	366,30	371,92	377,14	383,28
20,0	346,40	353,15	359,24	366,08	373,24	379,88	386,12	393,31
22,5	349,01	356,97	364,60	372,84	381,05	389,06	395,79	403,17
25,0	352,48	362,01	370,65	380,12	389,38	397,54	404,25	411,47
27,5	358,92	369,30	378,78	388,79	398,05	406,20	412,71	419,08
30,0	367,79	379,38	389,33	399,19	408,12	415,73	421,52	426,52
32,5	379,09	391,19	401,61	411,32	419,74	426,46	430,50	434,13
35,0	392,65	405,61	415,62	424,84	432,24	437,37	439,82	441,57
37,5	406,91	420,20	430,15	438,88	444,90	448,10	448,97	449,87
40,0	422,04	435,48	445,03	452,92	457,40	458,67	458,30	458,52
42,5	436,48	450,07	460,08	467,65	470,41	470,09	468,66	466,99
45,0	453,87	468,31	478,93	486,03	487,24	486,20	482,99	478,58
47,5	474,91	489,16	498,99	504,92	505,64	503,86	500,43	494,15
50,0	495,08	507,22	514,73	517,92	517,44	515,28	510,97	503,32
52,5	510,55	518,17	521,13	521,91	519,87	516,32	512,00	505,56
55,0	519,60	526,51	528,40	529,19	525,24	517,36	506,13	490,86
57,5	514,38	518,52	517,33	514,80	507,72	495,55	477,12	453,50
60,0	483,77	479,61	472,70	468,00	462,60	454,51	442,76	427,39
62,5	432,30	427,84	424,45	423,11	418,88	412,09	403,04	390,89
65,0	391,44	387,02	381,72	377,69	373,07	364,82	354,17	342,81
67,5	352,48	351,58	349,03	345,97	336,98	321,88	304,96	286,94
70,0	308,84	309,89	308,22	302,12	284,57	261,62	242,10	222,60
72,5	240,15	246,84	244,91	232,27	208,57	189,08	172,34	148,92
75,0	152,51	155,29	148,40	130,17	114,00	103,02	90,31	80,95
77,5	80,18	82,96	80,18	72,31	63,23	54,00	43,62	35,41
80,0	20,42	22,95	24,70	24,34	22,30	19,08	15,59	13,92
82,5	3,53	4,01	4,41	4,60	4,89	5,11	5,13	4,83
85,0	0,58	0,58	0,58	0,59	0,59	0,59	0,59	0,62
87,5	0,18	0,18	0,19	0,19	0,19	0,18	0,18	0,18
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	20,0	22,5	25,0	27,5	30,0	32,5	35,0	37,5
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	40,0	42,5	45,0	47,5	50,0	52,5	55,0	57,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	332,29	332,92	333,59	334,39	335,12	335,69	336,15	336,60
5,0	342,35	343,44	344,77	346,21	347,32	348,28	349,20	350,28
7,5	351,38	353,10	355,27	357,51	359,00	360,69	362,07	363,61
10,0	360,23	362,76	365,26	368,28	370,50	372,76	374,95	377,29
12,5	368,73	372,25	375,93	380,10	383,40	386,92	390,26	393,39
15,0	378,62	383,46	388,49	393,66	398,04	402,48	406,26	410,18
17,5	389,73	395,54	401,58	407,39	412,15	416,82	420,88	424,73
20,0	400,31	406,40	412,59	418,51	423,30	427,83	431,67	435,29
22,5	410,20	415,89	421,89	427,38	431,84	435,87	438,97	441,35
25,0	418,36	423,65	429,12	433,98	436,90	439,54	441,06	442,74
27,5	425,30	429,00	433,25	436,76	438,47	440,94	442,98	444,81
30,0	431,54	433,66	436,52	439,89	441,95	444,79	446,28	447,24
32,5	436,92	437,97	440,99	444,76	446,66	448,46	448,89	448,45
35,0	443,69	444,53	446,85	449,45	449,62	449,86	447,85	445,68
37,5	452,19	451,94	452,87	453,10	449,97	447,41	443,15	438,93
40,0	459,31	456,95	455,28	452,75	447,01	441,64	434,45	427,15
42,5	465,21	459,88	454,08	448,23	439,51	431,50	421,40	412,09
45,0	472,32	461,26	450,12	439,89	427,66	417,69	405,92	393,74
47,5	483,77	467,47	449,77	432,24	414,59	400,73	385,73	370,19
50,0	492,45	473,85	452,18	428,77	403,79	382,37	359,81	338,16
52,5	494,88	474,37	449,60	419,56	381,83	348,63	318,05	292,62
55,0	471,28	445,73	416,55	381,67	341,40	305,09	274,03	242,41
57,5	430,68	406,06	379,03	344,82	303,06	265,93	229,32	195,14
60,0	406,73	377,77	344,26	306,93	265,59	224,32	187,39	159,81
62,5	372,72	341,89	304,15	266,44	226,20	182,71	155,02	131,42
65,0	321,01	286,52	250,79	214,30	179,67	145,64	123,71	106,66
67,5	263,75	230,46	191,58	159,72	131,23	108,75	95,00	84,67
70,0	194,52	164,56	137,88	115,93	92,36	77,10	70,64	65,28
72,5	126,15	105,91	90,20	73,52	57,51	49,83	48,02	45,71
75,0	71,32	59,51	49,57	40,84	36,07	33,92	32,88	30,65
77,5	30,35	25,81	23,15	22,66	22,76	22,89	22,44	20,78
80,0	13,38	13,09	12,72	11,96	11,19	11,54	12,09	11,62
82,5	4,62	4,69	4,85	4,86	4,74	4,99	5,08	4,85
85,0	0,70	0,83	0,95	1,01	1,13	1,17	1,16	1,14
87,5	0,18	0,18	0,18	0,19	0,20	0,20	0,20	0,20
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	60,0	62,5	65,0	67,5	70,0	72,5	75,0	77,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	337,26	337,60	337,89	338,30	338,48	338,83	339,07	339,14
5,0	351,25	352,12	352,86	353,69	354,38	355,09	355,91	356,05
7,5	365,07	366,11	367,32	368,38	369,25	370,14	371,36	371,76
10,0	379,41	381,31	383,16	385,15	386,53	388,12	389,94	390,57
12,5	396,52	399,11	401,75	404,34	406,41	408,36	410,77	411,45
15,0	413,80	416,73	419,65	422,83	425,08	427,04	429,87	430,44
17,5	428,31	431,59	434,28	437,53	439,78	441,57	444,45	444,94
20,0	438,68	441,61	444,09	447,04	449,11	450,39	452,61	452,19
22,5	443,86	445,76	447,36	449,98	451,88	453,50	456,08	455,98
25,0	444,72	446,80	448,91	452,05	454,30	456,27	459,03	458,92
27,5	446,62	448,01	449,60	452,22	453,61	454,89	457,47	457,36
30,0	448,01	448,35	448,40	449,80	449,98	449,87	451,57	450,46
32,5	447,49	446,11	443,92	443,06	441,33	440,01	440,80	439,24
35,0	443,34	439,54	434,97	432,69	429,58	426,52	425,87	422,50
37,5	434,18	429,17	423,26	418,86	413,15	407,15	403,65	397,99
40,0	421,05	414,66	407,08	400,02	391,03	381,90	375,53	367,79
42,5	403,26	394,62	384,54	374,95	363,37	351,80	342,54	332,41
45,0	381,49	369,05	355,96	343,49	328,28	311,33	294,27	275,28
47,5	354,71	338,81	320,33	300,10	275,72	250,10	226,22	205,55
50,0	316,52	292,51	266,11	242,53	218,85	197,00	178,82	164,65
52,5	265,73	237,05	209,14	189,12	173,21	158,61	144,79	132,55
55,0	212,17	187,81	166,45	149,88	138,12	127,82	118,06	109,25
57,5	169,32	152,04	136,67	123,60	113,57	106,20	99,65	93,54
60,0	138,39	125,95	114,29	103,55	95,25	89,94	85,59	81,46
62,5	115,41	105,57	96,22	87,64	80,73	76,97	74,13	71,11
65,0	95,72	87,60	80,73	74,33	68,63	65,55	63,20	60,41
67,5	76,88	71,70	66,79	62,06	57,22	54,48	52,60	49,88
70,0	60,13	55,12	50,95	47,37	43,74	41,51	40,10	37,97
72,5	43,37	41,47	38,90	35,96	33,02	31,13	29,86	27,96
75,0	29,37	28,85	27,88	25,93	23,68	22,31	20,66	19,33
77,5	19,37	18,30	17,09	14,81	11,89	10,38	9,11	7,97
80,0	11,02	10,21	8,54	7,26	6,29	5,50	4,98	4,35
82,5	4,46	3,93	3,77	3,28	2,72	2,27	2,06	1,89
85,0	1,04	1,00	0,98	0,88	0,74	0,67	0,63	0,59
87,5	0,21	0,21	0,21	0,22	0,22	0,22	0,23	0,23
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	80,0	82,5	85,0	87,5	90,0	92,5	95,0	97,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	339,67	339,81	340,14	340,12	340,05	339,93	339,82	339,89
5,0	356,93	357,05	357,53	357,31	357,52	357,29	357,05	357,02

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	80,0	82,5	85,0	87,5	90,0	92,5	95,0	97,5
7,5	372,82	373,26	373,89	373,62	373,92	373,75	373,59	373,28
10,0	392,16	393,08	393,70	393,80	394,06	393,94	393,46	393,04
12,5	413,57	414,81	415,57	415,72	415,98	415,89	415,45	414,89
15,0	432,57	433,77	434,69	434,84	435,05	435,19	434,62	434,30
17,5	447,08	448,43	449,32	449,40	449,48	449,71	449,22	448,81
20,0	453,98	454,80	455,70	455,54	455,54	455,55	455,55	455,45
22,5	457,95	458,94	459,83	459,93	459,46	459,62	459,42	459,48
25,0	460,89	462,22	463,45	463,43	463,03	463,16	463,12	463,32
27,5	459,68	461,18	462,76	463,08	462,32	462,63	462,76	462,80
30,0	452,26	453,94	455,87	456,59	456,26	456,79	456,43	456,50
32,5	440,51	441,70	442,95	443,44	443,07	443,69	443,59	443,57
35,0	422,21	422,39	423,15	422,91	421,86	422,26	422,66	423,63
37,5	395,79	394,64	393,87	392,92	391,56	391,99	393,29	395,49
40,0	363,84	361,36	359,77	359,06	357,70	358,35	359,17	361,22
42,5	326,02	321,36	317,58	315,39	313,32	313,91	315,90	319,43
45,0	259,71	247,75	238,87	234,00	231,34	232,11	235,87	242,68
47,5	191,85	183,44	178,42	176,64	175,20	175,63	177,47	181,31
50,0	154,55	147,92	143,63	142,08	141,33	141,64	143,17	146,34
52,5	123,64	117,41	113,67	112,44	112,10	112,60	113,98	116,44
55,0	103,09	98,96	96,44	95,95	96,06	96,14	96,91	98,26
57,5	89,45	86,20	84,22	84,02	83,94	83,92	84,60	85,67
60,0	78,57	76,20	74,40	74,20	74,50	74,36	74,93	75,88
62,5	68,73	66,72	64,76	64,38	64,52	64,62	65,25	66,26
65,0	58,19	55,86	53,91	53,32	53,47	53,47	54,17	55,42
67,5	47,49	45,00	42,71	41,75	41,88	41,96	42,92	44,58
70,0	35,92	33,96	32,21	31,57	31,90	32,05	32,36	33,57
72,5	26,42	24,83	23,42	22,98	23,35	23,19	23,75	24,83
75,0	18,65	17,93	17,39	17,54	18,00	17,88	18,12	18,53
77,5	6,99	6,28	5,89	5,86	6,02	6,04	6,14	6,38
80,0	3,83	3,59	3,41	3,40	3,53	3,54	3,59	3,69
82,5	1,77	1,71	1,63	1,63	1,66	1,70	1,71	1,76
85,0	0,58	0,57	0,56	0,57	0,58	0,59	0,60	0,60
87,5	0,23	0,23	0,23	0,23	0,23	0,23	0,24	0,24
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	100,0	102,5	105,0	107,5	110,0	112,5	115,0	117,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	339,82	339,81	339,57	339,24	339,05	338,64	338,23	337,97
5,0	356,72	356,71	356,22	355,56	355,18	354,36	353,72	353,19
7,5	372,94	372,91	372,17	371,36	370,79	369,91	368,87	367,89
10,0	392,43	392,22	390,90	389,24	388,13	386,50	384,71	382,94
12,5	413,99	413,94	412,23	410,25	408,77	406,54	404,16	401,44

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	100,0	102,5	105,0	107,5	110,0	112,5	115,0	117,5
15,0	433,31	433,25	431,31	429,17	427,50	425,03	422,40	419,43
17,5	448,15	448,08	446,23	443,93	442,06	439,54	437,03	434,13
20,0	455,22	455,67	454,20	452,44	451,08	449,04	447,02	444,34
22,5	459,19	459,46	457,85	455,39	453,86	451,81	449,94	447,97
25,0	463,33	463,25	461,14	458,51	456,81	454,40	451,84	449,35
27,5	462,64	462,22	460,27	457,65	455,94	453,53	451,32	449,70
30,0	455,91	455,32	453,51	451,57	450,39	448,87	448,05	447,45
32,5	443,32	443,08	442,06	440,98	440,85	440,23	440,99	442,95
35,0	424,86	426,36	425,76	425,35	426,46	427,62	430,15	434,30
37,5	396,92	398,60	399,92	402,09	406,34	410,51	415,86	422,37
40,0	362,93	365,84	369,05	373,44	380,50	387,88	396,76	406,28
42,5	323,09	327,91	333,50	340,80	351,02	361,27	372,66	384,66
45,0	251,33	263,26	278,18	294,27	311,47	327,24	343,05	358,20
47,5	186,12	194,65	208,29	227,43	251,29	276,27	300,88	323,44
50,0	150,25	156,72	166,49	180,21	198,57	221,33	248,38	275,87
52,5	119,54	125,68	134,93	147,57	164,06	181,24	199,15	221,04
55,0	100,22	104,31	110,99	120,14	131,80	144,44	158,36	176,59
57,5	87,11	90,34	95,21	101,56	109,78	118,70	129,79	143,73
60,0	76,93	79,31	82,55	87,15	93,13	99,52	108,44	118,65
62,5	67,45	69,65	71,97	75,35	79,60	83,97	90,71	98,24
65,0	56,92	59,13	61,74	64,76	67,98	71,01	75,56	81,12
67,5	46,40	48,62	51,51	54,34	56,71	59,26	62,48	66,24
70,0	34,84	36,72	39,19	41,49	43,18	44,75	46,65	50,50
72,5	25,53	27,07	28,62	30,56	32,08	33,69	35,63	38,05
75,0	18,97	19,83	20,98	22,40	23,59	24,53	25,30	26,81
77,5	6,90	7,78	8,84	10,12	11,50	13,49	15,73	17,40
80,0	3,85	4,26	4,89	5,52	6,02	6,76	7,71	9,39
82,5	1,82	1,92	2,07	2,24	2,53	3,00	3,48	4,08
85,0	0,61	0,61	0,65	0,69	0,78	0,88	1,01	1,14
87,5	0,24	0,24	0,25	0,25	0,25	0,25	0,25	0,25
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	120,0	122,5	125,0	127,5	130,0	132,5	135,0	137,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	337,49	337,26	336,90	336,47	335,93	335,41	334,85	334,29
5,0	352,23	351,42	350,70	349,69	348,78	347,75	346,62	345,51
7,5	366,80	365,59	364,34	362,74	361,28	359,74	357,87	356,04
10,0	381,36	379,24	377,28	374,76	372,76	370,87	368,45	365,90
12,5	399,23	396,17	393,33	389,35	386,46	383,04	379,20	375,59
15,0	417,26	413,62	410,07	405,31	401,54	397,43	392,33	387,31
17,5	432,01	428,48	424,74	419,73	415,59	411,30	405,30	399,21
20,0	442,58	438,85	435,27	430,38	426,38	422,09	415,87	409,92

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	120,0	122,5	125,0	127,5	130,0	132,5	135,0	137,5
22,5	447,09	444,55	441,31	437,07	433,40	429,46	423,38	417,56
25,0	448,31	445,41	442,69	439,48	437,00	434,26	428,84	423,34
27,5	448,83	446,11	443,38	439,99	437,68	436,14	432,08	427,76
30,0	447,79	445,76	444,07	441,36	439,23	437,34	433,10	429,46
32,5	445,36	444,72	444,25	442,57	441,11	440,08	436,51	432,69
35,0	438,94	441,44	443,21	443,25	443,17	443,34	440,78	437,62
37,5	428,88	433,15	437,86	440,68	443,17	446,08	445,21	443,06
40,0	414,84	420,36	426,64	432,44	438,37	444,54	446,75	446,80
42,5	394,72	401,88	410,59	419,05	427,75	436,66	442,82	447,14
45,0	370,44	380,45	391,43	401,19	411,65	423,81	434,29	443,40
47,5	342,34	356,61	368,13	378,70	392,12	409,59	426,28	441,53
50,0	300,72	320,50	337,93	355,36	375,33	399,83	423,38	443,74
52,5	246,44	270,39	294,96	322,05	354,77	389,38	417,75	439,32
55,0	196,49	218,73	248,01	279,82	312,97	346,72	378,86	410,09
57,5	157,12	173,98	202,10	239,99	271,52	302,52	338,26	371,00
60,0	128,51	143,23	167,41	195,70	229,03	261,24	301,41	335,99
62,5	107,52	120,94	141,01	160,17	185,18	226,46	260,47	291,29
65,0	89,66	102,11	114,94	129,44	149,21	183,12	213,56	244,73
67,5	73,36	82,93	90,44	99,23	113,92	142,18	168,87	202,58
70,0	57,92	64,10	67,83	73,82	83,60	105,70	127,76	154,48
72,5	41,80	44,23	46,25	49,10	56,87	68,86	86,31	103,33
75,0	28,96	30,41	31,93	34,51	36,32	39,91	48,44	59,48
77,5	19,60	20,97	22,18	23,78	23,86	23,93	24,44	27,41
80,0	11,32	11,97	12,50	12,91	12,37	12,56	13,31	14,21
82,5	4,45	5,03	5,43	5,86	5,80	5,71	5,98	6,36
85,0	1,19	1,31	1,47	1,52	1,43	1,43	1,41	1,34
87,5	0,25	0,25	0,25	0,24	0,24	0,24	0,24	0,24
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	140,0	142,5	145,0	147,5	150,0	152,5	155,0	157,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	333,70	332,91	332,41	331,36	330,65	329,98	329,14	328,82
5,0	344,49	343,25	342,08	340,32	339,08	337,56	336,24	335,07
7,5	354,26	352,21	350,20	347,21	345,28	343,25	341,25	339,58
10,0	363,85	361,51	358,66	354,79	351,99	349,11	346,27	343,57
12,5	372,59	369,09	365,40	361,00	357,66	354,45	350,76	347,21
15,0	383,21	378,23	372,99	367,20	362,83	358,76	354,74	350,86
17,5	394,51	388,57	381,97	374,78	368,85	363,41	358,55	353,98
20,0	404,79	398,04	390,78	382,36	375,38	368,58	362,35	356,24
22,5	412,50	406,14	398,55	389,60	381,58	373,75	366,16	358,67
25,0	418,67	412,69	405,46	396,32	387,60	379,26	370,83	362,31
27,5	423,98	418,55	411,50	402,87	394,48	385,81	377,05	367,69

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	140,0	142,5	145,0	147,5	150,0	152,5	155,0	157,5
30,0	427,41	423,37	417,20	409,42	401,71	393,56	384,84	374,98
32,5	431,17	428,71	423,94	417,00	409,96	402,70	394,18	384,00
35,0	436,83	434,57	431,02	425,44	419,25	412,17	404,21	394,06
37,5	443,34	442,16	439,13	434,75	429,58	423,37	415,45	405,34
40,0	448,82	449,05	447,25	444,57	440,93	435,09	427,39	417,32
42,5	452,93	456,46	457,09	455,42	452,80	448,36	440,53	429,81
45,0	454,64	462,49	465,21	464,04	461,23	457,49	450,74	440,57
47,5	457,90	469,04	473,84	474,03	472,24	468,86	464,23	455,66
50,0	462,01	473,86	480,23	482,82	483,08	482,30	482,04	478,22
52,5	457,56	470,07	477,81	483,34	488,24	493,85	498,99	500,08
55,0	439,74	462,14	477,12	487,65	496,15	504,19	509,20	509,97
57,5	400,17	426,99	452,08	470,93	486,00	498,50	504,87	505,12
60,0	364,71	388,22	407,53	422,86	434,22	446,98	460,25	469,89
62,5	319,48	346,35	370,40	387,01	398,78	408,04	415,11	421,48
65,0	276,14	308,10	336,39	354,79	366,95	375,81	384,49	392,15
67,5	238,80	269,33	299,26	325,33	341,15	351,69	358,03	360,40
70,0	186,04	215,56	240,37	270,88	297,97	316,71	326,20	327,43
72,5	121,28	142,68	169,40	195,75	228,12	253,64	267,74	269,82
75,0	71,43	86,16	101,19	118,90	134,70	151,81	174,69	188,27
77,5	31,97	38,96	50,82	63,22	75,78	87,66	101,89	116,08
80,0	15,74	17,04	19,08	23,97	29,50	34,24	39,78	42,63
82,5	6,25	6,31	6,64	7,24	7,67	7,83	8,20	7,94
85,0	1,29	1,24	1,08	0,92	0,83	0,78	0,75	0,73
87,5	0,24	0,23	0,23	0,23	0,22	0,22	0,23	0,23
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	160,0	162,5	165,0	167,5	170,0	172,5	175,0	177,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	327,94	327,23	326,70	325,66	324,81	323,96	323,11	322,23
5,0	333,65	332,24	330,66	328,76	327,40	325,53	323,81	322,23
7,5	337,28	335,52	333,25	330,65	328,26	325,70	323,28	320,81
10,0	340,40	337,77	334,97	331,68	328,43	325,18	321,53	318,32
12,5	342,99	339,49	335,83	331,85	327,91	323,79	319,41	315,47
15,0	345,76	341,22	336,52	331,68	327,05	321,88	316,95	312,27
17,5	348,18	343,12	337,38	331,51	325,85	319,97	314,31	308,53
20,0	349,74	344,16	337,73	330,48	324,12	317,37	310,97	304,44
22,5	350,78	344,33	337,55	329,62	321,88	314,59	307,63	300,35
25,0	352,86	345,19	337,90	329,27	320,50	312,33	304,64	296,96
27,5	357,01	348,13	339,79	330,82	321,36	312,16	303,76	295,54
30,0	363,24	352,96	343,41	333,75	323,43	313,55	304,29	295,36
32,5	371,55	360,22	349,44	338,73	327,91	317,02	306,93	297,32
35,0	381,24	368,85	356,67	345,09	333,60	321,71	310,80	300,70

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	160,0	162,5	165,0	167,5	170,0	172,5	175,0	177,5
37,5	392,49	379,38	365,97	353,17	340,85	328,13	316,25	305,51
40,0	404,25	390,95	376,47	362,29	349,12	335,42	322,76	311,38
42,5	416,54	402,87	387,67	372,43	358,26	343,75	330,32	318,32
45,0	427,10	413,57	398,17	381,72	366,36	351,22	337,18	324,19
47,5	443,54	430,50	415,40	397,88	379,98	362,85	346,85	332,19
50,0	468,98	456,92	441,75	423,67	403,95	384,03	365,50	348,03
52,5	494,41	484,72	469,99	451,53	430,50	407,82	386,08	365,47
55,0	503,76	493,18	478,60	461,16	439,98	417,37	395,22	374,19
57,5	500,13	491,63	478,77	463,56	444,81	423,79	402,08	379,70
60,0	474,86	472,80	463,79	449,29	430,67	410,25	391,71	373,83
62,5	428,65	433,09	431,76	423,84	411,19	392,89	373,24	355,15
65,0	397,50	402,87	403,34	397,54	387,74	372,75	356,00	339,49
67,5	362,03	364,36	362,70	355,75	346,36	333,69	320,29	308,17
70,0	325,69	323,43	319,13	311,22	301,02	288,37	276,15	266,01
72,5	265,81	259,02	251,27	241,93	231,02	220,66	211,07	203,02
75,0	190,88	184,60	175,49	166,44	159,65	152,95	144,76	136,12
77,5	116,15	110,12	104,19	98,83	93,96	87,24	80,24	73,89
80,0	40,88	37,18	33,31	29,73	26,62	23,56	20,74	18,04
82,5	7,05	6,19	5,39	4,88	4,59	4,02	3,45	2,92
85,0	0,72	0,71	0,69	0,67	0,64	0,61	0,58	0,56
87,5	0,23	0,23	0,22	0,21	0,20	0,19	0,18	0,17
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	180,0	182,5	185,0	187,5	190,0	192,5	195,0	197,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	321,51	320,80	320,46	319,60	318,74	317,73	317,05	316,36
5,0	320,80	319,37	317,81	316,09	314,39	312,53	311,36	309,63
7,5	318,64	316,33	313,93	311,53	308,99	306,31	304,12	301,53
10,0	315,41	312,40	309,33	306,27	302,89	299,90	296,88	293,42
12,5	312,18	308,29	304,39	300,31	296,62	292,46	288,78	284,79
15,0	308,24	303,82	299,09	294,35	290,18	285,37	280,85	276,34
17,5	303,57	298,46	293,08	288,04	283,21	277,92	272,92	267,89
20,0	298,37	292,74	287,07	281,20	275,90	270,14	264,64	259,26
22,5	293,71	287,38	281,07	274,54	268,75	262,52	256,71	250,64
25,0	289,76	282,56	275,59	268,58	262,48	255,95	249,13	241,84
27,5	287,78	279,70	272,06	264,55	257,78	250,93	242,75	233,73
30,0	287,07	278,45	270,29	262,10	254,82	246,77	237,23	226,66
32,5	288,50	279,16	270,29	261,74	253,78	244,52	233,44	220,45
35,0	291,37	281,48	272,23	263,50	254,82	244,18	231,20	215,62
37,5	295,68	285,24	275,59	266,83	257,43	245,74	230,51	212,34
40,0	301,06	290,24	280,36	271,74	261,96	249,02	231,54	210,79
42,5	307,34	296,50	286,37	277,52	267,36	253,35	233,95	210,27

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	180,0	182,5	185,0	187,5	190,0	192,5	195,0	197,5
45,0	313,26	302,04	291,67	282,43	271,54	256,98	236,20	211,14
47,5	319,72	307,58	296,44	286,46	275,20	259,75	238,09	211,83
50,0	332,46	317,58	304,21	292,60	280,08	263,56	240,85	213,90
52,5	346,99	329,20	313,75	300,14	285,82	267,54	243,61	216,31
55,0	355,07	336,53	320,11	305,57	290,18	270,83	245,68	217,86
57,5	359,19	339,75	322,23	306,45	290,00	270,48	245,33	218,21
60,0	357,22	340,64	324,17	307,15	288,26	267,02	241,37	215,28
62,5	339,46	325,81	312,69	298,39	282,17	261,66	234,47	208,72
65,0	323,49	308,47	293,43	277,87	261,27	240,03	212,58	189,92
67,5	296,58	284,70	273,29	260,17	244,37	222,72	197,40	177,84
70,0	257,82	249,31	239,73	229,14	213,54	191,92	169,99	154,39
72,5	198,97	193,73	186,91	177,77	162,16	141,90	121,37	108,85
75,0	131,15	127,43	124,90	121,14	112,34	96,04	79,82	67,10
77,5	69,94	65,97	63,00	61,41	59,08	53,16	43,41	34,64
80,0	15,54	13,71	13,20	13,50	13,79	13,20	11,48	9,26
82,5	2,44	2,10	1,88	1,73	1,62	1,52	1,41	1,30
85,0	0,53	0,50	0,47	0,44	0,41	0,38	0,36	0,33
87,5	0,15	0,14	0,13	0,11	0,10	0,09	0,08	0,07
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	200,0	202,5	205,0	207,5	210,0	212,5	215,0	217,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	315,48	314,78	313,91	313,39	312,53	311,78	311,06	310,57
5,0	307,87	306,31	304,56	303,52	301,79	300,29	298,85	297,87
7,5	299,05	296,96	294,51	292,78	290,89	288,80	286,81	285,34
10,0	290,23	287,27	284,29	282,03	279,63	277,31	274,95	272,81
12,5	281,06	277,75	274,24	271,29	268,20	265,65	262,04	259,07
15,0	271,89	268,23	264,19	260,38	256,43	252,59	247,73	243,24
17,5	263,42	258,89	253,62	248,25	242,75	237,10	230,29	223,40
20,0	254,08	248,33	241,84	234,91	227,34	219,52	210,22	200,43
22,5	244,05	237,08	228,85	219,84	209,68	199,32	187,72	175,73
25,0	233,84	224,80	214,30	202,52	189,94	177,04	163,64	151,02
27,5	223,98	212,51	199,40	185,37	170,55	156,15	142,36	129,97
30,0	214,30	200,57	184,85	168,56	152,37	137,35	124,22	112,57
32,5	205,65	188,97	171,16	153,32	136,27	121,68	108,69	96,39
35,0	198,04	178,76	159,03	139,80	122,24	107,76	94,03	80,73
37,5	191,81	170,28	148,47	128,20	110,47	95,05	80,43	69,60
40,0	187,32	163,19	139,63	118,50	100,08	83,39	70,31	60,55
42,5	184,55	158,34	132,53	110,01	90,21	73,81	62,11	52,02
45,0	184,03	155,06	126,98	102,90	81,55	66,33	55,30	45,59
47,5	182,99	151,60	121,96	96,67	75,49	61,45	50,59	40,89
50,0	183,51	149,69	118,50	91,47	71,51	57,97	47,10	37,76

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	200,0	202,5	205,0	207,5	210,0	212,5	215,0	217,5
52,5	184,72	149,69	116,76	88,70	69,09	55,53	45,01	36,54
55,0	185,41	149,69	115,03	86,79	67,18	54,14	44,49	36,71
57,5	187,14	151,77	115,20	86,10	65,97	53,62	44,31	36,89
60,0	186,80	152,98	117,63	89,74	69,09	55,36	45,01	36,89
62,5	181,26	149,35	115,20	87,49	66,14	52,22	42,92	35,49
65,0	167,77	139,83	109,83	84,02	62,85	49,09	40,30	33,75
67,5	156,70	131,35	105,16	81,60	61,64	47,70	38,38	31,84
70,0	137,68	118,20	96,32	75,19	58,18	45,61	36,46	29,23
72,5	97,38	84,80	69,82	56,30	45,19	35,86	30,18	25,23
75,0	57,25	47,76	37,59	29,80	24,59	20,89	17,79	15,31
77,5	27,12	20,14	15,14	11,66	9,42	8,27	7,76	7,41
80,0	7,02	5,35	4,50	4,04	3,71	3,55	3,45	3,32
82,5	1,21	1,11	1,04	0,97	0,92	0,89	0,87	0,83
85,0	0,31	0,29	0,27	0,25	0,23	0,21	0,19	0,18
87,5	0,07	0,06	0,05	0,05	0,04	0,04	0,03	0,03
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	220,0	222,5	225,0	227,5	230,0	232,5	235,0	237,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	309,85	308,90	308,30	307,81	307,52	306,72	306,16	305,85
5,0	296,61	295,05	294,20	293,05	292,11	291,03	289,92	289,64
7,5	283,54	281,56	280,28	278,81	277,57	275,87	274,55	273,95
10,0	270,64	268,06	266,00	263,87	261,64	259,14	256,91	255,48
12,5	255,83	252,10	248,72	245,23	241,50	237,53	233,68	230,73
15,0	238,23	232,64	227,04	220,97	215,05	208,43	202,42	196,93
17,5	215,92	207,75	199,72	191,09	182,48	173,75	166,09	159,46
20,0	190,30	179,87	169,58	159,44	150,43	142,03	135,53	130,01
22,5	163,99	152,52	142,43	133,43	125,74	118,68	112,12	105,09
25,0	139,42	129,38	120,75	112,33	103,32	94,28	87,50	82,43
27,5	119,20	109,92	100,30	90,36	82,66	77,03	72,65	68,49
30,0	101,60	90,29	80,73	74,18	69,17	64,13	59,56	54,90
32,5	84,00	74,68	68,22	62,23	56,39	51,24	46,98	43,92
35,0	70,93	63,99	57,47	50,98	45,53	41,65	39,65	38,51
37,5	61,17	53,82	47,42	42,37	38,88	36,95	35,98	35,38
40,0	51,76	44,88	39,84	36,56	35,02	33,98	33,71	33,63
42,5	43,74	37,87	34,55	33,05	32,40	32,41	32,83	33,46
45,0	37,64	32,78	31,38	31,12	31,52	32,24	33,36	34,68
47,5	33,29	30,15	29,97	30,76	31,70	33,29	35,45	37,82
50,0	31,19	29,45	29,97	31,29	33,27	35,90	38,77	42,17
52,5	30,85	29,63	30,85	33,05	35,55	38,17	40,87	43,57
55,0	31,02	30,15	31,91	33,93	35,55	37,29	39,30	41,48
57,5	31,54	30,15	31,02	32,17	33,27	34,51	35,80	37,29

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	220,0	222,5	225,0	227,5	230,0	232,5	235,0	237,5
60,0	31,19	28,93	29,09	29,71	30,47	31,02	31,79	32,76
62,5	29,63	27,00	26,62	27,07	27,49	28,06	28,64	29,63
65,0	28,23	25,25	24,15	24,26	24,87	25,44	26,20	27,36
67,5	26,66	23,49	22,03	22,15	22,59	23,18	23,93	24,75
70,0	23,88	20,86	19,74	19,86	19,96	19,87	20,26	20,91
72,5	21,09	17,71	16,22	16,00	16,46	16,90	16,94	16,56
75,0	13,94	12,97	12,52	11,95	12,26	12,20	12,05	11,85
77,5	7,20	7,24	7,32	7,21	7,36	7,41	7,56	7,20
80,0	3,24	3,31	3,40	3,34	3,41	3,38	3,20	2,88
82,5	0,82	0,80	0,76	0,73	0,69	0,62	0,56	0,48
85,0	0,16	0,15	0,13	0,12	0,10	0,09	0,07	0,06
87,5	0,02	0,02	0,02	0,01	0,01	0,01	0,01	0,01
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	240,0	242,5	245,0	247,5	250,0	252,5	255,0	257,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	305,31	304,87	304,43	304,19	303,90	303,44	303,11	302,86
5,0	288,57	287,87	287,16	286,50	286,10	285,35	284,86	284,54
7,5	272,53	271,39	270,41	269,33	268,64	267,77	266,78	266,05
10,0	253,18	251,08	249,30	247,31	245,82	244,34	242,63	241,28
12,5	226,85	222,97	219,64	216,09	213,15	210,39	207,52	204,99
15,0	191,10	185,32	180,04	175,16	170,79	166,97	163,37	160,50
17,5	152,92	147,14	142,18	137,87	134,49	131,47	128,96	126,83
20,0	125,02	120,08	115,32	110,47	105,80	101,66	98,20	95,26
22,5	98,34	92,31	87,75	84,46	81,94	79,61	77,86	76,24
25,0	78,64	74,96	71,88	68,85	66,04	63,24	61,00	58,97
27,5	64,52	60,21	56,35	52,90	49,96	47,56	46,06	44,66
30,0	50,57	46,85	44,14	42,14	40,80	39,63	39,11	38,56
32,5	41,67	40,08	39,08	38,15	37,34	36,53	36,15	35,59
35,0	38,19	37,48	36,81	35,90	35,09	34,29	34,06	33,67
37,5	35,22	35,05	35,07	34,34	33,71	33,26	33,20	32,97
40,0	33,65	33,66	34,19	34,17	34,05	34,12	34,41	34,54
42,5	34,18	34,53	35,42	36,25	36,99	37,39	38,24	39,08
45,0	36,27	37,65	39,43	40,93	42,70	44,28	45,88	47,45
47,5	40,63	43,03	46,06	48,56	51,17	53,24	55,44	57,22
50,0	45,51	48,59	51,64	53,94	55,84	57,38	58,92	60,19
52,5	46,21	48,59	51,12	52,72	54,11	54,80	55,79	56,52
55,0	43,59	44,94	46,41	47,00	47,71	48,08	48,66	49,55
57,5	38,71	39,39	40,30	40,58	41,14	41,87	42,93	43,96
60,0	34,18	35,22	36,11	36,25	36,65	37,39	38,41	39,60
62,5	30,69	31,93	33,32	33,64	34,23	34,98	36,15	37,33
65,0	28,60	29,50	31,23	32,08	32,84	33,26	33,54	34,19

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	240,0	242,5	245,0	247,5	250,0	252,5	255,0	257,5
67,5	25,28	25,85	27,04	27,92	28,87	29,64	30,94	32,62
70,0	21,80	22,90	24,25	24,28	24,37	25,16	26,77	28,26
72,5	16,91	17,18	17,10	17,69	18,50	19,30	20,68	21,98
75,0	11,51	11,45	11,17	11,10	11,24	11,54	11,99	11,17
77,5	6,94	6,00	5,27	4,37	4,05	3,29	2,71	1,69
80,0	2,49	2,15	1,97	1,51	1,26	0,95	0,56	0,33
82,5	0,33	0,23	0,18	0,17	0,17	0,08	0,09	0,04
85,0	0,05	0,04	0,03	0,03	0,02	0,02	0,02	0,01
87,5	0,01	0,00	0,01	0,01	0,00	0,00	0,00	0,00
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	260,0	262,5	265,0	267,5	270,0	272,5	275,0	277,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	302,62	302,67	302,52	302,50	302,49	302,60	302,49	302,65
5,0	284,25	284,15	284,02	283,81	283,77	283,82	283,77	283,77
7,5	265,34	265,12	265,01	264,43	264,55	264,71	264,72	265,06
10,0	240,31	239,79	239,25	238,37	238,35	238,42	238,52	239,14
12,5	203,21	201,89	200,70	199,61	199,39	199,51	199,90	201,03
15,0	158,40	156,83	155,41	154,17	153,80	153,94	154,14	155,36
17,5	125,15	123,83	122,56	121,58	121,30	121,35	121,30	122,23
20,0	93,29	91,87	90,58	89,69	89,32	89,43	89,66	90,47
22,5	75,09	74,23	73,30	72,54	72,30	72,36	72,47	73,13
25,0	57,23	56,06	54,97	54,19	53,93	54,10	54,27	55,11
27,5	43,93	43,31	42,70	42,36	42,19	42,33	42,19	42,75
30,0	38,33	38,25	37,86	37,56	37,60	37,55	37,43	37,77
32,5	35,36	35,10	34,75	34,64	34,54	34,65	34,54	34,85
35,0	33,43	33,36	33,19	32,93	33,00	33,11	32,83	33,13
37,5	32,91	33,01	33,02	32,75	32,83	32,94	32,66	32,79
40,0	34,83	35,10	35,44	35,33	35,56	35,50	35,22	35,02
42,5	39,91	40,69	41,14	41,33	41,68	41,64	41,17	40,69
45,0	49,01	50,30	51,17	51,62	52,06	52,05	51,38	50,64
47,5	58,63	59,90	60,85	61,22	61,59	61,61	60,74	60,26
50,0	61,26	62,35	63,27	63,45	63,63	63,32	62,44	62,14
52,5	57,41	58,16	58,78	58,99	59,03	58,71	57,67	57,51
55,0	50,41	51,17	51,86	52,13	52,06	51,71	50,70	50,64
57,5	44,98	45,58	46,33	46,64	46,45	46,08	45,25	45,15
60,0	40,61	41,39	42,01	42,36	42,19	41,81	41,00	40,69
62,5	38,68	39,65	40,62	40,99	41,17	40,79	39,64	39,14
65,0	35,71	37,55	38,90	39,96	39,98	39,42	37,94	36,91
67,5	35,18	37,72	39,59	40,64	40,66	39,94	38,11	36,91
70,0	30,63	32,83	34,40	35,15	35,05	33,96	32,49	31,42
72,5	23,45	23,23	23,68	23,84	23,48	22,70	21,78	21,12

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	260,0	262,5	265,0	267,5	270,0	272,5	275,0	277,5
75,0	10,68	10,65	10,89	10,29	9,70	9,22	9,19	9,61
77,5	0,95	0,26	0,21	0,19	0,19	0,19	0,19	0,21
80,0	0,07	0,03	0,02	0,02	0,02	0,02	0,02	0,02
82,5	0,03	0,02	0,01	0,01	0,01	0,01	0,01	0,01
85,0	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
87,5	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	280,0	282,5	285,0	287,5	290,0	292,5	295,0	297,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	302,85	302,90	303,00	303,12	303,34	303,49	304,03	304,38
5,0	284,17	284,28	284,63	285,05	285,15	285,79	286,69	287,23
7,5	265,32	265,82	266,27	267,16	267,48	268,26	269,71	270,60
10,0	239,90	240,76	241,84	243,36	244,27	246,05	248,39	249,99
12,5	202,19	204,02	205,98	208,45	210,66	213,95	217,53	220,88
15,0	156,88	158,94	161,11	163,98	167,18	171,44	176,45	181,38
17,5	123,32	125,17	126,64	128,89	131,32	134,48	138,49	142,75
20,0	91,67	93,66	95,80	99,01	102,56	106,89	111,63	116,07
22,5	74,03	75,38	76,40	78,17	80,04	82,25	85,11	88,70
25,0	56,21	57,97	59,59	61,84	64,27	66,98	70,03	72,93
27,5	43,41	44,39	45,39	47,07	49,03	51,71	54,77	58,21
30,0	38,05	38,47	38,81	39,61	40,36	41,64	43,33	45,91
32,5	35,11	35,51	35,86	36,65	37,25	38,17	39,17	40,02
35,0	33,55	33,95	34,13	34,74	35,34	36,27	36,92	37,77
37,5	33,04	33,25	33,44	33,87	34,30	34,88	35,53	36,03
40,0	35,11	34,99	34,82	34,92	34,99	35,22	35,36	35,51
42,5	40,30	39,86	39,33	38,74	38,29	37,83	37,27	36,73
45,0	49,99	49,09	47,64	46,55	45,22	43,73	42,29	40,54
47,5	59,50	58,67	57,34	55,93	54,22	52,06	49,57	46,77
50,0	61,75	61,10	60,11	59,23	57,86	56,39	54,25	51,80
52,5	57,25	56,93	56,30	55,76	55,09	54,14	52,87	50,93
55,0	50,33	49,96	49,03	48,46	47,99	47,72	47,15	46,26
57,5	44,97	44,39	43,48	42,56	41,75	41,12	40,91	40,36
60,0	40,47	40,04	38,81	37,69	36,90	36,44	36,57	36,21
62,5	38,57	37,78	36,55	35,26	34,30	33,84	33,63	32,57
65,0	35,63	34,64	33,26	32,66	32,57	31,93	31,20	29,97
67,5	35,11	33,25	31,36	29,88	28,93	27,94	26,87	25,99
70,0	29,92	28,20	26,16	25,01	24,08	23,43	23,23	23,21
72,5	20,76	21,41	20,27	18,93	18,02	17,70	16,81	16,28
75,0	9,86	10,44	10,57	11,29	10,57	10,06	10,05	10,22
77,5	0,43	1,04	1,99	2,76	3,05	3,68	3,93	4,78
80,0	0,03	0,10	0,40	0,61	0,88	1,01	1,28	1,77

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	280,0	282,5	285,0	287,5	290,0	292,5	295,0	297,5
82,5	0,02	0,03	0,04	0,05	0,06	0,12	0,12	0,14
85,0	0,01	0,01	0,01	0,01	0,02	0,02	0,03	0,03
87,5	0,01	0,00	0,01	0,01	0,01	0,00	0,00	0,01
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	300,0	302,5	305,0	307,5	310,0	312,5	315,0	317,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	304,64	305,14	305,57	305,86	306,50	306,97	307,41	308,10
5,0	287,76	288,57	289,43	290,18	290,95	292,07	292,60	293,81
7,5	271,57	272,71	273,99	274,84	276,44	277,85	279,01	280,21
10,0	251,90	254,05	255,94	257,78	260,03	262,43	264,19	266,08
12,5	224,39	228,07	231,82	235,38	239,29	243,01	246,07	249,34
15,0	186,79	192,67	198,85	204,71	211,30	217,53	223,07	228,59
17,5	147,80	153,96	160,85	168,35	176,75	185,47	193,79	202,26
20,0	120,64	125,37	130,66	136,64	144,27	152,88	162,07	172,27
22,5	93,83	100,43	107,41	113,90	120,42	127,40	135,23	144,55
25,0	76,25	79,69	83,81	89,60	97,96	106,60	114,32	122,40
27,5	62,32	66,26	70,45	74,44	79,13	85,28	94,28	104,10
30,0	49,27	53,18	57,61	62,38	67,21	72,28	77,38	84,92
32,5	41,43	43,24	46,50	50,66	55,63	61,19	66,22	71,66
35,0	38,82	39,76	40,95	42,56	45,44	49,57	54,72	60,85
37,5	36,73	37,49	38,00	38,08	38,87	41,08	45,14	50,91
40,0	35,69	35,57	35,05	34,81	35,25	36,40	38,51	42,55
42,5	36,04	35,22	34,36	33,60	33,52	33,63	34,51	36,62
45,0	38,82	37,14	35,57	33,95	33,00	32,41	32,41	33,13
47,5	44,22	41,32	38,69	36,19	34,21	32,76	32,07	31,91
50,0	49,09	46,03	42,86	39,63	36,97	34,49	32,59	31,56
52,5	48,74	46,38	43,90	41,36	39,05	36,57	33,98	31,91
55,0	45,09	43,42	41,47	39,46	37,84	36,05	34,33	32,43
57,5	39,52	38,53	37,13	35,84	34,73	33,63	32,59	31,73
60,0	35,16	33,83	32,62	31,71	31,10	30,68	30,32	30,34
62,5	31,51	30,51	29,50	28,78	28,16	27,73	27,36	28,07
65,0	29,07	28,25	27,07	26,02	25,23	24,61	24,22	25,46
67,5	25,24	24,76	24,12	22,92	22,12	21,84	22,13	23,36
70,0	21,93	20,58	19,61	18,95	18,83	19,07	19,52	21,10
72,5	16,02	15,69	15,44	15,51	15,55	15,43	16,03	17,44
75,0	10,62	10,64	10,93	11,03	11,23	11,27	11,68	12,55
77,5	5,43	6,24	6,42	6,62	6,51	6,57	6,62	6,68
80,0	1,79	2,09	2,46	2,69	2,80	2,76	2,65	2,74
82,5	0,18	0,23	0,28	0,39	0,46	0,49	0,53	0,55
85,0	0,03	0,04	0,05	0,06	0,07	0,09	0,10	0,11
87,5	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	300,0	302,5	305,0	307,5	310,0	312,5	315,0	317,5
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	320,0	322,5	325,0	327,5	330,0	332,5	335,0	337,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	308,68	309,39	309,89	310,75	311,47	312,17	313,00	313,88
5,0	294,80	296,21	297,37	298,92	300,37	301,59	303,08	304,84
7,5	281,60	283,55	285,21	287,10	288,93	290,84	292,81	295,27
10,0	268,06	270,72	272,87	275,28	277,31	279,74	282,36	285,54
12,5	252,61	256,32	259,66	263,10	265,86	268,98	272,09	275,80
15,0	233,86	239,50	244,36	249,19	253,55	257,89	261,65	266,23
17,5	210,59	219,04	226,46	233,54	239,68	245,75	251,03	256,67
20,0	183,16	194,58	205,09	215,11	223,72	232,04	239,19	246,23
22,5	155,56	168,40	181,27	194,24	206,03	217,30	226,83	235,80
25,0	131,77	143,25	156,59	171,29	185,91	200,13	212,73	224,15
27,5	113,37	123,65	135,39	149,72	165,45	182,27	197,58	211,98
30,0	95,83	107,00	118,18	131,12	146,55	164,58	182,44	199,63
32,5	78,47	89,83	103,06	115,81	130,42	148,45	168,16	188,15
35,0	67,54	75,61	88,12	102,95	117,41	134,75	155,63	178,07
37,5	57,99	66,08	75,60	90,08	106,31	123,65	145,01	169,55
40,0	48,61	57,06	66,91	78,77	95,90	114,46	136,48	162,24
42,5	41,32	48,73	58,57	70,25	85,67	106,48	129,69	157,20
45,0	36,29	42,66	52,49	63,99	77,87	99,20	123,95	152,33
47,5	33,51	38,85	48,14	59,47	72,67	92,26	119,07	148,16
50,0	32,29	36,77	44,84	55,65	68,68	87,23	115,77	145,90
52,5	31,94	36,07	43,62	53,21	65,73	83,59	113,33	144,85
55,0	32,64	35,90	43,28	52,52	64,17	82,03	113,15	148,16
57,5	32,99	36,59	43,62	53,04	66,08	84,63	114,89	149,72
60,0	32,12	36,94	44,49	53,21	65,56	84,81	112,63	145,38
62,5	30,38	35,03	41,36	49,73	61,74	81,16	107,41	137,20
65,0	28,30	32,78	39,11	47,30	59,66	78,74	102,19	126,77
67,5	26,39	30,52	37,02	45,91	57,75	75,27	96,79	118,07
70,0	23,61	27,40	34,06	42,08	53,07	67,29	83,56	100,34
72,5	19,79	22,37	26,42	31,13	37,29	45,26	53,97	65,56
75,0	12,67	12,66	13,73	15,48	17,86	21,50	27,33	36,52
77,5	6,46	6,23	6,36	6,63	7,15	8,43	10,72	14,12
80,0	2,67	2,65	2,69	2,85	3,02	3,24	3,59	4,02
82,5	0,57	0,59	0,60	0,62	0,65	0,68	0,73	0,77
85,0	0,13	0,14	0,15	0,16	0,17	0,19	0,20	0,21
87,5	0,01	0,01	0,01	0,01	0,02	0,02	0,02	0,02
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	320,0	322,5	325,0	327,5	330,0	332,5	335,0	337,5
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

G/C [cd/klm]	340,0	342,5	345,0	347,5	350,0	352,5	355,0	357,5
0,0	322,05	322,05	322,05	322,05	322,05	322,05	322,05	322,05
2,5	314,60	315,30	316,19	317,05	317,88	318,55	319,42	320,13
5,0	306,27	307,69	309,46	310,83	312,49	314,18	316,10	317,68
7,5	297,43	299,56	301,87	304,10	306,40	308,93	311,72	314,01
10,0	288,23	291,25	294,11	297,03	300,14	303,50	306,81	309,81
12,5	279,04	282,25	285,66	289,26	293,19	297,20	301,38	305,26
15,0	270,03	273,94	277,89	282,01	286,75	291,25	296,30	300,71
17,5	261,18	265,46	270,13	274,76	279,97	285,30	290,51	295,46
20,0	251,99	257,33	262,54	267,69	273,71	279,35	285,08	290,22
22,5	242,97	249,37	255,30	261,30	267,80	273,75	280,18	285,84
25,0	233,26	241,06	248,05	255,09	262,23	268,67	275,62	282,17
27,5	223,55	233,45	242,19	250,43	258,23	265,34	272,99	280,42
30,0	214,36	226,87	237,87	247,84	256,84	264,64	273,17	281,29
32,5	205,86	221,68	235,11	247,15	257,54	266,22	275,27	284,27
35,0	198,92	218,22	234,42	248,70	260,67	270,24	280,00	289,52
37,5	193,54	216,14	235,29	251,64	265,19	275,67	285,78	295,81
40,0	189,03	214,59	236,49	255,09	270,23	282,15	292,79	302,99
42,5	185,91	214,24	238,74	259,23	275,97	288,62	299,80	309,98
45,0	183,14	213,38	239,60	261,82	279,80	293,52	305,58	316,46
47,5	180,36	212,34	240,46	264,41	283,80	298,60	311,36	323,28
50,0	178,80	211,82	241,50	267,00	287,97	304,38	319,60	333,60
52,5	178,11	212,34	244,95	273,04	296,66	315,05	331,69	347,24
55,0	181,75	216,14	249,26	277,35	301,19	320,13	337,12	353,72
57,5	181,23	212,51	245,46	276,83	302,75	323,80	341,85	358,09
60,0	177,07	208,88	242,88	275,11	300,66	319,95	335,19	347,94
62,5	166,49	196,42	227,52	256,99	280,49	297,90	311,54	323,80
65,0	152,44	180,84	209,07	236,62	259,97	275,85	289,11	301,59
67,5	140,65	167,86	193,54	217,29	238,93	254,49	265,81	276,57
70,0	118,45	140,52	161,11	181,22	200,67	218,44	228,14	236,51
72,5	80,12	97,26	113,16	128,41	143,81	155,25	160,15	163,56
75,0	47,00	58,15	69,52	80,08	89,03	95,04	98,82	102,86
77,5	19,16	24,83	29,70	34,16	36,90	37,63	37,37	38,00
80,0	4,75	5,52	6,02	6,32	6,36	6,28	6,22	6,46
82,5	0,79	0,82	0,85	0,91	0,97	1,04	1,11	1,20
85,0	0,23	0,24	0,26	0,28	0,30	0,33	0,35	0,37
87,5	0,02	0,03	0,03	0,03	0,04	0,05	0,06	0,07
90,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
91,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
92,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
93,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
94,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
95,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

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Intensity [cd/klm] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd/klm]	340,0	342,5	345,0	347,5	350,0	352,5	355,0	357,5
100,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
110,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
120,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
130,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
140,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
150,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
160,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
170,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
180,0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

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PHOTOMETRIC RESULTS

Sample Number	339-QL20-S01	**Report Number**	339-QL20-R01
Date:	21/04/2020 10.06.37	**Manufacturer**	RELCO
Flux:	14474 lm	**Efficacy:**	121 lm/W
Av. Voltage:	229,96 V	**Av. Current:**	0,525 A
Av. Power Factor:	0,9903	**Av. Power:**	119,6 W

Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	0,0	2,5	5,0	7,5	10,0	12,5	15,0	17,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4643,7	4653,9	4666,4	4678,9	4686,4	4698,9	4709,0	4719,2
5,0	4621,0	4636,4	4661,4	4681,4	4698,9	4726,5	4751,7	4777,0
7,5	4578,2	4606,4	4636,4	4668,9	4698,9	4739,0	4776,7	4812,2
10,0	4527,7	4561,3	4603,9	4648,9	4693,9	4746,5	4791,8	4837,3
12,5	4469,7	4513,8	4566,5	4621,3	4678,9	4741,5	4791,8	4849,9
15,0	4409,2	4466,2	4526,5	4596,3	4663,9	4734,0	4794,3	4870,0
17,5	4343,6	4413,7	4486,5	4568,8	4648,9	4731,5	4801,8	4895,1
20,0	4280,5	4358,7	4444,1	4538,7	4626,4	4719,0	4806,8	4910,2
22,5	4222,5	4311,1	4409,1	4513,7	4616,4	4721,5	4824,4	4935,3
25,0	4174,6	4276,1	4381,6	4498,7	4611,4	4734,0	4847,0	4970,5
27,5	4162,0	4273,6	4389,1	4513,7	4641,4	4776,5	4902,1	5040,8
30,0	4187,2	4308,6	4434,1	4568,8	4708,9	4854,1	4992,4	5151,4
32,5	4242,7	4371,2	4506,5	4653,9	4804,0	4961,7	5115,3	5292,1
35,0	4323,4	4461,2	4611,4	4769,1	4929,1	5099,3	5270,7	5473,1
37,5	4419,3	4566,3	4726,4	4896,7	5069,2	5251,9	5443,7	5664,0
40,0	4530,2	4683,9	4856,3	5039,4	5226,9	5424,5	5636,8	5870,1
42,5	4636,2	4794,0	4978,7	5177,1	5377,0	5589,7	5822,4	6071,1
45,0	4742,1	4911,6	5116,1	5334,8	5557,2	5797,4	6053,1	6314,9
47,5	4855,6	5049,2	5283,4	5530,1	5779,8	6055,1	6336,4	6616,4
50,0	5037,2	5261,9	5525,7	5800,5	6072,6	6370,3	6657,4	6925,5
52,5	5256,7	5504,6	5800,5	6108,4	6410,4	6713,1	6985,8	7212,0
55,0	5365,2	5627,2	5930,4	6251,1	6555,5	6858,2	7128,8	7345,2
57,5	5403,0	5627,2	5895,5	6198,5	6500,4	6803,2	7078,6	7292,4
60,0	5193,6	5364,5	5618,2	5950,7	6287,8	6600,5	6837,9	6965,7
62,5	4848,1	5004,2	5238,5	5542,6	5834,9	6067,6	6226,1	6282,2
65,0	4515,1	4661,4	4853,8	5099,5	5329,5	5519,6	5659,4	5704,3
67,5	4121,6	4233,5	4381,6	4583,8	4761,5	4916,6	5047,6	5103,7
70,0	3513,7	3603,0	3729,6	3922,9	4093,4	4236,0	4355,5	4427,7
72,5	2408,9	2462,1	2563,0	2731,3	2892,4	3035,0	3187,0	3332,1
75,0	1541,2	1576,3	1641,2	1754,9	1871,6	1974,2	2053,6	2123,4
77,5	581,2	621,8	665,5	733,0	816,4	905,5	1000,2	1089,8
80,0	100,6	115,8	135,1	155,7	180,9	207,7	240,0	261,8
82,5	18,8	20,2	22,1	25,5	28,8	32,5	36,7	44,0
85,0	5,7	6,0	6,3	6,8	7,2	7,7	8,0	8,3
87,5	1,2	1,3	1,5	1,7	1,9	2,1	2,3	2,4
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	0,0	2,5	5,0	7,5	10,0	12,5	15,0	17,5
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	20,0	22,5	25,0	27,5	30,0	32,5	35,0	37,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4729,4	4744,4	4756,5	4764,3	4776,9	4784,2	4791,4	4799,1
5,0	4802,4	4829,9	4851,7	4867,1	4887,4	4904,5	4918,8	4934,3
7,5	4847,7	4885,2	4911,7	4937,4	4967,8	4997,2	5021,3	5049,4
10,0	4885,4	4932,9	4971,8	5010,1	5050,7	5092,5	5126,3	5167,1
12,5	4918,1	4983,2	5036,9	5085,4	5138,6	5185,2	5226,3	5277,2
15,0	4950,9	5028,5	5092,0	5148,1	5211,4	5275,4	5331,2	5402,4
17,5	4986,1	5073,7	5144,6	5220,9	5301,8	5383,2	5458,7	5547,6
20,0	5013,8	5111,5	5199,6	5298,6	5402,3	5498,5	5588,7	5692,8
22,5	5051,5	5166,8	5277,2	5396,5	5515,3	5631,3	5728,7	5835,5
25,0	5101,9	5239,7	5364,9	5501,9	5635,9	5754,1	5851,1	5955,7
27,5	5195,0	5345,3	5482,5	5627,3	5761,5	5879,4	5973,6	6065,8
30,0	5323,4	5491,1	5635,2	5777,8	5907,1	6017,2	6101,1	6173,5
32,5	5487,0	5662,1	5813,0	5953,5	6075,4	6172,6	6231,0	6283,6
35,0	5683,3	5870,8	6015,8	6149,1	6256,2	6330,5	6366,0	6391,3
37,5	5889,7	6081,9	6226,1	6352,4	6439,6	6485,9	6498,5	6511,4
40,0	6108,7	6303,2	6441,3	6555,6	6620,4	6638,7	6633,4	6636,6
42,5	6317,6	6514,4	6659,1	6768,8	6808,8	6804,1	6783,4	6759,3
45,0	6569,3	6778,4	6932,0	7034,8	7052,4	7037,2	6990,9	6927,0
47,5	6873,8	7080,1	7222,4	7308,2	7318,6	7292,8	7243,3	7152,3
50,0	7165,8	7341,6	7450,2	7496,4	7489,4	7458,2	7395,8	7285,0
52,5	7389,8	7500,0	7542,9	7554,1	7524,5	7473,3	7410,8	7317,6
55,0	7520,7	7620,7	7648,0	7659,5	7602,4	7488,3	7325,8	7104,8
57,5	7445,2	7505,0	7487,8	7451,2	7348,7	7172,5	6905,9	6564,0
60,0	7002,2	6941,8	6841,9	6773,8	6695,7	6578,6	6408,5	6186,0
62,5	6257,2	6192,6	6143,4	6124,1	6062,8	5964,6	5833,6	5657,8
65,0	5665,7	5601,7	5525,1	5466,7	5399,8	5280,4	5126,3	4961,8
67,5	5101,9	5088,8	5051,9	5007,6	4877,4	4658,9	4414,0	4153,2
70,0	4470,1	4485,4	4461,1	4372,9	4118,9	3786,8	3504,2	3221,9
72,5	3475,9	3572,7	3544,9	3361,8	3018,9	2736,7	2494,4	2155,5
75,0	2207,4	2247,7	2148,0	1884,1	1650,1	1491,1	1307,2	1171,6
77,5	1160,6	1200,8	1160,6	1046,7	915,2	781,7	631,4	512,5
80,0	295,5	332,1	357,5	352,2	322,7	276,2	225,7	201,5
82,5	51,0	58,0	63,9	66,6	70,9	74,0	74,3	70,0
85,0	8,4	8,4	8,4	8,5	8,6	8,5	8,6	9,0
87,5	2,6	2,7	2,7	2,7	2,7	2,6	2,6	2,6
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	40,0	42,5	45,0	47,5	50,0	52,5	55,0	57,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4809,6	4818,7	4828,3	4840,0	4850,6	4858,8	4865,4	4871,9
5,0	4955,3	4971,0	4990,3	5011,1	5027,2	5041,0	5054,3	5069,9
7,5	5085,9	5110,8	5142,2	5174,6	5196,2	5220,7	5240,6	5262,9
10,0	5213,9	5250,6	5286,7	5330,6	5362,6	5395,3	5427,0	5460,9
12,5	5337,0	5388,0	5441,2	5501,6	5549,3	5600,3	5648,6	5693,9
15,0	5480,2	5550,2	5623,1	5697,8	5761,2	5825,5	5880,3	5937,0
17,5	5640,9	5725,0	5812,4	5896,6	5965,5	6033,0	6091,8	6147,5
20,0	5794,1	5882,3	5971,9	6057,6	6126,9	6192,4	6247,9	6300,4
22,5	5937,3	6019,6	6106,4	6185,9	6250,5	6308,8	6353,7	6388,1
25,0	6055,3	6132,0	6211,1	6281,4	6323,7	6362,0	6383,9	6408,2
27,5	6155,8	6209,4	6270,8	6321,7	6346,4	6382,2	6411,6	6438,3
30,0	6246,2	6276,8	6318,2	6367,0	6396,8	6437,9	6459,5	6473,3
32,5	6324,0	6339,2	6383,0	6437,4	6464,9	6491,0	6497,3	6490,9
35,0	6422,0	6434,1	6467,7	6505,3	6507,8	6511,3	6482,1	6450,8
37,5	6545,1	6541,4	6554,9	6558,2	6512,8	6475,9	6414,2	6353,0
40,0	6648,0	6613,8	6589,7	6553,1	6470,0	6392,3	6288,2	6182,6
42,5	6733,4	6656,3	6572,3	6487,7	6361,5	6245,6	6099,4	5964,6
45,0	6836,4	6676,3	6515,0	6367,0	6190,0	6045,7	5875,2	5698,9
47,5	7002,2	6766,1	6510,0	6256,3	6000,8	5800,2	5583,1	5358,1
50,0	7127,7	6858,5	6544,9	6206,0	5844,4	5534,5	5207,9	4894,5
52,5	7162,9	6866,0	6507,5	6072,7	5526,6	5046,1	4603,5	4235,4
55,0	6821,3	6451,6	6029,2	5524,3	4941,4	4415,9	3966,3	3508,6
57,5	6233,6	5877,3	5486,1	4990,9	4386,5	3849,1	3319,1	2824,4
60,0	5887,0	5467,8	4982,8	4442,5	3844,1	3246,8	2712,2	2313,2
62,5	5394,8	4948,5	4402,3	3856,4	3274,1	2644,5	2243,8	1902,2
65,0	4646,3	4147,1	3630,0	3101,7	2600,6	2108,0	1790,5	1543,8
67,5	3817,5	3335,6	2772,9	2311,8	1899,4	1574,0	1375,0	1225,5
70,0	2815,4	2381,9	1995,6	1677,9	1336,9	1116,0	1022,4	944,8
72,5	1825,9	1533,0	1305,5	1064,1	832,4	721,2	695,1	661,6
75,0	1032,2	861,4	717,5	591,2	522,1	490,9	476,0	443,6
77,5	439,3	373,5	335,1	328,0	329,4	331,3	324,9	300,7
80,0	193,6	189,5	184,1	173,1	161,9	167,0	175,0	168,2
82,5	66,8	67,9	70,2	70,3	68,6	72,3	73,5	70,2
85,0	10,1	12,1	13,8	14,7	16,4	16,9	16,7	16,5
87,5	2,6	2,6	2,6	2,7	2,8	2,9	2,9	3,0
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	60,0	62,5	65,0	67,5	70,0	72,5	75,0	77,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4881,5	4886,5	4890,6	4896,6	4899,1	4904,2	4907,7	4908,7
5,0	5084,0	5096,5	5107,4	5119,3	5129,3	5139,6	5151,4	5153,5
7,5	5284,1	5299,1	5316,6	5332,0	5344,5	5357,4	5375,1	5380,8
10,0	5491,7	5519,2	5545,9	5574,7	5594,7	5617,7	5643,9	5653,1

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	60,0	62,5	65,0	67,5	70,0	72,5	75,0	77,5
12,5	5739,2	5776,7	5814,9	5852,4	5882,4	5910,6	5945,5	5955,4
15,0	5989,3	6031,8	6074,0	6120,1	6152,7	6181,0	6221,9	6230,2
17,5	6199,4	6246,9	6285,8	6332,8	6365,3	6391,3	6433,0	6440,0
20,0	6349,4	6391,9	6427,8	6470,4	6500,4	6519,0	6551,1	6545,0
22,5	6424,4	6451,9	6475,1	6513,0	6540,5	6564,0	6601,4	6599,9
25,0	6436,9	6466,9	6497,6	6543,0	6575,5	6604,1	6644,1	6642,4
27,5	6464,4	6484,5	6507,5	6545,5	6565,5	6584,0	6621,5	6619,9
30,0	6484,5	6489,5	6490,1	6510,5	6513,0	6511,4	6536,0	6520,0
32,5	6477,0	6456,9	6425,3	6412,9	6387,8	6368,7	6380,2	6357,6
35,0	6416,9	6361,9	6295,8	6262,7	6217,7	6173,5	6164,1	6115,3
37,5	6284,4	6211,9	6126,3	6062,6	5980,0	5893,1	5842,5	5760,6
40,0	6094,3	6001,8	5892,2	5789,8	5659,7	5527,6	5435,4	5323,4
42,5	5836,8	5711,7	5565,8	5427,0	5259,4	5092,0	4957,9	4811,3
45,0	5521,7	5341,6	5152,2	4971,7	4751,5	4506,2	4259,3	3984,4
47,5	5134,0	4904,0	4636,5	4343,6	3990,8	3620,0	3274,3	2975,2
50,0	4581,4	4233,8	3851,7	3510,4	3167,7	2851,4	2588,3	2383,2
52,5	3846,2	3431,0	3027,0	2737,3	2507,1	2295,7	2095,7	1918,5
55,0	3070,9	2718,3	2409,2	2169,3	1999,2	1850,0	1708,8	1581,3
57,5	2450,7	2200,7	1978,2	1789,0	1643,9	1537,1	1442,4	1354,0
60,0	2003,1	1823,0	1654,3	1498,8	1378,7	1301,8	1238,9	1179,1
62,5	1670,5	1528,0	1392,7	1268,6	1168,5	1114,0	1073,0	1029,2
65,0	1385,4	1267,9	1168,5	1075,9	993,3	948,8	914,7	874,3
67,5	1112,8	1037,8	966,7	898,3	828,2	788,6	761,4	721,9
70,0	870,3	797,7	737,5	685,6	633,0	600,8	580,5	549,6
72,5	627,7	600,2	563,1	520,4	477,9	450,6	432,2	404,7
75,0	425,1	417,6	403,6	375,3	342,8	322,9	299,0	279,8
77,5	280,3	264,8	247,4	214,4	172,1	150,2	131,9	115,4
80,0	159,5	147,8	123,6	105,1	91,1	79,6	72,1	63,0
82,5	64,5	56,9	54,6	47,4	39,3	32,8	29,8	27,4
85,0	15,0	14,5	14,2	12,7	10,7	9,6	9,1	8,5
87,5	3,0	3,1	3,1	3,2	3,2	3,3	3,3	3,3
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	80,0	82,5	85,0	87,5	90,0	92,5	95,0	97,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4916,3	4918,4	4923,1	4922,9	4921,9	4920,2	4918,5	4919,5
5,0	5166,3	5168,0	5174,9	5171,7	5174,8	5171,4	5168,0	5167,5
7,5	5396,2	5402,5	5411,7	5407,8	5412,1	5409,7	5407,3	5402,9
10,0	5676,2	5689,5	5698,4	5699,8	5703,6	5701,8	5695,0	5688,8
12,5	5986,1	6003,9	6015,0	6017,2	6020,9	6019,6	6013,2	6005,2
15,0	6261,0	6278,4	6291,6	6293,9	6296,9	6298,9	6290,7	6286,1
17,5	6471,0	6490,5	6503,5	6504,6	6505,8	6509,1	6502,0	6496,1
20,0	6571,0	6582,9	6595,8	6593,5	6593,6	6593,6	6593,7	6592,3
22,5	6628,4	6642,8	6655,6	6657,0	6650,3	6652,6	6649,7	6650,5

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	80,0	82,5	85,0	87,5	90,0	92,5	95,0	97,5
25,0	6670,9	6690,2	6707,9	6707,7	6701,9	6703,8	6703,2	6706,1
27,5	6653,4	6675,2	6698,0	6702,7	6691,6	6696,1	6698,1	6698,6
30,0	6546,0	6570,4	6598,3	6608,7	6603,9	6611,6	6606,4	6607,5
32,5	6376,0	6393,2	6411,3	6418,3	6413,0	6421,9	6420,6	6420,2
35,0	6111,1	6113,7	6124,6	6121,3	6106,0	6111,8	6117,6	6131,7
37,5	5728,7	5712,0	5700,9	5687,1	5667,5	5673,6	5692,5	5724,3
40,0	5266,3	5230,4	5207,3	5197,1	5177,3	5186,7	5198,6	5228,3
42,5	4718,9	4651,4	4596,6	4564,9	4535,0	4543,5	4572,3	4623,4
45,0	3759,1	3585,9	3457,4	3386,9	3348,4	3359,6	3414,0	3512,5
47,5	2776,8	2655,1	2582,5	2556,7	2535,8	2542,1	2568,7	2624,3
50,0	2237,0	2141,1	2078,9	2056,5	2045,7	2050,1	2072,3	2118,1
52,5	1789,6	1699,4	1645,2	1627,4	1622,6	1629,8	1649,7	1685,4
55,0	1492,1	1432,4	1395,9	1388,8	1390,4	1391,5	1402,7	1422,2
57,5	1294,7	1247,7	1218,9	1216,1	1215,0	1214,7	1224,5	1240,0
60,0	1137,2	1103,0	1076,9	1074,0	1078,3	1076,3	1084,5	1098,3
62,5	994,8	965,7	937,3	931,8	933,8	935,4	944,5	959,1
65,0	842,3	808,5	780,2	771,8	773,9	773,9	784,1	802,2
67,5	687,3	651,3	618,2	604,3	606,2	607,3	621,2	645,3
70,0	519,9	491,6	466,1	457,0	461,8	463,8	468,4	485,9
72,5	382,4	359,3	339,0	332,6	337,9	335,7	343,7	359,3
75,0	269,9	259,5	251,8	253,9	260,5	258,8	262,2	268,2
77,5	101,2	90,8	85,3	84,8	87,2	87,4	88,8	92,4
80,0	55,5	51,9	49,4	49,3	51,1	51,3	51,9	53,4
82,5	25,6	24,7	23,7	23,6	24,1	24,6	24,7	25,4
85,0	8,3	8,3	8,1	8,2	8,4	8,5	8,6	8,8
87,5	3,3	3,3	3,3	3,4	3,4	3,4	3,4	3,5
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	100,0	102,5	105,0	107,5	110,0	112,5	115,0	117,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4918,6	4918,4	4914,9	4910,2	4907,4	4901,5	4895,6	4891,7
5,0	5163,2	5163,0	5155,9	5146,4	5140,8	5129,0	5119,8	5112,0
7,5	5397,9	5397,5	5386,8	5375,1	5366,8	5354,1	5339,1	5324,8
10,0	5680,1	5677,0	5657,9	5633,9	5617,8	5594,2	5568,3	5542,6
12,5	5992,2	5991,5	5966,7	5937,9	5916,5	5884,3	5849,8	5810,5
15,0	6271,8	6270,9	6242,8	6211,9	6187,6	6151,9	6113,9	6070,8
17,5	6486,5	6485,5	6458,7	6425,4	6398,4	6361,9	6325,7	6283,6
20,0	6588,9	6595,3	6574,2	6548,6	6529,0	6499,5	6470,2	6431,3
22,5	6646,3	6650,2	6626,9	6591,3	6569,1	6539,5	6512,5	6483,9
25,0	6706,2	6705,1	6674,6	6636,5	6611,8	6577,0	6539,9	6503,9
27,5	6696,2	6690,2	6662,0	6624,0	6599,3	6564,5	6532,4	6508,9
30,0	6598,9	6590,3	6564,1	6536,0	6518,9	6497,0	6485,1	6476,4
32,5	6416,6	6413,2	6398,4	6382,7	6380,9	6371,9	6383,0	6411,3
35,0	6149,5	6171,1	6162,5	6156,6	6172,5	6189,4	6226,0	6286,1

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	100,0	102,5	105,0	107,5	110,0	112,5	115,0	117,5
37,5	5745,0	5769,4	5788,5	5819,8	5881,4	5941,8	6019,2	6113,4
40,0	5253,1	5295,2	5341,7	5405,2	5507,3	5614,2	5742,7	5880,6
42,5	4676,4	4746,2	4827,1	4932,8	5080,6	5229,1	5393,9	5567,6
45,0	3637,7	3810,5	4026,3	4259,3	4508,3	4736,4	4965,4	5184,6
47,5	2694,0	2817,3	3014,7	3291,9	3637,3	3998,7	4355,0	4681,4
50,0	2174,7	2268,3	2409,8	2608,4	2874,2	3203,5	3595,1	3993,0
52,5	1730,2	1819,1	1952,9	2136,0	2374,6	2623,3	2882,5	3199,4
55,0	1450,6	1509,7	1606,5	1738,9	1907,7	2090,6	2292,1	2556,0
57,5	1260,9	1307,6	1378,1	1470,0	1588,9	1718,0	1878,5	2080,4
60,0	1113,5	1147,9	1194,8	1261,5	1348,0	1440,4	1569,6	1717,4
62,5	976,2	1008,1	1041,7	1090,6	1152,2	1215,4	1313,0	1422,0
65,0	823,9	855,9	893,6	937,3	984,0	1027,8	1093,7	1174,1
67,5	671,6	703,7	745,5	786,5	820,8	857,8	904,4	958,8
70,0	504,3	531,5	567,3	600,6	625,0	647,7	675,2	731,0
72,5	369,5	391,8	414,2	442,3	464,4	487,6	515,7	550,8
75,0	274,6	287,0	303,7	324,2	341,4	355,1	366,2	388,0
77,5	99,9	112,5	128,0	146,5	166,4	195,3	227,7	251,8
80,0	55,7	61,6	70,8	79,9	87,1	97,8	111,6	135,9
82,5	26,3	27,7	29,9	32,5	36,6	43,4	50,4	59,1
85,0	8,8	8,8	9,3	10,1	11,2	12,7	14,7	16,5
87,5	3,5	3,5	3,6	3,6	3,6	3,6	3,6	3,6
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	120,0	122,5	125,0	127,5	130,0	132,5	135,0	137,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4884,8	4881,5	4876,2	4870,1	4862,2	4854,8	4846,6	4838,5
5,0	5098,2	5086,5	5076,1	5061,5	5048,2	5033,3	5016,9	5000,9
7,5	5309,0	5291,6	5273,4	5250,3	5229,2	5206,9	5179,9	5153,4
10,0	5519,9	5489,2	5460,8	5424,2	5395,3	5368,1	5333,0	5296,0
12,5	5778,4	5734,2	5693,1	5635,4	5593,7	5544,1	5488,5	5436,3
15,0	6039,5	5986,8	5935,4	5866,5	5811,9	5752,4	5678,6	5606,0
17,5	6252,9	6201,9	6147,8	6075,2	6015,2	5953,2	5866,3	5778,2
20,0	6406,0	6351,9	6300,1	6229,3	6171,4	6109,4	6019,3	5933,1
22,5	6471,2	6434,4	6387,6	6326,2	6273,1	6216,0	6128,0	6043,8
25,0	6488,8	6446,9	6407,6	6361,0	6325,1	6285,5	6207,0	6127,5
27,5	6496,3	6456,9	6417,5	6368,4	6335,0	6312,7	6253,9	6191,4
30,0	6481,3	6451,9	6427,5	6388,3	6357,4	6330,1	6268,7	6216,0
32,5	6446,1	6436,9	6430,0	6405,7	6384,6	6369,8	6318,1	6262,8
35,0	6353,3	6389,4	6415,1	6415,6	6414,4	6416,9	6379,8	6334,1
37,5	6207,7	6269,4	6337,6	6378,4	6414,4	6456,5	6444,0	6412,8
40,0	6004,4	6084,3	6175,2	6259,1	6345,0	6434,2	6466,2	6466,9
42,5	5713,2	5816,8	5942,9	6065,3	6191,2	6320,2	6409,4	6471,8
45,0	5361,7	5506,7	5665,6	5806,9	5958,2	6134,2	6286,0	6417,7
47,5	4955,1	5161,6	5328,4	5481,4	5675,5	5928,4	6169,9	6390,7

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	120,0	122,5	125,0	127,5	130,0	132,5	135,0	137,5
50,0	4352,7	4638,9	4891,2	5143,4	5432,5	5787,1	6128,0	6422,7
52,5	3567,0	3913,7	4269,2	4661,4	5135,0	5635,8	6046,5	6358,7
55,0	2844,0	3166,0	3589,7	4050,2	4530,0	5018,4	5483,6	5935,6
57,5	2274,2	2518,3	2925,2	3473,7	3930,0	4378,7	4896,0	5369,8
60,0	1860,0	2073,1	2423,1	2832,6	3315,1	3781,2	4362,7	4863,1
62,5	1556,3	1750,5	2040,9	2318,3	2680,3	3277,9	3770,1	4216,2
65,0	1297,8	1477,9	1663,7	1873,5	2159,6	2650,6	3091,1	3542,2
67,5	1061,8	1200,4	1309,0	1436,2	1648,8	2058,0	2444,3	2932,1
70,0	838,4	927,8	981,7	1068,4	1210,0	1529,8	1849,3	2236,0
72,5	605,0	640,2	669,5	710,6	823,2	996,7	1249,3	1495,6
75,0	419,2	440,1	462,1	499,4	525,6	577,7	701,2	860,9
77,5	283,7	303,6	321,0	344,1	345,4	346,4	353,8	396,8
80,0	163,9	173,3	180,9	186,9	179,0	181,7	192,6	205,6
82,5	64,4	72,8	78,6	84,8	83,9	82,7	86,5	92,0
85,0	17,2	19,0	21,2	22,0	20,7	20,6	20,5	19,4
87,5	3,6	3,6	3,5	3,5	3,5	3,5	3,5	3,4
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	140,0	142,5	145,0	147,5	150,0	152,5	155,0	157,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4830,0	4818,5	4811,4	4796,1	4785,9	4776,1	4764,0	4759,4
5,0	4986,2	4968,2	4951,3	4925,8	4907,9	4885,9	4866,7	4849,8
7,5	5127,5	5097,9	5068,8	5025,5	4997,6	4968,2	4939,3	4915,1
10,0	5266,4	5232,5	5191,3	5135,3	5094,7	5053,0	5011,9	4972,8
12,5	5392,8	5342,3	5288,8	5225,1	5176,8	5130,3	5077,0	5025,6
15,0	5546,6	5474,5	5398,7	5314,8	5251,5	5192,6	5134,6	5078,3
17,5	5710,2	5624,1	5528,7	5424,6	5338,7	5260,0	5189,6	5123,5
20,0	5859,0	5761,3	5656,2	5534,3	5433,3	5334,8	5244,7	5156,2
22,5	5970,6	5878,5	5768,6	5639,1	5523,0	5409,6	5299,8	5191,3
25,0	6059,8	5973,3	5868,6	5736,3	5610,1	5489,4	5367,4	5244,1
27,5	6136,7	6058,1	5956,1	5831,1	5709,7	5584,2	5457,5	5321,9
30,0	6186,3	6127,9	6038,6	5925,9	5814,3	5696,4	5570,2	5427,4
32,5	6240,8	6205,2	6136,1	6035,6	5933,8	5828,6	5705,3	5558,0
35,0	6322,6	6290,0	6238,5	6157,8	6068,3	5965,8	5850,5	5703,7
37,5	6416,9	6399,8	6356,0	6292,5	6217,7	6127,9	6013,3	5866,9
40,0	6496,2	6499,5	6473,5	6434,7	6382,0	6297,5	6186,0	6040,2
42,5	6555,7	6606,8	6615,9	6591,8	6553,9	6489,6	6376,3	6221,1
45,0	6580,5	6694,1	6733,4	6716,5	6675,9	6621,7	6524,0	6376,8
47,5	6627,6	6788,8	6858,4	6861,2	6835,2	6786,3	6719,2	6595,3
50,0	6687,1	6858,7	6950,9	6988,4	6992,1	6980,9	6977,1	6921,8
52,5	6622,7	6803,8	6915,9	6995,8	7066,8	7148,0	7222,4	7238,2
55,0	6364,8	6689,1	6905,9	7058,2	7181,4	7297,6	7370,1	7381,4
57,5	5792,0	6180,3	6543,5	6816,3	7034,4	7215,3	7307,5	7311,1
60,0	5278,8	5619,1	5898,6	6120,4	6284,9	6469,6	6661,7	6801,2

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	140,0	142,5	145,0	147,5	150,0	152,5	155,0	157,5
62,5	4624,2	5013,1	5361,2	5601,7	5772,0	5905,9	6008,3	6100,5
65,0	3996,9	4459,4	4868,9	5135,3	5311,3	5439,6	5565,1	5676,1
67,5	3456,4	3898,2	4331,5	4708,8	4937,8	5090,4	5182,1	5216,5
70,0	2692,7	3120,1	3479,2	3920,7	4312,8	4584,1	4721,5	4739,3
72,5	1755,5	2065,1	2451,9	2833,3	3301,8	3671,3	3875,3	3905,4
75,0	1033,9	1247,0	1464,7	1720,9	1949,7	2197,3	2528,5	2725,0
77,5	462,7	563,9	735,6	915,1	1096,9	1268,7	1474,8	1680,2
80,0	227,9	246,7	276,2	346,9	427,0	495,6	575,8	617,1
82,5	90,5	91,4	96,2	104,8	111,0	113,4	118,7	115,0
85,0	18,6	17,9	15,6	13,3	12,0	11,3	10,8	10,5
87,5	3,4	3,4	3,3	3,3	3,2	3,2	3,3	3,3
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	160,0	162,5	165,0	167,5	170,0	172,5	175,0	177,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4746,6	4736,4	4728,7	4713,7	4701,3	4689,0	4676,7	4664,0
5,0	4829,2	4808,9	4786,0	4758,5	4738,8	4711,7	4686,9	4664,0
7,5	4881,8	4856,4	4823,4	4785,8	4751,2	4714,2	4679,2	4643,4
10,0	4926,9	4888,9	4848,4	4800,8	4753,7	4706,6	4653,8	4607,3
12,5	4964,5	4913,8	4860,8	4803,3	4746,2	4686,5	4623,2	4566,1
15,0	5004,6	4938,8	4870,8	4800,8	4733,8	4658,9	4587,6	4519,8
17,5	5039,6	4966,3	4883,3	4798,3	4716,3	4631,2	4549,4	4465,7
20,0	5062,2	4981,3	4888,2	4783,4	4691,3	4593,6	4501,0	4406,4
22,5	5077,2	4983,8	4885,7	4770,9	4658,9	4553,3	4452,6	4347,2
25,0	5107,3	4996,3	4890,7	4765,9	4638,9	4520,7	4409,4	4298,3
27,5	5167,4	5038,8	4918,2	4788,3	4651,4	4518,2	4396,6	4277,7
30,0	5257,5	5108,8	4970,5	4830,6	4681,4	4538,3	4404,3	4275,1
32,5	5377,8	5213,8	5057,7	4902,8	4746,2	4588,5	4442,5	4303,4
35,0	5518,0	5338,7	5162,4	4994,9	4828,6	4656,4	4498,5	4352,4
37,5	5680,9	5491,2	5297,1	5111,9	4933,4	4749,4	4577,4	4421,9
40,0	5851,2	5658,7	5449,1	5243,8	5053,2	4854,9	4671,6	4506,9
42,5	6029,0	5831,1	5611,1	5390,6	5185,4	4975,5	4781,1	4607,3
45,0	6181,8	5986,1	5763,2	5525,0	5302,7	5083,6	4880,3	4692,3
47,5	6419,8	6231,0	6012,5	5758,9	5499,9	5251,9	5020,4	4808,2
50,0	6788,0	6613,4	6393,9	6132,2	5846,7	5558,5	5290,2	5037,4
52,5	7156,2	7015,8	6802,7	6535,4	6231,0	5902,8	5588,1	5289,8
55,0	7291,4	7138,3	6927,3	6674,8	6368,3	6041,0	5720,5	5416,0
57,5	7238,8	7115,8	6929,8	6709,6	6438,1	6134,0	5819,8	5495,8
60,0	6873,1	6843,4	6712,9	6503,1	6233,5	5937,9	5669,6	5410,8
62,5	6204,4	6268,5	6249,3	6134,7	5951,5	5686,7	5402,2	5140,4
65,0	5753,5	5831,1	5838,0	5754,0	5612,2	5395,2	5152,7	4913,8
67,5	5240,0	5273,8	5249,7	5149,2	5013,3	4829,8	4635,9	4460,5
70,0	4714,0	4681,4	4619,0	4504,6	4357,0	4173,9	3996,9	3850,2
72,5	3847,3	3749,1	3636,9	3501,7	3343,8	3193,9	3055,0	2938,5

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	160,0	162,5	165,0	167,5	170,0	172,5	175,0	177,5
75,0	2762,8	2671,9	2540,1	2409,1	2310,7	2213,9	2095,2	1970,2
77,5	1681,2	1593,9	1508,1	1430,5	1360,0	1262,7	1161,4	1069,5
80,0	591,6	538,1	482,1	430,3	385,3	341,0	300,2	261,1
82,5	102,0	89,6	78,0	70,6	66,5	58,2	49,9	42,2
85,0	10,5	10,3	10,0	9,7	9,3	8,8	8,4	8,1
87,5	3,3	3,3	3,2	3,1	2,9	2,8	2,6	2,4
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	180,0	182,5	185,0	187,5	190,0	192,5	195,0	197,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4653,6	4643,3	4638,4	4625,9	4613,5	4598,8	4589,0	4579,0
5,0	4643,2	4622,6	4600,0	4575,1	4550,5	4523,6	4506,7	4481,6
7,5	4612,1	4578,6	4543,8	4509,2	4472,3	4433,5	4401,9	4364,3
10,0	4565,3	4521,7	4477,3	4433,0	4384,1	4340,8	4297,1	4246,9
12,5	4518,6	4462,2	4405,7	4346,8	4293,3	4233,1	4179,8	4122,1
15,0	4461,4	4397,5	4329,0	4260,5	4200,1	4130,4	4065,0	3999,8
17,5	4393,9	4319,9	4242,1	4169,1	4099,2	4022,7	3950,2	3877,4
20,0	4318,6	4237,2	4155,1	4070,2	3993,3	3910,0	3830,4	3752,6
22,5	4251,1	4159,6	4068,2	3973,7	3890,0	3799,8	3715,6	3627,8
25,0	4194,0	4089,7	3988,9	3887,5	3799,2	3704,6	3605,9	3500,4
27,5	4165,4	4048,3	3937,8	3829,1	3731,1	3631,9	3513,5	3383,1
30,0	4155,0	4030,2	3912,2	3793,6	3688,3	3571,8	3433,7	3280,7
32,5	4175,8	4040,6	3912,2	3788,5	3673,2	3539,3	3378,8	3190,8
35,0	4217,3	4074,2	3940,3	3813,9	3688,3	3534,3	3346,3	3120,9
37,5	4279,7	4128,5	3988,9	3862,1	3726,1	3556,8	3336,3	3073,5
40,0	4357,6	4201,0	4058,0	3933,1	3791,6	3604,4	3351,3	3051,0
42,5	4448,5	4291,5	4144,9	4016,9	3869,8	3667,0	3386,3	3043,5
45,0	4534,2	4371,7	4221,6	4087,9	3930,3	3719,6	3418,7	3056,0
47,5	4627,6	4451,9	4290,6	4146,3	3983,2	3759,7	3446,1	3066,0
50,0	4812,0	4596,7	4403,1	4235,1	4053,8	3814,8	3486,1	3096,0
52,5	5022,4	4764,9	4541,2	4344,2	4137,0	3872,4	3526,0	3130,9
55,0	5139,2	4870,9	4633,3	4422,9	4200,1	3920,0	3555,9	3153,4
57,5	5199,0	4917,5	4664,0	4435,6	4197,5	3915,0	3551,0	3158,4
60,0	5170,4	4930,4	4692,1	4445,7	4172,3	3864,9	3493,6	3115,9
62,5	4913,3	4715,7	4525,9	4318,8	4084,1	3787,2	3393,7	3021,0
65,0	4682,2	4464,8	4247,2	4022,0	3781,6	3474,1	3076,8	2748,9
67,5	4292,6	4120,8	3955,7	3765,7	3537,0	3223,7	2857,2	2574,1
70,0	3731,7	3608,6	3469,8	3316,5	3090,8	2777,8	2460,5	2234,6
72,5	2879,9	2804,1	2705,3	2573,0	2347,1	2053,9	1756,8	1575,4
75,0	1898,3	1844,4	1807,8	1753,4	1626,1	1390,2	1155,4	971,2
77,5	1012,3	954,8	911,8	888,9	855,1	769,5	628,3	501,3
80,0	224,9	198,4	191,0	195,4	199,7	191,1	166,2	134,1
82,5	35,3	30,4	27,3	25,1	23,5	22,1	20,4	18,9
85,0	7,7	7,2	6,8	6,3	5,9	5,6	5,2	4,8

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	180,0	182,5	185,0	187,5	190,0	192,5	195,0	197,5
87,5	2,2	2,0	1,8	1,6	1,5	1,3	1,2	1,1
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	200,0	202,5	205,0	207,5	210,0	212,5	215,0	217,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4566,3	4556,2	4543,6	4536,0	4523,6	4512,7	4502,3	4495,2
5,0	4456,1	4433,5	4408,1	4393,1	4368,2	4346,4	4325,6	4311,4
7,5	4328,4	4298,2	4262,7	4237,6	4210,3	4180,1	4151,3	4130,0
10,0	4200,8	4157,9	4114,8	4082,2	4047,4	4013,8	3979,6	3948,7
12,5	4068,1	4020,2	3969,3	3926,7	3882,0	3845,0	3792,8	3749,8
15,0	3935,4	3882,4	3823,9	3768,7	3711,6	3656,1	3585,7	3520,6
17,5	3812,7	3747,2	3671,0	3593,2	3513,6	3431,8	3333,2	3233,5
20,0	3677,6	3594,4	3500,4	3400,1	3290,6	3177,3	3042,8	2901,1
22,5	3532,4	3431,6	3312,4	3182,0	3034,9	2885,0	2717,0	2543,5
25,0	3384,6	3253,7	3101,8	2931,2	2749,2	2562,5	2368,6	2185,9
27,5	3242,0	3075,9	2886,1	2683,0	2468,5	2260,2	2060,5	1881,2
30,0	3101,8	2903,0	2675,5	2439,8	2205,4	1988,0	1797,9	1629,4
32,5	2976,6	2735,2	2477,4	2219,1	1972,3	1761,3	1573,2	1395,1
35,0	2866,4	2587,4	2301,9	2023,5	1769,3	1559,7	1361,0	1168,5
37,5	2776,3	2464,7	2148,9	1855,5	1598,9	1375,7	1164,1	1007,3
40,0	2711,2	2362,0	2021,0	1715,1	1448,5	1206,9	1017,6	876,4
42,5	2671,2	2291,9	1918,2	1592,3	1305,7	1068,3	898,9	753,0
45,0	2663,7	2244,3	1838,0	1489,4	1180,4	960,0	800,5	659,8
47,5	2648,6	2194,2	1765,3	1399,2	1092,7	889,4	732,3	591,8
50,0	2656,1	2166,6	1715,1	1323,9	1035,0	839,1	681,8	546,5
52,5	2673,7	2166,6	1690,0	1283,8	999,9	803,8	651,5	528,8
55,0	2683,7	2166,6	1665,0	1256,2	972,4	783,6	643,9	531,4
57,5	2708,7	2196,7	1667,5	1246,2	954,8	776,1	641,4	533,9
60,0	2703,7	2214,2	1702,6	1298,9	999,9	801,3	651,5	533,9
62,5	2623,6	2161,6	1667,5	1266,3	957,3	755,9	621,2	513,7
65,0	2428,3	2023,9	1589,7	1216,1	909,7	710,5	583,3	488,6
67,5	2268,1	1901,1	1522,0	1181,0	892,2	690,4	555,5	460,9
70,0	1992,7	1710,8	1394,2	1088,2	842,1	660,2	527,8	423,1
72,5	1409,4	1227,3	1010,5	814,9	654,1	519,1	436,8	365,2
75,0	828,6	691,3	544,1	431,3	355,9	302,4	257,6	221,6
77,5	392,5	291,6	219,2	168,8	136,3	119,7	112,4	107,3
80,0	101,6	77,4	65,2	58,4	53,6	51,4	50,0	48,1
82,5	17,4	16,0	15,0	14,1	13,4	12,9	12,5	12,0
85,0	4,5	4,1	3,9	3,6	3,3	3,0	2,8	2,5
87,5	1,0	0,9	0,8	0,7	0,6	0,5	0,5	0,4
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	200,0	202,5	205,0	207,5	210,0	212,5	215,0	217,5
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	220,0	222,5	225,0	227,5	230,0	232,5	235,0	237,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4484,8	4471,1	4462,4	4455,3	4451,0	4439,4	4431,4	4426,8
5,0	4293,1	4270,6	4258,3	4241,6	4228,0	4212,4	4196,3	4192,2
7,5	4104,0	4075,2	4056,7	4035,5	4017,6	3993,0	3973,8	3965,2
10,0	3917,3	3879,9	3850,1	3819,2	3786,9	3750,8	3718,5	3697,8
12,5	3702,9	3648,9	3600,0	3549,5	3495,4	3438,0	3382,3	3339,7
15,0	3448,1	3367,3	3286,2	3198,4	3112,7	3016,8	2929,8	2850,3
17,5	3125,3	3006,9	2890,7	2765,8	2641,2	2514,8	2404,0	2308,0
20,0	2754,5	2603,5	2454,4	2307,8	2177,3	2055,8	1961,6	1881,7
22,5	2373,6	2207,6	2061,5	1931,2	1820,0	1717,8	1622,9	1521,0
25,0	2017,9	1872,7	1747,7	1625,9	1495,5	1364,6	1266,5	1193,1
27,5	1725,3	1591,0	1451,7	1307,8	1196,4	1114,9	1051,6	991,3
30,0	1470,6	1306,8	1168,5	1073,8	1001,2	928,2	862,0	794,6
32,5	1215,8	1081,0	987,4	900,7	816,2	741,6	680,0	635,6
35,0	1026,6	926,2	831,8	737,9	659,0	602,9	573,8	557,5
37,5	885,4	779,0	686,3	613,2	562,7	534,7	520,7	512,0
40,0	749,2	649,6	576,6	529,2	506,9	491,9	487,9	486,8
42,5	633,1	548,1	500,1	478,4	468,9	469,2	475,2	484,3
45,0	544,8	474,5	454,1	450,4	456,3	466,6	482,8	502,0
47,5	481,8	436,5	433,7	445,3	458,8	481,8	513,2	547,4
50,0	451,5	426,3	433,7	452,9	481,6	519,6	561,2	610,4
52,5	446,5	428,8	446,5	478,4	514,6	552,4	591,5	630,6
55,0	449,0	436,5	461,8	491,1	514,6	539,8	568,8	600,3
57,5	456,6	436,5	449,0	465,6	481,6	499,4	518,2	539,8
60,0	451,5	418,7	421,0	430,0	441,0	449,0	460,1	474,2
62,5	428,8	390,8	385,3	391,8	398,0	406,1	414,6	428,8
65,0	408,6	365,4	349,5	351,1	359,9	368,3	379,2	396,0
67,5	385,9	340,0	318,9	320,6	327,0	335,5	346,3	358,2
70,0	345,6	302,0	285,8	287,5	289,0	287,6	293,2	302,7
72,5	305,2	256,3	234,7	231,5	238,3	244,7	245,2	239,6
75,0	201,8	187,8	181,1	173,0	177,4	176,6	174,4	171,5
77,5	104,2	104,8	105,9	104,3	106,5	107,2	109,5	104,2
80,0	46,9	48,0	49,2	48,3	49,4	48,9	46,3	41,6
82,5	11,9	11,5	11,0	10,6	10,0	9,0	8,1	6,9
85,0	2,3	2,1	1,9	1,7	1,5	1,2	1,0	0,8
87,5	0,4	0,3	0,3	0,2	0,1	0,1	0,1	0,1
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	220,0	222,5	225,0	227,5	230,0	232,5	235,0	237,5
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	240,0	242,5	245,0	247,5	250,0	252,5	255,0	257,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4419,1	4412,8	4406,4	4402,9	4398,7	4392,0	4387,2	4383,6
5,0	4176,8	4166,6	4156,4	4146,8	4141,0	4130,2	4123,1	4118,5
7,5	3944,7	3928,0	3914,0	3898,3	3888,3	3875,8	3861,4	3850,8
10,0	3664,5	3634,2	3608,4	3579,5	3558,0	3536,6	3511,8	3492,3
12,5	3283,4	3227,3	3179,1	3127,7	3085,1	3045,3	3003,6	2967,0
15,0	2766,1	2682,3	2605,9	2535,3	2472,1	2416,7	2364,7	2323,1
17,5	2213,3	2129,8	2058,0	1995,6	1946,6	1903,0	1866,6	1835,8
20,0	1809,5	1738,0	1669,1	1599,0	1531,3	1471,5	1421,3	1378,7
22,5	1423,4	1336,1	1270,1	1222,5	1186,0	1152,3	1127,0	1103,5
25,0	1138,2	1085,0	1040,4	996,5	955,8	915,3	883,0	853,5
27,5	933,8	871,5	815,6	765,6	723,1	688,4	666,6	646,4
30,0	731,9	678,1	638,9	610,0	590,5	573,6	566,0	558,1
32,5	603,2	580,2	565,6	552,2	540,5	528,7	523,2	515,1
35,0	552,7	542,5	532,8	519,6	507,9	496,3	493,1	487,4
37,5	509,8	507,3	507,6	497,0	487,9	481,4	480,5	477,3
40,0	487,1	487,2	494,9	494,5	492,9	493,8	498,1	500,0
42,5	494,7	499,8	512,6	524,6	535,4	541,2	553,4	565,6
45,0	524,9	545,0	570,7	592,4	618,0	641,0	664,1	686,8
47,5	588,0	622,9	666,6	702,9	740,6	770,7	802,5	828,2
50,0	658,7	703,2	747,4	780,7	808,2	830,5	852,8	871,2
52,5	668,8	703,2	739,9	763,1	783,2	793,1	807,5	818,1
55,0	630,9	650,5	671,7	680,3	690,6	695,8	704,4	717,1
57,5	560,3	570,1	583,3	587,4	595,5	606,1	621,4	636,3
60,0	494,7	509,8	522,7	524,6	530,4	541,2	555,9	573,2
62,5	444,2	462,1	482,3	487,0	495,4	506,3	523,2	540,4
65,0	413,9	427,0	452,0	464,4	475,4	481,4	485,5	494,9
67,5	365,9	374,2	391,4	404,1	417,8	429,0	447,8	472,2
70,0	315,5	331,5	351,0	351,4	352,8	364,1	387,4	409,1
72,5	244,8	248,6	247,5	256,0	267,7	279,3	299,4	318,2
75,0	166,6	165,8	161,6	160,7	162,6	167,1	173,6	161,6
77,5	100,4	86,9	76,3	63,3	58,5	47,6	39,2	24,5
80,0	36,1	31,1	28,5	21,8	18,3	13,7	8,0	4,8
82,5	4,8	3,3	2,6	2,4	2,5	1,1	1,2	0,6
85,0	0,7	0,6	0,5	0,4	0,3	0,3	0,2	0,2
87,5	0,1	0,1	0,1	0,1	0,1	0,0	0,1	0,1
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	240,0	242,5	245,0	247,5	250,0	252,5	255,0	257,5
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	260,0	262,5	265,0	267,5	270,0	272,5	275,0	277,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4380,2	4380,8	4378,7	4378,4	4378,2	4379,8	4378,2	4380,6
5,0	4114,2	4112,9	4110,9	4107,9	4107,4	4108,1	4107,4	4107,3
7,5	3840,6	3837,3	3835,7	3827,4	3829,1	3831,4	3831,6	3836,5
10,0	3478,3	3470,8	3462,9	3450,1	3449,9	3451,0	3452,3	3461,3
12,5	2941,2	2922,2	2904,9	2889,2	2886,0	2887,7	2893,4	2909,7
15,0	2292,7	2270,0	2249,4	2231,4	2226,0	2228,2	2231,0	2248,7
17,5	1811,4	1792,3	1774,0	1759,8	1755,7	1756,4	1755,7	1769,1
20,0	1350,3	1329,7	1311,1	1298,1	1292,8	1294,4	1297,7	1309,5
22,5	1086,8	1074,3	1060,9	1049,9	1046,5	1047,4	1049,0	1058,5
25,0	828,4	811,4	795,7	784,3	780,6	783,1	785,5	797,6
27,5	635,9	626,9	618,0	613,1	610,7	612,6	610,7	618,7
30,0	554,8	553,6	548,0	543,6	544,2	543,5	541,7	546,6
32,5	511,7	508,1	502,9	501,4	499,9	501,5	499,9	504,4
35,0	483,9	482,8	480,4	476,6	477,7	479,2	475,3	479,6
37,5	476,3	477,8	477,9	474,1	475,3	476,8	472,8	474,6
40,0	504,1	508,1	512,9	511,3	514,7	513,8	509,7	506,9
42,5	577,6	589,0	595,5	598,2	603,3	602,7	595,9	588,9
45,0	709,3	728,0	740,6	747,1	753,5	753,4	743,7	733,0
47,5	848,7	867,1	880,7	886,1	891,4	891,8	879,1	872,1
50,0	886,7	902,5	915,8	918,4	921,0	916,5	903,7	899,5
52,5	830,9	841,8	850,7	853,8	854,5	849,8	834,8	832,4
55,0	729,6	740,7	750,6	754,6	753,5	748,5	733,8	733,0
57,5	651,1	659,8	670,6	675,1	672,2	667,0	655,0	653,5
60,0	587,7	599,1	608,0	613,1	610,7	605,2	593,4	588,9
62,5	559,9	573,8	588,0	593,2	595,9	590,4	573,7	566,5
65,0	516,8	543,5	563,0	578,3	578,7	570,6	549,1	534,2
67,5	509,2	546,0	573,0	588,3	588,5	578,0	551,6	534,2
70,0	443,3	475,2	497,9	508,8	507,3	491,6	470,3	454,7
72,5	339,5	336,2	342,8	345,0	339,8	328,5	315,2	305,6
75,0	154,5	154,2	157,6	148,9	140,4	133,4	133,0	139,1
77,5	13,7	3,8	3,0	2,7	2,7	2,7	2,7	3,0
80,0	1,0	0,5	0,3	0,2	0,2	0,2	0,2	0,2
82,5	0,4	0,2	0,1	0,1	0,1	0,1	0,1	0,1
85,0	0,2	0,1	0,1	0,0	0,0	0,0	0,0	0,0
87,5	0,1	0,1	0,1	0,0	0,0	0,0	0,0	0,0
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	280,0	282,5	285,0	287,5	290,0	292,5	295,0	297,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4383,5	4384,2	4385,6	4387,4	4390,6	4392,7	4400,5	4405,6

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	280,0	282,5	285,0	287,5	290,0	292,5	295,0	297,5
5,0	4113,1	4114,6	4119,8	4125,9	4127,3	4136,5	4149,6	4157,4
7,5	3840,3	3847,5	3854,0	3866,9	3871,5	3882,8	3903,7	3916,7
10,0	3472,3	3484,7	3500,4	3522,5	3535,5	3561,4	3595,2	3618,3
12,5	2926,5	2953,1	2981,4	3017,1	3049,1	3096,7	3148,6	3197,0
15,0	2270,6	2300,5	2332,0	2373,4	2419,7	2481,4	2554,0	2625,3
17,5	1785,0	1811,6	1833,0	1865,6	1900,7	1946,4	2004,6	2066,2
20,0	1326,8	1355,6	1386,6	1433,1	1484,4	1547,1	1615,7	1680,0
22,5	1071,5	1091,0	1105,8	1131,4	1158,5	1190,5	1231,8	1283,8
25,0	813,6	839,1	862,6	895,1	930,3	969,5	1013,6	1055,6
27,5	628,4	642,5	657,0	681,4	709,6	748,4	792,8	842,5
30,0	550,8	556,8	561,7	573,2	584,2	602,8	627,2	664,5
32,5	508,2	514,0	519,0	530,5	539,1	552,5	567,0	579,2
35,0	485,7	491,3	494,0	502,8	511,5	524,9	534,4	546,6
37,5	478,2	481,3	483,9	490,3	496,5	504,8	514,3	521,6
40,0	508,2	506,5	504,0	505,4	506,5	509,8	511,8	514,0
42,5	583,3	577,0	569,2	560,7	554,2	547,5	539,4	531,6
45,0	723,5	710,5	689,6	673,8	654,5	632,9	612,2	586,8
47,5	861,2	849,1	830,0	809,6	784,8	753,5	717,5	677,0
50,0	893,7	884,4	870,1	857,4	837,5	816,2	785,3	749,7
52,5	828,6	823,9	814,9	807,1	797,4	783,6	765,2	737,2
55,0	728,5	723,1	709,6	701,5	694,6	690,7	682,4	669,5
57,5	650,9	642,5	629,4	616,0	604,3	595,2	592,1	584,2
60,0	585,8	579,5	561,7	545,6	534,1	527,4	529,4	524,1
62,5	558,3	546,8	529,1	510,4	496,5	489,7	486,7	471,4
65,0	515,7	501,4	481,4	472,7	471,4	462,1	451,6	433,8
67,5	508,2	481,3	453,9	432,4	418,7	404,4	388,9	376,1
70,0	433,1	408,2	378,6	362,1	348,5	339,1	336,2	336,0
72,5	300,4	309,9	293,4	274,1	260,8	256,2	243,4	235,7
75,0	142,7	151,2	153,0	163,4	153,0	145,7	145,5	147,9
77,5	6,3	15,1	28,8	40,0	44,1	53,2	57,0	69,2
80,0	0,5	1,5	5,8	8,8	12,8	14,6	18,6	25,6
82,5	0,2	0,4	0,5	0,7	0,9	1,7	1,7	2,1
85,0	0,1	0,2	0,2	0,2	0,3	0,3	0,4	0,4
87,5	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	300,0	302,5	305,0	307,5	310,0	312,5	315,0	317,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4409,4	4416,6	4422,8	4427,0	4436,3	4443,1	4449,5	4459,5
5,0	4165,0	4176,8	4189,2	4200,0	4211,3	4227,4	4235,1	4252,6
7,5	3930,7	3947,2	3965,7	3978,0	4001,2	4021,7	4038,4	4055,7
10,0	3646,0	3677,1	3704,5	3731,1	3763,6	3798,4	3824,0	3851,3
12,5	3247,9	3301,1	3355,4	3406,9	3463,5	3517,4	3561,6	3609,0
15,0	2703,6	2788,8	2878,2	2962,9	3058,4	3148,6	3228,7	3308,7

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	300,0	302,5	305,0	307,5	310,0	312,5	315,0	317,5
17,5	2139,2	2228,5	2328,2	2436,7	2558,3	2684,4	2804,9	2927,6
20,0	1746,1	1814,6	1891,2	1977,8	2088,1	2212,8	2345,8	2493,5
22,5	1358,1	1453,7	1554,6	1648,6	1743,0	1844,0	1957,4	2092,2
25,0	1103,6	1153,4	1213,1	1296,9	1417,9	1542,9	1654,7	1771,7
27,5	902,0	959,0	1019,7	1077,4	1145,3	1234,3	1364,6	1506,7
30,0	713,1	769,8	833,8	902,9	972,8	1046,2	1119,9	1229,1
32,5	599,7	625,9	673,1	733,3	805,2	885,6	958,5	1037,3
35,0	561,9	575,4	592,7	616,0	657,7	717,5	792,0	880,8
37,5	531,7	542,6	550,0	551,2	562,7	594,6	653,3	736,9
40,0	516,5	514,8	507,3	503,8	510,2	526,9	557,5	615,8
42,5	521,6	509,8	497,3	486,3	485,1	486,7	499,4	530,0
45,0	561,9	537,6	514,9	491,3	477,6	469,2	469,2	479,5
47,5	640,0	598,1	560,1	523,8	495,1	474,2	464,1	461,9
50,0	710,5	666,3	620,3	573,6	535,2	499,3	471,7	456,8
52,5	705,5	671,3	635,4	598,6	565,2	529,4	491,9	461,9
55,0	652,6	628,4	600,3	571,1	547,7	521,8	496,9	469,4
57,5	572,0	557,8	537,5	518,8	502,7	486,7	471,7	459,3
60,0	509,0	489,6	472,2	458,9	450,1	444,1	438,9	439,1
62,5	456,1	441,7	427,0	416,5	407,6	401,4	396,0	406,3
65,0	420,8	408,9	391,8	376,6	365,1	356,3	350,6	368,5
67,5	365,4	358,4	349,1	331,7	320,1	316,1	320,3	338,2
70,0	317,5	297,8	283,8	274,3	272,6	276,0	282,5	305,4
72,5	231,8	227,1	223,5	224,5	225,1	223,3	232,1	252,4
75,0	153,7	154,0	158,2	159,6	162,5	163,1	169,0	181,7
77,5	78,6	90,4	92,9	95,8	94,3	95,1	95,9	96,7
80,0	26,0	30,3	35,7	38,9	40,5	39,9	38,3	39,6
82,5	2,6	3,3	4,0	5,6	6,7	7,1	7,6	7,9
85,0	0,5	0,6	0,7	0,8	1,1	1,3	1,5	1,6
87,5	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	320,0	322,5	325,0	327,5	330,0	332,5	335,0	337,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4467,9	4478,2	4485,3	4497,8	4508,3	4518,3	4530,4	4543,1
5,0	4266,9	4287,4	4304,2	4326,6	4347,6	4365,2	4386,8	4412,2
7,5	4075,9	4104,1	4128,1	4155,5	4182,0	4209,6	4238,1	4273,8
10,0	3879,9	3918,4	3949,5	3984,3	4013,8	4048,9	4086,9	4132,8
12,5	3656,2	3710,0	3758,3	3808,2	3848,1	3893,3	3938,3	3991,9
15,0	3384,9	3466,6	3536,9	3606,8	3669,9	3732,6	3787,1	3853,5
17,5	3048,1	3170,4	3277,8	3380,3	3469,1	3556,9	3633,4	3715,0
20,0	2651,1	2816,4	2968,4	3113,5	3238,1	3358,6	3462,0	3564,0
22,5	2251,5	2437,4	2623,8	2811,4	2982,1	3145,3	3283,1	3413,0
25,0	1907,3	2073,4	2266,6	2479,2	2690,9	2896,7	3079,0	3244,4
27,5	1640,9	1789,8	1959,7	2167,1	2394,7	2638,2	2859,8	3068,2

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	320,0	322,5	325,0	327,5	330,0	332,5	335,0	337,5
30,0	1387,1	1548,8	1710,6	1897,8	2121,1	2382,2	2640,6	2889,5
32,5	1135,8	1300,3	1491,8	1676,3	1887,7	2148,7	2434,0	2723,3
35,0	977,5	1094,4	1275,4	1490,0	1699,4	1950,4	2252,6	2577,4
37,5	839,3	956,4	1094,3	1303,8	1538,7	1789,8	2098,9	2454,0
40,0	703,6	825,8	968,5	1140,2	1388,1	1656,7	1975,4	2348,3
42,5	598,1	705,4	847,8	1016,9	1240,0	1541,3	1877,2	2275,3
45,0	525,2	617,5	759,7	926,2	1127,1	1435,8	1794,0	2204,9
47,5	485,0	562,3	696,8	860,8	1051,8	1335,4	1723,5	2144,4
50,0	467,4	532,2	649,0	805,4	994,0	1262,6	1675,6	2111,7
52,5	462,4	522,1	631,4	770,2	951,4	1209,9	1640,3	2096,6
55,0	472,4	519,6	626,4	760,1	928,8	1187,3	1637,8	2144,4
57,5	477,4	529,6	631,4	767,7	956,4	1225,0	1663,0	2167,1
60,0	464,9	534,7	644,0	770,2	948,8	1227,5	1630,2	2104,2
62,5	439,8	507,1	598,7	719,8	893,6	1174,8	1554,6	1985,9
65,0	409,6	474,4	566,0	684,6	863,5	1139,6	1479,1	1834,9
67,5	382,0	441,8	535,8	664,5	835,9	1089,4	1400,9	1709,0
70,0	341,8	396,6	493,1	609,1	768,1	973,9	1209,4	1452,3
72,5	286,5	323,8	382,4	450,5	539,7	655,2	781,1	948,9
75,0	183,4	183,2	198,7	224,0	258,5	311,3	395,6	528,6
77,5	93,5	90,1	92,1	95,9	103,4	122,0	155,2	204,4
80,0	38,7	38,4	39,0	41,3	43,7	46,9	51,9	58,1
82,5	8,3	8,5	8,7	9,0	9,4	9,9	10,6	11,1
85,0	1,8	2,0	2,2	2,3	2,5	2,7	2,9	3,1
87,5	0,1	0,2	0,2	0,2	0,2	0,2	0,3	0,3
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

G/C [cd]	340,0	342,5	345,0	347,5	350,0	352,5	355,0	357,5
0,0	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4	4661,4
2,5	4553,5	4563,7	4576,5	4589,0	4601,0	4610,7	4623,4	4633,6
5,0	4433,0	4453,5	4479,1	4499,0	4523,0	4547,4	4575,2	4598,1
7,5	4305,0	4335,8	4369,3	4401,6	4434,9	4471,4	4511,8	4544,9
10,0	4171,9	4215,6	4256,9	4299,2	4344,3	4392,9	4440,8	4484,2
12,5	4038,9	4085,3	4134,6	4186,8	4243,6	4301,7	4362,1	4418,3
15,0	3908,4	3965,1	4022,2	4081,9	4150,5	4215,5	4288,6	4352,5
17,5	3780,3	3842,3	3909,9	3976,9	4052,3	4129,4	4204,9	4276,5
20,0	3647,3	3724,6	3800,0	3874,5	3961,7	4043,3	4126,3	4200,6
22,5	3516,8	3609,4	3695,2	3782,1	3876,1	3962,2	4055,3	4137,3
25,0	3376,2	3489,2	3590,3	3692,2	3795,6	3888,7	3989,3	4084,1
27,5	3235,6	3379,0	3505,4	3624,7	3737,7	3840,6	3951,3	4058,8
30,0	3102,6	3283,8	3443,0	3587,2	3717,5	3830,5	3953,8	4071,4
32,5	2979,6	3208,6	3403,0	3577,2	3727,6	3853,3	3984,3	4114,5
35,0	2879,2	3158,5	3393,1	3599,7	3772,9	3911,5	4052,7	4190,5
37,5	2801,4	3128,5	3405,5	3642,2	3838,4	3990,1	4136,4	4281,6
40,0	2736,1	3105,9	3423,0	3692,2	3911,4	4083,8	4237,9	4385,4

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Intensity [cd] RELCO 339-QL20-S01 / C0 to C357.5 in 2.5 - Gamma 0 to 110

G/C [cd]	340,0	342,5	345,0	347,5	350,0	352,5	355,0	357,5
42,5	2690,9	3100,9	3455,5	3752,1	3994,4	4177,5	4339,3	4486,7
45,0	2650,8	3088,4	3468,0	3789,6	4049,8	4248,5	4423,0	4580,4
47,5	2610,6	3073,4	3480,4	3827,0	4107,7	4321,9	4506,7	4679,1
50,0	2588,0	3065,9	3495,4	3864,5	4168,1	4405,5	4625,9	4828,5
52,5	2578,0	3073,4	3545,4	3952,0	4293,9	4560,1	4800,9	5026,0
55,0	2630,7	3128,5	3607,8	4014,4	4359,4	4633,5	4879,5	5119,7
57,5	2623,1	3075,9	3552,9	4006,9	4382,0	4686,7	4948,0	5183,0
60,0	2562,9	3023,3	3515,4	3981,9	4351,8	4631,0	4851,6	5036,1
62,5	2409,8	2842,9	3293,2	3719,6	4059,9	4311,8	4509,2	4686,7
65,0	2206,4	2617,5	3026,0	3424,9	3762,8	3992,6	4184,6	4365,2
67,5	2035,8	2429,6	2801,3	3145,1	3458,3	3683,5	3847,3	4003,1
70,0	1714,5	2033,9	2332,0	2623,0	2904,6	3161,6	3302,0	3423,3
72,5	1159,7	1407,7	1637,9	1858,6	2081,5	2247,1	2318,0	2367,4
75,0	680,3	841,6	1006,2	1159,1	1288,7	1375,6	1430,4	1488,8
77,5	277,4	359,4	429,9	494,4	534,1	544,7	541,0	549,9
80,0	68,8	79,9	87,1	91,4	92,1	90,9	90,0	93,4
82,5	11,5	11,9	12,4	13,1	14,1	15,0	16,1	17,4
85,0	3,3	3,5	3,8	4,0	4,4	4,7	5,0	5,4
87,5	0,3	0,4	0,4	0,5	0,6	0,7	0,8	1,0
90,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
91,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
92,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
93,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
94,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
95,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
110,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
120,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
130,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
140,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
150,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
160,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
170,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
180,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

TEST REPORT Nr. 339-QL20-R02 ver. 0

Addresses Indirizzi		
Applicant Richiedente	Relco Srl - Via delle Azalee, 6/A - 20090 - Buccinasco (MI)- Italy	
Manufacturer Produttore	Same as applicant/Come il richiedente	
Dates and authorization Date e autorizzazioni		
Report Date Data emissione rapporto di prova	27/04/2020	
Written by Preparato da	Marco Zanfabro	
Authorized by Autorizzato da	Ing. Michele Peschiera	
Sample under test (data declared by the applicant and under applicant's responsibility) Dispositivo sottoposto a prova (Dati forniti dal richiedente e sotto la sua responsabilità)		
Sample description Descrizione dispositivo	LED luminaire/Apparecchio di illuminazione a LED	
Type Modello	LED SEMPIONE	
Light source Sorgente luminosa	N° 48 Leds model 5050 Seoul Semiconductor 4000 K Code: S1W0-5050407006-00000000-0000	
Secondary optic Ottica secondaria:	L036 - LENTE STRAD. 4 LED mm25.4 alt. LT-20020-20220 (DK5050-120x60-TII-M)	
Power supply Alimentazione	AC 230 V, 50 Hz	
Driver model Modello alimentatore	Philips Xitanium XiLP 150 W 0,3-1,0 A S1230V S240 sXt Code 9290009629	
Output power supply current Corrente in uscita dall'alimentatore	800 mA	
Single led supply current Corrente sul singolo led	400 mA	
LM80 test report	Bay Area Compliance Laboratories Corp. LM-80 test report number: RSZ190718514-10, 19-07-2019 (accreditation IAS TL-460)	
Applicable standards Norme applicabili		
	IES LM-82-12, ANSI/UL 1598:2008 (ISTMT), IES TM-21-11	

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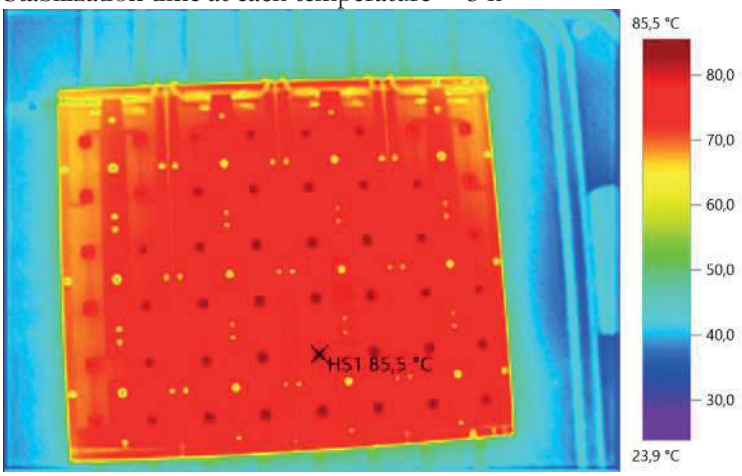
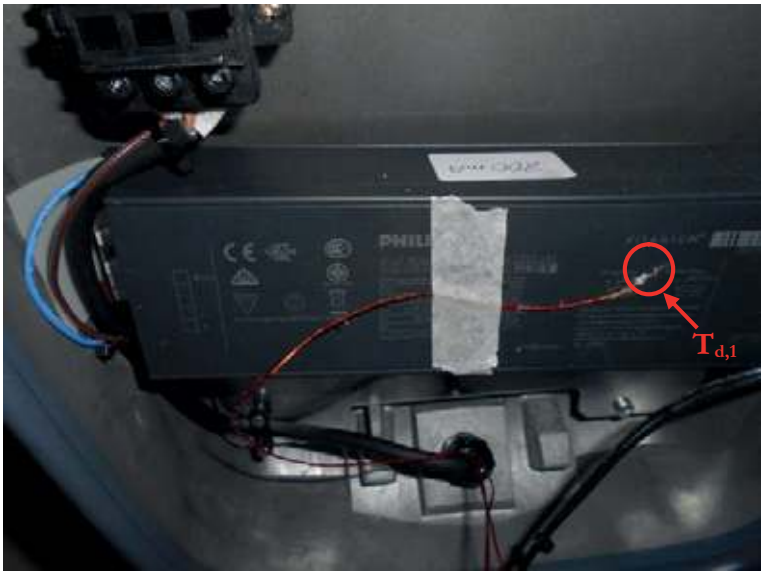
Test Name **Identificazione prova**	**Result** **Esito**
IES LM-79-19 Test result	See test report QUALILAB 339-QL20-R01
IES LM-82-12, ANSI/UL 1598:2008 par 19.7 (ISTMT)	See appendix I
IES TM-21-11 Energy Star TM21 Calculator Rev 06-18-2018 (from calculation)	See appendix II

Uncertainty Incertezza	
Photometric parameter Parametri fotometrici	Luminous flux and intensity: 2,5 % Luminous efficacy: 2,8 % Flusso e intensità luminosa, Efficacia luminosa
Sample mounting precision Precisione montaggio dispositivo	±0,5°
Average chromaticity coordin. Coordinate cromatiche medie	x = ±0,0007; y = ±0,0009
Correlated colour temperature Temperatura colore	±21 K
Colour rendering index (R_a) Indice di resa cromatica	1
Angular colour uniform. $\Delta u'v'$ Uniformità angolare del colore	±0,0009
Temperature measurement Misure di temperatura	±2,0 °C
Electrical parameter Parametri elettrici	Wattage: 0,24 %, Voltage: 0,06 %, Current: 0,17 % Potenza, Tensione, Corrente
Statement Dichiarazione	The measured value (y) and the associated expanded uncertainty (U) represent the interval ($y \pm U$) which contains the value of the measured quantity with a probability of approximately 95 % and a coverage factor k = 2. Il valore misurato (y) e l'incertezza estesa associata (U) rappresentano l'intervallo ($y \pm U$) che contiene il valore della grandezza misurata con una probabilità di circa il 95 % e un fattore di copertura k = 2.

Photographs
Foto

APPENDIX I	**Electrical And Photometric Properties As A Function Of Temperature**
Standards	IES LM-82-12, ANSI/UL 1598:2008 par 19.7 (ISTMT)
Sample number	339-QL20-S01
Place of testing	Qualilab Srl - Via Trento, 87 - 25020 - Capriano del Colle (BS) - Italy
Date of testing	From 23/04/2020 to 24/04/2020
Environmental conditions	-
Instruments	Illuminance transmitter Delta OHM HD2021T int. n. QL-IN-202 Powermeter Hioki 3333 int. n. QL-IN-186 Datalogger HIOKI 8400/20LR int. n. QL-IN-096 Termocouple TERSID T HF-D-30-TT int. n. QL-IN-197 Thermal chamber QUALILAB int. n. QL-IN-196 AC power source Chroma 6415 int. n. QL-IN-011 Thermal imager camera TESTO 865 int n. QL-IN-253
Test procedure	IES LM-82-12 §6 Directional measurement method used. T_b: according to applicant's request the air temperature of the chamber was taken $T_{d,1}$: driver temperature central power supply $T_{c,1}$: Led module (see figure) $T_{c,2}$: Led module (see figure) $T_{c,3}$: Led module (see figure) Temperature setup $T_{b,0}$ = 25,0 °C $T_{b,1}$ = $T_{b,0}$ + 10 °C = 35,0 °C $T_{b,2}$ = $T_{b,0}$ + 25 °C = 50,0 °C According to applicant's requirement the test was performed on a luminaire Stabilization time at each temperature > 5 h  Only for the evaluation of the hot point position - Temperature value not validated



Test Measurement

$T_{b,x}$ [°C]	$T_{d,1}$ [°C]	$T_{c,1}$ [°C]	$T_{c,2}$ [°C]	$T_{c,3}$ [°C]	Flux [lm]	Input Power [W]	Input Voltage [V]	Input Current [A]	Luminous efficacy [lm/W]
25,0	64,0	74,8	75,1	67,6	14474	119,6	230,0	0,525	121,0
35,0	71,3	81,8	82,2	74,9	14057	118,9	230,0	0,522	118,2
50,0	82,8	94,3	94,8	88,0	13166	117,6	230,0	0,517	111,9

APPENDIX II	**IES TM-21-11**
Standards	IES TM-21-11
Sample number	339-QL20-S01
Light source	N° 48 Leds model 5050 Seoul Semiconductor 4000 K Code: S1W0-5050407006-00000000-0000
Single led supply current	400 mA
Test procedure	Energy Star TM21 Calculator Rev 06-18-2018
Statement	Calculation below based on test report Bay Area Compliance Laboratories Corp. LM-80 test report number: RSZ190718514-10, 19-07-2019 (accreditation IAS TL-460) and measurement data from appendix I
TM21 calculation	

L70 at $T_{b,2}$ (ambient temperature) = 50 °C

LM-80 Test Inputs

Description of LED Light Source Tested (manufacturer, model, catalog number)
Leds model 5050 Seoul Semiconductor 4000 K Code: S1W0-5050407006-00000000-0000

LM-80 Testing Details	
Total number of units tested per case temperatur	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	9000
Tested drive current (mA):	400
Tested case temperature 1 (T_c, °C):	55
Tested case temperature 2 (T_c, °C):	85
Tested case temperature 3 (T_c, °C):	105

Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Test Data for 105°C Case Temperature	
Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
0	100,00%	0	100,00%	0	100,00%
1000	99,97%	1000	99,94%	1000	99,91%
2000	99,87%	2000	99,81%	2000	99,74%
3000	99,72%	3000	99,59%	3000	99,47%
4000	99,56%	4000	99,39%	4000	99,24%
5000	99,39%	5000	99,21%	5000	99,02%
6000	99,21%	6000	99,02%	6000	98,79%
7000	99,05%	7000	98,83%	7000	98,52%
8000	98,90%	8000	98,64%	8000	98,30%
9000	98,77%	9000	98,45%	9000	98,08%

***In-Situ* Inputs**

Drive current for each LED package/array/module (mA):	400
In-situ case temperature (T_c, °C):	94,8
Percentage of initial lumens to project to (e.g. for L_{70}, enter 70):	70

Results

Time (t) at which to estimate lumen maintenance (hours):	100.000
Lumen maintenance at time (t) (%):	80,96%
Reported L70 (hours):	>50000

L80 at $T_{b,2}$ (ambient temperature) = 50 °C

LM-80 Test Inputs

Description of LED Light Source Tested (manufacturer, model, catalog number)
Leds model 5050 Seoul Semiconductor 4000 K Code: S1W0-5050407006-00000000-0000

LM-80 Testing Details	
Total number of units tested per case temperatur	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	9000
Tested drive current (mA):	400
Tested case temperature 1 (T_c, °C):	55
Tested case temperature 2 (T_c, °C):	85
Tested case temperature 3 (T_c, °C):	105

Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Test Data for 105°C Case Temperature	
Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
0	100,00%	0	100,00%	0	100,00%
1000	99,97%	1000	99,94%	1000	99,91%
2000	99,87%	2000	99,81%	2000	99,74%
3000	99,72%	3000	99,59%	3000	99,47%
4000	99,56%	4000	99,39%	4000	99,24%
5000	99,39%	5000	99,21%	5000	99,02%
6000	99,21%	6000	99,02%	6000	98,76%
7000	99,05%	7000	98,83%	7000	98,52%
8000	98,90%	8000	98,64%	8000	98,30%
9000	98,77%	9000	98,45%	9000	98,08%

In-Situ Inputs

Drive current for each LED package/array/module (mA):	400
In-situ case temperature (T_c, °C):	94.8
Percentage of initial lumens to project to (e.g. for L_{70}, enter 70):	80

Results

Time (t) at which to estimate lumen maintenance (hours):	100.000
Lumen maintenance at time (t) (%):	80,96%
Reported L80 (hours):	>54000

L90 at $T_{b,2}$ (ambient temperature) = 50 °C

LM-80 Test Inputs

Description of LED Light Source Tested (manufacturer, model, catalog number)
Leds model 5050 Seoul Semiconductor 4000 K Code: S1W0-5050407006-00000000-0000

LM-80 Testing Details	
Total number of units tested per case temperatur	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	9000
Tested drive current (mA):	400
Tested case temperature 1 (T_c, °C):	55
Tested case temperature 2 (T_c, °C):	85
Tested case temperature 3 (T_c, °C):	105

Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Test Data for 105°C Case Temperature	
Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
0	100,00%	0	100,00%	0	100,00%
1000	99,97%	1000	99,94%	1000	99,91%
2000	99,87%	2000	99,81%	2000	99,74%
3000	99,72%	3000	99,59%	3000	99,47%
4000	99,56%	4000	99,39%	4000	99,24%
5000	99,39%	5000	99,21%	5000	99,02%
6000	99,21%	6000	99,02%	6000	98,76%
7000	99,05%	7000	98,83%	7000	98,52%
8000	98,90%	8000	98,64%	8000	98,30%
9000	98,77%	9000	98,45%	9000	98,08%

In-Situ Inputs

Drive current for each LED package/array/module (mA):	400
In-situ case temperature (T_c, °C):	94.8
Percentage of initial lumens to project to (e.g. for L_{70}, enter 70):	90

Results

Time (t) at which to estimate lumen maintenance (hours):	100.000
Lumen maintenance at time (t) (%):	90.96%
Reported L90 (hours):	50.000

Rapporto di Prova n. 63464 Rev.1

Test report n.

Avigliana, 06/05/2020

Committente: *Customer*	RELCO S.R.L. VIA DELLE AZALEE 6/A 20090 BUCCINASCO (MI)
Numero campione: *Identification number*	63464
Data ricevimento: *Arrival date*	07/02/2020
Descrizione campione: *Sample description*	LED SEMPIONE CELL ST IP66 RAL9007 CL2
Descrizione fornita da cliente: *Sample declared description by customer*	LED SEMPIONE CELL ST IP66 RAL9007 CL2
Matrice Campione *Type of sample*	MATERIALI METALLICI *METALLICS MATERIALS*
Quantità campione: *Sample amount*	2
Restituzione resti di prova: *Test leftovers restitution*	No
Procedura campionamento: *Sampling procedure*	Campionamento eseguito a cura del Cliente *Sampling delivered from customer*
Eventuale documentazione aggiuntiva: *Any additional documentation*	Conclusioni riferite al rapporto di prova 63464 *Conclusions referred to test report 63464*

Responsabile delle Prove
Responsible of the Test
Dott. Carlo Chiampo

Responsabile del Laboratorio
Head of Laboratory
Paolo Pollacino

Il presente Rapporto di Prova riguarda esclusivamente il campione sottoposto a prova. Esso non può essere riprodotto parzialmente, se non previa approvazione scritta da parte di questo Laboratorio. Il periodo di conservazione dei campioni non restituiti al Cliente è di 30 giorni dalla data di emissione del presente rapporto. Le incertezze di misura dichiarate sono espresse come incertezza estesa, ottenuta moltiplicando l'incertezza tipo per il fattore di copertura K corrispondente ad un livello di fiducia generalmente pari a circa il 95% (K=2). Eventuali giudizi sono formulati senza tenere conto dell'incertezza associata alle misure; il livello di rischio correlato a tale regola decisionale è riferito ad un livello di fiducia pari al 50%. Se non diversamente specificato le prove sono eseguite a temperatura ambiente (10°÷35°C). Le prove contrassegnate da * non sono accreditate ACCREDIA. Giudizi e interpretazioni non sono oggetto di accreditamento ACCREDIA. In caso di modifiche riferite alla descrizione del campione o che possono comprometterne la rintracciabilità, il Laboratorio emetterà un Rapporto di Prova riportante la dicitura "Rev" e la motivazione della modifica.

*This Test Report concerns only the sample tested. It may not be reproduced in part, without prior written approval by this Laboratory. The shelf life of the samples not returned to the Customer is 30 days from the date of issuance of this report. The measurement uncertainties reported are expressed as expanded uncertainty obtained by multiplying the uncertainty by a factor of type of coverage K corresponding to a level of confidence generally equal to approximately 95% (K = 2). Any judgments are formulated without taking into account the uncertainty associated with the measures; the level of risk related to this decision rule refers to a confidence level of 50%. Unless otherwise specified the tests are performed at room temperature (10 ° ÷ 35 ° C). The tests marked with * are not credited ACCREDIA. Judgments and interpretations are not subject to accreditation ACCREDIA.*
If customer requires any modification to sample description or any modification that could compromise sample traceability, MTC Lab will reproduce another Test Report with the indication of state "Rev." and with the motivation of modification.

Rapporto di Prova n. 63464 Rev.1

Test report n.

Il presente Rapporto di Prova N. 63464 Rev.1 del 06/05/2020 annulla e sostituisce il Rapporto di Prova n. 63464 del 30/04/2020.
Lista delle modifiche:
- pag. 1 di 17: modificate voci “Descrizione campione” e “Descrizione fornita da cliente” da “LED SEMPIONE CELL ST 120W 4K IP66 RAL9007 CL2” a “LED SEMPIONE CELL ST IP66 RAL9007 CL2”.

This Test Report No. 63464 Rev.1 of 06/05/2020 cancels and replaces the Test Report no. 63464 of 04/30/2020.
List of changes:
- pag. 1 of 17: modified items "Sample description" and "Sample declared description by customer" from "LED SEMPIONE CELL ST 120W 4K IP66 RAL9007 CL2" to "LED SEMPIONE CELL ST IP66 RAL9007 CL2".

Rapporto di Prova n. 63464 Rev.1

Test report n.

Tipo di Prova: LAY-OUT PER IDENTIFICAZIONE PUNTI DI PRELIEVO SAGGI *
*Type of test: lay-out for sampling identification **
Metodo di Prova: MMTC-PGQ05
Standard
Data di Esecuzione: 30/04/2020
Date of execution

LAY-OUT:

Rapporto di Prova n. 63464 Rev.1

Test report n.

Tipo di Prova: -PROVE DI CORROSIONE IN ATMOSFERE ARTIFICIALI, PROVE DI NEBBIA SALINA-
Type of test: Corrosion tests in artificial atmospheres, salt spray tets
Strumento: Camera Nebbia Salina ID.402
Equipment: Salt spray chamber ID.402
Metodo di Prova: UNI EN ISO 9227:2017
Standard
Data di Esecuzione: 30/04/2020
Date of execution

PUREZZA DEL SALE / LOTTO: *Salt purity / batch*	**Lotto n. V9D059059I – V9I115179N (Ph.Eur USP)** *Batch no. V9D059059I – V9I115179N (Ph.Eur USP)*
CONDUTTIVITA' DELL'ACQUA: *Water conductivity*	**17÷19 µS/cm**
DIMENSIONI E FORMA DEL CAMPIONE: *Size and shape of sample*	**Complessa** *Complex*
PREPARAZIONE E PULIZIA DEL CAMPIONE IN PROVA: *Preparation and cleaning of sample*	**Pulizia con acqua e asciugatura con carta assorbente** *Cleaning with water and drying with paper towel*
CARATTERISTICHE DEL RIVESTIMENTO: *Coating type*	**Verniciatura** *Painting*
ANGOLO DI INCLINAZIONE DEI CAMPIONI: *Angle of sample inclination*	**20°**
INIZO PROVA: *Test start*	**07/02/2020**
FINE PROVA: *Test end*	**30/04/2020**
DURATA PROVA: *Test length*	**2000 ore** *2000 hours*
CARATTERISTICHE DEI CAMPIONI DI RIFERIMENTO: *Type of reference sample*	**ISO 3574 grado CR4 sp. 1 mm** *ISO 3574 grade CR4 thk. 1 mm*
TEMPERATURA DI PROVA DELLA CAMERA: *Temperature of test chamber*	**35°C**
VOLUME DELLA SOLUZIONE RACCOLTA NEL PLUVIOMETRO(ml/h): *Volume of solution collected in rain gauge*	**1,20÷1,25 ml/h**

Rapporto di Prova n. 63464 Rev.1

Test report n.

PH DELLA SOLUZIONE PREPARATA: *pH of solution prepared*	**6,6÷7,0**
PH DELLA SOLUZIONE RACCOLTA NEL PLUVIOMETRO: *pH of solution collected in rain gauge*	**6,8÷7,0**
CONCENTRAZIONE DELLA SOLUZIONE SALINA: *Concentration of saline solution*	**50 g/l**
PERDITA DI PESO DEI CAMPIONI DI RIFERIMENTO (g/m2): *Weight loss of reference sample*	**61±5 g/m²**
FOTOGRAFIA: *Photo*	

Step 1 (100 ore)
Step 1 (100 hours)

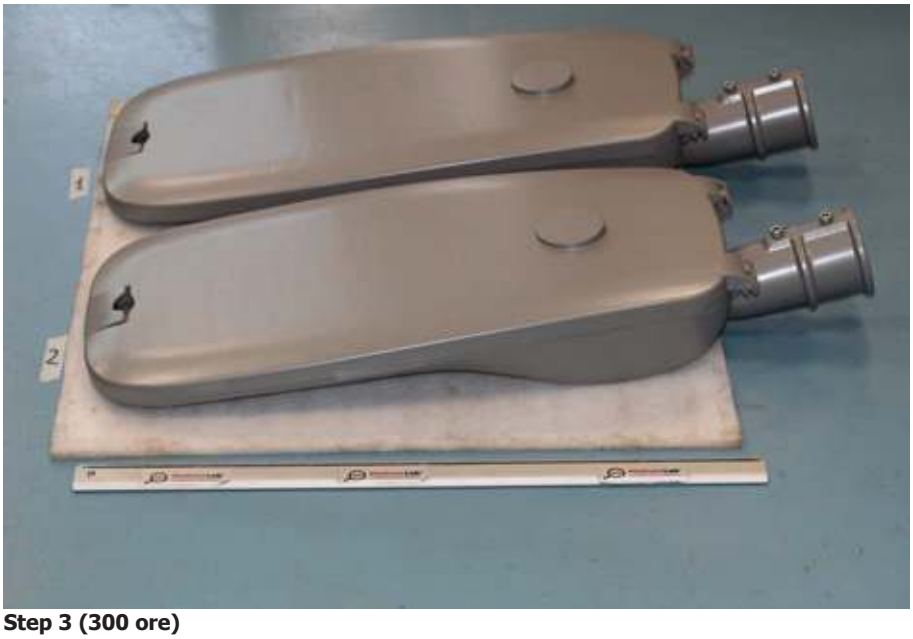
Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 2 (200 ore)
Step 2 (200 hours)

FOTOGRAFIA:
Photo



Step 3 (300 ore)
Step 3 (300 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 4 (400 ore)
Step 4 (400 hours)

FOTOGRAFIA:
Photo

Step 5 (500 ore)
Step 5 (500 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 6 (600 ore)
Step 6 (600 hours)

FOTOGRAFIA:
Photo

Step 7 (700 ore)
Step 7 (700 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 8 (800 ore)
Step 8 (800 hours)

FOTOGRAFIA:
Photo

Step 9 (900 ore)
Step 9 (900 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 10 (1000 ore)
Step 10 (1000 hours)

FOTOGRAFIA:
Photo

Step 11 (1100 ore)
Step 11 (1100 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 12 (1200 ore)
Step 12 (1200 hours)

FOTOGRAFIA:
Photo

Step 13 (1300 ore)
Step 13 (1300 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 14 (1400 ore)
Step 14 (1400 hours)

FOTOGRAFIA:
Photo

Step 15 (1500 ore)
Step 15 (1500 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 16 (1600 ore)
Step 16 (1600 hours)

FOTOGRAFIA:
Photo

Step 17 (1700 ore)
Step 17 (1700 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Step 18 (1800 ore)
Step 18 (1800 hours)

FOTOGRAFIA:
Photo

Step 19 (1900 ore)
Step 19 (1900 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

FOTOGRAFIA:
Photo

Fine prova (2000 ore)
Test end (2000 hours)

Rapporto di Prova n. 63464 Rev.1

Test report n.

Dettagli fotografici 63464-1 fine prova (2000 ore)

Test end 63464-1 (2000 hours) photographic details

Dettaglio 1
Detail 1

Dettaglio 2
Detail 2

Dettaglio 3
Detail 3

Dettaglio incisione
Scribe detail

Rapporto di Prova n. 63464 Rev.1

Test report n.

Dettagli fotografici 63464-2 fine prova (2000 ore) *Test end 63464-2 (2000 hours) photographic details*	
 Dettaglio 1 *Detail 1*	 **Dettaglio 2** *Detail 2*
 Dettaglio 3 *Detail 3*	 **Dettaglio incisione** *Scribe setail*

FINE CERTIFICATO DI PROVA

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

CONCLUSIONI

CONCLUSIONS

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 1 (100 ore): I campioni forniti non presentano alcun tipo di difettosità.	Non è ammessa la comparsa di corrosione rossa.	**Conforme secondo le richieste fornite da cliente.**
	Step 2 (200 ore): **63464-1:** Non si osserva nessuna difettosità. Non si nota la comparsa di corrosione sottopellicolare. **63464-2:** Non si osservano difettosità. Corrosione sottopellicolare: <0,30 mm		**Conforme secondo le richieste fornite da cliente.**
	Step 3 (300 ore): **63464-1:** Non si osserva nessuna difettosità. Non si nota la comparsa di corrosione sottopellicolare. **63464-2:** Non si osservano difettosità. Corrosione sottopellicolare: 0,35 mm		**Conforme secondo le richieste fornite da cliente.**
	Step 4 (400 ore): **63464-1:** Non si osserva nessuna difettosità. Non si nota la comparsa di corrosione sottopellicolare. **63464-2:** Non si osservano difettosità. Corrosione sottopellicolare: 0,35 mm		**Conforme secondo le richieste fornite da cliente.**
	Step 5 (500 ore): **63464-1:** Sul campione fornito si nota la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura. Corrosione sottopellicolare <0,30mm **63464-2:** Sul campione fornito si può notare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura. Corrosione sottopellicolare: 0,40 mm		**Conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 6 (600 ore): **63464-1:** Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura. Corrosione sottopellicolare < 0,30mm **63464-2:** Sul campione fornito si osserva la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura. Corrosione sottopellicolare: 0,40 mm	Non è ammessa la comparsa di corrosione rossa.	**Conforme secondo le richieste fornite da cliente.**
	Step 7 (700 ore): **63464-1:** Sul campione fornito si nota la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura Corrosione sottopellicolare < 0,50mm **63464-2:** Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura inoltre è possibile osservare qualche colatura di corrosione bianca, il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare: 0,45 mm		**Conforme secondo le richieste fornite da cliente.**
	Step 8 (800 ore): **63464-1:** Sul campione fornito si nota la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura. Corrosione sottopellicolare < 0,65mm **63464-2:** Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura inoltre possiamo osservare qualche colatura di corrosione bianca, il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare: < 0,60 mm		**Conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 9 (900 ore): **63464-1:** Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. Corrosione sottopellicolare < 0,75mm **63464-2:** Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. Inoltre si nota qualche colatura di corrosione bianca dalle viti di fissaggio, il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare: < 0,70 mm	Non è ammessa la comparsa di corrosione rossa.	**Conforme secondo le richieste fornite da cliente.**
	Step 10 (1000 ore): **63464-1:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. -Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare < 0,75mm **63464-2:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare: < 0,70 mm		**Conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 11 (1100 ore): **63464-1:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. -Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare < 0,75mm **63464-2:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare: < 0,70 mm	Non è ammessa la comparsa di corrosione rossa.	**Conforme secondo le richieste fornite da cliente.**
	Step 12 (1200 ore): **63464-1:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. -Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare < 0,75mm **63464-2:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare: < 0,70 mm		**Conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 13 (1300 ore): **63464-1:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. -Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare < 0,75mm **63464-2:** -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Il rivestimento non mostra segni di corrosione rossa. Corrosione sottopellicolare: < 0,70	Non è ammessa la comparsa di corrosione rossa.	**Conforme secondo le richieste fornite da cliente.**
	Step 14 (1400 ore): **63464-1:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare < 0,75mm **63464-2:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare: < 0,70		**Non conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 15 (1500 ore): **63464-1:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare < 2mm **63464-2:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare: < 1mm	Non è ammessa la comparsa di corrosione rossa.	**Non conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 16 (1600 ore): **63464-1:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare < 2mm **63464-2:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare: < 1mm	Non è ammessa la comparsa di corrosione rossa.	**Non conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 17 (1700 ore): **63464-1:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare < 2mm **63464-2:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare: < 1mm	Non è ammessa la comparsa di corrosione rossa.	**Non conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 18 (1800 ore): **63464-1:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare < 2mm **63464-2:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare: < 2,5mm	Non è ammessa la comparsa di corrosione rossa.	**Non conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Step 19 (1900 ore): **63464-1:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare < 2mm **63464-2:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare: < 2,5mm	Non è ammessa la comparsa di corrosione rossa.	**Non conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Prova (Metodo)	Riscontrato	Richiesto	Esito
Prova di corrosione in nebbia salina neutra (NSS) (UNI EN ISO 9227:2017)	Fine prova (2000 ore): **63464-1:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del rivestimento. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare 1,76mm **63464-2:** -Sul campione si può osservare la presenza di alcuni piccoli focolai isolati di corrosione rossa. -Sul campione fornito si può osservare la presenza di vescicature in prossimità della staffa di supporto e sui ganci di chiusura con un principio di sfogliamento del materiale. -Si nota la comparsa di corrosione bianca in prossimità delle viti di fissaggio della staffa. Corrosione sottopellicolare: 2,13mm	Non è ammessa la comparsa di corrosione rossa.	**Non conforme secondo le richieste fornite da cliente.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	Observed	Required	Result
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	Step 1 (100 hours): The samples supplied do not present any type of defect.	The appearance of red corrosion is not allowed.	**Compliant to standard provided by customer.**
	Step 2 (200 hours): **63464-1:** No defects are observed. The appearance of scribe corrosion is not known. **63464-2:** No defects are observed. Scribe corrosion: <0,30 mm		**Compliant to standard provided by customer.**
	Step 3 (300 hours): **63464-1:** No defects are observed. The appearance of scribe corrosion is not known. **63464-2:** No defects are observed. Scribe corrosion: 0,35 mm		**Compliant to standard provided by customer.**
	Step 4 (400 hours): **63464-1:** No defects are observed. The appearance of scribe corrosion is not known. **63464-2:** No defects are observed. Scribe corrosion: 0,35 mm		**Compliant to standard provided by customer.**
	Step 5 (500 hours): **63464-1:** The sample supplied shows the presence of blistering near the support bracket and on the closing hooks. Scribe corrosion: <0,30mm **63464-2:** On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks. Scribe corrosion: 0,40 mm		**Compliant to standard provided by customer.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	Observed	Required	Result
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	Step 6 (600 hours): **63464-1:** On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks. Scribe corrosion: <0,30mm **63464-2:** The sample supplied shows the presence of blistering near the support bracket and on the closing hooks. Scribe corrosion: 0,40 mm	The appearance of red corrosion is not allowed.	**Compliant to standard provided by customer.**
	Step 7 (700 hours): **63464-1:** The sample supplied shows the presence of blistering near the support bracket and on the closing hooks Scribe corrosion: <0,50mm **63464-2:** On the supplied sample it is possible to observe the presence of blistering near the support bracket and on the closing hooks it is also possible to observe some dripping of white corrosion, the coating does not show signs of red corrosion. Scribe corrosion: 0,45 mm		**Compliant to standard provided by customer.**
	Step 8 (800 hours): **63464-1:** The sample supplied shows the presence of blistering near the support bracket and on the closing hooks. Scribe corrosion: <0,65mm **63464-2:** On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks we can also observe some dripping of white corrosion, the coating shows no signs of red corrosion. Scribe corrosion: <0,60 mm		**Compliant to standard provided by customer.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Step 9 (900 hours):* ***63464-1:*** *On the sample supplied it can be observed the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *Scribe corrosion: < 0,75mm* ***63464-2:*** *On the supplied sample it can be observed the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *In addition there is some dripping of white corrosion from the fixing screws, the coating shows no signs of red corrosion.* *Scribe corrosion: < 0,70 mm*	*The appearance of red corrosion is not allowed.*	***Compliant to standard provided by customer.***
	Step 10 (1000 hours): ***63464-1:*** *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *-The coating shows no signs of red corrosion.* *Scribe corrosion: < 0,75mm* ***63464-2:*** *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material* *-The appearance of white corrosion near the fixing screws of the bracket is noted. The coating shows no signs of red corrosion.* *Scribe corrosion: < 0,70 mm*		***Compliant to standard provided by customer.***

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	Observed	Required	Result
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	Step 11 (1100 hours): **63464-1:** -On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating. -The appearance of white corrosion near the fixing screws of the bracket is noted. -The coating shows no signs of red corrosion. Scribe corrosion: < 0,75mm **63464-2:** -On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material. -The appearance of white corrosion near the fixing screws of the bracket is noted. The coating shows no signs of red corrosion. Scribe corrosion: < 0,70 mm	The appearance of red corrosion is not allowed.	**Compliant to standard provided by customer.**
	Step 12 (1200 hours): **63464-1:** -On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating. -The appearance of white corrosion near the fixing screws of the bracket is noted. -The coating shows no signs of red corrosion. Scribe corrosion: < 0,75mm **63464-2:** -On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material. -The appearance of white corrosion near the fixing screws of the bracket is noted. The coating shows no signs of red corrosion. Scribe corrosion: < 0,70 mm		**Compliant to standard provided by customer.**

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Step 13 (1300 hours):* ***63464-1:*** *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *-The coating shows no signs of red corrosion.* *Scribe corrosion: < 0,75mm* ***63464-2:*** *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *The coating shows no signs of red corrosion.* *Scribe corrosion: < 0,70 mm*	*The appearance of red corrosion is not allowed.*	***Compliant to standard provided by customer.***
	Step 14 (1400 hours): ***63464-1:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: < 0,75mm* ***63464-2:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-We note the appearance of white corrosion near the fixing screws of the bracket.* *Scribe corrosion: < 0,70 mm*		***Not compliant to standard provided by customer.***

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Step 15 (1500 hours):* ***63464-1:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: < 2mm* ***63464-2:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: < 1mm*	*The appearance of red corrosion is not allowed.*	***Not compliant to standard provided by customer.***

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Step 16 (1600 hours):* ***63464-1:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: < 2mm* ***63464-2:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: < 1mm*	*The appearance of red corrosion is not allowed.*	***Not compliant to standard provided by customer.***

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Step 17 (1700 hours):* ***63464-1:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: < 2mm* ***63464-2:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: < 1mm*	*The appearance of red corrosion is not allowed.*	***Not compliant to standard provided by customer.***

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Step 18 (1800 hours):* ***63464-1:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: <2mm* ***63464-2:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: <2,5mm*	*The appearance of red corrosion is not allowed.*	***Not compliant to standard provided by customer.***

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Step 19 (1900 hours):* ***63464-1:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: <2mm* ***63464-2:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: <2,5mm*	*The appearance of red corrosion is not allowed.*	***Not compliant to standard provided by customer.***

Conclusioni riferite al Rapporto di Prova n. 63464

Conclusions referred to Test report n.

Test (Method)	***Observed***	***Required***	***Result***
Neutral salt spray corrosion test (NSS) (UNI EN ISO 9227:2017)	*Test end (2000 hours):* ***63464-1:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the coating.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: 1,76mm* ***63464-2:*** *-On the sample we can observe the presence of some small isolated outbreaks of red corrosion.* *-On the sample supplied you can see the presence of blistering near the support bracket and on the closing hooks with a principle of peeling the material.* *-The appearance of white corrosion near the fixing screws of the bracket is noted.* *Scribe corrosion: 2,13mm*	*The appearance of red corrosion is not allowed.*	***Not compliant to standard provided by customer.***

Avigliana, 30/04/2020

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