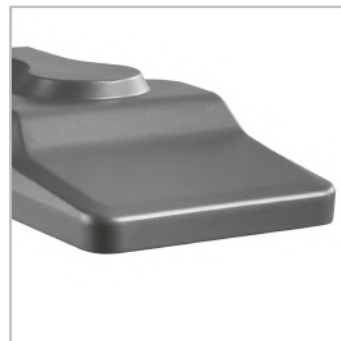


# VITALUM



## Aparat de iluminat de înaltă eficiență energetică și cel mai bun cost total de proprietate

Eficacitatea și funcționalitatea au fost principalele concepte din spatele designului aparatului de iluminat VITALUM.

Cu VITALUM, beneficiezi de o soluție eficientă de iluminare într-o carcasă ușoară și funcțională. VITALUM susține o abordare mai raționalizată a iluminatului, oferind pachete de lumeni și distribuții de lumină care îndeplinesc cu exactitate cerințele specifice ale aplicațiilor de iluminat stradal public, cum ar fi zone rezidențiale, piste de biciclete, parcuri și zone de transport public.

Echipat cu tehnologie fotometrică de ultimă oră, VITALUM oferă o eficiență excelentă cu cea mai rapidă rentabilitate a investiției.

VITALUM oferă două opțiuni de conectivitate avansate, făcând din acest aparat de iluminat funcțional o soluție de iluminat reală, gata de conectare.



CĂI DE  
CIRCULAȚIE  
URBANĂ ȘI  
STRĂZI



PODURI



PISTE DE  
BICICLETE ȘI  
PIETONALE



STAȚII DE TREN  
ȘI METROU



ZONE EXTINSE



PIEȚE ȘI ZONE  
PIETONALE



CĂI DE  
CIRCULAȚIE ȘI  
AUTOSTRĂZI

## Descriere

VITALUM susține utilizarea mai responsabilă a materiilor prime prin utilizarea de resurse minime, dar robuste. Fabricat din materiale reciclabile (aluminiu și sticlă), cu clase IP și IK ridicate, VITALUM susține principiul economiei circulare. Separabilitatea componentelor sale, opțiunile de control, consumul redus de energie și caracteristicile smart-ready îl fac o soluție de iluminat cu adevărat sustenabilă.

VITALUM beneficiază de un concept fotometric extrem de eficient - modulul Schröder HiFlex™ LED. Acest concept se concentrează pe performanță și eficacitate, rezultând în economii mai mari de energie. Permite o instalație de iluminat rentabilă și de lungă durată.

Cu VITALUM, obții iluminarea exactă de care ai nevoie. Aparatul de iluminat a fost proiectat cu un pachet opțional dezvoltat special pentru a satisface cerințele aplicațiilor tale de iluminat pentru zone rezidențiale, străzile orașului, parcuri, piste de biciclete, piețe publice și locuri publice.

Un aparat de iluminat eficient și rentabil, VITALUM oferă, de asemenea, două opțiuni de conectivitate: NEMA și Zhaga. Aceste caracteristici permit controlul de la distanță și reglarea nivelurilor de iluminare în orice moment, contribuind la reducerea consumului de energie pentru economii suplimentare de energie.

VITALUM dispune de fixare cu montaj lateral pentru ștuțuri de Ø42 mm până la Ø60 mm. Poate fi livrat cu un conector cu garnitură de etanșare conceput pentru a ușura și accelera instalarea.



Design funcțional cu greutate redusă.



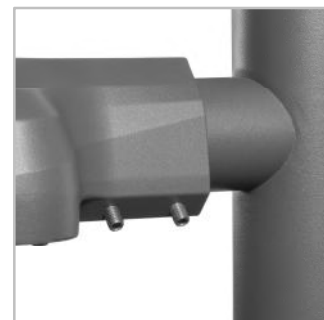
Echipat cu module fotometrice Schröder HiFlex™ pentru cea mai mare eficacitate.

## TIPURI DE APLICAȚII

- CĂI DE CIRCULAȚIE URBANĂ ȘI STRĂZI
- PODURI
- PISTE DE BICICLETE ȘI PIETONALE
- STAȚII DE TREN ȘI METROU
- ZONE EXTINSE
- PIEȚE ȘI ZONE PIETONALE
- CĂI DE CIRCULAȚIE ȘI AUTOSTRĂZI

## AVANTAJE CHEIE

- Modulul fotometric HiFlex™ conceput pentru eficiență energetică optimizată
- Instalare ușoară
- Eficiență ridicată, cu costuri operaționale reduse
- Furnizat pre-cablat, pentru instalare ușoară (opțional, conectori rapizi)
- Pregătit pentru interconectare în funcție de cerințele viitoare dvs. orașe inteligente



Fixare ușoară cu montaj lateral, asigurată cu două șuruburi. Opțional, poate fi livrat un conector cu garnitură de etanșare pentru a ușura și a accelera și mai mult instalarea.



Opțional, VITALUM poate fi echipat cu o priză NEMA sau Zhaga.



HiFlex™

Platforma HiFlex™ este proiectată în mod expert pentru optimizarea eficienței energetice. Modulele sale fotometrice dispun de LED-uri de mare putere care oferă performanțe excepționale cu un consum de energie minim, rezultând într-o eficacitate de neegalat (lm/W).

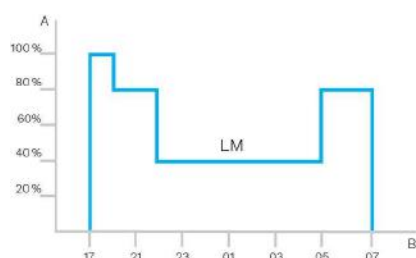
Ideal pentru proiectele care necesită o abordare simplificată pentru maximizarea eficienței iluminatului și obținerea rapidă a rentabilității investiției, HiFlex™ este disponibil în două versiuni: HiFlex™1, care dispune de 24 de LED-uri și HiFlex™2, echipat cu 36 de LED-uri. Ambele variante sunt proiectate având în vedere prioritățile de compactitate, rentabilitate și performanță



## Profil personalizat de reducere a fluxului luminos

Driverile inteligente pot fi programate cu profile complexe de reducere a fluxului luminos. Sunt posibile până la cinci combinații de intervale de timp și niveluri de lumină. Această caracteristică nu necesită cablare suplimentară.

Perioada dintre pornire și oprire este utilizată pentru a activa profilul de reducere a fluxului luminos presetat. Sistemul personalizat de reducere a fluxului luminos generează economii mari de energie electrică, asigurând în același timp nivelul de luminanță optim și uniformitatea pe timpul nopții.



A. Nivel de reducere a fluxului luminos | B. Timp



## Fotocelula

Fotocelula pornește aparatul de iluminat imediat ce lumina naturală scade la un anumit nivel. Poate fi programat pentru a porni în timpul unei furtuni, într-o zi înnorată (în zone critice) sau doar la căderea nopții, astfel încât să ofere siguranță și confort în spațiile publice.



Schröder EXEDRA este cel mai avansat sistem de gestionare a iluminatului de pe piață pentru controlul, monitorizarea și analiza iluminatului stradal într-un mod ușor de utilizat.



## Standardizarea ecosistemelor interoperabile

Schröder joacă un rol cheie în promovarea standardizării cu alianțe și parteneri precum uCIFI, TALQ sau Zhaga. Angajamentul nostru comun este de a oferi soluții concepute pentru integrarea verticală și orizontală a IoT. De la corp (hardware), la limbaj (model de date) și inteligență (algoritmi), întregul sistem Schröder EXEDRA se bazează pe tehnologii comune și deschise. Schröder EXEDRA se bazează, de asemenea, pe Microsoft™ Azure pentru serviciile cloud, furnizate cu cel mai ridicat nivel de încredere, transparență, conformitate cu standardele și reglementările în vigoare.

## Depășirea barierelor

Cu EXEDRA, Schröder a adoptat o abordare tehnologică-agnostică, bazându-se pe standarde și protocoale deschise pentru a proiecta o arhitectură care să poată interacționa perfect cu soluții software și hardware de la terți. Schröder EXEDRA este conceput pentru a debloca interoperabilitatea complet, deoarece oferă posibilitatea de :

- controlare a dispozitivelor (aparate de iluminat) de la alte mărci
- gestionarea controlerelor și integrarea de senzori de la alte mărci
- conectarea cu dispozitive și platforme de la terți

## O soluție de tip "plug-and-play"

Fiind un sistem concentrator de date care utilizează rețeaua celulară, un proces inteligent de punere în funcțiune automată recunoaște, verifică și extrage datele despre aparate de iluminat în interfața cu utilizatorul. Rețeaua de autoreglare dintre controlerelor de aparate de iluminat permite configurarea în timp real a iluminatului adaptiv direct prin intermediul interfeței cu utilizatorul.

## Experiență personalizată



care permite antreprenorilor, utilităților de producție sau orașelor mari să segmenteze proiectele.

Schröder EXEDRA include toate funcțiile avansate necesare pentru gestionarea dispozitivelor inteligente, controlul în timp real și programat, scenarii de iluminat dinamice și automatizate, planificarea operațiunilor de mentenanță și de exploatare pe teren, gestionarea consumului de energie și integrarea hardware-ului conectat de la terți. Acesta este complet configurabil și include instrumente pentru gestionarea utilizatorilor și o politică multi-tenant

## Un instrument puternic pentru eficiență, optimizare și pentru luarea deciziilor

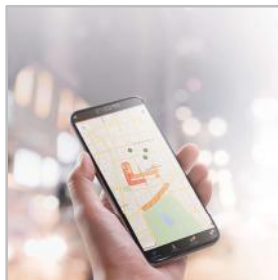
Datele sunt o mare valoare. Schröder EXEDRA le conferă managerilor toată claritatea de care au nevoie pentru a lua decizii. Platforma colectează cantități masive de date de la dispozitivele finale și, le cumulează, le analizează și le afișează intuitiv pentru a ajuta utilizatorii finali să ia cele mai bune decizii.

## Protejat pe toate laturile



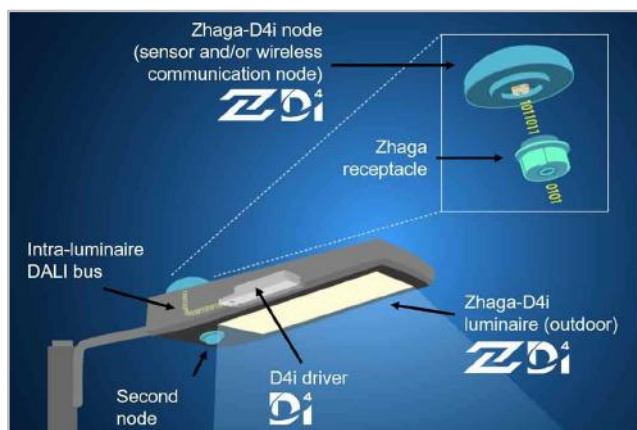
Schröder EXEDRA oferă tehnologie de ultimă generație cu criptare, analiză, clasificare și practici cheie de gestionare care protejează datele în întregul sistem și în serviciile asociate.

## Aplicație mobilă: în orice moment, în orice loc, conectați-vă la iluminatul stradal



Aplicația mobilă Schröder EXEDRA oferă funcționalitățile esențiale ale platformei desktop, pentru a însoți toate tipurile de operatori de pe șantier în efortul lor zilnic de a maximiza potențialul iluminatului conectat. Aceasta permite controlul și setările în timp real și contribuie la o întreținere eficientă.

Consortiul Zhaga și-a unit forțele cu DiiA și a produs o singură certificare Zhaga-D4i, care combină specificațiile Zhaga Book 18 versiunea 2 privind conectivitatea pentru exterior cu specificațiile D4i ale DiiA pentru DALI intra-luminar.



## Standardizare pentru ecosisteme interoperabile



În calitate de membru fondator al consorțiului Zhaga, Schröder a participat la crearea și, prin urmare, susține programul de certificare Zhaga-D4i și inițiativa acestui grup de standardizare a unui ecosistem interoperabil. Specificațiile D4i preiau ce este mai bun din protocolul standard DALI2 și îl adaptează la un mediu intra-luminar, dar are anumite limitări. Numai dispozitivele de control montate pe corpuri de iluminat pot fi combinate cu

un corp de iluminat Zhaga-D4i. Conform specificațiilor, dispozitivele de control sunt limitate la un consum mediu de energie de 2W și, respectiv, 1W.

## Programul de certificare

Certificarea Zhaga-D4i acoperă toate caracteristicile critice, inclusiv potrivirea mecanică, comunicarea digitală, raportarea datelor și cerințele de alimentare în cadrul unui singur corp de iluminat, asigurând interoperabilitatea plug-and-play a corpurilor de iluminat (drivere) și a perifericelor, cum ar fi nodurile de conectivitate.

## Soluție eficientă din punct de vedere al costurilor

Un corp de iluminat certificat Zhaga-D4i include drivere care oferă funcții care anterior se aflau în nodul de control, cum ar fi contorizarea energiei, ceea ce a simplificat dispozitivul de control, reducând astfel prețul sistemului de control.

| INFORMAȚII GENERALE                |                                                                                 |
|------------------------------------|---------------------------------------------------------------------------------|
| Înălțimea de instalare recomandată | 4m to 15m   13' to 49'                                                          |
| Eticheta Circle Light              | Scor> 90 - Produsul îndeplinește pe deplin cerințele privind economia circulară |
| Marca CE                           | Da                                                                              |
| Certificat ENEC                    | Da                                                                              |
| Certificat ENEC+                   | Da                                                                              |
| Certificat Zhaga-D4i               | Da                                                                              |
| Marca UKCA                         | Da                                                                              |
| Standard de testare                | EN 60598-1<br>EN 60598-2-1<br>EN 62262                                          |

| CARCASĂ AND FINISAJ     |                                                  |
|-------------------------|--------------------------------------------------|
| Carcasă                 | Aluminiu                                         |
| Distribuție luminoasă   | PMMA                                             |
| Difuzor                 | Sticlă securizată                                |
| Carcasă finisaj         | Vopsire în câmp electrostatic                    |
| Culoare                 | AKZO gri 900 sablat                              |
| Nivel de etanșeitate    | IP 66                                            |
| Rezistență la impact    | IK 08                                            |
| Test de vibrație        | Conform cu IEC modificat 68-2-6 (0,5G)           |
| Acces pentru mentenanță | Prin slăbirea șuruburilor de pe capacul inferior |

| CONDIȚII DE FUNCȚIONARE                                                                                   |                                                     |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| Temperatura de functionare(Ta)                                                                            | -30°C până la +55°C ținând cont de efectul vântului |
| · În funcție de configurația aparatului de iluminat. Pentru mai multe detalii, vă rugăm să ne contactați. |                                                     |

| INFORMAȚII ELECTRICE                   |                                                                              |
|----------------------------------------|------------------------------------------------------------------------------|
| Clasa electrică                        | Class I EU, Class II EU                                                      |
| Tensiune nominală                      | 220-240V – 50-60Hz                                                           |
| Protecție la supratensiuni (kV)        | 10                                                                           |
| Compatibilitate electromagnetică (EMC) | EN 55015 / EN 61000-3-2 / EN 61000-3-3 / EN 61547                            |
| Opțiuni de control                     | Profil personalizat de reducere a fluxului luminos, Fotocelulă, Telegestiune |
| Priză                                  | Zhaga (opțional)<br>Optional priză NEMA 7 pini                               |
| Sistem(e) de control asociate          | Schröder EXEDRA                                                              |

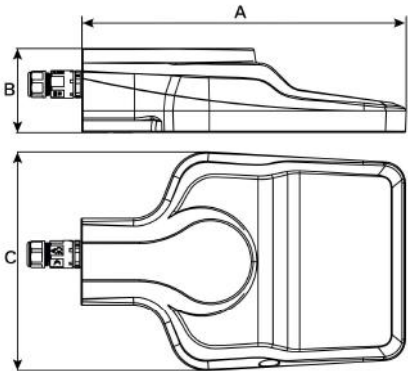
| INFORMAȚII FOTOMETRICE                                                                                                                                          |                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Temperatura de culoare LED                                                                                                                                      | 2200K (Alb cald WW 722)<br>2700K (Alb cald WW 727)<br>3000K (Alb cald WW 730)<br>4000K (Alb neutru NW 740) |
| Indicele de redare a culorilor (CRI)                                                                                                                            | >70 (Alb cald WW 722)<br>>70 (Alb cald WW 727)<br>>70 (Alb cald WW 730)<br>>70 (Alb neutru NW 740)         |
| Procent flux luminos in emisfera superioară (ULOR)                                                                                                              | 0%                                                                                                         |
| ULR                                                                                                                                                             | 0%                                                                                                         |
| · ULOR poate fi diferit în funcție de configurație. Vă rugăm să ne consultați.<br>· ULR poate fi diferit în funcție de configurație. Vă rugăm să ne consultați. |                                                                                                            |

| DURATA DE VIAȚA A LED-urilor @ TQ 25 ° C                                                                |                |
|---------------------------------------------------------------------------------------------------------|----------------|
| Toate configurațiile                                                                                    | 100,000h - L95 |
| · Durata de viață poate fi diferită în funcție de dimensiune / configurații. Vă rugăm să ne consultați. |                |

DIMENSIUNI ȘI MONTAJ

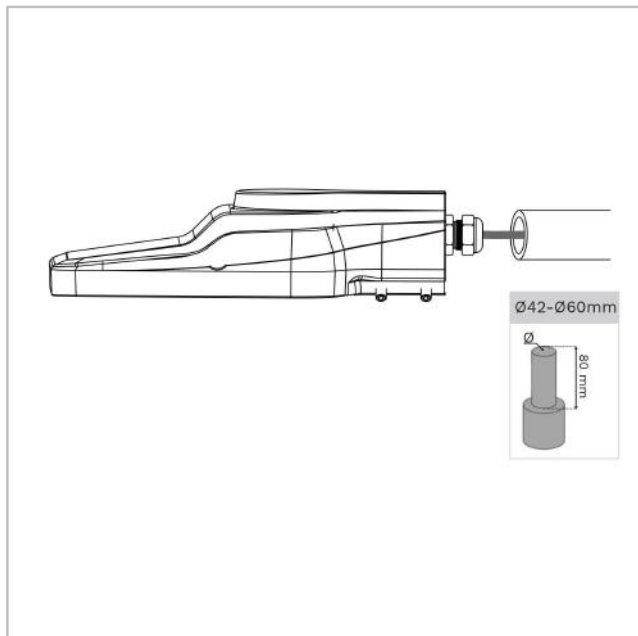
|                               |                                                                            |
|-------------------------------|----------------------------------------------------------------------------|
| AxBxC (mm   inch)             | 307x80x207   12.1x3.1x8.1                                                  |
| Greutate (kg   lbs)           | 2.4-2.9   5.3-6.4                                                          |
| Rezistență aerodinamică (CxS) | 0.04                                                                       |
| Posibilități de montaj        | Montaj lateral - Ø42mm<br>Montaj lateral - Ø48mm<br>Montaj lateral - Ø60mm |

· Pentru mai multe informații despre posibilitățile de montaj, vă rugăm să consultați fișa de instalare.





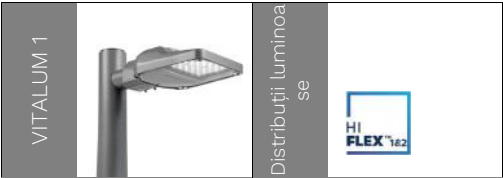
## VITALUM | Montaj lateral cu glisare pe ștuțuri Ø42-60 mm – 2 x șuruburi M8





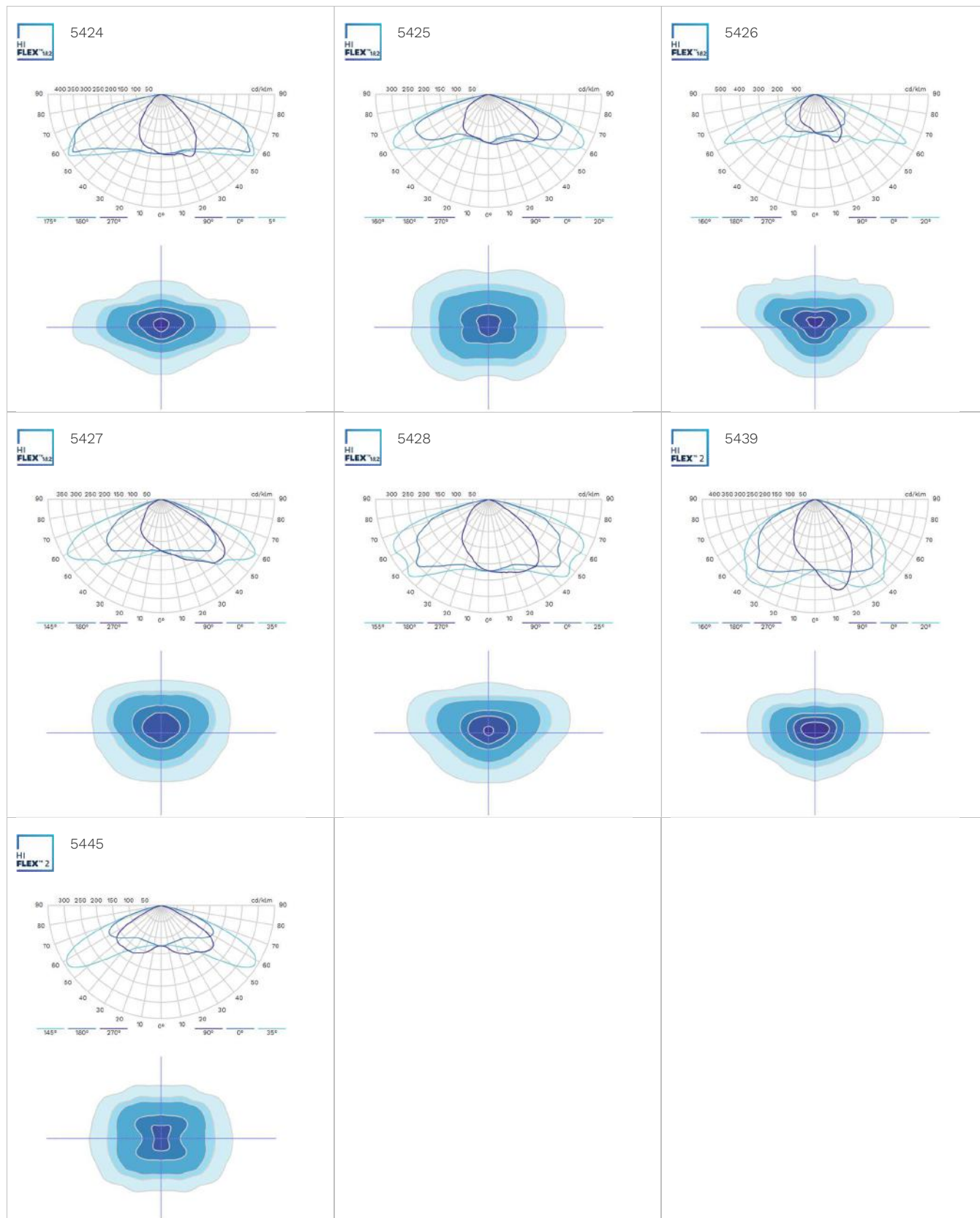
| Flux luminos al aparatului de iluminat (lm) |      |                 |      |                 |      |                   |      | Putere electrică (W) * |     | Eficacitate aparat de iluminat (lm/W) |         |
|---------------------------------------------|------|-----------------|------|-----------------|------|-------------------|------|------------------------|-----|---------------------------------------|---------|
| Alb cald WW 722                             |      | Alb cald WW 727 |      | Alb cald WW 730 |      | Alb neutru NW 740 |      |                        |     |                                       |         |
| Număr d e LED-uri                           | Min  | Max             | Min  | Max             | Min  | Max               | Min  | Max                    | Min | Max                                   | Până la |
| 36                                          | 1700 | 6300            | 1900 | 7100            | 2000 | 7400              | 2200 | 8000                   | 15  | 51                                    | 165     |

Toleranță flux luminos ± 7%, toleranță putere totală aparat de iluminat ± 5 %



|                  | Flux luminos al aparatului de iluminat (lm) |      |                 |      |                 |      |                   |      | Putere electrică (W) * | Eficacitate aparat de iluminat (lm/W) |         |
|------------------|---------------------------------------------|------|-----------------|------|-----------------|------|-------------------|------|------------------------|---------------------------------------|---------|
|                  | Alb cald WW 722                             |      | Alb cald WW 727 |      | Alb cald WW 730 |      | Alb neutru NW 740 |      |                        |                                       |         |
| Număr de LED-uri | Min                                         | Max  | Min             | Max  | Min             | Max  | Min               | Max  | Min                    | Max                                   | Până la |
| 24               | 1100                                        | 5700 | 1300            | 6400 | 1300            | 6700 | 1400              | 7200 | 11                     | 52                                    | 155     |
| 36               | 1700                                        | 6300 | 1900            | 7100 | 2000            | 7400 | 2200              | 8000 | 15                     | 51                                    | 165     |

Toleranță flux luminos ± 7%, toleranță putere totală aparat de iluminat ± 5 %



# Lumen maintenance report

## LED information

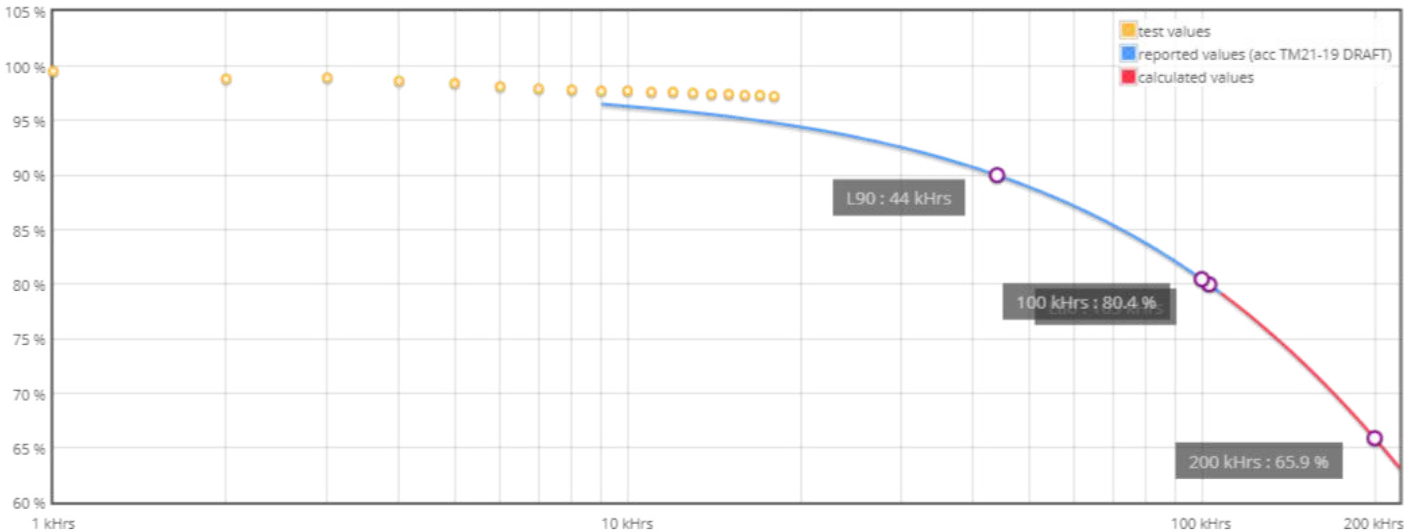
|             |                   |
|-------------|-------------------|
| LED type    | 5050              |
| LED current | 400 mA            |
| Ts          | 85°C              |
| Description | I-190520-096-I-03 |

## Projection data

|                          |                  |          |            |
|--------------------------|------------------|----------|------------|
| Test duration            | 18000 hrs        | $\alpha$ | 2.000E-006 |
| Time used for projection | 9000 to 18000hrs | $\beta$  | 0.983      |

| L (%) | Time (kHrs) |
|-------|-------------|
| 65.9  | 200         |
| 80.0  | 102         |
| 80.4  | 100         |
| 90.0  | 43          |

## Projection graphic



LxB50 results according to LM-80 and TM21-19 DRAFT procedures and norms.

LxBy results derived from LxB50 according to IEC 62717 Annex C.

## LED Flux measurement

Date : **22-08-23**

Operator : **FCE**

Filename : **2023\_433.xml**

FORM-L-41 V1



713-TEST

NBN EN ISO/IEC 17025 :2017

### LEDs

Trademark : **Seoul**

Entry number : **43R315-3**

Type : **5050**

BIN Description : **W4**

Part number : **Unknown**

Color or CCT (Theoretical) : **Neutral White**

Number of LEDs : **24**

### Lenses

Trademark : **None**

Type : **None**

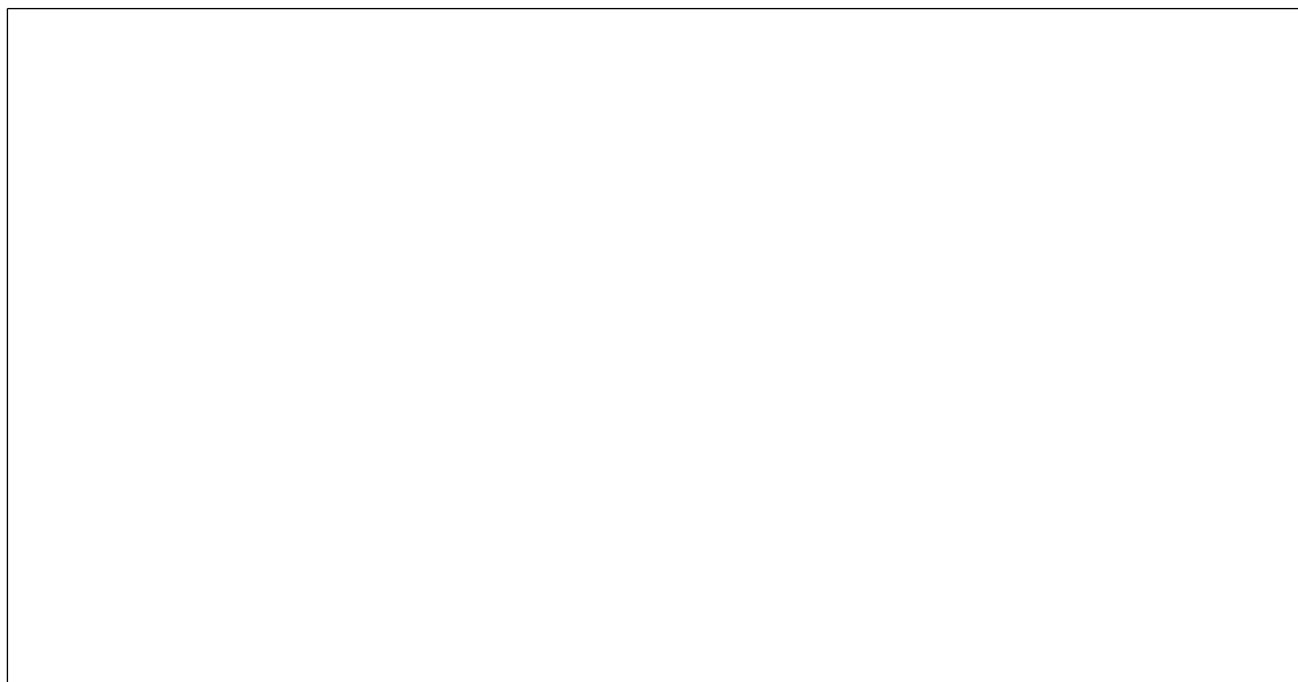
### Power & Print

Type : **DELTA SM400-AR-4**

Print description : **03-52-266**

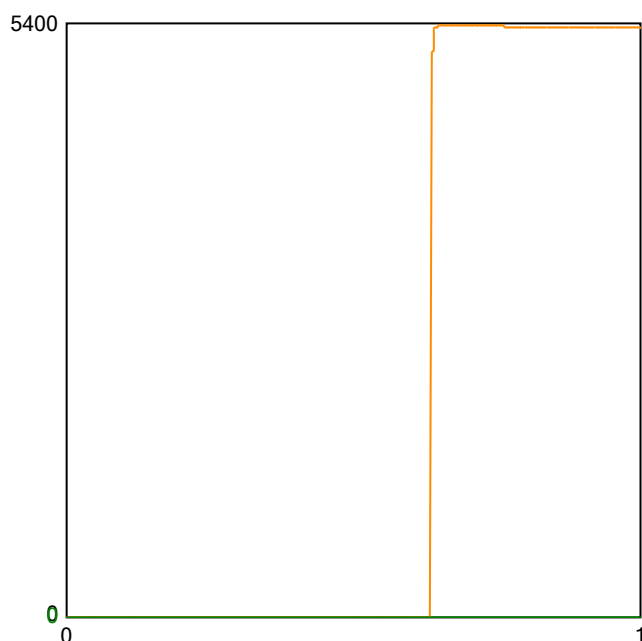
Active ☐

### Picture



## Sphere photometric measurement

Maximum flux : **5388** lm



### Operating condition

Position in sphere :

Ambient sphere T : **25,1** °C

## Electrical measurement

### ● Secondary electrical measurement

Voltage : **44,42** V

Current : **0,600** A

Power : **26,65** W

→ LEDs light efficiency :

**202,2** lm/W

**224,5** lm/Led

### ● Primary electrical measurement

Voltage : **N/A** V

Current : **N/A** A

Power : **N/A** W

Cos  $\varphi$  : **N/A**

→ Driver losses : **N/A** %

→ LEDS & Driver light efficiency :

**N/A** lm/W

Description :

Flux @25°/600mA (200mA/led) - pcba Hi-Flex1 - 20 Seoul 5050 - bin: W4 - 740 - pcba N°3

Comment :

FORM-L-41 V1

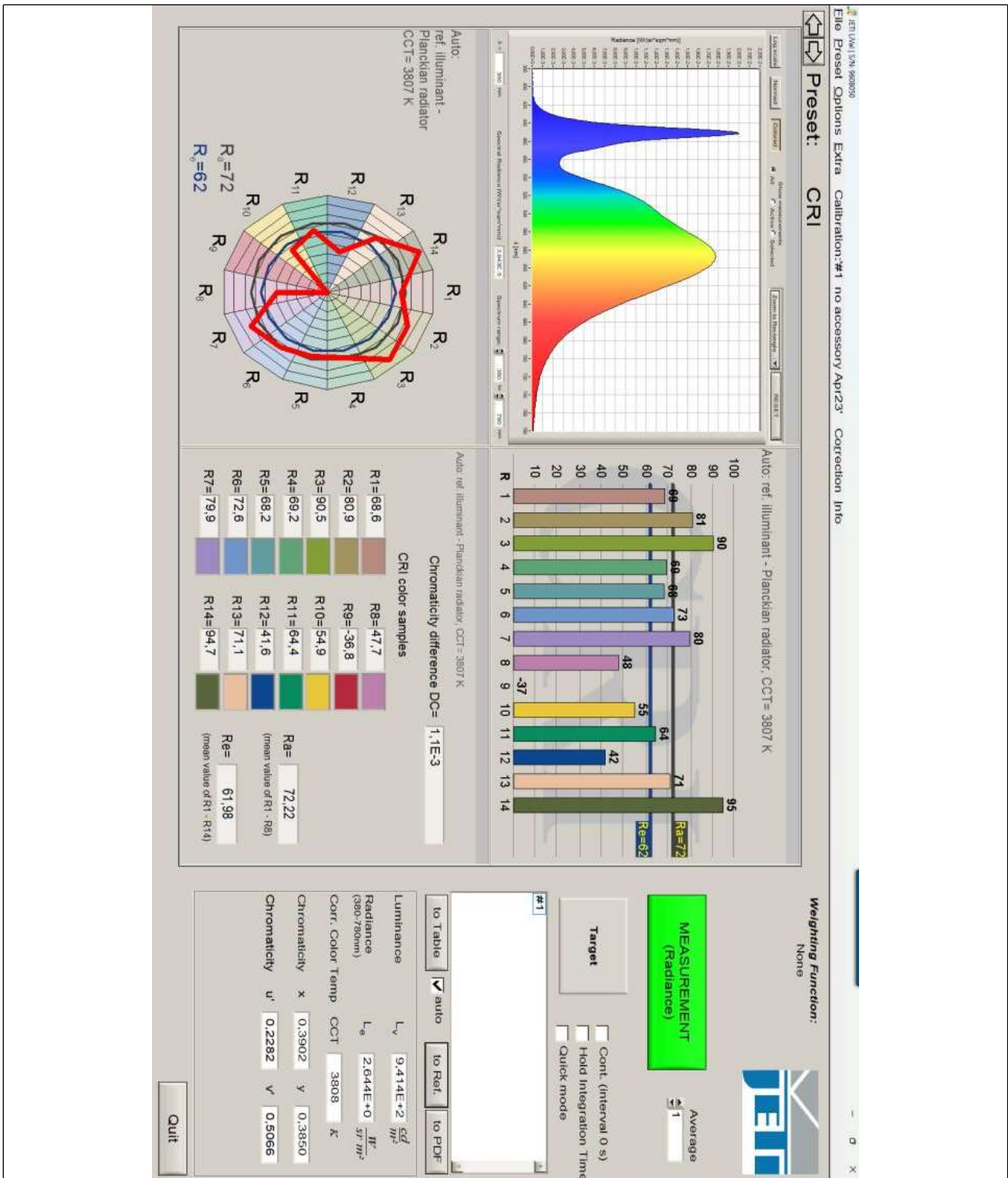


713-TEST

NBN EN ISO/IEC 17025 : 2017



## Colorimetry



SCHREDER-PHOTOMETRY LABORATORY

Testreport : Measurement of luminous intensity distribution related to the standard  
NBN-EN 13032-1; NBN-EN 13032-4; CIE 121-1996; CIE S 025/E; IES LM-79-08 and procedures PT-P-01  
and PT-P-02  
rue de Mons, 3 B-4000 LIEGE - Tel : 04/224.71.40 - Fax : 04/224.25.90  
Measurement for Schröder.



|                                                                                                                                                                                                                                                                                                   |                                          |                                                          |                   |                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------|-------------------|----------------------|
| Origin<br>Schröder Magyarország Zrt.                                                                                                                                                                                                                                                              | Production<br>Schröder Magyarország Zrt. | Luminaire<br>VITALUM 1                                   | Inclination<br>0° | Request #<br>FD44400 |
| Source                                                                                                                                                                                                                                                                                            |                                          |                                                          |                   |                      |
| Type<br>LED                                                                                                                                                                                                                                                                                       | BIN<br>W4                                | Trademark<br>Seoul                                       | Reference<br>5050 | # LEDs<br>24         |
| Master                                                                                                                                                                                                                                                                                            |                                          | Reflector<br>Schröder Led assembly Narrow Assembled 0,0° |                   | No<br>5424           |
| Protector Refractor Lens                                                                                                                                                                                                                                                                          |                                          |                                                          |                   |                      |
| Protector    Glass Extra Clear Flat Smooth<br>Lens        Seoul 5424                                                                                                                                                                                                                              |                                          |                                                          |                   |                      |
| Laboratory observation                                                                                                                                                                                                                                                                            |                                          |                                                          |                   |                      |
| VITALUM 1 with 24 SEOUL 5050 bin W4 (NW740) HF1<br>Used flux for efficiency matrix calculation = 5388 lm - CCT = 3808 K - CRI = 72,22 (see sphere test report 2023/433 on appendix).                                                                                                              |                                          |                                                          |                   |                      |
| Purpose    DOC                                                                                                                                                                                                                                                                                    |                                          | Sample date<br>04/10/2023                                |                   | Sample #<br>43R375   |
| Observation                                                                                                                                                                                                                                                                                       |                                          |                                                          |                   |                      |
| DOC VITALUM 1 with lenses 5424<br><br>Gonio measurement only @600mA - Coef I measured in sphere IPS2000<br>Flux coefficient multiplicator<br>From 600 to 200 mA : 0,349<br>From 600 to 400 mA : 0,684<br>From 600 to 800 mA : 1,295<br>From 600 to 1000 mA : 1,569<br>From 600 to 1050 mA : 1,632 |                                          |                                                          |                   |                      |
| Notes                                                                                                                                                                                                                                                                                             |                                          |                                                          |                   |                      |
| The publication of this report in another form than the original one is not allowed without agreement of the laboratory.<br>This report concerns type tests on one or a series of specimens. All information but the measurements results are provided by the customer.                           |                                          |                                                          |                   |                      |

|                 |                    |                      |               |                                        |       |
|-----------------|--------------------|----------------------|---------------|----------------------------------------|-------|
| Asked by<br>VLG | Measured by<br>CLD | Approved by<br>RLABO | Appendix<br>1 | 713-TEST<br>NBN EN ISO/IEC 17025 :2017 | 57538 |
|-----------------|--------------------|----------------------|---------------|----------------------------------------|-------|



LUMINOUS INTENSITY DIAGRAM

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                    |                        |                       |                      |                      |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------|------------------------|-----------------------|----------------------|----------------------|
| Origin<br>Schröder Magyarország Zrt. |                                                                                                                                                                                                                                                                                                                                                                                                                         | Production<br>Schröder Magyarország Zrt. |                    | Luminaire<br>VITALUM 1 |                       | Inclination<br>0°    | Request #<br>FD44400 |
| Source                               | Type<br>LED                                                                                                                                                                                                                                                                                                                                                                                                             | BIN<br>W4                                | Trademark<br>Seoul | Reference<br>5050      | # LEDs<br>24          | Reflector<br>5424    |                      |
| Reflector                            | Schreder Led assembly Narrow Assembled 0,0°                                                                                                                                                                                                                                                                                                                                                                             |                                          |                    |                        |                       | No                   | 5424                 |
| Matrices                             | 575381      Φ 0-90° = 4410lm   -   90-180° = 0lm                                                                                                                                                                                                                                                                                                                                                                        |                                          |                    |                        |                       | Absolute measurement |                      |
| Protector Refractor<br>Lens          | Protector   Glass Extra Clear Flat Smooth - VITALUM 1<br>Lens   24 x Seoul 5424                                                                                                                                                                                                                                                                                                                                         |                                          |                    |                        |                       |                      |                      |
| Observation                          | Matrix in total flux@600mA<br><br>Electrical measurement on LED (#1) :   Voltage = 43,92 V      Current = 0,600 A      Power = 26,37 W<br>Electrical measurement on driver (#1) :   Voltage = 230,00 V      Current = 0,134 A      Power = 30,16 W      PF = 0,975<br><br>Total luminaire power = 30,16 W : Lm/Watt = 146,24 lm/W<br><br>Driver #1 : SIGNIFY Xi FP 40W 0.3-1.0A SNLDAE 230V C123 sXt , PCBA : 03-52-266 |                                          |                    |                        |                       |                      |                      |
| Plane                                | I Peak                                                                                                                                                                                                                                                                                                                                                                                                                  | Peak position                            | Index              | I zero                 | Laboratory ambient t° | Measurement date     |                      |
| 5 - 175                              | 2365                                                                                                                                                                                                                                                                                                                                                                                                                    | 57                                       | S                  | 1276                   | 25,0°                 | 25/10/2023           |                      |
| 90                                   | 1479                                                                                                                                                                                                                                                                                                                                                                                                                    | 26                                       | D                  |                        |                       |                      |                      |
| 270                                  | 1276                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                        | G                  |                        |                       |                      |                      |

The diagram is a semi-circular plot with a grid. The vertical axis represents the angle from 0° to 90°. The horizontal axis represents the angle from 0° to 90° on both sides. Concentric circles are labeled 500, 1000, 1500, and 2000 cd/klm. Three curves are plotted: a red curve representing the main beam spread, a blue curve representing a narrower beam, and a green curve representing a different beam profile. The red curve peaks at approximately 175° and 57°.

57538

LUMINOUS INTENSITY DIAGRAM

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                    |                        |                       |                      |                      |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------|------------------------|-----------------------|----------------------|----------------------|
| Origin<br>Schröder Magyarország Zrt. |                                                                                                                                                                                                                                                                                                                                                                                                    | Production<br>Schröder Magyarország Zrt. |                    | Luminaire<br>VITALUM 1 |                       | Inclination<br>0°    | Request #<br>FD44400 |
| Source                               | Type<br>LED                                                                                                                                                                                                                                                                                                                                                                                        | BIN<br>W4                                | Trademark<br>Seoul | Reference<br>5050      | # LEDs<br>24          | Reflector<br>5424    |                      |
| Reflector                            | Schreder Led assembly Narrow Assembled 0,0°                                                                                                                                                                                                                                                                                                                                                        |                                          |                    |                        |                       | No                   | 5424                 |
| Matrices                             | 575382      η 0-90° = 81,9%   -   90-180° = 0,0%                                                                                                                                                                                                                                                                                                                                                   |                                          |                    |                        |                       | Relative measurement |                      |
| Protector Refractor<br>Lens          | Protector   Glass Extra Clear Flat Smooth - VITALUM 1<br>Lens      24 x Seoul 5424                                                                                                                                                                                                                                                                                                                 |                                          |                    |                        |                       |                      |                      |
| Observation                          | Matrix in efficiency@600mA<br><br>Electrical measurement on LED (#1) :   Voltage = 43,92 V      Current = 0,600 A      Power = 26,37 W<br>Electrical measurement on driver (#1) :   Voltage = 230,00 V      Current = 0,134 A      Power = 30,16 W      PF = 0,975<br><b>Total luminaire power = 30,16 W</b><br><br>Driver #1 : SIGNIFY Xi FP 40W 0.3-1.0A SNLDAE 230V C123 sXt , PCBA : 03-52-266 |                                          |                    |                        |                       |                      |                      |
| Plane                                | I Peak                                                                                                                                                                                                                                                                                                                                                                                             | Peak position                            | Index              | I zero                 | Laboratory ambient t° | Measurement date     |                      |
| 5 - 175                              | 439                                                                                                                                                                                                                                                                                                                                                                                                | 57                                       | S                  | 237                    | 25,0°                 | 25/10/2023           |                      |
| 90                                   | 275                                                                                                                                                                                                                                                                                                                                                                                                | 26                                       | D                  |                        |                       |                      |                      |
| 270                                  | 237                                                                                                                                                                                                                                                                                                                                                                                                | 0                                        | G                  |                        |                       |                      |                      |

57538

## INFORMATION

### Measurement fulfil Standards:

NBN-EN 13032-1  
NBN-EN 13032-4  
NBN-EN 17025:2017  
CIE 121-1996  
LM79-08  
CIE S 025

### Measurement quantities measured:

Light distribution in relative or absolute photometry  
Led alone cold lumen package  
Led CCT and CRI  
Power consumption of the fitting  
Lm/watt

### Electrical measurement, if not specified:

Primary values are AC with 50Hz frequency  
Secondary values on SSL are DC

CCT, CRI and chromaticity coordinates: are measured in Ulbricht sphere.  
If specified Main test report refer to sphere extra test report.

Light distribution are measured on gonio. If not otherwise specified, measurement is done at 50 Hz

Number of hours operated prior to measurement: if not otherwise specified, 0 hours (no aging).

Stabilization time: If not otherwise specified, a minimal stabilization time of 0.5 hour is applied; and measurement will start when it exists no more variation above 0.5% in 15 minutes

Total operating time of the product including stabilization:  
45 minutes have to be added by measurement.  
Minimal operating time is 75 minutes

Luminous intensity distribution: available on electronic file with  
.mat format (internal Schröder format)  
.ldt format (European standard)  
.IES format (American standard)

Statement of uncertainties (K=2, 95% of confidence level):  
Uncertainties calculated based on a typical Schröder fitting and PCBA

Intensity measurement: +/- 3.5%  
Angle: +/- 0.5°  
Flux: +/- 2.5%  
Electrical DC  
Power: +/- 0.15%  
Voltage: +/- 0.10%  
Current: +/- 0.20%  
Electrical AC  
Power: +/- 0.20%  
Voltage: +/- 0.10%  
Current: +/- 0.15%  
Temperature: +/- 0.65%

| ISP2000 | JETI   |          |
|---------|--------|----------|
| CCT:    | +/- 5% | +/-7.5%  |
| CRI:    | +/- 2% | +/-2.75% |
| x/y:    | +/- 2% | +/-4.6%  |

lm/Watt: +/-3.4%

Measuring instruments in use:

#### Gonio 1

Type C with Moving mirror

Manufacturer: LMT Lichtmesstechnik GmbH Berlin, Helmholtzstrasse 9 10587 Berlin, Germany

Type: GO-DS 2000

Calibration: traceable to PTB (Physikalisch-Technische Bundesanstalt D-Braunschweig) and METAS (Federal Institute of Metrology, CH-Bern)

Photometric test distance: By default 10 meter, on request 30 meter.

#### Gonio 2

Type C

Manufacturer: Technoteam Bildverarbeitung, Werner-von-Siemens-Strasse 5 98693 Ilmenau, Germany

Calibration: traceable to BIPM (Bureau International des Poids et Mesures F-Sèvres)

Photometric test distance: Near Field

#### Sphere n°1

4p geometry

Manufacturer: LMT Lichtmesstechnik GmbH, Helmholtzstrasse 9 10587 Berlin, Germany

Type: UL2000 + U1000 V-Lambda photometer

Calibration: traceable to BIPM (Bureau International des Poids et Mesures F-Sèvres)

#### Sphere n°2

4p geometry

Manufacturer: Instrument Systems GmbH, Neumarkter Str. 83, 81673 Muenchen, Germany

Type ISP2000 + Spectroradiometer CAS120 and CAS140

Calibration: traceable to NIST

#### Colorimetric portable spectroradiometer

Manufacturer: JETI Technische Instrumente GmbH, Tatzendpromenade 2 07745 Jena

Type: SPECBOS 1201

Calibration: traceable to NIST

#### Multimeters

Manufacturer: Agilent

Type: 34401A

Calibration: traceable to BIPM (Bureau International des Poids et Mesures F-Sèvres)

#### Wattmeters

Manufacturer: Yokogawa

Type: WT210 and WT310

Calibration: traceable to BIPM (Bureau International des Poids et Mesures F-Sèvres)

#### Thermometers

Amarell Precision

Type: Liquid in glass N63833

Calibration: traceable to LBT (Laboratoire Belge de Thermométrie)

End of test report

## DECLARAȚIE DE CONFORMITATE



SCHRÉDER ROMANIA S.R.L., cu sediul în Cluj - Napoca, str. Corneliu Coposu, nr. 167A, Jud. Cluj, România, înregistrată la Registrul Comerțului cu nr. J12/1759/1998, membră a SCHRÉDER GROUP, în calitate de furnizori de aparate de iluminat marca SCHRÉDER

Declarăm pe propria răspundere că aparatul de iluminat: **VITALUM**

**Echipare:** VITALUM 1 (max. 36 LED-uri)

**Clasa electrică:** I & II

**Caracteristici:** max. 1050mA

**Etanșeitate compartiment optic:** IP 66

**Etanșeitate compartiment aparataj:** IP 66

**Tensiune nominală:** 230 V – 50 Hz

Cu condiția ca acesta să fie instalat, întreținut și utilizat în conformitate cu standardele de instalare și instrucțiunile producătorului, este în conformitate cu următoarele directive sau standarde:

- EN 60598-1: 2015 + A1: 2018
- EN 60598-2-3: 2003 + A1: 2011
- EN 62471: 2008
- EN 62493: 2010
- EN 55015: 2019 + A1:2020
- EN 61000-3-2: 2014
- EN 61000-3-3: 2013
- EN 61547: 2009
- EN 62722-1: 2016
- EN 62722-2-1: 2016
- EN 62696: 2018
- Directiva 2014/30/EU
- Directiva 2014/35/EU
- Directiva 2009/125/EC
- Directiva 2012/19/EU
- Directiva RoHS 2011/65/EU

SCHRÉDER ROMANIA S.R.L.  
Director General,

Alexandru SIRCA



Eliberat,  
Iunie 2024, Cluj-Napoca



# ANSI/IES LM-80 Test Report

**Report Issue Date :** September 08, 2021      **Report Number :** I-190520-096-I-03  
**Testing Start Date :** August 17, 2019      **Testing Completion Date :** July 30, 2021  
**Revision Number :** 03      **Test Duration :** 18 000 h

## Manufacturer Information :

**Applicant :** Seoul Semiconductor Co., LTD  
**Address :** 97-11, Sandan-ro 163, Danwon-gu, Ansan, Gyeonggi-do, Korea 15429

## Description of Test Samples :

**Classification :** LED Package  
**PKG Name :** 5050  
**Part Number :** STW8LAPA  
**Drive Current :** 500 mA

## Test Procedure :

ANSI/IES LM-80-15 Approved Method for Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules



Tested by



JinHwi Han, Research Engineer

Approved by

YoungJoon WON, Laboratory Manager

Seoul Semiconductor Testing Laboratory(TL-688) is accredited to ISO/IEC 17025:2017 for the above test procedure by IAS, USA which is a signatory to ILAC-MRA.

## Seoul Semiconductor Testing Laboratory

If you need to verify the authenticity of this report, please contact the below address.  
97-11, Sandan-ro 163, Danwon-gu, Ansan, Gyeonggi-do, Korea 15429, E-mail: LM80@seoulsemicon.com

## Applicable Series Model Numbers

This LM-80 report is applicable to the following

| Model Name         | Forward Current | Typical VF | Power | LED Number | Power Density          | Current Density        | Minimum Spacing | CCT     |
|--------------------|-----------------|------------|-------|------------|------------------------|------------------------|-----------------|---------|
| STW8LAPA<br>Tested | 500 mA          | 5.9 V      | 2.9 W | 10         | 0.51 W/mm <sup>2</sup> | 175 mA/mm <sup>2</sup> | 0.2 mm          | ≥2200 K |
| STWxL8PA           | 400 mA          | 5.9 V      | 2.4 W | 8          | 0.51 W/mm <sup>2</sup> | 172 mA/mm <sup>2</sup> | 0.3 mm          | ≥2200 K |
| STWxL8SA           | 100 mA          | 24.0 V     | 2.4 W | 8          | 0.51 W/mm <sup>2</sup> | 172 mA/mm <sup>2</sup> | 0.3 mm          | ≥2200 K |

※ 'x' means CRI & can contain 0, 7, 8, and 9.

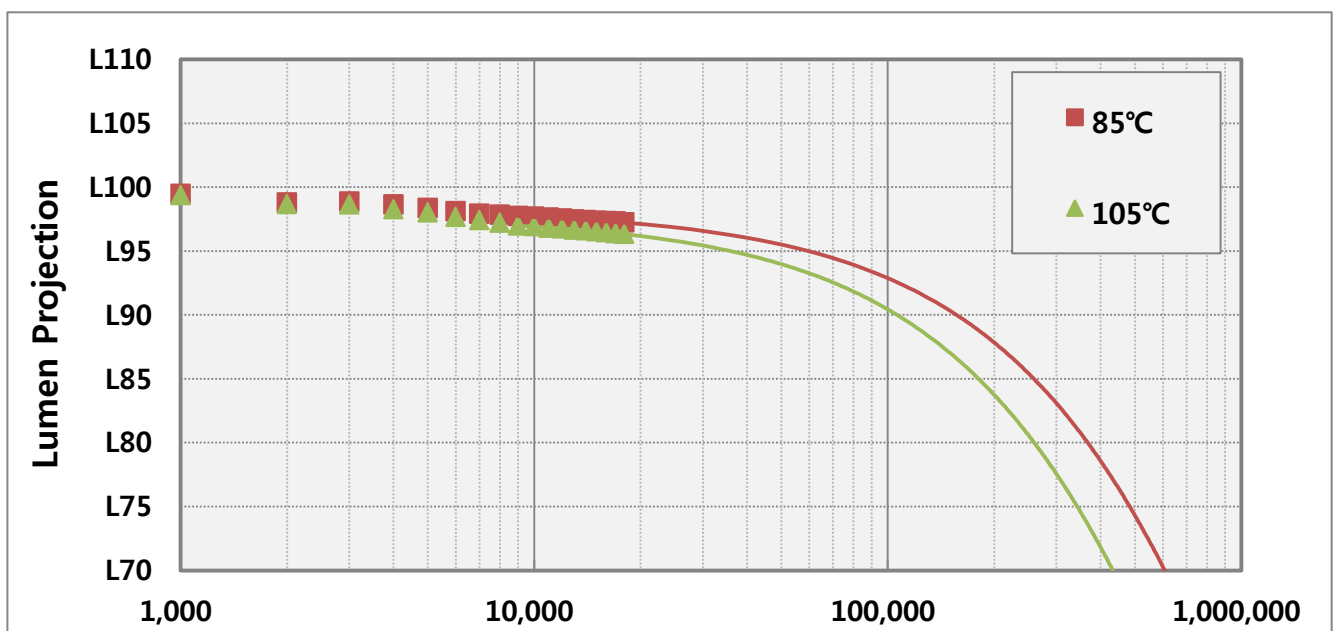


# SEOUL SEMICONDUCTOR

## 1. Test Summary

| Items                                         | Nominal Case Temperature |           |           |
|-----------------------------------------------|--------------------------|-----------|-----------|
|                                               |                          | 85 °C     | 105 °C    |
| Number of LED tested                          |                          | 20        | 20        |
| Drive and Measurement Current                 |                          | 500 mA    | 500 mA    |
| Test Duration                                 |                          | 18 000 h  | 18 000 h  |
| Actual Case Temperature                       |                          | ≥83.2 °C  | ≥103.0 °C |
| Actual Ambient Temperature                    |                          | ≥81.9 °C  | ≥103.9 °C |
| Air Flow Velocity                             |                          | ≤0.20 m/s | ≤0.20 m/s |
| Averaged Initial Luminous Flux                |                          | 437.5 lm  | 434.8 lm  |
| Initial Nominal CCT                           |                          | 2700 K    | 2700 K    |
| Average Initial CRI                           |                          | 81        | 81        |
| Total Input Power                             |                          | 2.9 W     | 2.9 W     |
| Average Current Density (mA/mm <sup>2</sup> ) |                          | 175       | 175       |
| Average Power Density (W/mm <sup>2</sup> )    |                          | 0.51      | 0.51      |
| Minimum Spacing from die edge to die edge     |                          | 0.2 mm    | 0.2 mm    |
| Average Lumen Maintenance                     |                          | 97.2 %    | 96.3 %    |
| Average Chromacity Shift                      |                          | 0.001 5   | 0.002 2   |
| α                                             |                          | 5.580E-07 | 7.687E-07 |
| B                                             |                          | 0.982     | 0.977     |
| TM-21 Projection L <sub>70</sub>              |                          | >108000   | >108000   |
| TM-21 Projection L <sub>80</sub>              |                          | >108000   | >108000   |
| TM-21 Projection L <sub>90</sub>              |                          | >108000   | 106000    |

※ The results shown in this certificate refer only to the sample(s) tested unless otherwise stated.  
This test report cannot be reproduced, except in full.





## 2. IES LM-80-08 Test Report Requirement :

### Number of LED Light Sources Tested

See the Test Summary

### Description of LED Light Sources

See the Description of Test samples at the cover of certificate

### Description of auxiliary equipment

Active cooling Test System

Temperature controlling chamber for LED package/array/module consists of the water cooling heat-sink plates to control the case temperature of each device and of the power supply required by LM-80 test conditions.

Measurement System

Photometric measurement tester for LED package/array/module consists of the integrating sphere with temperature controlling system(TEC) and of programmable current source meter.

### Operating Cycle

Constant Direct Current (DC)

### Ambient Conditions Including Airflow, Temperature and Relative Humidity

Airflow : < 1 m/s

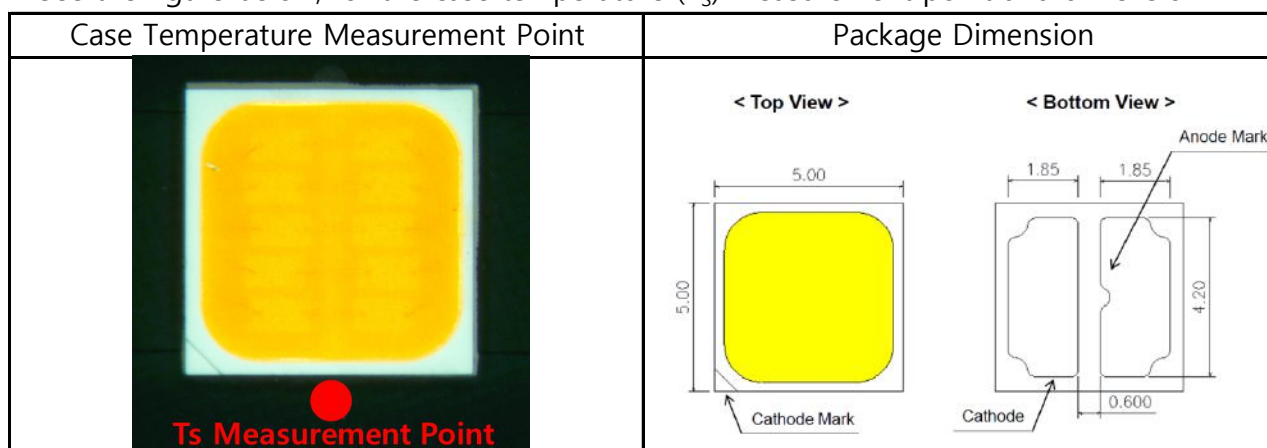
Ambient temperature :  $\geq -5^{\circ}\text{C}$  of Nominal  $T_A$

( See the Test Summary for actual  $T_A$  )

Relative Humidity :  $\leq 65\%$  RH

### Case Temperature (Test Point Temperature)

See the figure below, for the case temperature ( $T_S$ ) measurement point and dimension



**Drive Current of the LED Light Source During Lifetime Test**

See the Test Summary

**Initial Luminous Flux and Forward Voltage at Photometric Measurement Current**

See the Test Summary

**Lumen Maintenance Data for Each Individual LED Light Source Along with Median Value, Standard Deviation, Minimum and Maximum Lumen Maintenance Value for All of the LED Light Sources**

See the table of each data set

**Observation of LED light Sources Failures**

No failure observed

**LED Light Source Monitoring Interval**

See the table of each data set

**Photometric Measurement Uncertainty**

Seoul Semiconductor maintain a tolerance of  $\pm 3.0 \%$  at 95 % confidence level ( $k = 2$ )

**Chromaticity Shift Over the Measurement Time**

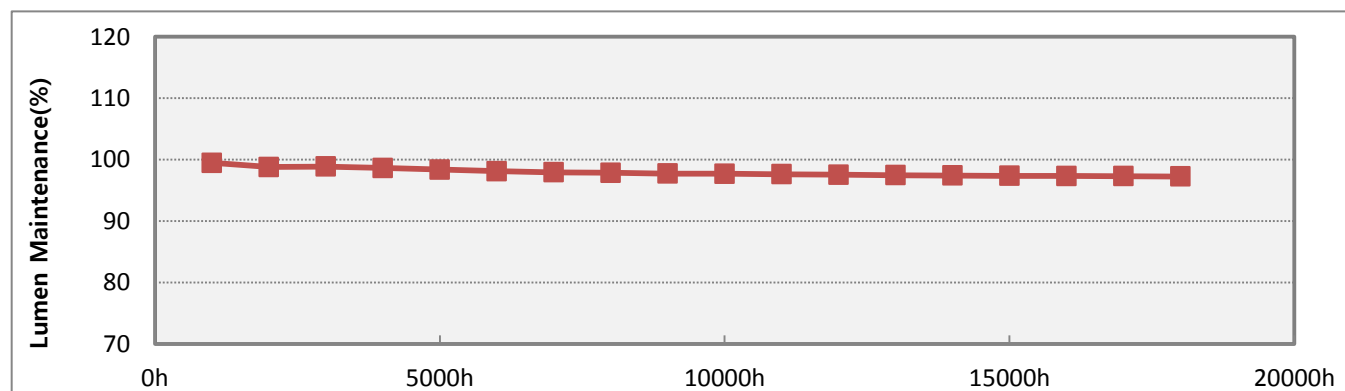
See the table of each data set

**DUT Sampling Method**

Each test condition is made with 20 samples that are randomly taken from 40 samples of 3 manufacturing lot. Each test sample is tested for LM-80 under 2 different temperature condition.

### 3. 85°C Data Set

| No.  | Initial Characteristics |           |         | Lumen Maintenance |        |        |        |        |        |        |        |        |
|------|-------------------------|-----------|---------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|      | Vf (V)                  | Flux (lm) | CCT (K) | 1000 h            | 2000 h | 3000 h | 4000 h | 5000 h | 6000 h | 7000 h | 8000 h | 9000 h |
| 01   | 5.87                    | 436.88    | 2798    | 98.6              | 97.9   | 98.1   | 98.1   | 97.7   | 97.6   | 97.3   | 97.2   | 97.1   |
| 02   | 5.88                    | 441.46    | 2777    | 98.9              | 98.4   | 98.4   | 98.0   | 97.7   | 97.4   | 97.1   | 97.0   | 96.8   |
| 03   | 5.88                    | 436.09    | 2800    | 99.6              | 99.0   | 99.2   | 98.9   | 98.5   | 98.2   | 98.1   | 97.9   | 97.7   |
| 04   | 5.88                    | 427.82    | 2820    | 98.6              | 97.9   | 98.0   | 98.0   | 97.8   | 97.5   | 97.3   | 97.1   | 96.9   |
| 05   | 5.87                    | 435.54    | 2810    | 100.0             | 99.1   | 98.9   | 98.7   | 98.4   | 98.1   | 97.9   | 97.8   | 97.7   |
| 06   | 5.89                    | 444.50    | 2797    | 99.8              | 99.2   | 99.2   | 98.9   | 98.7   | 98.5   | 98.3   | 98.2   | 97.9   |
| 07   | 5.88                    | 444.25    | 2767    | 99.8              | 99.2   | 99.3   | 99.0   | 98.9   | 98.6   | 98.4   | 98.4   | 98.3   |
| 08   | 5.88                    | 435.74    | 2780    | 99.3              | 98.5   | 99.1   | 98.6   | 98.2   | 97.9   | 97.9   | 97.8   | 97.8   |
| 09   | 5.90                    | 439.82    | 2837    | 99.8              | 98.7   | 98.9   | 98.6   | 98.2   | 98.0   | 97.8   | 97.7   | 97.6   |
| 10   | 5.92                    | 442.44    | 2801    | 99.4              | 98.8   | 98.9   | 98.5   | 98.3   | 98.0   | 97.8   | 97.8   | 97.7   |
| 11   | 5.89                    | 444.70    | 2804    | 99.4              | 98.6   | 98.8   | 98.6   | 98.3   | 98.0   | 97.9   | 97.8   | 97.8   |
| 12   | 5.87                    | 424.26    | 2779    | 99.0              | 98.2   | 98.9   | 98.1   | 97.8   | 97.5   | 97.4   | 97.4   | 97.4   |
| 13   | 5.88                    | 433.45    | 2789    | 99.7              | 99.2   | 99.0   | 99.0   | 98.7   | 98.4   | 98.2   | 98.1   | 98.0   |
| 14   | 5.85                    | 434.99    | 2795    | 99.8              | 99.1   | 99.1   | 99.1   | 98.8   | 98.2   | 98.0   | 98.0   | 97.8   |
| 15   | 5.86                    | 444.10    | 2778    | 99.8              | 99.1   | 99.0   | 98.9   | 98.8   | 98.6   | 98.4   | 98.3   | 98.1   |
| 16   | 5.88                    | 436.97    | 2794    | 99.6              | 99.1   | 98.9   | 98.7   | 98.6   | 98.4   | 98.1   | 98.0   | 97.9   |
| 17   | 5.87                    | 435.11    | 2775    | 99.8              | 99.1   | 99.0   | 98.9   | 98.6   | 98.4   | 98.3   | 98.2   | 98.1   |
| 18   | 5.89                    | 435.45    | 2811    | 99.1              | 98.4   | 98.4   | 98.1   | 98.1   | 97.8   | 97.6   | 97.4   | 97.3   |
| 19   | 5.90                    | 442.81    | 2790    | 99.9              | 99.3   | 99.3   | 99.3   | 98.9   | 98.7   | 98.6   | 98.5   | 98.3   |
| 20   | 5.89                    | 433.87    | 2801    | 99.7              | 99.1   | 99.1   | 99.0   | 98.6   | 98.5   | 98.2   | 98.3   | 98.2   |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
| Ave. | 5.88                    | 437.51    | 2795    | 99.5              | 98.8   | 98.9   | 98.6   | 98.4   | 98.1   | 97.9   | 97.8   | 97.7   |
| Med. | 5.88                    | 436.48    | 2796    | 99.7              | 99.0   | 99.0   | 98.7   | 98.5   | 98.1   | 98.0   | 97.9   | 97.8   |
| Min. | 5.85                    | 424.26    | 2767    | 98.6              | 97.9   | 98.0   | 98.0   | 97.7   | 97.4   | 97.1   | 97.0   | 96.8   |
| Max. | 5.92                    | 444.70    | 2837    | 100.0             | 99.3   | 99.3   | 99.3   | 98.9   | 98.7   | 98.6   | 98.5   | 98.3   |
| σ    | 0.02                    | 5.56      | 17      | 0.4               | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    | 0.4    |

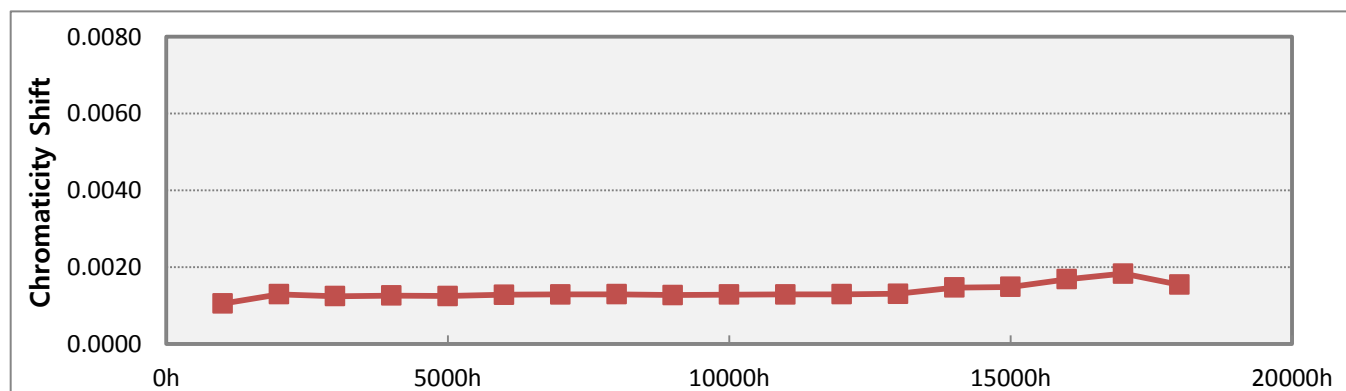


### 3. 85°C Data Set

| No.      |  | Lumen Maintenance |         |         |         |         |         |         |         |         |
|----------|--|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|          |  | 10000 h           | 11000 h | 12000 h | 13000 h | 14000 h | 15000 h | 16000 h | 17000 h | 18000 h |
| 01       |  | 97.1              | 97.0    | 96.9    | 96.8    | 96.5    | 96.5    | 96.5    | 96.4    | 96.4    |
| 02       |  | 96.8              | 96.7    | 96.7    | 96.6    | 96.2    | 96.2    | 96.0    | 96.1    | 96.0    |
| 03       |  | 97.7              | 97.6    | 97.5    | 97.5    | 97.2    | 97.2    | 97.1    | 97.1    | 97.1    |
| 04       |  | 96.7              | 96.7    | 96.7    | 96.6    | 97.2    | 97.1    | 97.1    | 97.1    | 96.9    |
| 05       |  | 97.7              | 97.5    | 97.6    | 97.4    | 97.5    | 97.5    | 97.4    | 97.4    | 97.3    |
| 06       |  | 97.9              | 97.9    | 97.8    | 97.7    | 97.4    | 97.4    | 97.4    | 97.3    | 97.3    |
| 07       |  | 98.4              | 98.2    | 98.2    | 98.1    | 98.1    | 98.1    | 98.0    | 98.0    | 98.0    |
| 08       |  | 97.8              | 97.7    | 97.7    | 97.6    | 97.3    | 97.3    | 97.3    | 97.2    | 97.2    |
| 09       |  | 97.6              | 97.6    | 97.5    | 97.4    | 97.5    | 97.4    | 97.4    | 97.4    | 97.3    |
| 10       |  | 97.7              | 97.6    | 97.5    | 97.4    | 97.0    | 96.9    | 96.9    | 96.9    | 96.8    |
| 11       |  | 97.7              | 97.8    | 97.7    | 97.6    | 97.5    | 97.5    | 97.5    | 97.5    | 97.4    |
| 12       |  | 97.4              | 97.3    | 97.2    | 97.0    | 95.8    | 95.8    | 95.8    | 95.8    | 95.7    |
| 13       |  | 97.9              | 97.9    | 97.9    | 97.8    | 98.0    | 98.0    | 98.0    | 97.9    | 97.9    |
| 14       |  | 97.7              | 97.7    | 97.6    | 97.5    | 97.7    | 97.7    | 97.7    | 97.7    | 97.6    |
| 15       |  | 98.0              | 98.0    | 97.9    | 97.8    | 98.0    | 97.9    | 97.9    | 97.8    | 97.8    |
| 16       |  | 97.8              | 97.7    | 97.8    | 97.6    | 97.8    | 97.8    | 97.8    | 97.8    | 97.7    |
| 17       |  | 98.1              | 98.0    | 97.9    | 97.9    | 98.1    | 98.0    | 98.0    | 98.0    | 98.0    |
| 18       |  | 97.2              | 97.2    | 97.2    | 97.0    | 97.4    | 97.4    | 97.4    | 97.3    | 97.3    |
| 19       |  | 98.3              | 98.1    | 98.1    | 98.1    | 97.7    | 97.7    | 97.6    | 97.5    | 97.5    |
| 20       |  | 98.3              | 98.1    | 97.9    | 97.8    | 98.1    | 98.1    | 98.1    | 98.0    | 98.0    |
|          |  |                   |         |         |         |         |         |         |         |         |
|          |  |                   |         |         |         |         |         |         |         |         |
|          |  |                   |         |         |         |         |         |         |         |         |
|          |  |                   |         |         |         |         |         |         |         |         |
|          |  |                   |         |         |         |         |         |         |         |         |
| Ave.     |  | 97.7              | 97.6    | 97.6    | 97.5    | 97.4    | 97.4    | 97.3    | 97.3    | 97.2    |
| Med.     |  | 97.7              | 97.7    | 97.6    | 97.5    | 97.5    | 97.4    | 97.4    | 97.4    | 97.3    |
| Min.     |  | 96.7              | 96.7    | 96.7    | 96.6    | 95.8    | 95.8    | 95.8    | 95.8    | 95.7    |
| Max.     |  | 98.4              | 98.2    | 98.2    | 98.1    | 98.1    | 98.1    | 98.1    | 98.0    | 98.0    |
| $\sigma$ |  | 0.5               | 0.4     | 0.4     | 0.4     | 0.6     | 0.6     | 0.6     | 0.6     | 0.6     |

### 3. 85°C Data Set

| No.  | Initial Characteristics |        |     | Chromaticity Shift du'v' |        |        |        |        |        |        |        |        |
|------|-------------------------|--------|-----|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|      | u'                      | v'     | CRI | 1000 h                   | 2000 h | 3000 h | 4000 h | 5000 h | 6000 h | 7000 h | 8000 h | 9000 h |
| 01   | 0.2588                  | 0.5233 | 81  | 0.0014                   | 0.0016 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 |
| 02   | 0.2594                  | 0.5247 | 81  | 0.0011                   | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 |
| 03   | 0.2586                  | 0.5235 | 81  | 0.0010                   | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 |
| 04   | 0.2580                  | 0.5222 | 82  | 0.0011                   | 0.0014 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0013 |
| 05   | 0.2585                  | 0.5217 | 82  | 0.0009                   | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0015 |
| 06   | 0.2583                  | 0.5254 | 81  | 0.0010                   | 0.0012 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 |
| 07   | 0.2595                  | 0.5264 | 81  | 0.0010                   | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| 08   | 0.2589                  | 0.5264 | 81  | 0.0010                   | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0011 |
| 09   | 0.2576                  | 0.5209 | 82  | 0.0010                   | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
| 10   | 0.2587                  | 0.5227 | 81  | 0.0011                   | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
| 11   | 0.2587                  | 0.5224 | 81  | 0.0011                   | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
| 12   | 0.2590                  | 0.5260 | 81  | 0.0010                   | 0.0013 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| 13   | 0.2591                  | 0.5237 | 81  | 0.0012                   | 0.0014 | 0.0014 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| 14   | 0.2588                  | 0.5236 | 81  | 0.0009                   | 0.0012 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
| 15   | 0.2592                  | 0.5257 | 81  | 0.0010                   | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0011 |
| 16   | 0.2590                  | 0.5227 | 81  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 |
| 17   | 0.2596                  | 0.5241 | 81  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0012 |
| 18   | 0.2584                  | 0.5222 | 82  | 0.0012                   | 0.0015 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 |
| 19   | 0.2585                  | 0.5260 | 81  | 0.0010                   | 0.0012 | 0.0012 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0011 | 0.0011 |
| 20   | 0.2586                  | 0.5233 | 81  | 0.0010                   | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
| Ave. | 0.2588                  | 0.5238 | 81  | 0.0011                   | 0.0013 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| Med. | 0.2587                  | 0.5235 | 81  | 0.0010                   | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
| Min. | 0.2576                  | 0.5209 | 81  | 0.0009                   | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Max. | 0.2596                  | 0.5264 | 82  | 0.0014                   | 0.0016 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0016 |
| σ    | 0.0005                  | 0.0017 | 0.3 | 0.0001                   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |

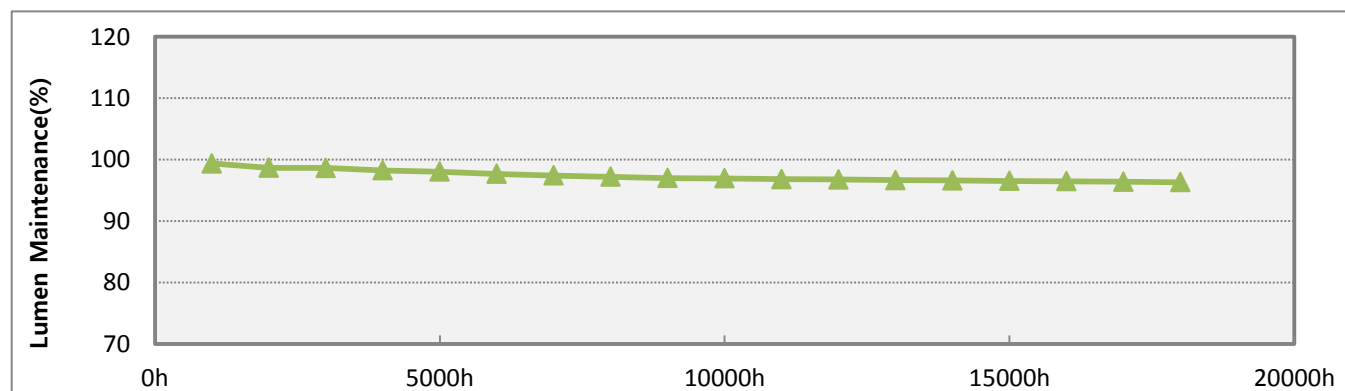


### 3. 85°C Data Set

| No.  |  | Chromaticity Shift du'v' |         |         |         |         |         |         |         |         |
|------|--|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|      |  | 10000 h                  | 11000 h | 12000 h | 13000 h | 14000 h | 15000 h | 16000 h | 17000 h | 18000 h |
| 01   |  | 0.0016                   | 0.0015  | 0.0015  | 0.0016  | 0.0019  | 0.0019  | 0.0022  | 0.0023  | 0.0019  |
| 02   |  | 0.0017                   | 0.0016  | 0.0017  | 0.0017  | 0.0020  | 0.0020  | 0.0022  | 0.0023  | 0.0021  |
| 03   |  | 0.0013                   | 0.0013  | 0.0013  | 0.0014  | 0.0016  | 0.0016  | 0.0018  | 0.0021  | 0.0016  |
| 04   |  | 0.0014                   | 0.0013  | 0.0014  | 0.0014  | 0.0015  | 0.0015  | 0.0018  | 0.0020  | 0.0016  |
| 05   |  | 0.0015                   | 0.0015  | 0.0015  | 0.0015  | 0.0017  | 0.0017  | 0.0020  | 0.0020  | 0.0018  |
| 06   |  | 0.0013                   | 0.0013  | 0.0013  | 0.0013  | 0.0015  | 0.0015  | 0.0017  | 0.0019  | 0.0016  |
| 07   |  | 0.0011                   | 0.0011  | 0.0011  | 0.0011  | 0.0012  | 0.0012  | 0.0014  | 0.0017  | 0.0012  |
| 08   |  | 0.0012                   | 0.0011  | 0.0012  | 0.0011  | 0.0013  | 0.0013  | 0.0016  | 0.0015  | 0.0013  |
| 09   |  | 0.0012                   | 0.0012  | 0.0012  | 0.0012  | 0.0014  | 0.0014  | 0.0015  | 0.0018  | 0.0014  |
| 10   |  | 0.0012                   | 0.0012  | 0.0012  | 0.0012  | 0.0016  | 0.0016  | 0.0019  | 0.0020  | 0.0019  |
| 11   |  | 0.0012                   | 0.0012  | 0.0012  | 0.0012  | 0.0013  | 0.0013  | 0.0014  | 0.0017  | 0.0013  |
| 12   |  | 0.0013                   | 0.0013  | 0.0013  | 0.0014  | 0.0016  | 0.0016  | 0.0017  | 0.0020  | 0.0018  |
| 13   |  | 0.0013                   | 0.0013  | 0.0013  | 0.0013  | 0.0014  | 0.0014  | 0.0016  | 0.0017  | 0.0014  |
| 14   |  | 0.0012                   | 0.0012  | 0.0012  | 0.0012  | 0.0013  | 0.0013  | 0.0016  | 0.0017  | 0.0013  |
| 15   |  | 0.0011                   | 0.0012  | 0.0012  | 0.0012  | 0.0014  | 0.0014  | 0.0016  | 0.0016  | 0.0016  |
| 16   |  | 0.0014                   | 0.0014  | 0.0014  | 0.0014  | 0.0015  | 0.0015  | 0.0017  | 0.0018  | 0.0015  |
| 17   |  | 0.0012                   | 0.0012  | 0.0012  | 0.0012  | 0.0013  | 0.0013  | 0.0015  | 0.0017  | 0.0013  |
| 18   |  | 0.0014                   | 0.0014  | 0.0014  | 0.0014  | 0.0015  | 0.0015  | 0.0017  | 0.0017  | 0.0015  |
| 19   |  | 0.0011                   | 0.0011  | 0.0011  | 0.0011  | 0.0013  | 0.0013  | 0.0016  | 0.0017  | 0.0016  |
| 20   |  | 0.0012                   | 0.0012  | 0.0012  | 0.0012  | 0.0012  | 0.0013  | 0.0014  | 0.0016  | 0.0012  |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
| Ave. |  | 0.0013                   | 0.0013  | 0.0013  | 0.0013  | 0.0015  | 0.0015  | 0.0017  | 0.0018  | 0.0015  |
| Med. |  | 0.0012                   | 0.0012  | 0.0012  | 0.0013  | 0.0014  | 0.0014  | 0.0017  | 0.0017  | 0.0015  |
| Min. |  | 0.0011                   | 0.0011  | 0.0011  | 0.0011  | 0.0012  | 0.0012  | 0.0014  | 0.0015  | 0.0012  |
| Max. |  | 0.0017                   | 0.0016  | 0.0017  | 0.0017  | 0.0020  | 0.0020  | 0.0022  | 0.0023  | 0.0021  |
| σ    |  | 0.0002                   | 0.0001  | 0.0001  | 0.0001  | 0.0002  | 0.0002  | 0.0002  | 0.0002  | 0.0003  |

#### 4. 105°C Data Set

| No.  | Initial Characteristics |           |         | Lumen Maintenance |        |        |        |        |        |        |        |        |
|------|-------------------------|-----------|---------|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|      | Vf (V)                  | Flux (lm) | CCT (K) | 1000 h            | 2000 h | 3000 h | 4000 h | 5000 h | 6000 h | 7000 h | 8000 h | 9000 h |
| 01   | 5.88                    | 422.27    | 2755    | 99.4              | 98.9   | 98.9   | 98.6   | 98.2   | 97.8   | 97.4   | 97.1   | 96.9   |
| 02   | 5.86                    | 431.64    | 2794    | 99.8              | 99.1   | 99.1   | 98.8   | 98.7   | 98.3   | 98.0   | 97.9   | 97.7   |
| 03   | 5.85                    | 433.47    | 2787    | 99.3              | 98.7   | 98.9   | 98.5   | 98.4   | 97.9   | 97.8   | 97.5   | 97.4   |
| 04   | 5.88                    | 446.24    | 2771    | 99.3              | 98.7   | 98.6   | 98.3   | 98.1   | 97.8   | 97.6   | 97.3   | 97.0   |
| 05   | 5.89                    | 445.66    | 2791    | 99.6              | 98.9   | 98.9   | 98.5   | 98.4   | 98.0   | 97.8   | 97.6   | 97.4   |
| 06   | 5.87                    | 439.13    | 2810    | 98.8              | 98.0   | 98.2   | 97.7   | 97.4   | 97.2   | 96.9   | 96.7   | 96.6   |
| 07   | 5.87                    | 436.18    | 2797    | 99.2              | 98.5   | 98.6   | 98.2   | 97.9   | 97.5   | 97.2   | 97.0   | 96.6   |
| 08   | 5.91                    | 435.08    | 2829    | 97.6              | 96.9   | 97.0   | 96.6   | 96.2   | 95.8   | 95.6   | 95.4   | 95.2   |
| 09   | 5.87                    | 443.07    | 2807    | 99.5              | 98.8   | 98.8   | 98.3   | 98.1   | 97.7   | 97.4   | 97.2   | 96.9   |
| 10   | 5.85                    | 427.70    | 2772    | 99.8              | 99.1   | 99.2   | 99.0   | 98.8   | 98.5   | 98.1   | 97.9   | 97.6   |
| 11   | 5.86                    | 427.34    | 2795    | 99.8              | 99.1   | 99.0   | 98.7   | 98.6   | 98.2   | 98.0   | 97.8   | 97.6   |
| 12   | 5.89                    | 433.38    | 2805    | 99.3              | 98.5   | 98.5   | 98.1   | 97.9   | 97.5   | 97.2   | 97.0   | 96.9   |
| 13   | 5.87                    | 437.34    | 2812    | 99.4              | 98.6   | 98.5   | 98.3   | 97.9   | 97.6   | 97.4   | 97.2   | 96.9   |
| 14   | 5.90                    | 440.28    | 2798    | 99.4              | 98.5   | 98.3   | 97.9   | 97.8   | 97.5   | 97.2   | 96.9   | 96.9   |
| 15   | 5.90                    | 427.17    | 2791    | 99.7              | 99.1   | 98.9   | 98.6   | 98.3   | 98.0   | 97.7   | 97.6   | 97.5   |
| 16   | 5.87                    | 422.21    | 2831    | 99.6              | 98.8   | 98.9   | 98.3   | 98.1   | 97.6   | 97.5   | 97.4   | 97.2   |
| 17   | 5.88                    | 440.07    | 2805    | 99.2              | 98.5   | 98.4   | 98.0   | 97.6   | 97.5   | 97.2   | 96.9   | 96.6   |
| 18   | 5.89                    | 445.15    | 2778    | 99.4              | 98.9   | 98.6   | 98.4   | 98.2   | 97.8   | 97.7   | 97.4   | 97.5   |
| 19   | 5.86                    | 440.37    | 2786    | 99.6              | 98.9   | 98.8   | 98.2   | 97.8   | 97.4   | 97.0   | 96.7   | 96.3   |
| 20   | 5.87                    | 422.65    | 2817    | 99.7              | 98.7   | 98.8   | 98.3   | 98.2   | 97.6   | 97.6   | 97.5   | 97.2   |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
|      |                         |           |         |                   |        |        |        |        |        |        |        |        |
| Ave. | 5.88                    | 434.82    | 2797    | 99.4              | 98.7   | 98.6   | 98.3   | 98.0   | 97.7   | 97.4   | 97.2   | 97.0   |
| Med. | 5.87                    | 435.63    | 2796    | 99.4              | 98.7   | 98.8   | 98.3   | 98.1   | 97.7   | 97.5   | 97.3   | 96.9   |
| Min. | 5.85                    | 422.21    | 2755    | 97.6              | 96.9   | 97.0   | 96.6   | 96.2   | 95.8   | 95.6   | 95.4   | 95.2   |
| Max. | 5.91                    | 446.24    | 2831    | 99.8              | 99.1   | 99.2   | 99.0   | 98.8   | 98.5   | 98.1   | 97.9   | 97.7   |
| σ    | 0.02                    | 7.89      | 19      | 0.5               | 0.5    | 0.5    | 0.5    | 0.6    | 0.5    | 0.5    | 0.6    | 0.6    |



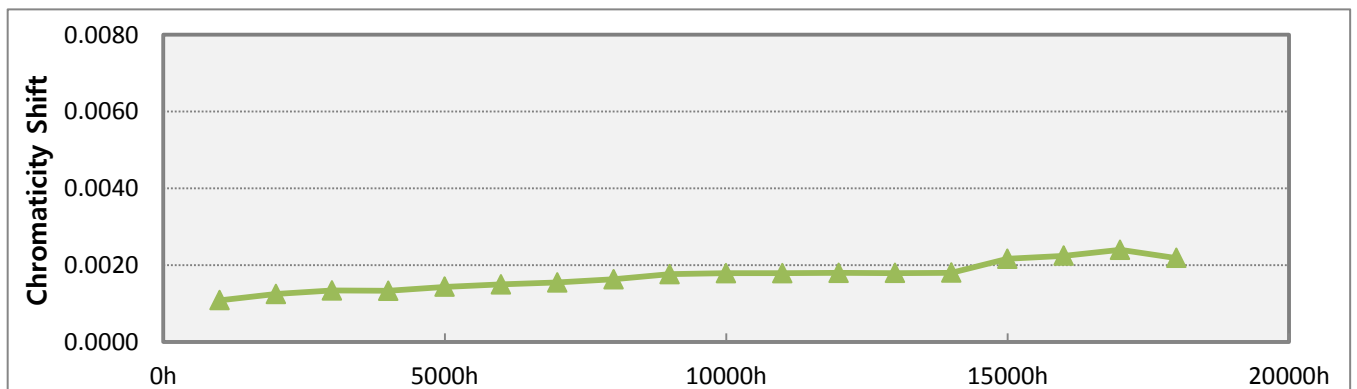
#### 4. 105°C Data Set

| No.  |  | Lumen Maintenance |         |         |         |         |         |         |         |         |
|------|--|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|      |  | 10000 h           | 11000 h | 12000 h | 13000 h | 14000 h | 15000 h | 16000 h | 17000 h | 18000 h |
| 01   |  | 96.8              | 96.6    | 96.7    | 96.5    | 96.5    | 96.5    | 96.4    | 96.4    | 96.3    |
| 02   |  | 97.7              | 97.5    | 97.6    | 97.4    | 97.3    | 97.3    | 97.2    | 97.1    | 97.1    |
| 03   |  | 97.4              | 97.3    | 97.3    | 97.0    | 97.0    | 97.1    | 97.0    | 97.0    | 96.9    |
| 04   |  | 96.8              | 96.6    | 96.7    | 96.5    | 96.5    | 96.4    | 96.3    | 96.3    | 96.2    |
| 05   |  | 97.3              | 97.3    | 97.1    | 97.0    | 97.0    | 96.9    | 96.8    | 96.8    | 96.7    |
| 06   |  | 96.5              | 96.5    | 96.4    | 96.3    | 96.2    | 96.2    | 96.1    | 96.0    | 96.0    |
| 07   |  | 96.6              | 96.5    | 96.6    | 96.4    | 96.4    | 96.4    | 96.3    | 96.3    | 96.2    |
| 08   |  | 95.1              | 94.9    | 94.9    | 94.9    | 94.8    | 94.5    | 94.5    | 94.4    | 94.3    |
| 09   |  | 96.8              | 96.7    | 96.6    | 96.5    | 96.4    | 96.2    | 96.2    | 96.1    | 96.0    |
| 10   |  | 97.6              | 97.6    | 97.5    | 97.5    | 97.3    | 97.4    | 97.4    | 97.3    | 97.2    |
| 11   |  | 97.5              | 97.5    | 97.4    | 97.4    | 97.3    | 97.4    | 97.4    | 97.3    | 97.2    |
| 12   |  | 96.9              | 96.8    | 96.7    | 96.5    | 96.6    | 96.6    | 96.5    | 96.5    | 96.4    |
| 13   |  | 96.8              | 96.8    | 96.7    | 96.6    | 96.5    | 96.5    | 96.4    | 96.3    | 96.2    |
| 14   |  | 96.7              | 96.6    | 96.5    | 96.5    | 96.4    | 96.3    | 96.2    | 96.1    | 96.1    |
| 15   |  | 97.4              | 97.3    | 97.2    | 97.2    | 97.0    | 97.2    | 97.2    | 97.1    | 97.0    |
| 16   |  | 97.4              | 97.1    | 96.9    | 96.9    | 97.0    | 96.8    | 96.7    | 96.6    | 96.6    |
| 17   |  | 96.5              | 96.5    | 96.4    | 96.3    | 96.1    | 96.2    | 96.2    | 96.1    | 96.0    |
| 18   |  | 97.3              | 97.3    | 97.1    | 97.0    | 96.9    | 96.6    | 96.5    | 96.5    | 96.4    |
| 19   |  | 96.3              | 96.2    | 96.2    | 96.1    | 96.0    | 95.7    | 95.6    | 95.6    | 95.5    |
| 20   |  | 97.5              | 96.8    | 96.8    | 96.8    | 97.0    | 96.4    | 96.5    | 96.2    | 96.2    |
|      |  |                   |         |         |         |         |         |         |         |         |
|      |  |                   |         |         |         |         |         |         |         |         |
|      |  |                   |         |         |         |         |         |         |         |         |
|      |  |                   |         |         |         |         |         |         |         |         |
|      |  |                   |         |         |         |         |         |         |         |         |
| Ave. |  | 96.9              | 96.8    | 96.8    | 96.7    | 96.6    | 96.5    | 96.5    | 96.4    | 96.3    |
| Med. |  | 96.9              | 96.8    | 96.7    | 96.6    | 96.6    | 96.5    | 96.4    | 96.3    | 96.3    |
| Min. |  | 95.1              | 94.9    | 94.9    | 94.9    | 94.8    | 94.5    | 94.5    | 94.4    | 94.3    |
| Max. |  | 97.7              | 97.6    | 97.6    | 97.5    | 97.3    | 97.4    | 97.4    | 97.3    | 97.2    |
| σ    |  | 0.6               | 0.6     | 0.6     | 0.6     | 0.6     | 0.7     | 0.7     | 0.7     | 0.7     |



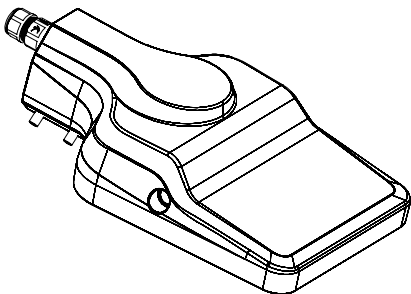
#### 4. 105°C Data Set

| No.  | Initial Characteristics |        |     | Chromaticity Shift du'v' |        |        |        |        |        |        |        |        |
|------|-------------------------|--------|-----|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|      | u'                      | v'     | CRI | 1000 h                   | 2000 h | 3000 h | 4000 h | 5000 h | 6000 h | 7000 h | 8000 h | 9000 h |
| 01   | 0.2601                  | 0.5261 | 81  | 0.0010                   | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0020 |
| 02   | 0.2589                  | 0.5234 | 81  | 0.0010                   | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0015 |
| 03   | 0.2592                  | 0.5233 | 81  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0017 |
| 04   | 0.2594                  | 0.5261 | 81  | 0.0011                   | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 |
| 05   | 0.2586                  | 0.5256 | 81  | 0.0010                   | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0016 |
| 06   | 0.2586                  | 0.5216 | 82  | 0.0012                   | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 |
| 07   | 0.2586                  | 0.5242 | 81  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 |
| 08   | 0.2575                  | 0.5229 | 82  | 0.0014                   | 0.0015 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0022 |
| 09   | 0.2579                  | 0.5254 | 81  | 0.0011                   | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0020 |
| 10   | 0.2600                  | 0.5228 | 82  | 0.0010                   | 0.0011 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 |
| 11   | 0.2585                  | 0.5250 | 81  | 0.0010                   | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0014 |
| 12   | 0.2585                  | 0.5230 | 81  | 0.0012                   | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 |
| 13   | 0.2582                  | 0.5227 | 82  | 0.0011                   | 0.0013 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 |
| 14   | 0.2589                  | 0.5227 | 82  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 |
| 15   | 0.2593                  | 0.5224 | 81  | 0.0011                   | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 |
| 16   | 0.2576                  | 0.5217 | 82  | 0.0011                   | 0.0013 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0016 |
| 17   | 0.2586                  | 0.5226 | 82  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0017 |
| 18   | 0.2591                  | 0.5258 | 81  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 |
| 19   | 0.2588                  | 0.5259 | 81  | 0.0011                   | 0.0013 | 0.0014 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0022 |
| 20   | 0.2579                  | 0.5232 | 81  | 0.0011                   | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0016 |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
|      |                         |        |     |                          |        |        |        |        |        |        |        |        |
| Ave. | 0.2587                  | 0.5238 | 81  | 0.0011                   | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 |
| Med. | 0.2586                  | 0.5233 | 81  | 0.0011                   | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0017 |
| Min. | 0.2575                  | 0.5216 | 81  | 0.0010                   | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0014 |
| Max. | 0.2601                  | 0.5261 | 82  | 0.0014                   | 0.0015 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 |
| σ    | 0.0007                  | 0.0015 | 0.4 | 0.0001                   | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |



#### 4. 105°C Data Set

| No.  |  | Chromaticity Shift du'v' |         |         |         |         |         |         |         |         |
|------|--|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|      |  | 10000 h                  | 11000 h | 12000 h | 13000 h | 14000 h | 15000 h | 16000 h | 17000 h | 18000 h |
| 01   |  | 0.0020                   | 0.0019  | 0.0020  | 0.0020  | 0.0020  | 0.0023  | 0.0024  | 0.0026  | 0.0023  |
| 02   |  | 0.0015                   | 0.0014  | 0.0015  | 0.0015  | 0.0015  | 0.0019  | 0.0019  | 0.0021  | 0.0019  |
| 03   |  | 0.0017                   | 0.0017  | 0.0017  | 0.0018  | 0.0018  | 0.0020  | 0.0021  | 0.0022  | 0.0020  |
| 04   |  | 0.0017                   | 0.0017  | 0.0017  | 0.0017  | 0.0017  | 0.0021  | 0.0022  | 0.0024  | 0.0021  |
| 05   |  | 0.0016                   | 0.0016  | 0.0016  | 0.0016  | 0.0016  | 0.0020  | 0.0020  | 0.0023  | 0.0020  |
| 06   |  | 0.0017                   | 0.0017  | 0.0017  | 0.0017  | 0.0017  | 0.0020  | 0.0021  | 0.0023  | 0.0020  |
| 07   |  | 0.0019                   | 0.0019  | 0.0018  | 0.0019  | 0.0019  | 0.0023  | 0.0023  | 0.0025  | 0.0023  |
| 08   |  | 0.0022                   | 0.0022  | 0.0022  | 0.0022  | 0.0022  | 0.0026  | 0.0027  | 0.0028  | 0.0027  |
| 09   |  | 0.0020                   | 0.0020  | 0.0020  | 0.0020  | 0.0021  | 0.0024  | 0.0025  | 0.0026  | 0.0025  |
| 10   |  | 0.0018                   | 0.0019  | 0.0018  | 0.0018  | 0.0019  | 0.0022  | 0.0023  | 0.0025  | 0.0022  |
| 11   |  | 0.0014                   | 0.0014  | 0.0014  | 0.0014  | 0.0014  | 0.0017  | 0.0018  | 0.0019  | 0.0017  |
| 12   |  | 0.0017                   | 0.0017  | 0.0018  | 0.0017  | 0.0017  | 0.0021  | 0.0022  | 0.0023  | 0.0021  |
| 13   |  | 0.0023                   | 0.0023  | 0.0023  | 0.0023  | 0.0023  | 0.0027  | 0.0028  | 0.0030  | 0.0028  |
| 14   |  | 0.0018                   | 0.0018  | 0.0018  | 0.0018  | 0.0018  | 0.0022  | 0.0023  | 0.0025  | 0.0022  |
| 15   |  | 0.0016                   | 0.0016  | 0.0016  | 0.0016  | 0.0016  | 0.0018  | 0.0019  | 0.0020  | 0.0018  |
| 16   |  | 0.0016                   | 0.0016  | 0.0016  | 0.0016  | 0.0016  | 0.0020  | 0.0020  | 0.0021  | 0.0020  |
| 17   |  | 0.0017                   | 0.0017  | 0.0018  | 0.0018  | 0.0018  | 0.0021  | 0.0022  | 0.0024  | 0.0022  |
| 18   |  | 0.0016                   | 0.0016  | 0.0016  | 0.0016  | 0.0016  | 0.0021  | 0.0021  | 0.0022  | 0.0021  |
| 19   |  | 0.0023                   | 0.0023  | 0.0023  | 0.0023  | 0.0023  | 0.0028  | 0.0029  | 0.0030  | 0.0028  |
| 20   |  | 0.0016                   | 0.0016  | 0.0016  | 0.0016  | 0.0016  | 0.0019  | 0.0020  | 0.0022  | 0.0019  |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
|      |  |                          |         |         |         |         |         |         |         |         |
| Ave. |  | 0.0018                   | 0.0018  | 0.0018  | 0.0018  | 0.0018  | 0.0022  | 0.0022  | 0.0024  | 0.0022  |
| Med. |  | 0.0017                   | 0.0017  | 0.0017  | 0.0017  | 0.0018  | 0.0021  | 0.0022  | 0.0023  | 0.0021  |
| Min. |  | 0.0014                   | 0.0014  | 0.0014  | 0.0014  | 0.0014  | 0.0017  | 0.0018  | 0.0019  | 0.0017  |
| Max. |  | 0.0023                   | 0.0023  | 0.0023  | 0.0023  | 0.0023  | 0.0028  | 0.0029  | 0.0030  | 0.0028  |
| σ    |  | 0.0003                   | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  |



# VITALUM

|     |                           |     |                             |     |                              |
|-----|---------------------------|-----|-----------------------------|-----|------------------------------|
| ENG | INSTALLATION INSTRUCTIONS | FRA | INSTRUCTIONS DE MONTAGE     | DEU | INSTALLATIONSANLEITUNG       |
| NLD | INSTALLATIE INSTRUCTIES   | ITA | ISTRUZIONI DI INSTALLAZIONE | SPA | INSTRUCCIONES DE INSTALACIÓN |
| DAN | INSTALLATIONSVEJLEDNING   | SWE | INSTALLATIONSANVISNING      | POR | INSTRUÇÕES DE INSTALAÇÃO     |
| SRP | UPUTSTVA ZA INSTALACIJU   | UKR | Інструкції з монтажу        | RUS | Инструкции по установке      |
| POL | INSTRUKCJE MONTAŻU        | HUN | TELEPÍTÉSI ÚTMUTATÓ         | RON | INSTRUCȚIUNI DE INSTALARE    |
| CHI | 安装说明                      | AR  | تعليمات التركيب             |     |                              |

**IEC**  
EN60598

4-8m ✓  
8-12m ✓  
12-15m ✓  
15m< ✓

220-240V  
50/60Hz

**IP**  
**66**

**IK**  
**08**

|                                      |     |     |     |     |
|--------------------------------------|-----|-----|-----|-----|
| LED colour code                      | 722 | 727 | 730 | 740 |
| Light source energy efficiency class | E   | D   | C   | C   |

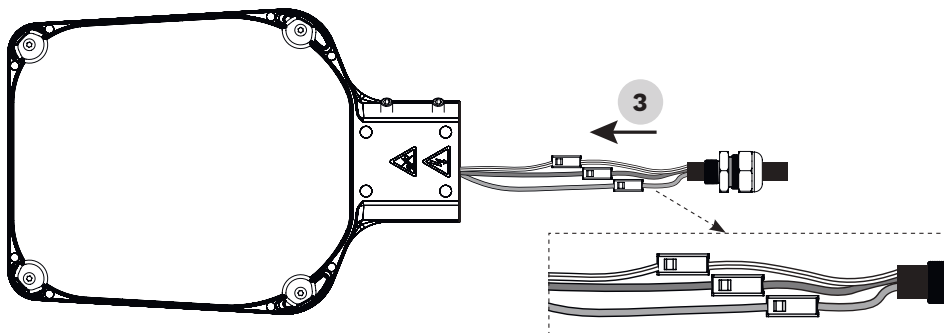


|          | Size 1  |
|----------|---------|
| A (mm)   | 307     |
| A1 (mm)  | 358     |
| B (mm)   | 207     |
| C (mm)   | 80      |
| CxS (m²) | 0.036   |
| kg       | 2.4-2.9 |

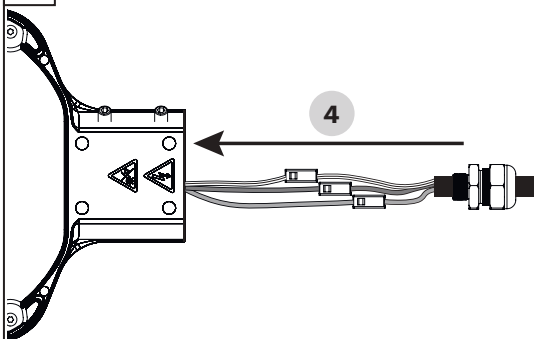
**1a CABLE GLAND**

**2a**

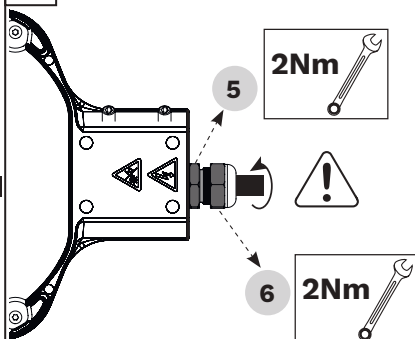
3a



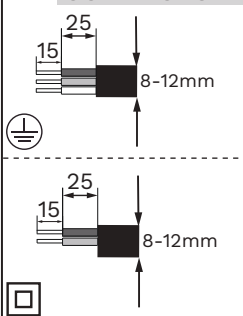
4a



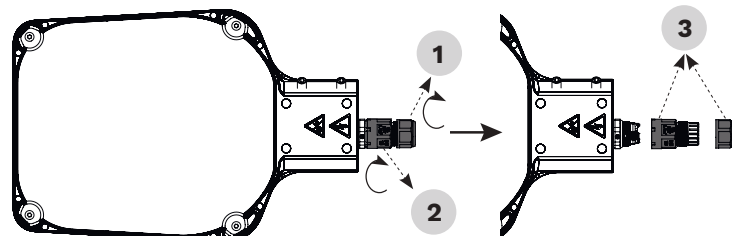
5a



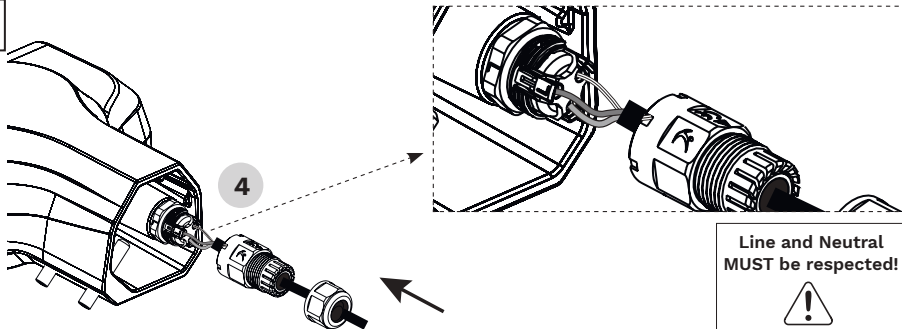
1b CABLE GLAND CONNECTOR



2b



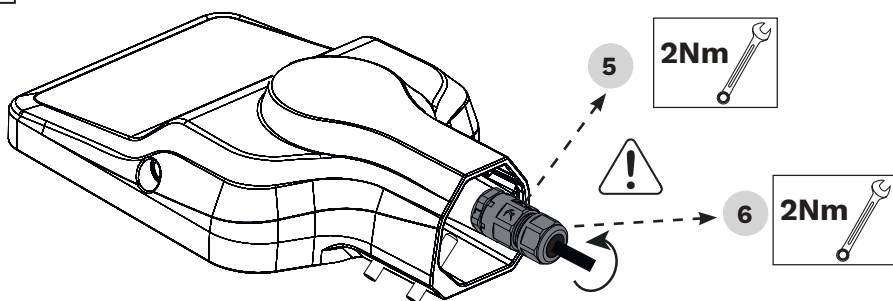
3b



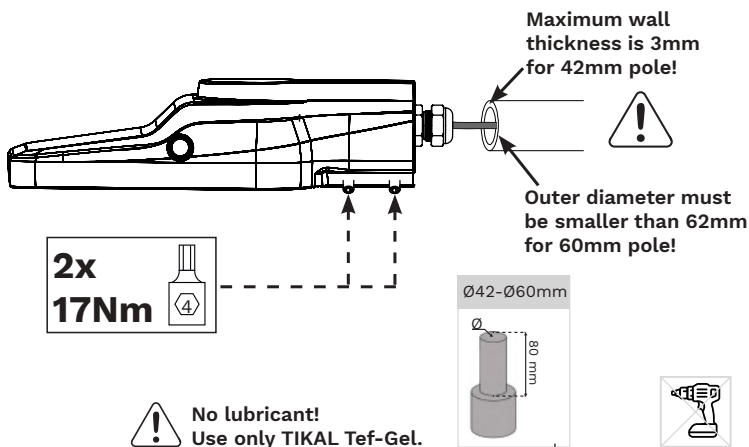
Line and Neutral  
MUST be respected!



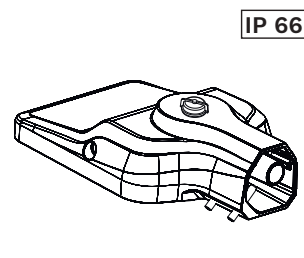
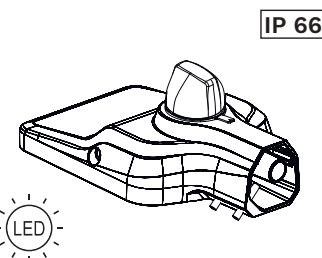
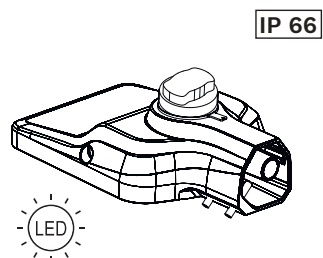
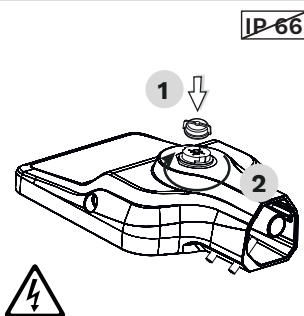
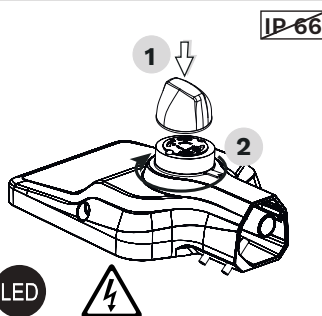
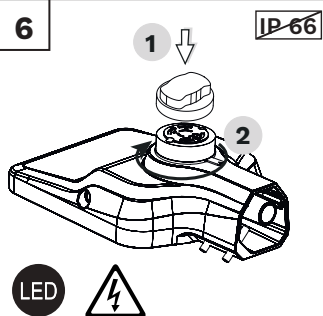
4b



5



6



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>ENG</b></p> <p><b>SAFETY INSTRUCTIONS</b><br/>The light source contained in this luminaire shall only be replaced by the manufacturer or his service agent or a similar qualified person.</p> <p>Always switch off the power prior to installation, maintenance or repair activities.</p> <p>This product contains a light source of an energy efficiency class ... - see table.</p> <p>In case of PVC insulated mains cable, the installer <b>MUST</b> ensure that the <b>WHOLE</b> cable is protected against climatic conditions, especially UV rays and rain, by making sure that the cable is contained inside the luminaire and pole</p> <p><b>Y-connection:</b> In case of damage to the wire, it has to be replaced only by the manufacturer, distributor or by an expert, to avoid risks.</p>                                                                                                                       | <p><b>SPA</b></p> <p><b>INSTRUCCIONES DE SEGURIDAD</b><br/>Solo el fabricante, un agente del servicio técnico o persona con cualificación similar puede sustituir la fuente de luz de este sistema de iluminación.</p> <p>Apague siempre el interruptor de alimentación antes de realizar tareas de instalación, mantenimiento o reparación.</p> <p>Este producto contiene una fuente de luz de clase de eficiencia energética ... -ver tabla.</p> <p>En el caso de un cable aislado de PVC, el instalador <b>DEBE</b> asegurarse de que todo el cable esté protegido contra las condiciones climáticas, especialmente los rayos UV y la lluvia, asegurándose de que el cable esté dentro de la luminaria y el poste</p> <p><b>Conexión en Y:</b> si el cable se daña, solo debe reemplazarlo el fabricante, un distribuidor o un experto para evitar riesgos.</p>                                                                                                       | <p><b>NLD</b></p> <p><b>VEILIGHEIDSIJNSTRUCTIES</b><br/>De lichtbron in deze armatuur dient uitsluitend door de fabrikant, diens onderhoudsvertegenwoordiger of een persoon met vergelijkbare kwalificaties te worden vervangen.</p> <p>Schakel altijd de stroom uit voordat u aan installatie, onderhoud of reparaties begint.</p> <p>Dit product bevat een lichtbron van energie-efficiëntieklasse ... -zie tabel.</p> <p>In het geval van PVC-geïsoleerde voedingskabels <b>MOET</b> de installateur ervoor zorgen dat de <b>GEHELE</b> kabel wordt beschermd tegen klimaatomstandigheden, met name UV-stralen en regen, door ervoor te zorgen dat de kabel zich in het armatuur en de paal bevindt</p> <p><b>Y-verbinding:</b> in geval van schade aan de draad dient deze te worden vervangen door de fabrikant, de distributeur of door een expert, om risico's te vermijden.</p>        |
| <p><b>DEU</b></p> <p><b>SICHERHEITSHINWEISE</b><br/>Die Lichtquelle in dieser Leuchte darf nur vom Hersteller bzw. von dessen Kundendienst oder einer ähnlich qualifizierten Person ausgetauscht werden.</p> <p>Schalten Sie die Stromversorgung vor Installation-, Wartungs- und Reparaturarbeiten stets ab.</p> <p>Dieses Produkt enthält eine Lichtquelle der Energieeffizienzklasse ... -siehe Tabelle.</p> <p>Bei Verwendung eines PVC-isolierten Netzkabels muss der Installateur sicherstellen, dass das gesamte Kabel vor klimatischen Bedingungen -insbesondere vor UV-Strahlen und Regen- geschützt ist, indem sichergestellt wird, dass das Kabel in der Leuchte und dem Mast verschlossen ist</p> <p><b>Y-Verbindung:</b> Falls die Leitung beschädigt ist, darf diese nur vom Hersteller, dem Händler oder einem Experten ersetzt werden, um Risiken zu vermeiden.</p>                                                | <p><b>POL</b></p> <p><b>INSTRUKCJA BEZPIECZEŃSTWA</b><br/>źródło światła zamontowane w tej oprawie może być wymieniane wyłącznie przez producenta, pracownika serwisu lub inną wykwalifikowaną osobę.</p> <p>Przed rozpoczęciem instalacji, konserwacji lub naprawy należy bezwzględnie odłączyć zasilanie elektryczne.</p> <p>Produkt zawiera źródło światła o klasie efektywności energetycznej ... -patrz tabela.</p> <p>W przypadku kabla sieciowego izolowanego PCV instalator <b>MUSI</b> upewnić się, że kabel <b>CAŁY</b> jest chroniony przed warunkami klimatycznymi, w szczególności przed promieniowaniem UV i deszczem, upewniając się, że kabel znajduje się wewnątrz oprawy i słupa.</p> <p><b>Połączenie Y:</b> ze względów bezpieczeństwa uszkodzony przewód powinien zostać wymieniony wyłącznie przez producenta, dystrybutora lub wykwalifikowanego elektryka.</p>                                                                                   | <p><b>RUS</b></p> <p><b>инструкция безопасности</b><br/>замену источника света для этого светильника должен выполнять только производитель, сервисный агент производителя или специалист с аналогичной квалификацией.</p> <p>Перед проведением установки, сервисного обслуживания или ремонта всегда отключайте питание устройства.</p> <p>Этот продукт содержит источник света с классом энергоэффективности ... см. таблицу.</p> <p>В случае кабеля питания с ПВХ изоляцией, монтажник <b>ДОЛЖЕН</b> обеспечить защиту <b>ВСЕГО</b> кабеля от воздействия климатических условий, особенно от ультрафиолетовых лучей и дождя, убедившись, что кабель находится внутри светильника и опоры.</p> <p><b>Подключение Y:</b> в случае повреждения кабеля его замена производится только производителем, дистрибьютором или экспертом.</p>                                                          |
| <p><b>FRA</b></p> <p><b>INSTRUCTIONS DE SECURITE</b><br/>La source lumineuse contenue dans ce luminaire doit être uniquement remplacée par le fabricant, son agent de maintenance ou une autre personne disposant des qualifications appropriées.</p> <p>Mettez toujours l'appareil hors tension avant toute opération d'installation, d'entretien ou de réparation.</p> <p>Ce produit contient une source lumineuse de classe d'efficacité énergétique... -voir tableau.</p> <p>Dans le cas d'un câble secteur isolé en PVC, l'installateur doit s'assurer que le câble entier est protégé contre les conditions climatiques, en particulier les rayons UV et la pluie, en s'assurant que le câble est contenu à l'intérieur du luminaire et du poteau</p> <p><b>Connexion Y :</b> si le câble est endommagé, il ne peut être remplacé que par le fabricant, par le distributeur ou par un expert, afin d'éviter tout risque.</p> | <p><b>ITA</b></p> <p><b>ISTRUZIONI DI SICUREZZA</b><br/>La sorgente di luce contenuta in questo sistema di illuminazione dovrà essere sostituita solo dal produttore, dal suo agente di servizio o da una persona con qualifica simile.</p> <p>Staccare sempre il filo della corrente prima di iniziare operazioni di installazione, manutenzione o riparazione.</p> <p>Questo prodotto contiene una sorgente luminosa di classe di efficienza energetica ... -vedi tabella.</p> <p>In caso di cavo di alimentazione isolato in PVC, l'installatore <b>DEVE</b> garantire che il cavo <b>INTERO</b> sia protetto dalle condizioni climatiche, in particolare dai raggi UV e dalla pioggia, assicurandosi che il cavo sia contenuto all'interno del corpo illuminante e del palo</p> <p><b>Collegamento Y:</b> in caso di danneggiamento, il cavo deve essere sostituito esclusivamente dal costruttore, dal distributore o da un tecnico esperto per evitare rischi.</p> | <p><b>POR</b></p> <p><b>INSTRUÇÕES DE SEGURANÇA</b><br/>A fonte de luz no interior deste candeeiro deve ser substituída apenas pelo fabricante, pelo seu técnico de assistência ou por uma pessoa com qualificação equivalente.</p> <p>Desligue sempre a alimentação antes de proceder a actividades de instalação, manutenção ou reparação.</p> <p>Este produto contém uma fonte de luz da classe de eficiência energética ... -ver tabela.</p> <p>No caso de cabo de alimentação com isolamento em PVC, o instalador <b>DEVE</b> assegurar que <b>TUDO</b> o cabo é protegido das condições climáticas, especialmente raios UV e chuva, certificando-se que o cabo está contido dentro da luminária e da coluna.</p> <p><b>Ligação Y:</b> em caso de danos no fio, este tem de ser substituído apenas pelo fabricante, distribuidor ou por um técnico especializado, para evitar riscos.</p> |

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|  | <p><b>SIKKERHEDSINSTRUKTIONER</b></p> <p>Lyskilden i dette armatur må kun udskiftes af producenten, af en vedligeholdelsesvirksomhed udeøget af producenten eller af en tilsvarende kvalificeret virksomhed.</p> <p>Sluk altid for strømmen inden påbegyndelse af installation, vedligeholdelse eller reparation.</p> <p>Dette produkt indeholder en lyskilde i energieffektivitetsklasse ... - se tabel.</p> <p>I tilfælde af PVC-isoleret ledning SKAL elektriker-en sikre, at HELE kablet er beskyttet mod klimatiske forhold, dette gælder især UV-stråler og regn. Elektrikerens skal derfor sørge for, at kablet forbliver inde i armaturet og masten.</p> <p><b>Type Y monterig:</b> Hvis det eksterne kabel eller ledning på dette armatur er beskudiget, må det kun udskiftes af producenten eller af en servicepartner til producenten eller tilsvarende kvalificeret person, for at undgå skader.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>INSTRUCIUNI DE EXPLOATARE</b></p> <p>Sursa de lumină din acest corp de iluminat trebuie înlocuită numai de producător sau de reprezentantul său de service sau o persoană ce deține calificări similare.</p> <p>Opriți întotdeauna alimentarea electrică înainte de lucrările de instalare, întreținere sau reparatii.</p> <p>Acest produs conține o sursă de lumină din clasa de eficiență energetică.....conform tabel</p> <p>În cazul cablului de alimentare cu izolație din PVC, instalatorul TREBUIE să se asigure că TOT cablul este protejat împotriva condițiilor climatice, mai ales împotriva razelor UV și a ploii, asigurându-se că acest cablu este plasat în interiorul aparatului de iluminat și al stălpului</p> <p><b>Conexiune Y:</b> În caz de deteriorare a firului, acesta trebuie înlocuit numai de către producător, distribuitor sau un expert, pentru evitarea riscurilor.</p> |  | <p><b>SÄKERHETSINSTRUKTIONER</b></p> <p>Ljuskällan som monteras i denna armatur får endast ersättas av en Schröder-anställd eller annan kvalificerad person.</p> <p>Stäng alltid av strömmen före installation, underhåll eller reparation.</p> <p>Denna produkt innehåller en ljuskälla av energieffektivitetsklass ... - se tabell.</p> <p>Vid PVC-isolerad kabel måste installatören se till att hela kabeln är skyddad mot klimatförhållanden, särskilt UV-strålar och regn, genom att se till att kabeln monteras inuti armaturen och stolpen</p> <p><b>Typ Y-anslutning:</b><br/>Om den externa kabeln eller ledningen på denna armatur är skadad, får den endast bytas ut av tillverkaren eller av en servicepartner till tillverkaren eller motsvarande kvalificerad person, för att undvika skador</p> |
|  | <p><b>BIZTONSÁGI ÚTMUTATÓ</b></p> <p>A lámpatestőnél található fényforrást kizárólag a gyártó, szervizkivételő vagy hivatalos szakszer-viz szakembere cserélheti ki.</p> <p>A szerelés, karbantartás és javítás előtt minden esetben végezzen áramlatlantást.</p> <p>Ez a termék ... energiahatékonysági osztályba tartozó fényforrást tartalmaz - lsd táblázat.</p> <p>PVC szigetelésű tápkábel esetén a telepítőknek biztosítani KELL, hogy a TELJES kábel védett legyen az éghajlati viszonyoktól, különösen az UV sugárzástól és az esőtől, ügyelve arra, hogy a kábel a lámpatest és az oszlop belsejében legyen.</p> <p><b>Y-csatlakozó:</b> A sérült vezetékét kizárólag a gyártó, forgalmazó vagy szakember cserélheti ki a kockázatok elkerülése végett.</p>                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>UPUTSTVA</b></p> <p>Izvor svetla u ovom rasvetnom telu može da zameni samo proizvođač, njegov servisni agent ili na sličan način kvalifikovana osoba.</p> <p>Uvek isključite napajanje pre instalacije, održavanja ili popravke.</p> <p>Ovaj proizvod sadrži izvor svetlosti klase energetske efikasnosti ... - pogledajte tabelu.</p> <p>U slučaju napojnog kabla sa PVC izolacijom, izvođač MORA obezbediti zaštitu CELOG kabla od klimatskih uslova, posebno UV zračenja i kiše, tako što će osigurati da se kabl nalazi unutar svetiljke i stuba.</p> <p><b>Y-veza:</b> U slučaju oštećenja žice zamenu mora da obavi isključivo proizvođač, distributer ili stručnjak kako bi se izbegao rizik.</p>                                                                                                                                                                                                |  | <p><b>інструкція безпеки</b></p> <p>Джерело світла, що міститься у цьому світильнику, повинен замінити лише виробник, його сервісний агент або кваліфікована особа.</p> <p>Завжди вимикайте живлення перед встановленням, доглядом або ремонтом.</p> <p>Цей продукт містить джерело світла класу енергоефективності ... -див. табл.</p> <p>У випадку кабелю живлення із ПВХ ізоляцією, монтажник ПОВИНЕН забезпечити захист ВСЬОГО кабелю від впливу кліматичних умов, особливо від ультрафіолетових променів та дощу, переконавшись, що кабель знаходиться всередині світильника та опори</p> <p><b>Y-з'єднання:</b> у разі пошкодження дроту його має замінити лише виробник, дистриб'ютор чи експерт, щоб запобігти ризикам.</p>                                                                             |
|  | <p><b>安全守则</b></p> <p>该灯具的光源仅可由施莱德员工、指定代理商或具备类似资质的人员进行更换。</p> <p>在安装、维护和维修灯具之前必须首先切断电源。</p> <p>本产品包含一个能效等级的光源.....见表。</p> <p>如果选择PVC主电缆，必须确保整个电缆被很好的保护以抵御恶劣气候状况，尤其是紫外线和雨水。而且要确保电缆被灯具和灯杆完全覆盖。</p> <p><b>Y类附件:</b><br/>如果灯具外部电缆被破坏，电缆必须被制造商或服务代理商或者有资质的人员及时更换从而避免伤害。</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>تعليمات السلامة:</b></p> <p>في حالة الحاجة لتغير مصدر الضوء، يتم ذلك من خلال الشركة. المصنعة أو الوكيل المأخول لعمل ذلك أو شخص موهل لذلك. دائما أفضل الدائرة الكهربائية قبل تركيب أو صيانة الجهاز. تحذير: هذا المنتج مصنف ضمن مجموعة المخاطر 2 خطر ابتداء الشاع ضوئي، لا تنظر مباشرة إلى الجهاز و هو مضاء لأن ذلك مؤذي للعين. الجهاز يجب أن يركب بشكل يضمن أن التصديق مصدر</p> <p>يجب على الشخص الذي يوصل الجهاز بالدائرة الكهربائية التأكد من أن محمي من التأثيرات المناخية و خاصة الأشعة فوق البنفسجية و الخطر من خلال التأكد أن الكابل محوي بداخل العمود و الجهاز في حالة الحاجة لتغير الأسلاك الداخلية، يتم ذلك من خلال الشركة. المصنعة أو الوكيل المأخول لعمل ذلك أو شخص موهل لذلك دائما أفضل الدائرة الكهربائية قبل تركيب أو صيانة الجهاز.</p>                                                                                                                                                    |  |                                                                                                                                                                                                                                                            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           |



# LICENCE

**No. 23055**

Issued to:  
Applicant:  
**Schröder S.A.**  
**Rue de Mons, 3**  
**4000 Liège**  
**Belgium**

Licensee:  
**Schröder SA**  
**Rue de Lusambo, 67**  
**1190 BRUXELLES**  
**Belgium**



Product : road, square and street lighting  
Trade name(s) : SCHREDER  
Type(s)/model(s) : VITALUM

The product and any acceptable variation thereto is specified in the annex to this licence and the documents therein referred to.

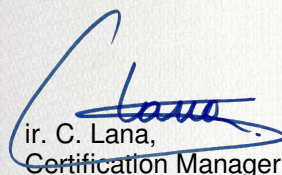
SGS CEBEC hereby declares that the above-mentioned product has been certified on the basis of:

- a type test according to the standard specified in annex
- an inspection of the production location
- a certification agreement with the number 1173

SGS CEBEC hereby grants the right to use the CEBEC certification mark

The ENEC/CEBEC certification mark may be applied to the product as specified in this licence for the duration of the ENEC/CEBEC certification agreement and under the conditions of the ENEC/CEBEC certification agreement.

This licence is issued on : 16-04-2024

  
ir. C. Lana,  
Certification Manager

© Only integral publication of this certificate, including the annex, is allowed

This certificate is only valid combined with the publication on the following web address: [www.sgs.com/ee](http://www.sgs.com/ee)



**SGS Belgium NV-Division SGS CEBEC**  
**Business Riverside Park**  
**Bld Internationaalelaan 55 Build. A**  
**B-1070 Brussels**  
**Tel.+32(0)2 556 00 20 Fax.+32(0)2 556 00 36**

This certificate is issued by the company under its General Conditions for Certification Services accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm). Attention is drawn to the limitations of liability defined therein and in the Test Report herein mentioned which findings are reflected in this Certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



## SPECIFICATION OF THE CERTIFIED PRODUCT

### Product data

|                                |   |                                    |
|--------------------------------|---|------------------------------------|
| Product                        | : | road, square and street lighting   |
| Trade name(s)                  | : | SCHREDER                           |
| Type(s)/Model(s)               | : | VITALUM                            |
| description                    | : | Street lighting                    |
| rated voltage (Un)             | : | 220-240 V                          |
| rated frequency                | : | 50-60 Hz                           |
| rated power                    | : | max. 63 W                          |
| rated current (In)             | : | max. 350 mA/LED                    |
| class                          | : | class I                            |
| degree of protection           | : | IP66                               |
| resistance to impact (IK)      | : | IK08                               |
| lamp(s)                        | : | max. 36 LED HF1 + HF2 (Seoul 5050) |
| rated ambient temperature (ta) | : | max. 45°C                          |

## TESTS

### Test requirements

EN 60598-2-3:2003 + A1:2011  
EN IEC 60598-1:2021 + A11:2022

### Test results

The test results are laid down in certification file 634191/01.

### Remarks

This certificate is based on test report No. P1626-I.



### Conclusion

The examination proved that all certification requirements were met.

Reviewed by, project leader : Christian Maes - 16/04/2024

Certification Manager :

 2024-04-16



## FACTORY LOCATION(S)

Schreder TOV  
Vul. Mykulynetska 46B  
46000 TERNOPIL  
Ukraine

Schreder (China) Lighting Industrial Co., Ltd  
No.40 Xinye 2 Street  
Tianjin Economic Technological Development Zone West Zone  
300462 Tianjin City, P.R.China  
China

Comatelec Schröder  
ZAC de l'échangeur 11 rue Louis BECHEREAU  
18000 Bourges  
France

Socelec S.A.  
Av. de Roanne, 66  
Poligono Industrial "EL HENARES"  
19180 MARCHAMALO (GUADALAJARA)  
Spain

Schröder Iluminação S.A.  
Rua da Fraternidade Operária, n° 3  
2794-089 CARNAXIDE, OEIRAS  
Portugal

Schröder Hungary Plc.  
Tópart 2  
2084 PILISSZENTIVAN  
Hungary

# VITALUM 1

## 5424

|                 |               |
|-----------------|---------------|
| Optic           | 5424          |
| Photometry Type | Narrow        |
| Protector       | Flat glass    |
| Source          | 24 Seoul 5050 |
| Matrix          | 575382        |



### Characteristics

|             |            |             |             |                  |                    |                   |          |
|-------------|------------|-------------|-------------|------------------|--------------------|-------------------|----------|
|             |            |             |             |                  |                    |                   |          |
| 307         | 207        | 80          | 2.9         | IP 66            | IK 08              | I EU, II EU       | 0.036    |
| Length (mm) | Width (mm) | Height (mm) | Weight (kg) | Tightness level* | Impact resistance* | Electrical class* | CxS (m²) |

\* According to IEC-EN60598 and IEC-EN62262

### Features

Highly energy-efficient luminaire with the best total cost of ownership

- HiFlex™ photometric engine designed for optimised energy efficiency
- Easy installation
- High efficiency with low operating costs
- Supplied pre-wired to facilitate installation (optional quick-on connectors)
- Connected-ready for your future Smart city requirements

### Types of application

- Square and park
- Bridge
- Car park
- Road and highway
- Train station
- Bike path

### Information for 1000 lm matrix

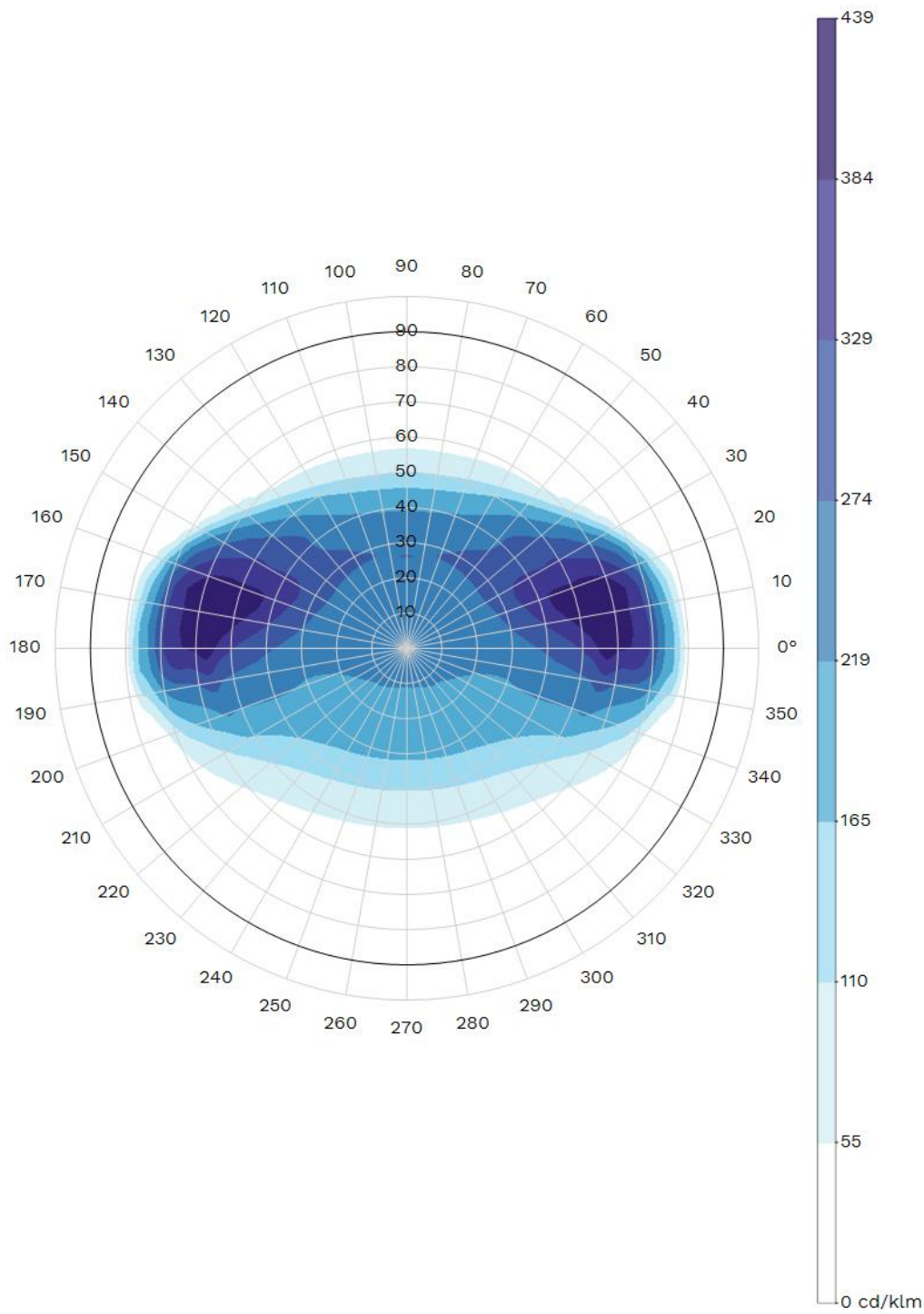
|              |         |                      |         |                         |                                   |
|--------------|---------|----------------------|---------|-------------------------|-----------------------------------|
| Efficacy (%) | 81.9    | G Class (EN 13201-2) | G6      | I 70-80-90-95 (cd)      | 314 - 38 - X - X                  |
| DLOR (%)     | 81.9    | G* (EN 13201 2015)   | G*4     | CIE flux code N 1→5 (%) | 45.0 - 80.8 - 98.5 - 100.0 - 81.9 |
| ULOR (%)     | 0.0     | Imax (cd)            | 439     | Gradient 90°            | 18cd                              |
| ULR (%)      | 0.0     | Aperture 0-180°      | 74 - 74 | Gradient 270°           | 7cd                               |
| Incl ULR 4%  | -45/42° | Aperture 90-270°     | 39 - 11 |                         |                                   |

Photometrical characteristics

| LED count | Colour code | Current (mA) | Luminaire power (W) | Source flux (lm) | Luminaire output flux (lm) | Luminaire efficacy (lm/W) | Peak (cd) | BUG Rating | Voltage (V) |
|-----------|-------------|--------------|---------------------|------------------|----------------------------|---------------------------|-----------|------------|-------------|
|           |             |              | Ambient temp = 25°  |                  |                            |                           |           |            |             |
| 24        | NW 740      | 67           | 11                  | 1885             | 1543                       | 140                       | 827       | B1 U0 G1   | 230         |
| 24        | NW 740      | 117          | 18                  | 3251             | 2661                       | 148                       | 1427      | B1 U0 G1   | 230         |
| 24        | NW 740      | 133          | 20                  | 3699             | 3028                       | 151                       | 1624      | B1 U0 G1   | 230         |
| 24        | NW 740      | 167          | 25                  | 4563             | 3735                       | 156                       | 2003      | B1 U0 G1   | 230         |
| 24        | NW 740      | 200          | 30                  | 5400             | 4420                       | 147                       | 2370      | B1 U0 G1   | 230         |
| 24        | NW 740      | 233          | 35                  | 6210             | 5083                       | 145                       | 2726      | B2 U0 G1   | 230         |
| 24        | NW 740      | 267          | 41                  | 6993             | 5724                       | 143                       | 3070      | B2 U0 G1   | 230         |
| 24        | NW 740      | 300          | 46                  | 7744             | 6339                       | 138                       | 3399      | B2 U0 G1   | 230         |
| 24        | NW 740      | 350          | 53                  | 8829             | 7227                       | 139                       | 3876      | B2 U0 G2   | 230         |
| 24        | WW 722      | 67           | 11                  | 1491             | 1220                       | 111                       | 654       | B1 U0 G0   | 230         |
| 24        | WW 722      | 117          | 18                  | 2572             | 2105                       | 117                       | 1129      | B1 U0 G1   | 230         |
| 24        | WW 722      | 133          | 20                  | 2926             | 2395                       | 120                       | 1285      | B1 U0 G1   | 230         |
| 24        | WW 722      | 167          | 25                  | 3610             | 2955                       | 123                       | 1585      | B1 U0 G1   | 230         |
| 24        | WW 722      | 200          | 30                  | 4272             | 3497                       | 117                       | 1875      | B1 U0 G1   | 230         |
| 24        | WW 722      | 233          | 35                  | 4913             | 4021                       | 115                       | 2157      | B1 U0 G1   | 230         |
| 24        | WW 722      | 267          | 41                  | 5532             | 4529                       | 113                       | 2428      | B2 U0 G1   | 230         |
| 24        | WW 722      | 300          | 46                  | 6126             | 5015                       | 109                       | 2689      | B2 U0 G1   | 230         |
| 24        | WW 722      | 350          | 53                  | 6985             | 5717                       | 110                       | 3066      | B2 U0 G1   | 230         |
| 24        | WW 727      | 67           | 11                  | 1684             | 1378                       | 125                       | 739       | B1 U0 G0   | 230         |
| 24        | WW 727      | 117          | 18                  | 2904             | 2377                       | 132                       | 1275      | B1 U0 G1   | 230         |
| 24        | WW 727      | 133          | 20                  | 3304             | 2705                       | 135                       | 1451      | B1 U0 G1   | 230         |
| 24        | WW 727      | 167          | 25                  | 4076             | 3337                       | 139                       | 1789      | B1 U0 G1   | 230         |
| 24        | WW 727      | 200          | 30                  | 4824             | 3949                       | 132                       | 2118      | B1 U0 G1   | 230         |
| 24        | WW 727      | 233          | 35                  | 5548             | 4541                       | 130                       | 2435      | B2 U0 G1   | 230         |
| 24        | WW 727      | 267          | 41                  | 6247             | 5114                       | 128                       | 2742      | B2 U0 G1   | 230         |
| 24        | WW 727      | 300          | 46                  | 6918             | 5663                       | 123                       | 3037      | B2 U0 G1   | 230         |
| 24        | WW 727      | 350          | 53                  | 7887             | 6456                       | 124                       | 3462      | B2 U0 G1   | 230         |
| 24        | WW 730      | 67           | 11                  | 1751             | 1433                       | 130                       | 768       | B1 U0 G1   | 230         |
| 24        | WW 730      | 117          | 18                  | 3020             | 2472                       | 137                       | 1326      | B1 U0 G1   | 230         |
| 24        | WW 730      | 133          | 20                  | 3436             | 2813                       | 141                       | 1508      | B1 U0 G1   | 230         |
| 24        | WW 730      | 167          | 25                  | 4239             | 3470                       | 145                       | 1861      | B1 U0 G1   | 230         |
| 24        | WW 730      | 200          | 30                  | 5016             | 4106                       | 137                       | 2202      | B1 U0 G1   | 230         |
| 24        | WW 730      | 233          | 35                  | 5768             | 4722                       | 135                       | 2532      | B2 U0 G1   | 230         |
| 24        | WW 730      | 267          | 41                  | 6496             | 5317                       | 133                       | 2851      | B2 U0 G1   | 230         |
| 24        | WW 730      | 300          | 46                  | 7193             | 5888                       | 128                       | 3157      | B2 U0 G1   | 230         |
| 24        | WW 730      | 350          | 53                  | 8201             | 6713                       | 129                       | 3600      | B2 U0 G2   | 230         |

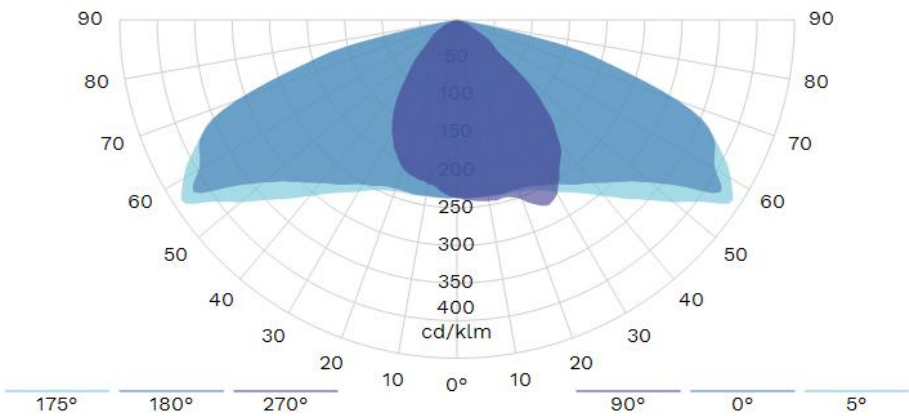
Tolerance on flux +- 7% - Tolerance on power +- 5%

Hypergon view

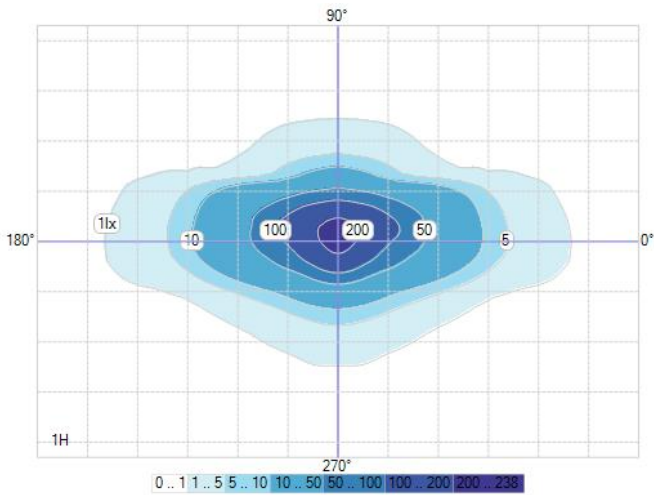




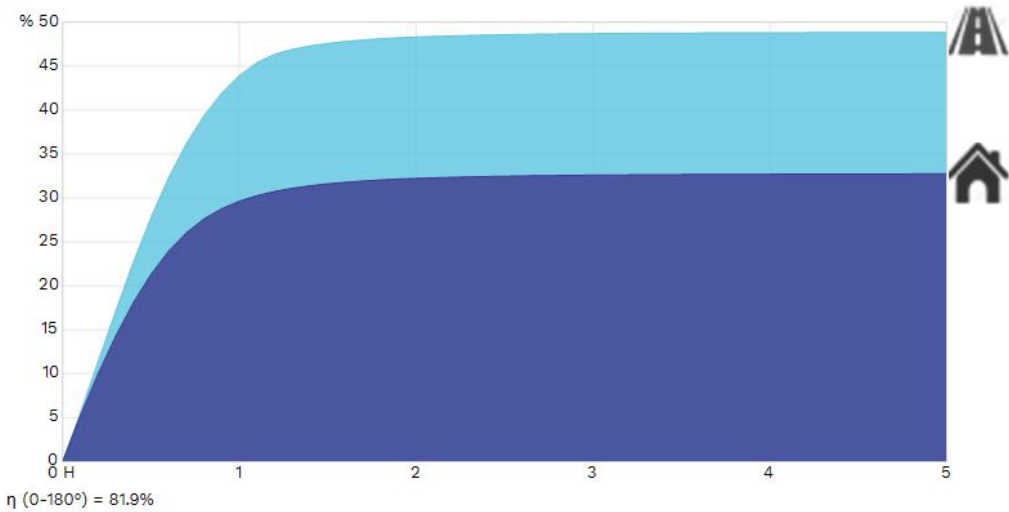
Polar/Cartesian diagram



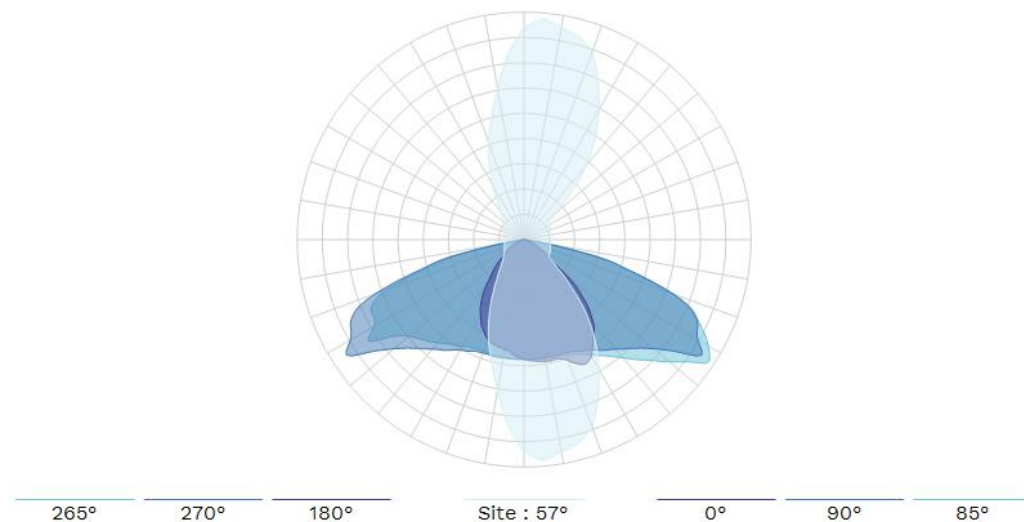
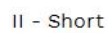
Isolux



K-Curve







<http://www.schreder.com>



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# LICENCE

to use the ENEC+ Mark



**ENEC+ License No.: 23129**

Under the conditions given in the "Rules concerning the use of the CEBEC mark" complemented by the ENEC+ Agreement under contract 1173/2, the license to use the ENEC+ Mark with suffix 02, as shown above, has been issued to:

Schreder S.A.  
Rue de Lusambo, 67  
1190 BRUXELLES  
Belgium

**For the product:**

Street lighting luminaire

**Trade name(s):**

SCHREDER

**Type(s)/Model(s):**

VITALUM

**Complying with the following EPRS for performance:**

EPRS 003:2018, IEC 62722-1:2014, IEC 62722-2-1:2014

EN 62722-1:2016, EN 62722-2-1:2016

**Based on test report No. P1626\_62722-2-1\_001**

**This licence is conditional to the validity of the ENEC License No.: 23055**

**Date:** 01/07/2024

**Signature:**

**Name:** Calogero LANA  
**Position:** Certification Manager

**Characteristics :**

|                              |   |                            |
|------------------------------|---|----------------------------|
| Description                  | : | Street lighting luminaire  |
| Rated voltage (Un)           | : | 220-240 V                  |
| Rated frequency              | : | 50-60 Hz                   |
| Rated power                  | : | max. 63 W                  |
| Rated current                | : | max. 350 mA/LED            |
| Class                        | : | class I                    |
| Lamps                        | : | max. 36 LEDs (SEOUL 5050)  |
| Colour temperature (CCT)     | : | 2200K, 2700K, 3000K, 4000K |
| Colour rendering index (CRI) | : | 70                         |
| Luminous flux                | : | max. 8004 lm               |
| Efficacy                     | : | max. 165 lm/W              |

## EMC test

### General information

Subject : VITALUM 1 - 36 Seoul 5050 - 850mA - OSRAM 4DIM G3 75W 150-1,050mA 220-240V DALI C123 . – Nema - CI I

Asked by : SZÜGYI János Péter

Created on : 02/02/2024

Started on : 13/02/2024

Test number : D240116

Reference norm : EN IEC 61547 (2023); IEC 61000-3-2 Ed5 (2018) +A1 (2020); EN IEC 61000-3-2 (2019) + A1 (2021); EN IEC 55015 (2019) +A11 (2020); IEC 61547 Ed3 (2020)

Sample(s) : E240055

### Test conditions

Luminaire : VITALUM 1

Electrical class : Class I EU

Number of LEDs : 36

LED Type : Seoul 5050

Lens : LENS PLATE 36 LENSES 5439 PMMA / 03-50-371

PCBA : PCBA HF2 36 SSC5050 4000K 4stp 70 Min. W4 12P3 1CH HT / 03-52-280

Driver : DRIVER\_OSRAM\_4DIM G3\_75W\_150-1,050mA\_220-240V\_DALI\_C123\_ / 03-55-719

Number of driver(s) : 1

Current setting (mA) : 850

Dimming minimum value : 20

Dimming protocol : DALI

Control system : Nema

Overvoltage protection : NA

Testing facility : External - EMC-ULg

External test report reference : 240207/0936/AAAN0587A

Operator : External Lab

### Conclusion



Success

Conclusion :

VITALUM 1 Cl. I with OSRAM 4DIM G3 75W driver complies with CISPR 15, EN IEC 55015, EN IEC 61547 and IEC61547 standards in accredited lab.

Remark: This report covers the extra surge test @6kV L-N and @10kV L/N-PE.

Validated by :  
LERHO Xavier

Duplicate to : PELSŐCZI Zoltán, SZÜGYI János Péter,  
NAGY Ádám, LÁMFALUSI Ferenc  
LAB : 21/02/2024

**D240116**  
1/3

# Test(s) details

## Test(s)

| Name                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Verdict |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Complete EMC test (10 Kv Surges) | <p>Emission measurements (EN IEC 55015):</p> <ul style="list-style-type: none"><li>- Terminal disturbance</li><li>- Radiated emissions</li><li>- Conducted emissions</li></ul> <p>Harmonics (IEC 61000-3-2 &amp; EN IEC 61000-3-2)</p> <p>Flicker (IEC 61000-3-3 &amp; EN IEC 61000-3-3)</p> <p>Immunity measurements (IEC 61547 &amp; EN IEC 61547)</p> <ul style="list-style-type: none"><li>- Electrostatic discharge (IEC 61000-4-2 &amp; EN 61000-4-2)</li><li>- Radiated, radio frequency electromagnetic field (IEC 61000-4-3 &amp; EN IEC 61000-4-3)</li><li>- Fast transients (IEC 61000-4-4 &amp; EN 61000-4-4)</li><li>- Surges (IEC 61000-4-5 &amp; EN 61000-4-5)</li><li>- Injected currents (IEC 61000-4-6 &amp; EN IEC 61000-4-6)</li><li>- Power frequency magnetic field immunity (IEC 61000-4-8 &amp; EN 61000-4-8)</li><li>- Voltage dips &amp; interruptions (IEC 61000-4-11 &amp; EN IEC 61000-4-11)</li></ul> | Success |

## Complete EMC test (10 Kv Surges)

### Detail(s)



IMG\_8566

**Number of appendix pages : 51**

**End of test report :**





# Laboratory Test report



713-TEST

NBN EN ISO/IEC 17025 :2017

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FORM L-54 V2

## Mechanical impact resistance test

### General information

Subject : VITALUM 1 - GLASS - Side-Entry - IK08

Asked by : SZÜGYI János Péter

Created on : 27/09/2023

Started on : 27/09/2023

Test number : D231174

Reference norm : IEC 62696 Ed1 (2011); IEC/EN 60598-1 Ed9 (2021) + A11 (2022)

Sample(s) : E230699

### Test conditions

Luminaire : VITALUM 1

Quantity of sample under test : 5

Protector Material : Glass Extra Clear wide serigraphy

Protector Shape : Flat

Serigraphy : ceramic

Protector Thickness (mm) : 5

Protector supplier : External - SzliffGlass

Testing facility : BER – SCHREDER

Operator : Philippe Léonard



IMG\_6537

### Conclusion



Success

Conclusion :

Statement of conformity according to TR 62696 Ed1 (2011) and section 4.13 of IEC/EN 60598-1 Ed9 (2021) +A11 (2022):  
IK08 passed.

Validated by :  
LERHO Xavier

Duplicate to : SZÜGYI János Péter  
LAB : 17/10/2023

**D231174**  
1/3

## Test(s) details

### Test(s)

| Name          | Description                                                                                                                                    | Verdict     |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Impact points | At pendulum hammer 5 impact points distributed on protector surface One impact on each point 2 supplementary impacts on the most fragile point | Informative |
| IK08          | Impact energy : 5 joules<br>Hammer weight : 1.7 Kg<br>Height of fall : 30 Cm                                                                   | Success     |

### Impact points

#### Detail(s)



IMG\_6537(a)

### IK08

#### Verdict(s)

| - NOT TESTED |        |      |   |   |      |   |   |      |   |   |      |   |   |      |      |      |
|--------------|--------|------|---|---|------|---|---|------|---|---|------|---|---|------|------|------|
| IK 08        | Impact | 1    |   |   | 2    |   |   | 3    |   |   | 4    |   |   | 5    |      |      |
| Sample       | Shot   | 1    | 2 | 3 | 1    | 2 | 3 | 1    | 2 | 3 | 1    | 2 | 3 | 1    | 2    | 3    |
| 1            |        | Pass | - | - | Pass | - | - | Pass | - | - | Pass | - | - | Pass | Pass | Pass |
| 2            |        | Pass | - | - | Pass | - | - | Pass | - | - | Pass | - | - | Pass | Pass | Pass |
| 3            |        | Pass | - | - | Pass | - | - | Pass | - | - | Pass | - | - | Pass | Pass | Pass |
| 4            |        | Pass | - | - | Pass | - | - | Pass | - | - | Pass | - | - | Pass | Pass | Pass |
| 5            |        | Pass | - | - | Pass | - | - | Pass | - | - | Pass | - | - | Pass | Pass | Pass |

**Test room temperature (°C) :**

23.8

**Measurement equipment :**

Pendulum hammer with chariot (M062)

Thermometer (A056)

**Quantities measured :**

For IK 04/05/06: Verification of the mechanical strength of a luminaire according to PT-S-13

For IK07/08/09/10/10+: Verification of the mechanical strength of a luminaire according to PT-S-05

**Uncertainties :**

Temperature: 0,6 °K

Mass: 0,25 %

Dynamometric key :

From 0.5 to 2.5 Nm : 0,15 Nm

From 2.5 to 5 Nm : 0,22 Nm

From 5 to 25 Nm : 0,83 Nm

From 25 to 60 Nm : 2,73 Nm

From 60 to 100 Nm : 3,55 Nm

For IK 04/05/06, Impact energy:  $\pm 10\%$

For IK07/08/09/10/10+, Impact energy:  $\pm 1\%$

**Decision rules :**

Pass/fail criteria for individual test statement of conformity (Verdict) according to GDE-GUI-003:

By visual inspection (or other means if necessary):

Luminaire shows dangerous behavior: fail

Luminaire shows no dangerous behavior: success

When several luminaires are tested, 4 out of 5 samples need to show positive result for compliance of the batch

Pass/fail criteria for the test report statement of conformity (Conclusion):

At least one of the individual test statements of conformity (Verdict) is successful: success, the highest achieved IK is reported

Otherwise: fail

**End of accredited report :**

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# Laboratory Test report



713-TEST

NBN EN ISO/IEC 17025 :2017

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Tél.: +32.4.224.71.40

FORM L-54 V2

## Thermal Test LED

### General information

Subject : VITALUM 1 - 24 Seoul 5050 - 1050-930mA - SIGNIFY FP 75W 300-1,050mA 220-240V DALI C133

Asked by : SZÜGYI János Péter

Created on : 01/02/2024

Started on : 07/02/2024

Test number : D240101

Reference norm : EN IEC 60598-1 (2021) + A11 (2022); EN 60598-2-3 (2003) + A1 (2011); EN 60598-2-5 (2015); IEC 60598-2-5 Ed3 (2015); IEC 60598-2-3 Ed3 (2002) +Amd 1 (2011); IEC 60598-1 Ed9 (2020)

Sample(s) : E240056

### Test conditions

Luminaire : VITALUM 1

Number of LED : 24

LED : Seoul 5050

Lens : LENS PLATE 25 LENSES 5425 PMMA / 03-48-040

PCBA : PCBA HF1 24 SC5050 740 4 stp Min. W4 8S3P HT / 03-52-266

Driver : DRIVER\_SIGNIFY\_FP\_75W\_300-1,050mA\_220-240V\_DALI\_C133\_ / 02-58-000

Number of driver(s) : 1

Control system : NEMA

SPD : None

Additional load info :

New foundry

Testing facility : BER - SCHREDER

Operator : CLOSSET Frédéric



lum

### Conclusion



Informative

Conclusion :

$\Delta T_s < 80^\circ\text{C}$  no risk of solder crack

Ta (@930mA):  $55^\circ\text{C}$  limited by driver according IEC 60598-2-3 & EN 60598-2-3 and IEC 60598-2-5 & EN 60598-2-5 (outdoor use only)

Ta (@930mA):  $45^\circ\text{C}$  limited by driver indoor use and UL standard

Tq (@930mA):  $35^\circ\text{C}$  limited by driver according IEC 62722-2-1 & EN IEC 62722-2-1

Ta (@1050mA):  $50^\circ\text{C}$  limited by driver according IEC 60598-2-3 & EN 60598-2-3 and IEC 60598-2-5 & EN 60598-2-5 (outdoor use only)

Ta (@1050mA):  $40^\circ\text{C}$  limited by driver indoor use and UL standard

Tq (@1050mA):  $30^\circ\text{C}$  limited by driver according IEC 62722-2-1 & EN IEC 62722-2-1

Tq given for 100 khrs of lifetime

Validated by :

LERHO Xavier

Duplicate to : PELSŐCZI Zoltán, SZÜGYI János Péter,  
NAGY Ádám, LÁMFALUSI Ferenc

LAB : 13/02/2024

**D240101**

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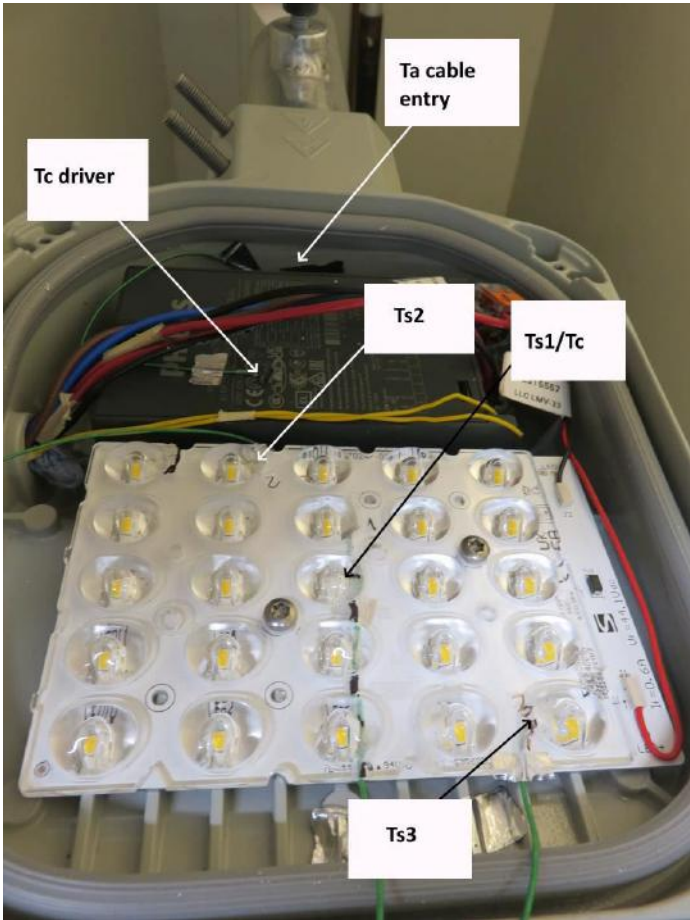
# Test(s) details

## Test(s)

| Name              | Description                                                                                                                                                    | Verdict     |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Sensors positions | Disposition of the thermocouples on the DUT.                                                                                                                   | Informative |
| Test @ 930mA      | Test according section 12.4 of IEC 60598-1 & EN IEC 60598-1.<br>The DUT is driven until all thermocouples reach thermal stabilization (i.e. variation = 1K/h). | Success     |
| Test @ 1050mA     | Evaluation of the harmonics behaviour according IEC 61000-3-2 & EN IEC 61000-3-2 - Not covered by the laboratory's accreditation.                              | Success     |

## Sensors positions

### Detail(s)



pos\_thermo

## Test @ 930mA

### Verdict(s)

|                                                                    | Ts1              | Ts2     | Ts3     | Driver  | Ta Cable entry |
|--------------------------------------------------------------------|------------------|---------|---------|---------|----------------|
| Limit Ta                                                           | 99.0 °C          | 99.0 °C | 99.0 °C | 80.0 °C | 90.0 °C        |
| Limit Tq                                                           | 85.0 °C          | 85.0 °C | 85.0 °C | 70.0 °C | 90.0 °C        |
| Thermocouple T°                                                    | 62.8 °C          | 65.6 °C | 62.9 °C | 61.0 °C | 38.1 °C        |
| Room                                                               | 26.0 °C          | 26.0 °C | 26.0 °C | 26.0 °C | 26.0 °C        |
| E Led                                                              | 5.7 V            | 5.7 V   | 5.7 V   |         |                |
| I Led                                                              | 0.309 A          | 0.309 A | 0.309 A |         |                |
| P Led                                                              | 1.8 W            | 1.8 W   | 1.8 W   |         |                |
| Heating                                                            | 36.8 °C          | 39.6 °C | 36.9 °C | 35.0 °C | 12.1 °C        |
| Ta Indoor                                                          | 62.2 °C          | 59.4 °C | 62.1 °C | 45.0 °C | 77.9 °C        |
| Tq                                                                 | 48.2 °C          | 45.4 °C | 48.1 °C | 35.0 °C | 77.9 °C        |
| Solder point temperature used as the image of the lens temperature |                  |         |         |         |                |
| Primary EM                                                         | Secondary Em Dr1 |         |         |         |                |
| U                                                                  | 229.9 V          | U       | 45.8 V  |         |                |
| I                                                                  | 0.215 A          | I       | 0.926 A |         |                |
| P                                                                  | 47.7 W           | P       | 42.4 W  |         |                |
| PF                                                                 | 0.967            |         |         |         |                |
| Efficiency                                                         | 88.9%            |         |         |         |                |
| THD                                                                | 10.0%            |         |         |         |                |
| Harmonics - 100%                                                   | PASS             |         |         |         |                |

## Test @ 1050mA

### Verdict(s)

|                                                                    | Ts1              | Ts2     | Ts3     | Driver  | Ta Cable entry |
|--------------------------------------------------------------------|------------------|---------|---------|---------|----------------|
| Limit Ta                                                           | 99.0 °C          | 99.0 °C | 99.0 °C | 80.0 °C | 90.0 °C        |
| Limit Tq                                                           | 85.0 °C          | 85.0 °C | 85.0 °C | 70.0 °C | 90.0 °C        |
| Thermocouple T°                                                    | 68.4 °C          | 71.7 °C | 68.6 °C | 65.4 °C | 39.9 °C        |
| Room                                                               | 26.1 °C          | 26.1 °C | 26.1 °C | 26.1 °C | 26.1 °C        |
| E Led                                                              | 5.8 V            | 5.8 V   | 5.8 V   |         |                |
| I Led                                                              | 0.349 A          | 0.349 A | 0.349 A |         |                |
| P Led                                                              | 2.0 W            | 2.0 W   | 2.0 W   |         |                |
| Heating                                                            | 42.3 °C          | 45.6 °C | 42.5 °C | 39.3 °C | 13.8 °C        |
| Ta Indoor                                                          | 56.7 °C          | 53.4 °C | 56.5 °C | 40.7 °C | 76.2 °C        |
| Tq                                                                 | 42.7 °C          | 39.4 °C | 42.5 °C | 30.7 °C | 76.2 °C        |
| Solder point temperature used as the image of the lens temperature |                  |         |         |         |                |
| Primary EM                                                         | Secondary Em Dr1 |         |         |         |                |
| U                                                                  | 229.9 V          | U       | 46.3 V  |         |                |
| I                                                                  | 0.243 A          | I       | 1.046 A |         |                |
| P                                                                  | 54.4 W           | P       | 48.4 W  |         |                |
| PF                                                                 | 0.973            |         |         |         |                |
| Efficiency                                                         | 89.0%            |         |         |         |                |
| THD                                                                | 8.9%             |         |         |         |                |
| Harmonics - 100%                                                   | PASS             |         |         |         |                |



**Test room temperature (°C) :**

@930mA : 26°C

@1050mA : 26.1°C

**Measurement equipment :**

Keithley with thermocouples type K (E127)

Norma 4000 (E068)

BK (E198)

Thermal test chamber 25 °C (A002)

**Quantities measured :**

Qualification of the thermal limits and measurement of the electrical behavior of a luminaire according to PT-S-07

**Uncertainties :**

Statement of uncertainties (K=2, 95% of confidence level):

Temperature: 1,26 K

Voltage (AC): 0,33%

Current (AC): 0,33 %

Power (AC): 0,27%

Voltage (DC): 0,3 %

Current (DC): 0,3%

Power (DC): 0,23%

Anemometer: ± 0,27 m/s

**Decision rules :**

Pass/fail criteria for individual test statement of conformity (Verdict):

No pass/fail criteria applied on electrical measurements, except on harmonics where the criteria of IEC 61000-3-2 are applied (the harmonics are not covered by the laboratory's accreditation).

No pass/fail criteria applied on thermal measurements when performed at 25°C (+/- 5°C), the Ta/Tq values are calculated according GDE-POL-001.

Pass/fail criteria on thermal qualification (test performed at announced Ta or Tq)

At the announced Ta, no component is above its maximum limit of operation : success

At the announced Ta, at least 1 component is above its maximum limit of operation : fail

According to IEC 60598-2-3 & EN 60598-2-3 and IEC 60598-2-5 & EN 60598-2-5 Standards, the maximum limit of every component can be augmented by 10 K provided that the luminaire is intended for outdoor use only.

At the announced Tq, no component is above its selected performance limit of operation: success

At the announced Tq, at least 1 component is above its selected performance limit of operation : fail

According to IEC 62722-2-1 & EN IEC 62722-2-1, the selected performance limit cannot be augmented by 10 K even if the luminaire is intended for outdoor use.

Any Ta/Tq defined value will be rounded down to the nearest multiple of 5.

In any case, test at 25°C or test at Ta or Tq, if delta Ts is above the recommended value of the GDE-POL-001, the test is failed.

Pass/fail criteria for the test report statement of conformity (Conclusion):

At least one of the individual test statements of conformity (Verdict) is successful: success, the highest achieved Ta/Tq is reported

Otherwise: fail

**End of accredited report :**

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# Laboratory Test report



713-TEST

NBN EN ISO/IEC 17025 :2017

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FORM L-54 V2

## Thermal Test LED

### General information

Subject : VITALUM 1 - 24 Seoul 5050 - 930mA - OSRAM P5 46W 930-930mA 220-240V NONE - Nema socket

Asked by : SZÜGYI János Péter

Created on : 01/02/2024

Started on : 13/02/2024

Test number : D240102

Reference norm : EN IEC 60598-1 (2021) + A11 (2022); EN 60598-2-3 (2003) + A1 (2011); EN 60598-2-5 (2015); IEC 60598-2-5 Ed3 (2015); IEC 60598-2-3 Ed3 (2002) +Amd 1 (2011); IEC 60598-1 Ed9 (2020)

Sample(s) : E240056

### Test conditions

Luminaire : VITALUM 1

Number of LED : 24

LED : Seoul 5050

Lens : LENS PLATE 25 LENSES 5425 PMMA / 03-48-040

PCBA : PCBA HF1 24 SC5050 740 4 stp Min. W4 8S3P HT / 03-52-266

Driver : DRIVER\_OSRAM\_P5\_46W\_930-930mA\_220-240V\_NONE\_.\_. / 03-63-349

Number of driver(s) : 1

Driver current (mA) : 930

Control system : Nema

SPD : none

Additional load info :

Driver: engineering sample.

Testing facility : BER - SCHREDER

Operator : CLOSSET Frédéric



lum

### Conclusion



Informative

Conclusion :

$\Delta T_s < 80^\circ\text{C}$  no risk of solder crack

Ta (@930mA) :  $55^\circ\text{C}$  limited by driver according IEC 60598-2-3 & EN 60598-2-3 and IEC 60598-2-5 & EN 60598-2-5 (outdoor use only)

Ta (@930mA) :  $50^\circ\text{C}$  limited by driver indoor use and UL standard

Tq (@930mA) :  $35^\circ\text{C}$  according IEC 62722-2-1 & EN IEC 62722-2-1

Tq given for 100 khrs of lifetime

Validated by :

LERHO Xavier

Duplicate to : PELSŐCZI Zoltán, SZÜGYI János Péter,

NAGY Ádám, LÁMFALUSI Ferenc

LAB : 26/02/2024

**D240102**

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## Test(s) details

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### Test(s)

| Name              | Description                                                                                                                                                                                                                                                                                        | Verdict     |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Driver detail     |                                                                                                                                                                                                                                                                                                    | Informative |
| Sensors positions | Disposition of the thermocouples on the DUT.                                                                                                                                                                                                                                                       | Informative |
| Test @ 930mA      | Test according section 12.4 of IEC 60598-1 & EN IEC 60598-1.<br>The DUT is driven until all thermocouples reach thermal stabilization (i.e. variation = 1K/h).<br>Evaluation of the harmonics behaviour according IEC 61000-3-2 & E IEC 61000-3-2 - Not covered by the laboratory's accreditation. | Informative |

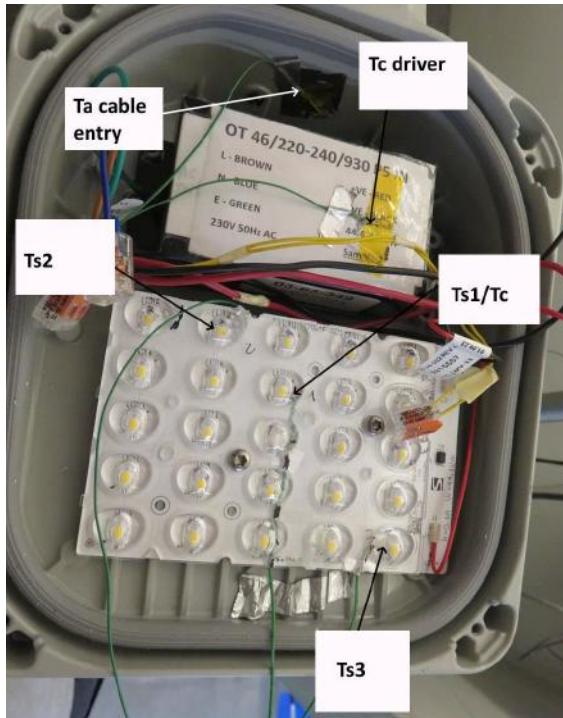
### Driver detail

#### Detail(s)



dr\_03-63-349

## Sensors positions



pos\_thermo

## Test @ 930mA

### Verdict(s)

|                                                                    | Ts1              | Ts2     | Ts3     | Driver  | Ta Cable entry |
|--------------------------------------------------------------------|------------------|---------|---------|---------|----------------|
| Limit Ta                                                           | 99.0 °C          | 99.0 °C | 99.0 °C | 80.0 °C | 90.0 °C        |
| Limit Tq                                                           | 85.0 °C          | 85.0 °C | 85.0 °C | 70.0 °C | 90.0 °C        |
| Thermocouple T°                                                    | 61.7 °C          | 64.4 °C | 62.0 °C | 52.5 °C | 37.2 °C        |
| Room                                                               | 26.0 °C          | 26.0 °C | 26.0 °C | 26.0 °C | 26.0 °C        |
| E Led                                                              | 5.7 V            | 5.7 V   | 5.7 V   |         |                |
| I Led                                                              | 0.307 A          | 0.307 A | 0.307 A |         |                |
| P Led                                                              | 1.8 W            | 1.8 W   | 1.8 W   |         |                |
| Heating                                                            | 35.7 °C          | 38.4 °C | 36.0 °C | 26.5 °C | 11.2 °C        |
| Ta Indoor                                                          | 63.3 °C          | 60.6 °C | 63.0 °C | 53.5 °C | 78.8 °C        |
| Tq                                                                 | 49.3 °C          | 46.6 °C | 49.0 °C | 43.5 °C | 78.8 °C        |
| Solder point temperature used as the image of the lens temperature |                  |         |         |         |                |
| Primary EM                                                         | Secondary Em Dr1 |         |         |         |                |
| U                                                                  | 229.9 V          | U       | 45.8 V  |         |                |
| I                                                                  | 0.207 A          | I       | 0.920 A |         |                |
| P                                                                  | 46.3 W           | P       | 42.1 W  |         |                |
| PF                                                                 | 0.972            |         |         |         |                |
| Efficiency                                                         | 90.9%            |         |         |         |                |
| THD                                                                | 7.2%             |         |         |         |                |
| Harmonics - 100%                                                   | PASS             |         |         |         |                |

**Test room temperature (°C) :**

26

**Measurement equipment :**

Keithley with thermocouples type K (E068)

Norma 4000 (E165)

BK (E198)

Thermal test chamber 25 °C (A002)

**Quantities measured :**

Qualification of the thermal limits and measurement of the electrical behavior of a luminaire according to PT-S-07

**Uncertainties :**

Statement of uncertainties (K=2, 95% of confidence level):

Temperature: 1,26 K

Voltage (AC): 0,33%

Current (AC): 0,33 %

Power (AC): 0,27%

Voltage (DC): 0,3 %

Current (DC): 0,3%

Power (DC): 0,23%

Anemometer:  $\pm 0,27$  m/s

**Decision rules :**

Pass/fail criteria for individual test statement of conformity (Verdict):

No pass/fail criteria applied on electrical measurements, except on harmonics where the criteria of IEC 61000-3-2 are applied (the harmonics are not covered by the laboratory's accreditation).

No pass/fail criteria applied on thermal measurements when performed at 25°C (+/- 5°C), the Ta/Tq values are calculated according GDE-POL-001.

Pass/fail criteria on thermal qualification (test performed at announced Ta or Tq)

At the announced Ta, no component is above its maximum limit of operation : success

At the announced Ta, at least 1 component is above its maximum limit of operation : fail

According to IEC 60598-2-3 & EN 60598-2-3 and IEC 60598-2-5 & EN 60598-2-5 Standards, the maximum limit of every component can be augmented by 10 K provided that the luminaire is intended for outdoor use only.

At the announced Tq, no component is above its selected performance limit of operation: success

At the announced Tq, at least 1 component is above its selected performance limit of operation : fail

According to IEC 62722-2-1 & EN IEC 62722-2-1, the selected performance limit cannot be augmented by 10 K even if the luminaire is intended for outdoor use.

Any Ta/Tq defined value will be rounded down to the nearest multiple of 5.

In any case, test at 25°C or test at Ta or Tq, if delta Ts is above the recommended value of the GDE-POL-001, the test is failed.

Pass/fail criteria for the test report statement of conformity (Conclusion):

At least one of the individual test statements of conformity (Verdict) is successful: success, the highest achieved Ta/Tq is reported

Otherwise: fail

**End of accredited report :**

---

# Laboratory Test report



713-TEST

NBN EN ISO/IEC 17025 :2017

**Schröder**  
Experts in lightability™

**Laboratoire Schröder**  
Rue de Mons 3 - B-4000 Liège - BELGIUM  
Tél.: +32.4.224.71.40

FORM L-54 V2

## Thermal Test LED

### General information

Subject : VITALUM 1 - 24 Seoul 5050 - 1000-930-900-850mA - OSRAM DEXAL G2 40W 150-1,050mA 220-240V D4i C133 . - Zhaga socket

Asked by : SZÜGYI János Péter

Created on : 01/02/2024

Started on : 08/02/2024

Test number : D240103

Reference norm : EN IEC 60598-1 (2021) + A11 (2022); EN 60598-2-3 (2003) + A1 (2011); EN 60598-2-5 (2015); IEC 60598-2-5 Ed3 (2015); IEC 60598-2-3 Ed3 (2002) +Amd 1 (2011); IEC 60598-1 Ed9 (2020)

Sample(s) : E240056

### Test conditions

Luminaire : VITALUM 1

Number of LED : 24

LED : Seoul 5050

Lens : LENS PLATE 25 LENSES 5425 PMMA / 03-48-040

PCBA : PCBA HF1 24 SC5050 740 4 stp Min. W4 8S3P HT / 03-52-266

Driver : DRIVER\_OSRAM\_DEXAL G2\_40W\_150-1,050mA\_220-240V\_D4i\_C133 / 03-71-446

Number of driver(s) : 1

Control system : Nema

SPD : None

Testing facility : BER - SCHREDER

Operator : CLOSSET Frédéric



lum

### Conclusion



Informative

Conclusion :

$\Delta T_s < 80^\circ\text{C}$  no risk of solder crack

Ta (@850mA) :  $55^\circ\text{C}$  limited by driver according IEC 60598-2-3 & EN 60598-2-3 and IEC 60598-2-5 & EN 60598-2-5 (outdoor use only)

Ta (@850mA):  $45^\circ\text{C}$  limited by driver indoor use and UL standard

Tq (@850mA):  $35^\circ\text{C}$  limited by driver according IEC 62722-2-1 & EN IEC 62722-2-1

Tq given for 100 khrs of lifetime

Remark: @900mA Pout > Pout max driver don't use that config

Validated by :  
LERHO Xavier

Duplicate to : PELSŐCZI Zoltán, SZÜGYI János Péter,  
NAGY Ádám, LÁMFALUSI Ferenc  
LAB : 26/02/2024

**D240103**

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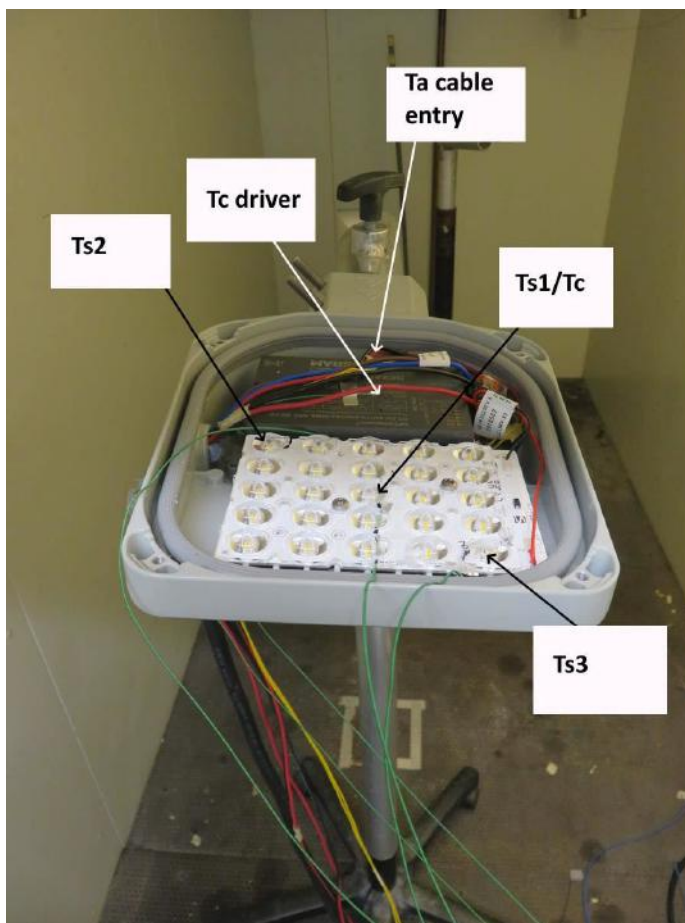
## Test(s) details

### Test(s)

| Name                                                         | Description                                                                                                                                                                                                                                                                                        | Verdict      |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Sensors positions                                            | Disposition of the thermocouples on the DUT.                                                                                                                                                                                                                                                       | Informative  |
| Test @ 900mA                                                 | Test according section 12.4 of IEC 60598-1 & EN IEC 60598-1.<br>The DUT is driven until all thermocouples reach thermal stabilization (i.e. variation = 1K/h).<br>Evaluation of the harmonics behaviour according IEC 61000-3-2 & E IEC 61000-3-2 - Not covered by the laboratory's accreditation. | Informative  |
| new test : Test @ 850mA in accordance with the driver matrix | Test according section 12.4 of IEC 60598-1 & EN IEC 60598-1. The DUT is driven until all thermocouples reach thermal stabilization (i.e. variation = 1K/h). Evaluation of the harmonics behaviour according IEC 61000-3-2 & E IEC 61000-3-2 - Not covered by the laboratory's accreditation.       | Success      |
| Test @ 930mA                                                 | Test not possible, bads parameters                                                                                                                                                                                                                                                                 | Non realized |
| Test @ 1000mA                                                | Test not possible, bads parameters                                                                                                                                                                                                                                                                 | Non realized |

### Sensors positions

#### Detail(s)



pos\_thermo

## Test @ 900mA

### Verdict(s)

Pout > Pout max driver

|                                                                    | Ts1              | Ts2     | Ts3     | Driver  | Ta Cable entry |
|--------------------------------------------------------------------|------------------|---------|---------|---------|----------------|
| Limit Ta                                                           | 99.0 °C          | 99.0 °C | 99.0 °C | 75.0 °C | 90.0 °C        |
| Limit Tq                                                           | 85.0 °C          | 85.0 °C | 85.0 °C | 65.0 °C | 90.0 °C        |
| Thermocouple T°                                                    | 61.1 °C          | 63.8 °C | 61.4 °C | 54.9 °C | 35.2 °C        |
| Room                                                               | 26.1 °C          | 26.1 °C | 26.1 °C | 26.1 °C | 26.1 °C        |
| E Led                                                              | 5.7 V            | 5.7 V   | 5.7 V   |         |                |
| I Led                                                              | 0.299 A          | 0.299 A | 0.299 A |         |                |
| P Led                                                              | 1.7 W            | 1.7 W   | 1.7 W   |         |                |
| Heating                                                            | 35.0 °C          | 37.7 °C | 35.3 °C | 28.8 °C | 9.1 °C         |
| Ta Indoor                                                          | 64.0 °C          | 61.3 °C | 63.7 °C | 46.2 °C | 80.9 °C        |
| Tq                                                                 | 50.0 °C          | 47.3 °C | 49.7 °C | 36.2 °C | 80.9 °C        |
| Solder point temperature used as the image of the lens temperature |                  |         |         |         |                |
| Primary EM                                                         | Secondary Em Dr1 |         |         |         |                |
| U                                                                  | 229.9 V          | U       | 45.7 V  |         |                |
| I                                                                  | 0.201 A          | I       | 0.897 A |         |                |
| P                                                                  | 45.8 W           | P       | 41.0 W  |         |                |
| PF                                                                 | 0.992            |         |         |         |                |
| Efficiency                                                         | 89.5%            |         |         |         |                |
| THD                                                                | 5.5%             |         |         |         |                |
| Harmonics - 100%                                                   | PASS             |         |         |         |                |

## new test : Test @ 850mA in accordance with the driver matrix

### Verdict(s)

|                                                                    | Ts1              | Ts2     | Ts3     | Driver  | Ta Cable entry |
|--------------------------------------------------------------------|------------------|---------|---------|---------|----------------|
| Limit Ta                                                           | 99.0 °C          | 99.0 °C | 99.0 °C | 75.0 °C | 90.0 °C        |
| Limit Tq                                                           | 85.0 °C          | 85.0 °C | 85.0 °C | 65.0 °C | 90.0 °C        |
| Thermocouple T°                                                    | 58.9 °C          | 61.4 °C | 59.2 °C | 54.3 °C | 34.8 °C        |
| Room                                                               | 26.1 °C          | 26.1 °C | 26.1 °C | 26.1 °C | 26.1 °C        |
| E Led                                                              | 5.7 V            | 5.7 V   | 5.7 V   |         |                |
| I Led                                                              | 0.283 A          | 0.283 A | 0.283 A |         |                |
| P Led                                                              | 1.6 W            | 1.6 W   | 1.6 W   |         |                |
| Heating                                                            | 32.8 °C          | 35.3 °C | 33.1 °C | 28.2 °C | 8.7 °C         |
| Ta Indoor                                                          | 66.2 °C          | 63.7 °C | 65.9 °C | 46.8 °C | 81.3 °C        |
| Tq                                                                 | 52.2 °C          | 49.7 °C | 51.9 °C | 36.8 °C | 81.3 °C        |
| Solder point temperature used as the image of the lens temperature |                  |         |         |         |                |
| Primary EM                                                         | Secondary Em Dr1 |         |         |         |                |
| U                                                                  | 229.9 V          | U       | 45.5 V  |         |                |
| I                                                                  | 0.189 A          | I       | 0.849 A |         |                |
| P                                                                  | 43.1 W           | P       | 38.6 W  |         |                |
| PF                                                                 | 0.991            |         |         |         |                |
| Efficiency                                                         | 89.6%            |         |         |         |                |
| THD                                                                | 5.5%             |         |         |         |                |
| Harmonics - 100%                                                   | PASS             |         |         |         |                |

**Test room temperature (°C) :**

@900mA : 26.1

@850mA : 26.1

**Measurement equipment :**

Keithley with thermocouples type K (E127)

Norma 4000 (E068)

BK (E198)

Thermal test chamber 25 °C (A002)

**Quantities measured :**

Qualification of the thermal limits and measurement of the electrical behavior of a luminaire according to PT-S-07

**Uncertainties :**

Statement of uncertainties (K=2, 95% of confidence level):

Temperature: 1,26 K

Voltage (AC): 0,33%

Current (AC): 0,33 %

Power (AC): 0,27%

Voltage (DC): 0,3 %

Current (DC): 0,3%

Power (DC): 0,23%

Anemometer:  $\pm 0,27$  m/s

**Decision rules :**

Pass/fail criteria for individual test statement of conformity (Verdict):

No pass/fail criteria applied on electrical measurements, except on harmonics where the criteria of IEC 61000-3-2 are applied (the harmonics are not covered by the laboratory's accreditation).

No pass/fail criteria applied on thermal measurements when performed at 25°C (+/- 5°C), the Ta/Tq values are calculated according GDE-POL-001.

Pass/fail criteria on thermal qualification (test performed at announced Ta or Tq)

At the announced Ta, no component is above its maximum limit of operation : success

At the announced Ta, at least 1 component is above its maximum limit of operation : fail

According to IEC 60598-2-3 & EN 60598-2-3 and IEC 60598-2-5 & EN 60598-2-5 Standards, the maximum limit of every component can be augmented by 10 K provided that the luminaire is intended for outdoor use only.

At the announced Tq, no component is above its selected performance limit of operation: success

At the announced Tq, at least 1 component is above its selected performance limit of operation : fail

According to IEC 62722-2-1 & EN IEC 62722-2-1, the selected performance limit cannot be augmented by 10 K even if the luminaire is intended for outdoor use.

Any Ta/Tq defined value will be rounded down to the nearest multiple of 5.

In any case, test at 25°C or test at Ta or Tq, if delta Ts is above the recommended value of the GDE-POL-001, the test is failed.

Pass/fail criteria for the test report statement of conformity (Conclusion):

At least one of the individual test statements of conformity (Verdict) is successful: success, the highest achieved Ta/Tq is reported

Otherwise: fail

**End of accredited report :**

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# Laboratory Test report

FORM L-54 V2



713-TEST

NBN EN ISO/IEC 17025 :2017

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**Laboratoire Schröder**  
Rue de Mons 3 - B-4000 Liège - BELGIUM  
Tél.: +32.4.224.71.40

## Tightness test

### General information

Subject : VITALUM 1 - 36 Seoul 5050 - SIGNIFY FP 75W 300-1,050mA 220-240V DALI C133 . - 850mA - GLASS - Nema socket  
>> IPX6 Before endurance

Asked by : SZÜGYI János Péter

Created on : 27/02/2024

Started on : 28/02/2024

Test number : D240214

Reference norm : EN IEC 60598-1 (2021) + A11 (2022); IEC 60598-1 Ed9 (2020)

Sample(s) : E240061

### Test conditions

Luminaire : VITALUM 1

Number of LED : 36

LED : Seoul 5050

Lens : LENS PLATE 36 LENSES 5439 PMMA /03-50-371

PCBA : PCBA HF2 36 SSC5050 4000K 4stp 70 Min. W4 12P3 1CH HT /03-52-280

Driver current (mA) : 850

Protector Material : Glass Extra Clear wide serigraphy

Protector Shape : Flat

Additional info :

Test realized before endurance D240216.

Testing Facility : BER - SCHREDER

Operator : KOY Fiston



IMG\_9275

### Conclusion



Success

Conclusion :

Statement of conformity according to section 9.2 of EN IEC 60598-1 (2021) + A11 (2022) & IEC 60598-1 Ed9 (2020):

IPx6 passed.

Note: based on the tests IPX5/IPX6 the product is considered to pass the rain test according to §17.5.2 of UL 1598:2021\*

\* not covered by BELAC accreditation

Validated by :

LERHO Xavier

Duplicate to : PELSŐCZI Zoltán, SZÜGYI János Péter,

NAGY Ádám, LÁMFALUSI Ferenc

LAB : 13/03/2024

**D240214**

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## Test(s) details

### Test(s)

| Name | Description                                                                                                                                                                                                                                                                                         | Verdict |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| IPx6 | <ul style="list-style-type: none"><li>- Luminaire switched ON until stable T°</li><li>- Luminaire switched OFF and immediately sprayed with water jet</li><li>- Hose diam. 12,5 mm</li><li>- Water flow: 100 l/min</li><li>- Spraying distance: 3 m</li><li>- Duration of test: 3 minutes</li></ul> | Success |

### IPx6

### Verdict(s)

Pre-conditioning time :

- 79 minutes

Test result :

- Passed : No water entry in the enclosure of the luminaire

### Detail(s)



IMG\_9277

**Test room temperature (°C) :**

22.6

**Measurement equipment :**

Rotating table (A001/2)

Chronometer (A069)

Thermometer (A039)

Flowmeter (A001/10 + A001/16)

Lance (A001/12/1)

IPx6 nozzle (A001/12/5)

Dynamometric key (M058)

**Quantities measured :**

Verification of water/dust ingress within a luminaire enclosure according to

For IP2X: PT-S-14

For IP3X/4X: PT-S-15

For IP5X/6X: PT-S-06

For IPX3/X4: PT-S-01

For IPX5/X6: PT-S-08

For IPX7/X8: PT-S-09

For IPX9(15°C)/X9(80°C) : PT-S-10

**Uncertainties :**

Statement of uncertainties (K=2, 95% of confidence level):

Time: 0,35 seconds per 10 minutes

Temperature: 0,6 K

Calipers: 0,005 mm

Measuring tape:  $\pm 1,13$  mm

Dynamometric key :

From 0.5 to 2.5 Nm : 0,15 Nm

From 2.5 to 5 Nm : 0,22 Nm

From 5 to 25 Nm : 0,83 Nm

From 25 to 60 Nm : 2,73 Nm

From 60 to 100 Nm : 3,55 Nm

For solid ingress test:

IP2X:

Probe dimensions:  $\pm 0,6$  mm

Applied force:  $\pm 0,4$  N

IP3X:

Probe dimensions:  $\pm 0,3$  mm

Applied force:  $\pm 0,13$  N

IP4X:

Probe dimensions:  $\pm 0,1$  mm

Applied force:  $\pm 0,11$  N

IP5X/6X

Test duration (talcum suspension time):  $\pm 3$  seconds

Talcum mass: 0,02 %

For liquid ingress test:

IPX3/X4

Table rotation:  $\pm 6$  sec/rotation

Arms Rotation angle:  $\pm 3^\circ$

Water flow:  $\pm 4,5$  %

IPX5/X6

Table rotation:  $\pm 6$  sec/rotation

Water flow:  $\pm 4$  %

Test Distance: +0 / -50 cm

IPX7/X8

Test depth: +10 cm / -0 cm

IPX9

Water temperature: 1.25 K

Test distance: 1.59 mm (for 175mm)

Test duration: 2.49 s (for 3min)  
Water pressure: 0.37 N

**Decision rules :**

Pass/fail criteria for individual test statement of conformity (Verdict):

For solid ingress test:

IP2X:

If contact possible with live parts: fail

Otherwise: success

IP3X/4X:

For luminaires without draining holes, nor ventilation slots for forced cooling, penetration of the test probe in the enclosure: fail

For luminaires with draining holes, or ventilation slots for forced cooling, if contact possible with live part: fail

Otherwise: success

IP5X/6X

By visual inspection:

If possible hazard due to presence of conductive dust: fail

For IP5X: If no possible hazard due to the presence of conductive dust: success

For IP6X: No presence of talcum: success

For liquid ingress test:

IPX3/X4/X5/X6/IPX9(15°C)/X9(80°C):

By visual inspection:

If possible hazard due to presence of water: fail

If no possible hazard due to the presence of water and no efficient way to evacuate the water: fail

If no possible hazard due to the presence of water and an efficient way to evacuate the water: success

No presence of water: success

IPX7/X8:

By visual inspection:

Presence of water: fail

No presence of water: success

Pass/fail criteria for the test report statement of conformity (Conclusion):

At least one of the individual test statements of conformity (Verdict) is failed: failed

Otherwise: success

**End of accredited report :**

---



# Laboratory Test report

FORM L-54 V2



713-TEST

NBN EN ISO/IEC 17025 :2017

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**Laboratoire Schröder**  
Rue de Mons 3 - B-4000 Liège - BELGIUM  
Tél.: +32.4.224.71.40

## Tightness test

### General information

Subject : VITALUM 1 - 36 Seoul 5050 - SIGNIFY FP 75W 300-1,050mA 220-240V DALI C133 . - 850mA - GLASS - Nema socket

Asked by : SZÜGYI János Péter

Created on : 14/03/2024

Started on : 14/03/2024

Test number : D240250

Reference norm : EN IEC 60598-1 (2021) + A11 (2022); IEC 60598-1 Ed9 (2020)

Sample(s) : E240061

### Test conditions

Luminaire : VITALUM 1

Number of LED : 36

LED : Seoul 5050

Lens : LENS PLATE 36 LENSES 5439 PMMA /03-50-371

PCBA : PCBA HF2 36 SSC5050 4000K 4stp 70 Min. W4 12P3 1CH HT /03-52-280

Driver current (mA) : 850

Protector Material : Glass Extra Clear wide serigraphy

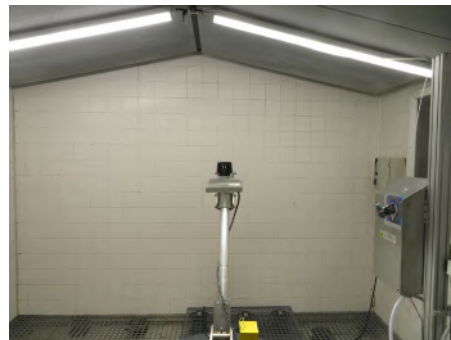
Protector Shape : Flat

Additional info :

Test realized after endurance D240216.

Testing Facility : BER - SCHREDER

Operator : KOY Fiston



IMG\_0095

### Conclusion



Success

Conclusion :

Statement of conformity according to section 9.2 of EN IEC 60598-1 (2021) + A11 (2022) & IEC 60598-1 Ed9 (2020):

IP66 passed.

Note: based on the tests IPX5/IPX6 the product is considered to pass the rain test according to §17.5.2 of UL 1598:2021\*

\* not covered by BELAC accreditation

Validated by :  
LERHO Xavier

Duplicate to : PELSŐCZI Zoltán, SZÜGYI János Péter,  
NAGY Ádám, LÁMFALUSI Ferenc  
LAB : 26/03/2024

**D240250**

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## Test(s) details

### Test(s)

| Name | Description                                                                                                                                                                                                                                                                                         | Verdict |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| IP6x | <ul style="list-style-type: none"><li>- Luminaire switched ON until stable T°</li><li>- Talcum in suspension (blowing ON)</li><li>- After 1', luminaire OFF</li><li>- Talcum for 3 hours</li></ul>                                                                                                  | Success |
| IPx6 | <ul style="list-style-type: none"><li>- Luminaire switched ON until stable T°</li><li>- Luminaire switched OFF and immediately sprayed with water jet</li><li>- Hose diam. 12,5 mm</li><li>- Water flow: 100 l/min</li><li>- Spraying distance: 3 m</li><li>- Duration of test: 3 minutes</li></ul> | Success |

### IP6x

### Verdict(s)

Pre-conditioning time :

- 98 minutes

Test result :

- Passed : No talcum entry in the enclosure of the luminaire

### Detail(s)



IMG\_0140



IMG\_0141

## IPx6

### Verdict(s)

Pre-conditioning time :

- 86 minutes

Test result :

- Passed : No water entry in the enclosure of the luminaire

### Detail(s)



IMG\_0096



IMG\_0099



IMG\_0102

**Test room temperature (°C) :**

IPx6 :22.5

IP6x :23.1

**Measurement equipment :**

IPx6 :

Rotating table (A001/2)

Chronometer (A069)

Thermometer (A039)

Flowmeter (A001/10 + A001/16)

Lance (A001/12/1)

IPx6 nozzle (A001/12/5)

IP6x :

Talcum chamber (A003)

Thermometer (A055)

Chronometer (A069)

**Quantities measured :**

Verification of water/dust ingress within a luminaire enclosure according to

For IP2X: PT-S-14

For IP3X/4X: PT-S-15

For IP5X/6X: PT-S-06

For IPX3/X4: PT-S-01

For IPX5/X6: PT-S-08

For IPX7/X8: PT-S-09

For IPX9(15°C)/X9(80°C) : PT-S-10

**Uncertainties :**

Statement of uncertainties (K=2, 95% of confidence level):

Time: 0,35 seconds per 10 minutes

Temperature: 0,6 K

Calipers: 0,005 mm

Measuring tape:  $\pm 1,13$  mm

Dynamometric key :

From 0.5 to 2.5 Nm : 0,15 Nm

From 2.5 to 5 Nm : 0,22 Nm

From 5 to 25 Nm : 0,83 Nm

From 25 to 60 Nm : 2,73 Nm

From 60 to 100 Nm : 3,55 Nm

For solid ingress test:

IP2X:

Probe dimensions:  $\pm 0,6$  mm

Applied force:  $\pm 0,4$  N

IP3X:

Probe dimensions:  $\pm 0,3$  mm

Applied force:  $\pm 0,13$  N

IP4X:

Probe dimensions:  $\pm 0,1$  mm

Applied force:  $\pm 0,11$  N

IP5X/6X

Test duration (talcum suspension time):  $\pm 3$  seconds

Talcum mass: 0,02 %

For liquid ingress test:

IPX3/X4

Table rotation:  $\pm 6$  sec/rotation

Arms Rotation angle:  $\pm 3^\circ$

Water flow:  $\pm 4,5$  %

IPX5/X6

Table rotation:  $\pm 6$  sec/rotation  
Water flow:  $\pm 4$  %  
Test Distance: +0 / -50 cm  
IPX7/X8  
Test depth: +10 cm / -0 cm  
IPX9  
Water temperature: 1.25 K  
Test distance: 1.59 mm (for 175mm)  
Test duration: 2.49 s (for 3min)  
Water pressure: 0.37 N

**Decision rules :**

Pass/fail criteria for individual test statement of conformity (Verdict):

For solid ingress test:

IP2X:

If contact possible with live parts: fail

Otherwise: success

IP3X/4X:

For luminaires without draining holes, nor ventilation slots for forced cooling, penetration of the test probe in the enclosure: fail

For luminaires with draining holes, or ventilation slots for forced cooling, if contact possible with live part: fail

Otherwise: success

IP5X/6X

By visual inspection:

If possible hazard due to presence of conductive dust: fail

For IP5X: If no possible hazard due to the presence of conductive dust: success

For IP6X: No presence of talcum: success

For liquid ingress test:

IPX3/X4/X5/X6/IPX9(15°C)/X9(80°C):

By visual inspection:

If possible hazard due to presence of water: fail

If no possible hazard due to the presence of water and no efficient way to evacuate the water: fail

If no possible hazard due to the presence of water and an efficient way to evacuate the water: success

No presence of water: success

IPX7/X8:

By visual inspection:

Presence of water: fail

No presence of water: success

Pass/fail criteria for the test report statement of conformity (Conclusion):

At least one of the individual test statements of conformity (Verdict) is failed: failed

Otherwise: success

**End of accredited report :**

---