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Clause	Requirement + Test	Result - Remark	Verdict

Laboratory Service PHYSICAL TEST REPORT

R-Tech
Rue de Mons 3 – B-4000 Liege – Belgium
Tel.: +32 4 224 71 40 – Fax: +32 4 224 25 90
Member of Schréder Group

Subject: **AXIA-1 Gen 2 / 24 led's @ 890mA**
Sample n°: P-E15480

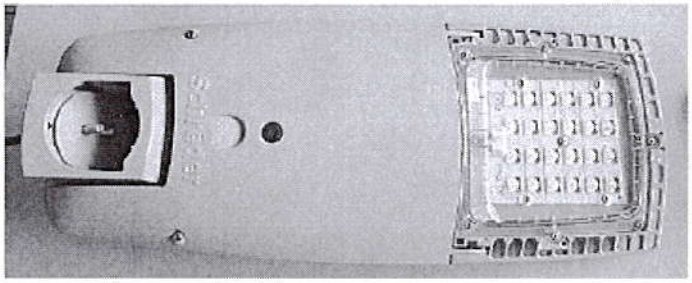
From: ESS

Test purpose: **Photobiological safety tests following IEC-EN 62471 Standard**

Remarks:
Test request n°: P-D16010
Folder n°: P-F15070

TEST CONDITIONS: Operator: Laborelec

AXIA-1 Gen 2 24 led's @ 890 mA



Test program:
Spectral radiance and irradiance measurements of the device under test in the following wavelength ranges:
- 200 to 400 nm : « Actinic UV skin & eye » irradiance
- 315 to 400 nm : « Eye UV-A » irradiance
- 300 to 700 nm : « Blue Light » radiance
- 380 to 1400 nm : « Thermal Retinal » radiance
- 780 to 1400 nm : « Thermal Retinal » radiance (weak visual stimulus)

Determination of the Risk Group classification for each hazard and recommendation about the marking of the product.

Test and results: see report LBE04112160 - 1.0 here after

CONCLUSIONS:

Fitting is risk Group 2 at 200 mm => moderate risk for maintenance users
1 at 215 mm => no risk for user
0 at 2,2 m => no risk for user

Duplicate to: MM Ph. Joris, M. Thijs
LAB 20/01/2016
L. Maghe

P-16E010

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Digitally signed by Eni Maria
Date: 2019.02.25 17:18:32 EET
Reason: MoldSign Signature
Location: Moldova

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BELAC Accr. 002-Test EN-ISO 17025

LABORATOIRE CENTRAL D'ELECTRICITE (L.C.E.)
CENTRAAL LABORATORIUM VOOR ELEKTRICITEIT (C.L.E.)
CENTRAL LABORATORY OF ELECTRICITY (C.L.E.)

Rodestraat, 125 – B-1630 Linkebeek

Photometry and lighting fixtures

REPORT OF TEST / MEASUREMENT

Purpose of the test / measurement	Photobiological safety of a Led Luminaire according to IEC 62471 Schreder Axia 2.1 24 Leds 890mA 4000K
Delivered to	R-TECH Laurent Maghe rue de Mons 3 B-4000 Liège l.maghe@schreder.com
Performed on	November 2015
Delivered on	11/04/2016
CLE task nr.	15_04796_A
CLE report nr.	LBE04112160 - 3.0
Applicant reference nr	Order N° PO000556

*This document is fully electronically signed

*Author	*Verifier	*Approver
Couvreur Guy Technical operator Tel.: +32 2 382 03 67 E-mail: guy.couvreur@laborelec.com	Deswert Jean Michel Technical expert	Deswert Jean Michel Technology Manager

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TEST REPORT IEC 62471 **Photobiological safety of lamps and lamp systems**	
Report Reference No. ..... :	LBE04112160 - 3.0
Date of issue ..... :	October 29-30/ 2015
Total number of pages ..... :	18 pages
Testing Laboratory..... :	Laborelec
Address ..... :	125 Rue de Rhode – 1630 Linkebeek - BELGIUM
Applicant's name ..... :	R-TECH
Address ..... :	Rue de Mons 3 B-4000 Liège
Test specification:	
Standard..... :	IEC 62471:2006 (First Edition)
Test procedure ..... :	Laborelec ISO17025 LCE_LIGHT_511_INS
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC62471A
TRF Originator ..... :	VDE Testing and Certification Institute
Master TRF ..... :	Dated 2009-05
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Test item description ..... :	Schreder Axia 2.1 24 Leds 890mA 4000K
Trade Mark..... :	Schreder
Manufacturer..... :	Schreder
Model/Type reference ..... :	Axia 2.1 24 Leds 890mA 4000K
Ratings ..... :	230 V a.c. ; 50 Hz LED current : 890 mA (manufacturer value)

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Testing procedure and testing location:	
☒ Testing Laboratory:	Laborelec
Testing location/ address.....:	125 Rue de Rhode – 1630 Linkebeek - BELGIUM
☐ Associated CB Laboratory:	
Testing location/ address.....:	
Tested by (name + signature) .....:	Couvreur Guy
Approved by (+ signature).....:	Deswert Jean Michel
☐ Testing procedure: TMP	
Tested by (name + signature) .....:	
Approved by (+ signature).....:	
Testing location/ address.....:	
☐ Testing procedure: WMT	
Tested by (name + signature) .....:	
Witnessed by (+ signature).....:	
Approved by (+ signature).....:	
Testing location/ address.....:	
☐ Testing procedure: SMT	
Tested by (name + signature) .....:	
Approved by (+ signature).....:	
Supervised by (+ signature) .....:	
Testing location/ address..... :	
☐ Testing procedure: RMT	
Tested by (name + signature) .....:	
Approved by (+ signature).....:	
Supervised by (+ signature) .....:	
Testing location/ address.....:	

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Summary of testing:	
Tests performed (name of test and test clause): IEC 62471 edition 1 – 2006 CIE S 009:2002 Measurements performed at a distance of 200 mm.	Testing location: Laborelec Rue de Rhode, 125 1630 Linkebeek
Summary of compliance with National Differences: N/A	
Copy of marking plate: 	

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Test item particulars	
Tested lamp	☒ continuous wave lamps ☐ pulsed lamps
Tested lamp system	LED Luminaire
Lamp classification group at 200 mm	☐ exempt ☐ risk 1 ☒ risk 2 ☐ risk 3
Lamp cap	N/A
Bulb	Led
Rated of the lamp	230,0 V, LED current : 890 mA (measured value)
Furthermore marking on the lamp.....	-
Seasoning of lamps according IEC standard	No seasoning before testing
Used measurement instrument.....	Bentham DTMc300 Double Monochromator equipped with D7 and TEL309 optics.
Temperature by measurement.....	25°C ± 1°C
Information for safety use	N/A
Possible test case verdicts:	
– test case does not apply to the test object.....	N/A
– test object does meet the requirement.....	P (Pass)
– test object does not meet the requirement.....	F (Fail)
Testing:	
Date of receipt of test item	24/09/2015
Date (s) of performance of tests.....	October 2015

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
Throughout this report a comma is used as the decimal separator.
List of test equipment must be kept on file and available for review.

General product information:

Led luminaire with LED's

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

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	$L_B \cdot t = \sum_{300}^{700} \sum_{t} L_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 10^6$ J · m^{-2} · sr^{-1}	for t ≤ 10^4 s $t_{max} = \frac{10^6}{L_B}$ L_B = 10345 Wm^{-2}sr^{-1} for 11 mrad field of view t_{max} = 97 s (<100 s)	F
	$L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 100$ W · m^{-2} · sr^{-1}	for t > 10^4 s L_B = 1780 Wm^{-2}sr^{-1} for 100 mrad field of view	F
4.3.4	Retinal blue light hazard exposure limit - small source		-
	Thus the spectral irradiance at the eye E_λ, weighted against the blue-light hazard function B(λ) shall not exceed the levels defined by:	see table 4.2	N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_{t} E_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 100$ J · m^{-2}	for t ≤ 100 s	N/A
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 1$ W · m^{-2}	for t > 100 s	N/A
4.3.5	Retinal thermal hazard exposure limit		-
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, L_λ, weighted by the burn hazard weighting function $R(\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{50\,000}{\alpha \cdot t^{0,25}}$ W · m^{-2} · sr^{-1}	(10 µs ≤ t ≤ 10 s) L_R = 138462 Wm^{-2}sr^{-1}	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		-
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, L_{IR}, as viewed by the eye for exposure times greater than 10 s shall be limited to:		N/A
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{6\,000}{\alpha}$ W · m^{-2} · sr^{-1}	t > 10 s	N/A
4.3.7	Infrared radiation hazard exposure limits for the eye		-

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	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, E_{IR}, over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		N/A
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \le 18\,000 \cdot t^{-0.75}$ W · m^{-2}	t ≤ 1000 s	N/A
	For times greater than 1000 s the limit becomes:		N/A
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \le 100$ W · m^{-2}	t > 1000 s	N/A
4.3.8	Thermal hazard exposure limit for the skin		-
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		N/A
	$E_H \cdot t = \sum_{380}^{3\,000} \sum_{t} E_\lambda(\lambda, t) \cdot \Delta t \cdot \Delta\lambda \le 20\,000 \cdot t^{0.25}$ J · m^{-2}		N/A
5	MEASUREMENT OF LAMPS AND LAMP SYSTEMS		-
5.1	Measurement conditions		-
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)		-
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.	No seasoning is required	N/A
5.1.2	Test environment		-
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.	Ambient temperature : 25°C ± 1°C	P
5.1.3	Extraneous radiation		-
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		P
5.1.4	Lamp operation		-
	Operation of the test lamp shall be provided in accordance with:		-
	– the appropriate IEC lamp standard, or	IEC 60598-1	P
	– the manufacturer' s recommendation		N/A
5.1.5	Lamp system operation		-

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	The power source for operation of the test lamp shall be provided in accordance with:		-
	– the appropriate IEC standard, or		N/A
	– the manufacturer' s recommendation		P
5.2	Measurement procedure		-
5.2.1	Irradiance measurements		-
	Minimum aperture diameter 7mm.	Aperture diameter : 10 mm	P
	Maximum aperture diameter 50 mm.	Aperture diameter : 10 mm	P
	The measurement shall be made in that position of the beam giving the maximum reading.		P
	The measurement instrument is adequate calibrated.		P
5.2.2	Radiance measurements		-
5.2.2.1	Standard method		-
	The measurements made with an optical system.		-
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.	Measurements at 1,7 and 11 mrad are performed with calibrated optical system	P
5.2.2.2	Alternative method		-
	Alternatively to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.	Measurements at 100 mrad are performed with calibrated optical system	P
5.2.3	Measurement of source size		-
	The determination of α, the angle subtended by a source, requires the determination of the 50% emission points of the source.		P
5.2.4	Pulse width measurement for pulsed sources		-
	The determination of Δt, the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N/A
5.3	Analysis methods		-
5.3.1	Weighting curve interpolations		-
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired.	see table 4.1	P
5.3.2	Calculations		-

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	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty		-
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	see Annex C in the norm	P

6	LAMP CLASSIFICATION		-
	For the purposes of this standard it was decided that the values shall be reported as follows:	see table 6.1	-
	– for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm	The IEC 60598-1 ed8 requires the measurement at 200mm and the determination of the distance between luminaire and the borderline between RG2 and RG1.	P
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm		N/A
6.1	Continuous wave lamps		-
6.1.1	Exempt Group		-
	In the exempt group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		-
	– an actinic ultraviolet hazard (E_S) within 8-hours exposure (30000 s), nor		N/A
	– a near-UV hazard (E_{UVA}) within 1000 s, (about 16 min), nor		N/A
	– a retinal blue-light hazard (L_B) within 10000 s (about 2,8 h), nor	The luminaire is classified in RG2 for blue-light hazard at 200mm	F
	– a retinal thermal hazard (L_R) within 10 s, nor	The Luminaire is classified in RG0 for retinal thermal hazard at 200mm	P
	– an infrared radiation hazard for the eye (E_{IR}) within 1000 s		N/A
6.1.2	Risk Group 1 (Low-Risk)		-
	In this group are lamps, which exceeds the limits for the except group but that does not pose:		-
	– an actinic ultraviolet hazard (E_S) within 10000 s, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 300 s, nor		N/A

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	– a retinal blue-light hazard (L_B) within 100 s, nor	The luminaire is classified in RG2 for blue-light hazard at 200mm	F
	– a retinal thermal hazard (L_R) within 10 s, nor	The Luminaire is classified in RG0 for retinal thermal hazard at 200mm	N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 100 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		-
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		-
	– an actinic ultraviolet hazard (E_S) within 1000 s exposure, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 100 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 0,25 s (aversion response), nor		N/A
	– a retinal thermal hazard (L_R) within 0,25 s (aversion response), nor	The luminaire is classified in RG2 for blue-light hazard at 200mm	P
	– an infrared radiation hazard for the eye (E_{IR}) within 10 s	The Luminaire is classified in RG0 for retinal thermal hazard at 200mm	N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 10 s are in Risk Group 2.		N/A
6.1.4	Risk Group 3 (High-Risk)		-
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		-
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N/A

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	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N/A
	– for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N/A

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

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

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

Wavelength nm	Blue-light hazard function B (λ)	Burn hazard function R (λ)
300	0,01	
305	0,01	
310	0,01	
315	0,01	
320	0,01	
325	0,01	
330	0,01	
335	0,01	
340	0,01	
345	0,01	
350	0,01	
355	0,01	
360	0,01	
365	0,01	
370	0,01	
375	0,01	
380	0,01	0,1
385	0,013	0,13
390	0,025	0,25
395	0,05	0,5
400	0,10	1,0
405	0,20	2,0
410	0,40	4,0
415	0,80	8,0
420	0,90	9,0
425	0,95	9,5
430	0,98	9,8
435	1,00	10,0
440	1,00	10,0
445	0,97	9,7
450	0,94	9,4
455	0,90	9,0
460	0,80	8,0
465	0,70	7,0
470	0,62	6,2
475	0,55	5,5
480	0,45	4,5
485	0,40	4,0
490	0,22	2,2
495	0,16	1,6
500-600	$10^{[(450-\lambda)/50]}$	1,0
600-700	0,001	1,0
700-1050		$10^{[(700-\lambda)/500]}$
1050-1150		0,2
1150-1200		$0{,}2\cdot10^{[0{,}02(1150-\lambda)]}$
1200-1400		0,02

TRF No. IEC62471A

TRF No. IEC60598_2_3J

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Table 5.4 Summary of the ELs for the surface of the skin or cornea (irradiance based values)

Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of constant irradiance $W \cdot m^{-2}$
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	≤1000 >1000	1,4 (80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	≤100 >100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 –3000	≤1000 >1000	1,4 (80)	$18000/t^{0.75}$ 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	$20000/t^{0.75}$

Table 5.5 Summary of the ELs for the retina (radiance based values)

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

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

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	-	0,003	-	0,03	-	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	-	33	-	100	-	
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	1780	10000	10345	4000000	10306	
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	-	1,0	-	400	-	
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α = 281171	138482	28000/α	-	71000/α	-	
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	-	6000/α	-	6000/α	-	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	-	570	-	3200	-	
* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian. ** Involves evaluation of non-GLS source										

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Clause	Requirement + Test	Result - Remark	Verdict

Furthermore remarks:

According to IEC 60598-1 Ed.8, for fixed luminaires having a Blue Light Risk Group higher than RG1 at 200 mm, an additional assessment shall be made to find the distance x between the luminaire and the borderline between RG2 and RG1. According to the measurements, this distance x (distance at which the Blue Light Risk Group goes from RG2 to RG1) is 215 mm.

Conclusion:

At a distance of 200mm, the tested luminaire (Schréder Axia 24 Leds 890mA 4000K) is classified as follow:

Hazard Name	Risk Group
Radiance Blue Light	Risk Group 2 (Moderate)
Radiance Retinal Thermal	Risk Group 0 (Exempt)

According to IEC 62471-2 and IEC 60598-1 Ed.8, the following marking is required:

- The following label should be permanently fixed on the housing, legible, and clearly visible during maintenance and service. They should be positioned so that they can be read without the necessity for human exposure to optical radiation in excess of the applicable ELVs. Text and borders should be black on a yellow background. The label size should be adapted to the size of the product. Reproductions of all required labels should be included in the user manual

RISK GROUP 2
CAUTION Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes.

- The following marking has to be visible when replacing lamps or other replaceable components on the outside of the luminaire (except the mounting side) or behind a cover which is removed during lamp or other component replacement and with the lamp removed. The marking shall be visible after installation with the luminaire assembled and installed as for normal use and with the lamp in place.

- the manufacturer's instructions provided with the luminaire shall give the following text: "The luminaire should be positioned so that prolonged staring into the luminaire at a distance closer than 0,215 m is not expected".
- According to the measurements, the distance x (distance at which the Blue Light Risk Group goes from RG1 to RG0) is 2200 mm (2,2 m).

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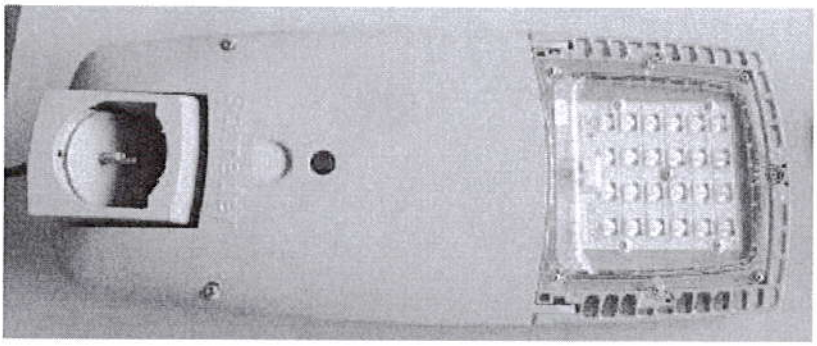
Clause	Requirement + Test	Result - Remark	Verdict

LABORATOIRE CENTRAL D'ELECTRICITE (L.C.E.)
CENTRAAL LABORATORIUM VOOR ELEKTRICITEIT (C.L.E.)
CENTRAL LABORATORY OF ELECTRICITY (C.L.E.)

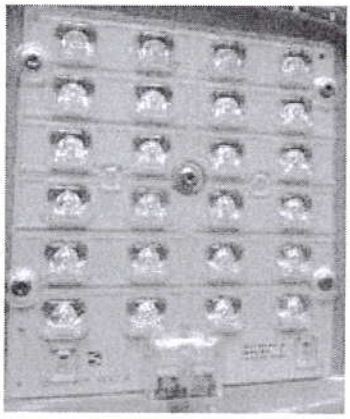
Measurement report CLE Report nr LBE04112160 - 3.0

Pictures of the device under test:

Overview of luminaire



Overview of lenses



Overview of auxiliary

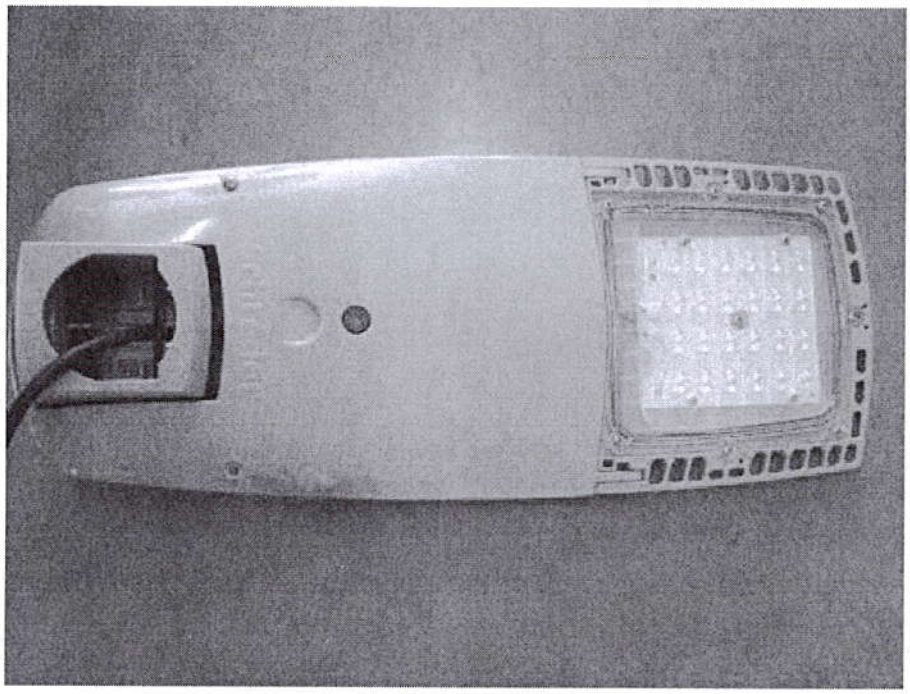
End of the report

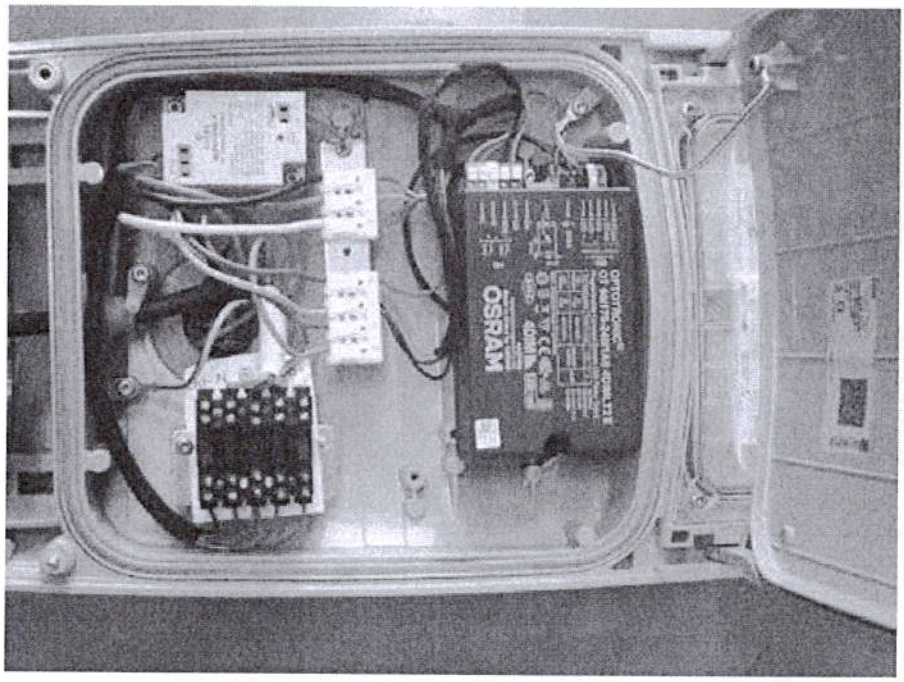
TRF No. IEC60598_2_3J

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

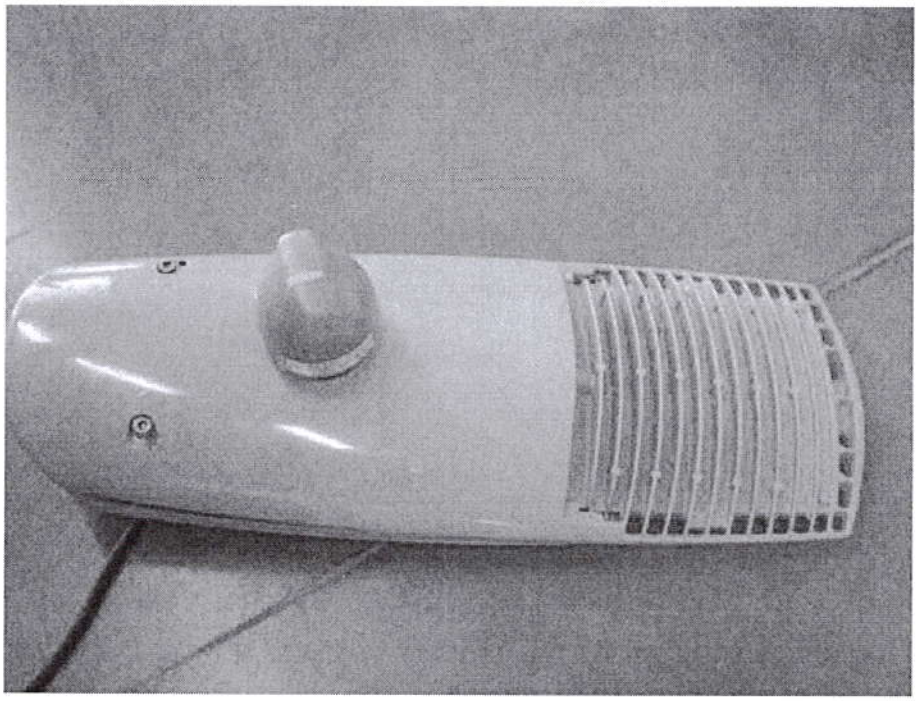
	ANNEX 6: **Photographs of the sample**

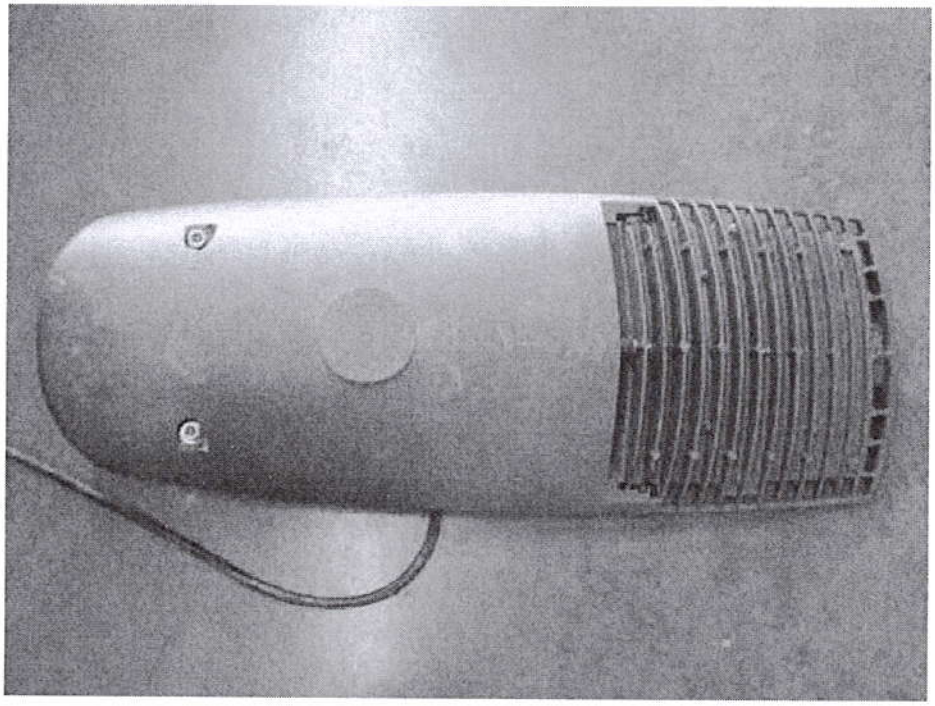
Axia Gen 2 – size 1



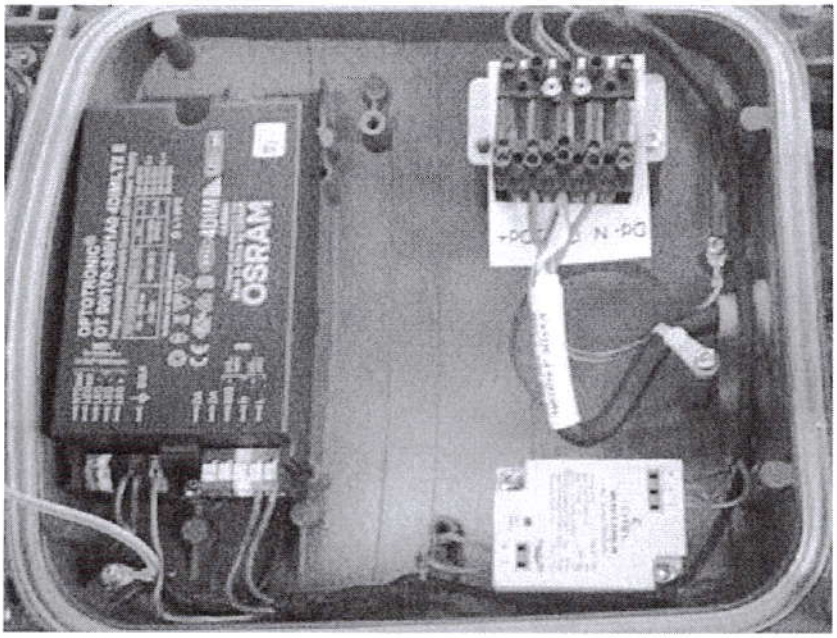


IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict



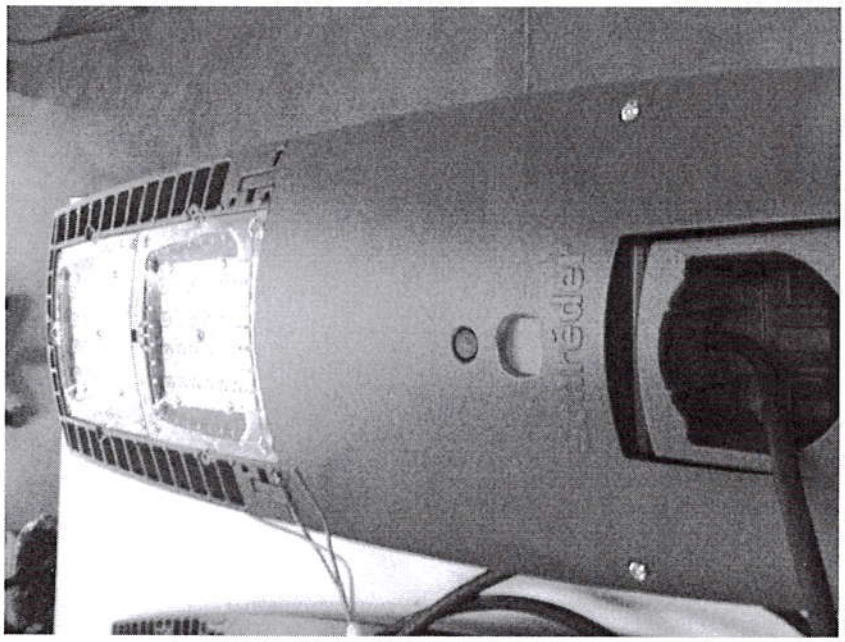


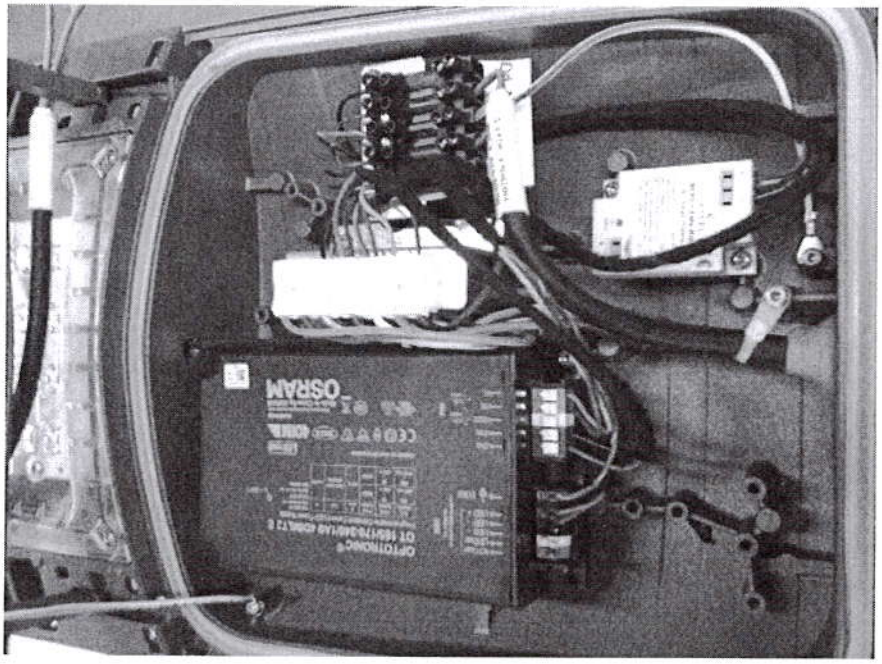
IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict



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

Axia Gen 2 – size 2





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

ATTACHMENT TO TEST REPORT IEC 60598-2-3
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

LUMINAIRES
PART 2: PARTICULAR REQUIREMENTS
SECTION 3: LUMINAIRES FOR ROAD AND STREET LIGHTING

Differences according to.....:	EN 60598-2-3:2003 + A1:2011 used in conjunction with EN 60598-1:2014
Annex Form No......:	EU_GD_IEC60598_2_3J
Annex Form Originator.....:	OVE
Master Annex Form.....:	2014-12

	CENELEC COMMON MODIFICATIONS (EN)	-

3.5 (3)	***MARKING***		-
3.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		N/A

3.6 (4)	***CONSTRUCTION***		-
3.6 (4.11.6)	Electro-mechanical contact systems		N/A

3.10 (5)	***EXTERNAL AND INTERNAL WIRING***		-
3.10 (5.2.1)	Connecting leads		P
	- without a means for connection to the supply		N/A
	- terminal block specified		P
	- relevant information provided		P
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		P
3.10 (5.2.2)	Cables equal to EN 50525		P
	Replace table 5.1 – Supply cord		P

3.12 (12)	***ENDURANCE TESTS AND THERMAL TESTS***		-
3.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		P

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

ZB	***ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)***		-
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug		N/A

ZC	***ANNEX ZC, NATIONAL DEVIATIONS (EN)***		-
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
	GB: Requirements according to United Kingdom Building Regulation		N/A

AENOR

ENEC Certification Body registered under ID # 01. For further information, please consult www.enec.com

LICENCE

to use the European Mark

01

Licence Nr. ENEC/001028

Under the conditions given in the following pages of this document, the licence to use the ENEC Mark in conjunction with the suffix 01, as shown above, has been issued to:

SCHRÉDER GROUP
RUE DE LUSAMBO, 67
B-1190 BRUXELLES (Bélgica *Belgium*)

For the product(s):

Luminaire for road and street lighting

Trade name(s):

SCHRÉDER

Complying with the following European Standards:

EN 60598-1:2015; EN 60598-2-3:2003;
EN 60598-2-3:2003/A1:2011; EN 62262:2002

Date: 2017-02-01

Signature:

Name: Avelino Brito
Position: Chief Executive Officer

This licence has been issued under the presumption and conditional on the fact that the licensee holds all necessary legal rights with regard to the product presented for testing and certification.

AENOR INTERNACIONAL, S.A.U.
Cl Génova, 6
28004 MADRID (Spain)

AENOR

CERTIFICADO ENEC DE PRODUCTO

Tipo de producto / Type of Product	LUMINARIA PARA ALUMBRADO PÚBLICO
r1/ Nº Certificado / Certificate nº	ENEC/001028
r2/ Fecha Certificado / Date of the Certificate	2017-02-01
r3/ Nº de Informe de ensayo / Test report nº	2016050306B1
r4/ Nombre y dirección del licenciatario Name and address of the licensee	SCHRÉDER GROUP RUE DE LUSAMBO, 67 B-1190 BRUXELLES (Bélgica)
r5/ Dirección de la factoría Address of the factory	AV ROANNE 66 - PI EL HENARES 19130 MARCHAMALO (Guadalajara - España)
r6/ Referencia de la Norma Española Spanish Standard	UNE-EN 60598-1:2015; UNE-EN 60598-2-3:2003; UNE-EN 60598-2-3:2003/A1:2011; UNE-EN 62262:2002
r7/ Referencia de la Norma Europea European Standard	EN 60598-1:2015; EN 60598-2-3:2003; EN 60598-2-3:2003/A1:2011; EN 62262:2002
r8/ Referencia / Type reference	Ver Anexo I *refer to Annex I*
r9/ Marca comercial / Trade mark	SCHRÉDER
r10/ Tensión y frecuencia asignadas Rated voltage and frequency	230 V~; 50/60 Hz
r11/ Nº de lámparas x potencia asignada Nº of lamps x rated wattage	Ver Anexo I *refer to Annex I*
r12/ Tipo de lámparas y portalámparas Type of lamps and lampholder	LED (module); SMD
r13/ Grado de protección / Degree of protection (IP)	IP 66; IK 08
r14/ Medios de conexión a la red Means for power supply connection	Terminals
r15/ Clasif. por material superficie apoyo Class. respect supporting material	Suitable for normally flammable surfaces
r16/ Protección contra choques eléctricos (clase) Protection against electric shock (class)	Class I
r17/ Limitaciones / Limitations	Horizontal mounting. Fixed to post or arm. Ta max. = 50 °C. Min. clearance to illum. objects: 0,2 m
r18/ Características generales / Technical data	AXIA 2.1 Series. Neutral white
Fecha de caducidad / Date of expiry 2021-06-14	

Este certificado anula y sustituye al 007/001028, de fecha 2016-06-14.
This certificate supersedes certificate 007/001028, dated 2016-06-14.

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CERTIFICADO ENEC DE PRODUCTO

ANEXO I AL CERTIFICADO ENEC/001028
ANNEX I TO CERTIFICATE ENEC/001028

REFERENCIA *Type reference*	**Nº DE LÁMPARAS X POTENCIA ASIGNADA** *Nº of lamps x rated wattage*
AXIA 2.1 16 LED 21 W Cl. I	16 LED; 21 W; 390 mA
AXIA 2.1 16 LED 26 W Cl. I	16 LED; 26 W; 480 mA
AXIA 2.1 16 LED 32 W Cl. I	16 LED; 32 W; 600 mA
AXIA 2.1 16 LED 36 W Cl. I	16 LED; 36 W; 690 mA
AXIA 2.1 16 LED 40 W Cl. I	16 LED; 40 W; 760 mA
AXIA 2.1 24 LED 38 W Cl. I	24 LED; 38 W; 490 mA
AXIA 2.1 24 LED 41 W Cl. I	24 LED; 41 W; 540 mA
AXIA 2.1 24 LED 48 W Cl. I	24 LED; 48 W; 630 mA
AXIA 2.1 24 LED 53 W Cl. I	24 LED; 53 W; 690 mA
AXIA 2.1 24 LED 57 W Cl. I	24 LED; 57 W; 750 mA
AXIA 2.1 24 LED 68 W Cl. I	24 LED; 68 W; 890 mA
AXIA 2.1 4 LED 10 W Cl. I	4 LED; 10 W; 680 mA
AXIA 2.1 8 LED 13 W Cl. I	8 LED; 13 W; 480 mA
AXIA 2.1 8 LED 19 W Cl. I	8 LED; 19 W; 690 mA
AXIA 2.1 8 LED 22 W Cl. I	8 LED; 22 W; 820 mA

Original Electrónico

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Génova, 6. 28004 Madrid. España
Tel. 91 432 60 00.- www.aenor.es

Entidad de certificación de producto acreditada por ENAC con nº 01/C-PR275
Product certification body accredited by ENAC, number 01/C-PR275