

LED Flux measurement

FORM-L-41 ED1 REV 3

Date : **01/02/2021**

Operator : **FCE**

Filename : **2021_94.xml**



226-TEST

NBN EN ISO/IEC 17025 :2017

LEDs

Trademark : **Osram**

Entry number : **38R137-4**

Type : **OSLON SQUARE GIANT**

Power (Catalogue) : **0.00** W

BIN Description : **N6**

Flux : **0** lm/LED

Part number : **GWCSSRM2.PM**

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

Number of LEDs : **16**

Lenses

Trademark : **None**

Type : **None**

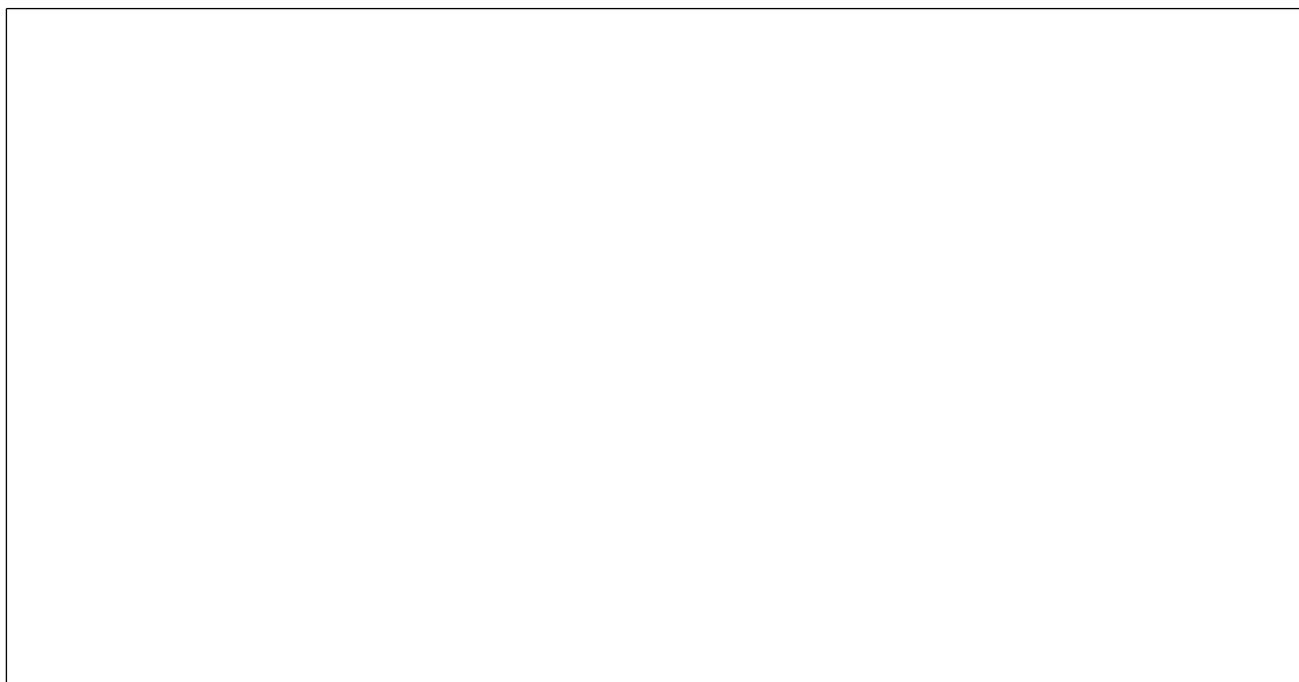
Power & Print

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

Print description : **00-57-060 B**

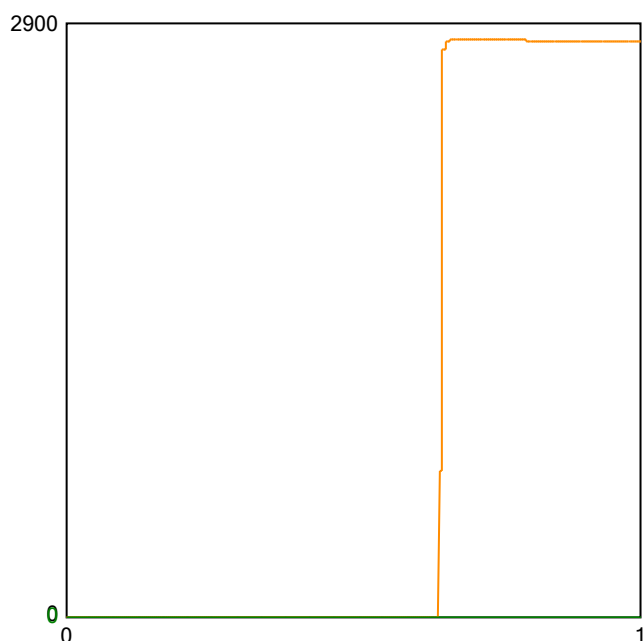
Active ☐

Picture



Sphere photometric measurement

Maximum flux : **2823** lumens



Operating condition

Position in sphere :



Ambient sphere T ° : **25.8**

Electrical measurement

● Secondary electrical measurement

Voltage : **45.01** V

Current : **0.350** A

Power : **15.73** Watt

→ LEDs light efficiency at 25° :

179.5 lm/W

176.5 lm/Led

● Primary electrical measurement

Voltage : **N/A** V

Current : **N/A** A

Power : **N/A** Watt

Cos φ : **N/A**

→ Driver losses : **N/A** %

→ LEDS & Driver light efficiency :

N/A lm/W

Description :

Flux @25°/350mA - pcb Axia 3.1 - 16 Giant N6 - pcb N°4

Comment :

FORM-L-41 ED1 REV 3



226-TEST

Approved by :

LED 2021/94 2/3

Colorimetry



226-TEST

NBN EN ISO/IEC 17025 :2017

File Preset Options Extra Calibration: #1 no accessory Apr20' Info

Presets: CRI

Auto: ref. illuminant - Planckian radiator CCT= 3856 K

Auto: ref. illuminant - Planckian radiator, CCT= 3856 K

Chromaticity difference DC= 6.1E-4

CRI color samples

R1= 68.7	R8= 51.6
R2= 76.7	R9= 31.2
R3= 83.4	R10= 45.2
R4= 71.3	R11= 68.3
R5= 68.4	R12= 43.1
R6= 67.7	R13= 69.4
R7= 78.5	R14= 90.4

Ra= 70.78
(mean value of R1 - R8)

Re= 60.81
(mean value of R1 - R14)

MEASUREMENT (radiance)

Average 1

Target

Cont. (interval 0 s)
Hold Integration Time
Quick mode

to Table ☒ auto to Ref. to PDF

Quit

RTECH-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 group.

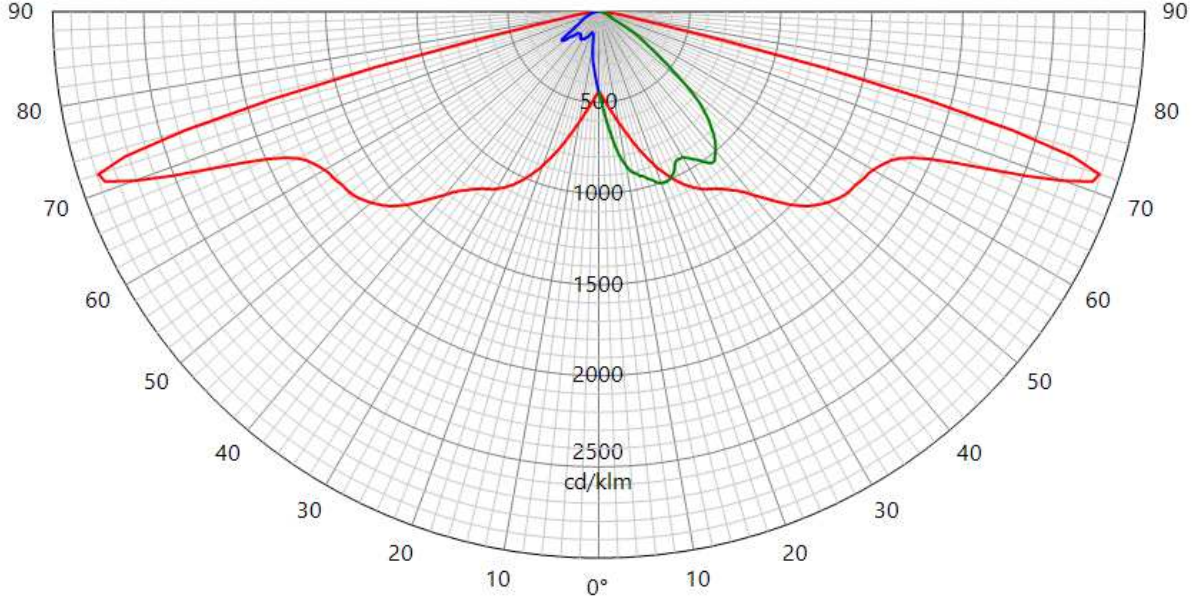
LED

Origin Schröder Magyarország Zrt.	Production Schröder Magyarország Zrt.	Luminaire VOLTANA EVO 1	Inclination 0°	Request # FD41030
Source				
Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16
Reflector Schreder Led assembly Road lighting Assembled 0,0°				No 5270
Protector Refractor Lens				
Protector integrated lenses Lens Gaggione 5270 PC				
Laboratory observation VOLTANA EVO 1 with 16 Osram oslon square giant bin N6 (NW740) Used flux for efficiency matrix calculation = 2823 lm - CCT = 3857 K - CRI = 70,78 (see sphere test report 2021/94 on appendix).				
Purpose DOC		Sample date 01-02-2021		Sample # 40R024
Observation DOC VOLTANA EVO 1 with lenses 5270 Flux coefficient multiplicator (only for efficiency matrix): From 350 to 200 mA : 0,597 From 350 to 500 mA : 1,371 From 350 to 700 mA : 1,822 From 350 to 1000 mA : 2,401 From 350 to 1200 mA : 2,722 Fixture powered with driver Philips Xi FP 40W 0,2-0,7A SNLDAE 230V S175 sXt @200/350/500 mA Fixture powered with driver Philips Xi FP 40W 0,3-1,05A SNLDAE 230V S175 sXt @700 mA Fixture powered with driver Philips Xi FP 75W 0,3-1,05A SNLDAE 230V C133 sXt @1000 mA Fixture powered with driver Philips Xi FP 75W 0,5-1,05A SNLDAE 230V C133 sXt @1200 mA				
Notes The publication of this report in another form than the original one is not allowed without agreement of the laboratory. 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 RCA	Measured by KDE	Approved by RLABO	Appendix 1	  226-TEST NBN EN ISO/IEC 17025 :2017	48123
-----------------	--------------------	----------------------	---------------	--	--------------

LUMINOUS INTENSITY DIAGRAM

Origin Schröder Magyarország Zrt.		Production Schröder Magyarország Zrt.		Luminaire VOLTANA EVO 1		Inclination 0°	Request # FD41030
Source	Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16	Reflector 5270	
Reflector	Schröder Led assembly Road lighting Assembled 0,0°					No	5270
Matrices	481231 Φ 0-90° = 2561lm - 90-180° = 0lm					Absolute measurement	
Protector Refractor Lens	Protector integrated lenses Lens 16 x Gaggione 5270 PC						
Observation	Matrix in total flux @350 mA						
	Electrical measurement on LED (#1) : Voltage = 44,33 V Current = 0,350 A Power = 15,51 W						
	Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,083 A Power = 18,33 W PF = 0,958						
	Total luminaire power = 18,33 W : Lm/Watt = 139,74 lm/W						
Driver #1 : See observations for driver details - . . 00-57-060B							
Plane	I Peak	Peak position	Index	I zero 441	Laboratory ambient t° 24,7°	Measurement date 02-02-2021	
20 - 160	2891	72	S				
90	1039	37	D				
270	441	0	G				



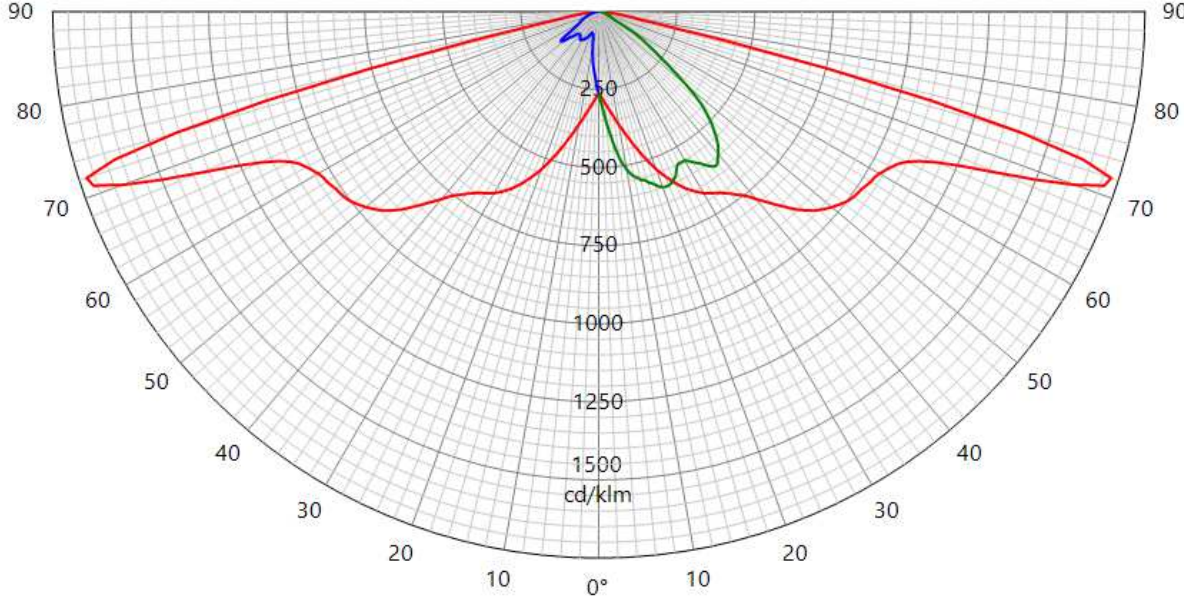
48123

LUMINOUS INTENSITY DIAGRAM

Origin Schröder Magyarország Zrt.		Production Schröder Magyarország Zrt.		Luminaire VOLTANA EVO 1		Inclination 0°	Request # FD41030
Source	Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16	Reflector 5270	
Reflector	Schröder Led assembly Road lighting Assembled 0,0°					No	5270
Matrices	481232 η 0-90° = 90,7% - 90-180° = 0,0%					Relative measurement	
Protector Refractor Lens	Protector integrated lenses Lens 16 x Gaggione 5270 PC						
Observation	Matrix in efficiency @350 mA Electrical measurement on LED (#1) : Voltage = 44,33 V Current = 0,350 A Power = 15,51 W Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,083 A Power = 18,33 W PF = 0,958 Total luminaire power = 18,33 W Driver #1 : See observations for driver details - . . 00-57-060B						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
20 - 160	1024	72	S	156	24,7°	02-02-2021	
90	368	37	D				
270	156	0	G				
							48123

LUMINOUS INTENSITY DIAGRAM

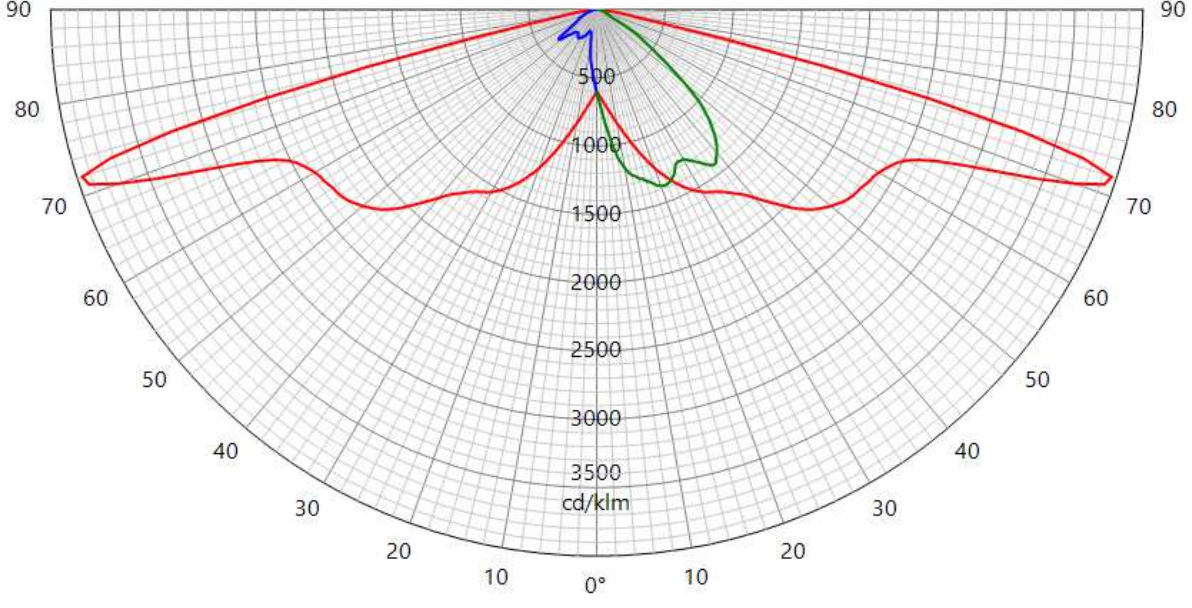
Origin Schröder Magyarország Zrt.		Production Schröder Magyarország Zrt.		Luminaire VOLTANA EVO 1		Inclination 0°	Request # FD41030
Source	Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16	Reflector 5270	
Reflector	Schröder Led assembly Road lighting Assembled 0,0°					No	5270
Matrices	481233 Φ 0-90° = 1529lm - 90-180° = 0lm					Absolute measurement	
Protector Refractor Lens	Protector integrated lenses Lens 16 x Gaggione 5270 PC						
Observation	Matrix in total flux @200 mA						
	Electrical measurement on LED (#1): Voltage = 43,66 V Current = 0,200 A Power = 8,71 W						
	Electrical measurement on driver (#1): Voltage = 230,00 V Current = 0,053 A Power = 11,24 W PF = 0,909						
	Total luminaire power = 11,24 W : Lm/Watt = 136,05 lm/W						
Driver #1 : See observations for driver details - . . 00-57-060B							
Plane	I Peak	Peak position	Index	I zero 263	Laboratory ambient t° 24,7°	Measurement date 02-02-2021	
20 - 160	1726	72	S				
90	620	37	D				
270	263	0	G				



48123

LUMINOUS INTENSITY DIAGRAM

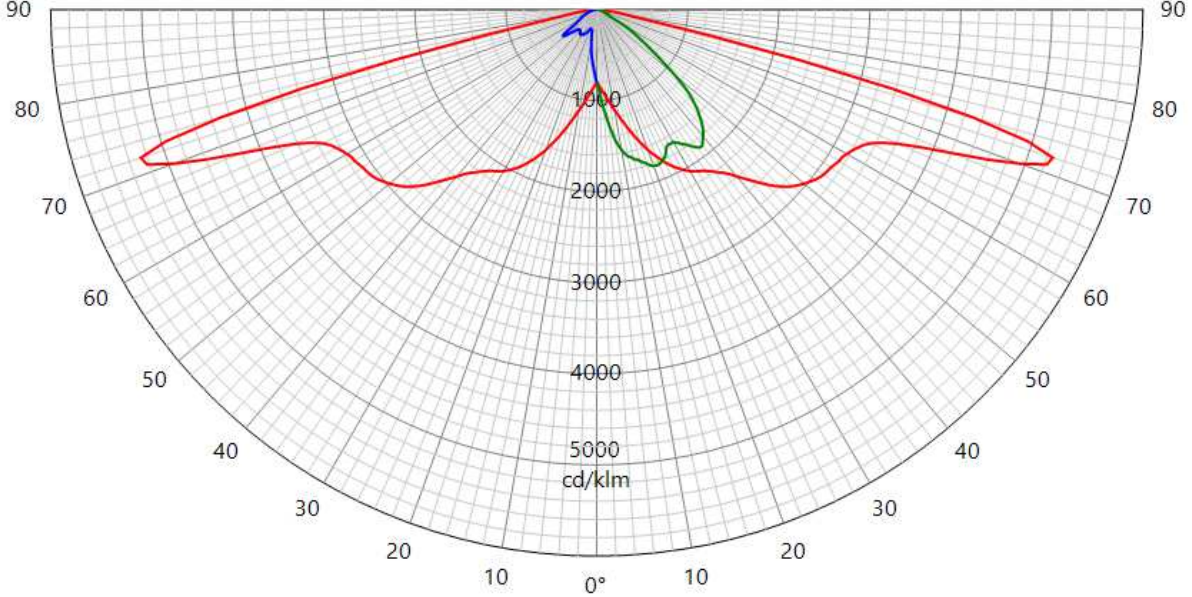
Origin Schröder Magyarország Zrt.		Production Schröder Magyarország Zrt.		Luminaire VOLTANA EVO 1		Inclination 0°	Request # FD41030
Source	Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16	Reflector 5270	
Reflector	Schröder Led assembly Road lighting Assembled 0,0°					No	5270
Matrices	481234 Φ 0-90° = 3512lm - 90-180° = 0lm					Absolute measurement	
Protector Refractor Lens	Protector integrated lenses Lens 16 x Gaggione 5270 PC						
Observation	Matrix in total flux @500 mA Electrical measurement on LED (#1): Voltage = 44,82 V Current = 0,500 A Power = 22,40 W Electrical measurement on driver (#1): Voltage = 230,00 V Current = 0,114 A Power = 25,61 W PF = 0,976 Total luminaire power = 25,61 W : Lm/Watt = 137,12 lm/W Driver #1 : See observations for driver details - . . 00-57-060B						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
20 - 160	3963	72	S	604	24,7°	02-02-2021	
90	1424	37	D				
270	604	0	G				



48123

LUMINOUS INTENSITY DIAGRAM

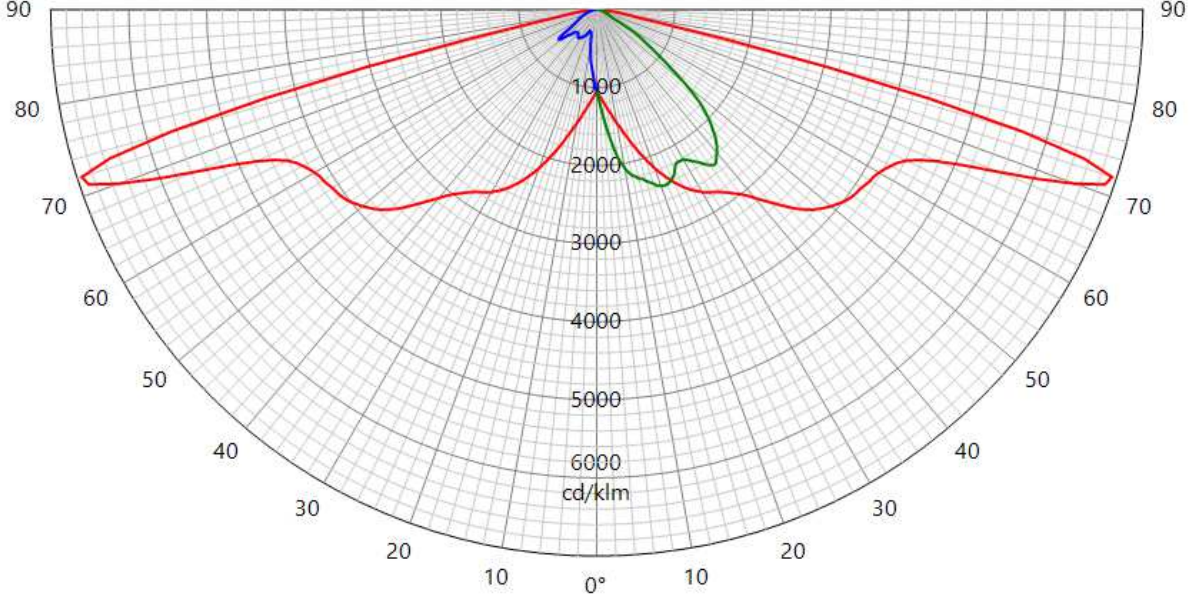
Origin Schröder Magyarország Zrt.		Production Schröder Magyarország Zrt.		Luminaire VOLTANA EVO 1		Inclination 0°	Request # FD41030
Source	Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16	Reflector 5270	
Reflector	Schröder Led assembly Road lighting Assembled 0,0°					No	5270
Matrices	481235 Φ 0-90° = 4667lm - 90-180° = 0lm					Absolute measurement	
Protector Refractor Lens	Protector integrated lenses Lens 16 x Gaggione 5270 PC						
Observation	Matrix in total flux @700 mA Electrical measurement on LED (#1) : Voltage = 45,03 V Current = 0,700 A Power = 31,53 W Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,158 A Power = 35,76 W PF = 0,984 Total luminaire power = 35,76 W : Lm/Watt = 130,51 lm/W Driver #1 : See observations for driver details - . . 00-57-060B						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
20 - 160	5266	72	S	803	24,7°	02-02-2021	
90	1893	37	D				
270	803	0	G				



48123

LUMINOUS INTENSITY DIAGRAM

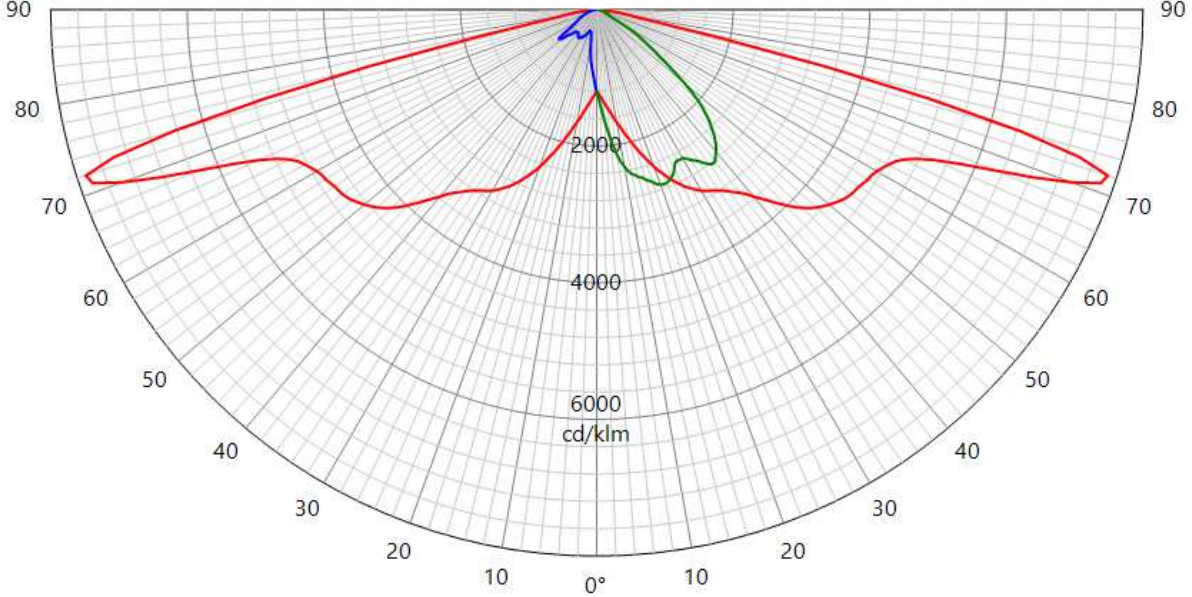
Origin Schröder Magyarország Zrt.		Production Schröder Magyarország Zrt.		Luminaire VOLTANA EVO 1		Inclination 0°	Request # FD41030
Source	Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16	Reflector 5270	
Reflector	Schröder Led assembly Road lighting Assembled 0,0°					No	5270
Matrices	481236 Φ 0-90° = 6150lm - 90-180° = 0lm					Absolute measurement	
Protector Refractor Lens	Protector integrated lenses Lens 16 x Gaggione 5270 PC						
Observation	Matrix in total flux @1000 mA Electrical measurement on LED (#1) : Voltage = 45,56 V Current = 1,000 A Power = 45,52 W Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,227 A Power = 51,20 W PF = 0,981 Total luminaire power = 51,20 W : Lm/Watt = 120,12 lm/W Driver #1 : See observations for driver details - . . 00-57-060B						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
20 - 160	6940	72	S	1059	24,7°	02-02-2021	
90	2494	37	D				
270	1059	0	G				



48123

LUMINOUS INTENSITY DIAGRAM

Origin Schröder Magyarország Zrt.		Production Schröder Magyarország Zrt.		Luminaire VOLTANA EVO 1		Inclination 0°	Request # FD41030
Source	Type LED	BIN N6	Trademark Osram	Reference OSLON SQUARE GIANT	# LEDs 16	Reflector 5270	
Reflector	Schröder Led assembly Road lighting Assembled 0,0°					No	5270
Matrices	481237 Φ 0-90° = 6972lm - 90-180° = 0lm					Absolute measurement	
Protector Refractor Lens	Protector integrated lenses Lens 16 x Gaggione 5270 PC						
Observation	Matrix in total flux @1200 mA Electrical measurement on LED (#1): Voltage = 45,88 V Current = 1,200 A Power = 55,10 W Electrical measurement on driver (#1): Voltage = 230,00 V Current = 0,272 A Power = 61,58 W PF = 0,984 Total luminaire power = 61,58 W : Lm/Watt = 113,22 lm/W Driver #1 : See observations for driver details - . . 00-57-060B						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
20 - 160	7868	72	S	1200	24,7°	02-02-2021	
90	2828	37	D				
270	1200	0	G				



48123

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%
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: **VOLTANA EVO**

Versiune: max. 16 LED-uri

Clasă electrică: I sau II

Tensiune nominală: 230V / 50Hz

Caracteristici: Max. 1400mA

Etanșeitate compartiment optic: IP 66

Etanșeitate compartiment aparataj: IP 66

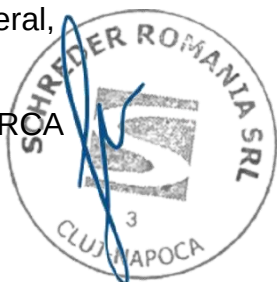
Cu condiția ca acesta să fie instalat, întreținut și utilizat în conformitate cu standardele de instalare și instrucțiunile producătorului. Este în conformitate cu următoarele directive sau standarde:

- EN 60598-1 (2015 + A11 2009)
- EN 60598-2-3 (2016 + A1 2011)
- EN 61547 (2009)
- EN 55015 (2013)
- EN 61000-3-2 (2014) & 3-3 (2013)
- EN 62471 (2008)
- EN 62493 (2010)
- IEC 62722-1 (2016)
- IEC 62722-2-1 (2016)
- Directiva 2014/30/EU
- Directiva 2014/35/EU
- Directiva 2009/125/EC
- Directiva RoHS 2011/65/EU (RoHS 2)

SCHRÉDER ROMANIA S.R.L.

Director General,

Alexandru SIRCA



Eliberat,

Noiembrie 2021, Cluj-Napoca

Lumen maintenance report

LED information

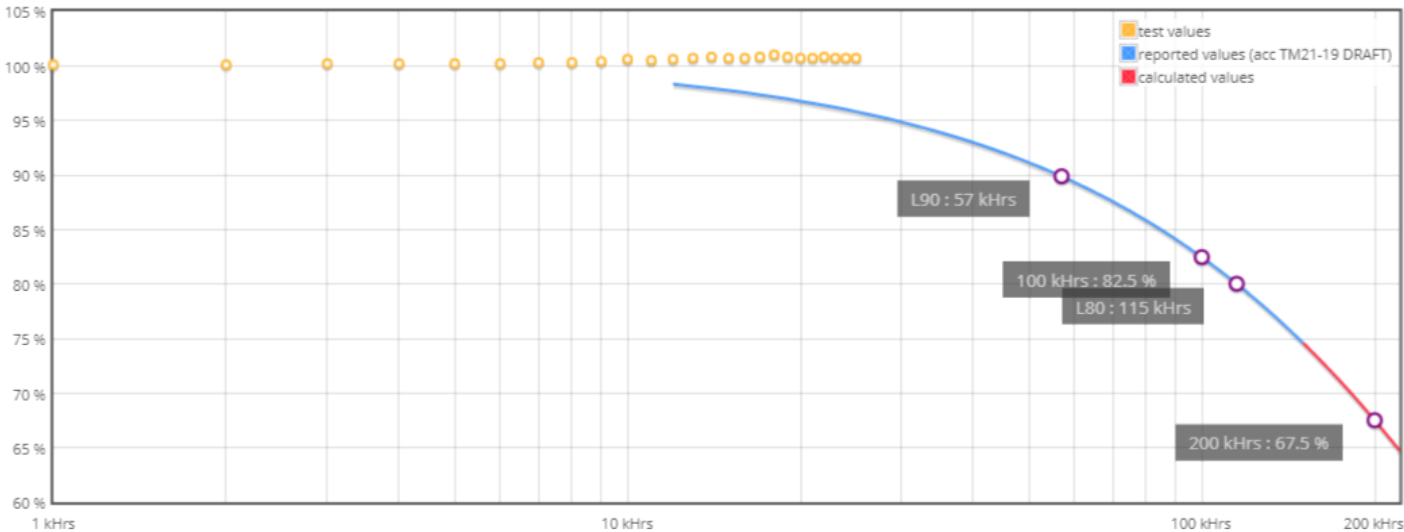
LED type	OSLON SQUARE GIANT
LED current	700 mA
Ts	55°C
Description	190145W10 5/05/2021 25kHrs

Projection data

Test duration	25000 hrs	α	2.000E-006
Time used for projection	12000 to 25000hrs	β	1.010

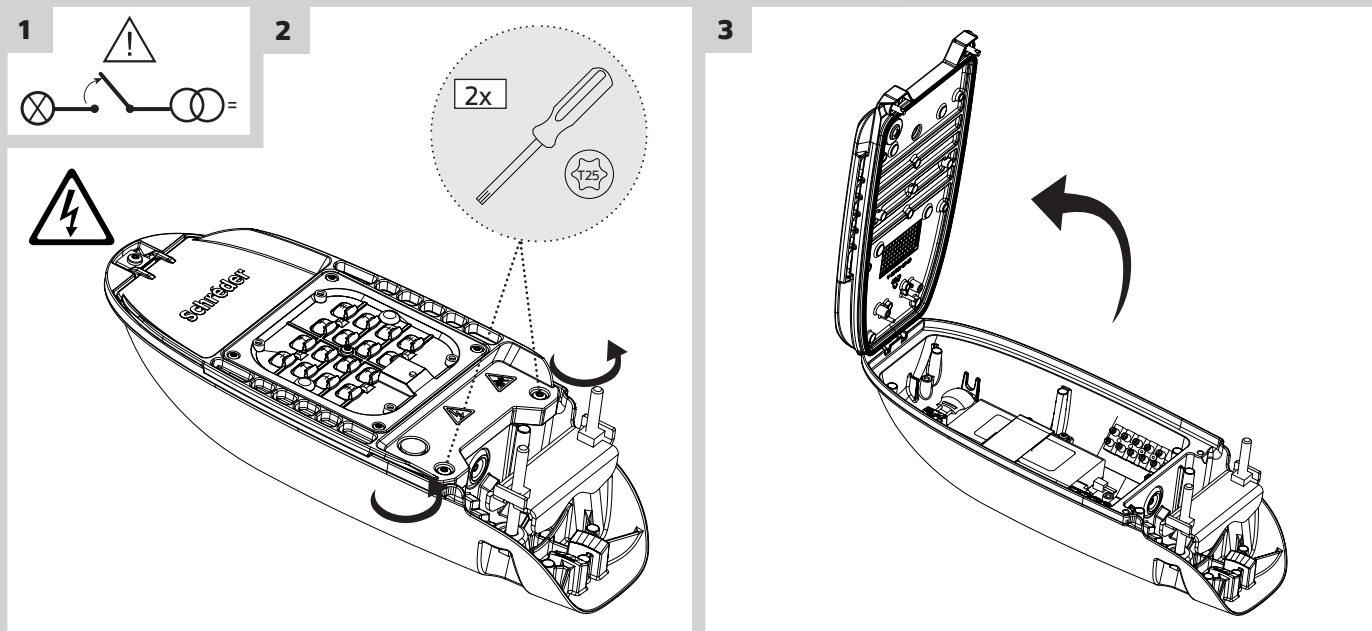
L (%)	Time (kHrs)
67.7	200
80.0	116
82.7	100
90.0	57

Projection graphic

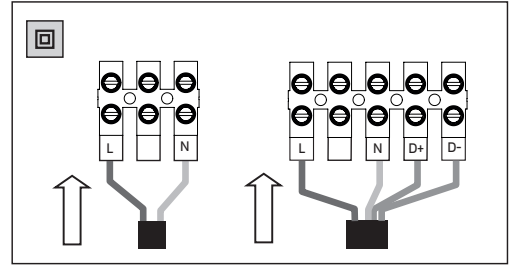
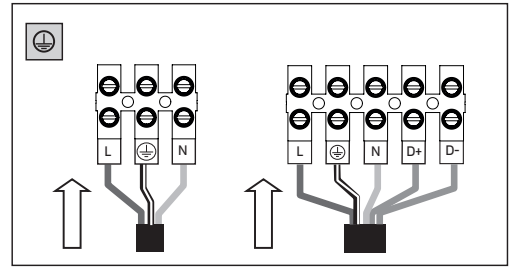
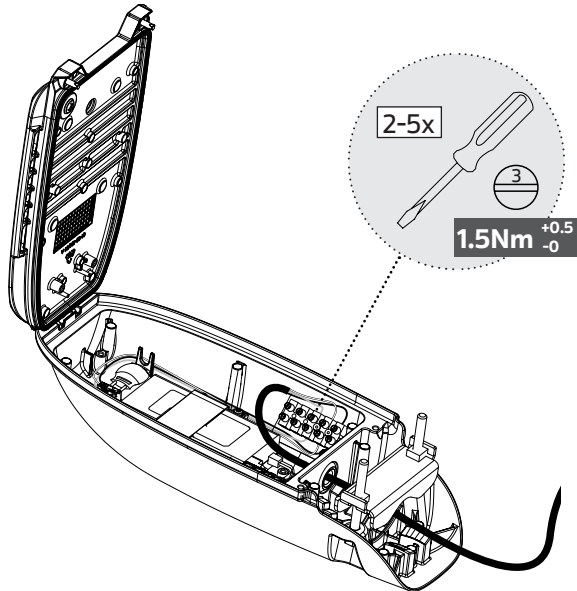


LxB50 results according to LM-80 and TM21-19 DRAFT procedures and norms.

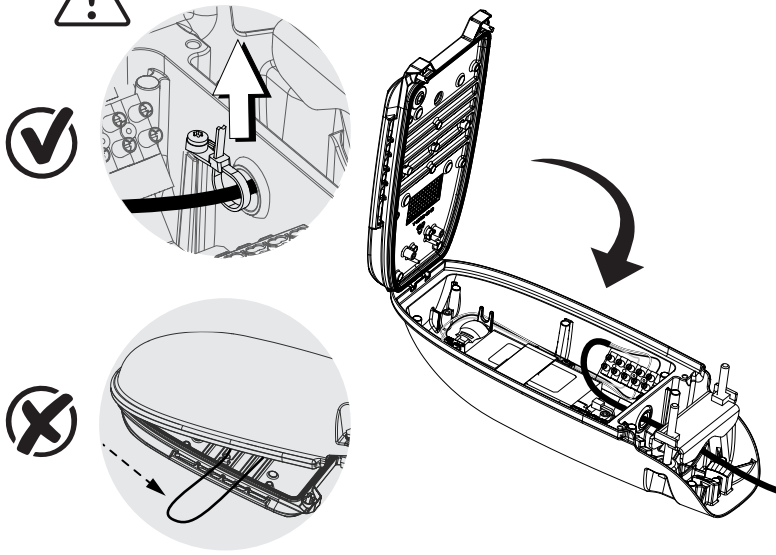
LxBy results derived from LxB50 according to IEC 62717 Annex C.



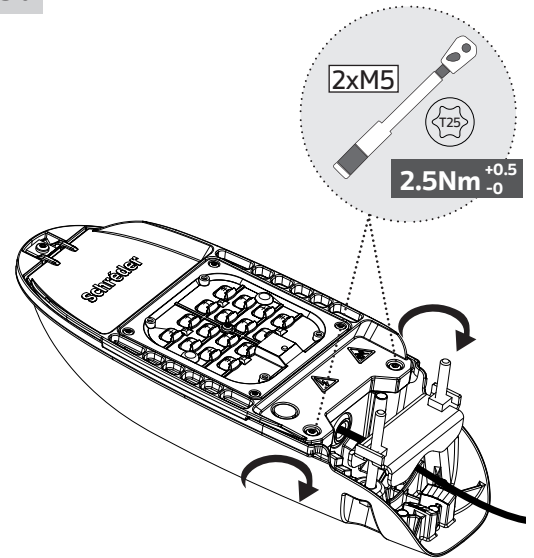
4



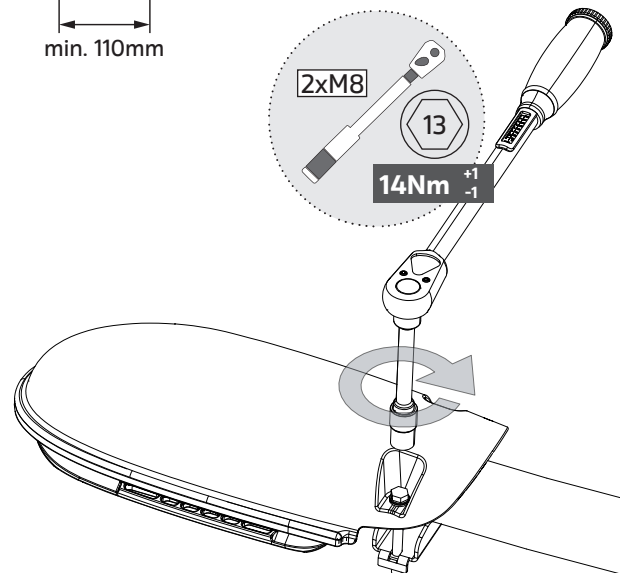
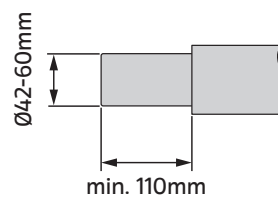
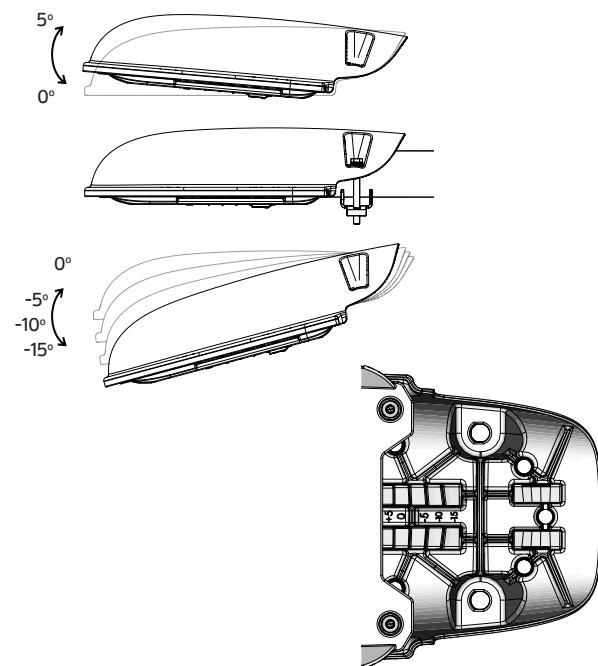
5a



5b



6



--	--	--	--	--

Electrical measurements

General information

Subject : VOLTANA EVO 1 - 8 Oslon Square Giant - Meanwell 40W - 1400mA

Asked by : BEDŐ Péter

Created on : 19/04/2021

Started on : 20/04/2021

Test number : D210386

Sample(s) : E210200

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Number of LED : 8

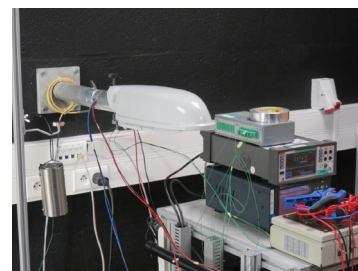
LED : Osram OSLON SQUARE GIANT

Driver : DRIVER_MEANWELL_PLD_40W_1400mA_220-277V_NONE_._. /
00-73-737

Number of driver(s) : 1

Driver current (mA) : 1400

Operator : CLOSSET Frédéric



lum

Conclusion



Informative

Conclusion :

PF : 0.97

Efficiency : 86.7%

THD : 15.8%

Harmonics : OK according to IEC 61000-3-2, Class C, P > 25 W (@100% dimming)

Validated by :

GHYSENS Gilles



Duplicate to : RACANELLI Frank, SZÜGYI János Péter,
HORVÁTH Csaba, CSIKÓS Balázs, BEDŐ Péter

LAB : 23/04/2021

D210386

1/4

Test(s) details

Test(s)

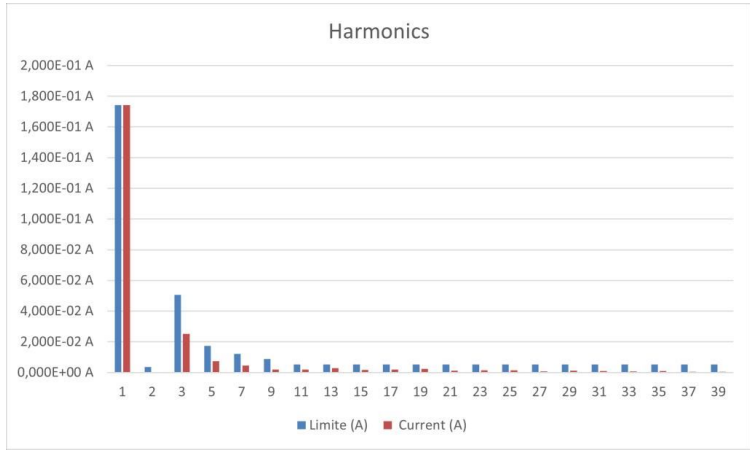
Name	Description	Verdict
Harmonics @ 1400mA	Measurement of the harmonic currents of the luminaire at thermal stabilization, according IEC 61000-3-2 - Class C (100% dimming).	Informative
Measurements @ 1400mA	Characterization of the electrical parameters of the luminaire at thermal stabilization.	Success

Harmonics @ 1400mA

Verdict(s)

Harmonic	Current (A)	Limite (A)
1	1,742E-01 A	1,742E-01 A
2	3,227E-04 A	3,483E-03 A
3	2,521E-02 A	5,054E-02 A
5	7,408E-03 A	1,742E-02 A
7	4,510E-03 A	1,219E-02 A
9	1,945E-03 A	8,709E-03 A
11	1,863E-03 A	5,225E-03 A
13	2,882E-03 A	5,225E-03 A
15	1,757E-03 A	5,225E-03 A
17	2,016E-03 A	5,225E-03 A
19	2,383E-03 A	5,225E-03 A
21	1,174E-03 A	5,225E-03 A
23	1,379E-03 A	5,225E-03 A
25	1,441E-03 A	5,225E-03 A
27	7,736E-04 A	5,225E-03 A
29	1,141E-03 A	5,225E-03 A
31	9,174E-04 A	5,225E-03 A
33	6,352E-04 A	5,225E-03 A
35	1,013E-03 A	5,225E-03 A
37	4,268E-04 A	5,225E-03 A
39	5,224E-04 A	5,225E-03 A

Annex(es)



Harmonics-D210386

Measurements @ 1400mA

Verdict(s)

input		output 1		
Urms	230,0 V	Urms	24,2 V	-
Irms	0,176 A	Irms	1,418 A	
Prms	39,2 W	Prms	34,0 W	
S	40,6 VA			
Q	-10,3 VAR			
PF	0,9672			
I(H01)	0,174 A	Uavg	24,2 V	
Cos j (H01)	0,9791	Iavg	1,406 A	
η rms	86,7%	Pavg	34,0 W	
η avg	86,5%			
THD	15,8%			

Test room temperature (°C) :

23.7

Measurement equipment :

Norma 4000 (E110)

APT (E102)

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: 0,6 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 :

No pass/fail criteria applied on electrical measurements

End of test report :

Laboratory Test report



226-TEST

NBN EN ISO/IEC 17025 :2017



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

FORM L-54 Edition 01 – Revision 04 – Date : 21/04/2021

Thermal Test LED

General information

Subject : VOLTANA EVO 1 - 8 Oslon Square Giant - Meanwell 40W - 1400mA

Asked by : BEDŐ Péter

Created on : 19/04/2021

Started on : 19/04/2021

Test number : D210385

Reference norm : IEC/EN 60598-1; 60598-2-3; 60598-2-5 Standards

Sample(s) : E210200

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Number of LED : 8

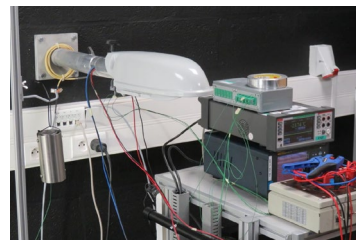
LED : Osram OSOLON SQUARE GIANT

Driver : DRIVER_MEANWELL_PLD_40W_1400mA_220-277V_NONE_._. /
00-73-737

Number of driver(s) : 1

Driver current (mA) : 1400

Operator : CLOSSET Frédéric



lum

Conclusion



Informative

Conclusion :

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

Ta: 55°C limited by driver; according IEC 60598-2-3 and IEC 60598-2-5 (outdoor use only)

Ta: 45°C limited by driver; indoor use and UL standard

Tq: 20°C limited by driver; according IEC 62722-2-1

Tq given for 100 khrs of lifetime

Validated by :

GHYSENS Gilles

Duplicate to : SZÜGYI János Péter, BEDŐ Péter

LAB : 23/04/2021

D210385

1/4

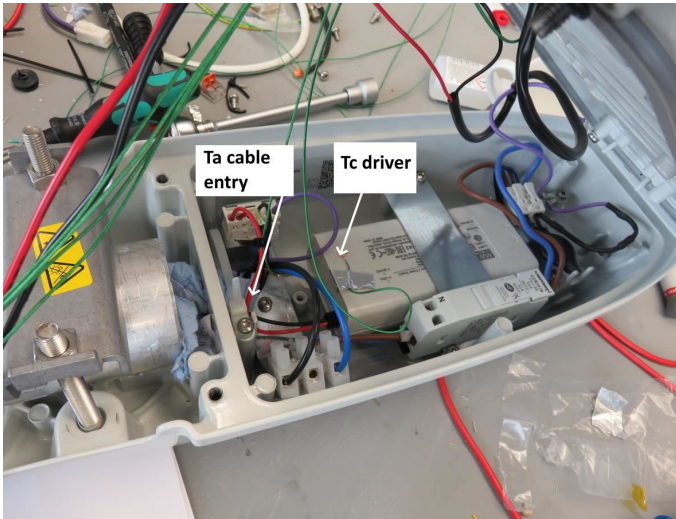
Test(s) details

Test(s)

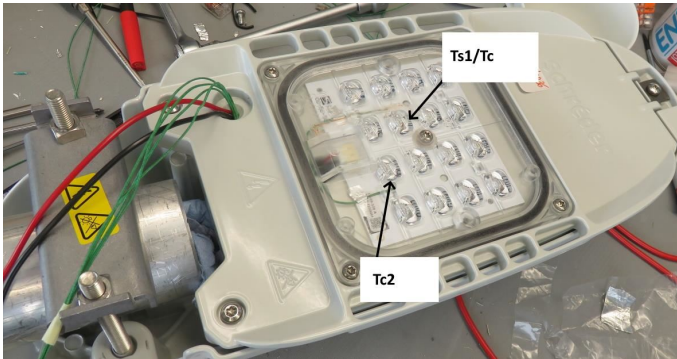
Name	Description	Verdict
Sensors positions	Disposition of the thermocouples on the DUT.	Informative
Test @ 1400mA	Test according section 12.4 of IEC 60598-1. The DUT is driven until all thermocouples reach thermal stabilization (i.e. variation = 1K/h).	Informative

Sensors positions

Annex(es)



pos_thermo2



pos_thermo1

Test @ 1400mA**Verdict(s)**

	Ts1	Ts2	Driver1	Ta Cable entry1
Limit Ta	110,0 °C	110,0 °C	90,0 °C	90,0 °C
Limit Tq	90,0 °C	90,0 °C	65,0 °C	90,0 °C
Thermocouple T°	74,5 °C	68,2 °C	66,9 °C	39,3 °C
Room	24,1 °C	24,1 °C	24,1 °C	24,1 °C
E Led	3,0 V	3,0 V		
I Led	1,406 A	1,406 A		
P Led	4,2 W	4,2 W		
Heating	50,4 °C	44,1 °C	42,8 °C	15,2 °C
Ta Indoor	59,6 °C	65,9 °C	47,2 °C	74,8 °C
Tq	39,6 °C	45,9 °C	22,2 °C	74,8 °C
Solder point temperature used as the image of the lens temperature				
Primary EM		Secondary Em Dr1		
U	230,0 V	U	24,2 V	
I	0,176 A	I	1,406 A	
P	39,2 W	P	34,0 W	
PF	0,967			
Efficiency	86,5%			

Test room temperature (°C) :

23.7

Measurement equipment :

Keithley with thermocouples type K (E127)

Norma 4000 (E110)

APT (E102)

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: 0,6 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 :

No pass/fail criteria applied on electrical measurements

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 reduced by the uncertainty on the temperature measurement: pass

At the announced Ta, at least 1 component is above its maximum limit of operation augmented by the uncertainty on the temperature measurement: fail

At the announced Ta, at least 1 component is at its maximum limit of operation $\pm$ the uncertainty on the temperature measurement and no other component is above its maximum limit of operation augmented by the uncertainty on the temperature measurement: pass with remark

According to IEC 60598-2-3 and IEC 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 reduced by the uncertainty on the temperature measurement: pass

At the announced Tq, at least 1 component is above its selected performance limit of operation augmented by the uncertainty on the temperature measurement: fail

At the announced Tq, at least 1 component is at its selected performance limit of operation $\pm$ the uncertainty on the temperature measurement and no other component is above its selected performance limit of operation augmented by the uncertainty on the temperature measurement: pass with remark

According to 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.

End of accredited report :

Laboratory Test report



226-TEST

NBN EN ISO/IEC 17025 :2017



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

FORM L-54 Edition 01 - Revision 03 - Date : 20/05/2020

Mechanical impact resistance test

General information

Subject : VOLTANA EVO 1 - 16 Oslon Square Giant - Philips 75W

Asked by : SZÜGYI János Péter

Created on : 12/01/2021

Started on : 13/01/2021

Test number : D210050

Reference norm : IEC/EN 60598-1 & 62696 Standards

Sample(s) : E210035, E210036, E210037

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Quantity of sample under test : 5

Protector Material : PC

Serigraphy : None

Protector supplier : External - Gaggione

Operator : Philippe Léonard



IMG_7602

Conclusion



Success

Conclusion :

Conformity statement according to TR 62696:2011 and section 4.13 of IEC 60598-1:2014, AMD1:2017 :

IK10 passed.

Validated by :
GHYSENS Gilles

Duplicate to : RACANELLI Frank, SZÜGYI János Péter,
HORVÁTH Csaba, CSIKÓS Balázs, BEDŐ Péter
LAB : 15/03/2021

D210050

1/4

Test(s) details

Test(s)

Name	Description	Result
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 Hammer weight : 1.7 Kg Height of fall : 30 Cm	Informative
IK09	Impact energy: 10 joules Hammer weight: 5 kg Height of fall: 20 cm	Informative
IK10	Impact Energy: 20 joules Hammer Weight: 5 Kg Height of fall: 40 cm	Informative

Impact points

Annex(es)



IK08

Result(s)

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
		-	NOT TESTED													

IK09

Result(s)

IK 09	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
		-	NOT TESTED													

IK10

Result(s)

IK 10	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
		-	NOT TESTED													

Test room temperature (°C) :

22

Measurement equipment :

Pendulum hammer with chariot (M062)

Thermometer (A039/3)

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 according to GDE-GUI-003

By visual inspection (or other means if necessary):

Luminaire shows dangerous behavior: fail

Luminaire shows no dangerous behavior: pass

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

End of accredited report :

Laboratory Test report



226-TEST

NBN EN ISO/IEC 17025 :2017



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

FORM L-54 Edition 01 - Revision 03 - Date : 20/05/2020

Tightness test

General information

Subject : VOLTANA EVO 1 - 16 Oslon Square Giant - Philips FP 75W - 1200mA - CL II (central screw modified 1Nm)

Asked by : SZÜGYI János Péter

Created on : 08/01/2021

Started on : 11/01/2021

Test number : D210026

Reference norm : IEC/EN 60598-1 Standard

Sample(s) : E210017

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

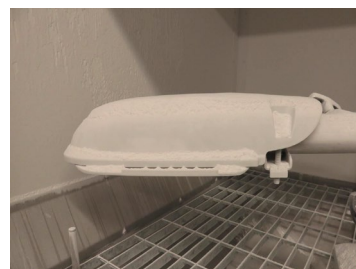
Number of LED : 16

LED : Osram OSLON SQUARE GIANT

Driver current (mA) : 1200

Protector Material : PC

Operator : Philippe Léonard



IMG_7592

Conclusion



Success

Conclusion :

According section 9.2 of IEC 60598-1:2014, AMD1:2017 :

IP66 passed.

Validated by :
GHYSENS Gilles

Duplicate to : SZÜGYI János Péter, HORVÁTH Csaba, CSIKÓS
Balázs, BEDŐ Péter
LAB : 15/02/2021

D210026

1/4

Test(s) details

Test(s)

Name	Description	Result
IP6x	- Luminaire switched ON until stable T° - Talcum in suspension (blowing ON) - After 1', luminaire OFF - Talcum for 3 hours	Success
IPx6	- Luminaire switched ON until stable T° - Luminaire switched OFF and immediately sprayed with water jet - Hose diam. 12,5 mm - Water flow: 100 l/min - Spraying distance: 3 m - Duration of test: 3 minutes	Success

IP6x

Result(s)

Pre-conditioning time :

- 60minutes

Test result :

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

IPx6

Result(s)

Pre-conditioning time :

- 60 minutes

Test result :

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

Test room temperature (°C) :

23.2

Measurement equipment :

Talcum chamber (A003)
Thermometer (A039/2)
Rotating table (A001/2)
Chronometer (A043/3)
Thermometer (A039/1)
Flowmeter (A001/10)
IPx6 nozzle (A001/5)

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

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: ± 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: ± 0,6 mm

Applied force: ± 0,4 N

IP3X:

Probe dimensions: ± 0,3 mm

Applied force: ± 0,13 N

IP4X:

Probe dimensions: ± 0,1 mm

Applied force: ± 0,11 N

IP5X/6X

Test duration (talcum suspension time): ± 3 seconds

Talcum mass: 0,02 %

For liquid ingress test:

IPX3/X4

Table rotation: ± 6 sec/rotation

Arms Rotation angle: ± 3°

Water flow: ± 4 %

IPX5/X6

Table rotation: ± 6 sec/rotation

Water flow: ± 4 %

Test Distance: +0 / -50 cm

IPX7/X8

Test depth: +10 cm / -0 cm

Decision rules :

Pass/fail criteria

For solid ingress test:

IP2X:

If contact possible with live parts: fail

Otherwise: pass

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: pass

IP5X/6X

By visual inspection:

If possible hazard due to presence of conductive dust: fail

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

No presence of talcum: IP6X granted

For liquid ingress test:

IPX3/X4/X5/X6:

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: pass

No presence of water: pass

IPX7/X8:

By visual inspection:

Presence of water: fail

No presence of water: pass

End of accredited report :

Vibrations test following ANSI C 136-31 Standard

General information

Subject : VOLTANA EVO 1 - Side entry

Asked by : LERHO Xavier

Created on : 26/05/2021

Started on : 26/05/2021

Test number : D210532

Reference norm : ANSI C 136-31 Standard

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Operator : External Lab

Type of Test : ANSI C 136-31 Bridge and Overpass application (3G)

Fixing type : Side-entry

Screw type : M8

Tightening torque (Nm): luminaire : 14

Test date : 19/01/2021

Testing facility : External-Ecotech Bosch Lab University

External test report reference : B_ECO_VJK_21003_Vol tana 0 EVO
1_ANSI_2mod_en

Conclusion



Success

Conclusion :

According to ANSI C136-31 (2018) and Schröder GDE-GUI-007:

VOLTANA EVO1 complies with vibration test following the ANSI 3G protocol.

Validated by :

LERHO Xavier

Duplicate to : RACANELLI Frank, SZÜGYI János Péter,
HORVÁTH Csaba, CSIKÓS Balázs, BEDŐ Péter, VYVEY
Morgan

LAB : 21/06/2021

D210532

1/2

Test(s) details

Test(s)

Name	Description	Verdict
ANSI C136-31 (3g) - Axis Y	ANSI C136-31 "Bridge and Overpass Application" and Schröder GDE-GUI-007 Amplitude: 3g Duration: 100.000 cycles	Informative
ANSI C136-31 (3g) - Axis Z	ANSI C136-31 "Bridge and Overpass Application" and Schröder GDE-GUI-007 Amplitude: 3g Duration: 100.000 cycles	Informative
ANSI C136-31 (3g) - Axis X	ANSI C136-31 "Bridge and Overpass Application" and Schröder GDE-GUI-007 Amplitude: 3g Duration: 100.000 cycles	Informative

Number of appendix pages : 33

End of test report :



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



**B_ECO_VJK_21003_Vol
tana EVO
1 ANSI 2mod_en**

Subject: **Voltana EVO 1 luminaire**

Body: 01-83-485, P1598 Voltana gen 2 0 Body, B.0, FOT
Cover: 01-83-486, P1598 Voltana gen 2 0 Cover, A.2, FOT
Fixation: 02-23-172, Clamp fixation III, A.2
Fixing screws: 2x M8 14Nm

From: HUS - Hungarian Schreder

Testing protocol: **"Street Lighting Luminaires" ANSI C 136-31 Standard (3g)**

Remarks: -

TEST CONDITIONS:

Operators: Gábor Neukum
Péter Hajnal

IEC Standard

Tightening torque M8 bolt(s): 14 Nm



Test and results:

See attached report for all details
ECO_VJK_21003_Voltana EVO 1_ANSI_2mod_en

CONCLUSIONS:

The luminaire consisting of parts mentioned above was able to withstand the ANSI standard's vibration test in the form provided to us by the customer.

Duplicate to: Tamás Dörflinger

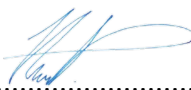
	 NAH-1-1874/2020 TESTING LABORATORY	Lifetime Testing Laboratory of Technical Division of Ecotech Nonprofit Co. Testing laboratory accredited by NAH under No. NAH-1-1874/2020 TEST REPORT	 B_ECO_VJK_21003_Vol tana 0 EVO 1 ANSI 2mod_en
---	--	--	--

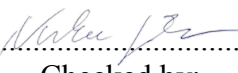
ANSI C 136-31 Standard (3g) vibration test of a(n) “Voltana EVO 1” luminaire		
Customer (name&address): Schröder Magyarország Zrt. 2084 Pilisszentiván Tópart 2.	Contractor (name&address): Dunaújvárosi Egyetem H-2400 Dunaújváros, Táncsics Mihály st. 1/a.	Executive organization (name&address): Ecotech Szolgáltató Nonprofit Zrt. H-2400 Dunaújváros, Táncsics Mihály st. 1/a.
Test location: Ecotech Nonprofit Zrt. Műszaki Igazgatóság Élettartam Vizsgáló laboratórium	Operator(s): Gábor Neukum Péter Hajnal	

Quotation: -	Order number: -	Contract number: FI60345
Applied standard: ANSI C 136-31(3g)	Project number: B ECO 21003	
Sample arrival: 2021.01.18.	Test started: 2021.01.19.	Test ended: 2021.01.20.
Number of samples: 1		
Sample serial number: S0386		
Test task: Vibration tests		
Test subject: Voltana EVO 1		

We call the attention that the results of the test only apply to the tested samples. This report is only valid and can only be copied in its full form and content.

Date: Dunaújváros, 2021.02.11.


 Made by:
Péter Hajnal
 Head of Maintenance


 Checked by:
Gábor Neukum
 Chief Operator


 Approved by:
Gábor Pór
 Technical Director

Before using this document, make sure there is no newer version or it has not been revoked.		
B_ECO_NY_08_02_2k_5mod		1. oldal (33)



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

Content

1. Introduction	3
1.1. Subject.....	3
1.2. Sample fixation	3
1.3. Abbreviations	3
2. Sample	4
3. Vibration test	4
3.1. Equipment	4
3.2. Applied standard	5
3.3. Test parameters – execution	5
4. Time logs	6
4.1. Photos of the setup	8
4.1.1. X direction.....	8
4.1.2. Y direction.....	10
4.1.3. Z direction	12
4.2. Test profiles.....	13
4.3. X direction results	14
4.4. Y direction results	20
4.5. Z direction results.....	26
4.6. Visual examination.....	31
5. Evaluation of results	31
6. Conclusion.....	32

Before using this document, make sure there is no newer version or it has not been revoked.

1. Introduction

1.1. Subject

The test is designed to determine whether the luminaire is able to withstand vibration conditions that may be encountered in normal installations.

1.2. Sample fixation

Adapter to Shaker:

- 14 pieces of M8x45 bolts
- 25Nm tightening torque

DUT to Adapter

- Tightening torque M8 bolts: 14 Nm

1.3. Abbreviations

Abbreviation	Meaning
CoG	Center of Gravity
DUT	Device Under Test
N/A	Not applicable
CTRL	Control
DoF	Degrees of Freedom
RSTD	Resonance Search Track and Dwell

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

2. Sample

Device under test (DUT): Voltana EVO 1 (previously called Voltana 0 GEN 2)
Manufacturer: Schröder Magyarország Zrt.
Manufacturing year: 2020

3. Vibration test

3.1. Equipment

Equipment details		
Equipment name	Shaker II. (LDS)	Slip Table
Equipment type	V875-440-SPA40K	HBT750-SB-V875
Equipment nr.	B_ECO_003	B_ECO_059
Serial nr.	1023471/1 13621-000010/1	349766/1
Calibration nr. (date)	CAS-458024-V2C0G9 (2020.07.23)	CAS-400197-V2F6S9 (2019.08.14)

Equipment name	Bruel&Kjaer Accelerometer	Bruel&Kjaer Accelerometer
Equipment type	Type 4526	Type 4533-B
Equipment nr.	B_ECO_086	B_ECO_088
Serial nr.	30928	33696
Calibration nr. (date)	00618-085 (2020.07.07)	150157.3 (2020.11.25)

Equipment name	PCB Accelerometer	PCB Accelerometer
Equipment type	356B21	356B21
Equipment nr.	B_ECO_010	B_ECO_012
Serial nr.	LW121008	LW121010
Calibration nr. (date)	00618-010 (2020.07.07)	00618-012 (2020.07.07)

Equipment name	Control unit (LDS)	Control unit (LDS)
Equipment type	LAS200	LAS210
Equipment nr.	B_ECO_023	B_ECO_024
Serial nr.	9098119	9289610
Calibration nr. (date)	ECO_KJB_20_023_024 (2020.01.30)	ECO_KJB_20_023_024 (2020.01.30)

Signal conditioner was not used in the given test.

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

3.2. Applied standard

"Bridge and Overpass Application" ANSI C136.31	
Test Item	Luminaire for bridge and overpass applications
Excitation Direction	3 directions
Search for frequencies and quality factor Q	Excitation: sine sweep Frequency band: 5 - 100 Hz Sweep speed: 1 octave/min. Acceleration: 0.5g Control point : Fixation to the pole
Test	Excitation: sine dwell Frequency: at or near f_0 Amplitude : 3.0g Control point : Centre of gravity Duration: 100,000 cycles
N.B.	A separate sample luminaire may be used for each excitation direction
Control of frequencies and quality factor Q	Excitation: sine sweep Frequency band: 5 - 100 Hz Sweep speed: 1 octave/min. Acceleration: 0.5g Control point : Fixation to the pole

3.3. Test parameters – execution

- Environmental temperature: 24 [°C]
- Test type: Passive
- Test direction: X; Y; Z directions

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

4. Time logs

RSTD Search Log (X direction)					
Swept Sine	Freq.(Hz) 100	Trans. 1.69	Phase -3.71	Q 3.9	Random Done
Sweep	Time	History			
	00:00:02	Start searching at 5.00 Hz with transmissibility6,14(f)			
	00:04:25	End searching at 100.00 Hz			
	00:05:27	Add resonance at 100.00 Hz			
	00:05:45	Start dwell at 100.00 Hz			
	00:22:28	End dwell at 100.00 Hz Full level elapsed sine cycles: 100139.6			

RSTD Search Log (Y direction)					
Swept Sine	Freq.(Hz) 100.00	Trans. 41.52	Phase -257.17	Q 42.9	Dwell Done
Sweep	Time	History			
	00:00:02	Start searching at 5.00 Hz with transmissibility7,14(f)			
	00:04:24	End searching at 100.00 Hz			
	00:04:59	Add resonance at 100.00 Hz			
	00:05:04	Start dwell at 100.00 Hz			
	00:21:46	End dwell at 100.00 Hz Full level elapsed sine cycles: 109008.9			

RSTD Search Log (Z direction)					
Swept Sine	Freq.(Hz) 100.00	Trans. 5.13	Phase -2.79	Q 15.9	Dwell Done
Sweep	Time	History			
	00:00:02	Start searching at 5.00 Hz with transmissibility8,14(f)			
	00:04:25	End searching at 100.00 Hz			
	00:12:40	Add resonance at 100.00 Hz			
	00:13:27	Start dwell at 100.00 Hz			
	00:30:09	End dwell at 100.00 Hz Full level elapsed sine cycles: 108234.7			

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

Input acceleration to reach 3g in CoG			
	Direction		
	X	Y	Z
Frequency	100.00Hz	100.00Hz	100.00Hz
Transmissibility	1.69	41.52	5.13
RSTD input acceleration	1.5g	0.102g	0.5g
Expected CoG acceleration	2.54g±correction (see run log)	4.23g±correction (see run log)	2.565g±correction (see run log)

The sine dwelling tests started off with feedback accelerations mentioned in the table above. Those values are within the range where it's possible to manually adjust the input acceleration in order to receive a value in the center of gravity that is -for the full duration of the test- within the required 3g acceleration $\pm 10\%$. Ensuring this is only possible with manual adjustments (see run log section of the report) and is the operator's responsibility.

Before using this document, make sure there is no newer version or it has not been revoked.



NAH-1-1874/2020
TESTING LABORATORY

Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

4.1. Photos of the setup

4.1.1. X direction

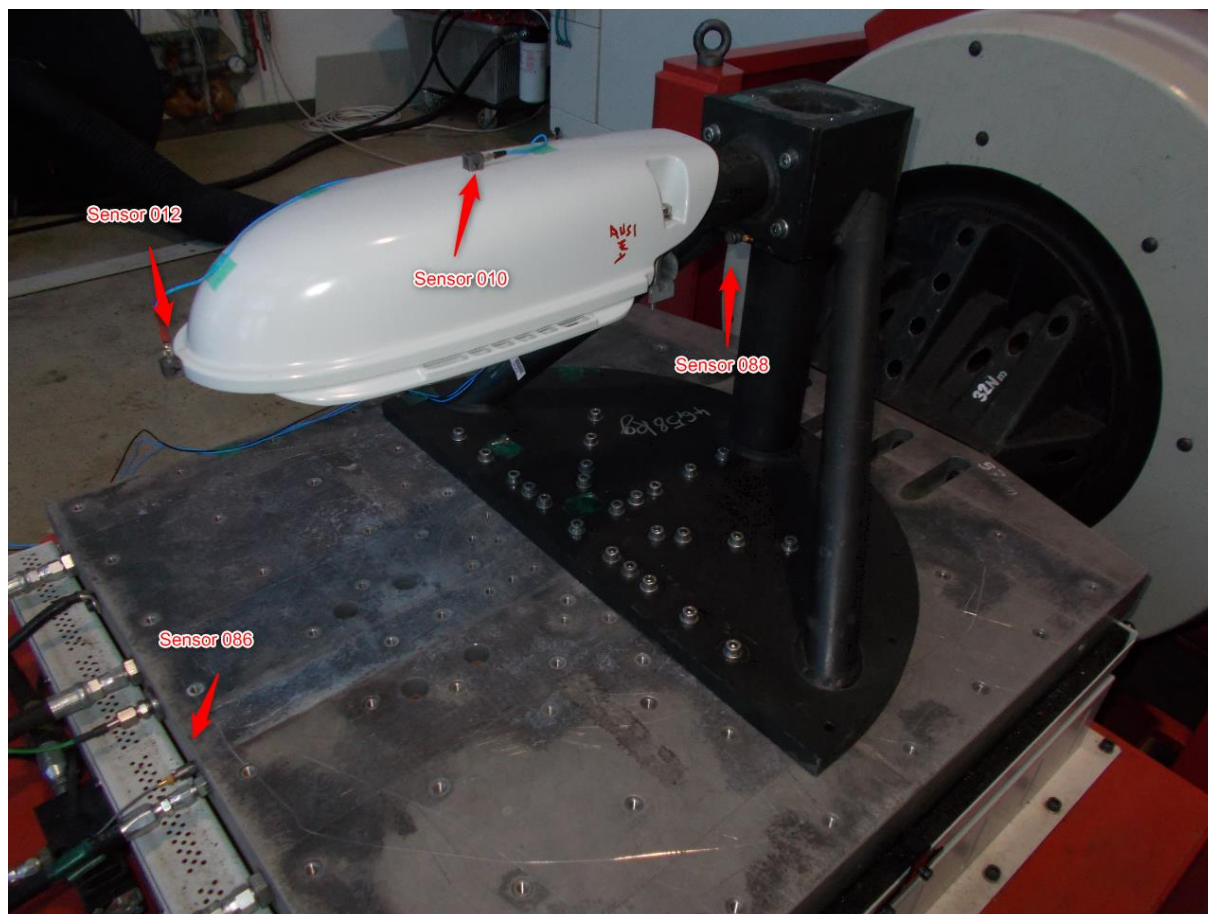


Figure 1
Sensor locations in the X direction

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

8. oldal (33)



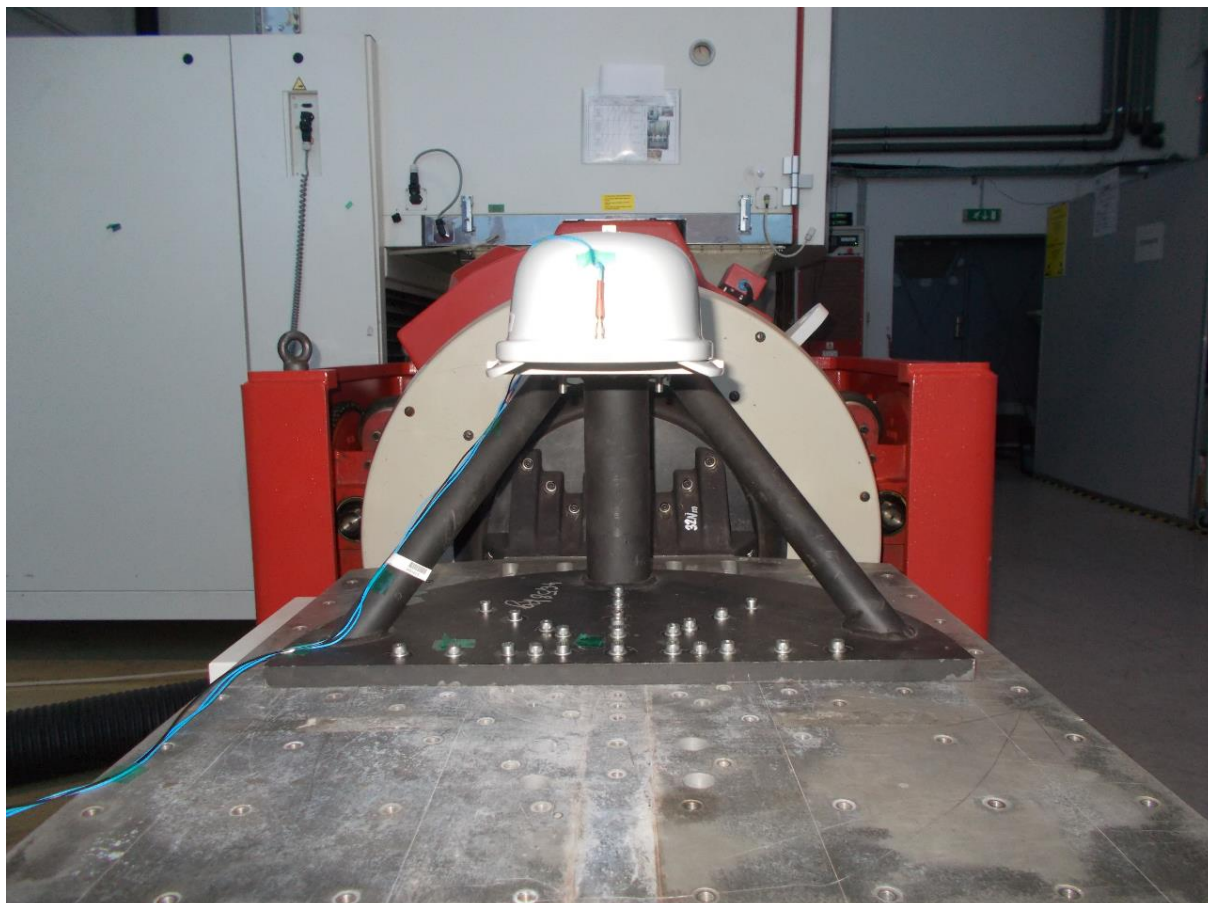
NAH-1-1874/2020
TESTING LABORATORY

Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en



2. Figure
Front view

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

9. oldal (33)



NAH-1-1874/2020
TESTING LABORATORY

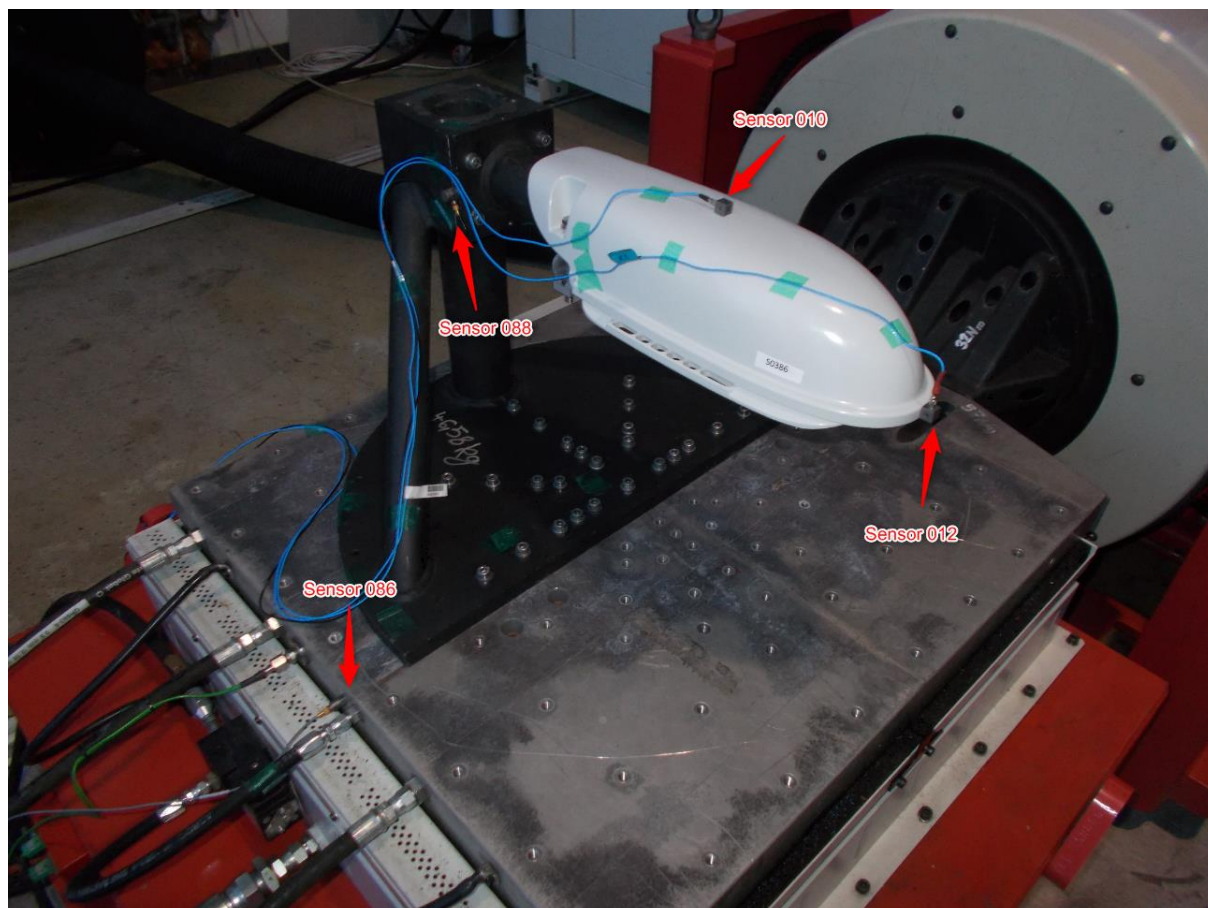
Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

4.1.2. Y direction



3. Figure
Sensor locations in Y direction

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

10. oldal (33)



NAH-1-1874/2020

TESTING LABORATORY

Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.

Testing laboratory accredited by NAH under No.

NAH-1-1874/2020

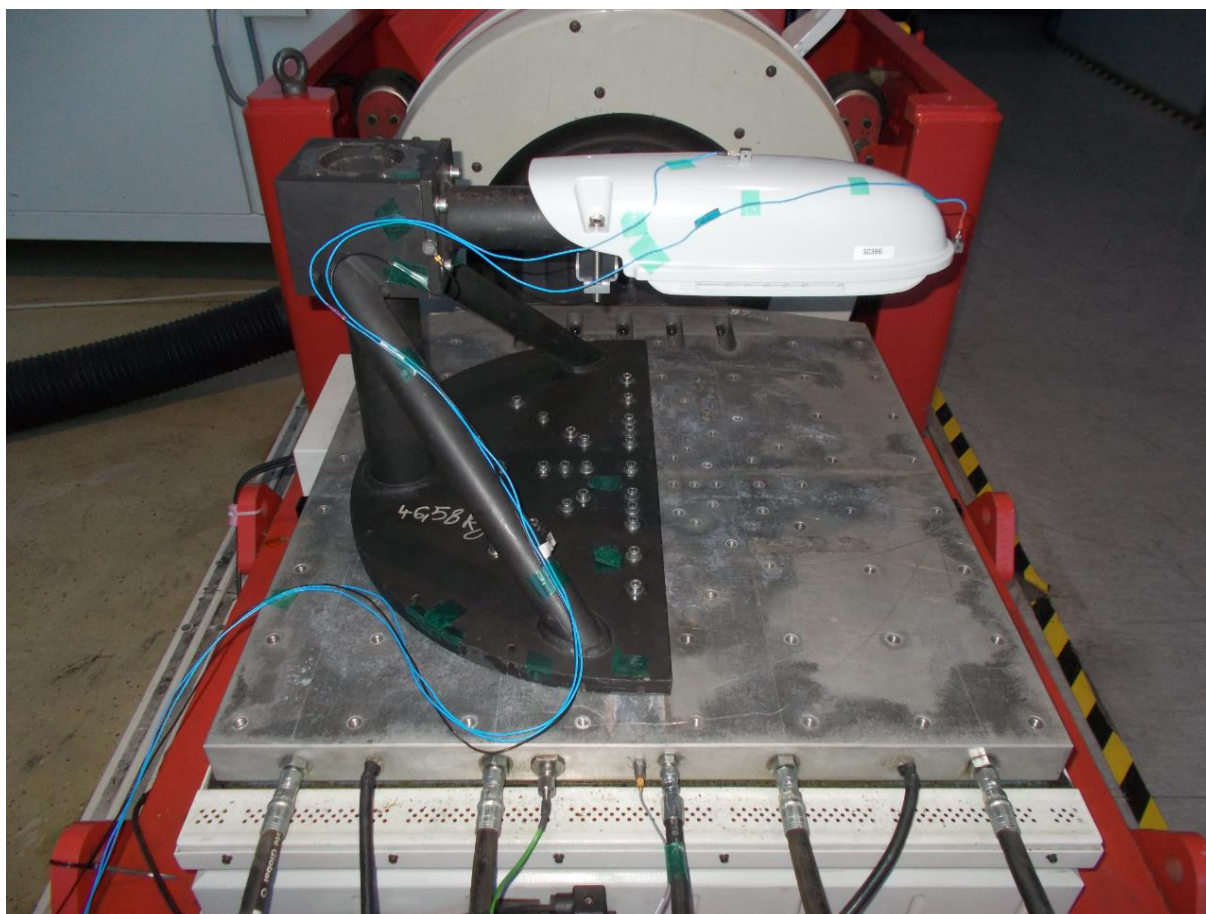
TEST REPORT



B_ECO_VJK_21003_Vol

tana 0 EVO

1 ANSI 2mod_en



4. Figure
Side view

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

11. oldal (33)



NAH-1-1874/2020
TESTING LABORATORY

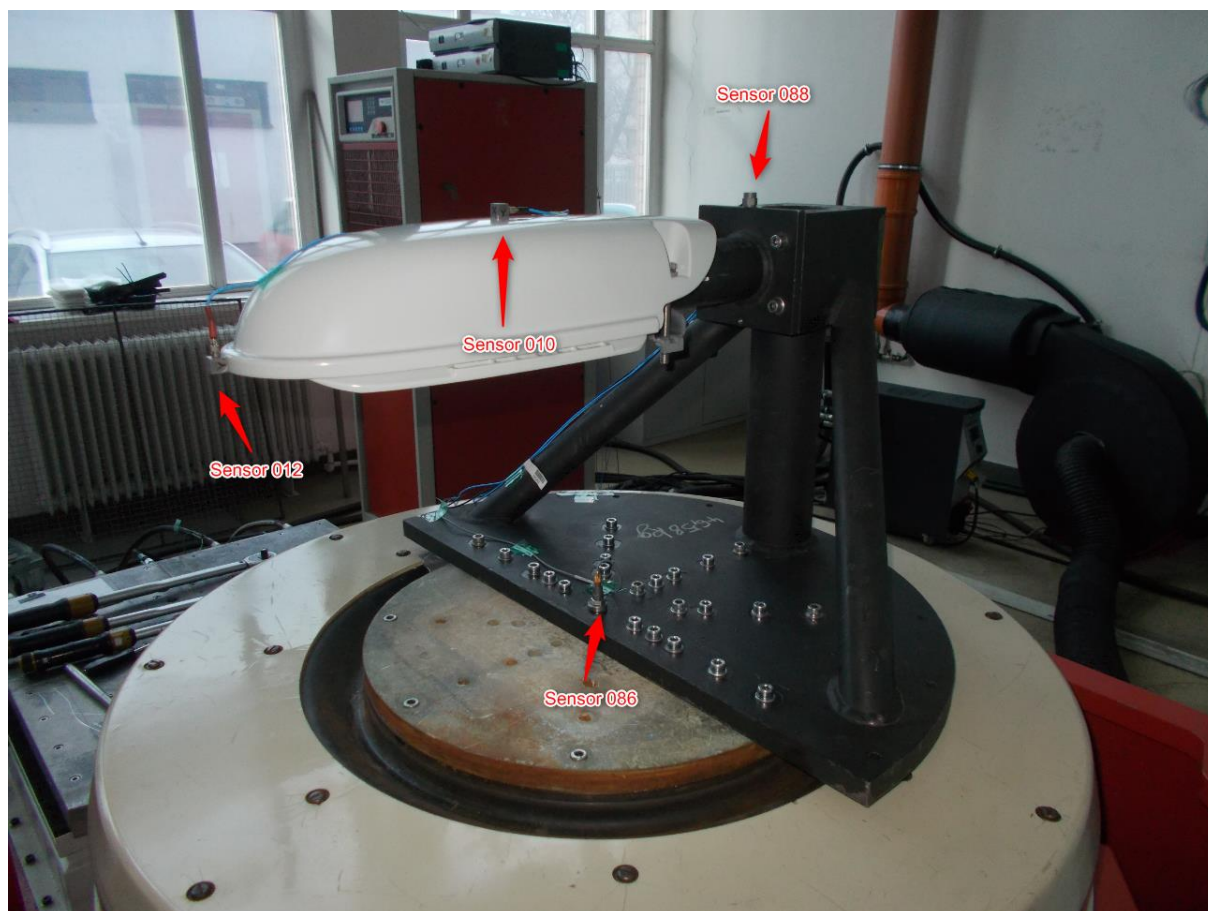
Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

4.1.3. Z direction



5. Figure
Sensor locations in Z direction

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

12. oldal (33)



NAH-1-1874/2020
TESTING LABORATORY

Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en



6. Figure
Side view

4.2. Test profiles

Resonant frequency search (sweep) Profile Table						
Frequency	Acceleration	Velocity	Displacement	Segment Type	High Abort	High Alarm
Hz	(gn) Peak	(m/s) Peak	(mm) Peak-Peak		dB	dB
5.0	0.5	0.156078	9.93621	Const. Ampl.	6.00	3.00
100.0	0.5	0.00780388	0.0248405		6.00	3.00

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

13. oldal (33)



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

4.3. X direction results

The DUT did not have its fundamental resonance in the examined frequency range in this direction. The standard instructs to run the dwelling at or near the resonant frequency. Since that frequency tends to be above 100Hz, it was selected as dwelling frequency.

Project File Name: ANSI C 136-31-1.prj
Profile Name: ANSI C 136-31-1
Test Type: Resonance Search, Track And Dwell
Run Folder: \B_ECO_21003_Voltana 0 GEN 2_ANSI_X_1.5g_sweep_before Jan
20, 2021 11-42-46

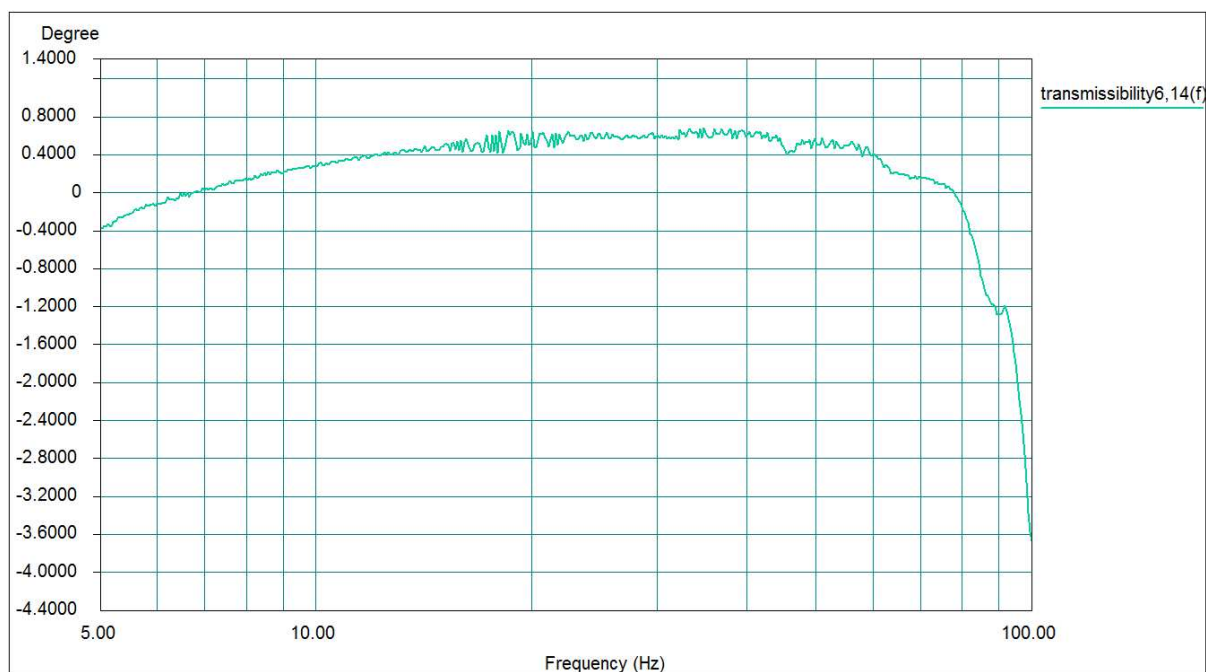


Figure 7
RSTD Search Log (X direction), phase of transmissibility between CoG(6) and CTRL(14)

Level: 100 %
Frequency: 99.948158 Hz

Full Level Time: 00:04:20
Time Remaining: 00:00:00

SweepType: Logarithmic
Sweep Rate: 1 Oct/Min

Before using this document, make sure there is no newer version or it has not been revoked.



NAH-1-1874/2020
TESTING LABORATORY

Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

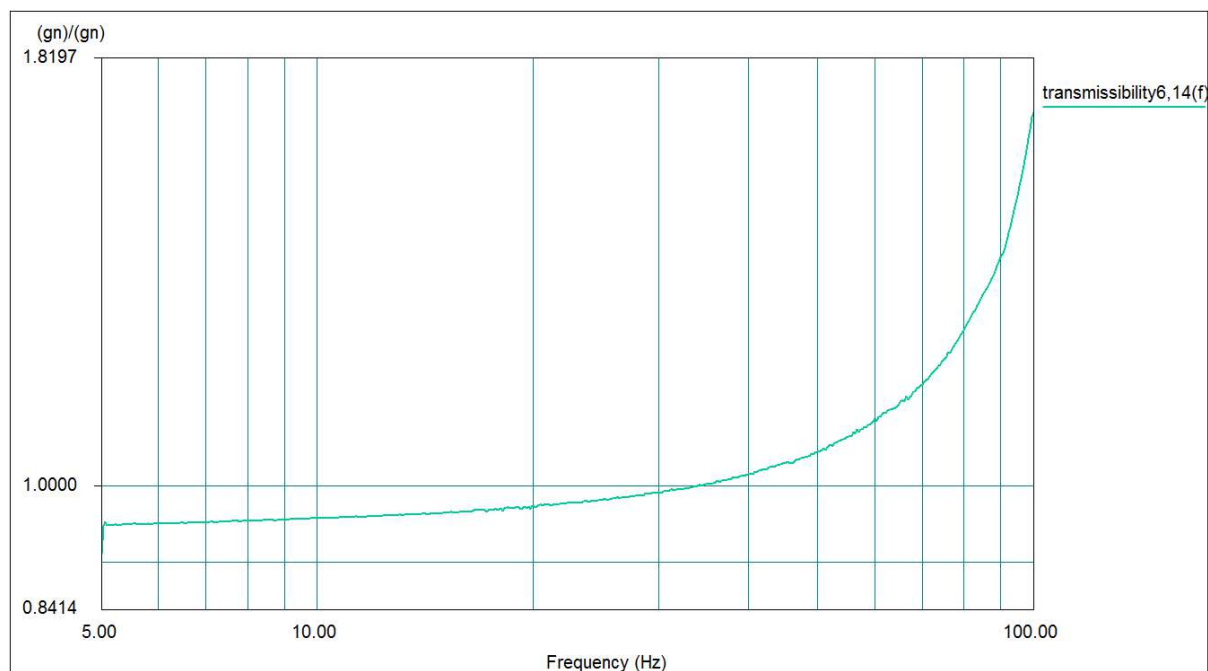


Figure 8

RSTD Search Log (X direction), amplitude ratio of transmissibility between CoG(6) and CTRL(14)

Input Channel Parameters

Input	Type	Analysis	Max. Volts	mv/(EU)	Weighting	Coupling	Quantity	I.D.	Location
1	Response	Filter	1.0	9.8090mv/(gn)	1.0000	ICP	Acce.	088	Consloe
6	Response	Filter	1.0	9.7000mv/(gn)	1.0000	ICP	Acce.	010x	
7	Response	Filter	1.0	10.0200mv/(gn)	1.0000	ICP	Acce.	010y	CoG
8	Response	Filter	1.0	9.6700mv/(gn)	1.0000	ICP	Acce.	010z	
10	Response	Filter	1.0	9.8900mv/(gn)	1.0000	ICP	Acce.	012x	
11	Response	Filter	1.0	9.9600mv/(gn)	1.0000	ICP	Acce.	012y	Tip
12	Response	Filter	1.0	9.7300mv/(gn)	1.0000	ICP	Acce.	012z	
14	Control	Filter	1.0	93.9700mv/(gn)	1.0000	ICP	Acce.	086	Table

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

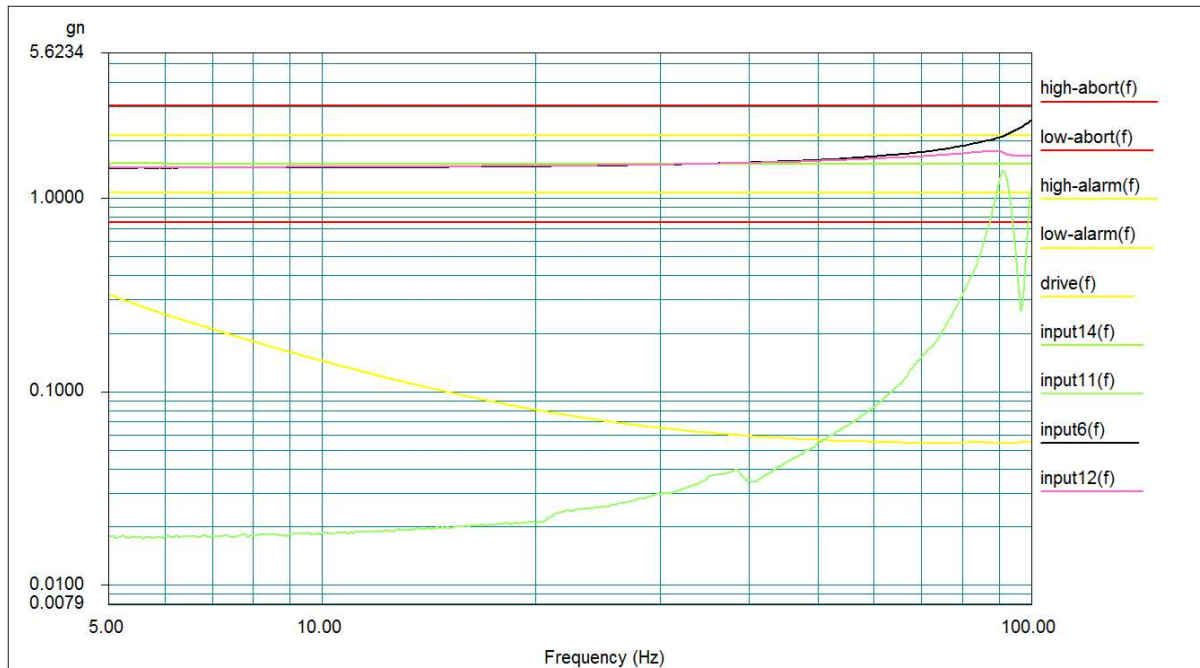


Figure 9
RSTD Search Log (X direction)

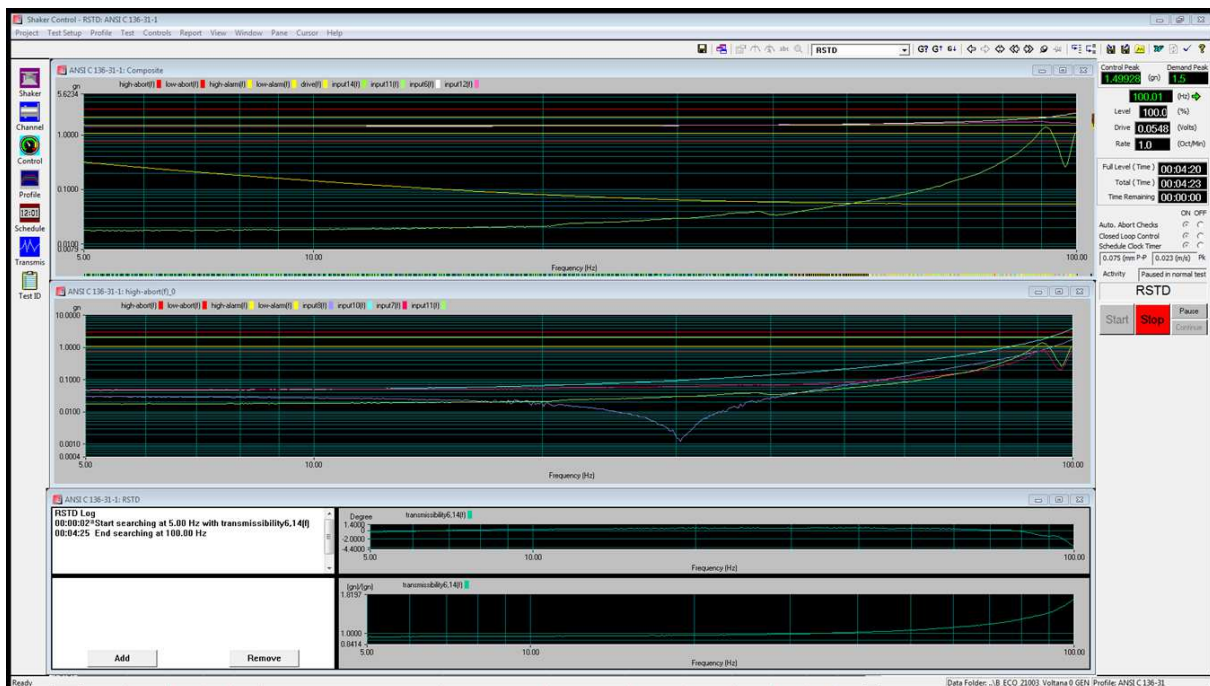


Figure 10
RSTD test control panel X direction

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

RSTD Resonance List

Res#	Freq.(Hz)	Trans.	Phase	Q	Dwell	Elapsed
1	100.00	1.69	-3.71	3.9	Done	00:16:39

RSTD Search Log

Time	Event
00:00:02	Start searching at 5.00 Hz with transmissibility6,14(f)
00:04:25	End searching at 100.00 Hz
00:05:27	Add resonance at 100.00 Hz
00:05:45	Start dwell at 100.00 Hz
00:22:28	End dwell at 100.00 Hz

Run Log

Dactron Dual DSP Shaker Control System				
Swept Sine Test Run Log				
11:42:46, Wednesday, January 20, 2021				
ENTRY TIME	FREQ(Hz)	CTL/DEMAND(Peak)	SOURCE	DESCRIPTION
11:42:46, Jan 20, 21	0.00		User Command	Start the Test
11:42:48, Jan 20, 21	5.00		Controller	Start a new sweep/dwell entry
11:47:12, Jan 20, 21	100.01	1.499/ 1.500 gn	Controller	Paused in scheduled test
11:47:12, Jan 20, 21	100.01		Controller	'control(f),drive(f),Hinv(f),profile(f),high-abort(f),low-abort(f),high-alarm(f),low-alarm(f),controlUp(f),controlDown(f),shaker_acc(f),shaker_vel(f),shaker_disp(f),control(t),frequency(t),input6(t),input_hist6(t),input7(t),input_hist7(t),input8(t),input_hist8(t),input6(f),input6Up(f),input6Down(f),input7(f),input7Up(f),in

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

17. oldal (33)



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

				put7Down(f),input8(f),input8Up(f),input8Down(f),input1(t),input_hist1(t),input10(t),input_hist10(t),input11(t),input_hist11(t),input12(t),input_hist12(t),input14(t),input_hist14(t),input1(f),input1Up(f),input1Down(f),input10(f),input10Up(f),input10Down(f),input11(f),input11Up(f),input11Down(f),input12(f),input12Up(f),input12Down(f),input14(f),input14Up(f),input14Down(f),' Saved Signals
11:48:32, Jan 20, 21	100.01		User Command	Resume(Continue) the Drive output
11:48:32, Jan 20, 21	100.00		Controller	Start a new sweep/dwell entry
12:03:54, Jan 20, 21	100.00		User Command	Set Level to 104%
12:05:15, Jan 20, 21	100.00		Controller	All Panes saved to the disk.
12:05:15, Jan 20, 21	100.00		Controller	'control(f),drive(f),Hinv(f),profile(f),high-abort(f),low-abort(f),high-alarm(f),low-alarm(f),controlUp(f),controlDown(f),shaker_acc(f),shaker_vel(f),shaker_disp(f),control(t),frequency(t),input6(t),input_hist6(t),input7(t),input_hist7(t),input8(t),input_hist8(t),input6(f),input6Up(f),input6Down(f),input7(f),input7Up(f),input7Down(f),input8(f),input8Up(f),input8Down(f),input1(t),input_hist1(t),input10(t),input_hist

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

				10(t),input11(t),input_hist11(t),input12(t),input_hist12(t),input14(t),input_hist14(t),input1(f),input1Up(f),input1Down(f),input10(f),input10Up(f),input10Down(f),input11(f),input11Up(f),input11Down(f),input12(f),input12Up(f),input12Down(f),input14(f),input14Up(f),input14Down(f),' Saved Signals
12:05:16, Jan 20, 21	0.00	1.575/ 1.575 gn	Controller	End of Test
12:05:16, Jan 20, 21	0.00			Full level elapsed 00:19:39
12:05:16, Jan 20, 21	0.00			Full level elapsed sine cycles: 100139.6

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

19. oldal (33)

4.4. Y direction results

The DUT did not have its fundamental resonance in the examined frequency range in this direction. The standard instructs to run the dwelling at or near the resonant frequency. Since that frequency tends to be above 100Hz, it was selected as dwelling frequency.

Project File Name: ANSI C 136-31-1.prj
 Profile Name: ANSI C 136-31-1
 Test Type: Resonance Search, Track And Dwell
 Run Folder: \B_ECO_21003_Voltana 0 GEN 2_ANSI_Y_0.1g_sweep_before Jan 20, 2021 10-33-21

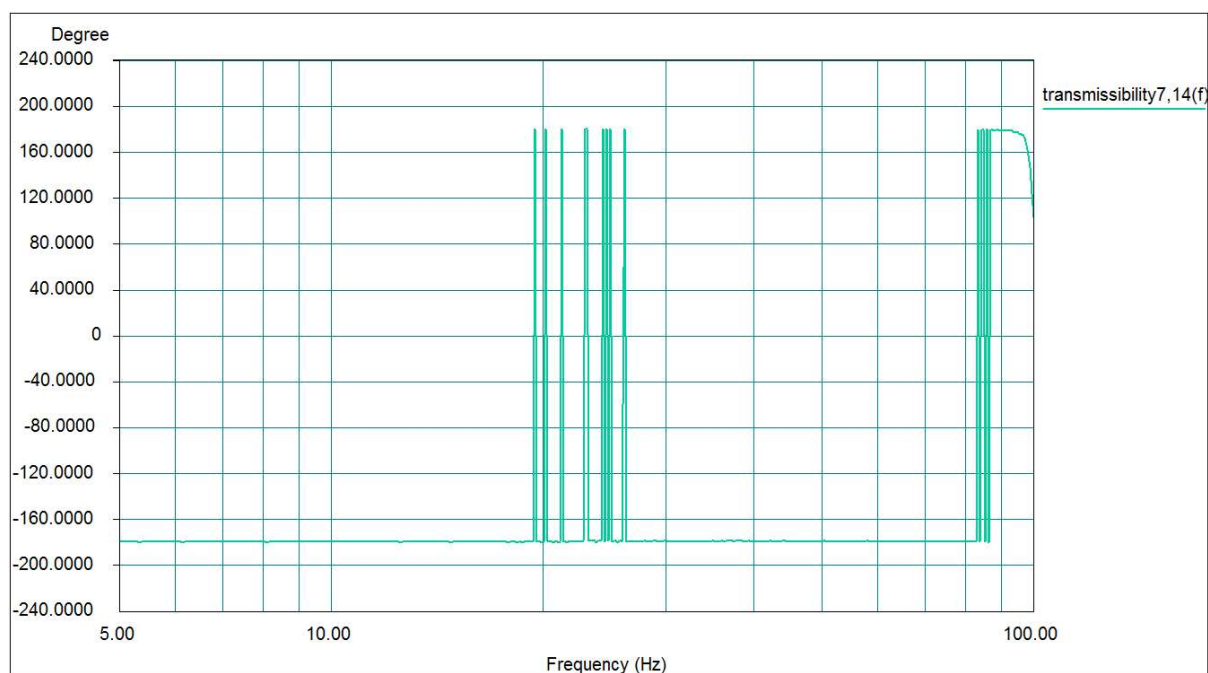


Figure 11
RSTD Search Log (Y direction), phase of transmissibility between CoG(7) and CTRL(14)

Level: 100 %
 Frequency: 99.985077 Hz

Full Level Time: 00:04:20 SweepType: Logarithmic
 Time Remaining: 00:00:00 Sweep Rate: 1 Oct/Min



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

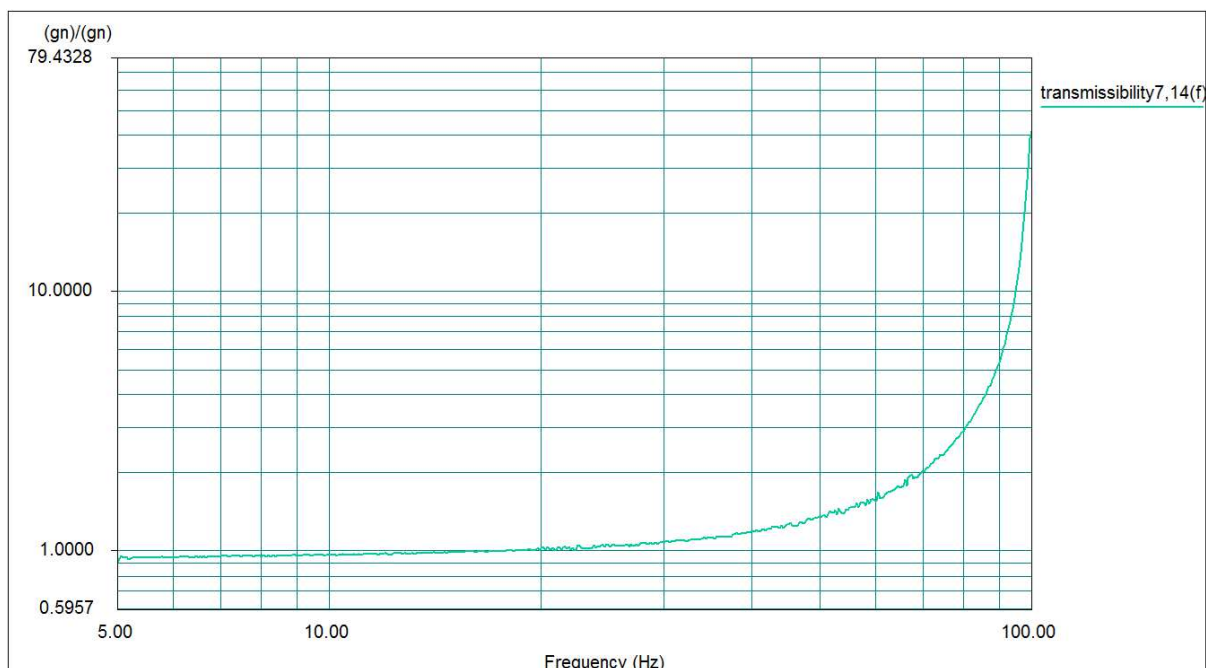


Figure 12

RSTD Search Log (Y direction), amplitude ratio of transmissibility between CoG(7) and CTRL(14)

Input Channel Parameters

Input	Type	Analysis	Max. Volts	mv/(EU)	Weighting	Coupling	Quantity	I.D.	Location
1	Response	Filter	1.0	9.8090mv/(gn)	1.0000	ICP	Acce.	088	Consloe
6	Response	Filter	1.0	9.7000mv/(gn)	1.0000	ICP	Acce.	010x	
7	Response	Filter	1.0	10.0200mv/(gn)	1.0000	ICP	Acce.	010y	CoG
8	Response	Filter	1.0	9.6700mv/(gn)	1.0000	ICP	Acce.	010z	
10	Response	Filter	1.0	9.8900mv/(gn)	1.0000	ICP	Acce.	012x	
11	Response	Filter	1.0	9.9600mv/(gn)	1.0000	ICP	Acce.	012y	Tip
12	Response	Filter	1.0	9.7300mv/(gn)	1.0000	ICP	Acce.	012z	
14	Control	Filter	1.0	93.9700mv/(gn)	1.0000	ICP	Acce.	086	Table

Before using this document, make sure there is no newer version or it has not been revoked.

B_ECO_NY_08_02_2k_5mod

21. oldal (33)



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

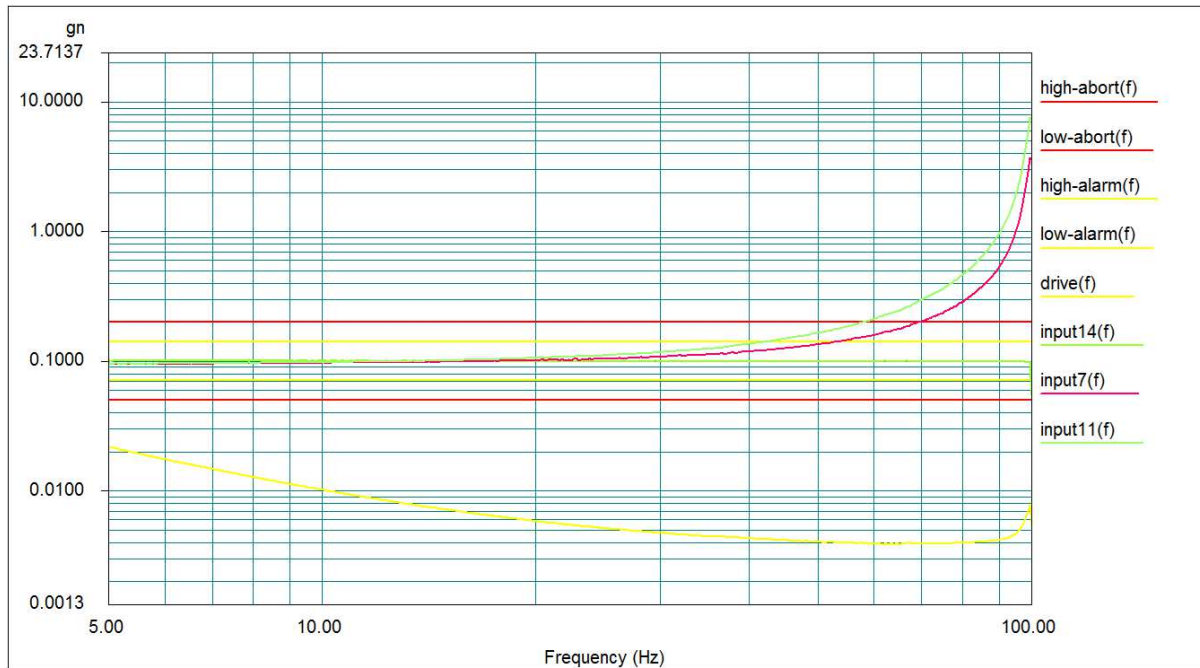


Figure 13
RSTD Search Log (Y direction)

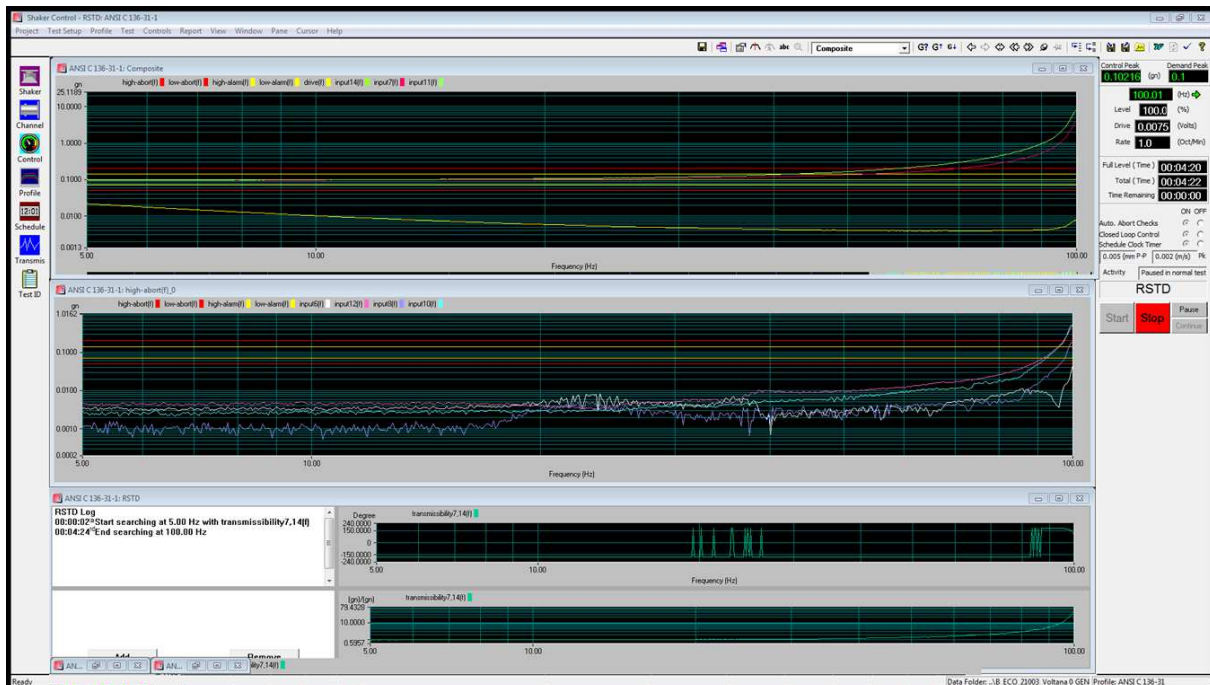


Figure 14
RSTD test control panel Y direction

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod en

RSTD Resonance List

Res#	Freq.(Hz)	Trans.	Phase	Q	Dwell	Elapsed
1	100.00	41.52	-257.17	42.9	Done	00:16:39

RSTD Search Log

Time	Event
00:00:02	Start searching at 5.00 Hz with transmissibility 7,14(f)
00:04:24	End searching at 100.00 Hz
00:04:59	Add resonance at 100.00 Hz
00:05:04	Start dwell at 100.00 Hz
00:21:46	End dwell at 100.00 Hz

Run Log

Dactron Dual DSP Shaker Control System				
Swept Sine Test Run Log				
10:33:23, Wednesday, January 20, 2021				
ENTRY TIME	FREQ(Hz)	CTL/DEMAND(Peak)	SOURCE	DESCRIPTION
10:33:23, Jan 20, 21	0.00		User Command	Start the Test
10:33:25, Jan 20, 21	5.00		Controller	Start a new sweep/dwell entry
10:37:47, Jan 20, 21	100.01	0.102/ 0.100 gn	Controller	Paused in scheduled test
10:37:48, Jan 20, 21	100.01		Controller	'control(f),drive(f),Hinv(f),profile(f),high-abort(f),low-abort(f),high-alarm(f),low-alarm(f),controlUp(f),controlDown(f),shaker_acc(f),shaker_vel(f),shaker_disp(f),control(t),frequency(t),input6(t),input_hist6(t),input7(t),input_hist7(t),input8(t),input_hist8(t),input6(f),input6Up(f),input6Down(f),input7(f),input7Up(f),input7Down(f),input8(f),input8Up(f),input8Down

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

				(f),input1(t),input_hist1(t),input10(t),input_hist10(t),input11(t),input_hist11(t),input12(t),input_hist12(t),input14(t),input_hist14(t),input1(f),input1Up(f),input1Down(f),input10(f),input10Up(f),input10Down(f),input11(f),input11Up(f),input11Down(f),input12(f),input12Up(f),input12Down(f),input14(f),input14Up(f),input14Down(f),transmissibility7,14(f),coherence7,14(f),' Saved Signals
10:38:28, Jan 20, 21	100.01		User Command	Resume(Continue) the Drive output
10:38:28, Jan 20, 21	100.00		Controller	Start a new sweep/dwell entry
10:38:37, Jan 20, 21	100.00		User Command	Set Level to 94%
10:38:43, Jan 20, 21	100.00		User Command	Set Level to 89%
10:38:53, Jan 20, 21	100.00		User Command	Set Level to 85%
10:38:58, Jan 20, 21	100.00		User Command	Set Level to 80%
10:39:14, Jan 20, 21	100.00		User Command	Set Level to 75%
10:39:22, Jan 20, 21	100.00		User Command	Set Level to 69%
10:39:26, Jan 20, 21	100.00		User Command	Set Level to 64%
10:39:30, Jan 20, 21	100.00		User Command	Set Level to 60%
10:41:35, Jan 20, 21	100.00		User Command	Set Level to 55%
10:55:09, Jan 20, 21	100.00		Controller	All Panes saved to the disk.
10:55:10, Jan 20, 21	100.00		Controller	'control(f),drive(f),Hinv(f),profile(f),high-abort(f),low-

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

				abort(f),high- alarm(f),low- alarm(f),controlUp(f),c ontrolDown(f),shaker_a cc(f),shaker_vel(f),shak er_disp(f),control(t),fre quency(t),input6(t),inpu t_hist6(t),input7(t),input _hist7(t),input8(t),input _hist8(t),input6(f),input 6Up(f),input6Down(f),i nput7(f),input7Up(f),in put7Down(f),input8(f),i nput8Up(f),input8Down (f),input1(t),input_hist1 (t),input10(t),input_hist 10(t),input11(t),input_h ist11(t),input12(t),input _hist12(t),input14(t),inp ut_hist14(t),input1(f),in put1Up(f),input1Down(f),input10(f),input10Up (f),input10Down(f),inp ut11(f),input11Up(f),in put11Down(f),input12(f ,input12Up(f),input12 Down(f),input14(f),inp ut14Up(f),input14Down (f),transmissibility7,14(f),coherence7,14(f),' Saved Signals
10:55:10, Jan 20, 21	0.00	0.055/ 0.055 gn	Controller	End of Test
10:55:10, Jan 20, 21	0.00			Full level elapsed 00:04:27
10:55:10, Jan 20, 21	0.00			Full level elapsed sine cycles: 109008.9

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

4.5. Z direction results

The DUT did not have its fundamental resonance in the examined frequency range in this direction. The standard instructs to run the dwelling at or near the resonant frequency. Since that frequency tends to be above 100Hz, it was selected as dwelling frequency.

Project File Name: ANSI C 136-31-1.prj
Profile Name: ANSI C 136-31-1
Test Type: Resonance Search, Track And Dwell
Run Folder: \B_ECO_21003_Voltana 0 GEN 2_ANSI_Z_0.5g_sweep_before Jan
19, 2021 13-13-34

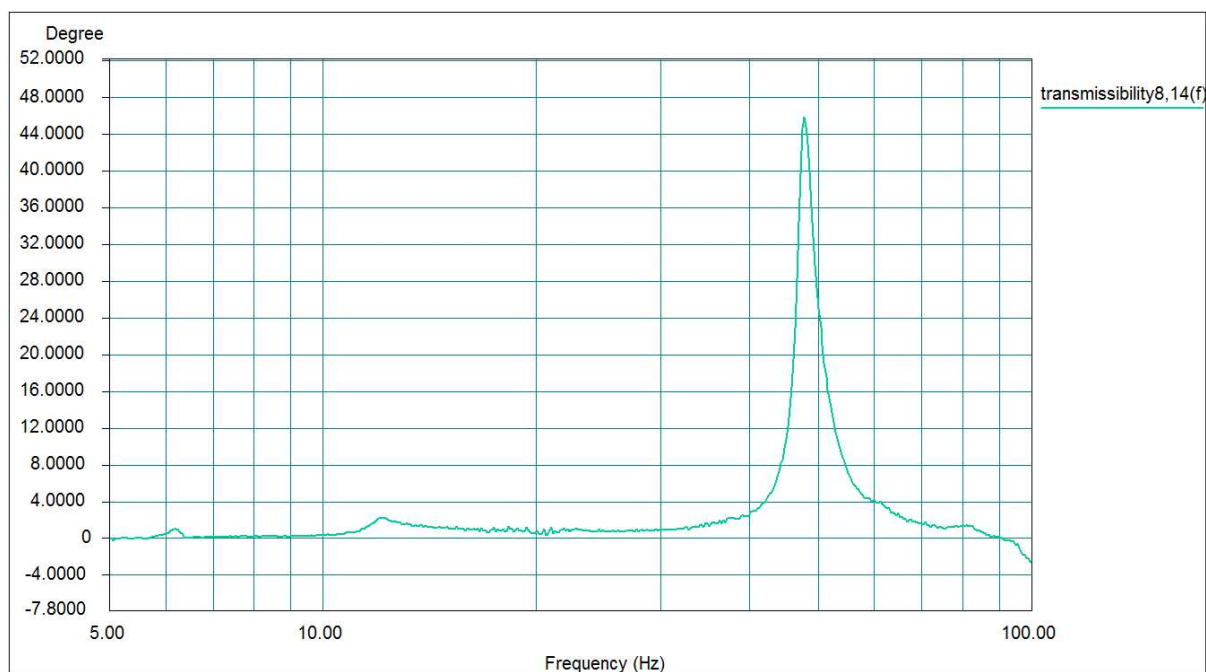


Figure 15
RSTD Search Log (Z direction), phase of transmissibility between CoG(8) and CTRL(14)

Level: 100 %
Frequency: 99.972771 Hz

Full Level Time: 00:04:20
Time Remaining: 00:00:00

Sweep Type: Logarithmic
Sweep Rate: 1 Oct/Min

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

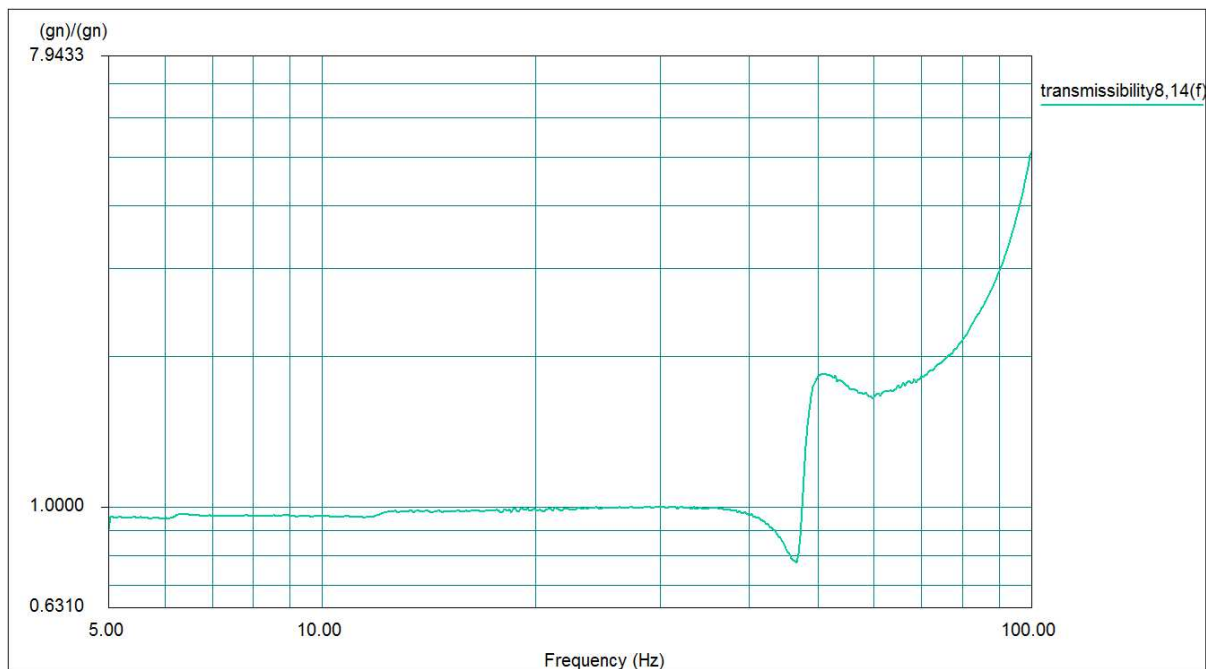


Figure 16

RSTD Search Log (Z direction), amplitude ratio of transmissibility between CoG(8) and CTRL(14)

Input Channel Parameters

Input	Type	Analysis	Max. Volts	mv/(EU)	Weighting	Coupling	Quantity	I.D.	Location
1	Response	Filter	1.0	9.8090mv/(gn)	1.0000	ICP	Acce.	088	Consloe
6	Response	Filter	1.0	9.7000mv/(gn)	1.0000	ICP	Acce.	010x	
7	Response	Filter	1.0	10.0200mv/(gn)	1.0000	ICP	Acce.	010y	CoG
8	Response	Filter	1.0	9.6700mv/(gn)	1.0000	ICP	Acce.	010z	
10	Response	Filter	1.0	9.8900mv/(gn)	1.0000	ICP	Acce.	012x	
11	Response	Filter	1.0	9.9600mv/(gn)	1.0000	ICP	Acce.	012y	Tip
12	Response	Filter	1.0	9.7300mv/(gn)	1.0000	ICP	Acce.	012z	
14	Control	Filter	1.0	93.9700mv/(gn)	1.0000	ICP	Acce.	086	Table

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

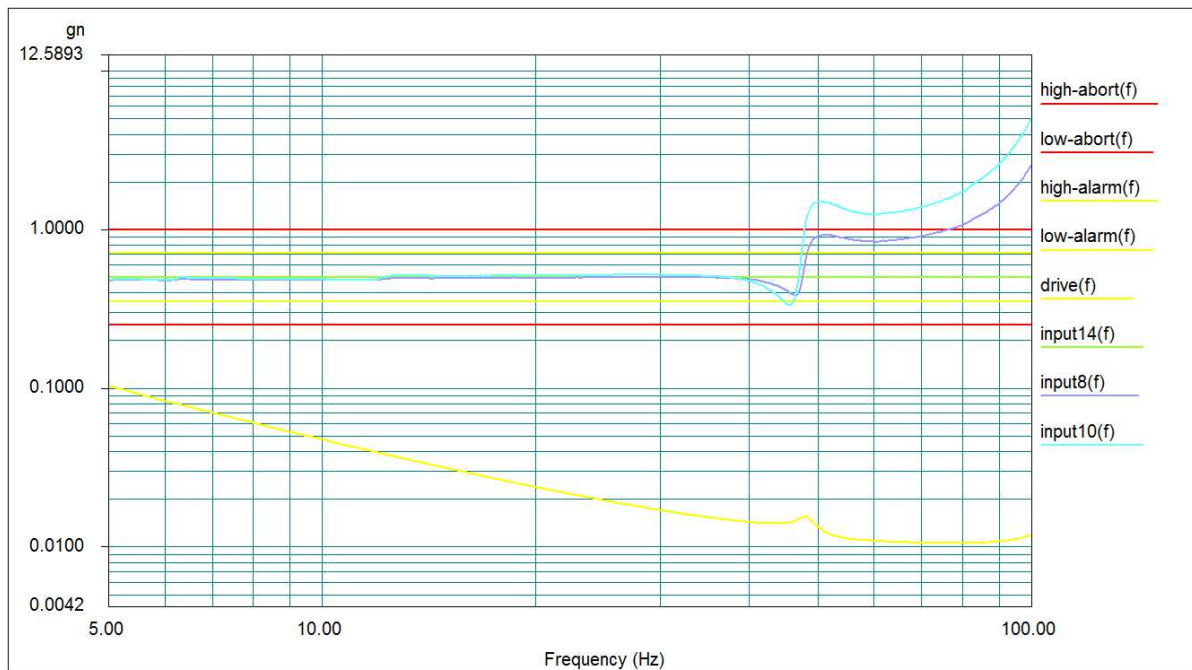


Figure 17
RSTD Search Log (Z direction)

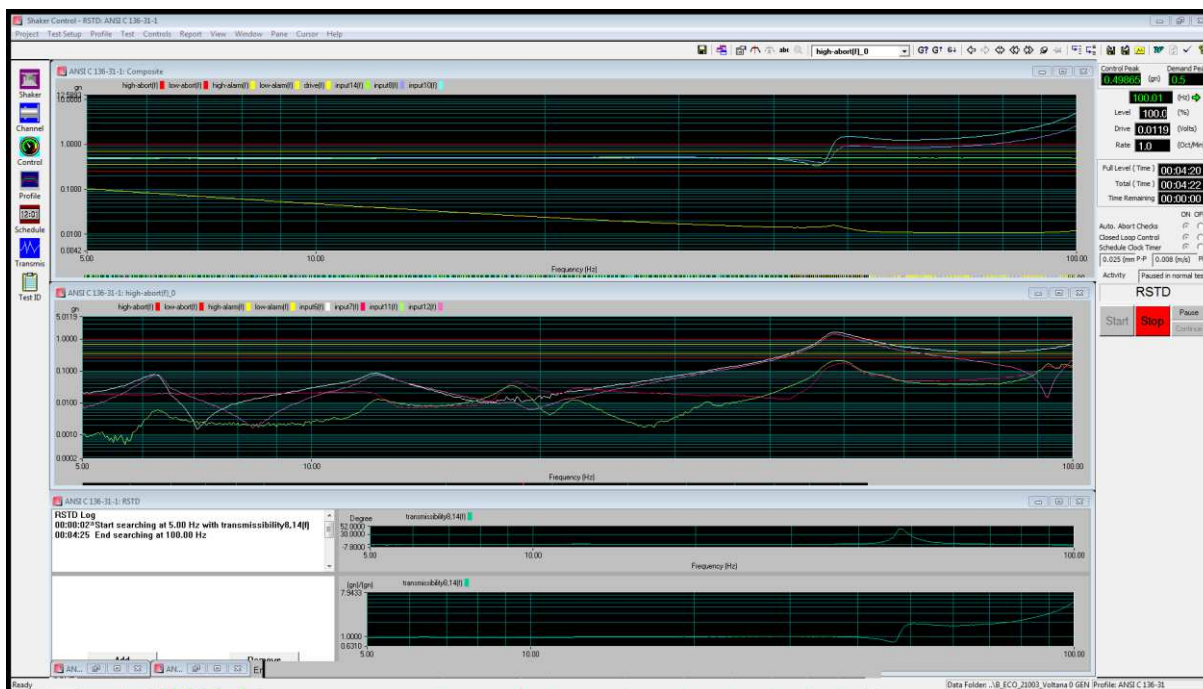


Figure 18
RSTD test control panel Z direction

Before using this document, make sure there is no newer version or it has not been revoked.



Lifetime Testing Laboratory of Technical Division of
Ecotech Nonprofit Co.
Testing laboratory accredited by NAH under No.
NAH-1-1874/2020

TEST REPORT



B_ECO_VJK_21003_Vol
tana 0 EVO
1 ANSI 2mod_en

				t),input_hist12(t),input14(t),input_hist14(t),input1(f),input1Up(f),input1Down(f),input10(f),input10Up(f),input10Down(f),input11(f),input11Up(f),input11Down(f),input12(f),input12Up(f),input12Down(f),input14(f),input14Up(f),input14Down(f),transmissibility8,14(f),coherence8,14(f),' Saved Signals
13:27:03, Jan 19, 21	100.01		User Command	Resume(Continue) the Drive output
13:27:03, Jan 19, 21	100.00		Controller	Start a new sweep/dwell entry
13:28:16, Jan 19, 21	100.00		User Command	Set Level to 101%
13:28:21, Jan 19, 21	100.00		User Command	Set Level to 104%
13:43:45, Jan 19, 21	100.00		Controller	All Panes saved to the disk.
13:43:46, Jan 19, 21	100.00		Controller	'control(f),drive(f),Hinv(f),profile(f),high-abort(f),low-abort(f),high-alarm(f),low-alarm(f),controlUp(f),controlDown(f),shaker_acc(f),shaker_vel(f),shaker_disp(f),control(t),frequency(t),input6(t),input_hist6(t),input7(t),input_hist7(t),input8(t),input_hist8(t),input6(f),input6Up(f),input6Down(f),input7(f),input7Up(f),input7Down(f),input8(f),input8Up(f),input8Down(f),input1(t),input_hist1(t),input10(t),input_hist10(t),input11(t),input_hist11(t),input12(t),input_hist12(t),input14(t),input_hist14(t),input1(f),input1Up(f),input1Down(f),input10(f),input10Up(f),input10Down(f),input11(f),input11Up(f),input11Down(f),input12(f),input12Up(f)

Before using this document, make sure there is no newer version or it has not been revoked.

				f),input12Down(f),input14(f),input14Up(f),input14Down(f),transmissibility8,14(f),coherence8,14(f),' Saved Signals
13:43:46, Jan 19, 21	0.00	0.525/ 0.525 gn	Controller	End of Test
13:43:46, Jan 19, 21	0.00			Full level elapsed 00:05:31
13:43:46, Jan 19, 21	0.00			Full level elapsed sine cycles: 108234.7

4.6. Visual examination

The customer requested an additional type of validation for the fixation. The fixing elements, e.g. Nut, washer, bolt must be marked together and must not turn relatively to each other or to a fix point outside their system. This applies to a turning torque of 80% of the original fixing torque after the test, too. If any of the mentioned system's parts turns when applying the $0.8 \times M_{\text{original}}$ torque, the fixation is considered failed.



Figure 19
Marked parts after the test

There was no noticeable turning of the parts or the whole system, therefore, the fixation passed.

5. Evaluation of results

The “Voltana EVO 1” luminaire was able to withstand the vibration test. Further evaluation shall be performed by the customer.

6. Conclusion

Control of frequencies – After sine sweep				
Performed	Yes	X	No	
Significant changes in frequency	Yes		No	X
Note	The severity of frequency changes do not imply significant structural damages			

Fixing Part Tightening Evaluation				
Performed	Yes	X	No	
Satisfied	Yes	X	No	
Note				

Modified ANSI C 136-31 Vibration test evaluation				
Performed	Yes	X	No	
Satisfied	Yes	X	No	
Note				

--- END ---

VOLTANA EVO 1

5270

Optic	5270
Protector	Integrated lenses
Source	8 Osram OSOLON SQUARE GIANT
Matrix	481232



Characteristics

416	170	104	2.8	IP 66	IK 09	I EU, II EU	0.013
Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Tightness level*	Impact resistance*	Electrical class*	CxS (m²)

* According to IEC-EN60598 and IEC-EN62262

Features

The compact, cost-effective LED solution for your urban spaces

- Cost-effective and efficient lighting solution for a fast return on investment
- Compact design
- ProFlex™ photometric engines offering high efficiency lighting, comfort and safety
- Adjustable inclination on-site
- Side-entry and post-top (with accessory) mounting
- LensoFlex@2 technology offering high performance photometry, comfort and safety

Types of application

- Square and park
- Car park
- Bike path
- Urban road

Information for 1000 lm matrix

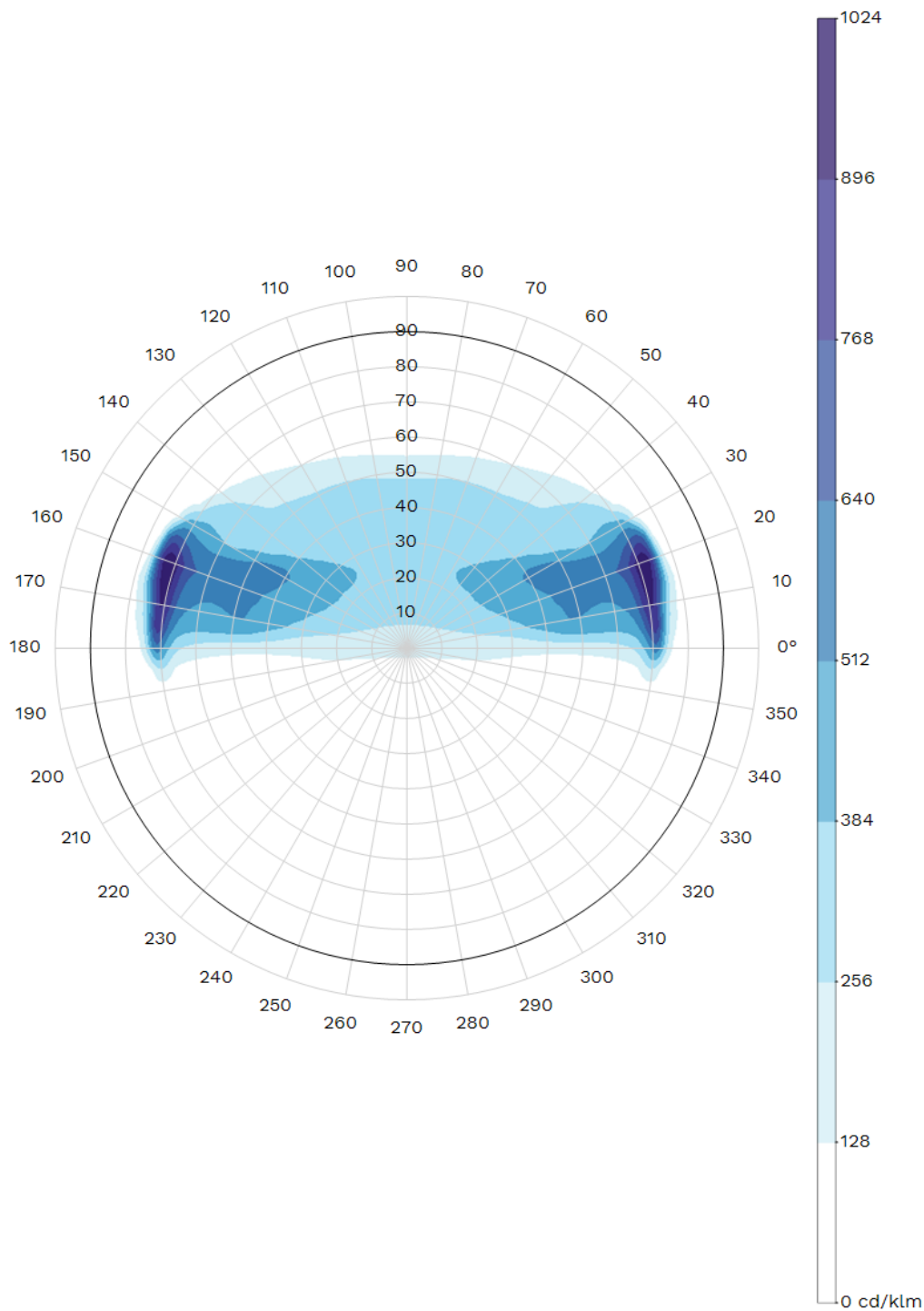
Efficacy (%)	90.7	G Class (EN 13201-2)	G3	I 70-80-90-95 (cd)	963 - 83 - X - X
DLOR (%)	90.7	G* (EN 13201 2015)	G*3	CIE flux code N 1→5 (%)	35.7 - 70.2 - 97.2 - 100.0 - 90.7
ULOR (%)	0.0	Imax (cd)	1024	Gradient 90°	24cd
ULR (%)	0.0	Aperture 0-180°	69 - 69	Gradient 270°	13cd
Incl ULR 4%	-41/34°	Aperture 90-270°	X - X		

Photometrical characteristics

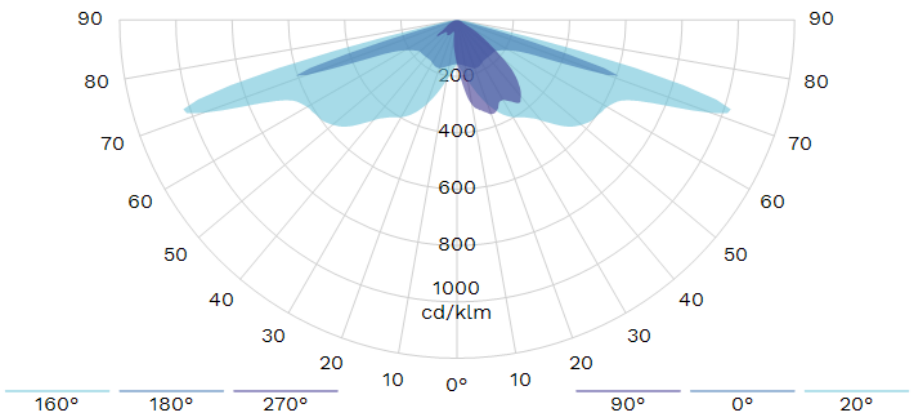
LED count	Colour code	Current (mA)	Luminaire power (W)	Source flux (lm)	Luminaire output flux (lm)	Luminaire efficacy (lm/W)	Peak (cd)	BUG Rating	Voltage (V)
			Ambient temp = 25°						
8	NW 740	200	7	930	843	120	952	B0 U0 G0	230
8	NW 740	350	10	1552	1408	141	1589	B0 U0 G0	230
8	NW 740	500	14	2128	1930	138	2178	B0 U0 G0	230
8	NW 740	700	19	2828	2565	135	2895	B1 U0 G1	230
8	NW 740	1050	29	3858	3500	121	3950	B1 U0 G1	230
8	NW 740	1250	36	4336	3934	109	4440	B1 U0 G1	230
8	NW 740	1400	40	4644	4213	105	4754	B1 U0 G1	230
8	WW 730	200	7	819	743	106	839	B0 U0 G0	230
8	WW 730	350	10	1368	1241	124	1401	B0 U0 G0	230
8	WW 730	500	14	1876	1702	122	1920	B0 U0 G0	230
8	WW 730	700	19	2492	2261	119	2552	B1 U0 G1	230
8	WW 730	1050	29	3401	3085	106	3482	B1 U0 G1	230
8	WW 730	1250	36	3822	3468	96	3913	B1 U0 G1	230
8	WW 730	1400	40	4093	3713	93	4191	B1 U0 G1	230

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

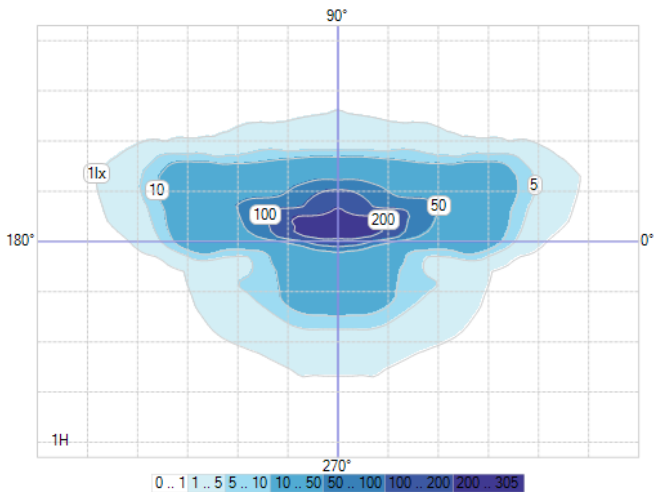
Hypergon view



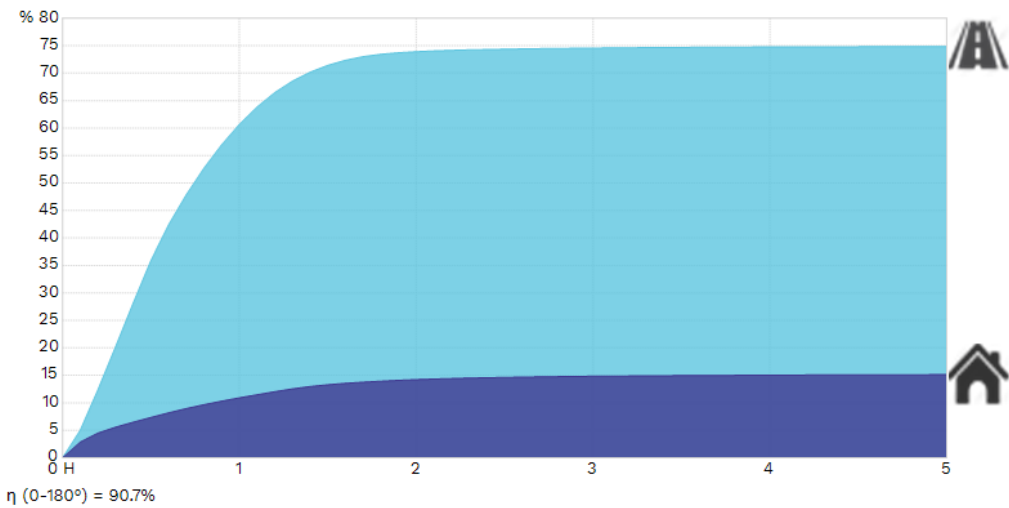
Polar/Cartesian diagram



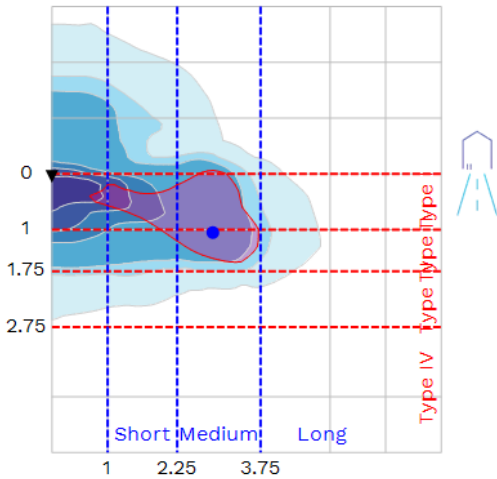
Isolux



K-Curve

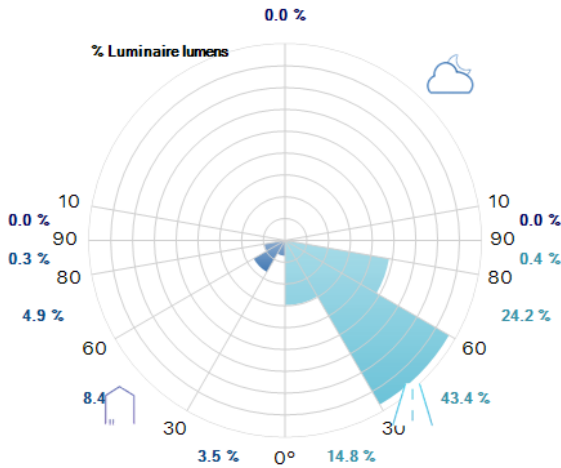


IES Roadway Classification / Nema Classification

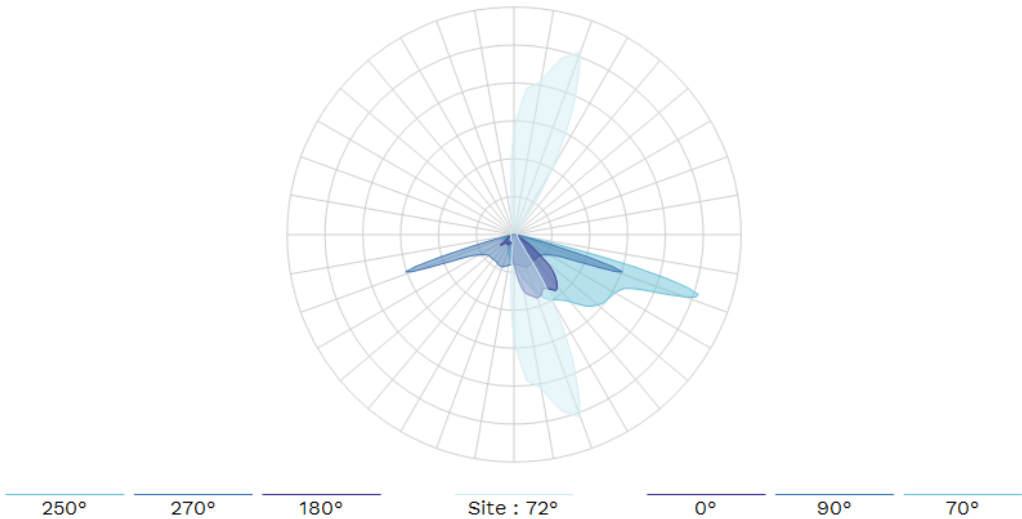


II - Medium

Luminaire classification system (LCS)



Intensity diagram in max Cone and in CPlane



Copyright © 2023 Schröder SA. All rights reserved. Specifications are of an indicative nature and subject to change without notice.

<http://www.schreder.com>

LICENCE

No. 21181/4 replaces No.21181/3

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, street, flood lighting
Trade name(s) : SCHREDER
Type(s)/model(s) : VOLTANA 0, VOLTANA 1, VOLTANA 2, VOLTANA 3,
VOLTANA 4, VOLTANA EVO 1

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

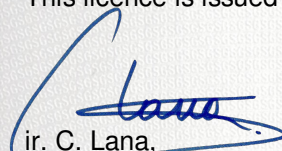
SGS CEBEC hereby declares that the above-mentioned product has been certified on the basis of:

- 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

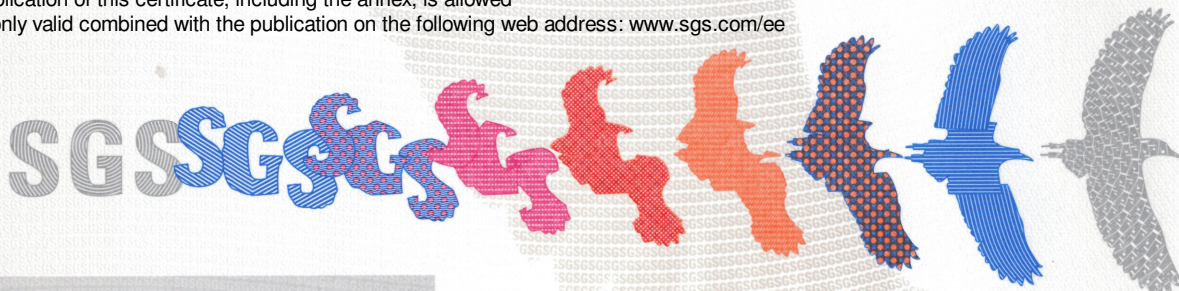
The ENEC/CEBEC certification mark may be applied to the product as specified in this licence for the duration of the ENEC/CEBEC certification agreement and under the conditions of the ENEC/CEBEC certification agreement.

This licence is issued on : 31/03/2023


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



SGS Belgium NV-Division SGS CEBEC
Business Riverside Park
Bld Internationalelaan 55 Build. K
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. 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, street, flood lighting
Trade name(s)	:	SCHREDER
Type(s)/Model(s)	:	VOLTANA 0, VOLTANA 1, VOLTANA 2, VOLTANA 3, VOLTANA 4, VOLTANA EVO 1
description	:	Street lighting
rated voltage (Un)	:	200-240 V
rated frequency	:	50-60 Hz
rated secondary current (In SEC)	:	max. 1400 mA (LED)
class	:	class I
degree of protection	:	IP66
lamp(s)	:	LED (3535 G4L, XP-G3, LH351C, OSOLON)

Additional information

Voltana 0 :
6 Leds :
ta 55°C with Control gear Meanwell model PLD-40W
ta 50°C with Control gear Signify model LP/FP 22W C123

8 Leds:
ta 45°C with Control gear Meanwell model PLD-40W

VOLTANA EVO 1 = VOLTANA GEN 2

Product data - type VOLTANA 1

design	:	8 Leds
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 41 W
rated current (In)	:	max. 1400 mA
resistance to impact (IK)	:	IK08

Product data - type VOLTANA 2

design	:	16 Leds
rated ambient temperature (ta)	:	max. 45°C
rated power	:	max. 58 W
rated current (In)	:	max. 1050 mA
resistance to impact (IK)	:	IK08

Product data - type VOLTANA 3

design	:	24 Leds
rated ambient temperature (ta)	:	max 50°C
rated power	:	max. 80 W
rated current (In)	:	max. 1000 mA
resistance to impact (IK)	:	IK08

Product data - type VOLTANA 4

design	:	32 Leds
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 105 W
rated current (In)	:	max. 1000 mA
resistance to impact (IK)	:	IK08

Product data - type VOLTANA 0

design	:	6, 8 Leds
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 39 W
rated current (In)	:	max. 1400 mA
resistance to impact (IK)	:	IK09 (PC), IK10 (Glass)

Product data - type VOLTANA EVO 1

design	:	6, 8, 16 Leds
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 62 W
rated current (In)	:	max. 1400 mA
resistance to impact (IK)	:	IK10 (8-16 Leds), IK09 (6 Leds)

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 618719/32.

Remarks

This certificate is based on test report No. P1540-44-If.

Conclusion

The examination proved that all certification requirements were met.

Reviewed by, project leader : Christian Maes - 31/03/2023

Certification Manager :



2023-03-31

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
2795-491 CARNAXIDE, OEIRAS
Portugal

Schröder Hungary Plc.
Tópart 2
2084 PILISSZENTIVAN
Hungary

VOLTANA EVO



Soluția LED compactă și rentabilă pentru spațiile dumneavoastră urbane

Creați un sistem de iluminat care se integrează eficient în peisajele urbane și reduce consumul de energie electrică fără a compromite nivelul de iluminare cu ajutorul VOLTANA EVO. Această nouă generație a binecunoscutei game VOLTANA este soluția compactă de ultimă generație care oferă fluxul luminos potrivit pentru spațiile dumneavoastră urbane, reducând în același timp în mod considerabil costurile de energie electrică pentru cel mai rapid randament al investiției.

VOLTANA EVO este o soluție de iluminat cu greutate redusă, proiectată pentru montaj lateral. Opțional, este disponibilă o clemă de fixare universală pentru montajul în vârf de stâlp, cât și pentru montajul lateral, ceea ce permite instalarea ușoară a VOLTANA EVO pe toate tipurile de stâlpi.

Acesta poate fi reglat la fața locului datorită unui sistem de înclinare în trepte care permite optimizarea fotometriei. Grație designului său compact și a tehnologiei de iluminat, aparatul de iluminat VOLTANA EVO este o soluție cu LED-uri durabilă și rentabilă, care garantează satisfacerea cerințelor de bază ale iluminatului urban, generează economii de energie și reduce amprenta ecologică.



CĂI DE
CIRCULAȚIE
URBANĂ ȘI
STRĂZI



PIEȚE ȘI ZONE
PIETONALE



CĂI DE
CIRCULAȚIE ȘI
AUTOSTRĂZI

IP 66

IK 10



Descriere

Aparatul de iluminat VOLTANA EVO este compus dintr-un corp din aluminiu turnat sub presiune și o piesă de fixare din oțel rezistent la coroziune.

VOLTANA EVO este echipat cu module fotometrice ProFlex™, care oferă performanțe fotometrice optimizate cu un cost total minim. Difuzorul din policarbonat asigură o rezistență ridicată la impact pentru a furniza o soluție eficientă și fiabilă.

Acest aparat de iluminat poate fi montat lateral cu ajutorul unei cleme de fixare universală pentru ștuț cu diametrul de Ø42-60 mm. Datorită unui sistem de înclinare încorporat, unghiul poate fi reglat la fața locului. Opțional, este disponibilă o piesă de fixare pentru ștuț de la Ø42 la Ø76 mm, atât pentru montajul în vârf de stâlp post-top, cât și pentru montajul lateral.



VOLTANA EVO este conceput pentru instalare ușoară și mentenanță la fața locului.



Reglare precisă la fața locului. Unghiul de înclinare poate fi setat de la -15° la +5° pentru montaj lateral și de la -10° la +10° cu ajutorul piesei de fixare pentru montaj în vârf de stâlp.

TIPURI DE APLICAȚII

- CĂI DE CIRCULAȚIE URBANĂ ȘI STRĂZI
- PIEȚE ȘI ZONE PIETONALE
- CĂI DE CIRCULAȚIE ȘI AUTOSTRĂZI

AVANTAJE CHEIE

- Soluție de iluminat rentabilă și eficientă, pentru o recuperare rapidă a investiției
- Design compact
- Module fotometrice ProFlex™ care oferă iluminat de înaltă eficiență, confort și siguranță
- Ajustarea precisă a unghiului de înclinație, la locul instalării
- Montaj lateral și în vârf de stâlp (cu accesoriu)



VOLTANA EVO este un aparat de iluminat cu greutate redusă care oferă o soluție de iluminat rentabilă și durabilă.



Difuzorul din policarbonat ProFlex™ asigură o rezistență ridicată la impact.



ProFlex™

Sistemul de distribuție luminoasă ProFlex integrează lentilele într-un difuzor de polycarbonat. Această integrare crește fluxul luminos emis de aparatul de iluminat și reduce reflexiile în unitatea optică. Polycarbonatul utilizat pentru ProFlex oferă următoarele caracteristici esențiale, claritate optică ridicată pentru transmiterea luminii, rezistență la impact ridicată, mai bună decât în cazul sticlei și o durată de viață mai mare cu tratamentul de stabilizare la UV. Conceptul Proflex permite un design compact cu un compartiment optic mai subțire. Permite distribuții luminoase largi astfel încât distanța dintre stâlpi poate fi crescută.

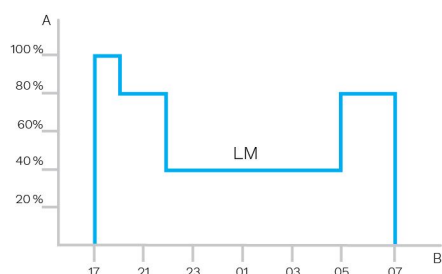




Profil personalizat de reducere a fluxului luminos

Driverule 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

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
Driver inclus	Da
Marca CE	Da
Certificat ENEC	Da
Certificat ENEC+	Da
Standard de testare	LM 80 (toate măsurătorile în laborator acreditat ISO17025)

CARCASĂ AND FINISAJ	
Carcasă	Aluminiu
Distribuție luminoasă	Polycarbonat
Difuzor	Polycarbonat cu lentile integrate
Carcasă finisaj	Vopsire în câmp electrostatic
Culoare	RAL 7035 gri deschis
Nivel de etanșeitate	IP 66
Rezistență la impact	IK 10
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 / -22 ° F până la 131 °F

· 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
Protocol de control	1-10V, DALI
Opțiuni de control	Profil personalizat de reducere a fluxului luminos

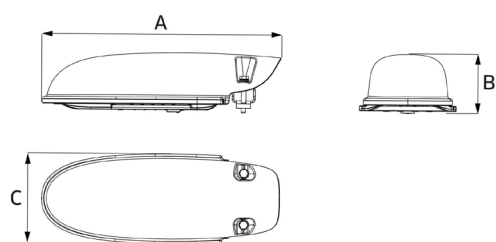
INFORMAȚII FOTOMETRICE	
Temperatura de culoare LED	
Indicele de redare a culorilor (CRI)	

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

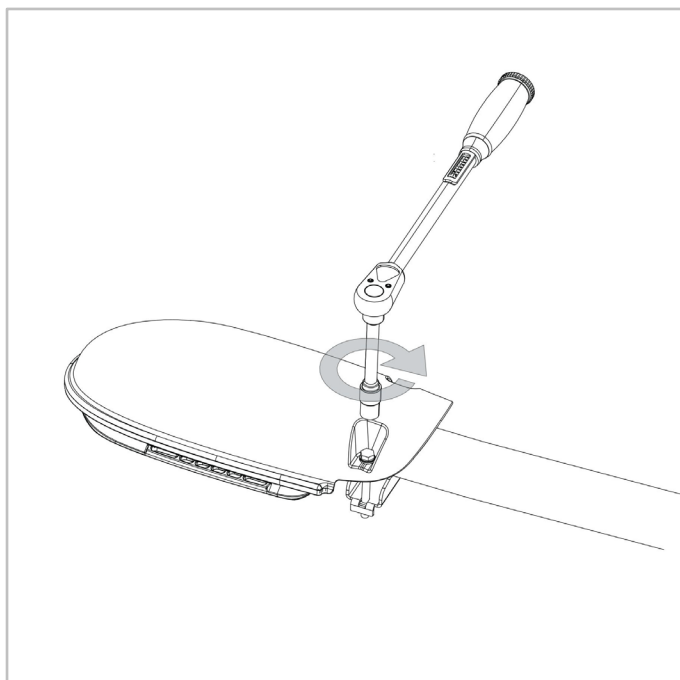
DIMENSIUNI ȘI MONTAJ

AxBxC (mm inch)	416x104x170 16.4x4.1x6.7
Greutate (kg lbs)	2.8 6.2
Rezistență aerodinamică (CxS)	0.01
Posibilități de montaj	Montaj lateral - Ø42mm Montaj lateral - Ø60mm Montaj lateral prin alunecare - Ø76mm

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



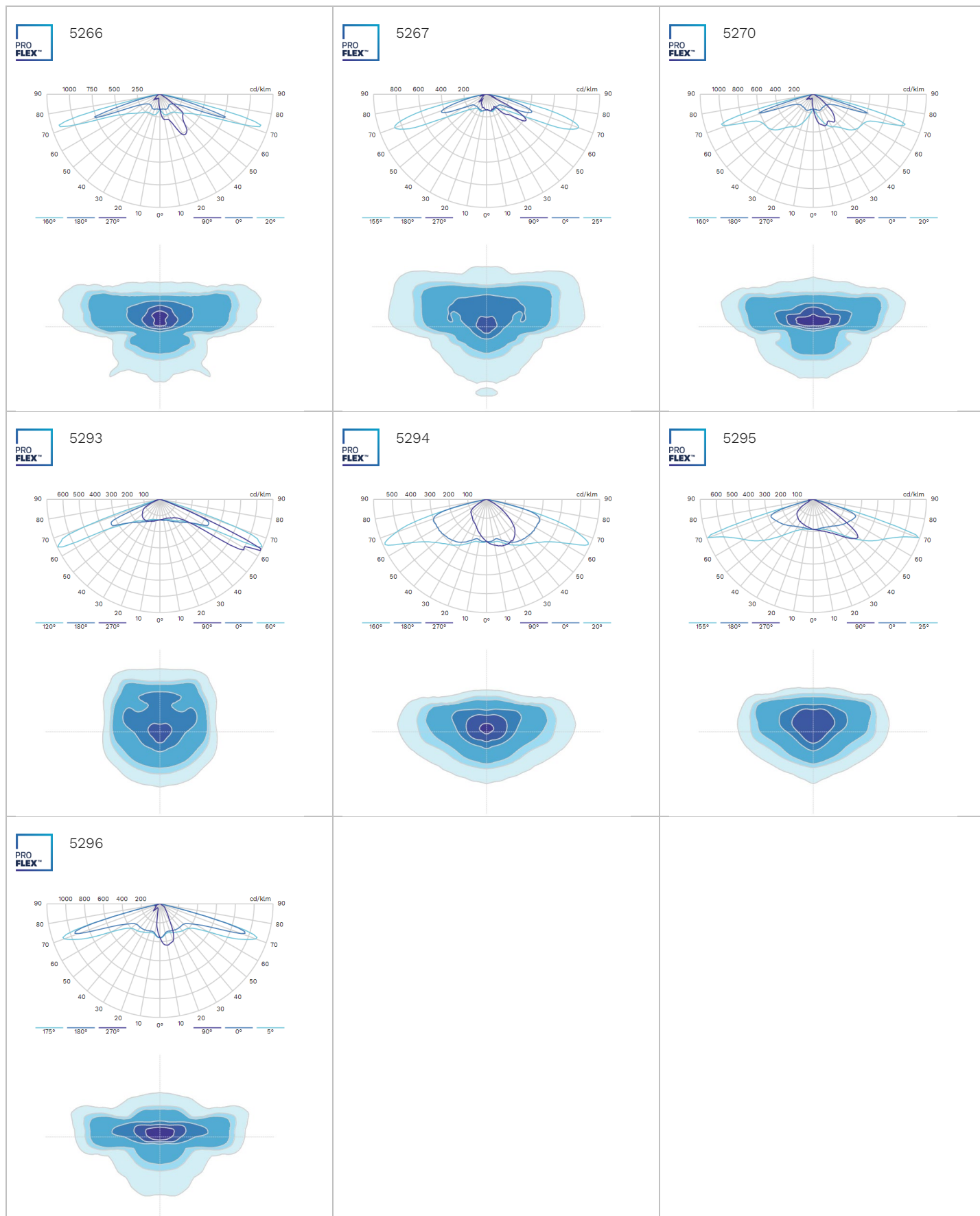
VOLTANA EVO | Montaj lateral (standard) și
în vârf de stâlp (cu piesă de fixare) - 2
șuruburi M8





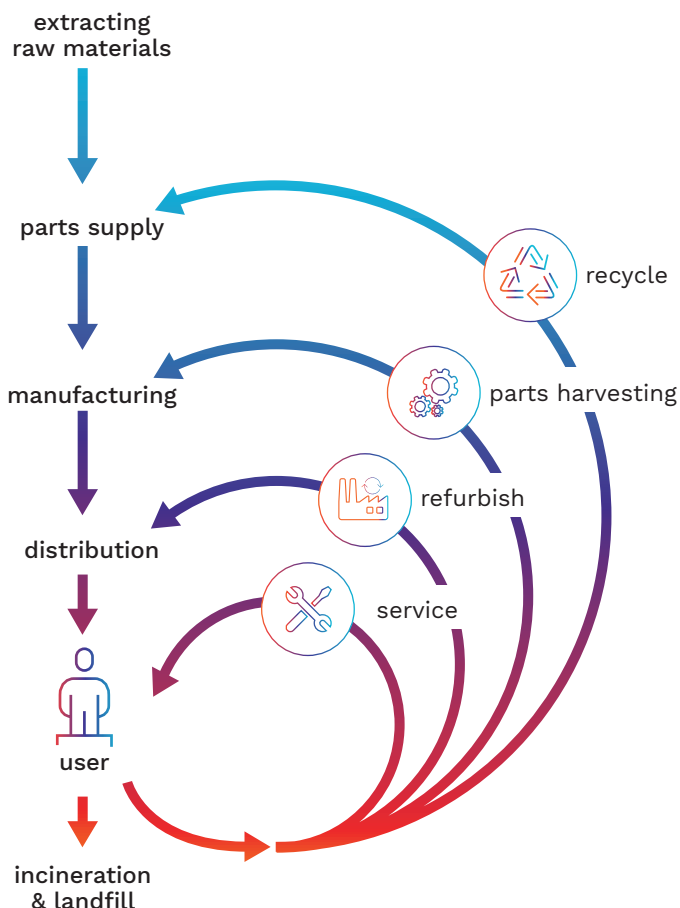
			Flux luminos al aparatului de iluminat (lm) Alb cald 730		Flux luminos al aparatului de iluminat (lm) Alb neutru 740		Putere electrică (W) *	Eficacitate aparat de iluminat (lm/W)	
Aparat de iluminat	Număr de LED-uri	Curent (mA)	Min	Max	Min	Max		Până la	Distribuții luminoase
VOLTANA EVO 1	8	200	700	700	800	800	6	133	
	8	350	1200	1200	1300	1400	9.7	144	
	8	500	1600	1700	1800	1900	13.1	145	
	8	700	2200	2300	2500	2600	18.4	141	
	8	1050	3000	3100	3400	3500	28.4	123	
	8	1250	3300	3500	3800	4000	36.1	111	
	8	1400	3600	3700	4100	4300	39.5	109	
	16	200	1400	1500	1600	1700	10.8	157	
	16	350	2400	2500	2700	2800	18	156	
	16	500	3300	3400	3700	3900	25.5	153	
	16	700	4400	4600	5000	5200	38.1	136	
	16	1050	6000	6300	6800	7100	56	127	
	16	1200	6600	6900	7500	7800	62	126	

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





PASSPORT



VOLTANA EVO 1

Circularity focuses on reducing the environmental burden by valorising the flow of all materials.

It is mainly defined in opposition to the traditional linear economy: take, make and dispose. In a circular economy, products are part of a value network where they will be used for as long as possible.

Then, depending on their characteristics, they can be reused, refurbished, upgraded or recycled.

Schröder takes circular economy into account, right from the offset. Before we start to design our products, we incorporate it into their DNA.

After a careful analysis of the potential circularity of our luminaires, we decided to introduce a “circular lighting” product label. This label acts as a circular indicator for our customers.

It clearly designates products that are optimised for circular economy through 12 objective criteria.

Circular highlights:



- All product information is available on a smart label to facilitate maintenance



- Less than 7 steps to completely disassemble the luminaire



- Materials with a high rate of recyclability

LONG-LASTING, LONG USE		POINTS	0	5	10	TOTAL
PERFORMANCE 		Luminary efficacy ⁽¹⁾	F/P < 110 lm/w	110 lm/w =< F/P < 140 lm/w	140 lm/w =< F/P	10
		Rated life of the LEDs	x < L90/100.000	L90/100.000 =< x < L95/100.000	L95/100.000 =< x	10
		Mechanical ⁽²⁾	Level 1	Level 2	Level 3	10
		Energy control	No control solution	Dimmable	Dynamic	5
		Smart ready ⁽³⁾	Not available	Proprietary smart solution ready	Open smart solution ready	0
MAINTENANCE 	PARTS WITHDRAWAL ⁽⁴⁾	Opening	Specific tools/ Impossible	Basic tools	Tool free	5
		Optical unit	Specific tools/ Impossible	Basic tools	Tool free	
		Gear plate (driver, SPD, smart, ...)	Specific tools/ Impossible	Basic tools	Tool free	
	INFO AVAILABILITY	Product sheet	In the box	On the website	On Smart Label	10
		Installation sheet	In the box	On the website	On Smart Label	
		Asset data sheet	In the box	On the website	On Smart Label	
REFURBISH 	SPARE PARTS	Availability ⁽⁵⁾	Product warranty	Announced end of life	10 years after the announced end of life	5
	UPGRADE	Mechanical fixation method	Directly to the mold (only one mechanical fixation method allowed)	Use of a gear plate for some functional parts (allow different fixation method)	Use of a module for all the functional parts (allow different fixation method)	5
NONDESTRUCTIVE DISASSEMBLY 		Dissassembly depth ⁽⁶⁾	> 9	9 ≤ x < 7	≤ 7	10
END OF LIFE						
RECYCLE 		Material separability	Not separable	/	All materials	10
		Material compatibility with recycling ⁽⁷⁾	No	/	Yes	10
						90

Remarks:

- (1) The luminaire's efficacy is the ratio between the output flux (F) and the consumed power (P). This measurement is carried out at 500mA with the maximum number of LEDs. When this configuration is not available, the variant with the maximum number of LEDs and highest current will be measured.
- (2) The mechanical criteria takes into account the IP and IK level of the luminaire. Our criteria is as follows:

LEVEL 1	LEVEL 2	LEVEL 3
Any luminaire with an IP level equal or below IP 54	Any luminaire with an IK level equal or below IK 07. Or any luminaire with an IP level between IP 54 and IP 66	Any luminaire with an IP level equal or over IP 66 and an IK level equal or above IK 08

- (3) A luminaire is considered smart ready if it can integrate an IoT solution. An open smart solution is a Nema or Zagha-D4I socket.
- (4) This factor ensures that it is feasible and practical for a professional to access components after the luminaire has been put into service.
- (5) The replacement parts should be the same as the originals, but if this is not possible, equivalent spare parts that perform the same function to the same or higher performance level may be used.
- (6) The disassembly depth is the minimum number of steps required to remove a component from a product.
- (7) The criteria focuses on the luminaire's main parts (body and reflector) with materials recognised by Schröder Group staff and R-Tech.



The product obtained a score between 0 and 30

It was designed to be cost-efficient



The product obtained a score between 30 and 60

It was built to last but not with circular economy requirements



The product obtained a score between 60 and 90

It was developed to meet most of circular economy requirements



The product obtained a score between 90 and 120

It was developed to fully meet circular economy requirements