

RTECH-PHOTOMETRY LABORATORY


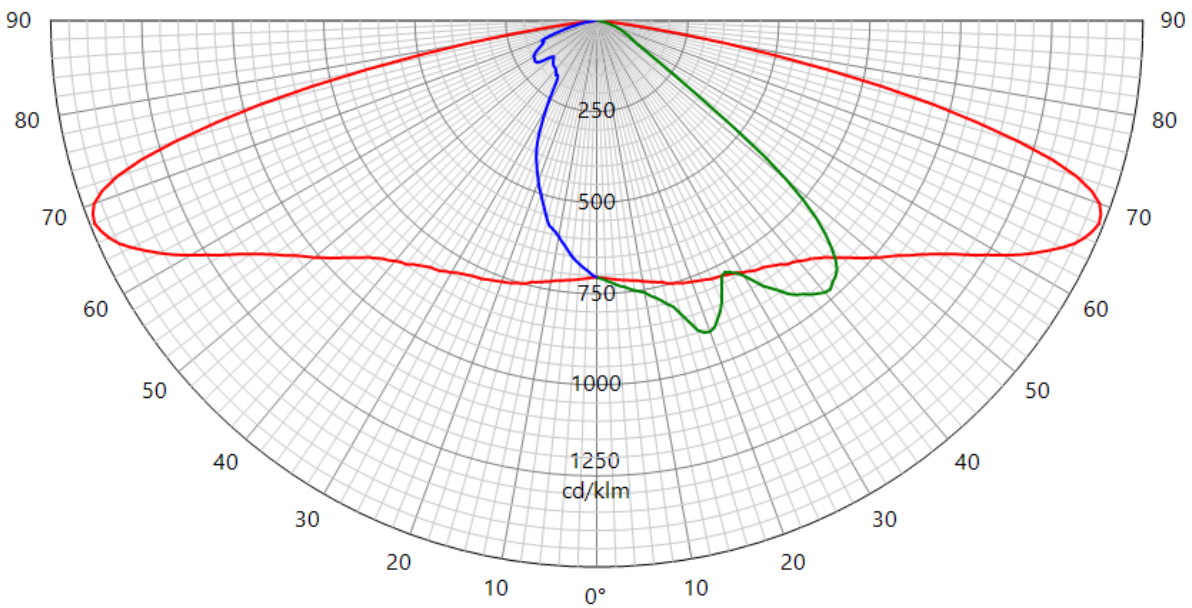
Testreport : Measurement of luminous intensity distribution related to the standard
NBN-EN 13032-1; NBN-EN 13032-4; CIE 121-1996; CIE S 025/E; IES LM-79-08 and procedures PT-P-01
and PT-P-02
rue de Mons, 3 B-4000 LIEGE - Tel : 04/224.71.40 - Fax : 04/224.25.90
Measurement for Schröder group.

LED

Origin TUNGSRAM-Schröder Zrt. Hungary	Production TUNGSRAM-Schröder Zrt. Hungary	Luminaire VOLTANA 2	Inclination 0°	Request # FD39014
Type LED	BIN 40-70M-4-TB-RB	Source Trademark Samsung	Reference LH351C	# LEDs 16
Master -	Reflector Schröder Led assembly Road lighting Assembled 0.0°			Reflector 5248
Protector Refractor Lens				
Protector Glass Extra Clear Flat Smooth				
Lens Gaggione 5248 PMMA				
Laboratory observation VOLTANA 2 with 16 SAMSUNG LH351C Used flux for efficiency matrix calculation = 3074 lm - CCT = 3863 K - CRI = 72,23 (see sphere test report 2019/64 on appendix).				
Purpose DOC	Sample date 08-01-2019		Sample # 39R006	
Observation DOC VOLTANA 2 with lenses 5248 Flux coefficient multiplicator (only for efficiency matrix): From 350 to 500 mA : 1,380 From 350 to 700 mA : 1,840 From 350 to 1000 mA : 2,453 Fixture powered with driver Osram OT40/120-277/1A0 4DIM LT2E for matrix @350/500/700mA Fixture powered with driver Philips Xitanium LP 75W 0,3 - 1,0A SNLDAE 230V C133 sXt for matrix @1000mA				
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.				

Asked by RCA	Measured by BMA	Approved by RLABO	Appendix 1	  226-TEST NBN EN ISO/IEC 17025 : 2005	42481
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LUMINOUS INTENSITY DIAGRAM

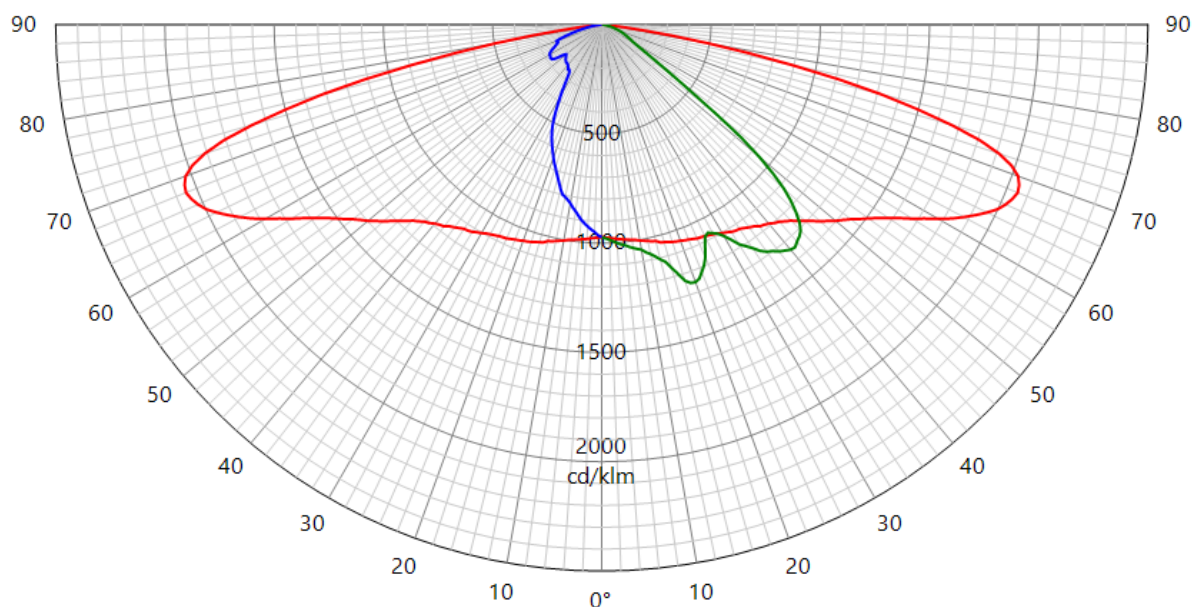
Origin TUNGSRAM-Schröder Zrt. Hungary		Production TUNGSRAM-Schröder Zrt. Hungary		Luminaire VOLTANA 2		Inclination 0°	Request # FD39014
Source	Type LED	BIN 40-70M-4-TB-RB	Trademark Samsung	Reference LH351C	# LEDs 16	Reflector 5248	
Reflector	Schröder Led assembly Road lighting Assembled 0.0°					No	5248
Matrices	424811 Φ 0-90° = 2512lm - 90-180° = 0lm					Absolute measurement	
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5248 PMMA						
Observation	<p>Matrix in total flux @350 mA</p> <p>Light losses due to thermal stabilization: 1 %</p> <p>Electrical measurement on LED (#1) : Voltage = 44.68 V Current = 0.350 A Power = 15.61 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.091 A Power = 18.91 W PF = 0.902</p> <p>Total luminaire power = 18.91 W : Lm/Watt = 132.86 lm/W</p> <p>Driver #1 : See observations for driver details - PCB 00-71-627 A</p>						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
15 - 165	1488	68	S	705	25.4°	31-01-2019	
90	978	41	D				
270	705	0	G				
							
							42481

LUMINOUS INTENSITY DIAGRAM


Origin TUNGSRAM-Schröder Zrt. Hungary		Production TUNGSRAM-Schröder Zrt. Hungary		Luminaire VOLTANA 2		Inclination 0°	Request # FD39014
Source	Type LED	BIN 40-70M-4-TB-RB	Trademark Samsung	Reference LH351C	# LEDs 16	Reflector 5248	
Reflector	Schröder Led assembly Road lighting Assembled 0.0°					No	5248
Matrices	424812 η 0-90° = 81.7% - 90-180° = 0.0%					Relative measurement	
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5248 PMMA						
Observation	<p>Matrix in efficiency @350 mA</p> <p>Light losses due to thermal stabilization: 1 %</p> <p>Electrical measurement on LED (#1) : Voltage = 44.68 V Current = 0.350 A Power = 15.61 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.091 A Power = 18.91 W PF = 0.902</p> <p>Total luminaire power = 18.91 W</p> <p>Driver #1 : See observations for driver details - PCB 00-71-627 A</p>						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
15 - 165	484	68	S	229	25.4°	31-01-2019	
90	318	41	D				
270	229	0	G				
							42481

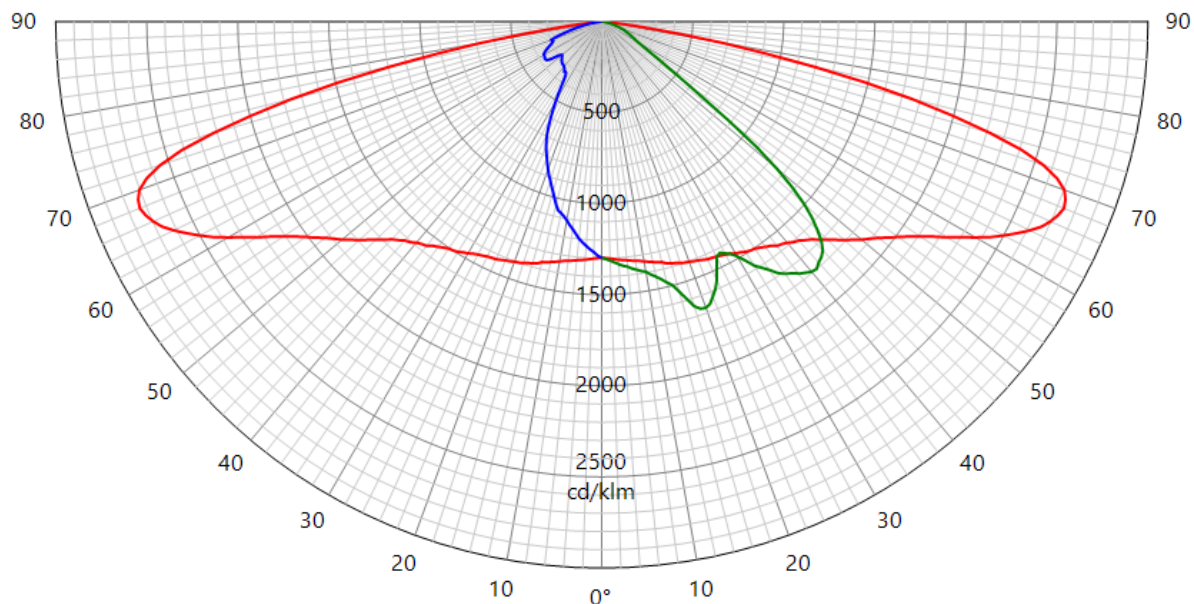
LUMINOUS INTENSITY DIAGRAM

Origin TUNGSRAM-Schröder Zrt. Hungary		Production TUNGSRAM-Schröder Zrt. Hungary		Luminaire VOLTANA 2		Inclination 0°	Request # FD39014
Source	Type LED	BIN 40-70M-4-TB-RB	Trademark Samsung	Reference LH351C	# LEDs 16	Reflector 5248	
Reflector	Schröder Led assembly Road lighting Assembled 0.0°					No	5248
Matrices	424813 Φ 0-90° = 3467lm - 90-180° = 0lm						Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5248 PMMA						
Observation	<p>Matrix in total flux @500 mA</p> <p>Light losses due to thermal stabilization: 1,5 %</p> <p>Electrical measurement on LED (#1) : Voltage = 45.54 V Current = 0.500 A Power = 22.74 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.120 A Power = 26.40 W PF = 0.954</p> <p>Total luminaire power = 26.40 W : Lm/Watt = 131.33 lm/W</p> <p>Driver #1 : See observations for driver details - PCB 00-71-627 A</p>						
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	
15 - 165	2053	68	S				
90	1349	41	D	973	25.4°	31-01-2019	
270	973	0	G				


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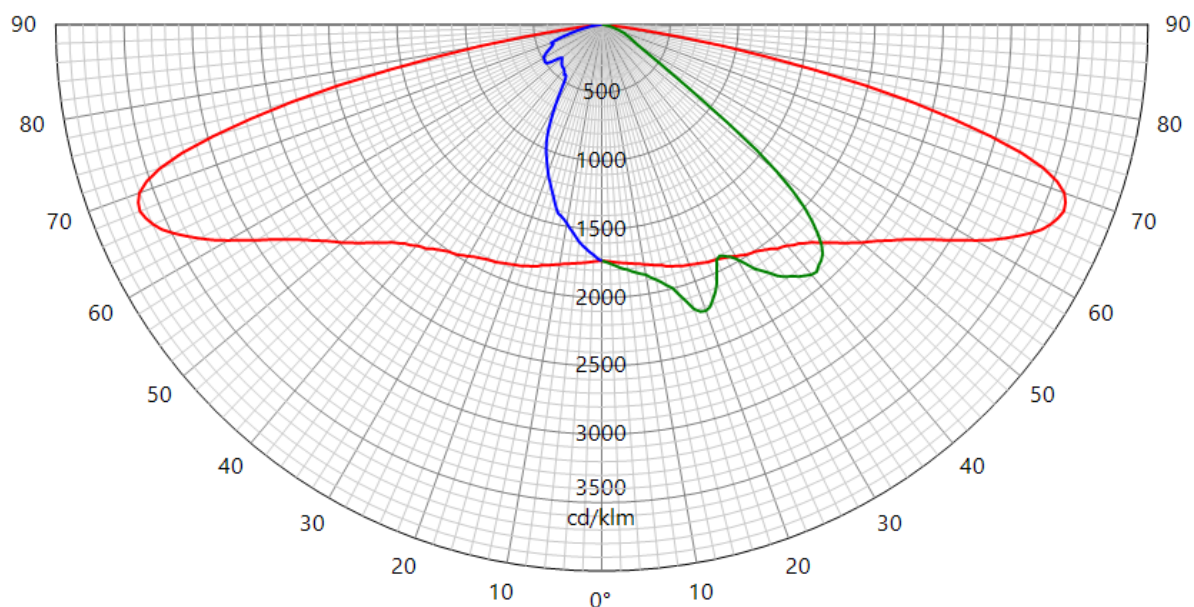
LUMINOUS INTENSITY DIAGRAM

Origin TUNGSRAM-Schröder Zrt. Hungary		Production TUNGSRAM-Schröder Zrt. Hungary		Luminaire VOLTANA 2		Inclination 0°		Request # FD39014		
Source	Type LED	BIN 40-70M-4-TB-RB		Trademark Samsung		Reference LH351C		# LEDs 16	Reflector 5248	
Reflector	Schreder Led assembly Road lighting Assembled 0.0°								No	5248
Matrices	424814	Φ 0-90° = 4623lm - 90-180° = 0lm							Absolute measurement	
Protector Refractor Lens		Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5248 PMMA								
Observation		Matrix in total flux @700 mA								
		Light losses due to thermal stabilization: 2,6 %								
		Electrical measurement on LED (#1) : Voltage = 46.53 V Current = 0.700 A Power = 32.52 W Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.165 A Power = 36.87 W PF = 0.973 Total luminaire power = 36.87 W : Lm/Watt = 125.38 lm/W								
		Driver #1 : See observations for driver details - PCB 00-71-627 A								
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°		Measurement date			
15 - 165	2737	68	S							
90	1799	41	D							
270	1297	0	G							

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LUMINOUS INTENSITY DIAGRAM

Origin TUNGSRAM-Schröder Zrt. Hungary		Production TUNGSRAM-Schröder Zrt. Hungary		Luminaire VOLTANA 2		Inclination 0°		Request # FD39014		
Source	Type LED	BIN 40-70M-4-TB-RB		Trademark Samsung		Reference LH351C		# LEDs 16	Reflector 5248	
Reflector	Schreder Led assembly Road lighting Assembled 0.0°								No	5248
Matrices	424815	Φ 0-90° = 6163lm - 90-180° = 0lm							Absolute measurement	
Protector Refractor Lens		Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5248 PMMA								
Observation		Matrix in total flux @1000 mA								
		Light losses due to thermal stabilization: 3,6 %								
		Electrical measurement on LED (#1): Voltage = 47.84 V Current = 1.000 A Power = 47.84 W Electrical measurement on driver (#1): Voltage = 230.00 V Current = 0.236 A Power = 53.37 W PF = 0.982 Total luminaire power = 53.37 W : Lm/Watt = 115.47 lm/W								
		Driver #1 : See observations for driver details - PCB 00-71-627 A								
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°		Measurement date			
15 - 165	3649	68	S							
90	2398	41	D							
270	1729	0	G							

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CONFORMITY STATEMENT

Measurement fulfil Standards:

NBN-EN 13032-1
NBN-EN 13032-4
NBN-EN 17025:2005
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: +/- 0.25%
Voltage: +/- 0.15%
Current: +/- 0.15%
Electrical AC
Power: +/- 0.15%
Voltage: +/- 0.3%
Current: +/- 0.3%
Temperature: +/- 0.65%

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

lm/Watt: +/-3.5%

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)