RTECH-PHOTOMETRY LABORATORY

Testreport : Measurement of luminous intensity distribution related to the standard
NBN-EN 13032-1; CIE 121-1996; 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 Schréder group.

LED

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source

Type	BIN	Trademark	Reference	# LEDs	Reflector
LED	Unknown	LG Innotek	3535 G4L	16	5162

Master Reflector

Gaggione Led assembly Road lighting Assembled 0.0° No 5162

Protector Refractor Lens

Protector Glass Extra Clear Flat Smooth
Lens Gaggione 5162 MS1002

Laboratory observation

VOLTANA 2 with 16 LG 3535 G4-L
Used flux for efficiency matrix calculation = 2825 lm - CCT = 4057 K - CRI = 72.89 (see sphere test report 2016/374 on appendix).

Purpose	Sample date	Sample #
DOC	13/06/2014	34R142

Observation

DOC VOLTANA 2 with lenses 5162 MS1002

Flux coefficient multiplicator (only for efficiency matrix):
From 350 to 500 mA : 1,386
From 350 to 700 mA : 1,869
From 350 to 1000 mA : 2,535
From 350 to 1200mA : 2,944
From 350 to 1400mA : 3.322

Fixture powered @350/500/700mA with 1 driver LG INNOTEK LLP 40W PISE A040D (dali)
Fixture powered @1000mA with 1 driver LG INNOTEK LLP 55W 1A PISE A055A
Fixture powered @1200/1400mA with DC powersupply Delta Electronica

Asked by	Measured by	Approved by	Appendix		
LME	FCE	LME	1	226-TEST NBN EN ISO/IEC 17025 : 2005	38909

LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 G4L	16	5162

Reflector	Gaggione Led assembly Road lighting Assembled 0.0°	No	5162
Matrices	**389091** Φ 0-90° = 2334lm - 90-180° = 0lm		Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5162 MS1002		

Observation

Matrix in total flux @350 mA

Light losses due to thermal stabilisation : 0.6 %

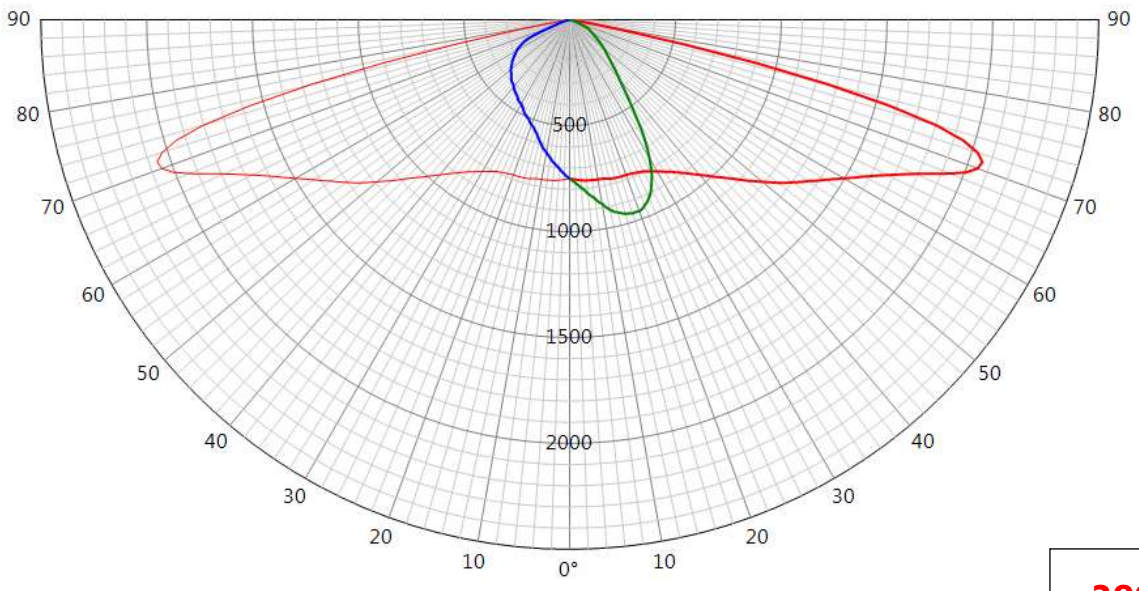
Electrical measurement on LED (#1) : Voltage = 44.35 V Current = 0.350 A Power = 15.58 W

Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.097 A Power = 19.60 W PF = 0.872

Total luminaire power = 19.60 W : Lm/Watt = 119.09 lm/W

Driver #1 : See observations for driver details -

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	2063	71	S	750	25.0°	15/07/2016
90	962	20	D			
270	750	0	G			



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LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 G4L	16	5162

Reflector	Gaggione Led assembly Road lighting Assembled 0.0°	No	5162
Matrices	**389092** η 0-90° = 82.5% - 90-180° = 0.0%		Relative measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5162 MS1002		

Observation

Matrix in efficiency @350 mA

Light losses due to thermal stabilisation : 0.6 %

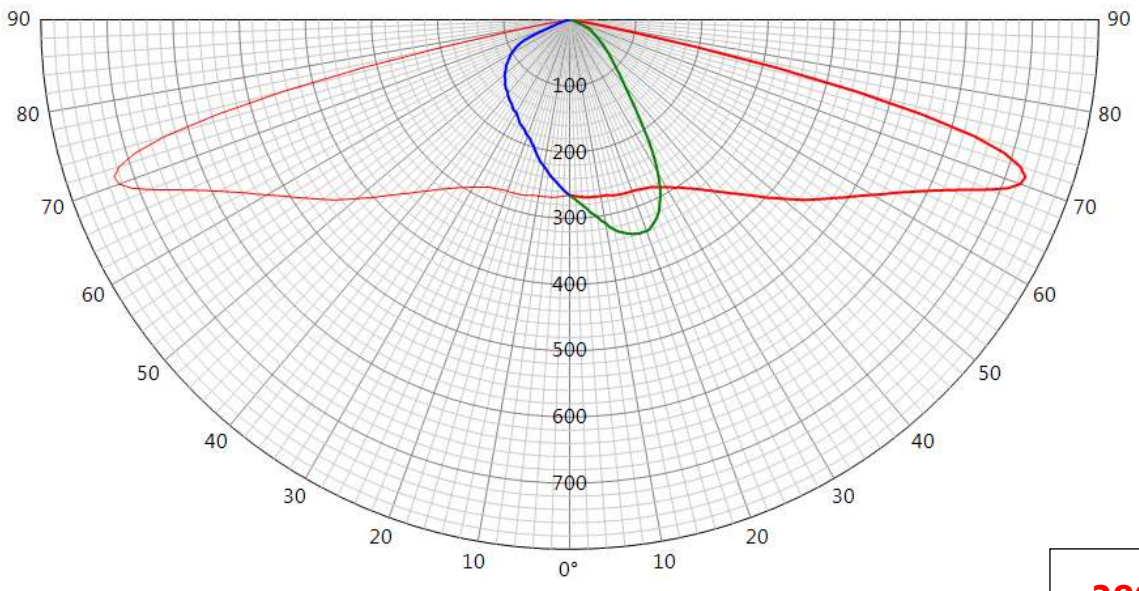
Electrical measurement on LED (#1) : Voltage = 44.35 V Current = 0.350 A Power = 15.58 W

Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.097 A Power = 19.60 W PF = 0.872

Total luminaire power = 19.60 W

Driver #1 : See observations for driver details -

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	729	71	S	265	25.0°	15/07/2016
90	340	20	D			
270	265	0	G			



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LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 G4L	16	5162

Reflector	Gaggione Led assembly Road lighting Assembled 0.0°	No 5162
Matrices	**389093** Φ 0-90° = 3235lm - 90-180° = 0lm	Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5162 MS1002	

Observation

Matrix in total flux @500 mA

Light losses due to thermal stabilisation : 0.9 %

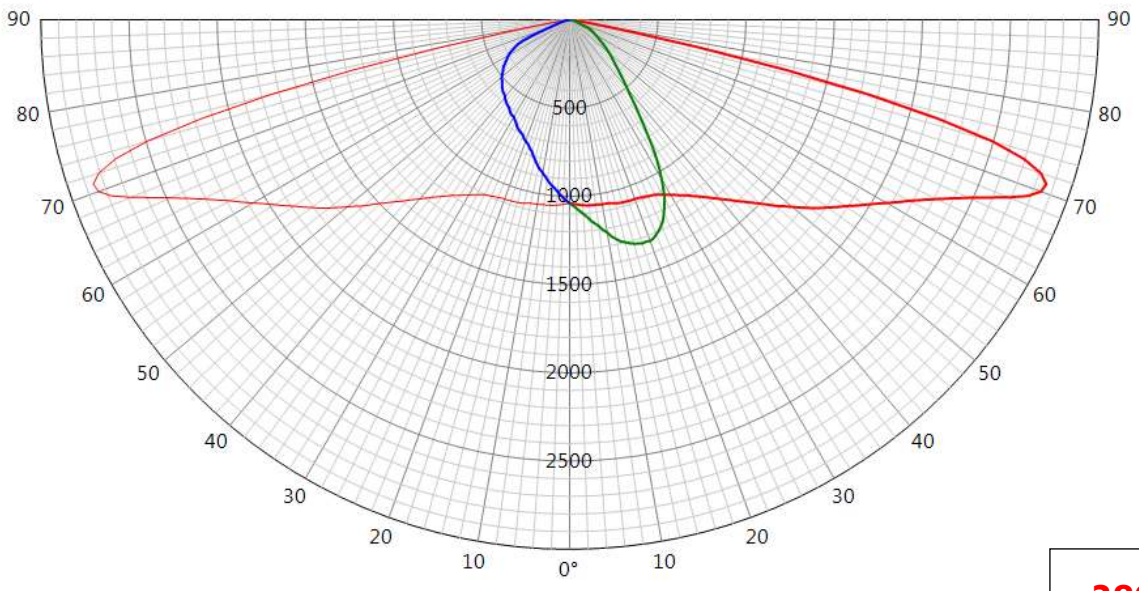
Electrical measurement on LED (#1) : Voltage = 44.89 V Current = 0.500 A Power = 22.44 W

Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.126 A Power = 26.90 W PF = 0.928

Total luminaire power = 26.90 W : Lm/Watt = 120.27 lm/W

Driver #1 : See observations for driver details -

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	2859	71	S	1039	25.0°	15/07/2016
90	1333	20	D			
270	1039	0	G			



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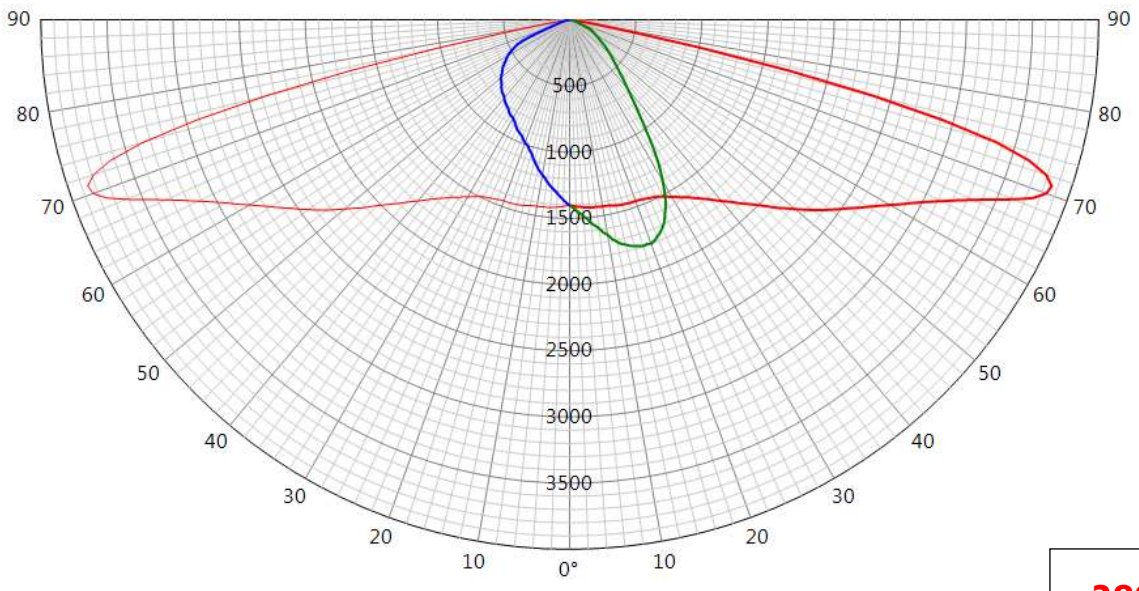
LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 G4L	16	5162

Reflector	Gaggione Led assembly Road lighting Assembled 0.0°	No 5162
Matrices	**389094** Φ 0-90° = 4363lm - 90-180° = 0lm	Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5162 MS1002	
Observation	Matrix in total flux @700 mA Light losses due to thermal stabilisation : 1.4 % Electrical measurement on LED (#1) : Voltage = 45.68 V Current = 0.700 A Power = 31.98 W Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.168 A Power = 37.30 W PF = 0.961 **Total luminaire power = 37.30 W : Lm/Watt = 116.96 lm/W** Driver #1 : See observations for driver details -	

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	3855	71	S	1401	25.0°	15/07/2016
90	1797	20	D			
270	1401	0	G			



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LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 G4L	16	5162

Reflector	Gaggione Led assembly Road lighting Assembled 0.0°	No	5162
Matrices	**389095** Φ 0-90° = 5917lm - 90-180° = 0lm		Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5162 MS1002		

Observation

Matrix in total flux @1000 mA

Light losses due to thermal stabilisation : 2 %

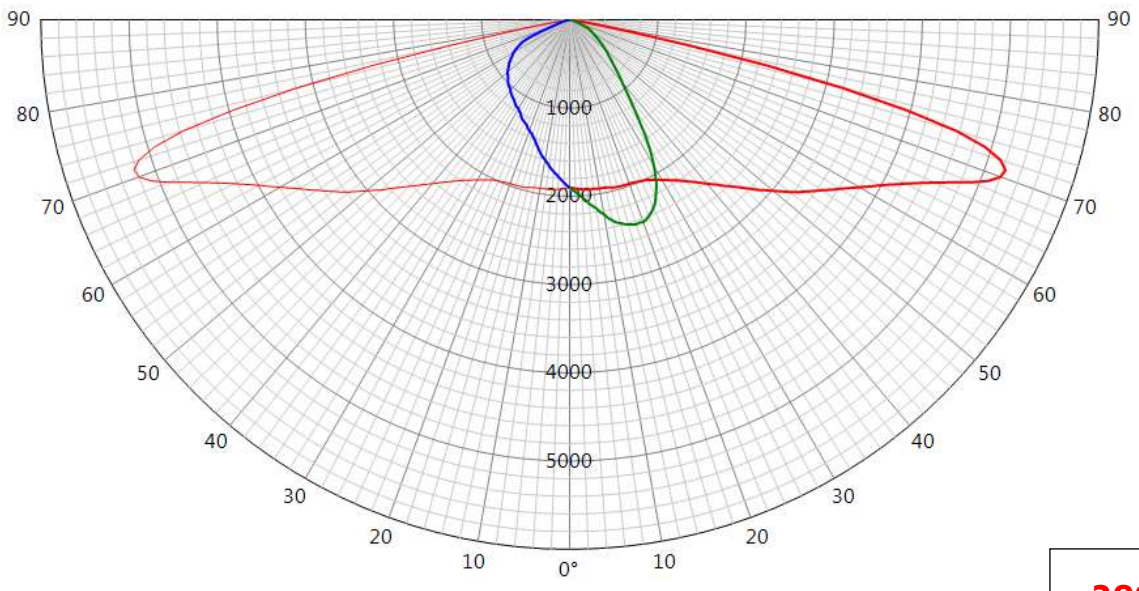
Electrical measurement on LED (#1) : Voltage = 46.37 V Current = 1.000 A Power = 46.51 W

Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.241 A Power = 53.40 W PF = 0.962

Total luminaire power = 53.40 W : Lm/Watt = 110.81 lm/W

Driver #1 : See observations for driver details -

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	5229	71	S	1900	25.0°	20/07/2016
90	2438	20	D			
270	1900	0	G			



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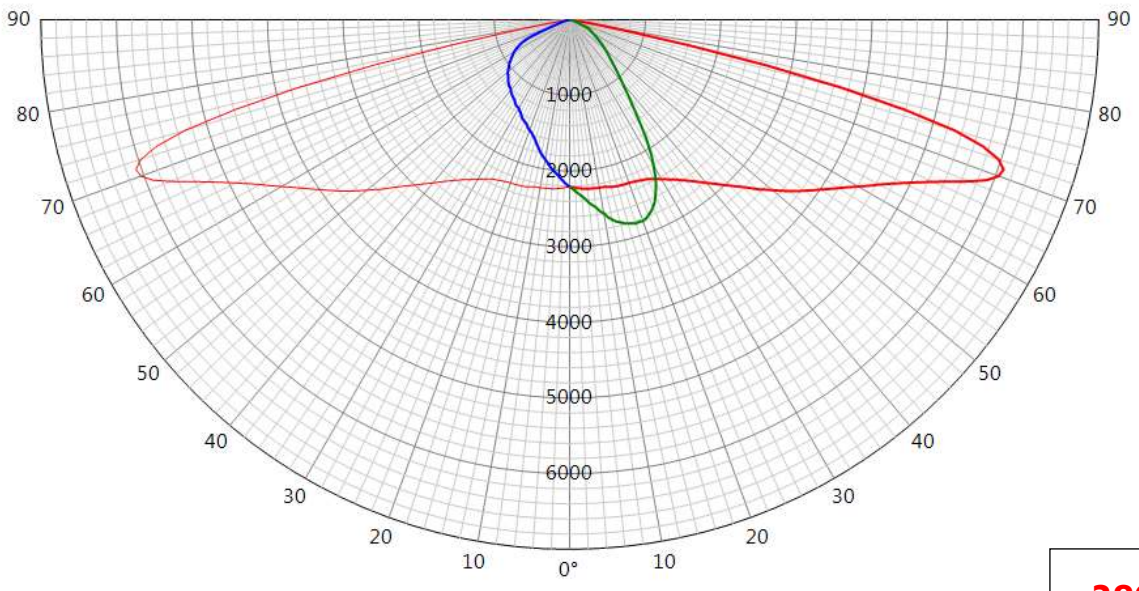
LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 G4L	16	5162

Reflector	Gaggione Led assembly Road lighting Assembled 0.0°	No	5162
Matrices	**389096** Φ 0-90° = 6872lm - 90-180° = 0lm		Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5162 MS1002		
Observation	Matrix in total flux @1200 mA Light losses due to thermal stabilisation : 3.4 % Electrical measurement on LED (#1) : Voltage = 47.43 V Current = 1.200 A Power = 56.95 W Driver #1 : See observations for driver details -		

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	6072	71	S	2207	25.0°	20/07/2016
90	2831	20	D			
270	2207	0	G			



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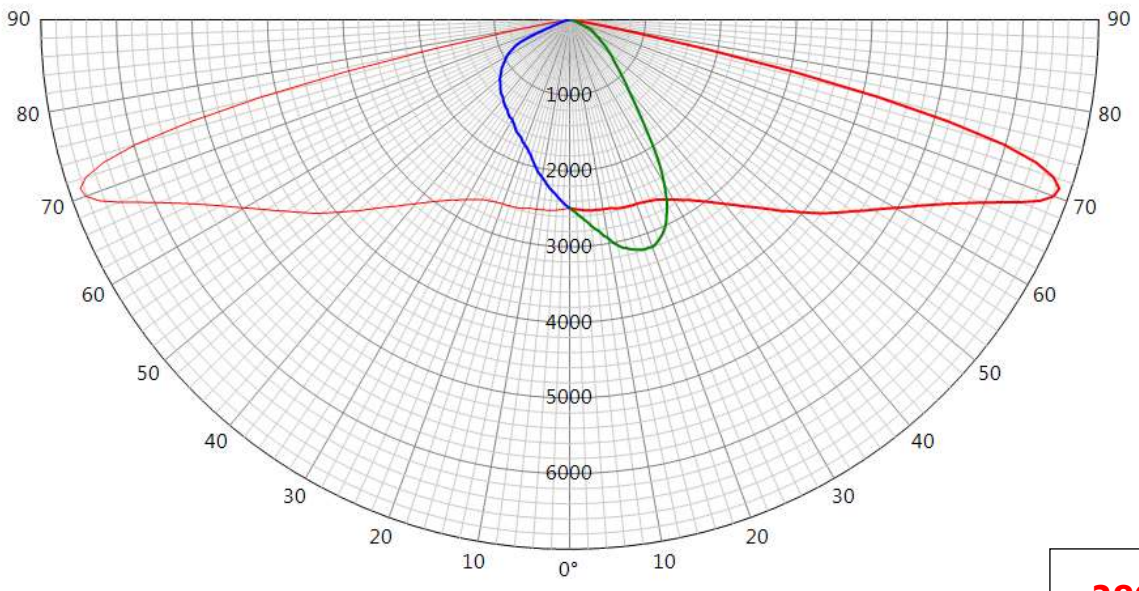
LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD36102

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 G4L	16	5162

Reflector	Gaggione Led assembly Road lighting Assembled 0.0°	No 5162
Matrices	**389097** Φ 0-90° = 7754lm - 90-180° = 0lm	Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5162 MS1002	
Observation	Matrix in total flux @1400 mA Light losses due to thermal stabilisation : 4.5 % Electrical measurement on LED (#1) : Voltage = 48.09 V Current = 1.400 A Power = 67.34 W Driver #1 : See observations for driver details -	

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	6852	71	S	2490	25.0°	20/07/2016
90	3195	20	D			
270	2490	0	G			



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Measurement fulfil Standards:

- NBN-EN 13032-1
- NBN-EN 17025:2005
- CIE 121-1996
- LM79-08

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 measurment, If not specified:

- Primary values are AC with 50Htz frequency
- Secondary values on SSL are DC

CCT, CRI and chromaticity coordinates: are Measured on sphere.
if specified Main test report refer to sphere extra test report.

Light distribution : are measured on gonio.

Number of hours operated prior to measurement: If no other specified, 0 hours (no aging)

Stabilization time: If no other specified, a minimal stabilization time of 1 hour is applied.

Total operating time of the product including stabilization:
45 minutes have to be added by measurement.
Minimal operating time is 105 minutes

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

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

Intensity measurement: +/- 3%
Angle: +/- 0.5°
Flux: +/- 2.5%
Electrical DC
Power: +/- 0.25%
Voltage: +/- 0.1%
Current: +/- 0.2%
Electrical AC
Power: +/- 0.1%

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Voltage: +/- 0.1%
Current: +/- 0.4%
Temperature: +/- 1.5%
CCT: +/- 5%
CRI: +/- 2%
x/y: +/- 2%

Measuring instruments in use:

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

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

Thermometers
Voltcraft K101 (Sphere IS2000)
LMT U1000 (Sphere LMT)
Gossen digem f96x48 CK/EK (gonio)
Calibration: traceable to PTB (Physikalisch-Technische Bundesanstalt)

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