

**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**

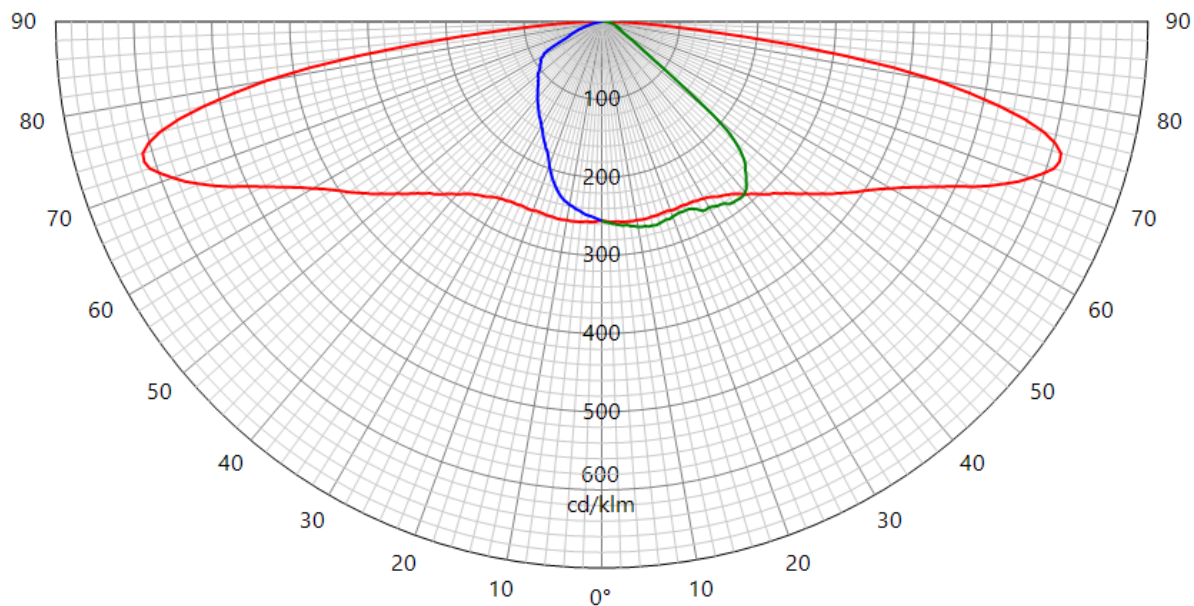
Origin R-Tech	Production Schröder TOV	Luminaire SKIDO	Inclination 0°	Request # FD39062
Source				
Type LED	BIN 40-70M-4-TB-RB	Trademark Samsung	Reference LH351C	# LEDs 6
Reflector # 5122				
Master	Reflector Schröder TOV-Ukraine Led assembly Road lighting Assembled 0,0°			No 5122
Protector Refractor Lens				
Protector Lens	integrated lenses Schröder 5122 PC			
Laboratory observation				
SKIDO fitted with 6 Samsung LH351C Used flux for efficient matrix calculation, measured in sphere @350mA / 25°C: 1161 lm - CCT= 3872K - CRI= 72,29 (see sphere test report 2019/53 on appendix)				
Purpose DOC	Sample date 08-01-2019		Sample # 39R004	
Observation				
DOC Skido with optic 5122				
Flux coefficient multiplier (only for efficiency matrix): From 350 to 700 mA : 1,842 From 350 to 1050 mA : 2,562				
Fixture powered with DC power supply from the lab for matrix @350mA Fixture powered with driver MeanWell PLD-16-700B for matrix @700mA Fixture powered with driver MeanWell PLD-25-1050 for matrix @1050mA				
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 GGS	Measured by CLD	Approved by RLABO	Appendix 1	  <b>226-TEST</b> NBN EN ISO/IEC 17025 : 2005	<b>42935</b>
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### LUMINOUS INTENSITY DIAGRAM

Origin <b>R-Tech</b>		Production <b>Schröder TOV</b>		Luminaire <b>SKIDO</b>		Inclination <b>0°</b>		Request # <b>FD39062</b>	
Source	Type <b>LED</b>	BIN <b>40-70M-4-TB-RB</b>	Trademark <b>Samsung</b>	Reference <b>LH351C</b>	# LEDs <b>6</b>	Reflector <b>5122</b>			
Reflector	<b>Schröder TOV-Ukraine Led assembly Road lighting Assembled 0,0°</b>				<b>No</b>		<b>5122</b>		
Matrices	<b>429351</b>		$\Phi$ 0-90° = 1033lm - 90-180° = 1lm			<b>Absolute measurement</b>			
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x Schröder 5122 PC</b>								
Observation	in total flux @350mA  Electrical measurement on LED (#1): Voltage = 17,24 V Current = 0,350 A Power = 6,03 W  Driver #1 : See observations for driver details - PCB 00-71-626 A								

Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
10 - 170	613	73	S	255	24,9°	25-03-2019	
90	288	38	D				
270	255	0	G				

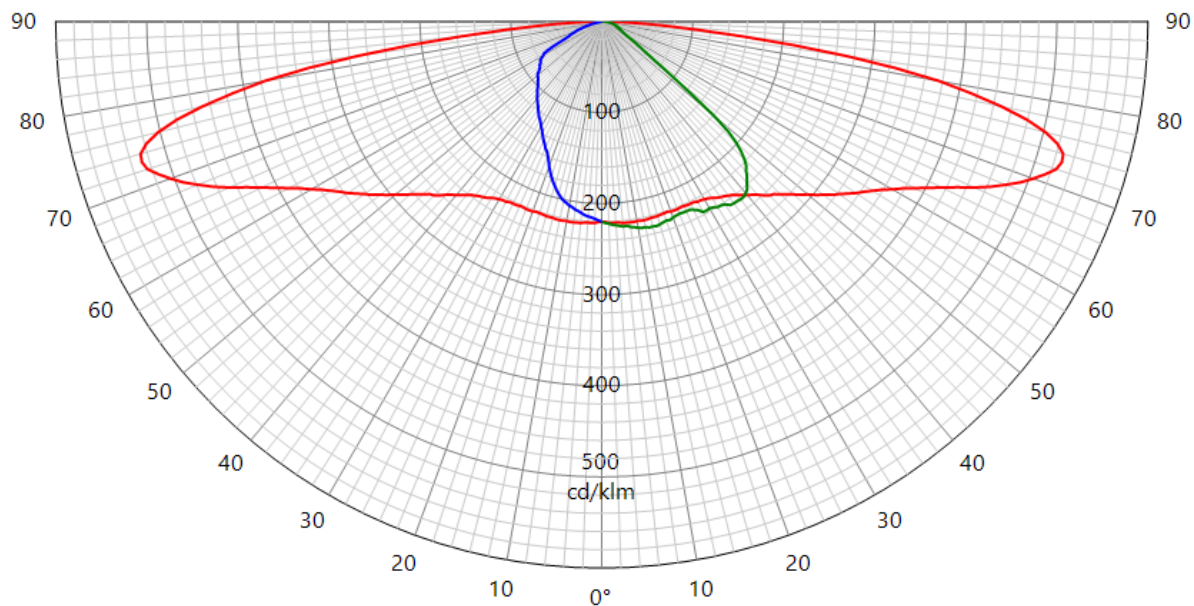


**42935**

### LUMINOUS INTENSITY DIAGRAM

Origin <b>R-Tech</b>	Production <b>Schröder TOV</b>	Luminaire <b>SKIDO</b>	Inclination <b>0°</b>	Request # <b>FD39062</b>		
Source	Type <b>LED</b>	BIN <b>40-70M-4-TB-RB</b>	Trademark <b>Samsung</b>	Reference <b>LH351C</b>	# LEDs <b>6</b>	Reflector <b>5122</b>
Reflector	<b>Schröder TOV-Ukraine Led assembly Road lighting Assembled 0,0°</b>			No	<b>5122</b>	
Matrices	<b>429352</b> $\eta$ 0-90° = 89,0% - 90-180° = 0,1%			Relative measurement		
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x Schröder 5122 PC</b>					
Observation	in efficiency @350mA .  Electrical measurement on LED (#1) : Voltage = 17,24 V     Current = 0,350 A     Power = 6,03 W  Driver #1 : See observations for driver details - PCB 00-71-626 A					

Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
10 - 170	528	73	S	220	24,9°	25-03-2019	
90	248	38	D				
270	220	0	G				

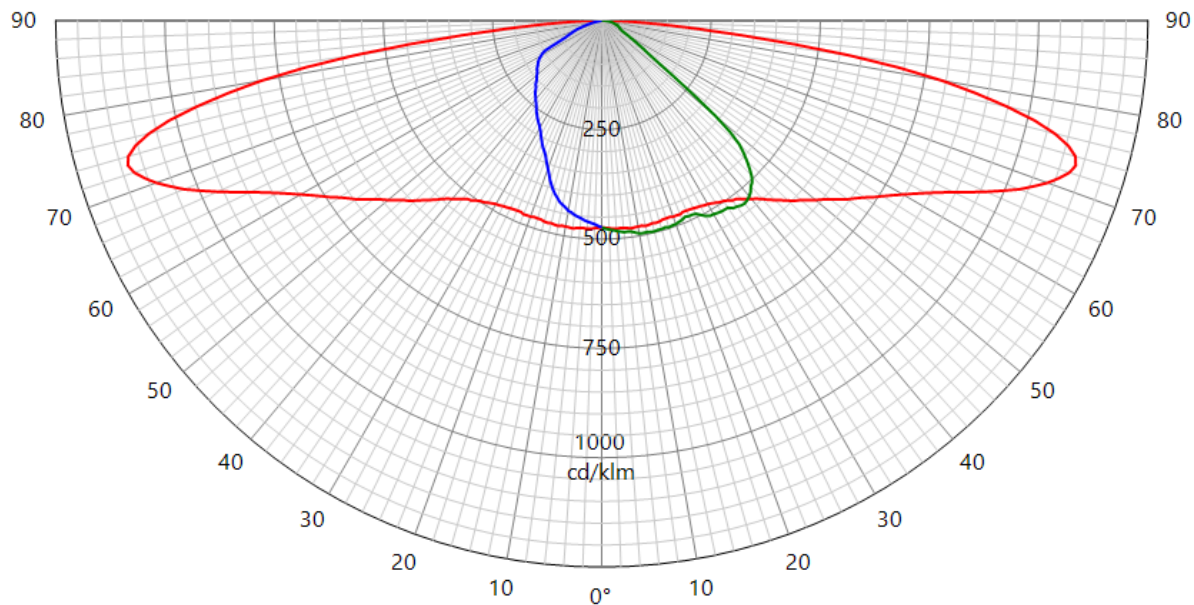


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### LUMINOUS INTENSITY DIAGRAM

Origin <b>R-Tech</b>	Production <b>Schröder TOV</b>	Luminaire <b>SKIDO</b>	Inclination <b>0°</b>	Request # <b>FD39062</b>		
Source	Type <b>LED</b>	BIN <b>40-70M-4-TB-RB</b>	Trademark <b>Samsung</b>	Reference <b>LH351C</b>	# LEDs <b>6</b>	Reflector <b>5122</b>
Reflector	<b>Schröder TOV-Ukraine Led assembly Road lighting Assembled 0,0°</b>			No	<b>5122</b>	
Matrices	<b>429353</b>			$\Phi$ 0-90° = 1904lm - 90-180° = 2lm		<b>Absolute measurement</b>
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x Schröder 5122 PC</b>					
Observation	<p>in total flux @700mA.</p> <p>Electrical measurement on LED (#1): Voltage = 18,20 V    Current = 0,701 A    Power = 12,76 W</p> <p>Electrical measurement on driver (#1): Voltage = 230,00 V    Current = 0,068 A    Power = 15,21 W    PF = 0,971</p> <p><b>Total luminaire power = 15,21 W : Lm/Watt = 125,35 lm/W</b></p> <p>Driver #1 : See observations for driver details - PCB 00-71-626 A</p>					

Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
10 - 170	1134	73	S	473	24,9°	25-03-2019	
90	531	38	D				
270	473	0	G				

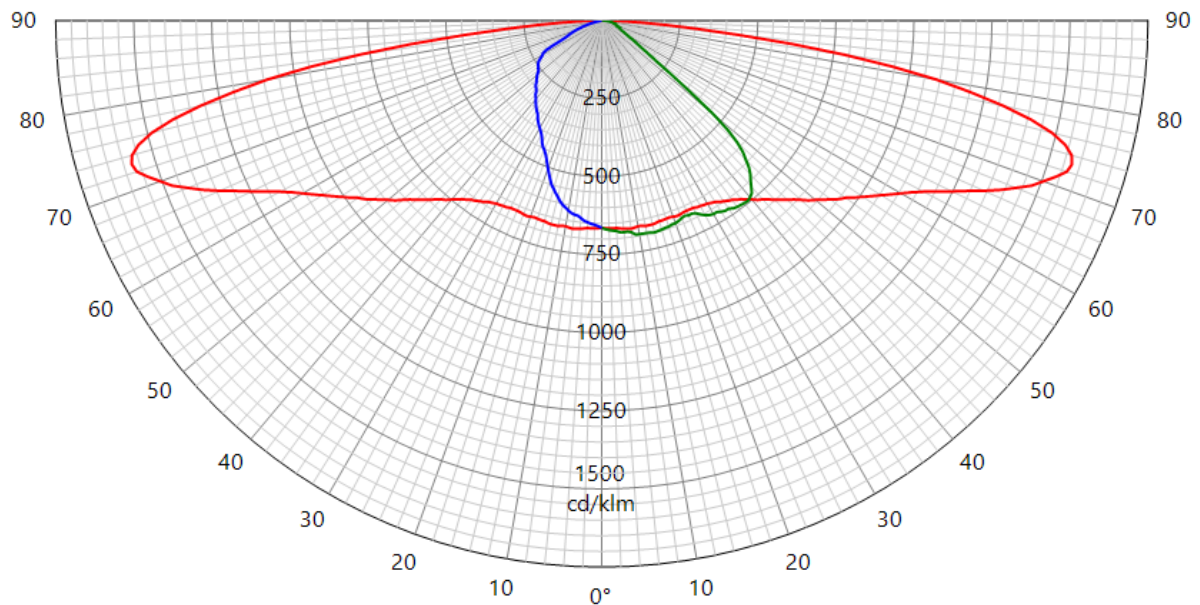


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### LUMINOUS INTENSITY DIAGRAM

Origin <b>R-Tech</b>	Production <b>Schröder TOV</b>	Luminaire <b>SKIDO</b>	Inclination <b>0°</b>	Request # <b>FD39062</b>		
Source	Type <b>LED</b>	BIN <b>40-70M-4-TB-RB</b>	Trademark <b>Samsung</b>	Reference <b>LH351C</b>	# LEDs <b>6</b>	Reflector <b>5122</b>
Reflector	<b>Schröder TOV-Ukraine Led assembly Road lighting Assembled 0,0°</b>			No	<b>5122</b>	
Matrices	<b>429354</b>			$\Phi$ 0-90° = 2648lm - 90-180° = 3lm		<b>Absolute measurement</b>
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x Schröder 5122 PC</b>					
Observation	<p>in total flux @1050mA.</p> <p>Electrical measurement on LED (#1): Voltage = 18,97 V    Current = 1,061 A    Power = 20,22 W</p> <p>Electrical measurement on driver (#1): Voltage = 230,00 V    Current = 0,108 A    Power = 24,14 W    PF = 0,975</p> <p><b>Total luminaire power = 24,14 W : Lm/Watt = 109,81 lm/W</b></p> <p>Driver #1 : See observations for driver details - PCB 00-71-626 A</p>					

Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
10 - 170	1575	73	S	664	24,9°	25-03-2019	
90	743	39	D				
270	664	0	G				



**42935**

## 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)