



**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

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Measurement for Schröder group.

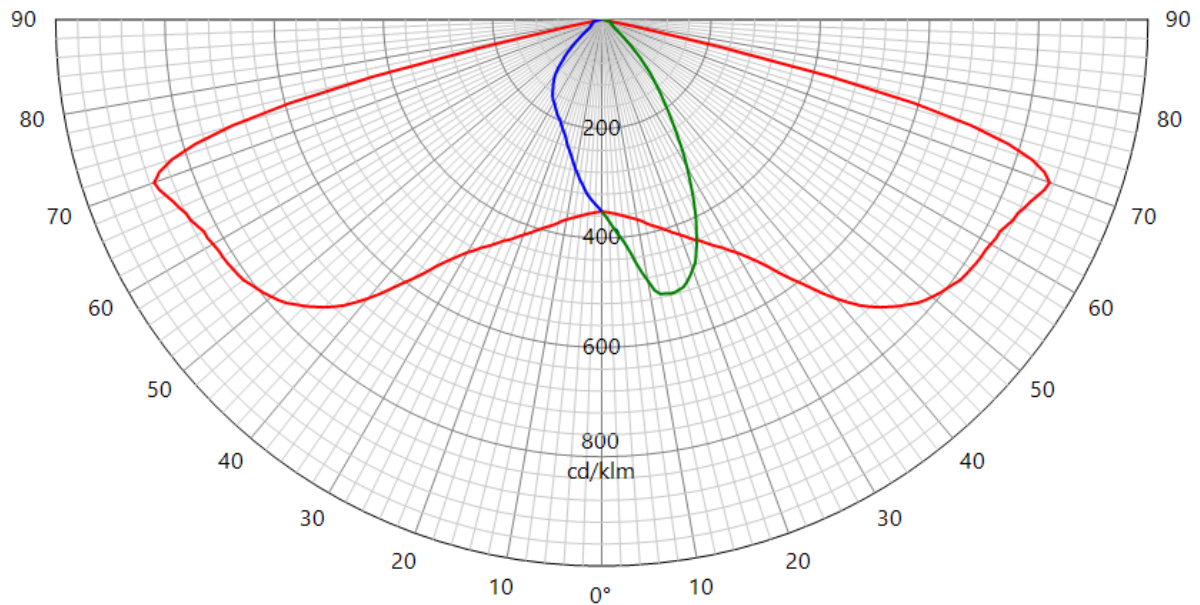
**LED**

Origin TUNGSRAM-Schröder Zrt. Hungary	Production TUNGSRAM-Schröder Zrt. Hungary	Luminaire VOLTANA 0	Inclination 0°	Request # FD39022
Source				
Type LED	BIN 40-70M-4-TB-RB	Trademark Samsung	Reference LH351C	# LEDs 6
Reflector 5205	Master -			Reflector No 5205
DKI Led assembly Road lighting Injected 0.0°				
Protector Refractor Lens				
Protector integrated lenses				
Lens DKI 5205 PC				
Laboratory observation				
VOLTANA 0 with 6 Samsung LH 351C Used flux for efficiency matrix calculation = 1157lm - CCT = 3859K - CRI = 72,26 (see sphere test report 2019/52 on appendix).				
Purpose DOC	Sample date 08-01-2019		Sample # 39R004	
Observation				
DOC Voltana 0 with lenses 5205				
Flux coefficient multiplier (only for efficiency matrix): From 350 to 500 mA : 1,379 From 350 to 700 mA : 1,846 From 350 to 1000mA: 2,450				
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 CLD	Approved by RLABO	Appendix 1	  <b>226-TEST</b> NBN EN ISO/IEC 17025 : 2005	<b>42571</b>
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### LUMINOUS INTENSITY DIAGRAM

Origin <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Production <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Luminaire <b>VOLTANA 0</b>		Inclination <b>0°</b>		Request # <b>FD39022</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>5205</b>			
Reflector	<b>DKI Led assembly Road lighting Injected 0.0°</b>				No	<b>5205</b>			
Matrices	<b>425711</b>		$\Phi$ 0-90° = 1036lm - 90-180° = 0lm			Absolute measurement			
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x DKI 5205 PC</b>								
Observation	<p>Matrix in total flux @350 mA</p> <p>Light losses due to thermal stabilisation : 1%</p> <p>Electrical measurement on LED (#1) : Voltage = 16.83 V    Current = 0.350 A    Power = 5.88 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V    Current = 0.037 A    Power = 7.98 W    PF = 0.936</p> <p><b>Total luminaire power = 7.98 W : Lm/Watt = 129.80 lm/W</b></p> <p>Driver #1 : Philips Xitanium FP 22W 0.3-1.0A SNLDAE 230V S175 sXt S175 sxt PCB 00-71-626 A</p>								
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date		↕	
5 - 175	872	70	S	351	24.9°	07-02-2019			
90	517	14	D						
270	351	0	G						

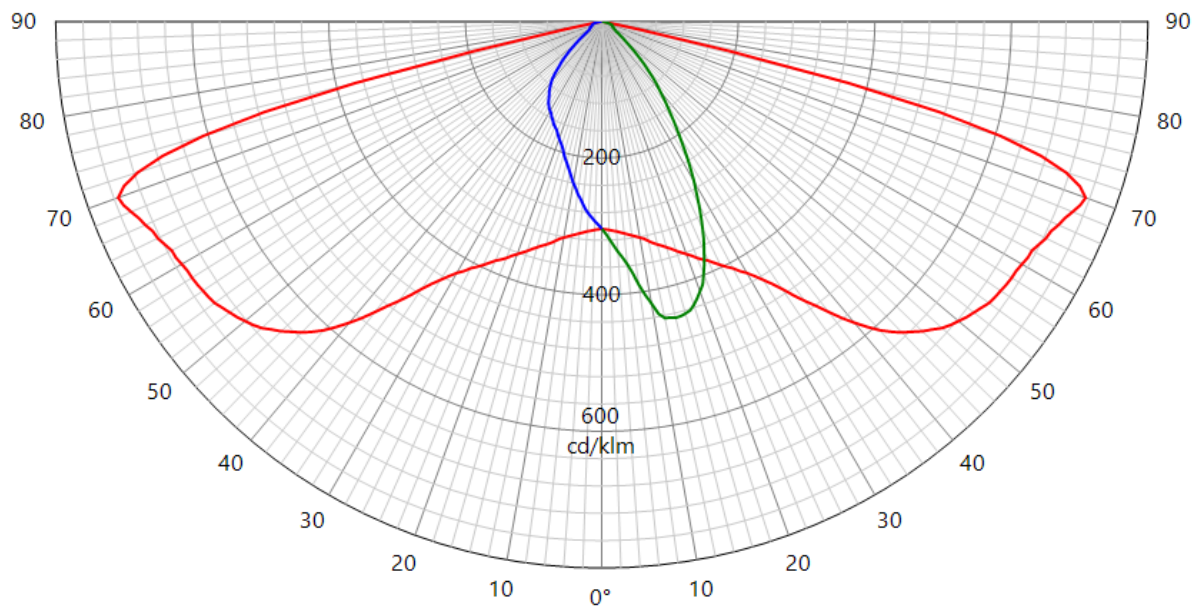


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### LUMINOUS INTENSITY DIAGRAM

Origin <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Production <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Luminaire <b>VOLTANA 0</b>		Inclination <b>0°</b>		Request # <b>FD39022</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>5205</b>			
Reflector	<b>DKI Led assembly Road lighting Injected 0.0°</b>				<b>No</b>		<b>5205</b>		
Matrices	<b>425712</b>		$\eta$ 0-90° = 89.5% - 90-180° = 0.0%			Relative measurement			
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x DKI 5205 PC</b>								
Observation	<p>Matrix in efficiency @350 mA</p> <p>Light losses due to thermal stabilisation : 1%</p> <p>Electrical measurement on LED (#1) : Voltage = 16.83 V    Current = 0.350 A    Power = 5.88 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V    Current = 0.037 A    Power = 7.98 W    PF = 0.936</p> <p><b>Total luminaire power = 7.98 W</b></p> <p>Driver #1 : Philips Xitanium FP 22W 0.3-1.0A SNLDAE 230V S175 sXt S175 sxt PCB 00-71-626 A</p>								

Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
5 - 175	754	70	S	303	24.9°	07-02-2019	
90	447	14	D				
270	303	0	G				

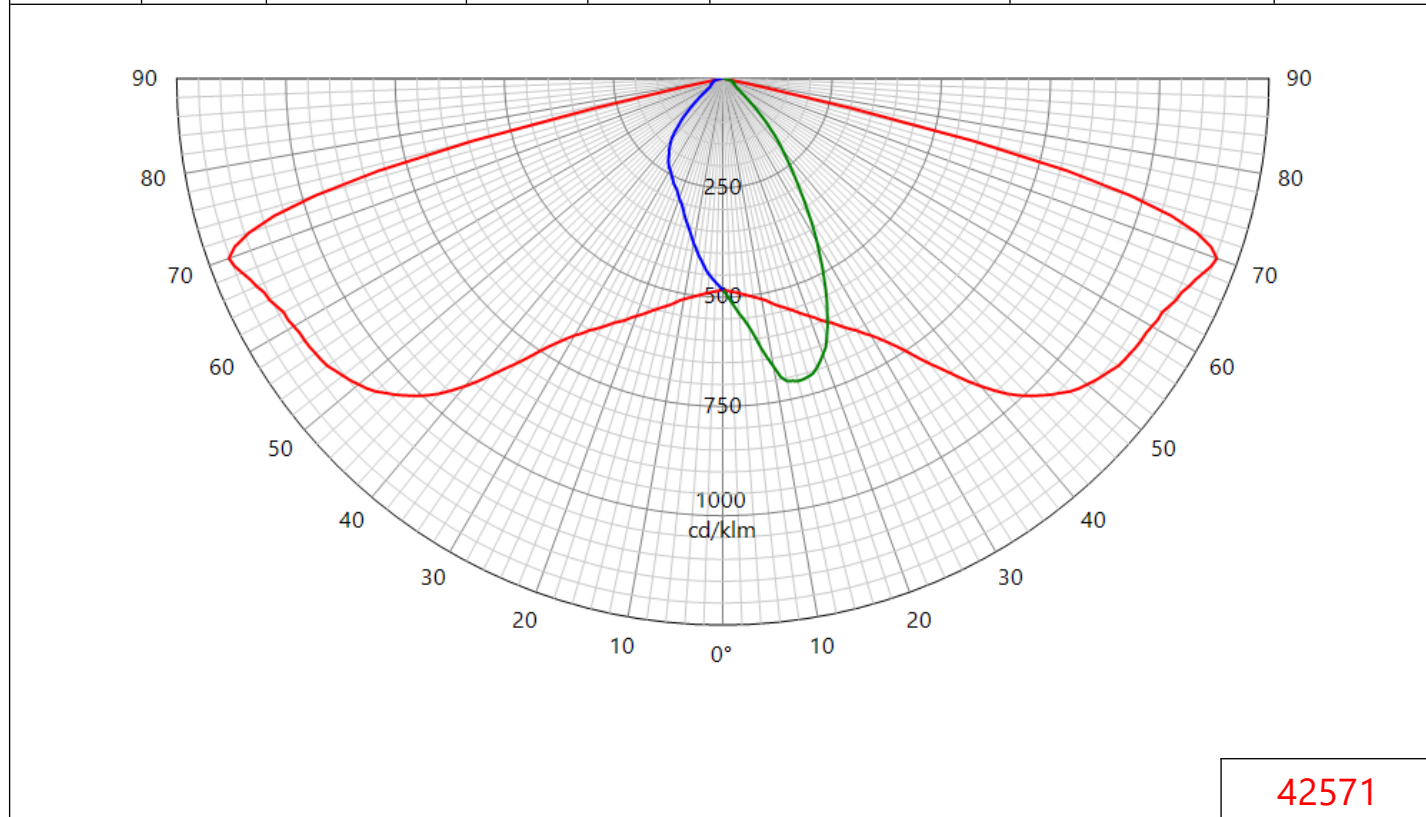


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### LUMINOUS INTENSITY DIAGRAM

Origin <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Production <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Luminaire <b>VOLTANA 0</b>		Inclination <b>0°</b>		Request # <b>FD39022</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>5205</b>			
Reflector	<b>DKI Led assembly Road lighting Injected 0.0°</b>				No	<b>5205</b>			
Matrices	<b>425713</b>		$\Phi$ 0-90° = 1428lm - 90-180° = 0lm			Absolute measurement			
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x DKI 5205 PC</b>								
Observation	<p>Matrix in total flux @500 mA</p> <p>Light losses due to thermal stabilisation : 1.7%</p> <p>Electrical measurement on LED (#1) : Voltage = 17.15 V    Current = 0.500 A    Power = 8.58 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V    Current = 0.050 A    Power = 10.97 W    PF = 0.962</p> <p><b>Total luminaire power = 10.97 W : Lm/Watt = 130.21 lm/W</b></p> <p>Driver #1 : Philips Xitanium FP 22W 0.3-1.0A SNLDAE 230V S175 sXt S175 sxt PCB 00-71-626 A</p>								

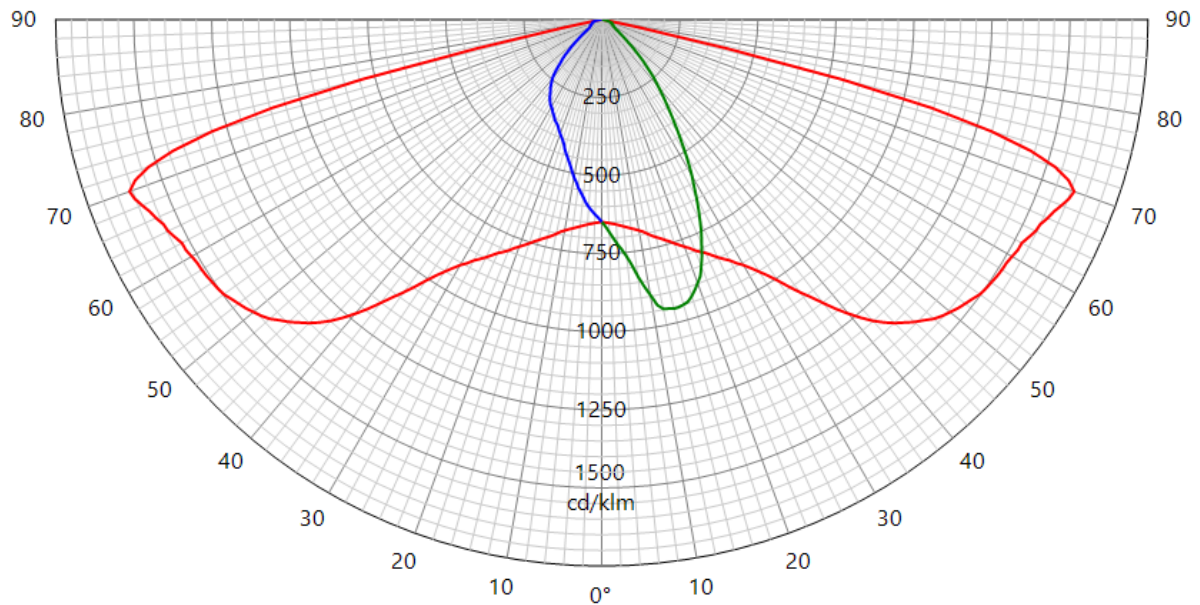
Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
5 - 175	1203	70	S	484	24.9°	11-02-2019	
90	713	14	D				
270	484	0	G				



### LUMINOUS INTENSITY DIAGRAM

Origin <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Production <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Luminaire <b>VOLTANA 0</b>		Inclination <b>0°</b>		Request # <b>FD39022</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>5205</b>			
Reflector	<b>DKI Led assembly Road lighting Injected 0.0°</b>				No	<b>5205</b>			
Matrices	<b>425714</b>		$\Phi$ 0-90° = 1912lm - 90-180° = 0lm			Absolute measurement			
Protector Refractor Lens	Protector <b>integrated lenses</b> Lens <b>6 x DKI 5205 PC</b>								
Observation	<p>Matrix in total flux @700 mA</p> <p>Light losses due to thermal stabilisation : 2,6 %</p> <p>Electrical measurement on LED (#1) : Voltage = 17.51 V    Current = 0.700 A    Power = 12.27 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V    Current = 0.067 A    Power = 15.15 W    PF = 0.977</p> <p><b>Total luminaire power = 15.15 W : Lm/Watt = 126.21 lm/W</b></p> <p>Driver #1 : Philips Xitanium FP 22W 0.3-1.0A SNLDAE 230V S175 sXt S175 sxt PCB 00-71-626 A</p>								

Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
5 - 175	1610	70	S	648	24.9°	11-02-2019	
90	954	14	D				
270	648	0	G				

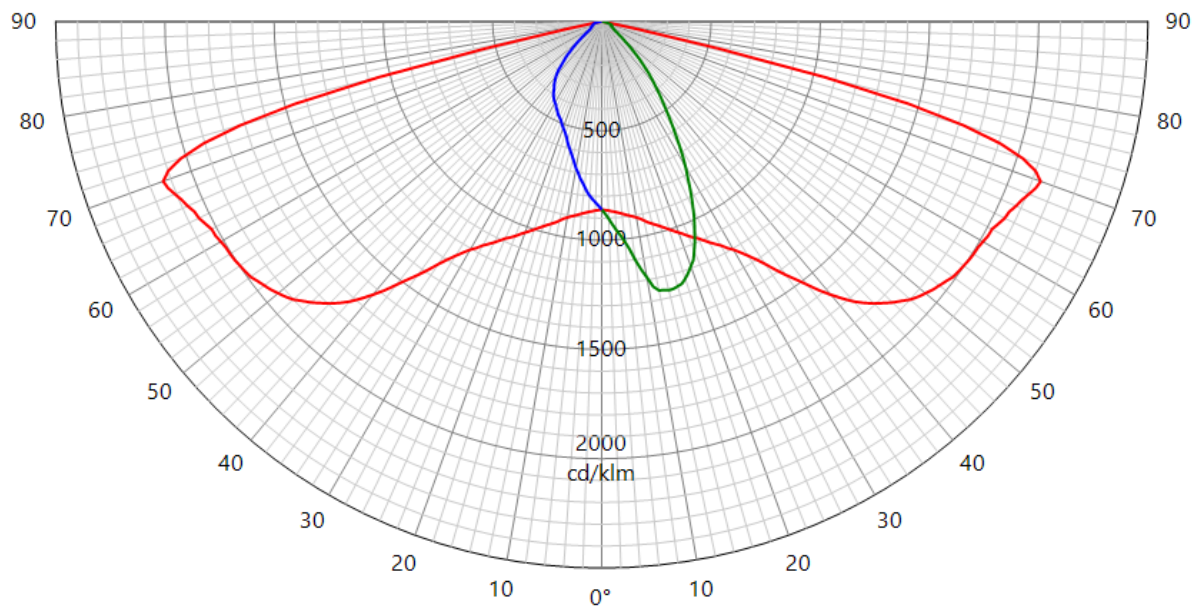


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### LUMINOUS INTENSITY DIAGRAM

Origin <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Production <b>TUNGSRAM-Schröder Zrt. Hungary</b>		Luminaire <b>VOLTANA 0</b>		Inclination <b>0°</b>		Request # <b>FD39022</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>5205</b>			
Reflector	<b>DKI Led assembly Road lighting Injected 0.0°</b>				<b>No</b>		<b>5205</b>		
Matrices	<b>425715</b>		$\Phi$ 0-90° = 2538lm - 90-180° = 0lm			<b>Absolute measurement</b>			
Protector Refractor Lens	<b>Protector integrated lenses Lens 6 x DKI 5205 PC</b>								
Observation	<p>Matrix in total flux @1000 mA</p> <p>Light losses due to thermal stabilisation : 3,7 %</p> <p>Electrical measurement on LED (#1) : Voltage = 17.96 V    Current = 1.000 A    Power = 17.96 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V    Current = 0.096 A    Power = 21.80 W    PF = 0.987</p> <p><b>Total luminaire power = 21.80 W : Lm/Watt = 116.41 lm/W</b></p> <p>Driver #1 : Philips Xitanium FP 22W 0.3-1.0A SNLDAE 230V S175 sXt S175 sxt PCB 00-71-626 A</p>								

Plane	I Peak	Peak position	Index	I zero	Laboratory ambient t°	Measurement date	↕
5 - 175	2137	70	S	860	24.9°	11-02-2019	
90	1267	14	D				
270	860	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)