

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 2**

Versiune: 16 LED-uri
Clasă electrică: I sau II
Balast: electronic
Tensiune nominală: 230V / 50Hz
Caracteristici: Max. 1000mA
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)
- EN 60598-2-1 (1979)
- EN 60598-2-3 (2003 + A1 2011)
- EN 61547 (2009)
- EN 61347 (2015)
- EN 55015 (2013)
- EN 61000-3-2 (2014) & 3-3 (2013)
- EN 62471 (2008)
- EN 62493 (2010)
- Directiva 2014/30/EU
- Directiva 2014/35/EU
- Directiva 2009/125/EC
- Directiva 2012/19/EU
- Directiva 2003/108/EC
- Directiva RoHS 2011/65/EU (RoHS 2)
- R.D. 1890/2008, 14 Noiembrie
- R.D. 154/1.995, 3 Februarie
- R.D. 842/2002, 2 August

SCHRÉDER ROMANIA S.R.L.
Director General,

Alexandru SIRCA

Eliberat,
Martie 2019, Cluj-Napoca

Lumen maintenance report

LED information

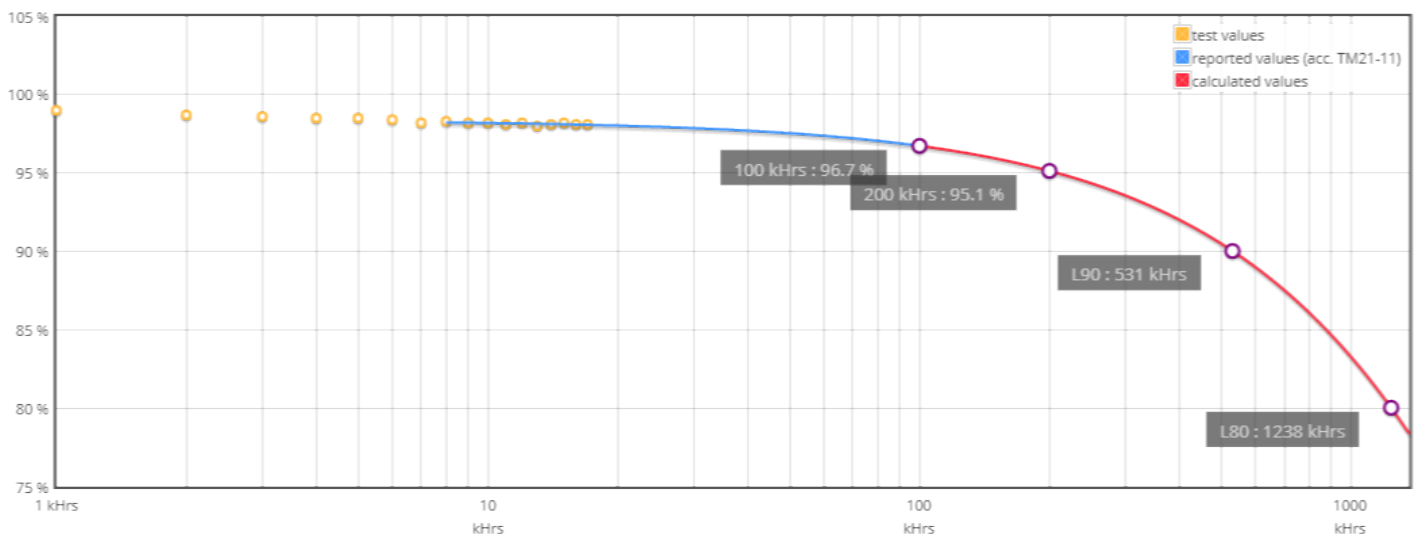
LED type LH351C
LED current 1000 mA
Ts 55°C
Description SLED-19-031-R02

Projection data

Test duration 17000 hrs **α** 1.667E-007
Time used for projection 8000 to 17000hrs **β** 0.984

L (%)	Time (kHrs)
80.0	1239
90.0	532
95.1	200
96.7	100

Projection graphic



LxB50 results according to LM-80 and TM-21-11 procedures and norms.



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



Test Report

IES LM-80-15 Approved Method for Measuring Lumen Maintenance of LED Light Sources

Report no. : SLED-19-031-R02
 Testing start date : 2017.07.28
 Testing completion date : 2019.08.27
 Report issued date : 2019.05.31
 Report revised date : 2020.05.21

Client	Testing performed by
SAMSUNG ELECTRONICS LED BUSINESS Lighting Marketing Group	SAMSUNG ELECTRONICS LED BUSINESS 1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do 17113, Korea e-mail) kwon.sc@samsung.com
Tested By	Technical Manager
 KyungYeup Kwak	 DooSung Park
Test Personal Name & Signatory	Approval Name & Signatory

The above test report is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

※ If you need confirmation about the authenticity of the test report, please contact the above contact information.

SAMSUNG ELECTRONICS LED BUSINESS
 Accredited by KOLAS, Republic of KOREA

■ Test Report Information ■

1. This test report complies with KS Q ISO/IEC 17025 and KOLAS accreditation regulations.
2. This test report does not comply with KS Q ISO/IEC 17025 and KOLAS accreditation regulations.
3. The test results are limited to samples provided by the client and cannot be partially replicated without the approval of this authority, except as a whole.
4. If a statement of conformity is provided in this report, the applied decision rule does not apply the measurement uncertainty except for the case where the measurement uncertainty is mentioned in the above test method.
5. The test results marked © are not accredited by KOLAS.
6. The test results received from external providers for the test results marked ㉠.

■ Revision History ■

Data	Revision History	Writer	
		Drawn	Approved
2019.05.31	Rev.0 : New Version	K.Y.KWAK	D.S.PARK
2020.03.30	Rev.1 : Typos Correction	K.Y.KWAK	D.S.PARK
2020.05.21	Rev.2 : Extended Test Duration	K.Y.KWAK	D.S.PARK

■ Test Summary ■

Life test condition			Summary of result		
Test condition	Current (mA)	Case temperature (°C)	Test duration (h)	Average lumen maintenance (%)	Maximum chromaticity shift ($\Delta u'v'$)
1	1 000	55.2	17 000	98.1	0.000 8
2	1 000	85.1	17 000	97.9	0.001 4
3	1 000	105.1	17 000	96.5	0.002 3

1. Number of the sample

- 20 Packages tested at actual case temperature 55.2 °C
- 20 Packages tested at actual case temperature 85.1 °C
- 20 Packages tested at actual case temperature 105.1 °C
- ※ Sampling method : Minimum three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.

2. Description of LED light sources

- Tested model code : SPHWHTL3D50CE4W***
- Product series : LH351C (SPHWHTL3D50C*****)
- Sample manufacturer : Samsung Electronics
- Sample Type : LED Package
- Package dimension : (3.5 × 3.5) mm
- Minimum die spacing : -
- CCT / CRI (Nominal) : 2 700 K / 70

3. Location of Test

- Permanent Testing Lab On Site Testing

(Address : 1, Samsung-ro, Giheung-gu, Yongin-si, Gyeonggi-do 17113, Korea)

4. Description of auxiliary equipment and Operating time

- 1) Instrument Integrating sphere ISP1000-100
- 2) Instrument CAS140-CT
- 3) Keithley 2425 Sourcemeter
- 4) Electrical condition
 - Drive current : 1 000 mA
 - Typical voltage : 3.06 V
 - Total input power : 3.06 W
 - Average current density per LED die : 499 mA/mm²
 - Average power density per LED die : 1.52 W/mm²
 - * LED packages are driven with a constant direct current.
- 5) Test duration : 17 000 h

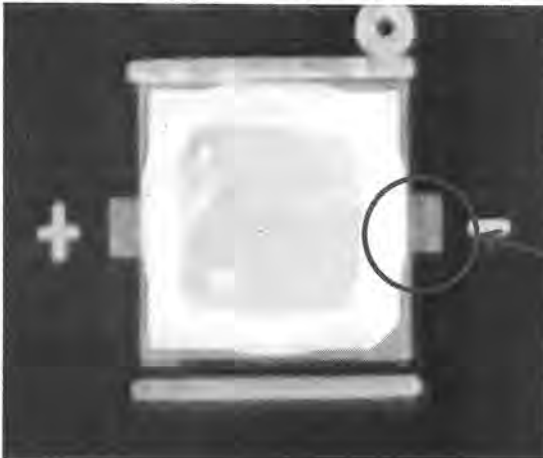
5. Ambient conditions including airflow, temperature and relative humidity

The minimal airflow is maintained in chamber.

The ambient temperature around the LED packages inside chamber is controlled by air flowing and the thermocouple readings are monitored.

- Case temperature : Controlled to $-2\text{ }^{\circ}\text{C}$
- Surrounding air temperature : Controlled to $-5\text{ }^{\circ}\text{C}$
- Relative humidity : $< 65\%$ R.H.

6. Case temperature (Test point temperature)



Case Temperature
Measurement Point

7. Drive current of the LED light source during lifetime test

See Sub-clause 9.1, 9.2 and 9.3

8. Initial luminous flux and forward voltage

See the table

9. Lumen maintenance data for each individual LED light source

See the table

9.1 Test condition 1 55 °C
 Drive Current 1 000 mA
 Measurement Current 1 000 mA

No.	Flux (lm)	Vf (V)	Lumen Maintenance (%)						
	0 h		500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	335.1	3.104	99.1	99.3	98.6	98.5	98.4	98.6	98.5
2	337.7	3.053	99.1	98.8	98.6	98.4	98.4	98.4	98.1
3	341.5	3.071	99.6	98.9	98.8	98.6	98.4	98.3	98.0
4	332.0	3.070	99.1	98.7	98.6	98.6	98.4	98.6	98.3
5	335.5	3.028	99.9	98.9	98.4	98.3	98.1	98.2	98.2
6	337.9	3.098	99.4	98.8	98.3	98.4	98.4	98.6	98.6
7	339.3	3.060	99.6	99.0	98.9	98.9	98.6	98.8	99.0
8	341.6	3.037	99.2	98.7	98.5	98.4	98.3	98.4	98.2
9	335.9	3.043	99.7	99.3	98.6	98.9	98.4	98.5	98.1
10	341.9	3.020	99.6	99.1	98.8	98.6	98.5	98.4	98.2
11	338.7	3.081	99.4	99.1	99.0	98.9	98.8	98.8	98.9
12	338.3	3.050	99.0	98.9	98.6	98.3	98.3	98.2	98.1
13	345.7	3.052	99.4	98.8	98.8	98.7	98.5	98.7	98.7
14	343.8	3.100	100.0	98.9	98.5	98.4	98.7	98.5	98.5
15	333.9	3.019	99.9	99.2	98.9	98.9	98.6	98.4	98.3
16	338.1	3.053	99.2	98.8	98.7	98.6	98.6	98.4	98.4
17	341.0	3.046	99.2	98.8	98.7	98.6	98.5	98.5	98.5
18	342.2	3.033	99.8	99.4	98.7	98.5	98.6	98.5	98.3
19	334.6	3.037	100.0	99.2	99.0	98.7	98.6	98.5	98.4
20	332.0	3.104	99.8	99.5	98.8	98.9	98.8	98.8	98.6
Mean	338.3	3.06	99.5	99.0	98.7	98.6	98.5	98.5	98.4
Median	338.2	3.05	99.5	98.9	98.7	98.6	98.5	98.5	98.4
std.dev	3.8	0.03	0.3	0.2	0.2	0.2	0.2	0.2	0.3
Max	345.7	3.10	100.0	99.5	99.0	98.9	98.8	98.8	99.0
Min	332.0	3.02	99.0	98.7	98.3	98.3	98.1	98.2	98.0

9.1 Test condition 1 55 °C
 Drive Current 1 000 mA
 Measurement Current 1 000 mA

No.	Lumen Maintenance (%)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	98.3	98.4	98.4	98.4	98.3	98.4	98.3	98.5	98.6
2	97.8	97.8	97.7	97.8	97.6	97.7	97.6	97.6	97.7
3	98.1	98.1	98.1	98.2	97.9	97.9	97.8	97.9	98.0
4	98.3	98.4	98.4	98.4	98.3	98.4	98.3	98.4	98.6
5	98.0	98.1	97.9	97.9	97.9	97.9	97.8	97.9	97.9
6	98.3	98.5	98.4	98.7	98.6	98.7	98.6	98.6	98.7
7	98.7	98.7	98.6	98.6	98.6	98.5	98.5	98.6	98.6
8	98.1	98.3	98.1	98.2	98.1	98.2	98.1	98.2	98.3
9	97.9	98.1	98.0	97.9	97.8	97.9	97.6	97.7	97.8
10	97.8	97.9	97.8	97.8	97.7	97.8	97.6	97.7	97.8
11	98.5	98.4	98.4	98.4	98.3	98.3	98.1	98.2	98.2
12	98.1	98.3	98.2	98.2	98.1	98.3	98.1	98.3	98.4
13	98.5	98.7	98.6	98.5	98.5	98.5	98.4	98.4	98.4
14	98.1	98.3	98.2	98.1	98.1	98.1	98.0	98.1	98.2
15	98.2	98.3	98.2	98.2	98.0	98.1	97.8	98.0	98.1
16	98.3	98.5	98.2	98.2	98.2	98.2	98.1	98.1	98.2
17	98.4	98.6	98.4	98.4	98.3	98.4	98.3	98.4	98.5
18	98.2	98.3	98.1	98.2	98.0	98.1	97.9	98.0	98.0
19	98.2	98.4	98.2	98.1	98.0	98.0	97.8	97.8	97.9
20	98.2	98.2	98.1	98.1	97.9	97.8	97.7	97.7	97.6
Mean	98.2	98.3	98.2	98.2	98.1	98.2	98.0	98.1	98.2
Median	98.2	98.3	98.2	98.2	98.1	98.2	98.0	98.1	98.2
std.dev	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Max	98.7	98.7	98.6	98.7	98.6	98.7	98.6	98.6	98.7
Min	97.8	97.8	97.7	97.8	97.6	97.7	97.6	97.6	97.6

9.1 Test condition 1

55 °C

Drive Current

1 000 mA

Measurement Current

1 000 mA

No.	Lumen Maintenance (%)								
	16 000 h	17 000 h	18 000 h	19 000 h	20 000 h	21 000 h	22 000 h	23 000 h	24 000 h
1	98.5	98.6							
2	97.7	97.7							
3	97.9	97.9							
4	98.5	98.5							
5	97.8	97.8							
6	98.7	98.6							
7	98.6	98.6							
8	98.2	98.2							
9	97.7	97.7							
10	97.5	97.6							
11	98.1	98.1							
12	98.3	98.4							
13	98.5	98.4							
14	98.1	98.0							
15	97.9	97.8							
16	98.1	98.2							
17	98.4	98.5							
18	98.0	97.9							
19	97.8	97.7							
20	97.6	97.5							
Mean	98.1	98.1							
Median	98.1	98.1							
std.dev	0.4	0.4							
Max	98.7	98.6							
Min	97.5	97.5							

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 F-P06-03(2020.04.01)

9.1 Test condition 1 55 °C
Drive Current 1 000 mA
Measurement Current 1 000 mA

No.	Chromaticity Shift ($\Delta u'v'$)								
	16 000 h	17 000 h	18 000 h	19 000 h	20 000 h	21 000 h	22 000 h	23 000 h	24 000 h
1	0.000 8	0.000 8							
2	0.000 6	0.000 6							
3	0.000 5	0.000 5							
4	0.000 7	0.000 8							
5	0.000 6	0.000 6							
6	0.000 6	0.000 6							
7	0.000 8	0.000 7							
8	0.000 7	0.000 7							
9	0.000 8	0.000 8							
10	0.000 8	0.000 8							
11	0.000 5	0.000 5							
12	0.000 6	0.000 6							
13	0.000 7	0.000 7							
14	0.000 5	0.000 5							
15	0.000 6	0.000 6							
16	0.000 7	0.000 7							
17	0.000 8	0.000 8							
18	0.000 6	0.000 6							
19	0.000 7	0.000 7							
20	0.000 6	0.000 6							
Mean	0.000 7	0.000 7							
Median	0.000 7	0.000 7							
std.dev	0.000 1	0.000 1							
Max	0.000 8	0.000 8							
Min	0.000 5	0.000 5							

9.2 Test condition 2. 85 °C
Drive Current 1 000 mA
Measurement Current 1 000 mA

No.	Lumen Maintenance (%)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	98.0	98.0	97.9	97.9	97.7	97.7	97.6	97.7	97.7
2	98.2	98.0	98.0	98.2	98.0	97.9	98.0	98.1	98.3
3	98.5	98.4	98.4	98.3	98.2	98.2	98.3	98.2	98.4
4	98.6	98.3	98.3	98.2	98.1	98.0	98.0	98.1	98.1
5	98.5	98.5	98.2	98.4	98.1	98.1	98.2	98.3	98.2
6	98.4	98.3	98.2	98.4	98.1	98.2	98.2	98.1	98.3
7	98.2	98.2	98.1	98.1	98.0	98.1	98.1	98.2	98.3
8	98.1	98.1	98.0	98.1	98.0	98.1	98.2	98.2	98.4
9	98.0	97.8	97.8	97.8	97.6	97.7	97.7	97.8	97.8
10	98.5	98.4	98.4	98.3	98.1	98.1	98.2	98.3	98.3
11	98.4	98.2	98.0	98.0	97.8	97.8	97.8	97.9	97.9
12	98.3	98.3	98.2	98.1	98.2	98.0	98.2	98.1	98.1
13	98.1	97.9	97.9	97.8	97.8	97.9	97.9	98.0	98.1
14	98.1	98.0	97.9	98.0	97.8	97.7	97.5	97.5	97.7
15	98.1	98.0	97.9	97.9	97.7	97.6	97.7	97.7	97.9
16	97.9	97.8	97.7	97.7	97.6	97.5	97.5	97.5	97.6
17	97.8	97.6	97.5	97.5	97.5	97.4	97.4	97.4	97.5
18	98.3	98.2	98.1	97.9	97.9	97.9	97.9	98.0	98.1
19	98.1	97.8	97.7	97.6	97.4	97.3	97.3	97.3	97.4
20	97.9	97.8	97.7	97.6	97.4	97.3	97.3	97.4	97.3
Mean	98.2	98.1	98.0	98.0	97.9	97.8	97.9	97.9	98.0
Median	98.1	98.1	98.0	98.0	97.9	97.9	97.9	98.0	98.1
std.dev	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Max	98.6	98.5	98.4	98.4	98.2	98.2	98.3	98.3	98.4
Min	97.8	97.6	97.5	97.5	97.4	97.3	97.3	97.3	97.3

9.2 Test condition 2**85 °C****Drive Current****1 000 mA****Measurement Current****1 000 mA**

No.	Chromaticity Shift ($\Delta u'v'$)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	0.000 6	0.000 6	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7
2	0.000 6	0.000 6	0.000 7	0.000 6	0.000 6	0.000 6	0.000 6	0.000 6	0.000 7
3	0.000 6	0.000 6	0.000 6	0.000 6	0.000 6	0.000 6	0.000 6	0.000 6	0.000 6
4	0.000 8	0.000 8	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7
5	0.000 6	0.000 8	0.000 7	0.000 6	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7
6	0.000 7	0.000 7	0.000 8	0.000 7	0.000 8	0.000 8	0.000 8	0.000 8	0.000 8
7	0.000 6	0.000 6	0.000 5	0.000 6	0.000 5	0.000 5	0.000 5	0.000 5	0.000 6
8	0.000 8	0.000 8	0.000 8	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7
9	0.000 6	0.000 7	0.000 7	0.000 6	0.000 7	0.000 7	0.000 7	0.000 7	0.000 7
10	0.000 7	0.000 7	0.000 8	0.000 7	0.000 7	0.000 7	0.000 7	0.000 8	0.000 8
11	0.000 9	0.000 9	0.001 0	0.001 0	0.001 0	0.001 0	0.001 0	0.001 1	0.001 1
12	0.000 9	0.001 0	0.001 1	0.001 1	0.001 2	0.001 2	0.001 2	0.001 3	0.001 3
13	0.001 0	0.001 0	0.001 1	0.001 2	0.001 2	0.001 2	0.001 2	0.001 2	0.001 3
14	0.000 8	0.000 8	0.001 0	0.001 0	0.001 1	0.001 1	0.001 2	0.001 2	0.001 2
15	0.001 0	0.001 0	0.001 0	0.001 0	0.001 0	0.001 1	0.001 1	0.001 1	0.001 2
16	0.001 0	0.001 0	0.001 1	0.001 0	0.001 1	0.001 1	0.001 1	0.001 1	0.001 1
17	0.000 8	0.000 9	0.000 9	0.000 9	0.001 0	0.001 1	0.001 1	0.001 1	0.001 1
18	0.000 9	0.000 9	0.001 0	0.001 1	0.001 1	0.001 1	0.001 1	0.001 2	0.001 2
19	0.000 7	0.000 8	0.000 8	0.000 8	0.000 8	0.000 9	0.000 9	0.001 0	0.001 0
20	0.000 8	0.000 7	0.000 8	0.000 8	0.000 8	0.000 9	0.000 9	0.000 9	0.000 9
Mean	0.000 8	0.000 8	0.000 8	0.000 8	0.000 8	0.000 9	0.000 9	0.000 9	0.000 9
Median	0.000 8	0.000 8	0.000 8	0.000 7	0.000 8	0.000 8	0.000 8	0.000 9	0.000 9
std.dev	0.000 1	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2
Max	0.001 0	0.001 0	0.001 1	0.001 2	0.001 2	0.001 2	0.001 2	0.001 3	0.001 3
Min	0.000 6	0.000 6	0.000 5	0.000 6	0.000 5	0.000 5	0.000 5	0.000 5	0.000 6

9.2 Test condition 2 **85 °C**
Drive Current **1 000 mA**
Measurement Current **1 000 mA**

No.	Chromaticity Shift ($\Delta u'v'$)								
	16 000 h	17 000 h	18 000 h	19 000 h	20 000 h	21 000 h	22 000 h	23 000 h	24 000 h
1	0.000 7	0.000 8							
2	0.000 7	0.000 7							
3	0.000 7	0.000 7							
4	0.000 7	0.000 7							
5	0.000 7	0.000 8							
6	0.000 9	0.000 9							
7	0.000 6	0.000 6							
8	0.000 7	0.000 7							
9	0.000 7	0.000 8							
10	0.000 8	0.000 8							
11	0.001 1	0.001 1							
12	0.001 3	0.001 4							
13	0.001 3	0.001 3							
14	0.001 2	0.001 2							
15	0.001 2	0.001 2							
16	0.001 2	0.001 2							
17	0.001 2	0.001 2							
18	0.001 2	0.001 2							
19	0.001 0	0.001 1							
20	0.001 0	0.001 0							
Mean	0.000 9	0.001 0							
Median	0.000 9	0.000 9							
std.dev	0.000 2	0.000 2							
Max	0.001 3	0.001 4							
Min	0.000 6	0.000 6							

9.2 Test condition 2

85 °C

Drive Current

1 000 mA

Measurement Current

1 000 mA

No.	CCT (K)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	2 707	2 706	2 707	2 705	2 706	2 705	2 705	2 705	2 704
2	2 680	2 679	2 680	2 678	2 678	2 678	2 677	2 677	2 677
3	2 702	2 701	2 700	2 701	2 700	2 699	2 699	2 699	2 698
4	2 684	2 683	2 682	2 680	2 680	2 680	2 679	2 679	2 679
5	2 711	2 713	2 711	2 710	2 710	2 710	2 709	2 709	2 709
6	2 721	2 720	2 722	2 720	2 721	2 720	2 720	2 720	2 720
7	2 728	2 727	2 725	2 726	2 725	2 724	2 724	2 724	2 723
8	2 702	2 701	2 701	2 698	2 698	2 698	2 698	2 697	2 697
9	2 691	2 692	2 691	2 689	2 690	2 689	2 689	2 689	2 689
10	2 725	2 723	2 725	2 723	2 723	2 723	2 723	2 722	2 722
11	2 675	2 675	2 675	2 675	2 676	2 676	2 675	2 676	2 675
12	2 711	2 712	2 713	2 713	2 714	2 714	2 714	2 714	2 715
13	2 736	2 736	2 738	2 738	2 739	2 738	2 737	2 737	2 738
14	2 680	2 679	2 682	2 682	2 683	2 683	2 684	2 683	2 684
15	2 716	2 716	2 716	2 715	2 715	2 716	2 716	2 716	2 716
16	2 733	2 733	2 733	2 733	2 733	2 733	2 733	2 732	2 732
17	2 706	2 708	2 708	2 708	2 709	2 709	2 709	2 709	2 709
18	2 722	2 721	2 723	2 723	2 723	2 724	2 723	2 724	2 724
19	2 687	2 687	2 686	2 686	2 687	2 687	2 688	2 688	2 688
20	2 665	2 664	2 665	2 664	2 665	2 665	2 664	2 665	2 665
Mean	2 704	2 704	2 704	2 703	2 704	2 704	2 703	2 703	2 703
Median	2 706	2 707	2 707	2 707	2 707	2 707	2 707	2 707	2 707
std.dev	21	21	21	21	21	21	21	21	21
Max	2 736	2 736	2 738	2 738	2 739	2 738	2 737	2 737	2 738
Min	2 665	2 664	2 665	2 664	2 665	2 665	2 664	2 665	2 665



9.2 Test condition 2 85 °C
Drive Current 1 000 mA
Measurement Current 1 000 mA

No.	CCT (K)								
	16 000 h	17 000 h	18 000 h	19 000 h	20 000 h	21 000 h	22 000 h	23 000 h	24 000 h
1	2 704	2 704							
2	2 677	2 676							
3	2 698	2 698							
4	2 679	2 679							
5	2 709	2 709							
6	2 720	2 720							
7	2 723	2 723							
8	2 697	2 696							
9	2 689	2 689							
10	2 722	2 722							
11	2 675	2 674							
12	2 715	2 715							
13	2 736	2 736							
14	2 684	2 684							
15	2 717	2 717							
16	2 732	2 732							
17	2 710	2 709							
18	2 724	2 723							
19	2 689	2 689							
20	2 666	2 665							
Mean	2 703	2 703							
Median	2 706	2 706							
std.dev	21	21							
Max	2 736	2 736							
Min	2 666	2 665							

9.3 Test condition 3 105 °C
Drive Current 1 000 mA
Measurement Current 1 000 mA

No.	Lumen Maintenance (%)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	97.4	97.4	97.5	97.4	97.3	97.2	97.2	97.1	97.2
2	96.9	96.8	97.0	97.0	96.9	97.0	97.0	97.0	97.1
3	97.4	97.1	97.3	97.3	97.2	97.2	97.1	97.1	97.2
4	97.2	97.2	97.4	97.1	97.1	97.0	97.0	96.9	97.0
5	97.1	96.9	97.0	97.0	96.7	96.7	96.6	96.5	96.6
6	97.0	97.0	97.2	97.0	96.8	96.8	96.8	96.7	96.8
7	96.7	96.7	96.8	96.8	96.6	96.5	96.5	96.4	96.4
8	96.6	96.6	96.5	96.4	96.4	96.3	96.2	96.0	96.1
9	97.1	97.0	97.2	97.1	97.0	97.0	97.0	96.9	97.0
10	97.5	97.3	97.5	97.4	97.3	97.1	97.0	96.9	96.9
11	97.0	96.9	97.1	97.1	97.0	97.0	97.1	97.0	97.1
12	96.9	97.0	96.9	96.9	96.8	96.8	96.9	96.7	96.9
13	97.2	97.0	97.1	96.9	96.7	96.7	96.6	96.6	96.7
14	97.2	96.9	96.8	96.6	96.3	96.1	96.1	96.0	96.0
15	97.7	97.2	97.2	97.2	96.9	96.7	96.5	96.3	96.3
16	97.3	97.2	97.1	97.0	96.9	96.8	96.7	96.6	96.6
17	97.0	97.0	97.1	97.1	97.0	97.0	97.0	96.8	96.9
18	97.0	97.0	97.1	97.0	96.9	96.9	96.9	96.9	96.9
19	97.2	97.1	97.3	97.1	97.1	97.0	97.1	97.0	97.1
20	96.9	96.6	96.9	96.6	96.5	96.4	96.4	96.2	96.3
Mean	97.1	97.0	97.1	97.0	96.9	96.8	96.8	96.7	96.8
Median	97.1	97.0	97.1	97.0	96.9	96.9	96.9	96.8	96.9
std.dev	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4
Max	97.7	97.4	97.5	97.4	97.3	97.2	97.2	97.1	97.2
Min	96.6	96.6	96.5	96.4	96.3	96.1	96.1	96.0	96.0

9.3 Test condition 3 **105 °C**
Drive Current **1 000 mA**
Measurement Current **1 000 mA**

No.	Lumen Maintenance (%)								
	16 000 h	17 000 h	18 000 h	19 000 h	20 000 h	21 000 h	22 000 h	23 000 h	24 000 h
1	97.1	97.0							
2	97.0	96.9							
3	97.0	97.0							
4	96.9	96.8							
5	96.4	96.3							
6	96.6	96.6							
7	96.3	96.2							
8	96.0	95.9							
9	96.9	96.9							
10	96.7	96.5							
11	96.9	96.8							
12	96.8	96.6							
13	96.5	96.5							
14	95.8	95.8							
15	96.0	95.9							
16	96.5	96.3							
17	96.8	96.8							
18	96.9	96.7							
19	96.9	96.8							
20	96.1	96.1							
Mean	96.6	96.5							
Median	96.7	96.6							
std.dev	0.4	0.4							
Max	97.1	97.0							
Min	95.8	95.8							

9.3 Test condition 3 **105 °C**
Drive Current **1 000 mA**
Measurement Current **1 000 mA**

No.	u'	v'	Chromaticity Shift ($\Delta u'v'$)						
	0 h		500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	0.260 9	0.526 2	0.000 9	0.001 3	0.001 4	0.001 6	0.001 6	0.001 6	0.001 6
2	0.264 2	0.528 9	0.000 6	0.000 7	0.001 0	0.000 8	0.001 0	0.001 1	0.001 1
3	0.261 9	0.527 2	0.000 9	0.001 3	0.001 7	0.001 5	0.001 6	0.001 5	0.001 5
4	0.261 4	0.527 2	0.001 0	0.001 3	0.001 4	0.001 5	0.001 6	0.001 5	0.001 4
5	0.263 3	0.528 5	0.000 6	0.000 9	0.001 1	0.001 2	0.001 2	0.001 5	0.001 4
6	0.263 0	0.527 7	0.000 6	0.000 5	0.000 8	0.000 9	0.000 8	0.000 9	0.001 0
7	0.263 7	0.528 6	0.000 9	0.000 8	0.001 3	0.001 1	0.001 3	0.001 1	0.001 2
8	0.262 3	0.529 6	0.000 9	0.001 2	0.001 4	0.001 5	0.001 6	0.001 5	0.001 4
9	0.263 0	0.528 7	0.000 8	0.001 2	0.001 4	0.001 5	0.001 4	0.001 5	0.001 4
10	0.261 2	0.528 7	0.000 4	0.001 0	0.001 4	0.001 3	0.001 3	0.001 4	0.001 5
11	0.263 1	0.527 1	0.001 1	0.001 2	0.001 4	0.001 2	0.001 5	0.001 3	0.001 3
12	0.261 9	0.528 0	0.001 0	0.001 3	0.001 3	0.001 4	0.001 6	0.001 5	0.001 4
13	0.262 0	0.526 3	0.000 9	0.001 2	0.001 3	0.001 4	0.001 4	0.001 5	0.001 4
14	0.262 1	0.527 3	0.001 0	0.001 1	0.001 3	0.001 5	0.001 4	0.001 5	0.001 5
15	0.262 2	0.527 9	0.000 7	0.001 1	0.001 3	0.001 1	0.001 3	0.001 2	0.001 2
16	0.261 8	0.525 8	0.001 0	0.001 3	0.001 6	0.001 5	0.001 7	0.001 5	0.001 4
17	0.261 1	0.527 0	0.000 5	0.000 7	0.001 0	0.001 1	0.001 3	0.001 1	0.001 1
18	0.261 3	0.527 0	0.000 7	0.000 6	0.001 0	0.001 3	0.001 2	0.001 3	0.001 3
19	0.263 5	0.528 3	0.001 0	0.001 0	0.001 3	0.001 1	0.001 3	0.001 5	0.001 1
20	0.261 8	0.527 0	0.001 1	0.001 3	0.001 6	0.001 5	0.001 7	0.001 6	0.001 5
Mean	0.262 3	0.527 6	0.000 8	0.001 1	0.001 3	0.001 3	0.001 4	0.001 4	0.001 3
Median	0.262 0	0.527 5	0.000 9	0.001 1	0.001 3	0.001 4	0.001 4	0.001 5	0.001 4
std.dev	0.001 0	0.001 0	0.000 2	0.000 3	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2
Max	0.264 2	0.529 6	0.001 1	0.001 3	0.001 7	0.001 6	0.001 7	0.001 6	0.001 6
Min	0.260 9	0.525 8	0.000 4	0.000 5	0.000 8	0.000 8	0.000 8	0.000 9	0.001 0

9.3 Test condition 3 105 °C
 Drive Current 1 000 mA
 Measurement Current 1 000 mA

No.	Chromaticity Shift ($\Delta u'v'$)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	0.001 8	0.002 0	0.002 0	0.002 0	0.002 0	0.002 1	0.002 1	0.002 1	0.002 2
2	0.001 1	0.001 0	0.001 2	0.001 1	0.001 2	0.001 3	0.001 3	0.001 3	0.001 3
3	0.001 7	0.001 6	0.001 6	0.001 5	0.001 6	0.001 6	0.001 6	0.001 6	0.001 6
4	0.001 7	0.001 6	0.001 6	0.001 5	0.001 6	0.001 6	0.001 6	0.001 6	0.001 7
5	0.001 4	0.001 7	0.001 6	0.001 5	0.001 7	0.001 8	0.001 8	0.001 8	0.001 9
6	0.001 0	0.000 9	0.001 1	0.001 2	0.001 2	0.001 3	0.001 3	0.001 3	0.001 4
7	0.001 3	0.001 3	0.001 2	0.001 2	0.001 3	0.001 3	0.001 3	0.001 3	0.001 4
8	0.001 6	0.001 6	0.001 5	0.001 4	0.001 6	0.001 6	0.001 5	0.001 5	0.001 6
9	0.001 4	0.001 6	0.001 6	0.001 4	0.001 6	0.001 6	0.001 6	0.001 6	0.001 7
10	0.001 3	0.001 2	0.001 4	0.001 3	0.001 4	0.001 4	0.001 4	0.001 4	0.001 5
11	0.001 5	0.001 5	0.001 5	0.001 6	0.001 6	0.001 7	0.001 7	0.001 7	0.001 8
12	0.001 5	0.001 6	0.001 5	0.001 5	0.001 6	0.001 6	0.001 6	0.001 5	0.001 6
13	0.001 5	0.001 7	0.001 7	0.001 7	0.001 8	0.001 9	0.001 9	0.001 9	0.002 0
14	0.001 5	0.001 5	0.001 7	0.001 6	0.001 7	0.001 8	0.001 7	0.001 7	0.001 8
15	0.001 3	0.001 2	0.001 5	0.001 3	0.001 4	0.001 5	0.001 4	0.001 4	0.001 5
16	0.001 8	0.001 9	0.001 9	0.001 8	0.001 9	0.002 0	0.002 0	0.002 0	0.002 1
17	0.001 2	0.001 4	0.001 3	0.001 3	0.001 4	0.001 5	0.001 5	0.001 5	0.001 5
18	0.001 2	0.001 2	0.001 4	0.001 3	0.001 3	0.001 4	0.001 4	0.001 4	0.001 5
19	0.001 3	0.001 3	0.001 6	0.001 5	0.001 6	0.001 6	0.001 7	0.001 6	0.001 7
20	0.001 6	0.001 6	0.001 5	0.001 5	0.001 6	0.001 6	0.001 5	0.001 5	0.001 6
Mean	0.001 4	0.001 5	0.001 5	0.001 5	0.001 6	0.001 6	0.001 6	0.001 6	0.001 7
Median	0.001 5	0.001 5	0.001 5	0.001 5	0.001 6	0.001 6	0.001 6	0.001 5	0.001 6
std.dev	0.000 2	0.000 3	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2	0.000 2
Max	0.001 8	0.002 0	0.002 0	0.002 0	0.002 0	0.002 1	0.002 1	0.002 1	0.002 2
Min	0.001 0	0.000 9	0.001 1	0.001 1	0.001 2	0.001 3	0.001 3	0.001 3	0.001 3

9.3 Test condition 3 105 °C
 Drive Current 1 000 mA
 Measurement Current 1 000 mA

No.	Chromaticity Shift ($\Delta u'v'$)								
	16 000 h	17 000 h	18 000 h	19 000 h	20 000 h	21 000 h	22 000 h	23 000 h	24 000 h
1	0.002 3	0.002 3							
2	0.001 4	0.001 5							
3	0.001 7	0.001 7							
4	0.001 7	0.001 8							
5	0.002 0	0.002 1							
6	0.001 5	0.001 6							
7	0.001 4	0.001 5							
8	0.001 6	0.001 7							
9	0.001 7	0.001 8							
10	0.001 5	0.001 6							
11	0.001 8	0.001 9							
12	0.001 7	0.001 7							
13	0.002 1	0.002 2							
14	0.001 9	0.001 9							
15	0.001 6	0.001 7							
16	0.002 2	0.002 3							
17	0.001 6	0.001 7							
18	0.001 5	0.001 6							
19	0.001 8	0.001 9							
20	0.001 6	0.001 7							
Mean	0.001 7	0.001 8							
Median	0.001 7	0.001 7							
std.dev	0.000 3	0.000 3							
Max	0.002 3	0.002 3							
Min	0.001 4	0.001 5							

9.3 Test condition 3 105 °C
Drive Current 1 000 mA
Measurement Current 1 000 mA

No.	CCT (K)							
	0 h	500 h	1 000 h	2 000 h	3 000 h	4 000 h	5 000 h	6 000 h
1	2 735	2 751	2 758	2 761	2 762	2 762	2 762	2 759
2	2 652	2 664	2 664	2 669	2 664	2 667	2 669	2 666
3	2 709	2 727	2 734	2 740	2 735	2 738	2 735	2 733
4	2 718	2 737	2 744	2 745	2 746	2 747	2 744	2 741
5	2 674	2 685	2 690	2 694	2 694	2 693	2 698	2 695
6	2 682	2 692	2 690	2 695	2 695	2 693	2 693	2 693
7	2 665	2 680	2 680	2 689	2 683	2 686	2 682	2 682
8	2 691	2 709	2 714	2 717	2 717	2 719	2 716	2 713
9	2 680	2 696	2 701	2 705	2 706	2 705	2 706	2 702
10	2 717	2 723	2 735	2 742	2 740	2 738	2 739	2 740
11	2 683	2 702	2 704	2 709	2 704	2 707	2 703	2 701
12	2 705	2 724	2 730	2 730	2 730	2 732	2 730	2 727
13	2 710	2 728	2 734	2 735	2 735	2 734	2 735	2 732
14	2 704	2 723	2 723	2 728	2 729	2 727	2 728	2 728
15	2 699	2 710	2 718	2 721	2 717	2 720	2 716	2 715
16	2 717	2 733	2 739	2 746	2 742	2 744	2 741	2 735
17	2 726	2 734	2 738	2 742	2 744	2 747	2 742	2 740
18	2 722	2 734	2 733	2 740	2 744	2 742	2 743	2 740
19	2 669	2 688	2 688	2 693	2 686	2 691	2 693	2 684
20	2 712	2 733	2 738	2 740	2 739	2 742	2 739	2 736
Mean	2 698	2 714	2 718	2 722	2 721	2 722	2 721	2 718
Median	2 704	2 723	2 727	2 729	2 730	2 730	2 729	2 727
std.dev	23	23	25	24	26	26	25	25
Max	2 735	2 751	2 758	2 761	2 762	2 762	2 762	2 759
Min	2 652	2 664	2 664	2 669	2 664	2 667	2 669	2 666

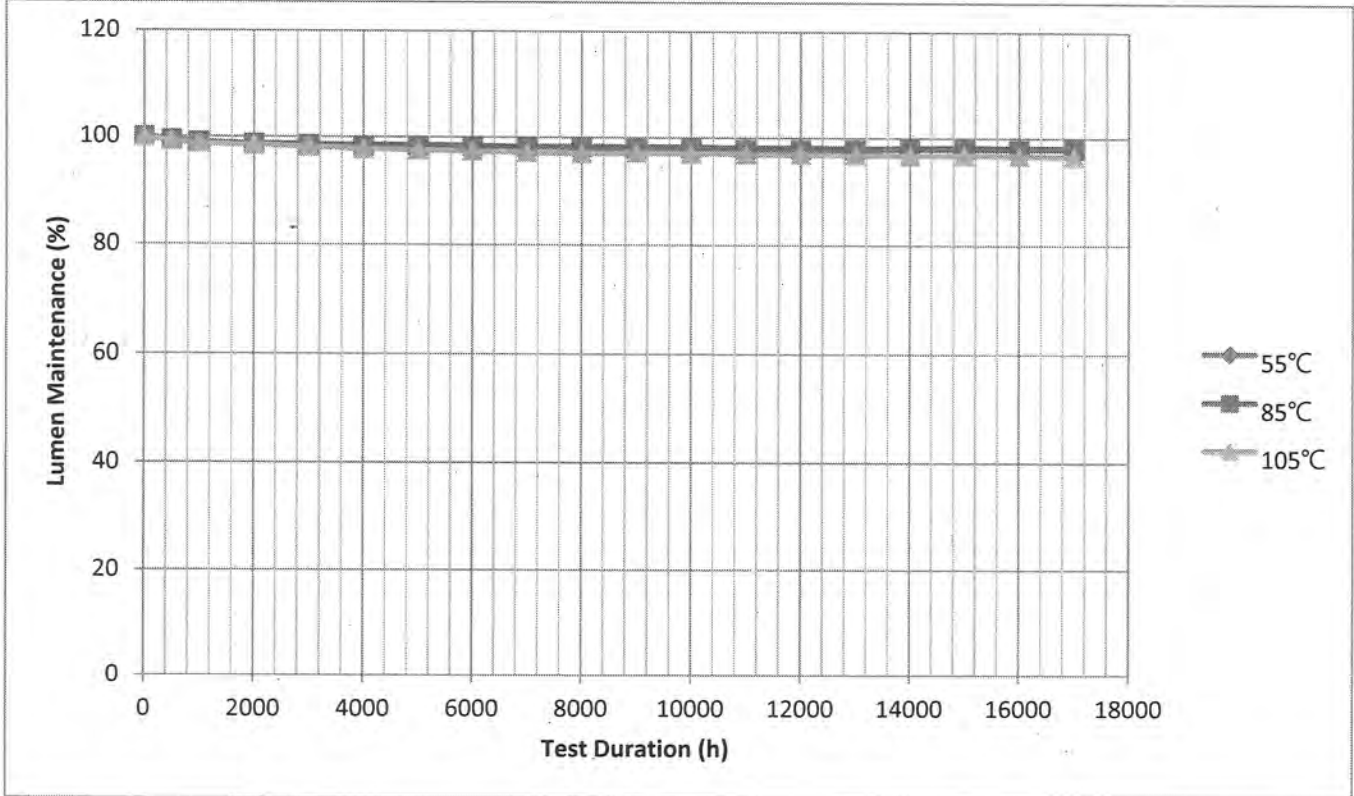


9.3 Test condition 3 105 °C
Drive Current 1 000 mA
Measurement Current 1 000 mA

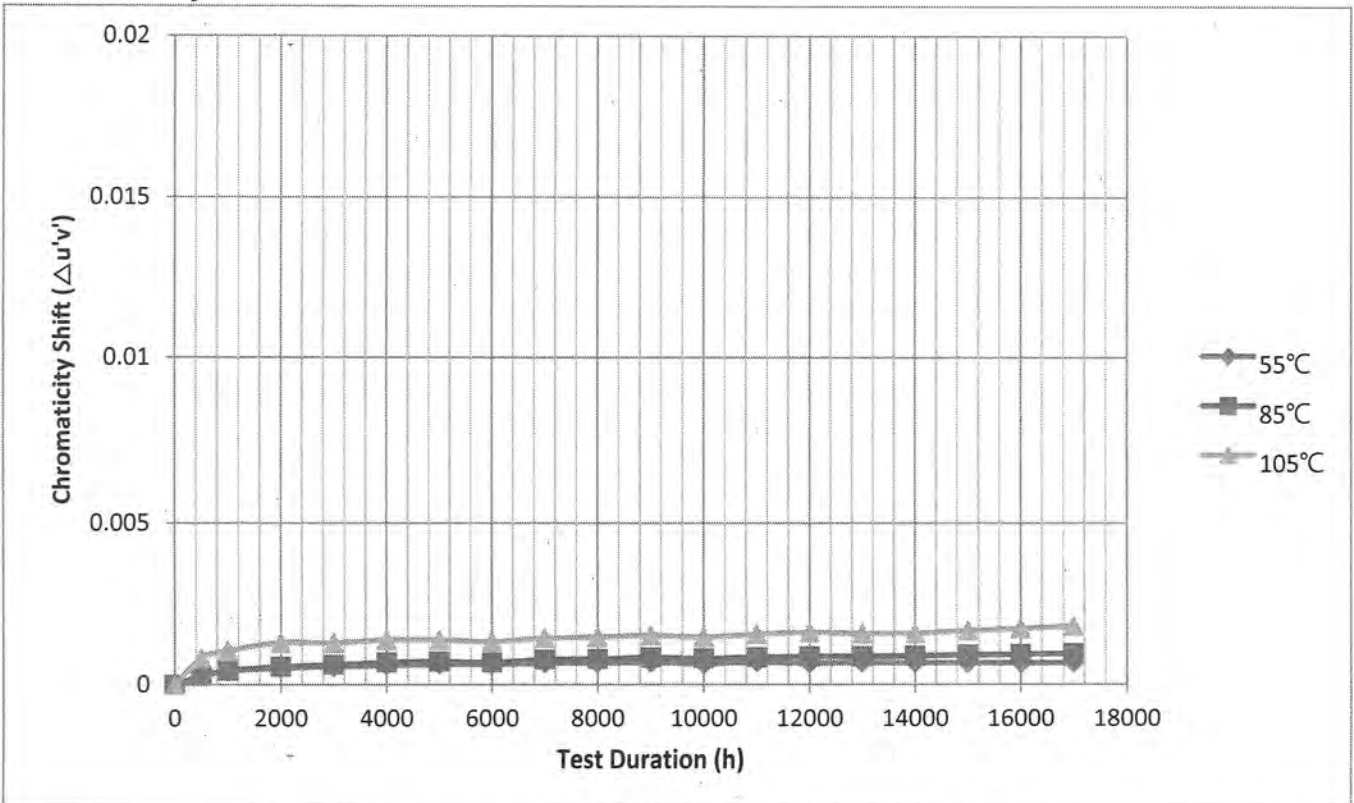
No.	CCT (K)								
	7 000 h	8 000 h	9 000 h	10 000 h	11 000 h	12 000 h	13 000 h	14 000 h	15 000 h
1	2 763	2 765	2 763	2 760	2 761	2 761	2 760	2 760	2 760
2	2 664	2 662	2 661	2 657	2 658	2 658	2 656	2 656	2 655
3	2 733	2 732	2 727	2 723	2 724	2 722	2 719	2 717	2 717
4	2 744	2 741	2 737	2 733	2 734	2 732	2 730	2 728	2 728
5	2 695	2 698	2 695	2 690	2 694	2 694	2 692	2 692	2 693
6	2 691	2 689	2 689	2 686	2 686	2 685	2 683	2 682	2 681
7	2 682	2 679	2 674	2 672	2 672	2 670	2 667	2 665	2 665
8	2 714	2 713	2 708	2 705	2 706	2 704	2 701	2 700	2 699
9	2 700	2 703	2 699	2 694	2 696	2 694	2 692	2 691	2 691
10	2 734	2 732	2 732	2 727	2 727	2 725	2 722	2 721	2 721
11	2 704	2 702	2 699	2 700	2 698	2 698	2 696	2 694	2 694
12	2 728	2 727	2 723	2 720	2 720	2 719	2 716	2 715	2 714
13	2 734	2 736	2 734	2 730	2 732	2 732	2 730	2 730	2 730
14	2 726	2 726	2 728	2 724	2 725	2 725	2 723	2 722	2 722
15	2 715	2 712	2 714	2 707	2 708	2 707	2 705	2 703	2 703
16	2 741	2 744	2 740	2 734	2 737	2 736	2 734	2 733	2 734
17	2 739	2 743	2 738	2 735	2 736	2 734	2 732	2 731	2 732
18	2 736	2 735	2 734	2 727	2 728	2 726	2 723	2 722	2 722
19	2 686	2 685	2 687	2 684	2 684	2 683	2 682	2 680	2 680
20	2 737	2 735	2 731	2 727	2 727	2 725	2 723	2 721	2 721
Mean	2 718	2 718	2 716	2 712	2 713	2 712	2 709	2 708	2 708
Median	2 727	2 726	2 725	2 721	2 722	2 720	2 718	2 716	2 716
std.dev	25	26	26	25	25	25	26	26	26
Max	2 763	2 765	2 763	2 760	2 761	2 761	2 760	2 760	2 760
Min	2 664	2 662	2 661	2 657	2 658	2 658	2 656	2 656	2 655

9.4 Chart

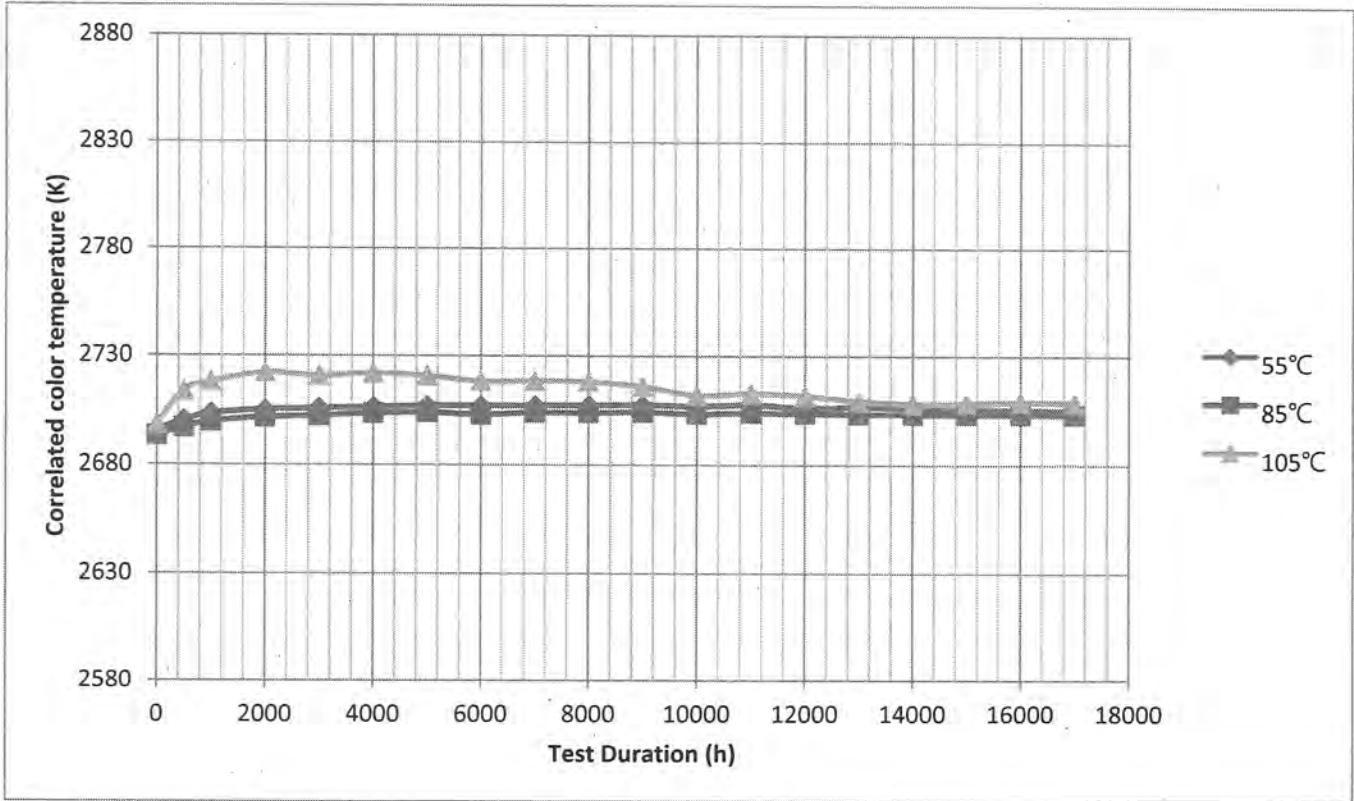
<Lumen Maintenance>



<Chromaticity Shift>



<CCT>



10. Observation of failures

No optical, Electrical or mechanical failure of any LED Package was seen during the lifetime testing.

11. LED light source monitoring interval

0 500 1 000 2 000 3 000 4 000 5 000 6 000 7 000 8 000
9 000 10 000 11 000 12 000 13 000 14 000 15 000 16 000 17 000

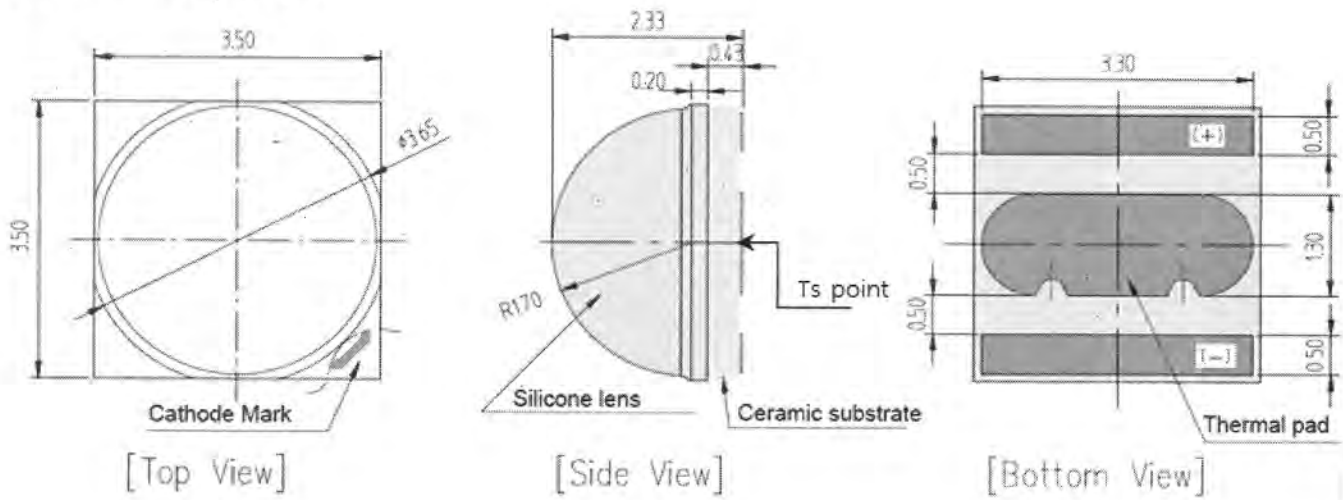
12. Photometric measurement uncertainty

3.5%

13. TM-21-11 Report : Projecting Long Term Lumen Maintenance of LED Light Source

Table 1: Report at each LM-80 Test Condition							
Description of LED Light Source Tested (manufacturer, model, catalog number)		Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°C Case Temp		Test Condition 3 - 105°C Case Temp	
Sample size	20	Sample size	20	Sample size	20	Sample size	20
Number of failures	0	Number of failures	0	Number of failures	0	Number of failures	0
DUT drive current used in the test (mA)	1 000	DUT drive current used in the test (mA)	1 000	DUT drive current used in the test (mA)	1 000	DUT drive current used in the test (mA)	1 000
Test duration (hours)	17,000	Test duration (hours)	17,000	Test duration (hours)	17,000	Test duration (hours)	17,000
Test duration used for projection (hour to hour)	8,000 - 17,000	Test duration used for projection (hour to hour)	8,000 - 17,000	Test duration used for projection (hour to hour)	8,000 - 17,000	Test duration used for projection (hour to hour)	8,000 - 17,000
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105	Tested case temperature (°C)	105
α	1.667E-07	α	1.484E-07	α	6.010E-07	α	6.010E-07
B	0.984	B	0.981	B	0.975	B	0.975
Reported L90(17k) (hours)	>102000	Reported L90(17k) (hours)	>102000	Reported L90(17k) (hours)	>102000	Reported L90(17k) (hours)	>102000

14. Dimension of samples



15. Cover models

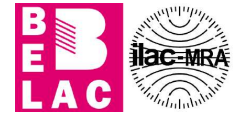
*******END OF TEST REPORT*******

LED Flux measurement

FORM-L-41 ED1 REV 2

Date : **16-01-19**

Operator : **FCE**



Filename : **2019_64.xml**

226 - TEST

NBN EN ISO/IEC 17025 : 2005

LEDs

Trademark : **Samsung**

Entry number : **39R006-4**

Type : **LH351C**

Power (Catalogue) : **0,00** W

BIN Description : **40-70M-4-TB-RB**

Flux : **0** lm/LED

Part number : **Unknown**

Color or CCT (Theoretical) : **NW**

Number of LEDs : **16**

Lenses

Trademark : **None**

Type : **None**

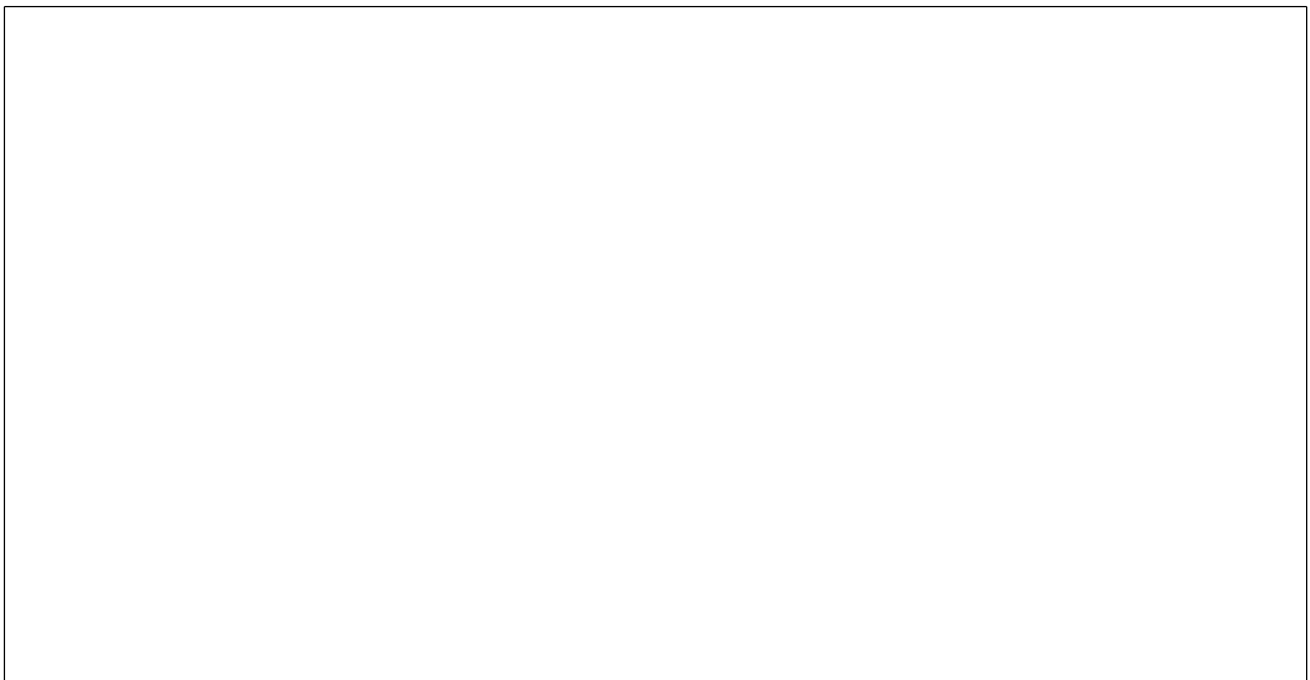
Power & Print

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

Print description : **00-71-627 A - Voltana 2**

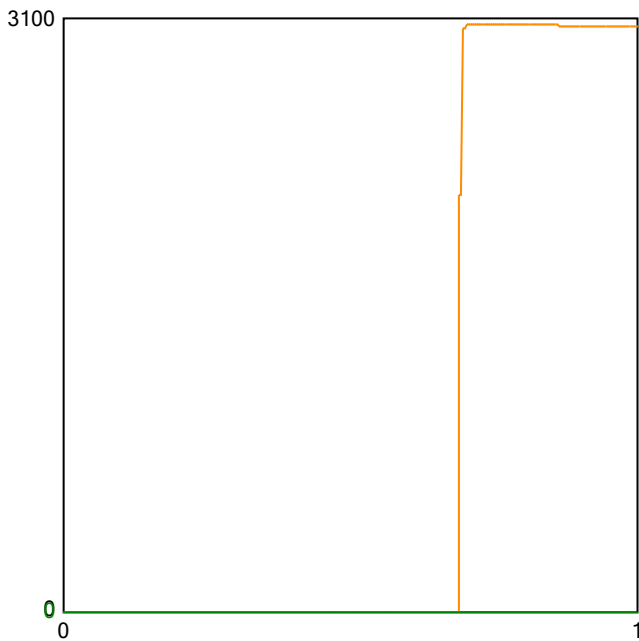
Active

Picture



Sphere photometric measurement

Maximum flux : **3074** lumens



Operating condition

Position in sphere :



Ambient sphere T ° : **24,3**

Electrical measurement

● Secondary electrical measurement

Voltage : **44,90** V

Current : **0,350** A

Power : **15,70** Watt

→ LEDs light efficiency at 25° :

195,9 lm/W

192,1 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 Voltana 2 - 16 Samsung LH351C - pcb N°4

Comment :

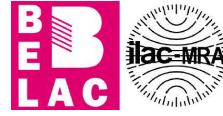
FORM-L-41 ED1 REV 2



226 - TEST

Approved by :

LED 2019/64 2/3



226 - TEST

NBN EN ISO/IEC 17025 : 2005

Colorimetry

File Preset Options Extra Calibration Info

Preset: CRI

Auto: ref: illuminant - Planckian radiator, CCT= 3862 K

Auto: ref: illuminant - Planckian radiator, CCT= 3862 K

Auto: ref: illuminant - Planckian radiator, CCT= 3862 K

Auto: ref: illuminant - Planckian radiator, CCT= 3862 K

Color Sample	Value
R1	68.5
R2	80.2
R3	90.3
R4	70.7
R5	69.3
R6	72.8
R7	78.7
R8	47.2
R9	39.5
R10	54.6
R11	67.5
R12	48.9
R13	70.6
R14	94.7
R15	60.2

Chromaticity difference DC= 6.4E-4

JIS color sample Re= 62.33 (mean value of R1 - R15)

Chromaticity x 0.3863 y 0.3792

Chromaticity u' 0.2280 v' 0.5035

Transfer data to table

Target

Calibration File: #1 no accessory

Measurement Mode: Radiance

Weighting Function: None

Average: 1

Measurement

Cont: 10

Hold Integration Time

Quick mode

QUIT

Auto: ref: illuminant - Planckian radiator, CCT= 3862 K

Luminance L_v 5.033E+2 $\frac{cd}{m^2}$

Radiance L_e 1.427E+0 $\frac{W}{m^2 \cdot sr}$ (380-780nm)

Corr. Color Temp CCT 3863 K

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
Source				
Type LED	BIN 40-70M-4-TB-RB	Trademark Samsung	Reference LH351C	# LEDs 16
Reflector 5141				
Master -	Reflector Schröder Led assembly Wide Assembled 0.0°			No 5141
Protector Refractor Lens				
Protector Lens	Glass Extra Clear Flat Smooth Gaggione 5141 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 5141 Flux coefficient multiplier (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 CLD	Approved by RLABO	Appendix 1	  226-TEST NBN EN ISO/IEC 17025 : 2005	42467
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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 5141			
Reflector	Schreder Led assembly Wide Assembled 0.0°				No	5141			
Matrices	424671		Φ 0-90° = 2623lm - 90-180° = 0lm			Absolute measurement			
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5141 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 = 138.73 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		↕	
25 - 155	1905	64	S						
90	1006	46	D	542	25.1°	31-01-2019			
270	542	0	G						
									42467

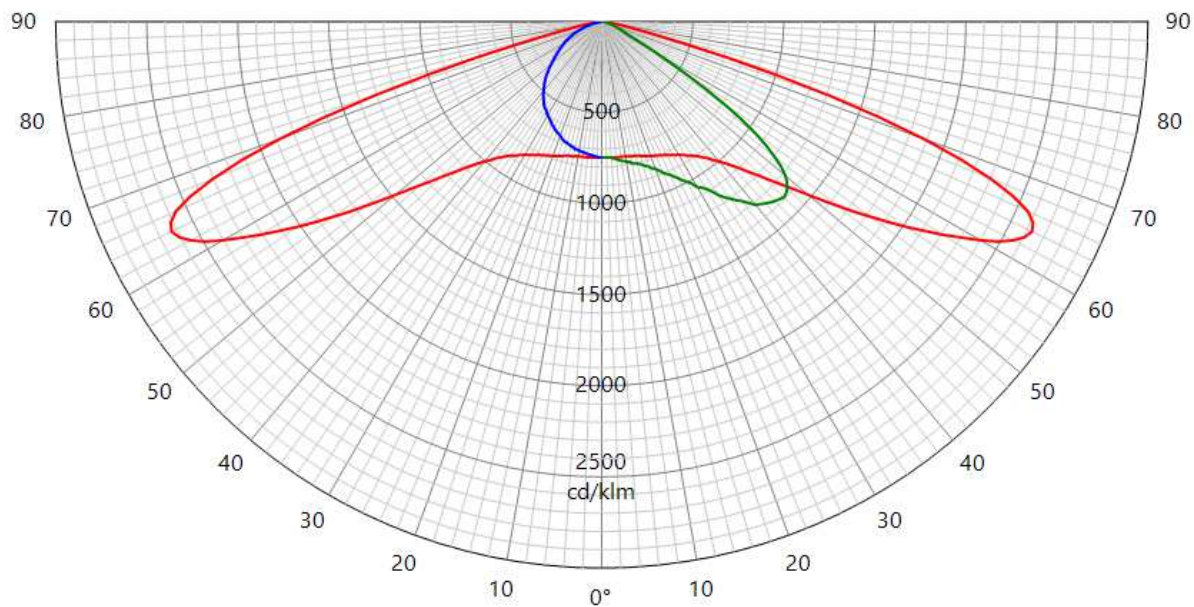
LUMINOUS INTENSITY DIAGRAM

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 5141			
Reflector	Schreder Led assembly Wide Assembled 0.0°				No	5141			
Matrices	424672		η 0-90° = 85.3% - 90-180° = 0.0%			Relative measurement			
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5141 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		↕	
25 - 155	620	64	S	176	25.1°	31-01-2019			
90	327	46	D						
270	176	0	G						
									42467

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 5141			
Reflector	Schröder Led assembly Wide Assembled 0.0°				No	5141			
Matrices	424673		Φ 0-90° = 3620lm - 90-180° = 0lm			Absolute measurement			
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5141 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 = 137.13 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	↕
25 - 155	2629	64	S	748	25.1°	31-01-2019	
90	1389	46	D				
270	748	0	G				

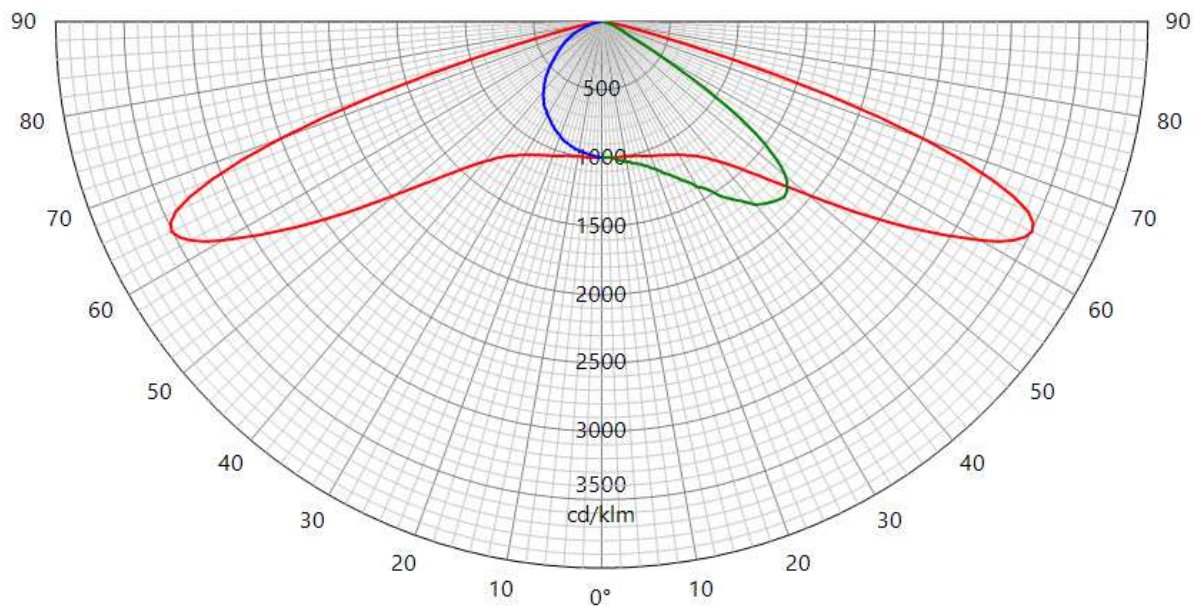


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LUMINOUS INTENSITY DIAGRAM

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 5141			
Reflector	Schröder Led assembly Wide Assembled 0.0°				No	5141			
Matrices	424674		Φ 0-90° = 4827lm - 90-180° = 0lm			Absolute measurement			
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5141 PMMA								
Observation	<p>Matrix in total flux @700 mA</p> <p>Light losses due to thermal stabilization: 2,6 %</p> <p>Electrical measurement on LED (#1) : Voltage = 46.53 V Current = 0.700 A Power = 32.52 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.165 A Power = 36.87 W PF = 0.973</p> <p>Total luminaire power = 36.87 W : Lm/Watt = 130.92 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	↕
25 - 155	3506	64	S	997	25.1°	31-01-2019	
90	1851	46	D				
270	997	0	G				

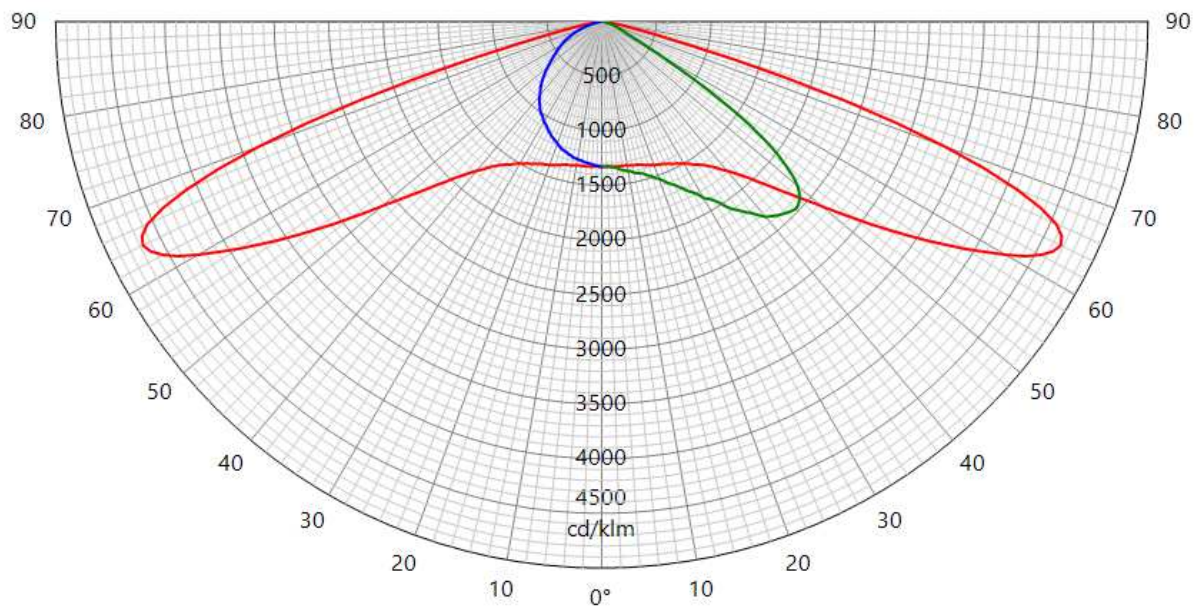


42467

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 5141			
Reflector	Schreder Led assembly Wide Assembled 0.0°				No	5141			
Matrices	424675		Φ 0-90° = 6435lm - 90-180° = 0lm			Absolute measurement			
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5141 PMMA								
Observation	<p>Matrix in total flux @1000 mA</p> <p>Light losses due to thermal stabilization: 3,6 %</p> <p>Electrical measurement on LED (#1) : Voltage = 47.84 V Current = 1.000 A Power = 47.84 W</p> <p>Electrical measurement on driver (#1) : Voltage = 230.00 V Current = 0.236 A Power = 53.37 W PF = 0.982</p> <p>Total luminaire power = 53.37 W : Lm/Watt = 120.57 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	↕
25 - 155	4673	64	S	1329	25.1°	31-01-2019	
90	2468	46	D				
270	1329	0	G				



42467

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)







VOLTANA 2

5141

Optic	5141
Protector	Flat glass
Source	16 Samsung LH351C
Matrix	424672




Characteristics

							
518	240	109	4.6	IP 66	IK 08	I EU, II EU	0.019
Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Tightness level*	Impact resistance*	Electrical class*	CxS (m ²)

* According to IEC-EN60598 and IEC-EN62262

Features

The ultimate, cost-effective, performing family of luminaires that pays for itself

- Cost-effective and efficient lighting solution for a fast return on investment
- High performance with safety and comfort
- 5 sizes for flexibility
- IP 66 tightness level
- ThermiX® to withstand high temperatures
- Designed to incorporate the Owlet range of control solutions

Types of application

- Square and park
- Roundabout
- Residential road
- Urban road

Information for 1000 lm matrix

Efficacy (%)	85.3	G Class (EN 13201-2)	G4	I 70-80-90-95 (cd)	443 - 22 - X - X
DLOR (%)	85.3	G* (EN 13201 2015)	G*3	CIE flux code N 1→5 (%)	34.4 - 74.4 - 98.6 - 100.0 - 85.3
ULOR (%)	0.0	Imax (cd)	620	Gradient 90°	31cd
ULR (%)	0.0	Aperture 0-180°	X - X	Gradient 270°	4cd
Incl ULR 4%	-41/34°	Aperture 90-270°	40 - 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°									
16	NW 740	350	18	3040	2594	144	1884	B1 U0 G1	230
16	NW 740	500	26	4195	3580	138	2600	B1 U0 G1	230
16	NW 740	700	37	5594	4773	129	3467	B1 U0 G1	230
16	NW 740	1000	53	7457	6364	120	4622	B2 U0 G1	230
16	NW 740	1050	58	7737	6602	114	4795	B2 U0 G1	230
16	WW 730	350	18	2880	2458	137	1785	B1 U0 G1	230
16	WW 730	500	26	3974	3392	130	2463	B1 U0 G1	230
16	WW 730	700	37	5299	4522	122	3284	B1 U0 G1	230
16	WW 730	1000	53	7065	6029	114	4378	B1 U0 G1	230
16	WW 730	1050	58	7330	6255	108	4543	B2 U0 G1	230

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

Summary

CONCEPT

Family of 6 road LED luminaires

Recommended installation height: between 4.00 and 12.00m

For optimal heat dissipation, the driver and LED engine are in separate compartments and juxtaposed in a horizontal section

HOUSING & FINISH

- Housing in high-pressure, die-cast aluminium, polyester powder coated
- Colour: RAL 7038

INSTALLATION

- Luminaire can be fixed by side-entry with a clamp, suitable for 42-60mm diameter
- Built-in inclination steps: -10°, -5°, 0°, 5°
- Post-top adapter diameter 48-60mm or 76mm, tightened with 2 stainless steel screws
- Direct access to the driver compartment with screws for easy maintenance on-site

OPTICAL UNIT

- Protected against lens degradation by 5mm thick extra-clear hardened glass
- Flatbed PCB with acrylic lens overlay principle
- Various photometric distributions: from narrow road to motorway, medium and large area
- CRI > 70
- ULOR: 0%

LED lumen depreciation

- Lifetime residual flux @ Tq=25°C @ 100.000 hrs: 350mA & 500mA: 90%; 700mA: 80%; 1A: 70%

ELECTRICAL

- Class I or Class II
- Input voltage: 120-277V - 50-60Hz
- Power factor > 90% at full load
- Surge protection: 4kV minimum (10kV + 10kA optional)
- Thermal protection on LED PCBA (see Thermix concept)

STANDARDS & CERTIFICATIONS

- CE
- ENEC
- LM79-80
- ROHS
- Certified for 3G vibration
- All measurements in ISO17025 accredited laboratory

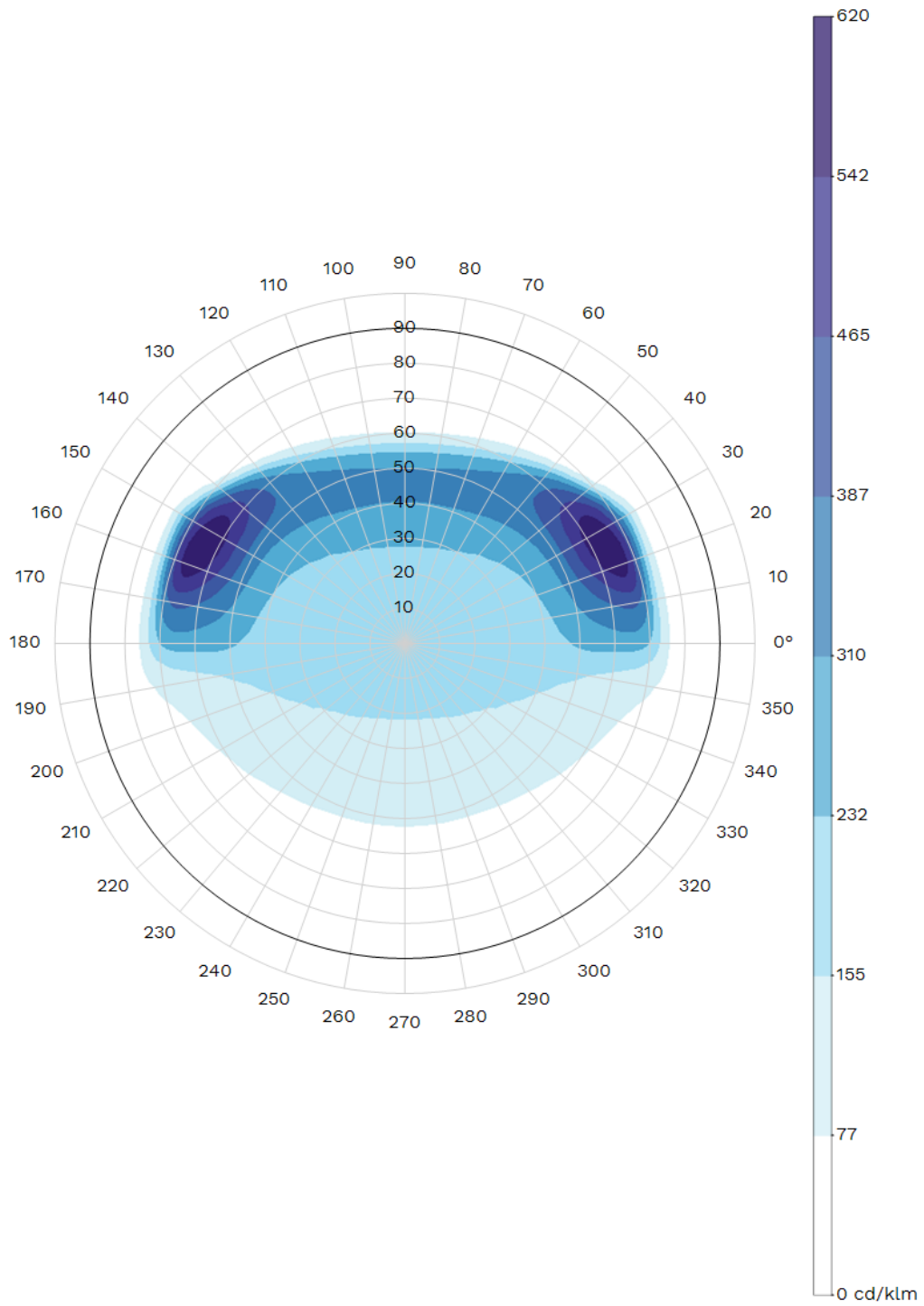
OPTIONS

- Other RAL or AKZO colours
- Back Light control system
- OWLET remote management
- Custom dimming profile

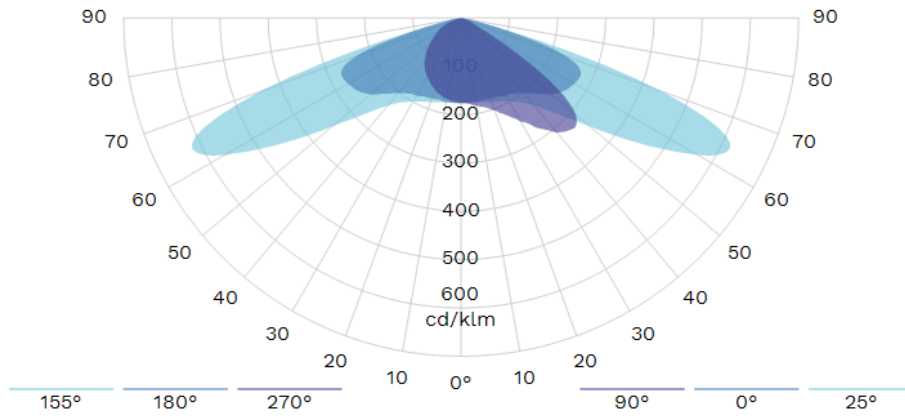
VOLTANA 2 - 5141 - 16 Samsung LH351C - Flat glass - 424672

24/10/2020

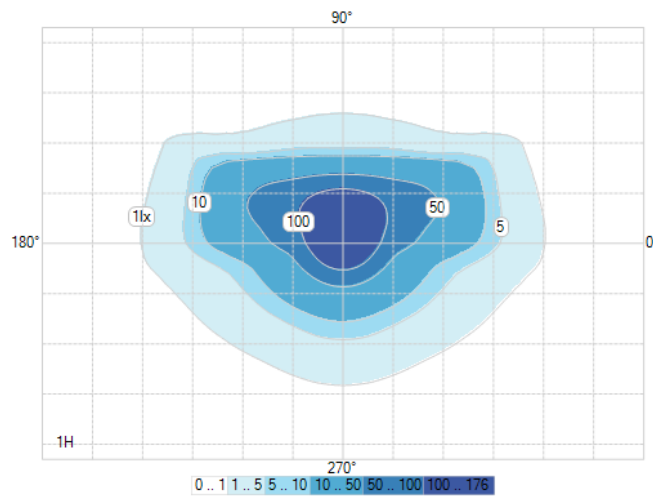
- Photocell



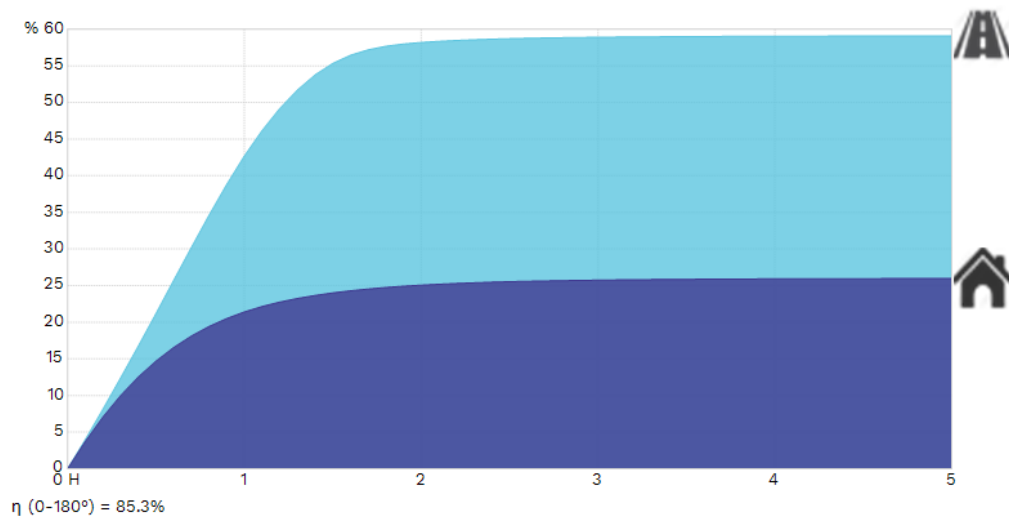
Polar/Cartesian diagram



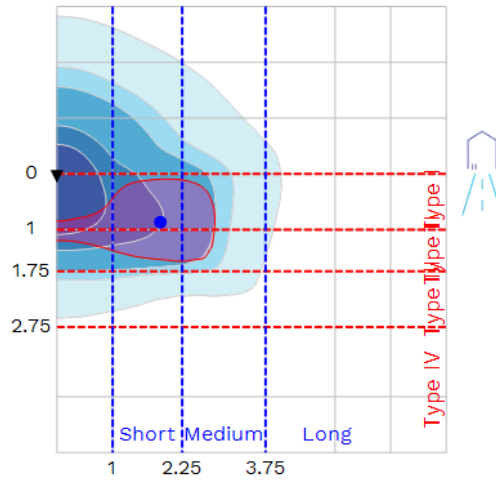
Isolux



K-Curve

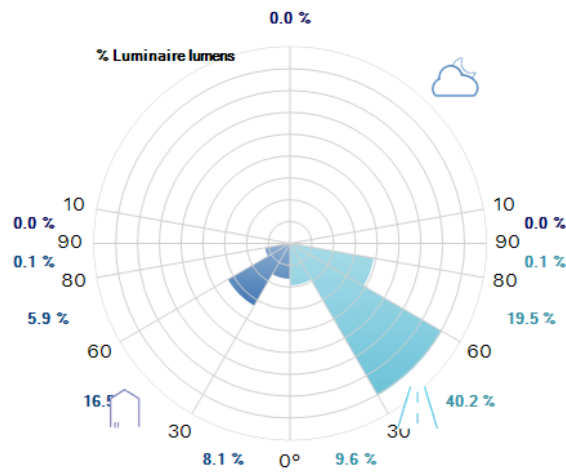


IES Roadway Classification / Nema Classification

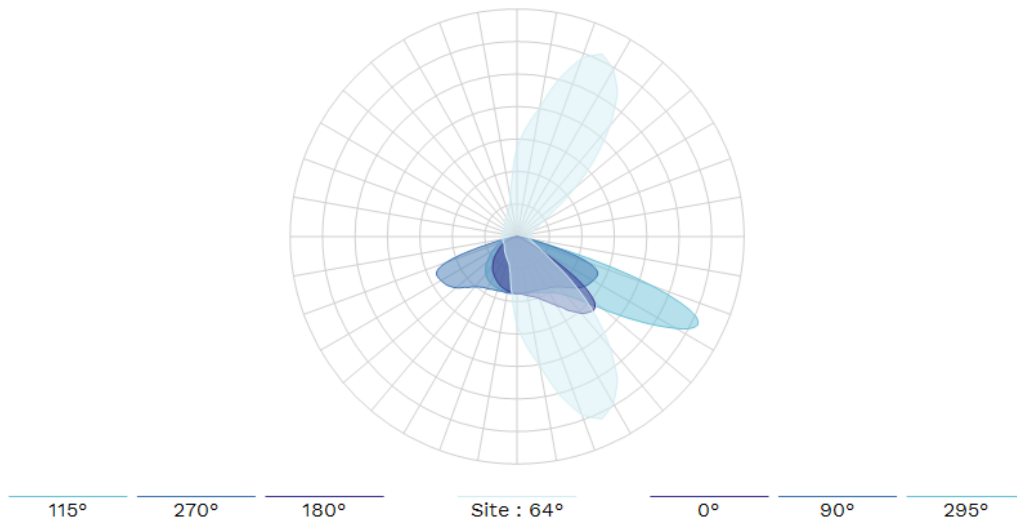


II - Short

Luminaire classification system (LCS)



Intensity diagram in max Cone and in CPlane



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<http://www.schreder.com>



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Belgium

For the product:

Road and street lighting

Trade name(s):

SCHREDER

Type(s)/Model(s):

VOLTANA 1, VOLTANA 2, VOLTANA 3, VOLTANA 4, VOLTANA 5 ranges

Complying with the following European Standards for safety and the EPRS for performance:

EN 60598-1:2015, EN 60598-2-3:2003 + A1:2011

PD EPRS 003:2014-12 (application of IEC 62722-2-1:2014)

Based on test reports n° : P1540-3535-012017, P1541-3535-012017, P1542-3535-012017, P1543-3535-012017, P1544-3535-012017.

This licence is conditional to the validity of the ENEC Licence No.: ENEC 02 N° 20113 and 20114

Date: 2017-04-13

Signature:

Name: Calogero LANA

Position: Certification Manager



Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2 16 Led's

Sample n°: P-E14361

Test purpose: Electrical measurements @ 1A

Remarks:

Test request n°: P-D14674

Folder n°: P-F14058

TEST CONDITIONS:

Operator: CLOSSET Frédéric

Driver: LG Innotek PISE-A055A, 1A driver

Load: 16 led's (Typical Vf: 3,18 V)

Power Supply:

Elgar Tw 3500-4

Supply voltage: 230 V 50 Hz

Measurement device:

Fluke Norma 4000 (HF Powermeter, User 10, filter OFF)

CONCLUSIONS:

- Efficiency: 87,0 %
- PF: 0,97
- THD: 8,6 %
- Harmonics distribution complies with the IEC/EN 61000-3-2 Standard.

Duplicate to: Mr M. Thijs

LAB 16/09/2014

J.P. Harchies

//P-14E674

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Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2 16 led's @ 1A class I

Sample n°:

Test purpose: EMC tests according to EN 55015 & EN 61547 Standards

Remarks:

Test request n°: P-D14700

Folder n°: P-F14058

TEST CONDITIONS:

Operator: ULg - EMC

Test Summary

EN 55015 & EN 61547 Standards

Emission

Standard	Limit / Level	Result	
		PASS	FAIL
EN 55015 Conducted Emission 9kHz- 30 MHz		X	
EN 55015 Annex B 30 MHz – 300 MHz		X	

Immunity

Standard	Limit / Level	Result	
		PASS	FAIL
EN 61000-4-5	0.5 , 1 , 2 & 4 kV M.D. Impulse + @ 90° Impulse - @ 270° 20' between impulse Criteria B required	X	

Driver: LG Innotek PISE-A 055A – 55W 1A (Rev-04)

EMC Auxiliaries: Ferrite W-E 742 700 55

CONCLUSIONS:

VOLTANA-2 16 led's driven @ 1A by LG Innotek 55 W driver complies with the CISPR/EN 55015 and EN 61547 Standards.

Remark: Surge protection tested OK up to 4 KV for both Differential & Common modes (Max ULg facilities).

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E700

Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2 Extra Clear glass protectors

Sample n°: P-E15378

Test purpose: Fragmentation test following IEC/EN 60598-2-3 Standard

Remarks:

Test request n°: P-D15559

Folder n°: P-F14058

TEST CONDITIONS:

Operator: BOMBIL Patrick

3 samples under test
Glass thickness: 5 mm



Fragmentation test

- An adhesive sheet is scotched on the protector internal side to hold the particles after breakage.
- Impact with spring punch hammer
- Impact on the external side of protector
- Impact at 3 cm from the mid-point of the longest edge.
- Counting of the particles in the coarsest area in a 5 cm side square within 5 minutes after breakage.

Results:

Sample 1: 117 pieces

Sample 2: 116 pieces

Sample 3: 118 pieces

CONCLUSIONS:

VOLTANA-2 Extra Clear Glass protector complies with fragmentation test following IEC/EN 60598-2-3 Standard.

Duplicate to: Mr M. Thijs

LAB 21/08/2015

L. Maghe

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//P-15CR559

Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2

Sample n°: P-E14362

Test purpose: Mechanical impact resistance test following IEC/EN 62262 Standard

Remarks:

Test request n°: P-D14698

Folder n°: P-F14058

TEST CONDITIONS:

Operator: BOMBIL Patrick

Smooth extra clear glass
Glass thickness: 5 mm

At pendulum hammer

5 impact points distributed on protector surface
One impact on each point

Test on 5 samples

Test

IK08 : Impact energy: 5 joules
Hammer weight: 1,7 kg
Height of fall: 29,4 cm

Result

OK for the 5 samples for all tested points

CONCLUSIONS:

VOLTANA-2 satisfies the IK08 test following IEC/EN 62262 Standard.

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E698

A handwritten signature in blue ink, appearing to read "J.P. Harchies", with a horizontal line drawn underneath it.

Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2 16 led's @ 1A

Sample n°:

Test purpose: Tightness test IP66 following IEC/EN 60598-1 Standard

Remarks:

Test request n°: P-D14696

Folder n°: P-F14058

TEST CONDITIONS:

Operator: BOMBIL Patrick

Preconditioning: endurance test

Test	Result
IP6X : -Luminaire switched ON until stable T° -Talcum in suspension (blowing ON) -After 1', luminaire OFF -Talcum for 3 hours	OK.
IPX6 : - Luminaire switched ON until stable T° - Luminaire switched OFF and immediately sprayed with water jet - Hose Φ 12,5 mm - Water pressure: 1 kg/cm ² - Spraying distance: 3 m - Duration of test: 3 minutes	OK.

CONCLUSIONS:

VOLTANA-2 16 led's @ 1A satisfies the IP66 test following IEC/EN 60598-1 Standard.

Duplicate to: Mr M. Thijs

LAB 23/09/2014

J.P. Harchies

A handwritten signature in blue ink, appearing to read "Patrick Bombil".

//P-14E696

Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2 16 Led's

Sample n°: P-E14361

Test purpose: Thermal test evaluation @ 1A

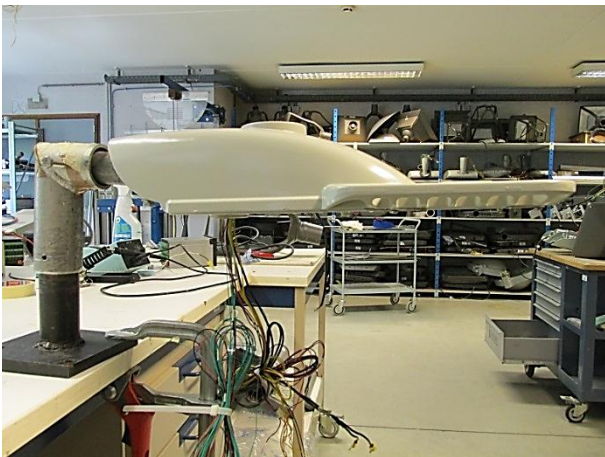
Remarks:

Test request n°: P-D14697

Folder n°: P-F14058

TEST CONDITIONS:

Operator: CLOSSET Frédéric



Load: 16 led's

Driver: LG Innotek LLP 55 W 1,0 A
PISE-A055A
Tc 80 °C

Measurement device:

Yokogawa TX10: thermal measurement

Yokogawa WT 210: primary EM

Fluke 87: secondary and led's EM

Junction Temperature measurement method

Junction temperature measurement by base temperature measurement and electrical measurement.

$$T^{\circ}_j = T^{\circ}_b + R_{jb} \times P_{led}$$

CONCLUSIONS:

According to "Led's Lumen Maintenance Criterion" LM80 extrapolation 6.000 hrs, we can state VOLTANA-2 16 led's driven @ 1A by LG Innotek driver LLP 55 W PISE-A055A driver satisfies:

Tq (CEI): 35 °C for led's with L80 – 100 Khrs target

Tq (CEI): 35 °C for lenses in Diakon material

Tq (CEI): 35 °C for driver PISE-A055A

Ta (CEI): 55 °C

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Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2 – Side entry Configuration

Sample n°: P-E14365

Test purpose: Vibrations test: "Street Lighting Luminaires" testing protocol

Remarks:

Test request n°: P-D14801

Folder n°: P-F14058

TEST CONDITIONS:

Operator: V2i

<u>Testing protocol</u>	
"Street Lighting Luminaires" testing protocol	
Test Item	Post-top and Side-entry Luminaire
Excitation Direction	3 directions
Search for frequencies and quality factor Q	Excitation: sine sweep Frequency band: 5 - 55 Hz Sweep speed: 1 octave/min. Acceleration: 0.5g
Test	Q < 2 (no natural frequency)
	Excitation: RANDOM (*) Frequency band: 5 - 55 Hz Acceleration: 0.84g _{RMS} Duration: 1h
	Q > 2
	Excitation : sine dwell Frequency : f0 (Qmax) Acceleration : 0.5g Duration : 30 minutes
Search for frequencies and quality factor Q	Excitation: sine sweep Frequency band: 5 - 55 Hz Sweep speed: 1 octave/min. Acceleration: 0.5g

(*) The RANDOM equivalent test consist in an accelerated ageing process of one hour which presents, on a reference one-degree-of-freedom system, an equivalent fatigue damage spectrum than 20 years of mean wind and 90 hours of storms.

CONCLUSIONS:

VOLTANA-2 side entry configuration satisfies the Vibration tests following "Street Lighting Luminaires" testing protocol.

Duplicate to: Mr M. Thijs
LAB 21/10/2014
J.P. Harchies

//P-14E801

Laboratory Service PHYSICAL TEST REPORT



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

Subject: VOLTANA-2

Sample n°: P-E14363

Test purpose: Aerodynamic wind test

Remarks:

Test request n°: P-D14699

Folder n°: P-F14058

TEST CONDITIONS:

Operator: ULg – CAT Soufflerie

2 tests realized:

- 1) Aerodynamic Coefficient determination
- 2) Endurance test

1) Aerodynamic coefficient determination

	<u>Value (m²)</u>		
<u>Wind Direction</u>	<u>Cd.S (drag)</u>	<u>Cs.S (Side)</u>	<u>CLS (Lift)</u>
Front	0,004	-0,004	0,002
<u>Side</u>	<u>0,019</u>	<u>0,019</u>	<u>0,019</u>

2) Endurance test: wind qualification test

Wind direction: Side

Wind resistance: 10' at 180 km/h

Result: OK

CONCLUSIONS:

VOLTANA-2 satisfies the wind speed test 180 Km/h for 10 minutes.
See Aerodynamic coefficients here above.

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E699

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