

XLamp® XP-G3 Standard White LEDs

GENERAL TEST INFORMATION

Manufacturer's name	Cree LED
Product series & applicable order codes in this report	XLamp XP-G3 Standard White LEDs XPGDWT-x1-xxxx-xxxx XPGDWT-x3-xxxx-xxxx
Test Equipment	Instrument Systems ISP-500 Integrating Sphere Instrument Systems CAS-140 Spectrometer Keithley 2420 Sourcemeter
Drive level type	Constant direct current (DC)
Description of air movement	LED packages are operated in environmental control chambers. The temperature of the ambient air around the LED packages is actively controlled by air flowing through the chamber. Air flow : 800 CFM
Relative humidity (RH) level	< 45%
Photometric measurement uncertainty	Cree LED maintains a tolerance of $\pm 2.0\%$ on flux measurements for LM-80 testing.
Testing agency identification	CreeLED SSL Laboratory 4400 Silicon Drive Durham, NC 27703 USA
Testing agency third-party accreditation	 Lab Code 500041-0
Test report authorization	Ryan Zienert, Components Reliability Laboratory Manager

REVISION HISTORY

Revision	Date	Change
0	Jan 7, 2016	Date of first issue
1	Apr 8, 2016	Added additional test duration to data set 1, removed successor status, added data set 2.
2	Aug 17, 2016	Extended data set #1 & 2 with additional test duration.
3	Sept 9, 2016	Added data sets #3 - 12
4	Sept 13, 2016	Fixed report error in data set 10
5	Dec 02, 2016	Extended data set #2 with additional test duration. Added data set #13.
6	Feb 28, 2017	Removed data sets #1 & 2. Added data set #14. Extended data sets #3, 4, 6, 7, 9 & 11 with additional test duration.
7	May 15, 2017	Extended data sets #3, 4, 6, 7, 9, 11 & 14 with additional test duration.
8	Nov 15, 2017	Added data set #15. Extended data sets #3, 4, 5, 6, 7, 8, 9 & 11 with additional test duration. Revised TM-21 graph for all data sets. Added color shift graph and Test Results Summary tables for all data sets.
9	May 30, 2018	Extended data sets #6 & 11 with additional test duration. Revised product name and order codes to refer to XLamp XP-G3 Standard.
10	Oct 18, 2018	Extended data sets #3, 4, 6, 7, 9 & 15 with additional test duration. Corrected calculation errors in color shift (du'v) values for all data sets #3, 4, 6, 7, 9 & 15.
10A	Jan 3, 2019	Removed data set #10.
11	Dec 17, 2019	Extended data sets #6, 9 & 11 with additional test duration. Adjusted data reporting interval to 1008 hrs for data sets #6 & 11. Corrected calculation errors in color shift (du'v) values for data sets #5, 8, 11, 12, 13 & 14.
12	Oct 26, 2020	Added data set #16.
13	May 4, 2021	Updated CreeLED testing agency information. Converted document style & information to Cree LED.
14	Jun 11, 2021	Extended data set #16 with additional test duration.

TEST RESULTS SUMMARY

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	ANSI CCT Target	Sample Count	Test Duration	Reported TM-21 Lifetimes
3	85°C	85°C	350 mA	3000K	25	15,120 hrs	L90(15k) > 90,700 hrs L80(15k) > 90,700 hrs L70(15k) > 90,700 hrs
4	105°C	105°C	350 mA	3000K	25	15,120 hrs	L90(15k) > 90,700 hrs L80(15k) > 90,700 hrs L70(15k) > 90,700 hrs
5	120°C	120°C	350 mA	3000K	25	8,568 hrs	L90(9k) > 51,400 hrs L80(9k) > 51,400 hrs L70(9k) > 51,400 hrs
6	85°C	85°C	700 mA	3000K	25	24,192 hrs	L90(24k) > 145,000 hrs L80(24k) > 145,000 hrs L70(24k) > 145,000 hrs
16	85°C	85°C	700 mA	2700K	20	15,624 hrs	L90(16k) > 93,700 hrs L80(16k) > 93,700 hrs L70(16k) > 93,700 hrs
7	105°C	105°C	700 mA	3000K	25	15,120 hrs	L90(15k) > 90,700 hrs L80(15k) > 90,700 hrs L70(15k) > 90,700 hrs
8	120°C	120°C	700 mA	3000K	25	8,568 hrs	L90(9k) = 39,600 hrs L80(9k) > 51,400 hrs L70(9k) > 51,400 hrs
9	85°C	85°C	1050 mA	3000K	25	15,120 hrs	L90(15k) > 90,700 hrs L80(15k) > 90,700 hrs L70(15k) > 90,700 hrs
15	105°C	105°C	1050 mA	3000K	25	12,096 hrs	L90(12k) > 72,600 hrs L80(12k) > 72,600 hrs L70(12k) > 72,600 hrs
11	85°C	85°C	1500 mA	3000K	25	24,192 hrs	L90(24k) > 145,000 hrs L80(24k) > 145,000 hrs L70(24k) > 145,000 hrs
14	105°C	105°C	1500 mA	3000K	25	10,080 hrs	L90(10k) = 27,900 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
12	120°C	120°C	1500 mA	3000K	20	6,048 hrs	L90(6k) = 7,830 hrs L80(6k) = 20,800 hrs L70(6k) = 35,500 hrs
13	85°C	85°C	2000 mA	3000K	25	6,048 hrs	L90(6k) = 17,500 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

DATA SET 3: 85°C; 350 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [IF]	350 mA
Testing Initiation Date	November 2, 2015
Case Temperature [Ts]	85°C
Ambient Temperature [TA]	85°C
Failures observed	None

Test Results Summary

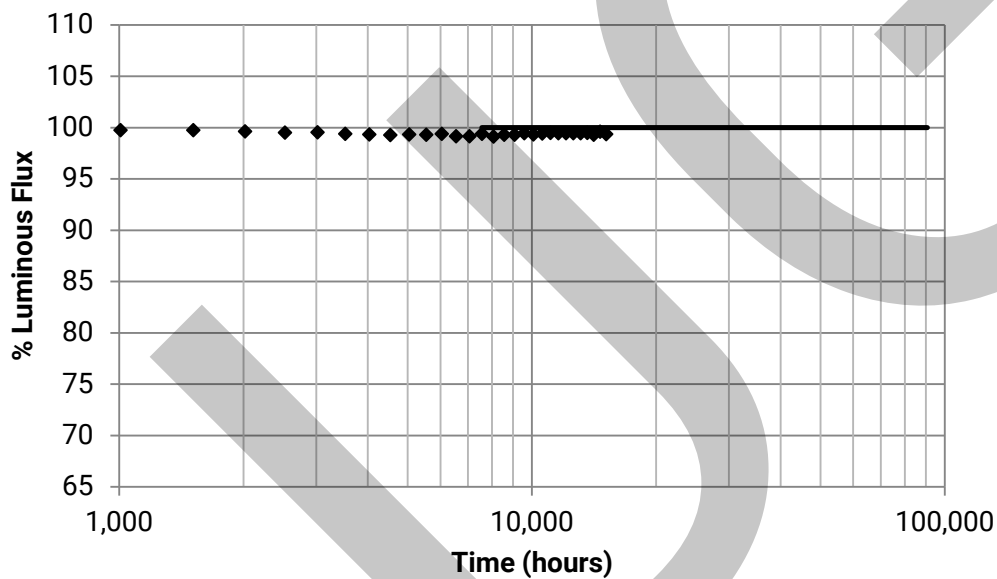
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	10080	99.33%	0.0010	-0.2	N/R
168	99.97%	0.0005	-0.1	N/R	10584	99.42%	0.0010	-0.2	-1.0%
1008	99.76%	0.0007	0.0	N/R	11088	99.49%	0.0010	-0.2	-1.1%
1512	99.75%	0.0007	0.0	N/R	11592	99.46%	0.0009	-0.2	-1.1%
2016	99.62%	0.0007	-0.1	N/R	12096	99.45%	0.0010	-0.3	-1.0%
2520	99.51%	0.0007	-0.1	N/R	12600	99.46%	0.0010	-0.2	-1.1%
3024	99.55%	0.0007	-0.1	N/R	13104	99.44%	0.0009	-0.3	-1.3%
3528	99.39%	0.0007	-0.1	N/R	13608	99.48%	0.0009	-0.2	-1.1%
4032	99.33%	0.0008	-0.1	N/R	14112	99.32%	0.0010	-0.3	-1.3%
4536	99.27%	0.0008	-0.1	N/R	14616	99.59%	0.0009	-0.3	-1.2%
5040	99.34%	0.0008	-0.1	N/R	15120	99.35%	0.0008	-0.3	-1.2%
5544	99.32%	0.0008	-0.1	N/R					
6048	99.38%	0.0009	-0.1	N/R					
6552	99.15%	0.0008	-0.1	N/R					
7056	99.15%	0.0008	-0.1	N/R					
7560	99.38%	0.0009	-0.1	N/R					
8064	99.12%	0.0009	-0.2	N/R					
8568	99.31%	0.0009	-0.2	N/R					
9072	99.31%	0.0009	-0.2	N/R					
9576	99.44%	0.0010	-0.2	N/R					

Note: "N/R" indicates data points that are not reported

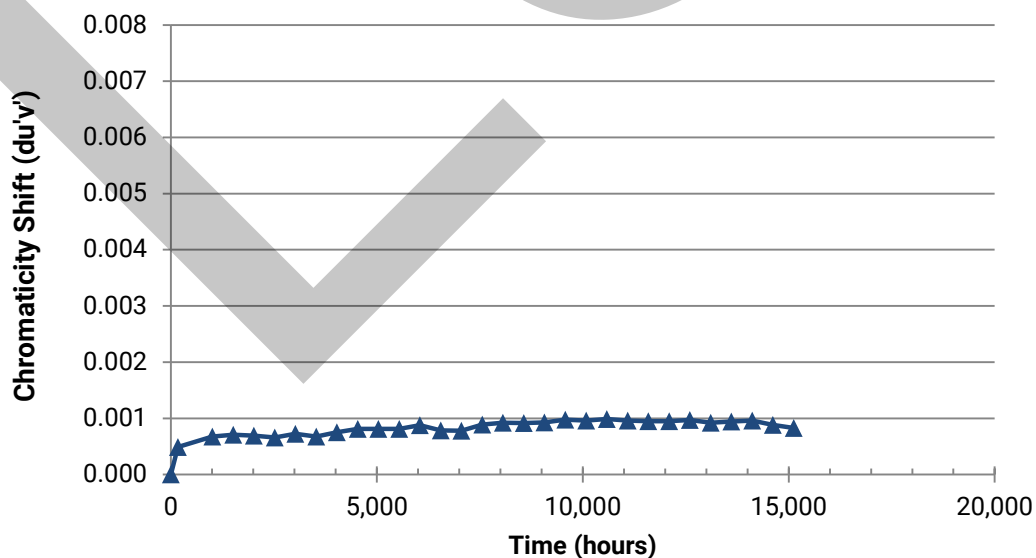
DATA SET 3: 85°C; 350 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	15,120 hours
Test duration used for projection	t=7,560 to t=15,120
α	-2.352E-07
β	9.913E-01
Reported Lifetimes	L90(15k) > 90,700 hours
	L80(15k) > 90,700 hours
	L70(15k) > 90,700 hours



Color Shift Graph



DATA SET 3: 85°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	162	2.83	3106	3000	100.12	100.25	99.88	100.12	100.06	99.82	99.75	99.75	99.69	99.57	99.57	99.51
2	155	2.87	3016	3000	99.81	99.87	99.74	99.35	99.29	99.61	99.29	99.22	99.03	99.35	99.10	99.29
3	153	2.82	3084	3000	100.00	99.61	99.54	99.87	99.93	99.61	99.35	99.54	99.54	99.80	99.54	99.74
4	158	2.83	3067	3000	99.75	100.19	100.06	100.00	99.24	99.18	98.73	98.54	98.29	98.48	98.54	98.54
5	150	2.84	3083	3000	99.73	99.87	100.07	99.93	99.67	99.80	99.80	99.80	99.73	99.80	100.13	100.13
6	159	2.86	3035	3000	100.13	100.13	99.62	99.81	99.31	99.56	99.31	99.18	98.74	98.74	98.87	98.74
7	157	2.83	3053	3000	99.87	99.55	99.49	98.98	98.79	98.79	98.85	98.79	98.47	98.98	98.79	98.72
8	153	2.85	3021	3000	100.26	99.67	99.87	99.54	99.22	99.41	99.54	99.48	99.61	99.41	99.48	99.41
9	162	2.85	3036	3000	100.00	100.12	100.00	99.57	99.57	99.32	99.07	98.89	98.83	99.14	99.01	99.01
10	158	2.89	3033	3000	100.06	100.19	100.00	100.13	100.06	100.06	99.49	99.49	99.30	99.56	99.49	99.62
11	157	2.82	3009	3000	100.13	99.68	100.06	100.00	100.13	100.00	99.94	99.87	99.81	99.94	100.00	100.13
12	157	2.82	3058	3000	100.32	100.13	99.94	100.19	100.13	100.13	100.19	100.06	100.00	100.06	100.13	100.38
13	154	2.87	2965	3000	100.26	100.06	100.19	99.94	99.94	100.26	99.87	99.61	99.81	100.06	100.19	100.00
14	155	2.87	3002	3000	100.13	100.06	100.19	99.74	99.81	99.87	99.94	99.94	99.81	99.81	100.06	100.00
15	161	2.84	2993	3000	99.56	99.13	99.19	99.07	99.13	99.25	99.07	99.25	99.07	99.19	99.31	99.31
16	154	2.87	3009	3000	100.26	99.68	99.48	99.61	99.42	99.48	99.16	99.09	99.16	99.42	99.48	99.48
17	149	2.82	3019	3000	99.80	99.66	99.66	99.60	99.26	99.13	98.79	99.06	99.19	98.93	99.06	99.26
18	155	2.81	2950	3000	100.13	100.00	99.94	99.74	99.35	99.74	99.87	99.61	99.81	99.61	99.55	99.87
19	153	2.82	2998	3000	99.74	99.74	99.61	99.34	99.61	99.80	99.74	99.80	99.54	99.48	99.41	99.93
20	157	2.87	2979	3000	100.06	99.55	99.36	99.62	99.43	99.30	99.87	99.62	99.68	99.55	99.43	98.85
21	155	2.87	2996	3000	99.87	99.35	99.29	99.87	99.23	99.68	99.10	98.84	98.97	99.03	98.97	98.97
22	159	2.84	3035	3000	99.94	99.37	100.19	99.12	99.44	99.31	98.93	98.49	98.43	98.49	98.62	98.74
23	158	2.81	3015	3000	99.68	99.24	99.49	98.99	98.86	98.86	98.67	98.67	98.55	98.29	98.23	98.48
24	160	2.84	3056	3000	99.94	99.69	99.75	99.87	99.81	99.69	99.62	99.62	99.62	99.75	99.31	99.25
25	151	2.87	3007	3000	99.60	99.14	99.21	99.34	99.01	99.01	98.88	99.01	99.01	98.94	98.81	99.07
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	156	2.84			99.97	99.76	99.75	99.62	99.51	99.55	99.39	99.33	99.27	99.34	99.32	99.38
Median	157	2.84			100.00	99.69	99.75	99.62	99.43	99.61	99.35	99.48	99.30	99.42	99.41	99.31
σ	3	0.02			0.22	0.34	0.31	0.38	0.39	0.39	0.45	0.46	0.51	0.50	0.53	0.55
Min.	149	2.81			99.56	99.13	99.19	98.97	98.79	98.79	98.67	98.49	98.29	98.29	98.23	98.48
Max.	162	2.89			100.32	100.25	100.19	100.19	100.13	100.26	100.19	100.06	100.00	100.06	100.19	100.38

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4346	0.4116	3106	3000	0.0002	0.0005	0.0005	0.0005	0.0003	0.0004	0.0005	0.0007	0.0006	0.0007	0.0005	0.0007
2	0.4395	0.4108	3016	3000	0.0005	0.0006	0.0006	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0008	0.0008	0.0009
3	0.4361	0.4121	3084	3000	0.0001	0.0003	0.0004	0.0004	0.0003	0.0001	0.0003	0.0004	0.0003	0.0004	0.0004	0.0004
4	0.4378	0.4136	3067	3000	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0009	0.0008
5	0.4357	0.4111	3083	3000	0.0004	0.0006	0.0006	0.0006	0.0004	0.0007	0.0007	0.0010	0.0010	0.0010	0.0010	0.0010
6	0.4390	0.4122	3035	3000	0.0003	0.0004	0.0005	0.0005	0.0004	0.0006	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007
7	0.4378	0.4118	3053	3000	0.0002	0.0005	0.0006	0.0007	0.0005	0.0007	0.0008	0.0008	0.0009	0.0008	0.0008	0.0007
8	0.4376	0.4074	3021	3000	0.0003	0.0006	0.0007	0.0006	0.0008	0.0007	0.0009	0.0010	0.0010	0.0011	0.0010	0.0009
9	0.4381	0.4103	3036	3000	0.0003	0.0007	0.0005	0.0006	0.0007	0.0007	0.0006	0.0007	0.0007	0.0007	0.0008	0.0008
10	0.4377	0.4091	3033	3000	0.0004	0.0007	0.0006	0.0006	0.0008	0.0007	0.0007	0.0008	0.0007	0.0008	0.0008	0.0009
11	0.4437	0.4187	3009	3000	0.0009	0.0011	0.0012	0.0011	0.0010	0.0011	0.0010	0.0010	0.0012	0.0012	0.0012	0.0012
12	0.4384	0.4138	3058	3000	0.0005	0.0008	0.0008	0.0007	0.0007	0.0009	0.0005	0.0006	0.0008	0.0008	0.0008	0.0011
13	0.4460	0.4177	2965	3000	0.0009	0.0011	0.0012	0.0011	0.0011	0.0011	0.0011	0.0011	0.0013	0.0012	0.0012	0.0013
14	0.4420	0.4142	3002	3000	0.0008	0.0012	0.0011	0.0012	0.0011	0.0012	0.0009	0.0011	0.0012	0.0011	0.0012	0.0014
15	0.4455	0.4204	2993	3000	0.0005	0.0005	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006	0.0008	0.0007	0.0007	0.0007
16	0.4417	0.4145	3009	3000	0.0007	0.0009	0.0012	0.0010	0.0011	0.0010	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012
17	0.4422	0.4169	3019	3000	0.0006	0.0007	0.0006	0.0005	0.0006	0.0007	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008
18	0.4481	0.4201	2950	3000	0.0005	0.0004	0.0006	0.0006	0.0006	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007	0.0006
19	0.4445	0.4189	2998	3000	0.0006	0.0008	0.0008	0.0009	0.0010	0.0009	0.0008	0.0010	0.0010	0.0010	0.0010	0.0011
20	0.4453	0.4181	2979	3000	0.0006	0.0008	0.0008	0.0009	0.0006	0.0008	0.0006	0.0008	0.0008	0.0008	0.0009	0.0009
21	0.4429	0.4153	2996	3000	0.0006	0.0008	0.0007	0.0006	0.0004	0.0007	0.0004	0.0006	0.0007	0.0007	0.0007	0.0008
22	0.4417	0.4178	3035	3000	0.0006	0.0007	0.0005	0.0006	0.0007	0.0007	0.0006	0.0006	0.0007	0.0008	0.0008	0.0008
23	0.4437	0.4194	3015	3000	0.0005	0.0005	0.0006	0.0005	0.0005	0.0004	0.0004	0.0005	0.0004	0.0005	0.0005	0.0006
24	0.4411	0.4193	3056	3000	0.0004	0.0005	0.0007	0.0007	0.0007	0.0007	0.0005	0.0006	0.0008	0.0007	0.0007	0.0008
25	0.4410	0.4128	3007	3000	0.0006	0.0007	0.0006	0.0006	0.0007	0.0008	0.0007	0.0005	0.0007	0.0008	0.0005	0.0008
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0005	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009
Median					0.0005	0.0007	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008
σ					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0001	0.0003	0.0004	0.0004	0.0003	0.0001	0.0003	0.0004	0.0003	0.0004	0.0004	0.0004
Max.					0.0009	0.0012	0.0012	0.0012	0.0011	0.0012	0.0011	0.0011	0.0013	0.0012	0.0012	0.0014

DATA SET 3: 85°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	162	2.83	3106	3000	99.57	99.75	99.82	99.45	99.63	99.57	99.88	99.75	100.12	100.12	99.69	99.69
2	155	2.87	3016	3000	99.48	99.68	99.68	99.16	99.10	98.77	99.42	99.29	99.55	99.87	100.06	100.00
3	153	2.82	3084	3000	98.89	99.61	99.54	98.89	99.35	99.28	99.61	99.67	100.26	99.67	100.00	99.74
4	158	2.83	3067	3000	98.22	98.48	98.79	98.35	98.22	98.73	98.29	98.22	98.22	98.73	98.86	98.79
5	150	2.84	3083	3000	99.73	99.67	99.80	100.00	99.60	99.80	100.20	100.40	100.07	100.13	99.73	99.60
6	159	2.86	3035	3000	98.74	98.81	98.93	98.74	99.31	98.49	98.24	98.18	99.12	98.99	98.99	99.12
7	157	2.83	3053	3000	98.47	99.04	99.36	98.79	99.11	98.27	99.11	98.85	98.79	98.91	99.42	99.49
8	153	2.85	3021	3000	99.67	99.67	99.61	98.96	100.13	100.33	99.87	99.74	99.48	100.00	99.87	99.93
9	162	2.85	3036	3000	99.26	99.20	99.69	99.20	99.51	99.38	99.88	99.81	99.32	99.63	100.06	99.44
10	158	2.89	3033	3000	100.00	100.06	99.75	99.24	99.81	100.06	100.44	100.19	100.32	100.00	100.32	100.19
11	157	2.82	3009	3000	99.49	99.11	99.49	99.68	99.81	99.87	99.74	99.68	100.13	100.13	100.32	99.87
12	157	2.82	3058	3000	100.00	99.87	100.58	100.26	100.06	100.19	100.32	100.96	101.28	100.64	100.13	100.26
13	154	2.87	2965	3000	99.87	99.42	99.29	99.61	99.68	99.55	100.06	100.19	100.00	99.87	99.68	100.13
14	155	2.87	3002	3000	99.35	99.22	100.00	99.68	99.74	99.42	99.87	99.94	99.81	100.13	100.32	100.58
15	161	2.84	2993	3000	98.88	99.19	99.44	98.82	99.38	99.31	99.00	99.13	99.13	99.63	99.63	99.19
16	154	2.87	3009	3000	99.55	99.61	99.68	99.35	99.42	99.81	99.16	98.90	98.96	99.03	98.90	99.03
17	149	2.82	3019	3000	98.79	98.66	98.59	98.93	98.99	98.59	98.59	98.19	98.46	98.05	97.79	97.99
18	155	2.81	2950	3000	99.61	99.16	99.29	99.55	99.55	99.35	99.81	99.81	99.55	100.13	100.00	99.87
19	153	2.82	2998	3000	99.54	99.15	99.21	99.67	99.74	99.54	99.61	99.74	99.74	100.20	99.48	100.07
20	157	2.87	2979	3000	98.85	99.11	99.43	98.92	98.85	99.68	100.13	99.24	99.17	99.55	98.92	99.30
21	155	2.87	2996	3000	98.45	98.32	98.97	98.58	98.84	99.35	98.77	98.71	98.84	99.03	99.23	99.55
22	159	2.84	3035	3000	98.24	98.56	98.56	98.68	98.68	98.12	98.31	98.12	98.31	97.99	97.87	97.55
23	158	2.81	3015	3000	98.48	98.04	98.92	98.36	98.42	98.67	98.80	98.80	98.80	98.67	99.11	99.11
24	160	2.84	3056	3000	99.37	98.87	99.12	98.50	99.00	99.37	99.44	98.69	98.62	98.94	99.12	98.56
25	151	2.87	3007	3000	98.22	98.61	98.88	98.55	98.88	99.34	99.41	99.01	99.47	99.14	99.07	99.14
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	156	2.84			99.15	99.15	99.38	99.12	99.31	99.31	99.44	99.33	99.42	99.49	99.46	99.45
Median	157	2.84			99.35	99.16	99.43	98.96	99.38	99.37	99.61	99.29	99.47	99.63	99.63	99.55
σ	3	0.02			0.58	0.52	0.47	0.52	0.49	0.59	0.65	0.76	0.73	0.70	0.69	0.71
Min.	149	2.81			98.22	98.04	98.56	98.35	98.22	98.12	98.24	98.12	98.22	97.99	97.79	97.55
Max.	162	2.89			100.00	100.06	100.58	100.26	100.13	100.33	100.44	100.96	101.28	100.64	100.32	100.58

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4346	0.4116	3106	3000	0.0006	0.0005	0.0007	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0007	0.0007	0.0007
2	0.4395	0.4108	3016	3000	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0009	0.0009	0.0009
3	0.4361	0.4121	3084	3000	0.0003	0.0002	0.0004	0.0003	0.0006	0.0005	0.0006	0.0005	0.0006	0.0005	0.0005	0.0006
4	0.4378	0.4136	3067	3000	0.0009	0.0008	0.0009	0.0009	0.0009	0.0010	0.0011	0.0010	0.0010	0.0010	0.0010	0.0009
5	0.4357	0.4111	3083	3000	0.0009	0.0009	0.0009	0.0009	0.0010	0.0009	0.0010	0.0011	0.0011	0.0010	0.0010	0.0010
6	0.4390	0.4122	3035	3000	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0007	0.0007	0.0007
7	0.4378	0.4118	3053	3000	0.0007	0.0008	0.0008	0.0008	0.0009	0.0008	0.0010	0.0009	0.0008	0.0008	0.0008	0.0008
8	0.4376	0.4074	3021	3000	0.0009	0.0008	0.0009	0.0009	0.0010	0.0010	0.0011	0.0011	0.0010	0.0010	0.0009	0.0010
9	0.4381	0.4103	3036	3000	0.0008	0.0006	0.0008	0.0009	0.0009	0.0009	0.0010	0.0008	0.0009	0.0008	0.0007	0.0009
10	0.4377	0.4091	3033	3000	0.0009	0.0008	0.0010	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0009	0.0009	0.0009
11	0.4437	0.4187	3009	3000	0.0009	0.0009	0.0010	0.0011	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0011	0.0011
12	0.4384	0.4138	3058	3000	0.0010	0.0010	0.0012	0.0012	0.0012	0.0012	0.0012	0.0013	0.0012	0.0012	0.0011	0.0011
13	0.4460	0.4177	2965	3000	0.0011	0.0012	0.0012	0.0013	0.0013	0.0013	0.0014	0.0014	0.0013	0.0011	0.0013	0.0013
14	0.4420	0.4142	3002	3000	0.0013	0.0014	0.0015	0.0015	0.0016	0.0016	0.0016	0.0016	0.0016	0.0015	0.0015	0.0014
15	0.4455	0.4204	2993	3000	0.0008	0.0007	0.0008	0.0009	0.0007	0.0008	0.0008	0.0008	0.0009	0.0009	0.0008	0.0009
16	0.4417	0.4145	3009	3000	0.0011	0.0011	0.0012	0.0012	0.0009	0.0008	0.0008	0.0007	0.0009	0.0009	0.0009	0.0009
17	0.4422	0.4169	3019	3000	0.0006	0.0007	0.0005	0.0008	0.0007	0.0009	0.0009	0.0013	0.0014	0.0016	0.0018	0.0017
18	0.4481	0.4201	2950	3000	0.0006	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009	0.0008	0.0008
19	0.4445	0.4189	2998	3000	0.0010	0.0010	0.0011	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0013
20	0.4453	0.4181	2979	3000	0.0008	0.0008	0.0010	0.0010	0.0010	0.0011	0.0011	0.0010	0.0011	0.0010	0.0010	0.0010
21	0.4429	0.4153	2996	3000	0.0006	0.0008	0.0009	0.0010	0.0008	0.0009	0.0009	0.0007	0.0008	0.0009	0.0008	0.0008
22	0.4417	0.4178	3035	3000	0.0006	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0008	0.0009	0.0009	0.0009	0.0007
23	0.4437	0.4194	3015	3000	0.0006	0.0005	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009	0.0008	0.0007
24	0.4411	0.4193	3056	3000	0.0007	0.0006	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0008	0.0009
25	0.4410	0.4128	3007	3000	0.0006	0.0007	0.0008	0.0009	0.0009	0.0008	0.0009	0.0009	0.0008	0.0009	0.0007	0.0008
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010	0.0009	0.0010
Median					0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
σ					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002
Min.					0.0003	0.0002	0.0004	0.0003	0.0006	0.0005	0.0006	0.0005	0.0006	0.0005	0.0005	0.0006
Max.					0.0013	0.0014	0.0015	0.0015	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0018	0.0017

DATA SET 3: 85°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)					
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	162	2.83	3106	3000	99.75	100.00	99.88	99.63	100.18	99.75
2	155	2.87	3016	3000	100.06	100.06	99.87	99.94	101.10	100.97
3	153	2.82	3084	3000	99.87	99.67	99.48	99.74	100.13	99.67
4	158	2.83	3067	3000	98.67	98.92	98.98	98.73	98.54	98.41
5	150	2.84	3083	3000	100.20	99.93	100.07	99.67	100.87	100.47
6	159	2.86	3035	3000	99.06	98.81	98.81	98.87	98.68	98.49
7	157	2.83	3053	3000	99.17	98.98	98.91	99.11	99.17	98.98
8	153	2.85	3021	3000	99.93	100.07	100.00	100.07	100.39	99.74
9	162	2.85	3036	3000	99.81	100.00	100.25	100.12	100.93	100.93
10	158	2.89	3033	3000	99.87	100.06	100.19	100.19	99.94	99.94
11	157	2.82	3009	3000	100.13	100.00	99.68	99.68	99.30	99.11
12	157	2.82	3058	3000	100.58	100.64	100.77	100.58	101.02	99.87
13	154	2.87	2965	3000	99.55	100.06	100.26	99.55	99.42	99.68
14	155	2.87	3002	3000	100.32	100.00	99.87	100.32	100.52	99.55
15	161	2.84	2993	3000	99.56	99.25	99.25	99.56	99.63	99.13
16	154	2.87	3009	3000	98.38	98.90	99.03	98.44	98.38	98.70
17	149	2.82	3019	3000	98.12	97.52	97.58	97.11	97.18	97.85
18	155	2.81	2950	3000	100.00	100.26	100.06	100.26	100.19	99.55
19	153	2.82	2998	3000	99.34	99.61	100.20	99.21	100.20	99.67
20	157	2.87	2979	3000	99.36	98.85	99.43	99.49	99.81	100.13
21	155	2.87	2996	3000	99.03	99.48	100.00	99.23	99.23	99.48
22	159	2.84	3035	3000	98.12	97.99	97.49	97.49	97.30	96.92
23	158	2.81	3015	3000	98.86	98.99	98.86	98.17	98.73	98.29
24	160	2.84	3056	3000	99.00	98.87	99.06	99.06	99.31	99.62
25	151	2.87	3007	3000	99.67	99.01	99.14	98.88	99.67	98.88
n	25	25	25	25	25	25	25	25	25	25
Mean	156	2.84			99.46	99.44	99.48	99.32	99.59	99.35
Median	157	2.84			99.56	99.61	99.68	99.55	99.67	99.55
σ	3	0.02			0.67	0.74	0.79	0.86	1.05	0.92
Min.	149	2.81			98.12	97.52	97.49	97.11	97.18	96.92
Max.	162	2.89			100.58	100.64	100.77	100.58	101.10	100.97

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')					
	CCx	CCy	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	0.4346	0.4116	3106	3000	0.0007	0.0005	0.0006	0.0006	0.0006	0.0005
2	0.4395	0.4108	3016	3000	0.0009	0.0009	0.0010	0.0009	0.0009	0.0008
3	0.4361	0.4121	3084	3000	0.0006	0.0005	0.0006	0.0006	0.0006	0.0005
4	0.4378	0.4136	3067	3000	0.0011	0.0010	0.0011	0.0010	0.0011	0.0009
5	0.4357	0.4111	3083	3000	0.0010	0.0007	0.0009	0.0010	0.0010	0.0007
6	0.4390	0.4122	3035	3000	0.0008	0.0007	0.0009	0.0008	0.0008	0.0006
7	0.4378	0.4118	3053	3000	0.0008	0.0007	0.0008	0.0008	0.0009	0.0007
8	0.4376	0.4074	3021	3000	0.0010	0.0008	0.0009	0.0010	0.0009	0.0008
9	0.4381	0.4103	3036	3000	0.0008	0.0008	0.0009	0.0009	0.0008	0.0007
10	0.4377	0.4091	3033	3000	0.0008	0.0010	0.0007	0.0008	0.0007	0.0006
11	0.4437	0.4187	3009	3000	0.0010	0.0010	0.0010	0.0011	0.0011	0.0009
12	0.4384	0.4138	3058	3000	0.0011	0.0012	0.0011	0.0012	0.0010	0.0009
13	0.4460	0.4177	2965	3000	0.0013	0.0014	0.0014	0.0013	0.0011	0.0012
14	0.4420	0.4142	3002	3000	0.0016	0.0015	0.0014	0.0013	0.0011	0.0014
15	0.4455	0.4204	2993	3000	0.0008	0.0009	0.0009	0.0008	0.0007	0.0008
16	0.4417	0.4145	3009	3000	0.0009	0.0009	0.0010	0.0010	0.0007	0.0008
17	0.4422	0.4169	3019	3000	0.0019	0.0018	0.0019	0.0019	0.0017	0.0020
18	0.4481	0.4201	2950	3000	0.0009	0.0008	0.0009	0.0008	0.0008	0.0007
19	0.4445	0.4189	2998	3000	0.0012	0.0011	0.0011	0.0013	0.0010	0.0011
20	0.4453	0.4181	2979	3000	0.0010	0.0009	0.0009	0.0010	0.0009	0.0010
21	0.4429	0.4153	2996	3000	0.0009	0.0008	0.0008	0.0009	0.0007	0.0007
22	0.4417	0.4178	3035	3000	0.0009	0.0007	0.0008	0.0008	0.0008	0.0008
23	0.4437	0.4194	3015	3000	0.0008	0.0007	0.0007	0.0007	0.0007	0.0005
24	0.4411	0.4193	3056	3000	0.0009	0.0008	0.0008	0.0008	0.0007	0.0008
25	0.4410	0.4128	3007	3000	0.0008	0.0008	0.0007	0.0008	0.0007	0.0007
n	25	25	25	25	25	25	25	25	25	25
Mean					0.0010	0.0009	0.0009	0.0010	0.0009	0.0008
Median					0.0009	0.0008	0.0009	0.0009	0.0008	0.0008
σ					0.0003	0.0003	0.0003	0.0003	0.0002	0.0003
Min.					0.0006	0.0005	0.0006	0.0006	0.0006	0.0005
Max.					0.0019	0.0018	0.0019	0.0019	0.0017	0.0020

DATA SET 4: 105°C; 350 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [IF]	350 mA
Testing Initiation Date	November 2, 2015
Case Temperature [Ts]	105°C
Ambient Temperature [TA]	105°C
Failures observed	None

Test Results Summary

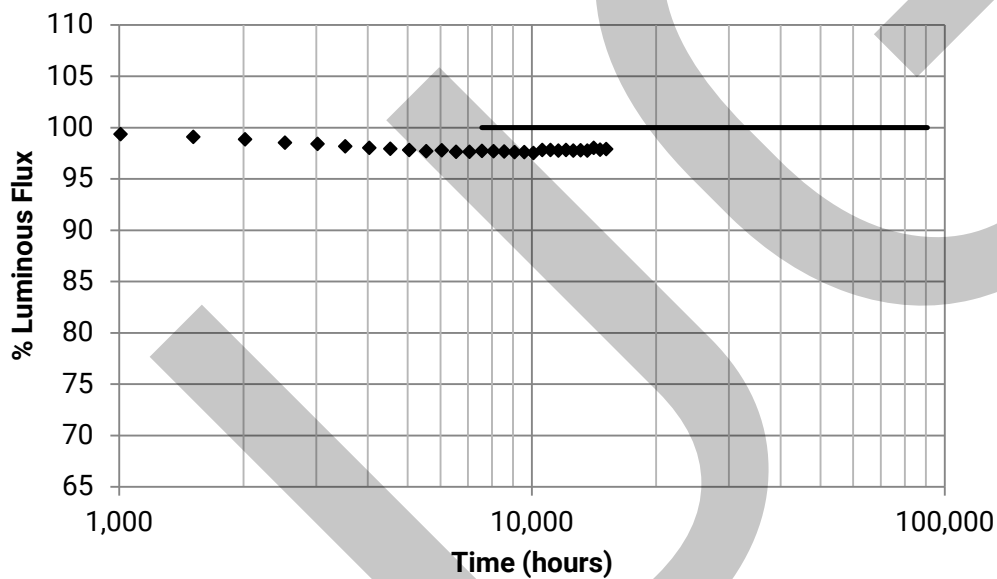
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	10080	97.53%	0.0006	-0.1	N/R
168	99.71%	0.0004	0.0	N/R	10584	97.81%	0.0006	-0.2	-0.5%
1008	99.37%	0.0006	0.0	N/R	11088	97.83%	0.0008	-0.1	-0.8%
1512	99.11%	0.0006	0.0	N/R	11592	97.76%	0.0009	-0.3	-0.8%
2016	98.86%	0.0006	0.0	N/R	12096	97.82%	0.0008	-0.1	-0.5%
2520	98.54%	0.0005	0.0	N/R	12600	97.75%	0.0009	-0.1	-0.6%
3024	98.42%	0.0006	0.0	N/R	13104	97.80%	0.0009	-0.1	-0.5%
3528	98.19%	0.0005	0.0	N/R	13608	97.75%	0.0009	-0.2	-0.4%
4032	98.03%	0.0006	0.0	N/R	14112	98.03%	0.0008	-0.1	-0.3%
4536	97.93%	0.0005	-0.1	N/R	14616	97.85%	0.0008	-0.1	-0.4%
5040	97.82%	0.0005	-0.1	N/R	15120	97.90%	0.0008	-0.1	-0.6%
5544	97.71%	0.0005	-0.1	N/R					
6048	97.78%	0.0006	-0.1	N/R					
6552	97.65%	0.0006	0.0	N/R					
7056	97.64%	0.0006	-0.1	N/R					
7560	97.72%	0.0005	-0.1	N/R					
8064	97.69%	0.0005	-0.2	N/R					
8568	97.68%	0.0005	-0.2	N/R					
9072	97.62%	0.0006	-0.2	N/R					
9576	97.60%	0.0006	-0.1	N/R					

Note: "N/R" indicates data points that are not reported

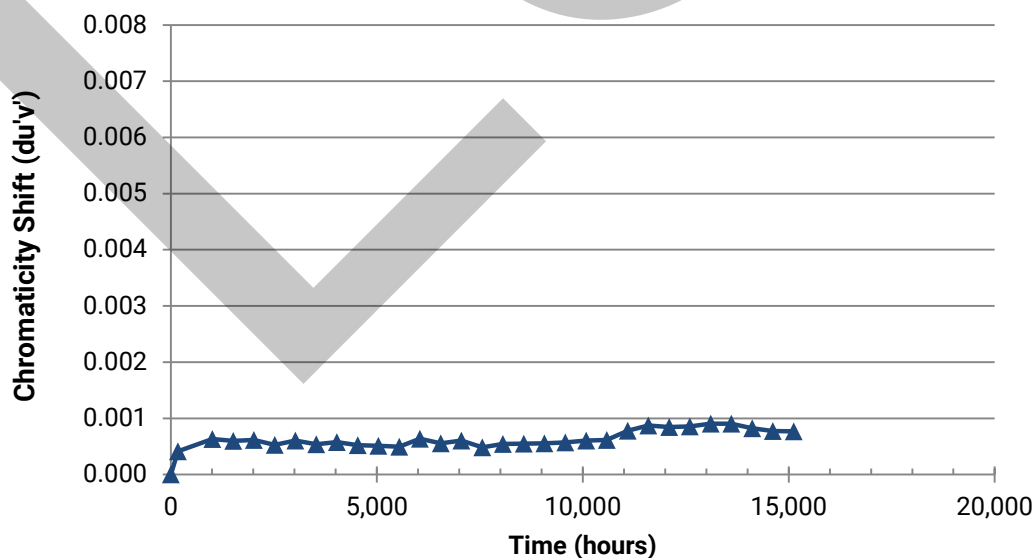
DATA SET 4: 105°C; 350 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	15,120 hours
Test duration used for projection	t=7,560 to t=15,120
α	-3.659E-07
β	9.735E-01
Reported Lifetimes	L90(15k) > 90,700 hours
	L80(15k) > 90,700 hours
	L70(15k) > 90,700 hours



Color Shift Graph



DATA SET 4: 105°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	157	2.81	3016	3000	100.06	99.68	99.17	98.92	98.72	98.40	98.34	98.34	98.40	97.96	97.45	97.32
2	156	2.87	2988	3000	99.49	99.81	99.55	99.10	98.84	98.78	98.46	98.01	98.07	98.14	97.88	98.26
3	156	2.86	2995	3000	99.55	99.29	98.84	98.59	98.39	98.20	98.26	98.14	97.81	97.81	97.56	97.49
4	159	2.83	2994	3000	99.81	99.68	99.31	99.12	98.42	98.11	97.85	98.11	98.23	98.17	97.79	98.04
5	153	2.81	3039	3000	99.54	99.48	99.67	99.35	99.02	98.63	98.63	98.37	98.57	97.85	98.11	97.91
6	154	2.82	3038	3000	99.55	98.96	98.57	98.70	98.64	99.09	98.77	98.51	97.99	98.51	98.38	98.51
7	154	2.83	3011	3000	99.68	99.74	99.16	99.03	99.03	98.77	98.57	98.51	98.18	98.25	97.99	98.05
8	156	2.87	3005	3000	99.81	99.36	98.72	98.53	98.27	98.14	98.02	97.82	97.95	97.38	97.70	97.70
9	156	2.87	3018	3000	99.81	99.23	99.04	98.78	98.46	98.85	98.65	98.08	97.76	97.63	97.37	97.69
10	160	2.85	2983	3000	99.81	99.37	99.37	99.19	98.75	98.75	98.44	98.19	98.06	98.19	97.87	97.81
11	158	2.87	3005	3000	99.87	99.62	99.75	99.43	98.74	98.86	98.42	98.04	98.42	98.17	98.23	98.10
12	158	2.87	3042	3000	99.68	99.62	99.18	98.92	98.42	98.99	98.61	98.29	97.85	97.91	98.04	97.97
13	157	2.82	3025	3000	99.43	98.86	98.54	98.22	98.09	97.78	97.71	97.27	97.46	97.01	97.40	97.65
14	157	2.82	3057	3000	99.87	99.43	99.36	99.30	98.86	99.17	98.73	98.35	98.09	97.77	97.27	97.58
15	162	2.84	3068	3000	99.75	99.07	99.32	99.20	99.26	98.76	98.21	98.08	97.83	97.22	97.15	96.97
16	156	2.88	3028	3000	99.87	99.61	99.29	99.04	98.59	98.14	98.14	98.01	97.95	98.14	98.01	98.27
17	153	2.82	3061	3000	99.61	99.41	99.48	98.89	98.30	98.49	98.10	97.97	97.71	98.17	97.77	98.30
18	156	2.84	3027	3000	99.87	99.49	99.10	98.59	98.72	98.08	97.57	97.82	97.57	97.50	97.25	97.31
19	163	2.85	3040	3000	99.82	99.82	99.08	99.02	98.52	98.59	98.16	97.97	98.03	97.97	97.91	97.85
20	161	2.89	3085	3000	99.88	99.25	98.94	98.76	98.88	98.01	97.82	97.64	97.70	97.64	97.45	97.51
21	153	2.84	3103	3000	99.74	99.28	98.95	98.63	98.10	98.04	97.91	97.91	97.78	97.65	97.65	97.84
22	160	2.85	3029	3000	99.50	98.87	98.63	98.00	97.81	97.81	97.81	97.63	97.63	97.63	97.44	97.38
23	157	2.83	3084	3000	99.68	98.98	98.72	98.66	97.90	97.77	97.64	97.70	97.64	97.51	97.58	97.58
24	158	2.82	3024	3000	99.68	99.49	99.30	99.37	98.73	98.35	98.29	98.29	98.23	97.91	98.16	97.97
25	159	2.83	3127	3000	99.44	98.93	98.68	98.24	98.12	97.93	97.74	97.62	97.30	97.37	97.37	97.37
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	157	2.84			99.71	99.37	99.11	98.86	98.54	98.42	98.19	98.03	97.93	97.82	97.71	97.78
Median	157	2.84			99.74	99.41	99.16	98.92	98.59	98.40	98.21	98.04	97.95	97.85	97.70	97.81
σ	3	0.02			0.16	0.30	0.34	0.38	0.37	0.43	0.37	0.31	0.31	0.36	0.34	0.37
Min.	153	2.81			99.43	98.86	98.54	98.00	97.81	97.77	97.57	97.27	97.30	97.01	97.15	96.97
Max.	163	2.89			100.06	99.82	99.75	99.43	99.26	99.17	98.77	98.51	98.57	98.51	98.38	98.51

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4429	0.4179	3016	3000	0.0006	0.0007	0.0007	0.0005	0.0006	0.0007	0.0008	0.0007	0.0004	0.0004	0.0005	0.0003
2	0.4440	0.4166	2988	3000	0.0006	0.0009	0.0009	0.0010	0.0009	0.0011	0.0008	0.0010	0.0009	0.0010	0.0012	0.0010
3	0.4439	0.4173	2995	3000	0.0003	0.0008	0.0007	0.0008	0.0007	0.0008	0.0009	0.0008	0.0007	0.0008	0.0007	0.0009
4	0.4441	0.4176	2994	3000	0.0007	0.0008	0.0006	0.0007	0.0007	0.0006	0.0006	0.0007	0.0006	0.0006	0.0006	0.0007
5	0.4407	0.4162	3039	3000	0.0004	0.0007	0.0008	0.0007	0.0006	0.0008	0.0006	0.0006	0.0006	0.0008	0.0005	0.0007
6	0.4425	0.4199	3038	3000	0.0005	0.0006	0.0003	0.0004	0.0005	0.0005	0.0006	0.0006	0.0005	0.0004	0.0003	0.0006
7	0.4427	0.4168	3011	3000	0.0006	0.0007	0.0007	0.0007	0.0007	0.0006	0.0005	0.0006	0.0005	0.0006	0.0005	0.0012
8	0.4415	0.4136	3005	3000	0.0006	0.0009	0.0007	0.0008	0.0010	0.0010	0.0007	0.0010	0.0009	0.0010	0.0010	0.0010
9	0.4418	0.4159	3018	3000	0.0005	0.0008	0.0010	0.0010	0.0009	0.0009	0.0010	0.0012	0.0009	0.0009	0.0009	0.0011
10	0.4445	0.4170	2983	3000	0.0007	0.0008	0.0009	0.0009	0.0008	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008
11	0.4425	0.4157	3005	3000	0.0007	0.0008	0.0010	0.0009	0.0010	0.0010	0.0007	0.0008	0.0006	0.0009	0.0007	0.0009
12	0.4407	0.4166	3042	3000	0.0007	0.0009	0.0009	0.0009	0.0008	0.0010	0.0010	0.0010	0.0009	0.0010	0.0010	0.0009
13	0.4416	0.4163	3025	3000	0.0004	0.0007	0.0006	0.0006	0.0004	0.0005	0.0004	0.0005	0.0006	0.0006	0.0006	0.0006
14	0.4398	0.4166	3057	3000	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0005	0.0006	0.0004	0.0006
15	0.4372	0.4125	3068	3000	0.0003	0.0006	0.0004	0.0007	0.0004	0.0008	0.0005	0.0005	0.0007	0.0004	0.0004	0.0006
16	0.4387	0.4106	3028	3000	0.0001	0.0005	0.0004	0.0005	0.0004	0.0003	0.0004	0.0004	0.0004	0.0002	0.0003	0.0005
17	0.4354	0.4077	3061	3000	0.0002	0.0005	0.0004	0.0005	0.0002	0.0005	0.0003	0.0003	0.0003	0.0001	0.0002	0.0004
18	0.4386	0.4103	3027	3000	0.0003	0.0005	0.0004	0.0005	0.0003	0.0003	0.0002	0.0002	0.0002	0.0001	0.0003	0.0004
19	0.4389	0.4125	3040	3000	0.0003	0.0008	0.0005	0.0005	0.0004	0.0005	0.0005	0.0005	0.0004	0.0005	0.0001	0.0005
20	0.4346	0.4090	3085	3000	0.0002	0.0005	0.0004	0.0004	0.0002	0.0003	0.0002	0.0002	0.0002	0.0001	0.0001	0.0003
21	0.4342	0.4104	3103	3000	0.0001	0.0004	0.0003	0.0004	0.0002	0.0003	0.0002	0.0002	0.0003	0.0002	0.0003	0.0004
22	0.4387	0.4108	3029	3000	0.0002	0.0002	0.0003	0.0001	0.0003	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
23	0.4340	0.4076	3084	3000	0.0001	0.0006	0.0006	0.0006	0.0003	0.0003	0.0004	0.0003	0.0002	0.0002	0.0003	0.0005
24	0.4421	0.4173	3024	3000	0.0004	0.0003	0.0005	0.0003	0.0002	0.0004	0.0003	0.0004	0.0004	0.0004	0.0003	0.0004
25	0.4341	0.4132	3127	3000	0.0002	0.0005	0.0004	0.0004	0.0002	0.0004	0.0002	0.0003	0.0004	0.0001	0.0002	0.0005
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0004	0.0006	0.0006	0.0006	0.0005	0.0006	0.0005	0.0006	0.0005	0.0005	0.0005	0.0006
Median					0.0004	0.0007	0.0006	0.0006	0.0005	0.0006	0.0005	0.0006	0.0005	0.0005	0.0004	0.0006
σ					0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0003
Min.					0.0001	0.0002	0.0003	0.0001	0.0002	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.0003
Max.					0.0007	0.0009	0.0010	0.0010	0.0010	0.0011	0.0010	0.0012	0.0009	0.0010	0.0012	0.0012

DATA SET 4: 105°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	157	2.81	3016	3000	97.51	97.51	97.32	97.19	96.94	96.87	97.57	97.89	97.70	98.09	97.70	97.96
2	156	2.87	2988	3000	97.69	97.94	97.62	97.88	97.94	97.75	97.43	97.69	98.14	98.33	98.59	98.33
3	156	2.86	2995	3000	97.75	97.68	98.01	97.75	97.88	97.81	97.04	97.23	97.11	96.91	96.66	96.72
4	159	2.83	2994	3000	97.98	97.92	98.17	98.11	98.04	97.67	98.11	98.42	98.23	98.68	98.30	98.42
5	153	2.81	3039	3000	97.98	97.98	97.85	98.24	98.31	98.17	97.91	98.17	98.44	98.76	99.02	98.76
6	154	2.82	3038	3000	98.31	98.12	98.31	98.44	98.44	98.64	97.92	97.53	98.64	98.77	98.90	98.70
7	154	2.83	3011	3000	97.99	97.40	97.40	97.66	97.53	97.60	98.18	98.25	98.38	97.92	98.05	97.60
8	156	2.87	3005	3000	97.12	97.31	97.50	97.57	97.50	97.31	97.44	97.44	97.70	98.27	98.02	98.02
9	156	2.87	3018	3000	97.44	97.25	97.89	97.76	97.82	97.82	98.14	97.63	98.14	98.21	98.21	98.14
10	160	2.85	2983	3000	97.75	97.75	98.06	97.81	98.25	97.93	98.31	97.93	98.00	98.00	97.93	97.93
11	158	2.87	3005	3000	97.85	98.23	98.36	98.29	98.74	98.42	97.91	97.79	98.17	98.74	98.29	98.23
12	158	2.87	3042	3000	97.85	98.23	98.10	97.97	98.10	97.97	98.16	97.47	97.78	98.23	97.66	98.04
13	157	2.82	3025	3000	97.59	97.20	97.40	97.14	97.14	97.01	97.27	97.01	97.20	97.20	97.14	97.46
14	157	2.82	3057	3000	97.46	97.97	97.65	97.71	97.71	98.28	98.03	97.90	97.77	98.22	97.84	97.71
15	162	2.84	3068	3000	97.09	96.91	97.03	97.03	97.15	97.15	97.34	96.97	97.28	97.34	97.22	97.77
16	156	2.88	3028	3000	97.88	97.69	97.69	97.43	98.01	97.43	97.43	97.24	98.07	97.75	98.20	98.27
17	153	2.82	3061	3000	97.90	98.30	98.17	98.23	97.77	97.71	97.77	97.71	97.71	97.77	97.51	97.71
18	156	2.84	3027	3000	97.25	97.31	97.89	97.82	97.31	97.89	97.12	98.21	97.63	97.25	96.93	96.93
19	163	2.85	3040	3000	97.97	97.66	98.22	98.22	98.16	98.16	98.03	98.52	98.83	97.91	97.91	97.85
20	161	2.89	3085	3000	97.64	97.70	97.76	97.39	97.01	97.14	96.95	97.20	97.08	97.01	97.45	97.64
21	153	2.84	3103	3000	97.12	97.51	97.38	97.71	97.25	97.32	97.12	97.12	97.32	97.06	97.19	97.45
22	160	2.85	3029	3000	97.94	97.94	97.81	97.88	98.31	98.38	98.44	97.75	98.56	98.69	98.31	98.56
23	157	2.83	3084	3000	97.64	97.45	97.51	97.07	97.39	97.26	97.39	96.94	97.64	97.26	97.00	97.32
24	158	2.82	3024	3000	97.47	97.09	96.96	97.03	96.84	96.33	96.33	96.27	96.77	96.52	97.09	96.58
25	159	2.83	3127	3000	96.99	96.86	96.99	96.93	96.55	96.36	96.68	96.05	96.86	96.93	96.86	97.30
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	157	2.84			97.65	97.64	97.72	97.69	97.68	97.62	97.60	97.53	97.81	97.83	97.76	97.82
Median	157	2.84			97.69	97.68	97.76	97.75	97.77	97.71	97.57	97.63	97.77	97.92	97.84	97.85
σ	3	0.02			0.34	0.41	0.41	0.44	0.56	0.60	0.54	0.61	0.56	0.68	0.64	0.57
Min.	153	2.81			96.99	96.86	96.96	96.93	96.55	96.33	96.33	96.05	96.77	96.52	96.66	96.58
Max.	163	2.89			98.31	98.30	98.36	98.44	98.74	98.64	98.44	98.52	98.83	98.77	99.02	98.76

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4429	0.4179	3016	3000	0.0006	0.0004	0.0003	0.0006	0.0006	0.0008	0.0008	0.0008	0.0008	0.0009	0.0012	0.0011
2	0.4440	0.4166	2988	3000	0.0009	0.0012	0.0009	0.0010	0.0011	0.0010	0.0008	0.0011	0.0013	0.0013	0.0013	0.0012
3	0.4439	0.4173	2995	3000	0.0008	0.0008	0.0006	0.0008	0.0008	0.0008	0.0011	0.0009	0.0003	0.0001	0.0003	0.0006
4	0.4441	0.4176	2994	3000	0.0006	0.0007	0.0006	0.0006	0.0006	0.0008	0.0010	0.0010	0.0008	0.0008	0.0010	0.0009
5	0.4407	0.4162	3039	3000	0.0006	0.0008	0.0005	0.0007	0.0005	0.0006	0.0004	0.0004	0.0007	0.0007	0.0007	0.0008
6	0.4425	0.4199	3038	3000	0.0005	0.0006	0.0004	0.0006	0.0005	0.0006	0.0006	0.0006	0.0005	0.0008	0.0008	0.0007
7	0.4427	0.4168	3011	3000	0.0005	0.0005	0.0004	0.0005	0.0006	0.0005	0.0006	0.0006	0.0005	0.0007	0.0010	0.0009
8	0.4415	0.4136	3005	3000	0.0010	0.0011	0.0008	0.0009	0.0010	0.0008	0.0009	0.0009	0.0011	0.0012	0.0012	0.0011
9	0.4418	0.4159	3018	3000	0.0008	0.0009	0.0009	0.0009	0.0010	0.0011	0.0009	0.0009	0.0009	0.0012	0.0012	0.0011
10	0.4445	0.4170	2983	3000	0.0007	0.0008	0.0008	0.0008	0.0009	0.0008	0.0009	0.0008	0.0011	0.0010	0.0011	0.0009
11	0.4425	0.4157	3005	3000	0.0008	0.0012	0.0010	0.0009	0.0010	0.0009	0.0009	0.0010	0.0011	0.0012	0.0012	0.0013
12	0.4407	0.4166	3042	3000	0.0007	0.0009	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0007	0.0011	0.0011	0.0009
13	0.4416	0.4163	3025	3000	0.0006	0.0006	0.0003	0.0002	0.0004	0.0004	0.0004	0.0004	0.0008	0.0008	0.0008	0.0009
14	0.4398	0.4166	3057	3000	0.0005	0.0006	0.0004	0.0005	0.0005	0.0004	0.0005	0.0006	0.0006	0.0008	0.0010	0.0008
15	0.4372	0.4125	3068	3000	0.0006	0.0004	0.0004	0.0004	0.0005	0.0004	0.0005	0.0005	0.0002	0.0006	0.0006	0.0008
16	0.4387	0.4106	3028	3000	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0007	0.0007	0.0008
17	0.4354	0.4077	3061	3000	0.0004	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0004	0.0004	0.0007	0.0007	0.0007
18	0.4386	0.4103	3027	3000	0.0002	0.0003	0.0002	0.0003	0.0002	0.0002	0.0003	0.0003	0.0004	0.0007	0.0007	0.0008
19	0.4389	0.4125	3040	3000	0.0005	0.0004	0.0005	0.0005	0.0004	0.0005	0.0005	0.0006	0.0005	0.0004	0.0009	0.0006
20	0.4346	0.4090	3085	3000	0.0003	0.0003	0.0002	0.0003	0.0001	0.0002	0.0002	0.0003	0.0005	0.0006	0.0007	0.0007
21	0.4342	0.4104	3103	3000	0.0004	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003	0.0004	0.0002	0.0006	0.0006	0.0006
22	0.4387	0.4108	3029	3000	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0007	0.0009	0.0009
23	0.4340	0.4076	3084	3000	0.0004	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0008	0.0008	0.0009
24	0.4421	0.4173	3024	3000	0.0004	0.0005	0.0003	0.0003	0.0002	0.0003	0.0004	0.0004	0.0007	0.0006	0.0007	0.0008
25	0.4341	0.4132	3127	3000	0.0005	0.0004	0.0004	0.0004	0.0004	0.0003	0.0004	0.0004	0.0003	0.0006	0.0007	0.0008
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0006	0.0006	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0008	0.0009	0.0008
Median					0.0005	0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.0006	0.0005	0.0007	0.0008	0.0008
σ					0.0002	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002
Min.					0.0002	0.0003	0.0002	0.0002	0.0001	0.0002	0.0002	0.0003	0.0002	0.0001	0.0003	0.0006
Max.					0.0010	0.0012	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0013	0.0013	0.0013	0.0013

DATA SET 4: 105°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)					
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	157	2.81	3016	3000	97.51	97.51	97.51	98.02	97.77	97.83
2	156	2.87	2988	3000	97.81	98.33	98.65	98.59	98.59	98.78
3	156	2.86	2995	3000	96.33	96.46	96.08	96.59	96.40	96.46
4	159	2.83	2994	3000	97.85	98.23	98.04	98.11	97.98	97.67
5	153	2.81	3039	3000	98.63	98.96	98.76	99.09	99.09	98.76
6	154	2.82	3038	3000	99.09	99.16	98.83	99.03	98.70	99.16
7	154	2.83	3011	3000	97.73	98.05	97.99	98.25	98.05	98.18
8	156	2.87	3005	3000	98.02	97.89	98.08	98.34	98.14	98.59
9	156	2.87	3018	3000	98.27	98.33	98.33	98.14	97.82	98.27
10	160	2.85	2983	3000	98.00	98.06	97.81	98.00	97.43	97.93
11	158	2.87	3005	3000	98.80	98.36	98.80	98.55	98.17	98.23
12	158	2.87	3042	3000	98.73	98.29	98.04	97.78	97.41	98.10
13	157	2.82	3025	3000	96.82	96.76	96.57	97.27	97.27	97.01
14	157	2.82	3057	3000	97.97	97.65	97.14	98.22	97.84	97.90
15	162	2.84	3068	3000	97.34	97.28	97.59	97.96	98.02	97.90
16	156	2.88	3028	3000	97.82	98.14	98.01	98.65	98.46	98.14
17	153	2.82	3061	3000	97.64	97.12	98.03	98.30	97.84	98.36
18	156	2.84	3027	3000	97.44	97.82	97.50	98.21	97.50	97.70
19	163	2.85	3040	3000	97.66	97.48	97.17	97.60	97.17	97.30
20	161	2.89	3085	3000	97.39	97.89	97.82	98.32	98.45	98.45
21	153	2.84	3103	3000	96.93	97.38	97.58	97.84	98.30	98.10
22	160	2.85	3029	3000	98.44	98.75	98.75	98.56	98.38	98.06
23	157	2.83	3084	3000	97.64	97.32	97.45	98.15	98.02	97.70
24	158	2.82	3024	3000	96.90	96.71	96.52	96.46	96.71	96.33
25	159	2.83	3127	3000	97.11	97.18	96.74	96.74	96.80	96.49
n	25	25	25	25	25	25	25	25	25	25
Mean	157	2.84			97.75	97.80	97.75	98.03	97.85	97.90
Median	157	2.84			97.73	97.89	97.82	98.15	97.98	98.06
σ	3	0.02			0.67	0.69	0.75	0.67	0.65	0.72
Min.	153	2.81			96.33	96.46	96.08	96.46	96.40	96.33
Max.	163	2.89			99.09	99.16	98.83	99.09	99.09	99.16

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')					
	CCx	CCy	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	0.4429	0.4179	3016	3000	0.0010	0.0009	0.0011	0.0010	0.0010	0.0010
2	0.4440	0.4166	2988	3000	0.0011	0.0013	0.0013	0.0011	0.0011	0.0013
3	0.4439	0.4173	2995	3000	0.0005	0.0005	0.0003	0.0003	0.0003	0.0005
4	0.4441	0.4176	2994	3000	0.0009	0.0010	0.0010	0.0007	0.0009	0.0009
5	0.4407	0.4162	3039	3000	0.0008	0.0008	0.0009	0.0006	0.0007	0.0006
6	0.4425	0.4199	3038	3000	0.0008	0.0008	0.0009	0.0006	0.0007	0.0006
7	0.4427	0.4168	3011	3000	0.0009	0.0010	0.0010	0.0007	0.0009	0.0006
8	0.4415	0.4136	3005	3000	0.0012	0.0013	0.0014	0.0012	0.0012	0.0013
9	0.4418	0.4159	3018	3000	0.0011	0.0012	0.0012	0.0010	0.0012	0.0010
10	0.4445	0.4170	2983	3000	0.0010	0.0012	0.0010	0.0009	0.0010	0.0009
11	0.4425	0.4157	3005	3000	0.0013	0.0012	0.0012	0.0009	0.0009	0.0009
12	0.4407	0.4166	3042	3000	0.0011	0.0009	0.0010	0.0010	0.0010	0.0010
13	0.4416	0.4163	3025	3000	0.0009	0.0009	0.0009	0.0007	0.0009	0.0009
14	0.4398	0.4166	3057	3000	0.0009	0.0010	0.0009	0.0007	0.0008	0.0007
15	0.4372	0.4125	3068	3000	0.0007	0.0008	0.0008	0.0008	0.0005	0.0007
16	0.4387	0.4106	3028	3000	0.0008	0.0008	0.0008	0.0009	0.0007	0.0006
17	0.4354	0.4077	3061	3000	0.0007	0.0007	0.0008	0.0007	0.0007	0.0006
18	0.4386	0.4103	3027	3000	0.0008	0.0008	0.0010	0.0010	0.0007	0.0006
19	0.4389	0.4125	3040	3000	0.0006	0.0008	0.0007	0.0008	0.0005	0.0004
20	0.4346	0.4090	3085	3000	0.0007	0.0007	0.0008	0.0008	0.0005	0.0006
21	0.4342	0.4104	3103	3000	0.0007	0.0007	0.0008	0.0008	0.0006	0.0006
22	0.4387	0.4108	3029	3000	0.0008	0.0009	0.0009	0.0010	0.0007	0.0008
23	0.4340	0.4076	3084	3000	0.0009	0.0009	0.0009	0.0009	0.0007	0.0007
24	0.4421	0.4173	3024	3000	0.0008	0.0009	0.0008	0.0007	0.0007	0.0006
25	0.4341	0.4132	3127	3000	0.0007	0.0007	0.0007	0.0008	0.0006	0.0006
n	25	25	25	25	25	25	25	25	25	25
Mean					0.0009	0.0009	0.0009	0.0008	0.0008	0.0008
Median					0.0008	0.0009	0.0009	0.0008	0.0007	0.0007
σ					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0005	0.0005	0.0003	0.0003	0.0003	0.0004
Max.					0.0013	0.0013	0.0014	0.0012	0.0012	0.0013

DATA SET 5: 120°C; 350 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [IF]	350 mA
Testing Initiation Date	November 2, 2015
Case Temperature [Ts]	120°C
Ambient Temperature [TA]	120°C
Failures observed	None

Test Results Summary

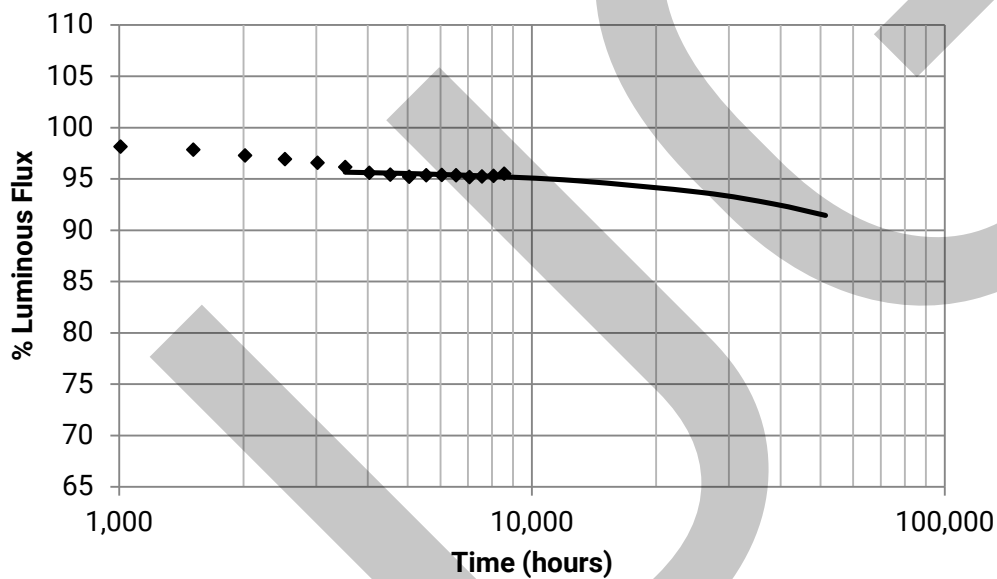
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%					
168	99.11%	0.0005	-0.1	N/R					
1008	98.14%	0.0005	-0.1	N/R					
1512	97.85%	0.0006	-0.1	N/R					
2016	97.28%	0.0005	-0.1	N/R					
2520	96.94%	0.0006	-0.1	N/R					
3024	96.58%	0.0006	-0.2	N/R					
3528	96.17%	0.0006	-0.2	N/R					
4032	95.59%	0.0005	-0.2	N/R					
4536	95.41%	0.0005	-0.2	N/R					
5040	95.21%	0.0005	-0.2	N/R					
5544	95.37%	0.0007	-0.3	N/R					
6048	95.40%	0.0007	-0.2	N/R					
6552	95.35%	0.0009	-0.3	-0.3%					
7056	95.18%	0.0008	-0.3	-0.2%					
7560	95.23%	0.0009	-0.4	-0.3%					
8064	95.31%	0.0010	-0.4	-0.2%					
8568	95.52%	0.0011	-0.4	-0.3%					

Note: "N/R" indicates data points that are not reported

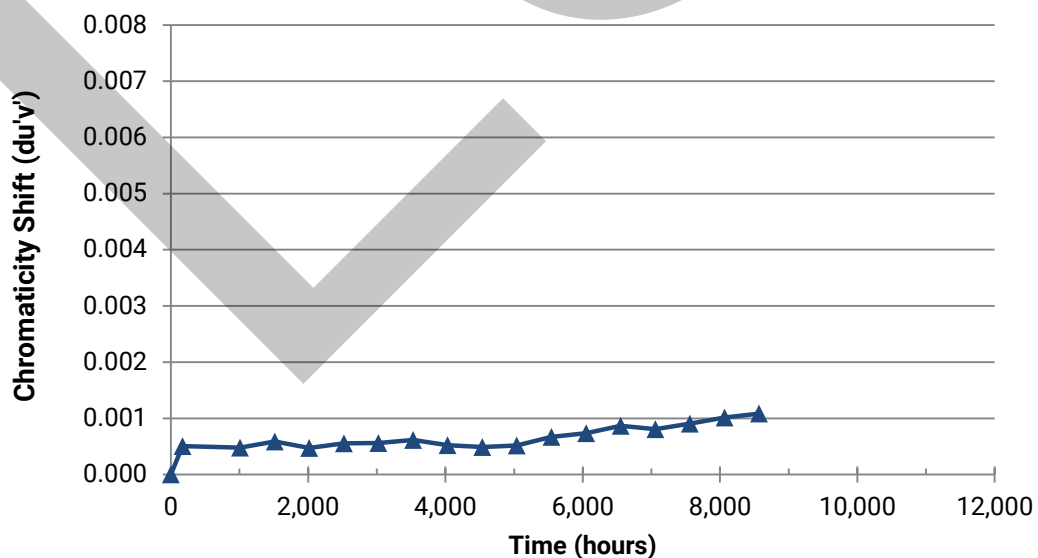
DATA SET 5: 120°C; 350 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	8,568 hours
Test duration used for projection	t=3,528 to t=8,568
α	9.406E-07
β	9.597E-01
Reported Lifetimes	L90(9k) > 51,400 hours
	L80(9k) > 51,400 hours
	L70(9k) > 51,400 hours



Color Shift Graph



DATA SET 5: 120°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	156	2.81	3025	3000	99.36	98.27	98.52	97.88	97.50	97.18	96.02	95.76	95.57	95.06	95.06	95.06
2	158	2.81	3044	3000	98.92	98.60	98.29	97.65	96.89	97.08	96.76	96.13	96.13	96.00	96.19	96.19
3	155	2.87	3019	3000	100.19	98.52	98.26	97.04	96.78	96.40	96.72	95.50	95.56	94.72	96.01	96.33
4	160	2.85	3063	3000	99.13	97.94	98.19	97.25	96.19	98.06	97.38	97.00	96.63	96.32	96.38	96.19
5	159	2.84	3008	3000	98.24	98.31	98.12	97.18	96.42	95.73	95.54	95.17	95.17	94.92	94.73	94.16
6	158	2.83	3027	3000	97.79	97.03	96.78	96.34	96.08	95.89	94.69	94.25	94.57	94.38	94.19	95.07
7	153	2.82	3041	3000	99.61	98.36	98.23	96.99	98.10	97.51	97.64	96.20	96.34	96.01	96.66	96.20
8	154	2.82	3021	3000	99.16	98.05	97.34	97.47	97.47	96.75	96.69	95.97	95.58	95.06	95.32	95.19
9	150	2.82	2999	3000	98.67	98.07	98.07	97.40	97.34	96.87	96.67	95.81	95.61	95.34	95.41	94.94
10	148	2.82	2985	3000	98.45	98.04	98.38	98.11	97.16	96.69	95.68	95.14	95.34	95.54	95.61	95.88
11	156	2.87	2994	3000	99.23	98.52	97.43	96.85	97.05	96.15	96.15	95.19	94.99	94.48	95.25	94.35
12	157	2.87	3047	3000	98.73	97.96	97.64	97.45	96.94	95.79	95.98	95.60	94.96	94.65	95.28	94.96
13	159	2.85	3052	3000	99.37	98.31	98.24	97.99	97.87	97.11	97.18	95.92	96.30	95.29	96.24	95.73
14	160	2.85	3055	3000	98.63	98.57	97.88	97.94	97.69	96.76	97.07	96.07	96.26	95.63	96.19	96.57
15	148	2.87	2994	3000	99.59	98.65	98.18	97.23	97.43	96.83	96.42	95.61	95.07	95.48	95.61	95.54
16	155	2.88	3063	3000	98.77	98.06	97.94	97.10	96.52	96.39	95.35	94.97	94.97	95.29	94.97	94.90
17	156	2.87	3006	3000	99.68	98.65	98.20	97.37	97.50	97.17	96.72	95.57	95.83	95.44	95.70	96.21
18	157	2.88	3052	3000	99.74	98.34	98.15	97.57	97.06	96.17	96.23	95.08	94.76	94.82	95.08	95.46
19	155	2.82	3028	3000	99.74	99.22	98.84	98.84	98.26	97.80	97.29	96.77	95.74	95.28	96.06	95.87
20	158	2.82	3062	3000	99.18	98.80	98.86	98.16	98.04	97.91	97.21	96.39	95.94	96.20	96.26	96.20
21	161	2.83	3094	3000	99.13	97.39	96.46	96.46	95.59	95.03	94.22	94.53	94.47	94.16	94.10	93.91
22	156	2.88	3070	3000	99.74	97.76	97.63	96.55	95.71	95.91	95.39	95.33	94.37	95.20	94.31	94.75
23	153	2.83	3100	3000	99.35	97.20	96.48	95.96	95.76	95.57	95.11	95.37	95.05	94.85	94.52	95.18
24	159	2.83	3106	3000	98.18	96.73	96.60	96.04	95.60	95.91	94.91	94.59	94.40	94.84	94.15	94.59
25	153	2.84	3126	3000	99.28	98.04	97.52	97.13	96.61	95.95	95.30	95.82	95.63	95.30	94.91	95.69
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	156	2.84			99.11	98.14	97.85	97.28	96.94	96.58	96.17	95.59	95.41	95.21	95.37	95.40
Median	156	2.84			99.18	98.27	98.12	97.25	97.05	96.69	96.23	95.60	95.56	95.28	95.32	95.46
σ	4	0.02			0.57	0.57	0.68	0.69	0.80	0.78	0.93	0.66	0.65	0.55	0.76	0.74
Min.	148	2.81			97.79	96.73	96.46	95.96	95.59	95.03	94.22	94.25	94.37	94.16	94.10	93.91
Max.	161	2.88			100.19	99.22	98.86	98.84	98.26	98.06	97.64	97.00	96.63	96.32	96.66	96.57

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4422	0.4176	3025	3000	0.0004	0.0002	0.0005	0.0004	0.0006	0.0006	0.0007	0.0005	0.0004	0.0004	0.0007	0.0010
2	0.4404	0.4162	3044	3000	0.0007	0.0006	0.0009	0.0007	0.0008	0.0008	0.0009	0.0008	0.0007	0.0008	0.0008	0.0009
3	0.4417	0.4158	3019	3000	0.0008	0.0006	0.0006	0.0006	0.0007	0.0008	0.0010	0.0008	0.0007	0.0006	0.0010	0.0012
4	0.4359	0.4091	3063	3000	0.0001	0.0001	0.0002	0.0002	0.0002	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0008
5	0.4437	0.4185	3008	3000	0.0005	0.0003	0.0007	0.0004	0.0005	0.0006	0.0006	0.0003	0.0003	0.0005	0.0006	0.0007
6	0.4400	0.4132	3027	3000	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0005	0.0005	0.0005
7	0.4410	0.4171	3041	3000	0.0007	0.0006	0.0009	0.0002	0.0006	0.0007	0.0008	0.0005	0.0005	0.0005	0.0007	0.0008
8	0.4428	0.4184	3021	3000	0.0004	0.0004	0.0006	0.0004	0.0005	0.0006	0.0006	0.0004	0.0004	0.0005	0.0006	0.0006
9	0.4447	0.4195	2999	3000	0.0006	0.0004	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0006	0.0006
10	0.4454	0.4191	2985	3000	0.0006	0.0005	0.0006	0.0004	0.0005	0.0006	0.0006	0.0005	0.0004	0.0007	0.0007	0.0008
11	0.4422	0.4136	2994	3000	0.0005	0.0005	0.0004	0.0005	0.0007	0.0008	0.0009	0.0007	0.0007	0.0008	0.0010	0.0011
12	0.4399	0.4156	3047	3000	0.0004	0.0005	0.0006	0.0003	0.0007	0.0006	0.0006	0.0004	0.0004	0.0005	0.0007	0.0006
13	0.4409	0.4184	3052	3000	0.0006	0.0006	0.0005	0.0006	0.0007	0.0006	0.0006	0.0005	0.0005	0.0004	0.0006	0.0009
14	0.4400	0.4168	3055	3000	0.0004	0.0006	0.0007	0.0006	0.0007	0.0006	0.0007	0.0006	0.0005	0.0005	0.0007	0.0008
15	0.4422	0.4136	2994	3000	0.0009	0.0010	0.0012	0.0009	0.0011	0.0009	0.0011	0.0009	0.0009	0.0009	0.0012	0.0013
16	0.4379	0.4134	3063	3000	0.0007	0.0005	0.0006	0.0006	0.0006	0.0007	0.0008	0.0007	0.0007	0.0006	0.0008	0.0007
17	0.4414	0.4135	3006	3000	0.0008	0.0009	0.0011	0.0010	0.0011	0.0011	0.0011	0.0010	0.0009	0.0010	0.0011	0.0013
18	0.4379	0.4120	3052	3000	0.0009	0.0008	0.0008	0.0006	0.0009	0.0008	0.0009	0.0009	0.0006	0.0006	0.0008	0.0008
19	0.4408	0.4151	3028	3000	0.0009	0.0008	0.0011	0.0006	0.0006	0.0007	0.0008	0.0007	0.0005	0.0004	0.0007	0.0007
20	0.4391	0.4158	3062	3000	0.0007	0.0007	0.0008	0.0006	0.0006	0.0007	0.0008	0.0006	0.0005	0.0006	0.0009	0.0009
21	0.4346	0.4101	3094	3000	0.0003	0.0001	0.0002	0.0003	0.0002	0.0001	0.0001	0.0002	0.0002	0.0001	0.0003	0.0002
22	0.4359	0.4099	3070	3000	0.0002	0.0004	0.0003	0.0005	0.0006	0.0003	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004
23	0.4325	0.4063	3100	3000	0.0003	0.0003	0.0004	0.0004	0.0003	0.0001	0.0001	0.0002	0.0003	0.0003	0.0004	0.0002
24	0.4350	0.4125	3106	3000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003	0.0002	0.0003	0.0002	0.0002	0.0004	0.0003
25	0.4325	0.4095	3126	3000	0.0002	0.0002	0.0001	0.0003	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0005	0.0005	0.0006	0.0005	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005	0.0007	0.0007
Median					0.0005	0.0005	0.0006	0.0005	0.0006	0.0006	0.0006	0.0005	0.0004	0.0005	0.0007	0.0008
σ					0.0003	0.0002	0.0003	0.0002	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003
Min.					0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0002	0.0002
Max.					0.0009	0.0010	0.0012	0.0010	0.0011	0.0011	0.0011	0.0010	0.0009	0.0010	0.0012	0.0013

DATA SET 5: 120°C; 350 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)				
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568
1	156	2.81	3025	3000	95.38	95.12	95.12	95.31	95.25
2	158	2.81	3044	3000	96.51	96.13	96.00	95.68	95.81
3	155	2.87	3019	3000	95.62	95.62	95.37	95.75	96.01
4	160	2.85	3063	3000	96.88	96.50	96.88	97.07	96.88
5	159	2.84	3008	3000	94.22	94.35	94.35	94.16	94.66
6	158	2.83	3027	3000	94.57	94.06	94.69	94.31	94.69
7	153	2.82	3041	3000	96.34	96.53	96.27	96.73	96.92
8	154	2.82	3021	3000	95.45	95.52	95.58	95.78	96.10
9	150	2.82	2999	3000	95.07	94.34	95.21	94.74	95.07
10	148	2.82	2985	3000	95.95	95.14	95.88	95.41	96.08
11	156	2.87	2994	3000	94.54	94.61	94.67	95.06	95.38
12	157	2.87	3047	3000	94.96	94.90	94.58	94.96	95.35
13	159	2.85	3052	3000	96.05	96.24	96.24	96.74	96.11
14	160	2.85	3055	3000	96.38	96.19	95.70	96.32	96.63
15	148	2.87	2994	3000	95.41	95.27	94.94	94.80	95.34
16	155	2.88	3063	3000	95.55	94.58	94.84	94.97	95.10
17	156	2.87	3006	3000	95.83	95.89	96.21	96.34	96.53
18	157	2.88	3052	3000	94.82	94.44	94.70	95.08	95.34
19	155	2.82	3028	3000	95.67	95.87	95.93	95.28	95.99
20	158	2.82	3062	3000	96.20	95.75	95.75	95.75	95.75
21	161	2.83	3094	3000	93.73	93.98	93.73	94.16	94.22
22	156	2.88	3070	3000	94.63	94.43	94.50	94.50	94.37
23	153	2.83	3100	3000	94.39	94.52	94.39	94.85	94.98
24	159	2.83	3106	3000	94.34	94.09	94.09	94.15	94.03
25	153	2.84	3126	3000	95.23	95.43	95.17	94.91	95.30
n	25	25	25	25	25	25	25	25	25
Mean	156	2.84			95.35	95.18	95.23	95.31	95.52
Median	156	2.84			95.41	95.14	95.17	95.08	95.35
σ	4	0.02			0.81	0.81	0.79	0.84	0.80
Min.	148	2.81			93.73	93.98	93.73	94.15	94.03
Max.	161	2.88			96.88	96.53	96.88	97.07	96.92

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')				
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568
1	0.4422	0.4176	3025	3000	0.0009	0.0007	0.0009	0.0011	0.0013
2	0.4404	0.4162	3044	3000	0.0011	0.0010	0.0015	0.0017	0.0020
3	0.4417	0.4158	3019	3000	0.0012	0.0012	0.0012	0.0013	0.0013
4	0.4359	0.4091	3063	3000	0.0006	0.0003	0.0005	0.0006	0.0006
5	0.4437	0.4185	3008	3000	0.0008	0.0007	0.0008	0.0010	0.0010
6	0.4400	0.4132	3027	3000	0.0010	0.0010	0.0011	0.0012	0.0013
7	0.4410	0.4171	3041	3000	0.0010	0.0010	0.0010	0.0011	0.0011
8	0.4428	0.4184	3021	3000	0.0009	0.0010	0.0010	0.0011	0.0011
9	0.4447	0.4195	2999	3000	0.0009	0.0008	0.0009	0.0011	0.0012
10	0.4454	0.4191	2985	3000	0.0012	0.0011	0.0012	0.0013	0.0015
11	0.4422	0.4136	2994	3000	0.0011	0.0011	0.0011	0.0012	0.0013
12	0.4399	0.4156	3047	3000	0.0009	0.0010	0.0010	0.0011	0.0012
13	0.4409	0.4184	3052	3000	0.0008	0.0008	0.0008	0.0009	0.0010
14	0.4400	0.4168	3055	3000	0.0010	0.0009	0.0009	0.0011	0.0012
15	0.4422	0.4136	2994	3000	0.0015	0.0015	0.0016	0.0018	0.0017
16	0.4379	0.4134	3063	3000	0.0006	0.0006	0.0007	0.0008	0.0010
17	0.4414	0.4135	3006	3000	0.0013	0.0012	0.0014	0.0014	0.0014
18	0.4379	0.4120	3052	3000	0.0011	0.0010	0.0011	0.0011	0.0012
19	0.4408	0.4151	3028	3000	0.0011	0.0010	0.0011	0.0011	0.0012
20	0.4391	0.4158	3062	3000	0.0011	0.0011	0.0011	0.0012	0.0015
21	0.4346	0.4101	3094	3000	0.0002	0.0002	0.0003	0.0004	0.0004
22	0.4359	0.4099	3070	3000	0.0004	0.0002	0.0004	0.0005	0.0005
23	0.4325	0.4063	3100	3000	0.0003	0.0002	0.0003	0.0005	0.0005
24	0.4350	0.4125	3106	3000	0.0005	0.0003	0.0003	0.0004	0.0004
25	0.4325	0.4095	3126	3000	0.0004	0.0003	0.0003	0.0004	0.0005
n	25	25	25	25	25	25	25	25	25
Mean					0.0009	0.0008	0.0009	0.0010	0.0011
Median					0.0009	0.0010	0.0010	0.0011	0.0012
σ					0.0003	0.0004	0.0004	0.0004	0.0004
Min.					0.0002	0.0002	0.0003	0.0004	0.0004
Max.					0.0015	0.0015	0.0016	0.0018	0.0020

DATA SET 6: 85°C; 700 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [IF]	700 mA
Testing Initiation Date	November 2, 2015
Case Temperature [Ts]	85°C
Ambient Temperature [TA]	85°C
Failures observed	None

Test Results Summary

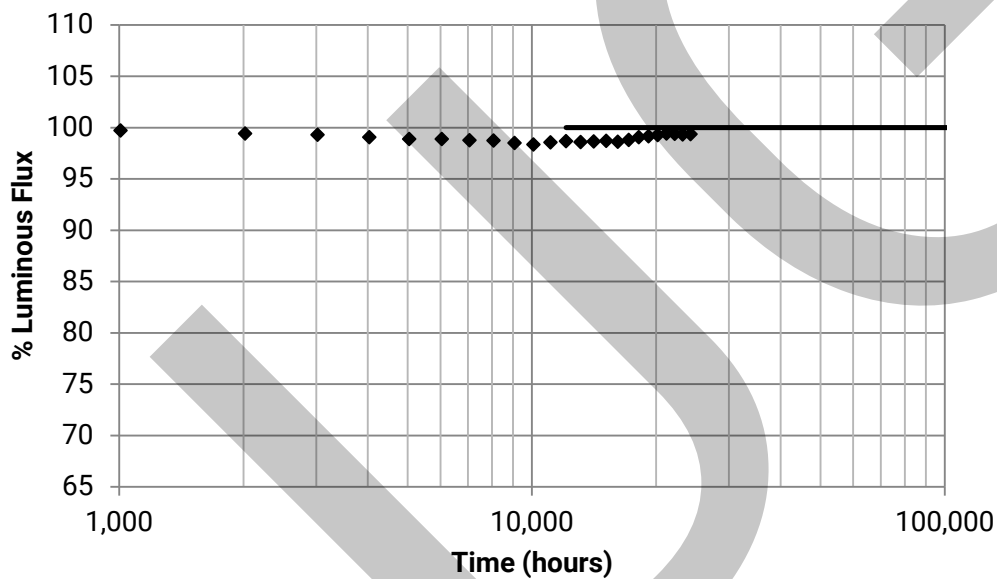
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	0.0000	0.0	0.0%	20160	99.28%	0.0012	-0.3	-2.5%
1008	99.73%	0.0009	-0.1	N/R	21168	99.43%	0.0013	-0.3	-2.7%
2016	99.43%	0.0008	-0.1	N/R	22176	99.40%	0.0012	-0.3	-2.4%
3024	99.31%	0.0009	-0.1	N/R	23184	99.34%	0.0011	-0.3	-2.5%
4032	99.07%	0.0009	-0.2	N/R	24192	99.37%	0.0011	-0.2	-2.5%
5040	98.90%	0.0008	-0.2	N/R					
6048	98.88%	0.0009	-0.2	N/R					
7056	98.77%	0.0009	-0.2	N/R					
8064	98.73%	0.0009	-0.2	N/R					
9072	98.51%	0.0009	-0.2	N/R					
10080	98.36%	0.0009	-0.2	N/R					
11088	98.56%	0.0009	-0.2	-1.9%					
12096	98.68%	0.0009	-0.2	-1.3%					
13104	98.59%	0.0010	-0.2	-1.8%					
14112	98.64%	0.0010	-0.2	-1.7%					
15120	98.72%	0.0010	-0.3	-2.2%					
16128	98.62%	0.0011	-0.2	-1.7%					
17136	98.80%	0.0012	-0.2	-1.6%					
18144	99.07%	0.0012	-0.3	-1.8%					
19152	99.17%	0.0012	-0.3	-2.4%					

Note: "N/R" indicates data points that are not reported

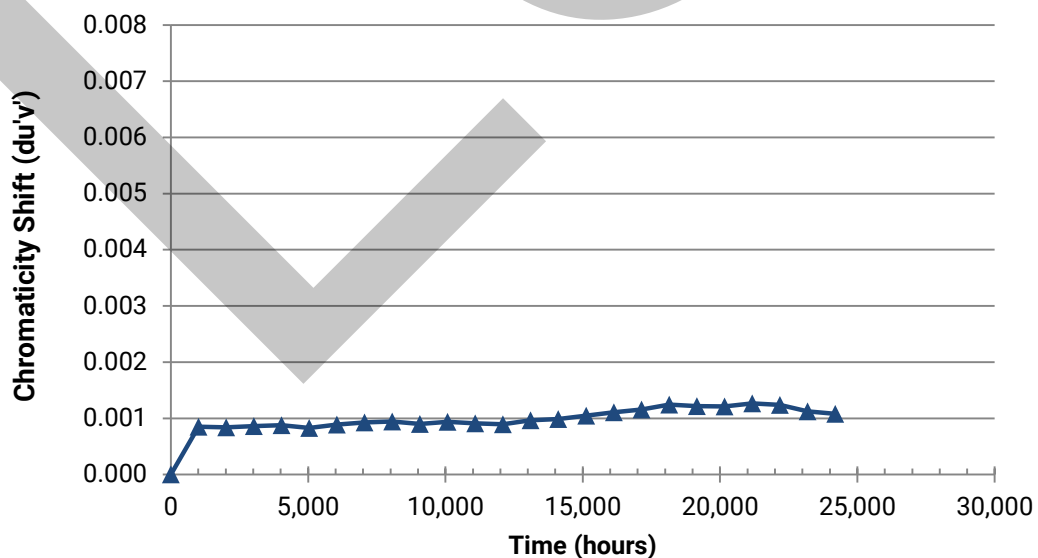
DATA SET 6: 85°C; 700 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	24,192 hours
Test duration used for projection	t=12,096 to t=24,192
α	-8.121E-07
β	9.756E-01
Reported Lifetimes	L90(24k) > 145,000 hours
	L80(24k) > 145,000 hours
	L70(24k) > 145,000 hours



Color Shift Graph



DATA SET 6: 85°C; 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	1008	2016	3024	4032	5040	6048	7056	8064	9072	10080	11088	12096
1	300	2.95	3142	3000	99.80	99.57	99.20	99.03	98.43	98.23	98.07	98.00	97.73	98.07	97.83	98.00
2	291	3.00	3073	3000	99.83	99.00	99.07	98.90	98.87	98.76	98.73	98.46	98.28	97.67	98.01	98.66
3	286	2.94	3117	3000	99.62	99.41	99.13	98.60	98.50	98.57	98.18	98.32	98.29	97.80	98.04	98.36
4	294	2.95	3133	3000	100.00	99.01	98.94	98.54	98.40	98.30	98.26	98.37	97.68	97.99	97.55	97.89
5	281	2.96	3082	3000	100.11	99.50	99.47	99.11	98.72	98.93	98.72	98.65	98.50	98.72	98.47	99.11
6	297	2.97	3067	3000	99.66	99.39	99.49	98.58	98.85	98.32	98.92	98.35	98.69	98.69	98.25	98.75
7	291	2.95	3064	3000	99.42	99.14	99.14	98.69	98.52	98.56	97.94	97.70	97.35	97.11	96.97	97.83
8	287	2.97	3070	3000	99.83	99.34	99.62	99.58	99.30	99.13	99.23	99.37	98.95	99.37	99.27	99.69
9	302	2.97	3088	3000	99.90	99.54	99.17	98.51	98.25	98.25	97.78	97.55	97.85	97.09	97.62	97.48
10	295	3.03	3068	3000	99.46	99.46	99.29	99.32	98.88	98.88	98.92	98.85	97.46	98.24	98.61	98.88
11	292	2.93	3022	3000	99.66	99.45	99.56	99.08	99.21	98.97	99.01	98.80	98.73	98.80	99.32	98.77
12	289	3.04	3033	3000	99.65	99.31	99.24	99.00	99.03	99.00	98.89	98.89	99.20	98.69	98.89	98.72
13	290	3.02	3052	3000	99.86	99.55	99.41	99.62	99.24	99.14	98.86	99.10	99.55	98.45	99.14	99.72
14	295	2.98	3042	3000	99.36	99.80	99.39	99.19	99.19	99.22	98.68	98.65	98.65	98.54	99.12	99.05
15	298	2.97	3054	3000	99.46	99.46	98.89	99.40	98.82	98.86	98.93	98.99	98.19	98.15	98.32	99.19
16	281	2.94	3080	3000	99.82	99.64	99.75	99.75	99.47	99.11	99.36	99.14	99.79	99.07	99.75	99.32
17	279	2.93	3026	3000	99.78	99.39	99.57	99.64	99.39	99.50	99.68	99.89	100.00	99.82	100.04	99.68
18	289	3.02	2992	3000	99.86	99.10	99.45	99.27	99.24	99.06	98.82	99.13	98.51	98.93	98.41	98.89
19	296	2.94	3031	3000	99.53	99.29	99.22	98.75	98.48	98.68	98.55	98.61	98.44	98.17	98.34	97.77
20	291	2.93	3052	3000	99.90	99.35	99.00	98.63	98.80	98.49	98.80	98.28	97.63	97.90	99.14	99.00
21	282	3.02	3049	3000	100.00	99.82	99.15	99.15	98.87	99.01	98.72	98.94	98.48	98.16	98.65	97.94
22	289	2.94	3084	3000	99.45	99.62	99.55	99.52	99.34	99.55	99.10	99.03	98.72	98.48	99.17	98.93
23	289	3.03	3040	3000	99.76	99.48	99.27	99.07	98.86	99.17	99.07	98.89	98.48	98.03	98.00	98.31
24	293	3.02	3071	3000	99.73	99.32	99.42	98.91	99.04	99.25	99.08	99.38	98.50	98.22	98.43	98.32
25	275	2.95	3056	3000	99.75	99.75	99.31	98.80	98.80	99.05	99.02	98.94	99.02	98.73	98.58	98.73
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	290	2.97			99.73	99.43	99.31	99.07	98.90	98.88	98.77	98.73	98.51	98.36	98.56	98.68
Median	291	2.97			99.76	99.45	99.29	99.07	98.87	98.87	98.86	98.85	98.50	98.24	98.47	98.75
σ	7	0.04			0.20	0.22	0.22	0.38	0.34	0.37	0.44	0.53	0.68	0.62	0.71	0.62
Min.	275	2.93			99.36	99.00	98.89	98.51	98.25	98.23	97.78	97.55	97.35	97.09	96.97	97.48
Max.	302	3.04			100.11	99.82	99.75	99.75	99.47	99.55	99.68	99.89	100.00	99.82	100.04	99.72

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	1008	2016	3024	4032	5040	6048	7056	8064	9072	10080	11088	12096
1	0.4315	0.4094	3142	3000	0.0006	0.0006	0.0006	0.0006	0.0006	0.0004	0.0008	0.0006	0.0008	0.0007	0.0006	0.0007
2	0.4352	0.4088	3073	3000	0.0007	0.0008	0.0006	0.0008	0.0007	0.0007	0.0007	0.0008	0.0007	0.0008	0.0008	0.0008
3	0.4299	0.4026	3117	3000	0.0003	0.0004	0.0003	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
4	0.4323	0.4100	3133	3000	0.0006	0.0008	0.0007	0.0010	0.0009	0.0008	0.0009	0.0009	0.0008	0.0009	0.0009	0.0009
5	0.4366	0.4129	3082	3000	0.0006	0.0008	0.0009	0.0010	0.0009	0.0009	0.0009	0.0008	0.0009	0.0009	0.0007	0.0009
6	0.4350	0.4076	3067	3000	0.0003	0.0007	0.0006	0.0007	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0008
7	0.4350	0.4072	3064	3000	0.0006	0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007	0.0008	0.0007	0.0007
8	0.4351	0.4082	3070	3000	0.0006	0.0008	0.0007	0.0008	0.0008	0.0005	0.0007	0.0008	0.0008	0.0008	0.0007	0.0007
9	0.4350	0.4102	3088	3000	0.0009	0.0006	0.0006	0.0008	0.0006	0.0006	0.0005	0.0006	0.0008	0.0008	0.0008	0.0008
10	0.4357	0.4093	3068	3000	0.0008	0.0008	0.0004	0.0008	0.0007	0.0008	0.0006	0.0008	0.0007	0.0009	0.0008	0.0009
11	0.4424	0.4176	3022	3000	0.0008	0.0006	0.0010	0.0008	0.0005	0.0008	0.0007	0.0007	0.0007	0.0007	0.0006	0.0004
12	0.4407	0.4155	3033	3000	0.0012	0.0012	0.0011	0.0011	0.0012	0.0011	0.0012	0.0011	0.0012	0.0012	0.0011	0.0013
13	0.4382	0.4126	3052	3000	0.0014	0.0014	0.0015	0.0014	0.0014	0.0015	0.0015	0.0017	0.0016	0.0015	0.0017	0.0016
14	0.4411	0.4175	3042	3000	0.0008	0.0008	0.0008	0.0008	0.0007	0.0009	0.0010	0.0009	0.0010	0.0010	0.0009	0.0009
15	0.4398	0.4162	3054	3000	0.0008	0.0007	0.0007	0.0006	0.0007	0.0008	0.0009	0.0008	0.0006	0.0008	0.0007	0.0007
16	0.4370	0.4136	3080	3000	0.0010	0.0009	0.0009	0.0009	0.0011	0.0011	0.0011	0.0010	0.0011	0.0010	0.0012	0.0010
17	0.4413	0.4159	3026	3000	0.0010	0.0011	0.0010	0.0010	0.0008	0.0010	0.0012	0.0013	0.0011	0.0013	0.0011	0.0012
18	0.4433	0.4157	2992	3000	0.0011	0.0013	0.0014	0.0014	0.0013	0.0014	0.0015	0.0014	0.0014	0.0015	0.0014	0.0014
19	0.4418	0.4175	3031	3000	0.0009	0.0009	0.0008	0.0008	0.0008	0.0009	0.0008	0.0009	0.0008	0.0008	0.0009	0.0007
20	0.4395	0.4154	3052	3000	0.0009	0.0006	0.0009	0.0009	0.0008	0.0009	0.0010	0.0011	0.0008	0.0007	0.0009	0.0009
21	0.4383	0.4124	3049	3000	0.0013	0.0009	0.0011	0.0010	0.0009	0.0011	0.0010	0.0010	0.0010	0.0012	0.0010	0.0007
22	0.4362	0.4124	3084	3000	0.0013	0.0011	0.0012	0.0010	0.0010	0.0012	0.0012	0.0013	0.0008	0.0012	0.0011	0.0011
23	0.4396	0.4141	3040	3000	0.0012	0.0012	0.0013	0.0012	0.0014	0.0014	0.0014	0.0014	0.0015	0.0012	0.0013	0.0013
24	0.4360	0.4103	3071	3000	0.0010	0.0011	0.0011	0.0010	0.0007	0.0011	0.0012	0.0012	0.0010	0.0011	0.0010	0.0011
25	0.4401	0.4172	3056	3000	0.0007	0.0005	0.0007	0.0006	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0008	0.0006
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0009	0.0008	0.0009	0.0009	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
Median					0.0008	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0008	0.0009	0.0009	0.0009
σ					0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.					0.0003	0.0004	0.0003	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
Max.					0.0014	0.0014	0.0015	0.0014	0.0014	0.0015	0.0015	0.0017	0.0016	0.0015	0.0017	0.0016

DATA SET 6: 85°C; 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	13104	14112	15120	16128	17136	18144	19152	20160	21168	22176	23184	24192
1	300	2.95	3142	3000	97.57	98.03	97.30	96.90	97.17	97.43	97.80	98.33	98.07	98.63	98.53	98.83
2	291	3.00	3073	3000	98.18	98.59	98.87	99.21	99.35	99.73	99.69	100.17	100.24	100.07	100.03	99.73
3	286	2.94	3117	3000	98.04	98.08	98.01	97.06	97.83	97.94	98.32	98.46	98.46	98.78	98.88	98.64
4	294	2.95	3133	3000	97.75	98.13	97.79	97.96	98.30	98.64	98.94	99.15	99.32	99.39	99.11	98.94
5	281	2.96	3082	3000	98.40	98.86	99.22	98.75	99.29	99.68	99.79	99.86	100.00	100.04	99.89	100.18
6	297	2.97	3067	3000	97.94	98.62	98.11	97.47	97.78	98.11	98.48	98.89	99.06	99.12	98.92	99.02
7	291	2.95	3064	3000	97.08	97.70	97.39	97.76	97.87	98.04	98.28	98.45	98.76	98.90	98.59	98.66
8	287	2.97	3070	3000	99.34	99.69	99.93	99.69	100.24	99.51	99.20	99.83	100.03	99.83	99.69	99.90
9	302	2.97	3088	3000	97.28	97.72	97.62	97.02	97.55	97.65	97.85	97.81	97.78	97.85	97.98	97.95
10	295	3.03	3068	3000	98.34	98.48	99.49	99.19	99.66	99.66	100.17	100.47	100.71	100.74	100.78	100.95
11	292	2.93	3022	3000	98.80	98.39	99.28	99.04	99.04	99.62	99.11	100.17	99.83	100.03	100.51	100.31
12	289	3.04	3033	3000	98.79	98.58	98.79	98.82	98.41	99.03	99.10	99.10	99.38	99.38	99.45	99.41
13	290	3.02	3052	3000	99.86	99.41	99.31	99.07	99.41	99.27	99.83	99.72	99.93	99.93	99.79	99.76
14	295	2.98	3042	3000	99.29	99.15	99.42	99.53	99.73	100.14	100.41	100.20	100.61	100.51	100.10	100.51
15	298	2.97	3054	3000	99.43	98.86	98.69	98.19	98.45	98.39	98.76	98.79	98.96	98.99	99.16	99.09
16	281	2.94	3080	3000	99.61	99.71	99.43	99.43	99.61	99.47	99.43	99.61	100.07	99.86	99.39	99.22
17	279	2.93	3026	3000	100.11	99.96	99.71	99.21	99.32	99.18	99.75	99.57	99.61	99.18	99.28	99.32
18	289	3.02	2992	3000	98.96	98.93	99.48	99.48	99.65	99.41	100.28	100.10	99.97	99.72	99.69	99.79
19	296	2.94	3031	3000	97.90	98.01	98.07	98.68	99.12	99.80	99.66	99.36	99.76	99.97	99.73	99.70
20	291	2.93	3052	3000	99.31	98.94	98.73	98.80	98.56	99.52	99.79	99.55	99.31	99.07	99.04	98.97
21	282	3.02	3049	3000	97.80	98.23	98.65	98.72	99.04	99.61	99.15	98.87	99.36	98.94	98.83	99.04
22	289	2.94	3084	3000	98.69	98.82	99.00	98.79	98.10	99.34	98.65	99.17	99.45	99.27	99.14	99.41
23	289	3.03	3040	3000	98.65	98.38	98.79	98.34	98.93	98.76	98.58	98.44	98.86	98.76	98.41	98.17
24	293	3.02	3071	3000	98.80	98.43	98.26	98.74	98.70	98.84	98.32	98.46	98.46	98.50	98.60	98.74
25	275	2.95	3056	3000	98.73	98.25	98.69	99.67	98.87	99.93	99.85	99.49	99.82	99.53	99.89	99.89
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	290	2.97			98.59	98.64	98.72	98.62	98.80	99.07	99.17	99.28	99.43	99.40	99.34	99.37
Median	291	2.97			98.69	98.58	98.79	98.79	98.93	99.34	99.15	99.36	99.45	99.38	99.28	99.32
σ	7	0.04			0.80	0.60	0.74	0.83	0.78	0.76	0.75	0.71	0.75	0.67	0.68	0.72
Min.	275	2.93			97.08	97.70	97.30	96.90	97.17	97.43	97.80	97.81	97.78	97.85	97.98	97.95
Max.	302	3.04			100.11	99.96	99.93	99.69	100.24	100.14	100.41	100.47	100.71	100.74	100.78	100.95

Lamp #	Initial (0 hrs)				Chromaticity Shift ($\Delta u'v'$)											
	CCx	CCy	Calc. CCT	ANSI Target	13104	14112	15120	16128	17136	18144	19152	20160	21168	22176	23184	24192
1	0.4315	0.4094	3142	3000	0.0006	0.0007	0.0007	0.0010	0.0008	0.0010	0.0008	0.0010	0.0010	0.0010	0.0009	0.0010
2	0.4352	0.4088	3073	3000	0.0007	0.0007	0.0009	0.0010	0.0009	0.0010	0.0009	0.0011	0.0010	0.0008	0.0006	0.0007
3	0.4299	0.4026	3117	3000	0.0005	0.0005	0.0004	0.0003	0.0006	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
4	0.4323	0.4100	3133	3000	0.0008	0.0009	0.0010	0.0009	0.0010	0.0011	0.0010	0.0011	0.0011	0.0012	0.0009	0.0009
5	0.4366	0.4129	3082	3000	0.0008	0.0009	0.0009	0.0008	0.0009	0.0011	0.0010	0.0011	0.0011	0.0011	0.0007	0.0008
6	0.4350	0.4076	3067	3000	0.0008	0.0008	0.0007	0.0009	0.0009	0.0009	0.0009	0.0010	0.0011	0.0012	0.0010	0.0011
7	0.4350	0.4072	3064	3000	0.0006	0.0007	0.0007	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0005	0.0007
8	0.4351	0.4082	3070	3000	0.0008	0.0008	0.0008	0.0007	0.0009	0.0010	0.0010	0.0011	0.0011	0.0008	0.0007	0.0008
9	0.4350	0.4102	3088	3000	0.0008	0.0008	0.0009	0.0009	0.0011	0.0012	0.0011	0.0010	0.0011	0.0011	0.0007	0.0008
10	0.4357	0.4093	3068	3000	0.0008	0.0009	0.0010	0.0012	0.0010	0.0011	0.0009	0.0011	0.0012	0.0012	0.0010	0.0011
11	0.4424	0.4176	3022	3000	0.0007	0.0008	0.0007	0.0009	0.0009	0.0011	0.0010	0.0012	0.0012	0.0012	0.0011	0.0011
12	0.4407	0.4155	3033	3000	0.0013	0.0013	0.0013	0.0012	0.0015	0.0015	0.0015	0.0016	0.0016	0.0015	0.0015	0.0016
13	0.4382	0.4126	3052	3000	0.0017	0.0015	0.0018	0.0019	0.0019	0.0018	0.0020	0.0019	0.0020	0.0017	0.0017	0.0016
14	0.4411	0.4175	3042	3000	0.0010	0.0009	0.0011	0.0012	0.0012	0.0012	0.0012	0.0013	0.0014	0.0013	0.0013	0.0013
15	0.4398	0.4162	3054	3000	0.0008	0.0006	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0010	0.0009	0.0007	0.0006
16	0.4370	0.4136	3080	3000	0.0011	0.0012	0.0012	0.0012	0.0014	0.0015	0.0014	0.0015	0.0016	0.0015	0.0015	0.0016
17	0.4413	0.4159	3026	3000	0.0013	0.0013	0.0014	0.0014	0.0015	0.0014	0.0015	0.0015	0.0015	0.0014	0.0013	0.0011
18	0.4433	0.4157	2992	3000	0.0016	0.0015	0.0016	0.0017	0.0017	0.0018	0.0017	0.0019	0.0019	0.0017	0.0018	0.0018
19	0.4418	0.4175	3031	3000	0.0009	0.0009	0.0008	0.0011	0.0011	0.0011	0.0011	0.0004	0.0005	0.0011	0.0012	0.0007
20	0.4395	0.4154	3052	3000	0.0010	0.0011	0.0012	0.0012	0.0011	0.0011	0.0012	0.0012	0.0012	0.0013	0.0012	0.0012
21	0.4383	0.4124	3049	3000	0.0011	0.0012	0.0012	0.0012	0.0014	0.0014	0.0014	0.0015	0.0016	0.0015	0.0016	0.0014
22	0.4362	0.4124	3084	3000	0.0013	0.0013	0.0015	0.0014	0.0014	0.0016	0.0016	0.0016	0.0016	0.0015	0.0014	0.0012
23	0.4396	0.4141	3040	3000	0.0013	0.0014	0.0015	0.0014	0.0016	0.0017	0.0016	0.0009	0.0010	0.0017	0.0017	0.0012
24	0.4360	0.4103	3071	3000	0.0011	0.0012	0.0013	0.0014	0.0013	0.0014	0.0014	0.0014	0.0014	0.0014	0.0008	0.0007
25	0.4401	0.4172	3056	3000	0.0009	0.0008	0.0009	0.0011	0.0011	0.0013	0.0013	0.0015	0.0015	0.0014	0.0014	0.0012
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0010	0.0010	0.0010	0.0011	0.0012	0.0012	0.0012	0.0012	0.0013	0.0012	0.0011	0.0011
Median					0.0009	0.0009	0.0010	0.0011	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0011	0.0011
σ					0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003
Min.					0.0005	0.0005	0.0004	0.0003	0.0006	0.0009	0.0008	0.0004	0.0005	0.0008	0.0005	0.0006
Max.					0.0017	0.0015	0.0018	0.0019	0.0019	0.0018	0.0020	0.0019	0.0020	0.0017	0.0018	0.0018

DATA SET 16: 85°C; 700 mA (2700K)

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_F]	700 mA
Testing Initiation Date	March 27, 2019
Case Temperature [T_s]	85°C
Ambient Temperature [T_A]	85°C
Failures observed	None

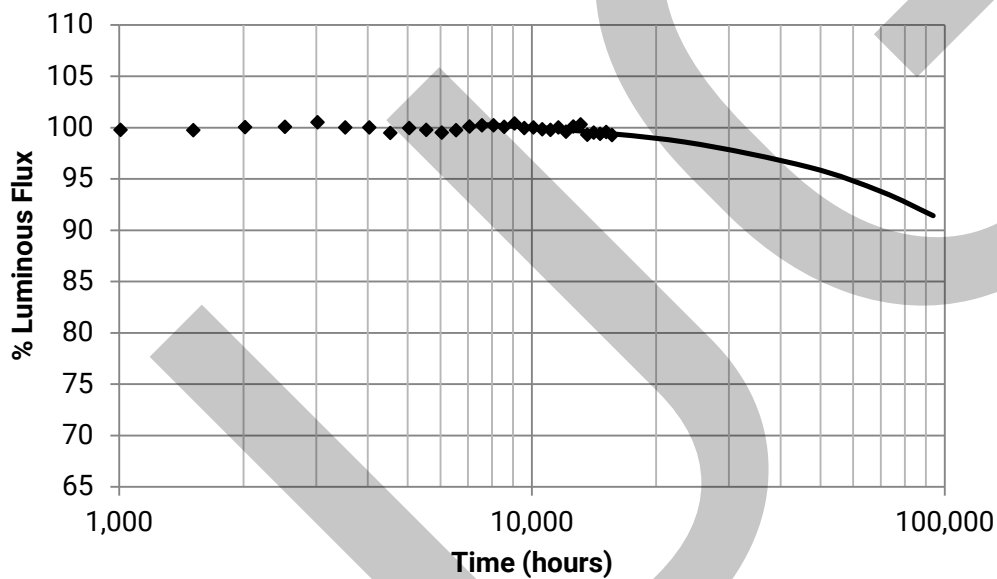
Test Results Summary

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	10080	100.01%	0.0005	-0.1	0.2%
168	100.48%	0.0004	-0.1	-0.1%	10584	99.83%	0.0006	-0.2	0.1%
1008	99.79%	0.0006	-0.2	0.0%	11088	99.78%	0.0005	-0.1	0.2%
1512	99.74%	0.0006	-0.1	0.1%	11592	100.01%	0.0004	-0.1	0.2%
2016	100.04%	0.0006	-0.2	0.1%	12096	99.61%	0.0004	-0.1	0.2%
2520	100.07%	0.0006	-0.1	0.1%	12600	100.12%	0.0005	-0.1	0.2%
3024	100.53%	0.0006	-0.2	0.1%	13104	100.30%	0.0005	-0.1	0.2%
3528	100.03%	0.0005	-0.1	0.1%	13608	99.32%	0.0005	-0.1	0.2%
4032	100.03%	0.0005	-0.1	0.1%	14112	99.50%	0.0005	-0.1	0.2%
4536	99.47%	0.0005	-0.1	0.1%	14616	99.40%	0.0003	0.0	0.2%
5040	99.97%	0.0005	-0.1	0.1%	15120	99.56%	0.0003	-0.1	0.2%
5544	99.77%	0.0005	-0.1	0.1%	15624	99.28%	0.0005	-0.1	0.2%
6048	99.50%	0.0005	-0.1	0.1%					
6552	99.76%	0.0006	-0.1	0.1%					
7056	100.10%	0.0006	-0.2	0.1%					
7560	100.23%	0.0007	-0.1	0.2%					
8064	100.22%	0.0006	-0.2	0.1%					
8568	100.07%	0.0006	-0.1	0.1%					
9072	100.40%	0.0005	-0.1	0.1%					
9576	99.97%	0.0005	-0.2	0.1%					

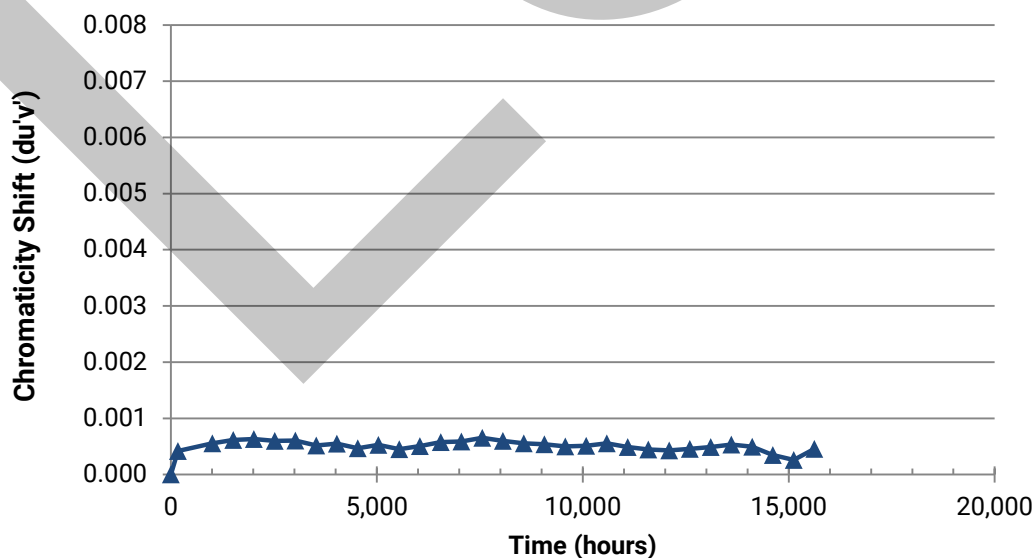
DATA SET 16: 85°C; 700 mA (2700K)

TM-21 Projection from Cree's Internal Calculator

Test duration	15,624 hours
Test duration used for projection	t=7,560 to t=15,624
α	1.075E-06
β	1.011E+00
Reported Lifetimes	L90(16k) > 93,700 hours
	L80(16k) > 93,700 hours
	L70(16k) > 93,700 hours



Color Shift Graph



DATA SET 16: 85°C; 700 mA (2700K)

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	342	2.92	2662	2700	100.53	100.00	99.82	100.00	99.97	100.55	100.00	100.12	99.33	100.32	99.65	99.59
2	353	2.88	2697	2700	100.85	100.06	100.11	100.48	100.48	100.74	100.51	100.37	99.94	100.34	100.25	100.00
3	345	2.88	2693	2700	100.55	99.48	99.83	99.91	99.94	100.61	100.12	100.03	99.56	100.17	99.97	99.74
4	346	2.90	2694	2700	99.91	99.54	99.51	99.77	99.80	100.32	99.60	99.71	99.42	99.86	99.97	99.36
5	342	2.86	2622	2700	100.55	99.97	99.68	99.97	99.94	100.55	100.06	99.82	99.62	99.85	99.97	99.59
6	346	2.88	2684	2700	100.12	99.71	99.65	100.06	100.14	100.55	99.57	100.09	99.57	100.32	100.12	99.77
7	352	2.89	2727	2700	100.51	99.89	99.86	100.23	100.26	100.60	99.52	100.28	99.49	100.14	99.72	99.63
8	348	2.89	2744	2700	100.20	98.97	99.40	99.86	99.71	100.14	99.63	99.51	98.94	99.31	99.11	98.85
9	353	2.88	2703	2700	100.34	99.97	99.55	100.09	100.11	100.74	99.94	100.17	99.77	99.86	99.77	99.40
10	351	2.88	2717	2700	100.43	99.69	99.46	100.03	99.89	100.40	99.83	99.80	99.09	99.17	99.09	98.86
11	353	2.87	2683	2700	100.65	99.72	99.69	100.28	100.17	100.62	100.40	100.03	100.03	99.77	99.94	99.40
12	352	2.87	2692	2700	100.43	99.77	99.57	99.26	99.91	100.28	99.86	99.83	98.92	99.89	99.18	99.40
13	350	2.90	2699	2700	100.54	99.37	99.66	99.80	99.66	100.26	100.00	99.97	99.40	99.60	99.37	99.14
14	345	2.91	2688	2700	100.75	99.88	99.88	100.03	100.15	100.44	100.23	100.20	99.45	100.38	100.41	99.94
15	348	2.89	2736	2700	100.81	99.48	99.45	99.77	99.68	100.17	99.80	99.51	99.19	99.45	99.45	98.99
16	347	2.91	2681	2700	100.20	100.52	100.37	100.81	100.75	101.27	100.81	100.66	99.77	100.75	100.69	100.06
17	352	2.90	2703	2700	100.54	99.80	99.66	99.91	99.89	100.20	99.89	99.91	98.84	100.00	99.80	99.49
18	351	2.90	2749	2700	101.17	100.37	100.20	100.31	100.37	100.88	100.28	100.26	99.32	100.20	99.29	99.60
19	354	2.88	2695	2700	100.20	99.92	99.69	100.28	100.37	100.65	100.20	100.20	99.66	100.11	99.94	99.80
20	355	2.89	2682	2700	100.39	99.61	99.69	100.00	100.20	100.70	100.25	100.11	100.03	99.89	99.66	99.35
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	349	2.89	2698		100.48	99.79	99.74	100.04	100.07	100.53	100.03	100.03	99.47	99.97	99.77	99.50
Median	350	2.89	2695		100.52	99.79	99.69	100.02	100.04	100.55	100.00	100.06	99.47	99.95	99.79	99.54
σ	4	0.02	29		0.29	0.34	0.25	0.32	0.29	0.27	0.33	0.28	0.35	0.39	0.43	0.35
Min.	342	2.86	2622		99.91	98.97	99.40	99.26	99.66	100.14	99.52	99.51	98.84	99.17	99.09	98.85
Max.	355	2.92	2749		101.17	100.52	100.37	100.81	100.75	101.27	100.81	100.66	100.03	100.75	100.69	100.06

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4587	0.4044	2662	2700	0.0003	0.0005	0.0004	0.0004	0.0003	0.0004	0.0003	0.0004	0.0004	0.0006	0.0004	0.0005
2	0.4554	0.4027	2697	2700	0.0004	0.0006	0.0006	0.0006	0.0006	0.0006	0.0004	0.0004	0.0005	0.0005	0.0004	0.0004
3	0.4524	0.3970	2693	2700	0.0005	0.0006	0.0007	0.0007	0.0006	0.0007	0.0006	0.0006	0.0005	0.0006	0.0006	0.0006
4	0.4519	0.3963	2694	2700	0.0004	0.0007	0.0007	0.0007	0.0007	0.0006	0.0005	0.0006	0.0005	0.0006	0.0006	0.0005
5	0.4612	0.4039	2622	2700	0.0004	0.0005	0.0004	0.0005	0.0004	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0004
6	0.4561	0.4024	2684	2700	0.0004	0.0006	0.0007	0.0007	0.0007	0.0007	0.0006	0.0007	0.0006	0.0008	0.0007	0.0008
7	0.4481	0.3933	2727	2700	0.0006	0.0008	0.0009	0.0009	0.0009	0.0008	0.0006	0.0009	0.0007	0.0007	0.0006	0.0007
8	0.4477	0.3944	2744	2700	0.0004	0.0005	0.0007	0.0007	0.0008	0.0007	0.0006	0.0006	0.0005	0.0006	0.0004	0.0005
9	0.4559	0.4043	2703	2700	0.0004	0.0005	0.0005	0.0005	0.0005	0.0006	0.0005	0.0004	0.0005	0.0004	0.0004	0.0004
10	0.4539	0.4024	2717	2700	0.0003	0.0003	0.0003	0.0004	0.0003	0.0004	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001
11	0.4511	0.3936	2683	2700	0.0005	0.0005	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0003	0.0003	0.0004
12	0.4531	0.3981	2692	2700	0.0005	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0005	0.0007	0.0005	0.0007
13	0.4512	0.3956	2699	2700	0.0003	0.0003	0.0006	0.0006	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004	0.0003	0.0004
14	0.4529	0.3973	2688	2700	0.0004	0.0006	0.0006	0.0006	0.0005	0.0005	0.0006	0.0006	0.0004	0.0006	0.0006	0.0006
15	0.4476	0.3934	2736	2700	0.0005	0.0004	0.0006	0.0006	0.0006	0.0006	0.0005	0.0006	0.0005	0.0005	0.0004	0.0005
16	0.4527	0.3962	2681	2700	0.0003	0.0007	0.0006	0.0007	0.0006	0.0007	0.0006	0.0006	0.0005	0.0006	0.0007	0.0006
17	0.4519	0.3973	2703	2700	0.0004	0.0006	0.0007	0.0007	0.0006	0.0006	0.0005	0.0006	0.0004	0.0007	0.0006	0.0007
18	0.4469	0.3936	2749	2700	0.0005	0.0007	0.0008	0.0008	0.0007	0.0008	0.0006	0.0007	0.0005	0.0006	0.0004	0.0006
19	0.4559	0.4034	2695	2700	0.0003	0.0005	0.0005	0.0006	0.0006	0.0005	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004
20	0.4533	0.3973	2682	2700	0.0004	0.0006	0.0007	0.0007	0.0008	0.0007	0.0006	0.0007	0.0008	0.0006	0.0004	0.0005
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	0.4529	0.3983	2698		0.0004	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Median	0.4528	0.3973	2695		0.0004	0.0006	0.0006	0.0007	0.0006	0.0006	0.0005	0.0006	0.0005	0.0006	0.0004	0.0005
σ	0.0037	0.0041	29		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002
Min.	0.4469	0.3933	2622		0.0003	0.0003	0.0003	0.0004	0.0003	0.0004	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001
Max.	0.4612	0.4044	2749		0.0006	0.0008	0.0009	0.0009	0.0009	0.0008	0.0007	0.0009	0.0008	0.0008	0.0007	0.0008

DATA SET 16: 85°C; 700 mA (2700K)

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	342	2.92	2662	2700	99.80	100.20	100.50	100.35	100.29	101.02	100.61	100.64	100.26	100.12	100.32	100.03
2	353	2.88	2697	2700	100.25	100.82	101.16	100.88	100.76	101.44	101.10	101.22	100.93	100.85	101.10	100.48
3	345	2.88	2693	2700	100.00	100.38	100.61	100.46	100.64	100.84	100.67	100.73	100.46	100.32	100.35	100.17
4	346	2.90	2694	2700	99.51	99.77	100.17	100.12	100.09	100.40	99.71	99.91	99.80	99.62	99.91	99.51
5	342	2.86	2622	2700	99.71	99.97	100.03	100.12	99.74	100.09	99.47	99.53	99.45	99.45	99.68	99.50
6	346	2.88	2684	2700	100.03	100.32	100.49	100.26	100.12	100.58	100.20	100.23	100.26	100.12	100.29	99.86
7	352	2.89	2727	2700	99.86	100.14	100.28	100.14	100.37	100.63	100.17	99.97	99.97	99.94	99.94	99.40
8	348	2.89	2744	2700	98.82	99.08	99.05	99.31	98.68	98.97	98.59	98.42	98.31	98.42	98.68	98.25
9	353	2.88	2703	2700	99.77	100.09	100.48	100.37	100.45	100.60	100.48	100.45	100.17	100.31	100.54	99.60
10	351	2.88	2717	2700	99.29	99.14	99.37	99.63	99.20	99.83	98.92	99.20	99.00	98.83	99.12	98.97
11	353	2.87	2683	2700	99.72	99.94	99.97	99.91	99.89	100.51	100.06	99.86	99.49	98.61	99.80	99.43
12	352	2.87	2692	2700	99.63	100.06	100.11	100.43	100.26	100.57	100.03	100.31	99.89	100.06	100.09	99.80
13	350	2.90	2699	2700	99.49	99.69	99.49	99.69	99.46	99.37	99.51	99.46	99.37	99.31	99.74	99.23
14	345	2.91	2688	2700	100.03	100.55	100.73	100.64	100.46	100.67	100.35	100.32	100.15	100.15	100.38	99.94
15	348	2.89	2736	2700	99.37	99.57	99.54	99.60	99.05	99.05	98.39	98.71	98.56	98.99	99.65	99.22
16	347	2.91	2681	2700	100.37	100.89	100.72	101.21	100.92	101.24	101.04	100.92	100.81	100.66	100.61	100.40
17	352	2.90	2703	2700	99.69	100.20	100.37	100.00	99.60	100.06	99.46	99.46	99.38	99.66	99.66	99.18
18	351	2.90	2749	2700	99.83	100.26	100.48	100.37	100.43	100.83	100.51	100.43	100.20	100.14	100.40	99.77
19	354	2.88	2695	2700	100.08	100.59	100.99	100.76	100.85	101.13	100.73	100.73	100.45	100.54	100.73	100.34
20	355	2.89	2682	2700	99.94	100.31	100.14	100.20	100.06	100.08	99.30	99.61	99.69	99.41	99.15	99.07
n	20	2.89	2698	2700	99.76	100.10	100.23	100.22	100.07	100.40	99.97	100.01	99.83	99.78	100.01	99.61
Mean	349	2.89	2698		99.76	100.10	100.23	100.22	100.07	100.40	99.97	100.01	99.83	99.78	100.01	99.61
Median	350	2.89	2695		99.79	100.17	100.33	100.23	100.19	100.58	100.12	100.10	99.93	100.00	100.02	99.56
σ	4	0.02	29		0.35	0.48	0.55	0.46	0.62	0.68	0.78	0.73	0.69	0.69	0.59	0.55
Min.	342	2.86	2622		98.82	99.08	99.05	99.31	98.68	98.97	98.39	98.42	98.31	98.42	98.68	98.25
Max.	355	2.92	2749		100.37	100.89	101.16	101.21	100.92	101.44	101.10	101.22	100.93	100.85	101.10	100.48

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4587	0.4044	2662	2700	0.0006	0.0006	0.0007	0.0005	0.0005	0.0007	0.0006	0.0005	0.0005	0.0004	0.0003	0.0003
2	0.4554	0.4027	2697	2700	0.0005	0.0006	0.0007	0.0006	0.0006	0.0006	0.0005	0.0005	0.0006	0.0004	0.0004	0.0003
3	0.4524	0.3970	2693	2700	0.0007	0.0007	0.0008	0.0006	0.0007	0.0007	0.0008	0.0008	0.0007	0.0006	0.0005	0.0005
4	0.4519	0.3963	2694	2700	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006	0.0005	0.0005	0.0006	0.0005	0.0005	0.0004
5	0.4612	0.4039	2622	2700	0.0004	0.0004	0.0005	0.0005	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003	0.0004	0.0005
6	0.4561	0.4024	2684	2700	0.0008	0.0009	0.0008	0.0008	0.0007	0.0008	0.0007	0.0006	0.0007	0.0006	0.0005	0.0005
7	0.4481	0.3933	2727	2700	0.0008	0.0008	0.0008	0.0007	0.0009	0.0009	0.0008	0.0008	0.0009	0.0009	0.0007	0.0007
8	0.4477	0.3944	2744	2700	0.0005	0.0005	0.0006	0.0006	0.0004	0.0003	0.0003	0.0003	0.0004	0.0003	0.0002	0.0002
9	0.4559	0.4043	2703	2700	0.0004	0.0004	0.0006	0.0005	0.0005	0.0004	0.0005	0.0003	0.0004	0.0003	0.0003	0.0003
10	0.4539	0.4024	2717	2700	0.0002	0.0001	0.0002	0.0003	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006
11	0.4511	0.3936	2683	2700	0.0005	0.0004	0.0006	0.0005	0.0004	0.0004	0.0004	0.0005	0.0005	0.0003	0.0004	0.0003
12	0.4531	0.3981	2692	2700	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007	0.0006	0.0007	0.0006	0.0007	0.0005	0.0005
13	0.4512	0.3956	2699	2700	0.0005	0.0005	0.0003	0.0004	0.0002	0.0003	0.0004	0.0003	0.0004	0.0004	0.0004	0.0003
14	0.4529	0.3973	2688	2700	0.0006	0.0007	0.0008	0.0007	0.0006	0.0006	0.0005	0.0005	0.0006	0.0004	0.0004	0.0004
15	0.4476	0.3934	2736	2700	0.0005	0.0006	0.0007	0.0006	0.0004	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004
16	0.4527	0.3962	2681	2700	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006	0.0006	0.0007	0.0005	0.0003	0.0003
17	0.4519	0.3973	2703	2700	0.0007	0.0007	0.0008	0.0007	0.0006	0.0007	0.0005	0.0005	0.0005	0.0006	0.0005	0.0004
18	0.4469	0.3936	2749	2700	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0009	0.0009	0.0007	0.0007	0.0007
19	0.4559	0.4034	2695	2700	0.0005	0.0006	0.0006	0.0005	0.0006	0.0005	0.0005	0.0004	0.0004	0.0004	0.0003	0.0005
20	0.4533	0.3973	2682	2700	0.0007	0.0007	0.0008	0.0007	0.0006	0.0005	0.0005	0.0006	0.0007	0.0006	0.0004	0.0005
n	20	20	20	20	0.0006	0.0006	0.0007	0.0006	0.0006	0.0005	0.0005	0.0005	0.0006	0.0005	0.0004	0.0004
Mean	0.4529	0.3983	2698		0.0006	0.0006	0.0007	0.0006	0.0006	0.0005	0.0005	0.0005	0.0006	0.0005	0.0004	0.0004
Median	0.4528	0.3973	2695		0.0006	0.0006	0.0007	0.0006	0.0006	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004
σ	0.0037	0.0041	29		0.0001	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001
Min.	0.4469	0.3933	2622		0.0002	0.0001	0.0002	0.0003	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0002
Max.	0.4612	0.4044	2749		0.0008	0.0009	0.0008	0.0008	0.0009	0.0009	0.0008	0.0009	0.0009	0.0009	0.0007	0.0007

DATA SET 16: 85°C; 700 mA (2700K)

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)						
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120	15624
1	342	2.92	2662	2700	100.67	101.08	99.71	99.80	99.74	99.88	99.65
2	353	2.88	2697	2700	101.16	101.33	100.45	100.42	100.42	100.40	100.06
3	345	2.88	2693	2700	100.58	100.99	99.88	99.85	99.80	99.88	99.68
4	346	2.90	2694	2700	99.86	100.20	99.34	99.31	99.28	99.28	99.05
5	342	2.86	2622	2700	99.68	99.42	98.80	99.30	99.04	99.33	99.09
6	346	2.88	2684	2700	100.35	100.69	99.51	99.62	99.68	99.77	99.45
7	352	2.89	2727	2700	99.91	100.43	99.29	99.26	99.23	99.43	99.18
8	348	2.89	2744	2700	98.76	98.56	97.59	98.28	97.64	98.10	97.87
9	353	2.88	2703	2700	100.62	100.48	100.09	99.83	99.89	99.94	99.69
10	351	2.88	2717	2700	99.37	99.71	98.20	99.00	99.09	99.09	98.83
11	353	2.87	2683	2700	99.97	100.06	98.67	99.12	99.35	99.43	99.21
12	352	2.87	2692	2700	100.20	100.62	99.52	99.74	99.60	99.80	99.57
13	350	2.90	2699	2700	99.66	99.77	98.80	99.03	98.97	99.09	98.77
14	345	2.91	2688	2700	100.17	100.55	99.68	99.68	99.48	99.80	99.39
15	348	2.89	2736	2700	99.57	99.05	98.48	99.28	99.05	99.34	98.96
16	347	2.91	2681	2700	100.95	101.33	100.26	99.91	99.77	100.03	99.74
17	352	2.90	2703	2700	99.80	100.20	99.18	99.32	99.09	99.35	98.95
18	351	2.90	2749	2700	100.57	100.54	99.74	99.57	99.49	99.37	99.20
19	354	2.88	2695	2700	100.71	101.04	100.11	100.28	100.25	100.25	99.89
20	355	2.89	2682	2700	99.80	99.97	99.15	99.32	99.21	99.58	99.32
n	20	20	20	20	20	20	20	20	20	20	20
Mean	349	2.89	2698		100.12	100.30	99.32	99.50	99.40	99.56	99.28
Median	350	2.89	2695		100.07	100.46	99.43	99.45	99.42	99.51	99.27
σ	4	0.02	29		0.59	0.74	0.73	0.48	0.58	0.50	0.49
Min.	342	2.86	2622		98.76	98.56	97.59	98.28	97.64	98.10	97.87
Max.	355	2.92	2749		101.16	101.33	100.45	100.42	100.42	100.40	100.06

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')						
	CCx	CCy	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120	15624
1	0.4587	0.4044	2662	2700	0.0004	0.0005	0.0005	0.0004	0.0003	0.0003	0.0003
2	0.4554	0.4027	2697	2700	0.0005	0.0005	0.0006	0.0005	0.0004	0.0004	0.0005
3	0.4524	0.3970	2693	2700	0.0004	0.0005	0.0005	0.0005	0.0003	0.0002	0.0004
4	0.4519	0.3963	2694	2700	0.0005	0.0005	0.0006	0.0006	0.0003	0.0003	0.0004
5	0.4612	0.4039	2622	2700	0.0005	0.0009	0.0008	0.0007	0.0005	0.0005	0.0004
6	0.4561	0.4024	2684	2700	0.0005	0.0005	0.0004	0.0005	0.0004	0.0000	0.0004
7	0.4481	0.3933	2727	2700	0.0006	0.0005	0.0004	0.0005	0.0005	0.0004	0.0006
8	0.4477	0.3944	2744	2700	0.0003	0.0004	0.0006	0.0003	0.0002	0.0003	0.0006
9	0.4559	0.4043	2703	2700	0.0004	0.0004	0.0005	0.0005	0.0003	0.0004	0.0005
10	0.4539	0.4024	2717	2700	0.0008	0.0007	0.0010	0.0007	0.0005	0.0007	0.0006
11	0.4511	0.3936	2683	2700	0.0004	0.0004	0.0006	0.0005	0.0002	0.0002	0.0005
12	0.4531	0.3981	2692	2700	0.0004	0.0005	0.0004	0.0005	0.0004	0.0001	0.0005
13	0.4512	0.3956	2699	2700	0.0004	0.0005	0.0006	0.0005	0.0002	0.0002	0.0005
14	0.4529	0.3973	2688	2700	0.0004	0.0004	0.0004	0.0005	0.0002	0.0002	0.0005
15	0.4476	0.3934	2736	2700	0.0004	0.0007	0.0005	0.0005	0.0003	0.0001	0.0004
16	0.4527	0.3962	2681	2700	0.0004	0.0003	0.0004	0.0004	0.0003	0.0002	0.0005
17	0.4519	0.3973	2703	2700	0.0004	0.0005	0.0004	0.0005	0.0003	0.0001	0.0005
18	0.4469	0.3936	2749	2700	0.0006	0.0005	0.0005	0.0006	0.0006	0.0002	0.0006
19	0.4559	0.4034	2695	2700	0.0006	0.0005	0.0006	0.0006	0.0004	0.0005	0.0005
20	0.4533	0.3973	2682	2700	0.0005	0.0004	0.0005	0.0005	0.0004	0.0001	0.0003
n	20	20	20	20	20	20	20	20	20	20	20
Mean	0.4529	0.3983	2698		0.0005	0.0005	0.0005	0.0005	0.0003	0.0003	0.0005
Median	0.4528	0.3973	2695		0.0004	0.0005	0.0005	0.0005	0.0003	0.0002	0.0005
σ	0.0037	0.0041	29		0.0001	0.0001	0.0002	0.0001	0.0001	0.0002	0.0001
Min.	0.4469	0.3933	2622		0.0003	0.0003	0.0004	0.0003	0.0002	0.0000	0.0003
Max.	0.4612	0.4044	2749		0.0008	0.0009	0.0010	0.0007	0.0006	0.0007	0.0006

DATA SET 7: 105°C; 700 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_F]	700 mA
Testing Initiation Date	November 2, 2015
Case Temperature [T_s]	105°C
Ambient Temperature [T_A]	105°C
Failures observed	None

Test Results Summary

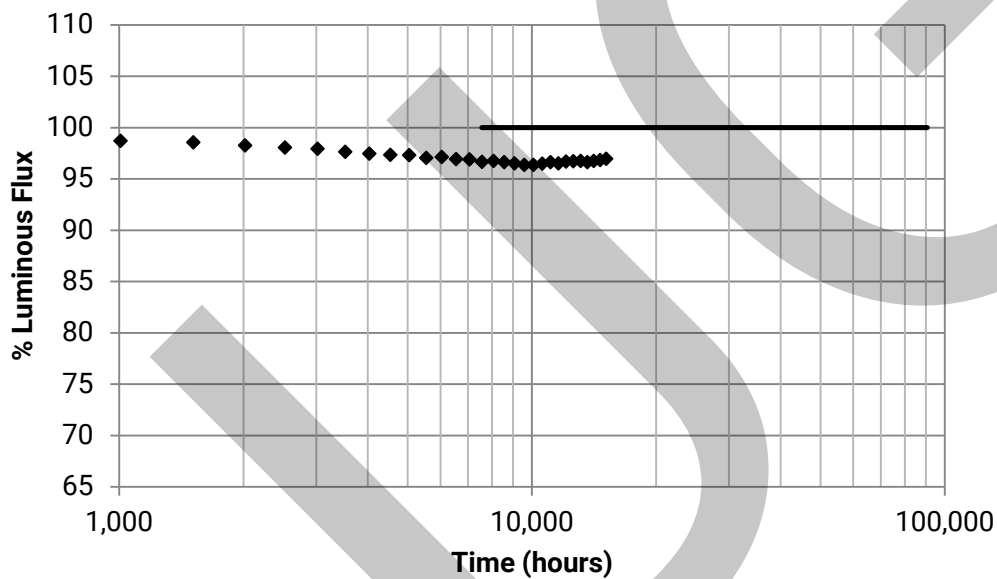
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	10080	96.36%	0.0009	-0.2	N/R
168	99.26%	0.0005	-0.1	N/R	10584	96.50%	0.0009	-0.2	-1.1%
1008	98.71%	0.0007	-0.2	N/R	11088	96.64%	0.0009	-0.2	-1.0%
1512	98.56%	0.0008	-0.1	N/R	11592	96.51%	0.0010	-0.3	-0.5%
2016	98.27%	0.0008	-0.2	N/R	12096	96.68%	0.0010	-0.3	-0.5%
2520	98.05%	0.0007	-0.1	N/R	12600	96.71%	0.0010	-0.3	-0.7%
3024	97.94%	0.0007	-0.2	N/R	13104	96.75%	0.0011	-0.3	-0.7%
3528	97.65%	0.0007	-0.1	N/R	13608	96.65%	0.0012	-0.3	-0.6%
4032	97.47%	0.0008	-0.2	N/R	14112	96.75%	0.0012	-0.3	-0.8%
4536	97.36%	0.0007	-0.2	N/R	14616	96.83%	0.0013	-0.3	-0.5%
5040	97.32%	0.0006	-0.2	N/R	15120	96.95%	0.0013	-0.4	-0.8%
5544	97.05%	0.0006	-0.2	N/R					
6048	97.14%	0.0006	-0.2	N/R					
6552	96.94%	0.0007	-0.2	N/R					
7056	96.91%	0.0007	-0.2	N/R					
7560	96.67%	0.0006	-0.2	N/R					
8064	96.74%	0.0007	-0.2	N/R					
8568	96.68%	0.0007	-0.2	N/R					
9072	96.52%	0.0007	-0.3	N/R					
9576	96.38%	0.0008	-0.3	N/R					

Note: "N/R" indicates data points that are not reported

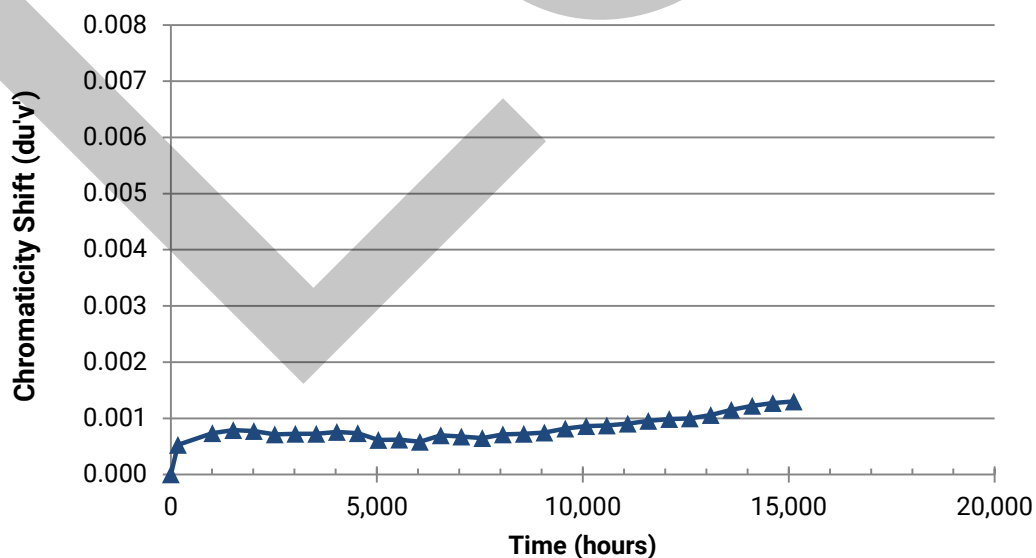
DATA SET 7: 105°C; 700 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	15,120 hours
Test duration used for projection	t=7,560 to t=15,120
α	-3.806E-07
β	9.623E-01
Reported Lifetimes	L90(15k) > 90,700 hours
	L80(15k) > 90,700 hours
	L70(15k) > 90,700 hours



Color Shift Graph



DATA SET 7: 105°C; 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	295	2.92	3082	3000	99.56	98.92	98.78	98.41	98.34	98.48	98.07	97.83	97.93	98.00	97.53	96.68
2	295	3.02	3019	3000	99.36	98.88	97.83	97.73	97.45	97.69	96.84	97.11	97.08	96.78	96.78	97.35
3	295	2.96	3007	3000	98.98	98.88	98.54	98.41	98.07	97.22	96.64	97.08	97.19	96.78	96.78	96.68
4	286	2.93	3057	3000	99.51	99.06	98.85	98.64	98.15	98.25	97.94	97.80	97.31	97.27	97.41	97.34
5	276	2.95	3068	3000	99.49	98.55	98.91	98.44	97.86	97.76	97.18	96.92	97.39	97.07	96.74	96.89
6	285	3.02	3029	3000	99.44	98.25	98.18	97.86	97.27	97.72	97.16	97.44	97.05	96.74	96.35	96.46
7	297	2.98	3060	3000	99.43	98.99	98.69	98.21	98.55	98.62	98.48	98.45	98.21	97.74	97.78	97.91
8	285	3.02	3087	3000	98.77	98.07	97.72	97.41	97.34	96.92	96.74	96.74	96.60	96.88	96.28	95.97
9	291	3.02	3031	3000	99.38	98.62	98.32	97.83	97.77	98.14	97.87	97.22	96.91	96.97	96.53	97.01
10	292	2.95	3044	3000	99.49	99.35	99.15	98.63	97.91	98.02	97.88	97.44	97.30	97.47	97.26	96.89
11	297	2.95	3106	3000	99.23	98.55	98.62	98.48	98.18	97.68	97.54	97.47	97.41	97.14	96.84	96.77
12	288	3.00	3027	3000	98.68	98.44	97.88	97.53	97.36	97.67	97.64	97.36	97.36	97.84	97.50	97.39
13	282	2.93	3059	3000	99.04	98.76	98.79	99.08	98.97	98.69	98.51	98.05	97.51	96.98	96.66	96.70
14	293	2.95	3114	3000	99.28	98.43	98.05	97.64	97.57	97.40	97.03	96.79	96.55	96.89	96.55	97.06
15	280	2.97	3138	3000	99.32	99.18	98.96	99.00	98.79	98.14	98.07	98.00	97.93	97.71	97.89	97.89
16	297	2.97	3093	3000	99.43	98.79	98.82	98.49	97.95	97.95	98.12	97.75	97.34	97.71	97.21	97.58
17	290	2.94	3099	3000	98.83	98.55	98.24	97.76	97.73	97.35	96.90	96.49	96.52	96.59	96.28	96.59
18	287	2.97	3079	3000	99.55	99.34	99.02	98.74	98.39	98.50	98.57	98.33	98.33	98.33	97.91	97.91
19	302	2.97	3088	3000	99.20	99.04	99.01	98.61	98.18	98.01	97.45	97.85	97.42	97.51	97.25	97.71
20	296	3.03	3061	3000	99.19	98.65	98.99	98.34	98.21	97.90	98.24	97.60	97.60	97.60	97.70	97.77
21	294	2.92	3096	3000	99.12	98.23	97.82	97.55	97.65	97.38	97.24	96.73	97.14	97.45	96.67	96.43
22	293	3.02	3045	3000	98.87	98.19	98.26	97.85	97.81	97.95	97.27	97.13	97.13	96.89	96.55	96.96
23	296	2.98	3096	3000	99.53	98.38	98.71	98.31	97.90	97.77	97.23	97.09	97.16	97.36	96.65	96.92
24	283	2.93	3026	3000	99.61	99.01	98.80	98.90	98.94	98.66	98.66	98.20	98.30	97.91	97.77	98.06
25	276	2.95	3046	3000	99.24	98.66	99.13	98.95	98.81	98.66	98.01	97.90	97.39	97.39	97.43	97.61
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	290	2.97			99.26	98.71	98.56	98.27	98.05	97.94	97.65	97.47	97.36	97.32	97.05	97.14
Median	292	2.97			99.32	98.66	98.71	98.41	97.95	97.95	97.64	97.44	97.34	97.36	96.84	97.01
σ	7	0.04			0.27	0.35	0.45	0.50	0.50	0.49	0.61	0.54	0.49	0.46	0.54	0.56
Min.	276	2.92			98.68	98.07	97.72	97.41	97.27	96.92	96.64	96.49	96.52	96.59	96.28	95.97
Max.	302	3.03			99.61	99.35	99.15	99.08	98.97	98.69	98.66	98.45	98.33	98.33	97.91	98.06

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4370	0.4138	3082	3000	0.0006	0.0006	0.0007	0.0007	0.0006	0.0006	0.0005	0.0004	0.0006	0.0005	0.0008	0.0002
2	0.4423	0.4171	3019	3000	0.0004	0.0006	0.0008	0.0009	0.0010	0.0011	0.0009	0.0011	0.0010	0.0008	0.0009	0.0008
3	0.4430	0.4170	3007	3000	0.0006	0.0007	0.0008	0.0007	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007
4	0.4401	0.4173	3057	3000	0.0007	0.0008	0.0009	0.0009	0.0010	0.0010	0.0009	0.0011	0.0010	0.0010	0.0008	0.0007
5	0.4372	0.4125	3068	3000	0.0007	0.0008	0.0010	0.0009	0.0010	0.0012	0.0012	0.0009	0.0011	0.0009	0.0010	0.0010
6	0.4397	0.4128	3029	3000	0.0009	0.0010	0.0010	0.0010	0.0010	0.0012	0.0010	0.0011	0.0011	0.0010	0.0009	0.0008
7	0.4387	0.4147	3060	3000	0.0008	0.0009	0.0010	0.0009	0.0008	0.0009	0.0008	0.0009	0.0008	0.0007	0.0008	0.0008
8	0.4354	0.4110	3087	3000	0.0007	0.0007	0.0009	0.0008	0.0009	0.0008	0.0009	0.0010	0.0010	0.0009	0.0007	0.0007
9	0.4405	0.4148	3031	3000	0.0006	0.0009	0.0010	0.0010	0.0008	0.0010	0.0009	0.0009	0.0008	0.0009	0.0007	0.0007
10	0.4399	0.4152	3044	3000	0.0006	0.0006	0.0010	0.0009	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0009
11	0.4361	0.4150	3106	3000	0.0005	0.0006	0.0006	0.0005	0.0004	0.0002	0.0004	0.0005	0.0005	0.0002	0.0004	0.0003
12	0.4382	0.4094	3027	3000	0.0006	0.0006	0.0006	0.0006	0.0006	0.0004	0.0005	0.0006	0.0006	0.0004	0.0006	0.0006
13	0.4352	0.4071	3059	3000	0.0003	0.0006	0.0006	0.0006	0.0005	0.0003	0.0004	0.0005	0.0005	0.0003	0.0003	0.0002
14	0.4342	0.4118	3114	3000	0.0005	0.0007	0.0007	0.0008	0.0006	0.0005	0.0007	0.0006	0.0006	0.0005	0.0006	0.0005
15	0.4308	0.4073	3138	3000	0.0005	0.0009	0.0009	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0003	0.0004	0.0002
16	0.4340	0.4087	3093	3000	0.0003	0.0009	0.0008	0.0009	0.0007	0.0007	0.0007	0.0008	0.0007	0.0006	0.0007	0.0006
17	0.4320	0.4050	3099	3000	0.0004	0.0007	0.0007	0.0008	0.0006	0.0009	0.0007	0.0005	0.0005	0.0004	0.0004	0.0004
18	0.4358	0.4108	3079	3000	0.0006	0.0008	0.0007	0.0008	0.0006	0.0005	0.0006	0.0007	0.0007	0.0005	0.0005	0.0005
19	0.4347	0.4096	3088	3000	0.0004	0.0007	0.0007	0.0007	0.0006	0.0005	0.0005	0.0007	0.0006	0.0004	0.0005	0.0006
20	0.4352	0.4073	3061	3000	0.0006	0.0007	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005	0.0004	0.0003	0.0003	0.0003
21	0.4360	0.4135	3096	3000	0.0001	0.0006	0.0007	0.0007	0.0006	0.0007	0.0006	0.0007	0.0005	0.0004	0.0004	0.0005
22	0.4380	0.4113	3045	3000	0.0004	0.0008	0.0007	0.0009	0.0010	0.0009	0.0008	0.0009	0.0009	0.0007	0.0004	0.0006
23	0.4369	0.4154	3096	3000	0.0006	0.0009	0.0009	0.0008	0.0008	0.0009	0.0008	0.0009	0.0009	0.0008	0.0006	0.0008
24	0.4420	0.4173	3026	3000	0.0005	0.0008	0.0008	0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0006	0.0005
25	0.4407	0.4171	3046	3000	0.0007	0.0008	0.0009	0.0007	0.0006	0.0008	0.0008	0.0007	0.0008	0.0007	0.0007	0.0008
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0005	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0008	0.0007	0.0006	0.0006	0.0006
Median					0.0006	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0006	0.0006
σ					0.0002	0.0001	0.0001	0.0001	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0001	0.0006	0.0006	0.0005	0.0004	0.0002	0.0004	0.0004	0.0004	0.0002	0.0003	0.0002
Max.					0.0009	0.0010	0.0010	0.0010	0.0010	0.0012	0.0012	0.0011	0.0011	0.0010	0.0010	0.0010

DATA SET 7: 105°C; 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	295	2.92	3082	3000	96.99	96.44	96.48	96.41	96.65	96.17	96.44	96.54	96.14	95.90	95.73	95.83
2	295	3.02	3019	3000	97.05	97.32	96.44	97.11	96.61	96.37	96.61	95.89	95.82	95.82	95.62	95.69
3	295	2.96	3007	3000	97.19	96.54	96.13	96.44	95.93	95.29	94.88	95.76	95.35	95.15	95.08	95.18
4	286	2.93	3057	3000	97.38	97.52	97.27	97.66	97.03	97.76	97.76	97.13	96.85	97.97	98.04	98.22
5	276	2.95	3068	3000	96.63	96.09	96.31	96.16	96.60	96.13	96.05	96.38	96.92	96.09	95.62	96.42
6	285	3.02	3029	3000	96.98	97.19	96.39	96.91	96.39	96.60	96.53	96.00	96.28	96.67	96.56	96.63
7	297	2.98	3060	3000	97.78	97.91	97.74	97.91	97.74	97.88	98.05	97.51	97.27	98.01	98.15	98.18
8	285	3.02	3087	3000	96.95	96.57	95.58	96.00	95.62	95.58	95.69	95.27	95.58	95.13	95.44	95.69
9	291	3.02	3031	3000	97.52	97.22	96.97	97.04	96.84	97.22	96.97	96.18	96.46	97.18	96.70	97.15
10	292	2.95	3044	3000	96.58	96.41	96.37	96.51	96.96	96.24	96.34	96.51	96.79	96.27	96.34	96.44
11	297	2.95	3106	3000	96.30	95.96	95.89	96.36	96.63	96.03	95.66	95.62	96.50	96.77	96.40	96.46
12	288	3.00	3027	3000	97.08	96.84	96.80	97.22	96.28	96.42	96.52	96.11	96.56	96.77	96.49	96.94
13	282	2.93	3059	3000	96.24	96.56	95.92	95.92	95.56	95.56	95.67	95.95	96.38	97.09	96.66	96.77
14	293	2.95	3114	3000	96.55	96.21	96.55	96.75	97.10	96.14	96.34	95.63	95.76	95.66	95.32	95.18
15	280	2.97	3138	3000	97.07	97.28	96.71	97.28	97.07	96.32	95.96	96.57	96.93	97.18	96.89	96.78
16	297	2.97	3093	3000	97.14	97.21	97.34	96.84	96.91	97.07	96.94	97.28	97.65	97.65	97.68	97.95
17	290	2.94	3099	3000	96.07	96.45	96.63	95.97	95.90	96.38	96.35	96.14	96.56	97.00	96.80	97.00
18	287	2.97	3079	3000	97.56	97.94	97.42	98.01	98.05	98.12	97.49	98.01	98.33	98.22	97.98	98.12
19	302	2.97	3088	3000	97.05	97.12	97.51	96.52	97.02	97.38	97.22	97.18	97.45	97.65	97.48	97.88
20	296	3.03	3061	3000	96.85	97.53	97.16	97.23	97.06	96.96	96.41	96.75	96.82	96.92	96.62	96.96
21	294	2.92	3096	3000	96.80	96.56	96.43	95.92	96.05	95.78	95.17	95.54	95.68	95.65	95.75	95.68
22	293	3.02	3045	3000	96.04	96.48	95.70	95.70	95.49	95.94	95.87	95.70	95.53	95.66	95.83	96.04
23	296	2.98	3096	3000	96.75	96.55	96.28	95.77	95.57	95.23	94.96	95.77	95.60	95.84	95.91	96.04
24	283	2.93	3026	3000	97.56	97.81	97.91	97.95	97.63	97.99	97.81	97.31	97.24	98.20	98.06	98.20
25	276	2.95	3046	3000	97.32	97.03	96.74	96.92	97.03	96.38	95.73	96.38	96.02	95.44	95.66	95.69
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	290	2.97			96.94	96.91	96.67	96.74	96.63	96.52	96.38	96.36	96.50	96.64	96.51	96.68
Median	292	2.97			96.99	96.84	96.55	96.75	96.65	96.37	96.35	96.18	96.50	96.77	96.49	96.63
σ	7	0.04			0.47	0.57	0.62	0.70	0.70	0.83	0.86	0.71	0.75	0.97	0.94	0.97
Min.	276	2.92			96.04	95.96	95.58	95.70	95.49	95.23	94.88	95.27	95.35	95.13	95.08	95.18
Max.	302	3.03			97.78	97.94	97.91	98.01	98.05	98.12	98.05	98.01	98.33	98.22	98.15	98.22

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4370	0.4138	3082	3000	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0009	0.0008	0.0008	0.0009	0.0008
2	0.4423	0.4171	3019	3000	0.0011	0.0011	0.0010	0.0011	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0013	0.0012
3	0.4430	0.4170	3007	3000	0.0007	0.0007	0.0006	0.0007	0.0006	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0010
4	0.4401	0.4173	3057	3000	0.0010	0.0011	0.0011	0.0012	0.0012	0.0010	0.0011	0.0012	0.0011	0.0013	0.0013	0.0013
5	0.4372	0.4125	3068	3000	0.0011	0.0011	0.0010	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012	0.0013	0.0013	0.0013
6	0.4397	0.4128	3029	3000	0.0011	0.0012	0.0011	0.0012	0.0013	0.0012	0.0013	0.0013	0.0013	0.0015	0.0015	0.0015
7	0.4387	0.4147	3060	3000	0.0008	0.0008	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011
8	0.4354	0.4110	3087	3000	0.0011	0.0011	0.0010	0.0010	0.0012	0.0011	0.0012	0.0011	0.0011	0.0013	0.0012	0.0013
9	0.4405	0.4148	3031	3000	0.0011	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0012	0.0013
10	0.4399	0.4152	3044	3000	0.0008	0.0008	0.0008	0.0011	0.0009	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0011
11	0.4361	0.4150	3106	3000	0.0002	0.0002	0.0003	0.0004	0.0005	0.0004	0.0005	0.0004	0.0005	0.0006	0.0006	0.0006
12	0.4382	0.4094	3027	3000	0.0005	0.0005	0.0004	0.0006	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0006
13	0.4352	0.4071	3059	3000	0.0002	0.0003	0.0004	0.0004	0.0005	0.0005	0.0005	0.0005	0.0007	0.0006	0.0007	0.0008
14	0.4342	0.4118	3114	3000	0.0005	0.0003	0.0003	0.0005	0.0006	0.0006	0.0008	0.0010	0.0012	0.0010	0.0009	0.0010
15	0.4308	0.4073	3138	3000	0.0003	0.0002	0.0005	0.0004	0.0005	0.0007	0.0005	0.0007	0.0006	0.0006	0.0007	0.0008
16	0.4340	0.4087	3093	3000	0.0007	0.0006	0.0007	0.0004	0.0004	0.0003	0.0007	0.0006	0.0006	0.0007	0.0008	0.0008
17	0.4320	0.4050	3099	3000	0.0003	0.0004	0.0004	0.0002	0.0003	0.0003	0.0006	0.0007	0.0006	0.0007	0.0008	0.0009
18	0.4358	0.4108	3079	3000	0.0005	0.0005	0.0004	0.0004	0.0005	0.0007	0.0008	0.0008	0.0008	0.0009	0.0009	0.0010
19	0.4347	0.4096	3088	3000	0.0006	0.0004	0.0006	0.0004	0.0004	0.0005	0.0008	0.0007	0.0008	0.0008	0.0009	0.0010
20	0.4352	0.4073	3061	3000	0.0004	0.0003	0.0002	0.0002	0.0002	0.0003	0.0005	0.0005	0.0006	0.0006	0.0008	0.0008
21	0.4360	0.4135	3096	3000	0.0005	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0008	0.0009	0.0008	0.0009	0.0009
22	0.4380	0.4113	3045	3000	0.0009	0.0009	0.0005	0.0008	0.0008	0.0008	0.0009	0.0010	0.0009	0.0009	0.0010	0.0009
23	0.4369	0.4154	3096	3000	0.0008	0.0009	0.0007	0.0009	0.0006	0.0008	0.0008	0.0009	0.0009	0.0009	0.0011	0.0010
24	0.4420	0.4173	3026	3000	0.0009	0.0009	0.0007	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0010	0.0010	0.0011
25	0.4407	0.4171	3046	3000	0.0008	0.0005	0.0004	0.0006	0.0007	0.0006	0.0005	0.0007	0.0008	0.0006	0.0008	0.0007
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0007	0.0007	0.0006	0.0007	0.0007	0.0007	0.0008	0.0009	0.0009	0.0009	0.0010	0.0010
Median					0.0007	0.0006	0.0006	0.0007	0.0007	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009	0.0010
σ					0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002
Min.					0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0006
Max.					0.0011	0.0012	0.0011	0.0012	0.0013	0.0012	0.0013	0.0013	0.0013	0.0015	0.0015	0.0015

DATA SET 7: 105°C; 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)					
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	295	2.92	3082	3000	95.39	95.80	95.90	95.73	96.31	96.68
2	295	3.02	3019	3000	96.03	95.82	96.54	96.57	96.67	96.88
3	295	2.96	3007	3000	95.49	95.18	95.42	95.12	95.29	95.29
4	286	2.93	3057	3000	98.39	98.36	97.97	98.01	97.97	98.36
5	276	2.95	3068	3000	95.73	96.23	95.80	96.16	96.16	95.94
6	285	3.02	3029	3000	96.81	96.70	96.49	96.56	96.39	96.95
7	297	2.98	3060	3000	98.45	98.42	98.01	98.32	98.05	98.38
8	285	3.02	3087	3000	95.30	95.93	95.20	95.30	95.86	95.86
9	291	3.02	3031	3000	97.28	97.22	96.97	97.18	96.60	97.18
10	292	2.95	3044	3000	96.37	96.72	96.34	95.79	96.31	96.20
11	297	2.95	3106	3000	96.77	96.84	96.90	97.14	97.17	96.80
12	288	3.00	3027	3000	96.87	96.73	96.56	96.97	95.90	96.70
13	282	2.93	3059	3000	96.84	96.41	97.05	97.09	97.44	96.73
14	293	2.95	3114	3000	95.49	95.25	94.94	95.18	95.08	95.59
15	280	2.97	3138	3000	96.86	96.43	96.75	97.25	97.46	97.82
16	297	2.97	3093	3000	98.22	97.95	97.68	98.32	98.39	98.05
17	290	2.94	3099	3000	96.94	97.45	97.28	97.66	97.69	97.56
18	287	2.97	3079	3000	97.98	97.98	97.98	97.94	97.84	97.49
19	302	2.97	3088	3000	98.11	98.08	98.08	98.18	98.24	98.28
20	296	3.03	3061	3000	97.29	97.02	96.79	96.92	97.63	97.43
21	294	2.92	3096	3000	95.58	96.19	95.75	96.56	96.36	97.14
22	293	3.02	3045	3000	96.14	96.11	96.24	96.17	96.55	96.58
23	296	2.98	3096	3000	95.67	96.18	96.11	95.84	96.08	96.48
24	283	2.93	3026	3000	98.27	98.23	98.52	98.34	98.62	98.44
25	276	2.95	3046	3000	95.37	95.47	95.08	94.42	94.61	95.00
n	25	25	25	25	25	25	25	25	25	25
Mean	290	2.97			96.71	96.75	96.65	96.75	96.83	96.95
Median	292	2.97			96.81	96.70	96.56	96.92	96.60	96.88
σ	7	0.04			1.07	0.99	1.01	1.12	1.08	0.97
Min.	276	2.92			95.30	95.18	94.94	94.42	94.61	95.00
Max.	302	3.03			98.45	98.42	98.52	98.34	98.62	98.44

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')					
	CCx	CCy	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	0.4370	0.4138	3082	3000	0.0009	0.0010	0.0012	0.0013	0.0013	0.0014
2	0.4423	0.4171	3019	3000	0.0012	0.0012	0.0014	0.0014	0.0016	0.0016
3	0.4430	0.4170	3007	3000	0.0010	0.0012	0.0012	0.0014	0.0016	0.0017
4	0.4401	0.4173	3057	3000	0.0013	0.0015	0.0016	0.0016	0.0018	0.0017
5	0.4372	0.4125	3068	3000	0.0012	0.0016	0.0017	0.0020	0.0019	0.0019
6	0.4397	0.4128	3029	3000	0.0014	0.0015	0.0017	0.0018	0.0019	0.0019
7	0.4387	0.4147	3060	3000	0.0011	0.0013	0.0012	0.0015	0.0014	0.0015
8	0.4354	0.4110	3087	3000	0.0013	0.0014	0.0015	0.0018	0.0018	0.0019
9	0.4405	0.4148	3031	3000	0.0012	0.0013	0.0014	0.0016	0.0017	0.0016
10	0.4399	0.4152	3044	3000	0.0011	0.0012	0.0014	0.0016	0.0010	0.0011
11	0.4361	0.4150	3106	3000	0.0007	0.0007	0.0008	0.0008	0.0010	0.0009
12	0.4382	0.4094	3027	3000	0.0006	0.0007	0.0007	0.0008	0.0007	0.0008
13	0.4352	0.4071	3059	3000	0.0008	0.0008	0.0009	0.0009	0.0010	0.0010
14	0.4342	0.4118	3114	3000	0.0012	0.0009	0.0011	0.0010	0.0012	0.0015
15	0.4308	0.4073	3138	3000	0.0009	0.0009	0.0009	0.0010	0.0010	0.0010
16	0.4340	0.4087	3093	3000	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010
17	0.4320	0.4050	3099	3000	0.0009	0.0009	0.0010	0.0009	0.0010	0.0007
18	0.4358	0.4108	3079	3000	0.0011	0.0010	0.0011	0.0011	0.0012	0.0012
19	0.4347	0.4096	3088	3000	0.0010	0.0009	0.0011	0.0011	0.0011	0.0011
20	0.4352	0.4073	3061	3000	0.0008	0.0008	0.0009	0.0008	0.0009	0.0014
21	0.4360	0.4135	3096	3000	0.0008	0.0010	0.0009	0.0011	0.0010	0.0011
22	0.4380	0.4113	3045	3000	0.0010	0.0010	0.0010	0.0012	0.0011	0.0012
23	0.4369	0.4154	3096	3000	0.0010	0.0011	0.0011	0.0012	0.0011	0.0012
24	0.4420	0.4173	3026	3000	0.0010	0.0010	0.0011	0.0012	0.0012	0.0011
25	0.4407	0.4171	3046	3000	0.0007	0.0008	0.0008	0.0006	0.0012	0.0011
n	25	25	25	25	25	25	25	25	25	25
Mean					0.0010	0.0011	0.0012	0.0012	0.0013	0.0013
Median					0.0010	0.0010	0.0011	0.0012	0.0012	0.0012
σ					0.0002	0.0003	0.0003	0.0004	0.0003	0.0004
Min.					0.0006	0.0007	0.0007	0.0006	0.0007	0.0007
Max.					0.0014	0.0016	0.0017	0.0020	0.0019	0.0019

DATA SET 8: 120°C; 700 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs This LM-80 report is applicable to the following order codes: XPGDWS-xx-xxxx-xxxxx XPGDWT-x1-xxxx-xxxxx XPGDWT-x3-xxxx-xxxxx
Tested Drive Current [IF]	700 mA
Testing Initiation Date	November 2, 2015
Case Temperature [Ts]	120°C
Ambient Temperature [TA]	120°C
Failures observed	None

Test Results Summary

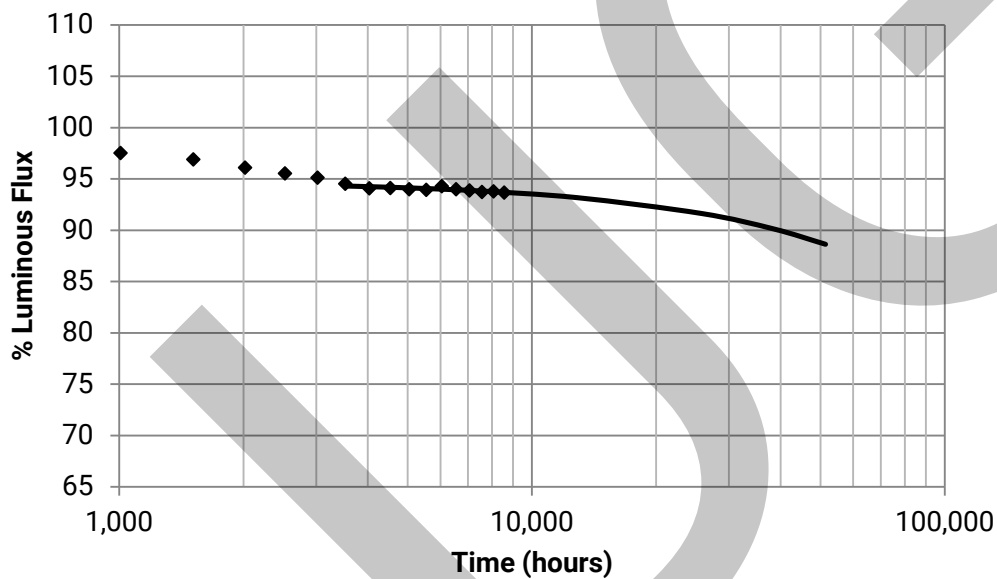
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	0.0000	0.0	0.0%					
168	98.62%	0.0005	-0.2	N/R					
1008	97.52%	0.0004	-0.2	N/R					
1512	96.89%	0.0005	-0.2	N/R					
2016	96.11%	0.0005	-0.2	N/R					
2520	95.54%	0.0005	-0.2	N/R					
3024	95.11%	0.0005	-0.2	N/R					
3528	94.53%	0.0005	-0.2	N/R					
4032	94.08%	0.0005	-0.3	N/R					
4536	94.10%	0.0005	-0.3	N/R					
5040	94.00%	0.0006	-0.3	N/R					
5544	93.94%	0.0007	-0.3	N/R					
6048	94.30%	0.0008	-0.4	N/R					
6552	94.00%	0.0008	-0.4	0.5%					
7056	93.89%	0.0010	-0.4	0.7%					
7560	93.72%	0.0011	-0.5	0.5%					
8064	93.79%	0.0012	-0.4	0.2%					
8568	93.67%	0.0013	-0.5	0.0%					

Note: "N/R" indicates data points that are not reported

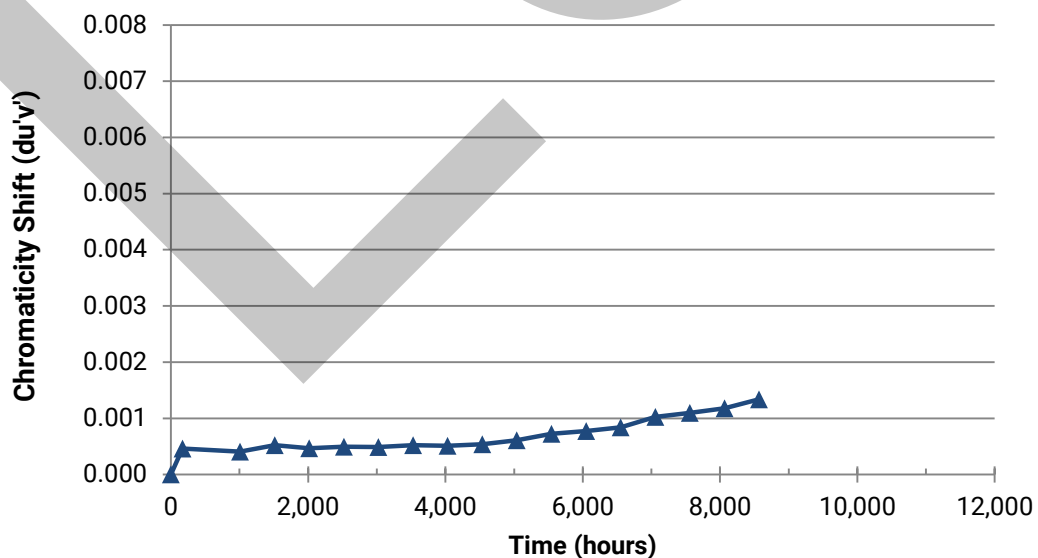
DATA SET 8: 120°C; 700 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	8,568 hours
Test duration used for projection	t=3,528 to t=8,568
α	1.297E-06
β	9.474E-01
Reported Lifetimes	L90(9k) = 39,600 hours
	L80(9k) > 51,400 hours
	L70(9k) > 51,400 hours



Color Shift Graph



DATA SET 8: 120°C; 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	276	2.94	3036	3000	98.77	97.46	96.85	95.80	94.68	94.89	94.20	93.73	93.84	93.48	93.52	93.59
2	281	2.93	3064	3000	98.25	97.61	97.26	95.94	95.01	94.73	94.44	93.62	93.91	93.51	93.09	93.69
3	290	3.02	3012	3000	99.07	96.41	95.99	94.89	95.13	94.44	94.09	93.51	94.23	93.64	93.58	94.23
4	290	3.02	3036	3000	99.55	97.41	97.10	95.66	95.69	95.00	94.35	93.45	93.76	93.31	93.66	94.35
5	276	2.97	3098	3000	98.08	98.19	97.57	96.99	95.98	95.14	94.31	93.91	94.16	94.42	94.74	94.35
6	275	2.97	3040	3000	98.26	97.27	96.66	96.22	95.57	95.57	94.91	94.91	94.37	94.84	95.09	95.09
7	277	2.96	3068	3000	97.40	96.36	95.85	94.70	94.30	94.41	93.40	92.85	93.32	93.65	93.36	93.83
8	286	2.96	3096	3000	98.36	97.90	97.17	96.75	96.65	95.46	94.93	94.58	93.82	94.13	94.55	94.93
9	285	2.97	3053	3000	99.44	97.89	97.15	96.98	96.94	95.43	95.43	94.48	95.11	94.62	94.59	95.18
10	286	2.94	3021	3000	99.02	98.11	97.48	96.85	96.61	95.66	95.70	94.58	95.28	94.68	94.33	94.82
11	281	3.01	3051	3000	98.58	97.76	96.94	95.73	95.13	94.95	94.45	94.02	94.38	94.02	94.09	94.66
12	279	3.01	3006	3000	98.57	97.13	96.52	95.31	94.05	93.55	92.94	92.80	92.48	92.73	92.73	92.40
13	296	2.98	3085	3000	99.43	98.04	97.97	97.30	96.99	96.45	95.91	95.20	94.83	95.37	95.27	95.23
14	297	2.98	3035	3000	98.89	97.85	97.92	96.47	96.81	96.00	96.03	95.19	95.80	95.06	95.12	95.80
15	293	2.98	3050	3000	98.98	98.02	96.72	96.41	95.90	94.98	95.32	94.09	94.23	93.78	93.85	94.33
16	295	3.04	3045	3000	99.80	98.40	97.69	96.95	96.84	96.30	94.77	94.84	93.89	93.86	93.41	93.89
17	287	3.02	3058	3000	100.03	97.91	97.18	95.68	95.44	94.74	94.60	93.59	94.08	93.59	94.22	94.74
18	278	2.94	3035	3000	98.52	98.20	97.80	96.43	95.32	94.95	93.62	93.69	93.77	93.30	93.84	93.95
19	280	2.93	3028	3000	98.96	98.03	97.17	95.78	94.81	94.35	93.96	93.56	93.63	93.60	93.67	93.63
20	297	2.95	3134	3000	97.65	97.48	96.20	95.90	95.22	95.73	94.58	94.18	94.05	94.18	93.81	94.18
21	285	2.95	3160	3000	97.13	95.86	95.30	95.69	94.32	94.32	94.22	94.39	94.01	93.69	93.62	93.80
22	299	2.97	3086	3000	98.63	97.35	96.55	96.48	95.65	95.31	94.01	93.77	93.67	93.84	93.10	93.80
23	297	2.98	3046	3000	98.15	97.84	96.97	96.67	95.42	95.86	95.12	94.98	94.61	94.98	94.24	94.81
24	288	2.96	3148	3000	97.08	95.80	95.52	95.24	94.51	93.92	93.05	93.47	92.53	92.67	92.08	93.15
25	295	2.95	3090	3000	98.81	97.69	96.81	96.00	95.46	95.49	94.85	94.51	94.74	95.05	95.05	95.18
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	287	2.97			98.62	97.52	96.89	96.11	95.54	95.11	94.53	94.08	94.10	94.00	93.94	94.30
Median	286	2.97			98.63	97.76	96.97	96.00	95.44	95.00	94.45	94.02	94.05	93.84	93.84	94.33
σ	8	0.03			0.77	0.71	0.71	0.69	0.88	0.72	0.81	0.67	0.74	0.72	0.79	0.76
Min.	275	2.93			97.08	95.80	95.30	94.70	94.05	93.55	92.94	92.80	92.48	92.67	92.08	92.40
Max.	299	3.04			100.03	98.40	97.97	97.30	96.99	96.45	96.03	95.20	95.80	95.37	95.27	95.80

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4398	0.4140	3036	3000	0.0004	0.0004	0.0006	0.0004	0.0003	0.0004	0.0007	0.0005	0.0004	0.0006	0.0008	0.0012
2	0.4384	0.4146	3064	3000	0.0005	0.0005	0.0005	0.0003	0.0004	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0007
3	0.4403	0.4120	3012	3000	0.0006	0.0002	0.0006	0.0005	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008	0.0009	0.0009
4	0.4389	0.4121	3036	3000	0.0007	0.0008	0.0007	0.0005	0.0008	0.0006	0.0007	0.0007	0.0006	0.0007	0.0008	0.0010
5	0.4356	0.4128	3098	3000	0.0006	0.0004	0.0006	0.0008	0.0005	0.0004	0.0004	0.0003	0.0005	0.0006	0.0008	0.0007
6	0.4412	0.4175	3040	3000	0.0004	0.0002	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0006	0.0007	0.0009
7	0.4391	0.4166	3068	3000	0.0005	0.0001	0.0002	0.0002	0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0006	0.0007
8	0.4366	0.4148	3096	3000	0.0003	0.0006	0.0005	0.0006	0.0005	0.0004	0.0005	0.0004	0.0003	0.0005	0.0006	0.0007
9	0.4392	0.4148	3053	3000	0.0005	0.0001	0.0005	0.0003	0.0005	0.0004	0.0004	0.0004	0.0004	0.0005	0.0008	0.0009
10	0.4427	0.4182	3021	3000	0.0004	0.0005	0.0007	0.0004	0.0006	0.0006	0.0007	0.0005	0.0007	0.0007	0.0008	0.0008
11	0.4368	0.4095	3051	3000	0.0005	0.0003	0.0006	0.0003	0.0004	0.0005	0.0006	0.0005	0.0006	0.0007	0.0009	0.0008
12	0.4401	0.4108	3006	3000	0.0008	0.0004	0.0006	0.0004	0.0005	0.0004	0.0005	0.0005	0.0005	0.0006	0.0008	0.0008
13	0.4382	0.4168	3085	3000	0.0003	0.0004	0.0004	0.0006	0.0006	0.0005	0.0006	0.0008	0.0006	0.0008	0.0009	0.0009
14	0.4415	0.4174	3035	3000	0.0005	0.0004	0.0006	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0007	0.0007
15	0.4401	0.4164	3050	3000	0.0007	0.0006	0.0007	0.0004	0.0006	0.0006	0.0008	0.0006	0.0006	0.0006	0.0008	0.0008
16	0.4387	0.4128	3045	3000	0.0007	0.0007	0.0008	0.0011	0.0008	0.0010	0.0006	0.0007	0.0006	0.0009	0.0007	0.0009
17	0.4378	0.4125	3058	3000	0.0009	0.0007	0.0009	0.0009	0.0009	0.0009	0.0011	0.0010	0.0011	0.0011	0.0011	0.0009
18	0.4414	0.4172	3035	3000	0.0002	0.0004	0.0006	0.0004	0.0003	0.0003	0.0002	0.0003	0.0002	0.0004	0.0005	0.0006
19	0.4421	0.4178	3028	3000	0.0007	0.0005	0.0005	0.0005	0.0004	0.0006	0.0005	0.0006	0.0006	0.0006	0.0006	0.0007
20	0.4340	0.4139	3134	3000	0.0003	0.0006	0.0004	0.0004	0.0003	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0005
21	0.4286	0.4050	3160	3000	0.0002	0.0002	0.0004	0.0004	0.0003	0.0003	0.0003	0.0005	0.0005	0.0004	0.0006	0.0006
22	0.4347	0.4093	3086	3000	0.0003	0.0002	0.0003	0.0004	0.0005	0.0005	0.0007	0.0006	0.0007	0.0007	0.0007	0.0007
23	0.4376	0.4106	3046	3000	0.0003	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0008	0.0007
24	0.4308	0.4085	3148	3000	0.0003	0.0002	0.0004	0.0003	0.0003	0.0002	0.0002	0.0003	0.0005	0.0003	0.0005	0.0005
25	0.4337	0.4076	3090	3000	0.0002	0.0002	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0005	0.0005
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0006	0.0007	0.0008
Median					0.0005	0.0004	0.0005	0.0004	0.0005	0.0004	0.0005	0.0005	0.0005	0.0006	0.0007	0.0007
σ					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002
Min.					0.0002	0.0001	0.0002	0.0002	0.0003	0.0002	0.0002	0.0003	0.0002	0.0003	0.0005	0.0005
Max.					0.0009	0.0008	0.0009	0.0011	0.0009	0.0010	0.0011	0.0010	0.0011	0.0011	0.0011	0.0012

DATA SET 8: 120°C; 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)				
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568
1	276	2.94	3036	3000	93.52	93.48	94.20	93.52	94.17
2	281	2.93	3064	3000	93.76	93.01	93.76	93.23	93.23
3	290	3.02	3012	3000	93.61	93.61	93.13	93.78	93.16
4	290	3.02	3036	3000	93.42	93.55	93.00	93.21	92.66
5	276	2.97	3098	3000	94.78	94.42	94.74	94.71	94.71
6	275	2.97	3040	3000	94.91	94.73	94.00	94.73	94.80
7	277	2.96	3068	3000	94.01	93.65	93.40	93.14	92.85
8	286	2.96	3096	3000	94.93	94.44	94.16	93.61	94.27
9	285	2.97	3053	3000	94.73	94.48	94.06	94.80	94.55
10	286	2.94	3021	3000	93.67	93.84	93.35	93.56	93.74
11	281	3.01	3051	3000	93.56	93.67	93.67	93.95	92.99
12	279	3.01	3006	3000	92.33	91.62	92.08	91.94	91.69
13	296	2.98	3085	3000	94.93	95.03	95.00	94.93	95.13
14	297	2.98	3035	3000	94.72	95.16	94.15	95.02	95.26
15	293	2.98	3050	3000	93.88	94.16	93.44	93.99	94.16
16	295	3.04	3045	3000	94.33	94.30	94.09	94.03	94.47
17	287	3.02	3058	3000	94.32	94.01	93.73	93.48	92.86
18	278	2.94	3035	3000	94.09	93.95	93.77	93.87	93.12
19	280	2.93	3028	3000	94.17	93.31	93.63	93.20	93.38
20	297	2.95	3134	3000	93.84	93.95	93.51	93.71	93.31
21	285	2.95	3160	3000	93.41	93.55	93.48	93.69	93.66
22	299	2.97	3086	3000	93.27	92.80	92.46	92.83	92.50
23	297	2.98	3046	3000	94.61	94.78	94.51	94.38	94.00
24	288	2.96	3148	3000	92.36	92.49	92.46	92.49	92.25
25	295	2.95	3090	3000	94.91	95.18	95.12	95.02	94.71
n	25	25	25	25	25	25	25	25	25
Mean	287	2.97			94.00	93.89	93.72	93.79	93.67
Median	286	2.97			94.01	93.95	93.73	93.71	93.66
σ	8	0.03			0.74	0.85	0.75	0.80	0.95
Min.	275	2.93			92.33	91.62	92.08	91.94	91.69
Max.	299	3.04			94.93	95.18	95.12	95.02	95.26

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')				
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568
1	0.4398	0.4140	3036	3000	0.0008	0.0011	0.0011	0.0013	0.0014
2	0.4384	0.4146	3064	3000	0.0006	0.0011	0.0012	0.0012	0.0014
3	0.4403	0.4120	3012	3000	0.0009	0.0011	0.0011	0.0013	0.0015
4	0.4389	0.4121	3036	3000	0.0007	0.0010	0.0010	0.0011	0.0014
5	0.4356	0.4128	3098	3000	0.0012	0.0013	0.0013	0.0016	0.0019
6	0.4412	0.4175	3040	3000	0.0005	0.0011	0.0011	0.0007	0.0009
7	0.4391	0.4166	3068	3000	0.0009	0.0012	0.0011	0.0012	0.0012
8	0.4366	0.4148	3096	3000	0.0010	0.0012	0.0010	0.0011	0.0017
9	0.4392	0.4148	3053	3000	0.0010	0.0010	0.0011	0.0012	0.0013
10	0.4427	0.4182	3021	3000	0.0009	0.0010	0.0012	0.0012	0.0016
11	0.4368	0.4095	3051	3000	0.0010	0.0010	0.0011	0.0012	0.0011
12	0.4401	0.4108	3006	3000	0.0010	0.0010	0.0012	0.0012	0.0014
13	0.4382	0.4168	3085	3000	0.0011	0.0011	0.0012	0.0013	0.0012
14	0.4415	0.4174	3035	3000	0.0007	0.0010	0.0011	0.0011	0.0014
15	0.4401	0.4164	3050	3000	0.0010	0.0012	0.0013	0.0014	0.0017
16	0.4387	0.4128	3045	3000	0.0010	0.0014	0.0013	0.0012	0.0015
17	0.4378	0.4125	3058	3000	0.0013	0.0014	0.0015	0.0019	0.0019
18	0.4414	0.4172	3035	3000	0.0009	0.0011	0.0012	0.0012	0.0014
19	0.4421	0.4178	3028	3000	0.0007	0.0010	0.0010	0.0011	0.0016
20	0.4340	0.4139	3134	3000	0.0007	0.0007	0.0010	0.0011	0.0011
21	0.4286	0.4050	3160	3000	0.0007	0.0009	0.0008	0.0010	0.0009
22	0.4347	0.4093	3086	3000	0.0008	0.0008	0.0010	0.0010	0.0010
23	0.4376	0.4106	3046	3000	0.0008	0.0009	0.0011	0.0011	0.0011
24	0.4308	0.4085	3148	3000	0.0005	0.0007	0.0007	0.0010	0.0009
25	0.4337	0.4076	3090	3000	0.0006	0.0006	0.0008	0.0010	0.0010
n	25	25	25	25	25	25	25	25	25
Mean					0.0008	0.0010	0.0011	0.0012	0.0013
Median					0.0009	0.0010	0.0011	0.0012	0.0014
σ					0.0002	0.0002	0.0002	0.0002	0.0003
Min.					0.0005	0.0006	0.0007	0.0007	0.0009
Max.					0.0013	0.0014	0.0015	0.0019	0.0019

DATA SET 9: 85°C; 1050 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_F]	1050 mA
Testing Initiation Date	November 2, 2015
Case Temperature [T_s]	85°C
Ambient Temperature [T_A]	85°C
Failures observed	None

Test Results Summary

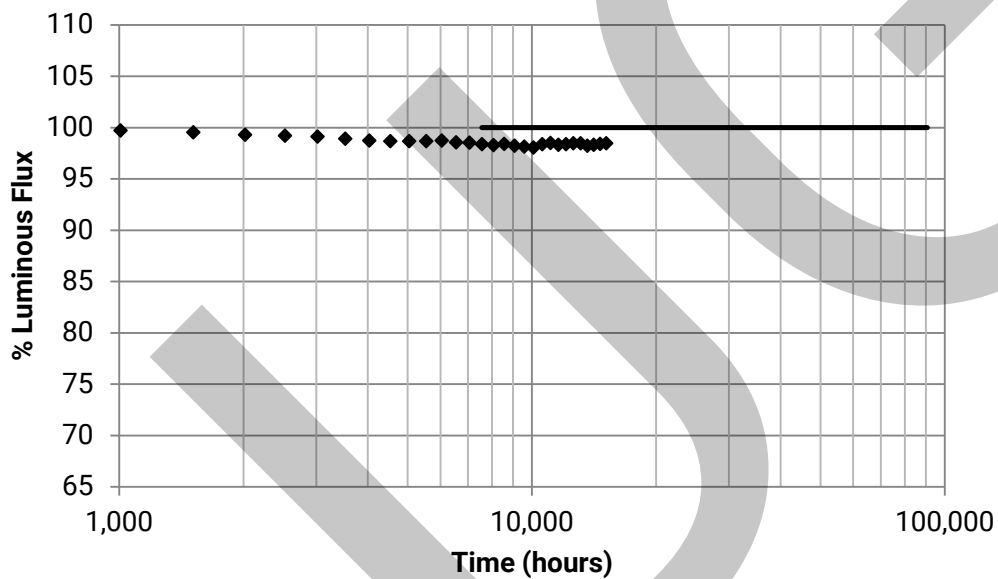
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	10080	98.06%	0.0009	-0.2	N/R
168	99.99%	0.0004	-0.1	N/R	10584	98.40%	0.0008	-0.2	-2.4%
1008	99.72%	0.0007	-0.1	N/R	11088	98.50%	0.0009	-0.2	-2.5%
1512	99.54%	0.0007	-0.2	N/R	11592	98.33%	0.0009	-0.2	-2.9%
2016	99.32%	0.0007	-0.2	N/R	12096	98.40%	0.0009	-0.2	-2.4%
2520	99.23%	0.0007	-0.2	N/R	12600	98.47%	0.0009	-0.2	-2.9%
3024	99.13%	0.0008	-0.2	N/R	13104	98.46%	0.0009	-0.2	-2.7%
3528	98.93%	0.0008	-0.2	N/R	13608	98.25%	0.0009	-0.2	-2.1%
4032	98.74%	0.0008	-0.2	N/R	14112	98.33%	0.0009	-0.2	-2.2%
4536	98.68%	0.0008	-0.2	N/R	14616	98.43%	0.0009	-0.2	-2.5%
5040	98.69%	0.0007	-0.2	N/R	15120	98.47%	0.0009	-0.2	-2.4%
5544	98.69%	0.0007	-0.2	N/R					
6048	98.73%	0.0008	-0.2	N/R					
6552	98.57%	0.0008	-0.2	N/R					
7056	98.52%	0.0008	-0.2	N/R					
7560	98.38%	0.0008	-0.2	N/R					
8064	98.29%	0.0009	-0.2	N/R					
8568	98.42%	0.0009	-0.2	N/R					
9072	98.23%	0.0009	-0.2	N/R					
9576	98.16%	0.0009	-0.2	N/R					

Note: "N/R" indicates data points that are not reported

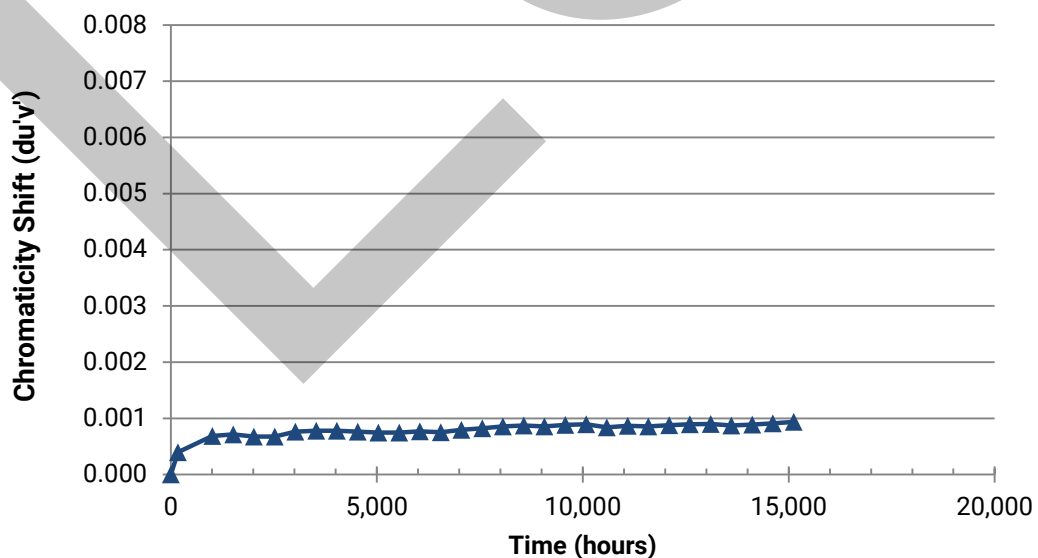
DATA SET 9: 85°C; 1050 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	15,120 hours
Test duration used for projection	t=7,560 to t=15,120
α	-1.882E-07
β	9.814E-01
Reported Lifetimes	L90(15k) > 90,700 hours
	L80(15k) > 90,700 hours
	L70(15k) > 90,700 hours



Color Shift Graph



DATA SET 9: 85°C; 1050 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	422	3.04	3197	3000	99.95	99.64	99.72	99.53	99.19	99.41	98.91	98.55	98.18	98.44	98.20	98.46
2	406	3.10	3079	3000	100.15	99.75	99.80	99.41	99.46	99.38	98.72	98.79	98.33	98.65	98.47	98.40
3	403	3.03	3146	3000	100.02	99.63	99.40	99.45	99.43	99.08	98.93	98.73	98.46	98.39	98.46	98.49
4	413	3.04	3154	3000	99.81	99.69	99.27	98.98	99.06	98.81	98.33	98.35	98.23	98.33	98.21	98.26
5	395	3.06	3149	3000	99.87	99.65	99.72	99.39	99.14	98.86	99.24	98.99	98.91	98.76	98.91	98.94
6	419	3.05	3102	3000	100.24	100.02	99.62	99.33	99.16	99.19	98.73	98.38	98.16	98.59	98.35	98.61
7	412	3.05	3080	3000	99.78	99.66	99.44	99.08	99.08	99.05	98.71	98.52	98.50	98.47	98.69	98.50
8	407	3.08	3101	3000	100.07	99.71	99.73	99.31	99.29	99.63	99.41	99.17	99.29	99.29	99.26	99.17
9	427	3.08	3114	3000	100.16	99.84	99.32	99.16	98.87	98.66	98.55	98.24	98.36	98.24	98.29	98.27
10	413	3.13	3053	3000	99.78	99.66	99.81	99.47	99.13	99.42	99.10	98.89	98.52	98.43	98.28	98.55
11	416	3.06	3114	3000	100.10	99.95	99.74	99.66	99.54	99.59	99.57	99.26	98.99	98.97	99.18	99.04
12	417	3.03	3039	3000	99.95	99.38	99.42	99.09	99.50	99.26	99.11	98.94	98.73	98.82	98.99	99.04
13	417	3.17	3098	3000	99.90	99.86	99.90	99.09	99.18	98.80	98.44	98.15	98.27	98.32	98.56	98.85
14	410	3.13	3039	3000	99.88	99.68	99.51	99.20	99.20	99.02	98.98	98.71	98.66	98.85	98.68	99.00
15	416	3.14	3043	3000	100.05	99.88	99.61	99.06	99.13	98.82	98.84	98.60	98.75	98.84	99.04	99.18
16	415	3.07	3096	3000	100.00	99.30	99.25	99.30	99.08	98.89	99.25	98.96	98.79	98.82	98.53	98.65
17	409	3.16	3075	3000	99.90	99.85	99.83	99.46	99.56	99.46	99.17	99.27	99.36	99.29	99.31	99.24
18	410	3.15	3065	3000	100.19	99.63	99.29	99.29	99.05	98.98	98.88	98.85	98.93	98.85	98.90	99.05
19	399	3.12	3157	3000	99.95	99.62	99.22	99.35	98.95	99.27	99.22	98.87	99.25	98.87	99.10	99.35
20	391	3.05	3047	3000	99.67	99.59	99.44	99.16	99.11	98.72	98.49	98.36	98.49	98.31	98.11	98.11
21	403	3.05	3087	3000	99.83	99.98	99.35	99.30	99.50	99.28	99.13	98.91	99.11	99.06	98.96	99.01
22	405	3.03	3080	3000	100.25	99.83	99.88	99.53	99.16	99.60	99.21	99.18	99.11	99.11	98.76	98.52
23	409	3.14	3018	3000	100.22	99.71	99.56	99.56	99.32	99.00	98.88	98.83	98.80	98.88	99.17	98.85
24	416	3.01	3083	3000	99.95	99.59	99.23	99.33	99.16	99.09	98.77	98.22	98.05	97.93	98.12	97.98
25	413	3.04	3088	3000	100.15	99.85	99.54	99.61	99.47	98.96	98.69	98.69	98.89	98.69	98.69	98.65
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	411	3.08			99.99	99.72	99.54	99.32	99.23	99.13	98.93	98.74	98.68	98.69	98.69	98.73
Median	412	3.06			99.95	99.69	99.54	99.33	99.16	99.08	98.91	98.79	98.73	98.76	98.69	98.65
σ	8	0.05			0.16	0.17	0.22	0.19	0.19	0.29	0.31	0.33	0.38	0.34	0.38	0.37
Min.	391	3.01			99.67	99.30	99.22	98.98	98.87	98.66	98.33	98.15	98.05	97.93	98.11	97.98
Max.	427	3.17			100.25	100.02	99.90	99.66	99.56	99.63	99.57	99.27	99.36	99.29	99.31	99.35

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4270	0.4061	3197	3000	0.0002	0.0004	0.0004	0.0004	0.0004	0.0006	0.0006	0.0007	0.0007	0.0007	0.0005	0.0006
2	0.4329	0.4045	3079	3000	0.0002	0.0005	0.0006	0.0006	0.0005	0.0006	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006
3	0.4289	0.4040	3146	3000	0.0003	0.0003	0.0004	0.0002	0.0005	0.0005	0.0003	0.0003	0.0003	0.0003	0.0000	0.0002
4	0.4295	0.4064	3154	3000	0.0002	0.0004	0.0004	0.0005	0.0005	0.0006	0.0007	0.0007	0.0006	0.0005	0.0005	0.0006
5	0.4312	0.4096	3149	3000	0.0001	0.0004	0.0004	0.0003	0.0003	0.0005	0.0006	0.0007	0.0007	0.0008	0.0007	0.0006
6	0.4341	0.4100	3102	3000	0.0003	0.0005	0.0006	0.0006	0.0005	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006	0.0007
7	0.4340	0.4071	3080	3000	0.0002	0.0002	0.0002	0.0004	0.0002	0.0003	0.0003	0.0004	0.0003	0.0003	0.0002	0.0003
8	0.4317	0.4046	3101	3000	0.0003	0.0003	0.0005	0.0005	0.0006	0.0005	0.0007	0.0006	0.0007	0.0007	0.0006	0.0007
9	0.4317	0.4062	3114	3000	0.0002	0.0007	0.0005	0.0004	0.0003	0.0005	0.0005	0.0007	0.0007	0.0007	0.0007	0.0006
10	0.4337	0.4031	3053	3000	0.0001	0.0004	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005	0.0004	0.0004	0.0005
11	0.4345	0.4124	3114	3000	0.0006	0.0009	0.0009	0.0009	0.0008	0.0008	0.0009	0.0008	0.0009	0.0009	0.0009	0.0010
12	0.4425	0.4201	3039	3000	0.0004	0.0009	0.0009	0.0007	0.0008	0.0009	0.0009	0.0010	0.0009	0.0008	0.0008	0.0010
13	0.4358	0.4133	3098	3000	0.0006	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010
14	0.4401	0.4150	3039	3000	0.0007	0.0009	0.0010	0.0009	0.0010	0.0011	0.0011	0.0011	0.0011	0.0011	0.0012	0.0011
15	0.4413	0.4180	3043	3000	0.0005	0.0010	0.0010	0.0009	0.0008	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0009
16	0.4350	0.4112	3096	3000	0.0004	0.0006	0.0009	0.0008	0.0008	0.0007	0.0008	0.0007	0.0007	0.0007	0.0008	0.0007
17	0.4363	0.4114	3075	3000	0.0006	0.0010	0.0011	0.0009	0.0010	0.0012	0.0012	0.0012	0.0011	0.0011	0.0012	0.0012
18	0.4382	0.4142	3065	3000	0.0007	0.0010	0.0010	0.0010	0.0010	0.0010	0.0011	0.0011	0.0010	0.0010	0.0010	0.0010
19	0.4313	0.4108	3157	3000	0.0003	0.0007	0.0008	0.0007	0.0006	0.0008	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008
20	0.4392	0.4141	3047	3000	0.0005	0.0007	0.0006	0.0006	0.0007	0.0008	0.0008	0.0008	0.0007	0.0007	0.0007	0.0007
21	0.4362	0.4127	3087	3000	0.0004	0.0010	0.0009	0.0009	0.0009	0.0009	0.0010	0.0009	0.0009	0.0008	0.0009	0.0009
22	0.4387	0.4172	3080	3000	0.0006	0.0008	0.0009	0.0008	0.0007	0.0009	0.0009	0.0009	0.0009	0.0008	0.0009	0.0009
23	0.4417	0.4156	3018	3000	0.0006	0.0009	0.0010	0.0009	0.0009	0.0011	0.0011	0.0010	0.0010	0.0011	0.0011	0.0010
24	0.4387	0.4177	3083	3000	0.0005	0.0007	0.0008	0.0007	0.0009	0.0008	0.0008	0.0007	0.0007	0.0007	0.0007	0.0008
25	0.4373	0.4152	3088	3000	0.0004	0.0009	0.0008	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0009	0.0009	0.0009
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0004	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007	0.0008
Median					0.0004	0.0007	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008
σ					0.0002	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002
Min.					0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0000	0.0002
Max.					0.0007	0.0010	0.0011	0.0010	0.0010	0.0012	0.0012	0.0012	0.0011	0.0011	0.0012	0.0012

DATA SET 9: 85°C; 1050 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	422	3.04	3197	3000	98.18	98.55	98.01	98.39	98.36	97.68	98.29	98.67	98.27	98.32	97.91	98.13
2	406	3.10	3079	3000	98.70	98.42	98.20	97.54	97.86	98.06	97.76	97.56	98.38	98.52	98.15	98.38
3	403	3.03	3146	3000	98.44	98.54	98.19	97.96	97.94	97.44	97.87	97.42	97.57	97.79	97.54	97.29
4	413	3.04	3154	3000	97.94	97.87	97.55	97.43	97.21	97.31	97.48	96.90	97.34	97.41	97.07	96.75
5	395	3.06	3149	3000	98.66	98.66	98.51	98.51	98.53	97.90	98.28	98.33	98.20	98.46	98.03	98.08
6	419	3.05	3102	3000	98.45	98.33	98.35	97.78	98.04	97.90	97.95	97.66	98.02	97.97	97.66	98.28
7	412	3.05	3080	3000	98.18	98.38	98.18	97.62	98.13	97.94	97.55	97.33	97.48	97.38	97.16	96.85
8	407	3.08	3101	3000	99.29	98.80	98.40	98.70	98.75	99.02	99.09	98.65	99.07	99.12	99.04	98.90
9	427	3.08	3114	3000	98.59	98.24	98.29	97.66	97.75	97.63	97.59	97.84	98.20	98.01	97.94	98.45
10	413	3.13	3053	3000	98.65	98.84	98.62	98.50	98.40	98.09	97.90	97.73	97.99	98.50	98.06	98.36
11	416	3.06	3114	3000	98.92	98.97	98.89	99.09	99.14	98.65	98.25	98.44	98.80	98.82	99.04	99.06
12	417	3.03	3039	3000	98.66	98.51	98.54	98.56	98.73	98.39	98.42	98.25	98.32	98.66	98.70	98.66
13	417	3.17	3098	3000	98.32	98.63	98.51	98.39	98.73	98.66	98.61	98.66	99.23	99.04	99.23	99.30
14	410	3.13	3039	3000	98.71	98.73	98.22	98.27	98.32	98.88	98.85	98.07	98.20	98.51	98.29	98.95
15	416	3.14	3043	3000	98.58	98.70	98.29	98.05	98.39	98.34	97.98	98.03	98.63	98.34	98.51	98.70
16	415	3.07	3096	3000	98.63	98.29	98.58	98.31	98.58	98.51	98.51	98.10	98.46	98.92	98.65	98.89
17	409	3.16	3075	3000	99.09	99.14	98.51	98.75	98.73	98.65	98.48	98.51	99.19	99.02	99.09	99.27
18	410	3.15	3065	3000	98.73	98.29	98.44	98.03	98.37	98.59	98.59	97.69	98.08	98.56	98.27	98.15
19	399	3.12	3157	3000	99.27	99.05	98.75	99.02	99.07	98.50	97.99	98.32	98.92	99.17	98.65	98.14
20	391	3.05	3047	3000	97.90	97.62	98.16	97.60	97.98	97.78	97.62	97.70	97.73	97.73	97.80	98.16
21	403	3.05	3087	3000	98.66	98.78	98.88	98.83	98.98	99.08	98.66	99.30	99.53	99.45	99.40	98.83
22	405	3.03	3080	3000	98.37	98.91	98.69	98.89	98.91	99.18	98.99	98.62	98.79	99.33	99.28	99.04
23	409	3.14	3018	3000	98.88	98.31	98.83	99.07	99.12	98.34	98.58	98.75	99.12	98.68	98.95	99.00
24	416	3.01	3083	3000	97.55	98.03	97.67	97.74	98.08	97.28	97.11	97.40	97.96	98.29	97.40	98.24
25	413	3.04	3088	3000	98.84	98.43	98.28	98.65	98.52	97.99	97.58	97.65	98.50	98.43	98.31	98.16
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	411	3.08			98.57	98.52	98.38	98.29	98.42	98.23	98.16	98.06	98.40	98.50	98.33	98.40
Median	412	3.06			98.65	98.54	98.40	98.39	98.40	98.34	98.25	98.07	98.32	98.51	98.29	98.38
σ	8	0.05			0.41	0.36	0.33	0.52	0.48	0.55	0.52	0.56	0.58	0.56	0.67	0.67
Min.	391	3.01			97.55	97.62	97.55	97.43	97.21	97.28	97.11	96.90	97.34	97.38	97.07	96.75
Max.	427	3.17			99.29	99.14	98.89	99.09	99.14	99.18	99.09	99.30	99.53	99.45	99.40	99.30

Lamp #	Initial (0 hrs)				Chromaticity Shift ($\Delta u'v'$)											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4270	0.4061	3197	3000	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0007	0.0006	0.0005	0.0005	0.0005	0.0006
2	0.4329	0.4045	3079	3000	0.0006	0.0008	0.0011	0.0010	0.0011	0.0010	0.0007	0.0007	0.0007	0.0008	0.0008	0.0007
3	0.4289	0.4040	3146	3000	0.0001	0.0003	0.0003	0.0004	0.0004	0.0004	0.0005	0.0006	0.0006	0.0006	0.0005	0.0006
4	0.4295	0.4064	3154	3000	0.0004	0.0005	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006	0.0005
5	0.4312	0.4096	3149	3000	0.0006	0.0006	0.0007	0.0006	0.0006	0.0007	0.0007	0.0007	0.0006	0.0006	0.0005	0.0006
6	0.4341	0.4100	3102	3000	0.0004	0.0006	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
7	0.4340	0.4071	3080	3000	0.0002	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0005	0.0005	0.0005	0.0006	0.0006
8	0.4317	0.4046	3101	3000	0.0004	0.0006	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0008
9	0.4317	0.4062	3114	3000	0.0006	0.0007	0.0007	0.0007	0.0008	0.0009	0.0007	0.0007	0.0008	0.0008	0.0007	0.0008
10	0.4337	0.4031	3053	3000	0.0004	0.0005	0.0006	0.0006	0.0005	0.0006	0.0006	0.0007	0.0006	0.0006	0.0006	0.0007
11	0.4345	0.4124	3114	3000	0.0010	0.0010	0.0010	0.0009	0.0012	0.0009	0.0010	0.0011	0.0010	0.0010	0.0010	0.0010
12	0.4425	0.4201	3039	3000	0.0010	0.0009	0.0010	0.0010	0.0010	0.0010	0.0011	0.0012	0.0008	0.0009	0.0010	0.0011
13	0.4358	0.4133	3098	3000	0.0009	0.0009	0.0011	0.0010	0.0010	0.0010	0.0010	0.0010	0.0011	0.0011	0.0009	0.0010
14	0.4401	0.4150	3039	3000	0.0012	0.0012	0.0012	0.0013	0.0012	0.0013	0.0012	0.0013	0.0011	0.0013	0.0012	0.0012
15	0.4413	0.4180	3043	3000	0.0010	0.0009	0.0010	0.0010	0.0011	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0011
16	0.4350	0.4112	3096	3000	0.0008	0.0009	0.0007	0.0009	0.0009	0.0010	0.0009	0.0010	0.0008	0.0010	0.0009	0.0009
17	0.4363	0.4114	3075	3000	0.0013	0.0013	0.0013	0.0014	0.0014	0.0013	0.0013	0.0014	0.0014	0.0014	0.0014	0.0013
18	0.4382	0.4142	3065	3000	0.0012	0.0012	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0012	0.0011	0.0011
19	0.4313	0.4108	3157	3000	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008
20	0.4392	0.4141	3047	3000	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0007	0.0008	0.0008	0.0008
21	0.4362	0.4127	3087	3000	0.0009	0.0009	0.0009	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0012
22	0.4387	0.4172	3080	3000	0.0010	0.0010	0.0008	0.0011	0.0011	0.0010	0.0010	0.0010	0.0010	0.0011	0.0010	0.0010
23	0.4417	0.4156	3018	3000	0.0011	0.0011	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0012	0.0011	0.0012	0.0011
24	0.4387	0.4177	3083	3000	0.0008	0.0008	0.0008	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0009	0.0007	0.0009
25	0.4373	0.4152	3088	3000	0.0009	0.0008	0.0009	0.0010	0.0010	0.0009	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0009	0.0009	0.0009
Median					0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0009	0.0008	0.0009
σ					0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0001	0.0003	0.0003	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Max.					0.0013	0.0013	0.0013	0.0014	0.0014	0.0013	0.0013	0.0014	0.0014	0.0014	0.0014	0.0013

DATA SET 9: 85°C; 1050 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)					
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	422	3.04	3197	3000	98.22	98.55	98.29	98.25	98.10	98.36
2	406	3.10	3079	3000	98.13	98.62	98.13	97.88	98.55	98.52
3	403	3.03	3146	3000	97.37	98.01	97.37	97.54	97.77	97.77
4	413	3.04	3154	3000	97.04	97.24	97.14	96.78	97.17	97.38
5	395	3.06	3149	3000	98.08	98.38	97.92	97.95	97.95	98.05
6	419	3.05	3102	3000	97.95	98.02	98.35	98.14	97.87	98.30
7	412	3.05	3080	3000	97.14	97.48	97.11	96.90	96.97	97.48
8	407	3.08	3101	3000	98.63	99.12	98.80	99.31	99.31	99.29
9	427	3.08	3114	3000	98.22	98.87	98.50	98.10	98.15	98.24
10	413	3.13	3053	3000	98.91	98.74	97.87	98.36	98.26	98.57
11	416	3.06	3114	3000	99.47	99.11	99.30	99.64	99.64	99.69
12	417	3.03	3039	3000	98.54	98.49	98.34	98.78	98.63	98.61
13	417	3.17	3098	3000	99.26	99.11	98.92	98.97	98.97	98.99
14	410	3.13	3039	3000	98.88	98.76	98.56	98.59	98.78	98.46
15	416	3.14	3043	3000	99.18	98.72	98.41	98.94	99.30	99.06
16	415	3.07	3096	3000	98.77	98.58	98.41	99.18	99.04	99.01
17	409	3.16	3075	3000	99.27	98.95	98.90	98.80	98.75	98.90
18	410	3.15	3065	3000	97.83	98.12	97.76	97.88	98.29	98.05
19	399	3.12	3157	3000	98.32	98.07	97.84	97.79	98.02	97.97
20	391	3.05	3047	3000	98.52	97.88	98.01	98.52	98.42	98.67
21	403	3.05	3087	3000	99.11	98.98	98.58	98.16	98.26	98.19
22	405	3.03	3080	3000	98.91	98.67	98.86	98.81	99.14	98.84
23	409	3.14	3018	3000	99.12	99.05	98.63	98.83	98.75	98.75
24	416	3.01	3083	3000	98.58	97.83	98.34	98.34	98.70	98.63
25	413	3.04	3088	3000	98.21	98.11	97.80	97.73	98.02	98.09
n	25	25	25	25	25	25	25	25	25	25
Mean	411	3.08			98.47	98.46	98.25	98.33	98.43	98.47
Median	412	3.06			98.54	98.58	98.34	98.34	98.42	98.52
σ	8	0.05			0.66	0.52	0.55	0.69	0.64	0.55
Min.	391	3.01			97.04	97.24	97.11	96.78	96.97	97.38
Max.	427	3.17			99.47	99.12	99.30	99.64	99.64	99.69

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')					
	CCx	CCy	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120
1	0.4270	0.4061	3197	3000	0.0006	0.0006	0.0007	0.0006	0.0007	0.0007
2	0.4329	0.4045	3079	3000	0.0006	0.0008	0.0007	0.0007	0.0009	0.0008
3	0.4289	0.4040	3146	3000	0.0005	0.0005	0.0005	0.0005	0.0001	0.0006
4	0.4295	0.4064	3154	3000	0.0005	0.0006	0.0006	0.0006	0.0007	0.0007
5	0.4312	0.4096	3149	3000	0.0006	0.0006	0.0006	0.0006	0.0005	0.0007
6	0.4341	0.4100	3102	3000	0.0007	0.0008	0.0008	0.0009	0.0008	0.0009
7	0.4340	0.4071	3080	3000	0.0006	0.0005	0.0006	0.0006	0.0007	0.0007
8	0.4317	0.4046	3101	3000	0.0008	0.0007	0.0008	0.0009	0.0009	0.0009
9	0.4317	0.4062	3114	3000	0.0006	0.0008	0.0009	0.0008	0.0010	0.0008
10	0.4337	0.4031	3053	3000	0.0008	0.0007	0.0008	0.0007	0.0007	0.0007
11	0.4345	0.4124	3114	3000	0.0011	0.0011	0.0010	0.0010	0.0011	0.0010
12	0.4425	0.4201	3039	3000	0.0011	0.0010	0.0007	0.0010	0.0013	0.0012
13	0.4358	0.4133	3098	3000	0.0011	0.0009	0.0011	0.0010	0.0010	0.0012
14	0.4401	0.4150	3039	3000	0.0013	0.0012	0.0012	0.0012	0.0012	0.0013
15	0.4413	0.4180	3043	3000	0.0011	0.0011	0.0011	0.0010	0.0012	0.0012
16	0.4350	0.4112	3096	3000	0.0009	0.0009	0.0008	0.0009	0.0008	0.0010
17	0.4363	0.4114	3075	3000	0.0014	0.0014	0.0014	0.0014	0.0015	0.0014
18	0.4382	0.4142	3065	3000	0.0012	0.0012	0.0011	0.0013	0.0013	0.0013
19	0.4313	0.4108	3157	3000	0.0008	0.0009	0.0007	0.0007	0.0006	0.0006
20	0.4392	0.4141	3047	3000	0.0009	0.0008	0.0007	0.0009	0.0008	0.0008
21	0.4362	0.4127	3087	3000	0.0012	0.0013	0.0013	0.0011	0.0010	0.0010
22	0.4387	0.4172	3080	3000	0.0010	0.0010	0.0009	0.0010	0.0010	0.0011
23	0.4417	0.4156	3018	3000	0.0013	0.0012	0.0012	0.0012	0.0014	0.0013
24	0.4387	0.4177	3083	3000	0.0009	0.0008	0.0008	0.0010	0.0007	0.0008
25	0.4373	0.4152	3088	3000	0.0010	0.0011	0.0009	0.0010	0.0011	0.0010
n	25	25	25	25	25	25	25	25	25	25
Mean					0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
Median					0.0009	0.0009	0.0008	0.0009	0.0009	0.0009
σ					0.0003	0.0003	0.0002	0.0002	0.0003	0.0002
Min.					0.0005	0.0005	0.0005	0.0005	0.0001	0.0006
Max.					0.0014	0.0014	0.0014	0.0014	0.0015	0.0014

DATA SET 15: 105°C; 1050 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_F]	1050 mA
Testing Initiation Date	October 16, 2015
Case Temperature [T_s]	105°C
Ambient Temperature [T_A]	105°C
Failures observed	None

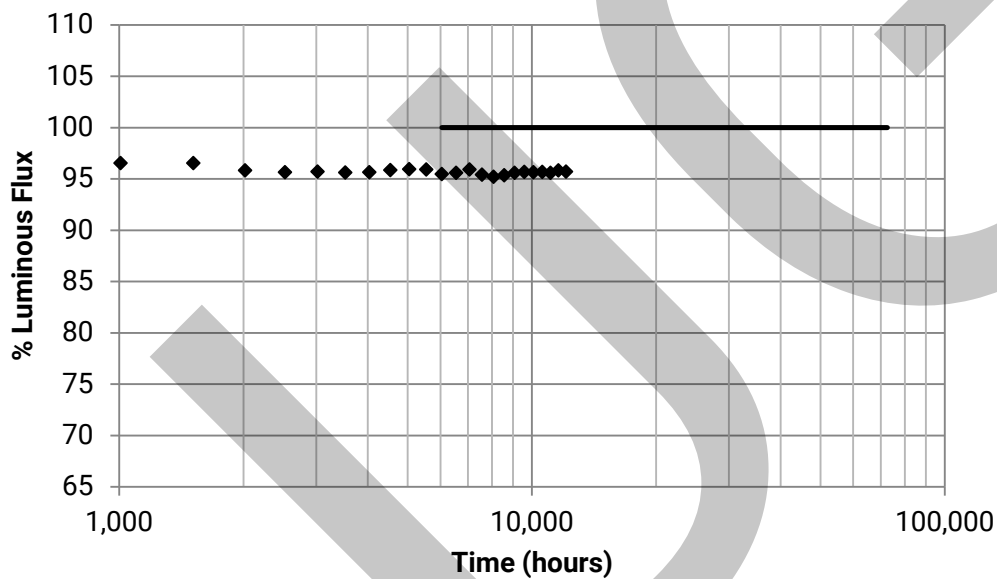
Test Results Summary

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	10080	95.66%	0.0012	-0.2	0.2%
168	98.63%	0.0006	-0.2	0.0%	10584	95.70%	0.0013	-0.2	-0.2%
1008	96.56%	0.0006	-0.1	0.1%	11088	95.61%	0.0012	-0.2	0.2%
1512	96.54%	0.0006	-0.1	0.2%	11592	95.84%	0.0013	-0.2	0.1%
2016	95.84%	0.0006	-0.1	0.3%	12096	95.73%	0.0013	-0.3	-0.3%
2520	95.67%	0.0007	-0.1	0.3%					
3024	95.73%	0.0007	-0.2	0.3%					
3528	95.62%	0.0008	-0.2	0.2%					
4032	95.66%	0.0008	-0.2	0.2%					
4536	95.87%	0.0008	-0.2	0.1%					
5040	95.96%	0.0008	-0.2	0.2%					
5544	95.93%	0.0008	-0.2	0.1%					
6048	95.49%	0.0008	-0.2	0.2%					
6552	95.60%	0.0008	-0.2	-0.1%					
7056	95.92%	0.0008	-0.2	-0.6%					
7560	95.43%	0.0009	-0.2	0.0%					
8064	95.20%	0.0009	-0.2	-0.3%					
8568	95.37%	0.0009	-0.2	0.0%					
9072	95.59%	0.0010	-0.2	0.0%					
9576	95.68%	0.0010	-0.2	-0.1%					

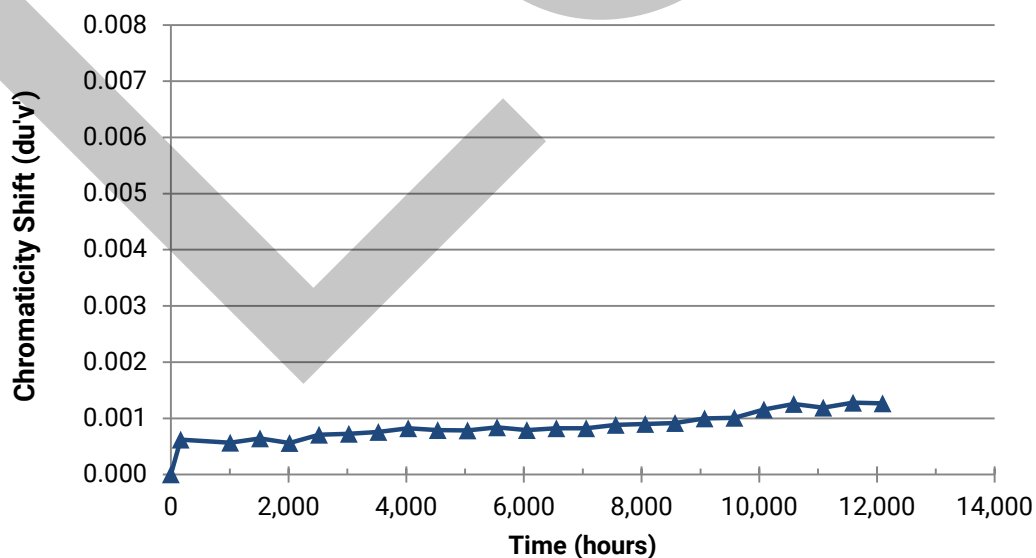
DATA SET 15: 105°C; 1050 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	12,096 hours
Test duration used for projection	t=6,048 to t=12,096
α	-3.926E-07
β	9.526E-01
Reported Lifetimes	L90(12k) > 72,600 hours
	L80(12k) > 72,600 hours
	L70(12k) > 72,600 hours



Color Shift Graph



DATA SET 15: 105°C; 1050 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	429	3.09	3153	3000	98.93	95.81	97.37	94.69	95.78	95.90	94.78	94.55	96.39	95.97	94.78	94.92
2	419	3.06	3133	3000	99.12	97.23	98.02	96.37	96.99	96.90	96.11	96.51	97.06	96.44	96.47	96.66
3	416	3.07	3107	3000	98.56	95.43	96.20	93.62	94.85	94.73	94.92	93.84	95.72	96.08	94.71	94.20
4	412	3.09	3081	3000	99.35	96.73	97.79	96.24	97.04	96.24	97.28	96.75	96.77	96.41	96.68	96.56
5	407	3.09	3121	3000	97.93	94.98	95.62	94.98	95.03	95.33	94.42	94.37	95.40	95.60	94.86	94.62
6	406	3.06	3073	3000	99.09	96.73	97.66	96.58	97.17	95.91	97.24	96.01	96.46	96.31	96.36	96.06
7	411	3.06	3099	3000	99.27	96.62	97.08	95.89	95.99	95.89	96.76	95.94	96.16	95.94	96.16	96.08
8	398	3.07	3062	3000	97.74	96.01	95.98	95.00	95.20	95.15	94.78	94.60	95.30	95.55	94.65	94.40
9	410	3.07	3095	3000	100.00	98.59	98.17	97.86	97.73	97.88	98.34	97.49	97.66	97.34	97.49	97.64
10	418	3.06	3104	3000	98.71	96.10	97.27	95.17	95.89	96.32	95.53	95.67	96.44	96.80	95.58	95.72
11	416	3.07	3031	3000	97.59	95.38	94.42	94.35	93.27	93.92	94.01	93.89	93.39	93.05	94.18	93.87
12	410	3.04	3067	3000	99.58	96.83	97.27	97.83	96.07	96.66	97.12	97.49	97.17	97.46	97.68	97.07
13	408	3.05	3103	3000	98.48	96.34	95.44	94.48	94.21	93.94	94.04	94.63	94.77	95.29	95.61	94.75
14	409	3.07	3085	3000	97.28	96.97	96.23	96.23	96.48	96.33	96.18	96.33	96.43	96.99	97.26	96.38
15	403	3.07	3114	3000	98.26	96.08	96.10	95.71	94.69	95.14	94.14	94.34	94.56	94.76	94.56	94.54
16	410	3.06	3058	3000	99.80	98.36	97.05	97.78	96.92	97.78	97.41	98.07	97.39	97.90	98.12	97.32
17	413	3.05	3105	3000	99.93	98.76	97.84	98.47	97.12	97.21	96.85	97.50	96.85	97.17	97.48	96.92
18	405	3.06	3132	3000	98.00	96.23	95.63	94.84	94.52	94.67	94.05	94.65	95.21	95.24	95.66	94.77
19	410	3.10	3062	3000	98.88	97.75	97.22	97.44	96.70	97.34	97.39	97.58	97.00	97.56	97.83	96.92
20	419	3.08	3078	3000	97.81	96.90	96.52	96.06	95.87	96.33	95.49	96.23	96.18	95.92	96.49	95.52
21	432	3.07	2994	3000	97.94	96.34	95.60	94.05	94.35	93.80	93.75	93.45	93.98	94.21	94.03	93.87
22	426	3.07	3044	3000	99.22	97.18	96.92	97.25	96.19	96.36	96.19	96.83	96.19	96.24	96.55	95.56
23	424	3.08	3012	3000	98.09	95.76	95.45	95.17	94.72	94.95	94.91	95.14	94.81	94.84	94.53	93.99
24	419	3.08	3002	3000	97.85	95.94	95.13	94.70	94.56	94.58	95.09	95.49	94.85	95.16	95.59	94.78
25	412	3.08	3043	3000	98.28	95.00	95.44	95.29	94.37	94.03	93.66	94.20	94.61	94.71	95.02	94.20
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	414	3.07			98.63	96.56	96.54	95.84	95.67	95.73	95.62	95.66	95.87	95.96	95.93	95.49
Median	412	3.07			98.56	96.34	96.52	95.71	95.87	95.90	95.49	95.67	96.18	95.97	95.66	95.52
σ	8	0.01			0.78	1.02	1.03	1.34	1.18	1.22	1.39	1.38	1.13	1.16	1.25	1.19
Min.	398	3.04			97.28	94.98	94.42	93.62	93.27	93.80	93.66	93.45	93.39	93.05	94.03	93.87
Max.	432	3.10			100.00	98.76	98.17	98.47	97.73	97.88	98.34	98.07	97.66	97.90	98.12	97.64

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4315	0.4108	3153	3000	0.0008	0.0009	0.0010	0.0008	0.0009	0.0010	0.0009	0.0011	0.0009	0.0009	0.0010	0.0010
2	0.4337	0.4131	3133	3000	0.0009	0.0011	0.0013	0.0011	0.0012	0.0013	0.0012	0.0013	0.0014	0.0012	0.0012	0.0013
3	0.4342	0.4109	3107	3000	0.0006	0.0007	0.0009	0.0006	0.0006	0.0007	0.0009	0.0010	0.0008	0.0009	0.0010	0.0009
4	0.4363	0.4122	3081	3000	0.0010	0.0008	0.0012	0.0008	0.0010	0.0010	0.0011	0.0012	0.0012	0.0011	0.0012	0.0011
5	0.4328	0.4096	3121	3000	0.0007	0.0007	0.0009	0.0008	0.0008	0.0009	0.0010	0.0010	0.0008	0.0008	0.0007	0.0007
6	0.4340	0.4062	3073	3000	0.0010	0.0007	0.0009	0.0008	0.0010	0.0009	0.0011	0.0010	0.0010	0.0010	0.0010	0.0010
7	0.4319	0.4048	3099	3000	0.0009	0.0003	0.0006	0.0006	0.0007	0.0007	0.0009	0.0010	0.0008	0.0008	0.0010	0.0009
8	0.4336	0.4040	3062	3000	0.0007	0.0006	0.0006	0.0004	0.0005	0.0006	0.0007	0.0008	0.0005	0.0007	0.0005	0.0005
9	0.4319	0.4043	3095	3000	0.0010	0.0011	0.0012	0.0008	0.0010	0.0011	0.0012	0.0012	0.0011	0.0012	0.0011	0.0012
10	0.4306	0.4026	3104	3000	0.0007	0.0004	0.0008	0.0006	0.0007	0.0007	0.0008	0.0009	0.0007	0.0009	0.0008	0.0007
11	0.4407	0.4152	3031	3000	0.0003	0.0005	0.0006	0.0003	0.0006	0.0004	0.0004	0.0005	0.0004	0.0007	0.0006	0.0007
12	0.4395	0.4173	3067	3000	0.0007	0.0005	0.0005	0.0007	0.0006	0.0006	0.0008	0.0008	0.0009	0.0008	0.0009	0.0009
13	0.4348	0.4117	3103	3000	0.0006	0.0002	0.0004	0.0003	0.0004	0.0006	0.0004	0.0005	0.0006	0.0007	0.0006	0.0006
14	0.4368	0.4138	3085	3000	0.0002	0.0004	0.0005	0.0004	0.0005	0.0005	0.0004	0.0006	0.0007	0.0006	0.0006	0.0007
15	0.4350	0.4136	3114	3000	0.0003	0.0004	0.0003	0.0004	0.0003	0.0003	0.0003	0.0005	0.0005	0.0005	0.0006	0.0004
16	0.4410	0.4193	3058	3000	0.0007	0.0006	0.0005	0.0007	0.0010	0.0010	0.0010	0.0009	0.0010	0.0010	0.0011	0.0009
17	0.4364	0.4155	3105	3000	0.0007	0.0007	0.0005	0.0007	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0010	0.0008
18	0.4331	0.4116	3132	3000	0.0002	0.0001	0.0004	0.0003	0.0004	0.0004	0.0004	0.0003	0.0005	0.0005	0.0006	0.0005
19	0.4375	0.4124	3062	3000	0.0006	0.0007	0.0004	0.0009	0.0011	0.0013	0.0012	0.0012	0.0012	0.0012	0.0013	0.0011
20	0.4383	0.4161	3078	3000	0.0004	0.0003	0.0004	0.0004	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006	0.0006	0.0005
21	0.4422	0.4136	2994	3000	0.0001	0.0002	0.0004	0.0002	0.0004	0.0003	0.0003	0.0005	0.0004	0.0006	0.0006	0.0008
22	0.4370	0.4090	3044	3000	0.0007	0.0008	0.0008	0.0008	0.0008	0.0006	0.0009	0.0009	0.0011	0.0009	0.0009	0.0009
23	0.4390	0.4093	3012	3000	0.0006	0.0006	0.0002	0.0001	0.0003	0.0004	0.0004	0.0005	0.0006	0.0005	0.0006	0.0006
24	0.4407	0.4116	3002	3000	0.0004	0.0004	0.0004	0.0005	0.0007	0.0006	0.0007	0.0007	0.0007	0.0006	0.0007	0.0007
25	0.4370	0.4089	3043	3000	0.0007	0.0007	0.0004	0.0002	0.0007	0.0006	0.0004	0.0007	0.0008	0.0006	0.0007	0.0008
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
Median					0.0007	0.0006	0.0005	0.0006	0.0007	0.0006	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008
σ					0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002
Min.					0.0001	0.0001	0.0002	0.0001	0.0003	0.0003	0.0003	0.0003	0.0004	0.0005	0.0005	0.0004
Max.					0.0010	0.0011	0.0013	0.0011	0.0012	0.0013	0.0012	0.0013	0.0014	0.0012	0.0013	0.0013

DATA SET 15: 105°C; 1050 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	429	3.09	3153	3000	95.57	95.67	95.09	94.81	94.60	95.48	95.48	95.25	95.46	94.85	95.55	96.16
2	419	3.06	3133	3000	96.54	97.64	97.06	96.56	96.61	97.09	97.23	97.33	97.25	97.57	97.92	97.23
3	416	3.07	3107	3000	95.23	95.02	94.61	94.42	93.98	94.20	94.32	94.18	94.08	93.86	93.96	94.13
4	412	3.09	3081	3000	96.53	97.40	97.02	96.65	96.53	97.11	97.26	97.55	97.26	97.62	98.01	97.19
5	407	3.09	3121	3000	94.74	93.85	93.98	94.12	93.46	93.71	94.12	93.56	93.80	93.36	93.80	93.71
6	406	3.06	3073	3000	96.06	97.00	96.68	96.41	95.99	96.55	96.90	97.17	96.87	97.12	97.78	96.95
7	411	3.06	3099	3000	95.74	96.84	96.57	95.91	95.96	96.64	96.64	97.06	96.86	97.15	97.69	96.84
8	398	3.07	3062	3000	94.60	94.05	93.67	94.30	93.37	93.39	93.90	93.67	93.97	93.49	93.80	94.35
9	410	3.07	3095	3000	97.49	98.51	98.08	97.47	98.29	98.03	98.59	98.81	98.71	98.98	99.42	98.64
10	418	3.06	3104	3000	96.06	96.01	95.63	96.20	95.79	96.15	95.84	95.86	96.01	95.89	96.13	96.22
11	416	3.07	3031	3000	93.60	93.72	93.29	93.31	93.58	93.65	93.84	93.96	94.73	94.13	94.42	94.40
12	410	3.04	3067	3000	96.78	97.66	96.83	95.70	96.66	96.70	96.48	96.48	96.56	96.56	96.92	96.75
13	408	3.05	3103	3000	94.16	94.55	93.67	94.06	94.16	94.36	94.23	93.82	94.11	94.09	93.96	93.94
14	409	3.07	3085	3000	96.67	97.28	96.36	95.79	96.55	96.48	96.58	96.80	96.45	96.80	96.58	96.80
15	403	3.07	3114	3000	94.54	94.91	94.51	94.34	94.17	94.24	94.12	94.02	93.92	94.27	94.17	94.39
16	410	3.06	3058	3000	97.73	98.00	97.51	96.97	97.78	97.56	97.29	97.49	97.46	97.61	97.51	97.88
17	413	3.05	3105	3000	97.21	97.41	96.70	96.15	96.92	97.14	97.67	97.84	97.58	97.70	97.60	98.09
18	405	3.06	3132	3000	94.94	94.77	94.42	94.89	95.02	95.19	94.74	94.65	94.77	94.40	94.94	94.97
19	410	3.10	3062	3000	97.24	97.48	96.68	96.80	97.41	97.51	97.92	97.95	97.95	98.17	97.95	98.05
20	419	3.08	3078	3000	95.52	96.28	95.47	95.52	95.13	95.71	95.64	95.42	95.47	95.30	95.71	95.47
21	432	3.07	2994	3000	93.56	93.80	93.26	92.82	92.66	93.26	92.64	93.06	93.29	92.80	93.26	92.99
22	426	3.07	3044	3000	95.82	96.26	96.36	95.44	96.69	96.73	97.13	96.76	96.66	96.59	97.16	96.73
23	424	3.08	3012	3000	94.53	94.22	93.87	93.23	93.85	94.03	93.66	93.87	93.61	92.97	92.36	92.76
24	419	3.08	3002	3000	94.51	95.04	94.42	94.56	94.56	94.78	95.28	94.49	94.80	94.68	95.04	94.68
25	412	3.08	3043	3000	94.59	94.63	94.05	93.64	94.42	94.10	94.51	94.54	94.80	94.22	94.46	93.86
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	414	3.07			95.60	95.92	95.43	95.20	95.37	95.59	95.68	95.66	95.70	95.61	95.84	95.73
Median	412	3.07			95.57	96.01	95.47	95.44	95.13	95.71	95.64	95.42	95.47	95.30	95.71	96.16
σ	8	0.01			1.21	1.52	1.47	1.30	1.54	1.51	1.61	1.71	1.57	1.84	1.89	1.73
Min.	398	3.04			93.56	93.72	93.26	92.82	92.66	93.26	92.64	93.06	93.29	92.80	92.36	92.76
Max.	432	3.10			97.73	98.51	98.08	97.47	98.29	98.03	98.59	98.81	98.71	98.98	99.42	98.64

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4315	0.4108	3153	3000	0.0008	0.0010	0.0009	0.0009	0.0008	0.0010	0.0010	0.0011	0.0012	0.0010	0.0011	0.0011
2	0.4337	0.4131	3133	3000	0.0012	0.0012	0.0012	0.0012	0.0011	0.0013	0.0012	0.0015	0.0015	0.0014	0.0015	0.0014
3	0.4342	0.4109	3107	3000	0.0008	0.0009	0.0010	0.0009	0.0009	0.0012	0.0011	0.0013	0.0013	0.0013	0.0014	0.0014
4	0.4363	0.4122	3081	3000	0.0011	0.0012	0.0012	0.0012	0.0011	0.0014	0.0013	0.0016	0.0016	0.0016	0.0016	0.0016
5	0.4328	0.4096	3121	3000	0.0007	0.0006	0.0009	0.0009	0.0009	0.0011	0.0011	0.0011	0.0014	0.0013	0.0014	0.0014
6	0.4340	0.4062	3073	3000	0.0012	0.0011	0.0012	0.0011	0.0011	0.0012	0.0013	0.0015	0.0016	0.0015	0.0016	0.0016
7	0.4319	0.4048	3099	3000	0.0009	0.0010	0.0009	0.0009	0.0009	0.0011	0.0011	0.0013	0.0014	0.0012	0.0014	0.0013
8	0.4336	0.4040	3062	3000	0.0006	0.0005	0.0007	0.0007	0.0008	0.0009	0.0008	0.0010	0.0012	0.0011	0.0012	0.0012
9	0.4319	0.4043	3095	3000	0.0012	0.0012	0.0011	0.0011	0.0012	0.0013	0.0013	0.0015	0.0016	0.0015	0.0015	0.0014
10	0.4306	0.4026	3104	3000	0.0008	0.0008	0.0009	0.0009	0.0010	0.0010	0.0011	0.0013	0.0013	0.0012	0.0014	0.0013
11	0.4407	0.4152	3031	3000	0.0006	0.0006	0.0007	0.0007	0.0008	0.0007	0.0007	0.0007	0.0009	0.0008	0.0009	0.0009
12	0.4395	0.4173	3067	3000	0.0009	0.0009	0.0009	0.0007	0.0007	0.0007	0.0008	0.0010	0.0011	0.0011	0.0011	0.0011
13	0.4348	0.4117	3103	3000	0.0006	0.0005	0.0008	0.0007	0.0006	0.0008	0.0008	0.0009	0.0011	0.0009	0.0011	0.0010
14	0.4368	0.4138	3085	3000	0.0006	0.0007	0.0007	0.0008	0.0008	0.0005	0.0008	0.0010	0.0010	0.0011	0.0011	0.0010
15	0.4350	0.4136	3114	3000	0.0006	0.0006	0.0005	0.0006	0.0006	0.0006	0.0007	0.0007	0.0009	0.0009	0.0010	0.0011
16	0.4410	0.4193	3058	3000	0.0010	0.0009	0.0012	0.0011	0.0011	0.0012	0.0011	0.0013	0.0014	0.0013	0.0015	0.0015
17	0.4364	0.4155	3105	3000	0.0010	0.0008	0.0010	0.0009	0.0009	0.0009	0.0010	0.0012	0.0012	0.0013	0.0013	0.0013
18	0.4331	0.4116	3132	3000	0.0005	0.0005	0.0006	0.0007	0.0007	0.0006	0.0007	0.0009	0.0009	0.0010	0.0009	0.0010
19	0.4375	0.4124	3062	3000	0.0012	0.0011	0.0012	0.0013	0.0014	0.0014	0.0013	0.0015	0.0015	0.0015	0.0016	0.0015
20	0.4383	0.4161	3078	3000	0.0006	0.0007	0.0007	0.0007	0.0005	0.0008	0.0007	0.0008	0.0009	0.0009	0.0009	0.0010
21	0.4422	0.4136	2994	3000	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0007	0.0010	0.0011	0.0011	0.0011	0.0012
22	0.4370	0.4090	3044	3000	0.0009	0.0011	0.0010	0.0010	0.0011	0.0012	0.0012	0.0015	0.0014	0.0014	0.0014	0.0015
23	0.4390	0.4093	3012	3000	0.0005	0.0005	0.0007	0.0012	0.0010	0.0012	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012
24	0.4407	0.4116	3002	3000	0.0007	0.0008	0.0008	0.0010	0.0010	0.0010	0.0010	0.0008	0.0013	0.0008	0.0014	0.0014
25	0.4370	0.4089	3043	3000	0.0008	0.0007	0.0009	0.0010	0.0011	0.0010	0.0012	0.0014	0.0015	0.0014	0.0015	0.0016
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0010	0.0012	0.0013	0.0012	0.0013	0.0013
Median					0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0011	0.0012	0.0013	0.0012	0.0014	0.0013
σ					0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
Min.					0.0005	0.0005	0.0005	0.0006	0.0005	0.0005	0.0007	0.0007	0.0009	0.0008	0.0009	0.0009
Max.					0.0012	0.0012	0.0012	0.0013	0.0014	0.0014	0.0013	0.0016	0.0016	0.0016	0.0016	0.0016

DATA SET 11: 85°C; 1500 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_F]	1500 mA
Testing Initiation Date	November 2, 2015
Case Temperature [T_s]	85°C
Ambient Temperature [T_A]	85°C
Failures observed	None

Test Results Summary

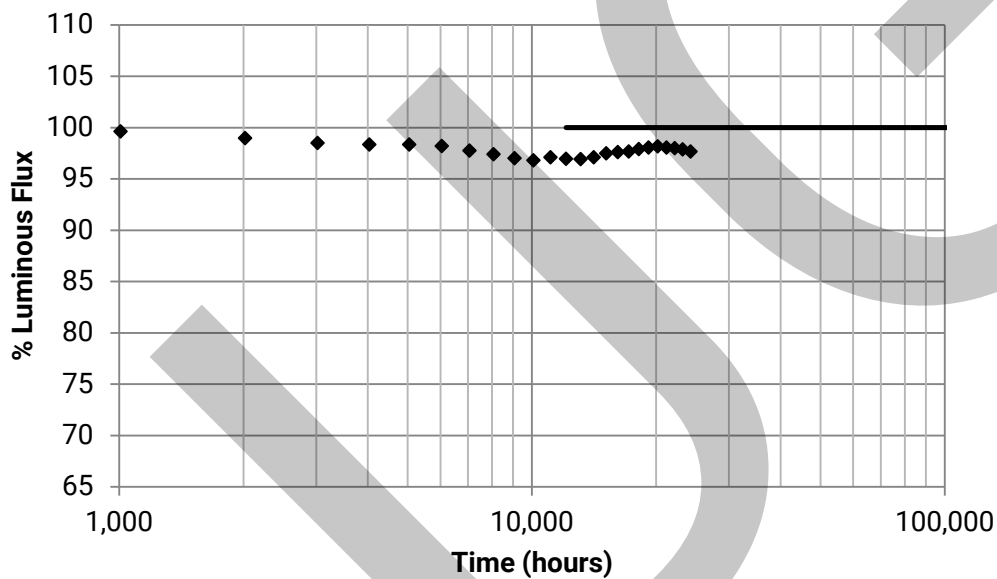
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	20160	98.18%	0.0012	-0.4	-5.3%
1008	99.63%	0.0007	-0.1	N/R	21168	98.06%	0.0013	-0.4	-4.9%
2016	98.99%	0.0008	-0.2	N/R	22176	98.00%	0.0012	-0.4	-5.3%
3024	98.50%	0.0007	-0.1	N/R	23184	97.87%	0.0012	-0.4	-5.0%
4032	98.36%	0.0007	-0.2	N/R	24192	97.67%	0.0012	-0.4	-5.3%
5040	98.36%	0.0007	-0.2	N/R					
6048	98.20%	0.0008	-0.2	N/R					
7056	97.77%	0.0008	-0.1	N/R					
8064	97.42%	0.0009	-0.2	N/R					
9072	97.02%	0.0009	-0.2	N/R					
10080	96.80%	0.0009	-0.2	N/R					
11088	97.12%	0.0009	-0.2	-3.2%					
12096	96.95%	0.0009	-0.2	-3.0%					
13104	96.94%	0.0009	-0.2	-3.5%					
14112	97.12%	0.0009	-0.2	-3.9%					
15120	97.50%	0.0010	-0.3	-3.8%					
16128	97.62%	0.0011	-0.3	-3.9%					
17136	97.67%	0.0011	-0.3	-4.2%					
18144	97.90%	0.0012	-0.4	-4.5%					
19152	98.06%	0.0012	-0.4	-4.9%					

Note: "N/R" indicates data points that are not reported

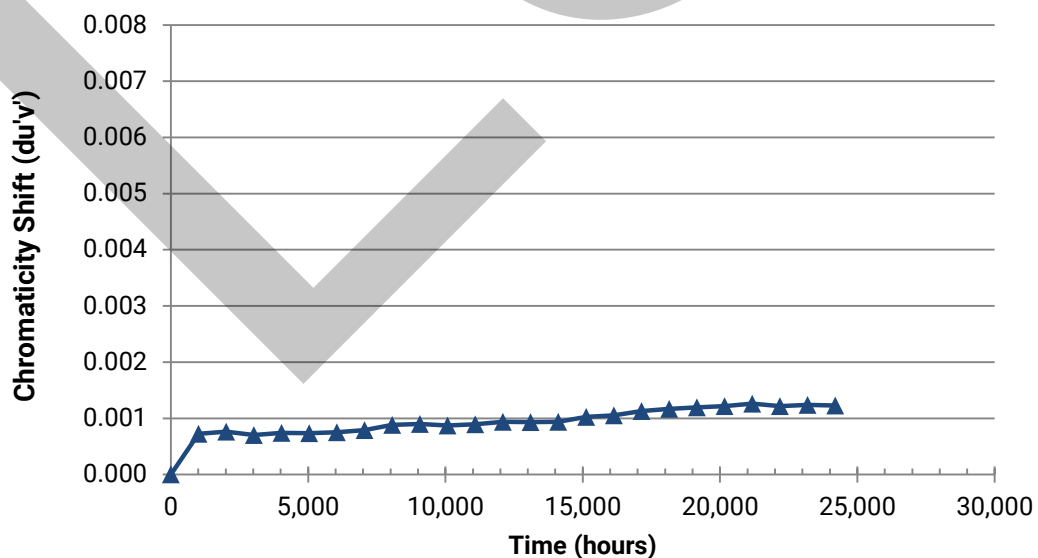
DATA SET 11: 85°C; 1500 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	24,192 hours
Test duration used for projection	t=12,096 to t=24,192
α	-8.766E-07
β	9.612E-01
Reported Lifetimes	L90(24k) > 145,000 hours
	L80(24k) > 145,000 hours
	L70(24k) > 145,000 hours



Color Shift Graph



DATA SET 11: 85°C; 1500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	1008	2016	3024	4032	5040	6048	7056	8064	9072	10080	11088	12096
1	559	3.11	3163	3000	100.07	99.79	98.64	98.64	98.98	98.23	97.85	97.15	97.39	96.54	96.96	96.37
2	559	3.15	3100	3000	99.64	98.82	98.75	98.44	98.66	98.62	97.78	97.62	97.41	97.55	98.00	98.09
3	533	3.10	3132	3000	99.59	98.57	97.75	97.78	97.71	97.95	97.54	96.24	97.11	95.96	95.94	95.76
4	532	3.18	3091	3000	99.44	98.23	98.36	97.88	98.14	97.46	96.69	97.03	96.80	96.86	97.01	97.05
5	559	3.14	3178	3000	99.16	98.39	97.78	97.77	97.82	97.57	96.71	96.57	96.75	96.39	96.84	96.94
6	541	3.15	3139	3000	100.00	99.19	98.65	98.36	98.74	98.37	97.56	97.43	97.60	97.41	97.75	97.36
7	554	3.12	3186	3000	99.26	98.56	98.32	97.62	97.89	97.35	96.66	96.95	96.84	96.77	97.27	97.11
8	550	3.22	3105	3000	99.62	99.33	98.58	98.80	98.76	98.53	98.20	97.56	97.89	97.60	98.02	97.71
9	523	3.12	3102	3000	99.89	99.75	98.53	98.66	98.43	98.49	98.49	97.90	97.17	97.40	97.05	96.92
10	525	3.13	3128	3000	99.52	99.28	98.78	98.72	98.02	98.00	97.62	97.20	96.51	96.40	96.93	96.70
11	527	3.14	3147	3000	100.19	99.41	98.80	98.80	98.86	98.88	98.31	98.27	97.78	97.42	97.42	97.61
12	561	3.26	3083	3000	99.06	98.04	97.92	97.97	97.33	97.67	97.58	96.99	96.15	95.99	96.22	96.83
13	549	3.27	3111	3000	99.40	98.69	98.41	97.99	98.76	98.09	97.54	97.74	97.28	96.81	97.76	97.17
14	558	3.24	3140	3000	100.00	99.10	98.51	98.10	98.23	98.23	97.56	97.38	97.13	96.72	97.60	97.29
15	551	3.20	3044	3000	99.33	99.18	99.29	98.67	98.58	99.02	98.47	97.77	98.17	97.77	97.57	97.15
16	551	3.16	3124	3000	99.27	98.80	98.22	97.99	98.75	98.40	98.19	97.44	96.57	96.30	96.79	96.21
17	534	3.19	3084	3000	100.17	99.53	99.59	99.31	99.12	99.25	98.73	98.82	98.14	98.16	98.50	98.33
18	544	3.16	3168	3000	99.34	99.32	98.92	98.58	98.58	98.99	98.24	98.24	97.61	97.41	98.02	97.85
19	546	3.31	3059	3000	99.98	99.27	98.55	98.66	98.44	98.17	97.82	97.40	96.37	97.01	96.85	95.99
20	548	3.26	3089	3000	99.82	98.96	98.16	97.81	98.72	98.07	97.77	97.66	96.66	95.91	96.99	96.41
21	529	3.13	3113	3000	99.62	99.39	98.92	99.21	98.75	98.34	98.34	97.90	96.75	96.58	96.43	96.28
22	544	3.15	3080	3000	99.61	98.71	98.77	99.08	98.42	98.51	98.47	97.94	97.07	97.02	97.68	97.64
23	529	3.26	3086	3000	99.70	99.11	98.47	98.28	97.83	97.90	97.64	96.71	96.14	95.63	95.92	95.86
24	556	3.18	3111	3000	99.30	98.06	97.30	97.75	97.52	97.34	97.28	96.69	95.84	95.81	96.06	96.44
25	525	3.09	3058	3000	99.71	99.31	98.49	98.23	98.06	97.56	97.27	96.93	96.38	96.59	96.47	96.61
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	543	3.18			99.63	98.99	98.50	98.36	98.36	98.20	97.77	97.42	97.02	96.80	97.12	96.95
Median	546	3.16			99.62	99.11	98.53	98.36	98.44	98.23	97.77	97.43	97.07	96.77	97.01	96.94
σ	13	0.06			0.32	0.49	0.48	0.49	0.48	0.53	0.57	0.60	0.63	0.67	0.71	0.69
Min.	523	3.09			99.06	98.04	97.30	97.62	97.33	97.34	96.66	96.24	95.84	95.63	95.92	95.76
Max.	561	3.31			100.19	99.79	99.59	99.31	99.12	99.25	98.73	98.82	98.17	98.16	98.50	98.33

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	1008	2016	3024	4032	5040	6048	7056	8064	9072	10080	11088	12096
1	0.4299	0.4084	3163	3000	0.0007	0.0007	0.0006	0.0008	0.0008	0.0008	0.0007	0.0008	0.0008	0.0009	0.0008	0.0006
2	0.4308	0.4026	3100	3000	0.0007	0.0008	0.0006	0.0009	0.0007	0.0007	0.0007	0.0008	0.0006	0.0006	0.0009	0.0009
3	0.4278	0.3998	3132	3000	0.0006	0.0005	0.0003	0.0004	0.0004	0.0003	0.0004	0.0005	0.0003	0.0003	0.0006	0.0006
4	0.4291	0.3977	3091	3000	0.0008	0.0007	0.0006	0.0007	0.0005	0.0006	0.0006	0.0006	0.0005	0.0007	0.0008	0.0008
5	0.4294	0.4092	3178	3000	0.0007	0.0008	0.0007	0.0009	0.0008	0.0008	0.0008	0.0008	0.0009	0.0011	0.0007	0.0007
6	0.4303	0.4063	3139	3000	0.0007	0.0007	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0006	0.0006
7	0.4240	0.3978	3186	3000	0.0009	0.0008	0.0007	0.0007	0.0008	0.0007	0.0008	0.0008	0.0007	0.0008	0.0010	0.0009
8	0.4291	0.3994	3105	3000	0.0008	0.0008	0.0006	0.0008	0.0006	0.0007	0.0007	0.0008	0.0006	0.0008	0.0008	0.0008
9	0.4356	0.4133	3102	3000	0.0005	0.0008	0.0007	0.0008	0.0007	0.0008	0.0007	0.0010	0.0009	0.0010	0.0008	0.0008
10	0.4326	0.4100	3128	3000	0.0009	0.0009	0.0007	0.0007	0.0007	0.0008	0.0008	0.0010	0.0012	0.0010	0.0009	0.0010
11	0.4305	0.4077	3147	3000	0.0009	0.0007	0.0008	0.0007	0.0007	0.0008	0.0008	0.0007	0.0011	0.0010	0.0007	0.0009
12	0.4363	0.4124	3083	3000	0.0007	0.0009	0.0008	0.0008	0.0008	0.0010	0.0010	0.0013	0.0010	0.0011	0.0011	0.0011
13	0.4333	0.4094	3111	3000	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009	0.0011	0.0010	0.0013	0.0012	0.0012	0.0012
14	0.4303	0.4064	3140	3000	0.0009	0.0008	0.0008	0.0008	0.0008	0.0010	0.0011	0.0011	0.0012	0.0011	0.0012	0.0011
15	0.4409	0.4173	3044	3000	0.0008	0.0012	0.0012	0.0011	0.0013	0.0012	0.0014	0.0014	0.0016	0.0015	0.0015	0.0014
16	0.4333	0.4111	3124	3000	0.0007	0.0008	0.0008	0.0008	0.0009	0.0008	0.0009	0.0010	0.0011	0.0010	0.0009	0.0010
17	0.4368	0.4137	3084	3000	0.0007	0.0010	0.0009	0.0009	0.0009	0.0008	0.0010	0.0011	0.0011	0.0008	0.0010	0.0011
18	0.4311	0.4118	3168	3000	0.0005	0.0007	0.0007	0.0007	0.0008	0.0007	0.0008	0.0010	0.0011	0.0010	0.0010	0.0011
19	0.4380	0.4130	3059	3000	0.0009	0.0009	0.0009	0.0009	0.0009	0.0010	0.0010	0.0009	0.0011	0.0007	0.0010	0.0012
20	0.4344	0.4090	3089	3000	0.0011	0.0010	0.0009	0.0009	0.0010	0.0009	0.0008	0.0010	0.0012	0.0011	0.0011	0.0012
21	0.4336	0.4103	3113	3000	0.0006	0.0007	0.0006	0.0005	0.0007	0.0006	0.0007	0.0008	0.0007	0.0009	0.0007	0.0008
22	0.4388	0.4175	3080	3000	0.0005	0.0006	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0008	0.0009	0.0008	0.0009
23	0.4348	0.4095	3086	3000	0.0008	0.0005	0.0008	0.0007	0.0006	0.0008	0.0008	0.0010	0.0012	0.0005	0.0009	0.0012
24	0.4327	0.4081	3111	3000	0.0005	0.0004	0.0003	0.0005	0.0007	0.0005	0.0005	0.0008	0.0004	0.0006	0.0008	0.0006
25	0.4396	0.4164	3058	3000	0.0006	0.0007	0.0007	0.0006	0.0006	0.0008	0.0008	0.0010	0.0008	0.0008	0.0008	0.0009
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0007	0.0008	0.0007	0.0007	0.0007	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009
Median					0.0007	0.0008	0.0007	0.0008	0.0007	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009
σ					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0002
Min.					0.0005	0.0004	0.0003	0.0004	0.0004	0.0003	0.0004	0.0005	0.0003	0.0003	0.0006	0.0006
Max.					0.0011	0.0012	0.0012	0.0011	0.0013	0.0012	0.0014	0.0014	0.0016	0.0015	0.0015	0.0014

DATA SET 11: 85°C; 1500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	13104	14112	15120	16128	17136	18144	19152	20160	21168	22176	23184	24192
1	559	3.11	3163	3000	97.19	96.92	97.14	97.62	97.89	97.55	97.85	98.26	98.34	98.50	98.44	97.99
2	559	3.15	3100	3000	98.14	97.57	98.35	99.25	98.55	98.84	99.16	99.39	99.53	99.53	99.12	98.87
3	533	3.10	3132	3000	95.57	95.44	95.59	95.40	96.19	96.36	96.53	96.69	96.98	96.73	96.68	96.49
4	532	3.18	3091	3000	97.37	97.07	98.20	98.68	97.89	98.23	98.82	98.95	99.10	98.83	98.91	98.70
5	559	3.14	3178	3000	96.87	96.98	97.87	98.57	97.85	97.93	98.71	98.69	98.73	98.77	98.55	98.36
6	541	3.15	3139	3000	97.40	97.67	97.19	97.32	97.65	98.32	98.41	98.61	98.54	98.76	98.73	98.67
7	554	3.12	3186	3000	97.36	96.66	96.37	97.36	96.62	96.59	96.51	96.61	96.32	96.10	95.83	95.63
8	550	3.22	3105	3000	97.80	98.45	98.25	98.69	98.42	98.49	98.82	99.20	98.93	99.00	98.74	98.36
9	523	3.12	3102	3000	96.54	97.91	98.07	97.76	98.24	98.20	98.58	98.37	97.86	97.68	97.67	97.57
10	525	3.13	3128	3000	96.57	96.95	96.42	95.94	96.30	96.51	96.05	96.09	96.17	96.19	96.45	96.28
11	527	3.14	3147	3000	97.38	97.53	97.83	97.21	98.48	98.99	98.88	98.63	98.77	98.61	98.25	98.27
12	561	3.26	3083	3000	96.65	97.10	96.49	96.69	97.33	97.34	97.43	97.26	96.95	96.65	96.44	96.31
13	549	3.27	3111	3000	97.56	97.87	97.90	98.20	98.94	98.54	98.67	99.22	99.14	98.92	99.02	98.91
14	558	3.24	3140	3000	96.95	97.40	98.32	98.85	98.28	98.93	99.16	99.00	98.76	98.85	98.60	98.39
15	551	3.20	3044	3000	96.80	96.26	97.39	97.46	96.10	97.80	97.86	97.55	97.51	97.20	97.39	97.11
16	551	3.16	3124	3000	96.39	96.04	97.42	97.57	97.70	97.59	97.77	98.04	97.77	97.84	97.46	97.30
17	534	3.19	3084	3000	98.29	98.22	98.59	98.89	98.54	98.20	98.54	99.08	98.73	98.88	98.73	98.35
18	544	3.16	3168	3000	97.74	98.16	99.03	99.38	98.47	99.50	99.52	99.78	99.36	98.97	98.77	98.57
19	546	3.31	3059	3000	96.43	96.67	97.42	96.78	97.53	97.67	97.82	98.13	98.17	98.17	98.11	97.64
20	548	3.26	3089	3000	96.55	96.62	97.41	97.08	97.52	98.18	98.36	98.12	98.08	97.96	98.08	98.12
21	529	3.13	3113	3000	96.33	96.97	97.03	96.41	97.09	97.16	96.82	97.35	96.97	97.07	97.11	97.11
22	544	3.15	3080	3000	97.37	98.01	98.62	98.29	98.60	99.06	99.19	99.41	98.86	98.53	98.10	97.90
23	529	3.26	3086	3000	95.86	96.09	95.43	96.09	97.05	96.43	96.26	96.37	96.58	96.75	96.62	96.56
24	556	3.18	3111	3000	96.20	96.83	97.64	97.10	97.35	97.44	97.95	98.07	97.62	97.55	97.41	97.12
25	525	3.09	3058	3000	96.11	96.68	97.50	97.86	97.16	97.69	97.71	97.62	97.73	97.86	97.56	97.14
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	543	3.18			96.94	97.12	97.50	97.62	97.67	97.90	98.06	98.18	98.06	98.00	97.87	97.67
Median	546	3.16			96.87	96.98	97.50	97.57	97.70	97.93	98.36	98.26	98.17	98.17	98.10	97.90
σ	13	0.06			0.70	0.75	0.91	1.06	0.81	0.86	0.99	1.02	0.97	0.98	0.94	0.92
Min.	523	3.09			95.57	95.44	95.43	95.40	96.10	96.36	96.05	96.09	96.17	96.10	95.83	95.63
Max.	561	3.31			98.29	98.45	99.03	99.38	98.94	99.50	99.52	99.78	99.53	99.53	99.12	98.91

Lamp #	Initial (0 hrs)				Chromaticity Shift ($\Delta u'v'$)											
	CCx	CCy	Calc. CCT	ANSI Target	13104	14112	15120	16128	17136	18144	19152	20160	21168	22176	23184	24192
1	0.4299	0.4084	3163	3000	0.0008	0.0008	0.0007	0.0008	0.0010	0.0009	0.0010	0.0010	0.0010	0.0012	0.0011	0.0010
2	0.4308	0.4026	3100	3000	0.0010	0.0010	0.0009	0.0010	0.0012	0.0012	0.0011	0.0013	0.0014	0.0015	0.0013	0.0014
3	0.4278	0.3998	3132	3000	0.0007	0.0008	0.0007	0.0006	0.0009	0.0010	0.0008	0.0008	0.0009	0.0010	0.0011	0.0011
4	0.4291	0.3977	3091	3000	0.0008	0.0008	0.0009	0.0009	0.0010	0.0012	0.0012	0.0013	0.0013	0.0013	0.0012	0.0014
5	0.4294	0.4092	3178	3000	0.0008	0.0010	0.0011	0.0011	0.0013	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011
6	0.4303	0.4063	3139	3000	0.0007	0.0007	0.0007	0.0008	0.0011	0.0010	0.0012	0.0011	0.0011	0.0012	0.0012	0.0012
7	0.4240	0.3978	3186	3000	0.0009	0.0010	0.0006	0.0007	0.0007	0.0007	0.0009	0.0009	0.0011	0.0009	0.0009	0.0010
8	0.4291	0.3994	3105	3000	0.0008	0.0009	0.0008	0.0009	0.0010	0.0010	0.0011	0.0011	0.0012	0.0012	0.0012	0.0012
9	0.4356	0.4133	3102	3000	0.0009	0.0009	0.0010	0.0014	0.0013	0.0012	0.0012	0.0013	0.0014	0.0011	0.0011	0.0010
10	0.4326	0.4100	3128	3000	0.0010	0.0011	0.0012	0.0012	0.0012	0.0014	0.0014	0.0015	0.0014	0.0013	0.0013	0.0014
11	0.4305	0.4077	3147	3000	0.0010	0.0009	0.0011	0.0010	0.0012	0.0011	0.0013	0.0013	0.0015	0.0014	0.0015	0.0015
12	0.4363	0.4124	3083	3000	0.0012	0.0011	0.0009	0.0010	0.0012	0.0015	0.0015	0.0015	0.0015	0.0016	0.0016	0.0016
13	0.4333	0.4094	3111	3000	0.0012	0.0011	0.0015	0.0013	0.0013	0.0013	0.0014	0.0013	0.0015	0.0014	0.0015	0.0016
14	0.4303	0.4064	3140	3000	0.0010	0.0010	0.0012	0.0013	0.0012	0.0013	0.0013	0.0014	0.0013	0.0015	0.0016	0.0015
15	0.4409	0.4173	3044	3000	0.0012	0.0012	0.0016	0.0015	0.0013	0.0013	0.0013	0.0015	0.0015	0.0013	0.0016	0.0017
16	0.4333	0.4111	3124	3000	0.0010	0.0008	0.0011	0.0011	0.0013	0.0012	0.0012	0.0013	0.0014	0.0014	0.0015	0.0014
17	0.4368	0.4137	3084	3000	0.0010	0.0011	0.0011	0.0011	0.0012	0.0012	0.0013	0.0014	0.0015	0.0012	0.0013	0.0013
18	0.4311	0.4118	3168	3000	0.0010	0.0009	0.0012	0.0012	0.0013	0.0012	0.0014	0.0013	0.0014	0.0013	0.0012	0.0012
19	0.4380	0.4130	3059	3000	0.0010	0.0011	0.0012	0.0012	0.0011	0.0012	0.0011	0.0013	0.0014	0.0011	0.0011	0.0011
20	0.4344	0.4090	3089	3000	0.0010	0.0009	0.0013	0.0011	0.0013	0.0013	0.0012	0.0012	0.0013	0.0012	0.0013	0.0014
21	0.4336	0.4103	3113	3000	0.0007	0.0008	0.0009	0.0009	0.0010	0.0011	0.0011	0.0010	0.0011	0.0009	0.0010	0.0008
22	0.4388	0.4175	3080	3000	0.0008	0.0009	0.0010	0.0011	0.0012	0.0012	0.0013	0.0012	0.0012	0.0013	0.0012	0.0012
23	0.4348	0.4095	3086	3000	0.0010	0.0009	0.0011	0.0011	0.0010	0.0010	0.0011	0.0010	0.0010	0.0010	0.0011	0.0010
24	0.4327	0.4081	3111	3000	0.0007	0.0008	0.0008	0.0010	0.0010	0.0012	0.0010	0.0009	0.0009	0.0008	0.0008	0.0008
25	0.4396	0.4164	3058	3000	0.0010	0.0009	0.0011	0.0012	0.0012	0.0014	0.0014	0.0013	0.0013	0.0013	0.0012	0.0011
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0009	0.0009	0.0010	0.0011	0.0011	0.0012	0.0012	0.0012	0.0013	0.0012	0.0012	0.0012
Median					0.0010	0.0009	0.0011	0.0011	0.0012	0.0012	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012
σ					0.0002	0.0001	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0007	0.0007	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0009	0.0008	0.0008	0.0008
Max.					0.0012	0.0012	0.0016	0.0015	0.0013	0.0015	0.0015	0.0015	0.0015	0.0016	0.0016	0.0017

DATA SET 14: 105°C; 1500 mA

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_F]	1500 mA
Testing Initiation Date	December 09, 2015
Case Temperature [T_s]	105°C
Ambient Temperature [T_A]	105°C
Failures observed	None

Test Results Summary

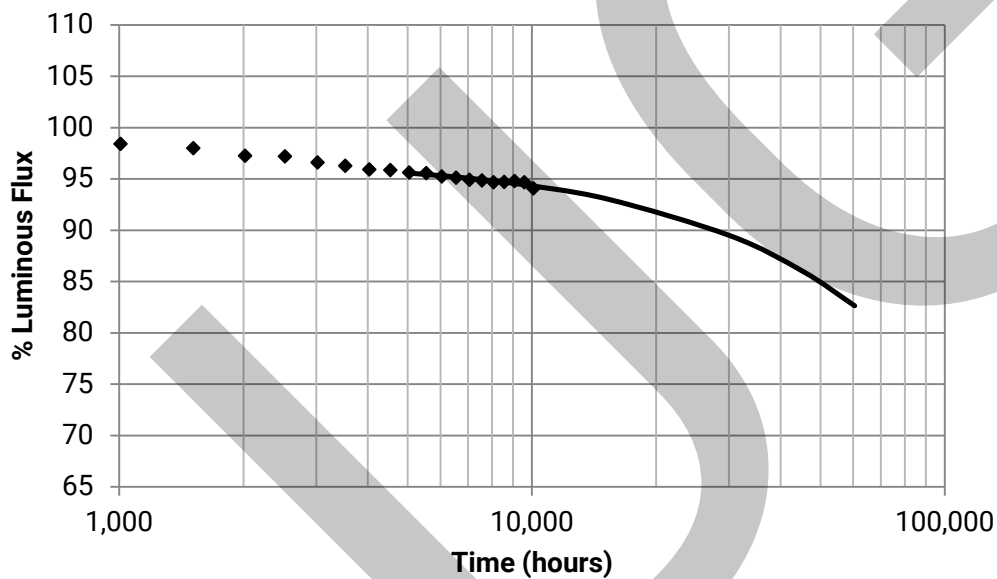
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_F$)
0	100.00%	0.0000	0.0	0.0%	10080	94.07%	0.0010	-0.3	N/R
168	99.73%	0.0005	-0.1	N/R					
1008	98.42%	0.0008	-0.2	N/R					
1512	97.99%	0.0008	-0.2	N/R					
2016	97.25%	0.0007	-0.2	N/R					
2520	97.21%	0.0007	-0.1	N/R					
3024	96.60%	0.0007	-0.2	N/R					
3528	96.29%	0.0007	-0.1	N/R					
4032	95.92%	0.0007	-0.2	N/R					
4536	95.87%	0.0007	-0.2	N/R					
5040	95.62%	0.0007	-0.2	N/R					
5544	95.58%	0.0007	-0.2	N/R					
6048	95.25%	0.0007	-0.2	N/R					
6552	95.12%	0.0007	-0.2	N/R					
7056	94.91%	0.0009	-0.2	N/R					
7560	94.85%	0.0008	-0.2	N/R					
8064	94.69%	0.0009	-0.2	N/R					
8568	94.72%	0.0009	-0.2	N/R					
9072	94.79%	0.0010	-0.3	N/R					
9576	94.67%	0.0009	-0.3	N/R					

Note: "N/R" indicates data points that are not reported

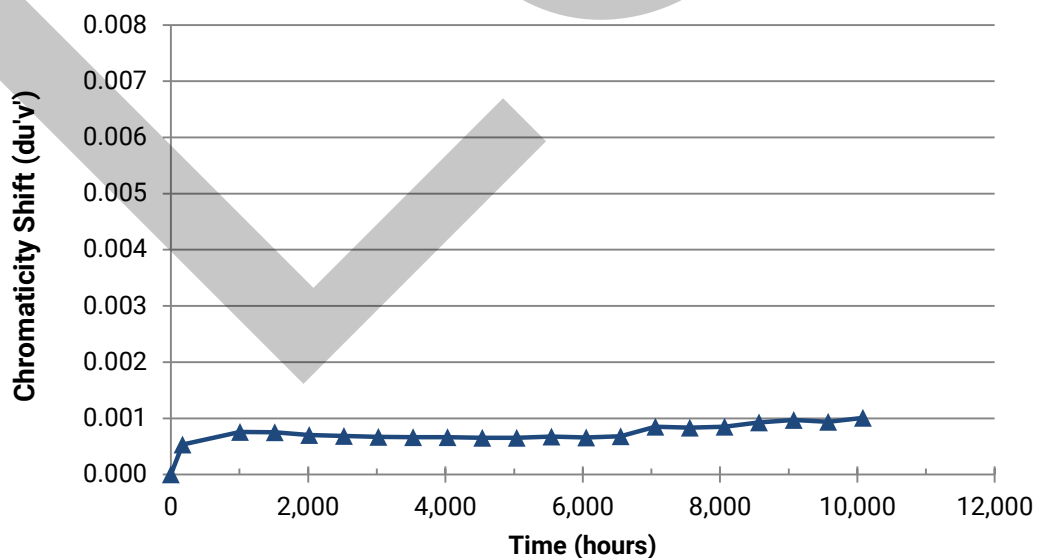
DATA SET 14: 105°C; 1500 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	10,080 hours
Test duration used for projection	t=5,040 to t=10,080
α	2.620E-06
β	9.683E-01
Reported Lifetimes	L90(10k) = 27,900 hours
	L80(10k) > 60,500 hours
	L70(10k) > 60,500 hours



Color Shift Graph



DATA SET 14: 105°C; 1500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	565	3.13	3131	3000	100.30	99.24	98.87	97.82	98.07	98.05	97.66	97.42	97.40	97.19	97.03	96.81
2	536	3.19	3102	3000	100.28	100.26	99.05	98.82	99.05	97.54	97.44	97.89	97.41	97.65	97.39	97.14
3	525	3.16	3089	3000	100.50	99.41	99.56	98.76	99.03	98.63	97.98	97.79	97.43	97.10	97.52	96.15
4	565	3.23	3152	3000	99.70	98.90	98.14	98.03	98.03	97.11	96.44	96.60	96.44	96.62	96.64	95.89
5	566	3.13	3071	3000	99.35	98.20	97.39	97.26	96.60	97.28	96.04	95.97	96.24	95.79	95.59	95.99
6	546	3.10	3170	3000	100.13	98.44	98.99	97.88	98.28	97.29	96.48	96.32	95.66	95.26	95.77	95.55
7	549	3.16	3130	3000	100.82	98.89	98.42	97.92	97.61	97.67	96.92	96.94	97.07	96.74	96.10	96.56
8	554	3.14	3166	3000	99.91	98.14	97.56	96.59	96.35	96.26	96.37	95.54	96.07	95.18	95.99	95.74
9	539	3.25	3106	3000	100.65	98.68	98.18	97.48	98.03	96.68	96.20	96.42	96.44	96.14	96.51	95.29
10	552	3.11	3132	3000	100.49	98.70	98.88	98.35	98.26	96.94	96.25	95.36	95.71	95.73	94.73	95.22
11	559	3.17	3104	3000	100.14	98.43	98.34	97.92	98.46	98.03	97.10	96.87	96.73	96.98	96.58	95.38
12	548	3.23	3023	3000	100.40	98.01	98.12	97.30	97.85	97.59	97.14	97.01	96.97	96.35	95.84	94.53
13	528	3.11	3098	3000	100.70	98.41	99.17	97.33	97.46	96.27	97.08	95.42	96.04	96.12	96.35	95.44
14	535	3.18	3070	3000	100.13	99.35	99.14	97.85	98.17	97.53	96.84	95.77	96.50	95.87	96.76	96.09
15	558	3.17	3105	3000	99.37	98.51	97.17	96.34	97.12	96.52	95.31	95.36	94.84	95.09	94.98	94.48
16	539	3.10	3153	3000	98.18	96.61	96.07	95.33	95.72	94.99	95.31	94.75	94.45	94.53	94.53	93.82
17	538	3.11	3089	3000	100.22	99.87	98.27	98.64	97.47	97.19	96.99	96.54	95.42	94.77	94.68	95.68
18	552	3.20	3057	3000	98.46	97.84	96.74	95.94	94.82	94.60	94.73	94.46	95.11	94.26	94.24	94.15
19	552	3.14	3126	3000	98.23	97.36	97.25	96.33	96.94	95.91	96.00	95.00	95.69	95.60	95.76	95.38
20	563	3.17	3051	3000	99.24	97.30	96.70	95.77	96.01	94.67	95.12	94.50	94.85	94.32	94.04	94.12
21	532	3.09	3091	3000	98.74	97.16	97.16	95.97	95.26	95.35	95.54	94.81	95.00	94.71	95.00	95.05
22	555	3.25	3081	3000	99.86	98.70	97.51	96.56	96.67	96.22	95.55	95.51	94.70	95.04	94.52	94.02
23	537	3.09	3093	3000	98.99	98.32	97.95	98.19	97.09	96.11	95.79	95.79	95.88	94.88	93.93	94.75
24	547	3.15	3137	3000	99.30	97.71	97.26	96.12	95.61	95.30	94.99	94.66	93.56	93.89	93.89	93.49
25	546	3.23	3066	3000	99.27	98.02	97.87	96.68	96.39	95.27	96.04	95.27	95.03	94.78	95.07	94.65
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	547	3.16			99.73	98.42	97.99	97.25	97.21	96.60	96.29	95.92	95.87	95.62	95.58	95.25
Median	548	3.16			99.91	98.43	98.12	97.33	97.46	96.68	96.25	95.77	95.88	95.60	95.76	95.38
σ	11	0.05			0.78	0.85	0.90	1.02	1.16	1.12	0.87	1.02	1.02	1.03	1.10	0.95
Min.	525	3.09			98.18	96.61	96.07	95.33	94.82	94.60	94.73	94.46	93.56	93.89	93.89	93.49
Max.	565	3.25			100.82	100.26	99.56	98.82	99.05	98.63	97.98	97.89	97.43	97.65	97.52	97.14

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4318	0.4086	3131	3000	0.0003	0.0006	0.0006	0.0005	0.0006	0.0007	0.0006	0.0006	0.0006	0.0005	0.0004	0.0005
2	0.4370	0.4164	3102	3000	0.0007	0.0009	0.0008	0.0008	0.0008	0.0007	0.0008	0.0009	0.0008	0.0008	0.0009	0.0008
3	0.4365	0.4137	3089	3000	0.0011	0.0012	0.0013	0.0012	0.0012	0.0012	0.0015	0.0016	0.0014	0.0015	0.0015	0.0014
4	0.4274	0.4013	3152	3000	0.0003	0.0006	0.0004	0.0006	0.0004	0.0003	0.0001	0.0004	0.0003	0.0004	0.0004	0.0004
5	0.4352	0.4086	3071	3000	0.0002	0.0006	0.0005	0.0007	0.0006	0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005
6	0.4266	0.4018	3170	3000	0.0002	0.0005	0.0004	0.0005	0.0004	0.0005	0.0003	0.0002	0.0003	0.0001	0.0003	0.0003
7	0.4298	0.4040	3130	3000	0.0002	0.0005	0.0004	0.0005	0.0004	0.0007	0.0005	0.0004	0.0003	0.0004	0.0006	0.0005
8	0.4290	0.4067	3166	3000	0.0003	0.0005	0.0007	0.0008	0.0007	0.0007	0.0006	0.0006	0.0006	0.0007	0.0007	0.0006
9	0.4331	0.4083	3106	3000	0.0007	0.0011	0.0009	0.0010	0.0009	0.0008	0.0009	0.0010	0.0011	0.0013	0.0010	0.0010
10	0.4313	0.4076	3132	3000	0.0002	0.0008	0.0006	0.0006	0.0005	0.0007	0.0005	0.0003	0.0003	0.0003	0.0002	0.0007
11	0.4357	0.4138	3104	3000	0.0006	0.0008	0.0009	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0009	0.0007
12	0.4402	0.4132	3023	3000	0.0009	0.0010	0.0011	0.0011	0.0012	0.0013	0.0013	0.0012	0.0014	0.0012	0.0012	0.0011
13	0.4371	0.4161	3098	3000	0.0007	0.0009	0.0009	0.0007	0.0006	0.0006	0.0007	0.0005	0.0005	0.0005	0.0005	0.0005
14	0.4382	0.4149	3070	3000	0.0010	0.0009	0.0011	0.0009	0.0009	0.0008	0.0009	0.0007	0.0007	0.0008	0.0009	0.0009
15	0.4351	0.4126	3105	3000	0.0005	0.0007	0.0007	0.0004	0.0006	0.0006	0.0004	0.0004	0.0005	0.0005	0.0006	0.0004
16	0.4323	0.4125	3153	3000	0.0007	0.0006	0.0008	0.0006	0.0008	0.0006	0.0007	0.0005	0.0004	0.0005	0.0005	0.0005
17	0.4376	0.4161	3089	3000	0.0005	0.0008	0.0007	0.0006	0.0006	0.0004	0.0004	0.0004	0.0005	0.0004	0.0005	0.0005
18	0.4353	0.4070	3057	3000	0.0003	0.0005	0.0004	0.0004	0.0003	0.0004	0.0005	0.0004	0.0006	0.0006	0.0005	0.0005
19	0.4329	0.4105	3126	3000	0.0004	0.0008	0.0008	0.0007	0.0008	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0007
20	0.4357	0.4071	3051	3000	0.0005	0.0005	0.0004	0.0003	0.0005	0.0004	0.0005	0.0004	0.0006	0.0006	0.0006	0.0006
21	0.4371	0.4152	3091	3000	0.0007	0.0010	0.0009	0.0007	0.0006	0.0005	0.0008	0.0007	0.0008	0.0005	0.0006	0.0005
22	0.4350	0.4094	3081	3000	0.0005	0.0009	0.0010	0.0009	0.0009	0.0008	0.0005	0.0008	0.0008	0.0007	0.0007	0.0008
23	0.4376	0.4166	3093	3000	0.0004	0.0007	0.0008	0.0007	0.0007	0.0006	0.0006	0.0006	0.0007	0.0005	0.0005	0.0006
24	0.4322	0.4103	3137	3000	0.0010	0.0009	0.0011	0.0008	0.0005	0.0005	0.0006	0.0004	0.0003	0.0005	0.0007	0.0006
25	0.4351	0.4077	3066	3000	0.0006	0.0009	0.0008	0.0009	0.0010	0.0009	0.0010	0.0013	0.0010	0.0009	0.0010	0.0010
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0005	0.0008	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
Median					0.0005	0.0008	0.0008	0.0007	0.0006	0.0007	0.0006	0.0006	0.0006	0.0005	0.0006	0.0006
σ					0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
Min.					0.0002	0.0005	0.0004	0.0003	0.0003	0.0003	0.0001	0.0002	0.0003	0.0001	0.0002	0.0003
Max.					0.0011	0.0012	0.0013	0.0012	0.0012	0.0013	0.0015	0.0016	0.0014	0.0015	0.0015	0.0014

DATA SET 14: 105°C; 1500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)							
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	565	3.13	3131	3000	96.96	96.90	96.50	96.58	96.23	96.90	96.05	95.88
2	536	3.19	3102	3000	96.57	97.20	96.34	96.77	96.68	97.28	96.94	95.76
3	525	3.16	3089	3000	96.70	96.11	96.23	95.92	96.48	96.23	95.45	95.43
4	565	3.23	3152	3000	96.33	96.00	95.91	95.77	96.05	95.64	96.12	95.87
5	556	3.13	3071	3000	95.90	95.84	95.30	95.41	95.45	95.86	94.82	94.46
6	546	3.10	3170	3000	96.34	95.46	96.08	95.37	95.42	95.75	95.81	94.78
7	549	3.16	3130	3000	96.50	95.94	95.96	95.72	95.61	95.47	95.87	95.45
8	554	3.14	3166	3000	95.90	95.67	95.04	95.47	95.49	95.63	94.87	94.33
9	539	3.25	3106	3000	95.53	94.88	94.82	94.06	94.88	94.73	93.75	94.15
10	552	3.11	3132	3000	95.49	94.79	95.27	94.53	94.48	95.09	95.40	94.66
11	559	3.17	3104	3000	94.97	94.86	94.45	94.85	95.22	94.92	94.29	94.63
12	548	3.23	3023	3000	94.93	94.80	94.25	94.12	94.78	94.62	93.80	93.83
13	528	3.11	3098	3000	94.53	94.22	95.15	94.41	94.79	94.04	95.40	94.74
14	535	3.18	3070	3000	95.47	96.07	95.17	95.12	95.17	95.72	95.10	93.45
15	558	3.17	3105	3000	93.85	94.73	94.21	94.32	94.52	94.82	94.48	93.62
16	539	3.10	3153	3000	93.88	93.53	94.27	94.66	93.36	93.77	93.77	92.65
17	538	3.11	3089	3000	95.70	95.54	94.35	94.31	93.92	94.03	95.16	93.15
18	552	3.20	3057	3000	94.13	94.26	93.69	93.68	93.62	94.15	93.30	93.10
19	552	3.14	3126	3000	94.90	94.12	94.71	94.26	94.01	93.57	94.03	93.77
20	563	3.17	3051	3000	93.95	93.04	93.61	92.93	94.02	93.75	93.29	93.29
21	532	3.09	3091	3000	94.19	93.85	94.45	93.81	93.64	93.02	93.60	93.32
22	555	3.25	3081	3000	93.78	94.02	93.55	93.64	93.96	94.69	94.09	93.04
23	537	3.09	3093	3000	93.74	93.67	93.82	94.34	93.78	94.24	93.93	93.20
24	547	3.15	3137	3000	93.69	93.45	93.76	94.13	93.25	93.01	93.43	92.19
25	546	3.23	3066	3000	93.97	93.71	94.36	93.05	93.26	92.94	93.97	93.05
n	25	25	25	25	25	25	25	25	25	25	25	25
Mean	547	3.16			95.12	94.91	94.85	94.69	94.72	94.79	94.67	94.07
Median	548	3.16			94.97	94.80	94.71	94.41	94.78	94.73	94.48	93.83
σ	11	0.05			1.09	1.13	0.91	1.00	1.03	1.17	1.02	1.06
Min.	525	3.09			93.69	93.04	93.55	92.93	93.25	92.94	93.29	92.19
Max.	565	3.25			96.96	97.20	96.50	96.77	96.68	97.28	96.94	95.88

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')							
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	0.4318	0.4086	3131	3000	0.0006	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0010
2	0.4370	0.4164	3102	3000	0.0008	0.0009	0.0010	0.0010	0.0012	0.0013	0.0013	0.0013
3	0.4365	0.4137	3089	3000	0.0015	0.0017	0.0014	0.0015	0.0015	0.0014	0.0013	0.0014
4	0.4274	0.4013	3152	3000	0.0004	0.0006	0.0007	0.0006	0.0007	0.0007	0.0007	0.0009
5	0.4352	0.4086	3071	3000	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
6	0.4266	0.4018	3170	3000	0.0004	0.0006	0.0007	0.0006	0.0007	0.0007	0.0008	0.0008
7	0.4298	0.4040	3130	3000	0.0005	0.0007	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
8	0.4290	0.4067	3166	3000	0.0008	0.0008	0.0007	0.0008	0.0007	0.0008	0.0008	0.0007
9	0.4331	0.4083	3106	3000	0.0009	0.0010	0.0010	0.0009	0.0010	0.0011	0.0009	0.0010
10	0.4313	0.4076	3132	3000	0.0005	0.0006	0.0007	0.0006	0.0006	0.0008	0.0008	0.0007
11	0.4357	0.4138	3104	3000	0.0008	0.0009	0.0008	0.0009	0.0010	0.0010	0.0010	0.0011
12	0.4402	0.4132	3023	3000	0.0012	0.0014	0.0011	0.0012	0.0013	0.0013	0.0012	0.0014
13	0.4371	0.4161	3098	3000	0.0005	0.0008	0.0007	0.0009	0.0009	0.0009	0.0008	0.0009
14	0.4382	0.4149	3070	3000	0.0007	0.0010	0.0009	0.0009	0.0010	0.0011	0.0011	0.0011
15	0.4351	0.4126	3105	3000	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009	0.0010	0.0011
16	0.4323	0.4125	3153	3000	0.0005	0.0007	0.0007	0.0008	0.0008	0.0010	0.0009	0.0011
17	0.4376	0.4161	3089	3000	0.0004	0.0006	0.0006	0.0006	0.0008	0.0007	0.0010	0.0010
18	0.4353	0.4070	3057	3000	0.0005	0.0008	0.0009	0.0009	0.0010	0.0011	0.0010	0.0009
19	0.4329	0.4105	3126	3000	0.0007	0.0010	0.0008	0.0010	0.0009	0.0010	0.0009	0.0010
20	0.4357	0.4071	3051	3000	0.0006	0.0009	0.0009	0.0009	0.0011	0.0011	0.0010	0.0010
21	0.4371	0.4152	3091	3000	0.0007	0.0006	0.0006	0.0007	0.0006	0.0006	0.0003	0.0006
22	0.4350	0.4094	3081	3000	0.0008	0.0009	0.0009	0.0009	0.0012	0.0012	0.0012	0.0012
23	0.4376	0.4166	3093	3000	0.0004	0.0007	0.0008	0.0007	0.0009	0.0010	0.0010	0.0011
24	0.4322	0.4103	3137	3000	0.0007	0.0011	0.0008	0.0009	0.0010	0.0011	0.0011	0.0014
25	0.4351	0.4077	3066	3000	0.0011	0.0012	0.0011	0.0011	0.0012	0.0012	0.0014	0.0013
n	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0007	0.0009	0.0008	0.0009	0.0009	0.0010	0.0009	0.0010
Median					0.0006	0.0008	0.0008	0.0009	0.0009	0.0010	0.0010	0.0010
σ					0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0004	0.0006	0.0006	0.0006	0.0006	0.0006	0.0003	0.0006
Max.					0.0015	0.0017	0.0014	0.0015	0.0015	0.0014	0.0014	0.0014

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_F]	1500 mA
Testing Initiation Date	November 2, 2015
Case Temperature [T_s]	120°C
Ambient Temperature [T_A]	120°C
Failures observed	None

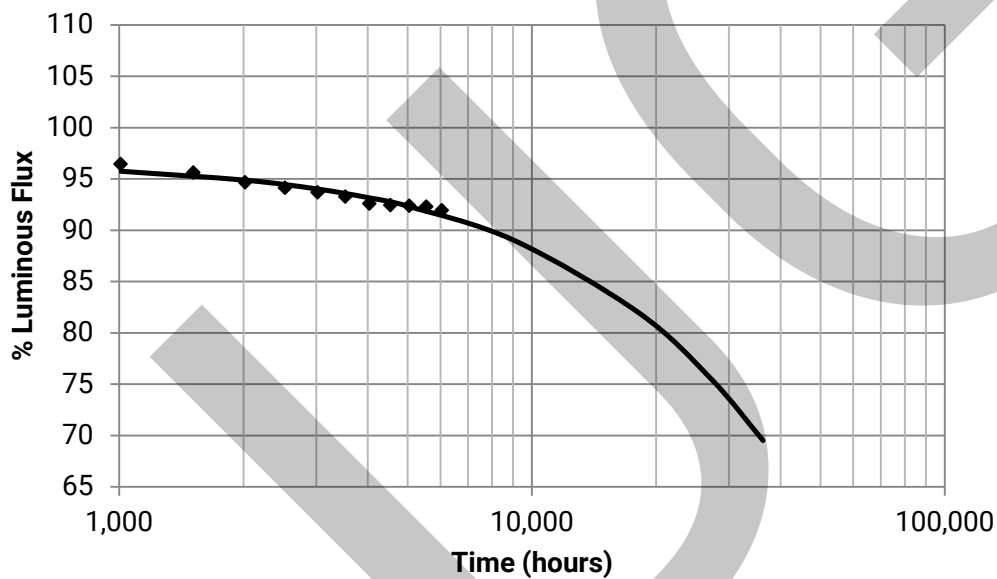
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Note: "N/R" indicates data points that are not reported

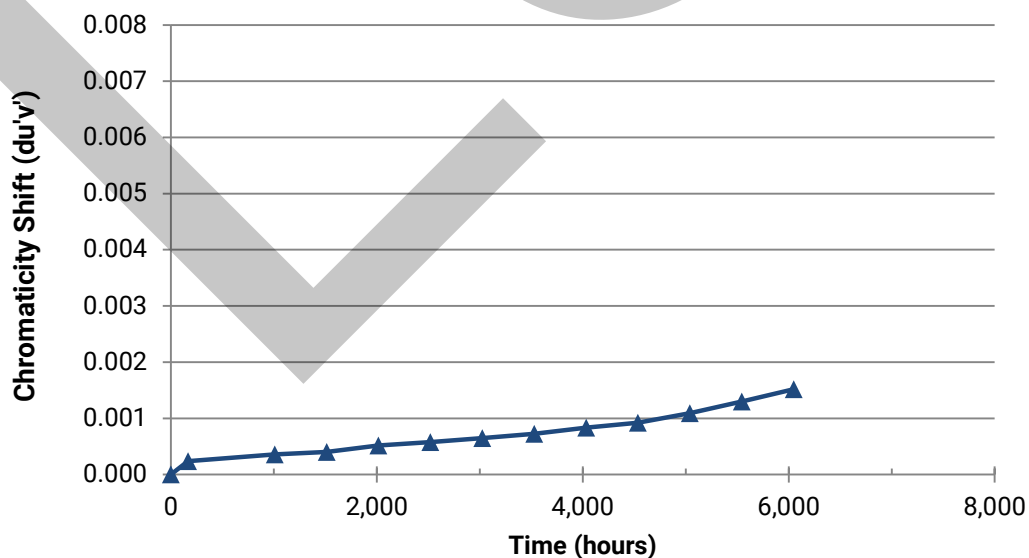
DATA SET 12: 120°C; 1500 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	6,048 hours
Test duration used for projection	t=1,008 to t=6,048
α	9.077E-06
β	9.663E-01
Reported Lifetimes	L90(6k) = 7,830 hours
	L80(6k) = 20,800 hours
	L70(6k) = 35,500 hours



Color Shift Graph



DATA SET 12: 120°C; 1500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	525.0	3.10	3122	3000	98.27	96.51	95.79	94.59	93.07	93.05	92.34	91.81	91.71	92.21	92.44	92.00
2	526.9	3.13	3149	3000	98.90	97.46	96.72	94.91	94.53	94.33	94.23	93.38	93.22	93.68	92.83	92.33
3	554.5	3.25	3138	3000	98.92	97.24	95.80	93.90	94.01	92.68	92.46	91.38	91.65	92.12	92.41	91.54
4	549.2	3.26	3118	3000	98.58	96.36	95.68	94.81	93.85	93.15	93.21	91.93	92.23	91.62	91.41	91.64
5	531.7	3.13	3053	3000	97.99	96.78	96.16	94.92	93.96	93.85	92.80	92.55	92.44	92.65	92.74	91.71
6	538.1	3.16	3112	3000	98.35	97.21	96.56	96.52	95.56	95.09	93.70	93.70	93.70	93.87	94.16	94.15
7	548.6	3.16	3077	3000	98.82	96.28	95.84	94.95	95.24	94.15	94.68	93.75	94.00	92.85	93.00	92.11
8	556.1	3.15	3112	3000	97.79	95.97	95.72	94.19	93.24	92.23	92.41	91.31	91.98	91.58	91.44	91.98
9	547.9	3.23	3095	3000	98.10	96.08	94.98	93.54	93.30	92.13	92.95	91.86	91.44	91.42	91.86	90.62
10	549.6	3.26	3075	3000	98.93	96.80	96.32	94.38	94.03	92.92	92.89	92.01	91.89	91.05	91.56	91.72
11	527.8	3.11	3079	3000	97.97	97.27	95.43	94.37	93.99	94.01	93.29	92.72	92.90	93.10	93.58	93.03
12	530.0	3.12	3101	3000	97.21	95.72	95.55	94.57	94.19	94.13	93.19	92.38	92.83	92.83	92.72	92.04
13	562.1	3.12	3184	3000	96.25	95.53	94.72	94.24	93.81	93.06	92.28	91.69	91.73	91.69	91.41	90.54
14	544.5	3.12	3181	3000	97.01	95.21	94.93	94.03	93.31	92.76	92.64	91.75	91.50	91.42	91.07	90.67
15	557.7	3.15	3110	3000	97.63	96.95	96.09	95.36	95.36	95.55	94.58	93.89	93.17	93.11	92.47	92.76
16	562.3	3.15	3116	3000	97.74	97.05	95.47	94.70	94.61	95.13	94.04	93.83	92.83	92.85	92.03	91.39
17	560.1	3.16	3088	3000	98.52	97.07	96.43	95.27	94.97	95.16	93.98	93.16	92.64	92.66	92.32	92.47
18	533.4	3.14	3107	3000	96.14	95.29	94.15	94.26	92.91	92.31	91.56	91.53	90.64	91.04	90.64	89.91
19	553.8	3.12	3173	3000	97.13	96.17	94.80	94.28	94.01	94.51	94.01	93.52	93.26	93.12	92.96	93.12
20	571.6	3.18	3152	3000	98.30	96.20	95.66	95.61	94.56	94.09	94.07	93.58	92.98	93.16	93.00	92.97
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	546.5	3.16			97.93	96.46	95.64	94.67	94.13	93.71	93.27	92.59	92.44	92.40	92.30	91.94
Median	548.9	3.15			98.05	96.44	95.70	94.58	94.01	93.93	93.20	92.47	92.54	92.66	92.43	91.99
σ	13.8	0.05			0.83	0.69	0.67	0.67	0.76	1.06	0.86	0.93	0.86	0.86	0.88	1.02
Min.	525.0	3.10			96.14	95.21	94.15	93.54	92.91	92.13	91.56	91.31	90.64	91.04	90.64	89.91
Max.	571.6	3.26			98.93	97.46	96.72	96.52	95.56	95.55	94.68	93.89	94.00	93.87	94.16	94.15

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4346	0.4137	3122	3000	0.0002	0.0004	0.0002	0.0005	0.0005	0.0005	0.0005	0.0007	0.0008	0.0009	0.0012	0.0016
2	0.4319	0.4111	3149	3000	0.0001	0.0002	0.0001	0.0003	0.0005	0.0006	0.0008	0.0008	0.0009	0.0011	0.0014	0.0016
3	0.4304	0.4064	3138	3000	0.0002	0.0002	0.0003	0.0004	0.0006	0.0007	0.0008	0.0008	0.0009	0.0013	0.0014	0.0018
4	0.4325	0.4085	3118	3000	0.0003	0.0003	0.0001	0.0004	0.0006	0.0010	0.0010	0.0010	0.0011	0.0013	0.0017	0.0018
5	0.4378	0.4118	3053	3000	0.0001	0.0002	0.0002	0.0006	0.0006	0.0008	0.0006	0.0008	0.0009	0.0012	0.0016	0.0019
6	0.4350	0.4133	3112	3000	0.0003	0.0005	0.0005	0.0006	0.0005	0.0008	0.0008	0.0009	0.0010	0.0013	0.0016	0.0022
7	0.4371	0.4134	3077	3000	0.0001	0.0005	0.0007	0.0008	0.0007	0.0009	0.0010	0.0012	0.0012	0.0012	0.0016	0.0021
8	0.4343	0.4118	3112	3000	0.0000	0.0003	0.0004	0.0006	0.0006	0.0007	0.0007	0.0009	0.0009	0.0011	0.0012	0.0015
9	0.4340	0.4089	3095	3000	0.0003	0.0003	0.0006	0.0005	0.0006	0.0007	0.0009	0.0011	0.0010	0.0013	0.0014	0.0021
10	0.4372	0.4134	3075	3000	0.0005	0.0004	0.0008	0.0009	0.0008	0.0009	0.0010	0.0011	0.0012	0.0012	0.0015	0.0014
11	0.4381	0.4158	3079	3000	0.0003	0.0002	0.0003	0.0004	0.0004	0.0006	0.0006	0.0008	0.0009	0.0012	0.0014	0.0016
12	0.4369	0.4161	3101	3000	0.0004	0.0005	0.0003	0.0005	0.0005	0.0005	0.0007	0.0006	0.0008	0.0008	0.0011	0.0011
13	0.4291	0.4092	3184	3000	0.0002	0.0003	0.0004	0.0004	0.0005	0.0005	0.0005	0.0007	0.0007	0.0007	0.0008	0.0009
14	0.4284	0.4072	3181	3000	0.0001	0.0003	0.0004	0.0002	0.0005	0.0005	0.0006	0.0008	0.0008	0.0009	0.0010	0.0011
15	0.4309	0.4040	3110	3000	0.0003	0.0006	0.0005	0.0006	0.0007	0.0007	0.0009	0.0009	0.0009	0.0010	0.0010	0.0011
16	0.4311	0.4052	3116	3000	0.0004	0.0005	0.0006	0.0007	0.0007	0.0007	0.0007	0.0009	0.0010	0.0010	0.0010	0.0012
17	0.4333	0.4065	3088	3000	0.0003	0.0004	0.0005	0.0006	0.0008	0.0006	0.0006	0.0008	0.0009	0.0011	0.0012	0.0012
18	0.4354	0.4135	3107	3000	0.0002	0.0003	0.0004	0.0004	0.0004	0.0003	0.0005	0.0006	0.0010	0.0011	0.0014	0.0016
19	0.4259	0.4005	3173	3000	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0006	0.0007	0.0007	0.0012	0.0011	0.0012
20	0.4286	0.4041	3152	3000	0.0001	0.0003	0.0005	0.0007	0.0008	0.0007	0.0008	0.0009	0.0010	0.0010	0.0013	0.0015
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0002	0.0004	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009	0.0011	0.0013	0.0015
Median					0.0003	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0009	0.0011	0.0013	0.0016
σ					0.0001	0.0001	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0004
Min.					0.0000	0.0002	0.0001	0.0002	0.0004	0.0003	0.0005	0.0006	0.0007	0.0007	0.0008	0.0009
Max.					0.0005	0.0006	0.0008	0.0009	0.0008	0.0010	0.0010	0.0012	0.0012	0.0013	0.0017	0.0022

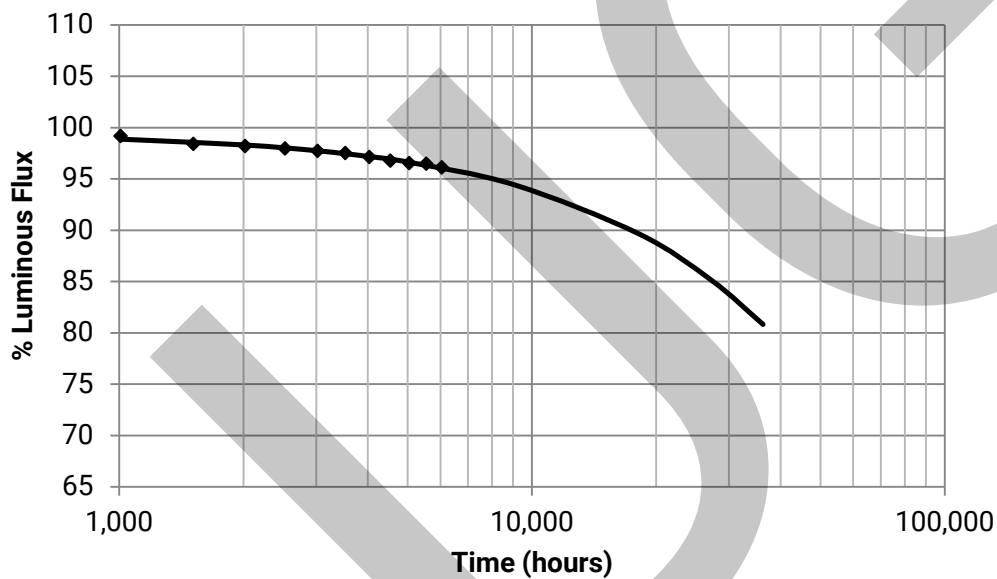


Note: "N/R" indicates data points that are not reported

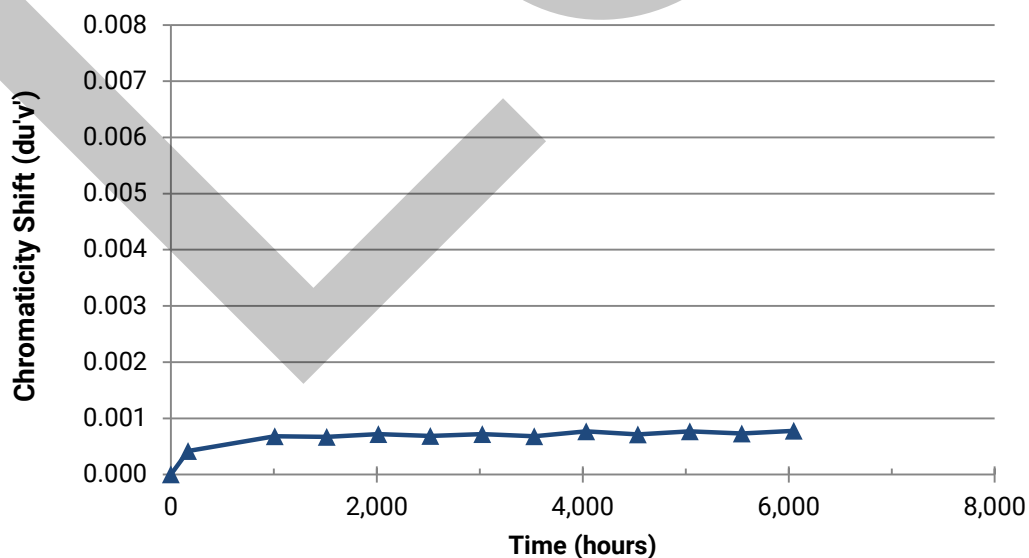
DATA SET 13: 85°C; 2000 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	6,048 hours
Test duration used for projection	t=1,008 to t=6,048
α	5.713E-06
β	9.944E-01
Reported Lifetimes	L90(6k) = 17,500 hours
	L80(6k) > 36,300 hours
	L70(6k) > 36,300 hours



Color Shift Graph



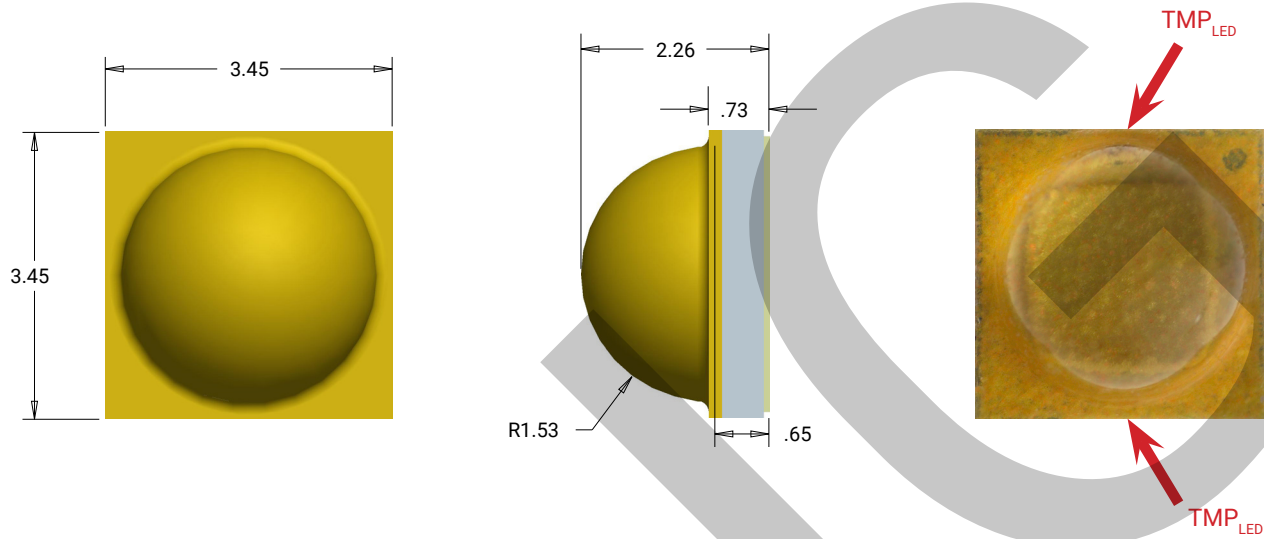
DATA SET 13: 85°C; 2000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	653.7	3.18	3127	3000	99.72	99.20	98.50	98.09	97.48	97.34	97.05	96.11	96.08	96.47	96.07	95.90
2	668.1	3.20	3171	3000	100.07	98.95	97.86	97.96	97.64	97.92	96.63	96.83	96.45	96.87	96.38	96.48
3	645.7	3.19	3149	3000	100.45	99.30	98.34	98.92	97.80	97.89	97.60	97.66	96.96	97.43	97.54	96.93
4	672.6	3.24	3189	3000	100.04	99.79	98.65	98.86	98.50	97.99	97.61	97.92	97.96	98.31	97.84	98.02
5	674.9	3.27	3186	3000	100.04	99.47	98.40	98.99	98.70	97.96	98.04	97.75	97.70	97.87	97.73	97.57
6	636.6	3.22	3168	3000	99.75	98.48	97.83	98.18	97.75	98.01	97.42	97.28	96.73	97.03	97.28	96.70
7	662.5	3.22	3172	3000	99.32	98.49	97.45	97.68	97.22	97.42	96.68	96.45	96.18	96.33	96.14	96.05
8	687.0	3.31	3172	3000	99.74	99.34	98.59	98.75	98.79	98.40	98.53	97.39	97.45	97.86	98.21	97.70
9	648.8	3.14	3148	3000	98.81	99.34	99.01	98.64	98.23	98.84	98.55	98.40	97.72	97.29	97.84	97.41
10	639.5	3.15	3152	3000	99.14	99.70	99.45	98.80	98.47	99.01	98.26	98.33	97.98	97.28	97.83	97.44
11	646.0	3.15	3112	3000	99.38	99.92	99.29	98.70	98.39	98.81	98.62	98.51	98.22	97.09	96.89	96.63
12	643.1	3.16	3108	3000	99.19	100.12	99.04	98.45	98.07	98.46	98.09	97.84	97.71	96.67	97.14	96.92
13	642.8	3.16	3110	3000	98.99	99.53	98.44	98.09	97.60	98.26	97.93	97.64	97.32	96.66	97.23	96.39
14	637.5	3.16	3080	3000	99.44	99.78	98.81	97.85	97.69	98.15	98.09	97.90	97.49	96.64	96.25	96.31
15	620.4	3.10	3159	3000	99.53	99.15	99.26	98.45	98.66	97.99	97.86	97.45	97.08	97.28	96.23	95.71
16	627.5	3.20	3103	3000	99.98	98.90	99.43	98.37	98.74	97.71	97.55	97.05	96.67	96.37	95.81	95.52
17	647.6	3.31	3102	3000	99.44	99.03	98.32	98.21	97.96	97.30	97.16	97.07	96.66	96.12	95.74	95.68
18	657.8	3.31	3144	3000	99.45	99.26	97.83	98.05	97.81	97.48	97.26	97.20	96.66	95.99	96.76	96.20
19	625.5	3.11	3153	3000	99.81	99.18	98.75	98.03	98.86	97.78	98.55	97.20	96.72	96.75	96.58	95.78
20	660.9	3.32	3139	3000	99.20	98.79	97.70	97.94	97.55	96.85	96.99	95.79	95.58	94.73	95.37	95.08
21	626.4	3.22	3128	3000	99.55	98.79	98.58	97.69	97.41	97.09	97.35	96.98	95.61	96.22	95.07	94.72
22	650.7	3.33	3141	3000	99.25	99.02	97.85	98.06	97.66	96.39	96.00	95.54	95.31	94.59	95.14	94.50
23	621.7	3.11	3104	3000	99.89	98.75	98.02	97.49	97.28	96.40	97.47	95.99	95.54	95.64	94.63	94.29
24	654.8	3.33	3137	3000	98.58	98.34	97.19	97.63	97.48	96.67	96.61	95.95	95.53	95.20	94.64	94.27
25	648.7	3.32	3145	3000	98.50	98.81	97.60	97.63	97.27	96.93	96.47	96.25	96.02	95.08	95.75	95.25
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	648.0	3.22			99.49	99.18	98.41	98.22	97.96	97.72	97.53	97.14	96.78	96.55	96.48	96.14
Median	647.6	3.20			99.45	99.18	98.44	98.09	97.80	97.89	97.55	97.20	96.72	96.66	96.38	96.20
σ	17.1	0.08			0.48	0.47	0.64	0.45	0.53	0.73	0.72	0.85	0.88	0.96	1.06	1.08
Min.	620.4	3.10			98.50	98.34	97.19	97.49	97.22	96.39	96.00	95.54	95.31	94.59	94.63	94.27
Max.	687.0	3.33			100.45	100.12	99.45	98.99	98.86	99.01	98.62	98.51	98.22	98.31	98.21	98.02

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4276	0.3987	3127	3000	0.0003	0.0007	0.0003	0.0005	0.0004	0.0007	0.0005	0.0007	0.0005	0.0004	0.0004	0.0003
2	0.4318	0.4137	3171	3000	0.0005	0.0009	0.0009	0.0009	0.0009	0.0009	0.0007	0.0009	0.0009	0.0008	0.0007	0.0008
3	0.4305	0.4080	3149	3000	0.0003	0.0008	0.0006	0.0008	0.0006	0.0007	0.0007	0.0010	0.0008	0.0007	0.0007	0.0007
4	0.4272	0.4055	3189	3000	0.0004	0.0009	0.0008	0.0007	0.0007	0.0008	0.0006	0.0007	0.0007	0.0007	0.0006	0.0006
5	0.4270	0.4047	3186	3000	0.0003	0.0009	0.0008	0.0008	0.0006	0.0008	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006
6	0.4291	0.4072	3168	3000	0.0002	0.0008	0.0005	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
7	0.4264	0.4016	3172	3000	0.0005	0.0009	0.0008	0.0008	0.0007	0.0006	0.0007	0.0008	0.0008	0.0006	0.0007	0.0006
8	0.4264	0.4016	3172	3000	0.0004	0.0008	0.0006	0.0006	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007
9	0.4336	0.4148	3148	3000	0.0004	0.0004	0.0005	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006	0.0007	0.0007	0.0008
10	0.4314	0.4104	3152	3000	0.0005	0.0007	0.0009	0.0010	0.0009	0.0010	0.0009	0.0010	0.0010	0.0011	0.0011	0.0011
11	0.4357	0.4149	3112	3000	0.0004	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0007	0.0009
12	0.4349	0.4126	3108	3000	0.0005	0.0007	0.0007	0.0008	0.0007	0.0008	0.0007	0.0008	0.0007	0.0009	0.0007	0.0009
13	0.4357	0.4146	3110	3000	0.0003	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007
14	0.4388	0.4175	3080	3000	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0008	0.0006	0.0009
15	0.4322	0.4131	3159	3000	0.0004	0.0006	0.0006	0.0007	0.0008	0.0008	0.0007	0.0008	0.0007	0.0008	0.0008	0.0009
16	0.4373	0.4172	3103	3000	0.0004	0.0005	0.0006	0.0005	0.0006	0.0006	0.0005	0.0005	0.0005	0.0006	0.0005	0.0007
17	0.4352	0.4124	3102	3000	0.0006	0.0007	0.0008	0.0007	0.0007	0.0008	0.0008	0.0009	0.0008	0.0010	0.0009	0.0010
18	0.4303	0.4069	3144	3000	0.0005	0.0008	0.0007	0.0008	0.0008	0.0008	0.0009	0.0010	0.0009	0.0010	0.0011	0.0008
19	0.4319	0.4116	3153	3000	0.0005	0.0005	0.0005	0.0004	0.0006	0.0005	0.0004	0.0006	0.0004	0.0005	0.0005	0.0006
20	0.4305	0.4067	3139	3000	0.0004	0.0004	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0008	0.0007
21	0.4338	0.4127	3128	3000	0.0004	0.0005	0.0006	0.0007	0.0005	0.0005	0.0005	0.0006	0.0005	0.0006	0.0006	0.0007
22	0.4320	0.4103	3141	3000	0.0006	0.0008	0.0009	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0011
23	0.4353	0.4129	3104	3000	0.0004	0.0006	0.0005	0.0006	0.0005	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006	0.0009
24	0.4313	0.4083	3137	3000	0.0005	0.0007	0.0007	0.0010	0.0010	0.0009	0.0010	0.0010	0.0010	0.0011	0.0010	0.0011
25	0.4300	0.4063	3145	3000	0.0004	0.0007	0.0008	0.0009	0.0008	0.0009	0.0009	0.0009	0.0009	0.0010	0.0010	0.0008
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0004	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0008	0.0007	0.0008
Median					0.0004	0.0007	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008
σ					0.0001	0.0002	0.0001	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0002	0.0004	0.0003	0.0004	0.0004	0.0005	0.0004	0.0005	0.0004	0.0004	0.0004	0.0003
Max.					0.0006	0.0009	0.0009	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0011

MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT

Dimensions are in mm. All measurements are ± 0.13 mm unless otherwise indicated.



The LED temperature measurement point (TMP_{LED}) should be measured on the PCB surface, as close to the LED's thermal pad as possible (shown in the picture above). Either one of the two shown TMP_{LED} locations may be used and are equivalent to each other.

PHOTOMETRIC TEST REPORT

LM-79 & EN 13032-4



Nr.TSP-17025-LB-001.00

LUG Light Factory Ltd ul. Gorzowska 11 65-127 Zielona Góra, POLAND KRS 0000290498 REGON 080212116 NIP PL 929-17-85-452	LUG Testing Laboratory address: ul. Nowa 7 66-002 Nowy Kisielin, POLAND	TEST SPECIFICATION – STANDARDS: PN – EN 13032-4:2015 IES LM-79-08
Test Report No. BF_13_5356_18	Tested by: Krzysztof Olek	Compiled by: Krzysztof Olek
Test date: 2018-02-14	Approved by: Marcin Białas	Client name: A. Pomalecki LUG Light Factory
This protocol shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.		
Measurement uncertainty: The measurement uncertainty was determined in accordance with EA-4/0,2 M:2013. The uncertainty values provided are expanded uncertainties at a confidence level of approximately 95% and an extension factor of k=2.		

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2. LUMINAIRE DATA

Company:	LUG Light Factory		
Model name:	URBINI LED ED 3900lm.740 O9 szary		
Index:	130232.5L101.101		
Sample No.:	056/3/18		
Power supply:	ELT LCM 42/350...1050-E set to 920mA		
Light source:	LUG ML1600400.W740.02A 12 LED		
LED model:	CREE XPG-3 BIN: S4		
Optic:	O9 PC lens		
Supplementary information:	-		
Dimensions of luminaire:		Dimensions of luminous area:	
Length:	407 mm	Length:	173 mm
Width:	110 mm	Width:	71 mm
Height:	120 mm	C0-plane height:	0 mm
		C90-plane height:	0 mm
		C180-plane height:	0 mm
		C270-plane height:	0 mm

3. MEASUREMENT CONDITIONS AND STABILIZATION

Photometric method:	Photo-spectro-goniometer type C-γ, bandwidth 380-750nm
Measurement type:	Absolute
Sample position during measurement:	Side, tilt 0°
Measurement distance:	10,478 ±0,002 m
Ambient temperature:	25 ±1,2°C
Integrating time:	Automatic
Burning time and stabilization criterion:	pre-stabilization time: >2h, stabilization: <0,5% during 15 min

N/A

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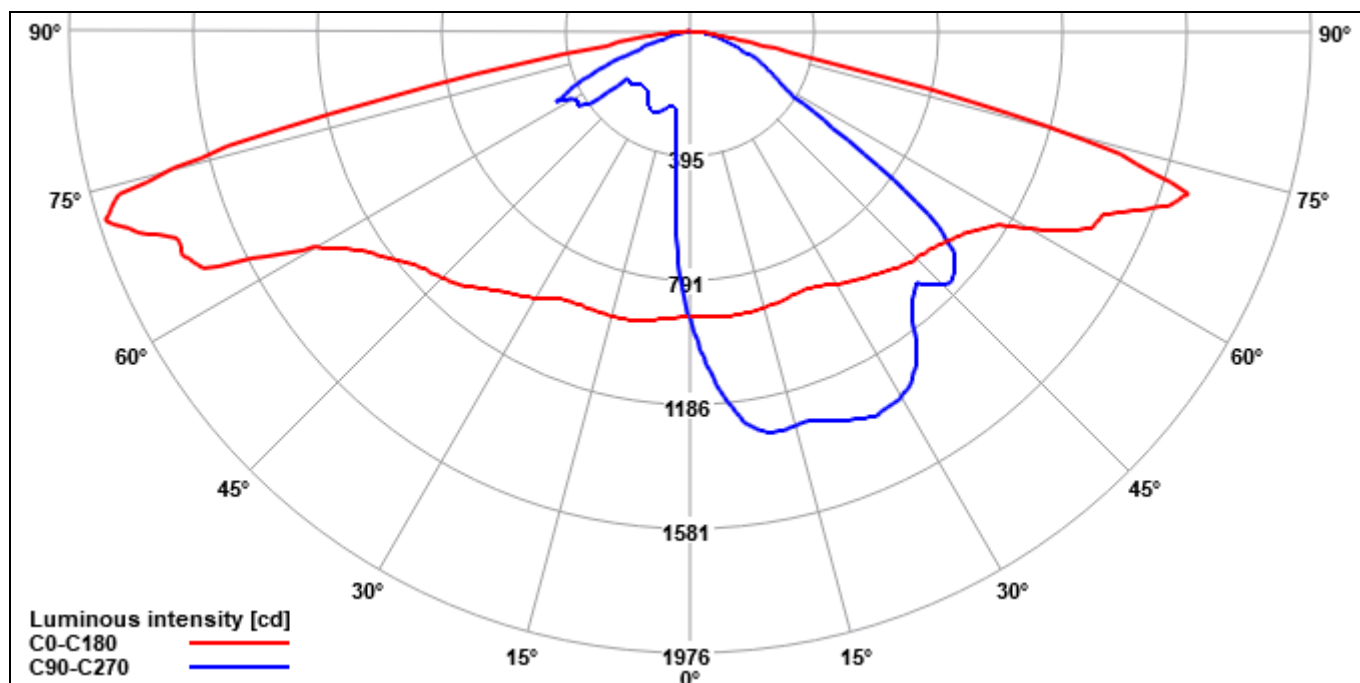
4. ELECTRICAL MEASUREMENTS RESULTS

Voltage:	230 V
Frequency:	50 Hz
Current:	0,167 A
Active power:	36,5 W
Apparent power:	N/A
Reactive power:	N/A
Power factor:	0,948
Current THD:	N/A

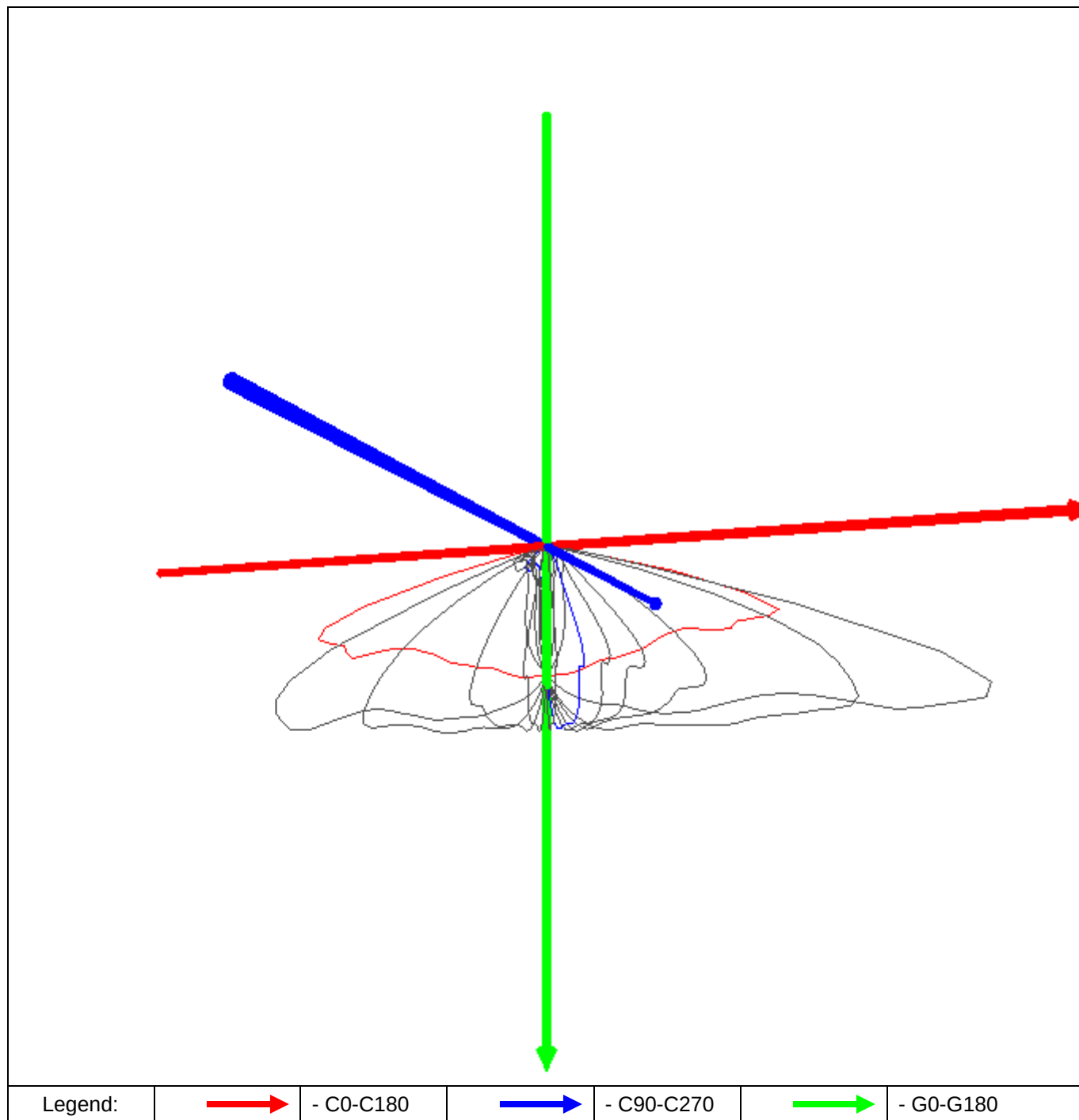
5. GONIOMETRIC MEASUREMENT RESULTS

Total luminous flux:	3960,25 lm, relative measurement uncertainty: $\pm 4,88\%$
Light output ratio (LOR):	100,00%
Lower hemisphere output ratio (DLOR):	100,00%
Upper hemisphere output ratio (ULOR):	-0,00%
Maximum luminous intensity:	3121,94 cd, relative measurement uncertainty: $\pm 4,88\%$
Luminous efficacy:	108,5 lm/W
Colour temperature:	4041
Colour rendering index:	72,40
Angular Colour Uniformity:	0,0325

6. LIGHT INTENSITY DISTRIBUTION DIAGRAM



7. 3D CHART



8. UTILIZATION FACTORS

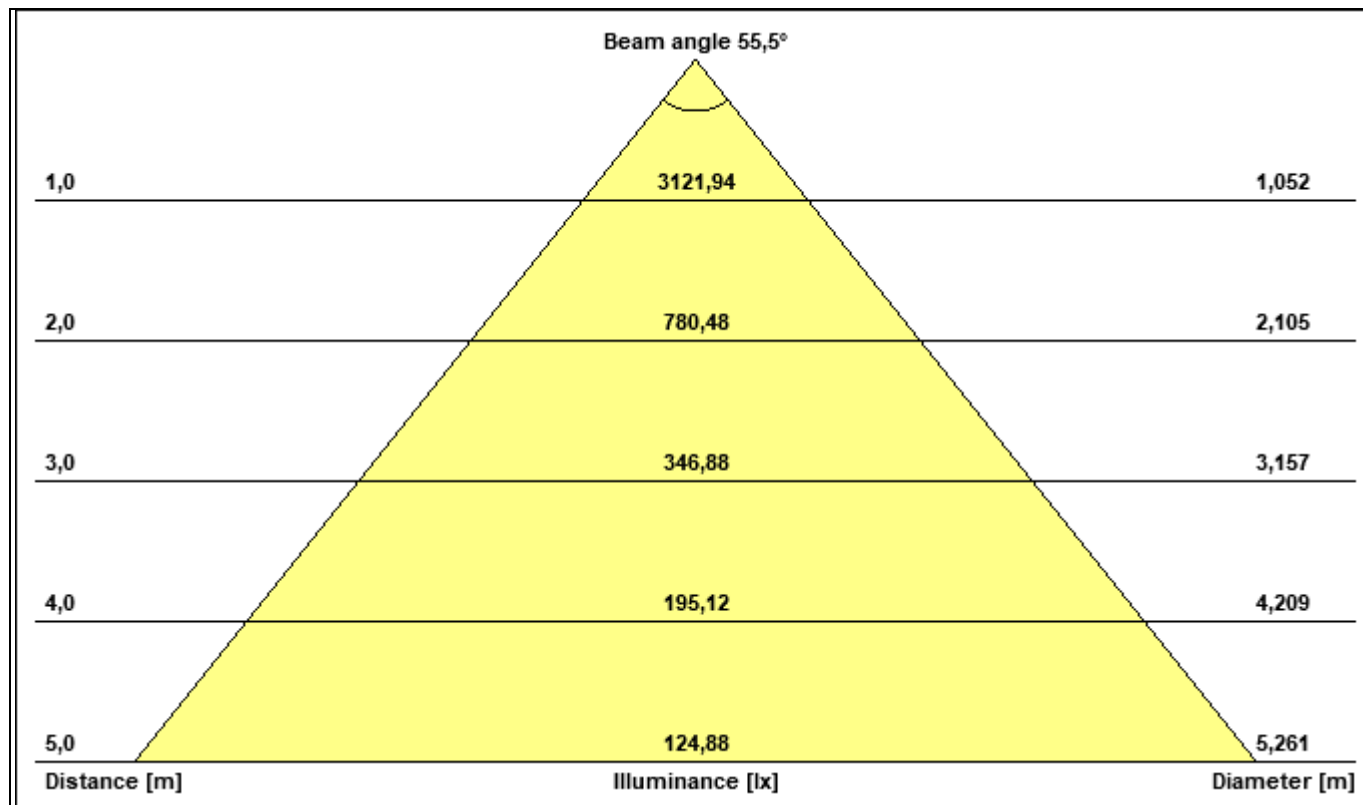
k = 0.60:	0,187	k = 2.00:	0,585
k = 0.80:	0,268	k = 2.50:	0,650
k = 1.00:	0,342	k = 3.00:	0,699
k = 1.25:	0,420	k = 4.00:	0,767
k = 1.50:	0,485	k = 5.00:	0,811

9. LUMINOUS INTENSITY [CD/KLM]

	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°
0°	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4
2°	230,0	237,8	250,6	249,6	253,8	255,9	256,3	254,1	253,9	249,3	244,9	238,8
4°	230,2	246,7	266,2	269,2	275,6	279,0	280,1	277,5	275,8	268,5	260,2	248,0
6°	230,6	254,9	281,0	286,0	294,8	298,7	300,3	298,4	295,3	286,7	274,5	257,6
8°	231,3	262,9	293,3	301,6	312,5	315,7	317,3	315,5	312,7	302,9	288,1	265,9
10°	231,1	269,7	304,5	315,4	325,8	327,5	326,3	326,2	326,3	317,2	299,9	272,8
12°	230,9	275,7	315,0	326,9	333,6	332,1	329,9	331,5	333,4	328,5	311,3	279,0
14°	230,8	281,7	325,9	332,3	332,1	332,0	329,4	330,8	334,4	335,1	321,6	285,7
16°	229,8	287,2	334,2	332,7	330,1	329,8	327,3	328,5	333,0	337,7	330,1	291,8
18°	229,6	293,2	339,3	329,8	328,9	330,2	329,1	329,1	331,7	336,3	336,3	298,9
20°	228,8	297,9	343,6	329,4	329,5	332,8	333,3	333,0	333,9	337,3	341,9	306,2
22°	227,87	302,48	345,71	330,57	331,10	336,57	337,20	336,78	337,80	339,52	346,26	313,48
24°	227,96	307,94	348,14	332,76	334,37	339,98	341,34	341,33	341,79	343,82	349,81	322,63
26°	228,89	316,00	350,24	336,16	336,88	342,95	343,96	345,23	346,87	349,47	355,12	331,62
28°	231,36	326,33	355,35	340,92	340,12	341,79	341,64	344,75	352,07	356,50	361,93	339,84
30°	235,10	336,81	361,53	345,71	340,11	339,01	340,55	343,34	355,19	364,54	368,47	347,49
32°	238,24	346,78	370,10	351,85	339,26	333,60	335,24	341,36	355,60	374,57	377,18	355,61
34°	241,46	356,58	379,20	356,88	334,26	326,30	325,76	336,93	352,22	383,62	387,93	364,35
36°	244,32	365,05	389,44	362,39	324,88	314,95	312,04	326,22	343,36	390,80	401,22	374,18
38°	247,31	373,49	400,59	365,77	314,51	292,35	290,76	302,12	333,88	396,31	415,63	386,74
40°	250,91	382,32	411,49	368,27	302,36	280,78	280,24	286,92	323,52	401,96	429,08	399,09
42°	254,60	390,85	423,89	369,25	294,36	270,13	272,87	276,67	317,04	408,28	443,30	408,28
44°	257,56	398,78	437,91	369,62	288,96	271,73	282,94	278,95	309,65	412,86	457,91	417,29
46°	259,47	406,84	453,24	367,70	293,70	287,14	291,89	296,68	313,40	413,65	472,15	427,51
48°	261,64	415,87	466,71	370,41	310,52	287,25	288,04	297,29	332,35	414,68	486,39	439,49
50°	265,54	426,85	476,86	382,57	318,54	281,35	277,94	292,28	340,24	430,24	500,17	453,86
52°	270,43	438,42	490,11	397,49	314,66	264,48	254,51	276,18	338,11	444,87	515,71	467,89
54°	275,63	452,11	508,13	406,88	298,64	226,37	203,51	239,89	322,97	462,20	537,04	484,95
56°	283,84	471,26	529,25	405,63	259,98	164,17	139,71	172,45	288,61	462,02	560,43	507,17
58°	293,84	495,51	553,99	387,81	196,98	112,46	98,55	117,51	220,67	448,37	592,15	544,53
60°	317,87	533,02	576,57	351,03	140,50	88,91	85,13	91,09	159,33	413,12	633,03	606,99
62°	342,61	587,83	607,78	297,12	98,45	79,87	77,77	79,82	105,67	358,34	682,54	692,20
64°	360,54	659,89	636,09	239,38	76,92	71,89	70,91	71,47	79,65	297,39	711,93	739,42
66°	363,50	700,65	642,34	185,05	66,01	65,98	65,18	66,31	67,05	231,97	702,05	759,06
68°	384,89	742,73	617,60	132,10	58,27	60,59	55,39	60,70	57,34	165,45	664,17	772,93
70°	410,72	787,30	585,04	93,42	53,38	50,60	44,29	49,85	51,45	117,61	602,82	766,42
72°	422,11	788,32	536,17	67,64	50,89	42,36	38,34	42,29	48,74	80,77	521,85	711,38
74°	360,40	698,07	442,06	51,07	47,43	36,90	32,64	36,19	46,41	56,71	413,29	572,26
76°	235,50	445,11	322,70	40,13	43,83	31,24	27,25	30,97	43,00	40,79	280,53	269,44
78°	81,21	174,96	186,12	31,99	39,31	25,83	22,03	25,62	39,85	31,48	143,25	100,42
80°	40,11	85,26	78,98	27,80	35,24	20,96	17,24	20,24	38,03	26,23	56,04	54,38
82°	24,36	43,19	40,50	24,80	33,20	15,60	12,69	15,47	39,15	20,62	31,50	29,63
84°	13,70	15,99	23,65	20,61	31,58	10,46	8,02	10,69	36,35	15,29	17,18	9,59
86°	6,11	6,69	13,16	13,67	25,25	6,40	5,31	7,17	25,67	10,34	8,32	5,13
88°	2,82	3,93	7,77	7,39	15,87	3,41	2,53	3,43	15,48	5,52	5,06	2,31
90°	0,86	1,84	5,29	3,87	6,69	1,22	1,52	1,96	6,62	2,89	2,53	1,81

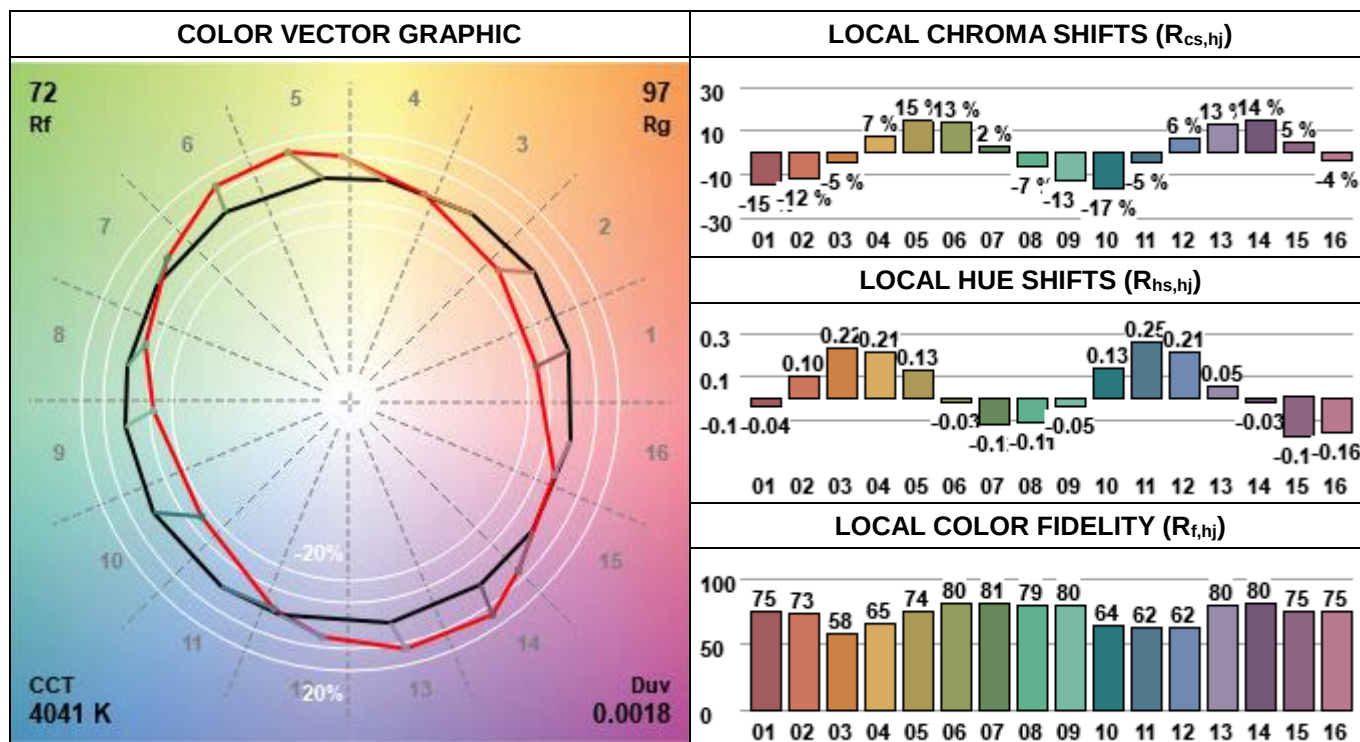
F – 10A/POL - 01	Nr wydania: 06	Data wydania: 07.01.2020	Strona(Page) 6 z 10
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	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°
0°	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4	229,4
2°	230,3	220,6	217,9	205,5	200,8	198,1	197,9	197,7	202,5	206,1	213,5	221,0
4°	230,9	211,3	197,8	177,1	164,8	156,8	155,5	157,2	167,5	179,0	194,7	211,6
6°	233,1	202,4	174,5	139,0	115,0	102,0	98,8	103,5	119,8	143,8	173,0	202,2
8°	234,9	191,6	146,2	98,5	78,8	71,7	70,0	71,4	80,2	103,0	147,7	191,5
10°	236,5	180,0	114,8	76,1	66,5	63,5	62,4	62,7	65,9	76,6	118,8	180,3
12°	237,3	166,3	90,4	66,9	63,4	62,2	61,8	61,1	61,8	66,8	92,1	168,6
14°	237,4	151,1	76,5	63,5	62,8	63,0	62,1	61,8	61,5	62,4	76,5	154,9
16°	237,4	135,5	69,3	62,5	63,2	64,2	64,3	63,2	62,5	60,7	68,4	139,5
18°	237,1	119,0	64,4	61,6	63,6	65,9	66,4	65,9	62,9	60,8	63,6	124,4
20°	237,3	103,5	62,2	60,5	64,1	68,3	69,0	68,0	64,6	60,6	61,2	109,8
22°	236,87	90,86	60,49	60,09	65,36	69,82	71,13	70,43	65,82	60,28	60,54	96,52
24°	237,56	82,06	58,86	58,91	65,37	71,13	71,62	71,02	66,55	60,13	58,04	85,69
26°	239,16	74,99	56,96	57,68	64,99	70,09	70,60	70,69	67,07	59,46	56,52	77,68
28°	243,28	70,26	54,73	56,17	63,14	67,99	68,57	69,31	65,95	58,63	55,12	72,10
30°	247,77	66,98	53,00	54,36	60,16	65,87	65,89	67,13	63,60	56,69	53,66	67,39
32°	251,64	63,72	51,08	51,71	56,57	62,58	63,27	63,57	60,49	54,36	51,45	64,30
34°	254,56	60,91	49,55	49,32	52,88	59,87	59,45	60,12	57,19	51,93	49,78	61,17
36°	258,30	58,68	47,37	46,22	49,93	57,36	57,99	58,26	53,49	48,41	48,18	58,80
38°	263,40	56,94	45,95	43,08	47,32	56,63	57,61	56,75	50,46	45,60	47,04	56,53
40°	268,82	54,87	43,88	40,76	44,66	56,49	57,13	56,19	46,84	42,76	45,31	55,02
42°	274,53	52,77	42,45	38,21	43,24	56,74	57,66	56,45	45,21	39,71	43,68	54,03
44°	278,81	51,85	40,25	35,91	41,55	57,37	59,28	57,22	43,78	37,42	42,03	52,30
46°	282,40	49,58	38,33	34,11	40,06	59,26	62,47	58,88	43,14	36,15	40,30	51,15
48°	285,51	48,14	36,22	32,67	39,63	60,75	63,66	60,19	42,57	35,11	38,13	49,62
50°	290,77	46,76	34,19	31,59	39,46	58,41	61,34	59,43	41,26	32,45	36,41	48,39
52°	298,86	45,33	31,80	29,68	37,88	55,86	62,37	55,82	39,37	31,33	34,71	47,18
54°	306,75	43,59	30,55	28,34	36,50	77,16	98,90	69,62	37,91	29,79	32,04	45,29
56°	315,82	41,56	28,04	27,40	35,72	100,58	107,89	94,84	36,94	28,59	30,45	43,22
58°	329,10	43,02	27,75	25,78	40,97	105,80	105,64	100,79	39,48	27,21	28,33	42,17
60°	347,09	50,56	25,87	24,41	48,22	104,43	108,76	101,56	47,61	25,65	27,59	42,80
62°	384,18	57,12	24,86	23,32	52,41	105,25	120,66	103,98	54,22	24,10	26,07	45,22
64°	434,87	54,02	23,21	22,51	53,70	106,81	102,26	109,26	56,95	23,32	24,62	43,03
66°	444,25	43,91	20,81	22,22	53,65	106,22	87,48	107,27	56,28	22,07	23,00	35,84
68°	443,95	39,00	20,58	21,74	51,57	96,65	59,38	97,01	55,95	21,55	22,12	31,72
70°	471,27	36,65	20,89	21,65	44,47	73,80	42,43	77,55	52,05	21,31	21,88	29,00
72°	494,10	31,02	22,50	21,26	39,14	49,40	24,09	54,87	46,87	20,72	23,33	25,99
74°	475,70	27,45	25,74	20,37	34,80	34,32	13,94	39,73	43,34	20,70	24,64	23,33
76°	382,15	22,75	25,97	18,45	29,45	24,13	1,78	28,75	39,62	20,23	25,02	19,47
78°	212,34	17,54	23,30	16,19	24,58	16,95	0,00	21,33	33,42	18,71	23,68	15,74
80°	65,73	11,90	19,52	13,71	19,34	12,12	0,10	15,18	26,71	16,48	20,49	11,00
82°	33,62	8,47	14,10	10,89	15,06	8,69	0,10	10,39	20,39	14,10	16,50	8,39
84°	16,93	5,50	9,78	8,65	11,79	5,94	0,07	7,25	16,03	10,53	12,35	6,09
86°	7,75	4,05	6,37	5,89	9,12	3,64	0,02	4,80	12,37	7,39	8,11	4,00
88°	4,26	2,68	3,93	3,75	6,51	2,47	0,00	3,56	7,83	4,52	5,03	2,86
90°	1,48	1,64	2,53	2,70	3,63	1,56	0,30	1,51	4,87	2,11	2,87	2,40

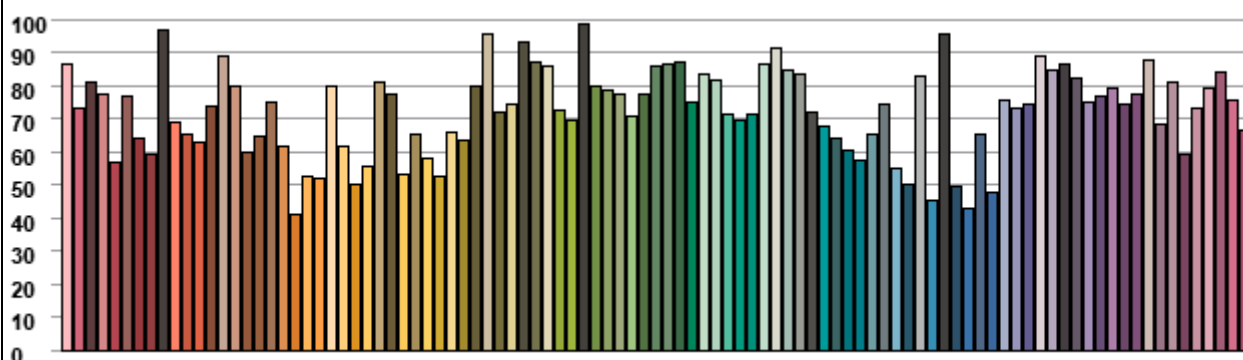
10. BEAM CONE

11. BEAM ANGLES

C plane	Beam angle [°]	Gamma max [°]	Start [°]	Stop [°]
0-180	47,9	-72,0	-77,6	-29,7
15-195	33,5	72,0	42,8	76,4
30-210	62,9	66,0	13,1	76,0
45-225	67,5	54,0	-2,1	65,3
60-240	62,7	28,0	-3,7	59,0
75-255	59,1	26,0	-3,3	55,8
90-270	58,2	26,0	-3,2	55,0
105-285	59,2	26,0	-3,2	56,0
120-300	62,8	32,0	-3,4	59,4
135-315	65,9	54,0	0,2	66,0
150-330	48,6	64,0	26,2	74,9
165-345	37,3	68,0	38,0	75,2

12. TM-30-18 CHARTS AND CALCULATIONS



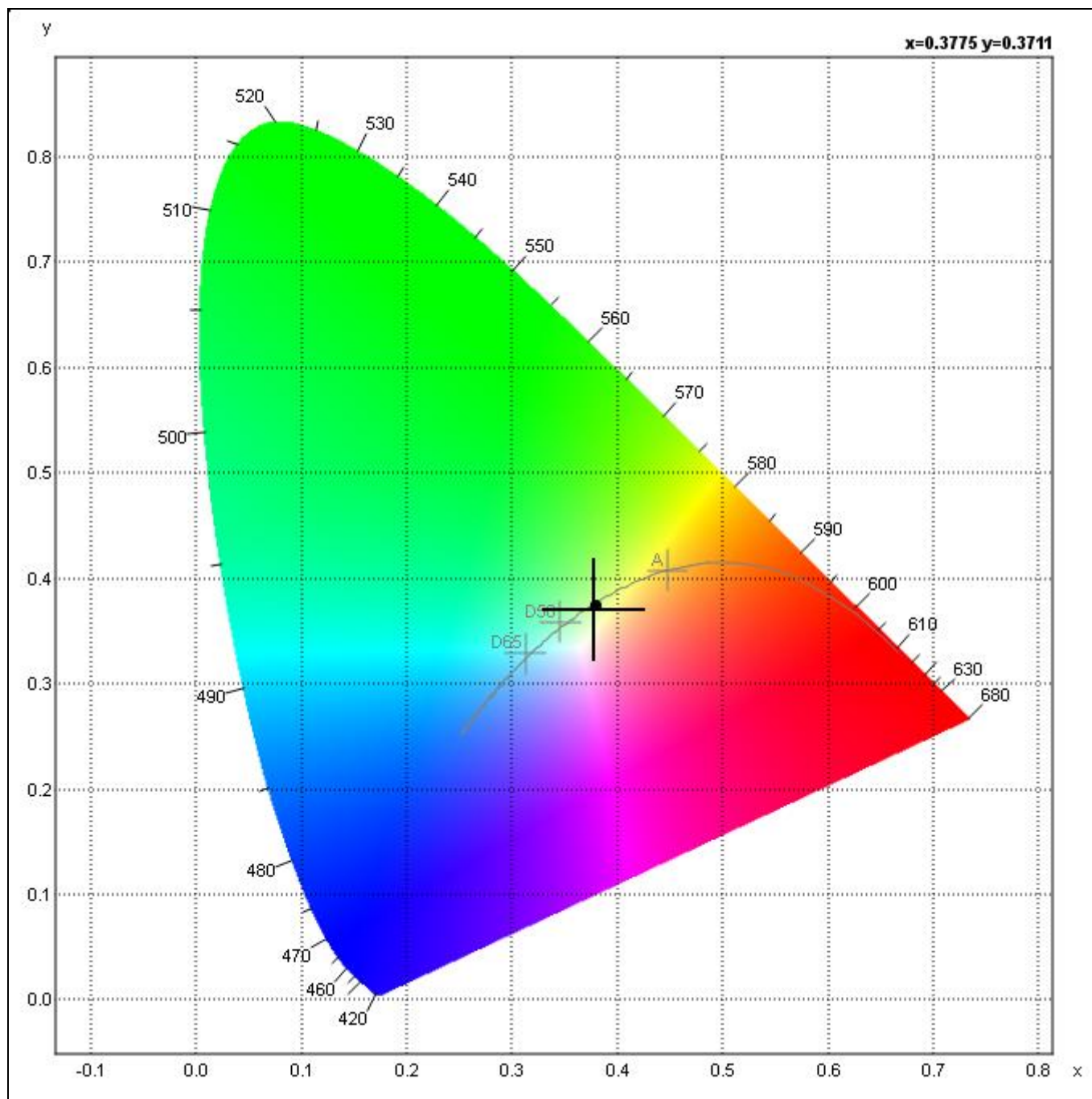
COLOR SAMPLE FIDELITY ($R_{f,CESi}$)



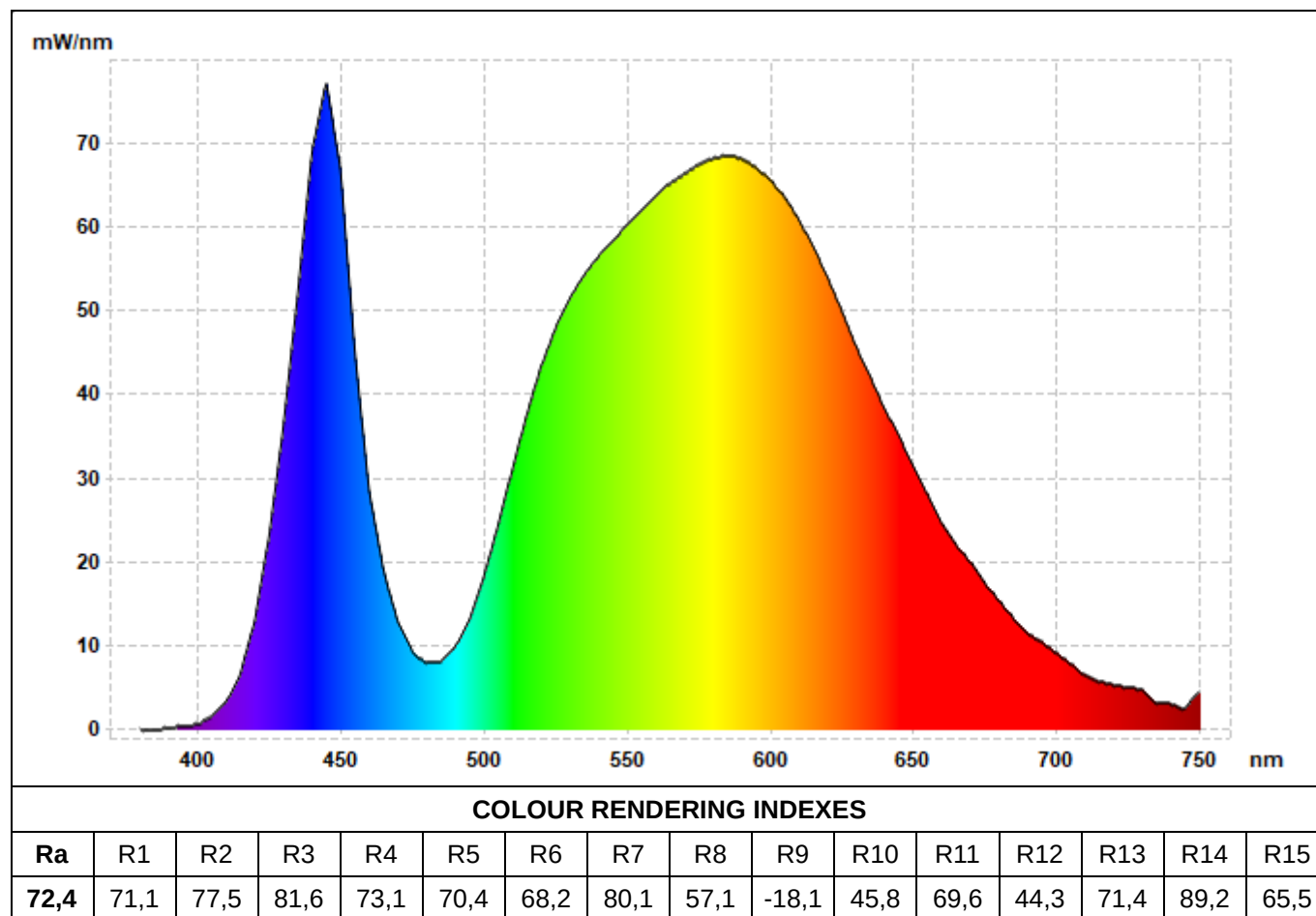
MAIN PARAMETERS

Fidelity Index (R_f)			72		Gamut Index (R_g)			97		Skin Index (R_{fskin})			77		
LOCAL CHROMA SHIFTS VALUES ($R_{cs,hj}$)															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
-15 %	-12 %	-5 %	7 %	15 %	13 %	2 %	-7 %	-13 %	-17 %	-5 %	6 %	13 %	14 %	5 %	-4 %
LOCAL HUE SHIFTS VALUES ($R_{hs,hj}$)															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
-0,04	0,099	0,22	0,21	0,13	-0,026	-0,12	-0,11	-0,046	0,13	0,25	0,21	0,049	-0,028	-0,18	-0,16
LOCAL COLOR FIDELITY VALUES ($R_{f,hj}$)															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
75	73	58	65	74	80	81	79	80	64	62	62	80	80	75	75

13. CIE1931 CHART AND COLOURIMETRIC PARAMETERS



CIE 1931 2° OBSERVER		x:	0,3775 ±0,0015
u':	0,2254	y:	0,3711 ±0,0015
v':	0,4986	OTHER PARAMETERS	
L:	100,00	CCT:	4041 K
a:	11,42	Chromaticity Error:	0,009
b:	29,27	Colour Peak:	444,09 nm
X:	3987,77	Colour Dominant:	580,0 nm
Y:	3920,71	Purity:	0,247
Z:	2655,41	Scotopic/Photopic:	0,60

14. SPECTRUM AND COLOUR RENDERING INDEX

15. EQUIPMENT USED

NO.	EQUIPMENT	PRODUCER/TYPE	SERIES	MARK	USED
1.	Goniometer C-y	GL Optic / GLG-20-1500	G1500-019 4/2017	LAB/UP/26	☒
2.	AC power supply	ITECH / IT7322	602130010727750003	LAB/UP/39	☒
3.	DC power supply	ITECH / IT6724H	600469010727730003	LAB/UP/40	☐
4.	Power meter*	ITECH / IT9121	60217300001045	LAB/PP/11	☐
5.	Spectrometer*	GL Optic / SPECTIS 1.0 VIS GLX10	X0010261/B14W0060	LAB/PP/30	☒
6.	Spectrometer*	GL Optic / SPECTIS 1.0 FLICKER VIS	Xt010065/16J00129	LAB/PP/29	☐
7.	Spectrometer*	GL Optic / SPECTIS 5.0 UV-VIS-NIR	Xt050149/1104N069	LAB/PP/31	☐
8.	Luminance telescope*	GL OPTIC / GL PSM	GL 160324	LAB/UP/27	☐
9.	Thermo-hygrometer*	T&D / TR-72wf	4214 09BA	LAB/UP/37	☐
10.	Photometer*	GL Optic / Photometer 3.0 LS + FLICKER	GL180140	LAB/PP/32	☐

* - Periods nad calibration reports of measuring instruments available upon request.

PHOTOMETRIC TEST REPORT

LM-79 & EN 13032-4



Nr.TSP-17025-LB-001.00

LUG Light Factory Ltd ul. Gorzowska 11 65-127 Zielona Góra, POLAND KRS 0000290498 REGON 080212116 NIP PL 929-17-85-452	LUG Testing Laboratory address: ul. Nowa 7 66-002 Nowy Kisielin, POLAND	TEST SPECIFICATION – STANDARDS: PN – EN 13032-4:2015 IES LM-79-08
Test Report No. BF_13_5375_18	Tested by: Krzysztof Olek	Compiled by: Krzysztof Olek
Test date: 2018-02-17	Approved by: Marcin Białas	Client name: A. Pomalecki LUG Light Factory
This protocol shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.		
Measurement uncertainty: The measurement uncertainty was determined in accordance with EA-4/0,2 M:2013. The uncertainty values provided are expanded uncertainties at a confidence level of approximately 95% and an extension factor of k=2.		

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2. LUMINAIRE DATA

Company:	LUG Light Factory		
Model name:	URBINI LED ED 2450lm/740 O9 szary II klasa		
Index:	130232.5L162.101		
Sample No.:	056/3/18		
Power supply:	Philips Xi LP 40W 0.3-1.0A S1 230V C123 sXt set to 500mA		
Light source:	LUG ML1600400.W740.02A 12 LED		
LED model:	CREE XPG-3 BIN: S4		
Optic:	O9 PC lens		
Supplementary information:	Test report is valid also for: 130232.5L041.101 URBINI LED ED 2450lm/740 O9 szary		
Dimensions of luminaire:		Dimensions of luminous area:	
Length:	407 mm	Length:	173 mm
Width:	110 mm	Width:	71 mm
Height:	120 mm	C0-plane height:	0 mm
		C90-plane height:	0 mm
		C180-plane height:	0 mm
		C270-plane height:	0 mm

3. MEASUREMENT CONDITIONS AND STABILIZATION

Photometric method:	Photo-spectro-goniometer type C-γ, bandwidth 380-750nm
Measurement type:	Absolute
Sample position during measurement:	Side, tilt 0°
Measurement distance:	10,478 ±0,002 m
Ambient temperature:	25 ±1,2°C
Integrating time:	Automatic
Burning time and stabilization criterion:	pre-stabilization time: >2h, stabilization: <0,5% during 15 min

N/A

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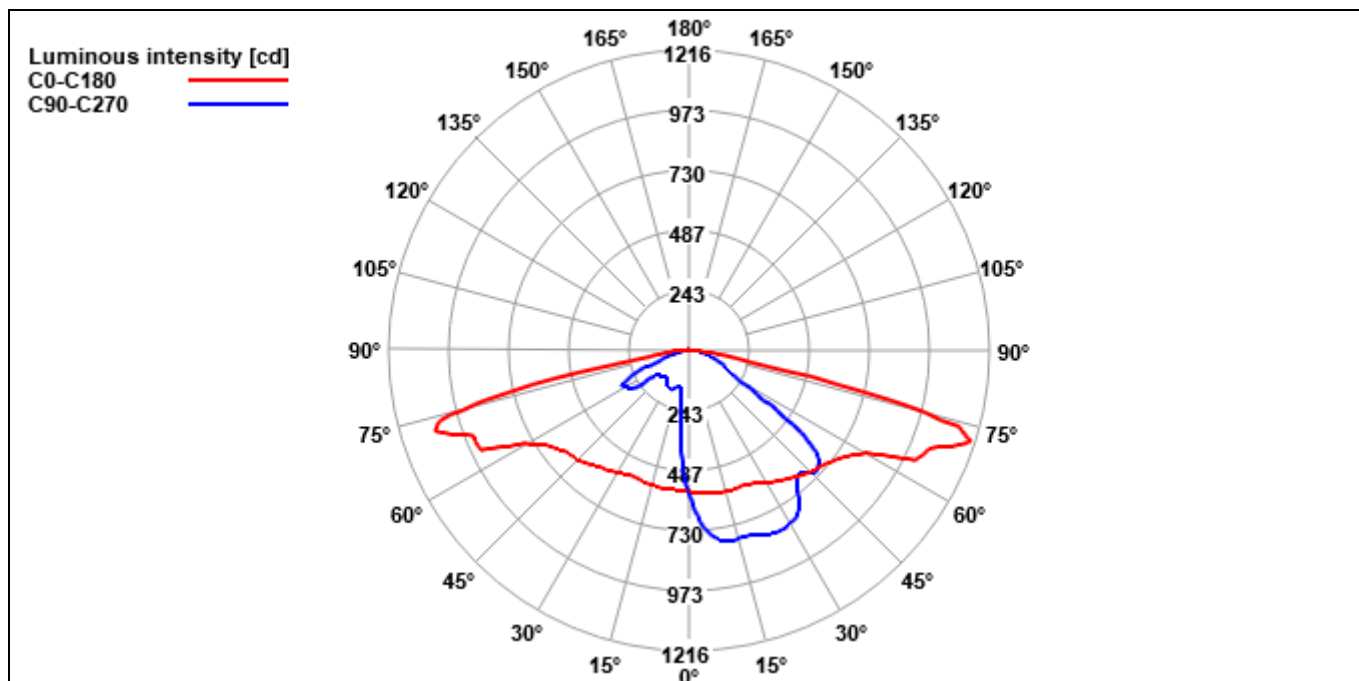
4. ELECTRICAL MEASUREMENTS RESULTS

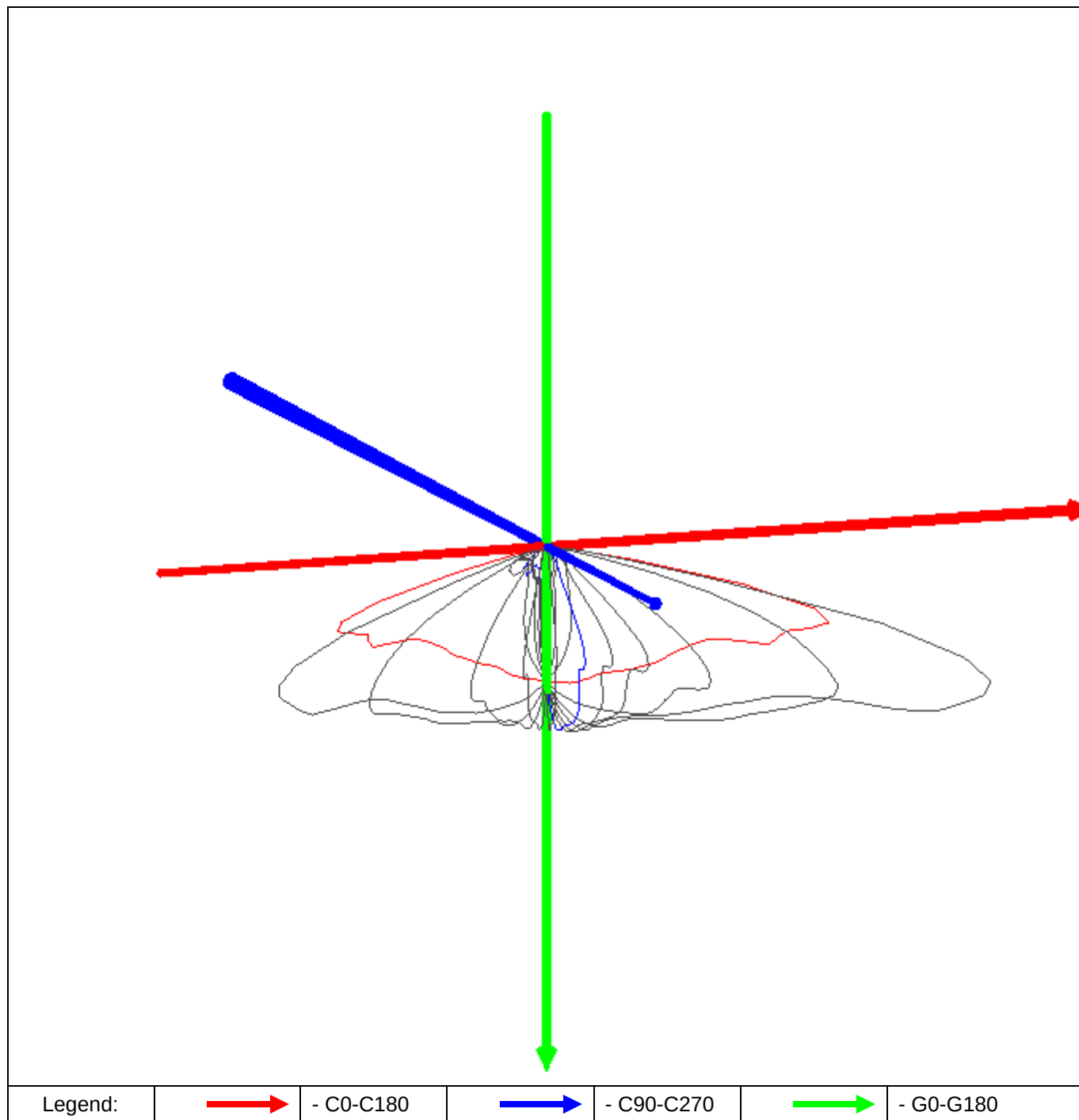
Voltage:	230 V
Frequency:	50 Hz
Current:	0,090 A
Active power:	19,6 W
Apparent power:	N/A
Reactive power:	N/A
Power factor:	0,946
Current THD:	N/A

5. GONIOMETRIC MEASUREMENT RESULTS

Total luminous flux:	2439,40 lm, relative measurement uncertainty: $\pm 4,88\%$
Light output ratio (LOR):	100,00%
Lower hemisphere output ratio (DLOR):	99,97%
Upper hemisphere output ratio (ULOR):	0,03%
Maximum luminous intensity:	1886,99 cd, relative measurement uncertainty: $\pm 4,88\%$
Luminous efficacy:	124,46 lm/W
Colour temperature:	4016
Colour rendering index:	72,44
Angular Colour Uniformity:	0,0352

6. LIGHT INTENSITY DISTRIBUTION DIAGRAM



7. 3D CHART

8. UTILIZATION FACTORS

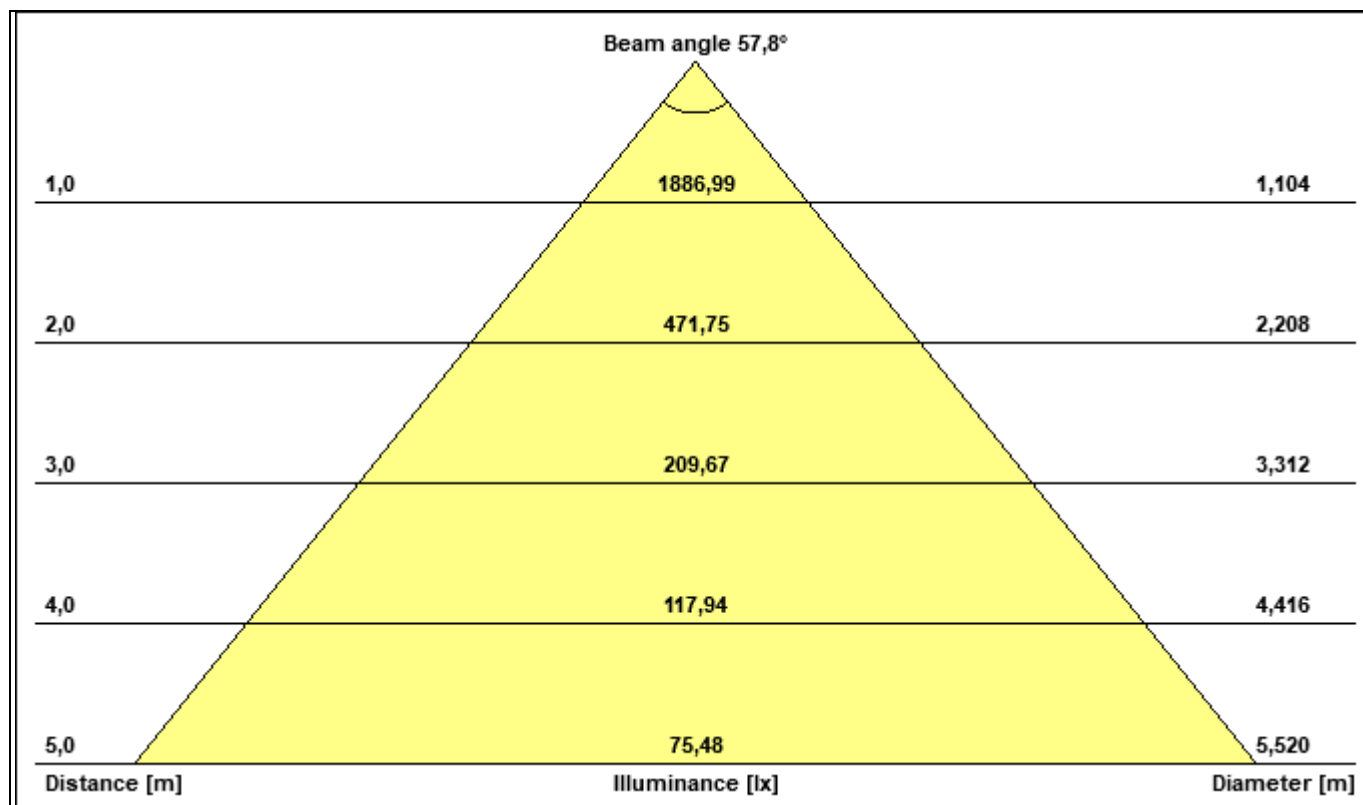
k = 0.60:	0,184	k = 2.00:	0,576
k = 0.80:	0,264	k = 2.50:	0,641
k = 1.00:	0,337	k = 3.00:	0,690
k = 1.25:	0,414	k = 4.00:	0,758
k = 1.50:	0,477	k = 5.00:	0,802

9. LUMINOUS INTENSITY [CD/KLM]

	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°
0°	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0
2°	236,8	243,9	251,9	255,3	259,5	259,2	261,5	258,9	257,5	253,4	247,8	241,3
4°	238,9	253,8	266,6	273,1	281,2	282,4	285,0	281,6	278,0	269,7	260,9	248,7
6°	239,9	261,4	280,2	291,2	298,7	300,8	302,4	299,7	294,7	285,8	272,7	256,7
8°	241,3	268,1	291,9	304,8	312,8	315,4	315,5	314,0	308,7	299,8	285,1	262,9
10°	242,9	275,3	302,3	315,9	324,1	323,8	323,2	322,3	319,5	311,1	295,3	269,8
12°	243,1	281,3	311,3	324,2	328,6	326,8	324,7	324,4	324,6	319,8	305,2	275,2
14°	243,8	286,5	318,7	326,9	326,2	326,9	326,0	325,8	326,5	325,3	313,0	281,3
16°	243,6	292,4	324,7	324,2	324,7	325,3	323,6	325,4	324,6	326,9	320,2	286,7
18°	244,5	297,6	328,0	322,2	324,1	324,5	324,9	323,8	323,1	326,0	324,2	292,1
20°	244,1	303,9	328,9	321,9	323,1	327,3	328,5	327,0	325,7	326,6	329,6	299,0
22°	243,34	310,20	328,66	322,58	325,03	330,10	331,75	330,42	327,64	327,52	331,67	305,06
24°	244,28	315,45	329,99	325,53	327,97	334,38	335,22	335,31	331,76	331,73	333,70	311,10
26°	247,71	322,23	332,99	328,26	330,45	336,52	337,71	337,54	335,18	335,86	336,98	318,20
28°	250,88	330,72	338,34	333,93	333,10	335,36	337,87	338,20	339,87	341,55	342,44	326,37
30°	255,01	338,67	345,00	338,84	333,55	332,31	334,24	335,43	342,17	348,16	349,35	332,31
32°	259,06	346,86	352,81	343,60	333,62	329,69	333,18	335,41	343,02	355,82	356,72	338,99
34°	264,28	354,18	361,36	349,19	329,14	324,47	326,65	331,70	341,42	363,42	365,12	345,87
36°	267,65	360,30	370,87	354,35	322,20	310,99	312,54	318,79	336,22	371,48	375,88	352,69
38°	271,92	367,93	383,09	355,62	310,13	292,95	295,65	300,49	324,87	375,97	388,54	361,78
40°	276,53	376,49	394,08	356,20	301,10	282,04	281,38	287,94	313,74	379,59	400,76	372,38
42°	281,62	383,51	405,09	355,51	296,34	273,04	275,16	277,66	308,70	384,60	412,59	381,49
44°	285,74	392,33	417,95	357,21	290,76	275,50	283,12	276,88	304,00	389,66	425,42	389,41
46°	289,21	400,73	432,26	356,96	296,84	291,81	294,74	295,58	304,47	392,58	440,21	398,50
48°	291,78	411,27	445,94	362,51	315,60	292,08	290,35	298,38	325,24	393,92	454,17	408,59
50°	296,06	424,26	457,00	379,03	323,20	287,77	283,24	295,30	335,22	407,11	467,81	421,62
52°	302,59	438,00	470,23	397,00	319,99	273,37	265,77	282,64	336,32	425,78	481,00	434,06
54°	308,85	450,93	488,18	410,76	307,51	246,88	232,31	260,12	327,33	439,85	499,42	447,93
56°	317,02	469,53	504,40	408,22	279,68	190,75	164,55	204,61	305,27	446,64	521,44	465,13
58°	327,35	496,58	525,95	392,50	220,19	131,25	109,99	140,24	255,51	439,02	543,04	489,27
60°	344,66	528,79	545,35	359,16	157,64	94,45	88,34	98,85	188,89	417,33	572,13	528,12
62°	377,02	578,36	567,90	308,51	108,66	82,10	77,89	84,86	133,18	368,81	609,19	586,92
64°	419,65	648,85	585,86	248,59	81,84	72,58	70,25	73,61	93,01	320,28	649,74	656,51
66°	426,95	706,03	588,25	191,19	70,03	65,56	64,86	65,31	74,92	262,06	661,14	687,30
68°	435,83	735,61	558,54	137,86	60,19	61,11	58,27	60,34	63,01	200,95	649,58	710,04
70°	469,31	767,06	515,83	96,63	53,76	52,42	47,78	53,35	53,09	141,33	614,13	737,58
72°	493,72	773,55	468,67	70,05	51,04	42,17	38,79	42,78	46,97	101,04	561,05	734,37
74°	467,95	724,16	398,41	52,50	46,23	36,70	33,50	36,32	43,49	71,26	483,86	677,78
76°	348,07	583,33	305,82	40,56	42,23	31,37	27,55	31,78	41,20	50,00	375,82	509,30
78°	161,86	286,49	198,47	32,46	37,59	25,62	23,25	27,08	38,84	35,79	239,68	216,42
80°	54,38	125,08	91,62	27,45	32,75	21,28	17,90	21,48	35,93	27,81	107,41	84,22
82°	30,07	66,79	44,80	24,99	30,45	15,62	12,89	17,15	35,77	21,74	44,47	43,75
84°	14,76	34,53	26,00	23,41	28,45	10,57	9,38	11,71	36,50	17,20	24,55	17,80
86°	5,43	9,83	15,83	14,96	25,77	6,76	4,76	7,08	27,94	11,68	11,16	4,81
88°	2,06	5,30	8,33	9,36	16,48	3,90	2,14	4,33	17,07	7,27	4,45	2,62
90°	0,36	2,76	5,41	3,20	6,95	0,96	0,14	1,24	8,13	3,15	2,55	2,15

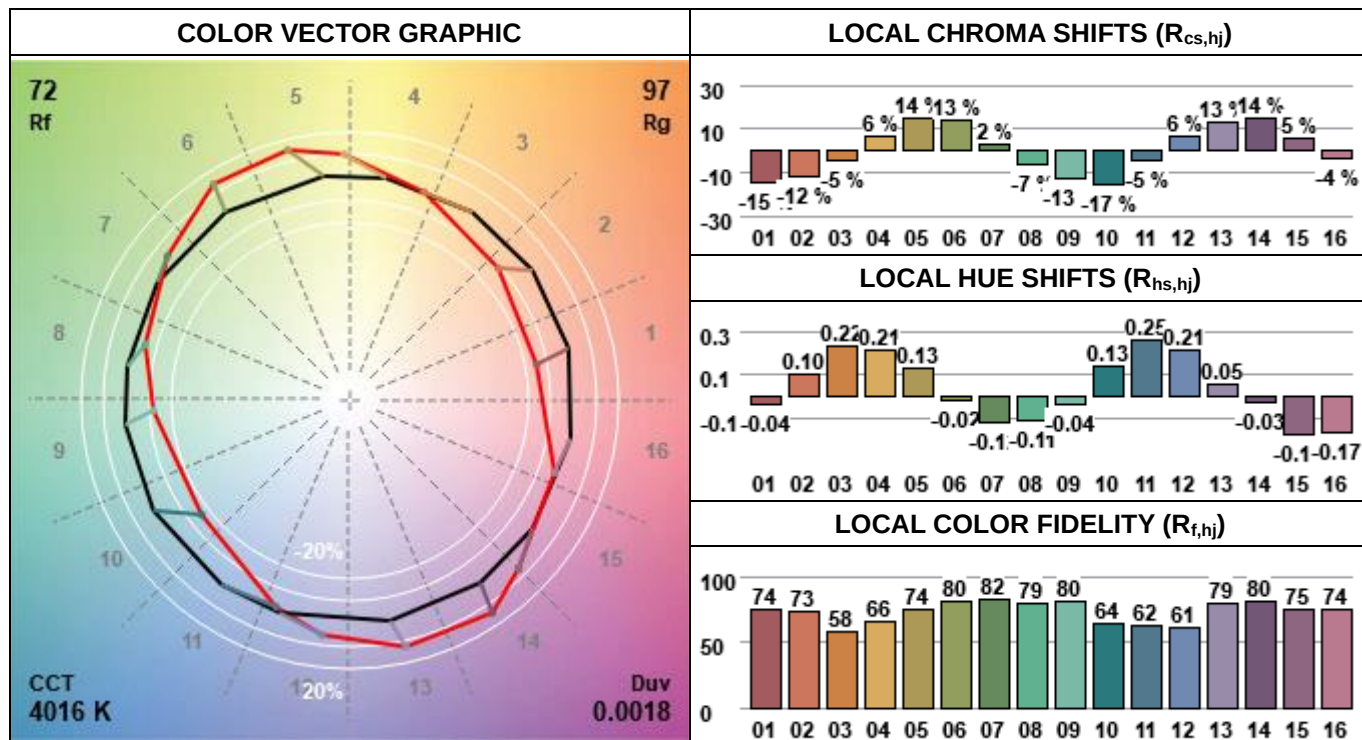
F – 10A/POL - 01	Nr wydania: 06	Data wydania: 07.01.2020	Strona(Page) 6 z 10
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	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°
0°	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0	235,0
2°	233,9	227,1	219,3	212,3	206,7	202,2	204,2	205,0	209,0	214,7	221,2	228,2
4°	233,4	216,6	200,4	182,8	170,3	160,3	162,4	164,2	175,7	188,8	206,7	222,0
6°	233,8	206,6	177,8	147,1	124,4	110,1	108,9	115,3	133,0	157,4	188,7	215,4
8°	234,7	196,2	151,7	106,7	83,1	73,6	73,4	75,8	89,3	123,5	167,4	208,7
10°	234,6	184,7	123,8	79,0	66,8	64,2	63,2	63,5	68,8	87,4	142,9	199,8
12°	233,6	171,3	95,0	66,5	62,7	61,8	61,7	61,5	61,4	70,9	117,5	191,1
14°	232,7	156,6	77,4	62,4	62,9	63,1	61,9	62,2	60,8	62,8	92,3	181,0
16°	233,4	141,7	67,3	61,9	62,8	64,4	64,1	63,9	60,6	61,4	76,6	171,4
18°	232,3	125,7	62,3	60,6	64,4	65,7	67,1	65,9	62,0	59,1	67,4	161,0
20°	230,2	110,2	59,1	60,5	64,9	68,5	69,4	68,9	62,4	58,2	61,7	149,4
22°	229,54	94,93	58,27	60,35	66,36	70,51	71,76	70,17	64,98	58,96	58,36	136,47
24°	229,17	83,05	56,25	59,68	66,74	71,29	71,85	71,26	65,44	57,83	56,96	125,12
26°	230,17	74,03	54,05	58,52	66,18	70,47	70,91	71,23	65,20	56,59	55,07	112,55
28°	233,13	67,87	51,66	56,26	64,44	69,85	70,18	69,50	64,27	55,12	53,27	100,94
30°	235,65	63,65	50,42	54,37	61,91	66,88	67,33	66,95	61,30	53,02	51,83	93,30
32°	238,03	59,33	48,30	52,25	58,34	63,51	64,89	63,47	58,24	50,96	49,42	86,39
34°	240,97	57,14	46,85	49,70	55,45	61,55	61,30	59,96	54,32	49,07	48,18	80,00
36°	243,09	53,90	44,37	46,01	52,15	60,73	59,25	57,93	50,34	45,38	46,74	74,88
38°	245,67	51,25	43,22	42,66	48,54	59,16	58,92	56,75	47,69	43,06	44,75	69,83
40°	249,39	49,65	41,49	41,15	46,91	59,60	58,81	54,37	43,64	40,88	44,33	66,61
42°	253,82	47,82	39,74	36,93	44,59	59,10	58,59	55,36	41,85	37,88	42,37	62,97
44°	257,42	46,55	37,59	35,60	43,07	60,31	61,79	56,16	41,09	36,11	40,19	60,49
46°	260,18	45,46	35,87	33,42	42,28	62,91	63,96	57,32	40,42	33,97	39,37	57,43
48°	261,24	43,56	33,50	31,94	42,03	63,39	65,17	58,15	38,63	32,74	37,40	55,72
50°	264,59	41,56	32,43	30,70	40,73	60,92	61,88	55,39	37,61	31,12	35,00	52,98
52°	270,64	39,63	29,86	29,34	38,98	61,55	70,97	53,64	36,46	29,49	33,82	51,12
54°	276,06	37,70	28,02	28,16	38,37	99,55	111,14	73,50	34,72	28,04	31,32	48,58
56°	283,84	36,55	26,86	26,96	42,31	116,79	119,34	98,71	33,62	26,94	29,10	46,03
58°	294,87	37,25	25,59	25,77	54,12	118,76	117,29	106,93	35,39	26,41	28,00	46,06
60°	312,23	44,76	25,24	24,61	63,50	117,64	120,94	108,24	41,58	24,06	26,41	50,13
62°	342,04	47,64	23,70	23,04	66,90	123,18	126,59	109,09	47,30	22,81	25,70	57,55
64°	382,04	43,72	22,20	23,23	68,06	114,69	109,96	111,31	49,38	21,36	23,73	54,09
66°	384,64	35,89	20,03	22,81	65,36	110,59	89,46	114,07	50,82	21,03	22,57	46,68
68°	382,66	31,64	18,99	23,23	58,20	86,75	63,29	100,18	49,45	19,39	21,31	44,13
70°	411,39	28,56	20,38	23,18	53,02	68,99	36,14	82,13	48,02	19,13	21,81	42,34
72°	440,62	24,76	22,48	22,79	49,38	45,29	23,12	59,32	41,63	18,89	23,87	42,18
74°	428,78	21,67	23,98	22,94	43,79	28,68	9,52	44,48	37,13	19,63	26,60	38,49
76°	346,87	18,27	21,89	19,47	37,48	19,51	0,00	33,05	32,89	17,30	25,56	29,28
78°	184,82	14,58	18,86	17,33	28,07	12,13	0,00	22,81	26,89	16,58	21,80	20,04
80°	61,99	8,88	15,39	13,24	21,61	8,22	0,00	16,63	22,16	14,65	18,43	11,83
82°	29,05	6,33	11,26	10,48	16,33	5,08	0,00	11,63	17,26	11,83	14,03	7,66
84°	13,91	4,22	7,05	7,92	11,85	3,90	0,00	7,32	12,30	8,53	9,53	3,78
86°	6,74	2,20	4,53	5,25	8,39	2,28	0,00	4,61	9,89	6,13	5,74	2,31
88°	2,83	1,67	2,27	2,67	5,78	1,24	0,00	3,17	5,99	3,51	3,12	1,71
90°	0,28	0,59	1,69	0,31	1,86	0,00	0,00	1,16	1,51	0,24	1,40	1,16

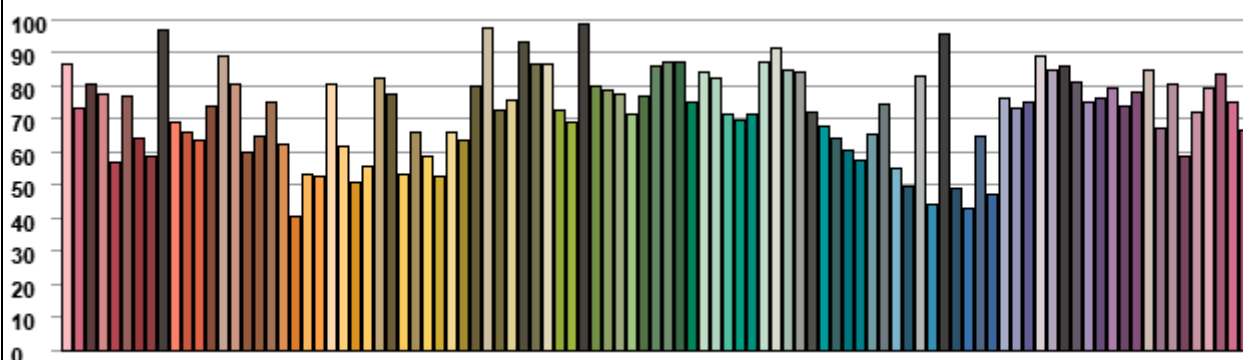
10. BEAM CONE

11. BEAM ANGLES

C plane	Beam angle [°]	Gamma max [°]	Start [°]	Stop [°]
0-180	51,6	72,0	25,5	77,1
15-195	34,6	72,0	42,7	77,3
30-210	67,8	66,0	8,4	76,2
45-225	68,0	54,0	-2,5	65,5
60-240	63,9	32,0	-4,2	59,7
75-255	60,4	26,0	-3,6	56,8
90-270	59,6	28,0	-3,7	55,9
105-285	60,9	28,0	-3,8	57,1
120-300	64,8	32,0	-4,2	60,6
135-315	68,4	56,0	-1,2	67,3
150-330	55,7	66,0	20,9	76,7
165-345	37,6	70,0	39,3	77,0

12. TM-30-18 CHARTS AND CALCULATIONS



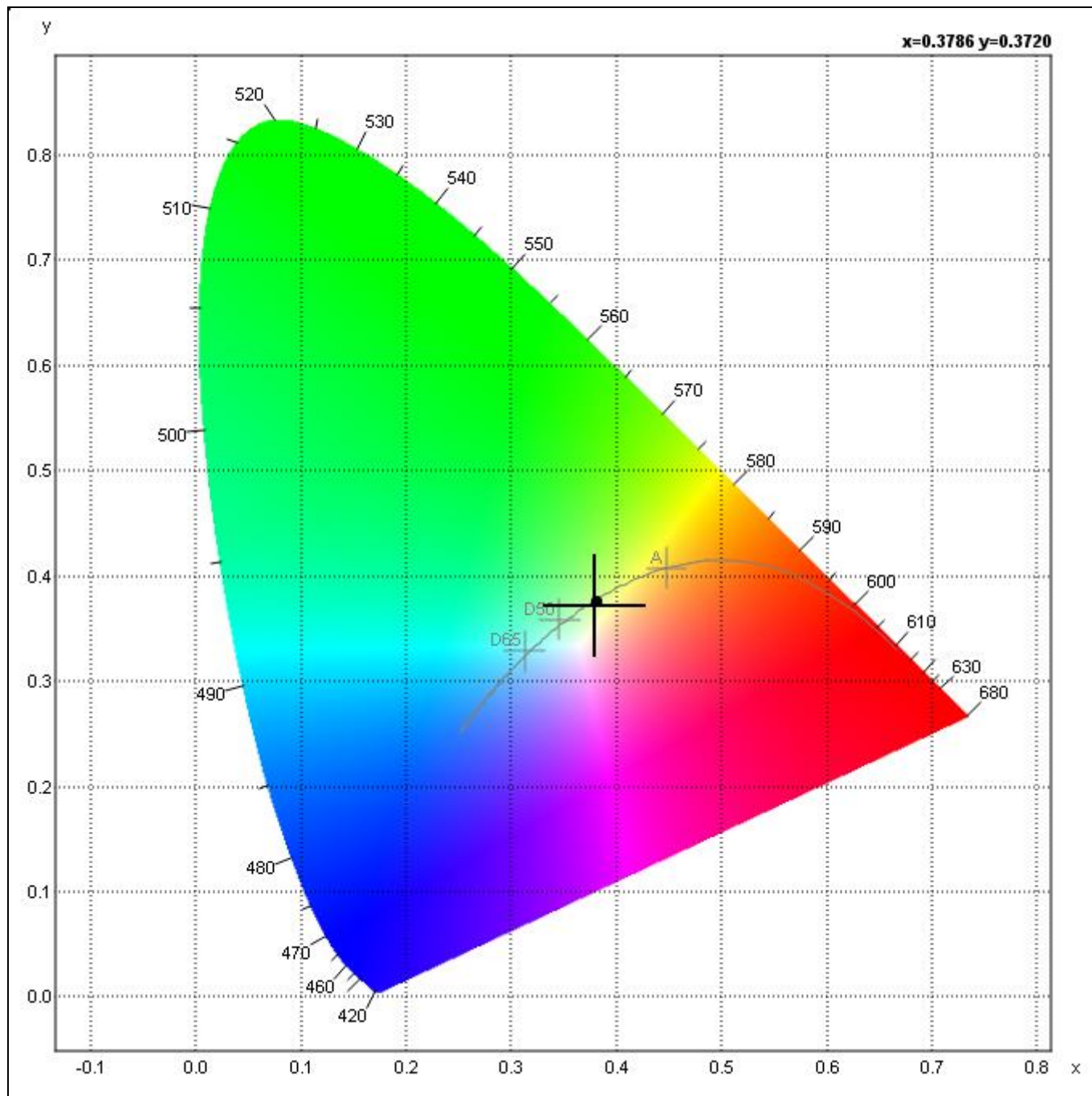
COLOR SAMPLE FIDELITY ($R_{f,CESi}$)



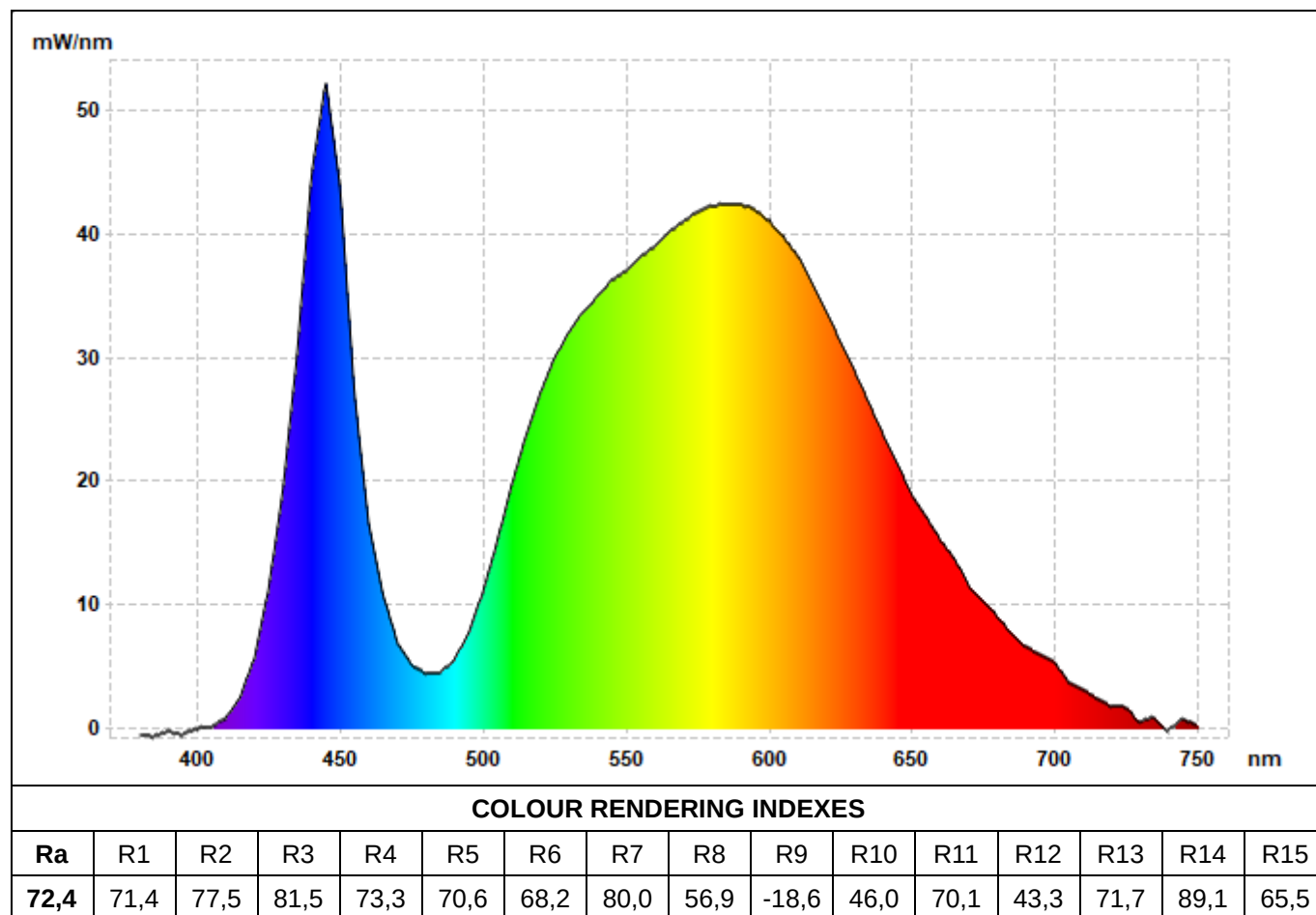
MAIN PARAMETERS

Fidelity Index (R_f)			72		Gamut Index (R_g)			97		Skin Index (R_{fskin})			78		
LOCAL CHROMA SHIFTS VALUES ($R_{cs,hj}$)															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
-15 %	-12 %	-5 %	6 %	14 %	13 %	2 %	-7 %	-13 %	-17 %	-5 %	6 %	13 %	14 %	5 %	-4 %
LOCAL HUE SHIFTS VALUES ($R_{hs,hj}$)															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
-0,041	0,098	0,22	0,21	0,13	-0,025	-0,12	-0,11	-0,043	0,13	0,25	0,21	0,047	-0,029	-0,18	-0,17
LOCAL COLOR FIDELITY VALUES ($R_{f,hj}$)															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
74	73	58	66	74	80	82	79	80	64	62	61	79	80	75	74

13. CIE1931 CHART AND COLOURIMETRIC PARAMETERS



CIE 1931 2° OBSERVER		x:	0,3786 ±0,0015
u':	0,2258	y:	0,3720 ±0,0015
v':	0,4992	OTHER PARAMETERS	
L:	100,00	CCT:	4016 K
a:	11,54	Chromaticity Error:	0,009
b:	29,84	Colour Peak:	445,94 nm
X:	2474,81	Colour Dominant:	580,0 nm
Y:	2431,45	Purity:	0,253
Z:	1630,41	Scotopic/Photopic:	0,60

14. SPECTRUM AND COLOUR RENDERING INDEX

15. EQUIPMENT USED

NO.	EQUIPMENT	PRODUCER/TYPE	SERIES	MARK	USED
1.	Goniometer C-y	GL Optic / GLG-20-1500	G1500-019 4/2017	LAB/UP/26	☒
2.	AC power supply	ITECH / IT7322	602130010727750003	LAB/UP/39	☒
3.	DC power supply	ITECH / IT6724H	600469010727730003	LAB/UP/40	☐
4.	Power meter*	ITECH / IT9121	60217300001045	LAB/PP/11	☐
5.	Spectrometer*	GL Optic / SPECTIS 1.0 VIS GLX10	X0010261/B14W0060	LAB/PP/30	☒
6.	Spectrometer*	GL Optic / SPECTIS 1.0 FLICKER VIS	Xt010065/16J00129	LAB/PP/29	☐
7.	Spectrometer*	GL Optic / SPECTIS 5.0 UV-VIS-NIR	Xt050149/1104N069	LAB/PP/31	☐
8.	Luminance telescope*	GL OPTIC / GL PSM	GL 160324	LAB/UP/27	☐
9.	Thermo-hygrometer*	T&D / TR-72wf	4214 09BA	LAB/UP/37	☐
10.	Photometer*	GL Optic / Photometer 3.0 LS + FLICKER	GL180140	LAB/PP/32	☐

* - Periods nad calibration reports of measuring instruments available upon request.

Digitally signed by Socolovschi Mihai
Date: 2019.07.05 12:52:04 EEST
Reason: MoldSign Signature
Location: Moldova



NVLAP Lab Code 500041-0

Cree® XLamp® XT-E White LEDs

INFORMATION REQUIRED BY LM-80-08

Cree classifies these LEDs as "LED packages" per Sep 9, 2011 ENERGY STAR guidelines¹.

1. Number of LED light sources tested	See individual data sets on following pages.
2. Description of LED light sources	XLamp XT-E White LEDs (Series: XTEAWT) This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx All measurements provided are LED package measurements.
3. Description of test and auxiliary equipment	Instrument Systems ISP-500 Integrating Sphere Instrument Systems CAS-140 Spectrometer Keithley 2420 Sourcemeter
4. Operating cycle	LED packages are driven at constant current.
5. Ambient conditions	LED packages are operated in environmental control chambers. The temperature of the ambient air around the LED packages is actively controlled by air flowing through the chamber. T_A : See individual data sets on following pages RH : < 45% Air flow : 800 CFM
6. Case temperature	See individual data sets on following pages.
7. Drive current of the LED light source during life-time test.	See individual data sets on following pages.
8. Initial luminous flux and forward voltage at photometric measurement current	See individual data sets on following pages.
9. Lumen maintenance data for each individual LED light source	See individual data sets on following pages.
10. Observation of LED light source failures	Ambient temperature during luminous flux testing set to 25°C ±2°C.
11. LED light source monitoring interval	No failures occurred during testing.
12. Photometric measurement uncertainty	See individual data sets on following pages.
13. Chromaticity shift reported over the measurement time	Cree maintains a tolerance of ±2.0% on flux measurements for LM-80 testing.
Test Report Authorization	See individual data sets on following pages.
	Ambient temperature during chromaticity testing set to 25°C ±2°C.
	Arthur Pun, Components Reliability Laboratory Manager

1 http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/luminaires/ENERGY_STAR_Final_Lumen_Maintenance_Guidance.pdf

REVISION HISTORY

Revision	Date	Change
0	Mar 29, 2012	Date of first issue
1	Sep 27, 2012	Removed successor data set 1. Added data set 2.
2	Oct 23, 2012	Added data set 3.
3	Nov 14, 2012	Added data set 4.
4	Apr 17, 2013	Revised data sets 2 & 4 to add additional test duration. Added data sets 5 & 6.
5	Aug 22, 2013	Revised data sets 2-6 to add additional test duration.
6	Nov 13, 2013	Revised data sets 5 & 6 to add additional test duration.
7	Sep 29, 2014	Removed data sets 3 & 4. Added data sets 3+ & 4+. Revised data sets 2 & 5 to add additional test duration.
8	Nov 20, 2015	Added data sets 8 & 9. Revised report format.
9	Jun 06, 2016	Added data sets 10 & 11. Removed data sets 2 & 4+. Extended data sets 8 & 9 with additional test duration.
10	Sep 22, 2016	Extended data sets 8 & 9 with additional test duration. Updated mechanical drawings and product photograph.

TEST RESULTS SUMMARY

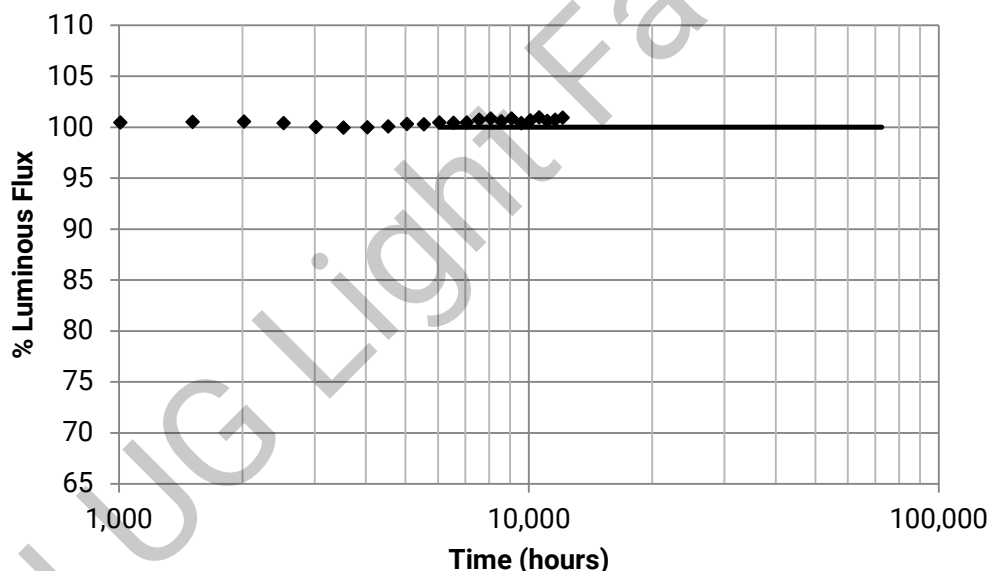
Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	ANSI CCT Target	Sample Count	Test Duration	Reported TM-21 Lifetimes
8	85°C	85°C	500 mA	3000K	20	12,096 hrs	L90(12k) > 72,600 hrs L80(12k) > 72,600 hrs L70(12k) > 72,600 hrs
9	105°C	105°C	500 mA	3000K	20	13,104 hrs	L90(13k) > 78,600 hrs L80(13k) > 78,600 hrs L70(13k) > 78,600 hrs
3+	55°C	55°C	1000 mA	3000K	16	18,144 hrs	L90(18k) = 45,600 hrs L80(18k) = 88,500 hrs L70(18k) > 99,800 hrs
10	85°C	85°C	1000 mA	3000K	20	10,080 hrs	L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
11	105°C	105°C	1000 mA	3000K	20	10,080 hrs	L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
5	55°C	55°C	1250 mA	3000K	25	10,080 hrs	L90(10k) = 46,100 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
6	85°C	85°C	1250 mA	3000K	25	9,072 hrs	L90(9k) = 19,300 hrs L80(9k) = 41,400 hrs L70(9k) > 54,400 hrs

DATA SET 8: 85°C; 500 mA

LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT)
	This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I_F]	500 mA
Testing Initiation Date	December 4, 2014
Case Temperature [T_s]	85°C
Ambient Temperature [T_A]	85°C
Failures observed	None

Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	12,096 hours
Test duration used for projection	t=6,048 to t=12,096
α	-5.311E-07
β	1.002E+00
Reported Lifetimes	L90(12k) > 72,600 hours
	L80(12k) > 72,600 hours
	L70(12k) > 72,600 hours



* <http://www.energystar.gov/TM-21calculator>

LM-80 Data For The Official TM-21 Calculator*

Time (hours)	Lumen Maintenance
0	100.00%
3024	100.02%
3528	99.95%
4032	99.98%
4536	100.07%
5040	100.30%
5544	100.28%
6048	100.46%
6552	100.45%
7056	100.47%
7560	100.74%
8064	100.85%
8568	100.59%
9072	100.85%
9576	100.41%
10080	100.66%
10584	100.96%
11088	100.62%
11592	100.73%
12096	100.93%

Note: Data points t=168 hr through t=2520 hr are intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, data points t=168 hr through t=2520 hr would be excluded, so the projection is unaffected.

DATA SET 8: 85°C; 500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	176.3	3.12	3284	3000	100.27	100.47	100.66	100.66	101.06	100.51	100.13	100.14	100.74	100.76	100.45	100.71
2	190.0	3.10	3177	3000	99.77	99.49	99.87	100.00	100.09	100.04	99.86	99.80	100.09	100.01	99.81	100.17
3	171.9	3.10	3240	3000	100.25	100.41	100.87	101.29	101.06	100.34	100.08	100.03	100.01	100.37	100.05	100.74
4	190.6	3.07	3295	3000	100.49	100.59	100.69	100.75	100.85	100.07	99.87	99.98	100.18	100.69	100.45	100.46
5	171.4	3.07	3233	3000	100.73	100.66	100.97	101.14	101.01	100.10	99.98	99.74	99.95	100.07	100.05	100.45
6	187.6	3.07	3190	3000	100.29	101.01	100.98	100.95	101.10	100.64	100.44	100.60	100.47	100.76	101.12	101.07
7	170.0	3.09	3183	3000	100.64	100.69	101.00	101.08	100.39	100.05	99.68	99.99	100.26	100.25	99.80	99.95
8	189.8	3.05	3227	3000	100.41	100.99	101.08	101.04	101.01	100.33	100.42	100.54	100.83	101.25	101.16	101.53
9	168.1	3.16	3159	3000	100.46	100.97	101.25	101.03	100.09	100.20	100.08	100.17	100.07	100.33	100.09	99.81
10	174.2	3.08	3228	3000	100.80	100.58	100.48	100.99	100.96	100.72	100.40	100.45	100.83	100.68	100.39	100.49
11	187.5	3.06	3232	3000	99.84	100.59	100.56	100.42	100.29	99.71	99.47	99.49	99.78	100.27	100.20	100.56
12	187.3	3.07	3272	3000	100.10	100.40	100.00	100.16	99.62	99.54	100.00	99.35	99.37	99.84	99.67	100.10
13	189.7	3.08	3170	3000	100.19	100.82	101.06	100.83	100.56	100.27	100.20	100.29	100.57	100.93	100.78	101.24
14	185.3	3.05	3170	3000	99.77	100.47	100.45	100.62	100.50	99.87	99.82	99.98	100.31	100.67	100.50	100.87
15	174.2	3.11	3216	3000	100.72	100.31	100.56	100.39	100.20	100.29	100.28	100.24	99.94	99.85	99.55	99.64
16	193.1	3.09	3279	3000	100.73	100.57	100.45	100.65	100.35	99.81	99.86	100.04	100.00	100.21	100.76	100.70
17	188.5	3.07	3266	3000	99.76	99.92	99.89	99.91	99.78	99.55	99.74	99.50	99.42	99.78	100.09	100.17
18	187.6	3.07	3203	3000	99.68	99.78	99.34	99.29	99.34	99.19	99.23	99.33	99.21	99.63	99.92	100.00
19	185.8	3.11	3226	3000	100.35	100.44	100.32	100.01	100.15	99.66	99.77	99.97	99.58	99.65	100.30	100.27
20	188.9	3.06	3195	3000	99.91	100.36	100.08	99.63	99.68	99.52	99.68	99.89	99.74	100.06	100.53	100.34
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	182.9	3.08			100.26	100.48	100.53	100.54	100.41	100.02	99.95	99.98	100.07	100.30	100.28	100.46
Median	187.4	3.08			100.28	100.52	100.56	100.66	100.37	100.06	99.92	99.99	100.04	100.26	100.25	100.46
σ	8.3	0.03			0.37	0.39	0.50	0.55	0.54	0.41	0.32	0.37	0.47	0.45	0.45	0.48
Min.	168.1	3.05			99.68	99.49	99.34	99.29	99.34	99.19	99.23	99.33	99.21	99.63	99.55	99.64
Max.	193.1	3.16			100.80	101.01	101.25	101.29	101.10	100.72	100.44	100.60	100.83	101.25	101.16	101.53

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4218	0.4048	3284	3000	0.0007	0.0011	0.0013	0.0015	0.0016	0.0017	0.0018	0.0019	0.0020	0.0020	0.0020	0.0020
2	0.4297	0.4097	3177	3000	0.0005	0.0013	0.0014	0.0017	0.0018	0.0020	0.0021	0.0021	0.0021	0.0022	0.0021	0.0023
3	0.4245	0.4056	3240	3000	0.0006	0.0012	0.0014	0.0015	0.0015	0.0016	0.0017	0.0017	0.0019	0.0020	0.0020	0.0020
4	0.4217	0.4059	3295	3000	0.0005	0.0011	0.0013	0.0014	0.0016	0.0018	0.0019	0.0020	0.0020	0.0021	0.0022	0.0022
5	0.4263	0.4090	3233	3000	0.0006	0.0011	0.0014	0.0014	0.0015	0.0017	0.0019	0.0019	0.0019	0.0020	0.0020	0.0021
6	0.4275	0.4062	3190	3000	0.0006	0.0011	0.0015	0.0017	0.0019	0.0019	0.0021	0.0021	0.0021	0.0022	0.0022	0.0022
7	0.4278	0.4060	3183	3000	0.0006	0.0012	0.0014	0.0014	0.0015	0.0016	0.0018	0.0017	0.0018	0.0019	0.0018	0.0019
8	0.4248	0.4047	3227	3000	0.0006	0.0012	0.0014	0.0016	0.0018	0.0019	0.0020	0.0020	0.0022	0.0023	0.0023	0.0022
9	0.4292	0.4064	3159	3000	0.0007	0.0013	0.0015	0.0014	0.0016	0.0017	0.0018	0.0019	0.0019	0.0019	0.0020	0.0020
10	0.4254	0.4062	3228	3000	0.0006	0.0011	0.0013	0.0014	0.0014	0.0017	0.0017	0.0017	0.0017	0.0018	0.0020	0.0019
11	0.4274	0.4115	3232	3000	0.0004	0.0010	0.0012	0.0014	0.0014	0.0016	0.0017	0.0018	0.0017	0.0020	0.0021	0.0021
12	0.4239	0.4084	3272	3000	0.0003	0.0012	0.0015	0.0017	0.0018	0.0018	0.0020	0.0020	0.0021	0.0023	0.0022	0.0022
13	0.4306	0.4108	3170	3000	0.0006	0.0013	0.0015	0.0016	0.0017	0.0018	0.0020	0.0021	0.0022	0.0023	0.0023	0.0024
14	0.4282	0.4054	3170	3000	0.0005	0.0012	0.0015	0.0019	0.0019	0.0020	0.0021	0.0022	0.0021	0.0023	0.0023	0.0023
15	0.4261	0.4063	3216	3000	0.0004	0.0009	0.0012	0.0014	0.0014	0.0014	0.0017	0.0016	0.0017	0.0017	0.0018	0.0019
16	0.4223	0.4054	3279	3000	0.0006	0.0012	0.0015	0.0018	0.0018	0.0019	0.0020	0.0020	0.0022	0.0022	0.0022	0.0023
17	0.4241	0.4080	3266	3000	0.0003	0.0010	0.0012	0.0014	0.0014	0.0015	0.0017	0.0017	0.0019	0.0019	0.0020	0.0021
18	0.4266	0.4058	3203	3000	0.0004	0.0008	0.0010	0.0012	0.0012	0.0012	0.0015	0.0015	0.0017	0.0017	0.0017	0.0019
19	0.4264	0.4084	3226	3000	0.0005	0.0010	0.0012	0.0014	0.0014	0.0014	0.0016	0.0016	0.0019	0.0019	0.0018	0.0019
20	0.4262	0.4039	3195	3000	0.0004	0.0013	0.0013	0.0014	0.0014	0.0016	0.0020	0.0018	0.0020	0.0020	0.0019	0.0020
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0005	0.0011	0.0014	0.0015	0.0016	0.0017	0.0019	0.0019	0.0020	0.0020	0.0021	0.0021
Median					0.0005	0.0011	0.0014	0.0014	0.0015	0.0017	0.0018	0.0019	0.0019	0.0020	0.0020	0.0021
σ					0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0003	0.0008	0.0010	0.0012	0.0012	0.0012	0.0015	0.0015	0.0017	0.0017	0.0017	0.0019
Max.					0.0007	0.0013	0.0015	0.0019	0.0019	0.0020	0.0021	0.0022	0.0022	0.0023	0.0023	0.0024

DATA SET 8: 85°C; 500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	176.3	3.12	3284	3000	100.57	100.65	101.04	101.20	100.74	100.46	101.08	100.92	101.30	100.79	100.34	100.51
2	190.0	3.10	3177	3000	100.17	100.54	100.65	100.95	101.30	101.19	100.32	100.68	101.21	100.68	100.95	101.05
3	171.9	3.10	3240	3000	100.17	100.55	100.51	100.05	99.63	100.22	100.10	100.38	100.58	100.58	100.23	100.76
4	190.6	3.07	3295	3000	100.77	101.02	100.84	101.13	101.20	100.99	99.83	101.22	101.26	100.63	100.73	100.89
5	171.4	3.07	3233	3000	100.22	100.13	100.25	100.65	99.92	101.01	100.68	100.37	101.23	101.11	101.05	101.05
6	187.6	3.07	3190	3000	101.02	101.35	101.56	101.90	101.70	101.93	101.41	101.67	102.24	101.60	101.71	101.87
7	170.0	3.09	3183	3000	100.07	100.02	100.16	100.51	99.43	100.65	100.15	100.25	101.00	100.94	100.12	101.00
8	189.8	3.05	3227	3000	100.92	101.35	101.55	101.65	101.78	101.60	101.26	101.45	102.11	101.48	101.95	101.95
9	168.1	3.16	3159	3000	100.27	100.43	100.52	100.50	100.18	101.02	100.88	100.51	100.89	101.31	100.59	101.19
10	174.2	3.08	3228	3000	100.62	100.80	101.10	101.43	100.52	101.28	100.73	100.71	101.15	101.66	100.86	101.61
11	187.5	3.06	3232	3000	100.20	100.27	100.67	101.04	101.13	101.14	100.31	101.01	101.01	100.53	100.91	100.91
12	187.3	3.07	3272	3000	100.01	99.92	100.20	100.52	100.65	100.73	99.95	100.38	100.53	100.11	100.43	100.37
13	189.7	3.08	3170	3000	100.93	100.96	101.30	100.53	100.54	100.82	100.19	100.30	100.69	100.21	100.37	100.37
14	185.3	3.05	3170	3000	100.50	100.67	100.91	101.22	100.95	100.85	100.10	101.17	101.40	100.92	101.24	101.24
15	174.2	3.11	3216	3000	100.28	99.77	100.83	100.78	100.50	100.71	100.59	100.04	100.40	99.83	99.94	100.06
16	193.1	3.09	3279	3000	100.78	100.66	101.04	101.41	101.16	101.01	100.78	101.14	101.04	100.57	101.04	101.66
17	188.5	3.07	3266	3000	100.19	99.93	100.49	100.72	100.45	100.60	100.20	100.12	100.00	99.68	100.53	100.27
18	187.6	3.07	3203	3000	100.17	99.94	100.45	99.67	99.42	99.82	99.45	100.30	100.16	99.84	100.69	100.27
19	185.8	3.11	3226	3000	100.53	100.15	100.29	100.18	99.88	100.08	99.66	100.00	100.22	99.73	100.00	100.86
20	188.9	3.06	3195	3000	100.54	100.25	100.43	101.00	100.62	100.90	100.53	100.61	100.69	100.11	101.01	100.69
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	182.9	3.08			100.45	100.47	100.74	100.85	100.59	100.85	100.41	100.66	100.96	100.62	100.73	100.93
Median	187.4	3.08			100.39	100.48	100.66	100.86	100.58	100.87	100.31	100.56	101.01	100.61	100.71	100.90
σ	8.3	0.03			0.31	0.47	0.43	0.55	0.69	0.49	0.52	0.48	0.58	0.62	0.53	0.54
Min.	168.1	3.05			100.01	99.77	100.16	99.67	99.42	99.82	99.45	100.00	100.00	99.68	99.94	100.06
Max.	193.1	3.16			101.02	101.35	101.56	101.90	101.78	101.93	101.41	101.67	102.24	101.66	101.95	101.95

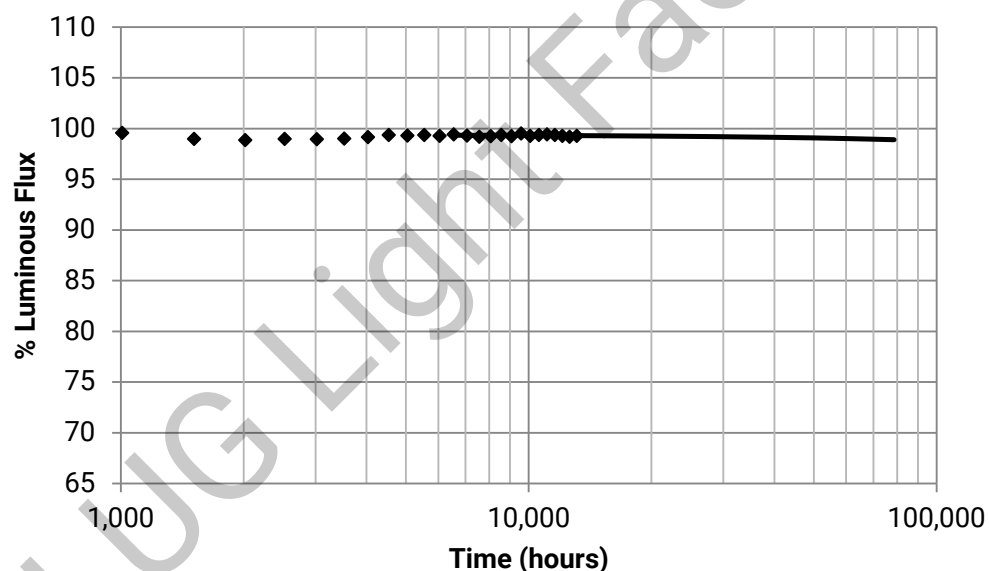
Lamp #	Initial (0 hrs)				Chromaticity Shift ($\Delta u'v'$)											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4218	0.4048	3284	3000	0.0021	0.0023	0.0024	0.0023	0.0024	0.0023	0.0023	0.0021	0.0021	0.0022	0.0023	0.0022
2	0.4297	0.4097	3177	3000	0.0023	0.0025	0.0025	0.0024	0.0025	0.0024	0.0024	0.0024	0.0024	0.0024	0.0026	0.0025
3	0.4245	0.4056	3240	3000	0.0021	0.0023	0.0023	0.0022	0.0022	0.0023	0.0022	0.0021	0.0021	0.0022	0.0024	0.0022
4	0.4217	0.4059	3295	3000	0.0022	0.0024	0.0025	0.0024	0.0024	0.0024	0.0024	0.0022	0.0022	0.0023	0.0025	0.0024
5	0.4263	0.4090	3233	3000	0.0022	0.0022	0.0023	0.0022	0.0022	0.0022	0.0022	0.0019	0.0020	0.0022	0.0022	0.0021
6	0.4275	0.4062	3190	3000	0.0023	0.0024	0.0026	0.0025	0.0024	0.0024	0.0024	0.0023	0.0022	0.0023	0.0024	0.0023
7	0.4278	0.4060	3183	3000	0.0019	0.0019	0.0020	0.0019	0.0019	0.0019	0.0020	0.0017	0.0018	0.0019	0.0019	0.0019
8	0.4248	0.4047	3227	3000	0.0023	0.0024	0.0026	0.0024	0.0025	0.0026	0.0025	0.0024	0.0023	0.0024	0.0025	0.0024
9	0.4292	0.4064	3159	3000	0.0020	0.0020	0.0022	0.0021	0.0021	0.0022	0.0022	0.0018	0.0018	0.0019	0.0020	0.0020
10	0.4254	0.4062	3228	3000	0.0021	0.0021	0.0022	0.0021	0.0022	0.0021	0.0022	0.0020	0.0020	0.0020	0.0021	0.0021
11	0.4274	0.4115	3232	3000	0.0022	0.0022	0.0024	0.0023	0.0025	0.0024	0.0023	0.0023	0.0021	0.0023	0.0024	0.0024
12	0.4239	0.4084	3272	3000	0.0024	0.0024	0.0025	0.0025	0.0026	0.0025	0.0025	0.0025	0.0023	0.0024	0.0025	0.0025
13	0.4306	0.4108	3170	3000	0.0026	0.0026	0.0027	0.0026	0.0026	0.0026	0.0025	0.0024	0.0023	0.0024	0.0024	0.0024
14	0.4282	0.4054	3170	3000	0.0024	0.0025	0.0026	0.0025	0.0024	0.0024	0.0024	0.0024	0.0023	0.0023	0.0024	0.0024
15	0.4261	0.4063	3216	3000	0.0019	0.0018	0.0021	0.0022	0.0022	0.0020	0.0019	0.0018	0.0018	0.0020	0.0019	0.0018
16	0.4223	0.4054	3279	3000	0.0025	0.0024	0.0026	0.0026	0.0026	0.0024	0.0024	0.0024	0.0023	0.0024	0.0024	0.0023
17	0.4241	0.4080	3266	3000	0.0021	0.0022	0.0022	0.0024	0.0024	0.0023	0.0022	0.0023	0.0023	0.0024	0.0024	0.0024
18	0.4266	0.4058	3203	3000	0.0018	0.0021	0.0022	0.0022	0.0023	0.0022	0.0021	0.0022	0.0022	0.0022	0.0023	0.0022
19	0.4264	0.4084	3226	3000	0.0020	0.0021	0.0022	0.0021	0.0022	0.0022	0.0021	0.0021	0.0022	0.0023	0.0023	0.0022
20	0.4262	0.4039	3195	3000	0.0020	0.0020	0.0021	0.0022	0.0023	0.0022	0.0021	0.0022	0.0022	0.0022	0.0021	0.0022
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0022	0.0022	0.0024	0.0023	0.0023	0.0023	0.0023	0.0022	0.0021	0.0022	0.0023	0.0022
Median					0.0022	0.0022	0.0024	0.0023	0.0024	0.0023	0.0023	0.0022	0.0022	0.0023	0.0024	0.0022
σ					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0018	0.0018	0.0020	0.0019	0.0019	0.0019	0.0019	0.0017	0.0018	0.0019	0.0019	0.0018
Max.					0.0026	0.0026	0.0027	0.0026	0.0026	0.0026	0.0025	0.0025	0.0024	0.0024	0.0026	0.0025

DATA SET 9: 105°C; 500 mA

LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT)
	This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I_F]	500 mA
Testing Initiation Date	December 4, 2014
Case Temperature [T_s]	105°C
Ambient Temperature [T_A]	105°C
Failures observed	None

Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	13,104 hours
Test duration used for projection	t=6,552 to t=13,104
α	6.205E-08
β	9.938E-01
Reported Lifetimes	L90(13k) > 78,600 hours
	L80(13k) > 78,600 hours
	L70(13k) > 78,600 hours



LM-80 Data For The Official TM-21 Calculator*

Time (hours)	Lumen Maintenance
0	100.00%
4032	99.16%
4536	99.35%
5040	99.29%
5544	99.37%
6048	99.29%
6552	99.43%
7056	99.31%
7560	99.20%
8064	99.23%
8568	99.38%
9072	99.25%
9576	99.53%
10080	99.26%
10584	99.36%
11088	99.43%
11592	99.37%
12096	99.27%
12600	99.18%
13104	99.28%

* <http://www.energystar.gov/TM-21calculator>

Note: Data points t=168 hr through t=3528 hr are intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, data points t=168 hr through t=3528 would be excluded, so the projection is unaffected.

DATA SET 9: 105°C; 500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)												
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048	6552
1	176.6	3.14	3264	3000	99.78	100.05	99.43	99.17	99.18	99.22	99.49	99.62	99.60	99.18	99.72	99.37	99.12
2	195.3	3.11	3243	3000	100.04	100.06	99.23	99.29	99.25	99.07	99.11	99.25	99.78	99.25	99.63	99.64	100.07
3	193.5	3.07	3288	3000	99.70	99.95	99.46	98.96	98.91	98.94	98.89	99.38	99.68	99.12	99.04	99.67	100.04
4	188.5	3.06	3125	3000	99.90	99.49	99.06	98.98	99.04	98.92	99.04	99.45	99.67	99.15	99.16	99.86	100.17
5	174.7	3.05	3230	3000	100.43	100.26	99.03	98.40	98.73	98.75	98.68	98.41	98.74	98.43	98.56	98.86	98.88
6	176.1	3.08	3187	3000	100.39	99.87	99.38	99.17	99.05	99.89	99.53	99.71	99.33	99.19	99.38	99.15	99.70
7	174.8	3.07	3253	3000	100.08	99.84	98.34	98.32	98.56	98.37	98.29	98.55	98.78	98.73	99.59	98.75	98.45
8	191.7	3.06	3233	3000	99.72	99.19	98.85	98.85	99.11	98.98	99.19	99.38	99.52	99.74	99.47	99.20	98.95
9	191.5	3.06	3222	3000	99.62	99.63	99.27	99.28	99.57	99.41	99.32	99.57	99.71	99.77	99.73	99.60	99.33
10	189.2	3.05	3147	3000	100.38	100.08	99.98	99.87	99.69	99.57	99.60	100.27	100.30	100.46	100.45	100.37	100.31
11	177.8	3.07	3227	3000	100.25	99.56	99.16	99.09	99.18	99.44	99.74	99.80	99.63	99.39	99.54	99.29	98.92
12	178.8	3.14	3269	3000	100.41	98.40	97.95	98.09	98.31	98.55	98.53	98.63	98.49	98.51	98.94	98.65	99.11
13	195.4	3.12	3262	3000	100.01	98.86	98.41	98.61	98.75	98.48	98.38	98.40	98.71	99.34	99.05	98.68	99.71
14	171.3	3.07	3200	3000	100.54	99.43	98.04	97.71	98.19	98.22	98.36	98.47	98.51	98.32	98.90	98.72	98.69
15	191.7	3.08	3200	3000	99.63	98.78	98.24	98.45	98.39	98.27	98.28	98.29	98.81	99.15	98.76	98.51	99.18
16	174.4	3.07	3235	3000	100.17	99.32	98.01	97.71	97.94	97.89	98.03	97.90	98.23	97.99	98.47	98.81	98.44
17	187.6	3.06	3204	3000	100.17	99.28	98.87	98.75	98.65	98.46	98.46	98.71	99.24	99.75	99.09	99.06	99.83
18	192.7	3.06	3193	3000	100.23	100.13	99.59	99.49	99.65	99.59	99.27	99.58	99.97	100.45	99.89	99.98	99.77
19	174.9	3.06	3226	3000	100.10	100.12	99.70	99.41	99.89	99.48	100.01	99.97	99.94	99.48	99.51	99.40	99.50
20	191.0	3.05	3200	3000	100.38	100.03	99.81	99.81	99.76	99.63	99.72	99.85	100.41	100.43	100.45	100.18	100.44
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	184.4	3.08			100.10	99.57	98.99	98.87	98.99	98.96	99.00	99.16	99.35	99.29	99.37	99.29	99.43
Median	188.0	3.07			100.13	99.60	99.11	98.97	99.05	98.96	99.07	99.38	99.56	99.22	99.43	99.24	99.41
σ	8.6	0.03			0.29	0.54	0.63	0.62	0.55	0.57	0.59	0.67	0.63	0.69	0.54	0.55	0.61
Min.	171.3	3.05			99.62	98.40	97.95	97.71	97.94	97.89	98.03	97.90	98.23	97.99	98.47	98.51	98.44
Max.	195.4	3.14			100.54	100.26	99.98	99.87	99.89	99.89	100.01	100.27	100.41	100.46	100.45	100.37	100.44

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')												
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048	6552
1	0.4230	0.4051	3264	3000	0.0008	0.0015	0.0017	0.0019	0.0019	0.0019	0.0019	0.0018	0.0019	0.0019	0.0015	0.0020	0.0019
2	0.4240	0.4049	3243	3000	0.0008	0.0015	0.0017	0.0016	0.0017	0.0017	0.0017	0.0017	0.0019	0.0019	0.0016	0.0017	0.0019
3	0.4225	0.4071	3288	3000	0.0008	0.0013	0.0016	0.0015	0.0016	0.0016	0.0017	0.0016	0.0017	0.0019	0.0014	0.0017	0.0019
4	0.4318	0.4079	3125	3000	0.0006	0.0011	0.0013	0.0013	0.0013	0.0011	0.0013	0.0014	0.0016	0.0015	0.0012	0.0015	0.0016
5	0.4236	0.4022	3230	3000	0.0009	0.0017	0.0017	0.0017	0.0017	0.0017	0.0019	0.0018	0.0019	0.0019	0.0014	0.0018	0.0017
6	0.4286	0.4086	3187	3000	0.0010	0.0016	0.0018	0.0017	0.0017	0.0016	0.0017	0.0017	0.0018	0.0019	0.0015	0.0018	0.0019
7	0.4241	0.4063	3253	3000	0.0003	0.0006	0.0008	0.0007	0.0007	0.0009	0.0010	0.0010	0.0010	0.0011	0.0010	0.0011	0.0011
8	0.4247	0.4053	3233	3000	0.0004	0.0010	0.0011	0.0013	0.0013	0.0014	0.0015	0.0014	0.0014	0.0013	0.0014	0.0014	0.0014
9	0.4254	0.4054	3222	3000	0.0006	0.0012	0.0013	0.0013	0.0012	0.0014	0.0015	0.0014	0.0013	0.0014	0.0014	0.0013	0.0013
10	0.4293	0.4050	3147	3000	0.0006	0.0013	0.0014	0.0014	0.0014	0.0015	0.0016	0.0016	0.0014	0.0015	0.0015	0.0017	0.0016
11	0.4259	0.4072	3227	3000	0.0008	0.0013	0.0011	0.0012	0.0012	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0015	0.0015
12	0.4232	0.4062	3269	3000	0.0005	0.0009	0.0009	0.0010	0.0009	0.0011	0.0011	0.0013	0.0012	0.0011	0.0011	0.0012	0.0011
13	0.4232	0.4053	3262	3000	0.0007	0.0011	0.0012	0.0011	0.0012	0.0013	0.0014	0.0014	0.0014	0.0015	0.0014	0.0014	0.0014
14	0.4276	0.4077	3200	3000	0.0006	0.0009	0.0010	0.0010	0.0010	0.0011	0.0012	0.0011	0.0012	0.0012	0.0012	0.0012	0.0011
15	0.4280	0.4087	3200	3000	0.0006	0.0010	0.0011	0.0012	0.0011	0.0012	0.0014	0.0013	0.0014	0.0012	0.0012	0.0013	0.0013
16	0.4252	0.4067	3235	3000	0.0006	0.0012	0.0012	0.0012	0.0012	0.0014	0.0016	0.0015	0.0015	0.0015	0.0015	0.0016	0.0015
17	0.4256	0.4036	3204	3000	0.0005	0.0007	0.0008	0.0009	0.0009	0.0010	0.0011	0.0010	0.0010	0.0010	0.0010	0.0011	0.0010
18	0.4291	0.4105	3193	3000	0.0006	0.0010	0.0012	0.0012	0.0010	0.0012	0.0013	0.0013	0.0013	0.0012	0.0012	0.0014	0.0013
19	0.4251	0.4054	3226	3000	0.0006	0.0012	0.0012	0.0012	0.0011	0.0013	0.0013	0.0013	0.0013	0.0012	0.0012	0.0015	0.0012
20	0.4276	0.4077	3200	3000	0.0007	0.0010	0.0011	0.0013	0.0014	0.0015	0.0017	0.0016	0.0016	0.0014	0.0014	0.0017	0.0015
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0006	0.0011	0.0013	0.0013	0.0013	0.0014	0.0015	0.0014	0.0015	0.0015	0.0013	0.0015	0.0015
Median					0.0006	0.0011	0.0012	0.0013	0.0012	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0015	0.0015
σ					0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002	0.0003
Min.					0.0003	0.0006	0.0008	0.0007	0.0007	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0011	0.0010
Max.					0.0010	0.0017	0.0018	0.0019	0.0019	0.0019	0.0019	0.0018	0.0019	0.0019	0.0016	0.0020	0.0019

DATA SET 9: 105°C; 500 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)												
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096	12600	13104
1	176.6	3.14	3264	3000	99.24	98.94	98.95	99.39	99.45	99.65	99.19	99.21	99.32	99.26	99.09	99.43	99.72
2	195.3	3.11	3243	3000	99.57	100.05	99.56	99.39	100.00	99.60	99.95	99.54	99.13	99.74	99.85	100.00	99.54
3	193.5	3.07	3288	3000	99.41	99.64	99.84	99.72	99.87	99.57	99.83	99.59	100.00	99.90	99.95	99.64	99.64
4	188.5	3.06	3125	3000	99.43	99.70	99.39	99.28	99.90	99.72	99.82	99.63	100.11	99.79	99.79	99.20	99.42
5	174.7	3.05	3230	3000	99.28	99.26	99.41	99.50	99.15	99.57	98.92	99.08	99.66	99.77	98.91	99.43	99.20
6	176.1	3.08	3187	3000	99.85	99.48	99.61	99.86	99.76	99.74	99.36	99.66	100.00	99.32	99.20	99.38	99.32
7	174.8	3.07	3253	3000	98.70	98.78	98.95	98.78	98.81	99.08	98.55	98.80	98.63	98.68	98.34	98.17	98.40
8	191.7	3.06	3233	3000	99.21	99.08	99.60	99.75	99.76	100.10	99.61	99.84	100.00	99.90	99.69	99.84	99.74
9	191.5	3.06	3222	3000	99.37	99.37	99.49	99.60	99.67	99.98	99.66	99.90	100.16	100.00	99.90	99.48	99.53
10	189.2	3.05	3147	3000	99.93	100.11	99.50	99.74	99.65	99.95	99.55	99.84	99.95	99.89	99.79	99.74	100.00
11	177.8	3.07	3227	3000	99.50	99.07	99.54	99.82	99.07	99.45	99.46	99.78	99.83	99.61	99.72	99.55	99.83
12	178.8	3.14	3269	3000	98.85	98.45	98.18	98.23	98.22	98.47	98.13	97.93	97.71	98.32	97.93	97.99	98.15
13	195.4	3.12	3262	3000	99.01	98.75	99.12	99.30	98.95	99.62	99.21	99.54	99.54	99.59	99.85	99.28	99.95
14	171.3	3.07	3200	3000	98.50	98.61	98.42	99.13	98.42	98.56	98.19	98.07	97.90	98.19	97.72	97.72	98.42
15	191.7	3.08	3200	3000	98.62	98.35	98.74	99.01	98.70	99.23	99.39	99.17	99.11	99.06	99.32	98.70	99.17
16	174.4	3.07	3235	3000	98.64	98.42	98.44	98.19	98.64	98.45	98.56	98.62	98.45	98.57	97.94	97.82	98.11
17	187.6	3.06	3204	3000	99.27	98.92	99.25	99.70	99.27	99.96	99.46	99.73	99.73	99.31	99.52	99.52	99.09
18	192.7	3.06	3193	3000	100.08	99.72	100.14	99.58	99.17	99.87	99.50	99.64	99.64	99.22	99.53	99.53	99.48
19	174.9	3.06	3226	3000	99.49	99.07	99.04	99.69	99.12	99.98	99.11	99.94	99.66	99.89	99.49	99.31	99.54
20	191.0	3.05	3200	3000	100.27	100.18	99.53	99.89	99.43	99.99	99.78	99.74	100.00	99.48	99.79	99.90	99.42
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	184.4	3.08			99.31	99.20	99.23	99.38	99.25	99.53	99.26	99.36	99.43	99.37	99.27	99.18	99.28
Median	188.0	3.07			99.32	99.07	99.40	99.54	99.22	99.63	99.42	99.61	99.66	99.53	99.53	99.43	99.45
σ	8.6	0.03			0.49	0.57	0.50	0.50	0.52	0.52	0.54	0.59	0.73	0.55	0.72	0.71	0.58
Min.	171.3	3.05			98.50	98.35	98.18	98.19	98.22	98.45	98.13	97.93	97.71	98.19	97.72	97.72	98.11
Max.	195.4	3.14			100.27	100.18	100.14	99.89	100.00	100.10	99.95	99.94	100.16	100.00	99.95	100.00	100.00

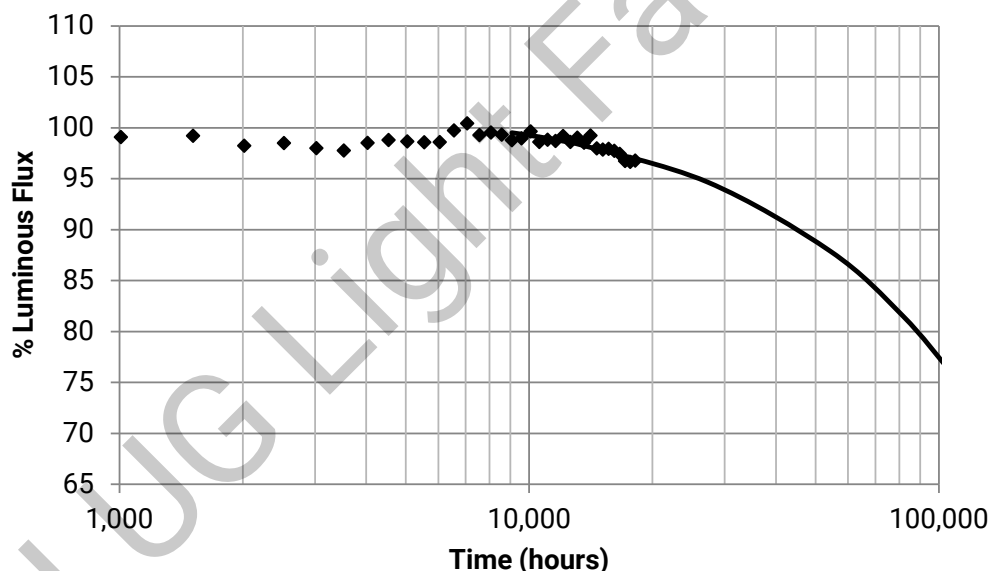
Lamp #	Initial (0 hrs)				Chromaticity Shift ($\Delta u'v'$)												
	CCx	CCy	Calc. CCT	ANSI Target	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096	12600	13104
1	0.4230	0.4051	3264	3000	0.0019	0.0020	0.0020	0.0020	0.0020	0.0019	0.0019	0.0020	0.0020	0.0018	0.0020	0.0020	0.0020
2	0.4240	0.4049	3243	3000	0.0019	0.0019	0.0018	0.0019	0.0019	0.0017	0.0018	0.0019	0.0019	0.0017	0.0018	0.0017	0.0018
3	0.4225	0.4071	3288	3000	0.0018	0.0017	0.0018	0.0018	0.0018	0.0017	0.0018	0.0018	0.0018	0.0017	0.0018	0.0018	0.0019
4	0.4318	0.4079	3125	3000	0.0015	0.0016	0.0016	0.0017	0.0017	0.0015	0.0017	0.0017	0.0017	0.0016	0.0016	0.0017	0.0017
5	0.4236	0.4022	3230	3000	0.0018	0.0018	0.0017	0.0019	0.0019	0.0017	0.0016	0.0017	0.0017	0.0017	0.0017	0.0018	0.0018
6	0.4286	0.4086	3187	3000	0.0018	0.0019	0.0018	0.0020	0.0020	0.0017	0.0017	0.0017	0.0018	0.0018	0.0017	0.0018	0.0019
7	0.4241	0.4063	3253	3000	0.0012	0.0012	0.0013	0.0013	0.0012	0.0012	0.0013	0.0011	0.0013	0.0012	0.0012	0.0012	0.0012
8	0.4247	0.4053	3233	3000	0.0015	0.0014	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015	0.0016	0.0015	0.0015	0.0016	0.0016
9	0.4254	0.4054	3222	3000	0.0013	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0015	0.0012
10	0.4293	0.4050	3147	3000	0.0015	0.0016	0.0017	0.0016	0.0016	0.0017	0.0016	0.0015	0.0016	0.0016	0.0016	0.0017	0.0015
11	0.4259	0.4072	3227	3000	0.0015	0.0014	0.0016	0.0016	0.0016	0.0015	0.0014	0.0013	0.0015	0.0014	0.0014	0.0015	0.0015
12	0.4232	0.4062	3269	3000	0.0014	0.0013	0.0013	0.0013	0.0011	0.0012	0.0012	0.0011	0.0011	0.0011	0.0011	0.0012	0.0013
13	0.4232	0.4053	3262	3000	0.0015	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0016	0.0015
14	0.4276	0.4077	3200	3000	0.0013	0.0013	0.0014	0.0013	0.0011	0.0011	0.0011	0.0012	0.0012	0.0012	0.0010	0.0012	0.0011
15	0.4280	0.4087	3200	3000	0.0013	0.0014	0.0014	0.0014	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012	0.0012	0.0014	0.0014
16	0.4252	0.4067	3235	3000	0.0016	0.0017	0.0017	0.0016	0.0014	0.0014	0.0014	0.0014	0.0014	0.0015	0.0016	0.0016	0.0017
17	0.4256	0.4036	3204	3000	0.0012	0.0013	0.0012	0.0013	0.0012	0.0013	0.0013	0.0012	0.0012	0.0014	0.0013	0.0014	0.0014
18	0.4291	0.4105	3193	3000	0.0013	0.0014	0.0015	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0013	0.0014	0.0014
19	0.4251	0.4054	3226	3000	0.0014	0.0014	0.0015	0.0014	0.0013	0.0012	0.0012	0.0011	0.0011	0.0013	0.0012	0.0013	0.0013
20	0.4276	0.4077	3200	3000	0.0016	0.0016	0.0020	0.0019	0.0019	0.0018	0.0019	0.0017	0.0018	0.0018	0.0017	0.0019	0.0018
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0015	0.0015	0.0016	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0016	0.0016
Median					0.0015	0.0015	0.0016	0.0015	0.0015	0.0015	0.0015	0.0014	0.0015	0.0015	0.0015	0.0016	0.0015
σ					0.0002	0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.0003	0.0003	0.0002	0.0003	0.0002	0.0003
Min.					0.0012	0.0012	0.0012	0.0013	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0010	0.0012	0.0011
Max.					0.0019	0.0020	0.0020	0.0020	0.0020	0.0019	0.0019	0.0020	0.0020	0.0018	0.0020	0.0020	0.0020

DATA SET 3+: 55°C; 1000 mA

LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT)
	This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I_F]	1000 mA
Testing Initiation Date	December 19, 2011
Case Temperature [T_s]	55°C
Ambient Temperature [T_A]	55°C
Failures observed	None

Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	18,144 hours
Test duration used for projection	t=9,072 to t=18,144
α	2.745E-06
β	1.020E+00
Reported Lifetimes	L90(18k) = 45,600 hours
	L80(18k) = 88,500 hours
	L70(18k) > 99,800 hours



LM-80 Data For The Official TM-21 Calculator*

Time (hours)	Lumen Maintenance
0	100.00%
9072	98.78%
9576	98.96%
10080	99.64%
10584	98.61%
11088	98.83%
11592	98.71%
12096	99.19%
12600	98.61%
13104	99.03%
13608	98.53%
14112	99.24%
14616	97.98%
15120	97.86%
15624	97.94%
16128	97.74%
16632	97.44%
17136	96.74%
17640	96.65%
18144	96.78%

* <http://www.energystar.gov/TM-21calculator>

Note: Data points t=168 hr through t=8568 hr are intentionally excluded from this table since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, data points t=168 hr to t=8568 hr would be excluded, so the projection is unaffected.

DATA SET 3+: 55°C; 1000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	268.5	3.43	3009	3000	100.66	98.74	99.60	98.68	98.00	98.15	97.49	98.44	98.41	98.14	98.96	99.53
2	261.7	3.39	3046	3000	99.40	98.40	98.46	97.27	97.94	97.54	97.81	99.14	98.69	98.52	98.73	98.42
3	260.1	3.41	3064	3000	99.79	99.64	99.85	99.06	99.15	98.34	98.77	99.95	99.49	99.40	99.57	99.37
4	239.5	3.40	2897	3000	101.40	99.58	100.01	98.93	98.80	97.61	97.70	98.23	98.94	98.60	99.24	100.34
5	258.3	3.43	3004	3000	98.32	97.84	98.06	97.57	97.42	96.91	97.21	97.28	96.97	96.87	97.22	97.12
6	243.1	3.42	2984	3000	99.90	98.33	98.50	97.86	97.70	97.25	97.52	98.54	98.45	98.26	98.45	98.30
7	253.7	3.44	3022	3000	100.10	98.82	99.76	98.38	98.09	97.62	97.54	97.22	98.24	97.85	98.01	99.38
8	256.4	3.39	2941	3000	100.86	100.66	101.14	99.92	100.15	99.70	99.96	100.83	100.60	100.27	100.69	100.49
9	267.5	3.43	3202	3000	100.86	100.37	100.41	99.33	99.54	98.00	97.93	97.81	99.01	98.54	98.75	100.28
10	271.5	3.42	2903	3000	100.33	98.89	98.21	97.96	98.76	98.29	97.48	98.17	98.52	99.63	97.98	97.64
11	256.9	3.40	2957	3000	99.79	99.78	99.16	98.26	98.95	98.69	97.84	98.91	99.30	99.12	98.64	98.56
12	262.4	3.43	3030	3000	100.01	99.47	99.66	98.12	98.90	98.75	98.32	99.11	99.35	99.41	98.54	98.69
13	260.7	3.46	2983	3000	98.47	97.88	97.93	96.41	97.13	96.87	96.18	97.36	97.67	97.18	97.25	96.21
14	255.4	3.41	3025	3000	100.84	98.03	99.00	98.21	98.74	98.49	98.09	98.96	99.47	99.01	98.96	98.45
15	258.0	3.49	3046	3000	101.06	100.00	98.88	98.16	98.76	97.95	96.55	97.52	98.58	99.05	97.61	96.60
16	256.4	3.43	3080	3000	100.73	99.00	98.79	97.66	97.96	97.83	97.89	98.81	99.09	98.72	98.59	98.16
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean	258.1	3.42			100.16	99.09	99.21	98.24	98.50	98.00	97.77	98.52	98.80	98.66	98.57	98.60
Median	258.2	3.43			100.21	98.94	99.08	98.18	98.75	97.98	97.76	98.49	98.82	98.66	98.61	98.50
σ	8.3	0.03			0.88	0.88	0.90	0.84	0.80	0.73	0.85	0.99	0.83	0.88	0.87	1.28
Min.	239.5	3.39			98.32	97.84	97.93	96.41	97.13	96.87	96.18	97.22	96.97	96.87	97.22	96.21
Max.	271.5	3.49			101.40	100.66	101.14	99.92	100.15	99.70	99.96	100.83	100.60	100.27	100.69	100.49

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4359	0.4023	3009	3000	0.0004	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009	0.0009	0.0008	0.0009	0.0008
2	0.4320	0.3986	3046	3000	0.0006	0.0011	0.0012	0.0010	0.0014	0.0015	0.0015	0.0017	0.0018	0.0016	0.0019	0.0018
3	0.4302	0.3969	3064	3000	0.0005	0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0010	0.0008	0.0009	0.0008
4	0.4406	0.3987	2897	3000	0.0005	0.0007	0.0009	0.0009	0.0010	0.0010	0.0012	0.0013	0.0013	0.0013	0.0012	0.0011
5	0.4293	0.3881	3004	3000	0.0009	0.0009	0.0008	0.0009	0.0008	0.0008	0.0009	0.0010	0.0009	0.0010	0.0007	0.0007
6	0.4389	0.4055	2984	3000	0.0004	0.0005	0.0005	0.0006	0.0006	0.0005	0.0005	0.0007	0.0007	0.0006	0.0005	0.0005
7	0.4374	0.4071	3022	3000	0.0006	0.0007	0.0011	0.0011	0.0013	0.0013	0.0013	0.0016	0.0016	0.0016	0.0016	0.0017
8	0.4392	0.4010	2941	3000	0.0011	0.0011	0.0013	0.0012	0.0013	0.0013	0.0013	0.0015	0.0015	0.0014	0.0013	0.0013
9	0.4280	0.4091	3202	3000	0.0004	0.0007	0.0011	0.0011	0.0012	0.0013	0.0012	0.0014	0.0015	0.0015	0.0015	0.0016
10	0.4432	0.4045	2903	3000	0.0005	0.0008	0.0008	0.0009	0.0010	0.0011	0.0012	0.0013	0.0013	0.0014	0.0011	0.0014
11	0.4406	0.4057	2957	3000	0.0004	0.0005	0.0005	0.0006	0.0007	0.0008	0.0006	0.0009	0.0009	0.0009	0.0009	0.0010
12	0.4354	0.4039	3030	3000	0.0002	0.0006	0.0007	0.0007	0.0008	0.0009	0.0008	0.0009	0.0010	0.0009	0.0008	0.0010
13	0.4353	0.3981	2983	3000	0.0004	0.0008	0.0008	0.0009	0.0010	0.0012	0.0012	0.0012	0.0014	0.0014	0.0014	0.0014
14	0.4366	0.4058	3025	3000	0.0004	0.0003	0.0005	0.0007	0.0008	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0012
15	0.4329	0.4005	3046	3000	0.0004	0.0005	0.0002	0.0004	0.0005	0.0006	0.0002	0.0007	0.0008	0.0007	0.0005	0.0009
16	0.4371	0.4138	3080	3000	0.0005	0.0007	0.0009	0.0010	0.0010	0.0012	0.0012	0.0014	0.0015	0.0014	0.0014	0.0015
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean					0.0005	0.0007	0.0008	0.0008	0.0009	0.0010	0.0010	0.0012	0.0012	0.0011	0.0011	0.0012
Median					0.0005	0.0007	0.0008	0.0009	0.0009	0.0010	0.0011	0.0012	0.0012	0.0012	0.0011	0.0012
σ					0.0002	0.0002	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004
Min.					0.0002	0.0003	0.0002	0.0004	0.0005	0.0005	0.0002	0.0007	0.0007	0.0006	0.0005	0.0005
Max.					0.0011	0.0011	0.0013	0.0012	0.0014	0.0015	0.0015	0.0017	0.0018	0.0016	0.0019	0.0018

DATA SET 3+: 55°C; 1000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	268.5	3.43	3009	3000	99.64	101.27	98.44	100.09	99.21	98.07	98.47	99.30	98.16	98.76	98.51	98.53
2	261.7	3.39	3046	3000	99.24	100.19	99.75	99.74	99.94	99.15	99.67	99.44	99.51	99.16	98.92	99.25
3	260.1	3.41	3064	3000	100.31	101.31	100.83	100.87	100.87	100.38	100.63	100.90	100.38	99.98	99.80	100.35
4	239.5	3.40	2897	3000	100.89	102.33	99.06	100.63	99.77	98.62	98.44	99.79	97.68	98.80	98.94	98.94
5	258.3	3.43	3004	3000	98.05	98.95	98.48	98.59	98.73	98.24	98.65	98.78	98.50	98.21	97.77	98.42
6	243.1	3.42	2984	3000	99.24	100.06	99.28	99.66	99.82	99.33	99.47	99.77	98.76	98.98	98.73	99.10
7	253.7	3.44	3022	3000	100.25	101.33	97.88	99.51	98.51	97.64	97.23	98.73	96.73	97.34	97.21	97.87
8	256.4	3.39	2941	3000	101.58	102.37	102.16	101.96	102.29	101.79	101.89	101.98	102.13	101.39	101.10	101.61
9	267.5	3.43	3202	3000	101.34	102.22	99.03	100.36	99.55	98.22	97.92	99.11	98.16	98.65	98.69	98.83
10	271.5	3.42	2903	3000	99.57	99.55	98.40	99.98	99.16	98.27	98.27	99.88	98.13	98.43	98.33	98.86
11	256.9	3.40	2957	3000	99.91	99.96	99.75	99.31	98.55	99.73	99.62	100.04	99.35	99.21	99.18	99.90
12	262.4	3.43	3030	3000	100.10	100.37	100.02	99.35	99.73	99.69	99.56	100.11	98.68	99.06	99.22	99.95
13	260.7	3.46	2983	3000	97.94	98.05	97.85	96.60	96.56	97.20	97.68	98.36	96.72	97.52	97.56	98.16
14	255.4	3.41	3025	3000	99.68	100.02	99.65	98.69	99.33	97.87	99.60	100.01	98.56	99.12	99.14	99.67
15	258.0	3.49	3046	3000	98.71	99.16	98.53	98.70	97.75	98.34	97.48	98.90	98.05	98.16	97.66	98.47
16	256.4	3.43	3080	3000	99.37	99.79	99.51	98.50	99.38	97.92	98.79	99.16	98.19	98.45	98.53	99.16
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean	258.1	3.42			99.74	100.43	99.29	99.53	99.32	98.78	98.96	99.64	98.61	98.83	98.71	99.19
Median	258.2	3.43			99.66	100.13	99.17	99.59	99.36	98.31	98.72	99.61	98.35	98.78	98.71	99.02
σ	8.3	0.03			1.03	1.27	1.12	1.22	1.26	1.18	1.22	0.90	1.32	0.95	0.95	0.94
Min.	239.5	3.39			97.94	98.05	97.85	96.60	96.56	97.20	97.23	98.36	96.72	97.34	97.21	97.87
Max.	271.5	3.49			101.58	102.37	102.16	101.96	102.29	101.79	101.89	101.98	102.13	101.39	101.10	101.61

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080	10584	11088	11592	12096
1	0.4359	0.4023	3009	3000	0.0010	0.0009	0.0010	0.0010	0.0010	0.0011	0.0011	0.0014	0.0012	0.0015	0.0010	0.0014
2	0.4320	0.3986	3046	3000	0.0019	0.0019	0.0020	0.0020	0.0020	0.0020	0.0021	0.0024	0.0022	0.0026	0.0026	0.0026
3	0.4302	0.3969	3064	3000	0.0009	0.0008	0.0008	0.0008	0.0010	0.0009	0.0010	0.0013	0.0010	0.0011	0.0012	0.0013
4	0.4406	0.3987	2897	3000	0.0014	0.0013	0.0015	0.0014	0.0014	0.0015	0.0014	0.0014	0.0014	0.0016	0.0016	0.0016
5	0.4293	0.3881	3004	3000	0.0007	0.0006	0.0008	0.0007	0.0007	0.0008	0.0011	0.0010	0.0007	0.0010	0.0010	0.0010
6	0.4389	0.4055	2984	3000	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0009	0.0007	0.0009	0.0009	0.0010
7	0.4374	0.4071	3022	3000	0.0018	0.0017	0.0019	0.0019	0.0020	0.0021	0.0021	0.0023	0.0020	0.0023	0.0021	0.0024
8	0.4392	0.4010	2941	3000	0.0013	0.0012	0.0012	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0014	0.0014	0.0014
9	0.4280	0.4091	3202	3000	0.0017	0.0016	0.0017	0.0018	0.0019	0.0017	0.0019	0.0020	0.0020	0.0022	0.0022	0.0022
10	0.4432	0.4045	2903	3000	0.0015	0.0016	0.0017	0.0016	0.0018	0.0020	0.0020	0.0019	0.0020	0.0021	0.0021	0.0022
11	0.4406	0.4057	2957	3000	0.0009	0.0011	0.0011	0.0010	0.0009	0.0012	0.0012	0.0012	0.0011	0.0013	0.0013	0.0014
12	0.4354	0.4039	3030	3000	0.0009	0.0011	0.0010	0.0009	0.0010	0.0011	0.0011	0.0011	0.0010	0.0011	0.0013	0.0013
13	0.4353	0.3981	2983	3000	0.0014	0.0017	0.0017	0.0013	0.0013	0.0017	0.0019	0.0020	0.0016	0.0023	0.0023	0.0023
14	0.4366	0.4058	3025	3000	0.0011	0.0012	0.0013	0.0011	0.0012	0.0012	0.0015	0.0015	0.0013	0.0015	0.0016	0.0015
15	0.4329	0.4005	3046	3000	0.0009	0.0008	0.0010	0.0009	0.0008	0.0011	0.0011	0.0010	0.0012	0.0011	0.0011	0.0010
16	0.4371	0.4138	3080	3000	0.0016	0.0016	0.0017	0.0013	0.0017	0.0015	0.0018	0.0019	0.0014	0.0020	0.0020	0.0021
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean					0.0012	0.0012	0.0013	0.0012	0.0013	0.0014	0.0015	0.0015	0.0014	0.0016	0.0016	0.0017
Median					0.0012	0.0012	0.0012	0.0012	0.0013	0.0012	0.0014	0.0014	0.0013	0.0015	0.0015	0.0015
σ					0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005	0.0005	0.0006
Min.					0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0009	0.0007	0.0009	0.0009	0.0010
Max.					0.0019	0.0019	0.0020	0.0020	0.0020	0.0021	0.0021	0.0024	0.0022	0.0026	0.0026	0.0026

DATA SET 3+: 55°C; 1000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120	15624	16128	16632	17136	17640	18144
1	268.5	3.43	3009	3000	98.17	99.11	97.29	98.62	97.23	98.01	96.73	95.51	96.22	96.08	96.17	96.01
2	261.7	3.39	3046	3000	98.83	99.48	98.77	99.50	98.17	98.45	98.18	98.33	97.61	97.56	97.28	97.49
3	260.1	3.41	3064	3000	99.59	100.23	99.64	100.42	98.83	99.09	98.95	98.66	97.96	97.47	96.83	96.91
4	239.5	3.40	2897	3000	98.44	99.00	98.25	98.96	97.55	97.89	97.77	96.75	96.87	96.68	96.82	96.40
5	258.3	3.43	3004	3000	97.78	98.52	98.14	98.09	97.29	97.42	97.38	97.71	96.92	96.62	96.39	96.43
6	243.1	3.42	2984	3000	98.69	99.17	98.96	99.62	98.35	98.39	98.40	98.53	97.92	97.74	97.27	97.53
7	253.7	3.44	3022	3000	97.40	98.21	97.28	97.96	97.01	96.57	97.08	96.36	96.20	95.75	95.99	95.87
8	256.4	3.39	2941	3000	101.02	102.00	101.37	102.04	100.65	100.43	100.71	100.76	100.37	99.71	99.75	99.94
9	267.5	3.43	3202	3000	97.92	98.67	97.84	98.24	96.89	96.71	96.57	96.38	96.19	95.77	95.84	95.71
10	271.5	3.42	2903	3000	98.43	98.18	97.75	98.64	97.57	97.69	97.29	96.69	97.87	96.10	95.85	96.75
11	256.9	3.40	2957	3000	99.41	99.15	99.16	100.06	98.63	98.14	98.68	97.95	98.19	97.08	97.01	97.08
12	262.4	3.43	3030	3000	99.02	99.16	99.20	100.10	98.33	97.86	98.47	98.88	97.97	97.11	97.06	97.13
13	260.7	3.46	2983	3000	97.57	97.75	97.55	98.31	97.13	96.75	97.17	97.44	96.19	95.34	95.45	95.76
14	255.4	3.41	3025	3000	99.17	99.64	99.26	100.10	98.93	98.42	98.50	99.19	98.47	97.50	97.32	97.58
15	258.0	3.49	3046	3000	97.78	97.22	97.42	98.06	97.36	96.95	97.50	97.33	97.21	95.88	95.94	96.27
16	256.4	3.43	3080	3000	98.50	98.95	98.64	99.08	97.74	97.00	97.59	97.40	96.86	95.44	95.49	95.61
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean	258.1	3.42			98.61	99.03	98.53	99.24	97.98	97.86	97.94	97.74	97.44	96.74	96.65	96.78
Median	258.2	3.43			98.47	99.05	98.45	99.02	97.66	97.88	97.68	97.58	97.41	96.65	96.60	96.59
σ	8.3	0.03			0.92	1.08	1.08	1.12	0.97	1.01	1.03	1.31	1.11	1.13	1.05	1.08
Min.	239.5	3.39			97.40	97.22	97.28	97.96	96.89	96.57	96.57	95.51	96.19	95.34	95.45	95.61
Max.	271.5	3.49			101.02	102.00	101.37	102.04	100.65	100.43	100.71	100.76	100.37	99.71	99.75	99.94

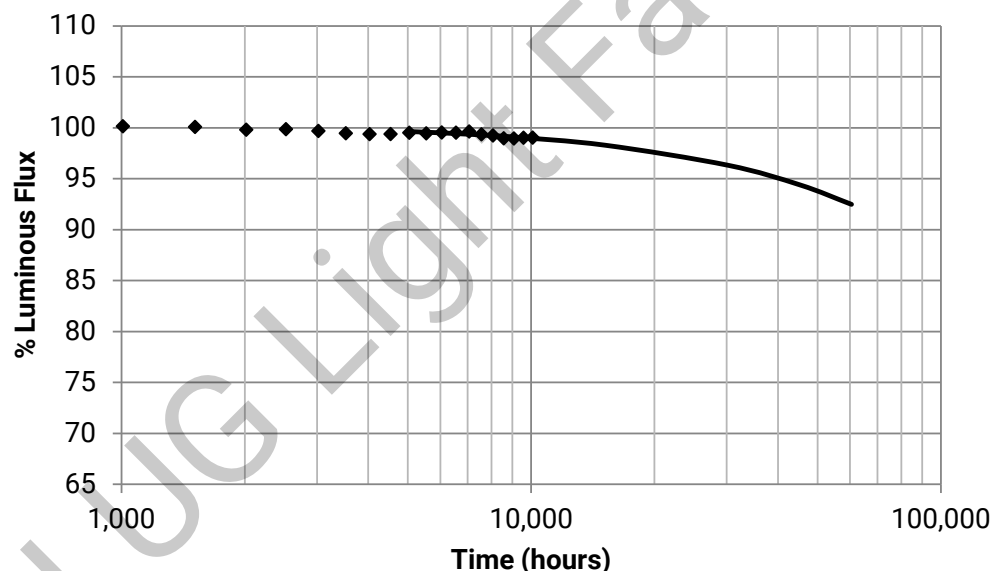
Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	12600	13104	13608	14112	14616	15120	15624	16128	16632	17136	17640	18144
1	0.4359	0.4023	3009	3000	0.0015	0.0013	0.0013	0.0014	0.0014	0.0013	0.0012	0.0014	0.0012	0.0012	0.0009	0.0006
2	0.4320	0.3986	3046	3000	0.0026	0.0028	0.0029	0.0031	0.0032	0.0033	0.0034	0.0035	0.0034	0.0035	0.0034	0.0034
3	0.4302	0.3969	3064	3000	0.0012	0.0011	0.0011	0.0011	0.0012	0.0010	0.0009	0.0010	0.0007	0.0004	0.0004	0.0002
4	0.4406	0.3987	2897	3000	0.0017	0.0016	0.0018	0.0019	0.0017	0.0017	0.0017	0.0017	0.0015	0.0014	0.0012	0.0010
5	0.4293	0.3881	3004	3000	0.0010	0.0008	0.0009	0.0010	0.0011	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0006
6	0.4389	0.4055	2984	3000	0.0010	0.0008	0.0009	0.0011	0.0011	0.0010	0.0011	0.0010	0.0010	0.0008	0.0006	0.0005
7	0.4374	0.4071	3022	3000	0.0026	0.0026	0.0027	0.0029	0.0029	0.0028	0.0029	0.0028	0.0028	0.0027	0.0024	0.0023
8	0.4392	0.4010	2941	3000	0.0016	0.0015	0.0015	0.0016	0.0017	0.0015	0.0013	0.0014	0.0015	0.0013	0.0012	0.0011
9	0.4280	0.4091	3202	3000	0.0023	0.0023	0.0024	0.0026	0.0026	0.0025	0.0024	0.0025	0.0024	0.0023	0.0020	0.0021
10	0.4432	0.4045	2903	3000	0.0021	0.0023	0.0022	0.0022	0.0025	0.0024	0.0024	0.0023	0.0024	0.0026	0.0025	0.0025
11	0.4406	0.4057	2957	3000	0.0015	0.0014	0.0014	0.0014	0.0014	0.0013	0.0013	0.0010	0.0011	0.0007	0.0006	0.0005
12	0.4354	0.4039	3030	3000	0.0013	0.0012	0.0013	0.0012	0.0011	0.0012	0.0011	0.0010	0.0009	0.0007	0.0006	0.0007
13	0.4353	0.3981	2983	3000	0.0024	0.0024	0.0023	0.0025	0.0024	0.0026	0.0026	0.0027	0.0027	0.0028	0.0030	0.0030
14	0.4366	0.4058	3025	3000	0.0017	0.0018	0.0017	0.0016	0.0018	0.0016	0.0015	0.0015	0.0016	0.0014	0.0011	0.0010
15	0.4329	0.4005	3046	3000	0.0012	0.0012	0.0012	0.0012	0.0014	0.0014	0.0013	0.0014	0.0013	0.0012	0.0011	0.0008
16	0.4371	0.4138	3080	3000	0.0022	0.0022	0.0022	0.0022	0.0021	0.0022	0.0021	0.0019	0.0019	0.0017	0.0016	0.0013
n	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Mean					0.0017	0.0017	0.0017	0.0018	0.0018	0.0018	0.0018	0.0018	0.0017	0.0016	0.0015	0.0014
Median					0.0016	0.0015	0.0016	0.0016	0.0017	0.0016	0.0014	0.0015	0.0015	0.0013	0.0011	0.0010
σ					0.0006	0.0006	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0010
Min.					0.0010	0.0008	0.0009	0.0010	0.0011	0.0008	0.0009	0.0009	0.0007	0.0004	0.0004	0.0002
Max.					0.0026	0.0028	0.0029	0.0031	0.0032	0.0033	0.0034	0.0035	0.0034	0.0035	0.0034	0.0034

DATA SET 10: 85°C; 1000 mA

LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT)
	This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I_F]	1000 mA
Testing Initiation Date	December 4, 2014
Case Temperature [T_s]	85°C
Ambient Temperature [T_A]	85°C
Failures observed	None

Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	10,080 hours
Test duration used for projection	t=5,040 to t=10,080
α	1.341E-06
β	1.003E+00
Reported Lifetimes	L90(10k) > 60,500 hours
	L80(10k) > 60,500 hours
	L70(10k) > 60,500 hours



* <http://www.energystar.gov/TM-21calculator>

LM-80 Data For The Official TM-21 Calculator*

Time (hours)	Lumen Maintenance
0	100.00%
1008	100.15%
1512	100.08%
2016	99.81%
2520	99.86%
3024	99.69%
3528	99.46%
4032	99.38%
4536	99.39%
5040	99.51%
5544	99.45%
6048	99.54%
6552	99.52%
7056	99.64%
7560	99.36%
8064	99.24%
8568	98.97%
9072	98.95%
9576	99.02%
10080	99.03%

Note: The data point t=168 hr is intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, the data point t=168 hr would be excluded, so the projection is unaffected.

DATA SET 10: 85°C; 1000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	300.0	3.25	3298	3000	100.31	99.75	99.52	99.56	99.22	99.08	98.62	98.73	98.88	98.97	98.94	99.12
2	336.6	3.27	3279	3000	100.14	100.37	100.03	99.92	100.11	99.76	99.48	99.33	99.94	100.35	100.01	99.74
3	298.6	3.23	3251	3000	100.37	100.49	100.35	99.74	99.56	99.12	98.68	98.99	98.61	98.96	99.09	99.52
4	328.7	3.24	3276	3000	100.40	100.28	100.19	100.08	100.17	100.10	99.97	100.01	99.98	100.37	99.88	99.69
5	302.4	3.27	3237	3000	100.11	100.16	99.71	99.74	99.25	99.40	99.03	98.64	98.87	98.84	98.69	99.37
6	331.1	3.26	3280	3000	99.70	100.19	99.91	99.81	99.74	99.39	99.31	99.32	99.39	99.74	99.62	100.09
7	307.4	3.31	3145	3000	99.49	99.61	99.43	99.18	99.48	99.15	99.00	98.97	99.10	99.50	99.54	99.67
8	334.3	3.23	3264	3000	99.93	100.44	100.37	100.21	100.36	100.11	99.69	99.88	100.11	100.56	100.48	100.39
9	306.2	3.24	3240	3000	100.45	99.41	99.43	99.29	99.32	99.40	99.26	99.22	99.37	99.15	99.24	99.65
10	310.7	3.33	3303	3000	100.75	100.03	100.25	99.79	100.04	99.91	99.43	99.36	99.06	99.15	98.85	98.81
11	329.8	3.23	3218	3000	100.15	100.13	100.10	99.55	99.52	99.35	99.34	99.20	99.21	99.64	99.95	100.10
12	333.4	3.21	3197	3000	100.02	99.57	99.64	98.88	98.98	99.07	98.56	98.82	98.87	99.42	99.79	99.76
13	307.3	3.35	3285	3000	100.21	100.26	100.58	100.15	100.21	100.22	100.44	100.20	100.25	99.59	99.60	99.42
14	337.7	3.29	3255	3000	100.74	100.65	100.29	100.04	99.99	99.55	99.61	99.62	99.52	99.73	100.01	99.66
15	303.8	3.26	3305	3000	100.41	100.53	100.43	100.06	100.42	100.45	100.56	100.08	99.71	99.68	99.57	99.49
16	337.4	3.26	3317	3000	99.70	99.58	99.80	99.64	99.78	99.00	99.07	99.09	98.84	99.02	99.22	99.27
17	298.9	3.23	3232	3000	100.15	100.50	100.31	99.93	100.31	100.10	99.65	99.01	99.07	98.76	98.62	99.23
18	331.9	3.22	3238	3000	100.30	100.51	100.54	100.41	100.44	100.61	100.24	100.42	100.17	100.15	99.85	99.42
19	302.4	3.24	3283	3000	100.73	100.60	100.57	100.48	100.61	100.42	99.74	99.27	99.34	99.29	98.97	99.30
20	302.4	3.30	3207	3000	100.16	99.89	100.25	99.76	99.75	99.58	99.54	99.41	99.43	99.36	99.10	99.05
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	317.1	3.26			100.21	100.15	100.08	99.81	99.86	99.69	99.46	99.38	99.39	99.51	99.45	99.54
Median	309.1	3.25			100.18	100.23	100.22	99.80	99.89	99.56	99.45	99.29	99.35	99.46	99.56	99.51
σ	15.6	0.04			0.34	0.39	0.38	0.40	0.47	0.52	0.56	0.51	0.50	0.53	0.51	0.38
Min.	298.6	3.21			99.49	99.41	99.43	98.88	98.98	99.00	98.56	98.64	98.61	98.76	98.62	98.81
Max.	337.7	3.35			100.75	100.65	100.58	100.48	100.61	100.61	100.56	100.42	100.25	100.56	100.48	100.39

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4208	0.4041	3298	3000	0.0003	0.0009	0.0010	0.0013	0.0013	0.0014	0.0015	0.0014	0.0013	0.0015	0.0015	0.0015
2	0.4209	0.4019	3279	3000	0.0009	0.0016	0.0018	0.0021	0.0021	0.0022	0.0024	0.0024	0.0023	0.0025	0.0023	0.0025
3	0.4236	0.4048	3251	3000	0.0010	0.0015	0.0016	0.0017	0.0017	0.0019	0.0019	0.0020	0.0018	0.0019	0.0020	0.0018
4	0.4230	0.4066	3276	3000	0.0010	0.0017	0.0019	0.0020	0.0020	0.0022	0.0024	0.0024	0.0023	0.0023	0.0023	0.0023
5	0.4250	0.4063	3237	3000	0.0008	0.0013	0.0013	0.0016	0.0015	0.0017	0.0017	0.0018	0.0018	0.0018	0.0018	0.0017
6	0.4208	0.4018	3280	3000	0.0006	0.0015	0.0015	0.0018	0.0017	0.0018	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
7	0.4293	0.4048	3145	3000	0.0008	0.0016	0.0018	0.0019	0.0020	0.0021	0.0022	0.0021	0.0021	0.0021	0.0022	0.0023
8	0.4229	0.4047	3264	3000	0.0009	0.0016	0.0018	0.0019	0.0019	0.0020	0.0021	0.0022	0.0023	0.0022	0.0023	0.0022
9	0.4248	0.4063	3240	3000	0.0008	0.0016	0.0018	0.0018	0.0017	0.0019	0.0020	0.0020	0.0018	0.0021	0.0021	0.0021
10	0.4198	0.4022	3303	3000	0.0008	0.0014	0.0015	0.0017	0.0016	0.0017	0.0017	0.0018	0.0019	0.0018	0.0017	0.0018
11	0.4261	0.4066	3218	3000	0.0008	0.0013	0.0014	0.0014	0.0014	0.0015	0.0017	0.0017	0.0017	0.0016	0.0017	0.0017
12	0.4261	0.4040	3197	3000	0.0009	0.0011	0.0012	0.0013	0.0014	0.0016	0.0016	0.0016	0.0017	0.0017	0.0017	0.0017
13	0.4235	0.4090	3285	3000	0.0006	0.0013	0.0016	0.0016	0.0018	0.0018	0.0018	0.0019	0.0020	0.0022	0.0022	0.0022
14	0.4229	0.4037	3255	3000	0.0006	0.0017	0.0019	0.0018	0.0021	0.0021	0.0022	0.0021	0.0023	0.0024	0.0023	0.0025
15	0.4189	0.4003	3305	3000	0.0007	0.0014	0.0016	0.0017	0.0021	0.0021	0.0023	0.0023	0.0023	0.0023	0.0025	0.0025
16	0.4205	0.4057	3317	3000	0.0004	0.0010	0.0010	0.0012	0.0013	0.0014	0.0015	0.0016	0.0015	0.0017	0.0019	0.0019
17	0.4264	0.4090	3232	3000	0.0008	0.0012	0.0013	0.0014	0.0015	0.0015	0.0017	0.0015	0.0017	0.0019	0.0019	0.0019
18	0.4235	0.4030	3238	3000	0.0008	0.0016	0.0018	0.0018	0.0021	0.0023	0.0022	0.0022	0.0022	0.0024	0.0021	0.0023
19	0.4202	0.4007	3283	3000	0.0008	0.0016	0.0017	0.0018	0.0020	0.0019	0.0021	0.0020	0.0021	0.0021	0.0020	0.0022
20	0.4269	0.4070	3207	3000	0.0008	0.0016	0.0017	0.0018	0.0020	0.0020	0.0021	0.0021	0.0021	0.0021	0.0022	0.0022
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0008	0.0014	0.0016	0.0017	0.0018	0.0019	0.0019	0.0020	0.0020	0.0020	0.0020	0.0021
Median					0.0008	0.0015	0.0016	0.0017	0.0018	0.0019	0.0020	0.0020	0.0020	0.0021	0.0021	0.0021
σ					0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.					0.0003	0.0009	0.0010	0.0012	0.0013	0.0014	0.0015	0.0014	0.0013	0.0015	0.0015	0.0015
Max.					0.0010	0.0017	0.0019	0.0021	0.0021	0.0023	0.0024	0.0024	0.0023	0.0025	0.0025	0.0025

DATA SET 10: 85°C; 1000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)							
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	300.0	3.25	3298	3000	99.39	99.35	98.78	98.49	98.11	98.14	97.81	97.78
2	336.6	3.27	3279	3000	99.64	99.74	99.88	99.82	99.49	98.71	99.21	99.78
3	298.6	3.23	3251	3000	99.74	99.66	98.91	98.71	98.12	97.63	97.87	97.95
4	328.7	3.24	3276	3000	99.47	99.57	99.87	99.91	99.56	99.80	99.71	99.72
5	302.4	3.27	3237	3000	99.44	99.58	98.43	98.51	98.14	98.58	98.18	97.98
6	331.1	3.26	3280	3000	99.86	99.91	99.70	99.80	99.07	99.47	99.83	99.40
7	307.4	3.31	3145	3000	99.76	99.96	99.36	99.29	98.77	99.06	98.69	99.15
8	334.3	3.23	3264	3000	100.20	100.34	99.96	100.13	99.80	99.60	99.64	99.58
9	306.2	3.24	3240	3000	99.66	100.02	98.99	98.81	98.98	98.48	99.06	99.11
10	310.7	3.33	3303	3000	98.99	99.62	99.33	98.62	98.56	98.51	98.95	97.90
11	329.8	3.23	3218	3000	99.75	99.38	99.79	99.82	99.68	99.54	99.56	99.43
12	333.4	3.21	3197	3000	99.73	99.61	100.03	99.77	99.48	99.40	99.46	99.49
13	307.3	3.35	3285	3000	99.43	99.40	99.77	99.93	99.87	100.09	99.91	99.94
14	337.7	3.29	3255	3000	99.59	99.50	99.30	99.56	99.64	99.58	99.55	99.69
15	303.8	3.26	3305	3000	99.18	99.41	99.72	99.46	99.40	99.34	99.35	99.39
16	337.4	3.26	3317	3000	99.25	99.52	98.93	98.77	98.45	98.31	98.45	98.51
17	298.9	3.23	3232	3000	98.72	99.17	99.00	98.27	97.86	97.74	98.01	98.30
18	331.9	3.22	3238	3000	99.57	99.68	98.77	99.18	99.20	99.03	98.84	98.65
19	302.4	3.24	3283	3000	99.56	99.78	99.49	98.94	98.45	99.05	99.27	99.76
20	302.4	3.30	3207	3000	99.44	99.55	99.13	99.10	98.69	98.93	99.07	99.14
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean	317.1	3.26			99.52	99.64	99.36	99.24	98.97	98.95	99.02	99.03
Median	309.1	3.25			99.57	99.59	99.35	99.24	99.02	99.04	99.14	99.27
σ	15.6	0.04			0.32	0.27	0.47	0.58	0.64	0.68	0.66	0.72
Min.	298.6	3.21			98.72	99.17	98.43	98.27	97.86	97.63	97.81	97.78
Max.	337.7	3.35			100.20	100.34	100.03	100.13	99.87	100.09	99.91	99.94

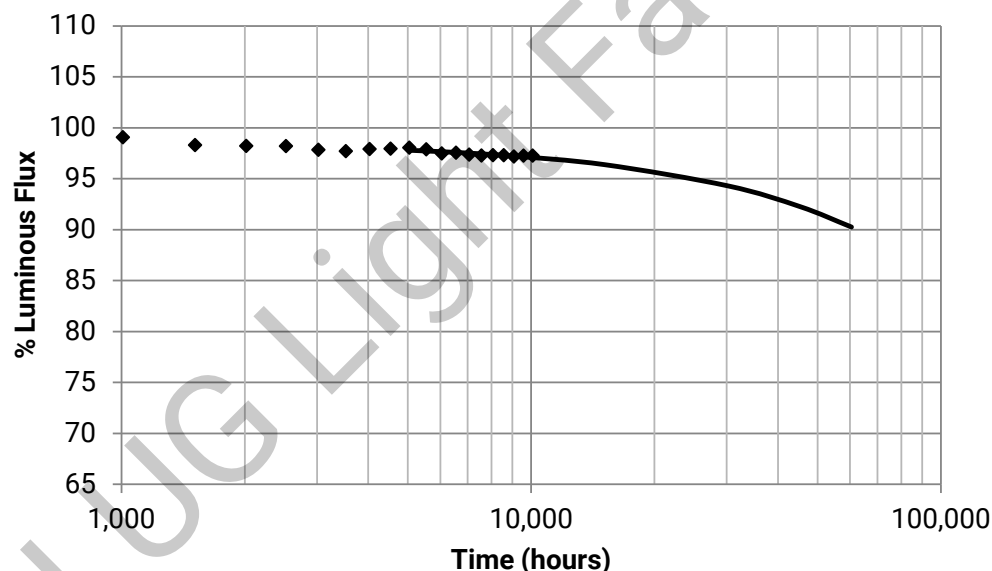
Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')							
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	0.4208	0.4041	3298	3000	0.0015	0.0017	0.0017	0.0017	0.0017	0.0017	0.0016	0.0015
2	0.4209	0.4019	3279	3000	0.0024	0.0025	0.0026	0.0026	0.0026	0.0027	0.0025	0.0025
3	0.4236	0.4048	3251	3000	0.0018	0.0020	0.0020	0.0021	0.0021	0.0021	0.0023	0.0020
4	0.4230	0.4066	3276	3000	0.0024	0.0024	0.0024	0.0026	0.0025	0.0026	0.0024	0.0023
5	0.4250	0.4063	3237	3000	0.0018	0.0018	0.0018	0.0019	0.0019	0.0018	0.0020	0.0017
6	0.4208	0.4018	3280	3000	0.0019	0.0019	0.0018	0.0020	0.0018	0.0020	0.0019	0.0018
7	0.4293	0.4048	3145	3000	0.0023	0.0023	0.0023	0.0024	0.0024	0.0024	0.0024	0.0024
8	0.4229	0.4047	3264	3000	0.0022	0.0023	0.0022	0.0024	0.0024	0.0025	0.0023	0.0023
9	0.4248	0.4063	3240	3000	0.0020	0.0022	0.0021	0.0021	0.0022	0.0021	0.0021	0.0019
10	0.4198	0.4022	3303	3000	0.0017	0.0019	0.0018	0.0019	0.0019	0.0018	0.0017	0.0017
11	0.4261	0.4066	3218	3000	0.0016	0.0017	0.0017	0.0017	0.0017	0.0016	0.0016	0.0016
12	0.4261	0.4040	3197	3000	0.0017	0.0018	0.0017	0.0017	0.0019	0.0018	0.0019	0.0018
13	0.4235	0.4090	3285	3000	0.0022	0.0022	0.0021	0.0022	0.0022	0.0023	0.0021	0.0021
14	0.4229	0.4037	3255	3000	0.0024	0.0024	0.0025	0.0026	0.0025	0.0026	0.0024	0.0022
15	0.4189	0.4003	3305	3000	0.0024	0.0024	0.0025	0.0026	0.0025	0.0026	0.0026	0.0023
16	0.4205	0.4057	3317	3000	0.0018	0.0019	0.0019	0.0020	0.0019	0.0020	0.0017	0.0018
17	0.4264	0.4090	3232	3000	0.0018	0.0019	0.0021	0.0021	0.0020	0.0022	0.0021	0.0019
18	0.4235	0.4030	3238	3000	0.0022	0.0022	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023
19	0.4202	0.4007	3283	3000	0.0020	0.0021	0.0023	0.0023	0.0022	0.0022	0.0022	0.0021
20	0.4269	0.4070	3207	3000	0.0020	0.0021	0.0022	0.0022	0.0021	0.0021	0.0021	0.0021
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0020	0.0021	0.0021	0.0022	0.0021	0.0022	0.0021	0.0020
Median					0.0020	0.0021	0.0021	0.0021	0.0022	0.0022	0.0021	0.0020
σ					0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.					0.0015	0.0017	0.0017	0.0017	0.0017	0.0016	0.0016	0.0015
Max.					0.0024	0.0025	0.0026	0.0026	0.0026	0.0027	0.0026	0.0025

DATA SET 11: 105°C; 1000 mA

LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT)
	This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I_F]	1000 mA
Testing Initiation Date	December 12, 2014
Case Temperature [T_s]	105°C
Ambient Temperature [T_A]	105°C
Failures observed	None

Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	10,080 hours
Test duration used for projection	t=5,040 to t=10,080
α	1.448E-06
β	9.852E-01
Reported Lifetimes	L90(10k) > 60,500 hours
	L80(10k) > 60,500 hours
	L70(10k) > 60,500 hours



* <http://www.energystar.gov/TM-21calculator>

LM-80 Data For The Official TM-21 Calculator*

Time (hours)	Lumen Maintenance
0	100.00%
1008	99.07%
1512	98.30%
2016	98.22%
2520	98.21%
3024	97.84%
3528	97.71%
4032	97.91%
4536	97.95%
5040	98.05%
5544	97.89%
6048	97.48%
6552	97.56%
7056	97.37%
7560	97.28%
8064	97.31%
8568	97.31%
9072	97.18%
9576	97.27%
10080	97.27%

Note: The data points t=168 hr is intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, the data point t=168 hr would be excluded, so the projection is unaffected.

DATA SET 11: 105°C; 1000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	293.0	3.36	3246	3000	99.91	98.97	97.99	97.65	97.71	97.49	97.36	97.77	97.75	97.63	98.15	97.15
2	330.7	3.24	3247	3000	100.39	97.60	97.06	97.02	97.13	96.73	96.60	96.85	96.41	96.66	96.37	96.05
3	329.5	3.29	3309	3000	99.59	99.24	99.00	98.79	98.71	98.22	98.16	98.64	98.37	98.71	98.26	97.84
4	304.1	3.32	3318	3000	99.58	99.22	97.11	96.58	96.75	96.93	96.89	96.92	96.66	96.36	97.04	96.32
5	327.2	3.27	3227	3000	100.27	99.23	98.37	98.46	98.72	98.06	97.69	98.35	98.42	98.82	98.35	98.17
6	322.2	3.24	3152	3000	99.88	99.56	98.77	98.69	98.64	98.15	97.87	98.50	98.43	98.73	98.29	98.18
7	292.0	3.26	3172	3000	100.16	99.89	97.67	97.46	97.49	97.54	97.86	97.57	97.99	97.46	97.58	96.79
8	335.2	3.22	3219	3000	100.03	99.28	98.80	99.07	99.08	98.65	98.57	98.52	98.57	99.13	98.41	98.03
9	305.4	3.25	3203	3000	99.87	99.11	98.41	98.14	98.55	98.44	98.34	98.75	98.90	97.84	97.55	97.44
10	298.9	3.24	3295	3000	100.26	99.54	99.53	99.42	98.56	98.01	97.81	98.01	98.09	97.61	98.38	97.13
11	334.1	3.24	3315	3000	99.91	99.11	98.97	98.93	99.03	98.32	98.01	98.21	98.50	98.94	98.33	97.95
12	331.5	3.26	3226	3000	100.39	99.32	98.41	98.57	98.61	97.91	97.70	97.75	98.08	98.41	97.79	97.40
13	326.6	3.23	3171	3000	99.16	98.17	97.91	97.82	97.79	97.33	97.02	97.01	97.19	97.42	96.83	96.64
14	316.5	3.27	3189	3000	100.36	99.33	98.71	98.70	98.56	98.25	98.31	98.09	98.52	98.93	98.19	98.16
15	297.9	3.23	3180	3000	100.01	98.53	97.72	97.65	97.74	97.57	97.47	97.50	97.38	96.56	96.95	96.71
16	324.7	3.28	3212	3000	100.12	99.11	99.01	98.87	98.86	98.38	98.33	98.52	98.59	99.01	98.51	98.42
17	335.9	3.28	3277	3000	99.57	99.18	98.77	98.38	98.35	97.73	97.45	97.55	97.90	98.87	98.64	98.16
18	327.7	3.26	3254	3000	99.98	98.85	97.83	97.99	98.04	97.85	97.79	98.07	97.84	98.69	98.36	98.00
19	333.6	3.22	3301	3000	100.61	99.13	98.18	98.26	98.26	97.95	97.71	98.01	97.73	98.20	98.03	97.87
20	289.3	3.27	3159	3000	100.62	99.04	97.86	97.97	97.54	97.27	97.25	97.71	97.71	96.99	97.73	97.28
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean	317.8	3.26			100.03	99.07	98.30	98.22	98.21	97.84	97.71	97.91	97.95	98.05	97.89	97.48
Median	325.6	3.26			100.02	99.16	98.39	98.32	98.45	97.93	97.75	98.01	98.03	98.31	98.17	97.64
σ	16.5	0.04			0.37	0.50	0.66	0.72	0.65	0.51	0.52	0.57	0.65	0.91	0.64	0.70
Min.	289.3	3.22			99.16	97.60	97.06	96.58	96.75	96.73	96.60	96.85	96.41	96.36	96.37	96.05
Max.	335.9	3.36			100.62	99.89	99.53	99.42	99.08	98.65	98.57	98.75	98.90	99.13	98.64	98.42

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4234	0.4038	3246	3000	0.0002	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008	0.0010	0.0007	0.0008	0.0008	0.0009
2	0.4243	0.4060	3247	3000	0.0006	0.0009	0.0009	0.0007	0.0007	0.0007	0.0009	0.0009	0.0008	0.0007	0.0008	0.0009
3	0.4198	0.4032	3309	3000	0.0007	0.0014	0.0015	0.0015	0.0014	0.0015	0.0015	0.0012	0.0015	0.0015	0.0015	0.0016
4	0.4189	0.4020	3318	3000	0.0004	0.0007	0.0007	0.0007	0.0008	0.0007	0.0008	0.0007	0.0007	0.0007	0.0008	0.0008
5	0.4252	0.4056	3227	3000	0.0008	0.0014	0.0014	0.0014	0.0013	0.0013	0.0014	0.0013	0.0013	0.0012	0.0012	0.0015
6	0.4305	0.4083	3152	3000	0.0008	0.0011	0.0011	0.0011	0.0012	0.0011	0.0012	0.0011	0.0010	0.0011	0.0011	0.0013
7	0.4280	0.4053	3172	3000	0.0004	0.0003	0.0004	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0004	0.0007
8	0.4249	0.4040	3219	3000	0.0008	0.0011	0.0011	0.0011	0.0010	0.0011	0.0011	0.0011	0.0010	0.0010	0.0013	0.0013
9	0.4264	0.4054	3203	3000	0.0010	0.0018	0.0018	0.0017	0.0017	0.0018	0.0018	0.0017	0.0016	0.0016	0.0014	0.0017
10	0.4208	0.4039	3295	3000	0.0007	0.0011	0.0012	0.0012	0.0012	0.0012	0.0013	0.0013	0.0013	0.0014	0.0013	0.0015
11	0.4204	0.4052	3315	3000	0.0008	0.0011	0.0011	0.0012	0.0011	0.0012	0.0013	0.0013	0.0013	0.0014	0.0014	0.0015
12	0.4242	0.4031	3226	3000	0.0007	0.0012	0.0012	0.0012	0.0012	0.0013	0.0014	0.0013	0.0013	0.0015	0.0014	0.0015
13	0.4288	0.4068	3171	3000	0.0004	0.0009	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010	0.0011
14	0.4269	0.4049	3189	3000	0.0004	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0010	0.0008	0.0009	0.0009	0.0011
15	0.4294	0.4095	3180	3000	0.0003	0.0007	0.0007	0.0006	0.0006	0.0007	0.0006	0.0008	0.0007	0.0006	0.0007	0.0009
16	0.4251	0.4034	3212	3000	0.0009	0.0010	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0011	0.0011	0.0012	0.0014
17	0.4207	0.4014	3277	3000	0.0008	0.0010	0.0012	0.0012	0.0012	0.0014	0.0014	0.0014	0.0012	0.0013	0.0014	0.0015
18	0.4228	0.4035	3254	3000	0.0006	0.0012	0.0011	0.0014	0.0014	0.0014	0.0015	0.0013	0.0013	0.0014	0.0014	0.0015
19	0.4196	0.4016	3301	3000	0.0010	0.0014	0.0014	0.0015	0.0015	0.0015	0.0017	0.0016	0.0014	0.0013	0.0015	0.0016
20	0.4308	0.4099	3159	3000	0.0009	0.0014	0.0015	0.0013	0.0014	0.0014	0.0016	0.0015	0.0014	0.0013	0.0015	0.0014
n	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0007	0.0011	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0011	0.0011	0.0012	0.0013
Median					0.0007	0.0011	0.0011	0.0012	0.0011	0.0011	0.0013	0.0012	0.0011	0.0012	0.0013	0.0014
σ					0.0002	0.0003	0.0003	0.0004	0.0003	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003
Min.					0.0002	0.0003	0.0004	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0004	0.0007
Max.					0.0010	0.0018	0.0018	0.0017	0.0017	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0017

DATA SET 11: 105°C; 1000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)							
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	293.0	3.36	3246	3000	97.40	96.88	97.28	97.41	97.19	96.79	96.91	96.97
2	330.7	3.24	3247	3000	96.10	96.07	95.99	96.27	95.93	95.88	96.32	96.37
3	329.5	3.29	3309	3000	98.05	98.12	98.15	98.03	97.83	97.88	97.78	97.74
4	304.1	3.32	3318	3000	96.60	96.49	96.36	96.28	96.36	96.35	96.47	96.38
5	327.2	3.27	3227	3000	98.17	97.52	97.82	97.67	97.68	97.61	97.74	98.01
6	322.2	3.24	3152	3000	98.23	97.90	97.78	97.73	97.50	97.61	97.56	97.58
7	292.0	3.26	3172	3000	96.74	96.67	96.28	96.52	96.45	96.38	96.40	96.40
8	335.2	3.22	3219	3000	98.49	98.15	98.26	97.95	97.83	97.91	98.06	97.97
9	305.4	3.25	3203	3000	97.65	97.01	96.82	97.00	96.66	96.78	97.00	96.94
10	298.9	3.24	3295	3000	97.65	97.44	97.17	97.08	97.05	96.99	96.93	97.01
11	334.1	3.24	3315	3000	97.19	97.45	97.50	97.30	97.87	97.37	97.27	97.41
12	331.5	3.26	3226	3000	97.17	97.20	97.12	97.01	97.10	97.07	97.37	97.34
13	326.6	3.23	3171	3000	96.28	96.10	96.32	96.96	96.43	96.21	96.40	96.23
14	316.5	3.27	3189	3000	98.07	97.70	98.11	97.77	97.84	97.72	97.79	97.84
15	297.9	3.23	3180	3000	96.50	96.89	96.63	96.23	96.90	96.46	96.43	96.29
16	324.7	3.28	3212	3000	98.54	98.11	98.52	98.19	98.01	98.14	98.17	98.07
17	335.9	3.28	3277	3000	98.56	98.34	97.56	97.94	98.06	97.89	98.27	97.65
18	327.7	3.26	3254	3000	98.17	97.95	97.32	97.82	97.85	97.63	97.81	98.06
19	333.6	3.22	3301	3000	98.10	97.78	97.21	97.68	97.77	97.54	97.69	98.19
20	289.3	3.27	3159	3000	97.46	97.54	97.34	97.41	97.87	97.42	96.98	96.95
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean	317.8	3.26			97.56	97.37	97.28	97.31	97.31	97.18	97.27	97.27
Median	325.6	3.26			97.65	97.49	97.30	97.41	97.59	97.39	97.32	97.38
σ	16.5	0.04			0.78	0.68	0.72	0.62	0.66	0.66	0.64	0.68
Min.	289.3	3.22			96.10	96.07	95.99	96.23	95.93	95.88	96.32	96.23
Max.	335.9	3.36			98.56	98.34	98.52	98.19	98.06	98.14	98.27	98.19

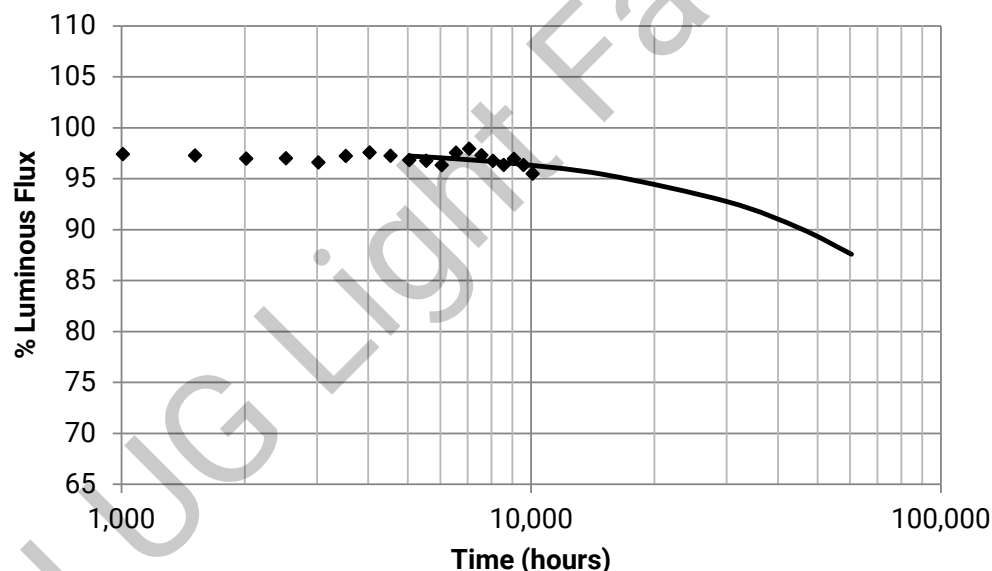
Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')							
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	0.4234	0.4038	3246	3000	0.0008	0.0007	0.0010	0.0011	0.0010	0.0011	0.0011	0.0011
2	0.4243	0.4060	3247	3000	0.0008	0.0010	0.0011	0.0011	0.0012	0.0011	0.0010	0.0009
3	0.4198	0.4032	3309	3000	0.0017	0.0018	0.0019	0.0019	0.0021	0.0019	0.0020	0.0019
4	0.4189	0.4020	3318	3000	0.0009	0.0010	0.0010	0.0008	0.0013	0.0011	0.0010	0.0011
5	0.4252	0.4056	3227	3000	0.0015	0.0016	0.0018	0.0016	0.0017	0.0017	0.0018	0.0018
6	0.4305	0.4083	3152	3000	0.0014	0.0015	0.0015	0.0015	0.0017	0.0016	0.0016	0.0019
7	0.4280	0.4053	3172	3000	0.0007	0.0008	0.0008	0.0008	0.0010	0.0012	0.0012	0.0012
8	0.4249	0.4040	3219	3000	0.0014	0.0016	0.0016	0.0015	0.0017	0.0017	0.0017	0.0019
9	0.4264	0.4054	3203	3000	0.0018	0.0019	0.0017	0.0018	0.0021	0.0020	0.0017	0.0020
10	0.4208	0.4039	3295	3000	0.0017	0.0016	0.0018	0.0016	0.0018	0.0016	0.0016	0.0020
11	0.4204	0.4052	3315	3000	0.0016	0.0016	0.0017	0.0015	0.0017	0.0016	0.0018	0.0019
12	0.4242	0.4031	3226	3000	0.0016	0.0018	0.0019	0.0019	0.0020	0.0020	0.0021	0.0022
13	0.4288	0.4068	3171	3000	0.0012	0.0014	0.0014	0.0014	0.0013	0.0012	0.0011	0.0011
14	0.4269	0.4049	3189	3000	0.0012	0.0013	0.0013	0.0013	0.0013	0.0010	0.0012	0.0014
15	0.4294	0.4095	3180	3000	0.0009	0.0010	0.0011	0.0011	0.0012	0.0012	0.0011	0.0014
16	0.4251	0.4034	3212	3000	0.0015	0.0016	0.0017	0.0017	0.0019	0.0019	0.0019	0.0021
17	0.4207	0.4014	3277	3000	0.0017	0.0017	0.0018	0.0019	0.0019	0.0020	0.0020	0.0021
18	0.4228	0.4035	3254	3000	0.0015	0.0016	0.0017	0.0018	0.0019	0.0019	0.0016	0.0017
19	0.4196	0.4016	3301	3000	0.0015	0.0017	0.0018	0.0020	0.0020	0.0020	0.0020	0.0020
20	0.4308	0.4099	3159	3000	0.0014	0.0016	0.0016	0.0016	0.0018	0.0018	0.0017	0.0016
n	20	20	20	20	20	20	20	20	20	20	20	20
Mean					0.0013	0.0014	0.0015	0.0015	0.0016	0.0016	0.0016	0.0017
Median					0.0015	0.0016	0.0017	0.0016	0.0017	0.0017	0.0016	0.0018
σ					0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004
Min.					0.0007	0.0007	0.0008	0.0008	0.0010	0.0010	0.0010	0.0009
Max.					0.0018	0.0019	0.0019	0.0020	0.0021	0.0020	0.0021	0.0022

DATA SET 5: 55°C; 1250 mA

LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT)
	This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I_F]	1250 mA
Testing Initiation Date	January 8, 2012
Case Temperature [T_s]	55°C
Ambient Temperature [T_A]	55°C
Failures observed	None

Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	10,080 hours
Test duration used for projection	t=5,040 to t=10,080
α	1.885E-06
β	9.817E-01
Reported Lifetimes	L90(10k) = 46,100 hours
	L80(10k) > 60,500 hours
	L70(10k) > 60,500 hours



LM-80 Data For The Official TM-21 Calculator*

Time (hours)	Lumen Maintenance
0	100.00%
1008	97.42%
1512	97.28%
2016	96.97%
2520	97.01%
3024	96.60%
3528	97.23%
4032	97.57%
4536	97.25%
5040	96.83%
5544	96.76%
6048	96.33%
6552	97.55%
7056	97.94%
7560	97.30%
8064	96.75%
8568	96.35%
9072	96.95%
9576	96.35%
10080	95.50%

* <http://www.energystar.gov/TM-21calculator>

Note: The data point t=168 hr is intentionally excluded from this table, since the ENERGY STAR tool has a 20 data point input limit. Per TM-21 methodology, the data point t=168 hr would be excluded, so the projection is unaffected.

DATA SET 5: 55°C; 1250 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	266.7	3.60	2981	3000	96.90	97.46	97.17	96.29	96.81	96.42	96.60	98.33	98.02	96.18	97.41	96.09
2	283.7	3.66	3042	3000	96.44	97.10	97.52	97.97	97.62	97.32	98.77	98.84	98.11	98.07	97.83	97.31
3	262.7	3.57	2979	3000	95.62	96.45	95.81	95.12	95.70	95.28	94.81	95.70	95.43	93.77	94.65	93.48
4	281.7	3.59	3035	3000	97.11	97.55	97.04	96.71	97.16	97.42	98.53	98.40	98.07	97.66	97.84	97.24
5	265.5	3.60	3036	3000	96.45	96.62	96.58	95.21	95.95	95.19	95.44	95.61	95.35	95.34	95.69	94.48
6	287.5	3.66	3070	3000	98.73	97.92	97.50	97.52	97.34	97.45	98.58	98.59	98.00	97.87	97.74	97.14
7	283.8	3.63	3014	3000	98.02	97.61	96.63	96.41	97.10	97.06	98.01	97.99	97.36	97.38	96.95	96.60
8	275.6	3.63	2997	3000	95.96	95.95	96.38	96.00	96.26	96.07	95.42	96.27	95.87	95.36	95.57	94.77
9	262.5	3.55	2911	3000	97.42	98.00	97.14	96.28	96.77	96.22	97.29	98.05	97.00	95.71	96.95	96.85
10	282.5	3.68	3016	3000	99.33	97.74	98.61	98.40	98.07	96.67	98.45	98.12	98.54	97.94	97.10	96.99
11	267.4	3.63	3082	3000	97.28	97.15	96.55	95.72	96.28	95.44	96.03	96.03	95.62	94.91	95.13	95.07
12	295.8	3.56	3004	3000	97.26	96.83	96.89	97.26	97.28	97.35	97.64	97.48	97.42	97.05	97.21	96.69
13	261.7	3.68	2991	3000	96.31	96.66	96.84	96.24	97.01	96.01	96.13	97.61	97.06	96.25	96.62	96.87
14	285.1	3.61	2971	3000	97.30	96.27	96.38	96.35	96.07	96.02	97.04	97.17	96.28	96.46	96.24	95.68
15	269.5	3.64	2995	3000	98.06	97.44	97.23	96.88	97.11	97.08	97.82	97.77	97.29	97.33	97.11	96.62
16	279.2	3.58	2990	3000	98.79	96.94	97.76	97.23	97.57	96.48	96.33	98.22	97.43	96.73	97.06	97.20
17	262.6	3.59	3220	3000	96.78	96.74	97.60	97.28	97.23	95.64	96.72	97.17	96.80	97.29	96.52	96.76
18	288.2	3.60	3156	3000	99.98	100.06	98.96	98.23	97.66	98.55	99.18	99.26	98.73	97.94	98.78	97.92
19	270.7	3.58	3021	3000	97.08	96.50	97.05	97.22	97.07	95.87	96.33	96.80	97.01	96.85	95.77	96.07
20	285.3	3.63	3047	3000	99.15	98.01	97.50	97.20	96.41	96.85	97.74	97.74	97.59	97.36	97.10	96.54
21	261.7	3.60	2943	3000	99.52	97.02	97.55	98.00	97.96	96.79	97.14	97.25	97.72	97.30	96.28	96.30
22	279.1	3.66	3013	3000	99.93	99.15	98.19	98.28	97.54	97.80	98.61	98.48	98.20	98.12	97.47	97.01
23	279.7	3.61	2955	3000	98.80	99.11	98.14	97.81	97.26	97.58	98.61	98.54	98.22	98.16	97.69	97.08
24	271.3	3.67	2977	3000	98.49	96.87	98.02	97.65	97.78	95.74	96.08	96.55	96.80	96.62	95.41	95.16
25	290.9	3.60	3117	3000	99.04	98.23	96.99	97.09	96.23	96.71	97.49	97.37	97.37	97.15	96.89	96.36
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	276.0	3.62			97.83	97.41	97.28	96.97	97.01	96.60	97.23	97.57	97.25	96.83	96.76	96.33
Median	279.1	3.61			97.42	97.15	97.17	97.20	97.11	96.67	97.29	97.74	97.37	97.15	96.95	96.62
σ	10.4	0.04			1.28	0.97	0.74	0.93	0.65	0.86	1.21	0.98	0.95	1.12	0.98	1.04
Min.	261.7	3.55			95.62	95.95	95.81	95.12	95.70	95.19	94.81	95.61	95.35	93.77	94.65	93.48
Max.	295.8	3.68			99.98	100.06	98.96	98.40	98.07	98.55	99.18	99.26	98.73	98.16	98.78	97.92

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4382	0.4039	2981	3000	0.0002	0.0003	0.0004	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006
2	0.4322	0.3985	3042	3000	0.0009	0.0006	0.0005	0.0005	0.0005	0.0005	0.0006	0.0007	0.0008	0.0008	0.0008	0.0009
3	0.4365	0.4000	2979	3000	0.0011	0.0004	0.0006	0.0006	0.0005	0.0006	0.0004	0.0007	0.0007	0.0008	0.0008	0.0008
4	0.4324	0.3982	3035	3000	0.0007	0.0006	0.0004	0.0007	0.0006	0.0006	0.0006	0.0008	0.0009	0.0009	0.0010	0.0009
5	0.4309	0.3951	3036	3000	0.0010	0.0007	0.0008	0.0007	0.0007	0.0009	0.0005	0.0008	0.0009	0.0009	0.0009	0.0009
6	0.4305	0.3983	3070	3000	0.0003	0.0004	0.0004	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0007	0.0006
7	0.4359	0.4030	3014	3000	0.0006	0.0004	0.0006	0.0007	0.0005	0.0005	0.0005	0.0008	0.0008	0.0008	0.0009	0.0008
8	0.4365	0.4021	2997	3000	0.0011	0.0004	0.0005	0.0006	0.0005	0.0005	0.0004	0.0005	0.0006	0.0007	0.0007	0.0007
9	0.4466	0.4122	2911	3000	0.0003	0.0005	0.0005	0.0006	0.0007	0.0008	0.0008	0.0007	0.0007	0.0008	0.0008	0.0007
10	0.4346	0.4007	3016	3000	0.0004	0.0005	0.0004	0.0004	0.0004	0.0006	0.0007	0.0005	0.0006	0.0005	0.0006	0.0006
11	0.4301	0.3989	3082	3000	0.0005	0.0003	0.0002	0.0003	0.0002	0.0003	0.0003	0.0004	0.0005	0.0004	0.0005	0.0006
12	0.4371	0.4043	3004	3000	0.0009	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0009	0.0009	0.0010	0.0011
13	0.4396	0.4079	2991	3000	0.0006	0.0003	0.0004	0.0004	0.0005	0.0005	0.0005	0.0006	0.0005	0.0005	0.0006	0.0007
14	0.4407	0.4078	2971	3000	0.0002	0.0006	0.0005	0.0007	0.0007	0.0007	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007
15	0.4391	0.4074	2995	3000	0.0006	0.0004	0.0003	0.0003	0.0005	0.0004	0.0005	0.0004	0.0005	0.0005	0.0004	0.0004
16	0.4394	0.4072	2990	3000	0.0005	0.0005	0.0004	0.0005	0.0004	0.0005	0.0005	0.0006	0.0007	0.0007	0.0007	0.0009
17	0.4168	0.3849	3220	3000	0.0006	0.0007	0.0006	0.0006	0.0006	0.0007	0.0008	0.0008	0.0009	0.0008	0.0008	0.0010
18	0.4200	0.3852	3156	3000	0.0003	0.0005	0.0005	0.0005	0.0005	0.0007	0.0007	0.0008	0.0008	0.0008	0.0009	0.0011
19	0.4363	0.4048	3021	3000	0.0003	0.0004	0.0006	0.0007	0.0006	0.0007	0.0007	0.0007	0.0007	0.0006	0.0007	0.0007
20	0.4334	0.4018	3047	3000	0.0005	0.0005	0.0006	0.0006	0.0005	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
21	0.4432	0.4093	2943	3000	0.0005	0.0005	0.0005	0.0005	0.0005	0.0006	0.0005	0.0006	0.0006	0.0007	0.0008	0.0008
22	0.4352	0.4015	3013	3000	0.0005	0.0008	0.0008	0.0010	0.0009	0.0010	0.0010	0.0010	0.0010	0.0009	0.0010	0.0010
23	0.4409	0.4062	2955	3000	0.0002	0.0007	0.0005	0.0005	0.0005	0.0006	0.0006	0.0007	0.0006	0.0006	0.0007	0.0007
24	0.4395	0.4060	2977	3000	0.0005	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0007	0.0008	0.0008	0.0008	0.0007
25	0.4294	0.4017	3117	3000	0.0001	0.0002	0.0001	0.0001	0.0001	0.0002	0.0004	0.0003	0.0004	0.0002	0.0003	0.0003
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0005	0.0005	0.0005	0.0006	0.0005	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0008
Median					0.0005	0.0005	0.0005	0.0006	0.0005	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007
σ					0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.					0.0001	0.0002	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0004	0.0002	0.0003	0.0003
Max.					0.0011	0.0008	0.0008	0.0010	0.0009	0.0010	0.0010	0.0010	0.0010	0.0009	0.0010	0.0011

DATA SET 5: 55°C; 1250 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)							
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	266.7	3.60	2981	3000	97.60	97.88	97.29	96.13	95.29	96.95	96.62	95.38
2	283.7	3.66	3042	3000	99.18	99.34	98.67	98.37	97.92	98.00	97.34	97.14
3	262.7	3.57	2979	3000	95.16	95.17	94.75	93.80	93.93	94.65	94.35	93.30
4	281.7	3.59	3035	3000	98.94	99.27	98.83	98.37	98.00	98.29	97.99	97.27
5	265.5	3.60	3036	3000	94.77	95.36	94.63	94.00	94.32	94.48	94.38	93.27
6	287.5	3.66	3070	3000	98.91	99.26	98.83	98.19	97.74	97.95	97.61	97.15
7	283.8	3.63	3014	3000	98.35	98.57	98.06	97.48	97.30	97.18	96.65	96.31
8	275.6	3.63	2997	3000	95.88	96.45	95.91	95.61	95.07	95.49	95.08	94.40
9	262.5	3.55	2911	3000	97.54	97.21	96.68	95.55	95.12	95.73	94.75	93.68
10	282.5	3.68	3016	3000	98.68	98.46	97.89	98.04	97.34	97.80	96.83	95.96
11	267.4	3.63	3082	3000	94.90	95.00	94.39	93.70	93.75	94.38	93.92	92.93
12	295.8	3.56	3004	3000	98.52	98.94	98.49	98.02	97.92	97.97	97.30	96.86
13	261.7	3.68	2991	3000	96.66	97.36	96.85	96.36	95.65	96.67	96.21	95.52
14	285.1	3.61	2971	3000	97.06	97.92	97.47	96.93	96.56	96.61	96.30	95.81
15	269.5	3.64	2995	3000	98.41	98.93	98.51	97.87	97.70	97.64	97.05	96.63
16	279.2	3.58	2990	3000	97.00	97.96	97.28	96.85	96.45	96.85	96.63	96.13
17	262.6	3.59	3220	3000	97.73	97.90	96.98	96.09	95.29	96.93	96.39	94.21
18	288.2	3.60	3156	3000	99.50	100.24	99.24	98.87	98.44	98.53	97.75	96.60
19	270.7	3.58	3021	3000	97.00	97.20	96.52	95.83	95.07	96.97	95.89	94.46
20	285.3	3.63	3047	3000	98.22	98.70	97.83	97.46	97.00	97.14	96.48	95.47
21	261.7	3.60	2943	3000	96.84	97.56	96.62	96.18	95.37	97.95	96.47	95.28
22	279.1	3.66	3013	3000	98.73	99.16	98.20	97.69	97.37	97.62	97.11	96.23
23	279.7	3.61	2955	3000	98.81	99.26	98.43	97.98	97.71	97.86	97.15	96.45
24	271.3	3.67	2977	3000	95.89	96.80	95.91	95.55	94.77	96.32	95.04	94.12
25	290.9	3.60	3117	3000	98.59	98.59	98.30	97.92	97.68	97.81	97.36	96.82
n	25	25	25	25	25	25	25	25	25	25	25	25
Mean	276.0	3.62			97.55	97.94	97.30	96.75	96.35	96.95	96.35	95.49
Median	279.1	3.61			97.73	97.96	97.47	96.93	96.56	97.14	96.62	95.81
σ	10.4	0.04			1.39	1.38	1.37	1.49	1.45	1.19	1.14	1.34
Min.	261.7	3.55			94.77	95.00	94.39	93.70	93.75	94.38	93.92	92.93
Max.	295.8	3.68			99.50	100.24	99.24	98.87	98.44	98.53	97.99	97.27

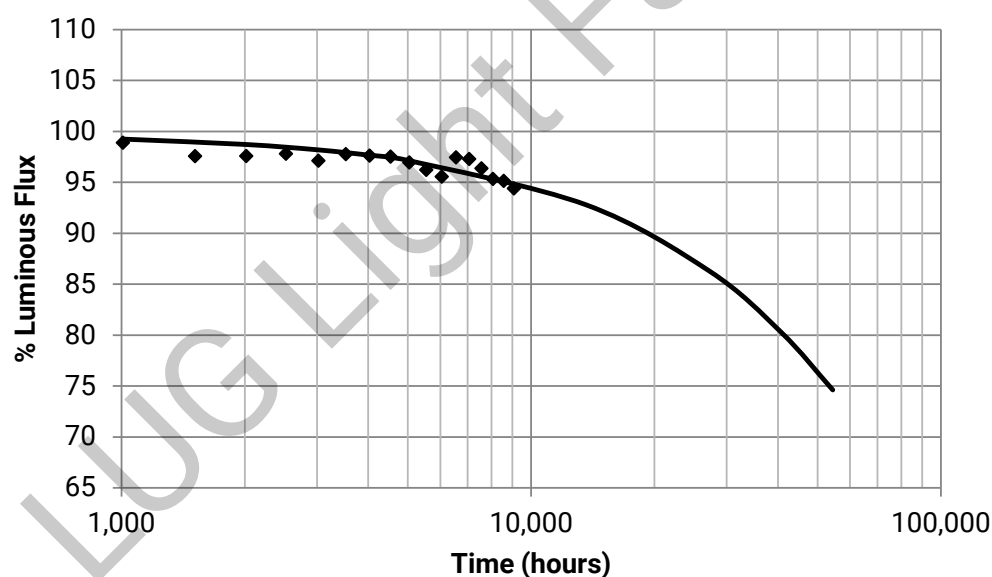
Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')							
	CCx	CCy	Calc. CCT	ANSI Target	6552	7056	7560	8064	8568	9072	9576	10080
1	0.4382	0.4039	2981	3000	0.0006	0.0008	0.0007	0.0007	0.0006	0.0008	0.0006	0.0006
2	0.4322	0.3985	3042	3000	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007
3	0.4365	0.4000	2979	3000	0.0007	0.0010	0.0009	0.0009	0.0009	0.0011	0.0011	0.0010
4	0.4324	0.3982	3035	3000	0.0009	0.0011	0.0012	0.0012	0.0010	0.0011	0.0010	0.0009
5	0.4309	0.3951	3036	3000	0.0007	0.0010	0.0011	0.0010	0.0010	0.0011	0.0013	0.0011
6	0.4305	0.3983	3070	3000	0.0007	0.0008	0.0009	0.0007	0.0007	0.0007	0.0007	0.0006
7	0.4359	0.4030	3014	3000	0.0008	0.0008	0.0008	0.0007	0.0005	0.0004	0.0005	0.0004
8	0.4365	0.4021	2997	3000	0.0006	0.0008	0.0008	0.0008	0.0008	0.0009	0.0010	0.0009
9	0.4466	0.4122	2911	3000	0.0009	0.0010	0.0010	0.0012	0.0013	0.0011	0.0009	0.0009
10	0.4346	0.4007	3016	3000	0.0005	0.0006	0.0006	0.0005	0.0005	0.0007	0.0006	0.0007
11	0.4301	0.3989	3082	3000	0.0005	0.0005	0.0006	0.0006	0.0004	0.0005	0.0006	0.0005
12	0.4371	0.4043	3004	3000	0.0009	0.0012	0.0012	0.0011	0.0011	0.0012	0.0012	0.0010
13	0.4396	0.4079	2991	3000	0.0005	0.0006	0.0007	0.0006	0.0006	0.0008	0.0007	0.0006
14	0.4407	0.4078	2971	3000	0.0007	0.0008	0.0008	0.0008	0.0007	0.0008	0.0007	0.0007
15	0.4391	0.4074	2995	3000	0.0004	0.0005	0.0006	0.0005	0.0005	0.0005	0.0006	0.0004
16	0.4394	0.4072	2990	3000	0.0007	0.0009	0.0009	0.0009	0.0009	0.0010	0.0011	0.0010
17	0.4168	0.3849	3220	3000	0.0009	0.0010	0.0010	0.0010	0.0009	0.0013	0.0012	0.0011
18	0.4200	0.3852	3156	3000	0.0008	0.0010	0.0011	0.0011	0.0011	0.0013	0.0012	0.0012
19	0.4363	0.4048	3021	3000	0.0007	0.0008	0.0008	0.0007	0.0007	0.0008	0.0007	0.0006
20	0.4334	0.4018	3047	3000	0.0007	0.0007	0.0008	0.0009	0.0008	0.0009	0.0008	0.0007
21	0.4432	0.4093	2943	3000	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007	0.0006
22	0.4352	0.4015	3013	3000	0.0012	0.0012	0.0012	0.0013	0.0013	0.0014	0.0013	0.0013
23	0.4409	0.4062	2955	3000	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006
24	0.4395	0.4060	2977	3000	0.0008	0.0008	0.0008	0.0009	0.0008	0.0009	0.0008	0.0007
25	0.4294	0.4017	3117	3000	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002
n	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0008	0.0008
Median					0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007
σ					0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.					0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002
Max.					0.0012	0.0012	0.0012	0.0013	0.0013	0.0014	0.0013	0.0013

DATA SET 6: 85°C; 1250 mA

LED Package Series	XLamp XT-E White LEDs (Series: XTEAWT)
	This LM-80 report is applicable to the following order codes: XTEAWT-xx-xxxx-xxxxxxxxxx
Tested Model Number	XTEAWT-00-0000-00000LBE7
Drive Current [I_F]	1250 mA
Testing Initiation Date	January 7, 2012
Case Temperature [T_s]	85°C
Ambient Temperature [T_A]	85°C
Failures observed	None

Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	9,072 hours
Test duration used for projection	t=4,032 to t=9,072
α	5.337E-06
β	9.977E-01
Reported Lifetimes	L90(9k) = 19,300 hours
	L80(9k) = 41,400 hours
	L70(9k) > 54,400 hours



LM-80 Data For The Official TM-21 Calculator*

Time (hours)	Lumen Maintenance
0	100.00%
168	98.72%
1008	98.89%
1512	97.57%
2016	97.58%
2520	97.81%
3024	97.12%
3528	97.77%
4032	97.62%
4536	97.52%
5040	96.95%
5544	96.22%
6048	95.56%
6552	97.45%
7056	97.29%
7560	96.37%
8064	95.34%
8568	95.14%
9072	94.40%

* <http://www.energystar.gov/TM-21calculator>

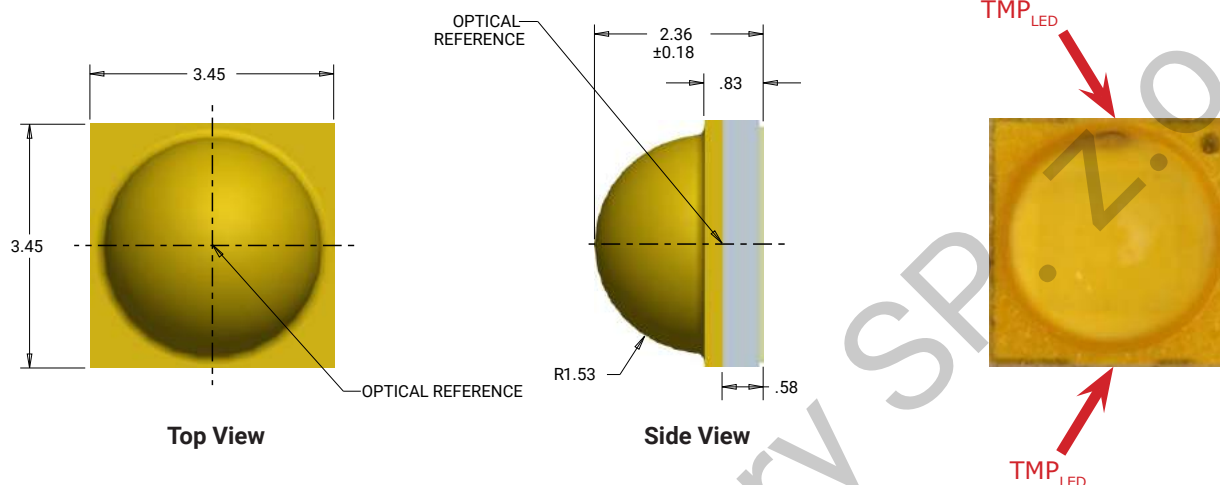
DATA SET 6: 85°C; 1250 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)																	
	LF (lm)	V _F (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048	6552	7056	7560	8064	8568	9072
1	261.9	3.54	3198	3000	98.97	98.59	96.65	97.18	98.89	96.84	97.64	98.00	97.85	97.06	96.21	95.35	97.20	97.12	96.97	95.06	94.70	94.74
2	284.7	3.61	3176	3000	98.82	98.93	98.05	97.91	97.73	97.42	98.56	97.99	98.16	97.75	97.06	96.30	98.75	97.94	97.80	97.22	97.12	96.43
3	269.8	3.51	3193	3000	99.28	99.18	97.59	98.22	98.44	97.44	97.97	98.33	98.12	97.41	96.02	95.82	97.96	98.06	97.33	95.66	95.53	95.66
4	289.7	3.63	3161	3000	99.36	99.81	98.43	98.38	98.30	98.03	99.13	98.76	98.68	98.16	97.54	96.53	98.66	97.68	96.87	95.69	94.95	93.89
5	287.1	3.55	3199	3000	99.18	98.76	97.65	97.47	97.39	96.90	98.07	97.62	97.74	97.12	96.59	95.81	98.17	97.44	96.64	95.69	95.40	94.13
6	271.6	3.58	3207	3000	100.60	99.89	98.15	98.71	98.66	97.90	97.62	97.89	97.63	97.05	96.13	95.22	97.47	97.06	96.48	95.78	95.69	96.02
7	288.6	3.60	3194	3000	98.88	98.58	97.71	97.63	97.27	97.10	98.17	97.66	97.73	97.39	96.58	96.23	98.28	98.10	97.64	97.27	96.42	96.40
8	273.6	3.55	3217	3000	98.15	97.44	97.02	96.14	97.06	96.53	95.90	96.40	96.09	95.31	94.73	93.96	95.80	97.49	95.66	94.24	93.80	93.33
9	287.2	3.70	3206	3000	99.00	98.87	98.02	98.11	97.86	97.43	98.73	98.16	98.18	97.80	96.93	96.48	98.71	98.30	97.15	96.49	95.47	95.22
10	284.0	3.60	3186	3000	99.73	99.07	97.98	97.58	97.66	97.48	98.36	98.06	98.13	97.80	97.03	96.19	98.59	98.65	97.92	97.52	96.34	96.20
11	269.9	3.60	3177	3000	97.63	97.80	96.99	96.76	97.30	96.14	96.25	96.46	96.24	95.51	94.61	93.67	94.62	95.76	93.09	91.93	90.61	91.67
12	257.2	3.54	2989	3000	98.28	99.01	97.08	97.44	98.42	97.26	97.12	97.94	97.57	96.95	96.48	95.59	96.36	97.03	96.05	93.67	95.20	93.77
13	271.7	3.58	2993	3000	98.89	99.11	97.73	97.50	97.62	97.47	98.39	97.66	98.00	97.68	96.99	96.58	98.35	97.88	97.66	97.19	96.86	96.14
14	280.8	3.55	3091	3000	97.74	98.59	97.14	97.24	97.20	97.22	98.30	97.69	97.83	97.38	96.77	96.34	97.92	97.46	97.06	96.22	95.29	94.03
15	254.7	3.55	2929	3000	99.13	99.30	97.85	98.14	98.93	97.38	97.77	98.11	97.73	97.12	96.46	95.61	97.05	97.14	96.34	95.09	96.75	95.41
16	269.8	3.60	2973	3000	98.71	99.38	97.84	97.65	97.68	97.67	98.78	98.06	98.16	97.76	97.03	96.43	98.08	97.86	96.80	95.54	94.43	93.26
17	273.8	3.56	3025	3000	98.70	99.72	98.26	98.10	97.93	98.00	98.80	98.21	98.48	97.78	97.33	96.75	98.54	98.42	97.53	96.93	96.19	94.93
18	259.2	3.59	3074	3000	98.64	99.61	97.33	97.72	98.27	96.89	97.28	97.30	97.10	96.49	95.71	95.13	97.07	96.82	96.15	95.27	96.77	95.65
19	289.0	3.62	3196	3000	98.46	98.46	97.26	97.20	96.83	96.36	96.76	96.16	96.19	95.83	95.14	94.82	97.01	96.48	95.93	95.80	95.30	94.78
20	265.9	3.58	3159	3000	97.30	98.21	96.75	96.78	97.32	96.11	96.83	97.20	96.81	95.97	95.15	94.25	95.91	95.78	94.44	92.30	93.11	92.15
21	288.9	3.65	3179	3000	97.72	97.54	97.18	97.24	96.97	96.46	96.84	96.39	96.14	95.60	94.88	94.36	96.24	96.65	93.87	92.59	91.24	90.18
22	264.5	3.62	2994	3000	98.71	99.15	97.33	97.36	97.89	96.83	97.18	97.45	97.04	96.23	95.50	94.70	96.70	96.55	95.63	94.26	96.17	94.82
23	276.1	3.63	3124	3000	98.57	98.46	97.34	97.22	97.17	96.69	97.85	97.37	97.33	96.85	96.18	95.65	97.69	97.33	96.49	96.01	95.15	94.07
24	281.8	3.64	2996	3000	99.07	99.03	98.06	97.70	97.88	97.52	98.58	98.16	98.16	97.61	97.02	96.44	98.54	98.20	97.44	96.93	96.18	95.11
25	264.4	3.69	2997	3000	98.50	99.64	97.87	98.20	98.46	96.98	97.30	97.42	97.00	96.19	95.49	94.69	96.57	95.96	94.29	93.03	93.91	92.04
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean	274.6	3.59			98.72	98.89	97.57	97.58	97.80	97.12	97.77	97.62	97.52	96.95	96.22	95.56	97.45	97.29	96.37	95.34	95.14	94.40
Median	273.6	3.60			98.71	99.01	97.65	97.58	97.73	97.22	97.85	97.69	97.73	97.12	96.46	95.65	97.69	97.44	96.64	95.69	95.40	94.78
σ	11.0	0.05			0.70	0.66	0.49	0.57	0.61	0.55	0.85	0.67	0.76	0.83	0.86	0.90	1.10	0.87	1.28	1.62	1.62	1.61
Min.	254.7	3.51			97.30	97.44	96.65	96.14	96.83	96.11	95.90	96.16	96.09	95.31	94.61	93.67	94.62	95.65	93.09	91.93	90.61	90.18
Max.	289.7	3.70			100.60	99.89	98.43	98.71	98.93	98.03	99.13	98.76	98.68	98.16	97.54	96.75	98.75	98.65	97.92	97.52	97.12	96.43

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')																	
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048	6552	7056	7560	8064	8568	9072
1	0.4181	0.3856	3198	3000	0.0006	0.0011	0.0010	0.0012	0.0016	0.0013	0.0013	0.0017	0.0016	0.0016	0.0016	0.0017	0.0017	0.0016	0.0019	0.0019	0.0024	0.0028
2	0.4199	0.3871	3176	3000	0.0005	0.0009	0.0009	0.0010	0.0012	0.0013	0.0012	0.0013	0.0013	0.0014	0.0014	0.0015	0.0017	0.0016	0.0019	0.0020	0.0022	0.0026
3	0.4182	0.3851	3193	3000	0.0006	0.0009	0.0008	0.0009	0.0011	0.0010	0.0009	0.0011	0.0010	0.0010	0.0010	0.0011	0.0012	0.0013	0.0014	0.0012	0.0014	0.0019
4	0.4206	0.3869	3161	3000	0.0004	0.0009	0.0008	0.0010	0.0011	0.0012	0.0011	0.0012	0.0012	0.0013	0.0014	0.0015	0.0017	0.0016	0.0021	0.0023	0.0025	0.0024
5	0.4188	0.3872	3199	3000	0.0005	0.0010	0.0009	0.0011	0.0011	0.0013	0.0012	0.0013	0.0014	0.0014	0.0016	0.0016	0.0019	0.0020	0.0026	0.0027	0.0032	0.0036
6	0.4197	0.3903	3207	3000	0.0007	0.0009	0.0009	0.0011	0.0012	0.0011	0.0010	0.0012	0.0010	0.0012	0.0011	0.0012	0.0014	0.0012	0.0014	0.0014	0.0017	0.0021
7	0.4180	0.3849	3194	3000	0.0003	0.0007	0.0007	0.0008	0.0009	0.0010	0.0009	0.0010	0.0010	0.0010	0.0011	0.0011	0.0012	0.0013	0.0015	0.0019	0.0021	0.0023
8	0.4191	0.3901	3217	3000	0.0003	0.0007	0.0005	0.0006	0.0008	0.0007	0.0006	0.0008	0.0008	0.0008	0.0009	0.0010	0.0010	0.0016	0.0017	0.0018	0.0021	0.0021
9	0.4172	0.3844	3206	3000	0.0002	0.0008	0.0007	0.0009	0.0009	0.0011	0.0010	0.0011	0.0012	0.0012	0.0014	0.0016	0.0019	0.0023	0.0028	0.0029	0.0032	0.0031
10	0.4179	0.3836	3186	3000	0.0004	0.0008	0.0007	0.0009	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0011	0.0013	0.0014	0.0019	0.0020	0.0024	0.0029
11	0.4222	0.3926	3177	3000	0.0004	0.0007	0.0005	0.0005	0.0007	0.0006	0.0005	0.0007	0.0007	0.0008	0.0008	0.0011	0.0014	0.0019	0.0022	0.0024	0.0024	0.0026
12	0.4372	0.4026	2989	3000	0.0004	0.0006	0.0005	0.0005	0.0007	0.0007	0.0007	0.0007	0.0006	0.0007	0.0006	0.0007	0.0007	0.0011	0.0011	0.0007	0.0005	0.0008
13	0.4374	0.4036	2993	3000	0.0003	0.0005	0.0006	0.0005	0.0006	0.0007	0.0007	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0009	0.0008
14	0.4282	0.3957	3091	3000	0.0007	0.0004	0.0004	0.0005	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0009	0.0011	0.0008	0.0007
15	0.4412	0.4037	2929	3000	0.0004	0.0006	0.0005	0.0006	0.0007	0.0008	0.0007	0.0008	0.0009	0.0010	0.0010	0.0010	0.0010	0.0009	0.0010	0.0009	0.0010	0.0010
16	0.4371	0.4006	2973	3000	0.0004	0.0006	0.0005	0.0007	0.0008	0.0008	0.0008	0.0009	0.0010	0.0010	0.0010	0.0009	0.0009	0.0010	0.0010	0.0013	0.0022	0.0028
17	0.4328	0.3979	3025	3000	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009	0.0011	0.0011	0.0010	0.0010	0.0010	0.0010	0.0009	0.0008	0.0008	0.0011	0.0014
18	0.4268	0.3908	3074	3000	0.0003	0.0004	0.0005	0.0006	0.0007	0.0007	0.0008	0.0008	0.0009	0.0009	0.0011	0.0010	0.0010	0.0009	0.0009	0.0009	0.0008	0.0009
19	0.4186	0.3864	3196	3000	0.0003	0.0010	0.0011	0.0013	0.0014	0.0015	0.0015	0.0016	0.0016	0.0016	0.0017	0.0019	0.0019	0.0021	0.0026	0.0028	0.0031	0.0037
20	0.4202	0.3859	3159	3000	0.0011	0.0008	0.0007	0.0008	0.0009	0.0007	0.0009	0.0012	0.0012	0.0012	0.0014	0.0015	0.0017	0.0024	0.0030	0.0031	0.0032	0.0032
21	0.4203	0.3884	3179	3000	0.0006	0.0014	0.0014	0.0017	0.0018	0.0019	0.0019	0.0020	0.0022	0.0023	0.0024	0.0028	0.0030	0.0039	0.0048	0.0048	0.0045	0.0041
22	0.4363	0.4015	2964	3000	0.0004	0.0006	0.0005	0.0005	0.0006	0.0007	0.0006	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0009	0.0010	0.0010	0.0011	0.0009
23	0.4266	0.3962	3124	3000	0.0003	0.0004	0.0005	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0006	0.0006	0.0007	0.0006	0.0008	0.0010	0.0009	0.0006	0.0005
24	0.4367	0.4025	2996	3000	0.0003	0.0005	0.0005	0.0005	0.0007	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0012	0.0011	0.0008	0.0008
25	0.4372	0.4037	2997	3000	0.0003	0.0006	0.0006	0.0006	0.0006	0.0007	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0007	0.0008	0.0008	0.0011	0.0017	0.0025
n	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Mean					0.0004	0.0007	0.0007	0.0008	0.0009	0.0009	0.0009	0.0010	0.0011	0.0011	0.0011	0.0012	0.0013	0.0014	0.0017	0.0018	0.0019	0.0021
Median					0.0004	0.0007	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009	0.0010	0.0010	0.0010	0.0011	0.0012	0.0013	0.0014	0.0014	0.0021	0.0024
σ					0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0010	0.0011
Min.					0.0002	0.0004	0.0004	0.0005	0.0006	0.0006	0.0005	0.0006	0.0007	0.0006	0.0006	0.0007	0.0006	0.0007	0.0008	0.0007	0.0005	0.0005
Max.					0.0011	0.0014	0.0014	0.0017	0.0018	0.0019	0.0019	0.0020	0.0022	0.0023	0.0024	0.0028	0.0030	0.0039	0.0048	0.0048	0.0045	0.0041

MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT

All measurements are ± 0.13 mm unless otherwise indicated.



The LED temperature measurement point (TMP_{LED}) should be measured on the PCB surface, as close to the LED's thermal pad as possible (shown in the picture above). It is not required to use a solder footprint for the thermal pad that is larger than the LED itself. In testing, Cree has found such a solder pad to have insignificant impact on the resulting temperature measurement. Either one of the two shown TMP_{LED} locations may be used and are equivalent to each other.



Certificate of Acceptance

To participate
in the IECEE CB Scheme – IEC System of Conformity Assessment Schemes for Electrotechnical
Equipment and Components (IECEE)

TUV SUD Limited, Titchfield

Octagon House, Concorde Way
Segensworth North
Fareham, Hampshire PO15 5RL
United Kingdom

has been assessed and determined to fully comply with the requirements of ISO/IEC 17025: 2005-05,
The Basic Rules, IEC CA 01:2016-07 & IECEE 01-S:2017-02 and Rules of Procedure IECEE 02: 2018-06, and the relevant
IECEE CB-Scheme Operational Documents.

TUV SUD Limited, Titchfield

is therefore entitled to operate as a CB Testing Laboratory (CBTL) under the responsibility of **TÜV SÜD Product Service GmbH** as National Certification Body (NCB) and to carry out testing within the IECEE CB Scheme for the
Scope (Product Category(ies) and Standard(s)) as listed in the relevant part of the IECEE Web Site at www.iecee.org,
and is subject to all other terms as set forth in the IECEE Basic Rules and Rules of Procedure

The IECEE membership status of this CBTL can be verified on the aforementioned site.



A handwritten signature in blue ink, reading 'Kerry McManama'.

Date of Issue: 2019-04-30
TL067

Kerry McManama
IECEE Executive Secretary



Test Report issued under the responsibility of:



TEST REPORT
IEC / EN 60598-2-3
Luminaires
Part 2: Particular requirements
Section 3: Luminaires for road and street lighting

Report Number..... : 701588-01/01-M1
 Date of issue : 31. 07. 2017, Amendment No. 1: 2018 December 04
 Total number of pages 13 + 9 (Attachment No. 1)

Name of Testing Laboratory preparing the Report : Elektrotechnický zkušební ústav, s. p.
 Pod lisem 129/2, 171 02 Praha 8 – Troja, Czech republic

Applicant's name : LUG Light Factory Sp.z o.o.
 Address : Ul. Grozowska 11, 65-127 Zilena Góra, Poland

Test specification:

Standard : IEC 60598-1:2014,
 IEC 60598-2-3:2002 + A1:2011
 EN 60598-1:2015,
 EN 60598-2-3:2003+A1:2011

Test procedure : CB, ENEC Scheme

Non-standard test method : N/A

Test Report Form No. : IEC60598_2_3J

Test Report Form(s) Originator.... : Intertek Semko AB

Master TRF : 2014-09

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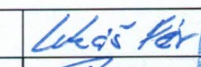
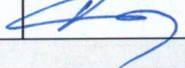
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description	Luminaires for road and street lighting	
Trade Mark		
Manufacturer.....	LUG Light Factory Sp.z o.o.	
Model/Type reference	URBINI LED ED 4700lm/740	
Ratings	220-240 V; 50-60 Hz; IP66; protection class I 42 W LED; ta 40 °C - URBINI LED ED 4700lm/740	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	
Testing location/ address		Elektrotechnický zkušební ústav, s. p. Pod lisem 129/2, 171 02 Praha 8 – Troja, Czech republic
☐	Associated CB Testing Laboratory:	
Testing location/ address		
Tested by (name, function, signature)		Lukáš Fér 
Approved by (name, function, signature)		Zdeněk Dvořák 
		
☐	Testing procedure: TMP/CTF Stage 1:	
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature)		
☐	Testing procedure: WMT/CTF Stage 2:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature)		
☐	Testing procedure: SMT/CTF Stage 3 or 4:	
Testing location/ address		
Tested by (name, function, signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature)		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

Attachment No. 1: LED modules for general lighting – Safety specifications (9 pages)

This Amendment Report, Ref. No. 701588-01/01-M1 to the original Report. No. 701588-01/01 contains 11 Report Pages and new photographs.

Summary of testing:

Tests performed (name of test and test clause):

cl.: 10; 12.3; 12.4

Testing location:

Elektrotechnický zkušební ústav, s.p.
Pod lisem 129/2, 171 02 Praha 8 – Troja,
Czech republic

Summary of compliance with National Differences: ---

List of countries addressed

☐ The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Test item particulars :	
Classification of installation and use : Luminaires for road and street lighting	
Supply Connection : Wires	
Possible test case verdicts:	
- test case does not apply to the test object : N/A (Not applicable)	
- test object does meet the requirement : P (Pass)	
- test object does not meet the requirement : F (Fail)	
Testing :	
Date of receipt of test item : 10. 09. 2018; 25. 09. 2018	
Date (s) of performance of tests : 06. 11. 2018 - 04. 12. 2018	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a ☒ comma / ☐ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60598-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) : ---	
General product information:	
The tested sample was selected in accordance with Annex S of ČSN EN 60598-1. Tested type: see page 4. 220-240 V; 50-60 Hz; IP 66; protection class II	
Amendmend No. 1 Report:	
The original Test Report Ref. No. 701588-01/01, dated 2017 July 31 was modified on 2018 December 04 to include the following changes and/or additions:	
New model added: New model contain new electronic control gear and LED modules. Construction of the luminaire remains same as before.	

IEC 60598-2-3			
Clause	Requirement + Test		Verdict
3.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
3.12.2 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 3.13		—
3.12 (12.3)	Endurance test:		P
	- mounting-position	On pipe	—
	- test temperature (°C)	50 °C	—
	- total duration (h)	240	—
	- supply voltage: Un factor; calculated voltage (V)	253	—
	- lamp used	LED module	—
3.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
3.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
3.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	N/A
3.12 (12.6)	Thermal test (failed lamp control gear condition):		N/A
3.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		—
	- case of abnormal conditions.....		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un		—
	- measured mounting surface temperature (°C) at 1,1 Un		N/A
	- calculated mounting surface temperature (°C)		N/A
	- track-mounted luminaires		N/A
3.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions.....		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C).....		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- track-mounted luminaires		N/A
3.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
3.12 (12.7.1)	Luminaire without temperature sensing control		N/A
3.12 (12.7.1.1)	Luminaire with fluorescent lamp $\leq 70W$		N/A
	Test method 12.7.1.1 or Annex W		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions.....		—
	- Ballast failure at supply voltage (V)		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions.....		—
	- measured winding temperature ($^{\circ}C$): at 1,1 Un		—
	- measured temperature of fixing point/exposed part ($^{\circ}C$): at 1,1 Un.....		—
	- calculated temperature of fixing point/exposed part ($^{\circ}C$)		—
	Ball-pressure test.....		N/A
3.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp $> 70W$, transformer $> 10 VA$		N/A
	- case of abnormal conditions.....		—
	- measured winding temperature ($^{\circ}C$): at 1,1 Un		—
	- measured temperature of fixing point/exposed part ($^{\circ}C$): at 1,1 Un.....		—
	- calculated temperature of fixing point/exposed part ($^{\circ}C$)		—
	Ball-pressure test.....		N/A
3.12 (12.7.1.3)	Luminaire with short circuit proof transformers $\leq 10 VA$		N/A
	- case of abnormal conditions.....		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
3.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link	Yes ☐ No ☐	—

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- manual reset cut-out.....:	Yes ☐ No ☐	—
	- auto reset cut-out	Yes ☐ No ☐	—
	- case of abnormal conditions.....:		—
	- highest measured temperature of fixing point/ exposed part (°C):		—
	Ball-pressure test:		N/A
3.12.1 (-)	Temperature reduction if for outdoor use only		N/A
3.12.2 (-)	(See above)		—
3.12.3 (-)	Glass covers used within the thermal limits declared by the glass manufacturer		N/A
3.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		
3.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø		—
	Insulation resistance (MΩ).....:		—
	SELV		
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface	>110 MΩ	P
	- between current-carrying parts and metal parts of the luminaire	>110 MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5		N/A
	Other than SELV		
	- between live parts of different polarity.....:		N/A
	- between live parts and mounting surface.....:	>550 MΩ	P
	- between live parts and metal parts	>550 MΩ	P
	- between live parts of different polarity through action of a switch		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts	>550 MΩ	P
	- Insulation bushings as described in Section 5		N/A

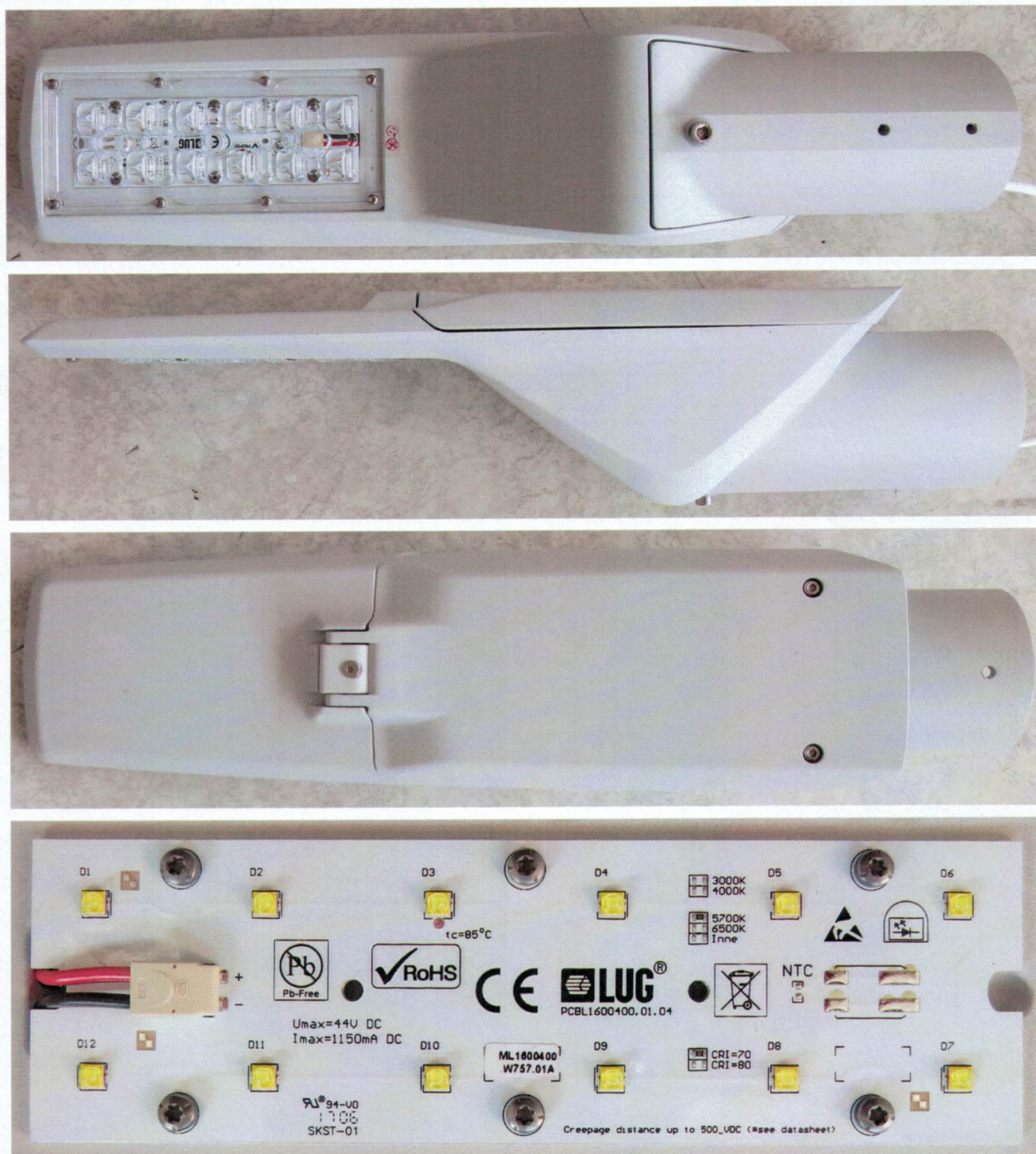
IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V)		N/A
	SELV		
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface	500 V	P
	- between current-carrying parts and metal parts of the luminaire	500 V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5		N/A
	Other than SELV		
	- between live parts of different polarity		N/A
	- between live parts and mounting surface	1460 V	P
	- between live parts and metal parts	1460 V	P
	- between live parts of different polarity through action of a switch		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts	1460 V	P
	- Insulation bushings as described in Section 5		N/A
3.14 (10.3)	Touch current (mA)	0,0025	P
	Protective conductor current (mA)	0,036	P

ANNEX 1		TABLE: Critical components information					
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Description:		LUG URBINI LED ED 4700lm/740 130232.5L221.101.001					
LED module	B	LUG	ML180400 W757.01A	U _{max} 44 V; t _c 85 °C; I _{max} 1150 mA	62031	Tested in equipment	
Control gear	B	Philips	Xi FP 40W 0.3-1.0A SLNDAE 230V C123 sXt	220-240 V; 50/60 Hz, t _c 85 °C		ENEC 05; DEKRA Certificate no. 31-102115	
Wires LED	B		LGY	300/500 V; 0,5 mm ²	IEC227	---	
Ext. wires	B	MROWIEC	H03VV-F	3 x 1,0 mm ²	IEC227	BBJ-SEP; PL 2 0306	
Supplementary information:							
¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.							
The codes above have the following meaning:							
A - The component is replaceable with another one, also certified, with equivalent characteristics							
B - The component is replaceable if authorised by the test house							
C - Integrated component tested together with the appliance							
D - Alternative component							

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12						
	Type reference.....:	LUG URBINI LED ED 4700lm/740 130232.5L221.101.001	—				
	Lamp used	LED module LUG	—				
	Lamp control gear used	Philips	—				
	Mounting position of luminaire.....:	On pipe	—				
	Supply wattage (W)	41,4 W	—				
	Supply current (A).....:	---	—				
	Calculated power factor	---	—				
	Table: measured temperatures corrected for ta = 35 °C:						
	- abnormal operating mode	Not used; see supplementary information	—				
	- test 1: rated voltage	240 V	—				
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage(230 x 1,06).....:	243,8 V	—				
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage.....:	---	—				
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage	---	—				
	Through wiring or looping-in wiring loaded by a current of A during the test	---	—				
Temperature measurements, (°C)							
Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
LED module tc	40,4	64,2	---	---	85	---	---
Control gear tc	40,4	78,3	---	---	85	---	---
LED wires	40,4	---	63,7	---	90	---	---
Internal wires	40,4	---	57,1	---	90	---	---
Supplementary information: Temperature marked control gear 120 °C.							

ANNEX 3

Photo



ATTACHMENT No. 1 TO TEST REPORT 701588-01/01-M1
IEC / EN 62031:2008
LED modules for general lighting – Safety specifications

	GENERAL REQUIREMENTS	P
4.4	Integral modules tested assembled in the luminaire	P
4.5	Independent modules complies with requirements in IEC 60598-1	N/A

5	GENERAL TEST REQUIREMENTS	N/A
5.5	SELV-operated LED modules comply with Annex I of IEC 61347-2-13	(see Annex 1) N/A
	General conditions for tests in Annex A	(see Annex A) N/A

6	CLASSIFICATION	P
	Built-in module: Yes ☒ No ☐	—
	Independent module.....: Yes ☐ No ☒	—
	Integral module: Yes ☐ No ☒	—
	For Integral module; Note to 1.2.1 in IEC 60598-1 applies.	—

7	MARKING	P
7.1	Mandatory markings for built-in or independent modules	
	a) mark of origin	LUG P
	b) model number, type reference	ML1600400 P
	c1) constant voltage module; rated supply voltage and supply frequency	44 V P
	c2) constant current module; rated supply current and supply frequency	1150 mA P
	d) nominal power	50,6 W P
	e) indication of connections, wiring diagram	P
	f) value of t_c and place on the module	85 °C P
	g) E_{thr} if required	N/A
	h) symbol for built-in modules	P
	i) heat transfer temperature t_d	P
	j) power for heat-conduction P_d	P
	k) working voltage for insulation	500 V P
7.2	Location of marking	
	- marking of a), b), c) and f) on the modules	P
	- marking of d), e), g), h), i) and j) on the modules or data sheet	N/A
	- marking of k) in manufactures literature	P

IEC / EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- integral modules a) to g) in literature		P
7.3	Durable and legibility of marking		
	- marking of a), b), c) and f) legible after test with water		P
	- marking of d) to j) inspection of compliance		P
8	TERMINALS		P
	Screw terminals according section 14 of IEC 60598-1:		
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 3)	N/A
	Screwless terminals according section 15 of IEC 60598-1:		
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 4)	P
	Connectors according IEC 60838-2-2:		
	Separately approved; component list	(see Annex 2)	N/A
9 (9)	PROVISION FOR PROTECTIVE EARTHING		N/A
10 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		N/A
11 (11)	MOISTURE RESISTANCE AND INSULATION		P
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation $\geq 2 \text{ M}\Omega$	>550 MΩ	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A
12 (12)	ELECTRIC STRENGTH		P
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A
	Working voltage $\leq 50 \text{ V}$, test voltage 500 V		N/A
	Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$, test voltage (V):		
	Basic insulation, $2U + 1000 \text{ V}$	1088 V	P
	Supplementary insulation, $2U + 1000 \text{ V}$		N/A
	Double or reinforced insulation, $4U + 2000 \text{ V}$		N/A
	No flashover or breakdown		P

IEC / EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A
13 (14)	FAULT CONDITIONS		P
- (14)	When operated under fault conditions the controlgear:		
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	N/A
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	After the tests has been carried out on three samples:		
	The insulation resistance $\geq 1 \text{ M}\Omega$	>550 M Ω	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		N/A
13.2	Overpower condition		
	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		P
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P

IEC / EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
15	CONSTRUCTION		P
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
16 (16)	CREEPAGE DISTANCES AND CLEARANCES		P
- (16)	Creepage and distances and clearances in compliance with IEC 61347-1	(see appended table)	P
	Insulating lining of metallic enclosures		N/A
	Basic insulation on printed boards tested according to clause 14		N/A
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in Table 16		N/A
	Creepage distances not less than minimum clearance		N/A
16 (-)	Conductive accessible parts in compliance with applicable parts of IEC 60598-1		N/A
17 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		N/A
18 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		N/A
- (18.1)	Ball-pressure test		N/A
- (18.3)	Glow-wire test (650°C)		N/A
- (18.4)	Needle-flame test (10 s)		N/A
- (18.5)	Proof tracking test		N/A
19 (19)	RESISTANCE TO CORROSION		N/A
20	INFORMATION FOR LUMINAIRE DESIGN		N/A
	Information in Annex D (informative)		—
21	HEAT MANAGEMENT		N/A

IEC / EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict

22	PHOTOBIOLOGICAL SAFETY		
22.1	UV radiation		
	Luminous radiation not exceed 2mW/klm		N/A
22.2	Blue light hazard		
	Assessed according to IEC TR 62778		N/A
22.3	Infrared radiation		
	Requirements for infrared radiation when required		N/A

A	ANNEX A - TESTS		N/A
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13 (14)	TABLE: tests of fault conditions		P
Part	Simulated fault		Hazard
LED	Short-circuit over LED		NO

IEC / EN 62031								
Clause	Requirement + Test				Result - Remark		Verdict	
16 (16)	TABLES: Creepage distances and clearances						P	
Table 3	Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages							
RMS working voltage (V) not exceeding		50	150	250	500	750	1000	
Creepage distances								
Required basic insulation, PTI ≥ 600		0,6	0,8	1,5	3	4	5,5	
Measured		-	-	-	-	-	-	
Required basic insulation, PTI < 600		1,2	1,6	2,5	5	8	10	
Measured		-	-	-	5,2	-	-	
Required supplementary insulation PTI ≥ 600		-	0,8	1,5	3	4	5,5	
Measured			-	-	-	-	-	
Required supplementary insulation PTI < 600		-	1,6	2,5	5	8	10	
Measured			-	-	-	-	-	
Required reinforced insulation		-	3,2	5	6	8	11	
Measured			-	-	-	-	-	
Clearances								
Required basic insulation		0,2	0,8	1,5	3	4	5,5	
Measured		-	-	-	6,1	-	-	
Required supplementary insulation		-	0,8	1,5	3	4	5,5	
Measured			-	-	-	-	-	
Required reinforced insulation		-	1,6	3	6	8	11	
Measured			-	-	-	-	-	
Table 4	Minimum distances (mm) for non-sinusoidal pulse voltages							
Rated pulse voltage (peak kV)		2,0	2,5	3,0	4,0	5,0	6,0	8,0
Required clearances		1,0	1,5	2	3	4	5,5	8
Measured		-	-	-	-	-	-	-
Rated pulse voltage (peak kV)		10	12	15	20	25	30	40
Required clearances		11	14	18	25	33	40	60
Measured		-	-	-	-	-	-	-
Rated pulse voltage (peak kV)		50	60	80	100	-	-	-
Required clearances		75	90	130	170	-	-	-
Measured		-	-	-	-			

IEC / EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
18 (18.1)	TABLE: Ball Pressure Test of Thermoplastics		N/A
18 (18.3)	TABLE: Glow-wire test		N/A
18 (18.4)	TABLE: Needle-flame test		N/A
18 (18.5)	TABLE: Proof tracking test		N/A

List of used test equipment:		
Device:	Type:	Inv. No.:
Thermometer	GTH1150	00551122
High voltage transformer KIKUSUI	TOS5301	00110285
Multimeter Fluke	1587	551734
Power supply KIKUSUI	PCR500M	00110185
Caliper	MITUTOYO	551392

ANNEX 1	SELV-operated LED modules	N/A
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ANNEX 2		TABLE: Critical components information					
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Description:		LUG ML1701403.W740.01A					
Connector	A	BJB	46.102	9 A; 320 V 0,34 – 0,75 mm ²	IEC 60598	VDE 40037753	
LED	A	Cree	XP-G3	Max. 2000 mA	---	UL E349212	
AI PCB	A	TAMINGKEE ELECTRONIC TECHNOLOGY (HK) CO.,LTD.	HDMA-210	---	---	UL E500775	

Supplementary information:

¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

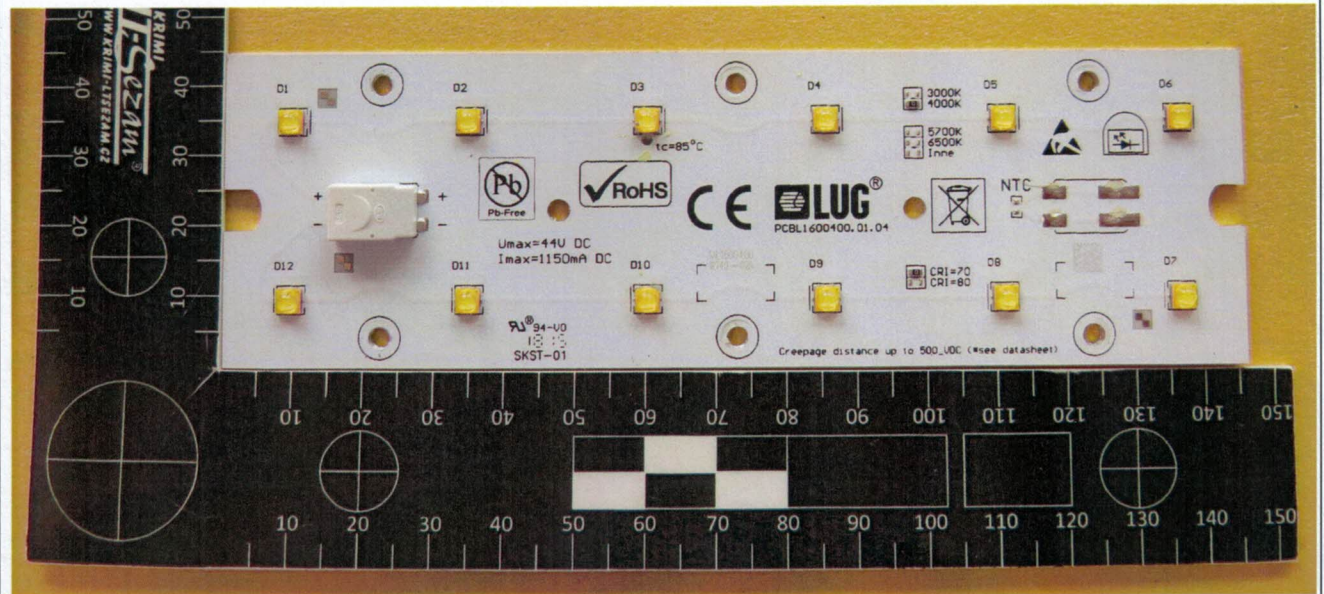
C - Integrated component tested together with the appliance

D - Alternative component

ANNEX 3	Screw terminals (part of the luminaire)	N/A
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ANNEX 4	Screwless terminals (part of the luminaire)	N/A
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ANNEX 5 Photo



Tested by: Lukáš Fér

Lukáš Fér