


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-xxxxx XPGDWT-x3-xxxx-xxxxx
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

Cree LED / 4400 Silicon Drive / Durham, NC 27703 USA / +1.919.313.5330 / www.cree-led.com

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 (duv) 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 (duv) 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 _c]	Ambient Temp. [T _a]	Drive Current [I _d]	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

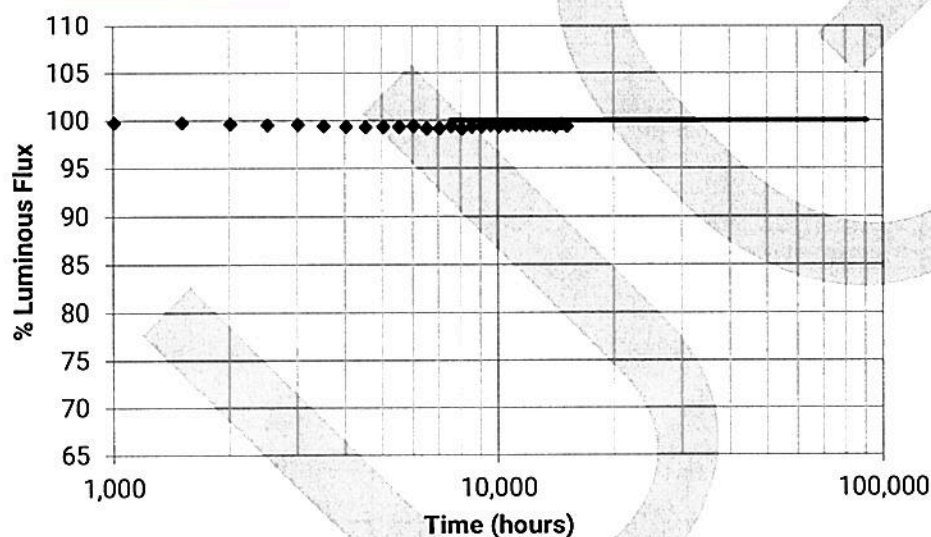
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

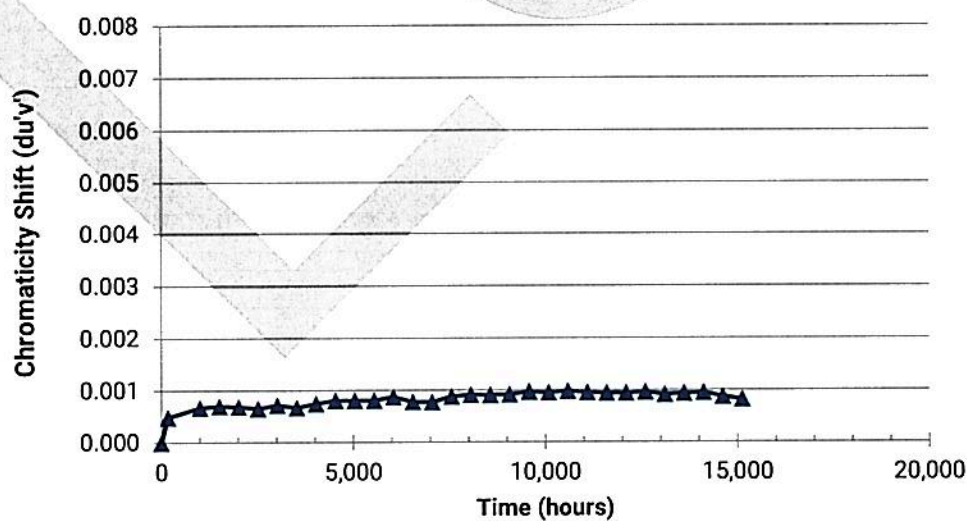
DATA SET 3: 85°C; 350 mA

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	98.97	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	100.08	100.19	100.32	100.96	100.128	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	98.82	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	98.24	98.12	98.24	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	0.0010	0.0008	0.0009	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	0.0007	0.0009	0.0009	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	0.0008	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	0.0008	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	0.0009	0.0008	0.0009
25	0.4410	0.4128	3007	3000	0.0006	0.0007	0.0008	0.0009	0.0009	0.0009	0.0008	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	0.0009	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	100.83	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	98.92
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	99.69	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

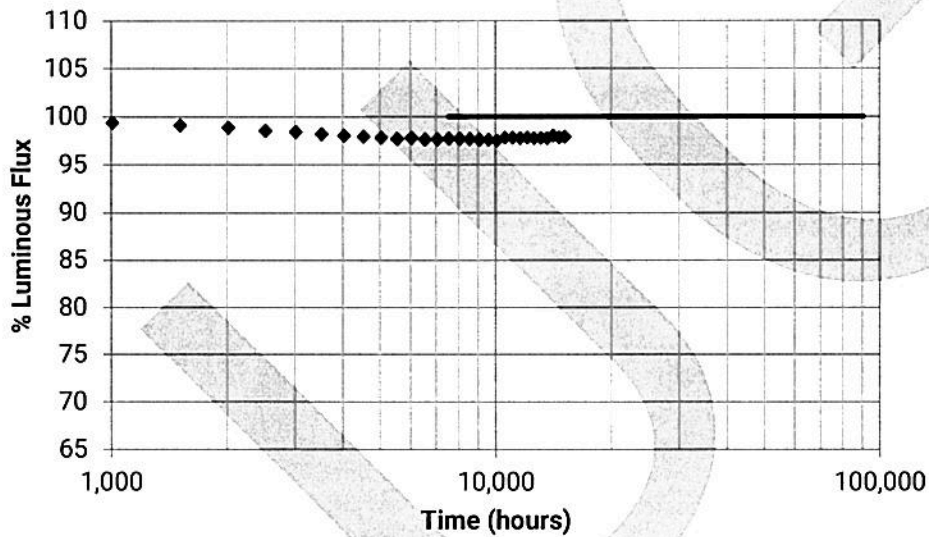
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

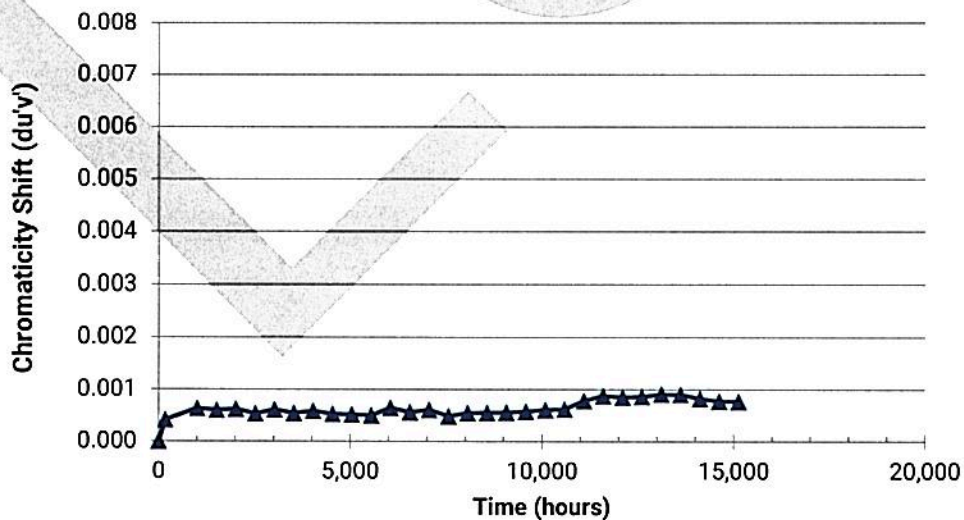
DATA SET 4: 105°C; 350 mA

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	97.63	97.63	97.63	97.44	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	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85
Mean	157	2.84			99.71	99.37	99.11	98.86	98.54	98.42	98.19	98.03	97.83	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	0.0003	0.0003	0.0004	0.0003	0.0002	0.0003	0.0005
23	0.4340	0.4076	3084	3000	0.0001	0.0006	0.0006	0.0006	0.0003	0.0003	0.0003	0.0004	0.0003	0.0002	0.0003	0.0004
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	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85
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	97.58	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	97.59	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	97.28	97.39	96.94	97.64	97.28	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	2.85	25	25	97.65	97.64	97.72	97.69	97.68	97.62	97.60	97.53	97.51	97.53	97.76	97.82
Mean	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
Median	157	2.84			0.34	0.41	0.41	0.44	0.56	0.60	0.54	0.61	0.56	0.68	0.64	0.57
σ	3	0.02			96.99	96.86	96.96	96.93	96.55	96.33	96.33	96.05	96.77	96.52	96.66	96.58
Min.	153	2.81			98.31	98.30	98.36	98.44	98.74	98.64	98.44	98.52	98.83	98.77	99.02	98.76
Max.	163	2.89														

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	0.0009	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	0.0004	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	2.85	25	25	0.0006	0.0006	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0008	0.0009	0.0008
Mean					0.0005	0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.0006	0.0005	0.0007	0.0008	0.0008
Median					0.0002	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0002
σ					0.0002	0.0003	0.0002	0.0002	0.0001	0.0002	0.0002	0.0003	0.0002	0.0001	0.0003	0.0006
Min.					0.0010	0.0012	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0013	0.0013	0.0013	0.0013
Max.																

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

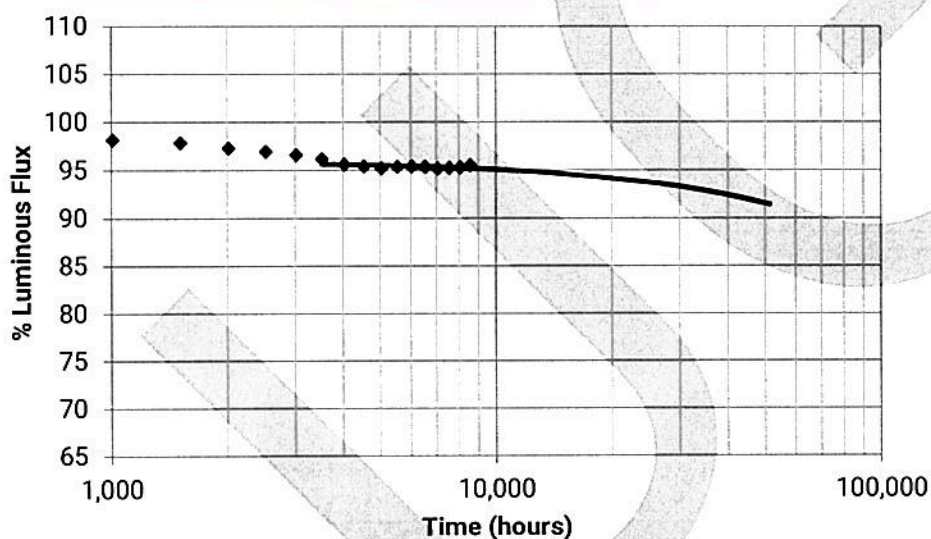
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

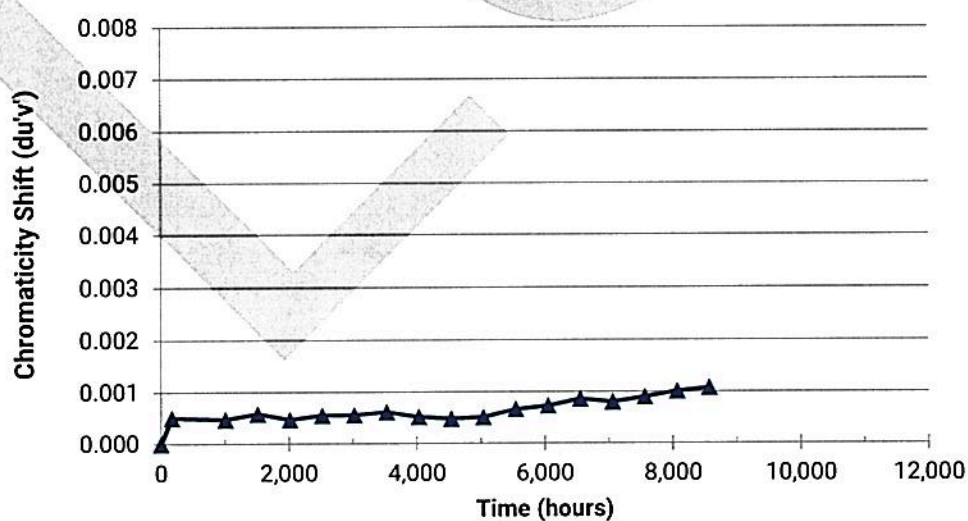
DATA SET 5: 120°C; 350 mA

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	95.57
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	95.69	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	0.0008	0.0006	0.0007	0.0008	0.0008	0.0010	0.0008	0.0007	0.0006	0.0010
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	0.0003	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	0.0006	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	0.0003	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	0.0001	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	95.62
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

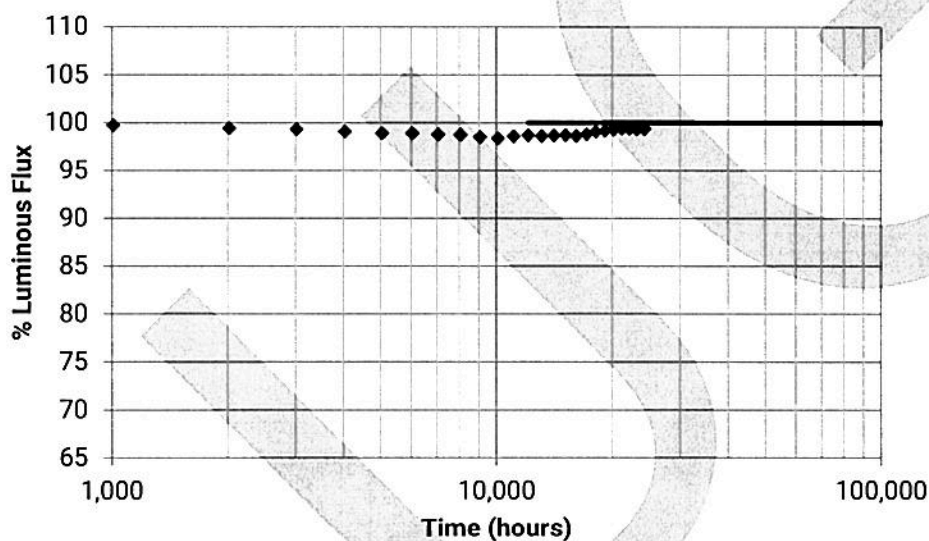
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

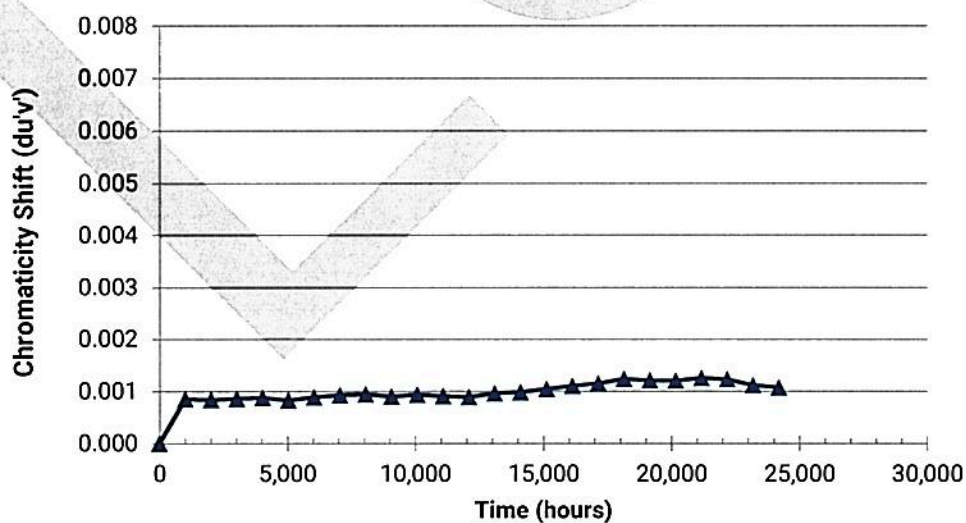
DATA SET 6: 85°C; 700 mA

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	98.61	98.36	98.56	98.68
Median	291	2.97			99.76	99.45	99.29	99.07	98.87	98.97	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	0.4182	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	98.52	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	98.66	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	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95
Mean	290	2.97			98.69	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 (Δu'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	0.0016	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	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95
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_c]	85°C
Ambient Temperature [T_a]	85°C
Failures observed	None

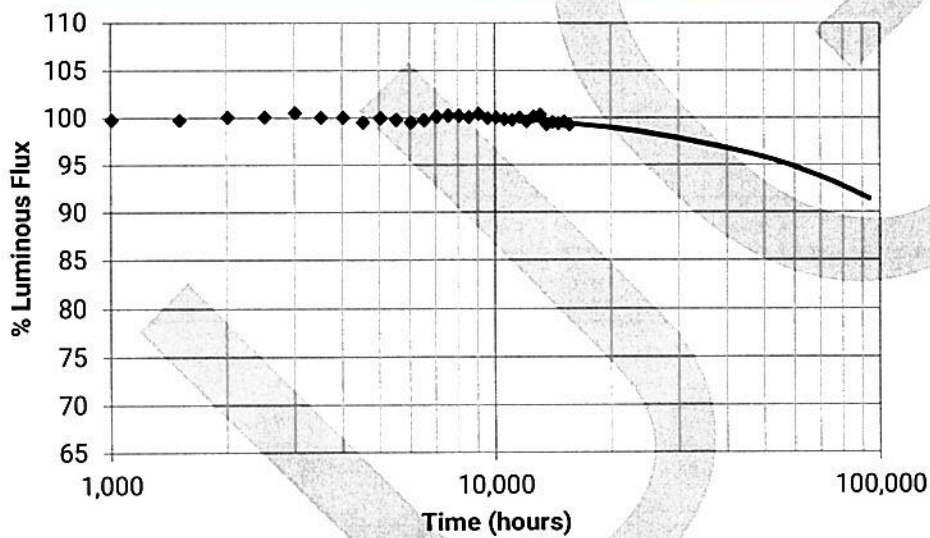
Test Results Summary

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%					

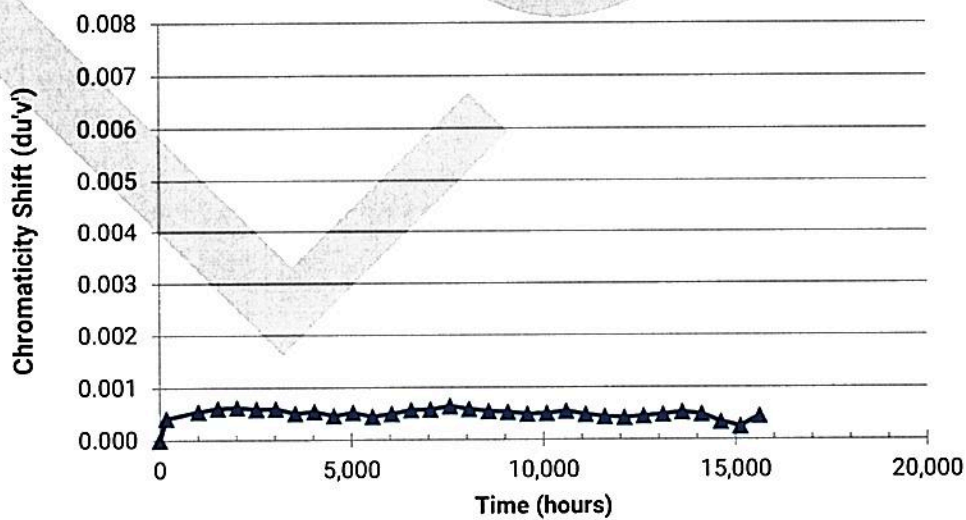
DATA SET 16: 85°C; 700 mA (2700K)

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	0.0006	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	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
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 ($\Delta u'v'$)											
	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	0.4581	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	20	20	20	20	20	20	20	20	20	20	20	20
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	0.0006	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_c]	105°C
Ambient Temperature [T_a]	105°C
Failures observed	None

Test Results Summary

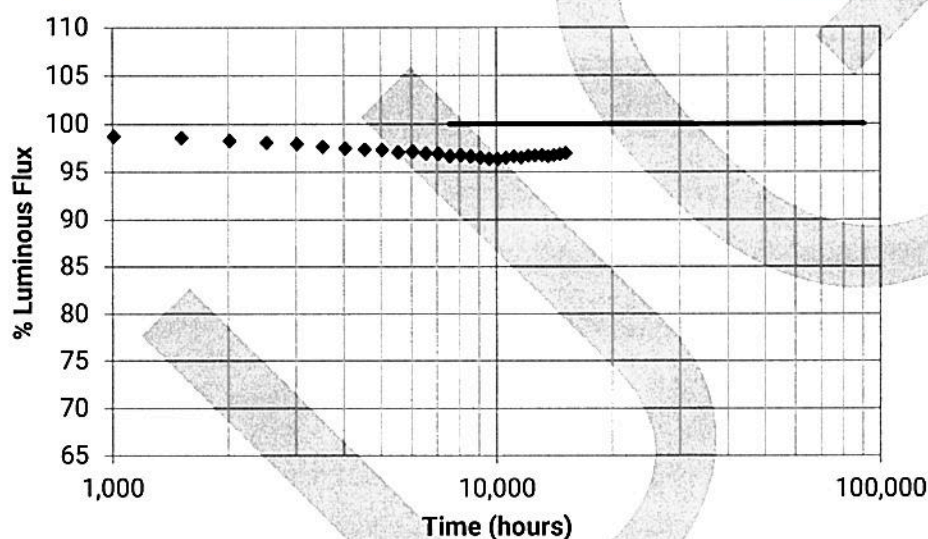
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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	96.63%	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

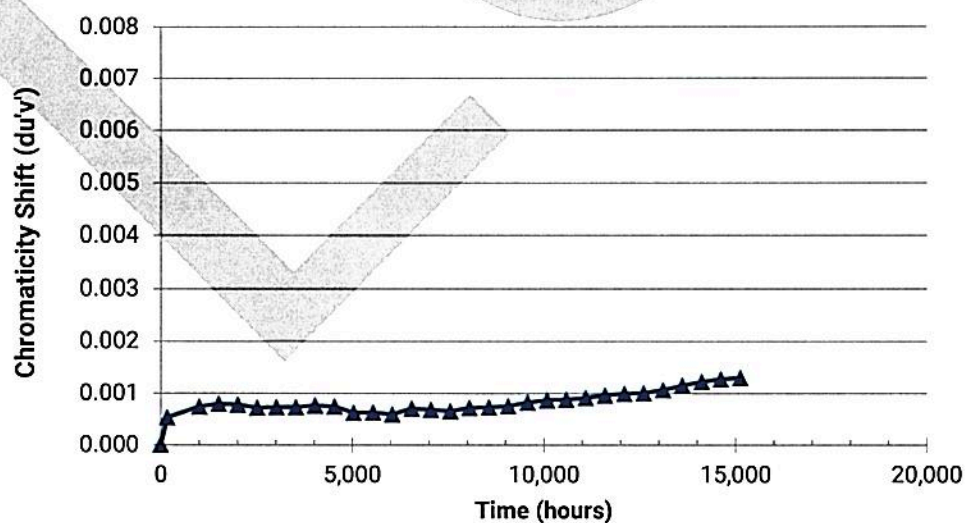
DATA SET 7: 105°C; 700 mA

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	2.95	3082	3000	99.26	98.71	98.66	98.27	98.05	97.94	97.65	97.47	97.36	97.32	97.05	97.14
Mean	290	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
Median	292	2.97			0.27	0.35	0.45	0.50	0.50	0.49	0.61	0.54	0.49	0.46	0.54	0.56
σ	7	0.04			98.68	98.07	97.72	97.41	97.27	96.92	96.64	96.49	96.52	96.59	96.28	95.97
Min	276	2.92			99.61	99.35	99.15	99.08	98.97	98.69	98.66	98.45	98.33	98.33	97.91	98.06
Max	302	3.03														

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	0.0008	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	0.0009	0.0008	0.0009	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	2.95	3082	3000	0.0005	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0008	0.0007	0.0006	0.0006	0.0006
Mean					0.0006	0.0007	0.0008	0.0008	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0006	0.0006
Median					0.0002	0.0001	0.0001	0.0001	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
σ					0.0001	0.0006	0.0006	0.0005	0.0004	0.0002	0.0004	0.0004	0.0004	0.0002	0.0003	0.0002
Min					0.0009	0.0010	0.0010	0.0010	0.0010	0.0012	0.0012	0.0011	0.0011	0.0010	0.0010	0.0010
Max																

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	2.95	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	96.60	96.64	96.61	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	0.0008	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	96.65
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	95.96	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	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95
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	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95
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
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

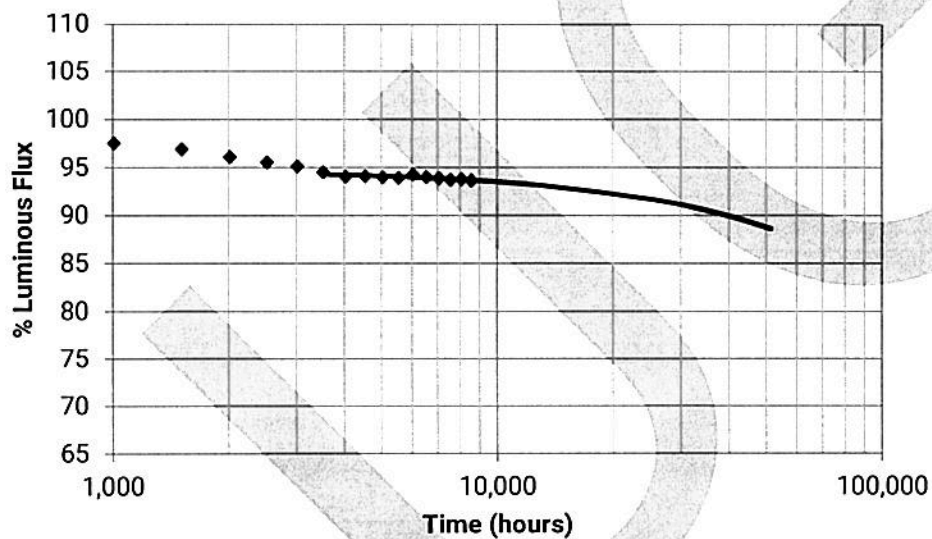
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

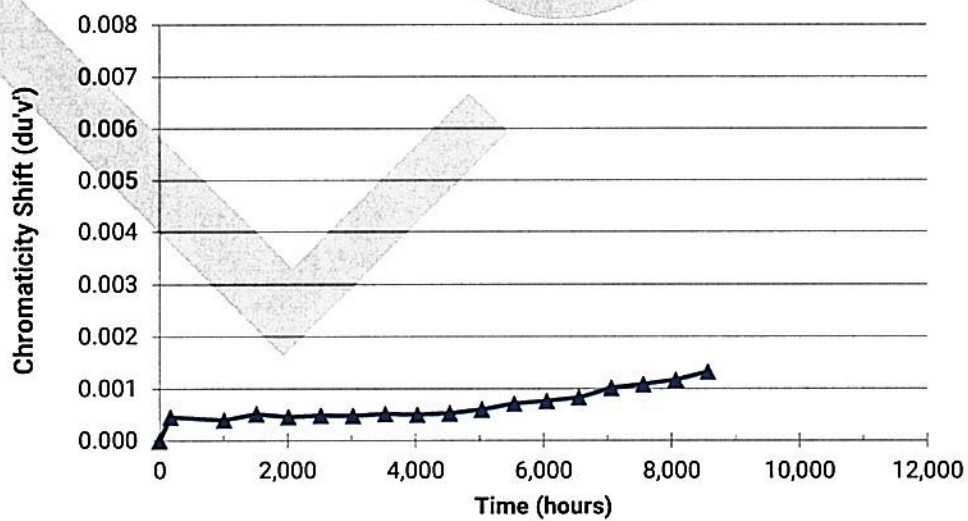
DATA SET 8: 120°C; 700 mA

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	96.81	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	95.88	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	95.64	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	0.0005	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	0.4184	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	0.0003	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	0.0003	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	2.95	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_c]	85°C
Ambient Temperature [T_a]	85°C
Failures observed	None

Test Results Summary

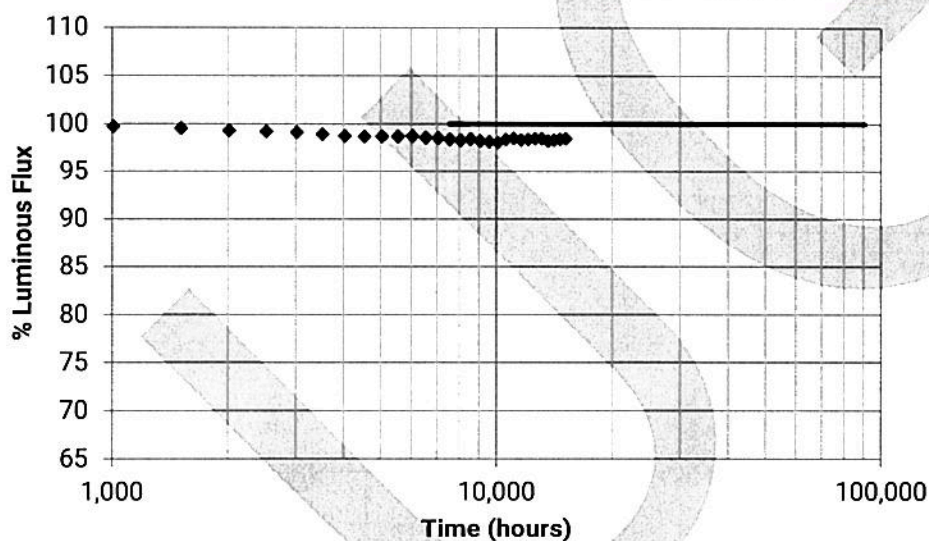
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

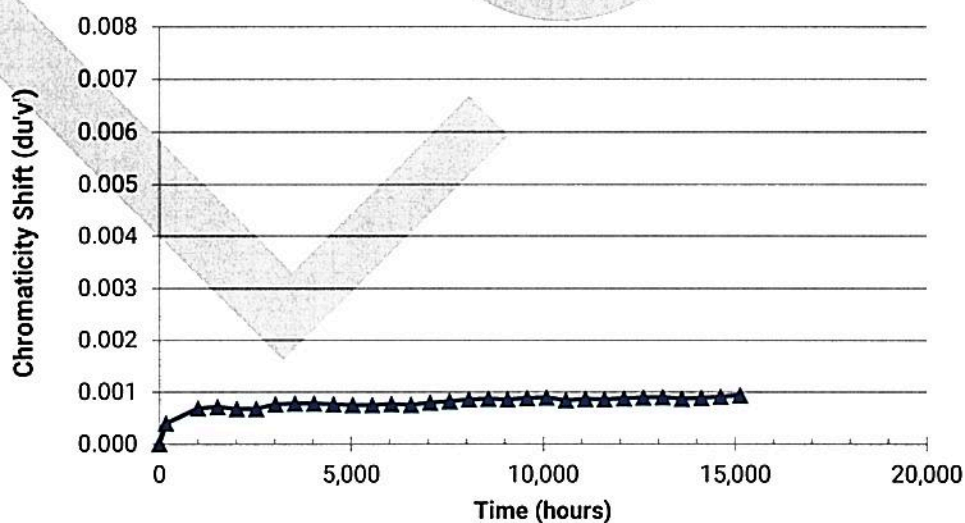
DATA SET 9: 85°C; 1050 mA

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	3058	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	99.85	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	98.78	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	99.81	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 (Δuv)											
	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	3058	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	0.0009	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	0.0006	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	0.0009	0.0009	0.0009	0.0009	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	0.0008	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	96.65
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	98.65	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	3056	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	98.55	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	98.62	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 (Δu'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	0.4362	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	0.0008	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	98.28	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 _c]	105°C
Ambient Temperature [T _a]	105°C
Failures observed	None

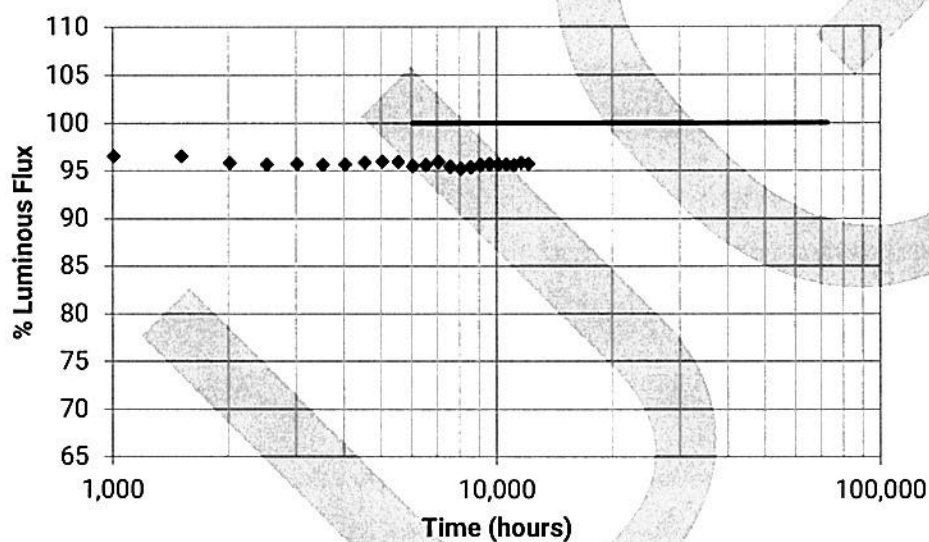
Test Results Summary

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV _f)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV _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%					

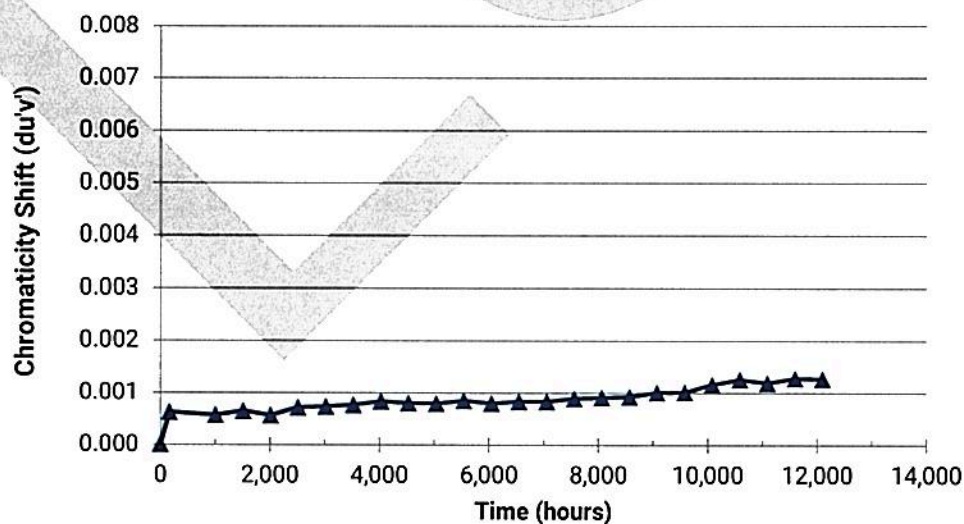
DATA SET 15: 105°C; 1050 mA

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	94.89	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	96.82	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	96.62	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	0.4138	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 _r (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	95.45	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	93.85
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	0.0014	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	0.4308	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	0.0008	0.0005	0.0008	0.0010	0.0010	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_c]	85°C
Ambient Temperature [T_a]	85°C
Failures observed	None

Test Results Summary

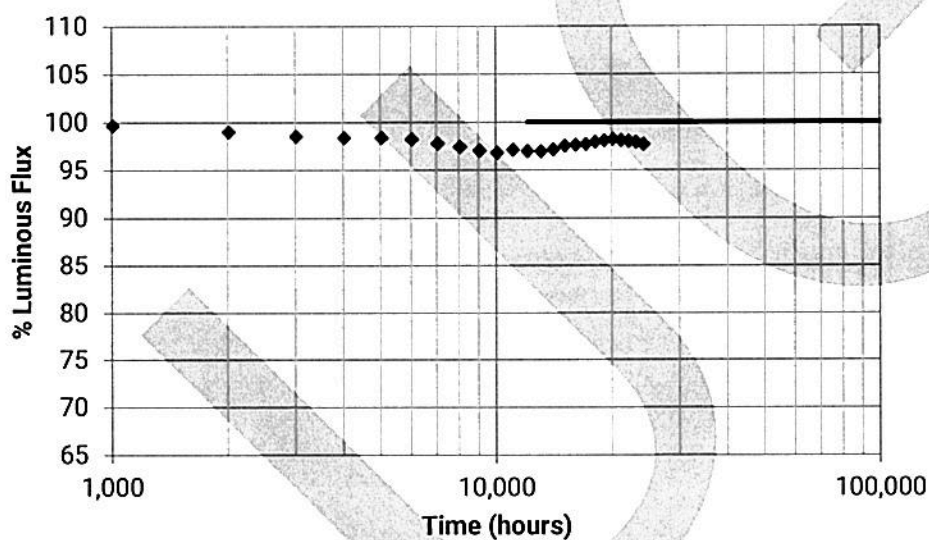
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

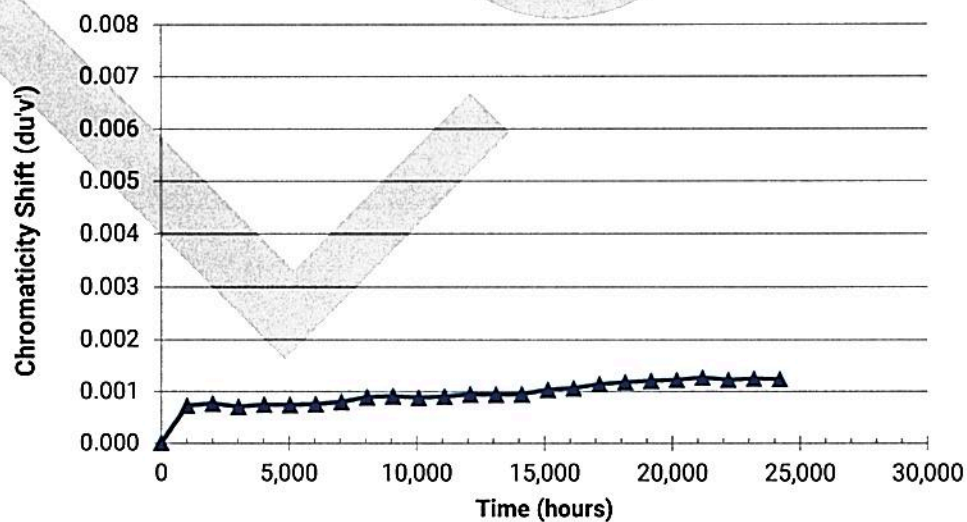
DATA SET 11: 85°C; 1500 mA

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	98.82	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	95.99	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	0.0008	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	0.0008	0.0010	0.0012	0.0005	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	98.28	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	98.95	98.65	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	98.82	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	96.28	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	97.82	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	98.28	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 (Δu'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	0.0007	0.0009	0.0009	0.0011	0.0009	0.0009		
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	0.0014	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	0.0013	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_c]	105°C
Ambient Temperature [T_a]	105°C
Failures observed	None

Test Results Summary

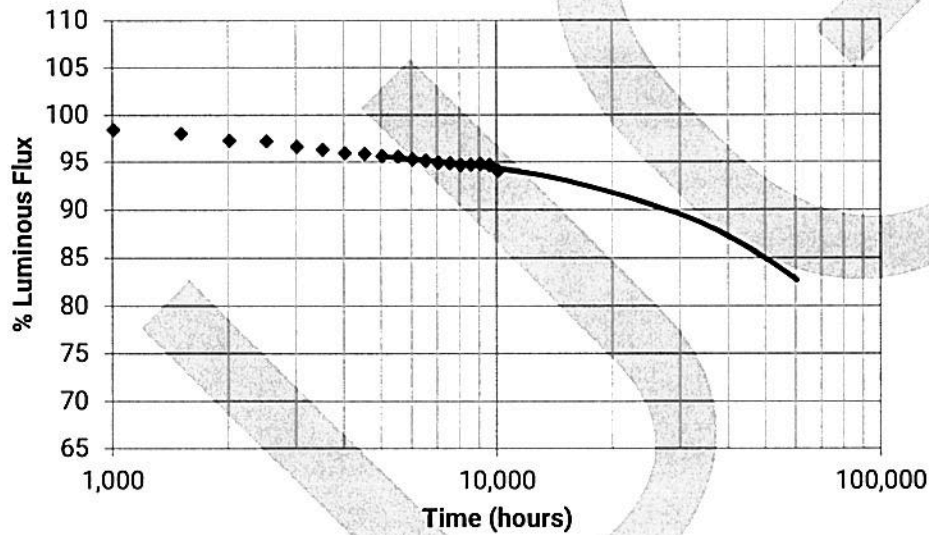
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)	Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift ($\% \Delta V_f$)
0	100.00%	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

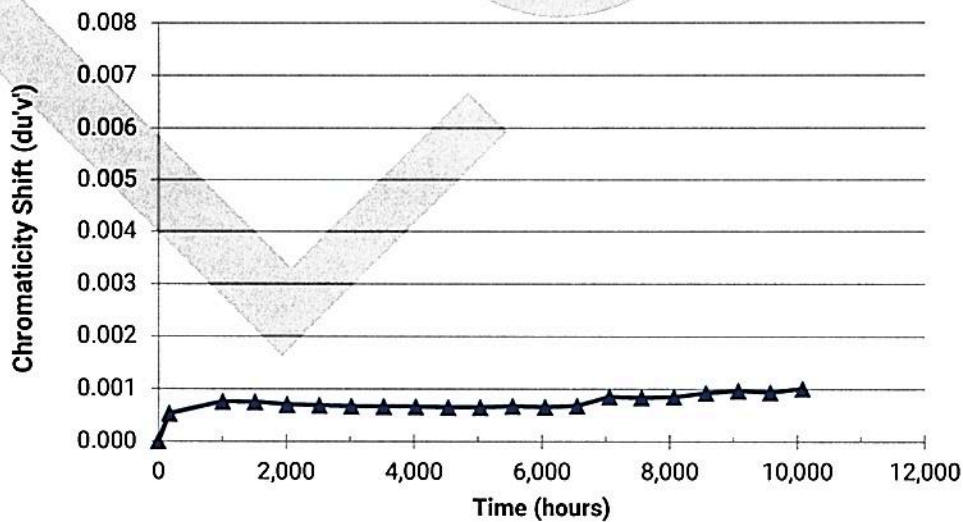
DATA SET 14: 105°C; 1500 mA

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 _r (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	556	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	95.38	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	94.53	94.53	93.82	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	96.58	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	0.0008	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	94.59	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 (Δuv)							
	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	0.4181	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

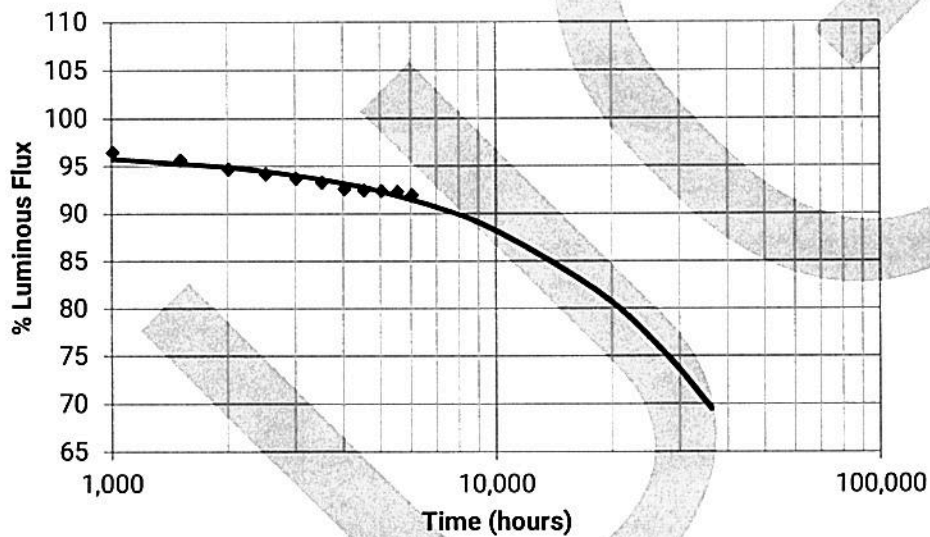
Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_f]	1500 mA
Testing Initiation Date	November 2, 2015
Case Temperature [T_c]	120°C
Ambient Temperature [T_a]	120°C
Failures observed	None

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	97.93%	0.0002	-0.1	N/R
1008	96.46%	0.0004	-0.1	N/R
1512	95.64%	0.0004	-0.2	N/R
2016	94.67%	0.0005	-0.2	N/R
2520	94.13%	0.0006	-0.2	N/R
3024	93.71%	0.0006	-0.3	N/R
3528	93.27%	0.0007	-0.3	N/R
4032	92.59%	0.0008	-0.3	N/R
4536	92.44%	0.0009	-0.4	N/R
5040	92.40%	0.0011	-0.3	N/R
5544	92.30%	0.0013	-0.3	N/R
6048	91.94%	0.0015	-0.6	N/R

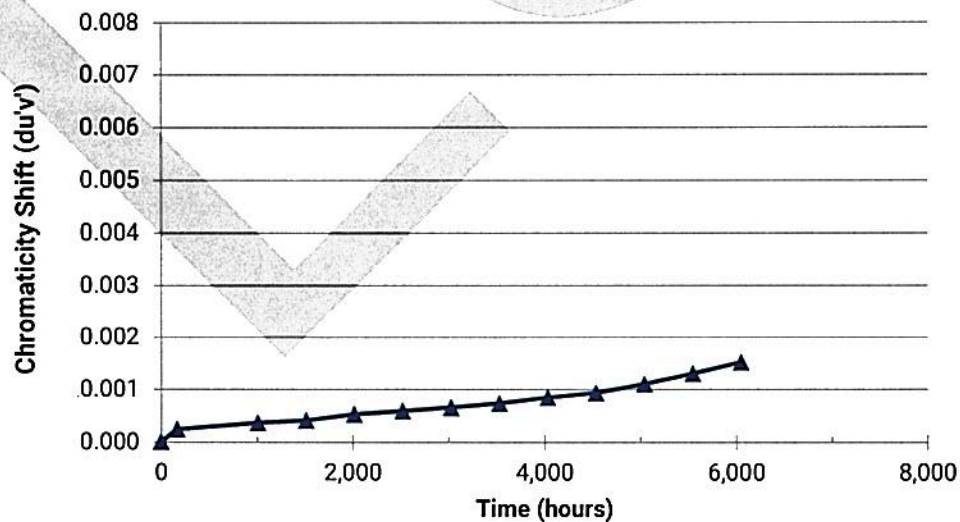
DATA SET 12: 120°C; 1500 mA

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	3118	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

Tested LED Package Series	XLamp XP-G3 Standard White LEDs
Tested Drive Current [I_f]	2000 mA
Testing Initiation Date	February 10, 2016
Case Temperature [T_c]	85°C
Ambient Temperature [T_a]	85°C
Failures observed	None

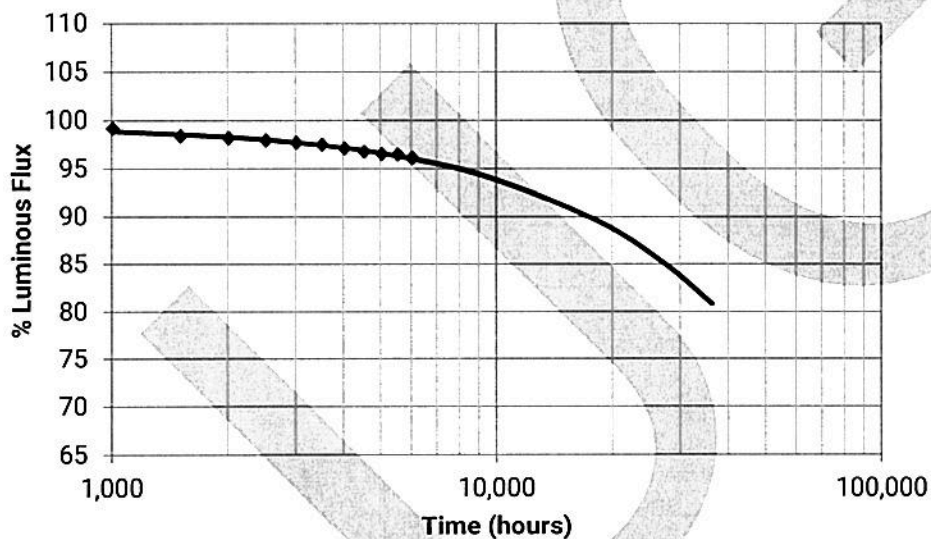
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift ($\Delta u'v'$)	Relative CRI Shift (ΔRa)	Relative Voltage Shift (% ΔV_f)
0	100.00%	0.0000	0.0	0.0%
168	99.49%	0.0004	-0.1	N/R
1008	99.18%	0.0007	-0.1	N/R
1512	98.41%	0.0007	-0.1	N/R
2016	98.22%	0.0007	-0.1	N/R
2520	97.96%	0.0007	-0.1	N/R
3024	97.72%	0.0007	-0.1	N/R
3528	97.53%	0.0007	-0.1	N/R
4032	97.14%	0.0008	-0.1	N/R
4536	96.78%	0.0007	-0.1	N/R
5040	96.55%	0.0008	-0.1	N/R
5544	96.48%	0.0007	-0.1	N/R
6048	96.14%	0.0008	-0.2	N/R

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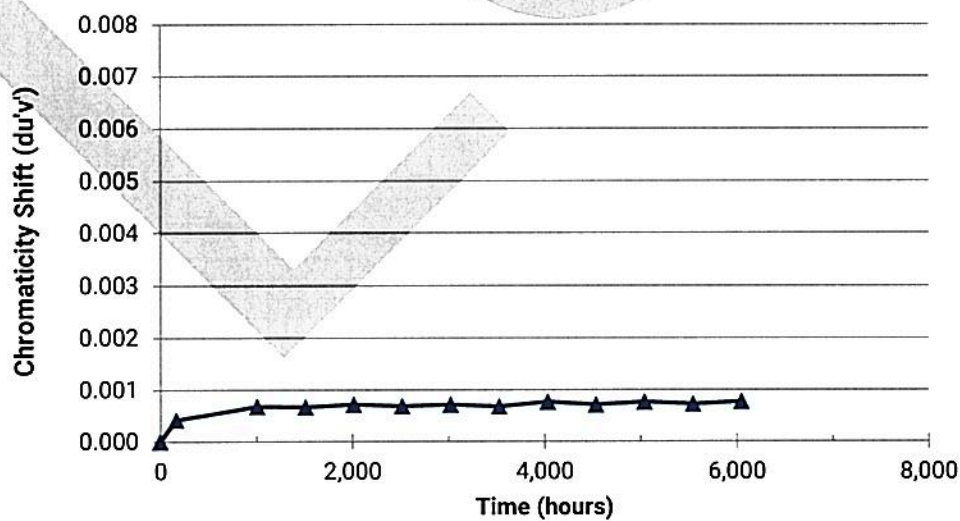
DATA SET 13: 85°C; 2000 mA

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



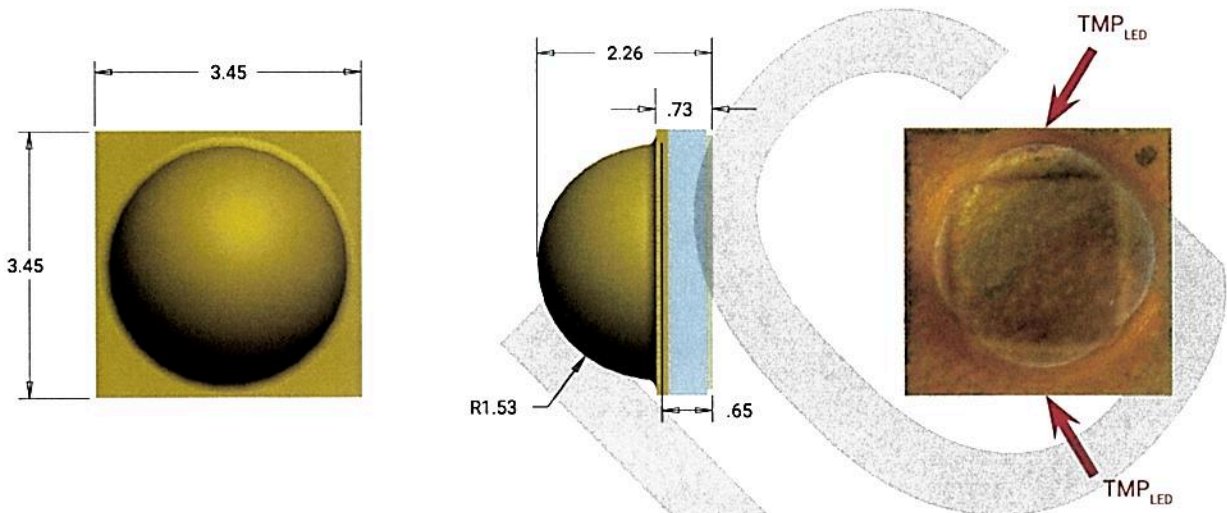
DATA SET 13: 85°C; 2000 mA

# 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	98.68	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	0.0006	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	0.0006	0.0006	0.0006	0.0007	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	0.0006	0.0007	0.0008	0.0006	0.0007	0.0008	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 $\pm .13$ 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.

