

Cree® LED Components IES LM-80-2008 Testing Results



NVLAP Lab Code 500041-0

Revision: 16A (July 2, 2014)

INTRODUCTION

This document provides the results of Cree’s IES LM-80-2008 (“LM-80”) testing on its LED components. Cree is providing this data so that the public can verify the reliability of Cree LEDs as part of a complete LED lighting system.

Note that this document only provides the end results of the LM-80 tests. This is not a complete LM-80 report. Do not use this document to submit luminaires or lamps to an agency. Cree customers who need the full LM-80 reports should contact their Cree sales representative.

Cree’s customers who wish to share LM-80 results with their customers have permission to link to this document from their website. This document is subject to change without notice, so please do not link to a local copy.

NVLAP ACCREDITATION FOR LM-80-2008 TESTING

Cree’s SSL testing laboratory in Durham, NC, USA is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) to perform IES LM-80-2008 testing. All LM-80-2008 results produced by Cree are generated in Cree’s accredited laboratory. Full details on Cree’s NVLAP accreditation are available here:

<http://ts.nist.gov/standards/scopes/5000410.htm>

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any other agency of the federal government.

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LED MODULES (REV 2)

Revision: 2 (October 15, 2013)

Description Of LED Light Sources

Module Family	Nominal Light Output	Applicable Order Codes
LMR2	650 lm	LMR020-0650-xxxx-xxxxxTW
LMR4	700 lm	LMR040-0700-xxxx-xxxxxTW
	1000 lm	LMR040-1000-xxxx-xxxxxTW
LMH2	850 lm	LMH020-0850-xxxx-xxxxxTW
	1250 lm	LMH020-1250-xxxx-xxxxxTW
	2000 lm	LMH020-2000-xxxx-xxxxxTW
	3000 lm	LMH020-3000-xxxx-xxxxxTW
LMH6	2000 lm	LMH060-2000-xxxx-xxxxxTW
	2900 lm	LMH060-2900-xxxx-xxxxxTW

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	85°C	85°C	White: 700 mA Single-Color: 1000 mA	96.2%	0.0007	L90(7k) > 42,300 hrs L80(7k) > 42,300 hrs L70(7k) > 42,300 hrs
1+*	85°C	85°C	White: 700 mA Single-Color: 1000 mA	96.4%	0.0007	L90(16k) = 27,200 hrs L80(16k) = 57,400 hrs L70(16k) = 91,600 hrs

Notes:

- Max. LED Current: These values are the maximum current that the white and single-color LEDs will receive during operation in the specified module.
- Max. Tc: There is no practical way to directly measure LED Tsp inside Cree’s module without adversely affecting the module’s optical, thermal or mechanical properties. Therefore, Cree has characterized samples of our LED modules for the temperature difference between LED Tsp and the Cree-specified Tc measurement point on the outside of the module. Cree recommends using the external Tc measurement point and the maximum Tc values listed in the table above.

* Data sets marked with a (+) are extended versions of some of the data sets above, but have sample sizes less than 25 units each. Please refer to each individual data set for the exact number of samples included. These data sets are projected according to IES TM-21-11 standards and the Reported L70 lifetimes presented are valid under TM-21-11. However, the use of these extended data sets may not be allowed by a particular program because of the sample size of the data set. Cree recommends reviewing the details on LM-80 lumen maintenance for each program to verify that data sets with fewer than 25 samples are considered valid. If not, then the data sets above should be referenced.

XLAMP® CXA1304 WHITE LEDS (REV 0)

Revision: 0 (June 10, 2013)

Description Of LED Light Sources

XLamp® CXA1304 White LEDs (Series: CXA1304)

This LM-80 report is applicable to the following order codes:

CXA1304-xxxx-xxxCxxxxxxxx (9V)

CXA1304-xxxx-xxxNxxxxxxxx (37V)

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	115 mA (37V) 460 mA (9V)	97.4%	0.0014	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2530-1	85°C	85°C	200 mA (37V) 800 mA (9V)	97.4%	0.0011	L90(6k) = 32,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA1507 WHITE LEDS (REV 1)

Revision: 1 (August 8, 2013)

Description Of LED Light Sources

XLamp CXA1507 White LEDs (Series: CXA1507)

This LM-80 report is applicable to the following order codes:
CXA1507-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	55°C	55°C	200 mA	98.8%	0.0005	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2	85°C	85°C	200 mA	98.7%	0.0006	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3	105°C	105°C	200 mA	98.5%	0.0008	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
4	55°C	55°C	375 mA	97.7%	0.0006	L90(6k) = 30,200 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
5	85°C	85°C	375 mA	97.6%	0.0007	L90(7k) = 39,600 hrs L80(7k) > 42,300 hrs L70(7k) > 42,300 hrs

XLAMP® CXA1512 WHITE LEDS (REV 0)

Revision: 0 (April 19, 2013)

Description Of LED Light Sources

XLamp CXA1512 White LEDs (Series: CXA1512)

This LM-80 report is applicable to the following order codes:

CXA1512-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _r]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	346 mA	97.4%	0.0014	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3050-2	85°C	85°C	519 mA	97.4%	0.0016	L90(6k) = 23,900 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA1816 WHITE LEDS (REV 0)

Revision: 0 (June 10, 2013)

Description Of LED Light Sources

XLamp CXA1816 White LEDs (Series: CXA1816)

This LM-80 report is applicable to the following order codes:

CXA1816-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _f]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	462 mA	97.4%	0.0014	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2530-1	85°C	85°C	800 mA	97.4%	0.0011	L90(6k) = 32,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA1820 WHITE LEDS (REV 0)

Revision: 0 (October 11, 2013)

Description Of LED Light Sources

XLamp CXA1820 White LEDs (Series: CXA1820)

This LM-80 report is applicable to the following order codes:

CXA1820-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _f]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	577 mA	97.4%	0.0014	L95(6k) = 17,200 hrs L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2530-1	85°C	85°C	810 mA	97.4%	0.0011	L90(6k) = 32,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3050-2	85°C	85°C	865 mA	97.4%	0.0016	L90(6k) = 23,900 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA1830 WHITE LEDS (REV 0)

Revision: 0 (October 11, 2013)

Description Of LED Light Sources

XLamp CXA1830 White LEDs (Series: CXA1830)

This LM-80 report is applicable to the following order codes:

CXA1830-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _f]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	656 mA	97.4%	0.0014	L95(6k) = 17,200 hrs L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2530-1	85°C	85°C	842 mA	97.4%	0.0011	L90(6k) = 32,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3050-2	85°C	85°C	994 mA	97.4%	0.0016	L90(6k) = 23,900 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA2011 WHITE LEDS (REV 0)

Revision: 0 (May 18, 2012)

Description Of LED Light Sources

XLamp CXA2011 White LEDs (Series: CXA2011)

This LM-80 report is applicable to the following order codes:
CXA2011-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 L70 Lifetime
1	85°C	85°C	300 mA	97.2%	0.0012	L70(6k) > 36,300 hrs

XLAMP® CXA2520 WHITE LEDS (REV 0)

Revision: 0 (April 22, 2013)

Description Of LED Light Sources

XLamp CXA2520 White LEDs (Series: CXA2520)

This LM-80 report is applicable to the following order codes:
CXA2520-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _r]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
2520-1	105°C	105°C	700 mA	98.7%	0.0011	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2520-2	85°C	85°C	1250 mA	98.5%	0.0010	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA2530 WHITE LEDS (REV 0)

Revision: 0 (April 18, 2013)

Description Of LED Light Sources

XLamp CXA2530 White LEDs (Series: CXA2530)

This LM-80 report is applicable to the following order codes:

CXA2530-xxxx-xxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _r]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	808 mA	97.4%	0.0014	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3050-2	85°C	85°C	1212 mA	97.4%	0.0016	L90(6k) = 23,900 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2530-1	85°C	85°C	1400 mA	97.4%	0.0011	L90(6k) = 32,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA2540 WHITE LEDS (REV 0)

Revision: 0 (April 19, 2013)

Description Of LED Light Sources

XLamp CXA2540 White LEDs (Series: CXA2540)

This LM-80 report is applicable to the following order codes:

CXA2540-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _r]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	1154 mA	97.4%	0.0014	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3050-2	85°C	85°C	1731 mA	97.4%	0.0016	L90(6k) = 23,900 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® CXA3050 WHITE LEDS (REV 0)

Revision: 0 (April 19, 2013)

Description Of LED Light Sources

XLamp CXA3050 White LEDs (Series: CXA3050)

This LM-80 report is applicable to the following order codes:

CXA3050-xxxx-xxxxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _r]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3050-1	105°C	105°C	1500 mA	97.4%	0.0014	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3050-2	85°C	85°C	2250 mA	97.4%	0.0016	L90(6k) = 23,900 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® MC-E WHITE LEDS (REV 1)

Revision: 1 (December 8, 2010)

Description Of LED Light Sources

XLamp MC-E White LEDs (MCE4WT) & XLamp MC-E EasyWhite LEDs (MCEEZW)

All measurements provided are LED package measurements with all LEDs on simultaneously. No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours
1	45°C	45°C	350 mA	98.1%	0.0009
2	45°C	45°C	700 mA	99.0%	0.0015
3	55°C	55°C	350 mA	98.4%	0.0010
4	55°C	55°C	700 mA	95.8%	0.0027
5	85°C	85°C	350 mA	98.2%	0.0014
6	85°C	85°C	700 mA	92.8%	0.0070

XLAMP® ML-B WHITE LEDS (REV 1)

Revision: 1 (May 1, 2012)

Description Of LED Light Sources

XLamp ML-B White LEDs (MLBAWT)

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 L70 Lifetime
1	45°C	45°C	80 mA	99.0%	0.0009	L70(6k) > 36,300 hrs
2	55°C	55°C	80 mA	98.3%	0.0010	L70(6k) > 36,300 hrs
3	85°C	85°C	80 mA	98.1%	0.0011	L70(6k) > 36,300 hrs
4	85°C	85°C	175 mA	96.3%	0.0012	L70(8k) = 36,300 hrs

XLAMP® ML-C & ML-E WHITE LEDS (REV 1)

Revision: 1 (March 19, 2012)

Description Of LED Light Sources

XLamp ML-C (MLCxWT) & ML-E (MLExWT) White LEDs

This LM-80 report is applicable to the following order codes:

- ML-C Parallel : MLCxWT-xx-xxxx-xxxxxx
- ML-C Series : MLCSWT-xx-xxxx-xxxxxx
- ML-E Parallel : MLExWT-xx-xxxx-xxxxxx
- ML-E Series : MLESWT-xx-xxxx-xxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 L70 Lifetime
1	45°C	45°C	116 mA (MLCAWT); 58 mA (MLCSWT); 175 mA (MLEAWT); 58 mA (MLESWT)	97.9%	0.0008	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2	55°C	55°C	116 mA (MLCAWT); 58 mA (MLCSWT); 175 mA (MLEAWT); 58 mA (MLESWT)	96.9%	0.0012	L90(6k) = 25,600 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3	85°C	85°C	116 mA (MLCAWT); 58 mA (MLCSWT); 175 mA (MLEAWT); 58 mA (MLESWT)	95.5%	0.0012	L90(6k) = 13,600 hrs L80(6k) = 27,200 hrs L70(6k) > 36,300 hrs

XLAMP® ML-E WHITE LEDS (REV 1)

Revision: 1 (June 14, 2013)

Description Of LED Light Sources

XLamp ML-E (MLEAWT) White LEDs

This LM-80 report is applicable to the following order codes:

MLEAWT-xx-xxxx-xxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
P2	55°C	55°C	175 mA	99.8%	0.0014	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
P3	85°C	85°C	175 mA	99.2%	0.0016	L90(7k) = 24,700 hrs L80(7k) > 39,300 hrs L70(7k) > 39,300 hrs
P1	105°C	105°C	175 mA	94.1%	0.0024	L90(6k) = 10,200 hrs L80(6k) = 18,700 hrs L70(6k) = 28,300 hrs
P4	55°C	55°C	350 mA	98.7%	0.0010	L90(6k) = 23,000 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
P5	85°C	85°C	350 mA	94.1%	0.0023	L90(6k) = 9,450 hrs L80(6k) = 18,600 hrs L70(6k) = 28,900 hrs

The following data sets are extended versions of some of the data sets above, but have sample sizes less than 25 units each. These data sets are projected according to IES TM-21-11 standards and the Reported L70 lifetimes presented are valid under TM-21-11. However, the use of these extended data sets may not be allowed by a particular program because of the sample size of the data set. Cree recommends reviewing the details on LM-80 lumen maintenance for each program to verify that data sets with fewer than 25 samples are considered valid. If not, then the data sets above should be referenced.

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
P3+	85°C	85°C	175 mA	99.2%	0.0016	L90(11k) = 17,100 hrs L80(11k) = 29,900 hrs L70(11k) = 44,300 hrs

XLAMP® MP-L EASYWHITE LEDS (REV 0)

Revision: 0 (September 30, 2010)

Description Of LED Light Sources

XLamp MP-L EasyWhite LEDs (MPLEZW)

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours
1	45°C	45°C	250 mA	96.9%	0.0007
2	55°C	55°C	250 mA	96.1%	0.0012
3	85°C	85°C	250 mA	96.7%	0.0017

XLAMP® MT-G EASYWHITE LEDS (REV 1)

Revision: 1 (February 16, 2012)

Description Of LED Light Sources

XLamp MT-G EasyWhite LED arrays (Series: MTGEZW)

This LM-80 report is applicable to the following order codes:

- MT-G 6V : MTGEZW-xx-xxxx-xBxxxxxxxx
- MT-G 36V : MTGEZW-xx-xxxx-xNxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	55°C	55°C	2000 mA (6V); 333 mA (36V)	97.2%	0.0028	L90(6k) = 25,500 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2	85°C	85°C	2000 mA (6V); 333 mA (36V)	95.5%	0.0027	L90(6k) = 15,900 hrs L80(6k) = 35,000 hrs L70(6k) > 36,300 hrs
3	105°C	105°C	2000 mA (6V); 333 mA (36V)	94.0%	0.0022	L90(6k) = 14,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
4	55°C	55°C	3000 mA (6V); 500 mA (36V)	95.8%	0.0024	L90(6k) = 23,500 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
5	85°C	85°C	3000 mA (6V); 500 mA (36V)	92.7%	0.0021	L90(6k) = 13,200 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
6	105°C	105°C	3000 mA (6V); 500 mA (36V)	92.5%	0.0019	L90(6k) = 11,800 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
7	105°C	105°C	4200 mA (6V); 700 mA (36V)	91.5%	0.0020	L90(6k) = 14,000 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® MT-G2 EASYWHITE LEDS (REV 1)

Revision: 1 (June 14, 2013)

Description Of LED Light Sources

XLamp MT-G2 EasyWhite LED arrays (Series: MTGBEZ)

This LM-80 report is applicable to the following order codes:

- MT-G2 6V : MTGBEZ-xx-xxxx-xBxxxxxxxx
- MT-G2 9V : MTGBEZ-xx-xxxx-xCxxxxxxxx
- MT-G2 36V : MTGEZw-xx-xxxx-xNxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	85°C	85°C	3000 mA (6V); 2000 mA (9V); 500 mA (36V)	94.5%	0.0020	L90(6k) = 12,000 hrs L80(6k) = 26,600 hrs L70(6k) > 36,300 hrs
2	105°C	105°C	3000 mA (6V); 2000 mA (9V); 500 mA (36V)	90.2%	0.0034	L90(6k) = 6,060 hrs L80(6k) = 15,400 hrs L70(6k) = 26,000 hrs

The following data sets are extended versions of some of the data sets above, but have sample sizes less than 25 units each. Please refer to each individual data set for the exact number of samples included. These data sets are projected according to IES TM-21-11 standards and the Reported L70 lifetimes presented are valid under TM-21-11. However, the use of these extended data sets may not be allowed by a particular program because of the sample size of the data set. Cree recommends reviewing the details on LM-80 lumen maintenance for each program to verify that data sets with fewer than 25 samples are considered valid. If not, then the data sets above should be referenced.

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 L70 Lifetime
1+	85°C	85°C	3000 mA (6V); 2000 mA (9V); 500 mA (36V)	94.5%	0.0020	L70(7k) = 40,000 hrs
2+	105°C	105°C	3000 mA (6V); 2000 mA (9V); 500 mA (36V)	90.2%	0.0034	L70(7k) = 27,700 hrs

XLAMP® MX-3 WHITE LEDS (REV 0)

Revision: 0 (March 29, 2011)

Description Of LED Light Sources

XLamp MX-3 White LEDs: parallel (MX3AWT) & series (MX3SWT) configurations.

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _r]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours
1	45°C	45°C	400 mA (MX3AWT) 133 mA (MX3SWT)	98.7%	0.0010
2	55°C	55°C	400 mA (MX3AWT) 133 mA (MX3SWT)	97.0%	0.0013
3	85°C	85°C	400 mA (MX3AWT) 133 mA (MX3SWT)	94.9%	0.0009

XLAMP® MX-6 WHITE LEDS (REV 2)

Revision: 2 (September 2, 2011)

Description Of LED Light Sources

XLamp MX-6 White LEDs: parallel (MX6AWT) & series (MX6SWT) configurations

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	45°C	45°C	350 mA (MX6AWT) 58 mA (MX6SWT)	97.5%	0.0007	L90(6k) = 15,700 hrs L80(6k) = 29,400 hrs L70(6k) > 36,300 hrs
2	55°C	55°C	350 mA (MX6AWT) 58 mA (MX6SWT)	98.6%	0.0007	L90(6k) = 27,900 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3	85°C	85°C	350 mA (MX6AWT) 58 mA (MX6SWT)	96.5%	0.0014	L90(6k) = 12,100 hrs L80(6k) = 23,100 hrs L70(6k) = 35,600 hrs
4	45°C	45°C	600 mA (MX6AWT) 100 mA (MX6SWT)	98.0%	0.0009	L90(6k) = 28,400 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
5	55°C	55°C	600 mA (MX6AWT) 100 mA (MX6SWT)	97.2%	0.0009	L90(6k) = 19,500 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
6	85°C	85°C	600 mA (MX6AWT) 100 mA (MX6SWT)	94.5%	0.0008	L90(6k) = 11,100 hrs L80(6k) = 22,000 hrs L70(6k) = 34,400 hrs

XLAMP® XB-D WHITE LEDS (REV 2)

Revision: 2 (October 10, 2013)

Description Of LED Light Sources

XLamp XB-D White LEDs (Series: XBDAWT)

This LM-80 report is applicable to the following order codes:

XBDAWT-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
7	85°C	85°C	500 mA	98.9%	0.0011	L95(10k) = 29,400 hrs L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
3	105°C	105°C	700 mA	93.9%	0.0013	L90(10k) = 56,000 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
4	55°C	55°C	1000 mA	96.9%	0.0007	L90(10k) = 45,000 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
5	85°C	85°C	1000 mA	95.2%	0.0008	L90(10k) = 33,400 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
6	105°C	105°C	1000 mA	94.4%	0.0014	L90(6k) = 12,800 hrs L80(6k) = 29,100 hrs L70(6k) > 36,300 hrs

XLAMP® XB-E HIGH VOLTAGE WHITE LEDS (REV 0)

Revision: 0 (October 11, 2013)

Description Of LED Light Sources

XLamp XB-E White LEDs (Series: XBEHVW)

This LM-80 report is applicable to the following order codes:
XBEHVW-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	105°C	105°C	44 mA	94.1%	0.0031	L90(6k) = 10,400 hrs L80(6k) = 23,100 hrs L70(6k) > 36,300 hrs

XLAMP® XB-G HIGH VOLTAGE WHITE LEDS (REV 0)

Revision: 0 (October 11, 2013)

Description Of LED Light Sources

XLamp XB-G White LEDs (Series: XBGHVW)

This LM-80 report is applicable to the following order codes:

XBGHVW-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	105°C	105°C	44 mA	95.6%	0.0029	L90(6k) = 15,400 hrs L80(6k) = 33,800 hrs L70(6k) > 36,300 hrs

XLAMP® XM-L EASYWHITE LEDS (REV 1)

Revision: 1(August 8, 2013)

Description Of LED Light Sources

XLamp XM-L EasyWhite LED arrays (Series: XMLEZW)

This LM-80 report is applicable to the following order codes:

- XM-L EZW 6V : XMLEZW-xx-xxxx-xBxxxxxxxx
- XM-L EZW 12V : XMLEZW-xx-xxxx-xDxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3	105°C	105°C	700 mA (6V); 350 mA (12V)	97.3%	0.0025	L95(15k) = 28,700 hrs L90(15k) > 90,700 hrs L80(15k) > 90,700 hrs L70(15k) > 90,700 hrs
6	105°C	105°C	1000 mA (6V); 500 mA (12V)	98.5%	0.0008	L95(7k) = 42,200 hrs L90(7k) > 42,300 hrs L80(7k) > 42,300 hrs L70(7k) > 42,300 hrs
7	85°C	85°C	1500 mA (6V); 750 mA (12V)	97.6%	0.0009	L95(6k) = 19,400 hrs L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® XM-L HIGH VOLTAGE WHITE LEDS (REV 0)

Revision: 0 (November 13, 2012)

Description Of LED Light Sources

XLamp XM-L High Voltage White LEDs (Series: XMLHVW)

This LM-80 report is applicable to the following order codes:

XMLHVW-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	55°C	55°C	88 mA	94.7%	0.0007	L90(6k) = 15,000 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2	85°C	85°C	88 mA	92.3%	0.0010	L90(6k) = 8,180 hrs L80(6k) = 22,100 hrs L70(6k) > 36,300 hrs
3	105°C	105°C	88 mA	92.0%	0.0009	L90(6k) = 7,450 hrs L80(6k) = 19,500 hrs L70(6k) = 33,200 hrs

XLAMP® XM-L WHITE LEDS (REV 2)

Revision: 2 (October 31, 2012)

Description Of LED Light Sources

XLamp XM-L White LED packages (Series: XMLAWT)

This LM-80 report is applicable to the following order codes:

XMLAWT-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 L70 Lifetime
4	55°C	55°C	1500 mA	99.4%	0.0026	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
5	85°C	85°C	1500 mA	96.0%	0.0022	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
6	105°C	105°C	1500 mA	96.7%	0.0019	L90(10k) = 27,700 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
7	55°C	55°C	2000 mA	99.9%	0.0033	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
8	85°C	85°C	2000 mA	97.6%	0.0027	L90(9k) = 38,300 hrs L80(9k) > 54,400 hrs L70(9k) > 54,400 hrs
9	105°C	105°C	2000 mA	95.6%	0.0021	L90(6k) = 21,600 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
10	85°C	85°C	3000 mA	94.1%	0.0032	L90(6k) = 11,100 hrs L80(6k) = 25,000 hrs L70(6k) > 36,300 hrs

XLAMP® XM-L WHITE LEDS (REV 2) - CONTINUED

The following data sets are extended versions of some of the data sets listed on the previous page, but have sample sizes less than 25 units each. These data sets are projected according to IES TM-21-11 standards and the Reported L70 lifetimes presented are valid under TM-21-11. However, the use of these extended data sets may not be allowed by a particular program because of the sample size of the data set. Cree recommends reviewing the details on LM-80 lumen maintenance for each program to verify that data sets with fewer than 25 samples are considered valid. If not, then the data sets on the previous page should be referenced.

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
5+	85°C	85°C	1500 mA	96.0%	0.0022	L90(12k) = 29,600 hrs L80(12k) > 72,600 hrs L70(12k) > 72,600 hrs
6+	105°C	105°C	1500 mA	96.7%	0.0019	L90(12k) = 25,900 hrs L80(12k) = 59,800 hrs L70(12k) > 72,600 hrs
7+	55°C	55°C	2000 mA	99.9%	0.0033	L90(11k) > 61,000 hrs L80(11k) > 61,000 hrs L70(11k) > 61,000 hrs
8+	85°C	85°C	2000 mA	97.6%	0.0027	L90(12k) = 24,800 hrs L80(12k) = 52,600 hrs L70(12k) > 72,600 hrs
9+	105°C	105°C	2000 mA	95.6%	0.0021	L90(9k) = 15,900 hrs L80(9k) = 33,700 hrs L70(9k) > 47,100 hrs

XLAMP® XM-L2 WHITE LEDS (REV 1)

Revision: 1 (July 31, 2013)

Description Of LED Light Sources

XLamp XM-L2 White LEDs (Series: XMLBWT)

This LM-80 report is applicable to the following order codes:

XMLBWT-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Cree classifies these LED packages as “successors to previously tested subcomponents” (Section 5) per Sep 9, 2011 ENERGY STAR® guidelines¹. The XLamp XM-L2 White LED is a successor to the previously tested XLamp XM-L White LED and meets all the criteria listed in Section 5.1 of the ENERGY STAR guidelines.

Comparison Of Existing & Successor Data Sets

The following table compares the lumen maintenance, color maintenance and luminous flux for the existing and successor data sets to fulfill the requirements of ENERGY STAR Guidance Regarding Lumen Maintenance Performance, Section 5.2.e.

Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	LED	Average Lumen Maintenance at 3,000 hours	Average Chromaticity Shift (Δu'v') at 3,000 hours	Average Initial Luminous Flux
85°C	85°C	1000 mA	Existing: XLamp XM-L White LED	96.0%	0.0022	435.2 lm
			Successor: XLamp XM-L2 White LED	98.5%	0.0009	512.9 lm
105°C	105°C	1500 mA	Existing: XLamp XM-L White LED	96.7%	0.0019	420.9 lm
			Successor: XLamp XM-L2 White LED	98.2%	0.0009	512.7 lm
85°C	85°C	2000 mA	Existing: XLamp XM-L White LED	97.6%	0.0027	557.5 lm
			Successor: XLamp XM-L2 White LED	97.8%	0.0010	642.3 lm
105°C	105°C	2000 mA	Existing: XLamp XM-L White LED	97.1%	0.0018	529.3 lm
			Successor: XLamp XM-L2 White LED	98.1%	0.0009	665.9 lm
85°C	85°C	3000 mA	Existing: XLamp XM-L White LED	96.2%	0.0032	738.4 lm
			Successor: XLamp XM-L2 White LED	98.5%	0.0010	892.5 lm

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

XLAMP® XP-E WHITE LEDS (REV 3)

Revision: 3 (November 9, 2011)

Description Of LED Light Sources

XLamp XP-E White LED packages (Series: XPEWHT)

This LM-80 report is applicable to the following order codes:

XPEWHT-xx-xxxx-xxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
8	55°C	55°C	350 mA	97.7%	0.0022	L90(10k) = 56,800 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
9	85°C	85°C	350 mA	98.1%	0.0021	L90(10k) = 39,700 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
10	105°C	105°C	350 mA	96.4%	0.0021	L90(6k) = 19,400 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
5	45°C	45°C	700 mA	96.6%	0.0013	L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
6	55°C	55°C	700 mA	96.5%	0.0013	L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
7	85°C	85°C	700 mA	95.6%	0.0004	L90(10k) = 28,300 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs

XLAMP® XP-E HIGH EFFICIENCY WHITE LEDS (REV 4)

Revision: 4 (April 25, 2012)

Description Of LED Light Sources

XLamp XP-E High Efficiency White LEDs (XPEHEW)

This LM-80 report is applicable to the following order codes:

XPEHEW-xx-xxxx-xxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
11	85°C	85°C	350 mA	99.8%	0.0007	L90(10k) = 32,800 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
12	105°C	105°C	350 mA	95.7%	0.0009	L90(6k) = 15,600 hrs L70(6k) = 34,100 hrs L70(6k) > 36,300 hrs
8	55°C	55°C	500 mA	100.0%	0.0008	L90(8k) > 48,400 hrs L80(8k) > 48,400 hrs L70(8k) > 48,400 hrs
9	85°C	85°C	500 mA	97.7%	0.0005	L90(8k) = 28,400 hrs L80(8k) > 48,400 hrs L70(8k) > 48,400 hrs
10	85°C	85°C	700 mA	97.6%	0.0006	L90(9k) = 21,900 hrs L80(9k) = 44,100 hrs L70(9k) > 54,400 hrs

XLAMP® XP-E2 HIGH EFFICIENCY WHITE LEDS (REV 0)

Revision: 0 (Sept 3, 2013)

Description Of LED Light Sources

XLamp XP-E2 (XPEBWT)

This LM-80 report is applicable to the following order codes:

XPEBWT-xx-xxxx-xxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	105°C	105°C	350 mA	98.0%	0.0014	L95(7k) = 20,600 hrs L90(7k) > 39,300 hrs L80(7k) > 39,300 hrs L70(7k) > 39,300 hrs
2	85°C	85°C	700 mA	97.3%	0.0012	L90(6k) = 19,100 hrs L80(6k) = 38,900 hrs L70(6k) > 39,300 hrs

XLAMP® XP-G WHITE LEDS (REV 6)

Revision: 6 (September 10, 2013)

Description Of LED Light Sources

XLamp XP-G White LEDs (Series: XPGWHT)

This LM-80 report is applicable to the following order codes:

XPGWHT-xx-xxxx-xxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
13	85°C	85°C	1000 mA	98.4%	0.0011	L95(14k) > 81,600 hrs L90(14k) > 81,600 hrs L80(14k) > 81,600 hrs L70(14k) > 81,600 hrs
14	105°C	105°C	1000 mA	96.6%	0.0005	L95(12k) > 72,600 hrs L90(12k) > 72,600 hrs L80(12k) > 72,600 hrs L70(12k) > 72,600 hrs
15	55°C	55°C	1500 mA	97.8%	0.0009	L95(12k) > 72,600 hrs L90(12k) > 72,600 hrs L80(12k) > 72,600 hrs L70(12k) > 72,600 hrs
16	85°C	85°C	1500 mA	98.5%	0.0006	L95(12k) > 72,600 hrs L90(12k) > 72,600 hrs L80(12k) > 72,600 hrs L70(12k) > 72,600 hrs

XLAMP® XP-G2 WHITE LEDS (REV 3)

Revision: 3 (November 19, 2013)

Description Of LED Light Sources

XLamp XP-G2 White LEDs (Series: XPGBWT)

This LM-80 report is applicable to the following order codes:

XPGBWT-xx-xxxx-xxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
9	85°C	85°C	500 mA	98.0%	0.0012	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
10	105°C	105°C	500 mA	98.3%	0.0010	L90(9k) > 51,400 hrs L80(9k) > 51,400 hrs L70(9k) > 51,400 hrs
8	105°C	105°C	700 mA	96.8%	0.0010	L90(9k) = 27,000 hrs L80(9k) > 51,400 hrs L70(9k) > 51,400 hrs
3	55°C	55°C	1000 mA	97.0%	0.0010	L90(9k) > 54,400 hrs L80(9k) > 54,400 hrs L70(9k) > 54,400 hrs
4	85°C	85°C	1000 mA	96.6%	0.0010	L90(9k) > 51,400 hrs L80(9k) > 51,400 hrs L70(9k) > 51,400 hrs
5	105°C	105°C	1000 mA	96.8%	0.0011	L90(6k) = 24,500 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
6	55°C	55°C	1500 mA	98.1%	0.0009	L90(6k) = 28,800 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
7	85°C	85°C	1500 mA	96.5%	0.0012	L90(6k) = 24,500 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® XQ-B WHITE LEDS (REV 0)

Revision: 1 (October 15, 2013)

Description Of LED Light Sources

XLamp XQ-B White LEDs (Series: XQBAWT)

This LM-80 report is applicable to the following order codes:

XQBAWT-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3	85°C	85°C	100 mA	95.7%	0.0024	L90(6k) = 17,200 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
1	85°C	85°C	200 mA	94.6%	0.0025	L90(6k) = 11,600 hrs L80(6k) = 24,600 hrs L70(6k) > 36,300 hrs
2	105°C	105°C	200 mA	92.2%	0.0032	L90(6k) = 8,440 hrs L80(6k) = 18,800 hrs L70(6k) = 30,500 hrs

XLAMP® XQ-D WHITE LEDS (REV 0)

Revision: 0 (October 14, 2013)

Description Of LED Light Sources

XLamp XQ-D White LEDs (Series: XQDAWT)

This LM-80 report is applicable to the following order codes:

XQDAWT-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	105°C	105°C	500 mA	94.6%	0.0030	L90(8k) = 13,800 hrs L80(8k) = 32,500 hrs L70(8k) > 45,400 hrs
2	105°C	105°C	700 mA	93.8%	0.0032	L90(6k) = 12,500 hrs L80(6k) = 30,100 hrs L70(6k) > 36,300 hrs

XLAMP® XR-E WHITE LEDS (REV 1)

Revision: 1 (September 20, 2010)

Description Of LED Light Sources

XLamp XR-E White LEDs (Series: XREWHT)

No failures occurred during testing.

Test Summary

Data Set	Color	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours
1	Cool White	25°C	25°C	350 mA	98.1%	0.0040
2	Warm White	25°C	25°C	350 mA	98.8%	0.0020
3	Cool White	25°C	25°C	700 mA	98.0%	0.0040
4	Warm White	25°C	25°C	700 mA	97.8%	0.0022
5	Cool White	45°C	45°C	350 mA	97.8%	0.0129
6	Cool White	45°C	45°C	1000 mA	97.9%	0.0017
7	Cool White	55°C	55°C	350 mA	98.0%	0.0031
8	Warm White	55°C	55°C	350 mA	97.7%	0.0019
9	Cool White	55°C	55°C	1000 mA	97.0%	0.0047
10	Warm White	55°C	55°C	1000 mA	96.2%	0.0026
11	Cool White	85°C	85°C	350 mA	94.3%	0.0030
12	Warm White	85°C	85°C	350 mA	96.9%	0.0012
13	Cool White	85°C	85°C	1000 mA	95.0%	0.0022

XLAMP® XT-E HIGH VOLTAGE WHITE LEDS (REV 0)

Revision: 0 (August 21, 2012)

Description Of LED Light Sources

XLamp XT-E High Voltage White LEDs (Series: XTEHVW)

This LM-80 report is applicable to the following order codes:
XTEHVW-QX-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	55°C	55°C	44 mA	98.5%	0.0007	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2	85°C	85°C	44 mA	94.1%	0.0009	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3	105°C	105°C	44 mA	93.3%	0.0012	L90(6k) = 13,500 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
4	55°C	55°C	66 mA	95.6%	0.0008	L90(6k) = 25,100 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
5	85°C	85°C	66 mA	93.7%	0.0011	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

XLAMP® XT-E WHITE LEDS (REV 6)

Revision: 6 (November 13, 2013)

Description Of LED Light Sources

XLamp XT-E White LEDs (Series: XTEAWT)

This LM-80 report is applicable to the following order codes:

XTEAWT-xx-xxxx-xxxxxxxxxx

No failures occurred during testing.

Test Summary

Data Set	Case Temp. [T _s]	Ambient Temp. [T _A]	Drive Current [I _F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
3	55°C	55°C	1000 mA	98.1%	0.0012	L95(12k) > 69,600 hrs L90(12k) > 69,600 hrs L80(12k) > 69,600 hrs L70(12k) > 69,600 hrs
2	85°C	85°C	1000 mA	98.8%	0.0014	L95(11k) > 66,500 hrs L90(11k) > 66,500 hrs L80(11k) > 66,500 hrs L70(11k) > 66,500 hrs
4	105°C	105°C	1000 mA	96.1%	0.0021	L90(10k) > 60,500 hrs L80(10k) > 60,500 hrs L70(10k) > 60,500 hrs
5	55°C	55°C	1250 mA	96.3%	0.0008	L90(9k) > 54,400 hrs L80(9k) > 54,400 hrs L70(9k) > 54,400 hrs
6	85°C	85°C	1250 mA	95.6%	0.0012	L90(9k) = 19,300 hrs L80(9k) = 41,400 hrs L70(9k) > 54,400 hrs