Lumileds

IESNA LM-80 Test Report

1. Applicable LUXEON® Series part number(s)

This IESNA LM-80 Test Report applies to the following LUXEON part numbers:

Product Family	Part Number	CCT
LUXEON 3030 2D	L130-xxyy003000W21	white
LUXEON HR30	L130-xxyyzzHR00001	white

In these part numbers xx designates the nominal ANSI color bin (e.g. 27 for 2700K, 30 for 3000K, etc.) and yy designates the minimum CRI value (e.g. 80 for a minimum CRI of 80).

2. L_{70} Extrapolations per IESNA TM-21-11

	If = 165mA	
Ts = 105°C	> 54,000	
Ts = 85°C	> 54,000	
Ts = 55°C	> 54,000	
		= Limited by TM-21 6x rule

3. Number of LED light sources tested

50 units tested per stress condition / data reported for 20 units per test condition.

4. Description of LED light sources tested

LUXEON 3030 2D: L130-2780003000W21 (nominal CCT 2700K)

5. Dates Tests Started

All DATA SETs: 03-23-2014.

6. Date Report First Issued

All DATA SETs: first reported on 01-20-2015.

7. Package Pictures

Figure 1. Picture of LUXEON 3030 2D.

8. Mechanical Drawing

For detailed mechanical drawings, please see individual product data sheets.

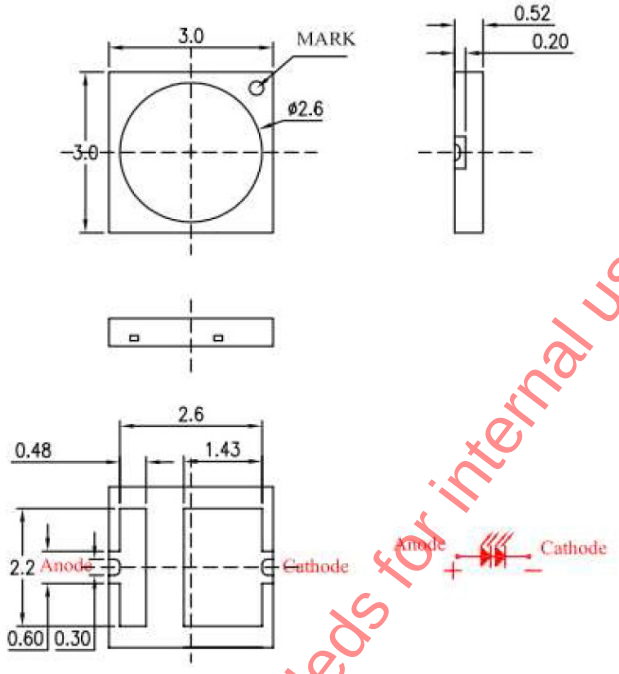

Figure 2: Mechanical Drawing for LUXEON 3030 2D. All dimensions are in millimeters.

9. T_s Measurement Point

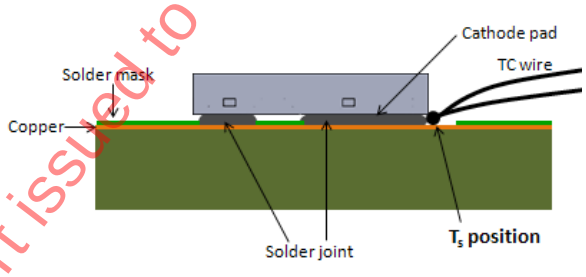

Figure 3: Preferred T_s measurement point for LUXEON 3030 2D.

For further information on measuring the in-situ T_s, please see Lumileds Application Brief AB207, which is available online at www.lumileds.com.

10. Description of auxiliary equipment

LUXEON LED devices are soldered to reliability stress boards that can accommodate up to 25 devices and are driven by a constant current source.

Reliability stress boards are mounted in a chamber with minimal ambient airflow. The chamber temperature is controlled based on the temperature of a control Ts point, which is located on the stress board.

The reliability stress board is periodically removed from the thermal chamber, allowed to cool to room temperature, and then tested. After testing, the reliability stress board is returned to the thermal chamber for additional operation.

11. Operating Cycle

LUXEON LEDs are driven with a constant direct current (DC).

12. Ambient conditions including airflow, temperature, and relative humidity

The typical relative humidity within the chamber is < 65%. The temperature uniformity of the board (center to edge) was experimentally determined to be less than 2°C.

The photometry measurement temperature is set and monitored to be within 25°C ± 2°C with no forced airflow and RH < 65%.

13. T_s and ambient temperatures (ambient temperature measured 5mm above reliability stress board)

In all cases, both T_s and T_{air} meet or exceed the IESNA LM-80-08 limits.

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

See tables.

15. Initial luminous flux and forward voltage at photometric measurement current

See tables.

16. Lumen maintenance for data for each individual light source along with median value, standard deviation, minimum and maximum lumen maintenance value for all of the light sources

See tables.

17. Observation of LED light source failures including the failure conditions and time of failure

No failures observed in devices reported.

18. LED light source monitoring interval

Units were tested at 0 hour and at subsequent 1,000 hours intervals.

19. Photometric measurement uncertainty

Long-term measurement uncertainty is based on reproducibility tests done over a period of one year, calculated to k = 2 coverage (i.e. 95% coverage).

Luminous Flux (Φ_v) ± 1.59%

Correlated Color Temperature (CCT) ± 21K

20. Chromaticity shift reported over the measurement time

See tables.

21. Sampling Method/Sample size

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days. These manufacturing lots are picked to represent a wide parametric distribution.

22. ISO 17025-2005 Accreditation

International Accreditation Service

CERTIFICATE OF ACCREDITATION

This is to signify that

BAY AREA COMPLIANCE LABORATORIES CORP (DONGGUAN)
PULONG CUN 69, PUXINHU INDUSTRIAL AREA
TANGXIA TOWN, GUANG DONG 523719
PEOPLE'S REPUBLIC OF CHINA

Testing Laboratory TL-460
(Revised June 25, 2014)

has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005, *General requirements for the competence of testing and calibration laboratories*, and has been accredited, commencing April 14, 2014, for the test methods listed in the approved scope of accreditation.

Patrick V. McCullen
Vice President, Chief Technical Officer

C. P. Ramani, P.E.
President

ACCREDITED

(see attached scope of accreditation for fields of calibration and accredited calibration methods)

Print Date: 06/26/2014

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See the IAS Accreditation Listings on the web at www.iasonline.org for current accreditation information, or contact IAS directly at (562) 364-8201.

11-04577

International Accreditation Service

SCOPE OF ACCREDITATION

Bay Area Compliance Laboratories Corp (Dongguan) TL-460
(Revised June 25, 2014)

Bay Area Compliance Laboratories Corp (Dongguan)
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FIELDS OF TESTING	ACCREDITED TEST METHODS	
ENERGY STAR Program Requirements for Lighting (except Electromagnetic and Radio Frequency Interference, Air Tight for Restricted Air Flow, and Mercury Content)	ANSI C62.41.2-2002:	IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits
	ANSI C78.5-2003:	Specifications for Performance of Self-Ballasted Compact
	ANSI C78.375-1997:	American National Standard for Fluorescent Lamps—Guide for Electrical Measurements
	ANSI C78.376-2001:	Specification for the Chromaticity of Fluorescent Lamps
	ANSI C78.377-2008:	Chromaticity of Solid State Lighting Products
	ANSI C78.377-2011:	Specifications for the Chromaticity of Solid State Lighting Products
	ANSI C78.379:2006:	Electric Lamps – Classification of the Beam Patterns of Reflector Lamps
	ANSI C78.387-1987:	Metal-Halide Lamps - Method of Measuring Characteristics
	ANSI C78.387: 2007:	Metal-Halide Lamps - Method of Measuring Characteristics
	ANSI C78.389-2004:	American National Standard for Electric Lamps – High-Intensity Discharge (HID) – Methods of Measuring Characteristics
	ANSI C82.2-2002:	Fluorescent Lamp Ballasts--Methods of Measurement
	ANSI C82.6-2005:	Ballast For High Intensity Discharge Lamps - Methods of Measurement
	ANSI C82.11-2002:	High-Frequency Fluorescent Lamp Ballasts
	ANSI C82.77-2002:	Harmonic Emission Limits – Related Power Quality Requirements for Lighting
	ANSI/IEEE C62.41 – 1991 (01-May-1991):	Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits, Category A, 7 Strikes
	ANSI/UL 153-2005:	Portable Electric Luminaires
	CIE Pub 13.2-1974:	Method of measuring and Specifying Color Rendering of Light Sources
	CIE 13.3-1995:	Method of Measuring and Specifying Color Rendering of Light Sources
	CIE 15-2004:	Colorimetry Standard
	CIE 84-1989:	The Measurement of Luminous Flux
	CIE 121-1996:	The Photometry and Goniophotometry of Luminaires
	CIE 127-1997:	Measurement of LEDs
	CSA-22.2 No.37-M1989 (R2004):	Christmas Tree and Other Decorative Lighting Outfits
	EPA DLS:	Appendix A
	ENERGY STAR Online	CBCP: Tool for Calculating Minimum Center Beam Intensity
	IEC/TR 61341:	Method of measurement of centre beam intensity and beam angle(s) of reflector lamps
	IES LM-9-99:	Approved Method for the Electrical and Photometric Measurements of Fluorescent Lamps
	IES LM-9-09:	Approved Method for the Electrical and Photometric Measurements of Fluorescent Lamps
	IES LM-10-13:	Photometric Testing of Outdoor Fluorescent Luminaires
	IES TM-16-05:	Technical Memorandum on Light Emitting Diode (LED) Sources and Systems

April 14, 2014
Commencement Date

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C. P. Ramani, P.E.
President

Print Date: 06/26/2014

International Accreditation Service

SCOPE OF ACCREDITATION

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(Revised June 25, 2014)

FIELDS OF TESTING	ACCREDITED TEST METHODS	
ENERGY STAR Program Requirements for Lighting (except Electromagnetic and Radio Frequency Interference, Air Tight for Restricted Air Flow, and Mercury Content) (continued)	IES LM-16-93:	Practical Guide to Colorimetry of Light Sources
	IES LM-20-13:	Photometric Testing of Reflector-Type Lamps
	IES LM-31-95:	Photometric Testing of Roadway Luminaires Using Incandescent Filament and HID Lamps
	IES LM-35-02:	Photometric Testing of Floodlights Using High Intensity Discharge or Incandescent Filament Lamps
	IES LM-4010:	Approved Method for Life Performance Testing of Fluorescent Lamps
	IES LM- 41-98:	Approved Method for Photometric Testing of Indoor Fluorescent Luminaries
	IES LM-45-02:	Approved Method for Electrical and Photometric Measurements of General Service Incandescent Filament Lamps
	IES LM-45-09:	Approved Method for Electrical and Photometric Measurements of General Service Incandescent Filament Lamps
	IES LM-46-04:	Photometric Testing of Indoor Luminaires Using High Intensity Discharge or Incandescent Filament Lamps
	IES LM-47-12:	Life Testing of High Intensity Discharge (HID) Lamps
	IES LM-49-12:	Life Testing of General Lighting Incandescent Filament Lamps
	IES LM-51-13:	Electrical and Photometric Measurements of HID Lamps Fluorescent Lamps
	IES LM-54-12:	IESNA Guide to Lamp Seasoning
	IES LM-58-13:	Guide to Spectroradiometric Measurements
	IES LM-65-10:	Approved Method for Life Testing of Single-Ended Compact Fluorescent Lamps
	IES LM-66-00:	Electrical and Photometric Measurements of Single-Ended Compact Fluorescent Lamps
	IES LM-66-11:	Electrical and Photometric Measurements of Single-Ended Compact Fluorescent Lamps
	ASTM G 154 – 05:	Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
	IES LM-79-08:	Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products, Sections 9, 10 and 12
	IES LM 82-12:	Characterization of LED Light Engines and LED Lamps for Electrical and Photometric Properties as a Function of Temperature
	IES LM-80-08:	Approved Method for Measuring Lumen Maintenance of LED Light Sources (LED Packages/Modules/Arrays)
	US EPA DLS:	ENERGY STAR Program Requirements for decorative light strings Appendix A
	UL 588-2004:	Standard for Seasonal and Holiday Decorative Products
	UL1993 – 2009:	Self-Ballasted Lamps and Lamp Adapters

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ENERGY STAR Program Requirements for Lighting (except Electromagnetic and Radio Frequency Interference, Air Tight for Restricted Air Flow, and Mercury Content) (continued)	US EPA Lamps v1 ENERGY STAR Program Requirements for Lamps (Light Bulbs), (except Sections 12,4 and 13) Elevated Temperature Life Test - ENERGY STAR Program Requirements Product Specification for Lamps Version 1.0: Elevated Temperature Life Testing Elevated Temperature Light Output Ratio- ENERGY STAR Program Requirements Product Specification for Lamps Version 1.0: Elevated Temperature Light Output Ratio Ambient Temperature Life Test Start Time Test- ENERGY STAR Program Requirements Product Specification for Lamps Version 1.0: Start Time Run Up Time Test- ENERGY STAR Program Requirements Product Specification for Lamps Version 1.0: Run-up Time 10 CFR 430 Subpart B Appendix W Uniform Test Method for Measuring the Energy Consumption of Medium Base Compact Fluorescent Lamps
ENERGY STAR Program Requirements for Electronics	**Computers** ENERGY STAR Program Requirements Product Specification for Computers, Version 6.0 ENERGY STAR Test Method for Computer, Rev. Oct 2013 EPRI Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies. Version 6.6 (for products that have internal, multi-output, or single output with integral cooling power supplies; available at: www.efficientpowersupplies.org) IEC 62301:2011 Household Electrical Appliances - Measurement of Standby Power **Computer (Enterprise) Servers** ENERGY STAR Test Method for Computer Servers Version 2.0, ENERGY STAR Test Procedure for Determining the Power Use of Computer Servers at Idle and Full Load (Appendix A of specification) EPRI Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies. Version 6.6 Available at www.efficientpowersupplies.org IEC 62301:2011 Household Electrical Appliances - Measurement of Standby Power **Small Network Equipment** ENERGY STAR Program Requirements for Small Network Equipment ENERGY STAR Test Procedure for Small Network Equipment **Imaging Equipment** ENERGY STAR Imaging Equipment Test Method Version 2.0, ENERGY STAR Program Requirements ENERGY STAR Test Method for Computer, Rev. Oct 2013 IEC 62301 Ed 1.0: Household Electrical Appliances – Measurement of Standby Power IEC 62301 Ed 2.0: Household Electrical Appliances – Measurement of Standby Power EPRI Generalized Test Protocol for Calculating the Energy Efficiency of Internal Ac-Dc and Dc-Dc Power Supplies Version 6.6. Available at www.efficientpowersupplies.org ENGRGY STAR Program Requirements Produtct Specification for Imaging Equipment, Version 2.0 EPRI Test Method for Calculating the Energy Efficiency of Single Voltage External AC-DC and AC-AC Power Supplies, Rev. August 11, 2004, Available at www.efficientpowersupplies.org

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FIELDS OF TESTING	ACCREDITED TEST METHODS
ENERGY STAR Program Requirements for Electronics (continued)	**Battery Charging Systems** ENERGY STAR Test Method, ENERGY STAR Program Requirements for Battery Charging Systems Version 1.1, ENERGY STAR Test Method for Battery Charging Systems, Rev. Aug 2012 IEC Standard 61951-1: Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – Part 1: Nickel-cadmium. Ed. 2.1. January 2006 IEC Standard 61951-2: Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – Part 2: Nickel-metal hydride. Ed. 2.0. April 2003 IEC Standard 61951-2: Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – Part 2: Nickel-metal hydride. Ed. 3.0. May 2011 IEC Standard 61960: Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for portable applications. Ed. 1.0. December 2003 IEC Standard 61960: Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for portable applications. Ed. 2.0. June 2011 **Telephony** ENERGY STAR Test Method for Telephony, ENERGY STAR Program Requirements for Telephony Version 3.0, (except VoIP) ENERGY STAR Test Method for Telephony, Rev. Nov. 2013 **Set Top Boxes** ENERGY STAR Test Method for Set-top Boxes Version 3.0 (Testing Products for ENERGY STAR) ENERGY STAR Program Requirements for Set-top Boxes Version 3.0 **Televisions** ENERGY STAR Program Requirements Product Specification for Televisions Eligibility Criteria Version 6.1 10 CFR 430 Subpart B Appendix H Uniform Test Method for Measuring the Power Consumption of Television Sets 10 CFR 429.25 Subpart B Television Sets 77FR 2864 NOPR Test Procedure for Television sets ENERGY STAR Test Method for Televisions, Rev. Aug 2010 **Displays** ENERGY STAR® Program Requirements Product Specification for Displays Eligibility Criteria Version 6.0 ENERGY STAR Test Method for Determining Displays Energy use Version 6.0, Rev. Jan. 2013 **Audio/Video** ENERGY STAR Program Requirements for Audio/Video ENERGY STAR Test Procedure for Audio/Video product
ENERGY STAR Program Requirements for Appliances	**Water Coolers** ENERGY STAR Program Requirements Product Specification for Water Coolers Version 2.0, ENERGY STAR Test Method for Water Coolers, Rev. May 2013
Safety Testing for UV Exposure	IEC 62471:2006/EN 62471:2008: Photobiological Safety of Lamps and Lamp Systems

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FIELDS OF TESTING	ACCREDITED TEST METHODS
Safety Testing	IEC 62031 Edition 2.0: LED Modules for General Lighting – Safety Specifications ANSI/UL 1598: 2008: Luminaires ANSI/UL 1574:2004: Standard for Track Lighting Systems ASTM G154:2006: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials UL153-2005: Portable Luminaires
Energy Efficiency	IEC 62623:2012-10 Edition 1.0: Desktop and Notebook Computers – Measurement of Energy Consumption IEC 62612:2013: Self-ballasted LED lamps for general lighting services with supply voltage >50v – Performance requirements IEC 62087 Ed. 3.0 -2011-04: Methods of measurement for the power consumption of audio, video and related equipment EN/IEC 60969 Ed. 1.2:2001: Self-Ballasted Lamps for General Lighting Services - Performance Requirements

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13-08892

Notes

Data is for reference only and is not an endorsement to exceed the Data Sheet operating conditions.

The TM-21 extrapolations are based on IES TM-21-11 "Projecting Long Term Lumen Maintenance of LED Light Sources. The TM-21 lumen maintenance model is based on the flux data normalized to 1 at 0 hours and the use of a exponential model for flux(time):

Flux(time) = B exp[-alpha*time], where normally B ≅ 1, and alpha > 0.

An L70 extrapolation less than 0 means that the model predicts an increasing flux output with time, i.e. alpha < 0 (see graphs). Generally, this means that additional test time is needed to determine the long-term lumen maintenance behavior.

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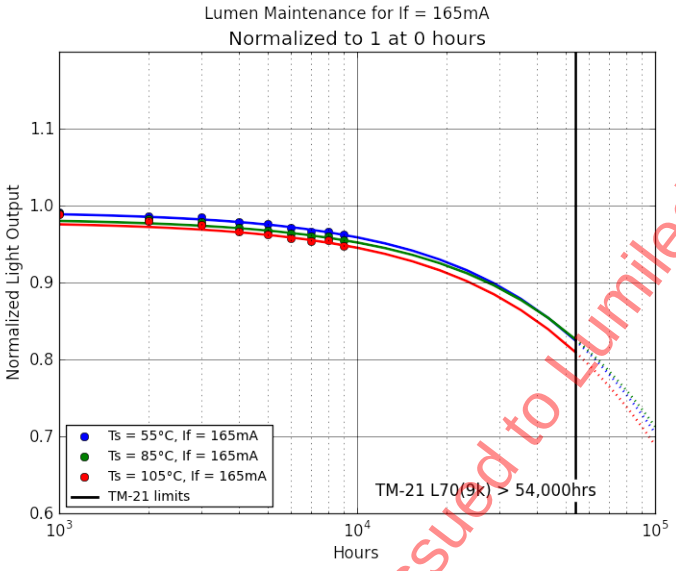
Normalized Flux Statistics for I_f = 165mA

		0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	alpha	B	L70
	median =	1.0000	0.9879	0.9786	0.9732	0.9653	0.9626	0.9578	0.9534	0.9547	0.9476			
Ts=Tair=105°C	average =	1.0000	0.9884	0.9800	0.9750	0.9662	0.9624	0.9570	0.9533	0.9545	0.9481	3.5207e-06	0.9790	95,290
	st dev =	0.0000	0.0048	0.0052	0.0047	0.0049	0.0047	0.0053	0.0053	0.0057	0.0057	TM-21 L70(9k) > 54,000hrs		
	min =	1.0000	0.9807	0.9734	0.9699	0.9590	0.9560	0.9491	0.9446	0.9464	0.9402			
	max =	1.0000	0.9954	0.9891	0.9845	0.9776	0.9733	0.9701	0.9664	0.9673	0.9596			
	median =	1.0000	0.9914	0.9810	0.9782	0.9708	0.9668	0.9632	0.9587	0.9596	0.9554			
Ts=Tair=85°C	average =	1.0000	0.9898	0.9821	0.9784	0.9715	0.9676	0.9636	0.9594	0.9599	0.9553	3.2178e-06	0.9832	105,585
	st dev =	0.0000	0.0050	0.0051	0.0043	0.0044	0.0047	0.0053	0.0056	0.0057	0.0048	TM-21 L70(9k) > 54,000hrs		
	min =	1.0000	0.9801	0.9749	0.9714	0.9653	0.9610	0.9549	0.9497	0.9515	0.9487			
	max =	1.0000	0.9962	0.9916	0.9880	0.9819	0.9768	0.9750	0.9707	0.9742	0.9682			
	median =	1.0000	0.9915	0.9873	0.9847	0.9786	0.9753	0.9710	0.9668	0.9663	0.9638			
Ts=Tair=55°C	average =	1.0000	0.9918	0.9866	0.9849	0.9791	0.9758	0.9718	0.9666	0.9656	0.9630	3.4233e-06	0.9921	101,884
	st dev =	0.0000	0.0031	0.0037	0.0038	0.0043	0.0044	0.0041	0.0036	0.0039	0.0041	TM-21 L70(9k) > 54,000hrs		
	min =	1.0000	0.9846	0.9801	0.9783	0.9719	0.9683	0.9652	0.9584	0.9584	0.9553			
	max =	1.0000	0.9973	0.9923	0.9911	0.9867	0.9831	0.9796	0.9733	0.9724	0.9706			



Delta u'v' for I_f = 165mA

		0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
	median =	0.0000	0.0016	0.0020	0.0022	0.0024	0.0029	0.0035	0.0041	0.0043	0.0047
Ts=Tair=105°C	average =	0.0000	0.0015	0.0019	0.0023	0.0025	0.0029	0.0035	0.0040	0.0043	0.0048
	st dev =	0.0000	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	min =	0.0000	0.0010	0.0013	0.0017	0.0021	0.0023	0.0029	0.0035	0.0036	0.0042
	max =	0.0000	0.0020	0.0025	0.0029	0.0032	0.0035	0.0044	0.0048	0.0050	0.0057
	median =	0.0000	0.0013	0.0017	0.0019	0.0022	0.0025	0.0030	0.0033	0.0039	0.0045
Ts=Tair=85°C	average =	0.0000	0.0013	0.0017	0.0020	0.0023	0.0025	0.0031	0.0035	0.0040	0.0046
	st dev =	0.0000	0.0003	0.0004	0.0004	0.0004	0.0004	0.0006	0.0006	0.0006	0.0007
	min =	0.0000	0.0009	0.0013	0.0015	0.0017	0.0020	0.0023	0.0028	0.0033	0.0038
	max =	0.0000	0.0023	0.0028	0.0028	0.0031	0.0034	0.0049	0.0052	0.0056	0.0065
	median =	0.0000	0.0012	0.0015	0.0018	0.0020	0.0023	0.0027	0.0031	0.0037	0.0038
Ts=Tair=55°C	average =	0.0000	0.0012	0.0016	0.0018	0.0021	0.0024	0.0028	0.0032	0.0036	0.0039
	st dev =	0.0000	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0005
	min =	0.0000	0.0008	0.0010	0.0013	0.0016	0.0019	0.0023	0.0027	0.0030	0.0033
	max =	0.0000	0.0018	0.0025	0.0026	0.0028	0.0031	0.0036	0.0043	0.0046	0.0049

Luminous Flux [lm] data for tested units

$T_s = T_{air}$ = 55°C, I_f = 165mA; $T_s \geq$ 53°C and $T_{air} \geq$ 50°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2851K	111.900	111.300	110.500	110.400	109.700	109.200	108.800	108.400	107.400	106.900
2	2852K	116.100	115.200	114.600	114.400	113.600	113.000	112.400	112.000	112.200	111.900
3	2859K	114.900	113.800	113.000	112.700	112.000	111.400	110.900	110.500	110.200	110.000
4	2808K	116.200	115.800	115.300	114.900	114.300	113.900	113.200	112.700	112.500	112.100
5	2821K	113.500	113.100	112.100	111.600	110.800	110.400	110.100	109.500	109.500	108.900
6	2774K	111.900	110.400	109.800	109.600	109.000	108.900	108.500	108.100	107.800	107.400
7	2764K	113.000	111.900	111.300	111.200	110.600	110.100	109.800	109.400	109.300	108.900
8	2775K	109.200	108.200	107.900	107.700	107.000	106.700	106.000	105.600	105.500	105.100
9	2778K	112.200	111.900	111.300	111.200	110.700	110.300	109.700	109.200	109.100	108.900
10	2768K	110.400	108.700	108.200	108.000	107.300	106.900	106.600	106.200	106.200	106.100
11	2711K	110.700	109.700	109.000	108.800	108.000	107.900	107.400	107.000	106.700	106.500
12	2758K	109.600	108.400	107.800	107.700	107.200	107.000	106.600	105.700	105.700	105.900
13	2772K	112.000	111.000	110.100	110.000	109.400	109.100	108.700	108.300	107.800	107.400
14	2738K	108.300	107.300	106.300	106.100	105.400	105.000	104.700	103.800	103.800	103.600
15	2769K	110.000	109.300	108.700	108.500	107.700	107.200	106.700	106.300	106.500	106.400
16	2780K	108.000	107.000	106.400	106.200	105.600	105.400	104.900	104.500	104.700	104.400
17	2848K	97.700	96.930	96.850	96.800	96.130	95.910	95.620	94.870	94.720	94.490
18	2743K	109.200	108.400	108.000	107.900	107.300	106.900	106.300	105.400	105.800	105.400
19	2793K	107.800	107.000	106.800	106.600	106.000	105.700	105.300	104.300	104.500	104.100
20	2790K	112.600	111.700	111.500	111.400	111.100	110.700	110.300	109.500	109.100	108.700

Normalized Luminous Flux data for tested units

$T_s = T_{air}$ = 55°C, I_f = 165mA; $T_s \geq$ 53°C and $T_{air} \geq$ 50°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2851K	1.0000	0.9946	0.9875	0.9866	0.9803	0.9759	0.9723	0.9687	0.9598	0.9553
2	2852K	1.0000	0.9922	0.9871	0.9854	0.9785	0.9733	0.9681	0.9647	0.9664	0.9638
3	2859K	1.0000	0.9904	0.9835	0.9809	0.9748	0.9695	0.9652	0.9617	0.9591	0.9574
4	2808K	1.0000	0.9966	0.9923	0.9888	0.9836	0.9802	0.9742	0.9699	0.9682	0.9647
5	2821K	1.0000	0.9965	0.9877	0.9833	0.9762	0.9727	0.9700	0.9648	0.9648	0.9595
6	2774K	1.0000	0.9866	0.9812	0.9794	0.9741	0.9732	0.9696	0.9660	0.9634	0.9598
7	2764K	1.0000	0.9903	0.9850	0.9841	0.9788	0.9743	0.9717	0.9681	0.9673	0.9637
8	2775K	1.0000	0.9908	0.9881	0.9863	0.9799	0.9771	0.9707	0.9670	0.9661	0.9625
9	2778K	1.0000	0.9973	0.9920	0.9911	0.9866	0.9831	0.9777	0.9733	0.9724	0.9706
10	2768K	1.0000	0.9846	0.9801	0.9783	0.9719	0.9683	0.9656	0.9620	0.9620	0.9611
11	2711K	1.0000	0.9910	0.9846	0.9828	0.9756	0.9747	0.9702	0.9666	0.9639	0.9621
12	2758K	1.0000	0.9891	0.9836	0.9827	0.9781	0.9763	0.9726	0.9644	0.9644	0.9662
13	2772K	1.0000	0.9911	0.9830	0.9821	0.9768	0.9741	0.9705	0.9670	0.9625	0.9589
14	2738K	1.0000	0.9908	0.9815	0.9797	0.9732	0.9695	0.9668	0.9584	0.9584	0.9566
15	2769K	1.0000	0.9936	0.9882	0.9864	0.9791	0.9745	0.9700	0.9664	0.9682	0.9673
16	2780K	1.0000	0.9907	0.9852	0.9833	0.9778	0.9759	0.9713	0.9676	0.9694	0.9667
17	2848K	1.0000	0.9921	0.9913	0.9908	0.9839	0.9817	0.9787	0.9710	0.9695	0.9671
18	2743K	1.0000	0.9927	0.9890	0.9881	0.9826	0.9789	0.9734	0.9652	0.9689	0.9652
19	2793K	1.0000	0.9926	0.9907	0.9889	0.9833	0.9805	0.9768	0.9675	0.9694	0.9657
20	2790K	1.0000	0.9920	0.9902	0.9893	0.9867	0.9831	0.9796	0.9725	0.9689	0.9654

TM-21 Extrapolation of Luminous Flux data for tested units
$T_s = T_{air} = 55°C$, $I_f = 165mA$; $T_s \geq 53°C$ and $T_{air} \geq 50°C$ in compliance with LM-80-08

	CCT (t=0)	alpha	B	L70
1	2851K	5.2235e-06	1.0021	68,691
2	2852K	2.8648e-06	0.9873	120,053
3	2859K	3.6056e-06	0.9875	95,422
4	2808K	3.9630e-06	0.9988	89,709
5	2821K	3.3287e-06	0.9891	103,872
6	2774K	3.0883e-06	0.9873	111,351
7	2764K	2.9422e-06	0.9894	117,597
8	2775K	3.6370e-06	0.9937	96,343
9	2778K	3.4101e-06	0.9992	104,346
10	2768K	2.2772e-06	0.9795	147,538
11	2711K	3.0632e-06	0.9883	112,596
12	2758K	3.0330e-06	0.9897	114,167
13	2772K	3.7686e-06	0.9923	92,591
14	2738K	3.6927e-06	0.9872	93,109
15	2769K	2.4037e-06	0.9862	142,599
16	2780K	2.3130e-06	0.9862	148,179
17	2848K	3.7533e-06	0.9994	94,868
18	2743K	3.6818e-06	0.9959	95,760
19	2793K	3.8352e-06	0.9984	92,591
20	2790K	4.5757e-06	1.0055	79,138
ave	2787K	3.4233e-06	0.9921	101,884

CIE 1976 u' data for tested units
$T_s = T_{air} = 55°C$, $I_f = 165mA$; $T_s \geq 53°C$ and $T_{air} \geq 50°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2851K	0.2544	0.2527	0.2525	0.2529	0.2529	0.2527	0.2522	0.2518	0.2516	0.2516
2	2852K	0.2552	0.2543	0.2538	0.2537	0.2533	0.2531	0.2529	0.2525	0.2519	0.2515
3	2859K	0.2546	0.2537	0.2532	0.2532	0.2530	0.2528	0.2523	0.2522	0.2521	0.2519
4	2808K	0.2562	0.2551	0.2545	0.2545	0.2544	0.2542	0.2537	0.2535	0.2536	0.2536
5	2821K	0.2557	0.2545	0.2542	0.2541	0.2540	0.2538	0.2534	0.2531	0.2529	0.2528
6	2774K	0.2588	0.2579	0.2573	0.2578	0.2576	0.2574	0.2567	0.2563	0.2555	0.2554
7	2764K	0.2590	0.2583	0.2577	0.2578	0.2577	0.2576	0.2572	0.2568	0.2564	0.2562
8	2775K	0.2586	0.2578	0.2571	0.2571	0.2570	0.2569	0.2569	0.2557	0.2558	0.2556
9	2778K	0.2584	0.2575	0.2570	0.2571	0.2569	0.2568	0.2566	0.2564	0.2562	0.2558
10	2768K	0.2590	0.2583	0.2577	0.2577	0.2575	0.2573	0.2569	0.2566	0.2564	0.2563
11	2711K	0.2608	0.2600	0.2598	0.2597	0.2596	0.2593	0.2590	0.2585	0.2584	0.2582
12	2758K	0.2590	0.2578	0.2576	0.2576	0.2574	0.2572	0.2568	0.2565	0.2563	0.2561
13	2772K	0.2589	0.2573	0.2571	0.2571	0.2570	0.2567	0.2563	0.2558	0.2557	0.2556
14	2738K	0.2604	0.2590	0.2588	0.2588	0.2587	0.2584	0.2582	0.2577	0.2576	0.2575
15	2769K	0.2587	0.2575	0.2573	0.2570	0.2568	0.2566	0.2563	0.2560	0.2558	0.2555
16	2780K	0.2581	0.2572	0.2569	0.2569	0.2567	0.2565	0.2563	0.2559	0.2558	0.2556
17	2848K	0.2563	0.2553	0.2551	0.2552	0.2551	0.2547	0.2544	0.2540	0.2535	0.2536
18	2743K	0.2600	0.2586	0.2583	0.2582	0.2581	0.2580	0.2574	0.2570	0.2567	0.2566
19	2793K	0.2582	0.2571	0.2562	0.2563	0.2560	0.2557	0.2557	0.2555	0.2553	0.2551
20	2790K	0.2579	0.2564	0.2555	0.2556	0.2555	0.2553	0.2548	0.2543	0.2542	0.2540

CIE 1976 v' data for tested units

$T_s = T_{air}$ = 55°C, I_f = 165mA; $T_s \geq$ 53°C and $T_{air} \geq$ 50°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2851K	0.5322	0.5317	0.5319	0.5310	0.5308	0.5306	0.5306	0.5302	0.5298	0.5297
2	2852K	0.5285	0.5281	0.5282	0.5277	0.5276	0.5274	0.5271	0.5267	0.5262	0.5254
3	2859K	0.5296	0.5294	0.5293	0.5289	0.5286	0.5284	0.5282	0.5278	0.5275	0.5275
4	2808K	0.5332	0.5330	0.5331	0.5326	0.5323	0.5321	0.5319	0.5316	0.5314	0.5312
5	2821K	0.5324	0.5322	0.5322	0.5318	0.5316	0.5312	0.5312	0.5307	0.5304	0.5301
6	2774K	0.5282	0.5275	0.5276	0.5267	0.5265	0.5263	0.5265	0.5264	0.5258	0.5253
7	2764K	0.5297	0.5292	0.5293	0.5289	0.5286	0.5284	0.5283	0.5280	0.5277	0.5271
8	2775K	0.5290	0.5284	0.5285	0.5279	0.5277	0.5274	0.5272	0.5269	0.5266	0.5264
9	2778K	0.5293	0.5287	0.5289	0.5284	0.5281	0.5279	0.5278	0.5275	0.5272	0.5270
10	2768K	0.5289	0.5283	0.5284	0.5278	0.5276	0.5273	0.5272	0.5269	0.5265	0.5264
11	2711K	0.5335	0.5333	0.5332	0.5328	0.5324	0.5322	0.5321	0.5317	0.5315	0.5312
12	2758K	0.5312	0.5307	0.5308	0.5302	0.5300	0.5297	0.5296	0.5293	0.5289	0.5287
13	2772K	0.5283	0.5276	0.5277	0.5272	0.5270	0.5267	0.5265	0.5262	0.5258	0.5256
14	2738K	0.5287	0.5281	0.5282	0.5277	0.5274	0.5271	0.5270	0.5267	0.5263	0.5260
15	2769K	0.5300	0.5294	0.5296	0.5290	0.5287	0.5285	0.5283	0.5280	0.5276	0.5273
16	2780K	0.5302	0.5295	0.5298	0.5293	0.5291	0.5288	0.5288	0.5284	0.5281	0.5278
17	2848K	0.5242	0.5236	0.5238	0.5234	0.5231	0.5228	0.5226	0.5222	0.5217	0.5215
18	2743K	0.5294	0.5286	0.5288	0.5283	0.5280	0.5278	0.5277	0.5273	0.5268	0.5266
19	2793K	0.5269	0.5259	0.5263	0.5258	0.5255	0.5252	0.5252	0.5249	0.5245	0.5241
20	2790K	0.5292	0.5282	0.5285	0.5280	0.5278	0.5275	0.5273	0.5269	0.5265	0.5263

Delta u'v' data for tested units

$T_s = T_{air}$ = 55°C, I_f = 165mA; $T_s \geq$ 53°C and $T_{air} \geq$ 50°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2851K	0.0000	0.0018	0.0019	0.0019	0.0021	0.0023	0.0027	0.0033	0.0037	0.0038
2	2852K	0.0000	0.0010	0.0014	0.0017	0.0021	0.0024	0.0027	0.0032	0.0040	0.0048
3	2859K	0.0000	0.0009	0.0014	0.0016	0.0019	0.0022	0.0027	0.0030	0.0033	0.0034
4	2808K	0.0000	0.0011	0.0017	0.0018	0.0020	0.0023	0.0028	0.0031	0.0032	0.0033
5	2821K	0.0000	0.0012	0.0015	0.0017	0.0019	0.0022	0.0026	0.0031	0.0034	0.0037
6	2774K	0.0000	0.0011	0.0016	0.0018	0.0021	0.0024	0.0027	0.0031	0.0041	0.0045
7	2764K	0.0000	0.0009	0.0014	0.0014	0.0017	0.0019	0.0023	0.0028	0.0033	0.0038
8	2775K	0.0000	0.0010	0.0016	0.0019	0.0021	0.0023	0.0032	0.0036	0.0037	0.0040
9	2778K	0.0000	0.0011	0.0015	0.0016	0.0019	0.0021	0.0023	0.0027	0.0030	0.0035
10	2768K	0.0000	0.0009	0.0014	0.0017	0.0020	0.0023	0.0027	0.0031	0.0035	0.0037
11	2711K	0.0000	0.0008	0.0010	0.0013	0.0016	0.0020	0.0023	0.0029	0.0031	0.0035
12	2758K	0.0000	0.0013	0.0015	0.0017	0.0020	0.0023	0.0027	0.0031	0.0035	0.0038
13	2772K	0.0000	0.0017	0.0019	0.0021	0.0023	0.0027	0.0032	0.0037	0.0041	0.0043
14	2738K	0.0000	0.0015	0.0017	0.0019	0.0021	0.0026	0.0028	0.0034	0.0037	0.0040
15	2769K	0.0000	0.0013	0.0015	0.0020	0.0023	0.0026	0.0029	0.0034	0.0038	0.0042
16	2780K	0.0000	0.0011	0.0013	0.0015	0.0018	0.0021	0.0023	0.0028	0.0031	0.0035
17	2848K	0.0000	0.0012	0.0013	0.0014	0.0016	0.0021	0.0025	0.0030	0.0038	0.0038
18	2743K	0.0000	0.0016	0.0018	0.0021	0.0024	0.0026	0.0031	0.0037	0.0042	0.0044
19	2793K	0.0000	0.0015	0.0021	0.0022	0.0026	0.0030	0.0030	0.0034	0.0038	0.0042
20	2790K	0.0000	0.0018	0.0025	0.0026	0.0028	0.0031	0.0036	0.0043	0.0046	0.0049

Forward Voltage [V] data for tested units

$T_s = T_{air} = 55°C$, $I_f = 165mA$; $T_s \geq 53°C$ and $T_{air} \geq 50°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2851K	6.267	6.229	6.229	6.224	6.221	6.228	6.226	6.237	6.231	6.298
2	2852K	6.170	6.139	6.143	6.137	6.136	6.144	6.141	6.148	6.146	6.144
3	2859K	6.254	6.227	6.225	6.227	6.231	6.230	6.229	6.242	6.237	6.229
4	2808K	6.323	6.280	6.285	6.286	6.283	6.290	6.288	6.302	6.288	6.289
5	2821K	6.236	6.199	6.204	6.202	6.201	6.204	6.211	6.213	6.206	6.272
6	2774K	6.311	6.268	6.267	6.267	6.262	6.268	6.274	6.285	6.273	6.268
7	2764K	6.397	6.372	6.374	6.385	6.383	6.383	6.389	6.396	6.392	6.386
8	2775K	6.282	6.231	6.238	6.230	6.234	6.238	6.242	6.254	6.245	6.238
9	2778K	6.352	6.299	6.306	6.307	6.304	6.307	6.308	6.317	6.310	6.319
10	2768K	6.409	6.379	6.384	6.388	6.388	6.392	6.390	6.397	6.388	6.393
11	2711K	6.239	6.210	6.211	6.217	6.212	6.215	6.216	6.221	6.215	6.212
12	2758K	6.431	6.405	6.408	6.425	6.423	6.428	6.428	6.433	6.430	6.420
13	2772K	6.403	6.355	6.357	6.369	6.364	6.368	6.370	6.378	6.368	6.375
14	2738K	6.255	6.205	6.212	6.215	6.210	6.212	6.214	6.225	6.217	6.210
15	2769K	6.348	6.312	6.312	6.312	6.310	6.315	6.315	6.321	6.316	6.310
16	2780K	6.409	6.361	6.367	6.357	6.355	6.369	6.360	6.369	6.362	6.392
17	2848K	6.522	6.480	6.482	6.478	6.477	6.483	6.480	6.488	6.480	6.519
18	2743K	6.217	6.191	6.190	6.197	6.196	6.202	6.197	6.204	6.199	6.224
19	2793K	6.459	6.420	6.420	6.428	6.424	6.431	6.428	6.435	6.427	6.610
20	2790K	6.552	6.512	6.516	6.532	6.532	6.538	6.535	6.544	6.532	6.577

Luminous Flux [lm] data for tested units

$T_s = T_{air} = 85°C$, $I_f = 165mA$; $T_s \geq 83°C$ and $T_{air} \geq 80°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2866K	112.800	112.200	111.600	110.800	109.800	109.400	108.900	108.400	108.300	107.800
2	2863K	116.200	115.600	115.200	114.800	114.100	113.500	113.300	112.800	113.200	112.500
3	2850K	116.200	115.100	114.200	114.100	113.300	112.500	111.800	111.400	111.700	111.100
4	2868K	115.400	113.100	112.500	112.100	111.400	110.900	110.200	109.600	110.000	109.600
5	2819K	110.800	108.600	108.100	107.900	107.200	106.500	106.200	105.800	106.000	105.400
6	2825K	112.000	110.100	109.300	108.900	108.300	107.800	107.200	106.600	106.900	106.400
7	2838K	110.100	108.800	107.600	107.300	106.600	106.000	105.700	105.500	105.600	105.200
8	2867K	116.200	114.400	114.000	113.500	112.800	112.400	112.000	111.400	111.100	111.000
9	2756K	112.700	111.700	111.200	110.600	109.800	109.300	108.900	108.500	108.300	107.800
10	2772K	107.300	106.800	106.400	105.200	104.400	104.100	103.900	103.400	103.400	102.700
11	2727K	108.600	107.700	106.300	106.100	105.100	104.700	104.500	104.100	104.400	104.000
12	2715K	107.300	105.600	105.000	104.500	103.700	103.300	102.900	102.400	102.100	101.800
13	2686K	109.900	109.200	108.200	107.600	106.700	106.200	105.800	105.400	105.300	104.800
14	2726K	106.400	105.600	105.000	104.800	104.100	103.900	103.500	103.100	102.900	102.300
15	2738K	111.900	111.200	109.700	109.400	108.500	108.100	107.900	107.200	107.200	106.600
16	2742K	113.100	111.900	111.000	110.700	109.900	109.700	109.100	108.800	108.600	107.900
17	2770K	107.900	107.000	105.700	105.400	104.600	104.200	103.600	103.100	103.100	102.600
18	2772K	106.600	106.200	105.100	104.700	104.200	103.800	103.600	103.200	103.500	102.700
19	2769K	107.200	106.300	104.900	104.600	103.800	103.500	102.800	102.200	102.400	102.000
20	2761K	110.200	109.000	108.100	108.000	107.400	107.000	106.200	105.800	105.800	105.400

Normalized Luminous Flux data for tested units

$T_s = T_{air} = 85°C$, $I_f = 165mA$; $T_s \geq 83°C$ and $T_{air} \geq 80°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2866K	1.0000	0.9947	0.9894	0.9823	0.9734	0.9699	0.9654	0.9610	0.9601	0.9557
2	2863K	1.0000	0.9948	0.9914	0.9880	0.9819	0.9768	0.9750	0.9707	0.9742	0.9682
3	2850K	1.0000	0.9905	0.9828	0.9819	0.9750	0.9682	0.9621	0.9587	0.9613	0.9561
4	2868K	1.0000	0.9801	0.9749	0.9714	0.9653	0.9610	0.9549	0.9497	0.9532	0.9497
5	2819K	1.0000	0.9801	0.9756	0.9738	0.9675	0.9612	0.9585	0.9549	0.9567	0.9513
6	2825K	1.0000	0.9830	0.9759	0.9723	0.9670	0.9625	0.9571	0.9518	0.9545	0.9500
7	2838K	1.0000	0.9882	0.9773	0.9746	0.9682	0.9628	0.9600	0.9582	0.9591	0.9555
8	2867K	1.0000	0.9845	0.9811	0.9768	0.9707	0.9673	0.9639	0.9587	0.9561	0.9552
9	2756K	1.0000	0.9911	0.9867	0.9814	0.9743	0.9698	0.9663	0.9627	0.9610	0.9565
10	2772K	1.0000	0.9953	0.9916	0.9804	0.9730	0.9702	0.9683	0.9637	0.9637	0.9571
11	2727K	1.0000	0.9917	0.9788	0.9770	0.9678	0.9641	0.9622	0.9586	0.9613	0.9576
12	2715K	1.0000	0.9842	0.9786	0.9739	0.9664	0.9627	0.9590	0.9543	0.9515	0.9487
13	2686K	1.0000	0.9936	0.9845	0.9791	0.9709	0.9663	0.9627	0.9591	0.9581	0.9536
14	2726K	1.0000	0.9925	0.9868	0.9850	0.9784	0.9765	0.9727	0.9690	0.9671	0.9615
15	2738K	1.0000	0.9937	0.9803	0.9777	0.9696	0.9660	0.9643	0.9580	0.9580	0.9526
16	2742K	1.0000	0.9894	0.9814	0.9788	0.9717	0.9699	0.9646	0.9620	0.9602	0.9540
17	2770K	1.0000	0.9917	0.9796	0.9768	0.9694	0.9657	0.9601	0.9555	0.9555	0.9509
18	2772K	1.0000	0.9962	0.9859	0.9822	0.9775	0.9737	0.9719	0.9681	0.9709	0.9634
19	2769K	1.0000	0.9916	0.9785	0.9757	0.9683	0.9655	0.9590	0.9534	0.9552	0.9515
20	2761K	1.0000	0.9891	0.9809	0.9800	0.9746	0.9710	0.9637	0.9601	0.9601	0.9564

TM-21 Extrapolation of Luminous Flux data for tested units
$T_s = T_{air} = 85°C$, $I_f = 165mA$; $T_s \geq 83°C$ and $T_{air} \geq 80°C$ in compliance with LM-80-08

	CCT (t=0)	alpha	B	L70
1	2866K	3.6238e-06	0.9872	94,872
2	2863K	2.3707e-06	0.9896	146,040
3	2850K	3.5153e-06	0.9858	97,400
4	2868K	3.1816e-06	0.9756	104,347
5	2819K	2.9303e-06	0.9767	113,692
6	2825K	3.4075e-06	0.9786	98,313
7	2838K	2.2668e-06	0.9749	146,131
8	2867K	3.4486e-06	0.9838	98,684
9	2756K	3.5191e-06	0.9874	97,754
10	2772K	3.0615e-06	0.9854	111,694
11	2727K	1.8586e-06	0.9736	177,526
12	2715K	3.7824e-06	0.9809	89,208
13	2686K	3.4045e-06	0.9833	99,816
14	2726K	3.4314e-06	0.9927	101,824
15	2738K	3.4264e-06	0.9831	99,110
16	2742K	3.5662e-06	0.9863	96,156
17	2770K	3.8058e-06	0.9835	89,357
18	2772K	2.4300e-06	0.9864	141,128
19	2769K	3.5821e-06	0.9814	94,320
20	2761K	3.7599e-06	0.9881	91,691
ave	2786K	3.2178e-06	0.9832	105,585

CIE 1976 u' data for tested units
$T_s = T_{air} = 85°C$, $I_f = 165mA$; $T_s \geq 83°C$ and $T_{air} \geq 80°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2866K	0.2540	0.2530	0.2526	0.2525	0.2524	0.2521	0.2517	0.2515	0.2512	0.2510
2	2863K	0.2548	0.2528	0.2526	0.2526	0.2525	0.2523	0.2522	0.2518	0.2506	0.2494
3	2850K	0.2549	0.2537	0.2526	0.2524	0.2523	0.2520	0.2519	0.2513	0.2510	0.2509
4	2868K	0.2545	0.2536	0.2530	0.2532	0.2532	0.2531	0.2525	0.2521	0.2512	0.2503
5	2819K	0.2561	0.2552	0.2547	0.2543	0.2541	0.2539	0.2534	0.2533	0.2534	0.2527
6	2825K	0.2553	0.2544	0.2535	0.2530	0.2529	0.2529	0.2508	0.2506	0.2505	0.2505
7	2838K	0.2553	0.2540	0.2534	0.2533	0.2531	0.2528	0.2526	0.2523	0.2520	0.2518
8	2867K	0.2534	0.2528	0.2521	0.2518	0.2517	0.2513	0.2512	0.2509	0.2507	0.2504
9	2756K	0.2591	0.2578	0.2573	0.2572	0.2570	0.2567	0.2563	0.2560	0.2558	0.2555
10	2772K	0.2589	0.2574	0.2569	0.2568	0.2567	0.2564	0.2561	0.2557	0.2555	0.2552
11	2727K	0.2606	0.2594	0.2590	0.2591	0.2587	0.2585	0.2580	0.2574	0.2570	0.2568
12	2715K	0.2611	0.2598	0.2595	0.2597	0.2596	0.2595	0.2588	0.2586	0.2584	0.2583
13	2686K	0.2623	0.2612	0.2610	0.2616	0.2614	0.2612	0.2606	0.2603	0.2599	0.2597
14	2726K	0.2602	0.2586	0.2584	0.2584	0.2583	0.2582	0.2577	0.2573	0.2569	0.2567
15	2738K	0.2601	0.2590	0.2587	0.2586	0.2585	0.2584	0.2582	0.2577	0.2572	0.2569
16	2742K	0.2600	0.2587	0.2585	0.2583	0.2582	0.2581	0.2595	0.2590	0.2583	0.2578
17	2770K	0.2589	0.2576	0.2574	0.2570	0.2568	0.2565	0.2562	0.2561	0.2555	0.2549
18	2772K	0.2587	0.2578	0.2571	0.2567	0.2566	0.2564	0.2561	0.2559	0.2555	0.2546
19	2769K	0.2592	0.2582	0.2578	0.2578	0.2577	0.2575	0.2574	0.2570	0.2567	0.2560
20	2761K	0.2593	0.2580	0.2580	0.2595	0.2593	0.2590	0.2583	0.2577	0.2576	0.2570

CIE 1976 v' data for tested units

$T_s = T_{air}$ = 85°C, I_f = 165mA; $T_s \geq$ 83°C and $T_{air} \geq$ 80°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2866K	0.5311	0.5307	0.5310	0.5305	0.5302	0.5300	0.5298	0.5296	0.5292	0.5288
2	2863K	0.5282	0.5270	0.5265	0.5264	0.5261	0.5259	0.5256	0.5258	0.5254	0.5245
3	2850K	0.5301	0.5305	0.5295	0.5290	0.5287	0.5286	0.5284	0.5277	0.5273	0.5272
4	2868K	0.5285	0.5290	0.5282	0.5276	0.5273	0.5271	0.5269	0.5269	0.5263	0.5257
5	2819K	0.5313	0.5319	0.5310	0.5304	0.5301	0.5299	0.5297	0.5290	0.5291	0.5288
6	2825K	0.5334	0.5342	0.5326	0.5323	0.5319	0.5317	0.5314	0.5311	0.5306	0.5303
7	2838K	0.5307	0.5312	0.5302	0.5297	0.5295	0.5294	0.5291	0.5287	0.5282	0.5278
8	2867K	0.5334	0.5341	0.5332	0.5326	0.5323	0.5323	0.5318	0.5315	0.5311	0.5307
9	2756K	0.5311	0.5311	0.5302	0.5297	0.5294	0.5293	0.5290	0.5287	0.5282	0.5278
10	2772K	0.5282	0.5283	0.5273	0.5268	0.5265	0.5264	0.5261	0.5257	0.5254	0.5248
11	2727K	0.5302	0.5305	0.5296	0.5291	0.5288	0.5286	0.5284	0.5279	0.5276	0.5269
12	2715K	0.5307	0.5311	0.5302	0.5296	0.5293	0.5291	0.5289	0.5286	0.5284	0.5278
13	2686K	0.5320	0.5324	0.5315	0.5307	0.5305	0.5303	0.5302	0.5298	0.5297	0.5291
14	2726K	0.5327	0.5330	0.5322	0.5317	0.5313	0.5311	0.5308	0.5306	0.5304	0.5299
15	2738K	0.5302	0.5306	0.5297	0.5293	0.5289	0.5287	0.5282	0.5283	0.5278	0.5272
16	2742K	0.5300	0.5305	0.5296	0.5296	0.5294	0.5291	0.5278	0.5274	0.5270	0.5264
17	2770K	0.5287	0.5294	0.5280	0.5285	0.5281	0.5278	0.5273	0.5272	0.5267	0.5261
18	2772K	0.5291	0.5291	0.5285	0.5289	0.5286	0.5284	0.5278	0.5277	0.5272	0.5265
19	2769K	0.5277	0.5276	0.5272	0.5270	0.5265	0.5263	0.5259	0.5257	0.5254	0.5249
20	2761K	0.5290	0.5290	0.5286	0.5274	0.5271	0.5269	0.5266	0.5261	0.5259	0.5257

Delta u'v' data for tested units

$T_s = T_{air}$ = 85°C, I_f = 165mA; $T_s \geq$ 83°C and $T_{air} \geq$ 80°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2866K	0.0000	0.0011	0.0014	0.0016	0.0018	0.0022	0.0026	0.0029	0.0034	0.0038
2	2863K	0.0000	0.0023	0.0028	0.0028	0.0031	0.0034	0.0037	0.0038	0.0050	0.0065
3	2850K	0.0000	0.0013	0.0024	0.0027	0.0030	0.0033	0.0034	0.0043	0.0048	0.0049
4	2868K	0.0000	0.0010	0.0015	0.0016	0.0018	0.0020	0.0026	0.0029	0.0040	0.0050
5	2819K	0.0000	0.0011	0.0014	0.0020	0.0023	0.0026	0.0031	0.0036	0.0035	0.0042
6	2825K	0.0000	0.0012	0.0020	0.0025	0.0028	0.0029	0.0049	0.0052	0.0056	0.0057
7	2838K	0.0000	0.0014	0.0020	0.0022	0.0025	0.0028	0.0031	0.0036	0.0041	0.0045
8	2867K	0.0000	0.0009	0.0013	0.0018	0.0020	0.0024	0.0027	0.0031	0.0035	0.0040
9	2756K	0.0000	0.0013	0.0020	0.0024	0.0027	0.0030	0.0035	0.0039	0.0044	0.0049
10	2772K	0.0000	0.0015	0.0022	0.0025	0.0028	0.0031	0.0035	0.0041	0.0044	0.0050
11	2727K	0.0000	0.0012	0.0017	0.0019	0.0024	0.0026	0.0032	0.0039	0.0044	0.0050
12	2715K	0.0000	0.0014	0.0017	0.0018	0.0021	0.0023	0.0029	0.0033	0.0035	0.0040
13	2686K	0.0000	0.0012	0.0014	0.0015	0.0017	0.0020	0.0025	0.0030	0.0033	0.0039
14	2726K	0.0000	0.0016	0.0019	0.0021	0.0024	0.0026	0.0031	0.0036	0.0040	0.0045
15	2738K	0.0000	0.0012	0.0015	0.0017	0.0021	0.0023	0.0028	0.0031	0.0038	0.0044
16	2742K	0.0000	0.0014	0.0016	0.0017	0.0019	0.0021	0.0023	0.0028	0.0034	0.0042
17	2770K	0.0000	0.0015	0.0017	0.0019	0.0022	0.0026	0.0030	0.0032	0.0039	0.0048
18	2772K	0.0000	0.0009	0.0017	0.0020	0.0022	0.0024	0.0029	0.0031	0.0037	0.0049
19	2769K	0.0000	0.0010	0.0015	0.0016	0.0019	0.0022	0.0025	0.0030	0.0034	0.0043
20	2761K	0.0000	0.0013	0.0014	0.0016	0.0019	0.0021	0.0026	0.0033	0.0035	0.0040

Forward Voltage [V] data for tested units

$T_s = T_{air} = 85°C$, $I_f = 165mA$; $T_s \geq 83°C$ and $T_{air} \geq 80°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2866K	6.113	6.107	6.108	6.113	6.124	6.114	6.118	6.123	6.122	6.120
2	2863K	6.318	6.284	6.289	6.301	6.320	6.310	6.313	6.321	6.310	6.306
3	2850K	6.028	6.019	6.019	6.016	6.026	6.022	6.026	6.028	6.023	6.020
4	2868K	6.214	6.193	6.192	6.197	6.206	6.201	6.205	6.210	6.203	6.251
5	2819K	6.204	6.179	6.177	6.179	6.191	6.189	6.188	6.195	6.185	6.185
6	2825K	6.267	6.235	6.237	6.236	6.248	6.242	6.238	6.253	6.243	6.254
7	2838K	6.220	6.205	6.200	6.206	6.214	6.211	6.212	6.221	6.212	6.218
8	2867K	6.222	6.193	6.193	6.197	6.206	6.201	6.204	6.217	6.203	6.202
9	2756K	6.339	6.297	6.296	6.299	6.309	6.305	6.310	6.318	6.308	6.299
10	2772K	6.389	6.356	6.359	6.360	6.372	6.364	6.369	6.371	6.365	6.361
11	2727K	6.495	6.457	6.454	6.469	6.479	6.478	6.479	6.489	6.483	6.468
12	2715K	6.306	6.268	6.272	6.266	6.268	6.265	6.266	6.274	6.268	6.297
13	2686K	6.394	6.353	6.356	6.345	6.350	6.348	6.351	6.353	6.345	6.364
14	2726K	6.351	6.316	6.321	6.310	6.314	6.318	6.317	6.322	6.323	6.309
15	2738K	6.407	6.381	6.378	6.373	6.378	6.376	6.373	6.375	6.371	6.364
16	2742K	6.383	6.369	6.366	6.357	6.364	6.360	6.353	6.364	6.354	6.353
17	2770K	6.337	6.490	6.298	6.294	6.294	6.295	6.297	6.308	6.296	6.297
18	2772K	6.323	6.283	6.279	6.269	6.281	6.277	6.278	6.290	6.280	6.280
19	2769K	6.268	6.236	6.238	6.230	6.234	6.234	6.236	6.244	6.241	6.237
20	2761K	6.297	6.260	6.265	6.251	6.259	6.260	6.261	6.269	6.297	6.263

Luminous Flux [lm] data for tested units

$T_s = T_{air}$ = 105°C, I_f = 165mA; $T_s \geq$ 103°C and $T_{air} \geq$ 100°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2863K	112.800	111.300	110.100	109.600	108.600	107.900	107.100	106.700	107.000	106.200
2	2846K	112.100	110.800	110.200	109.600	108.700	108.200	107.600	107.100	107.300	106.700
3	2847K	109.600	109.100	108.400	107.900	107.000	106.500	105.700	105.200	105.400	104.800
4	2841K	114.200	112.100	111.300	111.000	110.200	110.000	109.600	109.200	109.300	108.600
5	2846K	113.200	111.500	110.600	110.100	109.100	109.000	108.500	108.000	107.500	106.800
6	2821K	118.600	117.100	116.100	116.000	115.100	114.600	114.000	113.800	114.100	113.200
7	2810K	117.500	116.600	115.700	115.300	113.900	113.500	112.900	112.300	112.400	111.500
8	2705K	112.400	111.200	110.400	110.100	108.900	108.400	107.900	107.300	107.700	107.000
9	2790K	107.200	105.800	104.600	104.000	102.800	102.600	102.200	101.600	101.500	100.900
10	2765K	113.700	111.500	110.800	110.500	109.300	108.700	108.200	109.000	109.200	108.600
11	2737K	114.700	112.800	112.200	112.100	110.800	110.400	109.800	109.200	109.500	108.600
12	2762K	102.500	102.000	101.200	100.900	100.200	99.760	99.440	99.060	99.150	98.360
13	2798K	112.000	110.700	109.400	108.700	107.600	107.100	106.300	105.800	106.000	105.300
14	2753K	115.000	114.200	112.800	112.200	111.300	110.700	110.200	109.600	110.100	109.400
15	2700K	112.100	111.300	109.800	108.900	108.000	107.500	106.900	106.500	106.700	105.900
16	2754K	103.000	102.500	101.800	100.300	99.450	98.950	98.280	97.780	97.870	97.270
17	2699K	109.200	107.400	106.300	106.100	105.300	105.000	104.000	103.800	103.800	103.200
18	2735K	108.300	107.700	107.000	105.700	104.800	104.400	103.900	103.300	103.400	102.700
19	2755K	112.000	110.300	109.300	108.700	107.900	107.400	106.900	106.400	106.400	105.800
20	2768K	113.000	111.200	110.200	109.600	108.600	108.400	107.600	107.100	107.200	106.300

Normalized Luminous Flux data for tested units

$T_s = T_{air}$ = 105°C, I_f = 165mA; $T_s \geq$ 103°C and $T_{air} \geq$ 100°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2863K	1.0000	0.9867	0.9761	0.9716	0.9628	0.9566	0.9495	0.9459	0.9486	0.9415
2	2846K	1.0000	0.9884	0.9831	0.9777	0.9697	0.9652	0.9599	0.9554	0.9572	0.9518
3	2847K	1.0000	0.9954	0.9891	0.9845	0.9763	0.9717	0.9644	0.9599	0.9617	0.9562
4	2841K	1.0000	0.9816	0.9746	0.9720	0.9650	0.9632	0.9597	0.9562	0.9571	0.9510
5	2846K	1.0000	0.9850	0.9770	0.9726	0.9638	0.9629	0.9585	0.9541	0.9496	0.9435
6	2821K	1.0000	0.9874	0.9789	0.9781	0.9705	0.9663	0.9612	0.9595	0.9621	0.9545
7	2810K	1.0000	0.9923	0.9847	0.9813	0.9694	0.9660	0.9609	0.9557	0.9566	0.9489
8	2705K	1.0000	0.9893	0.9822	0.9795	0.9689	0.9644	0.9600	0.9546	0.9582	0.9520
9	2790K	1.0000	0.9869	0.9757	0.9701	0.9590	0.9571	0.9534	0.9478	0.9468	0.9412
10	2765K	1.0000	0.9807	0.9745	0.9719	0.9613	0.9560	0.9516	0.9587	0.9604	0.9551
11	2737K	1.0000	0.9834	0.9782	0.9773	0.9660	0.9625	0.9573	0.9520	0.9547	0.9468
12	2762K	1.0000	0.9951	0.9873	0.9844	0.9776	0.9733	0.9701	0.9664	0.9673	0.9596
13	2798K	1.0000	0.9884	0.9768	0.9705	0.9607	0.9562	0.9491	0.9446	0.9464	0.9402
14	2753K	1.0000	0.9930	0.9809	0.9757	0.9678	0.9626	0.9583	0.9530	0.9574	0.9513
15	2700K	1.0000	0.9929	0.9795	0.9715	0.9634	0.9590	0.9536	0.9500	0.9518	0.9447
16	2754K	1.0000	0.9951	0.9883	0.9738	0.9655	0.9607	0.9542	0.9493	0.9502	0.9444
17	2699K	1.0000	0.9835	0.9734	0.9716	0.9643	0.9615	0.9524	0.9505	0.9505	0.9451
18	2735K	1.0000	0.9945	0.9880	0.9760	0.9677	0.9640	0.9594	0.9538	0.9548	0.9483
19	2755K	1.0000	0.9848	0.9759	0.9705	0.9634	0.9589	0.9545	0.9500	0.9500	0.9446
20	2768K	1.0000	0.9841	0.9752	0.9699	0.9611	0.9593	0.9522	0.9478	0.9487	0.9407

TM-21 Extrapolation of Luminous Flux data for tested units
$T_s = T_{air} = 105°C$, $I_f = 165mA$; $T_s \geq 103°C$ and $T_{air} \geq 100°C$ in compliance with LM-80-08

	CCT (t=0)	alpha	B	L70
1	2863K	4.0173e-06	0.9759	82,718
2	2846K	3.5020e-06	0.9819	96,645
3	2847K	3.9933e-06	0.9904	86,897
4	2841K	2.7410e-06	0.9759	121,233
5	2846K	4.3636e-06	0.9828	77,774
6	2821K	2.8028e-06	0.9800	120,054
7	2810K	4.0293e-06	0.9850	84,772
8	2705K	3.2291e-06	0.9800	104,203
9	2790K	3.7572e-06	0.9744	88,017
10	2765K	3.1402e-07	0.9591	1,003,015
11	2737K	3.7232e-06	0.9800	90,361
12	2762K	3.2828e-06	0.9899	105,569
13	2798K	4.1064e-06	0.9752	80,747
14	2753K	3.0816e-06	0.9778	108,452
15	2700K	3.5525e-06	0.9760	93,569
16	2754K	4.2527e-06	0.9808	79,301
17	2699K	3.9180e-06	0.9786	85,525
18	2735K	3.8821e-06	0.9824	87,314
19	2755K	3.7435e-06	0.9770	89,072
20	2768K	4.1453e-06	0.9776	80,575
ave	2779K	3.5207e-06	0.9790	95,290

CIE 1976 u' data for tested units
$T_s = T_{air} = 105°C$, $I_f = 165mA$; $T_s \geq 103°C$ and $T_{air} \geq 100°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2863K	0.2547	0.2535	0.2529	0.2523	0.2522	0.2520	0.2516	0.2512	0.2510	0.2505
2	2846K	0.2550	0.2540	0.2532	0.2530	0.2529	0.2526	0.2522	0.2517	0.2514	0.2510
3	2847K	0.2554	0.2534	0.2533	0.2526	0.2525	0.2524	0.2519	0.2517	0.2513	0.2510
4	2841K	0.2550	0.2534	0.2530	0.2529	0.2528	0.2527	0.2521	0.2517	0.2516	0.2514
5	2846K	0.2555	0.2536	0.2531	0.2529	0.2527	0.2525	0.2520	0.2516	0.2512	0.2509
6	2821K	0.2560	0.2549	0.2547	0.2542	0.2540	0.2535	0.2529	0.2524	0.2523	0.2521
7	2810K	0.2562	0.2548	0.2546	0.2538	0.2537	0.2535	0.2529	0.2525	0.2524	0.2521
8	2705K	0.2612	0.2601	0.2597	0.2596	0.2593	0.2592	0.2585	0.2582	0.2581	0.2577
9	2790K	0.2585	0.2569	0.2564	0.2559	0.2557	0.2554	0.2547	0.2544	0.2543	0.2540
10	2765K	0.2588	0.2577	0.2573	0.2569	0.2568	0.2563	0.2557	0.2553	0.2551	0.2548
11	2737K	0.2596	0.2585	0.2579	0.2577	0.2575	0.2571	0.2567	0.2563	0.2561	0.2556
12	2762K	0.2596	0.2582	0.2577	0.2573	0.2571	0.2570	0.2558	0.2555	0.2554	0.2551
13	2798K	0.2577	0.2562	0.2557	0.2556	0.2555	0.2552	0.2546	0.2542	0.2541	0.2538
14	2753K	0.2588	0.2570	0.2569	0.2569	0.2568	0.2563	0.2566	0.2560	0.2559	0.2554
15	2700K	0.2615	0.2598	0.2596	0.2590	0.2588	0.2587	0.2583	0.2578	0.2572	0.2566
16	2754K	0.2590	0.2572	0.2573	0.2574	0.2572	0.2568	0.2568	0.2566	0.2560	0.2556
17	2699K	0.2616	0.2599	0.2597	0.2597	0.2596	0.2593	0.2592	0.2587	0.2587	0.2585
18	2735K	0.2600	0.2584	0.2584	0.2589	0.2587	0.2583	0.2581	0.2576	0.2569	0.2569
19	2755K	0.2595	0.2579	0.2575	0.2574	0.2572	0.2571	0.2566	0.2561	0.2557	0.2553
20	2768K	0.2587	0.2572	0.2570	0.2568	0.2566	0.2563	0.2562	0.2558	0.2562	0.2554

CIE 1976 v' data for tested units
$T_s = T_{air}$ = 105°C, I_f = 165mA; $T_s \geq$ 103°C and $T_{air} \geq$ 100°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2863K	0.5287	0.5286	0.5280	0.5281	0.5277	0.5274	0.5270	0.5267	0.5261	0.5260
2	2846K	0.5308	0.5309	0.5305	0.5305	0.5302	0.5298	0.5293	0.5290	0.5286	0.5284
3	2847K	0.5288	0.5285	0.5281	0.5280	0.5276	0.5273	0.5268	0.5266	0.5262	0.5259
4	2841K	0.5314	0.5316	0.5310	0.5311	0.5308	0.5306	0.5300	0.5298	0.5295	0.5293
5	2846K	0.5285	0.5281	0.5277	0.5278	0.5274	0.5271	0.5266	0.5263	0.5259	0.5257
6	2821K	0.5309	0.5311	0.5307	0.5307	0.5304	0.5301	0.5293	0.5290	0.5288	0.5286
7	2810K	0.5327	0.5328	0.5324	0.5322	0.5318	0.5315	0.5311	0.5308	0.5306	0.5303
8	2705K	0.5330	0.5330	0.5325	0.5325	0.5321	0.5318	0.5314	0.5311	0.5308	0.5305
9	2790K	0.5261	0.5258	0.5253	0.5250	0.5246	0.5244	0.5239	0.5236	0.5233	0.5229
10	2765K	0.5303	0.5304	0.5297	0.5297	0.5292	0.5290	0.5285	0.5282	0.5279	0.5276
11	2737K	0.5327	0.5326	0.5321	0.5322	0.5317	0.5313	0.5310	0.5307	0.5305	0.5301
12	2762K	0.5270	0.5264	0.5260	0.5260	0.5257	0.5254	0.5247	0.5245	0.5242	0.5239
13	2798K	0.5284	0.5282	0.5278	0.5278	0.5274	0.5272	0.5266	0.5263	0.5260	0.5258
14	2753K	0.5333	0.5332	0.5327	0.5324	0.5321	0.5318	0.5314	0.5311	0.5309	0.5306
15	2700K	0.5326	0.5325	0.5320	0.5318	0.5315	0.5313	0.5307	0.5304	0.5300	0.5297
16	2754K	0.5318	0.5317	0.5312	0.5306	0.5304	0.5301	0.5296	0.5293	0.5292	0.5290
17	2699K	0.5320	0.5318	0.5314	0.5305	0.5302	0.5299	0.5295	0.5293	0.5293	0.5292
18	2735K	0.5315	0.5314	0.5310	0.5299	0.5296	0.5294	0.5288	0.5286	0.5286	0.5285
19	2755K	0.5295	0.5294	0.5289	0.5290	0.5287	0.5284	0.5278	0.5276	0.5271	0.5268
20	2768K	0.5303	0.5302	0.5298	0.5291	0.5287	0.5285	0.5279	0.5273	0.5277	0.5274

Delta u'v' data for tested units
$T_s = T_{air}$ = 105°C, I_f = 165mA; $T_s \geq$ 103°C and $T_{air} \geq$ 100°C in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2863K	0.0000	0.0012	0.0019	0.0025	0.0027	0.0030	0.0035	0.0040	0.0045	0.0050
2	2846K	0.0000	0.0010	0.0018	0.0020	0.0022	0.0026	0.0032	0.0038	0.0042	0.0047
3	2847K	0.0000	0.0020	0.0022	0.0029	0.0031	0.0034	0.0040	0.0043	0.0049	0.0053
4	2841K	0.0000	0.0016	0.0020	0.0021	0.0023	0.0024	0.0032	0.0037	0.0039	0.0042
5	2846K	0.0000	0.0019	0.0025	0.0027	0.0030	0.0033	0.0040	0.0045	0.0050	0.0054
6	2821K	0.0000	0.0011	0.0013	0.0018	0.0021	0.0026	0.0035	0.0041	0.0043	0.0045
7	2810K	0.0000	0.0014	0.0016	0.0025	0.0027	0.0030	0.0037	0.0042	0.0043	0.0048
8	2705K	0.0000	0.0011	0.0016	0.0017	0.0021	0.0023	0.0031	0.0036	0.0038	0.0043
9	2790K	0.0000	0.0016	0.0022	0.0028	0.0032	0.0035	0.0044	0.0048	0.0050	0.0055
10	2765K	0.0000	0.0011	0.0016	0.0020	0.0023	0.0028	0.0036	0.0041	0.0044	0.0048
11	2737K	0.0000	0.0011	0.0018	0.0020	0.0023	0.0029	0.0034	0.0039	0.0041	0.0048
12	2762K	0.0000	0.0015	0.0021	0.0025	0.0028	0.0031	0.0044	0.0048	0.0050	0.0055
13	2798K	0.0000	0.0015	0.0021	0.0022	0.0024	0.0028	0.0036	0.0041	0.0043	0.0047
14	2753K	0.0000	0.0018	0.0020	0.0021	0.0023	0.0029	0.0029	0.0036	0.0038	0.0043
15	2700K	0.0000	0.0017	0.0020	0.0026	0.0029	0.0031	0.0037	0.0043	0.0050	0.0057
16	2754K	0.0000	0.0018	0.0018	0.0020	0.0023	0.0028	0.0031	0.0035	0.0040	0.0044
17	2699K	0.0000	0.0017	0.0020	0.0024	0.0027	0.0031	0.0035	0.0040	0.0040	0.0042
18	2735K	0.0000	0.0016	0.0017	0.0019	0.0023	0.0027	0.0033	0.0038	0.0042	0.0043
19	2755K	0.0000	0.0016	0.0021	0.0022	0.0024	0.0026	0.0034	0.0039	0.0045	0.0050
20	2768K	0.0000	0.0015	0.0018	0.0022	0.0026	0.0030	0.0035	0.0042	0.0036	0.0044

Forward Voltage [V] data for tested units

$T_s = T_{air} = 105°C$, $I_f = 165mA$; $T_s \geq 103°C$ and $T_{air} \geq 100°C$ in compliance with LM-80-08

	CCT (t=0)	0hrs	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2863K	6.215	6.190	6.192	6.200	6.207	6.210	6.217	6.219	6.218	6.210
2	2846K	6.247	6.218	6.222	6.233	6.244	6.244	6.252	6.250	6.250	6.245
3	2847K	6.221	6.189	6.192	6.202	6.216	6.219	6.220	6.225	6.227	6.213
4	2841K	6.035	6.031	6.030	6.039	6.042	6.044	6.052	6.053	6.058	6.045
5	2846K	6.339	6.383	6.385	6.442	6.454	6.454	6.462	6.461	6.465	6.450
6	2821K	6.013	6.005	6.006	6.007	6.005	6.010	6.015	6.019	6.019	6.009
7	2810K	6.297	6.269	6.268	6.282	6.284	6.295	6.297	6.302	6.293	6.288
8	2705K	6.447	6.402	6.402	6.413	6.424	6.423	6.436	6.439	6.429	6.421
9	2790K	6.424	6.390	6.391	6.379	6.395	6.402	6.415	6.413	6.410	6.401
10	2765K	6.275	6.245	6.244	6.242	6.241	6.242	6.254	6.252	6.249	6.247
11	2737K	6.253	6.222	6.220	6.230	6.232	6.235	6.239	6.247	6.251	6.236
12	2762K	6.518	6.480	6.478	6.484	6.490	6.488	6.497	6.504	6.499	6.482
13	2798K	6.328	6.310	6.310	6.326	6.329	6.329	6.340	6.341	6.335	6.330
14	2753K	6.443	6.410	6.401	6.403	6.399	6.404	6.402	6.407	6.399	6.388
15	2700K	6.465	6.429	6.428	6.421	6.417	6.421	6.425	6.427	6.423	6.415
16	2754K	6.404	6.364	6.366	6.359	6.360	6.365	6.365	6.378	6.369	6.363
17	2699K	6.217	6.198	6.195	6.189	6.189	6.195	6.193	6.209	6.291	6.195
18	2735K	6.323	6.295	6.292	6.291	6.287	6.294	6.293	6.309	6.299	6.288
19	2755K	6.265	6.238	6.239	6.229	6.232	6.234	6.237	6.251	6.238	6.247
20	2768K	6.266	6.252	6.240	6.235	6.231	6.238	6.235	6.248	6.243	6.253

Company Information

Lumileds is a leading provider of power LEDs for everyday lighting applications. The company's records for light output, efficacy and thermal management are direct results of the ongoing commitment to advancing solid-state lighting technology and enabling lighting solutions that are more environmentally friendly, help reduce CO2 emissions and reduce the need for power plant expansion. Lumileds LUXEON LEDs are enabling never before possible applications in outdoor lighting, shop lighting, home lighting, digital imaging, display and automotive lighting.

Lumileds is a fully integrated supplier, producing core LED material in all three base colors, (red, green, blue) and white. Lumileds has R & D centers in San Jose, California and in the Netherlands, and production capabilities in San Jose, Singapore and Penang, Malaysia. Founded in 1999, Lumileds is the high flux LED technology leader and is dedicated to bridging the gap between solid-state technology and the lighting world. More information about the company's LUXEON LED products and solid-state lighting technologies can be found at www.lumileds.com.