



DLC V4.0 TEST REPORT

Applicant's name	Shanghai Supertek Lighting Co., Ltd.
Address	No.455,laodongRoad,caowang industrial Zone, Jiading District, shanghai
Brand Name	SUPERTEK
Report No.	BTR66.181.16.0003.48
Product Name	FLOOD FIXTURE
Basic Model	FL31A-30-4000K
Tested by (printed name and signature)	David Zhang
Title	Test Engineer
Approved by (printed name and signature)	Steven Su
Title	Approved Signatory
Date of issue	Sept 09, 2016
Testing Laboratory Name	BEST Test Service Shenzhen Co., Ltd.
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Accreditation	DLC/Lighting Facts/UL/ETL/ELI/NVLAP/EPA/DOE
Test specification	
Standard	DLC V4.0
Test procedure	DLC Test Procedure
Non-standard test method	No
Test Report Form No.	BEST_ DLC-V4.0
TRF originator	BEST Test Service Shenzhen Co., Ltd. Mr Tseng
Master TRF	BEST_ DLC V4.0.doc

Note:

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Product description:		
Sample received date	Sept 08, 2016	
Sample Quantity	1 pcs per model	
Model Number	FL31A-30-4000K; FL31A-30-5000K	
Rating(s) (V; Hz)	AC 120V-277V	
Nominal Power.....	30W	
Nominal Power Factor	N/A	
Nominal Lumen Output.....	3000lm; 3050lm	
Nominal CCT	4000K; 5000K	
Nominal CRI(Ra)	80	
Nominal Life	50000H	
Product Classification	<input type="checkbox"/> Premium	<input checked="" type="checkbox"/> Standard
Category	<input type="checkbox"/> Indoor	<input type="checkbox"/> Indoor Retrofit Kit
	<input checked="" type="checkbox"/> Outdoor	<input type="checkbox"/> Outdoor Retrofit Kit
	<input type="checkbox"/> Linear Replacement Lamp	<input type="checkbox"/> E39 Replacements for HID Lamps
General Applicant	Outdoor –Low Output	
Primary use.....	Architectural Flood and Spot Luminaires	
Dimmable	<input checked="" type="checkbox"/> Yes,	<input type="checkbox"/> No
If Yes, Select Dimming Mechanism ...:	<input checked="" type="checkbox"/> Continuous dimming,	<input type="checkbox"/> Step dimming
If Yes, Mini Dimming Level	10%	
Integral Controller	<input checked="" type="checkbox"/> Yes,	<input type="checkbox"/> No
LED Lighting Source Manufacture	Seoul Semiconductor Co.,Ltd	
LED Lighting Source Model	STW8C2SB	
LED Driver Brand.....	N/A	
LED Driver Model Number.....	N/A	
Maximum Recommended Temperature (°C) During Normal Operation	N/A	
Fixtures Band (Retrofit Kit/Lamp Only)	N/A	
Fixtures Model No. (Retrofit Kit/Lamp Only)	N/A	

Test Method Description

ANSI C78.376-2001 Specifications for the Chromaticity of Fluorescent Lamps
 ANSI/NEMA/ANSLG C78.377-2011 Specifications for the Chromaticity of Solid State Lighting Products
 ANSI C78.5-2003 Specifications for Performance of Self-ballasted Compact Fluorescent Lamps
 ANSI/ANSLG C78.81-2010 Double-Capped Fluorescent Lamps—Dimensional and Electrical Characteristics
 ANSI C78.901-2014 Single-Based Fluorescent Lamps—Dimensional and Electrical Characteristics
 ANSI/ANSLG C81.61-2009 Specifications for Bases (Caps) for Electric Lamps
 ANSI/ANSLG C81.62-2009 Lamp holders for Electric Lamps
 ANSI C82.11-2011 High-Frequency Fluorescent Lamp Ballasts
 ANSI/ANSLG C82.16-2015 (anticipated) Light Emitting Diode Drivers—Methods of Measurement
 ANSI C82.2-2002 Method of Measurement of Fluorescent Lamp Ballasts
 ANSI C82.77-10:2014 Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
 ANSI/IEEE C62.41.1-2002 IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits
 ANSI/IEEE C62.41.2-2002 IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits
 ANSI/UL 153-2002 Standard for Safety of Portable Electric Luminaires
 ANSI/UL 935-2009 Standard for Safety of Fluorescent-Lamp Ballasts
 ANSI/UL 1310-2010 Standard for Safety of Class 2 Power Units
 ANSI/UL 1574-2004 Standard for Safety of Track Lighting Systems
 ANSI/UL 1598-2008 Standard for Safety of Luminaires
 ANSI/UL 1598C Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits
 ANSI/UL 1598B-2010 Standard for Supplemental Requirements for Luminaire Reflector Kits for Installation on Previously Installed Fluorescent Luminaires
 ANSI/UL 1993-2009 Standard for Safety of Self-Ballasted Lamps and Lamp Adapters
 ANSI/UL 2108-2004 Standard for Low-Voltage Lighting Systems
 ANSI/UL 8750-2009 Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products
 ASTM E283-04 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 CIE Pub. No. 13.3-1995 Method of Measuring and Specifying Color Rendering of Light Sources
 CIE Pub. No. 15:2004 Colorimetry
 EU Directive 2002/95/EC Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the Restriction of the Use of Certain Hazardous Substances In Electrical and Electronic Equipment
 FCC CFR Title 47 Part 15 Radio Frequency Devices
 FCC CFR Title 47 Part 18 Industrial, Scientific, and Medical Equipment
 IEC 60061-1 (2012) Lamp Caps and Holders Together with Gauges for the Control of Interchangeability and Safety – Part 1: Lamp Caps
 IEC 60081 Amend 4 Ed 5.0 (2010) Double-capped Fluorescent Lamps - Performance Specifications
 IEC 60901 (2011) Single-capped Fluorescent Lamps - Performance Specifications
 IEC 62301 ED.2.0 B:2011 Household electrical appliances - Measurement of standby power
 IEC 61347-2-3-am2 ed1.0 b.2011 Amendment 2 - Lamp Control Gear - Part 2-3: Particular Requirements for A.C. Supplied Electronic Ballasts for Fluorescent Lamps
 IEC 62321 Ed. 1.0 Electrotechnical Products - Determination Of Levels Of Six Regulated Substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)
 IEEE PAR1789 IEEE Recommending Practices for Modulating Current in High Brightness LEDs for Mitigating Health Risks to Viewers
 IES LM-9-09 Electric and Photometric Measurements of Fluorescent Lamps
 IES LM-10-96 or LM-10-XX Photometric Testing of Outdoor Fluorescent Luminaires (2015 update anticipated)
 IES LM-31-95 Photometric Testing of Roadway Luminaires Using Incandescent Filament and High Intensity Discharge (HID) Lamps
 IES LM-40-10 Life Testing of Fluorescent Lamps
 IES LM-41-14 Approved Method for Photometric Testing of Indoor Fluorescent Luminaires
 IES LM-46-04 Photometric Testing of Indoor Luminaires Using High Intensity Discharge or Incandescent Filament Lamps
 IES LM-49-12 Life Testing of Incandescent Filament Lamps
 IES LM-58-13 Method for Spectroradiometric Measurement Methods for Light Sources
 IES LM-65-14 Life Testing of Compact Fluorescent Lamps
 IES LM-66-14 Electrical and Photometric Measurements of Single-Ended Compact Fluorescent Lamps
 IES LM-79-08 Electrical and Photometric Measurements of Solid-State Lighting Products
 IES LM-80-08 Measuring Lumen Maintenance of LED Light Sources
 IES LM-82-12 Method for the Characterization of LED Light Engines and Integrated LED Lamps for Electrical and Photometric Properties as a Function of Temperature
 IES LM-84-14 Measuring Luminous Flux and Color Maintenance of LED Lamps, Light Engines, and Luminaires
 IES RP-16-10 Nomenclature and Definitions for Illuminating Engineering
 IES TM-21-11 Projecting Long Term Lumen Maintenance of LED Sources
 IES TM-28-14 Projecting Long-Term Luminous Flux Maintenance of LED Lamps and Luminaires
 NEMA LL 9-2009 Dimming of T8 Fluorescent Lighting Systems
 NEMA LSD 45-2009 Recommendations for Solid State Lighting Sub-Assembly Interfaces for Luminaires
 NEMA SSL 7A-2013 Phase Cut Dimming for Solid State Lighting: Basic Compatibility

Initial Photometric and Electrical Test Data

EUT	Input Voltage (V)	Frequency (Hz)	Input Current (A)	ITHD	Input Power (W)	Power Factor	Lumen Output (Lumens)	Efficiency Lumen/w
FL31A-30-4000K	120.0	60.0	0.261	9.6%	30.81	0.984	3419.47	110.99
FL31A-30-4000K	277.0	60.0	0.110	12.8%	29.22	0.960	/	/

EUT	CCT (K)	CRI Ra	R9	x CIE1931	y CIE1931
FL31A-30-4000K	4213	84.7	19	0.3725	0.3752
FL31A-30-5000K	4850	84.5	17	0.3503	0.3625

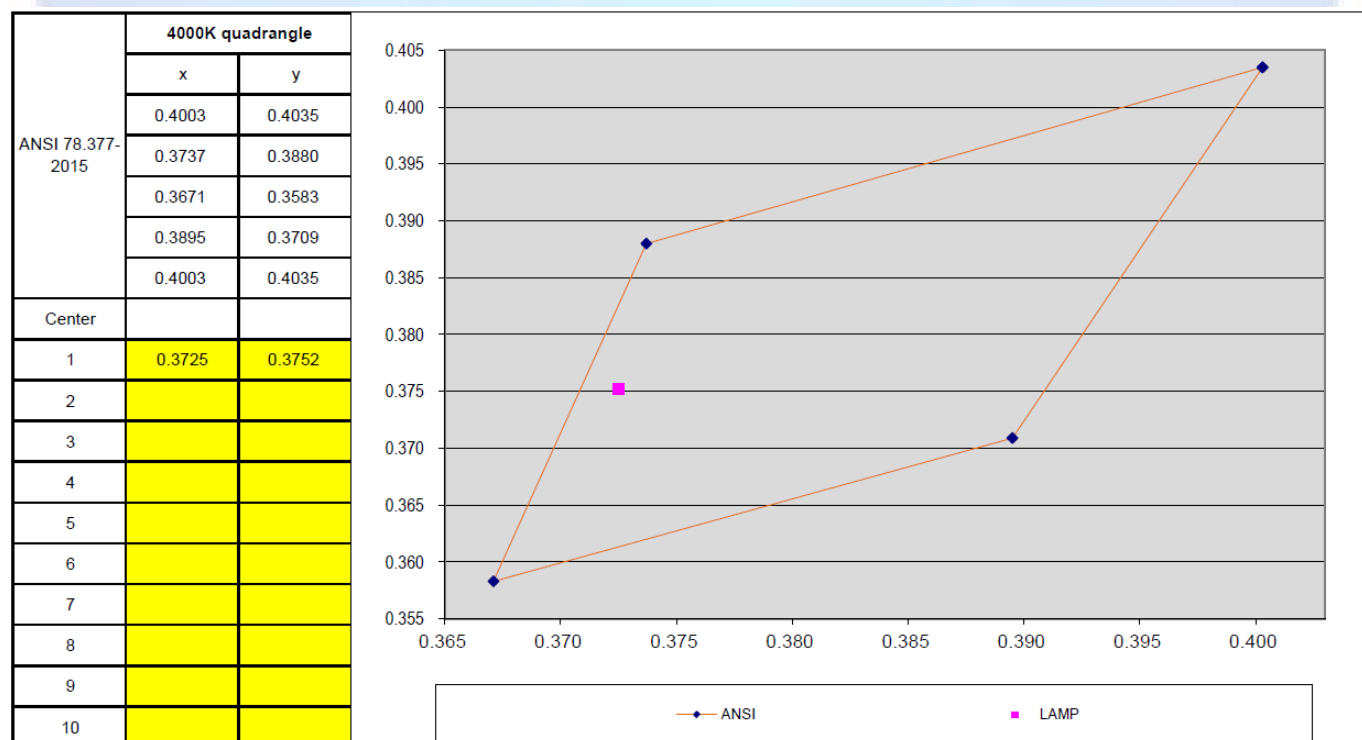
EUT	u' CIE1976	v' CIE1976	Duv	Rf	Rg
FL31A-30-4000K	0.2205	0.4997	0.0017	84	95
FL31A-30-5000K	0.2107	0.4906	0.0033	84	95

EUT	Zonal Lumen Density zone (0-90°)
FL31A-30-4000K	100%

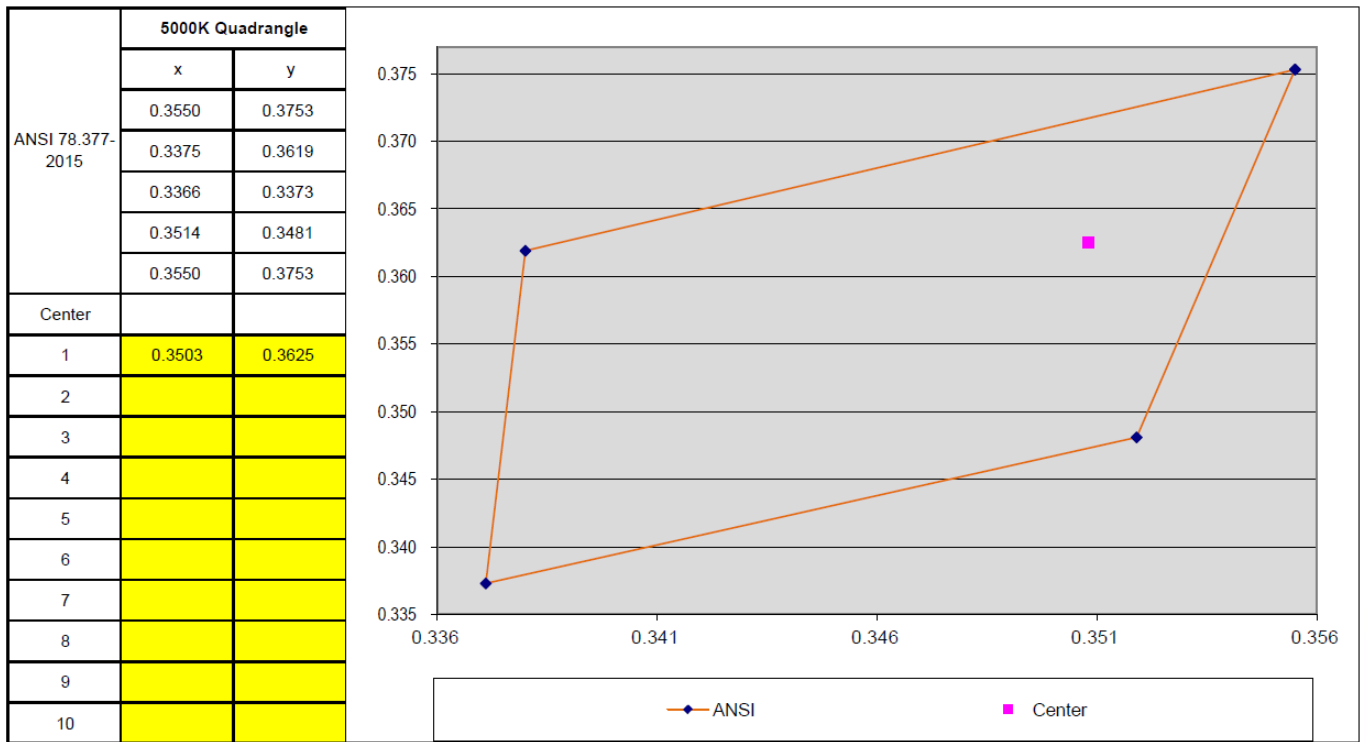
Note: see the annex of Luminous Intensity Distribution Test Plots

7 Step Quadrangle

FL31A-30-4000K



FL31A-30-5000K



Spectral Energy Distribution

FL31A-30-4000K

WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0174	1.0230	585	0.8678	51.0000
385	0.0104	0.6118	590	0.8726	51.2800
390	0.0079	0.4627	595	0.8711	51.1900
395	0.0062	0.3632	600	0.8663	50.9200
400	0.0056	0.3302	605	0.8506	49.9900
405	0.0082	0.4798	610	0.8328	48.9400
410	0.0163	0.9584	615	0.8058	47.3600
415	0.0344	2.0240	620	0.7719	45.3700
420	0.0677	3.9780	625	0.7325	43.0500
425	0.1241	7.2960	630	0.6864	40.3400
430	0.2091	12.2900	635	0.6392	37.5700
435	0.3256	19.1400	640	0.5890	34.6100
440	0.4761	27.9800	645	0.5386	31.6500
445	0.7003	41.1600	650	0.4879	28.6700
450	0.9596	56.4000	655	0.4403	25.8700
455	0.9249	54.3600	660	0.3932	23.1100
460	0.6393	37.5700	665	0.3493	20.5300
465	0.4913	28.8700	670	0.3084	18.1300
470	0.4059	23.8600	675	0.2712	15.9400
475	0.3277	19.2600	680	0.2374	13.9500
480	0.3076	18.0800	685	0.2075	12.2000
485	0.3348	19.6800	690	0.1806	10.6200
490	0.3795	22.3000	695	0.1565	9.1990
495	0.4338	25.5000	700	0.1351	7.9390
500	0.4900	28.8000	705	0.1162	6.8310
505	0.5371	31.5600	710	0.1003	5.8950
510	0.5739	33.7300	715	0.0865	5.0850
515	0.6025	35.4100	720	0.0746	4.3840
520	0.6259	36.7900	725	0.0639	3.7570
525	0.6458	37.9500	730	0.0552	3.2440
530	0.6669	39.2000	735	0.0472	2.7770
535	0.6868	40.3700	740	0.0406	2.3840
540	0.7087	41.6500	745	0.0348	2.0430
545	0.7327	43.0600	750	0.0305	1.7900
550	0.7543	44.3300	755	0.0263	1.5430
555	0.7765	45.6400	760	0.0226	1.3290
560	0.7961	46.7900	765	0.0195	1.1480
565	0.8150	47.9000	770	0.0169	0.9915
570	0.8319	48.8900	775	0.0147	0.8629
575	0.8459	49.7200	780	0.0136	0.8000
580	0.8580	50.4300			

FL31A-30-5000K

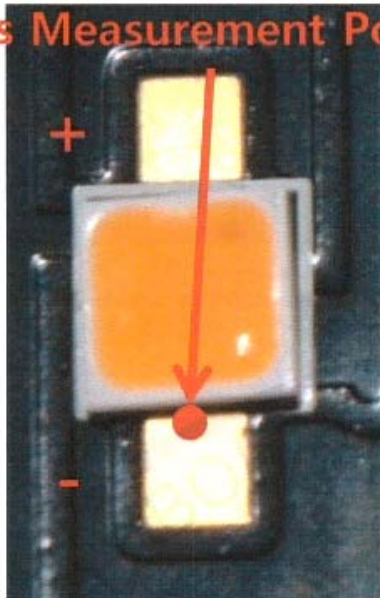
WL(nm)	Spectrum	Spectrum	WL(nm)	Spectrum	Spectrum
380	0.0182	1.3060	585	0.6817	48.8200
385	0.0103	0.7379	590	0.6776	48.5300
390	0.0079	0.5630	595	0.6707	48.0400
395	0.0059	0.4257	600	0.6603	47.2900
400	0.0060	0.4287	605	0.6465	46.3000
405	0.0074	0.5303	610	0.6280	44.9800
410	0.0151	1.0820	615	0.6042	43.2700
415	0.0325	2.3280	620	0.5753	41.2000
420	0.0649	4.6450	625	0.5444	38.9900
425	0.1202	8.6080	630	0.5079	36.3700
430	0.2094	14.9900	635	0.4710	33.7300
435	0.3277	23.4700	640	0.4325	30.9800
440	0.4916	35.2100	645	0.3952	28.3100
445	0.7501	53.7200	650	0.3559	25.4900
450	0.9881	70.7700	655	0.3196	22.8900
455	0.8689	62.2300	660	0.2852	20.4300
460	0.5860	41.9700	665	0.2534	18.1500
465	0.4536	32.4900	670	0.2235	16.0100
470	0.3675	26.3200	675	0.1966	14.0800
475	0.2959	21.1900	680	0.1713	12.2700
480	0.2834	20.2900	685	0.1492	10.6900
485	0.3107	22.2500	690	0.1297	9.2920
490	0.3506	25.1100	695	0.1126	8.0650
495	0.3997	28.6300	700	0.0964	6.9010
500	0.4502	32.2400	705	0.0834	5.9720
505	0.4929	35.3000	710	0.0718	5.1430
510	0.5236	37.5000	715	0.0619	4.4360
515	0.5465	39.1400	720	0.0531	3.8060
520	0.5632	40.3300	725	0.0459	3.2860
525	0.5775	41.3600	730	0.0394	2.8210
530	0.5898	42.2400	735	0.0339	2.4250
535	0.6060	43.4000	740	0.0289	2.0700
540	0.6186	44.3000	745	0.0250	1.7920
545	0.6323	45.2800	750	0.0214	1.5310
550	0.6434	46.0800	755	0.0186	1.3320
555	0.6543	46.8600	760	0.0161	1.1530
560	0.6643	47.5800	765	0.0140	1.0030
565	0.6714	48.0800	770	0.0121	0.8695
570	0.6764	48.4500	775	0.0106	0.7620
575	0.6797	48.6800	780	0.0096	0.6878
580	0.6815	48.8100			

Driver Case Temperature/ LED Drive Current/TMP_{LED} Test Data

EUT	Driver Max Tc (°C)	Driver In-Situ Temperature (°C)	LED In-Situ Current (mA)	LED In-Situ Temperature (°C)(1#)	LED In-Situ Temperature (°C)(2#)	LED In-Situ Temperature (°C)(3#)
FL31A-30-4000K	N/A	N/A	135.3	62.2	61.8	61.6

LED Lighting Source Temperature Measurement Point in LM-80 Report

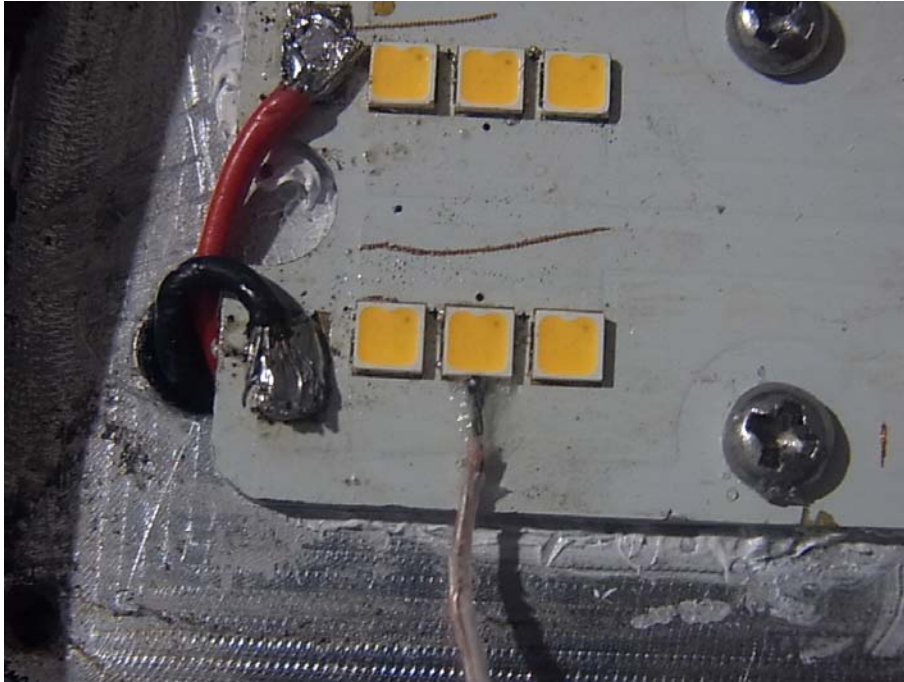
Ts Measurement Point



LED Lighting Source In Situ Temperature Measurement




TOP: LED 01



Lumen Maintenance and Lighting Source Life Test Data

L70



TM-21 Inputs

Instructions

Yellow fields are completed by the user. Fields not used should be left blank. Cyan fields are calculated based on user entries.

First, enter a description of the LED light source tested. Then complete the fields labeled "LM-80 Testing Details". Test duration must be at least 6,000 hours. If only one case temperature data set is to be used (no interpolation), complete only "Tested case temperature 1". For only two case temperature data sets, complete 1 and 2.

Next, further to the right, in the corresponding box(es) for each tested case temperature, enter the test data along with the time (in hours) at which each measurement was taken. Data entered must be normalized then averaged measured data (per TM-21 sections 5.2.1 and 5.2.2). If case temperatures have different test durations, enter data up to the lowest of the test durations for all of the case temperatures.

Enter drive current, *in-situ* temperature data and the percentage of initial lumens to project to in the fields labeled "In-Situ Inputs".

Results can be tailored to estimate lumen maintenance at a specific time by entering a value (t) in the yellow field. A complete TM-21 report will appear on the next tab labeled "Report".

Description of LED Light Source Tested (manufacturer, model, catalog number)		Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Test Data for 105°C Case Temperature	
		Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
Seoul, 3030B (STWxC2SB)		0	100.00%	0	100.00%	0	100.00%
		1000	101.20%	1000	101.00%	1000	99.20%
		2000	100.80%	2000	100.10%	2000	98.10%
		3000	101.20%	3000	99.80%	3000	96.90%
		4000	101.10%	4000	98.80%	4000	95.90%
		5000	100.80%	5000	97.50%	5000	94.30%
		6000	99.90%	6000	97.00%	6000	92.30%
		7000	99.10%	7000	96.10%	7000	90.20%

LM-80 Testing Details	
Total number of units tested per case temperature:	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	7000
Tested drive current (mA):	200
Tested case temperature 1 (T _c , °C):	55
Tested case temperature 2 (T _c , °C):	85
Tested case temperature 3 (T _c , °C):	105

In-Situ Inputs	
Drive current for each LED package/array/module (mA):	135.3
In-situ case temperature (T _c , °C):	62.2
Percentage of initial lumens to project to (e.g. for L ₇₀ , enter 70):	70

Results	
Time (t) at which to estimate lumen maintenance (hours):	50,000
Lumen maintenance at time (t) (%):	81.43%
Reported L70 (hours):	>42000

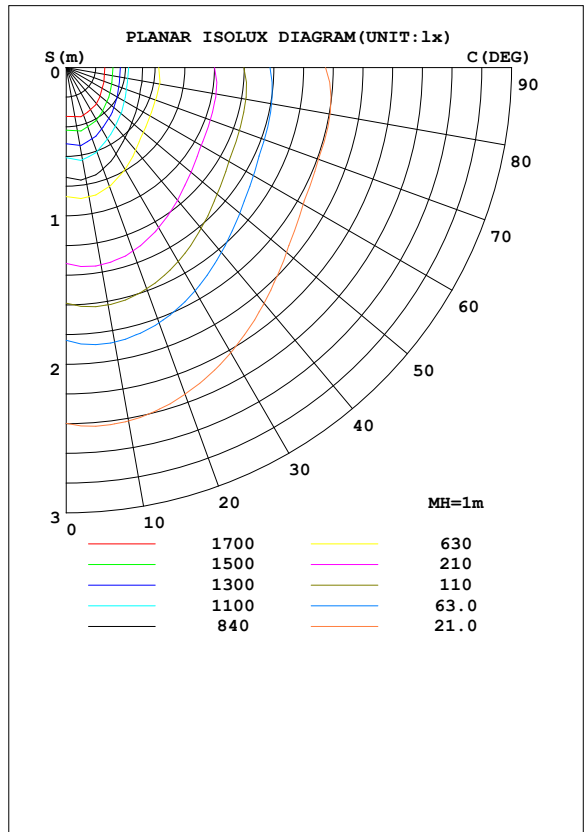
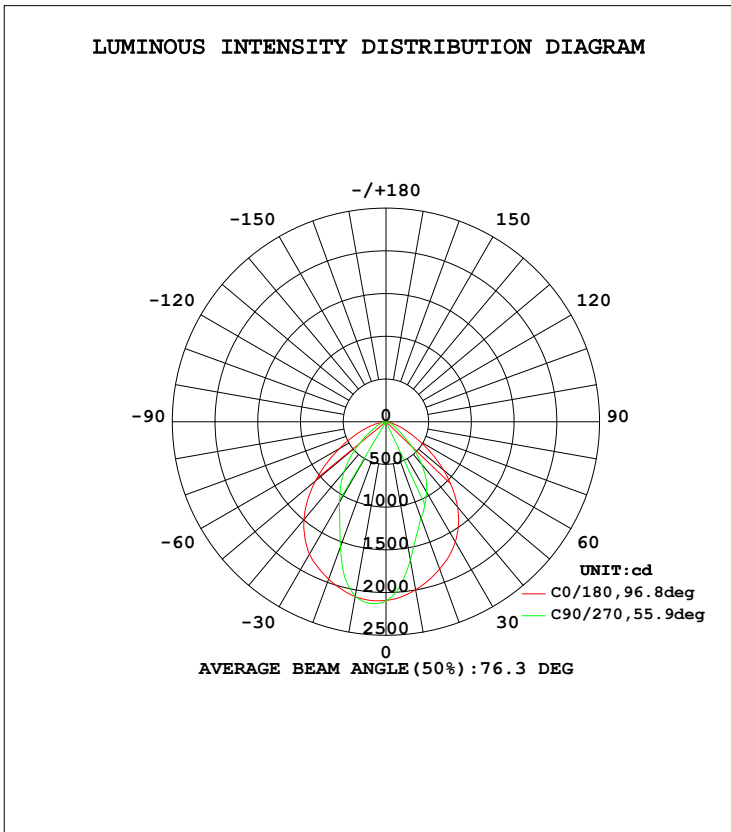
EUT Photo



LUMINAIRE PHOTOMETRIC TEST REPORT

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 110.99 lm/W			
MODEL	FL31A-30-4000K	I _{max} (cd)	2142	S/MH (C0/180)	1.16
NOMINAL POWER (W)	30	LOR (%)	100.0	S/MH (C90/270)	0.68
RATED VOLTAGE (V)	120.0	TOTAL FLUX (lm)	3419.5	η UP, DN (C0-180)	0.0, 55.0
NOMINAL FLUX (lm)	3419.47	CIE CLASS	DIRECT	η UP, DN (C180-360)	0.0, 45.0
LAMPS INSIDE	1	η up (%)	0.0	CIBSE SHR NOM	1.00
TEST VOLTAGE (V)	120.0	η down (%)	100.0	CIBSE SHR MAX	1.05



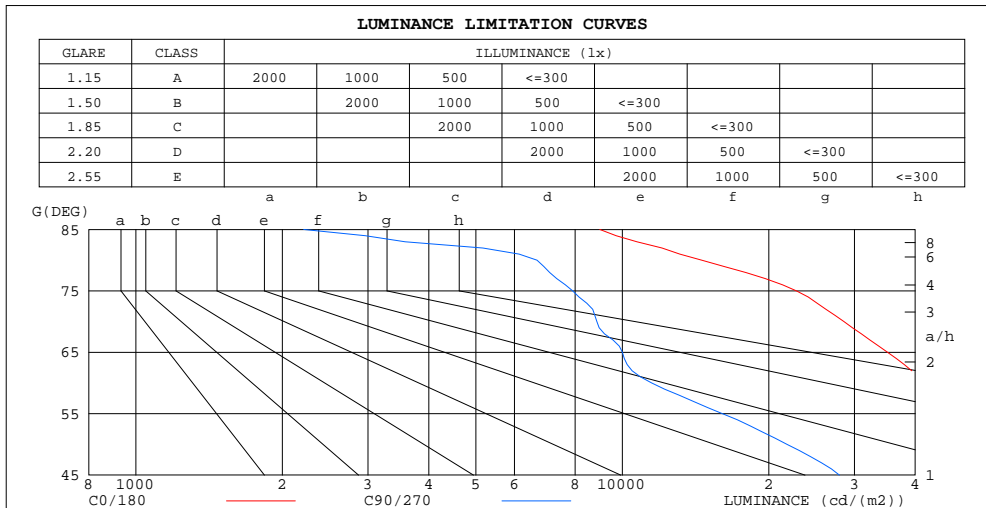
C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity: 67.1%
 Test Distance: 2.476m [K=1.0000]
 Remarks:

**ZONAL FLUX DIAGRAM
AND LUMINANCE LIMITATION CURVES**

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	$\#lum$
10	2077	2122	2072	2068	1998	1753	1644	1833	0- 10	192.6	192.6	5.63
20	1961	1851	1560	1810	1836	1325	1202	1425	10- 20	502.2	694.9	20.3
30	1791	1355	1091	1345	1624	1036	950.6	1124	20- 30	668.1	1363	39.9
40	1494	979.9	763.9	951.6	1303	782.1	649.4	899.5	30- 40	714.7	2078	60.8
50	1079	665.3	420.6	621.8	880.7	455.8	293.1	622.2	40- 50	629.0	2707	79.2
60	626.5	328.9	172.3	277.3	451.7	160.1	115.5	277.1	50- 60	419.9	3127	91.4
70	293.1	115.7	90.98	88.62	168.8	52.57	52.64	80.88	60- 70	204.7	3331	97.4
80	75.86	47.25	34.79	28.00	23.93	12.53	15.37	25.23	70- 80	75.04	3406	99.6
90	3.906	0.2261	0	0.0031	0.0301	0.0192	0.0084	0.6566	80- 90	12.79	3419	100
100	0	0	0	0	0.0043	0	0	0	90-100	0.0680	3419	100
110	0.0077	0	0	0	0.0213	0.0042	0	0	100-110	0.0015	3419	100
120	0.0349	0.0066	0.0002	0.0189	0.0557	0.0254	0.0089	0.0169	110-120	0.0123	3419	100
130	0.0591	0.0235	0.0146	0.0418	0.0972	0.0589	0.0322	0.0484	120-130	0.0302	3419	100
140	0.1033	0.0579	0.0504	0.0762	0.1134	0.0859	0.0583	0.0733	130-140	0.0482	3419	100
150	0.1585	0.1099	0.0978	0.1277	0.1260	0.1180	0.0927	0.0963	140-150	0.0596	3419	100
160	0.1898	0.1578	0.1457	0.1720	0.1492	0.1532	0.1392	0.1337	150-160	0.0625	3419	100
170	0.1797	0.1752	0.1771	0.1842	0.1460	0.1487	0.1542	0.1540	160-170	0.0471	3419	100
180	0.1533	0.1512	0.1481	0.1530	0.1506	0.1507	0.1488	0.1508	170-180	0.0140	3419	100
DEG	LUMINOUS INTENSITY:cd								UNIT:lm			



LUMINANCE cd/(m2)		
G(DEG)	C0/180	C90/270
85	8989	2212
80	14562	6677
75	22800	7907
70	28563	8867
65	35077	9999
60	41769	11485
55	49371	16063
50	55973	21810
45	61207	27940

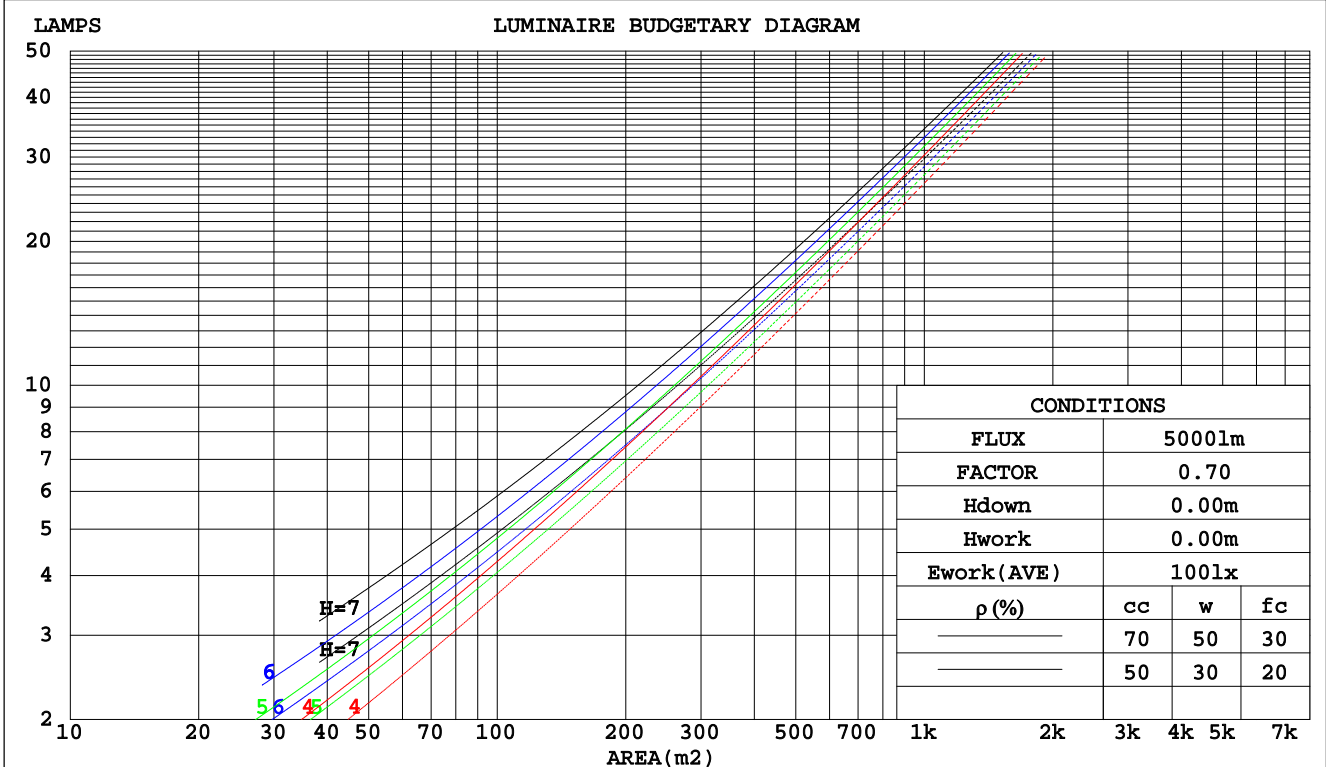
C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:

pcc	80%			70%			50%			30%			10%			0
	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
pw																0
pfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio Coefficients of Utilization(CU)															
0.0	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	.00
1.0	1.07	1.04	1.01	1.05	1.02	.99	1.01	.99	.96	.97	.95	.93	.94	.92	.91	.89
2.0	.96	.91	.86	.94	.89	.85	.91	.87	.83	.88	.84	.81	.85	.82	.80	.78
3.0	.87	.80	.74	.85	.79	.74	.82	.77	.72	.80	.75	.71	.77	.73	.70	.68
4.0	.78	.71	.65	.77	.70	.65	.75	.69	.64	.72	.67	.63	.70	.66	.62	.60
5.0	.71	.63	.58	.70	.63	.57	.68	.62	.57	.66	.60	.56	.64	.59	.56	.54
6.0	.65	.57	.51	.64	.57	.51	.62	.56	.51	.61	.55	.50	.59	.54	.50	.48
7.0	.59	.52	.46	.59	.51	.46	.57	.51	.46	.56	.50	.45	.55	.49	.45	.43
8.0	.55	.47	.42	.54	.47	.42	.53	.46	.42	.52	.46	.41	.51	.45	.41	.39
9.0	.51	.43	.38	.50	.43	.38	.49	.43	.38	.48	.42	.38	.47	.42	.38	.36
10.0	.47	.40	.35	.47	.40	.35	.46	.39	.35	.45	.39	.35	.44	.39	.35	.33



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

WEC AND CCEC

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Wall Exitance Coefficients(WEC)									
0.0																
1.0	.243	.138	.044	.236	.134	.043	.223	.128	.041	.211	.122	.039	.200	.116	.037	
2.0	.236	.129	.040	.230	.126	.039	.218	.121	.038	.208	.117	.037	.199	.112	.035	
3.0	.224	.119	.036	.218	.117	.035	.209	.113	.034	.200	.109	.034	.191	.106	.033	
4.0	.211	.110	.032	.206	.108	.032	.198	.105	.031	.190	.102	.031	.182	.099	.030	
5.0	.198	.101	.029	.194	.100	.029	.187	.097	.029	.180	.095	.028	.173	.092	.028	
6.0	.187	.094	.027	.183	.092	.027	.176	.090	.026	.170	.088	.026	.164	.086	.026	
7.0	.176	.087	.025	.173	.086	.025	.167	.084	.024	.161	.083	.024	.156	.081	.024	
8.0	.166	.081	.023	.163	.080	.023	.158	.079	.023	.153	.077	.022	.148	.076	.022	
9.0	.157	.076	.021	.154	.075	.021	.150	.074	.021	.145	.073	.021	.141	.071	.021	
10.0	.149	.071	.020	.146	.071	.020	.142	.070	.020	.138	.068	.019	.134	.067	.019	

ρcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.191	.191	.191	.163	.163	.163	.111	.111	.111	.064	.064	.064	.020	.020	.020	
1.0	.176	.157	.140	.150	.135	.120	.103	.093	.083	.059	.054	.048	.019	.017	.016	
2.0	.165	.132	.105	.141	.114	.091	.097	.079	.063	.056	.046	.037	.018	.015	.012	
3.0	.156	.114	.081	.133	.098	.070	.092	.068	.049	.053	.040	.029	.017	.013	.010	
4.0	.147	.100	.064	.127	.087	.056	.087	.060	.039	.050	.035	.023	.016	.012	.008	
5.0	.140	.089	.052	.120	.077	.045	.083	.054	.032	.048	.032	.019	.015	.010	.006	
6.0	.133	.081	.043	.114	.070	.038	.079	.049	.027	.046	.029	.016	.015	.009	.005	
7.0	.127	.074	.036	.109	.064	.032	.075	.045	.022	.044	.026	.013	.014	.009	.004	
8.0	.121	.068	.031	.104	.059	.027	.072	.041	.019	.042	.024	.012	.014	.008	.004	
9.0	.115	.063	.027	.099	.055	.024	.069	.038	.017	.040	.023	.010	.013	.007	.003	
10.0	.110	.059	.024	.095	.051	.021	.066	.036	.015	.038	.021	.009	.012	.007	.003	

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

UGR(Unified Glare Rating) Table

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm										
NAME:					TYPE:FL31A-30-4000K			WEIGHT:		
SPEC.:					DIM.:			SERIAL No.:		
MFR.: Supertek					SUR.:			PROTECTION ANGLE:		
ceiling/cavity	0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
walls	0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimensions	Viewed crosswise					Viewed endwise				
x = 2H y = 2H	26.9	28.2	27.1	28.4	28.6	21.8	23.1	22.1	23.3	23.5
3H	27.6	28.8	27.9	29.1	29.3	22.1	23.3	22.4	23.6	23.8
4H	27.8	29.0	28.1	29.2	29.5	22.3	23.4	22.6	23.6	23.9
6H	27.9	29.0	28.2	29.2	29.5	22.4	23.4	22.7	23.7	23.9
8H	27.9	28.9	28.2	29.2	29.5	22.4	23.4	22.7	23.7	23.9
12H	27.9	28.9	28.2	29.1	29.4	22.3	23.3	22.7	23.6	23.9
4H 2H	26.8	28.0	27.1	28.2	28.4	22.5	23.7	22.8	23.9	24.2
3H	27.7	28.7	28.0	29.0	29.2	22.9	23.9	23.3	24.2	24.5
4H	27.9	28.8	28.3	29.1	29.5	23.1	24.0	23.5	24.3	24.6
6H	28.1	28.9	28.5	29.2	29.6	23.3	24.1	23.7	24.4	24.8
8H	28.1	28.8	28.5	29.2	29.6	23.3	24.0	23.7	24.4	24.8
12H	28.1	28.7	28.5	29.1	29.5	23.3	23.9	23.7	24.3	24.7
8H 4H	27.9	28.6	28.3	29.0	29.3	23.3	24.0	23.7	24.4	24.7
6H	28.0	28.6	28.5	29.0	29.5	23.5	24.1	24.0	24.5	24.9
8H	28.1	28.6	28.5	29.0	29.5	23.6	24.1	24.0	24.5	25.0
12H	28.1	28.6	28.6	29.0	29.5	23.6	24.0	24.1	24.5	24.9
12H 4H	27.8	28.5	28.3	28.9	29.3	23.3	23.9	23.7	24.3	24.7
6H	28.0	28.5	28.5	29.0	29.4	23.5	24.1	24.0	24.5	24.9
8H	28.1	28.5	28.5	29.0	29.4	23.6	24.1	24.1	24.5	25.0
Variations with the observer position at spacings:										
S = 1.0H	+ 0.3 / - 0.5					+ 0.9 / - 1.1				
1.5H	+ 0.4 / - 1.0					+ 0.4 / - 0.9				
2.0H	+ 1.3 / - 2.2					+ 1.4 / - 2.2				

CIE Pub.117 Corrected 3419 lm Total Lamp Luminous Flux.(8log(F/F0) = 4.3)

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

UTILIZATION FACTORS TABLE

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:

REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) k(RI) x RCR = 5									
k = 0.60	67	57	51	66	56	51	65	56	50	45
0.80	77	67	61	76	67	61	74	66	60	54
1.00	85	76	70	84	75	69	82	76	69	63
1.25	91	83	77	90	82	77	87	81	76	70
1.50	95	88	82	94	87	82	91	85	81	74
2.00	101	94	89	99	93	89	96	91	87	80
2.50	104	98	93	102	97	92	99	94	90	83
3.00	107	101	97	105	100	96	101	97	94	86
4.00	110	105	102	107	103	100	103	100	98	89
5.00	111	108	105	109	106	103	105	102	100	91
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended				SHRNOM = 1.25			

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

ISOCANDELA DIAGRAM

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:

Conical surface Flux(90deg):

2412.1 lm

%lum = 70.5%

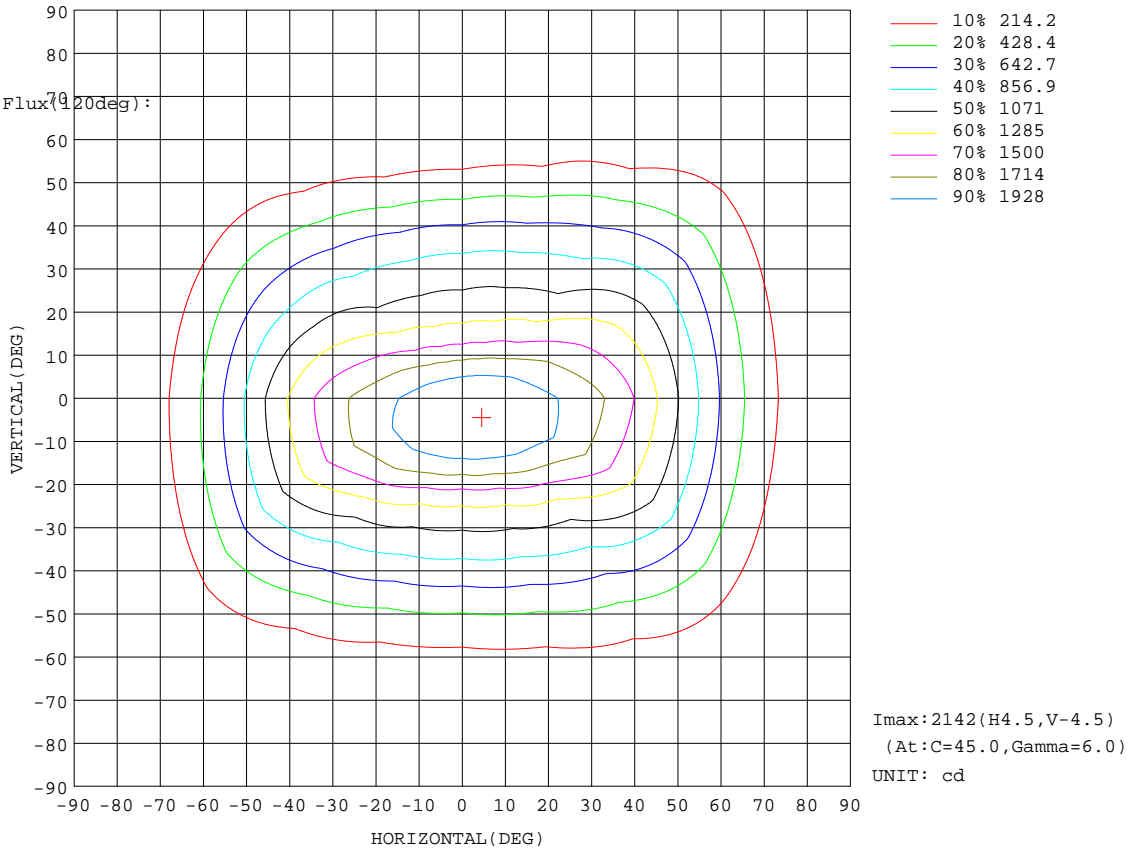
%lamp = 70.5%

Conical surface Flux(70deg):

3126.6 lm

%lum = 91.4%

%lamp = 91.4%

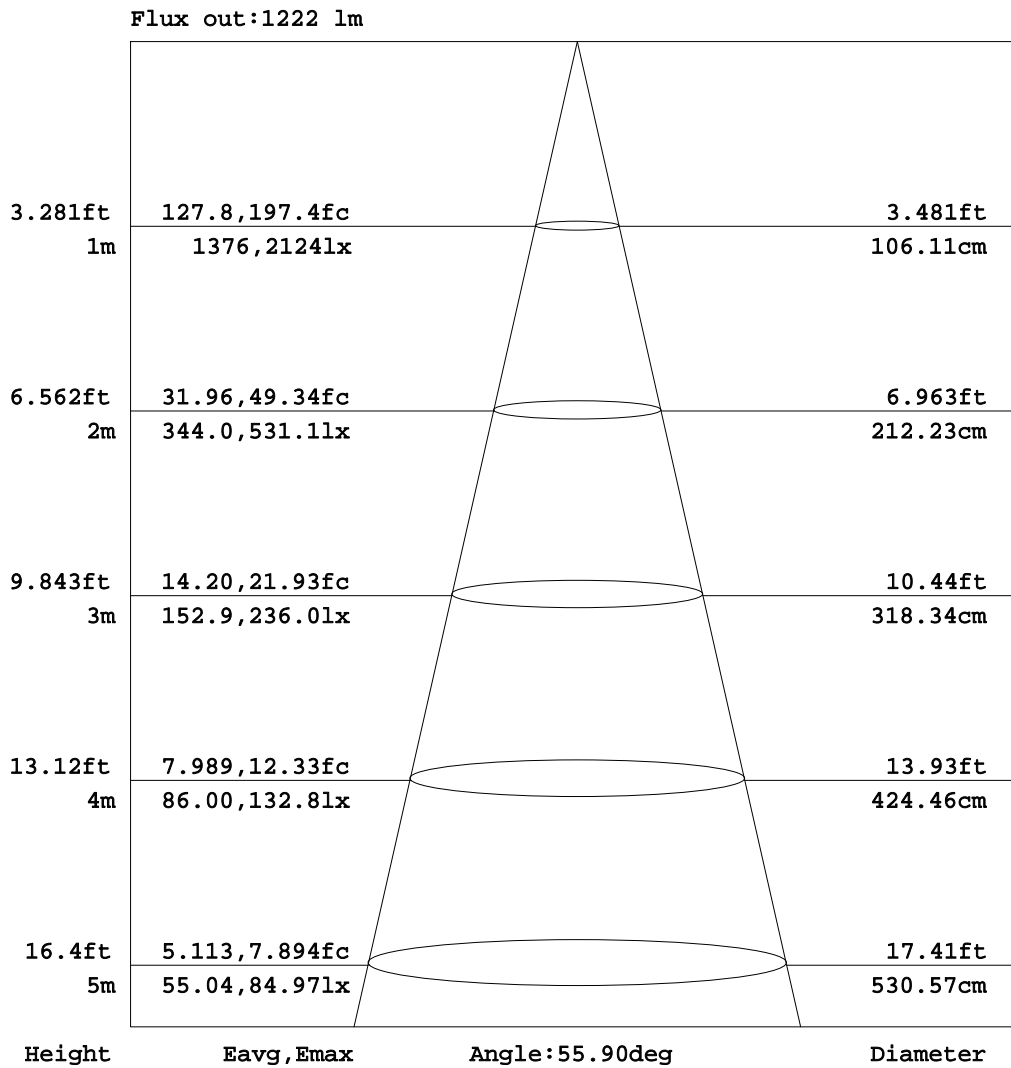


C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature: 25.6DEG
 Operators: David
 Test Date: 2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity: 67.1%
 Test Distance: 2.476m [K=1.0000]
 Remarks:

AAI Figure

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:



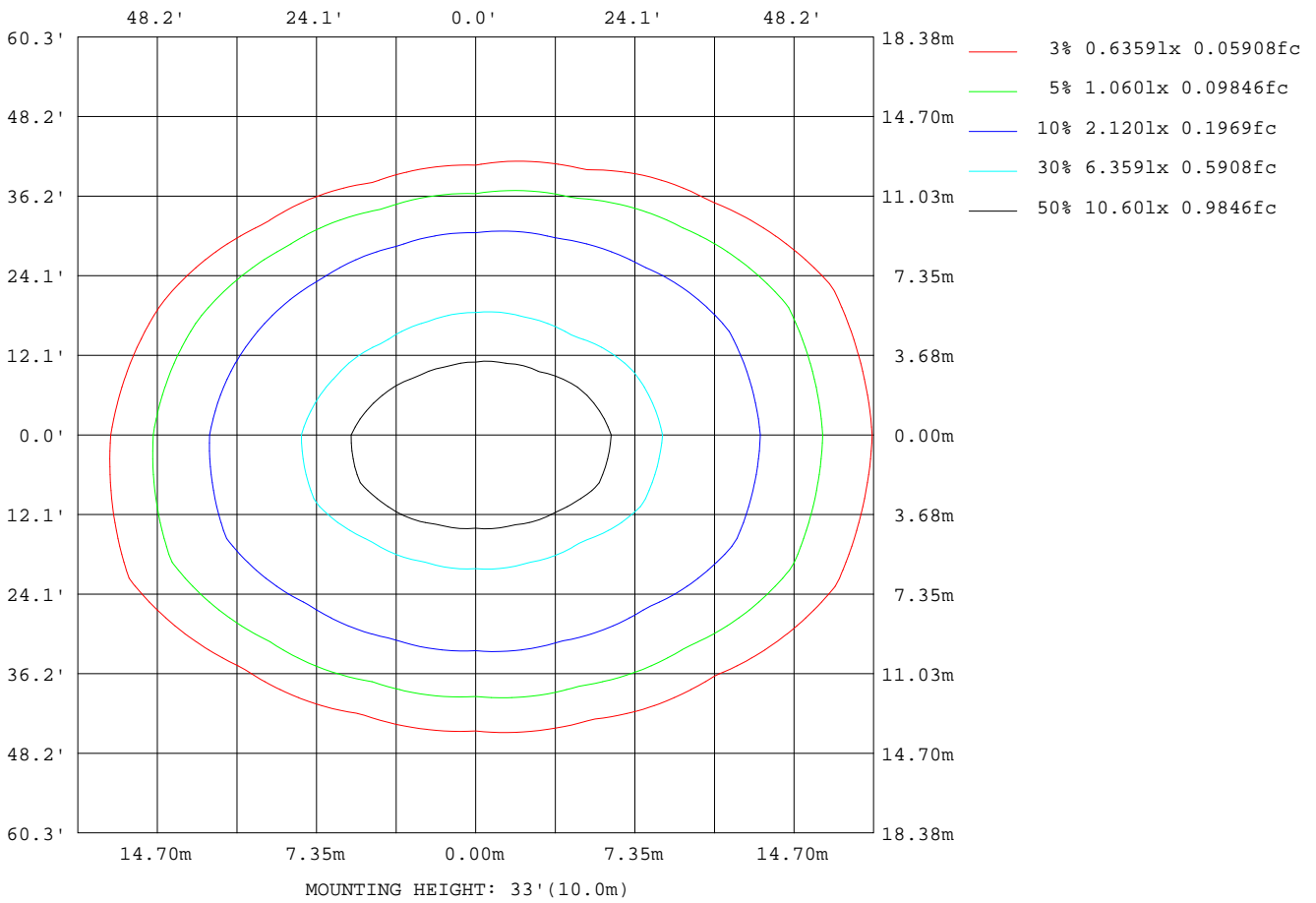
Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

ISOLUX DIAGRAM

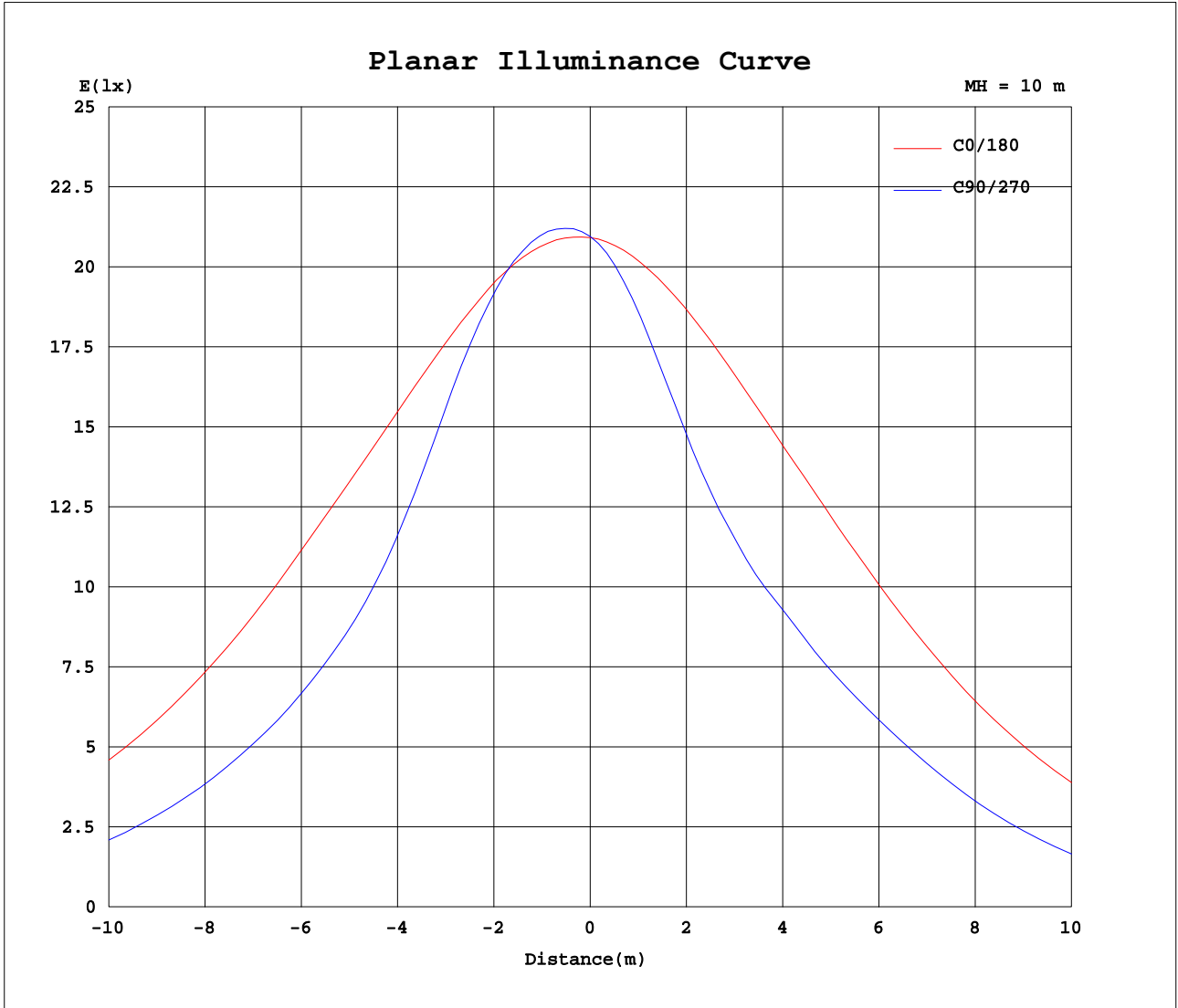
Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.6DEG
Operators:David
Test Date:2016-09-08

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
Humidity:67.1%
Test Distance:2.476m [K=1.0000]
Remarks:

LUMINOUS DISTRIBUTION INTENSITY DATA

Test:U:120.0V I:0.2608A P:30.81W PF:0.9843 Lamp Flux:3419.47x1 lm		
NAME:	TYPE:FL31A-30-4000K	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: Supertek	SUR.:	PROTECTION ANGLE:

Table--1

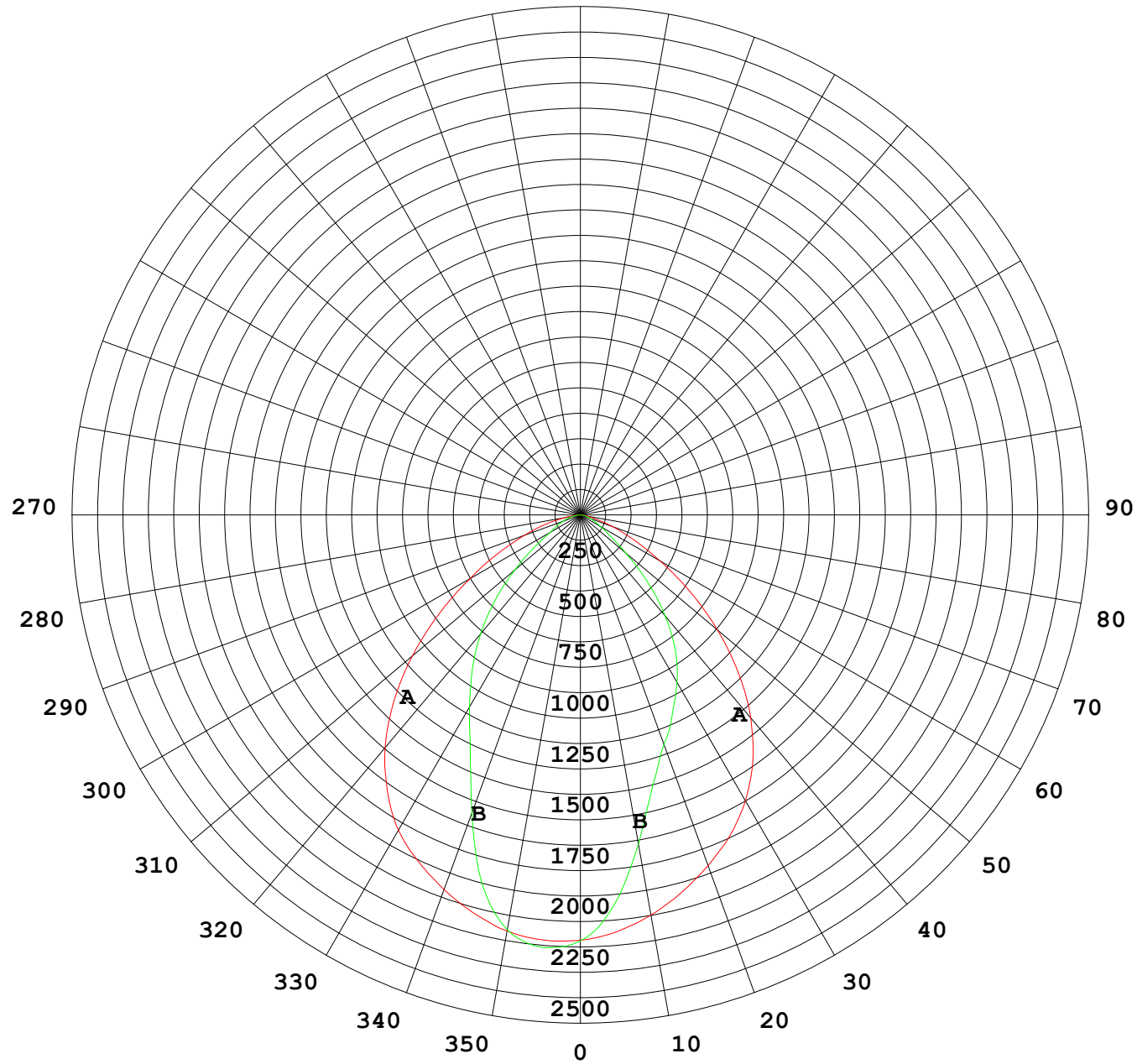
UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	2091	2093	2092	2095	2095	2097	2097	2093	2091	2093	2092	2095	2095	2097	2097	2093			
5	2098	2128	2139	2140	2135	2127	2114	2088	2058	2014	1963	1928	1924	1953	2005	2059			
10	2077	2120	2122	2097	2072	2071	2068	2045	1998	1890	1753	1661	1644	1704	1833	1981			
15	2028	2072	2027	1928	1875	1906	1969	1974	1922	1744	1523	1401	1377	1448	1625	1872			
20	1961	1991	1851	1643	1560	1635	1810	1881	1836	1585	1325	1209	1202	1256	1425	1749			
25	1883	1880	1607	1355	1283	1344	1591	1770	1741	1434	1156	1087	1073	1133	1263	1621			
30	1791	1748	1355	1147	1091	1130	1345	1635	1624	1299	1036	956	951	1005	1124	1496			
35	1656	1589	1140	981	927	967	1126	1476	1479	1159	912	825	814	883	1015	1375			
40	1494	1401	980	822	764	803	952	1295	1303	1003	782	667	649	736	899	1253			
45	1298	1220	829	657	593	631	792	1107	1100	841	626	489	468	566	772	1109			
50	1079	1029	665	486	421	459	622	915	881	676	456	311	293	388	622	946			
55	850	818	495	329	276	302	443	712	660	503	285	182	174	236	452	762			
60	627	600	329	207	172	187	277	510	452	328	160	112	115	140	277	571			
65	445	397	199	136	127	119	155	320	289	177	87.2	74.7	78.2	88.0	149	387			
70	293	225	116	97.2	91.0	86.4	88.6	171	169	83.5	52.6	49.5	52.6	59.7	80.9	233			
75	177	112	76.4	68.7	61.4	57.4	55.8	77.1	75.9	38.3	29.4	28.6	31.1	36.6	48.5	120			
80	75.9	55.1	47.3	40.3	34.8	31.2	28.0	31.2	23.9	15.2	12.5	13.0	15.4	18.7	25.2	51.6			
85	23.5	23.9	20.5	9.63	5.78	4.95	3.69	6.56	3.76	2.30	1.83	2.51	3.68	5.81	9.07	19.5			
90	3.91	3.63	0.23	0.00	0.00	0.00	0.00	0.01	0.03	0.04	0.02	0.00	0.01	0.07	0.66	2.16			
95	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02			
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00			
110	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.01			
115	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.04	0.03	0.01	0.00	0.00	0.00	0.01	0.02			
120	0.03	0.02	0.01	0.00	0.00	0.01	0.02	0.04	0.06	0.05	0.03	0.01	0.01	0.01	0.02	0.03			
125	0.05	0.03	0.01	0.01	0.01	0.01	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.02	0.03	0.05			
130	0.06	0.04	0.02	0.02	0.01	0.02	0.04	0.07	0.10	0.09	0.06	0.04	0.03	0.04	0.05	0.07			
135	0.08	0.06	0.04	0.03	0.03	0.04	0.06	0.09	0.11	0.10	0.07	0.05	0.05	0.05	0.06	0.08			
140	0.10	0.08	0.06	0.05	0.05	0.06	0.08	0.11	0.11	0.11	0.09	0.07	0.06	0.06	0.07	0.09			
145	0.13	0.11	0.08	0.07	0.07	0.08	0.10	0.13	0.12	0.12	0.10	0.08	0.07	0.07	0.08	0.10			
150	0.16	0.14	0.11	0.10	0.10	0.11	0.13	0.16	0.13	0.13	0.12	0.10	0.09	0.09	0.10	0.11			
155	0.18	0.16	0.14	0.12	0.12	0.13	0.15	0.18	0.14	0.14	0.13	0.12	0.11	0.11	0.11	0.13			
160	0.19	0.17	0.16	0.15	0.15	0.15	0.17	0.19	0.15	0.15	0.15	0.15	0.14	0.13	0.13	0.14			
165	0.19	0.18	0.17	0.17	0.17	0.17	0.19	0.20	0.16	0.17	0.17	0.17	0.16	0.16	0.16	0.16			
170	0.18	0.18	0.18	0.17	0.18	0.18	0.18	0.19	0.15	0.15	0.15	0.15	0.15	0.16	0.15	0.15			
175	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12			
180	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15			

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.6DEG
 Operators:David
 Test Date:2016-09-08

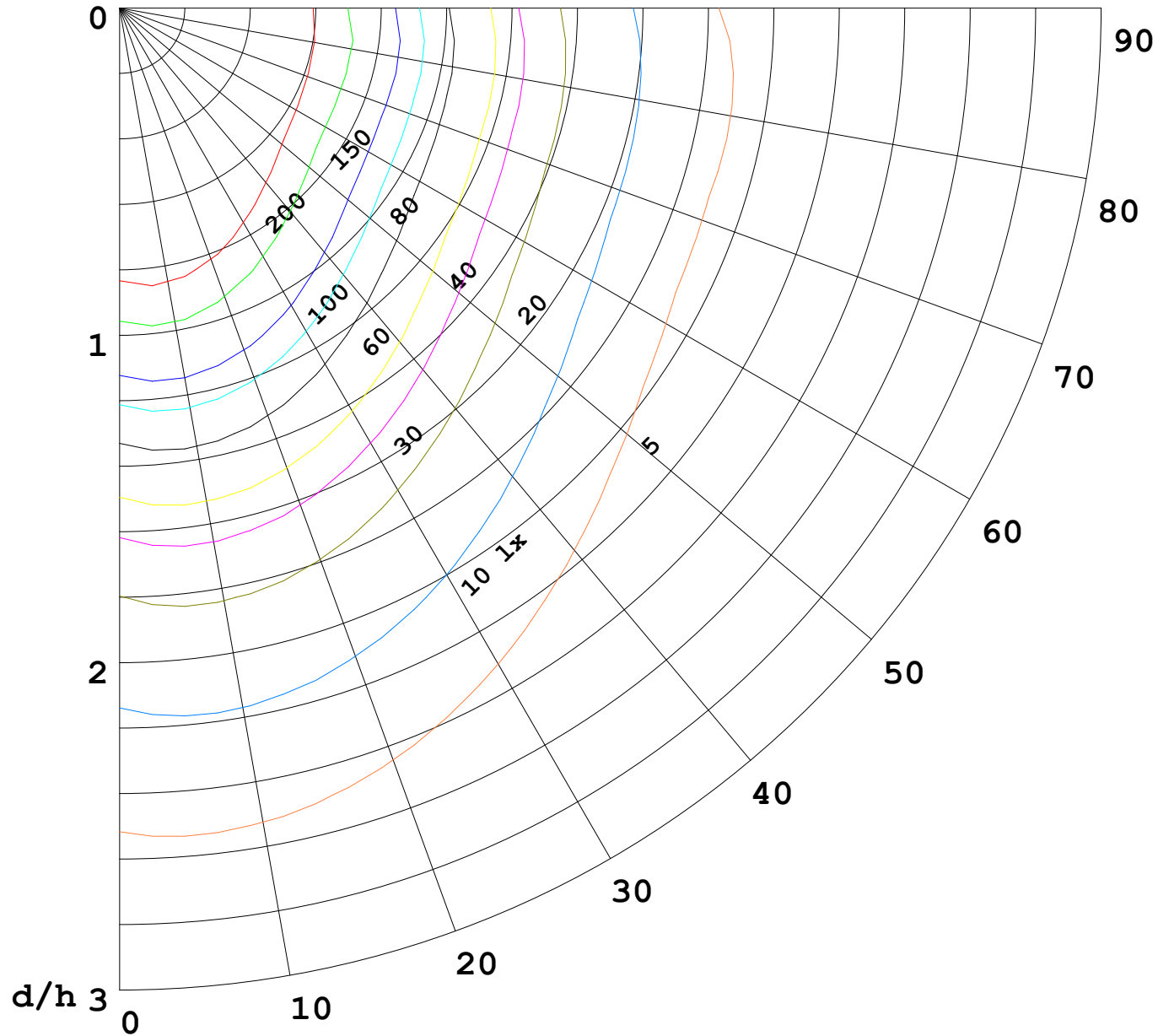
γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:67.1%
 Test Distance:2.476m [K=1.0000]
 Remarks:

I (cd)



1000 lm

$K = 1$



F = 5000 lm
K = 0.7
Hcc = 0.0 m
Hfc = 0.0 m
Eave = 100 lx

	Pcc	Pw	Pfc
—————	70	50	30
—————	50	30	20

