LM-79-08 Test Report

For

LEDVANCE LLC

200 Ballardvale St. Wilmington MA 01887

LED LAMP

Model Name(s):
LED18A21UNVCL840MED
LED18A21UNVCL850MED

Representative (Tested) Model:
LED18A21UNVCL840MED
LED18A21UNVCL850MED

Model Difference: All construction and rating are the same, except CCT

Prepared by:

Engineer: Alan Wang
Date: 2022-12-29

Reviewed by:

Technical Lead: Vincent Yuan
Issue Date: 2023-02-13
Revised Date: N/A

Note:
1. The results contained in this report pertain only to the tested samples.
2. This report shall not be reproduced, no limited part or full, without approval of Dongguan New Testing Centre Co., Ltd
3. This report d not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

Client Information:

Applicant Name:	LEDVANCE LLC
Brand Name:	SYLVANIA, LEDVANCE, SIMPLY DONE

Product Information:

Model Number:	LED18A21UNVCL840MED LED18A21UNVCL850MED
Product Type:	LED LAMP
Rating Input:	120-277Vac, 50/60Hz, 18W
Declared CCT:	4000K,5000K
Declared Light Output:	2605lm
LED Manufacturer:	N/A
LED Model:	N/A

Test Information:

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST. 1. D908S for Gonio 2. D215S for Integrating Sphere
Date of Receipt Samples:	2022-04-08
Quantity of Receipt Samples:	2 pc
Sample Number:	221216002-S1(4000K), S2(5000K)

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1st North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_zhong@ntc-cert.com

Report Information:

Test Report Form:	LM-79-08_TRF_V1.5
Issued Date of Test Report:	2023-02-13
Revised Date of Test Report:	N/A
Test Report No.:	NTCLR22120223
Remark *(If applicable)*:	N/A

Test Specification:	
Date of Test	2022-04-10
Test Item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Fidelity Index 8. Gamut Index 9. Local Chroma Shift 10. THD and PF
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2017 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry ANSI IES TM-30-18 IES Method for Evaluating Light Source Color Rendition ANSI C78.77-10-2014 Harmonic Emission Limits – Related Power Quality Requirements IES TM-15-11 Luminaire Classification System for Outdoor Luminaires Addendum A for IES TM-15-11 Backlight, Uplight, and Glare (BUG) Ratings

Test Methods:

1. Photometric and Electrical Measurements – Light Distribution Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25 °C ± 1°C, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at 1° vertical intervals and 15° horizonal intervals.

2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at 25 °C± 1°C. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at require Voltage and Frequency. It was stabilized before measurement was made. Chromaticity Coordinates, Correlated Color Temperature and Color Rendering Index were calculated from the spectral radiant flux measurements taken at least 1 nm intervals over the rage of 380 to 780 nm.

3. THD and PF Measurements:

The sample was tested according to the ANSI C82.77, the sample was operated at requirement Voltage and Frequency, and was stabilized before measurement. The Total Harmonic Distortion was calculated from the Digital Power Meter.

Integrating Sphere Test Results:4000K

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.0	41.0	Face Down	90	10

Electrical Data:

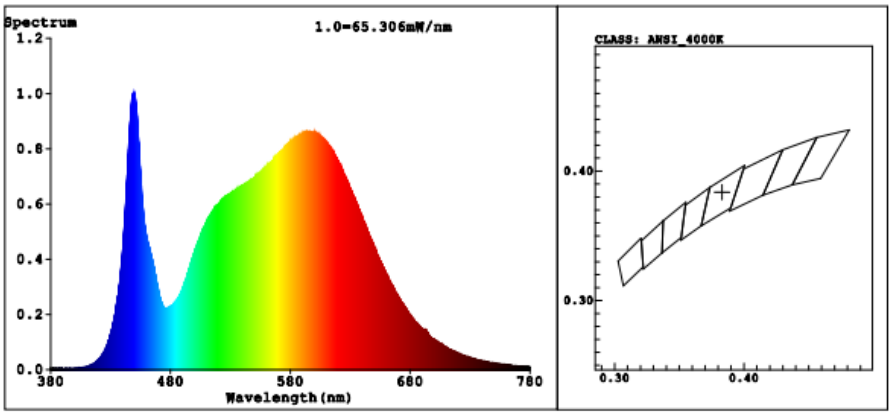
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60.01	0.1473	17.58	0.9949

Color Data:

Parameter	Result
CCT(K)	3982
Ra	83.2
R_f	85
R_g	96
$R_{cs,\ h1}$	-12
Chromaticity, (x, y)	(0.3830,0.3836)
Chromaticity, (u', v')	(0.2240,0.5050)
Duv	0.0025

Specify Color Rendering			
R1	81	R9	9
R2	88	R10	73
R3	94	R11	83
R4	83	R12	62
R5	82	R13	83
R6	84	R14	97
R7	87	R15	75
R8	65	-	-

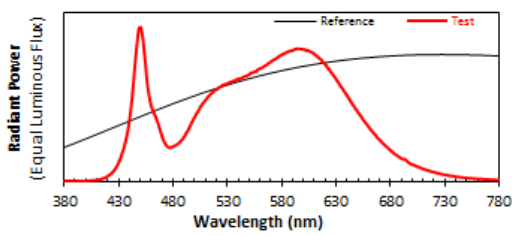
Spectrum Diagram:

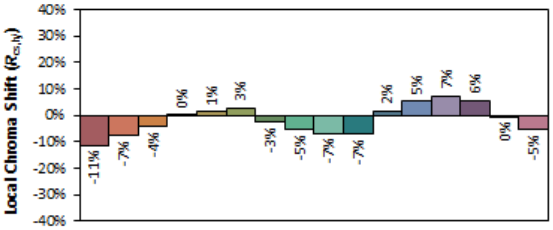


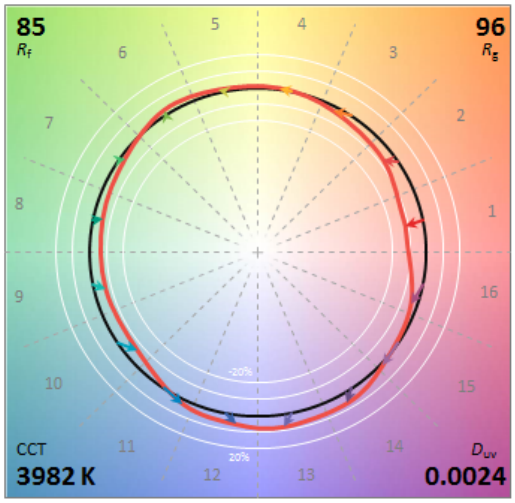
IES TM-30-18 Color Rendition Result (4000K):

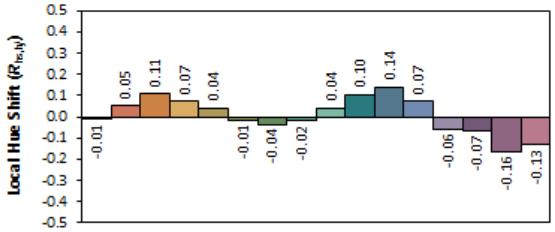
ANSI/IES TM-30-18 Color Rendition Report

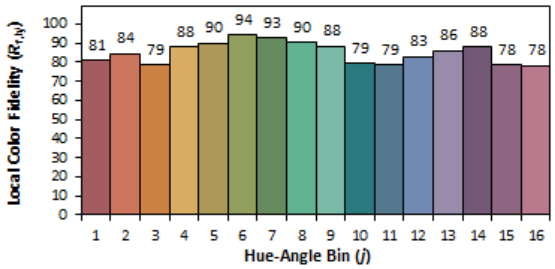
Source: --
Manufacturer: LEDVANCE LLC
Date: 2022/4/10
Model: LED18A21UNVCL840MED

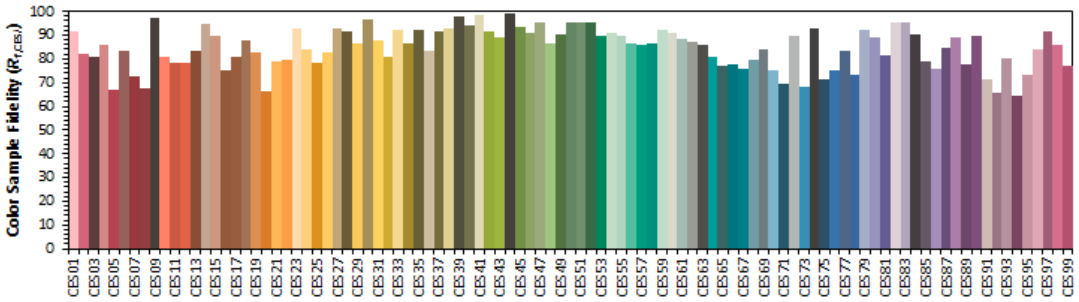












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3830
y	0.3835
u'	0.2241
v'	0.5049

CIE 13.3-1995 (CRI)

R_a	83
R_9	9

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Spectrum Data (4000K):

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0040	447	0.9233	514	0.5633	581	0.8261	648	0.4654	715	0.0685
381	0.0033	448	0.9831	515	0.5719	582	0.8307	649	0.4556	716	0.0664
382	0.0045	449	0.9995	516	0.5772	583	0.8332	650	0.4458	717	0.0649
383	0.0019	450	0.9990	517	0.5865	584	0.8354	651	0.4340	718	0.0630
384	0.0040	451	0.9627	518	0.5895	585	0.8411	652	0.4265	719	0.0605
385	0.0031	452	0.9186	519	0.5949	586	0.8429	653	0.4138	720	0.0589
386	0.0028	453	0.8478	520	0.5974	587	0.8443	654	0.4051	721	0.0576
387	0.0040	454	0.7804	521	0.6016	588	0.8491	655	0.3932	722	0.0549
388	0.0032	455	0.7017	522	0.6089	589	0.8475	656	0.3862	723	0.0528
389	0.0046	456	0.6318	523	0.6146	590	0.8525	657	0.3750	724	0.0512
390	0.0025	457	0.5805	524	0.6162	591	0.8546	658	0.3676	725	0.0499
391	0.0029	458	0.5391	525	0.6238	592	0.8593	659	0.3576	726	0.0481
392	0.0025	459	0.5050	526	0.6253	593	0.8585	660	0.3474	727	0.0458
393	0.0028	460	0.4795	527	0.6290	594	0.8628	661	0.3382	728	0.0450
394	0.0022	461	0.4613	528	0.6312	595	0.8595	662	0.3313	729	0.0441
395	0.0029	462	0.4438	529	0.6315	596	0.8598	663	0.3208	730	0.0425
396	0.0033	463	0.4300	530	0.6374	597	0.8586	664	0.3137	731	0.0411
397	0.0024	464	0.4110	531	0.6388	598	0.8592	665	0.3044	732	0.0403
398	0.0026	465	0.3917	532	0.6437	599	0.8546	666	0.2981	733	0.0385
399	0.0033	466	0.3733	533	0.6446	600	0.8575	667	0.2870	734	0.0365
400	0.0028	467	0.3501	534	0.6493	601	0.8543	668	0.2784	735	0.0362
401	0.0042	468	0.3271	535	0.6498	602	0.8477	669	0.2740	736	0.0344
402	0.0028	469	0.3059	536	0.6542	603	0.8526	670	0.2652	737	0.0341
403	0.0044	470	0.2822	537	0.6553	604	0.8487	671	0.2590	738	0.0327
404	0.0047	471	0.2639	538	0.6612	605	0.8440	672	0.2505	739	0.0312
405	0.0062	472	0.2491	539	0.6620	606	0.8420	673	0.2433	740	0.0300
406	0.0060	473	0.2393	540	0.6669	607	0.8367	674	0.2378	741	0.0294
407	0.0061	474	0.2281	541	0.6676	608	0.8354	675	0.2298	742	0.0284
408	0.0075	475	0.2229	542	0.6652	609	0.8290	676	0.2245	743	0.0280
409	0.0076	476	0.2209	543	0.6699	610	0.8244	677	0.2186	744	0.0267
410	0.0088	477	0.2188	544	0.6773	611	0.8156	678	0.2102	745	0.0258
411	0.0112	478	0.2204	545	0.6792	612	0.8124	679	0.2045	746	0.0249
412	0.0116	479	0.2237	546	0.6812	613	0.8052	680	0.1988	747	0.0246
413	0.0144	480	0.2280	547	0.6838	614	0.7984	681	0.1928	748	0.0231
414	0.0160	481	0.2304	548	0.6879	615	0.7934	682	0.1850	749	0.0229
415	0.0184	482	0.2337	549	0.6906	616	0.7897	683	0.1795	750	0.0222
416	0.0204	483	0.2384	550	0.6952	617	0.7730	684	0.1752	751	0.0217
417	0.0236	484	0.2432	551	0.7024	618	0.7700	685	0.1707	752	0.0203
418	0.0278	485	0.2488	552	0.7048	619	0.7620	686	0.1660	753	0.0203
419	0.0305	486	0.2570	553	0.7069	620	0.7554	687	0.1595	754	0.0193
420	0.0361	487	0.2632	554	0.7079	621	0.7454	688	0.1573	755	0.0198
421	0.0404	488	0.2707	555	0.7134	622	0.7333	689	0.1505	756	0.0184
422	0.0470	489	0.2813	556	0.7117	623	0.7293	690	0.1469	757	0.0181
423	0.0517	490	0.2902	557	0.7228	624	0.7148	691	0.1450	758	0.0166
424	0.0593	491	0.3044	558	0.7270	625	0.7062	692	0.1433	759	0.0166
425	0.0658	492	0.3171	559	0.7299	626	0.6977	693	0.1434	760	0.0161
426	0.0767	493	0.3248	560	0.7341	627	0.6873	694	0.1371	761	0.0161
427	0.0863	494	0.3422	561	0.7352	628	0.6809	695	0.1288	762	0.0155
428	0.1003	495	0.3544	562	0.7394	629	0.6685	696	0.1238	763	0.0149
429	0.1110	496	0.3704	563	0.7460	630	0.6572	697	0.1180	764	0.0146
430	0.1291	497	0.3850	564	0.7503	631	0.6487	698	0.1138	765	0.0142
431	0.1433	498	0.3966	565	0.7531	632	0.6365	699	0.1108	766	0.0133
432	0.1647	499	0.4128	566	0.7588	633	0.6244	700	0.1082	767	0.0130
433	0.1872	500	0.4228	567	0.7634	634	0.6143	701	0.1057	768	0.0127
434	0.2047	501	0.4388	568	0.7696	635	0.6049	702	0.1026	769	0.0125
435	0.2343	502	0.4474	569	0.7735	636	0.5953	703	0.0994	770	0.0116
436	0.2605	503	0.4595	570	0.7772	637	0.5832	704	0.0971	771	0.0116
437	0.2908	504	0.4720	571	0.7838	638	0.5739	705	0.0935	772	0.0111
438	0.3272	505	0.4855	572	0.7899	639	0.5601	706	0.0909	773	0.0108
439	0.3724	506	0.4943	573	0.7895	640	0.5537	707	0.0890	774	0.0100
440	0.4204	507	0.5064	574	0.7959	641	0.5395	708	0.0858	775	0.0099
441	0.4800	508	0.5134	575	0.8008	642	0.5313	709	0.0828	776	0.0102
442	0.5434	509	0.5222	576	0.8043	643	0.5172	710	0.0798	777	0.0095
443	0.6222	510	0.5321	577	0.8124	644	0.5054	711	0.0781	778	0.0092
444	0.7045	511	0.5398	578	0.8150	645	0.4982	712	0.0751	779	0.0088
445	0.7821	512	0.5507	579	0.8186	646	0.4861	713	0.0735	780	0.0083
446	0.8634	513	0.5579	580	0.8249	647	0.4743	714	0.0707	N/A	N/A

Integrating Sphere Test Results:5000K

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.0	41.0	Face Down	90	10

Electrical Data:

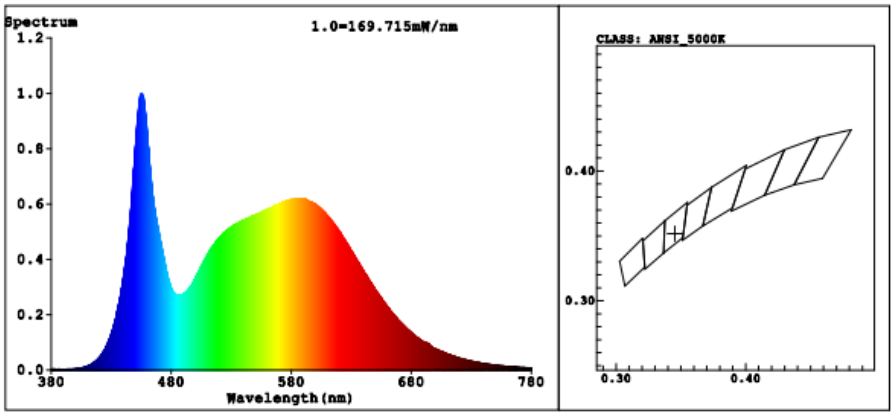
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60.01	0.1431	17.09	0.9949

Color Data:

Parameter	Result
CCT(K)	4994
Ra	84.0
R_f	83
R_g	95
$R_{cs,\ h1}$	-13
Chromaticity, (x, y)	(0.3453,0.3517)
Chromaticity, (u', v')	(0.2115,0.4847)
Duv	-0.0000

Specify Color Rendering			
R1	83	R9	14
R2	91	R10	77
R3	94	R11	79
R4	81	R12	57
R5	82	R13	86
R6	85	R14	97
R7	87	R15	78
R8	68	-	-

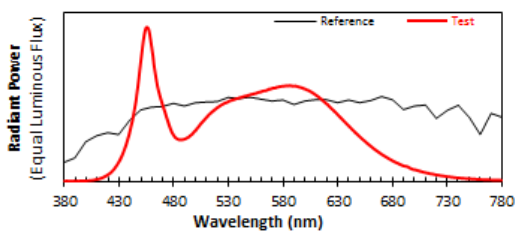
Spectrum Diagram:

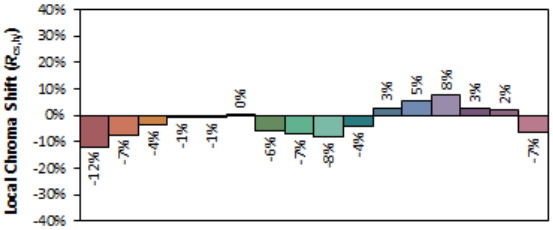


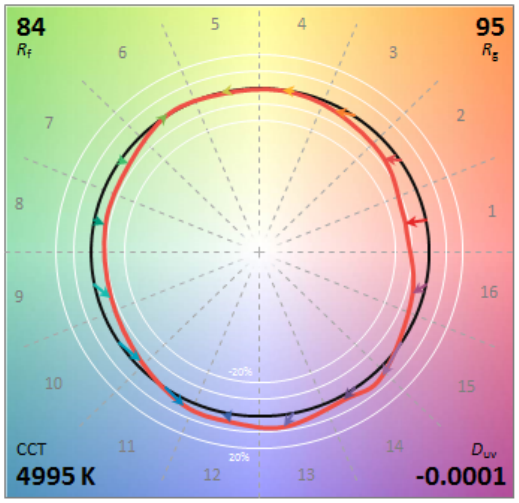
IES TM-30-18 Color Rendition Result (5000K):

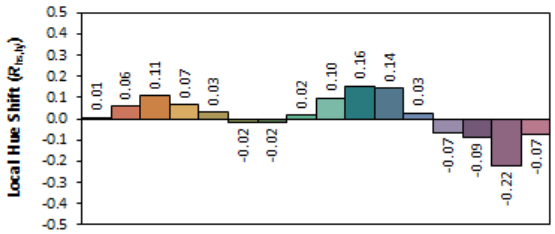
ANSI/IES TM-30-18 Color Rendition Report

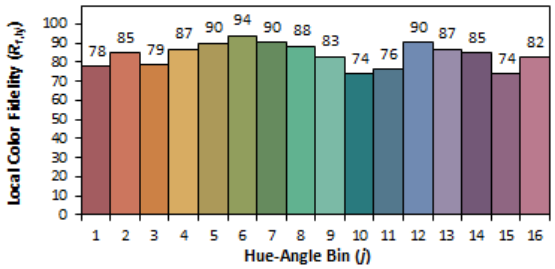
Source: --
Manufacturer: LEDVANCE LLC
Date: 2022/4/10
Model: LED18A21UNVCL850MED

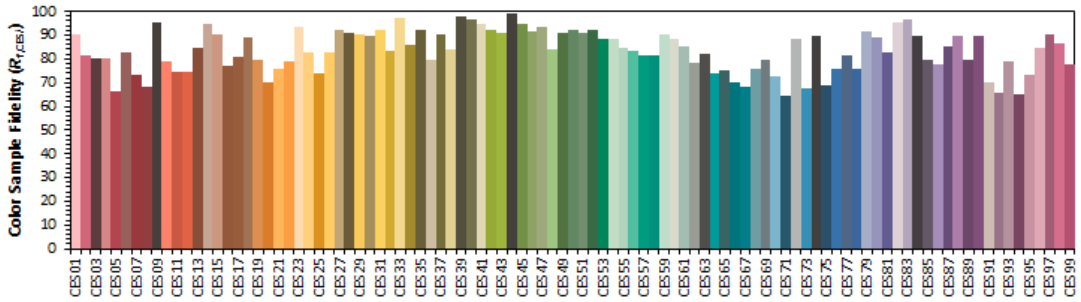












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.3452
y	0.3515
u'	0.2115
v'	0.4846

CIE 13.3-1995 (CRI)

R_a	84
R_9	14

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Spectrum Data (5000K):

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	0.0030	447	0.6105	514	0.4431	581	0.6156	648	0.3046	715	0.0503
381	0.0023	448	0.6705	515	0.4494	582	0.6169	649	0.2975	716	0.0489
382	0.0037	449	0.7308	516	0.4541	583	0.6175	650	0.2906	717	0.0474
383	0.0022	450	0.7911	517	0.4615	584	0.6174	651	0.2842	718	0.0463
384	0.0029	451	0.8496	518	0.4651	585	0.6168	652	0.2778	719	0.0449
385	0.0026	452	0.9050	519	0.4732	586	0.6190	653	0.2719	720	0.0432
386	0.0029	453	0.9497	520	0.4767	587	0.6186	654	0.2655	721	0.0422
387	0.0026	454	0.9824	521	0.4823	588	0.6177	655	0.2603	722	0.0407
388	0.0025	455	0.9963	522	0.4862	589	0.6159	656	0.2524	723	0.0399
389	0.0027	456	0.9921	523	0.4917	590	0.6161	657	0.2474	724	0.0381
390	0.0025	457	0.9803	524	0.4959	591	0.6168	658	0.2404	725	0.0371
391	0.0026	458	0.9446	525	0.4990	592	0.6148	659	0.2357	726	0.0361
392	0.0027	459	0.9009	526	0.5038	593	0.6138	660	0.2298	727	0.0349
393	0.0026	460	0.8527	527	0.5068	594	0.6110	661	0.2239	728	0.0342
394	0.0033	461	0.8009	528	0.5090	595	0.6093	662	0.2181	729	0.0331
395	0.0029	462	0.7436	529	0.5120	596	0.6073	663	0.2118	730	0.0321
396	0.0035	463	0.6969	530	0.5161	597	0.6063	664	0.2074	731	0.0314
397	0.0035	464	0.6526	531	0.5196	598	0.6021	665	0.2016	732	0.0302
398	0.0035	465	0.6159	532	0.5226	599	0.5996	666	0.1971	733	0.0295
399	0.0042	466	0.5841	533	0.5228	600	0.5984	667	0.1923	734	0.0286
400	0.0041	467	0.5578	534	0.5285	601	0.5940	668	0.1865	735	0.0275
401	0.0048	468	0.5341	535	0.5280	602	0.5910	669	0.1817	736	0.0266
402	0.0053	469	0.5108	536	0.5310	603	0.5890	670	0.1768	737	0.0261
403	0.0056	470	0.4870	537	0.5341	604	0.5846	671	0.1722	738	0.0250
404	0.0068	471	0.4664	538	0.5369	605	0.5815	672	0.1681	739	0.0243
405	0.0074	472	0.4460	539	0.5367	606	0.5769	673	0.1634	740	0.0237
406	0.0082	473	0.4203	540	0.5400	607	0.5725	674	0.1595	741	0.0230
407	0.0096	474	0.4002	541	0.5417	608	0.5681	675	0.1552	742	0.0224
408	0.0108	475	0.3783	542	0.5418	609	0.5630	676	0.1508	743	0.0216
409	0.0119	476	0.3569	543	0.5469	610	0.5585	677	0.1463	744	0.0208
410	0.0140	477	0.3376	544	0.5479	611	0.5536	678	0.1429	745	0.0204
411	0.0157	478	0.3216	545	0.5510	612	0.5489	679	0.1389	746	0.0200
412	0.0179	479	0.3076	546	0.5524	613	0.5423	680	0.1345	747	0.0192
413	0.0201	480	0.2959	547	0.5517	614	0.5353	681	0.1312	748	0.0188
414	0.0224	481	0.2865	548	0.5569	615	0.5327	682	0.1272	749	0.0181
415	0.0254	482	0.2801	549	0.5566	616	0.5254	683	0.1239	750	0.0178
416	0.0291	483	0.2746	550	0.5601	617	0.5186	684	0.1206	751	0.0170
417	0.0323	484	0.2719	551	0.5634	618	0.5134	685	0.1179	752	0.0167
418	0.0360	485	0.2694	552	0.5636	619	0.5066	686	0.1141	753	0.0159
419	0.0402	486	0.2695	553	0.5649	620	0.4997	687	0.1105	754	0.0157
420	0.0451	487	0.2700	554	0.5676	621	0.4963	688	0.1077	755	0.0152
421	0.0499	488	0.2700	555	0.5685	622	0.4865	689	0.1047	756	0.0149
422	0.0556	489	0.2717	556	0.5711	623	0.4804	690	0.1022	757	0.0142
423	0.0622	490	0.2735	557	0.5747	624	0.4729	691	0.0999	758	0.0140
424	0.0696	491	0.2766	558	0.5765	625	0.4667	692	0.0982	759	0.0134
425	0.0773	492	0.2814	559	0.5771	626	0.4603	693	0.0975	760	0.0132
426	0.0864	493	0.2834	560	0.5793	627	0.4525	694	0.0955	761	0.0129
427	0.0965	494	0.2888	561	0.5817	628	0.4472	695	0.0920	762	0.0123
428	0.1060	495	0.2963	562	0.5851	629	0.4391	696	0.0870	763	0.0121
429	0.1188	496	0.3006	563	0.5852	630	0.4321	697	0.0838	764	0.0116
430	0.1291	497	0.3066	564	0.5868	631	0.4243	698	0.0805	765	0.0113
431	0.1432	498	0.3151	565	0.5881	632	0.4167	699	0.0779	766	0.0111
432	0.1589	499	0.3244	566	0.5910	633	0.4096	700	0.0764	767	0.0106
433	0.1751	500	0.3286	567	0.5969	634	0.4030	701	0.0756	768	0.0104
434	0.1918	501	0.3409	568	0.5955	635	0.3952	702	0.0734	769	0.0101
435	0.2114	502	0.3480	569	0.5982	636	0.3882	703	0.0712	770	0.0097
436	0.2316	503	0.3557	570	0.6006	637	0.3814	704	0.0694	771	0.0094
437	0.2538	504	0.3667	571	0.6032	638	0.3740	705	0.0674	772	0.0091
438	0.2783	505	0.3758	572	0.6027	639	0.3661	706	0.0654	773	0.0089
439	0.3022	506	0.3821	573	0.6036	640	0.3601	707	0.0635	774	0.0088
440	0.3306	507	0.3910	574	0.6076	641	0.3517	708	0.0616	775	0.0084
441	0.3613	508	0.3983	575	0.6091	642	0.3459	709	0.0594	776	0.0082
442	0.3902	509	0.4066	576	0.6101	643	0.3378	710	0.0582	777	0.0079
443	0.4256	510	0.4147	577	0.6134	644	0.3312	711	0.0563	778	0.0078
444	0.4682	511	0.4218	578	0.6135	645	0.3243	712	0.0549	779	0.0075
445	0.5078	512	0.4304	579	0.6144	646	0.3167	713	0.0535	780	0.0073
446	0.5579	513	0.4366	580	0.6158	647	0.3104	714	0.0515	N/A	N/A

Goniophotometer Test Results:4000K

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.2	46.6	Face Down	90	25

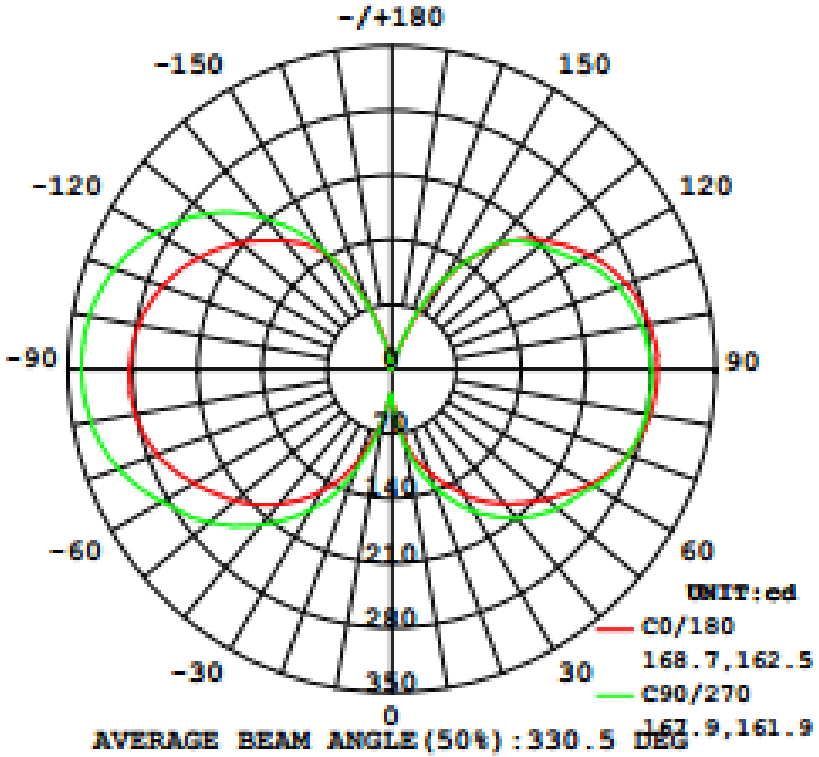
Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60.01	0.1473	17.54	0.9924
277.0	60.01	0.0657	16.05	0.8824

Goniophotometer Data:

Parameter	Results	
	120V	277V
Total Luminous (lm)	2774.1	2884.8
Luminous Efficacy (lm/W)	158.13	179.74
Beam Angle (°)	330.5	
Center Beam Intensity (cd)	31	

Luminous Intensity Distribution Diagram:

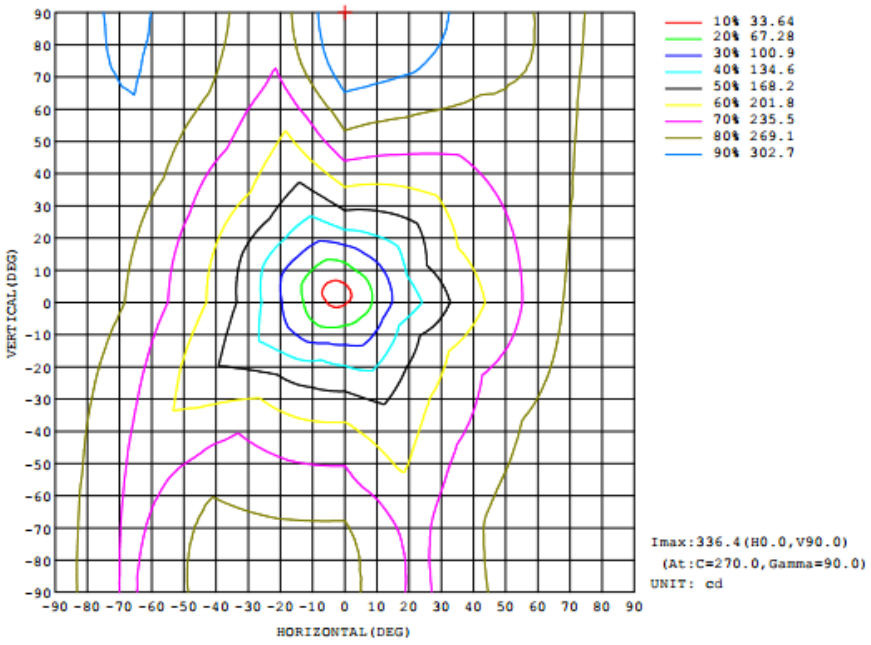


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	76.02	83.52	83.16	65.31	54.34	41.60	54.43	69.30	0- 10	4.741	4.741	0.17,0.17
20	118.6	133.8	135.6	119.1	103.1	98.05	116.7	120.5	10- 20	27.06	31.80	1.15,1.15
30	156.1	174.0	177.1	168.6	152.2	147.8	175.3	159.9	20- 30	66.18	97.99	3.53,3.53
40	189.9	202.2	210.3	208.0	190.5	187.8	219.6	196.0	30- 40	113.5	211.4	7.62,7.62
50	218.6	224.8	233.5	237.0	221.4	215.9	257.9	224.3	40- 50	163.2	374.6	13.5,13.5
60	248.8	246.1	253.3	257.9	246.9	240.0	286.2	249.7	50- 60	210.6	585.3	21.1,21.1
70	271.5	262.4	271.8	275.5	270.1	263.1	314.1	270.2	60- 70	255.1	840.3	30.3,30.3
80	283.7	268.2	279.7	282.0	281.8	277.5	330.3	283.0	70- 80	286.2	1126	40.7,40.7
90	287.4	267.4	280.6	280.0	284.3	283.3	335.9	287.6	80- 90	303.9	1432	51.6,51.6
100	283.0	261.1	274.3	270.2	277.9	281.8	332.5	284.6	90-100	302.7	1735	62.5,62.5
110	270.3	247.7	260.5	254.9	263.9	273.3	318.9	275.1	100-110	284.7	2020	72.8,72.8
120	247.4	226.2	234.7	231.8	241.5	255.3	295.4	254.3	110-120	251.1	2271	81.9,81.9
130	216.9	197.3	208.5	202.1	213.4	231.4	262.0	226.0	120-130	205.1	2476	89.3,89.3
140	174.7	153.5	177.6	158.0	181.4	200.5	213.9	189.9	130-140	153.3	2629	94.8,94.8
150	109.6	93.14	112.8	99.30	145.4	156.6	149.6	130.4	140-150	95.79	2725	98.2,98.2
160	29.29	24.68	30.14	41.10	71.62	81.05	67.84	60.13	150-160	41.53	2767	99.7,99.7
170	1.802	1.705	1.539	4.525	9.718	8.987	7.545	3.989	160-170	7.339	2774	100,100
180	0	0	0	0	0	0	0	0	170-180	0.1237	2774	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Isocandela Diagram:



Luminous Distribution Intensity Data:

Table--1 UNIT: cd

C(DEG) / γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5		
0	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1		
5	47.8	53.0	55.8	55.7	53.9	48.9	43.3	37.7	31.1	25.8	23.9	26.1	30.7	36.9	41.3	44.8		
10	76.0	80.4	83.5	80.8	83.2	76.8	65.3	58.9	54.3	44.3	41.6	45.7	54.4	64.8	69.3	74.2		
15	101	114	108	102	111	110	90.6	82.4	75.4	68.4	71.1	70.4	83.2	96.7	98.1	102		
20	119	143	134	122	136	138	119	107	103	92.5	98.9	97.4	117	121	121	132		
25	137	165	157	142	157	157	144	125	130	121	125	120	150	147	141	160		
30	156	182	174	157	177	175	169	140	152	145	148	138	175	168	160	179		
35	174	199	189	169	195	192	190	152	172	167	169	154	198	188	179	195		
40	190	214	202	179	210	207	208	164	190	188	188	168	220	208	196	209		
45	204	228	214	187	223	222	224	175	207	207	203	181	240	226	211	221		
50	219	240	225	193	234	234	237	184	221	222	216	191	258	242	224	229		
55	233	250	235	200	242	243	248	195	234	237	227	200	273	258	237	239		
60	249	259	246	210	253	253	258	205	247	251	240	210	286	271	250	248		
65	261	272	255	216	264	264	267	213	259	269	251	219	302	287	259	254		
70	271	279	262	222	272	272	276	220	270	283	263	228	314	299	270	261		
75	279	284	266	225	277	278	280	225	277	294	272	235	324	307	278	264		
80	284	287	268	226	280	281	282	230	282	301	277	239	330	313	283	266		
85	286	287	268	226	281	282	282	232	285	306	281	242	334	317	286	266		
90	287	285	267	225	281	282	280	234	284	308	283	243	336	319	288	265		
95	286	282	265	223	278	280	276	234	282	309	283	242	335	318	287	261		
100	283	276	261	220	274	276	270	234	278	306	282	240	333	315	285	257		
105	277	269	255	215	268	271	264	232	272	302	278	237	327	309	281	251		
110	270	259	248	209	260	264	255	228	264	297	273	233	319	301	275	244		
115	260	247	238	201	249	254	244	223	254	288	265	226	308	291	266	235		
120	247	232	226	191	235	242	232	215	242	276	255	218	295	277	254	225		
125	233	218	213	181	220	228	218	207	228	262	244	209	280	262	241	214		
130	217	204	197	171	208	211	202	196	213	247	231	199	262	245	226	200		
135	199	190	178	156	197	193	183	183	197	229	218	187	240	227	210	183		
140	175	169	153	138	177	172	158	166	181	209	201	168	214	208	190	162		
145	144	134	125	118	145	142	129	147	166	185	181	142	183	185	165	139		
150	110	97.0	93.1	94.9	113	107	99.3	126	145	156	157	118	150	158	130	111		
155	65.7	62.4	55.6	63.2	74.3	68.9	70.1	98.7	113	118	124	97.9	111	117	92.5	77.3		
160	29.3	18.8	24.7	30.5	30.1	29.0	41.1	63.3	71.6	71.8	81.0	71.4	67.8	65.5	60.1	48.2		
165	6.89	6.04	5.43	6.69	5.36	10.2	21.2	32.2	37.9	37.0	39.8	35.7	30.4	24.6	21.6	19.6		
170	1.80	1.93	1.71	1.20	1.54	2.91	4.53	7.49	9.72	10.1	8.99	8.58	7.55	4.13	3.99	3.45		
175	0.03	0.03	0.04	0.03	0.05	0.09	0.13	0.16	0.21	0.22	0.22	0.22	0.19	0.17	0.13	0.09		
180	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		

Goniophotometer Test Results:5000K

Test Condition:

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	Test Time (minute)
25.2	46.6	Face Down	90	25

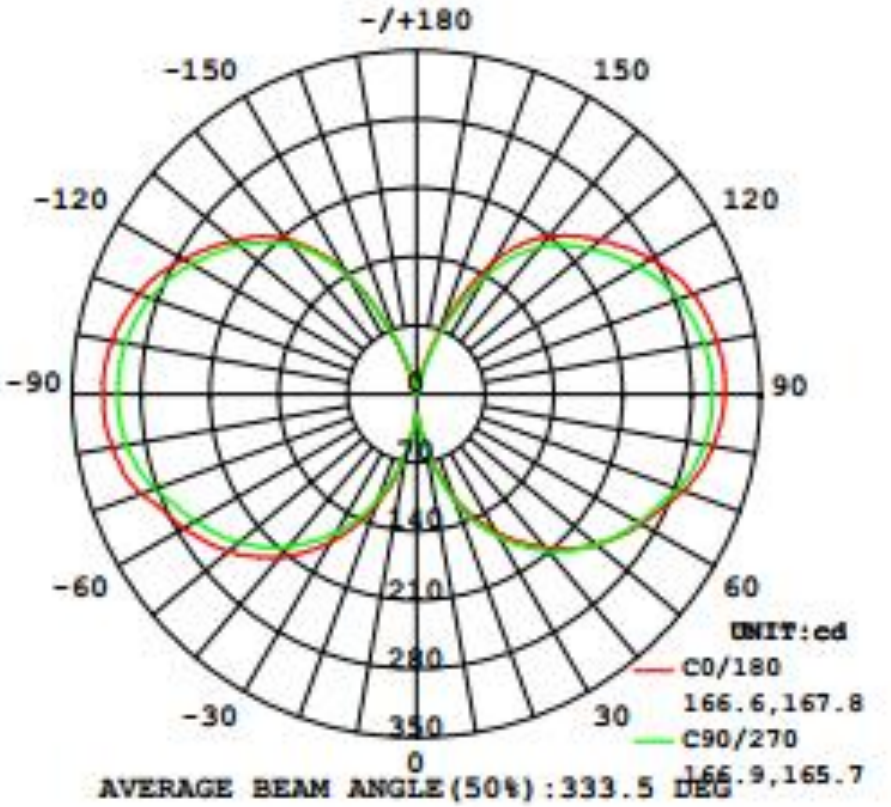
Electrical Data:

Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60.01	0.1433	17.07	0.9928
277.0	60.01	0.0666	16.30	0.8836

Goniophotometer Data:

Parameter	Results	
	120V	277V
Total Luminous (lm)	2774.6	2858.9
Luminous Efficacy (lm/W)	162.51	175.40
Beam Angle (°)	333.5	
Center Beam Intensity (cd)	21	

Luminous Intensity Distribution Diagram:

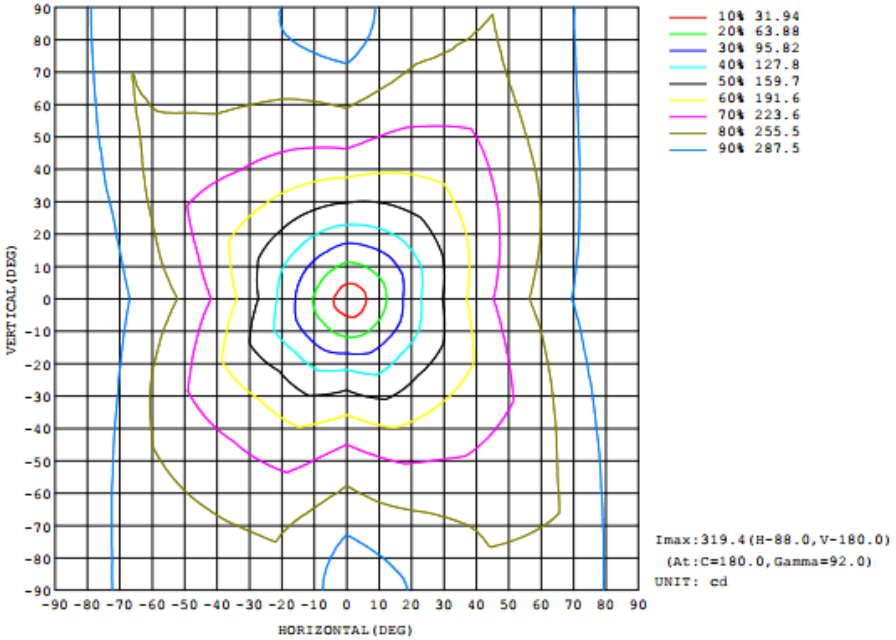


Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	49.71	53.30	54.00	61.88	61.00	66.79	57.31	55.63	0- 10	3.910	3.910	0.14,0.14
20	111.6	108.5	116.1	113.2	120.0	120.6	112.3	103.5	10- 20	24.89	28.80	1.04,1.04
30	161.8	154.0	167.9	158.2	173.4	164.2	162.1	147.7	20- 30	63.47	92.26	3.33,3.33
40	204.4	185.7	208.0	190.0	217.0	199.3	202.7	177.8	30- 40	111.0	203.2	7.32,7.32
50	238.5	210.7	238.8	214.9	249.2	225.3	235.4	200.9	40- 50	161.1	364.3	13.1,13.1
60	263.7	228.4	260.8	234.0	273.5	245.5	259.4	219.1	50- 60	207.9	572.2	20.6,20.6
70	280.7	245.0	282.9	250.5	297.7	264.2	283.6	237.1	60- 70	250.1	822.3	29.6,29.6
80	306.6	256.0	297.3	261.5	314.5	276.3	299.3	249.2	70- 80	285.2	1108	39.9,39.9
90	313.3	260.5	301.5	264.0	318.8	279.9	304.2	254.7	80- 90	303.1	1411	50.8,50.8
100	310.3	258.4	297.2	260.9	314.2	275.5	300.2	253.3	90-100	303.5	1714	61.8,61.8
110	298.9	250.7	284.1	251.0	300.1	264.0	287.8	245.9	100-110	286.8	2001	72.1,72.1
120	275.8	235.1	259.9	234.6	274.6	245.0	264.8	231.7	110-120	254.0	2255	81.3,81.3
130	244.4	213.3	230.0	209.7	243.0	219.4	235.7	211.7	120-130	208.9	2464	88.8,88.8
140	210.2	174.4	196.2	170.5	206.3	180.3	198.9	177.8	130-140	157.7	2622	94.5,94.5
150	154.2	126.2	135.6	115.9	142.6	119.6	138.4	125.8	140-150	101.6	2723	98.1,98.1
160	66.78	58.58	53.83	44.13	45.74	46.70	55.05	56.57	150-160	44.22	2767	99.7,99.7
170	5.120	4.227	2.731	2.780	2.747	3.710	3.856	4.883	160-170	7.156	2774	100,100
180	0	0	0	0	0	0	0	0	170-180	0.0996	2775	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Isocandela Diagram:

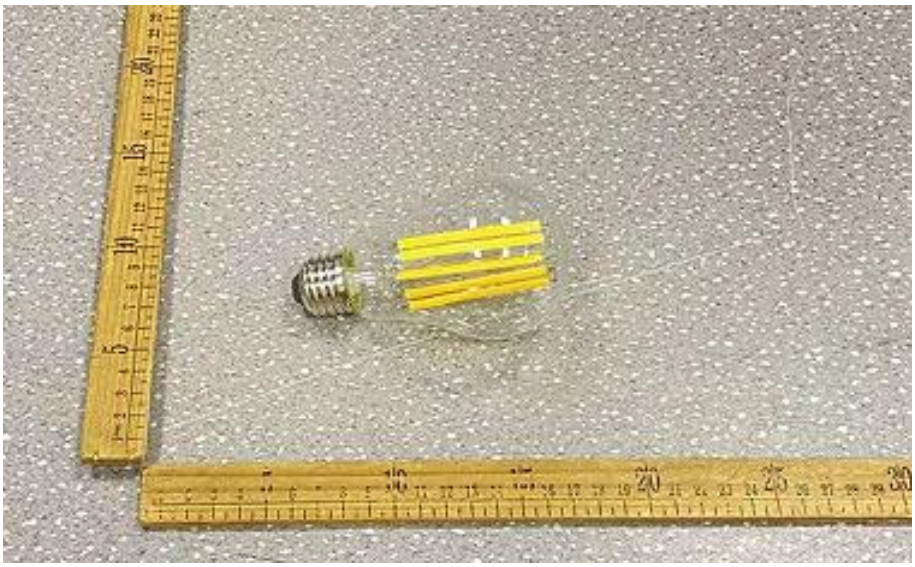


Luminous Distribution Intensity Data:

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5		
0	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8		
5	27.9	27.6	27.3	28.1	30.6	33.3	33.9	34.3	36.3	39.2	39.2	36.6	34.1	31.6	30.5	27.8		
10	49.7	52.6	53.3	51.0	54.0	58.4	61.9	59.6	61.0	66.4	66.8	64.3	57.3	56.4	55.6	51.2		
15	81.7	80.3	82.2	80.6	83.8	83.6	86.8	86.3	91.2	93.6	94.2	93.0	85.4	83.1	79.5	77.3		
20	112	107	109	105	116	109	113	110	120	120	121	118	112	110	104	102		
25	138	131	134	127	145	133	138	129	148	142	145	142	140	133	128	127		
30	162	151	154	148	168	152	158	148	173	161	164	165	162	154	148	149		
35	184	168	170	168	189	170	175	166	197	178	183	185	183	172	164	169		
40	204	183	186	186	208	186	190	183	217	192	199	201	203	188	178	187		
45	223	197	199	202	224	199	203	197	234	205	213	216	221	201	190	203		
50	239	209	211	216	239	210	215	211	249	215	225	229	235	212	201	217		
55	252	218	220	229	251	221	224	222	262	224	235	239	248	223	210	228		
60	264	228	228	239	261	231	234	231	274	234	245	249	259	233	219	238		
65	275	237	238	251	270	241	243	242	283	242	256	261	270	242	229	250		
70	289	244	245	264	283	248	250	255	298	247	264	272	284	248	237	263		
75	299	251	252	274	292	254	258	265	309	253	272	281	293	256	245	271		
80	307	256	256	280	297	257	262	271	315	255	276	285	299	260	249	277		
85	311	258	259	285	300	260	264	275	318	257	279	288	303	262	253	281		
90	313	260	260	286	301	261	264	277	319	256	280	287	304	263	255	282		
95	314	260	260	287	301	260	263	276	318	254	278	285	304	261	255	281		
100	310	258	258	285	297	258	261	273	314	252	276	281	300	259	253	278		
105	306	255	255	281	292	255	257	269	308	248	270	275	295	254	251	272		
110	299	251	251	274	284	249	251	262	300	242	264	266	288	247	246	265		
115	289	244	244	265	273	242	243	253	289	235	256	255	278	239	240	255		
120	276	235	235	253	260	232	235	241	275	225	245	242	265	230	232	243		
125	260	225	225	240	245	222	223	228	259	214	234	227	251	219	223	229		
130	244	214	213	225	230	209	210	215	243	203	219	212	236	207	212	215		
135	227	200	197	209	215	194	192	200	227	189	202	197	219	194	197	200		
140	210	178	174	193	196	173	171	185	206	167	180	186	199	176	178	187		
145	187	153	152	171	170	148	145	163	177	145	152	171	173	154	153	173		
150	154	125	126	140	136	118	116	126	143	121	120	142	138	127	126	150		
155	110	92.8	96.2	101	94.2	84.5	81.9	86.0	93.0	84.8	83.4	97.9	91.8	92.7	92.5	112		
160	66.8	57.1	58.6	56.4	53.8	44.2	44.1	43.4	45.7	42.6	46.7	53.8	55.0	55.0	56.6	66.3		
165	26.2	23.9	24.6	18.8	13.8	17.0	15.8	10.9	14.6	15.3	18.2	17.9	16.8	20.3	25.9	26.8		
170	5.12	5.92	4.23	3.15	2.73	2.60	2.78	2.50	2.75	2.84	3.71	2.45	3.86	5.68	4.88	4.13		
175	0.15	0.16	0.14	0.09	0.06	0.06	0.05	0.04	0.06	0.06	0.08	0.09	0.12	0.14	0.16	0.17		
180	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		

Photo of Sample:4000K



5000K

Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2021-11-10	2022-11-09
NTC-F01-006	2.0 meter Integrating Sphere	2021-11-10	2022-11-09
NTC-F01-012	Standard Lamp	2021-11-10	2022-11-09
NTC-F01-013	Standard Lamp	2021-11-10	2022-11-09
NTC-F01-031	Digital Power Meter	2021-08-22	2022-08-21
NTC-F01-020	Temperature & Humidity Meter	2021-11-15	2022-11-14

************End of Report************