NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

CEA GROUP INTERNATIONAL CO.,LTD

(Brand Name: CEA/EAEC)

Sanjiali Industrial Zone Zhucheng Road Panshi North baixiang Yueqing Zhejiang China

Architectural Flood and Spot Luminaires and Industrial buildings

Model name(s): CSFL-20X

Remark:The letter 'X' in the model name stand for different mounting arm. It could be blank, stand for large u-shaped iron. It could be "A", stand for rocker arm.

Representative (Tested) Model: CSFL-20(2700K)
CSFL-20(5700K)

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

Test & Report By:

Peeta Cao

Engineer: Peeta Cao

Date:Mar.10,2016

Review By:

Tommy Liang

Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
CSFL-20(2700K)	2700K	1698.0	19.13	88.76
CSFL-20(3000K)	3000K	1715*1	19.26*2	89.05*3
CSFL-20(3500K)	3500K	1731*1	19.26*2	89.92*3
CSFL-20(4000K)	4000K	1748*1	19.26*2	90.78*3
CSFL-20(4500K)	4500K	1765*1	19.26*2	91.65*3
CSFL-20(5000K)	5000K	1781*1	19.26*2	92.51*3
CSFL-20(5700K)	5700K	1798	19.38	92.78

*1: This value is calculated and the calculation formula is as below:

1715= (1798-1698.0) /6+1698.0

1731= (1798-1698.0) /6+1715

1748= (1798-1698.0) /6+1731

1765= (1798-1698.0) /6+1748

1781= (1798-1698.0) /6+1765

*2: This value is calculated and the calculation formula is as below:

19.26=(19.38+19.13)/2

*3: This value is calculated and the calculation formula is as below:

89.05=1715/19.26

89.92=1731/19.26

90.78=1748/19.26

91.65=1765/19.26

92.51=1781/19.26

U.S. Department of Energy

Lighting Facts™ Uniform LM-79 Reporting Template

Laboratory Information:

Name of Test Laboratory	Standard-Tech Co., Ltd.
Date of Test Report	Mar.10,2016
Test Report No.	STD1602034NB-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	CEA GROUP INTERNATIONAL CO.,LTD	
Brand Name	CEA/EAEC	
Model Number	CSFL-20(2700K)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Architectural Flood and Spot Luminaires and Industrial buildings	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Electrical Measurements:	**Integrating Sphere Output**	**Goniophotometer Output**	
Input Wattage	--	19.13	W
Input Current	--	0.1636	A
Input Voltage (ac)	--	120.0	V
Power Factor	--	0.9746	
Off-State Power	--	0	W
Photometric Characteristics			
Total Initial Lumen Output	--	1698.0	lm
Initial Lumen Efficacy	--	88.76	lm/w
Correlated color temperature / CCT	2792		K
Color rendering index / CRI	79.9		
R9 Value	0		
Duv	-0.0021		
Luminous Intensity Distribution			
Center beam candlepower (if applicable)	-----	708	cd
Beam angle (if applicable)		104.4	°
Zonal lumens in the 0 °-60 °zone		89.4	%
Zonal lumens in the 60 °-90 °zone		10.6	%
Zonal lumens in the 90 °-120 °zone		0	%
Zonal lumens in the 120 °-180 °zone		0	%

NVLAP LAB CODE 201011-0

U.S. Department of Energy

Lighting Facts™ Uniform LM-79 Reporting Template

Laboratory Information:

Name of Test Laboratory	Standard-Tech Co., Ltd.
Date of Test Report	Mar.10,2016
Test Report No.	STD1602034NB-A
Laboratory Contact Name	Tommy Liang

Product Information:

Organization Name	CEA GROUP INTERNATIONAL CO.,LTD	
Brand Name	CEA/EAEC	
Model Number	CSFL-20(5700K)	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Architectural Flood and Spot Luminaires and Industrial buildings	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Electrical Measurements:	**Integrating Sphere Output**	**Goniophotometer Output**	
Input Wattage	19.38	--	W
Input Current	0.1649	--	A
Input Voltage (ac)	120.0	--	V
Power Factor	0.9793	--	
Off-State Power	0	--	W

Photometric Characteristics

Total Initial Lumen Output	1798	--	lm
Initial Lumen Efficacy	92.78	--	lm/w
Correlated color temperature / CCT	5555	--	K
Color rendering index / CRI	84.8	--	
R9 Value	12	--	
Duv	0.0032	--	
Luminous Intensity Distribution			
Center beam candlepower (if applicable)	-----		cd
Beam angle (if applicable)			°
Zonal lumens in the 0 °-60 °zone			%
Zonal lumens in the 60 °-90 °zone			%
Zonal lumens in the 90 °-120 °zone			%
Zonal lumens in the 120 °-180 °zone			%

Test Specifications:	
Date of Receipt	:Dec.17,2015
Date of Test	:Dect.19,2015
Test item	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry IESNA LM-16-93 Practical Guide to Colorimetry of Light Source IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

Test Methods

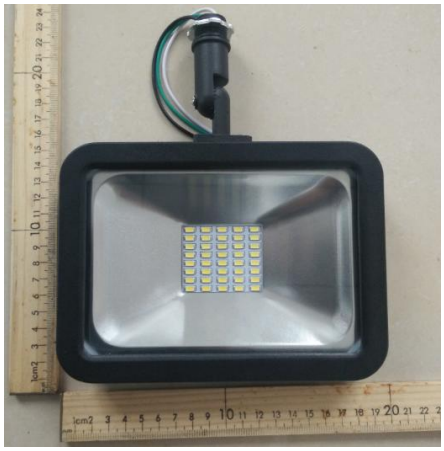
1. Photometric and Electrical measurements – Light Distribution Method:

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 120 Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1 °vertical intervals and 22.5 °horizontal intervals.

2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 ºC ±1 ºC. 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 120 Volts AC, 60Hz. 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 5 nm intervals over the range of 380 to 780 nm.

1. Product Information:

Brand Name	CEA EAEC
Model Number	CSFL-20X
Luminaire Type	Architectural Flood and Spot Luminaires and Industrial buildings
Rated Voltage / Frequency	100~ 277Vac, 50/60Hz
Nominal Power	20W
Rated Initial Lamp Lumen	--
Declared CCT	2700K,3000K,3500K,4000K,4500K,5000K,5700K
LED Manufacturer	Chuang Te LED
LED Model	CT-5730
Sample Receipt Date	Dec.17,2015
Sample Number	STD1602034NB-A1(2700K),A2(5700K)
Photo	
CSFL-20	
	
CSFL-20A	
	

2.1 Electrical, Photometric and Chromaticity Measurements *(Refer to Work Instruction QD25)*	**IES LM-79 2008**

Test date	2015-12-19	**Test Ambient:**	25.2 ℃
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	CSFL-20(2700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD160203	120.0	60	0.1636	19.13	0.9746	10.26
4NB-A1	277.0	60	0.0774	19.48	0.9082	13.30

Sphere-Spectroradiometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	79.9
R9	0
CCT (K)	2792
Chromaticity (x, y)	x=0.4491 y=0.4024
Chromaticity (u', v')	u'=0.2592 v'=0.5225
Duv	-0.0021

Special Color Rendering Indices			
R1	79	R9	0
R2	93	R10	84
R3	91	R11	75
R4	76	R12	75
R5	80	R13	83
R6	92	R14	96
R7	77	R15	71
R8	51	--	--

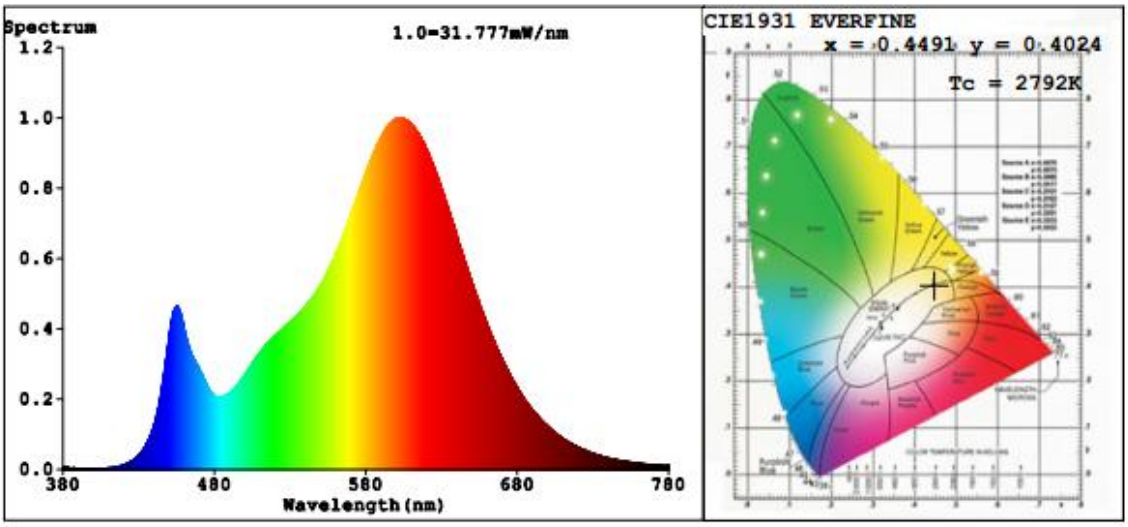
Goniophotometer Method:

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Total Luminous (lm)	1698.0
Luminous Efficacy (lm/W)	88.76
Beam Angle °	104.4
Center Beam Candle Power (cd)	708

Goniophotometer Method:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Luminous (lm)	1726
Luminous Efficacy (lm/W)	88.63

Spectral Power Distribution & Chromaticity Diagram



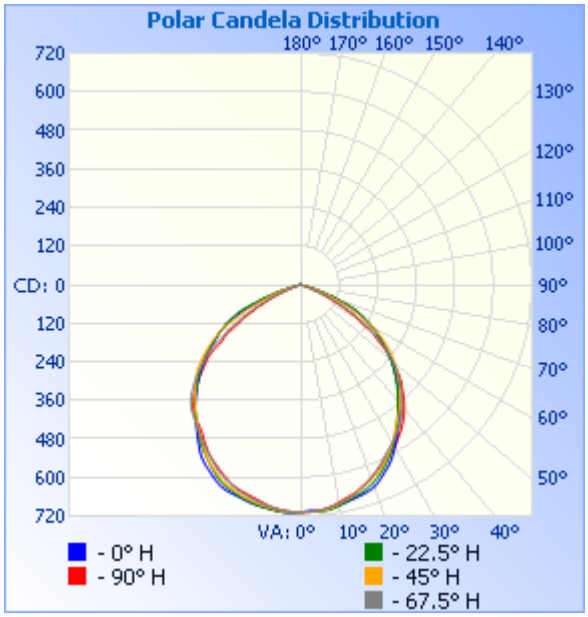
NVLAP LAB CODE 201011-0

Zonal Lumen Tabulation

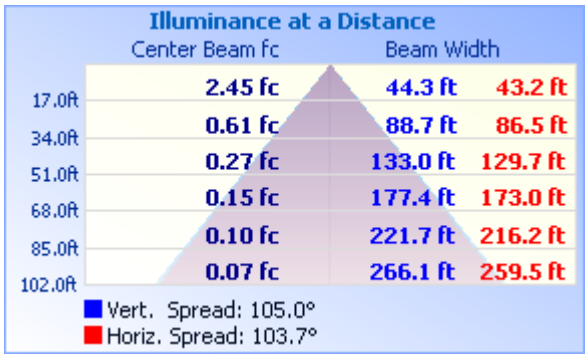
Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	545.9	32.2%
0-40	885.4	52.1%
0-60	1,517.4	89.4%
60-90	180.4	10.6%
70-100	23.2	1.4%
90-120	0	0%
0-90	1,697.8	100%
90-180	0.1	0%
0-180	1,697.9	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	67.0	3.9%	90-100	0	0%
10-20	191.3	11.3%	100-110	0	0%
20-30	287.6	16.9%	110-120	0	0%
30-40	339.5	20.0%	120-130	0	0%
40-50	344.8	20.3%	130-140	0	0%
50-60	287.2	16.9%	140-150	0.0	0%
60-70	157.2	9.3%	150-160	0.0	0%
70-80	22.8	1.3%	160-170	0.0	0%
80-90	0.4	0.0%	170-180	0.0	0%

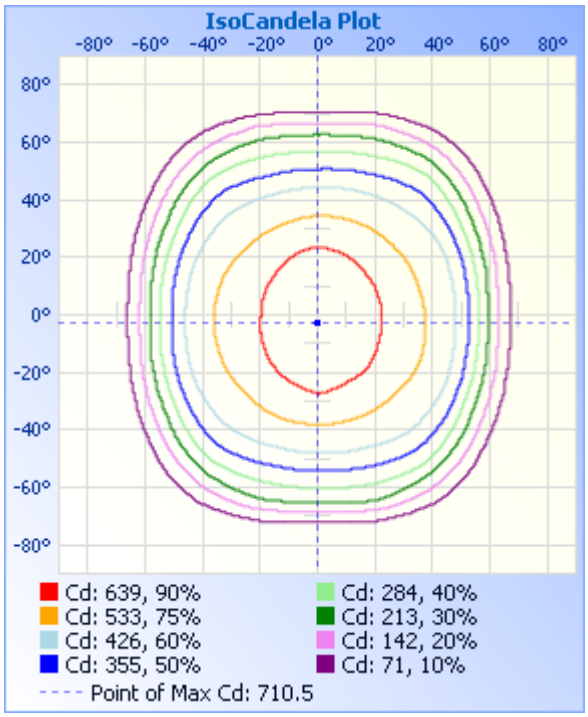
Photometric Data



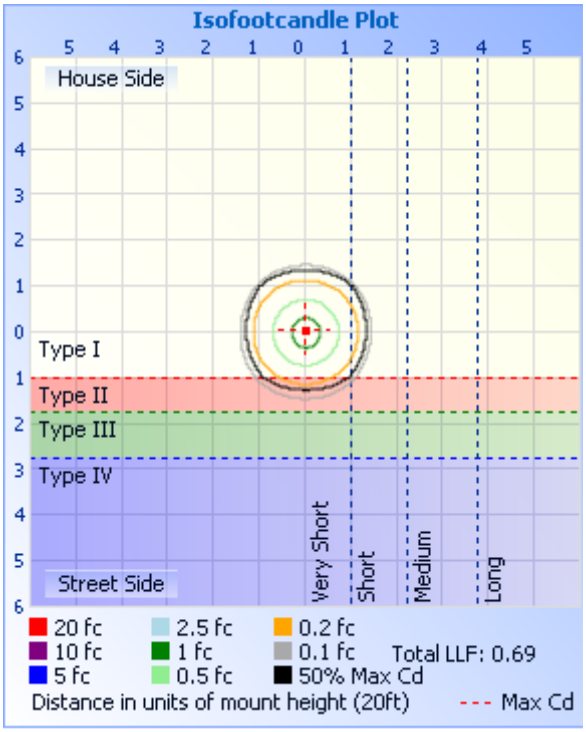
Illuminance Plots



ISOCANDELA DIAGRAM



ISOLUX DIAGRAM



Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708
1	706	708	707	708	708	707	708	708	709	709	708	708	707	708	707	707	706
2	705	707	707	707	708	707	708	708	710	709	709	707	707	707	706	707	705
3	704	708	707	707	708	706	708	709	710	710	708	706	706	706	705	709	704
4	705	709	707	706	707	706	708	709	710	710	708	705	705	705	704	710	705
5	704	709	707	705	705	706	708	708	709	709	707	704	703	701	704	709	704
6	704	708	706	703	703	704	707	707	708	708	705	702	701	698	702	707	704
7	702	706	704	700	700	702	706	706	706	706	702	699	699	695	700	705	702
8	701	704	700	697	696	700	703	705	703	704	701	696	696	692	697	702	701
9	699	701	697	694	692	698	700	703	702	703	698	693	692	690	694	699	699
10	697	698	693	691	688	694	696	702	701	701	697	691	688	689	692	695	697
11	695	694	689	688	683	690	692	700	700	699	694	688	684	686	688	691	695
12	692	689	684	684	679	686	690	699	699	697	692	685	680	683	684	687	692
13	689	686	680	680	675	682	686	697	696	695	689	682	677	680	680	684	689
14	686	682	676	676	672	679	682	695	693	692	686	679	674	676	675	680	686
15	684	679	670	671	667	675	679	692	691	690	683	676	671	672	670	677	684
16	681	676	664	666	662	671	675	688	688	686	679	672	668	668	666	674	681
17	679	672	659	660	656	666	671	684	686	682	675	667	665	662	661	671	679
18	677	668	654	654	651	660	666	679	684	678	671	663	661	658	656	668	677
19	674	662	649	648	645	654	662	675	683	675	668	658	657	652	652	665	674
20	669	657	644	641	640	648	658	670	681	671	664	653	651	649	648	660	669
21	663	651	639	634	633	641	652	664	677	667	659	648	646	644	643	654	663
22	656	645	633	627	627	634	647	658	673	661	654	643	639	639	639	648	656
23	648	637	627	619	621	627	640	652	667	655	648	638	633	632	635	639	648
24	641	629	621	612	616	621	633	646	660	647	642	631	627	624	629	631	641
25	633	621	613	603	609	615	626	639	653	640	636	625	620	616	622	624	633
26	625	613	605	596	603	608	618	632	646	632	630	617	614	607	613	617	625
27	617	604	597	588	597	601	611	624	640	624	623	610	608	599	605	609	617
28	607	595	588	582	592	593	603	616	633	616	615	603	602	591	596	601	607

29	596	586	580	576	586	585	595	608	626	608	607	596	594	584	586	592	596
30	586	576	570	569	581	578	586	600	618	601	598	588	586	578	578	583	586
31	575	565	560	563	578	571	578	592	608	593	588	582	577	571	569	573	575
32	564	554	550	557	569	565	569	584	596	585	578	575	568	563	560	563	564
33	553	544	541	550	561	559	560	576	584	576	569	568	559	555	551	552	553
34	542	533	532	543	554	552	551	568	573	566	561	562	551	547	543	541	542
35	531	523	523	535	547	545	544	558	562	557	553	554	545	539	533	532	531
36	520	512	514	527	538	538	536	549	551	548	545	547	539	531	524	523	520
37	510	502	506	519	530	530	527	538	540	538	536	541	534	523	514	513	510
38	498	491	497	510	521	521	518	527	530	529	526	534	528	515	504	502	498
39	488	480	489	500	511	512	509	515	520	519	517	528	522	508	495	492	488
40	477	471	480	491	502	504	501	504	510	509	509	522	515	500	485	481	477
41	466	461	471	482	491	495	492	494	499	500	501	516	507	493	475	470	466
42	454	451	463	472	480	485	483	484	488	491	492	509	497	485	466	460	454
43	444	441	454	461	468	477	474	473	478	481	483	501	487	477	457	448	444
44	434	431	444	449	456	467	466	462	467	470	473	490	476	469	447	438	434
45	423	422	434	438	445	457	456	452	456	459	463	479	464	460	437	428	423
46	413	412	423	427	434	445	447	441	445	448	454	466	450	449	427	418	413
47	402	401	412	415	422	432	437	430	435	437	445	452	435	437	417	407	402
48	391	390	402	403	407	420	427	420	424	427	437	438	421	424	408	397	391
49	380	379	392	391	390	408	417	409	412	417	430	424	406	411	399	387	380
50	369	368	382	378	373	394	407	399	400	407	420	409	392	397	389	376	369
51	358	357	372	363	357	380	396	390	389	396	409	391	378	382	380	365	358
52	346	345	362	346	342	364	386	378	376	383	396	376	366	366	370	353	346
53	334	333	350	330	323	349	374	365	364	372	383	363	343	350	360	342	334
54	322	322	338	314	301	334	363	351	352	360	372	350	310	338	349	331	322
55	311	311	326	297	286	316	351	340	342	349	359	326	294	324	337	317	311
56	299	301	312	277	274	292	337	327	331	336	345	294	282	293	325	305	299
57	288	290	299	263	245	271	322	315	319	322	330	278	256	268	312	293	288
58	276	278	284	250	222	261	307	304	307	310	317	266	229	255	298	282	276
59	265	266	267	220	210	243	291	291	296	300	299	239	218	239	282	271	265
60	253	253	250	202	187	211	275	278	285	288	284	215	196	211	261	259	253

Address：Standard-Tech Building, No.6 Guanhong Road,Guangzhou Science City, Guangzhou 510663, China
Tel: 8620-3229 0320 Fax: 8620-32290422 http://www.standard-tech.com

61	239	242	232	190	163	197	258	266	273	275	269	202	170	195	247	246	239
62	227	229	213	162	152	183	241	252	261	263	243	176	158	180	232	233	227
63	213	216	196	146	126	153	221	243	247	250	213	155	132	151	211	219	213
64	200	205	184	132	110	142	199	234	230	237	201	143	118	138	186	207	200
65	185	191	160	107	94	120	183	219	212	225	184	116	99	117	173	193	185
66	158	176	141	97	76	100	163	201	192	211	158	105	81	101	156	180	158
67	137	160	128	74	63	88	141	184	156	193	146	80	63	85	131	164	137
68	126	129	104	65	46	69	129	160	143	165	121	69	51	68	117	137	126
69	107	116	94	45	29	56	109	130	129	135	105	43	32	52	97	120	107
70	82	105	73	31	21	40	94	118	98	124	86	37	22	42	82	109	82
71	75	76	62	20	7	24	75	102	85	102	72	23	7	24	65	85	75
72	51	66	46	6	6	16	63	77	67	79	53	7	5	13	53	70	51
73	42	45	29	4	5	6	44	66	48	66	39	4	4	5	36	56	42
74	23	35	19	4	4	5	30	45	36	43	24	3	4	4	26	38	23
75	15	18	9	3	3	4	20	36	22	29	13	3	3	4	17	26	15
76	3	11	3	3	3	4	11	18	6	17	5	2	3	3	9	14	3
77	2	3	2	2	2	3	5	8	4	5	3	2	2	3	3	4	2
78	2	2	2	2	2	3	4	4	3	3	2	2	2	2	3	3	2
79	1	2	2	2	2	2	3	3	2	2	2	1	2	2	2	2	1
80	1	1	1	1	1	2	3	3	2	2	1	1	1	2	2	2	1
81	1	1	1	1	1	1	2	2	1	1	1	0	1	1	1	1	1
82	0	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	0
83	0	1	1	0	0	0	1	1	0	0	0	0	1	1	1	1	0
84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
131	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
143	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.2 Electrical, Photometric and Chromaticity Measurements *(Refer to Work Instruction QD25)*	**IES LM-79 2008**

Test date	2015-12-19	**Test Ambient:**	25.2 ℃
Test Orientation	As intended	**Stabilization Time (min)**	90
Model Number	CSFL-20(5700K)		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD160203	120.0	60	0.1649	19.38	0.9793	10.39
4NB-A2	277.0	60	0.0797	20.04	0.9074	13.24

Sphere-Spectroradiometer Method:

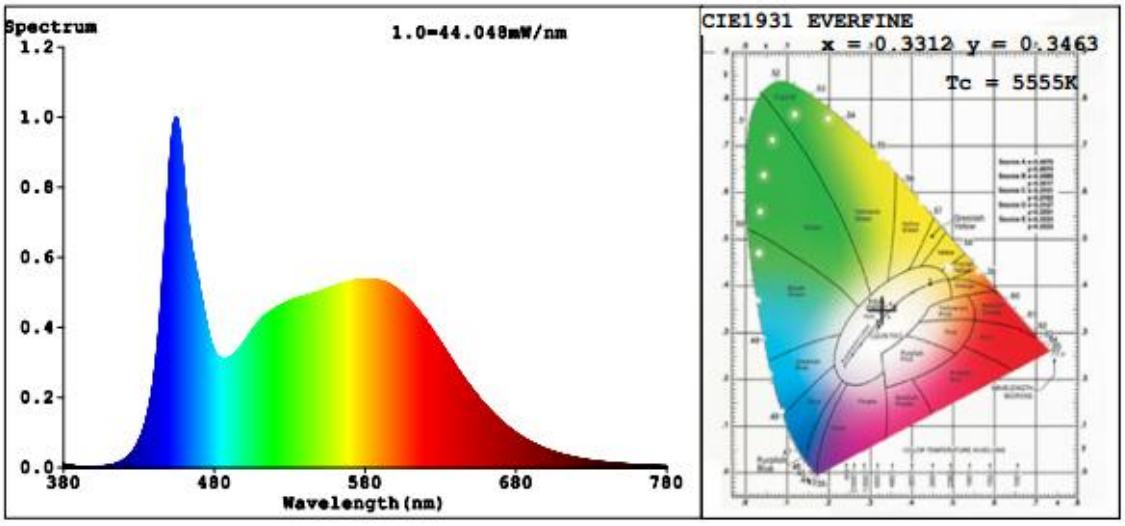
Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
Color Rendering Index (CRI)	84.8
R9	12
CCT (K)	5555
Chromaticity (x, y)	x=0.3312 y=0.3463
Chromaticity (u', v')	u'=0.2040 v'=0.4800
Duv	0.0032
Total Initial Lumen Output(lm)	1798
Initial Lumen Efficacy(lm/w)	92.78

Special Color Rendering Indices			
R1	84	R9	12
R2	93	R10	82
R3	95	R11	81
R4	81	R12	62
R5	84	R13	87
R6	88	R14	98
R7	86	R15	78
R8	68	--	--

Sphere-Spectroradiometer Method for 277V:

Parameter	Result
Test Voltage (V)	277.0
Frequency (Hz)	60
Total Initial Lumen Output(lm)	1832
Initial Lumen Efficacy(lm/w)	91.42

Spectral Power Distribution & Chromaticity Diagram



3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2015-07-01	2016-06-30
ST-R-331	Spectral analysis system HAAS-2000	2015-07-01	2016-06-30
D204	Standard Lamp	2015-07-01	2016-06-30
PF2010	Power Meter for Integrating Sphere	2015-07-01	2016-06-30
EE-09	Goniophotometer system	2015-07-01	2016-06-30
D908S	Standard Lamp	2015-07-01	2016-06-30
PF210	Power Meter for Goniophotometer	2015-07-01	2016-06-30
ST-R-181A	Temperature Tester	2015-07-01	2016-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

****** END OF DATASHEET PACKAGE ******