

# Photometric Test Report

## Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2014

## Prepared For

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## Project Number

**DLF1812117**

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**DLF1812117-2a**

## Test Date

**2018/12/28**

## Issue Date

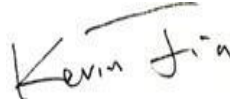
**2019/1/2**

## Prepared By



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## Approved By



Kevin Jia

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## 1.0 Test Summary

DLC Technical Requirements v4.4

Indoor / Linear Ambient Direct Linear Ambient Luminaire			
Requirement Category	Test Method	Requirements	Test value
Lamp Output (lm)	IES LM-79-2008	$\geq 1500$	5539
Zonal Lumen Requirement (0°-60°)	IES LM-79-2008	$\geq 40\%$	62.9%
Minimum Luminaire Efficacy (lm/W)	IES LM-79-2008	$\geq 130$	142.1
Power (Input Wattage)	IES LM-79-2008	Worst Case	39.0
Input Voltage	IES LM-79-2008	Worst Case	120
Input Current	IES LM-79-2008	Worst Case	0.326
Allowable CCTs* (K)	IES LM-79-2008	$\leq 5000$	3961
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	$\geq 80$	84
Power Factor	ANSI C82.77:2014	$\geq 0.873$	0.972
Total Harmonic Distortion (A%)	ANSI C82.77:2014	$\leq 25\%$	7.63%

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2018/12/28	STRP440-840U	B1
2	Goniophotometer Test	2018/12/28	STRP440-840U	B1
3	THD and PF Test	2018/12/28	STRP440-840U	B1

### Remark(If any)

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### 3.0 Production Description

**Luminaire Description:** STRP440-840U

**Electrical Specification:** 120V-277V,50/60HZ, 40W

#### Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

Model No.	STRP440-840U	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ .

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 voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

#### Test Conditions

Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
25.2	119.96	60	0.325	38.9	0.997

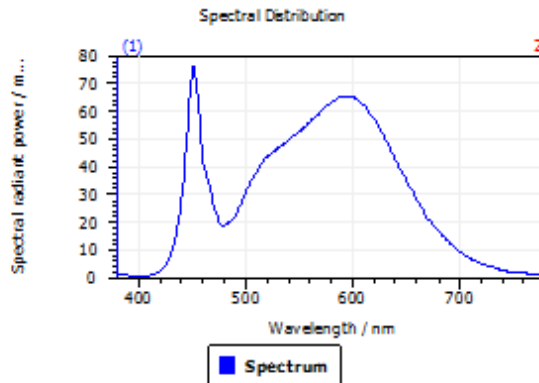
#### Test Result

CCT (K)	CRI (Ra)	Duv
3961	84	3.6E-04

## 4.1 Integrating Sphere Test

### Spectroradiometric Parameters

#### Results



#### Spectral values

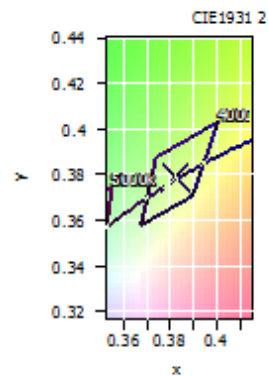
DominantWavelength	579.02 nm
Purity	0.285
PeakWavelength	451.00 nm
Radiant Power	11.61 W
Width50%	19.75 nm

#### Color Coordinates

Correlated Color Temperature 3961 K

x: 0.3824 u: 0.2256 u': 0.2256  
y: 0.3788 v: 0.3352 v': 0.5028

ResultsCRICRI01	82.2	ResultsCRICRI09	14.0
ResultsCRICRI02	89.2	ResultsCRICRI10	74.1
ResultsCRICRI03	94.3	ResultsCRICRI11	82.0
ResultsCRICRI04	83.1	ResultsCRICRI12	60.7
ResultsCRICRI05	82.1	ResultsCRICRI13	83.8
ResultsCRICRI06	84.6	ResultsCRICRI14	96.9
ResultsCRICRI07	87.3	ResultsCRICRI15	76.6
ResultsCRICRI08	67.1	ResultsCRICRI16	74.6
ResultsCRI	83.7		



PlanckDistance 3.6E-004

## 4.0 LM-79 Measurement and Test Results

### 4.3 Goniophotometer Test

Model No.	STRP440-840U	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45

#### Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within  $\pm 0.2$  percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at  $0.5^{\circ}$  vertical intervals and  $10^{\circ}$  horizontal intervals.

#### Test Conditions

Temperature ( $^{\circ}\text{C}$ )	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.3	120.02	60	0.326	39.0	0.996	Light Down

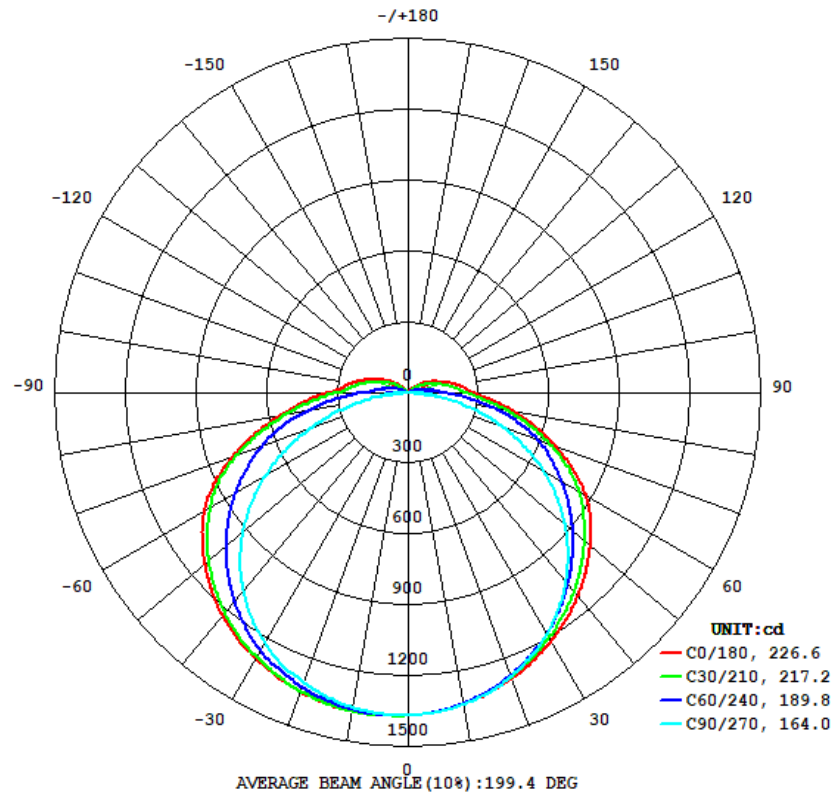
#### Test Result

Flux(lm)	Zonal Lumen Requirement( $0^{\circ}$ - $60^{\circ}$ )	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		0-180	90-270	0-180	90-270	
5539	62.9%	226.6	164.0	143.6	119.9	142.1

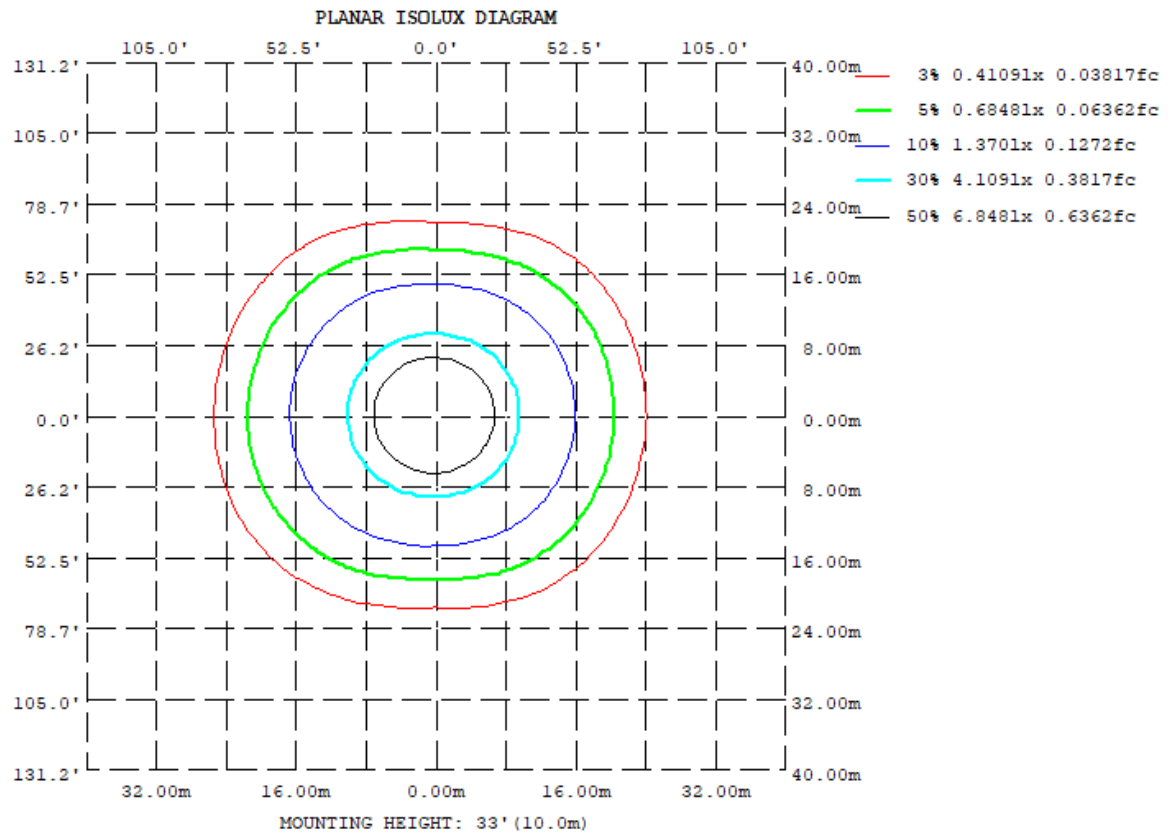
Length (ft)	lumen/ft
4	1385

### 4.3 Goniophotometer Test

#### Light Distrubtion Curve



#### Isolux Plot



### 4.3 Goniophotometer Test

#### Zonal Lumen Summary

DEG	LUMINOUS INTENSITY:cd									
$\gamma$	C0	C45	C90	C135	C180	C225	C270	C315		
10	1340	1336	1341	1357	1370	1368	1355	1345		
20	1288	1276	1279	1318	1346	1337	1305	1295		
30	1214	1188	1181	1247	1296	1281	1224	1221		
40	1124	1078	1046	1149	1230	1186	1092	1114		
50	1013	952.2	873.9	1028	1129	1067	916.8	988.9		
60	874.5	807.4	666.1	886.9	1000	922.4	699.8	842.7		
70	666.7	624.8	431.5	726.3	797.1	746.7	447.3	667.2		
80	451.7	399.2	183.1	504.2	552.4	495.1	182.9	426.3		
90	283.1	213.3	18.02	264.8	341.8	260.1	16.86	219.6		
100	214.4	145.7	10.34	167.0	248.8	175.1	12.99	149.0		
110	144.7	88.46	8.859	102.6	171.7	107.2	11.10	91.04		
120	94.43	46.96	6.964	57.28	111.6	59.75	8.696	47.23		
130	51.33	11.40	5.198	20.57	63.21	21.33	6.424	13.44		
140	14.15	2.094	3.745	2.212	22.23	2.710	4.647	2.805		
150	1.747	1.848	2.684	1.887	2.695	2.660	3.423	2.689		
160	1.949	2.012	2.066	1.958	3.004	3.060	2.843	2.899		
170	2.201	2.255	2.240	2.250	2.931	3.066	2.912	2.847		
180	2.677	2.677	2.638	2.616	2.677	2.686	2.657	2.622		

### 4.3 Goniophotometer Test

#### ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	129.74	0 - 10	129.74	2.34%
10-20	376.64	0 - 20	506.38	9.14%
20-30	587.46	0 - 30	1093.84	19.75%
30-40	741.42	0 - 40	1835.26	33.14%
40-50	822.77	0 - 50	2658.03	47.99%
50-60	823.83	0 - 60	3481.86	62.86%
60-70	737.75	0 - 70	4219.61	76.18%
70-80	559.38	0 - 80	4778.99	86.28%
80-90	333.25	0 - 90	5112.24	92.30%
90-100	187.56	0 - 100	5299.80	95.69%
100-110	119.45	0 - 110	5419.25	97.84%
110-120	68.84	0 - 120	5488.09	99.09%
120-130	33.96	0 - 130	5522.05	99.70%
130-140	11.93	0 - 140	5533.98	99.92%
140-150	2.57	0 - 150	5536.55	99.96%
150-160	1.14	0 - 160	5537.69	99.98%
160-170	0.72	0 - 170	5538.41	100.00%
170-180	0.25	0 - 180	5538.66	100.00%

### 4.3 Goniophotometer Test

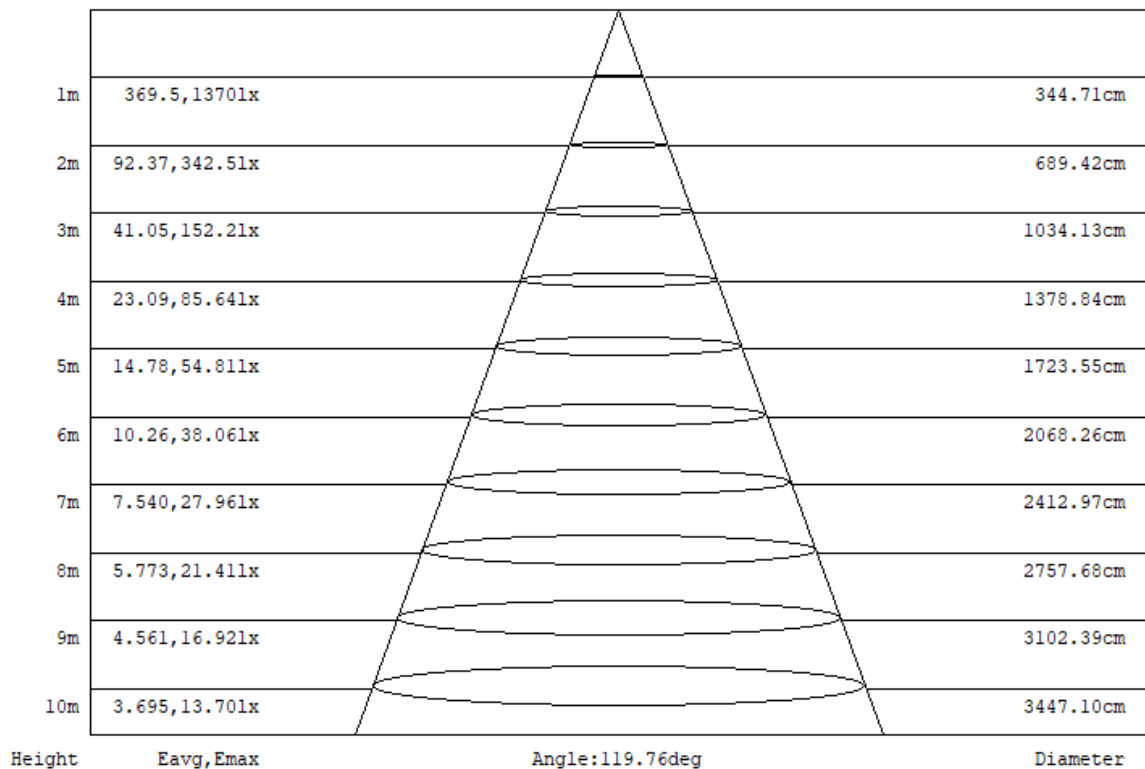
#### COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

##### Coefficients Of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
Rw	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	117	117	117	117	114	114	114	114	107	107	107	101	101	101	95	95	95	92
1	104	99	93	89	101	96	91	86	90	86	82	84	81	78	80	77	75	72
2	94	84	76	70	90	82	75	68	77	71	66	72	67	63	68	64	60	58
3	85	73	64	57	82	71	62	56	67	60	54	63	57	52	59	54	50	47
4	77	64	55	47	74	62	53	46	59	51	45	55	49	43	52	47	42	39
5	71	57	47	40	68	55	46	39	52	44	38	49	43	37	47	41	36	34
6	65	51	41	35	63	49	41	34	47	39	33	44	37	32	42	36	31	29
7	60	46	37	30	58	45	36	30	42	35	29	40	33	28	38	32	28	25
8	56	42	33	27	54	41	32	26	39	31	26	37	30	25	35	29	24	22
9	52	38	30	24	50	37	29	24	35	28	23	34	27	22	32	26	22	20
10	49	35	27	21	47	34	26	21	33	26	21	31	25	20	30	24	20	18

#### CONE OF LIGHT DIAGRAM



## 5.0 THD and PF Test

Model No.	STRP440-840U	Sample ID.	B1
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### Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

### Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
25.3	276.94	60	0.144	38.8	0.972	7.63%
25.3	119.96	60	0.325	38.9	0.997	5.86%

## 6.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2018/12/26	2019/12/25
DLF108	Auxiliary Lamp	2018/12/26	2019/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF116	AC Power Source	2018/12/26	2019/12/25
DLF113	Power Meter	2018/12/26	2019/12/25
DLF112	Temperature Recorder	2018/12/26	2019/12/25
DLF114	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF101	Goniophotometer	2018/12/26	2019/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2018/12/26	2019/12/25
DLF104	AC Power Source	2018/12/26	2019/12/25
DLF507	DC Power Source	2018/12/26	2019/12/25
DLF102	Power Meter	2018/12/26	2019/12/25
DLF111	Temperature & Humidity Datalogger	2018/12/26	2019/12/25
DLF119	Power Meter	2018/12/26	2019/12/25
DLF031	Temperature data logger	2018/12/26	2019/12/25
DLF022	Digital power meter	2018/12/26	2019/12/25
DLF003	Temperature & Humidity Datalogger	2018/12/26	2019/12/25

\*\*\*\*\* End of Test Report\*\*\*\*\*