Photometric Test Report

Relevant Standards

☑IES LM-79-2008

☑ANSI C82.77:2017

Prepared For

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Project Number

DLF2208107

Report Number

DLF2208107-1a

Test Date

2022/8/16

Issue Date

2022/8/18

Prepared By	**Approved By**
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1.0 Test Summary

DLC Technical Requirements v5.1

Linear Replacement Lamps - Replacement Lamps("Plug and Play") (UL Type A+B) (Type B mode)				
Requirement Category	**Test Method**	**Requirements**		**Test value**
Luminaire Output (lm)	IES LM-79-2008	2000		1305
Luminaire Efficacy (lm/W)	IES LM-79-2008	120		131.4
Beam Angle	IES LM-79-2008	⩾160		231.5
Total Harmonic Distortion (A%)	ANSI C82.77:2014	20%	120V	17.62%
			277V	16.81%
Power Factor	ANSI C82.77:2014	0.9	120V	0.984
			277V	0.942
Lamp light output (lm)	IES LM-79-2008 CIE 13.3-1995	1600		1281
				1386
Lamp Efficacy (lm/W)	IES LM-79-2008 CIE 13.3-1995	120		129.39
				135.88
Allowable CCTs* (K)	IES LM-79-2008	7 step	3045±175	3033
		7 step	3985±275	5155
Minimum CRI	IES LM-79-2008 CIE 13.3-1995	⩾70		83
				85
Minimum R9	IES LM-79-2008 CIE 13.3-1995	⩾0		10
				17
Minimum Rf	ANSI/IES TM-30-18	⩾70		85
				85
Minimum Rg	ANSI/IES TM-30-18	⩾89		97
				97
IES Rcs,h1	ANSI/IES TM-30-18	-12%⩽IES Rcs,h1⩽+23%		-11%
				-12%

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2022/8/16	L24T8/830/9G-AB	A1
			L24T8/850/9G-AB	A2
2	Goniophotometer Test	2022/8/16	L24T8/830/9G-AB	A1
3	THD and PF Test	2022/8/16	L24T8/830/9G-AB	A1
			L24T8/850/9G-AB	A2

Remark(If any)
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2、The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

3.0 Production Description

Luminaire Description: L24T8/830/9G-AB

Electrical Specification: 120-277V,60HZ

Photos of Luminaire Characteristics

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 3000K

Model No.	L24T8/830/9G-AB	Sample ID.	A1
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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 ±0.2 percent under load.
The sample was measured using 4π 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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
276.97	60	0.038	9.9	0.942

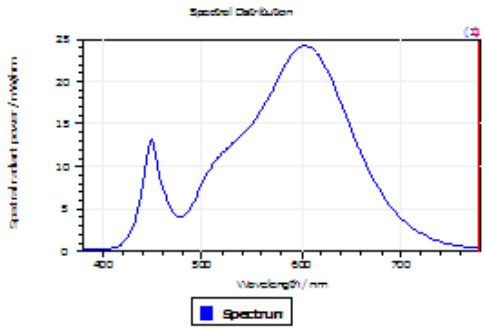
Test Result

CCT (K)	CRI	R9	Duv	THD
3033	83	10	0.00035	16.81%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
85	97	-11%	1281	129.39

4.1 Integrating Sphere Test

Results



Spectral Distribution

Spectral values

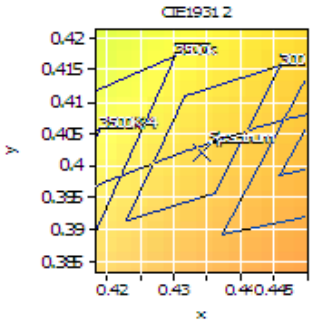
DominantWavelength	582.81 nm
Purity	0.511
PeakWavelength	603.37 nm
Radiant Power	3.675 W
Width50%:	

Color Coordinates

Correlated Color Temperat		3033 K			
x:	0.4341	u:	0.2496	u':	0.2496
y:	0.4022	v:	0.3468	v':	0.5202

CRI01	81.6	CRI09	10.1
CRI02	90.1	CRI10	77.3
CRI03	96.8	CRI11	82.0
CRI04	82.3	CRI12	71.4
CRI05	81.7	CRI13	83.4
CRI06	87.7	CRI14	98.4
CRI07	84.3	CRI15	74.5
CRI08	61.4	CRI16	72.8

ResultsCRI 83.2

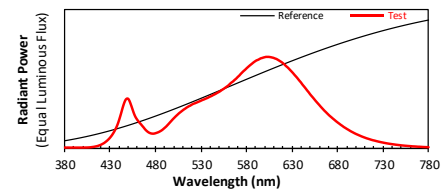


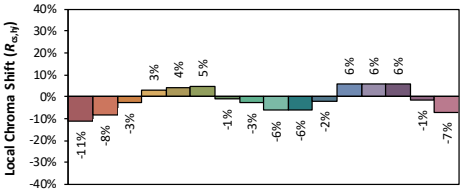
PlanckDistance 3.5E-004

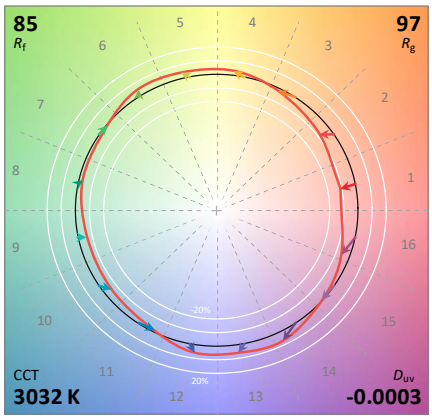
4.1 Integrating Sphere Test

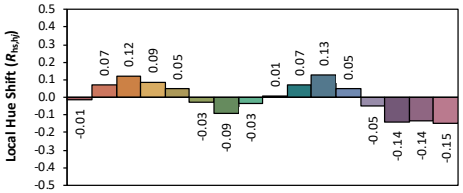
IES TM-30-18 Color Rendition Report

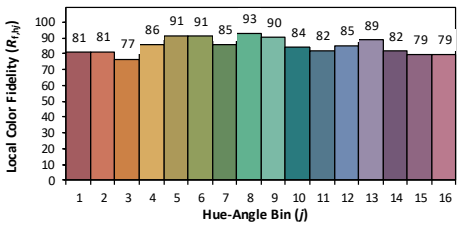
Source:	DLF2208107-1a	Manufacturer:	Espen Technology Inc.
Date:	2022/8/16	Model:	L24T8/830/9G-AB

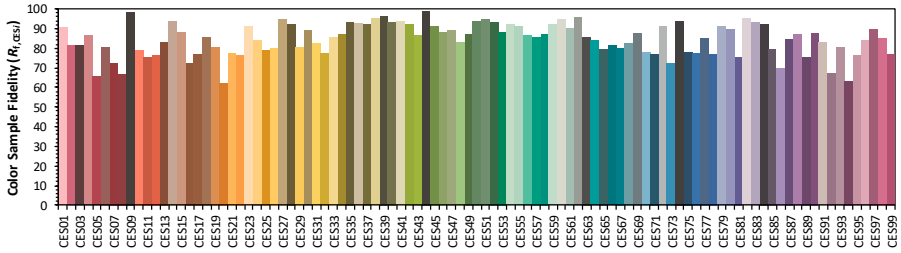












Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x	0.4341
y	0.4022
u'	0.2496
v'	0.5202

CIE 13.3-1995 (CRI)

R_a	83
R_9	9

lors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test - 5000K

Model No.	L24T8/850/9G-AB	Sample ID.	A2
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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 ±0.2 percent under load.
The sample was measured using 4π 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 Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
277.01	60	0.039	10.2	0.935

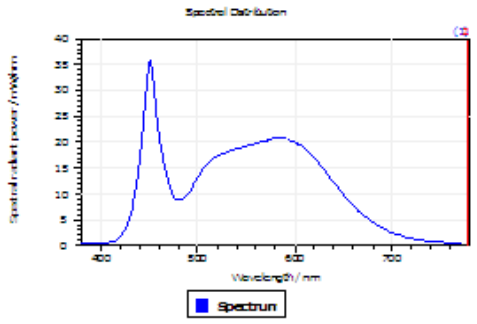
Test Result

CCT (K)	CRI	R9	Duv	THD
5155	85	17	0.00054	16.76%

Rf	Rg	IES Rcs,h1	Lamp Light Output (lm)	Lamp Efficacy (lm/W)
85	97	-12%	1386	135.88

4.1 Integrating Sphere Test

Results



Spectral Distribution

Spectral values

DominantWavelength	569.55 nm
Purity	0.071
PeakWavelength	450.91 nm
Radiant Power	4.186 W
Width50%:	

Color Coordinates

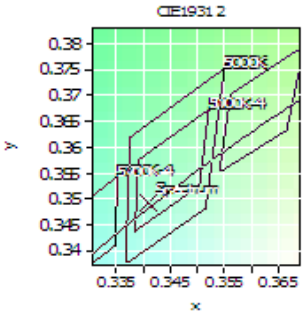
Correlated Color Temperat 5155 K

x: 0.3410 u: 0.2095 u': 0.2095

y: 0.3494 v: 0.3220 v': 0.4830

CRI01	84.2	CRI09	17.4
CRI02	89.4	CRI10	74.1
CRI03	92.4	CRI11	85.4
CRI04	85.6	CRI12	64.2
CRI05	84.5	CRI13	85.6
CRI06	84.3	CRI14	96.0
CRI07	88.1	CRI15	79.5
CRI08	71.2	CRI16	77.8

ResultsCRI 85.0

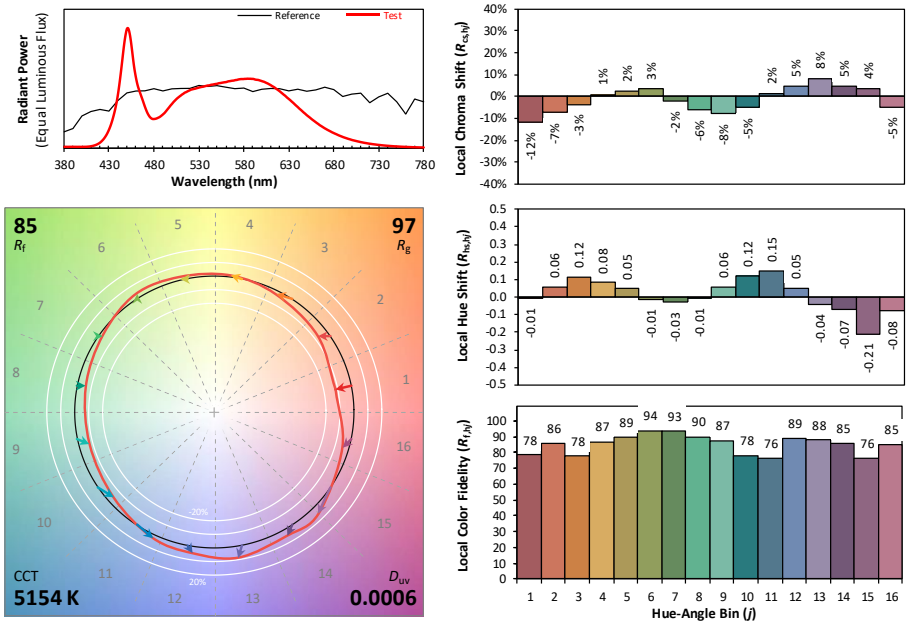


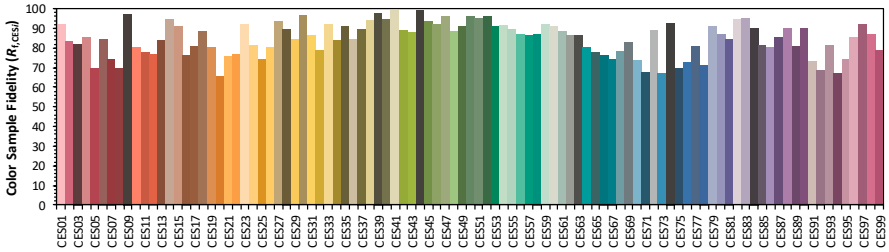
PlanckDistance 5.4E-004

4.1 Integrating Sphere Test

IES TM-30-18 Color Rendition Report

Source:	DLF2208107-1a	Manufacturer:	Espen Technology Inc.
Date:	2022/8/16	Model:	L24T8/850/9G-AB





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

x	0.3410
y	0.3493
u'	0.2095
v'	0.4830

CIE 13.3-1995 (CRI)

R_a	85
R_9	16

lors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test - 3000K

Model No.	L24T8/830/9G-AB	Sample ID.	A1
Opreate time (Min.)	90	Stabilization time (Min.)	70
Temperature (°C)	25.1	Humidity (%RH)	52.0

Test Method
The samples were tested according to the IES LM-79-2008.
Photometric paramters were measured using a type C 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 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 ±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^{o} vertical intervals and 10^{o} horizontal intervals.

Test Conditions

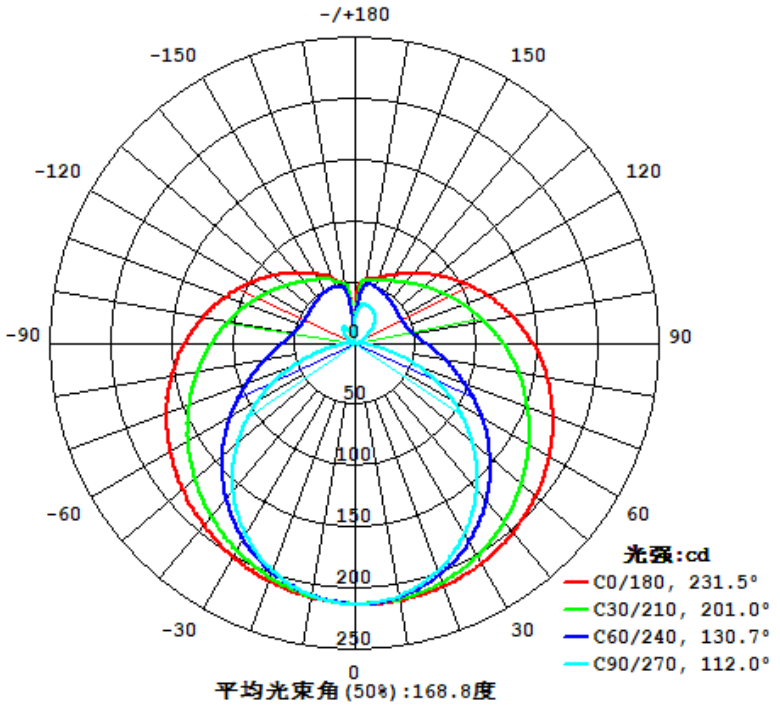
Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	276.97	60	0.038	9.9	0.938

Test Result

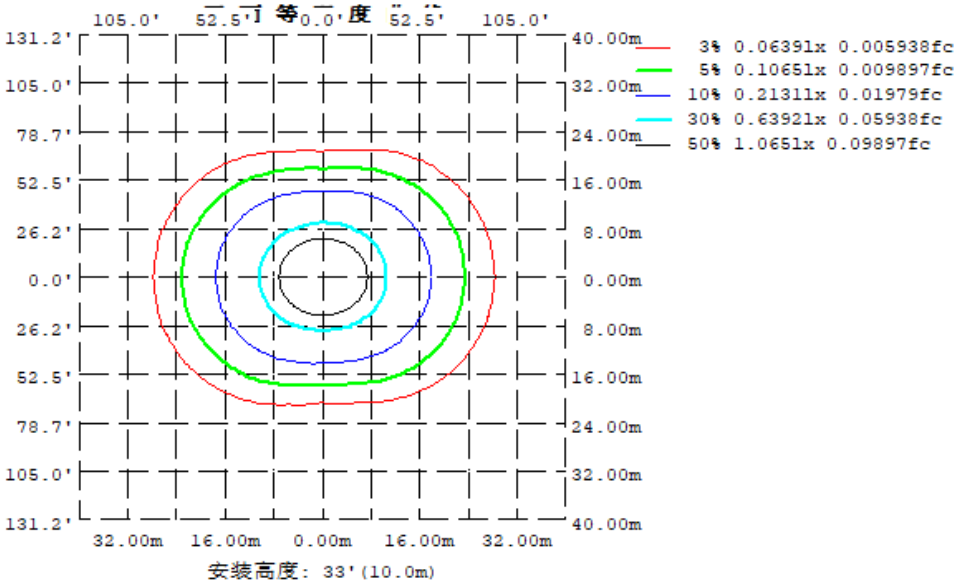
Flux (lm)	Luminous Efficacy (lm/W)	Beam Angle
1305	131.4	231.5

4.2 Goniophotometer Test

Zonal Lumen Summary



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	213.4	211.3	209.5	210.0	210.2	209.4	209.6	210.6
20	211.1	204.6	198.1	202.3	206.0	201.1	198.3	205.6
30	207.3	193.9	180.5	191.6	201.0	189.7	179.8	195.7
40	201.8	179.5	155.9	176.8	193.9	174.9	155.9	182.0
50	193.9	162.7	126.6	160.8	185.5	157.8	125.8	166.0
60	185.2	144.7	93.04	144.6	175.5	140.0	91.81	148.9
70	173.4	126.7	56.40	128.1	164.3	122.7	55.11	132.0
80	160.6	110.0	21.26	112.0	153.0	107.1	19.93	115.6
90	146.6	95.17	1.195	99.09	140.5	93.90	0.3775	101.4
100	131.9	82.52	0.5506	88.24	127.1	82.52	0.3558	88.71
110	116.4	72.74	4.123	78.47	113.6	73.53	3.279	78.16
120	101.3	65.31	8.830	70.20	100.2	66.48	3.266	69.81
130	87.59	60.13	17.55	64.12	87.66	61.36	11.06	63.35
140	75.63	56.50	26.79	59.31	76.29	57.77	15.40	58.69
150	65.48	54.18	31.37	56.06	66.39	55.74	16.47	55.00
160	58.06	53.03	33.57	48.03	58.48	53.06	12.25	52.28
170	53.65	50.74	32.76	44.03	49.20	50.14	8.848	46.00
180	0	0	2.631	2.827	0.2294	0.2379	0.3440	6.055

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	L24T8/830/9G-AB	Sample ID.	A1
Model No.	L24T8/850/9G-AB	Sample ID.	A2
Temperature (°C)	25.1	Humidity (%RH)	52.0

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 25º C ± 1º 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					
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
3000K					
120.08	60	0.083	9.8	0.984	17.62%
276.97	60	0.038	9.9	0.942	16.81%
5000K					
120.05	60	0.085	10.1	0.986	16.45%
277.01	60	0.039	10.2	0.935	16.76%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2021/12/26	2022/12/25
DLF108	Auxiliary Lamp	2021/12/26	2022/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF116	AC Power Source	2021/12/26	2022/12/25
DLF113	Power Meter	2021/12/26	2022/12/25
DLF112	Temperature Recorder	2021/12/26	2022/12/25
DLF114	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF101	Goniophotometer	2021/12/26	2022/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF104	AC Power Source	2021/12/26	2022/12/25
DLF507	DC Power Source	2021/12/26	2022/12/25
DLF102	Power Meter	2021/12/26	2022/12/25
DLF111	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF119	Power Meter	2021/12/26	2022/12/25
DLF031	Temperature data logger	2021/12/26	2022/12/25
DLF022	Digital power meter	2021/12/26	2022/12/25
DLF003	Temperature & Humidity Datalogger	2021/12/26	2022/12/25

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