



Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For

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1.0 Test Summary

DLC Technical Requirements v5.1

Retrofit Kits for Direct Linear Ambient Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1500		1294
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 115	Premium 130	127.4
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		10.2
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	10.47%
		20.00%	277V	20.79%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.983
		0.9	277V	0.906
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3045±175	2983
		4 step	3045±100	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥80		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥0		12
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		85
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		96
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-12% ≤ IES Rcs,h1 ≤ +23%		-11%
Zonal Lumen Requirement (0°-60°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥75%		75.78%
Corrected UGR (X=4H, Y=8H, 70/50/20%) (Goniophotometer - Section 4.2)	CIE 190-2010	<22		21.3

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/9/10	VEKM-L21F/830 N	D1
2	Goniophotometer Test	2021/9/10	VEKM-L21F/830 N	D1

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.

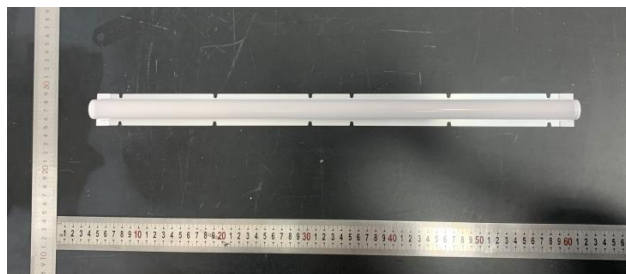
3.0 Production Description

Tested Model: VEKM-L21F/830 N

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

Test in Fixture: Columbia CS Bi-Pin 2L

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	VEKM-L21F/830 N	Sample ID.	D1
Operate 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 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 ± 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

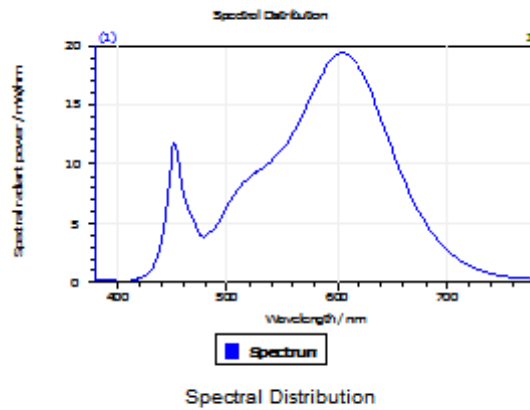
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
119.94	60	0.083	9.79	0.983	10.47%
276.99	60	0.041	10.26	0.906	20.79%

CCT (K)	CRI	R9	Duv
2983	84.2	12.1	0.0015

Rf	Rg	IES Rcs,h1
85	96	-11%

4.1 Integrating Sphere Test

Results



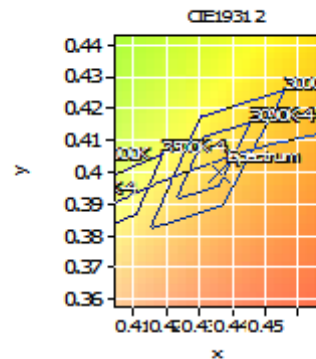
Spectral values

DominantWavelength 583.44 nm
Purity 0.510
PeakWavelength 604.85 nm
Radiant Power 2.844 W
Width50%:

Color Coordinates

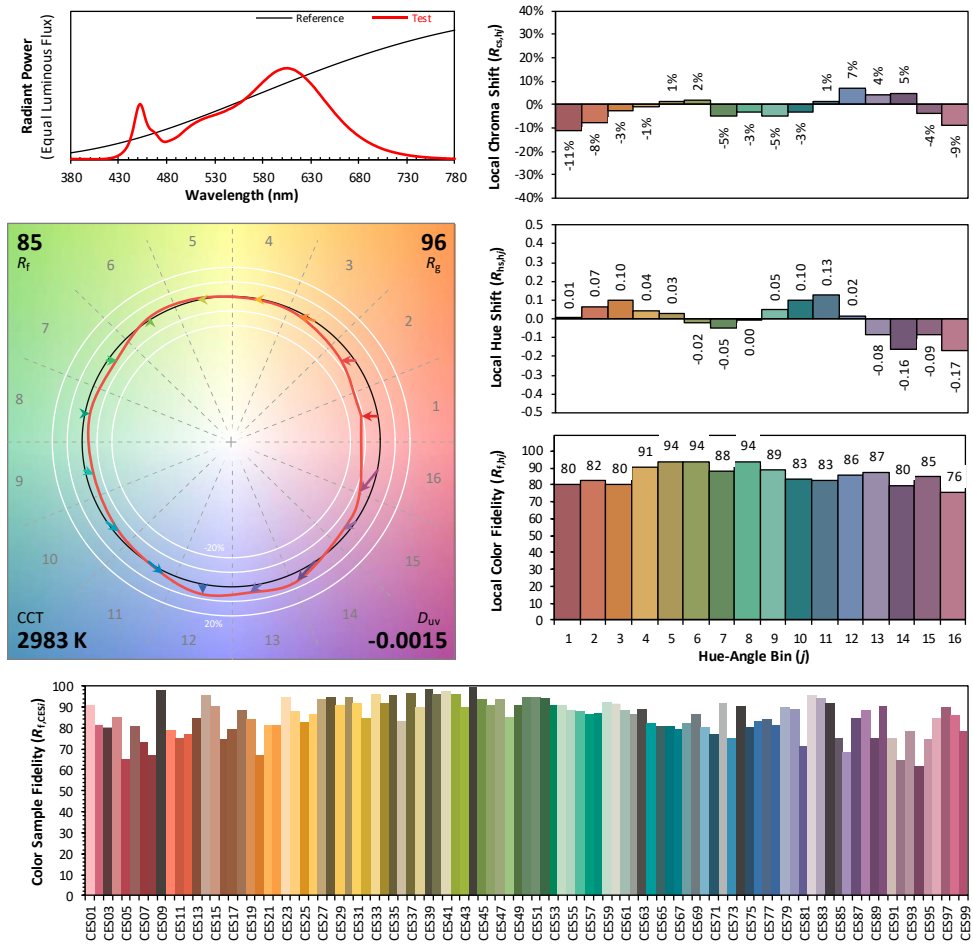
Correlated Color Temporal 2983 K
x: 0.4360 u: 0.2517 u': 0.2517
v: 0.4001 v: 0.3464 v': 0.5197

CRI01	83.3	CRI09	12.1
CRI02	93.1	CRI10	84.3
CRI03	95.4	CRI11	83.1
CRI04	82.7	CRI12	74.2
CRI05	84.2	CRI13	85.8
CRI06	92.0	CRI14	98.3
CRI07	82.4	CRI15	76.0
CRI08	60.5	CRI16	72.8
ResultsCRI	84.2		



PlanckDistance 1.5E-003

4.1 Integrating Sphere Test



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

x 0.4360
 y 0.4001
 u' 0.2517
 v' 0.5197

CIE 13.3-1995
(CRI)

R_a 84
 R_g 11

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

Model No.	VEKM-L21F/830 N	Sample ID.	D1
Opreate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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 ± 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° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WROST CASE	277.02	60	0.040	10.2	0.907

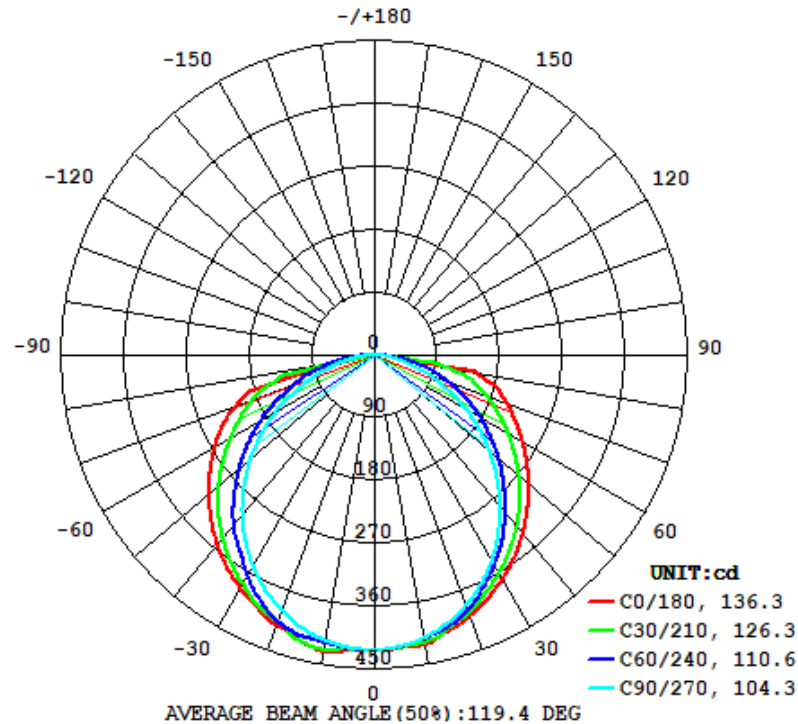
Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
1294	159.5	155.0	136.3	104.3	127.4

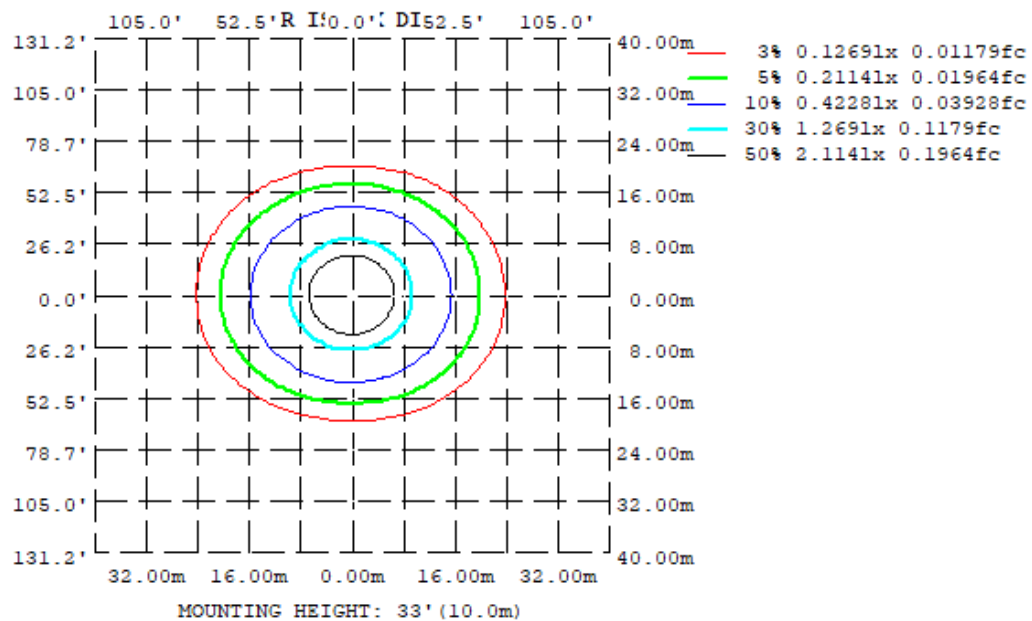
Zonal Lumen Requirement (0° - 60°)	UGR (X=4H, Y=8H, 70/50/20%)	Length (ft)	Lumen (lm/ft)
75.78%	21.3	2	647

4.2 Goniophotometer Test

Light Distrubtion Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	420.8	414.4	410.7	420.6	431.1	423.9	415.0	417.1
20	397.3	388.8	383.4	402.4	411.9	408.7	390.4	394.8
30	369.2	352.9	339.4	366.4	386.2	373.3	349.4	359.5
40	332.7	306.7	282.3	318.6	352.5	326.6	296.0	314.6
50	290.2	253.3	218.2	263.9	310.7	273.4	233.6	262.5
60	246.0	197.0	150.1	204.9	265.7	215.3	166.1	206.5
70	202.9	142.0	82.61	143.7	210.8	156.1	95.27	151.1
80	147.4	75.34	25.21	48.40	17.74	76.98	32.47	89.83
90	0.4713	0.5467	0.1905	0.7906	0.5110	0.4997	0.2362	0.6500
100	0.6852	0.1343	0.2352	0.1952	0.2151	0.1382	0.1833	0.4508
110	0.4096	0.5532	0.1816	0.2231	0.5602	0.2088	0.2641	0.3099
120	0.4559	0.3437	0.2836	0.2433	0.3360	0.2264	0.2920	0.3663
130	0.4749	0.3319	0.3359	0.2876	0.3898	0.2923	0.3079	0.3070
140	0.3054	0.3648	0.3651	0.3528	0.4441	0.3828	0.3633	0.3862
150	0.3330	0.3838	0.3597	0.3558	0.4539	0.3784	0.3851	0.4267
160	0.3275	0.3474	0.3719	0.3760	0.4378	0.4031	0.3954	0.3778
170	0.3063	0.3157	0.3367	0.3459	0.3481	0.3187	0.3434	0.3324
180	0.3560	0.3827	0.4020	0.3837	0.3499	0.3501	0.3997	0.3845
DEG	LUMINOUS INTENSITY:cd							

UGR Table - Corrected

UGR Table - Corrected

Reflectances											
Ceiling Cavity	70	70	50	50	30	70	70	50	50	30	
Walls	50	30	50	30	30	50	30	50	30	30	
Floor Cavity	20	20	20	20	20	20	20	20	20	20	
Room Size											
X=2H	UGR Viewed Crosswise					UGR Viewed Endwise					
Y=2H	13.6	15.3	14.0	15.6	15.9	16.4	18.1	16.8	18.4	18.7	
3H	15.1	16.6	15.5	16.9	17.3	19.2	20.7	19.5	21.0	21.4	
4H	15.6	17.0	16.0	17.4	17.7	20.4	21.8	20.7	22.1	22.5	
6H	15.8	17.2	16.2	17.5	17.9	20.3	21.7	20.8	22.1	22.4	
8H	15.9	17.2	16.3	17.5	17.9	20.3	21.6	20.7	22.0	22.4	
12H	15.9	17.1	16.3	17.5	17.9	20.3	21.5	20.7	21.9	22.3	
4H	2H	14.7	16.2	15.1	16.5	16.9	16.9	18.3	17.3	18.7	19.1
	3H	16.4	17.7	16.8	18.1	18.5	19.9	21.1	20.3	21.5	21.9
	4H	17.1	18.2	17.5	18.6	19.0	21.3	22.4	21.7	22.8	23.2
	6H	17.4	18.4	17.9	18.8	19.3	21.3	22.3	21.8	22.7	23.2
	8H	17.5	18.4	17.9	18.8	19.3	21.3	22.2	21.7	22.6	23.1
	12H	17.5	18.3	18.0	18.8	19.3	21.3	22.1	21.7	22.6	23.0
8H	4H	17.9	18.8	18.4	19.3	19.7	21.5	22.4	21.9	22.8	23.3
	6H	18.4	19.1	18.9	19.6	20.1	21.6	22.3	22.0	22.8	23.3
	8H	18.5	19.1	19.0	19.6	20.1	21.5	22.2	22.0	22.7	23.2
	12H	18.5	19.1	19.0	19.6	20.1	21.5	22.1	22.0	22.6	23.2
12H	4H	18.1	18.9	18.5	19.3	19.8	21.5	22.3	22.0	22.8	23.3
	6H	18.6	19.2	19.1	19.7	20.2	21.5	22.2	22.1	22.7	23.2
	8H	18.7	19.3	19.2	19.8	20.3	21.5	22.1	22.0	22.6	23.2

Maximum UGR = 23.3

4.2 Goniophotometer Test

ZONAL LUMEN SUMMARY

	Zonal (lm)		Total (lm)	Percent
0-10	40.15	0 - 10	40.15	3.10%
10-20	115.80	0 - 20	155.95	12.05%
20-30	175.81	0 - 30	331.76	25.63%
30-40	213.48	0 - 40	545.24	42.12%
40-50	224.90	0 - 50	770.14	59.50%
50-60	210.82	0 - 60	980.96	75.78%
60-70	176.37	0 - 70	1157.33	89.41%
70-80	115.60	0 - 80	1272.93	98.34%
80-90	19.35	0 - 90	1292.28	99.83%
90-100	0.35	0 - 100	1292.63	99.86%
100-110	0.35	0 - 110	1292.98	99.89%
110-120	0.33	0 - 120	1293.31	99.91%
120-130	0.29	0 - 130	1293.60	99.94%
130-140	0.28	0 - 140	1293.88	99.96%
140-150	0.24	0 - 150	1294.12	99.98%
150-160	0.18	0 - 160	1294.30	99.99%
160-170	0.10	0 - 170	1294.40	100.00%
170-180	0.03	0 - 180	1294.43	100.00%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

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