



UL Solutions
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Photometric Test Report

Relevant Standards
IES LM-79-2008, ANSI C82.77-10-2014, UL 1598-2008
CIE 13.3-1995, CIE 15-2004, ANSI C78.377-2017
IES TM-30-2018

Prepared For
LDPI Inc
4404 Anderson Dr
Eau Claire, WI 54703
United States

Catalog Number
LE451-180-V1-A-D1-5

Order Number
14480670
Test Number
14480670.03

Test Date
2022-11-16 - 2022-12-02

Prepared By

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Approved By

Tiffany Hamm, Engineering Project Handler

The results contained in this report pertain only to the tested sample.
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Table of Contents

Summary of Results	Page 3
Integrating Sphere Results	Page 4
Distribution Results	
Conditions / Summary of Results / Polar Plot / Zonal Lumens	Page 5
Candela Tabulation / Average LuminanceFull TM-30 Report	Page 6
Coefficients of Utilization / Cone of Light	Page 7
ISOFootcandle Plot	Page 8
In-Situ Results	Page 9
Full TM-30 Report	Page 10

Laboratory results may not be representative of field performance
Ballast factors have not been applied

Testing was performed in a 3-meter integrating sphere using the 4π geometry method.

Absorption correction was employed for Sphere measurement



Luminaire Description: White aluminum housing, clear glass lens enclosure
Lamp: 540 LEDs
Mounting: Recessed
Ballast/Driver: 1 INVENTRONICS 150W 0-10V EUM-150S210DT and 1 INVENTRONICS 75W 0-10V EUM-075S210DT

Luminaire



Luminaire Characteristics

Luminous Length: 44.00 in.
Luminous Width: 18.00 in.

Summary of Results

Integrating Sphere

Luminous Flux: 19610 Lumens
Efficacy: 110.45 lm/w
CCT: 5168 K
CRI (Ra): 82.9

Distribution

Total Luminaire Output: 19420 Lumens
Luminaire Efficacy: 109.3 lm/w
Maximum Candela: 6729 Candela

Electrical Data at 120 VAC

Test Temperature: 24.8 °C
Voltage: 120.0 VAC
Current: 1.481 A
Power: 177.5 W
Power Factor: 0.999
Frequency: 60 Hz
Current THD: 3.05 %

In-Situ

LED Temperature: 67.4 °C
Driver Temperature: 50.0 °C
Measured LED Current: 0.01225 A

Temperature is offset to an ambient temperature of 25°C as described in UL1598-2008.

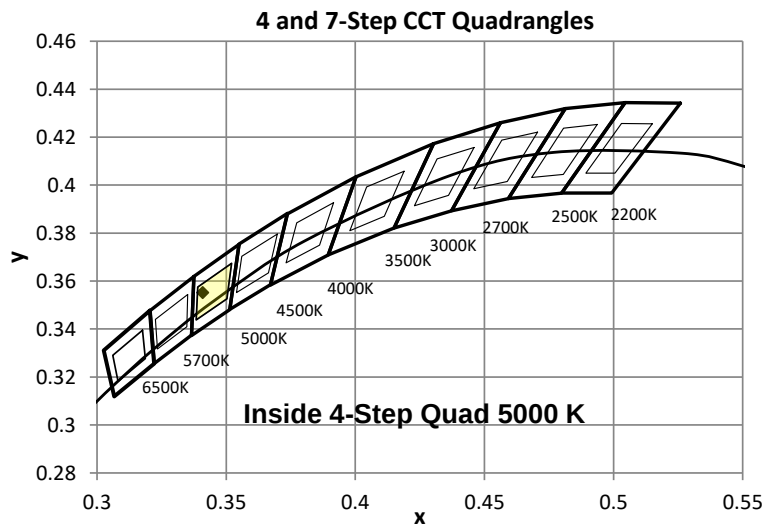
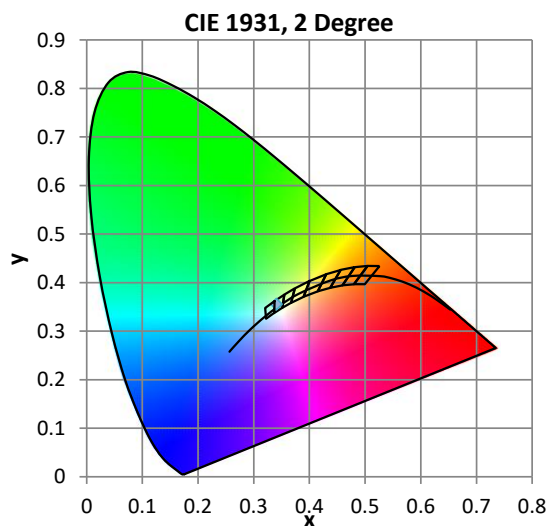
Color Quality - Integrating Sphere

Integrating Sphere Test Conditions

Temperature	Voltage	Current	Power	Power Factor	Frequency	Current THD
24.8 °C	120.0 VAC	1.481 A	177.5 W	0.999	60 Hz	3.05 %

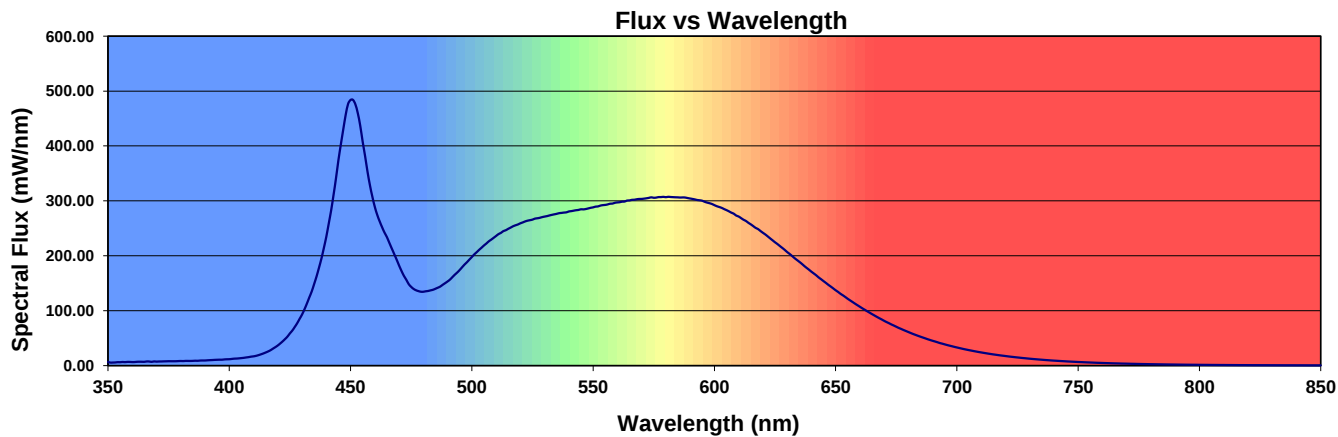
Summary of Results

Total Output:	19610 Lumens	Chromaticity (x):	0.3409
Efficacy:	110.5 lm/w	Chromaticity (y):	0.3553
CCT:	5168 K	Chromaticity (u'):	0.2072
CRI (Ra):	82.9	Chromaticity (v'):	0.4859
CRI (R9):	4.3	TM-30 Rf:	84
Peak Wavelength:	451 nm	TM-30 Rg:	96
Dominant Wavelength:	555 nm	TM-30 Rcs,h1:	-13%
S/P Ratio:	1.99	Duv:	0.0036
M/P Ratio:	0.84	WELL Building Standard v2	



Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
82.9	80.8	87.8	92.9	82.8	81.8	83.4	86.9	66.6	4.3	71.2	82.2	64.1	82.5	96.3	74.4



Distribution - Goniophotometer

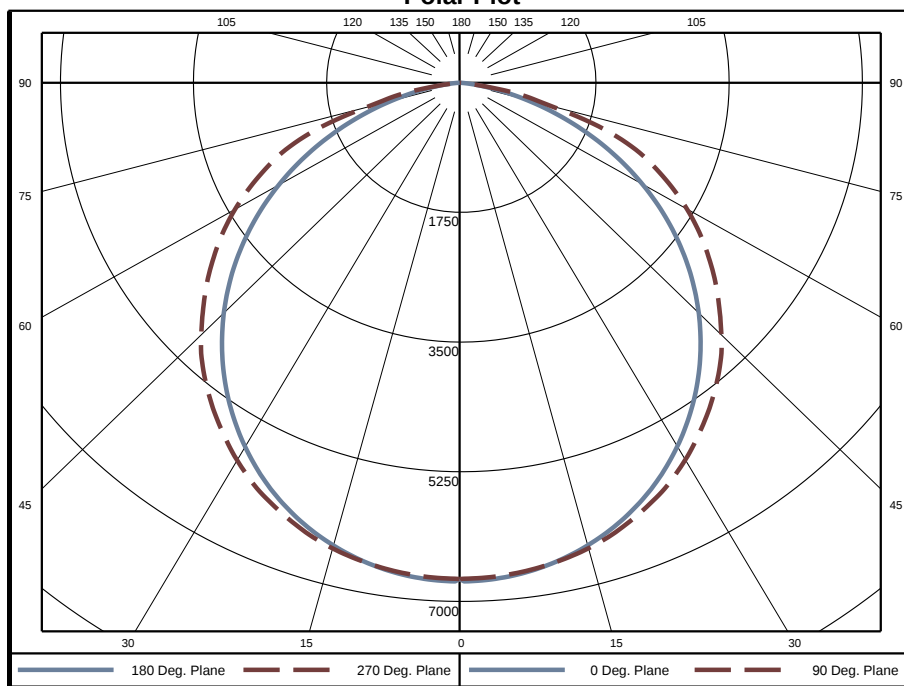
Distribution Test Conditions

Temperature	Voltage	Current	Power	Power Factor	Frequency	Current THD
25.1 °C	120.0 VAC	1.482 A	177.6 W	0.999	60 Hz	3.18 %

Summary of Results

Spacing Criteria	Total Lumen Output:	19420 Lumens
0-180: 1.26	Luminaire Efficacy:	109.3 lm/w
90-270: 1.30	Maximum Candela:	6729 Candela
Corrected UGR (Room Dimension: X=4H, Y=8H, Reflectances: 70/50/20%, S/H: 1)		
Crosswise: 24	Endwise: 25.4	

Polar Plot



Zonal Lumen Summary

Zone	Lumens	% of Luminaire	Zone	Lumens	% of Luminaire	Zone	Lumens	% of Luminaire
0-5	160	0.8%	60-65	1365	7.0%	120-125	0	0.0%
5-10	475	2.4%	65-70	1123	5.8%	125-130	0	0.0%
10-15	776	4.0%	70-75	815	4.2%	130-135	0	0.0%
15-20	1052	5.4%	75-80	461	2.4%	135-140	0	0.0%
20-25	1296	6.7%	80-85	161	0.8%	140-145	0	0.0%
25-30	1498	7.7%	85-90	20	0.1%	145-150	0	0.0%
30-35	1651	8.5%	90-95	0	0.0%	150-155	0	0.0%
35-40	1751	9.0%	95-100	0	0.0%	155-160	0	0.0%
40-45	1793	9.2%	100-105	0	0.0%	160-165	0	0.0%
45-50	1774	9.1%	105-110	0	0.0%	165-170	0	0.0%
50-55	1695	8.7%	110-115	0	0.0%	170-175	0	0.0%
55-60	1556	8.0%	115-120	0	0.0%	175-180	0	0.0%

Zone	Lumens	% of Luminaire
0-40	8659	44.6%
0-60	15477	79.7%
0-90	19422	100.0%
90-180	0	0.0%

Candela Tabulation
Horizontal Angle (Degrees)

Vertical Angle (Degrees)	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	6697	6697	6697	6697	6697	6697	6697	6697	6697	6697	6697	6697	6697	6697	6697
	5	6700	6680	6664	6672	6671	6672	6664	6680	6700	6680	6664	6672	6671	6672	6664
	10	6610	6602	6595	6603	6606	6603	6595	6602	6610	6602	6595	6603	6606	6603	6595
	15	6462	6451	6464	6493	6500	6493	6464	6451	6462	6451	6464	6493	6500	6493	6464
	20	6258	6253	6291	6330	6338	6330	6291	6253	6258	6253	6291	6330	6338	6330	6291
	25	5995	6002	6063	6115	6135	6115	6063	6002	5995	6002	6063	6115	6135	6115	6063
	30	5672	5695	5779	5852	5872	5852	5779	5695	5672	5695	5779	5852	5872	5852	5779
	35	5300	5339	5455	5532	5560	5532	5455	5339	5300	5339	5455	5532	5560	5532	5455
	40	4878	4936	5064	5177	5218	5177	5064	4936	4878	4936	5064	5177	5218	5177	5064
	45	4413	4484	4629	4784	4814	4784	4629	4484	4413	4484	4629	4784	4814	4784	4629
	50	3904	3995	4163	4313	4369	4313	4163	3995	3904	3995	4163	4313	4369	4313	4163
	55	3353	3460	3634	3835	3911	3835	3634	3460	3353	3460	3634	3835	3911	3835	3634
	60	2765	2882	3076	3331	3417	3331	3076	2882	2765	2882	3076	3331	3417	3331	3076
	65	2153	2272	2513	2777	2871	2777	2513	2272	2153	2272	2513	2777	2871	2777	2513
	70	1523	1640	1921	2185	2243	2185	1921	1640	1523	1640	1921	2185	2243	2185	1921
	75	923	1046	1313	1321	1267	1321	1313	1046	923	1046	1313	1321	1267	1321	1313
	80	419	537	567	616	599	616	567	537	419	537	567	616	599	616	567
	85	99	130	103	64	62	64	103	130	99	130	103	64	62	64	103
	90	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
	100	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
	110	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
	120	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
	130	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
	140	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
	150	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
	160	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
	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	175	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

Average Luminance (cd/m²)

Vertical Angle (Degrees)	Horizontal Angle (Degrees)		
	0	45	90
	0	13110	13110
	45	12210	13320
	55	11440	13340
	65	9968	13300
	75	6982	9581
	85	2218	1388



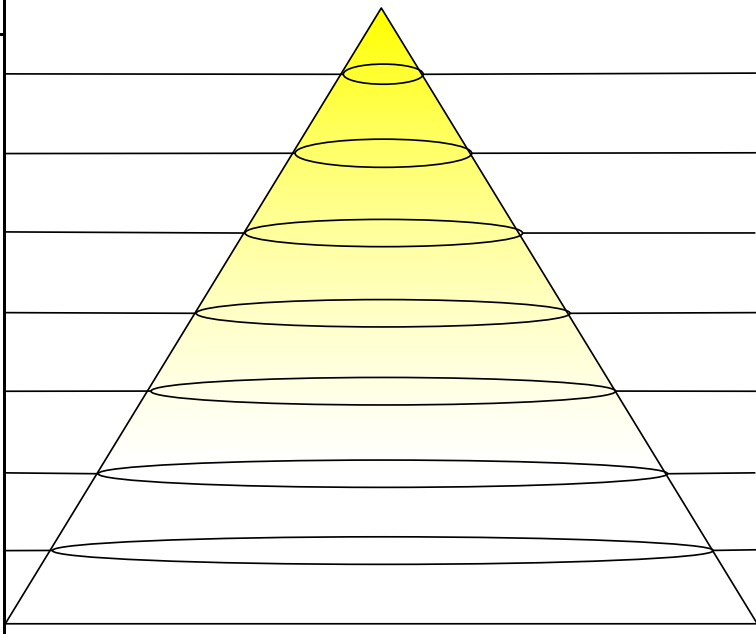
Coefficients of Utilization - Zonal Cavity Method

Effective Floor Cavity Reflectance 20%																		
Ceiling Cavity Reflectance	80				70				50			30			10			0
Wall Reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Room Cavity Ratio (RCR)	** Values are expressed as percent of total lumen output delivered to the task surface **																	
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	109	104	100	96	106	102	98	95	98	95	92	94	91	89	90	88	86	84
2	99	91	84	79	97	89	83	78	86	80	76	82	78	74	79	76	72	70
3	90	80	72	65	88	78	71	65	75	69	63	72	67	62	70	65	61	59
4	83	71	62	55	80	69	61	55	67	60	54	64	58	53	62	57	52	50
5	76	63	54	47	74	62	53	47	60	52	46	58	51	46	56	50	45	43
6	70	57	48	41	68	56	47	41	54	46	41	52	45	40	51	45	40	38
7	65	51	42	36	63	50	42	36	49	41	36	47	41	36	46	40	35	33
8	60	47	38	32	59	46	38	32	45	37	32	43	37	32	42	36	32	30
9	56	43	35	29	55	42	34	29	41	34	29	40	33	29	39	33	28	27
10	53	39	32	26	51	39	31	26	38	31	26	37	31	26	36	30	26	24

Beam and Field Information

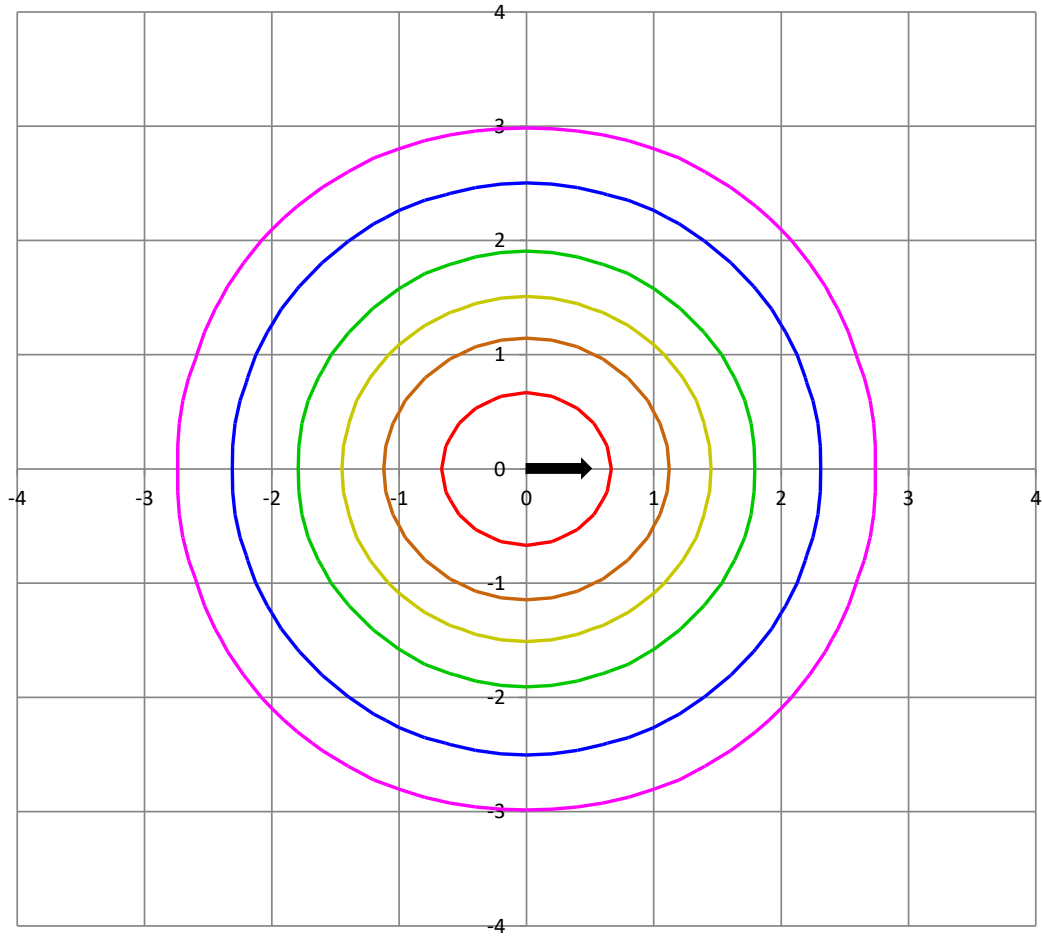
CIE Type:	Direct
Center Beam Intensity:	6697 Candela
Central Cone Intensity:	6690 Candela
Beam Flux:	14838.4 Lumens
Beam Angle (0-180):	110.1 Degrees
Beam Angle (90-270):	121.3 Degrees
Field Angle (0-180):	154.7 Degrees
Field Angle (90-270):	159.1 Degrees

Cone of Light Tabulation

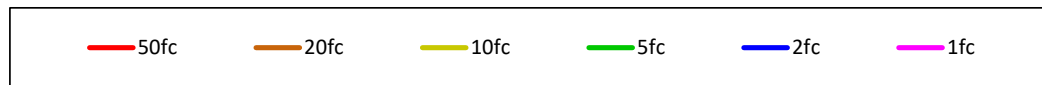
Mounting Height (Feet)		Footcandles at Nadir	Diameter (Feet)
4.00		419	5.12
6.00		186	7.68
8.00		105	10.2
10.0		67.0	12.8
12.0		46.5	15.4
14.0		34.2	17.9
16.0		26.2	20.5

ISOFootcandle Plot

Mounting Height - 8 Feet



Grid Lines in Units of Mounting Height



In-Situ Test

In-Situ Test Conditions

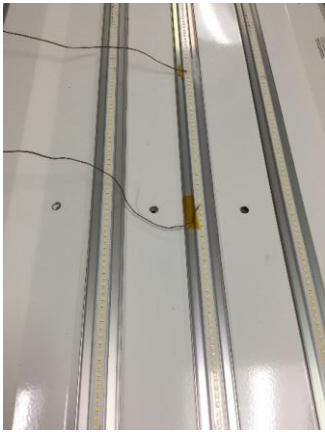
Temperature	Voltage	Current	Power	Power Factor	Frequency	Current THD
22.8 °C	120.0 VAC	N/A	N/A	N/A	60 Hz	N/A

Summary of Results

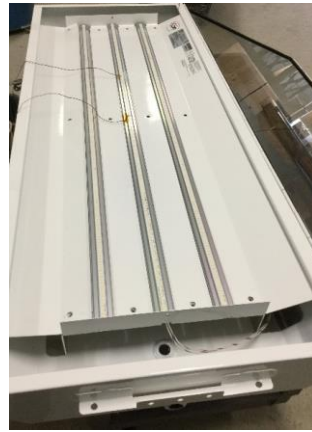
LED Temperature: 67.4 °C
 Driver Temperature: 50.0 °C
 Measured LED Current: 0.01225 A

Temperatures are offset to an ambient temperature of 25°C as described in UL1598-2008

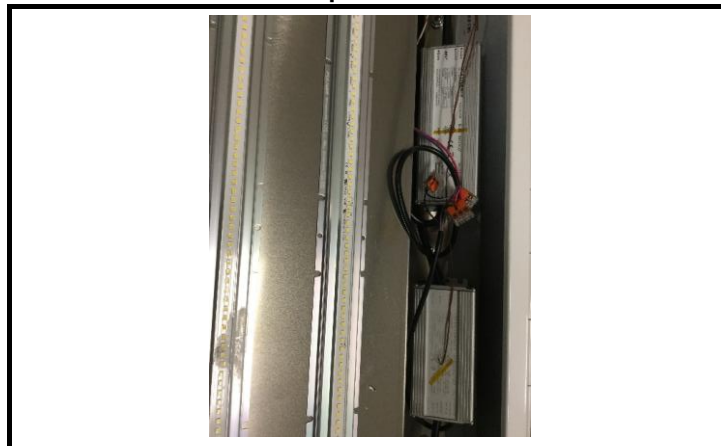
LED Temperature Location



Thermocouple Reference



Driver Temperature Location



ANSI/IES TM-30-18 Color Rendition Report

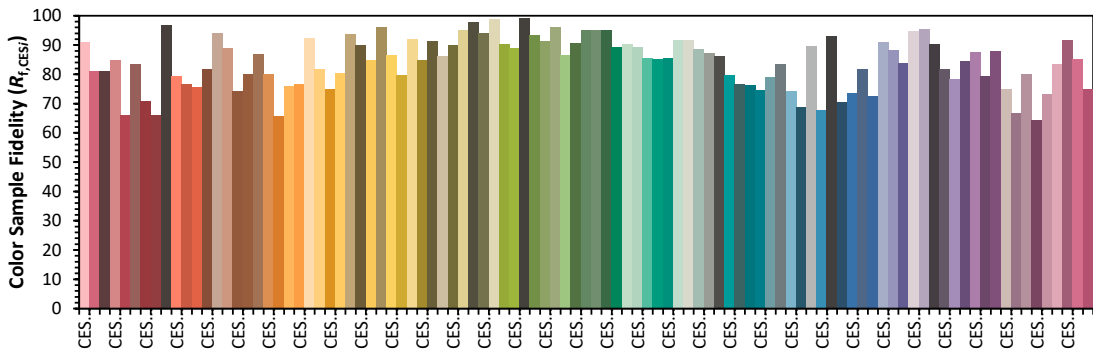
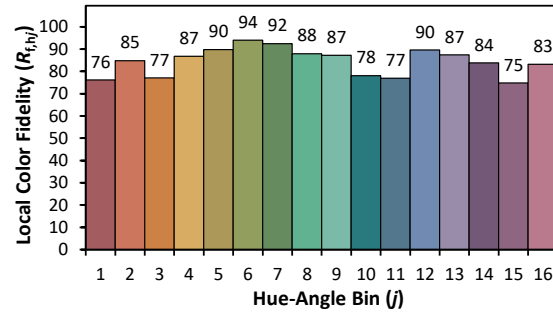
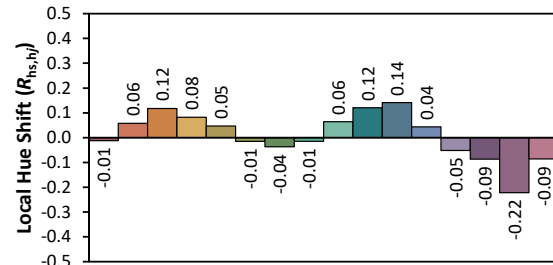
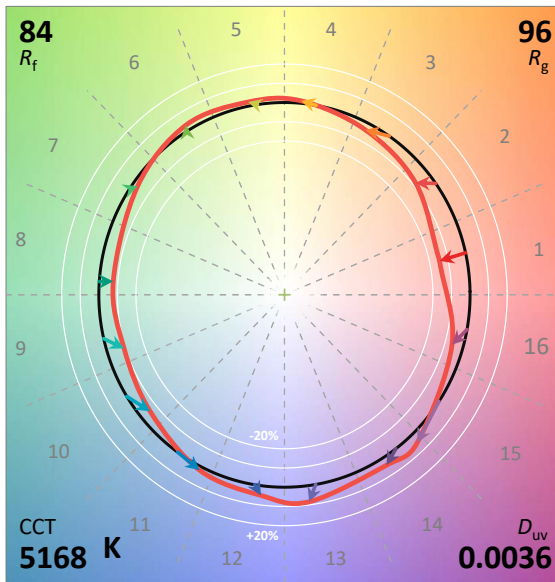
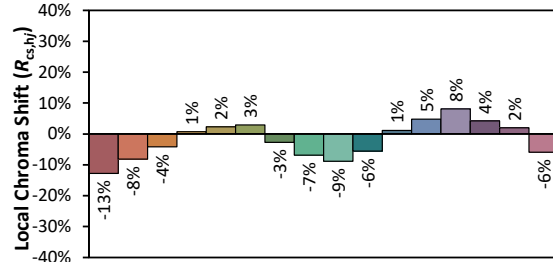
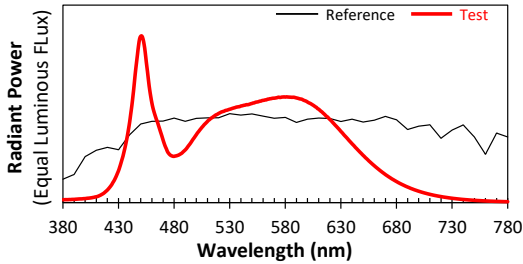
Date: 2022-11-16

Manufacturer:

LDPI Inc

Model:

LE451-180-V1-A-D1-5



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

x 0.3409

y 0.3553

u' 0.2072

v' 0.4859

CIE 13.3-1995
(CRI)

R_a 83

R_g 4

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