LightLab INTERNATIONAL ALLENTOWN LLC

Radiant Flux Test Report

LLIA003056-001A-R01*

Catalog Number: Diesel XL
Portable, formed steel housing, 5 aluminum heatsinks
and 6 cooling fans behind LEDs.
414 dual chip LEDs - 270 Red, 414 NIR, and 144 unenergized blue LEDs, each with a conical plastic optic in front. Two Ture Full ZF-CV-240-48A LED drivers and one ZF120A-1202000 fan power supply



Performance Summary

Total Radiometric (350-1700nm)		
Total Radiant Flux	164.21	W
Radiant Efficiency	44.4	% (W_r/W_e)
Radiometric Range: 570-1100nm		
Radiant Flux (570-1100nm)	164.08	W
Red/Total Red Ratio*	94.8	%
Deep Red/Total Red Ratio*	5.2	%
NIR/Total NIR Ratio*	56.6	%
Deep NIR/Total NIR Ratio*	43.4	%

*Note: In this report, Red spans the wavelength range 600-700nm, Deep Red spans 700-780nm, Total Red spans 600-780nm, NIR spans 780-900nm, Deep NIR spans 900-1100nm, and Total NIR spans 780-1100nm.

Peak Wavelength(s)	670, 813, 949	nm
Luminous Flux	2988.4	Lumens
Luminous Efficacy	8.1	Lm/W

Prepared For:
LightpathLED
565 Ostrander Road
Richfield Springs, NY 13439, USA

*This test report supersedes test report LLIA003056-001A

Test date: 09/10/2026
Report date: 10/22/2026

Signed: Michael L. Grather Digitally signed by Michael L. Grather Date: 2026.10.23 12:51:16 -04'00'

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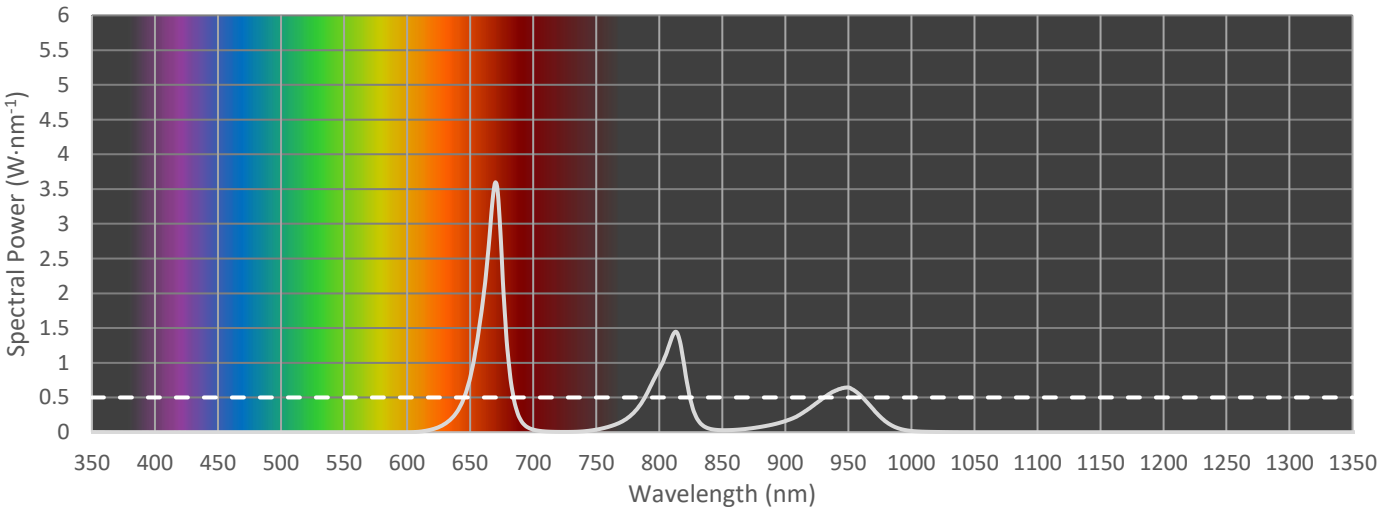
Test Report Number: LLIA003056-001A-R01*

Radiant Flux Tabulation			
Waveband (nm)	Radiant Flux (W_r)	Percent of Total	Efficiency (W_r/W_e)
350-500	0.10	0.1%	0.000
500-570	0.03	0.0%	0.000
Amber 570-600	0.00	0.0%	0.000
Red 600-700	79.36	48.3%	0.214
Deep Red 700-780	4.38	2.7%	0.012
NIR 780-900	45.45	27.7%	0.123
Deep NIR 900-1100	34.89	21.2%	0.094
570-1100	164.08	99.9%	0.443
Total 350-1700	164.21	100.0%	0.444



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Test Report Number: LLIA003056-001A-R01*

Electrical Data

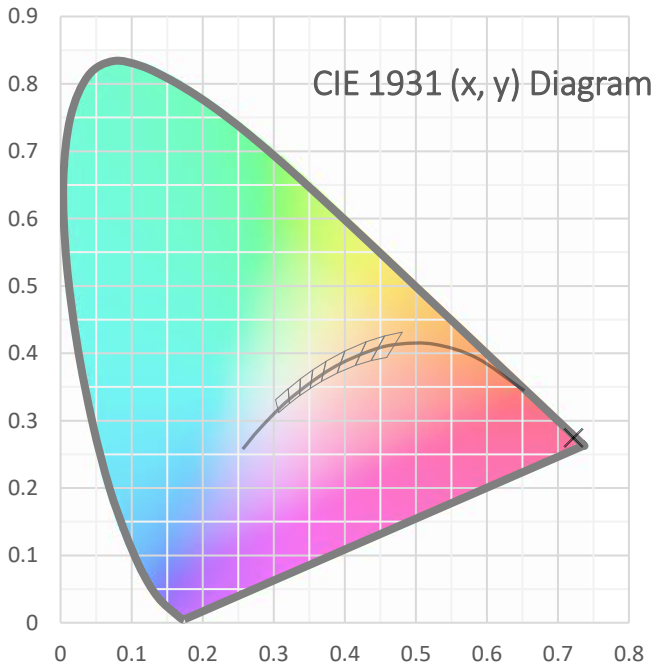
Voltage	120.0	Vac
Current	3.100	A
Power	370.2	W
Frequency	60.00	Hz
Power Factor	0.995	
Current THD	6.7	%

Spectral Power of Select Wavelengths

Wavelength (nm)	Spectral Power ($W \cdot nm^{-1}$)
590	0.0001
630	0.1204
660	1.8675
810	1.3617
830	0.1962
850	0.0291
1064	0.0000

Photometric (Human Vision) Data

Total Luminous Flux		2988.4	lm
Luminous Efficacy		8.1	lm/W
Chromaticity	(x,y)	(0.7220, 0.2748)	
	(u',v')	(0.5951, 0.5095)	
Duv		n/a	
CCT		n/a	K
CRI (Ra)		n/a	
R9		n/a	
TM-30: Rf		n/a	
TM-30: Rg		n/a	



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Test Report Number: LLIA003056-001A-R01*

Test Equipment Configuration:	Measurements acquired using the LightLab International Allentown, LLC Labsphere 2m Integrating Sphere system with spectroradiometer. Testing was performed using 4π geometry
Test Temperature:	25.8 °C
Test Procedure:	Tested in accordance with the applicable sections of: LM-79-24, LM-78-20, LM-58-20, ANSI_ANSLG C78.377-2017, TM-30-24
Significance:	The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.
Notes:	The measurements and other derived quantities contained in this report are based on the absolute data as measured. Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results. This report is free of erasures and corrections This report may contain data that are not covered by the NVLAP accreditation. Quantities marked with ǂ are not covered.

Revisions:

R01 - 10/22/2026 - Modified scale of SPD plot and added 0.5 W/nm line

LightLab
INTERNATIONAL
ALLENTOWN LLC

Radiant Flux Stabilization Report

LLIA003056-001B-R01*

Catalog Number: Diesel XL

Portable, formed steel housing, 5 aluminum heatsinks
and 6 cooling fans behind LEDs.
414 dual chip LEDs - 270 Red, 414 NIR, and 144 unenergized blue LEDs, each with a conical plastic optic in front. Two Ture Full ZF-CV-240-48A LED drivers and one ZF120A-1202000 fan power supply



Test Equipment:

Irradiance measurements were acquired with LightLab asset A108-Gigahertz-Optik BTS2048-VL-TEC Spectral Irradiance Meter using LightLab's Application Distance Measurement Grid in the LightLab goniometer room with stray light reduction. Spectral irradiance was recorded in one-minute intervals during stabilization.

Prepared For:
LightpathLED
565 Ostrander Road
Richfield Springs, NY 13439, USA

*This test report supersedes test report LLIA003056-001B

Test date: 09/15/2026
Report date: 10/22/2026

LightLab INTERNATIONAL ALLENTOWN LLC

Test Report Number: LLIA003056-001B-R01*

Spectral Irradiance measurements taken 12" above the center of the panel.

Time (minutes)	Irradiance (570-1100nm) (mW/cm2)	Irradiance (600-780nm) (mW/cm2)	Irradiance (780-1100nm) (mW/cm2)
0.5	48.3	25.8	22.6
1.5	47.9	25.6	22.3
2.5	47.8	25.5	22.3
3.5	47.6	25.4	22.2
4.5	47.4	25.3	22.1
5.5	47.2	25.3	22.0
6.5	47.1	25.2	21.9
7.5	47.1	25.1	21.9
8.5	47.0	25.1	21.9
9.5	46.9	25.0	21.8
10.5	46.8	25.0	21.8
11.5	46.7	25.0	21.7
12.5	46.7	24.9	21.7
13.5	46.7	24.9	21.8
14.5	46.5	24.9	21.6
15.5	46.6	24.9	21.7
16.5	46.4	24.8	21.6
17.5	46.4	24.8	21.6
18.5	46.4	24.8	21.6
19.5	46.4	24.8	21.6

15 Minute 570-1100nm Irradiance Retention
96.2%

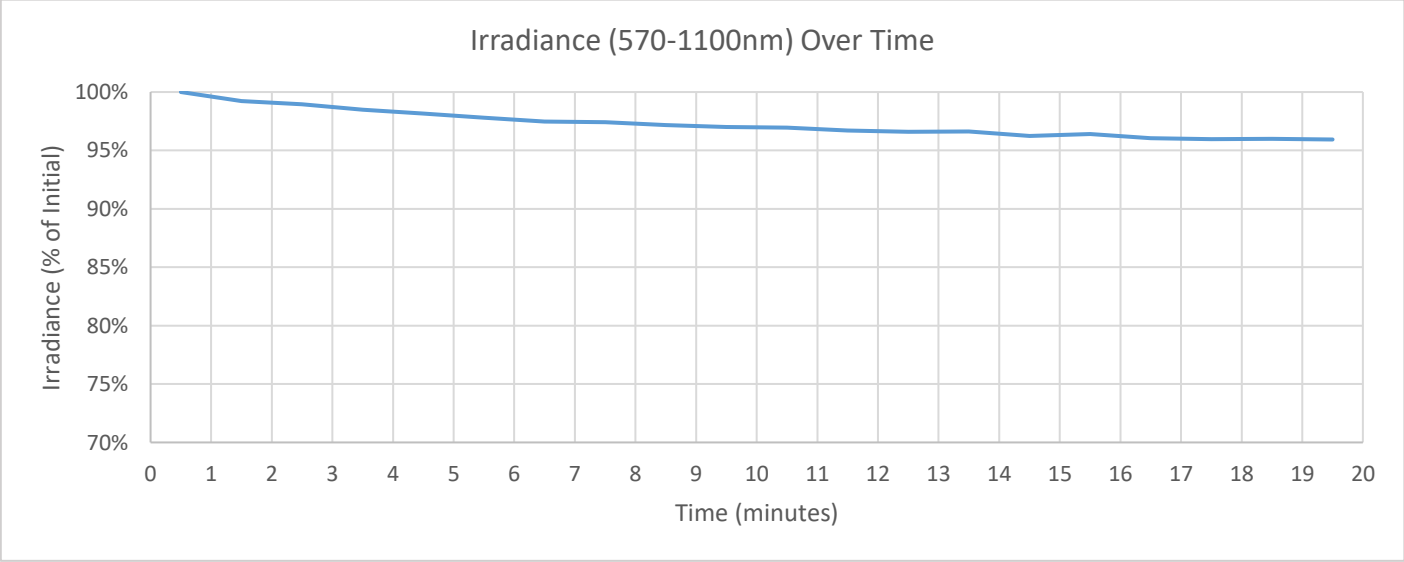
20 Minute 570-1100nm Irradiance Retention
95.9%

15 Minute 600-780nm Irradiance Retention
96.6%

20 Minute 600-780nm Irradiance Retention
96.2%

15 Minute 780-1100nm Irradiance Retention
95.9%

20 Minute 780-1100nm Irradiance Retention
95.6%



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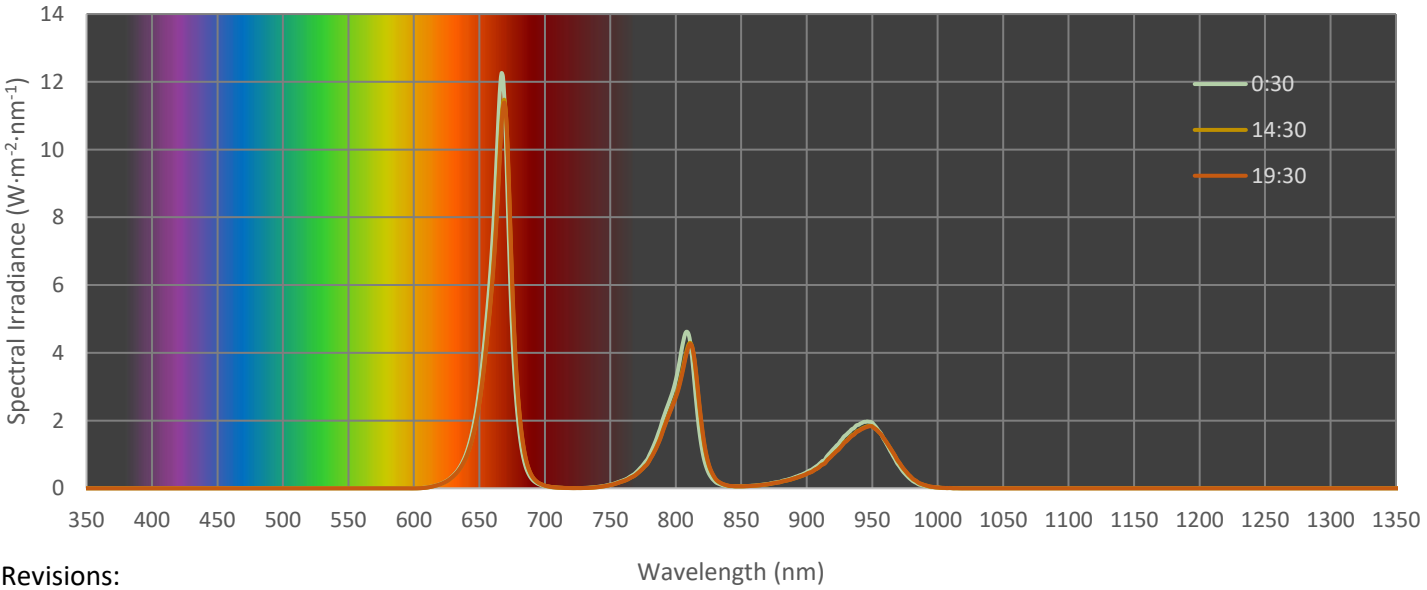
Test Report Number: LLIA003056-001B-R01*

Spectral Irradiance measurements taken 12" above the center of the panel.

Local Peak Number	0.5 min peak wavelength (nm)	14.5 min peak wavelength (nm)	19.5 min peak wavelength (nm)
1	667	669	669
2	808	811	811
3	946	948	948



Revisions:

R01 - 10/22/2026 - Modified scale of Irrad retention plot.

LightLab INTERNATIONAL ALLENTOWN LLC

Grid Application Distance Measurement Test Report

Test Report Number: LLIA003056-001C-R01*

Catalog Number: Diesel XL

Portable, formed steel housing, 5 aluminum heatsinks
and 6 cooling fans behind LEDs.

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Performance Summary

Electrical		
Voltage	120.0	Vac
Current	3.139	A
Power	374.5	W
Frequency	60.00	Hz
Power Factor	0.994	
Current THD	6.9	%
Ambient Temperature	24.8	°C
Grid Dimensions		
Test Plane Distance	12	inches
X Axis minimum	-12	inches
X Axis maximum	12	inches
X Axis increments	2	inches
Y Axis minimum	-30	inches
Y Axis maximum	30	inches
Y Axis increments	2	inches
Number of measurement points	403	

Test Equipment:

Irradiance measurements were acquired with LightLab asset A108-Gigahertz-Optik BTS2048-VL-TEC Spectral Irradiance Meter using LightLab's Application Distance Measurement Grid in the LightLab goniometer room with stray light reduction. The test subject was allowed to reach stabilization according to IES LM-79-24 criteria prior to measurements.

Prepared For:
LightpathLED
565 Ostrander Road
Richfield Springs, NY 13439, USA

*This test report supersedes test report LLIA003056-001C

Test date: 09/15/2026
Report date: 10/22/2026

LightLab INTERNATIONAL ALLENTOWN LLC

Test Report Number: LLIA003056-001C-R01*

Full Body Target Area
Total Irradiance (570-1100nm) in mW/cm^2
Test Distance = 12 inches

X Axis Distance (inches)

Y Axis Distance (inches)	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12
30	0.21	0.26	0.30	0.35	0.39	0.41	0.41	0.39	0.36	0.32	0.28	0.23	0.19
28	0.27	0.33	0.41	0.49	0.57	0.60	0.61	0.58	0.53	0.45	0.37	0.30	0.24
26	0.33	0.43	0.62	1.04	1.48	1.55	1.54	1.51	1.38	0.93	0.56	0.39	0.30
24	0.41	0.60	1.14	3.28	5.78	6.26	6.54	5.94	5.32	3.06	1.23	0.56	0.37
22	0.50	0.90	2.98	10.75	19.80	21.05	21.51	20.60	18.46	10.40	3.05	0.87	0.46
20	0.59	1.32	4.79	21.09	35.69	43.38	40.96	39.41	38.37	20.86	5.04	1.23	0.57
18	0.67	1.58	5.67	23.87	41.99	48.98	48.89	48.65	46.22	23.95	6.25	1.43	0.65
16	0.74	1.74	5.69	23.34	41.35	47.27	50.38	48.28	43.91	24.13	6.07	1.55	0.73
14	0.79	1.88	6.18	23.01	39.83	45.65	48.37	45.07	39.99	21.49	6.09	1.62	0.78
12	0.83	1.96	6.40	22.01	37.69	42.97	45.74	43.24	38.96	22.09	5.98	1.68	0.82
10	0.89	2.01	6.34	21.77	36.68	42.39	43.14	42.70	37.80	21.63	5.79	1.74	0.86
8	0.93	2.08	6.48	22.37	38.28	43.86	43.23	44.09	39.22	22.08	5.80	1.80	0.89
6	0.97	2.13	6.32	23.14	38.94	45.75	45.54	42.96	40.69	22.20	6.05	1.80	0.92
4	0.98	2.32	6.49	21.39	39.96	45.75	45.84	43.80	40.65	22.34	5.72	1.85	0.94
2	0.99	2.18	6.47	22.12	39.04	44.57	46.29	42.97	39.73	21.09	5.89	1.89	0.95
0	1.01	2.21	6.65	23.18	40.55	44.87	45.92	43.85	38.39	20.98	5.91	1.94	0.97
-2	1.01	2.23	6.70	22.66	39.71	44.13	44.39	43.36	39.43	22.07	5.83	1.95	0.98
-4	1.02	2.25	6.45	22.49	38.80	45.59	46.28	45.36	40.48	22.59	5.73	1.96	1.00
-6	1.03	2.41	7.16	23.73	41.20	47.29	49.26	47.48	43.12	23.38	5.93	2.03	0.99
-8	1.04	2.35	7.29	24.88	42.28	48.97	50.63	50.38	44.48	24.29	6.27	2.06	0.98
-10	1.04	2.56	7.84	24.88	44.37	49.80	51.38	49.90	44.08	24.32	6.48	2.08	0.97
-12	1.01	2.84	8.02	25.00	44.79	49.83	51.04	49.53	44.81	24.49	6.68	2.10	0.95
-14	0.98	2.74	8.05	25.97	45.43	50.64	50.67	50.22	44.77	23.89	6.72	2.02	0.92
-16	0.94	2.58	8.19	26.46	44.85	51.87	52.31	50.33	45.59	24.96	6.55	1.96	0.87
-18	0.82	2.44	7.38	24.76	41.20	48.35	50.61	48.29	44.03	23.83	6.58	1.78	0.78
-20	0.71	2.25	6.18	19.42	31.01	37.03	39.13	36.90	33.84	19.35	5.19	1.48	0.67
-22	0.56	1.17	2.89	9.19	16.82	19.56	19.55	19.71	17.72	10.08	3.00	1.04	0.55
-24	0.44	0.66	1.20	2.64	4.79	5.56	5.68	5.57	4.80	2.90	1.15	0.65	0.44
-26	0.35	0.45	0.63	0.87	1.07	1.18	1.25	1.22	1.03	0.85	0.62	0.46	0.35
-28	0.28	0.34	0.42	0.51	0.59	0.65	0.66	0.65	0.59	0.52	0.43	0.35	0.28
-30	0.22	0.26	0.32	0.37	0.41	0.45	0.46	0.44	0.41	0.37	0.32	0.27	0.22

Center Point Irradiance	45.92	mW/cm^2	Target Area Radiant Power	163.3	W
Maximum Irradiance	52.31	mW/cm^2	Average Irradiance	17.57	mW/cm^2
Minimum Irradiance	0.19	mW/cm^2	Percent area over $20mW/cm^2$	36.9	%
Standard Deviation	18.30	mW/cm^2	Percent area over $30mW/cm^2$	29.2	%
Coefficient of Variation	116.1	%	Percent area over $40mW/cm^2$	21.3	%

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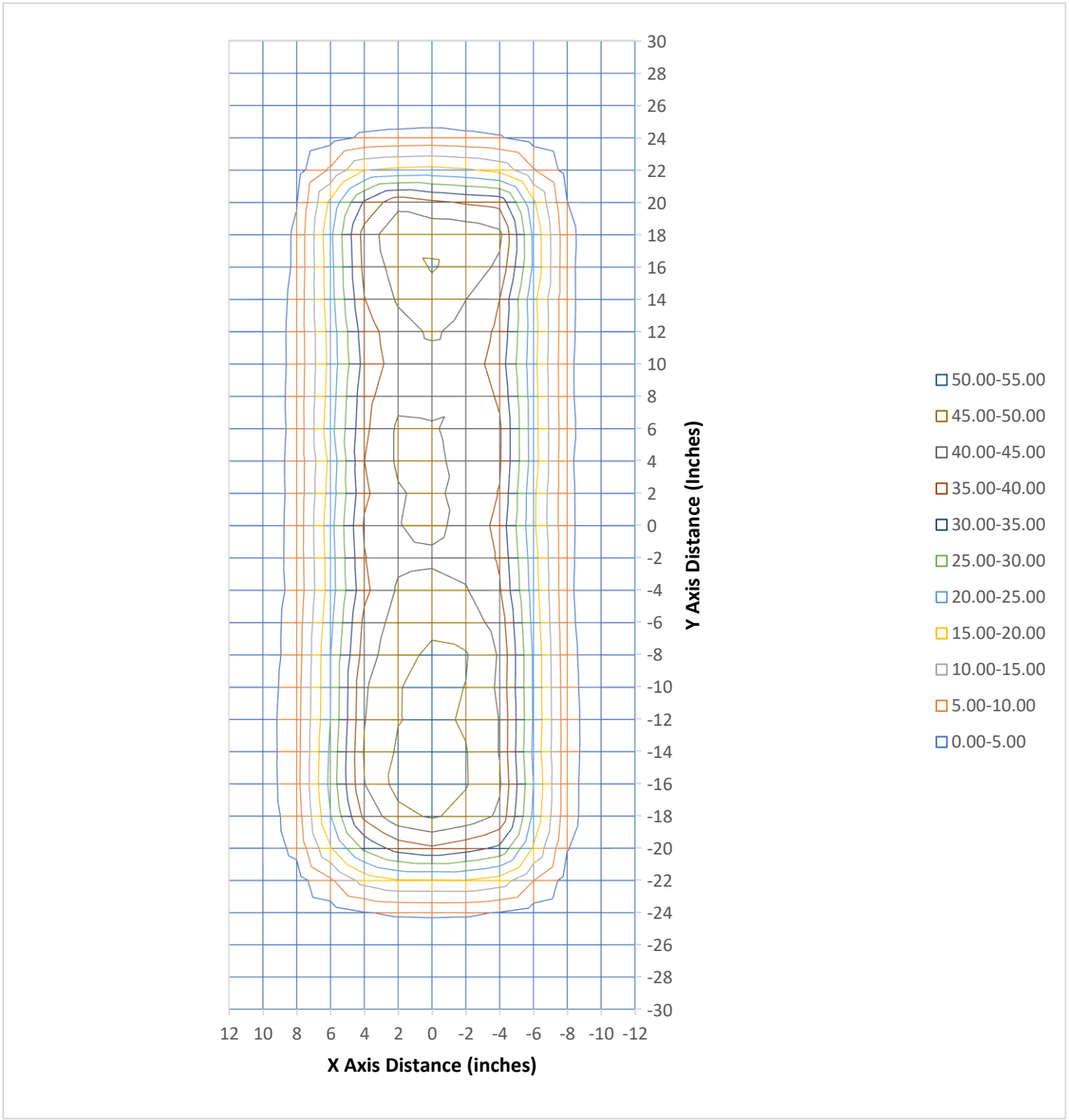
Report of Test

Test Report Number: LLIA003056-001C-R01*

Total Irradiance (570-1100nm) in mW/cm^2
Test Distance = 12 inches



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Half Body Target Area
Total Irradiance (570-1100nm) in mW/cm^2
Test Distance = 12 inches

X Axis Distance (inches)

Y Axis Distance (inches)	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12
14	0.79	1.88	6.18	23.01	39.83	45.65	48.37	45.07	39.99	21.49	6.09	1.62	0.78
12	0.83	1.96	6.40	22.01	37.69	42.97	45.74	43.24	38.96	22.09	5.98	1.68	0.82
10	0.89	2.01	6.34	21.77	36.68	42.39	43.14	42.70	37.80	21.63	5.79	1.74	0.86
8	0.93	2.08	6.48	22.37	38.28	43.86	43.23	44.09	39.22	22.08	5.80	1.80	0.89
6	0.97	2.13	6.32	23.14	38.94	45.75	45.54	42.96	40.69	22.20	6.05	1.80	0.92
4	0.98	2.32	6.49	21.39	39.96	45.75	45.84	43.80	40.65	22.34	5.72	1.85	0.94
2	0.99	2.18	6.47	22.12	39.04	44.57	46.29	42.97	39.73	21.09	5.89	1.89	0.95
0	1.01	2.21	6.65	23.18	40.55	44.87	45.92	43.85	38.39	20.98	5.91	1.94	0.97
-2	1.01	2.23	6.70	22.66	39.71	44.13	44.39	43.36	39.43	22.07	5.83	1.95	0.98
-4	1.02	2.25	6.45	22.49	38.80	45.59	46.28	45.36	40.48	22.59	5.73	1.96	1.00
-6	1.03	2.41	7.16	23.73	41.20	47.29	49.26	47.48	43.12	23.38	5.93	2.03	0.99
-8	1.04	2.35	7.29	24.88	42.28	48.97	50.63	50.38	44.48	24.29	6.27	2.06	0.98
-10	1.04	2.56	7.84	24.88	44.37	49.80	51.38	49.90	44.08	24.32	6.48	2.08	0.97
-12	1.01	2.84	8.02	25.00	44.79	49.83	51.04	49.53	44.81	24.49	6.68	2.10	0.95
-14	0.98	2.74	8.05	25.97	45.43	50.64	50.67	50.22	44.77	23.89	6.72	2.02	0.92

Center Point Irradiance	45.92	mW/cm^2	Target Area Radiant Power	110.2	W
Maximum Irradiance	51.38	mW/cm^2	Average Irradiance	23.72	mW/cm^2
Minimum Irradiance	0.78	mW/cm^2	Percent area over 20mW/cm^2	51.6	%
Standard Deviation	19.04	mW/cm^2	Percent area over 30mW/cm^2	42.6	%
Coefficient of Variation	86.7	%	Percent area over 40mW/cm^2	32.1	%

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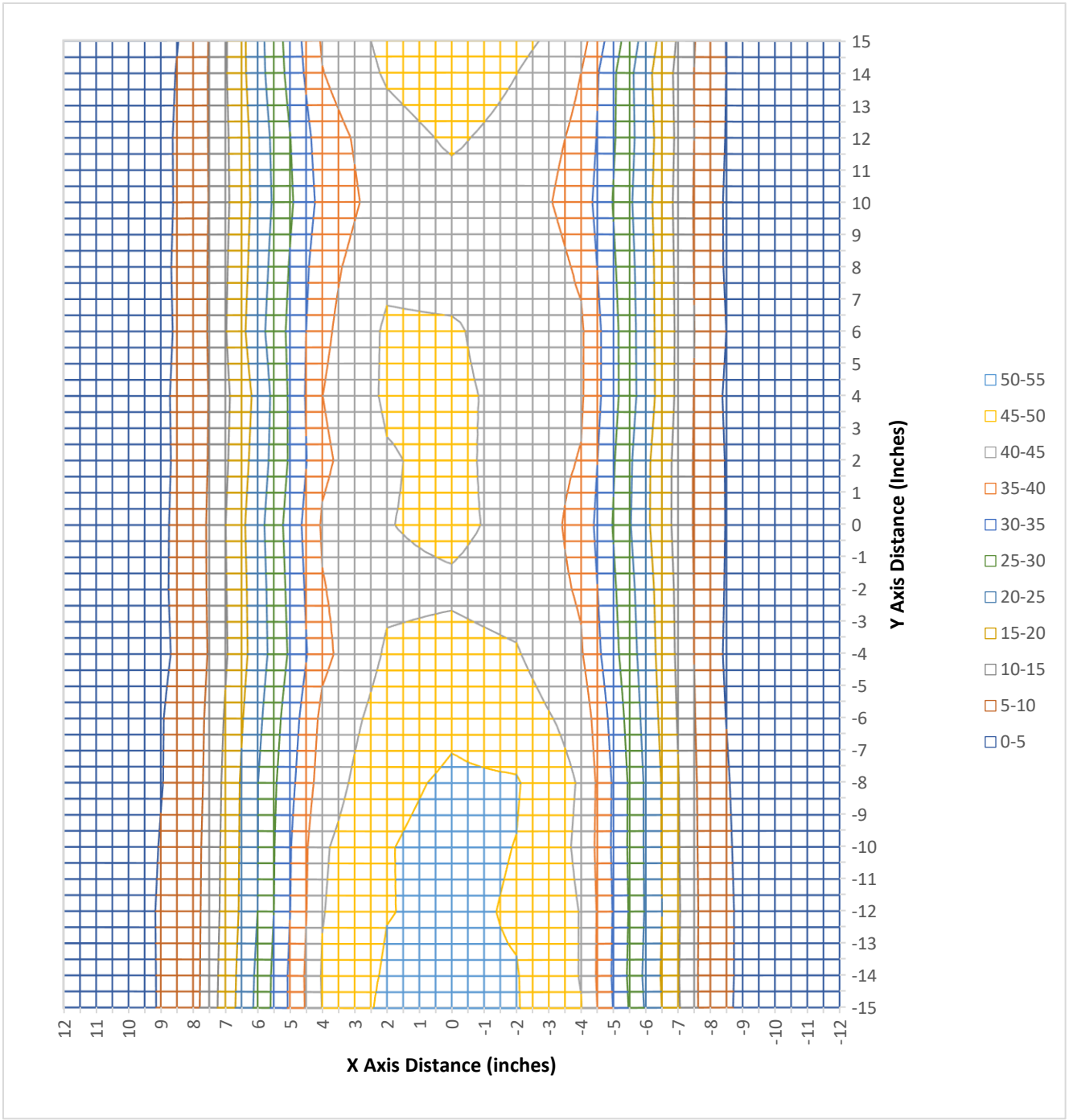
Total Irradiance (570-1100nm) in mW/cm^2
Test Distance = 12 inches



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Test Report Number: LLIA003056-001C-R01*

Face Target Area
Total Irradiance (570-1100nm) in mW/cm^2
Test Distance = 12 inches

Y Axis Distance (inches)	X Axis Distance (inches) -2	0	2
4	45.75	45.84	43.80
2	44.57	46.29	42.97
0	44.87	45.92	43.85
-2	44.13	44.39	43.36
-4	45.59	46.28	45.36

Center Point Irradiance	45.92	mW/cm^2	Target Area Radiant Power	17.2	W
Maximum Irradiance	46.29	mW/cm^2	Average Irradiance	44.52	mW/cm^2
Minimum Irradiance	42.97	mW/cm^2	Percent area over $20mW/cm^2$	100.0	%
Standard Deviation	1.09	mW/cm^2	Percent area over $30mW/cm^2$	100.0	%
Coefficient of Variation	2.4	%	Percent area over $40mW/cm^2$	100.0	%

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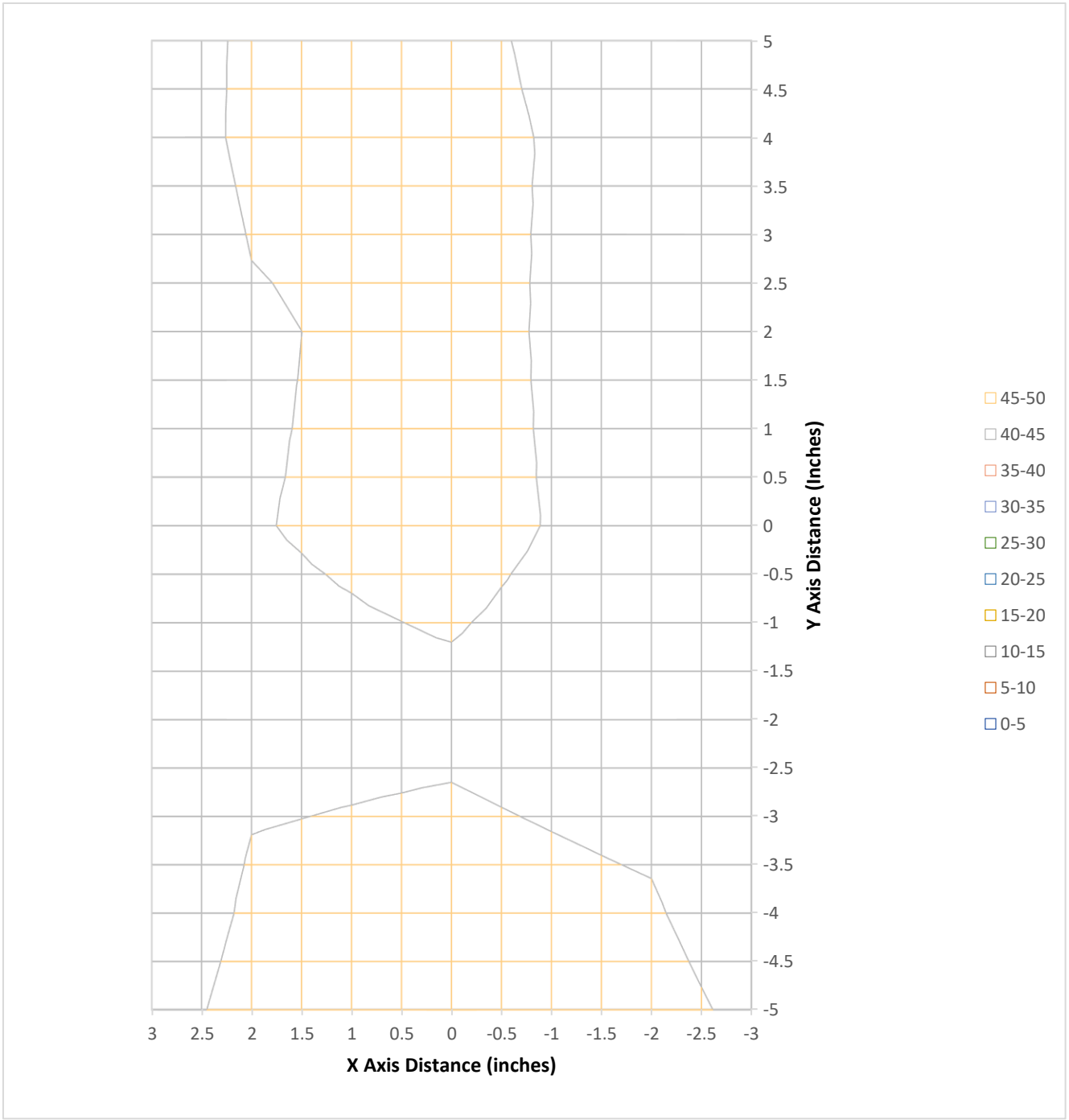
Total Irradiance (570-1100nm) in mW/cm^2
Test Distance = 12 inches



LightLab INTERNATIONAL ALLENTOWN LLC

Test Report Number: LLIA003056-001C-R01*

Test Equipment Configuration:	LightLab International Allentown Application Distance Measurement Grid Measurements acquired using a spectral irradiance meter (350-1050nm) The rectangular scan method was employed using cartesian coordinates. No symmetry was applied to the results.
Test Procedure:	Tested in accordance with the applicable sections of: LM-91-22, LM-79-24, LM-58-20
Significance:	The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.
Notes:	The measurements and other derived quantities contained in this report are based on the absolute data as measured. Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results. This report is free of erasures and corrections This report may contain data that are not covered by the NVLAP accreditation. Quantities marked with ‡ are not covered. This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Revision History: R01 - 10/22/2026 - Corrected typo on front page Xmin and Xmax values.

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