

**PHOTOMETRIC TESTING & EVALUATION TO IES LM-79-19**

Sample Tested

**JR4-50-GT3-GY-\*\*-AC**

Prepared for:

**Nemalux Inc.**1018 72 Ave NE  
Calgary, Alberta, Canada T2E 8V9**Technical Report Number**

80213137-2

June 17, 2024

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## Program Description

Photometric and electrical testing of a JR4-50-GT3-GY-\*\*-AC Type C LED Luminaire to IES LM-79-19.

## Executive Summary

Sample Tested = JR4-50-GT3-GY-\*\*-AC

Sample Number = 44003157

Driver = Sosen SS-35VA-L50BHL

LED Module = CREE XHP35.2

Luminous Efficacy (Lumens/Watt)	Luminous Flux (Lumens)	Input Power (Watts)	Power Factor	ATHD (%)
97.57	3711.66	38.04	0.9943	7.70

CCT(K)	CRI	R9	Rcs,h1	Rf / Rg
5614	71.4	-20	-16	70 / 98

\* The above results are recorded / derived from measurements made using an Integrating Sphere

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### Test Sample Pictures

The following sample was submitted for evaluation:



**Nemalux Inc. : JR4-50-GT3-GY-\*\*-AC**

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**Test Result**

The following results were measured after stabilization of the sample in the Integrating Sphere (unless otherwise stated). Stability shall be achieved when the variation (Maximum to minimum) of at least three readings of the light output and electrical power consumption, taken at a maximum of 10 minute intervals over a period of 20 minutes and divided by the last of these measurements chronologically, is less than 0.5%.

Key Photometric Results	Sample Reference	
	JR4-50-GT3-GY-**-AC	
	Integrating Sphere	Goniophotometer
Luminous Efficacy (Lumens/Watt)	97.57	95.00
Total Luminous Flux (Lumens)	3711.66	3613.64
Total Radiant Flux (Watts)	11.73	
Correlated Color Temperature (CCT)	5614	
Color Rendering Index (CRI)(Ra)	71.4	
R9 Value	-20	
IES R <sub>f</sub> / IES R <sub>g</sub>	70 / 98	
Local Chroma Shift R <sub>cs,h1</sub>	-16	
Chromaticity (Chroma x/Chroma y)	0.3299 / 0.3361	
Chromaticity (Chroma u/Chroma v)	0.2071 / 0.3164	
Chromaticity (Chroma u'/Chroma v')	0.2071 / 0.4746	
Duv Value	-0.0014	
Stabilization Time (Light and Power)	40 minutes	
Total Run Time (Integrating Sphere)	45 minutes	
Spacing Criteria (0°-180°)/(90°-270°)	2.06 / 1.64	
Scotopic/Photopic ratio $\Phi(v')/\Phi(v)$	1.84	

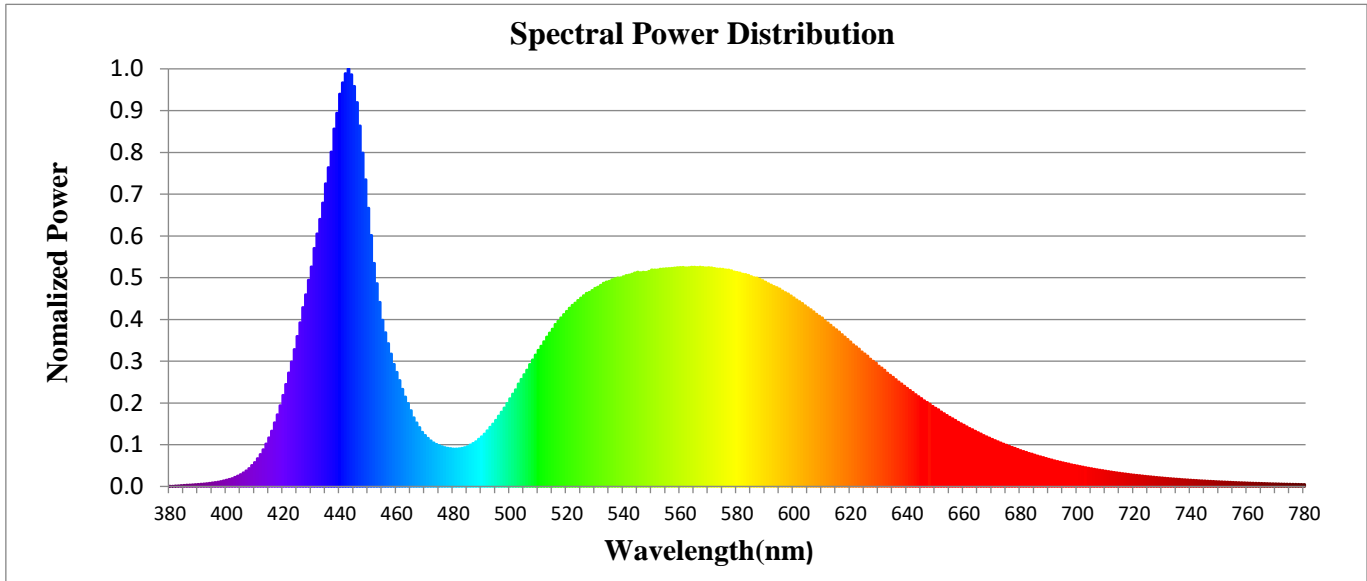
Electrical Input Results:	Sample Reference
	JR4-50-GT3-GY-**-AC
Input Power (Watts)	38.04/ 37.04
Input Voltage (Volts AC)	120.06/ 277.05
Input Current (Amps)	0.3186/ 0.1414
Input Frequency (Hertz)	60.0/ 60.0
Power Factor	0.9943/ 0.9458
Total Harmonic Distortion (THD A)%	7.70/ 10.60 %

Additional Information	Sample Reference
	JR4-50-GT3-GY-**-AC
Ambient Temperature	25°C
Integrating Sphere Detector	CDS 2600 Spectroradiometer
Absortion Correction Used?	Yes
Date Tested	6/14/2024

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## Spectral Flux

The following graph shows the spectral response curve of the radiant flux for the sample:



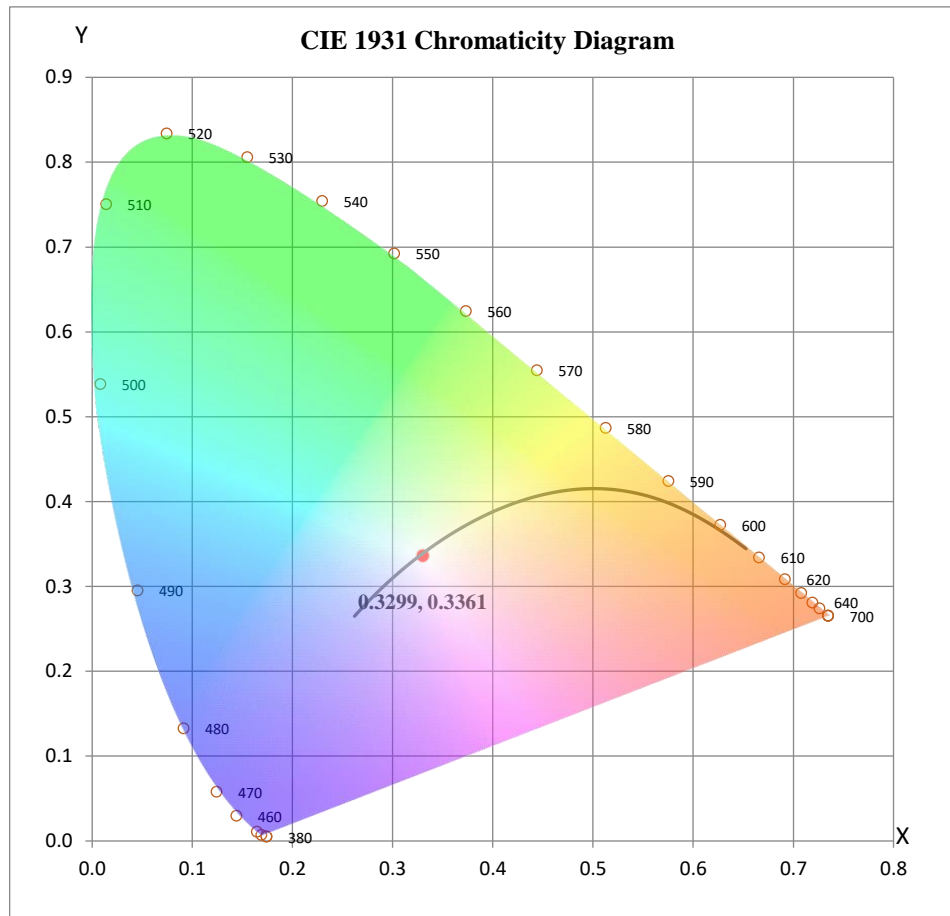
### Spectral response of the Radiant Flux

(380nm to 780nm - calibrated range of the Spectroradiometer)

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## Chromaticity Diagram

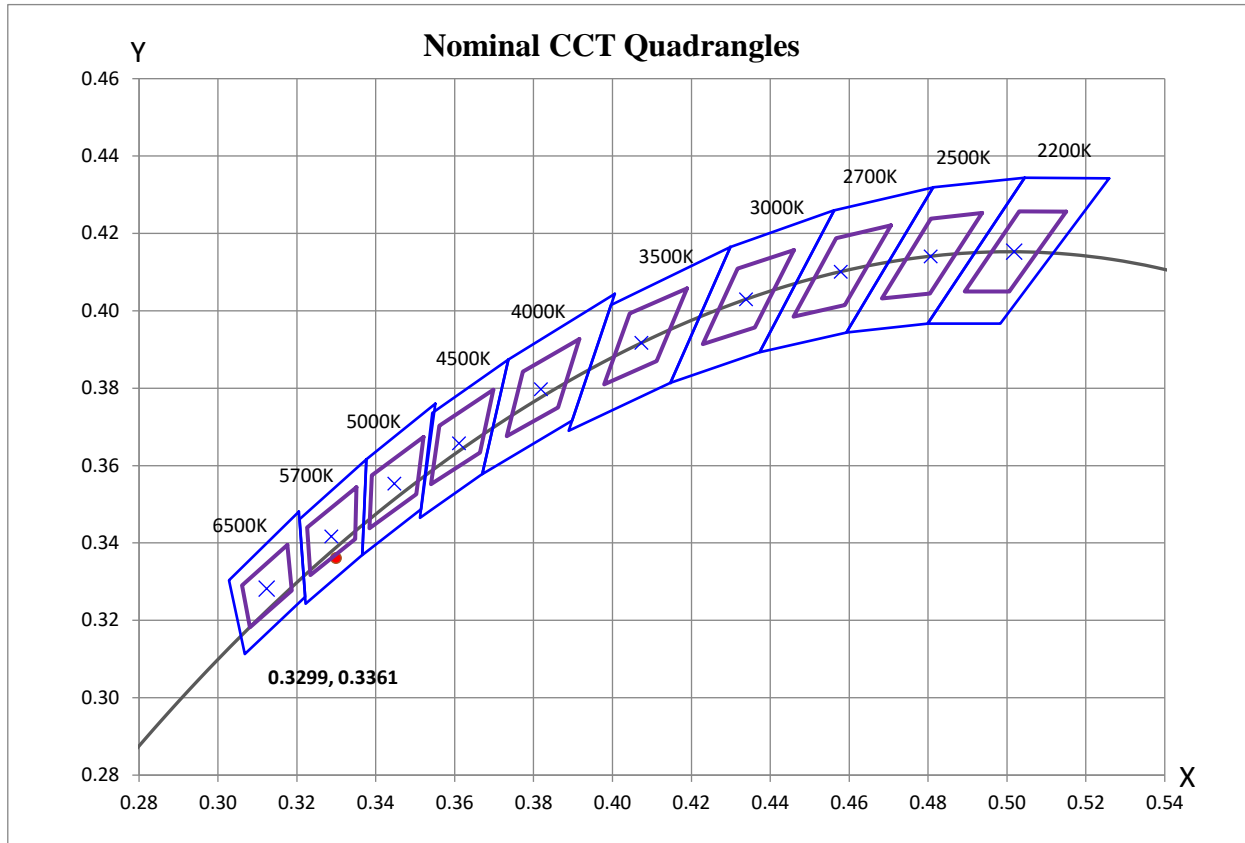
The following image shows the chromaticity diagram for the sample:



$x = 0.3299$        $y = 0.3361$

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## Nominal CCT Quadrangles

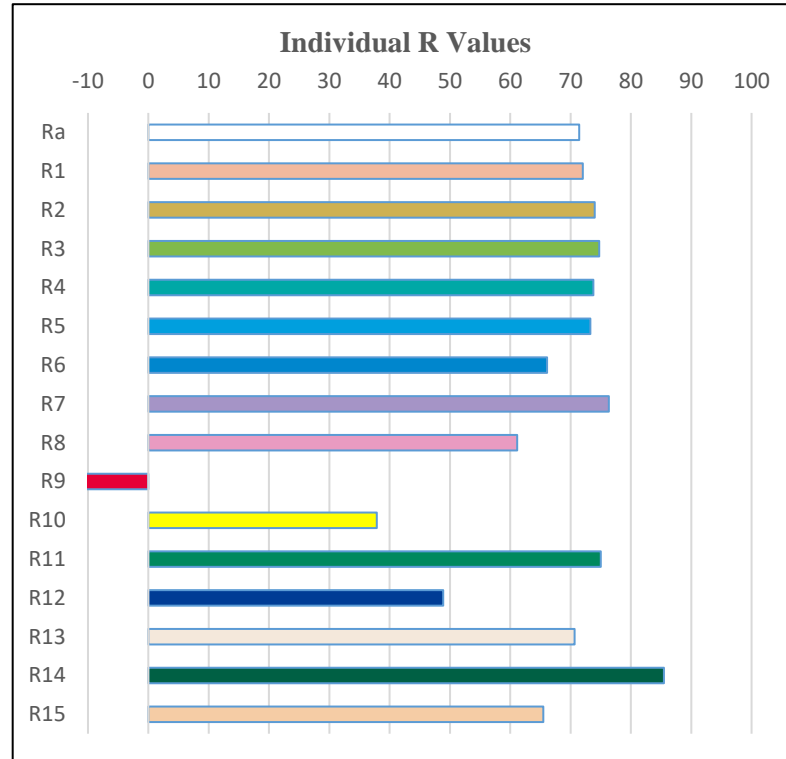


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## Color Rendering Index

Ra	71.4
R1	72
R2	74
R3	75
R4	74
R5	73
R6	66
R7	76
R8	61
R9	-20
R10	38
R11	75
R12	49
R13	71
R14	85
R15	65



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## Photometric Test Results

Characteristics		Luminance Data (cd/sq.m)			
Total Lumens:	3613.64	Angle In Degrees	Average		
Input Wattage (W):	38		0°	45°	90°
Efficacy(lm/W):	95.10	45	82576	102246	60067
Spacing Criterion (0-180°):	2.06	55	74783	133943	74132
Spacing Criterion (90-270°):	1.64	65	30040	131425	122701
Spacing Criterion (Diagonal):	1.84	75	11902	68889	97382
Luminous Length (0-180°):	0.48 ft	85	1607	4284	3213
Luminous Width (90-270°):	0.48 ft				
Luminous Height:	0.00 ft				

Zonal Lumen Summary												
Zone	Lumens	%Fixt		Zone	Lumens	%Fixt		Zone	Lumens		Zone	Lumens
0-20°	304.00	8.4		60-80°	987.74	27.3		0-10°	79.56		90-100°	0.00
0-30°	674.93	18.7		70-80°	310.19	8.6		10-20°	224.44		100-110°	0.00
0-40°	1199.94	33.2		80-90°	15.40	0.4		20-30°	370.93		110-120°	0.00
0-60°	2610.50	72.2		90-110°	0.00	0.0		30-40°	525.01		120-130°	0.00
0-80°	3598.24	99.6		90-120°	0.00	0.0		40-50°	665.57		130-140°	0.00
0-90°	3613.64	100.0		90-130°	0.00	0.0		50-60°	744.99		140-150°	0.00
10-90°	3534.08	97.8		90-150°	0.00	0.0		60-70°	677.55		150-160°	0.00
20-40°	895.94	24.8		90-180°	0.00	0.0		70-80°	310.19		160-170°	0.00
20-50°	1561.51	43.2		110-180°	0.00	0.0		80-90°	15.40		170-180°	0.00
40-70°	2088.11	57.8		0-180°	3613.64	100.0		0-90°	3613.64		90-180°	0.00

Coefficients of Utilization																		
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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	98	94	105	101	96	93	96	93	90	92	90	87	89	87	84	82
2	97	88	80	74	94	86	79	73	82	77	72	79	74	70	76	72	68	66
3	87	76	67	59	85	74	66	59	71	64	58	68	62	57	65	60	56	53
4	79	66	56	49	76	64	55	48	62	54	48	59	52	47	57	51	46	44
5	72	58	48	41	70	57	47	40	54	46	40	52	45	39	50	44	39	37
6	66	51	42	35	64	50	41	34	48	40	34	47	39	34	45	38	33	31
7	61	46	36	30	59	45	36	30	43	35	29	42	35	29	41	34	29	27
8	56	41	32	26	54	41	32	26	39	31	26	38	31	26	37	30	25	23
9	52	38	29	23	51	37	29	23	36	28	23	35	28	23	34	27	23	21
10	49	35	26	21	47	34	26	21	33	26	20	32	25	20	31	25	20	18

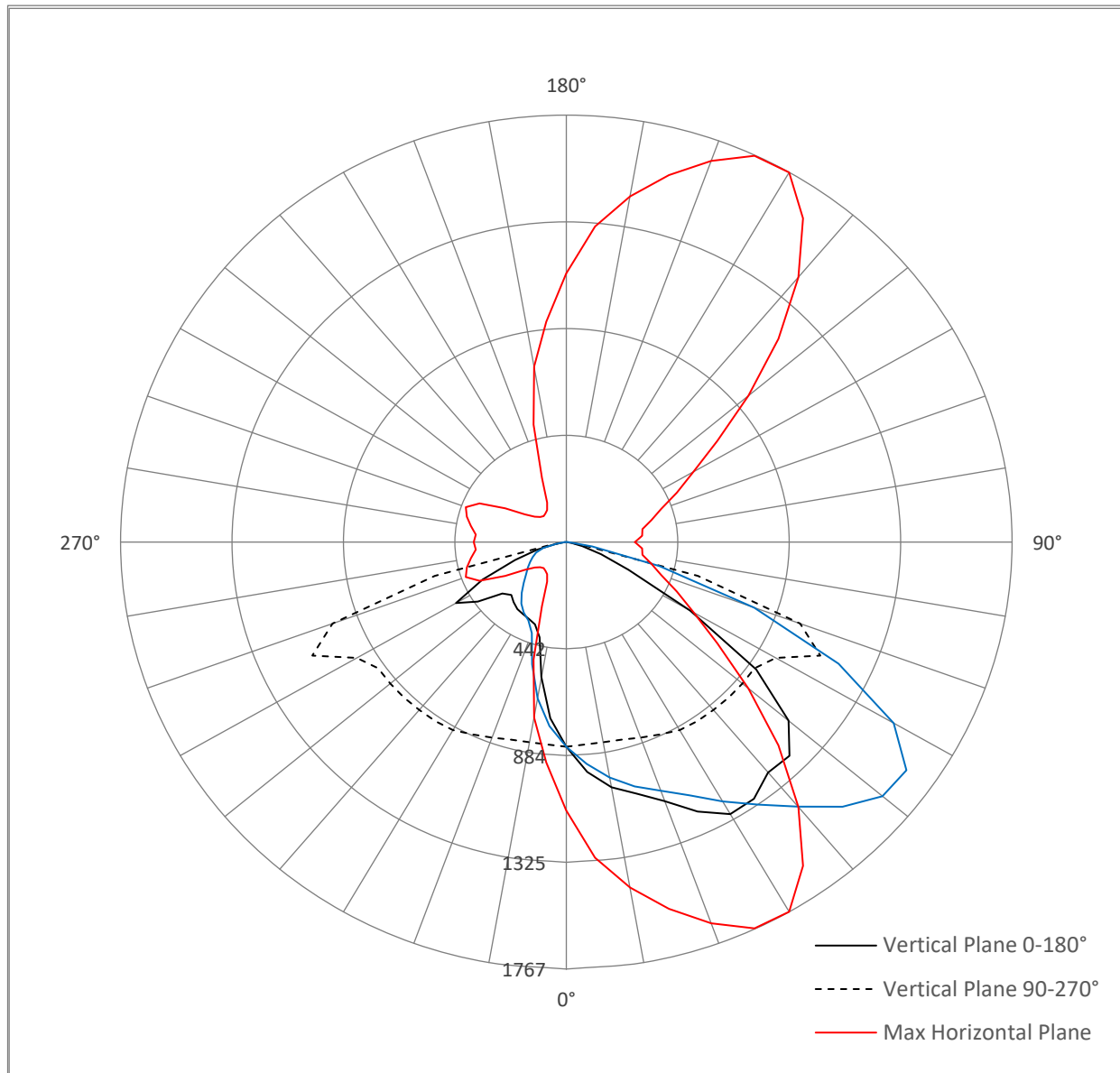
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UGR Table												
		Reflectances						Reflectances				
Ceiling Cavity		70	70	50	50	30		70	70	50	50	30
Walls		50	30	50	30	30		50	30	50	30	30
Floor Cavity		20	20	20	20	20		20	20	20	20	20
Room Size		UGR Viewed Crosswise						UGR Viewed Endwise				
X=2H	Y=2H	28.8	30.6	31.2	31.5	32.1	29.7	31.5	30.1	31.8	32.1	
	3H	29.1	30.7	31.4	35.2	35.8	33.5	35.2	33.9	35.5	35.8	
	4H	29.1	30.6	31.3	35.8	36.5	34.2	35.8	34.6	36.1	36.5	
	6H	29.0	30.5	31.2	35.7	36.5	34.3	35.7	34.7	36.1	36.5	
	8H	29.0	30.4	31.2	35.6	36.4	34.3	35.6	34.7	36.0	36.4	
	12H	29.0	30.3	31.1	35.5	36.3	34.2	35.5	34.7	35.9	36.3	
4H	2H	30.7	32.2	33.0	32.0	32.7	30.5	32.0	30.9	32.4	32.7	
	3H	31.0	32.3	33.1	35.9	36.7	34.6	35.9	35.0	0.0	36.7	
	4H	31.0	32.2	33.0	36.6	37.4	35.4	36.6	35.9	37.0	37.4	
	6H	31.0	32.0	32.9	36.5	37.4	35.5	36.5	36.0	37.0	37.4	
	8H	31.0	31.9	32.8	36.4	37.3	35.5	36.4	35.9	36.9	37.3	
	12H	31.0	31.8	32.8	36.3	37.3	35.5	36.3	36.0	36.8	37.3	
8H	4H	32.1	33.0	33.9	36.4	37.3	35.5	36.4	35.9	36.9	37.3	
	6H	32.1	32.9	33.8	36.4	37.3	35.6	36.4	36.1	36.8	37.3	
	8H	32.1	32.8	33.8	36.2	37.2	35.5	36.2	36.0	36.7	37.2	
	12H	32.1	32.7	33.7	36.2	37.2	35.6	36.2	36.1	36.6	37.2	
12H	4H	32.1	33.0	33.9	36.3	37.3	35.5	36.3	36.0	36.8	37.3	
	6H	32.1	32.8	33.8	36.3	37.3	35.6	36.3	36.1	36.7	37.3	
	8H	32.1	32.7	33.8	36.2	37.2	35.6	36.2	36.1	36.6	37.2	

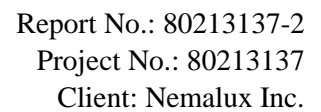
Maximum UGR = 37.4

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**Polar Graph**



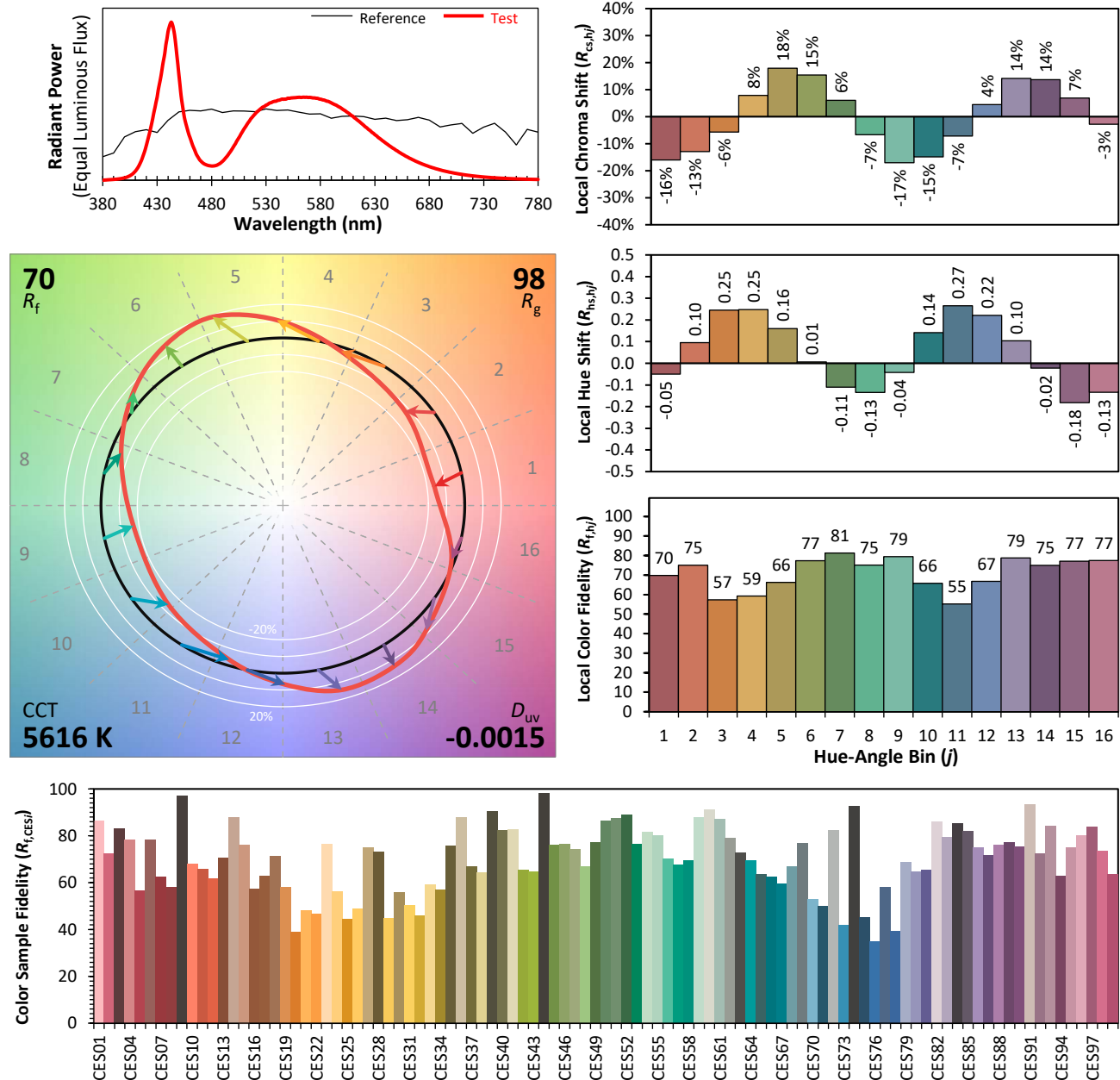
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### Vertical Angle

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## ANSI/IES TM-30-18 Color Rendition Report



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

$x$  0.3299  
 $y$  0.3359  
 $u'$  0.2071  
 $v'$  0.4745

CIE 13.3-1995  
 (CRI)  
 $R_a$  71  
 $R_g$  -20

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

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**Photometric Testing Information**

The sample was evaluated for photometric and electrical characteristics using an integrating sphere and a goniophotometer, each located in purpose-built, temperature and humidity-controlled, draft free environments

The integrating sphere is by Labsphere which exhibits a “4 $\pi$  geometry” configuration according to IES LM-79-19 and is applicable for all types of LED products (directional and non-directional light projections). Its spectroradiometer is an array-type detector manufactured and calibrated by Labsphere.

The integrating sphere uses self-absorption correction to eliminate errors due to mismatches between the standard reference lamp and the test samples being measured. The auxiliary lamp used to perform this task is a halogen type lamp powered by a calibrated Lamp Power Supply manufactured and calibrated by Labsphere. Ambient temperature (for photometric analysis) is measured using a “J-Type” thermocouple located inside the integrating sphere at the same height as the sample under test and not more than 1 meter in horizontal distance away from the sample. The thermocouple is located behind the baffle of the photo detector in order to eliminate any direct optical radiation from the sample under test.

**Luminaire Stabilization.**

The sample was placed inside the integrating sphere and powered by a regulated and conditioned Voltage alternating current supply. The correlated color temperature, color rendering index, chromaticity coordinates and electrical power measurements contained in this report are the numeric averages of the three readings upon which stabilization is verified. The stabilization times shown on the results pages of this report denote the time of the 1st measurement (of the 3 consecutive readings) since this is the minimum time that the sample is assumed to have taken to reach stabilization.

The integrating sphere is calibrated using a quartzline halogen lamp with the following specifications:  
(Calibrated by Labsphere – NIST traceable).

Lamp ID	J178		
Manufacture	Donar		
Model Number	SCL-1400-J178		
Part ID	SCL-1400		
Current (A)	2.679		
Wattage (W)	75.0		
Voltage (VDC)	28.0		
Luminous Flux	1306		
Calibration Date	6/21/2021		

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**Photometric Testing Information (Continued)**

The goniophotometer Mayer Engineering Type C is calibrated using a frosted tungsten filament FDS/DZE lamp with the following specifications:

Manufacturer: GE  
Part Number: DZE  
Bulb Number: 106-A  
Voltage: 16.93 Volts DC reference  
Calibration Current: 4.863 Amperes  
Luminous Intensity: 168.8 Candelas  
Calibration Date: 4/25/12 (NIST traceable)

Manufacturer: GE  
Part Number: DZE  
Bulb Number: 106-B  
Voltage: 16.45 Volts DC reference  
Calibration Current: 4.79 Amperes  
Luminous Intensity: 145.3 Candelas  
Calibration Date: 4/25/12 (NIST traceable)

Manufacturer: GE  
Part Number: DZE  
Bulb Number: 106-C  
Voltage: 16.57 Volts DC reference  
Calibration Current: 4.829 Amperes  
Luminous Intensity: 157.0 Candelas  
Calibration Date: 4/25/12 (NIST traceable)

A Yokogawa WT310 Power Analyzer was used to measure all electrical characteristics of the sample.

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**Equipment List: Goniophotometer Type C (Mirror 2)**

Description	Manufacturer and Model Number	CSA Instrument Reference Number	Calibration Due Date
Optometer	Gigahertz Optik P9801	OPT400	N/A
Programmable DC Power Supply	Chroma Instruments 62012P-80-60	DCP300	N/A
Regulated Power Supply	Chroma Instruments 61602	AC301	N/A
Power Analyzer	Yokogawa WT310-E	POA400	9/25/2024

**Equipment List: Sphere B Equipment**

Description	Manufacturer and Model Number	CSA Instrument Reference Number	Calibration Due Date
Integrating Sphere 118"	Labsphere LMS-3M	Z00029788	N/A
Spectroradiometer	Labsphere CDS2600	N/A	N/A
Auxiliary Lamp PSU	Labsphere LPS525	N/A	N/A
Power Analyzer	Yokogawa WT310E	Z00025875	10/18/2024
Programmable AC Power Supply	Chroma Instruments 61605	Z00023974	N/A

\* All equipment is calibrated to ISO / IEC 17025-2017 guidelines.

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