

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

ENCY3RS-L278354D-UNV-WB

PROJECT NUMBER

G104349704

REPORT NUMBER

104349704CRT-069

ISSUE DATE

3/1/2021

REVISED DATE

3/3/2021

TEST DATES

February 26, 2021 through March 1, 2021

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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REPORT NUMBER

104349704CRT-069

MODEL NUMBER(s)

ENCY3RS-L278354D-UNV-WB

REPORT RENDERED TO:

VISUAL COMFORT AND COMPANY
7400 LINDER AVE
SKOKIE, IL 60077
USA

STATEMENT OF LIMITATION

NVLAP Lab Code 100402-0. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION

The testing performed was authorized by signed quote number Qu-01080748-1.

TEST STANDARDS

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:

Reviewer:



Jacki Swiernik
Staff Engineer
Lighting Division



Melanie Brittain
Senior Associate Engineer
Lighting Division

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SAMPLE INFORMATION

REPORT NO. 104349704CRT-069

ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2102221222-001A	ENCY3RS-L278354D-UNV-WB	FIXED CYLINDERS STATIC WHITE	Production	2/22/2021
2	--	--	WHITE TRIM	Production	2/22/2021
3	CRT2102241113-001	Tech Lighting 353E4LEDCOPT40	40° OPTIC	Production	2/24/2021

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	ENCY3RS-L278354D-UNV-WB	1, 2, 3

SAMPLE PHOTOS - TESTED CONFIGURATIONS



2 - WHITE TRIM



3 - OPTIC



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	ENCY3RS-L278354D-UNV-WB
Product Description:	FIXED CYLINDERS STATIC WHITE
LED Model No.:	Bridgelux DS413 V13 Gen 8
Driver Model No.:	ESS030W-0700-42
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	2679.7	2851.8
Input Power (W) @ 120 (Vac)	27.78	27.79
Lumen Efficacy (lm/W)	96.45	102.6
Input Power Factor (I) @ 120 (Vac)	0.980	0.981

Criteria	Results
Input ATHD (%) @ 120 (Vac)	13.31
Correlated Color Temperature (K)	3435
Color Rendering Index - Ra (I)	81.4
Color Rendering Index - R9 (I)	8.0
Duv (I)	0.0008
Chromaticity Coordinate (x)	0.408
Chromaticity Coordinate (y)	0.391
Chromaticity Coordinate (u')	0.238
Chromaticity Coordinate (v')	0.512

TEST METHODS

SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

No seasoning was performed in accordance with IESNA LM-79.

INTEGRATING SPHERE TESTING

A spectroradiometer and integrating sphere were used to measure the spectral distribution for each EUT resulting in photometric and colorimetric data. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature was measured at a position inside the sphere and stabilization procedures to LM-79 were followed.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

A Type C Mirror Goniophotometer system was used to measure the luminous intensity (candela) at each angle of distribution for the EUT. Electrical measurements of the unit were measured using a power analyzer. Each EUT was operated at the rated input voltage of the system in its designated orientation. The ambient temperature was measured at a position near the EUT at equal height and stabilization procedures to LM-79 were followed.

TYPE C GONIOPHOTOMETER DISTRIBUTION TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	ENCY3RS-L278354D-UNV-WB	NA

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)

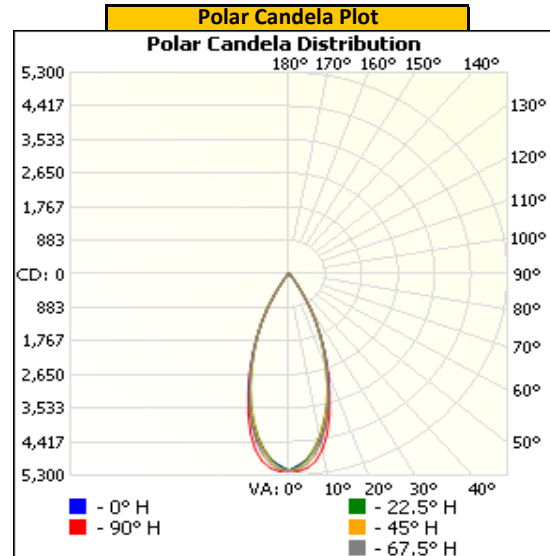
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	119.99	236.3	27.78	0.980

Light Output (lm)	Lumen Efficacy (lm/W)
2679.7	96.4

INTENSITY SUMMARY - CANDELA

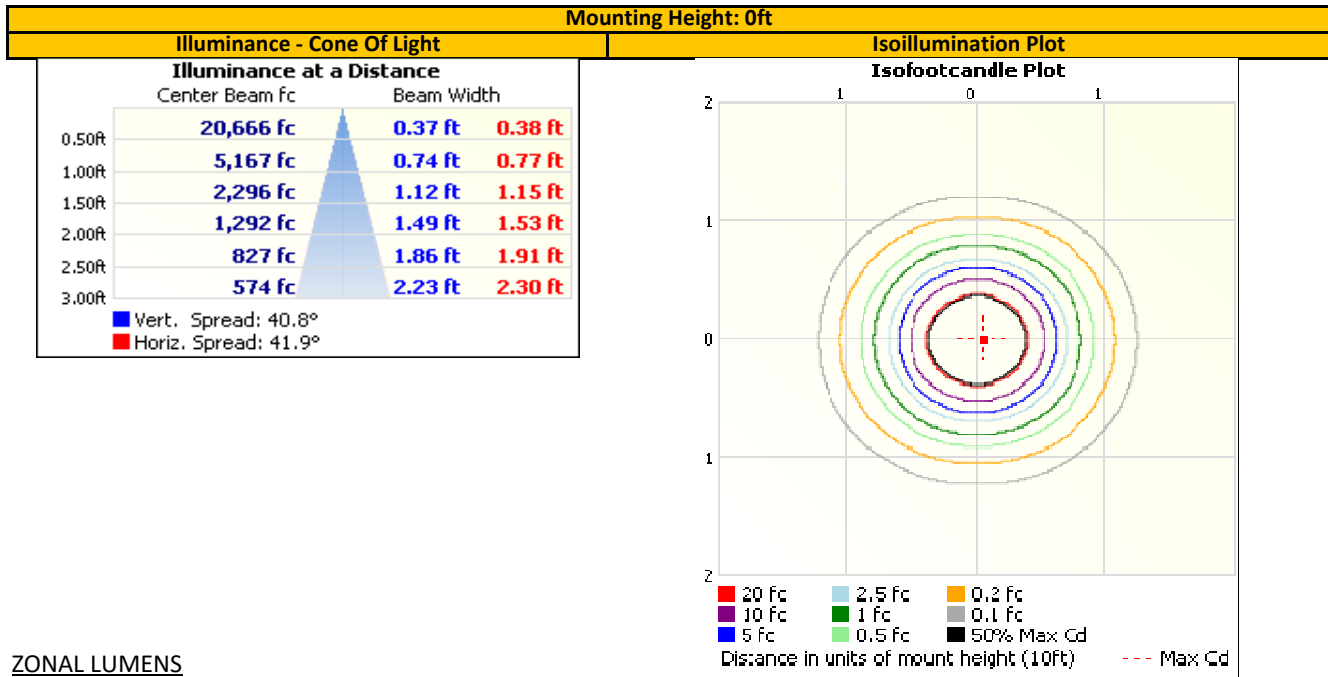
Angle	0	22.5	45	67.5	90
0	5166	5166	5166	5166	5166
5	4911	4901	4955	5022	5125
10	4416	4330	4366	4503	4691
15	3652	3554	3570	3675	3811
20	2728	2648	2648	2716	2786
25	1845	1804	1799	1814	1828
30	1047	1075	1080	1032	971
35	396	416	433	418	394
40	159	169	175	168	166
45	70	71	76	77	79
50	40	43	44	44	43
55	28	30	30	30	30
60	18	19	20	20	21
65	11	11	12	12	12
70	5	5	5	5	5
75	0	0	0	0	0
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0
95	0	0	0	0	0
100	0	0	0	0	0
105	0	0	0	0	0
110	0	0	0	0	0
115	0	0	0	0	0
120	0	0	0	0	0
125	0	0	0	0	0
130	0	0	0	0	0
135	0	0	0	0	0
140	0	0	0	0	0
145	0	0	0	0	0
150	0	0	0	0	0
155	0	0	0	0	0
160	0	0	0	0	0
165	0	0	0	0	0
170	0	0	0	0	0
175	0	0	0	0	0
180	0	0	0	0	0

Entire luminous intensity matrix found in .IES file



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary																																																																																																			
<table><tr><th>Zone</th><th>Lumens</th><th>Luminaire</th></tr><tr><td>0-30</td><td>2,276.2</td><td>84.9%</td></tr><tr><td>0-40</td><td>2,573.2</td><td>96.0%</td></tr><tr><td>0-60</td><td>2,667.0</td><td>99.5%</td></tr><tr><td>60-90</td><td>12.7</td><td>0.5%</td></tr><tr><td>70-100</td><td>1.1</td><td>0.0%</td></tr><tr><td>90-120</td><td>0.0</td><td>0.0%</td></tr><tr><td>0-90</td><td>2,679.7</td><td>100.0%</td></tr><tr><td>90-180</td><td>0.0</td><td>0.0%</td></tr><tr><td>0-180</td><td>2,679.7</td><td>100.0%</td></tr></table>			Zone	Lumens	Luminaire	0-30	2,276.2	84.9%	0-40	2,573.2	96.0%	0-60	2,667.0	99.5%	60-90	12.7	0.5%	70-100	1.1	0.0%	90-120	0.0	0.0%	0-90	2,679.7	100.0%	90-180	0.0	0.0%	0-180	2,679.7	100.0%	<table><tr><th>Zone</th><th>Lumens</th><th>Total</th><th>Zone</th><th>Lumens</th><th>Total</th></tr><tr><td>0-10</td><td>456.6</td><td>17.0%</td><td>90-100</td><td>0.0</td><td>0.0%</td></tr><tr><td>10-20</td><td>994.0</td><td>37.1%</td><td>100-110</td><td>0.0</td><td>0.0%</td></tr><tr><td>20-30</td><td>825.6</td><td>30.8%</td><td>110-120</td><td>0.0</td><td>0.0%</td></tr><tr><td>30-40</td><td>297.0</td><td>11.1%</td><td>120-130</td><td>0.0</td><td>0.0%</td></tr><tr><td>40-50</td><td>66.7</td><td>2.5%</td><td>130-140</td><td>0.0</td><td>0.0%</td></tr><tr><td>50-60</td><td>27.0</td><td>1.0%</td><td>140-150</td><td>0.0</td><td>0.0%</td></tr><tr><td>60-70</td><td>11.6</td><td>0.4%</td><td>150-160</td><td>0.0</td><td>0.0%</td></tr><tr><td>70-80</td><td>1.1</td><td>0.0%</td><td>160-170</td><td>0.0</td><td>0.0%</td></tr><tr><td>80-90</td><td>0.0</td><td>0.0%</td><td>170-180</td><td>0.0</td><td>0.0%</td></tr></table>							Zone	Lumens	Total	Zone	Lumens	Total	0-10	456.6	17.0%	90-100	0.0	0.0%	10-20	994.0	37.1%	100-110	0.0	0.0%	20-30	825.6	30.8%	110-120	0.0	0.0%	30-40	297.0	11.1%	120-130	0.0	0.0%	40-50	66.7	2.5%	130-140	0.0	0.0%	50-60	27.0	1.0%	140-150	0.0	0.0%	60-70	11.6	0.4%	150-160	0.0	0.0%	70-80	1.1	0.0%	160-170	0.0	0.0%	80-90	0.0	0.0%	170-180	0.0	0.0%
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INTEGRATING SPHERE TESTING

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Test Configuration	Tested Model No.	Pass/Fail/NA
1	ENCY3RS-L278354D-UNV-WB	NA

PHOTOMETRIC, COLORIMETRIC, AND ELECTRICAL MEASUREMENTS (25°C +/- 1°C)

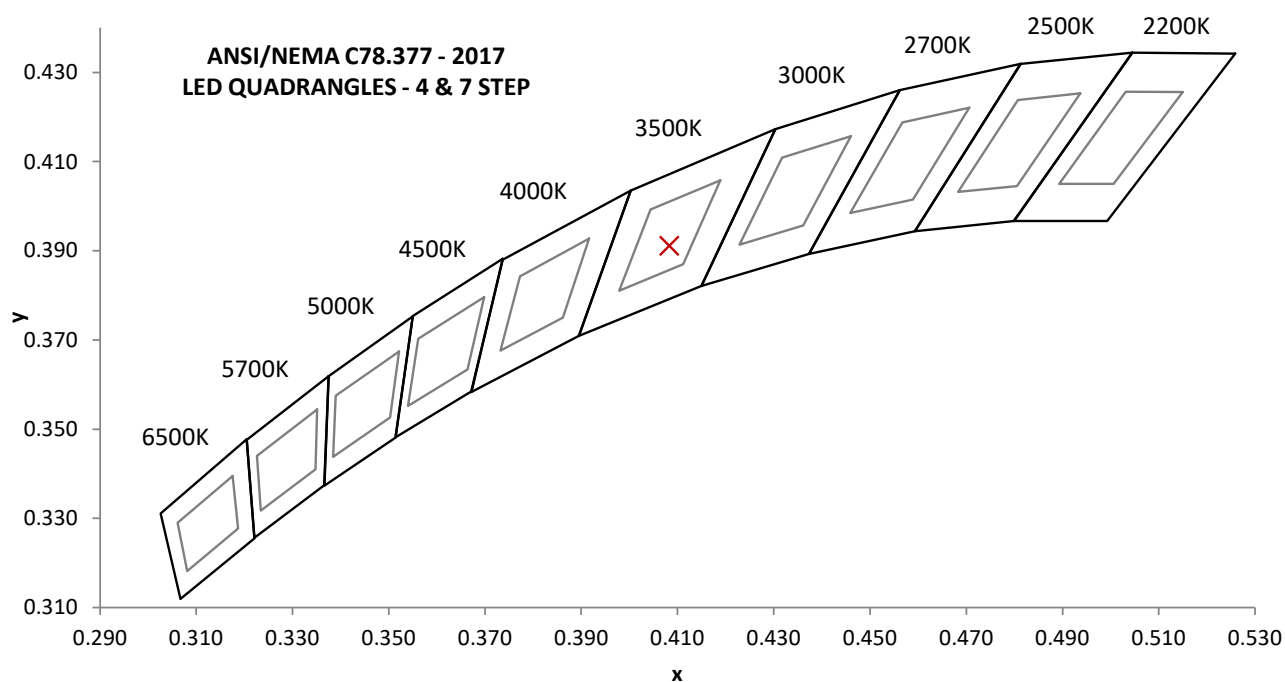
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.02	236.2	27.79	0.981	13.31

Measured at 120.02(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
2851.8	102.6	3435	81.4	8.0

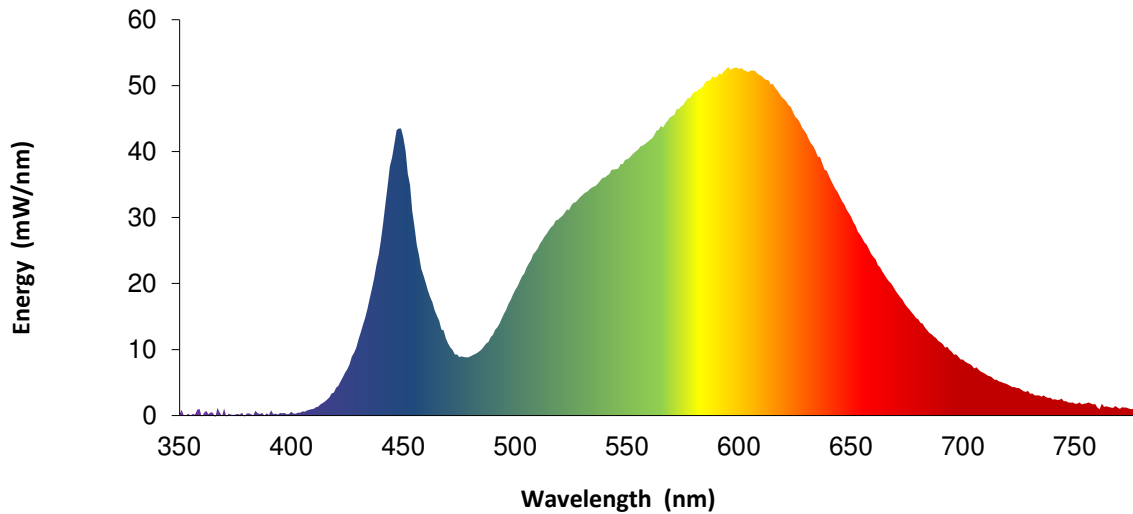
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0008	0.408	0.391	0.238	0.512



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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.2		460	20.1		570	45.4		680	14.6
355	0.0		465	15.1		575	47.1		685	12.5
360	-0.2		470	10.9		580	49.1		690	11.1
365	0.4		475	8.9		585	50.6		695	9.7
370	1.1		480	9.0		590	51.3		700	8.5
375	0.1		485	10.0		595	52.8		705	7.1
380	0.3		490	12.2		600	52.5		710	6.3
385	0.3		495	15.5		605	52.3		715	5.4
390	0.1		500	19.0		610	51.5		720	4.7
395	0.4		505	22.4		615	50.2		725	4.1
400	0.6		510	25.3		620	48.0		730	3.3
405	0.6		515	28.1		625	45.3		735	2.9
410	1.0		520	29.9		630	42.7		740	2.4
415	2.1		525	31.9		635	39.2		745	2.2
420	4.2		530	33.4		640	36.3		750	1.8
425	7.0		535	34.7		645	33.1		755	1.8
430	11.5		540	36.1		650	30.2		760	1.2
435	17.7		545	37.3		655	26.9		765	1.3
440	26.6		550	38.8		660	24.1		770	1.0
445	39.1		555	40.4		665	21.3		775	1.0
450	42.1		560	41.7		670	18.9		780	1.0
455	28.6		565	43.9		675	16.5		---	---



Portrayed color in graphic is estimated by wavelength (nm) and may not be exact - it is a visual representation only

EQUIPMENT LIST

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#	Equipment	Model No	Control No.	Last Cal	Cal Due
1	2M Integrating Sphere Spectrometer System	CDS 600	W/N308	2/18/2021	5/18/2021
2	Yokogawa Power Analyzer	WT1600	307-E440	9/29/2020	9/29/2021
3	Digital Thermometer	Fluke 53 II	307-D587	5/2/2021	2/5/2022
4	Xantrex DC Power Supply	XTR 150-5.6	---	VBU	VBU
5	Elgar AC Power Supply	CW1251	---	VBU	VBU
6	Fisher Scientific Digital Stopwatch	130471471	307-N1404	3/19/2020	3/19/2021
7	LSI High Speed Mirror Goniophotometer	6440	---	1/14/2021	4/14/2021
8	Elgar AC Power Supply	CW1251	---	VBU	VBU
9	Yokogawa Power Analyzer	WT210	E464	5/11/2020	5/11/2021
10	Traceable Hygrothermometer	4800	L204	2/21/2021	2/21/2022
11	M-D Building Products Digital Level	Smart Tool	307-L112	5/14/2020	5/14/2021
12	Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
13	Traceable Thermometer	4800	L204	2/12/2021	2/12/2022

REVISION HISTORY

#	Revision Date	Updated By	Reviewed By	Description of Change
1	3/3/2021	Jacki Swiernik <i>JS</i>	Melanie Brittain <i>NB</i>	Updated model name from ENC3RS-L279WD4D-UNV-WB to ENC3RS-L278354D-UNV-WB
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