

VISUAL COMFORT AND COMPANY TEST REPORT

SCOPE OF WORK

LED Performance Testing

MODEL NUMBER

ENCY2RS-L128354D-UNV-WW

PROJECT NUMBER

G104659241

REPORT NUMBER

104659241CRT-008

ISSUE DATE

8/19/2021

REVISED DATE

None

TEST DATES

8/17/21 through 8/19/21

DOCUMENT CONTROL NUMBER

RTTDS-R-AMER-Test-3407

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PAGES

12

REPORT NUMBER

104659241CRT-008

MODEL NUMBER(s)

ENCY2RS-L128354D-UNV-WW

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-01166088-0.

TEST STANDARDS

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

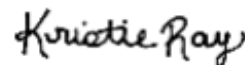
ANSI NEMA ANSLG C78.377: 2017: Specifications for the Chromaticity of Solid State Lighting (SSL) Products

In Charge of Testing:



Gerald Gray
Associate Engineer
Lighting Division

Reviewer:



Kristie Ray
Team Lead, Engineering
Title
Lighting Division

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SAMPLE INFORMATION

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ITEMS RECEIVED

Item No.	Control No.	Model No.	Description	Type	Received
1	CRT2108101057-001-2	PTB15W-0300-42	Driver	Production	8/10/2021
2	CRT2108101057-001-6	BXRE-35-E1000-C-83	LED	Production	8/10/2021
3	CRT2108101057-001-10	40°	Optic	Production	8/10/2021

TESTED SAMPLE CONFIGURATIONS

Config No.	Tested Model No.	Item Nos. Utilized
1	ENCY2RS-L128354D-UNV-WW	1,2,3

SAMPLE PHOTOS - TESTED CONFIGURATIONS



SUMMARY

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PRODUCT INFORMATION AND SUMMARY OF DATA

Product Model No.:	ENCY2RS-L128354D-UNV-WW
Product Description:	2 Inch Cylinder Downlight, 80 CRI, 3500K 40° optic
LED Model No.:	BXRE-35-E1000-C-83
Driver Model No.:	PTB15W-0300-42
Light Source:	LED

Criteria	Results	
	Goniophotometer	Integrating Sphere
Light Output (lumens)	1241.4	1266.7
Input Power (W) @ 120 (Vac)	11.05	11.08
Lumen Efficacy (lm/W)	112.3	114.3
Input Power Factor (I) @ 120 (Vac)	0.988	0.986

Criteria	Results
Input ATHD (%) @ 120 (Vac)	11.86
Correlated Color Temperature (K)	3481
Color Rendering Index - Ra (I)	82.7
Color Rendering Index - R9 (I)	14.7
Duv (I)	0.0013
Chromaticity Coordinate (x)	0.405
Chromaticity Coordinate (y)	0.388
Chromaticity Coordinate (u')	0.237
Chromaticity Coordinate (v')	0.510

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	ENCY2RS-L128354D-UNV-WW	NA

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

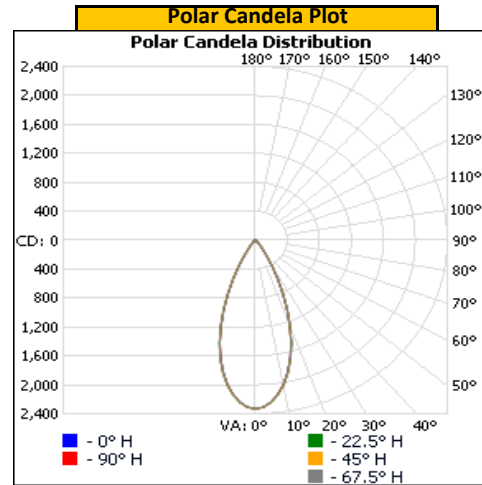
Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor ()
Up	120.06	93.2	11.05	0.988

Light Output (lm)	Lumen Efficacy (lm/W)
1241.4	112.3

INTENSITY SUMMARY - CANDELA

Angle	0	22.5	45	67.5	90
0	2331	2331	2331	2331	2331
5	2244	2248	2250	2249	2248
10	2031	2026	2035	2029	2017
15	1685	1697	1695	1688	1685
20	1262	1271	1263	1257	1257
25	804	811	811	812	814
30	426	431	435	437	431
35	179	187	192	193	190
40	88	91	90	91	92
45	48	49	49	50	50
50	28	29	29	29	30
55	17	18	18	18	18
60	13	13	13	14	14
65	10	10	10	10	10
70	6	6	6	6	6
75	2	3	3	3	3
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



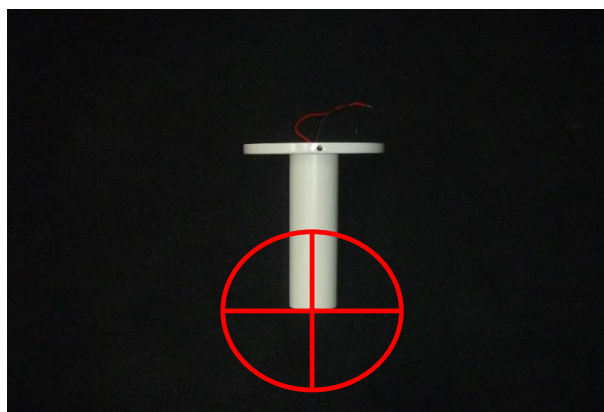
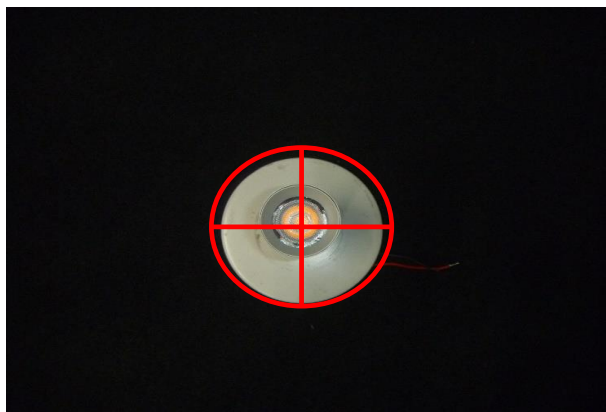
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ORIENTATION AND ALIGNMENT OF EUT

Luminous Opening		
Length (ft)	Width (ft)	Height (ft)
0.14	0.14	0.00
0°-180° H	90°-270° H	0°-180° V

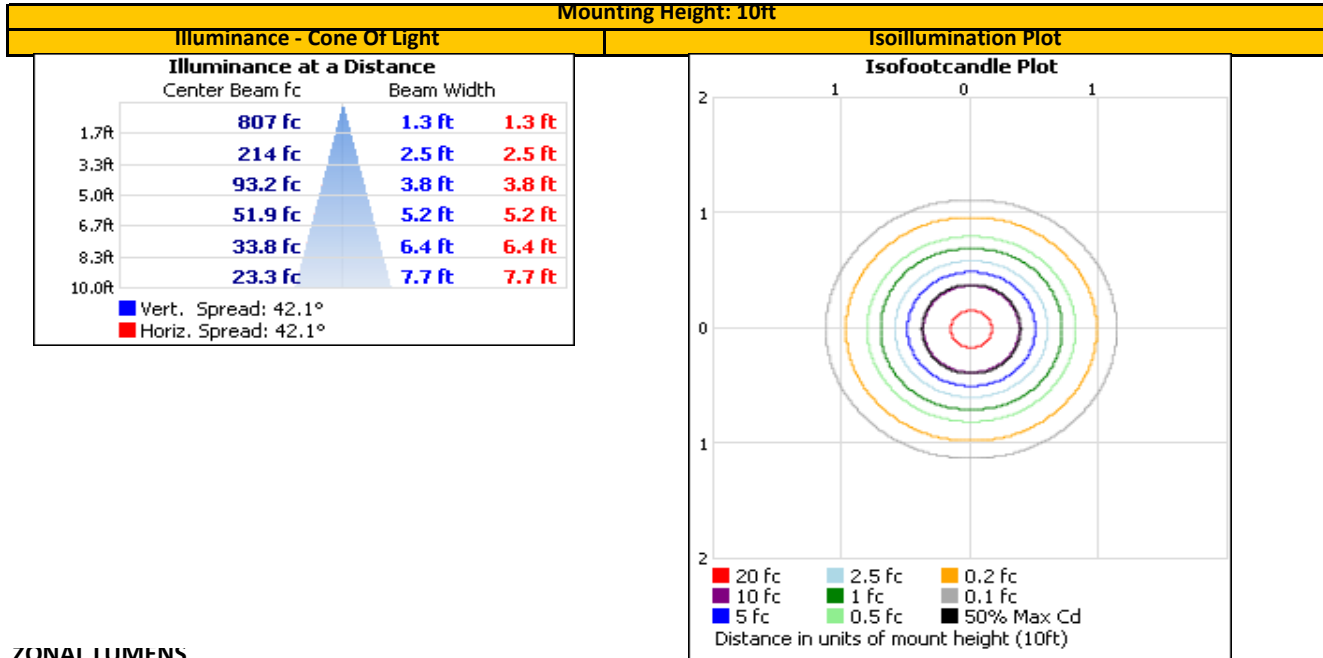
Test Distance (ft)
29.6

PHOTOMETRIC CENTER OF EUT



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ILLUMINANCE SUMMARY



ZONAL LUMENS

Zonal Lumen Summary					
Zone	Lumens	Luminaire	Zone	Lumens	Total
0-30	1,039.5	83.7%	0-10	207.1	16.7%
0-40	1,171.1	94.3%	10-20	462.4	37.2%
0-60	1,228.6	99.0%	20-30	370.1	29.8%
60-90	12.8	1.0%	30-40	131.6	10.6%
70-100	2.9	0.2%	40-50	40.5	3.3%
90-120	0.0	0.0%	50-60	17.1	1.4%
0-90	1,241.4	100.0%	60-70	9.8	0.8%
90-180	0.0	0.0%	70-80	2.9	0.2%
0-180	1,241.4	100.0%	80-90	0.0	0.0%
			90-100	0.0	0.0%
			100-110	0.0	0.0%
			110-120	0.0	0.0%
			120-130	0.0	0.0%
			130-140	0.0	0.0%
			140-150	0.0	0.0%
			150-160	0.0	0.0%
			160-170	0.0	0.0%
			170-180	0.0	0.0%

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UNIFIED GLARE RATING (UGR) SUMMARY

Reflectances					
Ceiling Cavity	70	70	50	50	30
Walls	50	30	50	30	30
Floor Cavity	20	20	20	20	20

Room Size	
X=2H	Y=2H
	3H
	4H
	6H
	8H
	12H

UGR Viewed Crosswise				
13.6	14.5	13.9	14.8	15.2
14.6	15.4	15.0	15.8	16.1
14.7	15.5	15.1	15.8	16.2
14.6	15.3	15.0	15.7	16.1
14.6	15.2	15.0	15.6	16.0
14.5	15.1	14.9	15.5	15.9

4H	2H
	3H
	4H
	6H
	8H
	12H

14.0	14.7	14.4	15.1	15.5
15.1	15.7	15.5	16.1	16.5
15.2	15.8	15.6	16.2	16.6
15.1	15.6	15.6	16.0	16.5
15.0	15.5	15.5	15.9	16.4
15.0	15.4	15.5	15.8	16.3

8H	4H
	6H
	8H
	12H

15.1	15.6	15.6	16.0	16.5
15.0	15.4	15.5	15.9	16.4
15.0	15.3	15.5	15.8	16.3
14.9	15.2	15.4	15.7	16.2

12H	4H
	6H
	8H

15.1	15.4	15.5	15.9	16.4
15.0	15.3	15.5	15.7	16.3
14.9	15.2	15.4	15.7	16.2

Room Size	
X=2H	Y=2H
	3H
	4H
	6H
	8H
	12H

UGR Viewed Endwise				
13.6	14.5	13.9	14.8	15.2
14.6	15.4	15.0	15.8	16.1
14.7	15.5	15.1	15.9	16.2
14.6	15.4	15.1	15.7	16.1
14.6	15.2	15.0	15.6	16.1
14.5	15.2	15.0	15.5	16.0

4H	2H
	3H
	4H
	6H
	8H
	12H

14.0	14.7	14.4	15.1	15.5
15.1	15.7	15.5	16.1	16.5
15.2	15.8	15.7	16.2	16.6
15.1	15.6	15.6	16.1	16.5
15.0	15.5	15.5	16.0	16.4
15.0	15.4	15.5	15.9	16.3

8H	4H
	6H
	8H
	12H

15.1	15.6	15.6	16.0	16.5
15.0	15.4	15.6	15.9	16.4
15.0	15.3	15.5	15.8	16.3
14.9	15.2	15.4	15.7	16.3

12H	4H
	6H
	8H

15.1	15.5	15.6	16.0	16.4
15.0	15.3	15.5	15.8	16.3
14.9	15.2	15.4	15.7	16.3

Maximum UGR	
	16.6

INTEGRATING SPHERE TESTING

REPORT NO. 104659241CRT-008

Test Configuration	Tested Model No.	Pass/Fail/NA
1	ENCY2RS-L128354D-UNV-WW	NA

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

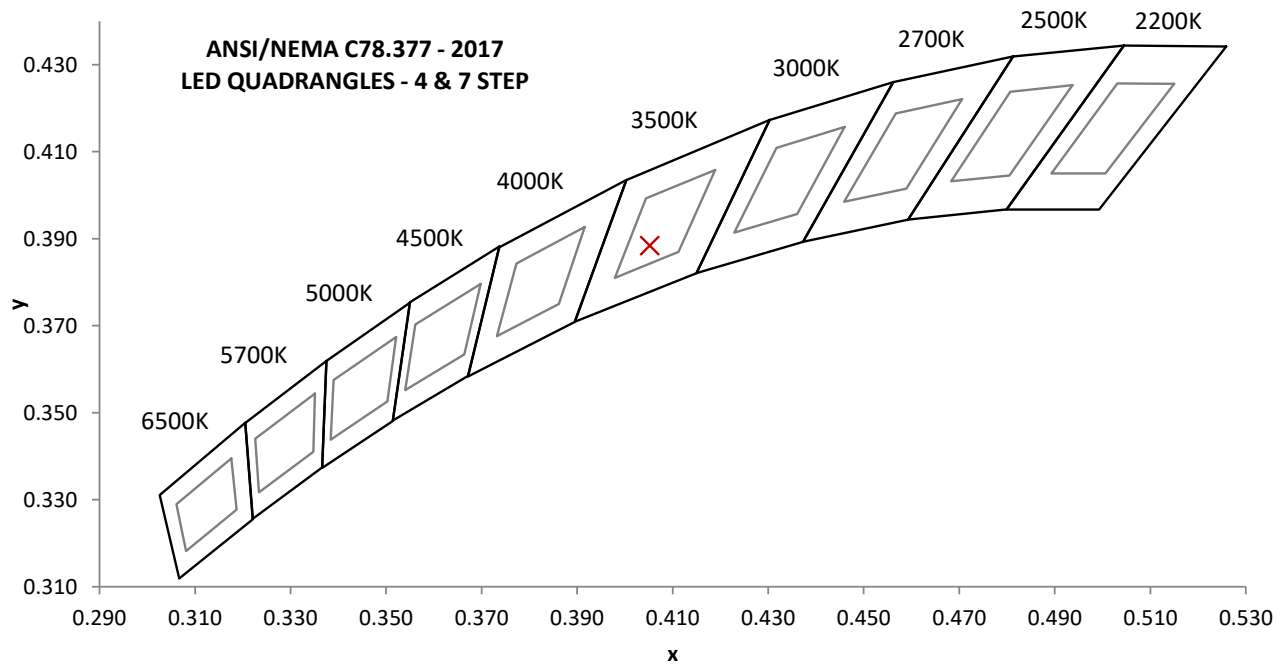
Base Orientation
Up

Input Voltage (Vac)	Input Current (mA)	Input Power (W)	Input Power Factor (l)	Input ATHD (%)
120.03	93.6	11.08	0.986	11.86

Measured at 120.03(Vac)

Light Output (lm)	Lumen Efficacy (lm/W)	CCT (K)	CRI - Ra (l)	CRI - R9 (l)
1266.7	114.3	3481	82.7	14.7

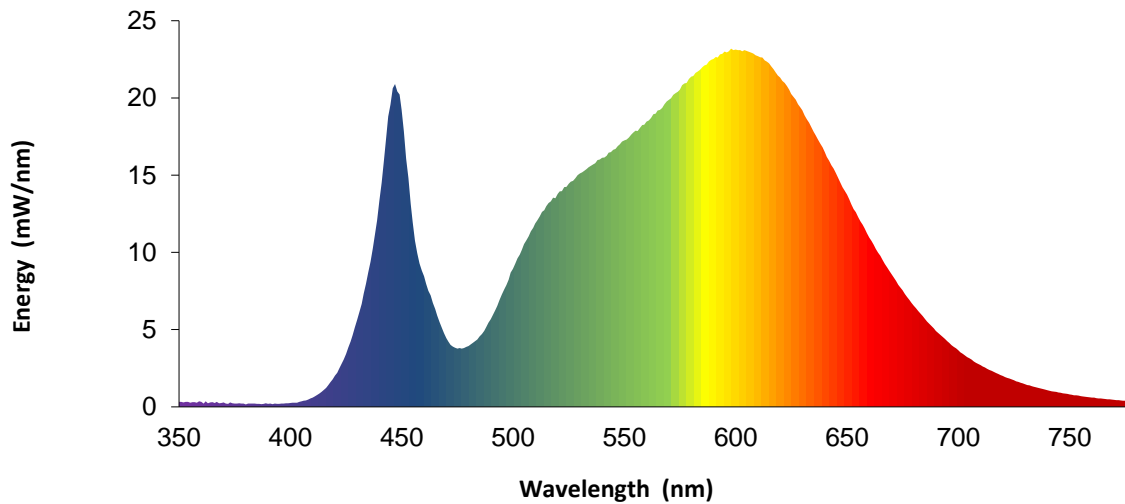
Duv (l)	1931 Chrom (x)	1931 Chrom (y)	1976 Chrom (u')	1976 Chrom (v')
0.0013	0.405	0.388	0.237	0.510



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SPECTRAL DISTRIBUTION OVER WAVELENGTHS

nm	mW/nm		nm	mW/nm		nm	mW/nm		nm	mW/nm
350	0.3		460	8.4		570	19.9		680	6.6
355	0.3		465	6.3		575	20.5		685	5.7
360	0.3		470	4.5		580	21.4		690	4.9
365	0.3		475	3.8		585	22.0		695	4.3
370	0.3		480	3.9		590	22.5		700	3.7
375	0.2		485	4.6		595	23.0		705	3.1
380	0.2		490	5.7		600	23.1		710	2.7
385	0.2		495	7.3		605	23.0		715	2.3
390	0.2		500	8.9		610	22.7		720	2.0
395	0.2		505	10.5		615	22.3		725	1.7
400	0.3		510	11.9		620	21.3		730	1.5
405	0.4		515	13.0		625	20.3		735	1.3
410	0.6		520	13.8		630	19.2		740	1.1
415	1.1		525	14.4		635	17.8		745	0.9
420	2.0		530	15.1		640	16.5		750	0.8
425	3.4		535	15.6		645	15.1		755	0.7
430	5.6		540	16.1		650	13.7		760	0.6
435	8.7		545	16.6		655	12.3		765	0.5
440	13.3		550	17.2		660	11.0		770	0.5
445	19.6		555	17.9		665	9.8		775	0.4
450	19.2		560	18.5		670	8.6		780	0.3
455	12.0		565	19.2		675	7.5		---	---



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

SEE ANNEX A FOR TM-30 REPORT

EQUIPMENT LIST

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#	Equipment	Model No	Control No.	Last Cal	Cal Due
1	Elgar AC Power Supply	CW1251	---	VBU	VBU
2	Sorenson DC Power Supply	XFR 150-8	---	VBU	VBU
3	Traceable Hygrothermometer	4800	L206	2/12/2021	2/12/2022
4	Yokogawa Power Analyzer	WT1600	E474	6/15/2021	6/15/2022
5	Fluke Thermometer	53 II	D587	2/5/2021	2/5/2022
6	3M Integrating Sphere Spectrometer System	CDS 1100	O235	7/26/2021	10/26/2021
7	Fisher Scientific Stopwatch	14-649-9	N1132	3/26/2021	3/26/2022
8	LSI High Speed Mirror Goniophotometer	6440	---	8/16/2021	11/16/2021
9	Elgar AC Power Supply	CW1251	---	VBU	VBU
10	Yokogawa Power Analyzer	WT210	E464	5/11/2021	5/11/2022
11	Traceable Hygrothermometer	4800	L204	2/21/2021	2/21/2022
12	Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
13	Omega Thermometer	DPI8-C24	M263	3/23/2021	3/23/2022
14	Bosch Distance Laser	Pro GLM 20	L211	3/3/2021	3/3/2022
15	M-D Building Products Digital Level	Smart Tool	L112	5/26/2021	5/26/2022

REVISION HISTORY

#	Revision Date	Updated By	Reviewed By	Description of Change
---	None	---	---	---
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REPORT NO. 104659241CRT-008

TM-30 REPORT

Source: 104659241CRT-008

Date: 8/19/2021

Manufacturer: VISUAL COMFORT AND COMPANY

Model: ENC52RS-L128354D-UNV-WW



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