

VISUAL COMFORT GROUP TEST REPORT

SCOPE OF WORK

Electrical and Photometric tests as required to the IESNA test standard.

MODEL NUMBER

ENN2x-LO930ADI12x (30 Degree)

REPORT NUMBER

103643585CHI-042

ISSUE DATE

February 15, 2019

REVISION DATE

None

DOCUMENT CONTROL NUMBER

TBD

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TEST REPORT

REPORT NO.: 103643585CHI-042

REPORT DATE: February 15, 2019

TEST OF ONE LOW-VOLTAGE RECESSED

MODEL NO. ENN2X-LO930ADI12X (30 DEGREE)
LED MODEL NO. LUMINUS CXM-6-30-90-18-AC40-F5-3
DRIVER MODEL NO. LTF DL110W250C1840-3000

RENDERED TO:

VISUAL COMFORT GROUP
7400 LINDER AVE.
SKOKIE IL 60077

AUTHORIZATION

The testing performed was authorized by signed quote number Qu-00912313.

STANDARDS USED

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting
ANSI NEMA ANSLG C78.377: 2015: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE

The client submitted one production sample of model number ENN2x-LO930ADI12x (30 Degree). The sample was received by Intertek on February 7, 2019 in undamaged condition and one sample was tested as received. The sample designation was AH02072019031148.

DATE OF TESTS

February 14, 2019 through February 14, 2019.

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SUMMARY

MODEL NO:	ENN2x-LO930ADI12x (30 Degree)
DESCRIPTION:	Low-voltage recessed

CRITERIA	RESULTS	
	INTEGRATING SPHERE	GONIOPHOTOMETER
Lumen Output (lumens)	421.5	431.0
Input Power (W) @ 12 (VAC)	5.88	5.86
Lumen Efficacy (lm/W)	71.7	73.6
Input Power Factor @ 12 (VAC)	0.640	0.633

CRITERIA	RESULTS
Input Current ATHD (%) @ 12 (VAC)	69.73
Correlated Color Temperature (K)	3129
Color Rendering Index - Ra	91.1
Color Rendering - R9	61.0
DUV	0.0014
Chromaticity Coordinate (x)	0.430
Chromaticity Coordinate (y)	0.406
Chromaticity Coordinate (u')	0.246
Chromaticity Coordinate (v')	0.521

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EQUIPMENT LIST

EQUIPMENT USED	MODEL NO.	CONTROL NO.	LAST CAL DATE	CAL DUE DATE
Yokogawa Power Meter	WT210	146919	7/9/2018	7/9/2019
Omega Newport Thermometer	DPI8-C24	146920	10/4/2018	10/4/2019
LSI High Speed Mirror Goniometer	6440T	146928	VBV	VBV
Newport Thermohygrometer	iServer	146379	4/16/2018	4/16/2019
Pacific, AC power supply	118-ACX	CHI0358	VBV	VBV
Staco Energy Product Variac	3PN2210B	146360	VBV	VBV
Labsphere 2M Sphere & Spectroradiometer	CDS1100	146137	VBV	VBV
Elgar AC Power Supply	CW1251M	146113	VBV	VBV
Sorenson DC Power Supply	XFR150-8	146847	VBV	VBV
Yokogawa Power Analyzer	WT1600	146767	4/5/2018	4/5/2019
Omega Temperature	MDSi8	146873	7/10/2018	7/10/2019
Newport Thermohygrometer	iTHX-M	146961	4/16/2018	4/16/2019

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TEST METHODS

SEASONING IN SAMPLE ORIENTATION - LED PRODUCTS

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

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - INTEGRATING SPHERE METHOD

A Spectroradiometer and integrating sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD

A Type C Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for the SSL sample.

Ambient temperature was measured equal to the height of the sample mounted on the goniometer equipment. The SSL sample was operated on the client provided driver at rated input volts in its designated orientation. The SSL sample was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

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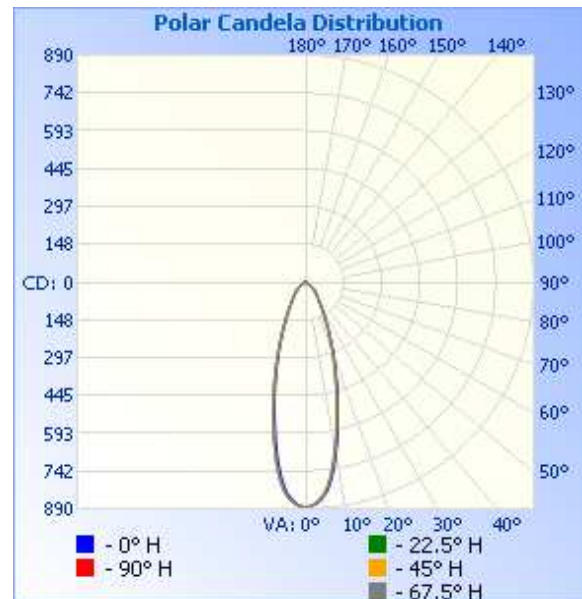
RESULTS OF TESTS

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

INTERTEK CONTROL NO.	BASE POSITION	INPUT VOLTAGE (VAC)	INPUT CURRENT (mA)	INPUT POWER (W)	INPUT POWER FACTOR	LIGHT OUTPUT (lm)	LUMEN EFFICACY (lm/W)
AH02072019031148	Base Up	12.0	773.4	5.86	0.633	431.0	73.6

INTENSITY SUMMARY - CANDELAS

Angle	0	22.5	45	67.5	90
0	882	882	882	882	882
5	840	830	832	834	836
10	684	660	665	668	675
15	486	464	467	472	477
20	331	316	317	321	324
25	218	205	207	209	211
30	143	134	134	136	138
35	96	92	92	94	95
40	70	67	68	68	69
45	52	50	50	51	52
50	37	36	36	36	37
55	24	22	22	22	23
60	10	9	9	9	9
65	6	6	6	6	5
70	4	3	3	3	3
75	0	0	0	0	0
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0



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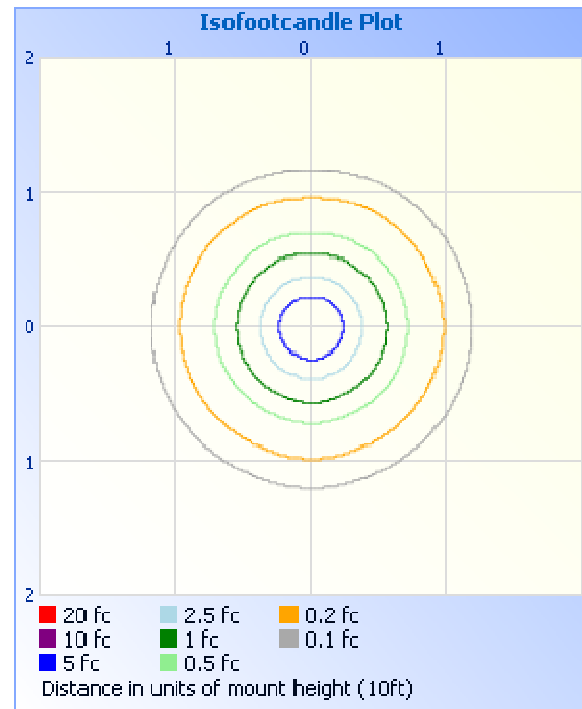
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RESULTS OF TESTS

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

MOUNTING HEIGHT: 10ft	
ILLUMINANCE - CONE OF LIGHT	ISOILLUMINATION PLOT



ZONAL LUMEN SUMMARY AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	304.2	70.6
0-40	364.5	84.6
0-60	424.5	98.5
60-90	6.5	1.5
70-100	0.8	0.2
90-120	0.0	0.0
0-90	431.0	100.0
90-180	0.0	0.0
0-180	431.0	100.0

ZONE	LUMENS	% LUMINAIRE
0-10	74.5	17.3
10-20	131.8	30.6
20-30	97.9	22.7
30-40	60.3	14.0
40-50	39.8	9.2
50-60	20.2	4.7
60-70	5.7	1.3
70-80	0.8	0.2
80-90	0.0	0.0

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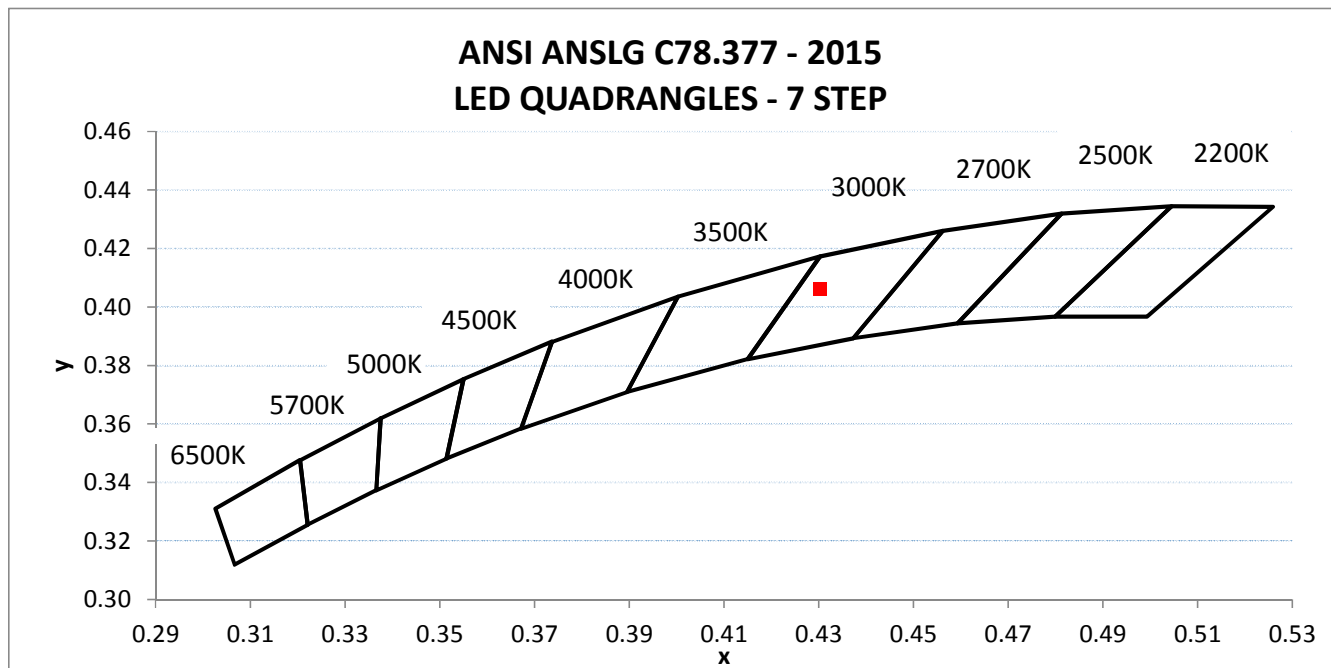
RESULTS OF TESTS

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

INTERTEK CONTROL NO.	BASE POSITION	INPUT VOLTAGE (VAC)	INPUT CURRENT (mA)	INPUT POWER (W)	INPUT POWER FACTOR	INPUT CURRENT ATHD (%)
AH02072019031148	Base Up	12.00	765.70	5.88	0.640	69.73

LIGHT OUTPUT (lm)	LUMEN EFFICACY (lm/W)	CORRELATED COLOR TEMPERATURE - CCT (K)	CRI - Ra	CRI - R9	DUV
421.5	71.7	3129	91.1	61.0	0.0014

CIE 1931 CHROMATICITY COORDINATE (x)	CIE 1931 CHROMATICITY COORDINATE (y)	CIE 1976 CHROMATICITY COORDINATE (u')	CIE 1976 CHROMATICITY COORDINATE (v')
0.430	0.406	0.246	0.521



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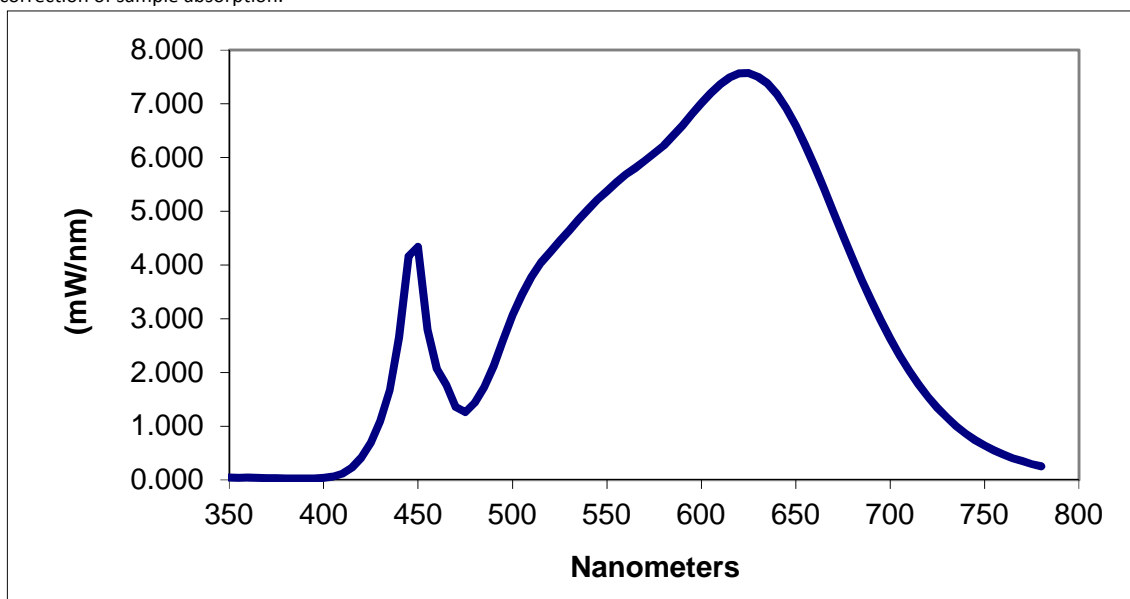
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RESULTS OF TESTS

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

SPECTRAL DISTRIBUTION OVER VISIBLE WAVELENGTHS*							
nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.046	460	2.073	570	5.938	680	4.124
355	0.041	465	1.767	575	6.078	685	3.720
360	0.044	470	1.360	580	6.219	690	3.334
365	0.043	475	1.259	585	6.404	695	2.976
370	0.035	480	1.442	590	6.593	700	2.629
375	0.033	485	1.723	595	6.807	705	2.319
380	0.032	490	2.123	600	7.013	710	2.036
385	0.028	495	2.600	605	7.196	715	1.781
390	0.028	500	3.071	610	7.363	720	1.547
395	0.031	505	3.448	615	7.490	725	1.343
400	0.038	510	3.773	620	7.566	730	1.164
405	0.062	515	4.044	625	7.572	735	1.001
410	0.119	520	4.246	630	7.503	740	0.864
415	0.229	525	4.447	635	7.381	745	0.745
420	0.414	530	4.644	640	7.180	750	0.644
425	0.695	535	4.842	645	6.916	755	0.553
430	1.092	540	5.038	650	6.594	760	0.477
435	1.672	545	5.212	655	6.232	765	0.407
440	2.652	550	5.374	660	5.835	770	0.348
445	4.164	555	5.535	665	5.420	775	0.298
450	4.338	560	5.683	670	4.977	780	0.256
455	2.795	565	5.806	675	4.551		

*Without correction of sample absorption.



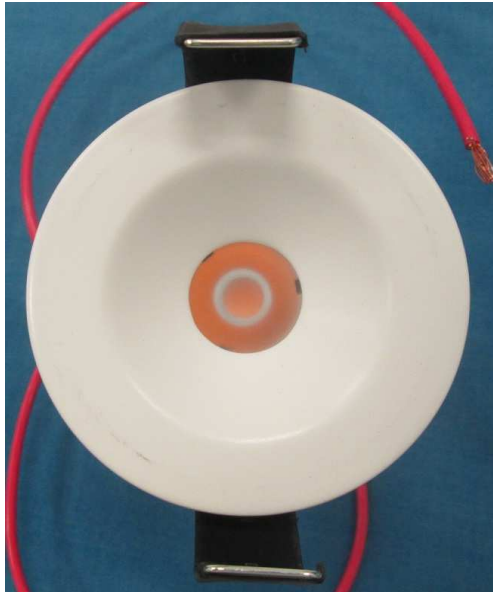
End Of Test Results

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PICTURES



CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:

Tim Quigley

Timothy Quigley
Engineer
Lighting Division

Report Reviewed By:

Hector Huitron

Hector Huitron
Associate Engineer
Lighting Division

Attachments: IES File

REVISION HISTORY

JOB NUMBER	DATE OF REVISION	PROJECT HANDLER	REVIEWED BY	REVISION NOTE
None				