LIGHT LABORATORY INC.
8165 E Kaiser Blvd. Anaheim, CA 92808
www.lightlaboratory.com

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: L092511813 **Issue Date: 10/6/2025**
Amendment: N/A **Revision Date: N/A**

Report Prepared For: FX Luminaire / Lumascape
1940 Diamond Street, San Marcos, CA 92078

Model Number: TN-60-ZDC-GR-FW

Test: Photometric/Colorimetric/Electrical Test

Standards Used: Appropriate part or all test guidelines were used for test performed:

IES LM79: 2008 Approved Methods for Electrical and Photometric Measurements of Solid-State Lighting Products

ANSI/IES LM79: 2019 Approved Methods for Optical and Electrical Measurements of Solid-State Lighting Products

ANSI/NEMA C78.377: 2017 Specification of the Chromaticity of Solid State Lighting Products

ANSI C82.77-10:2014: Harmonic Emission Limits-Related Quality Requirements for Lighting Equipment

Description of Sample: Client submitted the sample. Received in working and undamaged condition. No modifications were necessary.

Special Test Condition: Fixture is tested with no special conditions.

Date of Tests: 9/29/25

Seasoning of Sample: No seasoning was performed in accordance with IESNA LM-79.

Equipment List

Equipment Used	Model No	Stock No	Calibration Due Date
Chroma Programmable AC Source	61604	PS-AC02	--
Yokogawa Digital Power Meter	WT210	MT-EL06-S3	6/21/26
HP Power Supply	6032A	PS-DC05-S2	--
Fluke Digital Thermometer	52K/J	MT-TP05	6/25/26
LLI Type C Goniophotometer System	RMG-C-MKII	CD-LL04-GC	--
LLI 2M Sphere	2MR97	CD-SN03-S2	--
LLI Spectroradiometer	SPR-3000	MT-SC01-S2	Before Use

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General Information	
Manufacturer:	FX Luminaire / Lumascape
Model Number:	TN-60-ZDC-GR-FW
Driver Model Number:	Custom

Test Summary	
Total Lumens:	418.00
Efficacy:	44.57
Color Redering Index:	37.8
Correlated Color Temperature:	5622
Input Voltage (VAC/60Hz):	12.05
Input Current (Amp):	1.0523
Input Power (W):	9.38
Input Power Factor:	0.7393
Current ATHD (%):	23.1%

Test Condition	
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:10

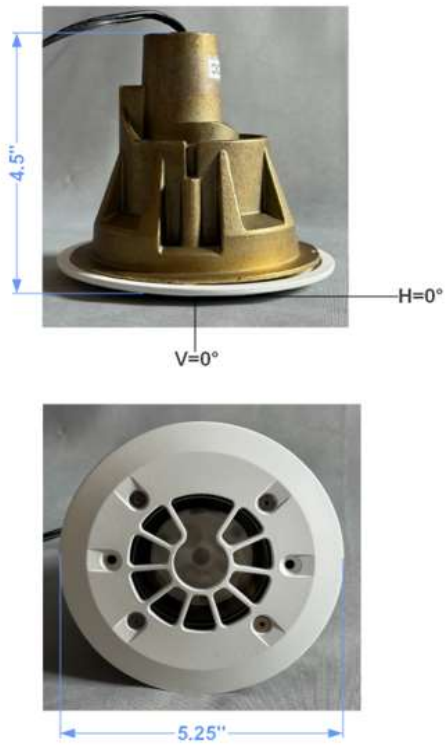


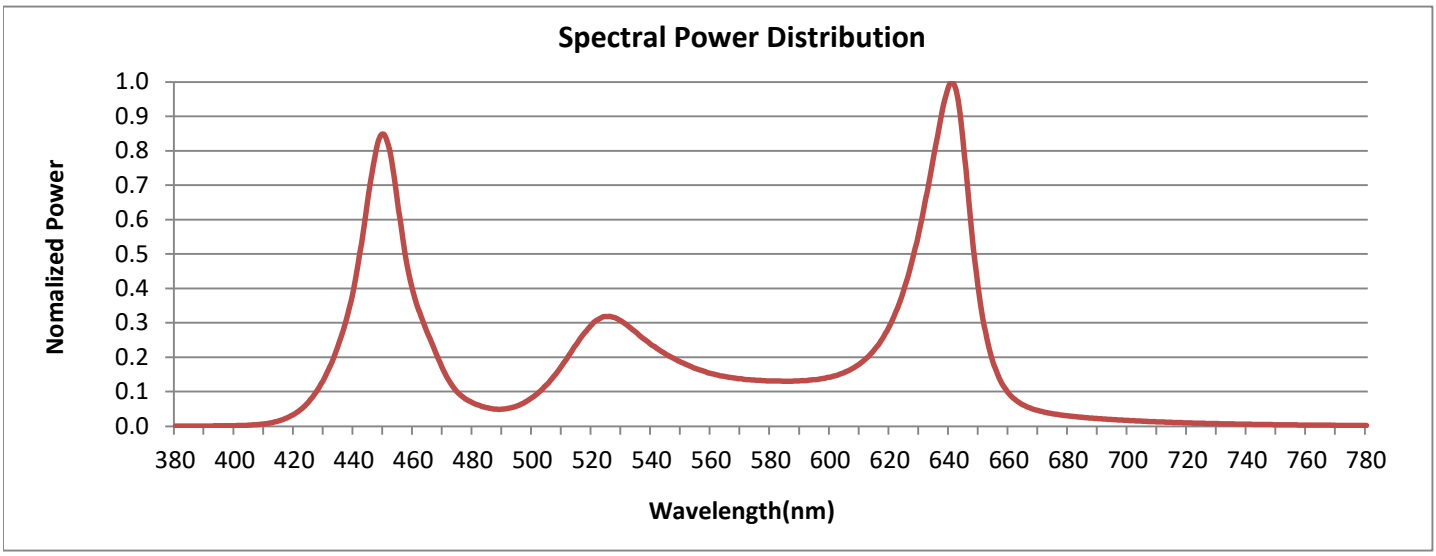
FIG. 1 LUMINAIRE

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Colorimetry Test Results

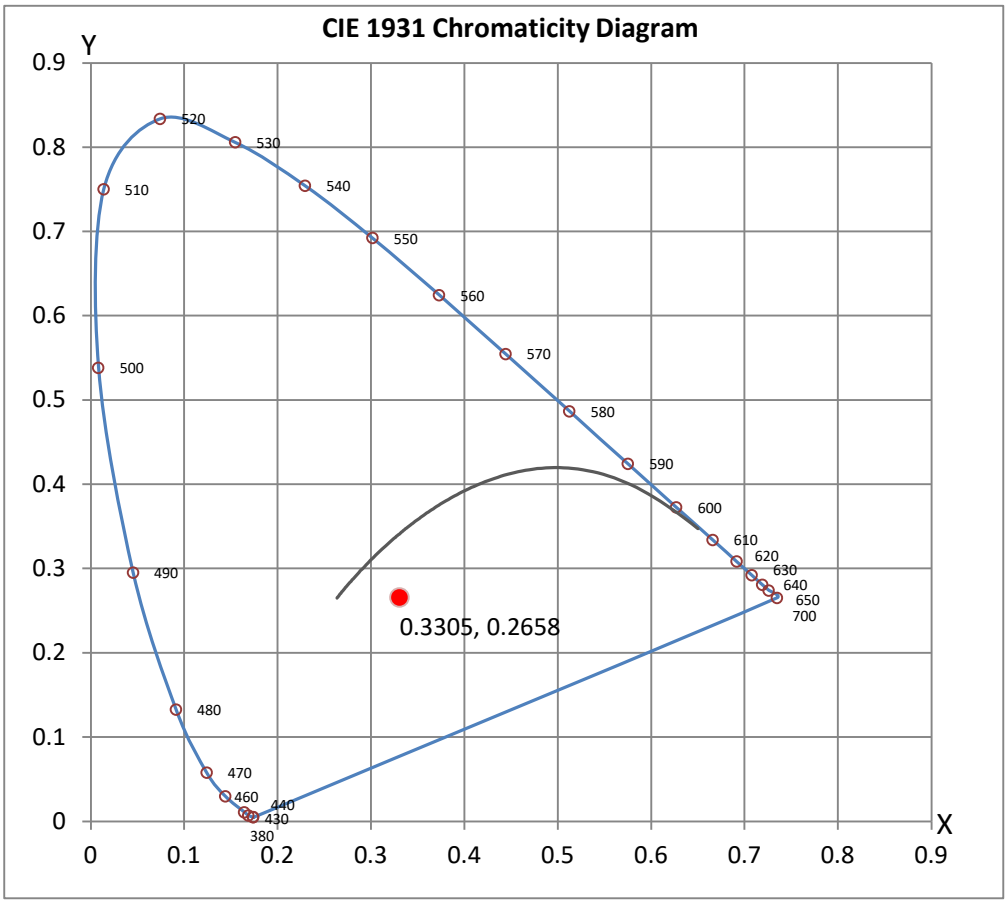


CRI & CCT

x	0.3305
y	0.2658
u'	0.2391
v'	0.4327
CRI	37.80
CCT	5622
Duv	-0.04395

R Values

R1	24.58
R2	70.17
R3	53.59
R4	17.74
R5	33.72
R6	69.30
R7	56.51
R8	-23.27
R9	-184.34
R10	52.50
R11	3.33
R12	67.07
R13	34.01
R14	67.26
R15	-3.38



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Test Methods

Photometric Measurements - Goniophotometer

A Custom Light Laboratory Type C Rotating Mirror Goniophotometer was used to measure candelas(intensity) at each angle of distribution as defined by IESNA for the appropriate fixture type.

Ambient temperature is set to 25°C and is measured from the center of the fixture, within 1ft from the outside of the fixture. Temperature is maintained at 25°C throughout the testing process and the sample is stabilized for at least 30mins and longer as necessary for the sample to achieve stabilization.

Electrical measurements are measured using the listed equipment.

Spectral Measurements - Integrating Sphere

A Sensing Spectroradiometer SPR-3000, in conjunction with Light Laboratory 2 meter integrating sphere was used to measure chromaticity coordinates, correlated color temperature(CCT) and the color rendering index(CRI) for each sample.

Ambient temperature is set to 25°C and is measured from the center of the fixture, within 1ft from the outside of the fixture. Temperature is maintained at 25°C throughout the testing process and the sample is stabilized for at least 30mins and longer as necessary for the sample to achieve stabilization.

Electrical measurements are measured using the listed equipment.

Disclaimers:

The results related only to the samples as received and tested. 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.

Report Prepared by : JG

Test Report Reviewed by:

Steve Kang
Quality Assurance

**Attached are photometric data reports.*

Addendum A

Report Amendment Log

Date	Reference No.	Revision Description	Revision By

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Photometric Test Report

IES ROAD REPORT
PHOTOMETRIC FILENAME : L092511813.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L092511813
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 10/3/2025
[MANUFAC] FX Luminaire / Lumascape
[LUMCAT] TN-60-ZDC-GR-FW
[LUMINAIRE] TN60, ZDC, Grill, Flat White
[BALLASTCAT] Custom
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 12 VAC
[TEST PROCEDURE] IESNA:LM-79-19

CHARACTERISTICS

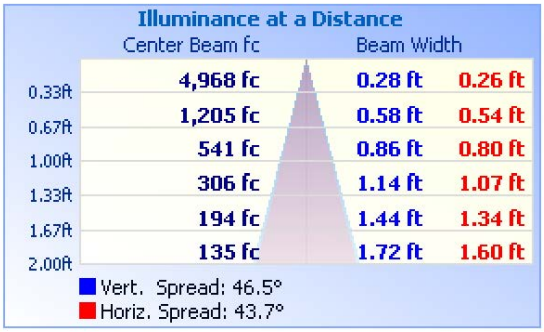
IES Classification	Type VS
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	418
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	45
Total Luminaire Watts	9.38
Ballast Factor	1.00
Upward Waste Light Ratio	0.01
Maximum Candela	541
Maximum Candela Angle	180H 0V
Maximum Candela (<90 Degrees Vertical)	541
Maximum Candela Angle (<90 Degrees Vertical)	180H 0V
Maximum Candela At 90 Degrees Vertical	1 (0.2% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	5 (1.2% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

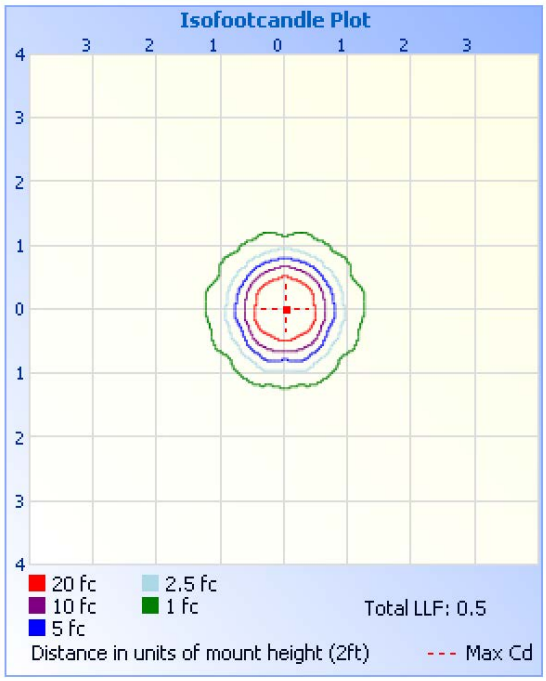
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Results derived from content of manufacturers photometric file.

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LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	130.7	N.A.	31.2
FM - Front-Medium (30-60)	63.3	N.A.	15.1
FH - Front-High (60-80)	8.3	N.A.	2.0
FVH - Front-Very High (80-90)	1.2	N.A.	0.3
BL - Back-Low (0-30)	134.2	N.A.	32.1
BM - Back-Medium (30-60)	66.4	N.A.	15.9
BH - Back-High (60-80)	7.8	N.A.	1.9
BVH - Back-Very High (80-90)	1.2	N.A.	0.3
UL - Uplight-Low (90-100)	0.5	N.A.	0.1
UH - Uplight-High (100-180)	4.9	N.A.	1.2
Total	418.5	N.A.	100.0
BUG Rating	B1-U1-G0		





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CANDELA TABULATION

Vert. Angles	Horizontal Angles									
	0	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**
0	541	541	541	541	541	541	541	541	541	541
5	500	500	501	505	509	510	510	512	514	515
10	451	451	449	451	456	457	458	460	464	469
15	379	378	376	375	374	374	376	379	385	392
20	306	305	302	297	293	290	288	289	295	303
25	232	232	228	223	217	215	215	218	223	230
30	165	164	164	162	162	162	165	171	176	178
35	98	101	108	116	119	121	121	123	125	122
40	61	64	70	77	81	78	71	68	71	71
45	48	47	47	52	53	50	43	39	40	42
50	32	31	29	32	36	36	35	35	33	29
55	23	22	21	20	21	21	19	21	21	20
60	13	13	13	14	14	14	13	14	15	15
65	10	10	10	10	10	10	10	10	10	10
70	7	8	7	8	8	8	8	8	8	8
75	6	6	6	6	6	6	6	6	7	6
80	4	4	4	5	5	4	5	4	4	4
85	2	2	2	2	2	2	2	2	2	2
90	1	1	1	1	1	1	1	1	1	1
95	1	0	0	0	0	0	0	0	1	0
100	1	0	0	0	1	1	0	1	0	0
105	0	0	0	0	0	1	0	0	1	1
110	1	0	0	1	0	0	0	1	1	0
115	1	0	1	0	0	0	0	0	0	0
120	0	1	1	0	0	1	0	0	1	1
125	1	0	1	1	0	0	0	1	0	0
130	0	1	1	1	1	1	1	0	0	1
135	1	1	1	1	1	1	1	1	1	1
140	1	1	1	1	1	1	1	1	1	1
145	2	2	2	2	2	2	2	2	2	2
150	2	2	2	2	2	2	2	2	2	2
155	2	2	2	2	3	3	2	2	2	2
160	3	3	3	3	3	3	3	3	3	3
165	3	3	3	3	3	3	3	3	3	3
170	3	3	3	3	3	3	3	3	3	3
175	3	3	3	3	3	3	3	3	3	3
180	3	3	3	3	3	3	3	3	3	3

Vert. Angles	Horizontal Angles									
	50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**
0	541	541	541	541	541	541	541	541	541	541
5	515	518	517	515	513	511	511	511	508	509
10	472	472	474	475	475	471	470	467	466	464
15	398	402	405	406	404	402	400	396	394	390
20	313	318	323	328	325	320	313	307	303	298
25	234	239	241	244	240	234	227	218	215	214
30	179	176	170	165	164	164	161	158	155	156
35	116	105	96	94	98	104	110	111	110	107
40	66	57	56	56	56	60	67	70	67	63
45	39	42	48	50	45	41	45	45	41	40
50	24	28	33	35	33	31	33	35	34	36
55	18	20	24	24	22	20	20	23	24	24

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CANDELA TABULATION - (Cont.)

60	14	13	14	14	14	13	14	14	13	13
65	10	10	10	10	10	10	10	10	10	10
70	8	8	8	8	8	8	8	7	7	7
75	6	6	6	6	6	6	6	6	6	6
80	4	4	4	4	4	4	3	4	4	4
85	2	2	2	2	2	2	2	2	2	2
90	1	1	1	1	0	1	1	1	1	1
95	1	0	0	0	0	0	0	0	1	0
100	1	0	1	1	0	0	1	0	0	1
105	1	0	0	0	0	1	0	0	0	0
110	0	1	0	0	0	1	0	1	1	0
115	1	1	0	0	0	0	0	0	1	0
120	1	0	0	1	0	1	0	1	0	1
125	0	1	1	0	0	1	0	0	0	1
130	1	0	1	1	1	1	1	1	1	0
135	1	1	1	1	1	1	1	1	1	1
140	1	1	1	1	1	1	1	1	1	1
145	2	2	2	2	2	1	2	2	2	2
150	2	2	2	2	2	2	2	2	2	2
155	2	2	2	2	3	2	2	2	3	2
160	3	3	3	3	3	3	3	3	3	3
165	3	3	3	3	3	3	3	3	3	3
170	3	3	3	3	3	3	3	3	3	3
175	3	3	3	3	3	3	3	3	3	3
180	3	3	3	3	3	3	3	3	3	3

Vert. Angles	**Horizontal Angles**									
	100	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**
0	541	541	541	541	541	541	541	541	541	541
5	508	511	511	511	513	513	511	510	510	513
10	460	457	455	453	452	451	449	452	456	460
15	386	385	379	378	378	377	378	382	387	393
20	294	295	299	306	314	317	319	323	328	328
25	215	220	226	237	249	252	253	257	258	258
30	158	162	170	181	188	188	187	183	183	183
35	106	108	111	114	114	114	117	120	125	130
40	60	63	67	67	64	60	63	66	70	75
45	41	42	45	45	45	47	47	42	41	45
50	37	36	31	27	30	35	36	34	30	33
55	27	27	22	19	22	25	25	23	20	21
60	14	14	14	13	14	16	16	14	14	15
65	10	10	10	10	10	10	10	10	8	10
70	7	7	8	7	7	7	7	7	7	7
75	6	6	6	6	6	6	5	6	5	5
80	4	4	4	4	4	4	4	4	4	3
85	2	2	2	2	2	2	2	2	2	2
90	1	1	1	1	1	1	1	1	1	1
95	1	0	0	0	0	0	0	0	1	0
100	1	0	0	1	0	0	0	0	1	1
105	0	0	0	0	0	0	1	0	0	1
110	0	0	1	0	0	0	0	0	0	1
115	0	0	0	0	0	0	0	0	0	0
120	0	1	0	1	0	0	0	0	0	0
125	0	1	0	0	0	0	0	0	0	0
130	0	1	1	1	1	0	0	1	1	1

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CANDELA TABULATION - (Cont.)

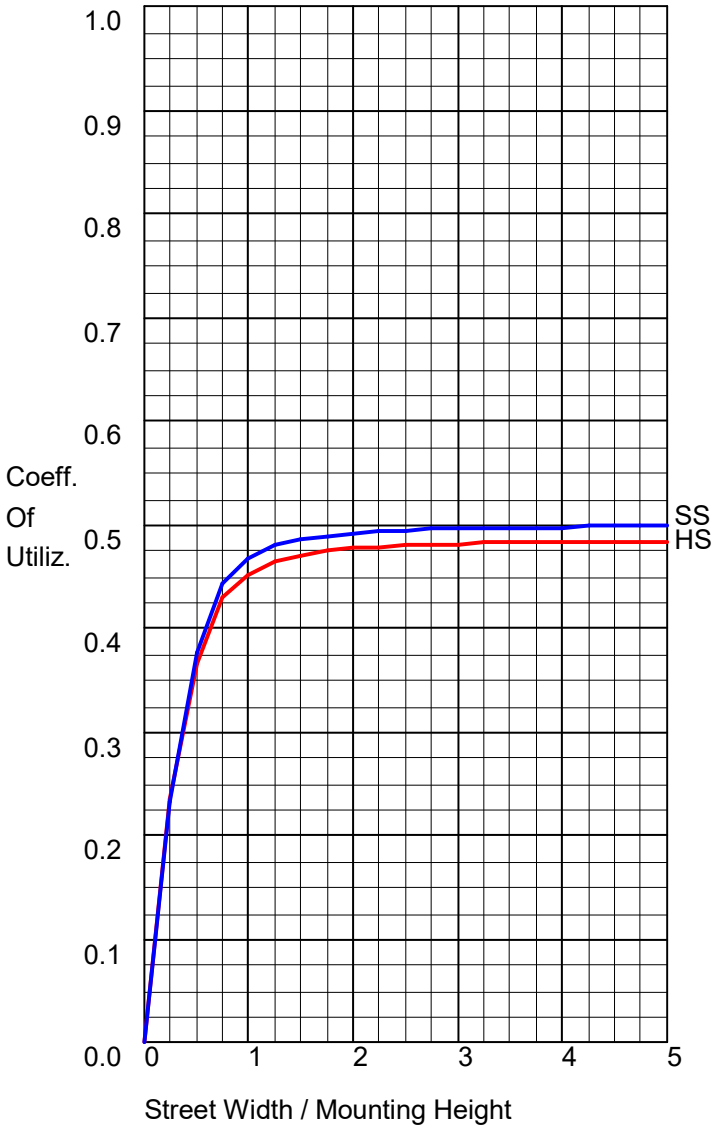
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150	2	2	2	2	2	2	2	2	2	2
155	2	2	2	2	3	2	2	2	2	2
160	3	3	3	3	3	3	3	3	3	3
165	3	3	3	3	3	3	3	3	3	3
170	3	3	3	3	3	3	3	3	3	3
175	3	3	3	3	3	3	3	3	3	3
180	3	3	3	3	3	3	3	3	3	3

Vert. Angles	**Horizontal Angles**						
	150	**155**	**160**	**165**	**170**	**175**	**180**
0	541	541	541	541	541	541	541
5	514	515	517	519	522	520	516
10	464	467	474	476	477	476	475
15	396	399	403	409	408	405	403
20	325	322	323	325	324	324	324
25	252	245	244	247	252	258	259
30	181	177	177	183	193	204	210
35	129	126	122	123	128	134	139
40	76	76	71	70	70	73	75
45	45	42	43	46	47	48	48
50	34	33	34	37	35	30	25
55	22	22	23	25	25	22	20
60	15	15	14	16	16	15	15
65	10	10	8	8	8	8	8
70	7	7	7	6	6	6	7
75	5	5	5	5	5	5	5
80	3	3	3	3	3	3	3
85	2	2	2	1	2	2	2
90	1	1	1	1	1	1	0
95	0	0	0	1	0	1	1
100	1	0	0	0	1	0	0
105	0	0	0	0	0	0	0
110	0	0	0	1	0	0	1
115	1	0	0	0	0	1	1
120	1	1	1	0	0	0	1
125	0	0	0	0	0	0	0
130	0	1	1	0	1	1	1
135	1	1	1	1	1	1	1
140	1	1	1	1	1	1	1
145	1	2	2	2	2	2	2
150	2	2	2	2	2	2	2
155	2	3	2	2	2	2	3
160	3	3	3	3	3	3	3
165	3	3	3	3	3	3	3
170	3	3	3	3	3	3	3
175	3	3	3	3	3	3	3
180	3	3	3	3	3	3	3

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COEFFICIENTS OF UTILIZATION



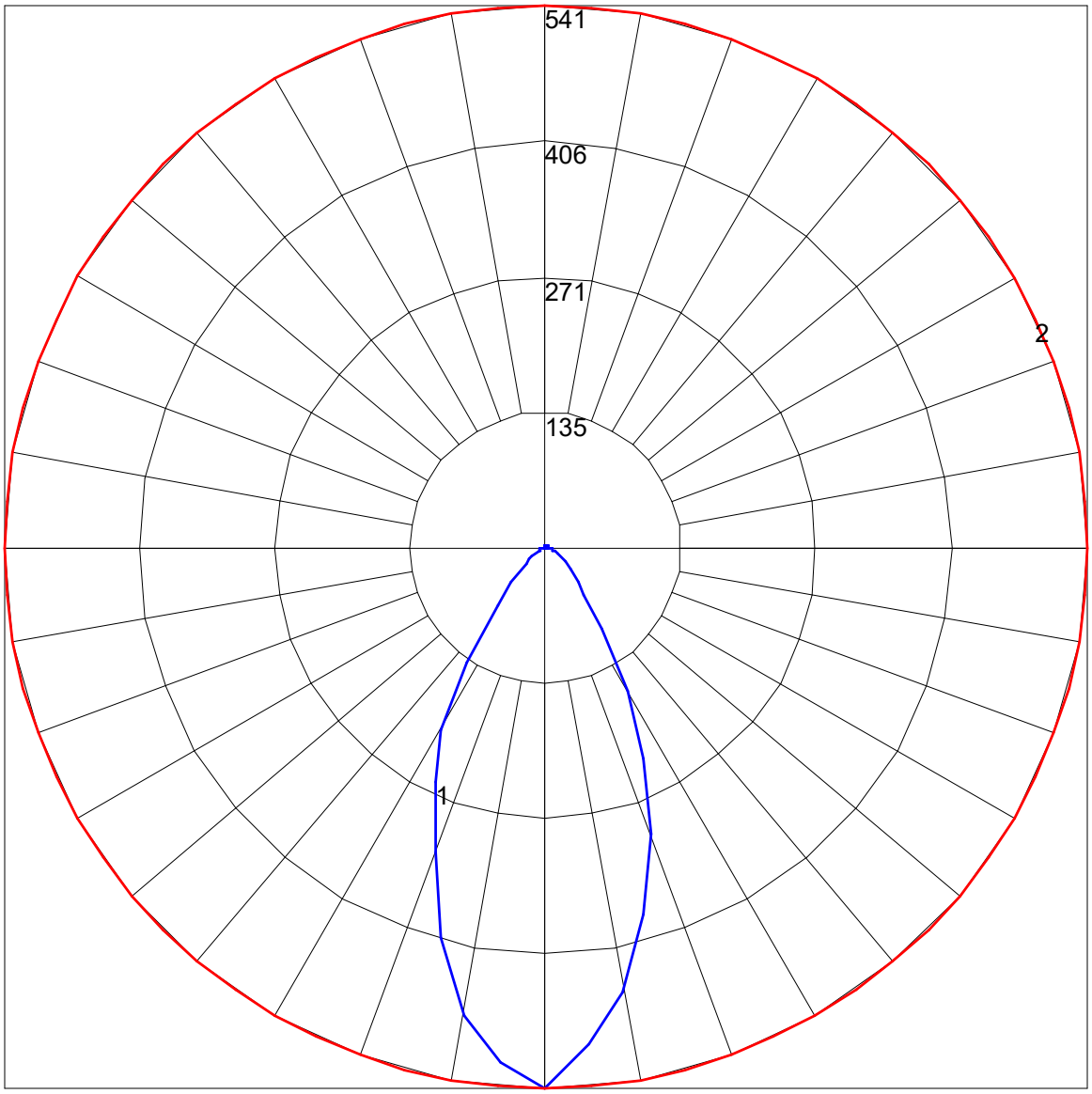
FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	203.5	48.6
Downward House Side	209.5	50.1
Downward Total	413.0	98.7
Upward Street Side	2.8	0.7
Upward House Side	2.6	0.6
Upward Total	5.4	1.3
Total Flux	418.4	100.0

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POLAR GRAPH

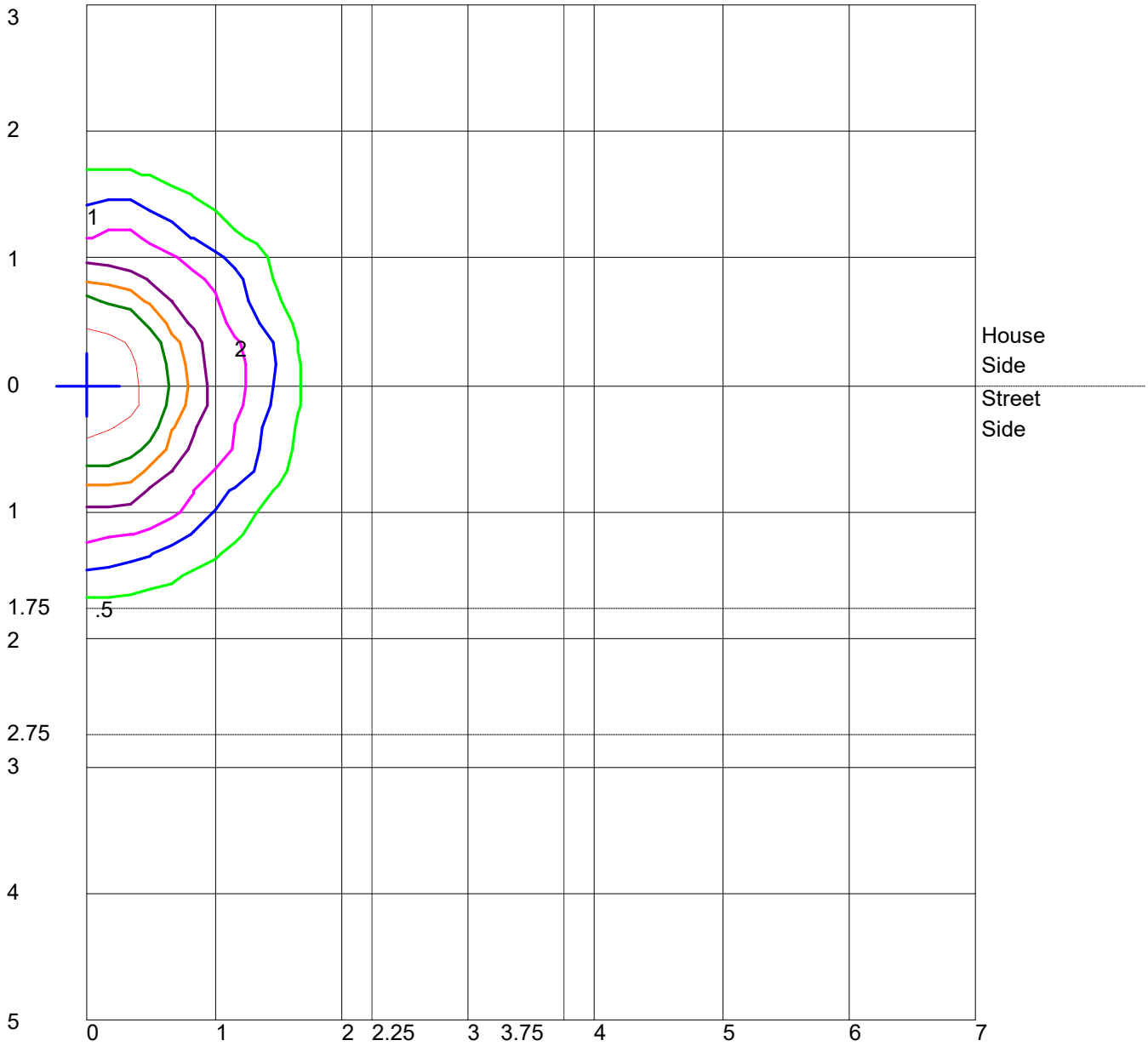


Maximum Candela = 541 Located At Horizontal Angle = 180, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (180 - 0) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)

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ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



Distance In Units Of Mounting Height
Values Based On 2 Foot Mounting Height
1/2 Maximum Candela Trace Shown As Dashed Curve
(+) = Maximum Candela Point

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