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Report No: L081505002

Date: 8/21/2015



NVLAP LAB CODE 200927-0

Report No: L081505002

Report Prepared For: Revolution Lighting Technologies
 4139 Guardian Street, Simi Valley, CA 93063

Model Number: 204220-011

Test: Electrical and Photometric tests

Standards Used: Appropriate part or all test guidelines were used for test performed:
IESNA LM79: 2008 Approved Methods for Electrical and Photometric Measurements of Solid-State Lighting Products
ANSI NEMA ANSLG C78.377: 2008 Specification of the Chromaticity of Solid State Lighting Products
ANSI C82.77:2002: Harmonic Emission Limits-Related Quality Requirements for Lighting Equipment

Description of Sample: Client submitted the sample. Catalog number is 204220-011. Received in working and undamaged condition. No modifications were necessary.

Testing Condition: GE ULTRAMAX P-SERIES GE232MAXP-N+ driver was connected to two LED tubes from the driver output. Photometric measurements were measured from a single LED tube while the other lamp was powered and covered with black velvet to prevent any light pollution. Input power of single measured module is calculated from the total power divided by two.

Sample Arrival Date: 8/12/15

Date of Tests: 8/14/15 - 8/20/15

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-S1	11/10/15
Xitron Power Analysis System	2503AH	MT-EL01	10/20/15
BK Precision DC Power Supply	1747	PSDC-04	01/08/16
Fluke Digital Thermometer	52k/J	MT-TP02-GC	01/05/16
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

*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

Test Summary

Manufacturer:	Revolution Lighting Technologies	
Model Number:	204220-011	
Driver Model Number:	GE ULTRAMAX P-SERIES GE232MAXP-N+	
Total Lumens:	1828.23	
Input Voltage (VAC/60Hz):	120.00	
Input Current (Amp):	0.14	
Input Power (W):	16.88	
Input Power Factor:	1.00	
Current ATHD @ 120V(%):	6%	
Current ATHD @ 277V(%):	14% (0.07A, 17.04W, 0.91PF)	
Efficacy:	108	
Color Rendering Index (CRI):	84	
Correlated Color Temperature (K):	2995	
Chromaticity Coordinate x:	0.4356	
Chromaticity Coordinate y:	0.4006	
Ambient Temperature (°C):	25.0	
Stabilization Time (Hours):	0:30	
Total Operating Time (Hours):	1:00	
Off State Power(W):	0.00	

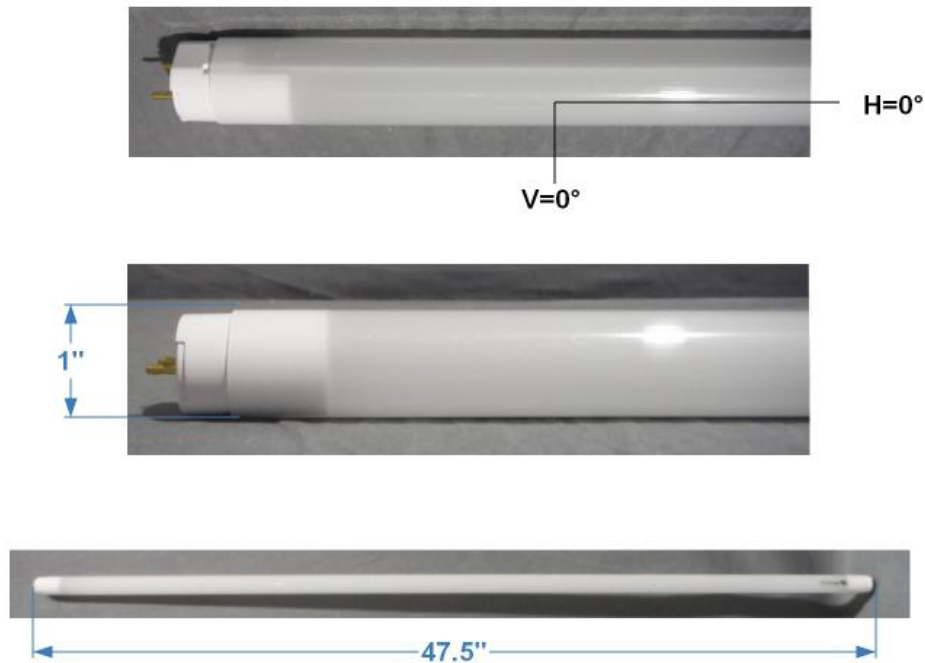
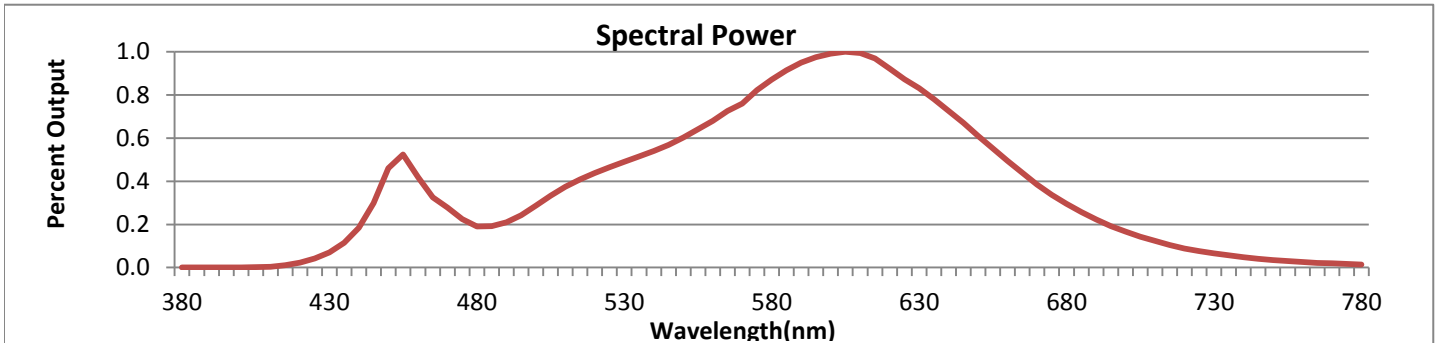


FIG. 1 LUMINAIRE

*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.



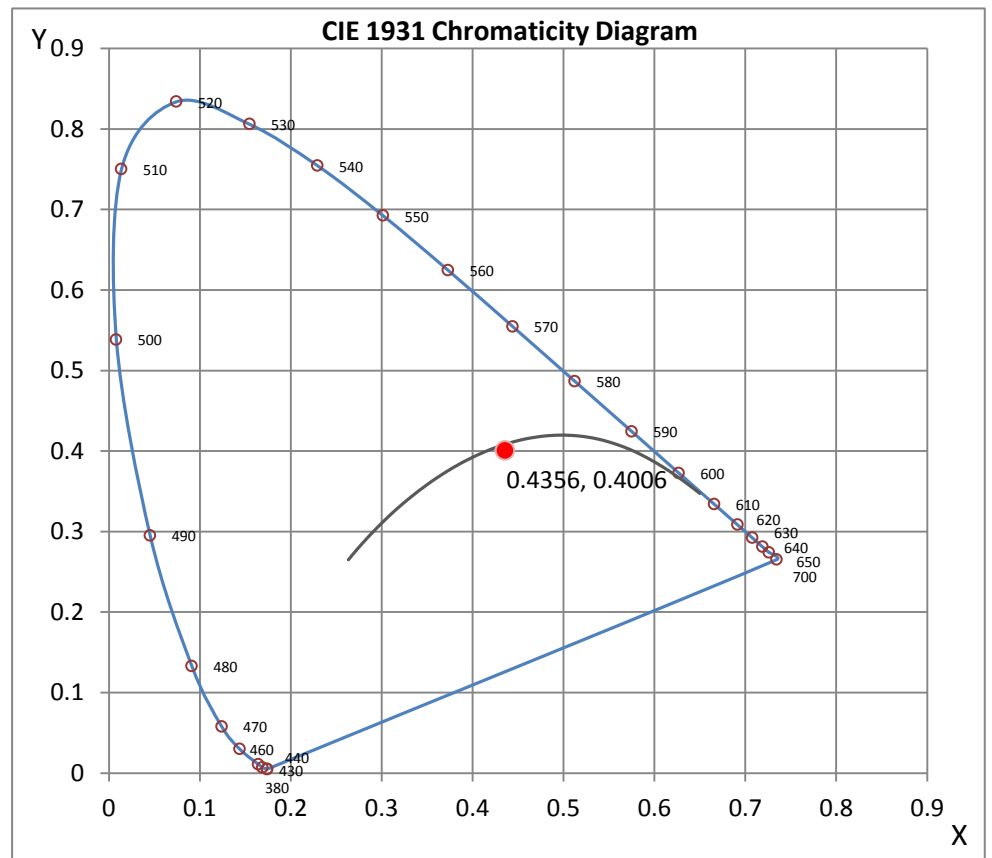
Wavelength	W/m ² nm	440	0.1841	510	0.3742	580	0.8715	650	0.6109	720	0.0887
380	0.0008	450	0.4602	520	0.4382	590	0.9504	660	0.4945	730	0.0654
390	0.0008	460	0.4183	530	0.4903	600	0.9917	670	0.3847	740	0.0479
400	0.0012	470	0.2782	540	0.5413	610	0.9953	680	0.2953	750	0.0352
410	0.0041	480	0.1912	550	0.6025	620	0.9223	690	0.2230	760	0.0257
420	0.0227	490	0.2099	560	0.6805	630	0.8310	700	0.1665	770	0.0191
430	0.0701	500	0.2869	570	0.7597	640	0.7258	710	0.1234	780	0.0142

CRI & CCT

x	0.4356
y	0.4006
u'	0.2512
v'	0.5198
CRI	83.50
CCT	2995
Duv	-0.00121

R Values

R1	82.32
R2	91.95
R3	96.27
R4	80.90
R5	82.08
R6	89.75
R7	83.19
R8	61.23
R9	13.59
R10	80.97
R11	79.85
R12	71.14
R13	84.72
R14	98.65



*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

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:

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Government.

Report Prepared by : Keyur Patel

Test Report Released by:



Jeff Ahn
Engineering Manager

Test Report Reviewed by:



Steve Kang
Quality Assurance

**Attached are photometric data reports. Total number of pages: 10*



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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L081505002.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L081505002
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 8/21/2015
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
 [LUMCAT] 204220-011
 [LUMINAIRE] 12W BALLAST READY TUBE 3000K
 [MORE] DIFFUSED LENS
 [MORE] SIZE: 1"DIA. X 47.75"L.
 [BALLASTCAT] GE ULTRAMAX P-SERIES GE232MAXP-N+
 [LAMPPOSITION] 0,0
 [LAMPCAT] N/A
 [_TEST CONDITION] GE ULTRAMAX P-SERIES GE232MAXP-N+ WAS CONNECTED TO TWO LED TUBES
 [MORE] FROM THE DRIVER OUTPUT. PHOTOMETRIC MEASUREMENTS WERE MEASURED FROM
 [MORE] A SINGLE LED FIXTURE WHILE THE OTHER LAMPS WERE POWERED
 [MORE] AND COVERED WITH BLACK VELVET TO PREVENT ANY LIGHT POLLUTION.
 [MORE] INPUT POWER OF SINGLE MEASURED MODULE IS CALCULATED
 [MORE] FROM THE TOTAL POWER DIVIDED BY TWO.
 [OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
 [MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
 [_INPUT] 120VAC, 16.88W
 [_TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1828
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	108
Total Luminaire Watts	16.88
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.20
Spacing Criterion (90-270)	1.38
Spacing Criterion (Diagonal)	1.44
Basic Luminous Shape	Rectangular w/Sides
Luminous Length (0-180)	3.69 ft
Luminous Width (90-270)	0.08 ft
Luminous Height	0.04 ft

IES INDOOR REPORT
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LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	11774	10634	11095
55	10671	10069	10853
65	9355	9739	10850
75	7210	9895	11228
85	3377	10988	12246

**IES INDOOR REPORT
PHOTOMETRIC FILENAME : L081505002.IES**

CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	388.75	388.75	388.75	388.75	388.75
5	387.14	387.06	387.27	387.32	387.23
10	380.03	380.80	382.56	384.23	384.92
15	368.64	370.31	374.98	379.22	380.46
20	352.53	356.21	364.27	371.93	374.89
25	334.70	340.10	350.77	362.94	367.35
30	312.25	319.15	335.17	352.70	358.01
35	287.06	296.53	319.71	340.27	347.30
40	259.12	272.45	300.73	326.61	335.73
45	231.02	246.83	280.98	311.57	323.05
50	201.46	220.22	260.37	295.80	308.14
55	170.61	193.92	240.32	278.62	292.89
60	140.27	168.55	220.18	262.04	277.38
65	111.05	143.57	200.51	244.86	260.84
70	83.29	120.27	181.88	228.15	244.73
75	53.30	99.87	165.08	211.95	228.62
80	27.85	83.38	149.36	196.23	212.68
85	9.08	67.52	134.83	180.93	196.74
90	0.60	56.60	122.02	166.79	182.35
95	0.00	48.97	110.63	153.13	168.21
100	0.00	44.04	100.00	140.83	154.93
105	0.00	41.35	92.20	129.39	142.33
110	0.00	39.72	85.52	117.52	131.28
115	0.00	38.00	79.86	108.65	120.39
120	0.00	36.76	74.42	100.99	106.86
125	0.00	34.83	69.07	93.62	100.26
130	0.00	31.45	62.85	85.73	90.83
135	0.00	27.89	55.48	77.68	83.72
140	0.00	24.85	49.31	69.75	74.81
145	0.00	21.21	42.89	62.04	66.92
150	0.00	17.78	37.32	52.40	59.04
155	0.00	15.60	31.45	42.25	51.33
160	0.00	13.37	24.12	32.65	40.79
165	0.00	10.63	18.85	22.84	29.91
170	0.00	7.84	13.20	16.07	18.85
175	0.00	5.96	7.41	8.44	5.06
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
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ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	142.62	N.A.	7.80
0-30	304.54	N.A.	16.70
0-40	503.91	N.A.	27.60
0-60	931.15	N.A.	50.90
0-80	1287.31	N.A.	70.40
0-90	1420.83	N.A.	77.70
10-90	1384.02	N.A.	75.70
20-40	361.29	N.A.	19.80
20-50	576.87	N.A.	31.60
40-70	619.58	N.A.	33.90
60-80	356.15	N.A.	19.50
70-80	163.82	N.A.	9.00
80-90	133.52	N.A.	7.30
90-110	197.21	N.A.	10.80
90-120	268.45	N.A.	14.70
90-130	323.83	N.A.	17.70
90-150	388.39	N.A.	21.20
90-180	407.40	N.A.	22.30
110-180	210.18	N.A.	11.50
0-180	1828.23	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	36.81
10-20	105.81
20-30	161.92
30-40	199.36
40-50	215.59
50-60	211.66
60-70	192.34
70-80	163.82
80-90	133.52
90-100	108.64
100-110	88.57
110-120	71.24
120-130	55.38
130-140	39.42
140-150	25.14
150-160	13.36
160-170	4.94
170-180	0.71

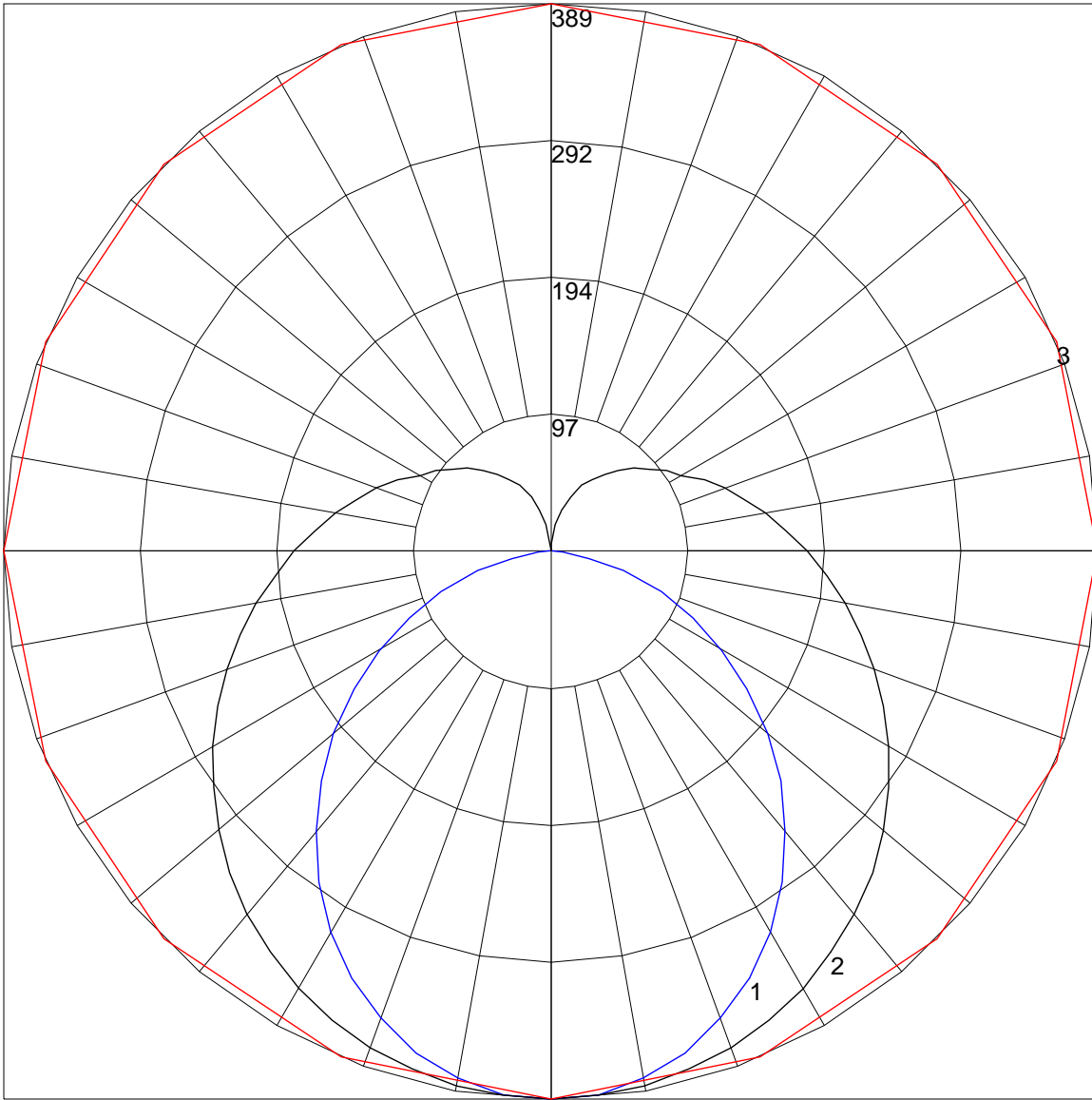
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	114	114	114	114	109	109	109	109	99	99	99	90	90	90	82	82	82	78
1	101	95	90	85	96	90	86	81	82	78	75	74	71	68	67	65	63	59
2	91	81	74	67	86	77	70	64	70	65	60	64	59	55	57	54	50	47
3	82	71	62	55	78	67	59	53	61	54	49	55	50	45	50	46	42	39
4	75	62	53	46	71	59	51	44	54	47	41	49	43	38	44	39	35	32
5	69	55	46	39	65	53	44	38	48	41	35	44	37	33	40	34	30	28
6	63	49	40	33	60	47	39	32	43	36	30	39	33	28	36	31	26	24
7	58	45	36	29	55	43	34	28	39	32	27	36	30	25	33	27	23	21
8	54	40	32	26	51	39	31	25	36	29	24	33	27	22	30	25	21	19
9	51	37	29	23	48	35	28	22	33	26	21	30	24	20	28	22	19	17
10	47	34	26	21	45	33	25	20	30	24	19	28	22	18	26	21	17	15

POLAR GRAPH



Maximum Candela = 388.75 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Vertical Plane Through Horizontal Angles (90 - 270)
3 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)