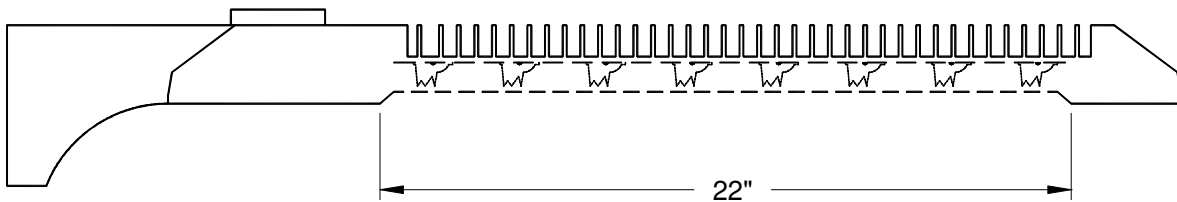




INDEPENDENT TEST LABORATORY REPORT No. 29180

SOLAR OUTDOOR LIGHTING - LED ROADWAY LUMINAIRE, CAT# 20/20 TYPE 3
WITH ALUMINUM INTERIOR AND CLEAR FLAT GLASS LENS
FORTY EIGHT LEDS. LUMINAIRE OUTPUT: 6298 Lms.
LUMINAIRE OPERATING AT 13.5 VDC AND 99.8 WATTS

IESNA CUTOFF CLASSIFICATION: CUTOFF



PREPARED FOR:

SOLAR OUTDOOR LIGHTING INC
PALM CITY, FL

CERTIFIED BY:

DATE: JUN 16, 2011

LABORATORY RESULTS MAY NOT BE REPRESENTATIVE OF FIELD PERFORMANCE.
BALLAST FACTORS HAVE NOT BEEN APPLIED

TESTED IN 30 PLANES LEFT SIDE, 30 PLANES RIGHT SIDE, LEFT AND RIGHT AVERAGED

VERTICAL TEST INCREMENTS ARE 2.5 DEGREES.

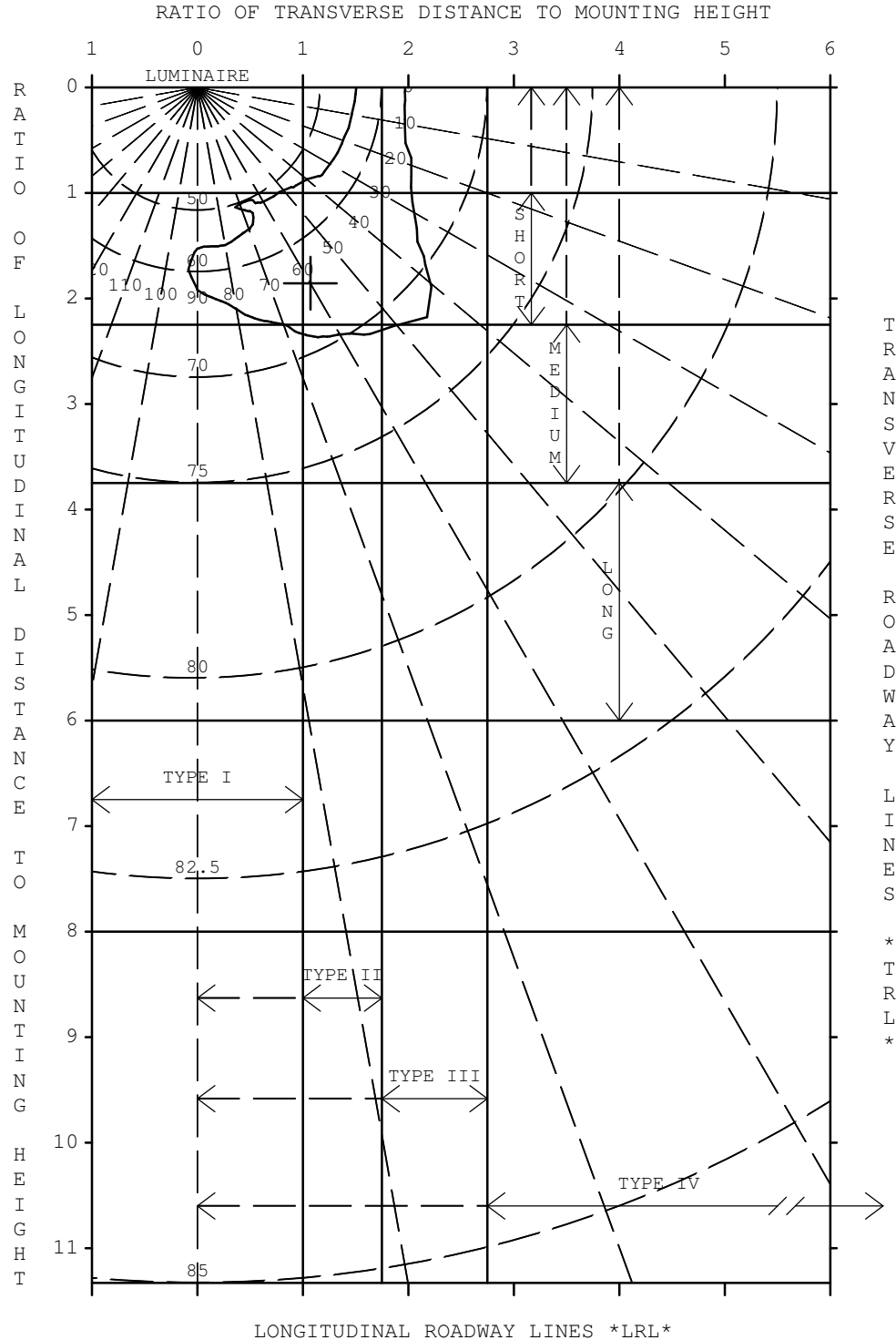
TEST DISTANCE EXCEEDS FIVE TIMES THE GREATEST
LUMINOUS OPENING OF LUMINAIRE.

LIGHTING SCIENCES, INC.

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NOTE:
CONTOUR LINE
IS FOR 50%
OF THE MAXIMUM
INTENSITY

IES ROADWAY CLASSIFICATION: TYPE III, SHORT

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*** THIS IS AN ABSOLUTE TEST REPORT ***

UTILIZATION TABLE

CO-EFFICIENT OF UTILIZATION

RATIO	HOUSE SIDE	STREET SIDE	TOTAL
0.5	0.117	0.215	0.332
1.0	0.151	0.429	0.580
1.5	0.168	0.606	0.774
2.0	0.177	0.707	0.884
2.5	0.182	0.757	0.938
3.0	0.185	0.778	0.962
3.5	0.187	0.790	0.977
4.0	0.188	0.796	0.984
5.0	0.189	0.804	0.993
TOTAL:	0.192	0.808	1.000

PERCENTAGE OUTPUTS

DOWNWARD:	STREET SIDE =	80.8%
	HOUSE SIDE =	19.2%
	TOTAL =	100.0%
UPWARD:	STREET SIDE =	0.0%
	HOUSE SIDE =	0.0%
	TOTAL =	0.0%

EFFICACY (LUMENS PER WATT) 63.1

THE ABOVE COEFFICIENTS HAVE BEEN CALCULATED BASED ON LUMINAIRE LUMENS
BECAUSE IN AN ABSOLUTE TEST THE BARE LAMP LUMENS ARE UNKNOWN.
LIGHTING DESIGN CALCULATIONS MADE USING THESE COEFFICIENTS SHOULD
THEREFORE USE THE LUMINAIRE LUMENS IN THE CALCULATION FORMULA

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ZONAL LUMEN SUMMARY PER IES PUBLICATION TM-15-07

*** THIS IS AN ABSOLUTE TEST REPORT ***

FORWARD LIGHT:

LUMENS	5088.9
% LUMENS	80.8 %
FORWARD LOW ZONE (0 TO 30 DEGREES)	7.2 %
FORWARD MID ZONE (30 TO 60 DEGREES)	39.6 %
FORWARD HIGH ZONE (60 TO 80 DEGREES)	33.7 %
FORWARD VERY HIGH ZONE (80 TO 90 DEGREES)	0.3 %

BACK LIGHT:

LUMENS	1208.8
% LUMENS	19.2 %
BACK LIGHT LOW ZONE (0 TO 30 DEGREES)	4.5 %
BACK LIGHT MID ZONE (30 TO 60 DEGREES)	10.0 %
BACK LIGHT HIGH ZONE (60 TO 80 DEGREES)	4.4 %
BACK LIGHT VERY HIGH ZONE (80 TO 90 DEGREES)	0.3 %

UPLIGHT:

LUMENS	0.2
% LUMENS	0.0 %
UPLIGHT LOW ZONE (90 TO 100 DEGREES)	0.0 %
UPLIGHT HIGH ZONE (100 TO 180 DEGREES)	0.0 %

TRAPPED LIGHT: NOT APPLICABLE TO AN ABSOLUTE TEST

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IES "BUG" RATING (BACK LIGHT, UPLIGHT, GLARE)
PER ADDENDUM TO IES TM-15-07

	LUMENS	SECONDARY SOLID ANGLE RATING
BACK LIGHT		
BH (60-80 DEGREES)	278.1	B1
BM (30-60 DEGREES)	632.6	B1
BL (0-30 DEGREES)	281.9	B1
UPLIGHT		
UH (100-180 DEGREES)	0.1	U1
UL (90-100 DEGREES)	0.0	U1
FVH (80-90 DEGREES)	20.5	U1
BVH (80-90 DEGREES)	16.2	U1
GLARE LIGHT		
FVH (80-90 DEGREES)	20.5	G1
BVH (80-90 DEGREES)	16.2	G1
FH (60-80 DEGREES)	2120.4	G2
BH (60-80 DEGREES)	278.1	G1

IES BUG RATING: B1 U1 G1

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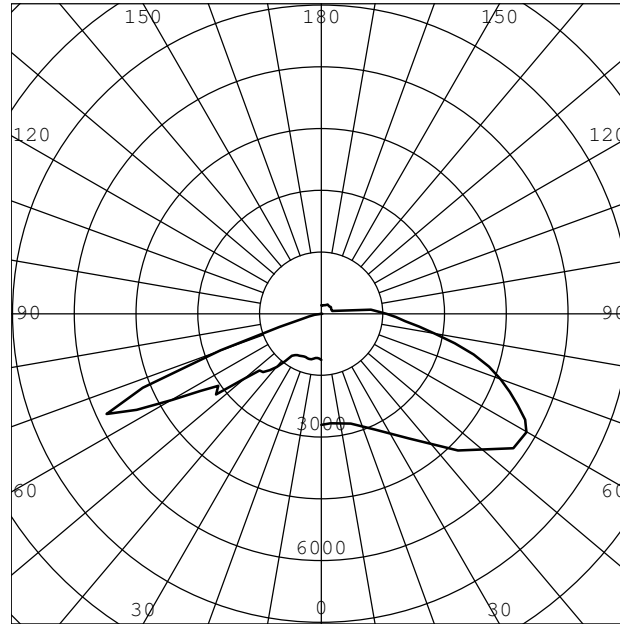
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LUMINAIRE OPERATING AT 13.5 VDC AND 99.8 WATTS

INTENSITY (CANDLEPOWER)
IN MAX. PLANE

INTENSITY (CANDLEPOWER)
IN MAX. CONE

ANGLE	CANDLEPOWER
0.0	1121
5.0	1087
10.0	1111
15.0	1148
20.0	1126
25.0	1140
30.0	1170
35.0	1257
40.0	1691
45.0	2008
50.0	2476
52.5	3232
55.0	3066
57.5	3495
60.0	4190
62.5	5064
65.0	5759
67.5	4697
70.0	2612
72.5	1078
75.0	515
77.5	308
80.0	171
82.5	65
85.0	21
87.5	3
90.0	0
95.0	0
105.0	0
115.0	0
125.0	0
135.0	0
145.0	0
155.0	0
165.0	0
175.0	0
180.0	0



ANGLE	CANDLEPOWER
0.0	2700
5.0	2676
15.0	2768
25.0	3110
35.0	3697
45.0	4705
55.0	5701
60.0	5759
62.5	5594
65.0	5275
67.5	4962
70.0	4640
72.5	4277
75.0	3835
77.5	3333
80.0	2828
82.5	2404
85.0	2056
87.5	1818
90.0	1589
95.0	1213
105.0	282
115.0	277
125.0	288
135.0	268
145.0	281
155.0	238
165.0	218
175.0	202
180.0	210

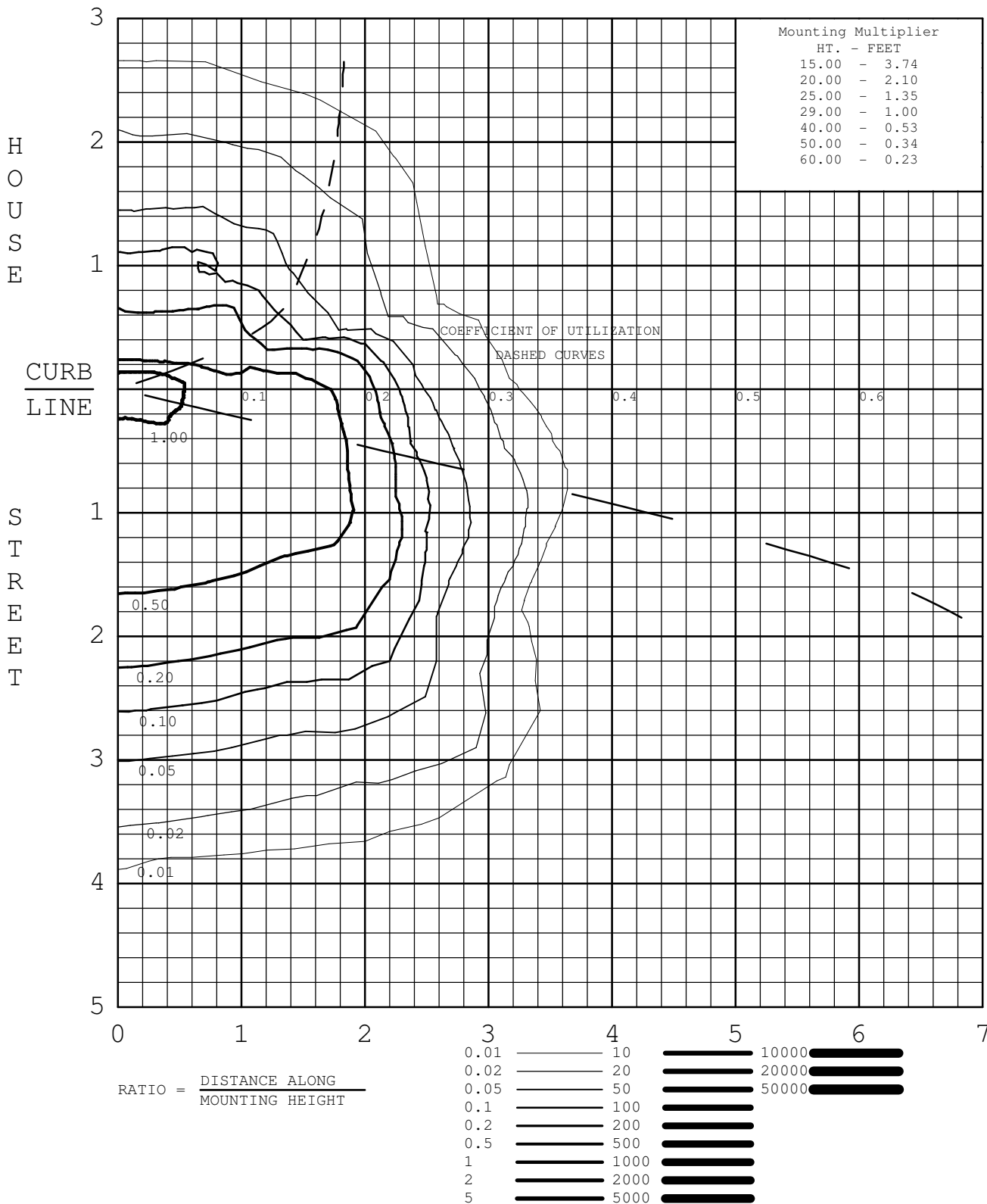
MAXIMUM INTENSITY (CANDLEPOWER) : 5759 CD
 PLANE OF MAXIMUM: 60.0
 VERTICAL ANGLE OF MAXIMUM: 65.0

ISOFOOTCANDLE

CERTIFIED TEST REPORT NO.29180

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MOUNTING HEIGHT FOR ISOFC 29.0 FEET



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INTENSITY (CANDLEPOWER) SUMMARY

VERT. ANGLE	HORIZONTAL ANGLES - STREET SIDE										
	0.0	5.0	15.0	25.0	35.0	45.0	55.0	60.0	65.0	75.0	85.0

0.0	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121
5.0	1087	1087	1087	1088	1085	1083	1085	1087	1086	1093	1104
10.0	1020	1014	1023	1050	1078	1096	1109	1111	1112	1130	1155
15.0	875	869	877	925	1006	1075	1127	1148	1166	1192	1231
20.0	825	824	824	850	927	1038	1106	1126	1158	1229	1262
25.0	1012	1006	1001	997	993	1047	1142	1140	1143	1219	1230
30.0	1018	1015	1068	1160	1182	1149	1174	1170	1157	1202	1209
35.0	1242	1244	1226	1299	1406	1349	1345	1257	1202	1183	1177
40.0	1739	1743	1761	1695	1574	1586	1847	1691	1533	1402	1281
45.0	1933	1946	2046	2199	2166	1848	2006	2008	1774	1734	1787
50.0	1892	1931	1990	2195	2547	2381	2263	2476	2999	2718	2314
55.0	2610	2635	2654	2680	2811	3378	3073	3066	2983	2729	2572
60.0	2933	2951	3045	3310	3697	3904	4490	4190	3943	4011	3640
65.0**	2700	2676	2768	3110	3697	4705	5701	5759	5275	3835	2056
70.0	1536	1533	1632	1793	2419	4012	3356	2612	2124	1348	744
75.0	568	546	561	717	1127	1501	721	515	392	463	286
80.0	100	89	106	144	158	225	220	171	112	76	56
85.0	24	14	21	28	29	21	29	21	19	14	11
90.0	0	0	0	0	0	0	0	0	0	0	0

VERT. ANGLE	HORIZONTAL ANGLES - HOUSE SIDE										
	90.0	95.0	105.0	115.0	125.0	135.0	145.0	155.0	165.0	175.0	180.0
0.0	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121	1121
5.0	1114	1122	1139	1145	1151	1139	1118	1095	1070	1054	1038
10.0	1173	1189	1205	1163	1063	947	850	781	740	720	704
15.0	1251	1263	1222	1061	873	688	539	438	394	374	364
20.0	1265	1267	1159	882	597	391	323	315	314	312	312
25.0	1249	1257	1030	665	387	333	316	305	299	297	297
30.0	1233	1228	913	502	421	368	328	303	285	286	290
35.0	1202	1173	775	453	534	453	357	300	278	278	287
40.0	1245	1155	662	518	640	448	311	285	270	273	272
45.0	1677	1394	604	603	698	393	297	283	285	287	289
50.0	2154	1860	710	547	558	339	305	363	296	279	285
55.0	2560	2249	595	452	402	305	381	299	272	231	233
60.0	3322	2560	443	345	310	367	285	274	218	200	204
65.0**	1589	1213	282	277	288	268	281	238	218	202	210
70.0	567	437	180	202	254	243	225	217	201	184	182
75.0	194	147	108	134	172	235	185	159	162	151	133
80.0	48	54	50	68	108	130	104	114	80	72	66
85.0	10	10	12	15	26	29	32	40	28	16	15
90.0	0	0	0	0	0	0	0	0	0	0	0

** DENOTES VERTICAL ANGLE OF MAXIMUM CONE

**** DENOTES LATERAL ANGLE OF MAXIMUM PLANE

INTENSITY WAS MEASURED IN 2.5 DEGREE STEPS - TABULATIONS ARE AVAILABLE

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LUMINAIRE OPERATING AT 13.5 VDC AND 99.8 WATTS

ELECTRICAL MEASUREMENTS

INPUT VOLTAGE:	13.5	VOLTS DC
INPUT CURRENT:	7.400	AMPS
INPUT POWER:	99.8	WATTS
OFF STATE POWER:	0.00	WATTS

LIGHT OUTPUT

LUMENS:	6298	lm
EFFICACY:	63.1	lm/W

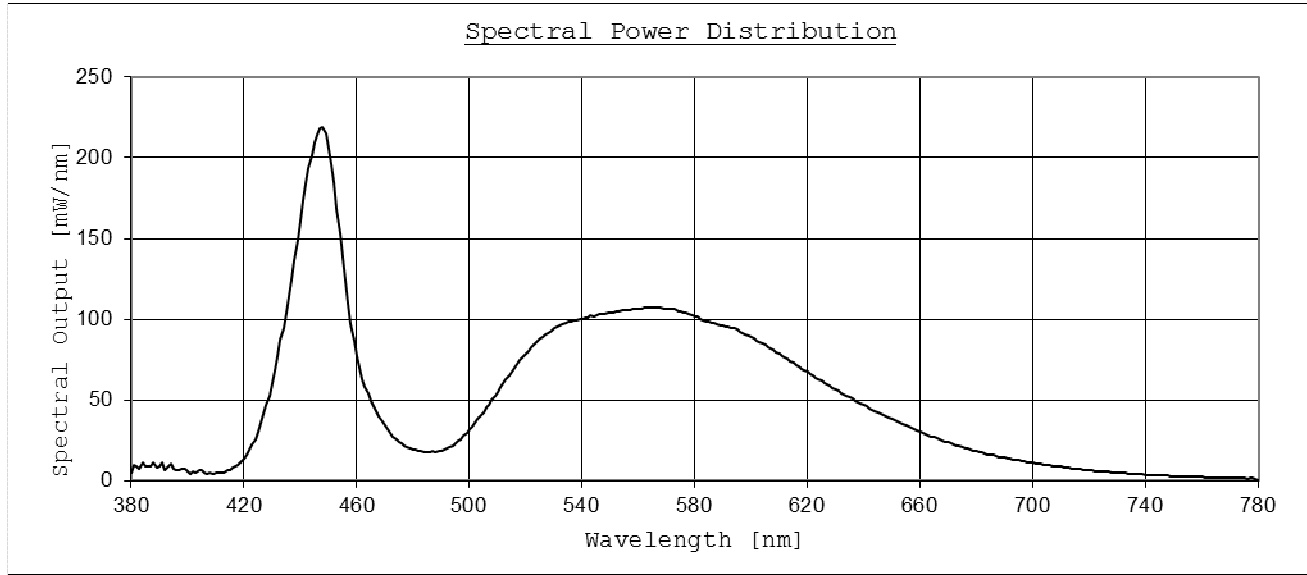
SPECTRAL MEASUREMENTS

X:	0.3262	
y:	0.3284	
u/u':	0.2075	
v:	0.3133	
v':	0.4700	
Duv:	0.0036	
CRI (R _a):	71.9	
CRI (R _g):	-15.7	
CCT:	5799	K
RADIANT FLUX:	19991	mW

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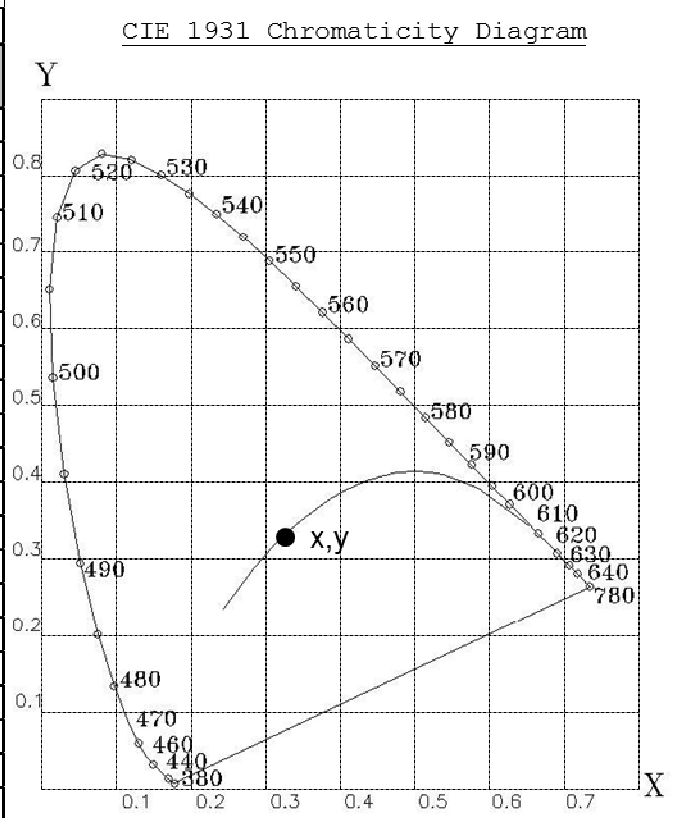
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Tabulated Spectral Power Distribution

Wavelength [nm]	[mW/nm]	Wavelength [nm]	[mW/nm]
380	4.83286	590	95.84855
390	8.81483	600	89.32887
400	5.82328	610	78.81759
410	4.71041	620	67.48823
420	14.08474	630	56.55004
430	60.72803	640	46.92174
440	160.90669	650	38.25252
450	205.15171	660	30.38047
460	77.12618	670	23.73290
470	34.54102	680	18.27366
480	19.34227	690	14.36511
490	18.81855	700	11.07297
500	31.68473	710	8.73094
510	55.27346	720	6.60906
520	78.69889	730	4.95768
530	94.49604	740	3.77206
540	100.37597	750	3.01499
550	103.93539	760	2.39902
560	106.12668	770	1.82970
570	106.60153	780	0.69128
580	102.07290		



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LUMINOUS OPENING



SIDE VIEW



All testing was conducted in accordance with LM-79-08,

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products as published by the Illuminating Engineering Society of North America (IESNA).

The condition of the item tested was new. Stabilization time before testing exceeded 16 hours.

The test results (luminous distribution and flux) were obtained by using a Lighting Sciences series 6000 Type C Moving Mirror Goniophotometer

- The photometric reference standard used is a set of three incandescent luminous intensity standard lamps calibrated and traceable to the U.S. National Institute of Standards and Technology.

The test results (colorimetric and luminous flux) were obtained by using a Lighting Sciences model 4000 Integrating Sphere of either 1 or 2 meters diameter, having an internal reflectance exceeding 0.80. 4π geometry was used. Correction factors were applied for spectral mismatch and self-absorption. The spectroradiometer employed was a LSC model 500E having a bandwidth of .84.

- The photometric reference standard used is a set of three incandescent luminous flux standard lamps calibrated and traceable to the U.S. National Institute of Standards and Technology.
- The colorimetric reference standard used is an incandescent spectral standard lamp calibrated and traceable to the U.S. National Institute of Standards and Technology.

Power measurements were obtained with a Yokogawa WT210 power analyzer.

Ambient temperature during testing was $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured using an Omega model DP460.

Calibration certificates are on file at the laboratories of Lighting Sciences Inc.