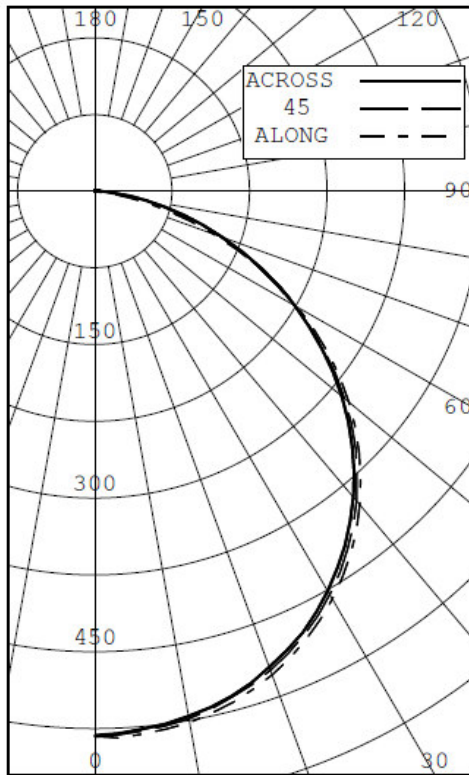




INDEPENDENT TEST LABORATORY REPORT No. 29225

HUDNUT COMPANY INC - LED T8 TUBE LIGHT, CAT# FY-T8-1200
WITH WHITE INTERIOR AND CLEAR CURVED PLASTIC LENS
288 LEDS. LUMINAIRE OUTPUT = 1487 LMS
LAMP OPERATING AT 120 VAC AND 18.3 WATTS



INTENSITY (CANDLEPOWER) SUMMARY						OUTPUT LUMENS
ANGLE	ALONG	22.5	45	67.5	ACROSS	
0	532	532	532	532	532	
5	533	528	530	530	528	51
15	517	512	513	512	511	144
25	484	479	479	478	476	220
35	432	427	427	424	422	266
45	362	358	357	354	353	274
55	276	275	271	269	269	242
65	176	176	175	179	180	174
75	74	78	85	90	90	89
85	6	18	22	23	22	23
90	0	4	4	5	5	
95	0	1	1	1	1	1
105	0	0	0	1	1	0
115	0	0	0	0	0	0
125	0	0	0	0	0	0
135	0	0	0	0	0	0
145	0	0	0	0	0	0
155	0	0	0	0	0	0
165	0	0	0	0	0	0
175	0	0	0	0	0	0
180	0	0	0	0	0	0

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	416	27.96
0-40	682	45.85
0-60	1198	80.58
0-90	1485	99.88
40-90	803	54.03
60-90	287	19.30
90-180	2	0.12
0-180	1487	100.00

EFFICACY (LUMENS PER WATT): 81.3

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS LENGTH: 44.880 INS
WIDTH: 0.880 INS

LUMINANCE SUMMARY CD./SQ.M.

S/MH: 1.3
SC: 1.3

ANGLE	ALONG	45	ACROSS
45	20083	19892	19647
55	18881	18589	18445
65	16358	16280	16732
75	11145	12851	13646
85	2566	9954	9922

CERTIFIED BY:

Ryder Sumney

DATE:
JUN 27, 2011

PREPARED FOR:

HUDNUT COMPANY INC
PORTLAND, OR

TESTED IN ACCORDANCE WITH IES PROCEDURES.

LIGHTING SCIENCES, INC.
 7826 E. EVANS RD.
 SCOTTSDALE, AZ, USA 85260

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INTENSITY (CANDLEPOWER) DATA

ANGLE	PLANE						OUTPUT LUMENS
	ALONG	22.5	45	67.5	ACROSS	AVERAGE	
0	532	532	532	532	532	532	
5	533	528	530	530	528	530	51
10	527	522	523	523	521	523	
15	517	512	513	512	511	513	144
20	503	498	498	497	495	498	
25	484	479	479	478	476	479	220
30	460	455	455	454	451	455	
35	432	427	427	424	422	426	266
40	399	395	394	391	389	393	
45	362	358	357	354	353	357	274
50	321	319	315	313	312	316	
55	276	275	271	269	269	272	242
60	228	227	223	224	224	225	
65	176	176	175	179	180	177	174
70	123	124	129	132	132	128	
75	74	78	85	90	90	83	89
80	33	43	50	52	51	46	
85	6	18	22	23	22	19	23
90	0	4	4	5	5	4	
95	0	1	1	1	1	1	1
100	0	0	1	1	1	0	
105	0	0	0	1	1	0	0
110	0	0	0	0	0	0	
115	0	0	0	0	0	0	0
120	0	0	0	0	0	0	
125	0	0	0	0	0	0	0
130	0	0	0	0	0	0	
135	0	0	0	0	0	0	0
140	0	0	0	0	0	0	
145	0	0	0	0	0	0	0
150	0	0	0	0	0	0	
155	0	0	0	0	0	0	0
160	0	0	0	0	0	0	
165	0	0	0	0	0	0	0
170	0	0	0	0	0	0	
175	0	0	0	0	0	0	0
180	0	0	0	0	0	0	

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AVERAGE LUMINANCE DATA

CD./SQ.M (FOOTLAMBERTS)

ANGLE	ALONG	22.5	45	67.5	ACROSS
0	20892(6097)	20892(6097)	20892(6097)	20892(6097)	20892(6097)
30	20848(6084)	20697(6040)	20688(6038)	20612(6016)	20440(5965)
40	20446(5967)	20272(5916)	20183(5890)	20106(5868)	19929(5816)
45	20083(5861)	19911(5811)	19892(5805)	19711(5753)	19647(5734)
50	19583(5715)	19535(5701)	19257(5620)	19178(5597)	19055(5561)
55	18881(5510)	18836(5497)	18589(5425)	18481(5394)	18445(5383)
60	17868(5215)	17871(5216)	17533(5117)	17627(5144)	17566(5127)
65	16358(4774)	16350(4771)	16280(4751)	16643(4857)	16732(4883)
70	14079(4109)	14325(4181)	14816(4324)	15156(4423)	15106(4409)
75	11145(3252)	11804(3445)	12851(3750)	13656(3985)	13646(3982)
80	7356(2147)	9653(2817)	11264(3287)	11735(3425)	11594(3384)
85	2566(749)	8314(2426)	9954(2905)	10213(2981)	9922(2895)

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COEFFICIENTS OF UTILIZATION

ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE = .20

CC	90				80				70				50				30				10				0	
WALL	70	50	30	10	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0	
RCR	0	1.221	.221	.221	.22	1.191	.191	.191	.19	1.161	.161	.161	.16	1.111	.111	.111	.11	1.061	.061	.061	.06	1.021	.021	.021	.02	1.00
	1	1.121	.071	.031	.00	1.101	.051	.010	.98	1.071	.031	.000	.96	0.990	.960	.93	0.950	.930	.90	0.910	.890	.88	0.86			
	2	1.030	.950	.890	.83	1.010	.930	.870	.82	0.980	.920	.860	.81	0.880	.830	.79	0.850	.810	.77	0.820	.790	.76	0.74			
	3	0.950	.840	.760	.70	0.920	.830	.750	.69	0.900	.810	.740	.69	0.780	.720	.67	0.760	.710	.66	0.730	.690	.65	0.63			
	4	0.870	.760	.670	.60	0.850	.740	.660	.60	0.830	.730	.660	.59	0.700	.640	.59	0.680	.620	.58	0.660	.610	.57	0.55			
	5	0.810	.680	.590	.52	0.790	.660	.580	.52	0.760	.650	.570	.51	0.630	.560	.51	0.610	.550	.50	0.590	.540	.50	0.48			
	6	0.740	.610	.520	.45	0.720	.600	.510	.45	0.700	.590	.500	.45	0.570	.500	.44	0.550	.490	.44	0.540	.480	.43	0.41			
	7	0.680	.540	.450	.40	0.660	.530	.450	.39	0.650	.520	.440	.39	0.510	.430	.38	0.490	.430	.38	0.480	.420	.38	0.36			
	8	0.630	.490	.410	.35	0.620	.480	.400	.34	0.600	.480	.400	.34	0.460	.390	.34	0.450	.380	.34	0.440	.380	.33	0.32			
	9	0.590	.450	.360	.30	0.570	.440	.360	.30	0.560	.430	.360	.30	0.420	.350	.30	0.410	.340	.30	0.400	.340	.29	0.28			
	10	0.540	.410	.320	.27	0.530	.400	.320	.27	0.520	.390	.320	.27	0.380	.310	.27	0.370	.310	.26	0.370	.310	.26	0.24			

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

LUMINAIRE INPUT WATTS 18.3

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

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

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ELECTRICAL MEASUREMENTS

INPUT VOLTAGE:	120.0	VOLTS AC
INPUT CURRENT:	0.154	AMPS
INPUT POWER:	18.3	WATTS
POWER FACTOR:	99.0	PERCENT
TOTAL HARMONIC DISTORTION:	11.20	PERCENT
OFF STATE POWER:	0.00	WATTS

LIGHT OUTPUT

LUMENS:	1487	lm
EFFICACY:	81.3	lm/W

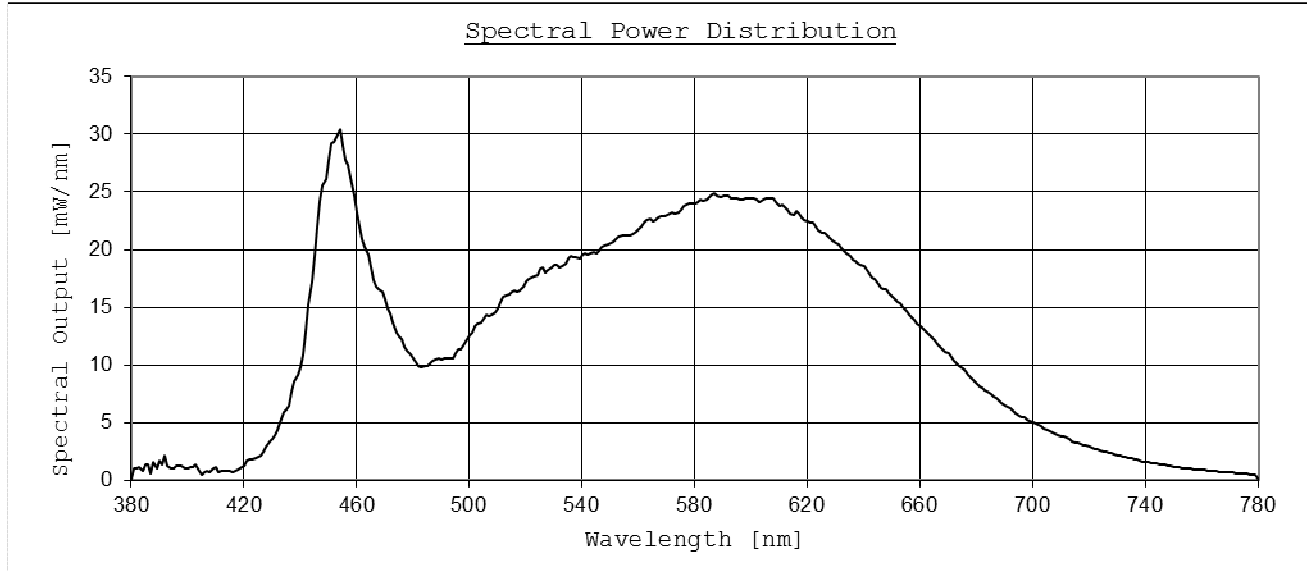
SPECTRAL MEASUREMENTS

X:	0.3721	
y:	0.3661	
u/u':	0.2239	
v:	0.3304	
v':	0.4955	
Duv:	0.0025	
CRI (R _a):	88.1	
CRI (R ₉):	39.7	
CCT:	4157	K
RADIANT FLUX:	4877	mW

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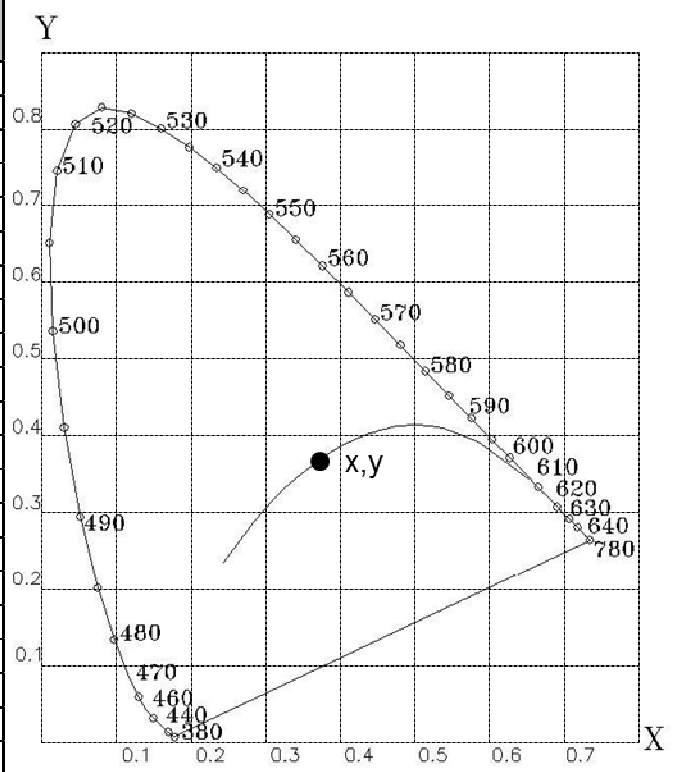
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Tabulated Spectral Power Distribution

Wavelength [nm]	[mW/nm]	Wavelength [nm]	[mW/nm]
380	0.17885	590	24.65470
390	1.72246	600	24.43388
400	1.02568	610	23.81883
410	1.11514	620	22.42393
420	1.22740	630	20.53934
430	3.63223	640	18.51212
440	9.79071	650	15.95148
450	27.80376	660	13.39127
460	23.23317	670	10.97703
470	15.64834	680	8.41574
480	10.55482	690	6.51308
490	10.51274	700	5.07704
500	12.53316	710	3.85939
510	14.94364	720	2.93405
520	17.28573	730	2.18939
530	18.63874	740	1.63901
540	19.59648	750	1.19312
550	20.55281	760	0.91321
560	21.80511	770	0.69908
570	22.96830	780	0.00000
580	23.96581		

CIE 1931 Chromaticity Diagram

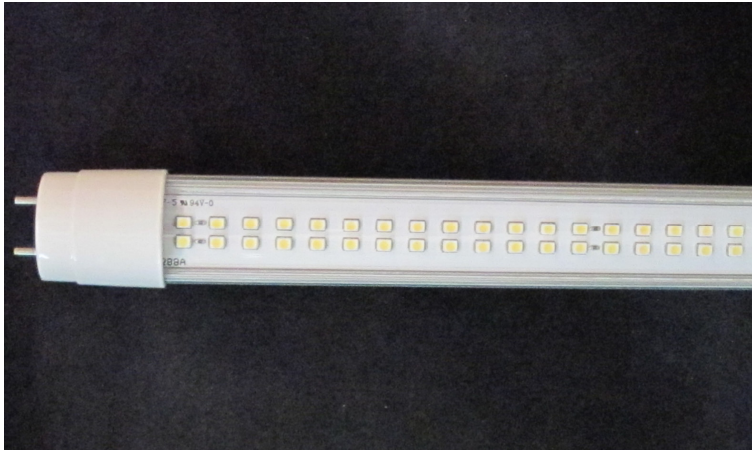


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LUMINOUS OPENING



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.