LTL LUMINAIRE TESTING LABORATORY, INC.

SUSTAINING MEMBER of the IESNA

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LTL Number: 16703 Date: 09-24-2009

Prepared For: LEDnovation

Catalog Number: LEDA-19-25-1N-I

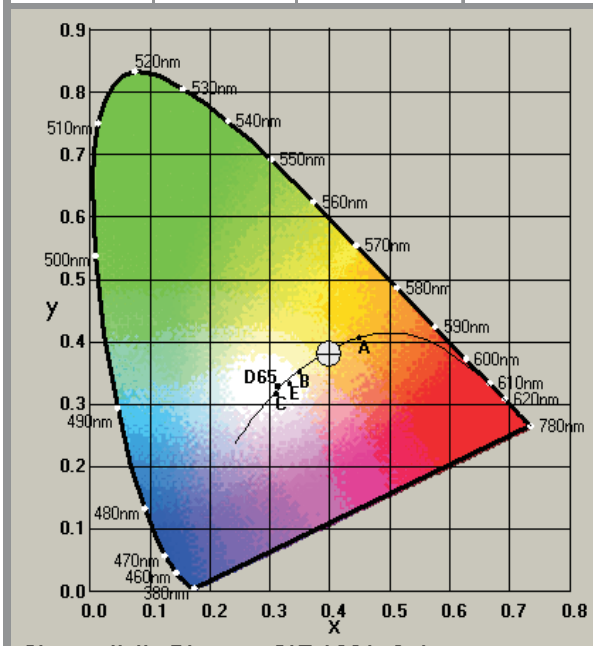
Lamp: One VBU 25 Watt A19 LED Replacement Lamp

Lamp Catalog Number: LEDA-19-25-1N-I

LED Power Supply: Internal

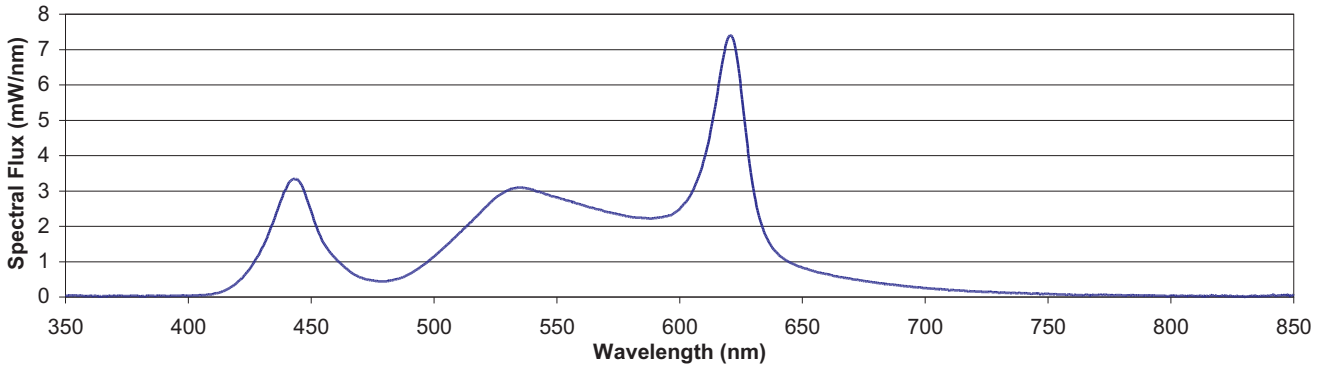
Lamp Efficacy: 89.6 Lumens/Watt

Lamp Input Voltage	Lamp Current	Lamp Watts	Power Factor
120.0VAC	0.0193A	2.123W	0.916
Radiant Flux mW	**Luminous Flux lumen**	**Corr.Color Temperature K**	**Color Rend. Index Ra**
560.9957	190.166	3589	88.9
Chroma x	**Chroma y**	**Chroma u**	**Chroma v**
0.3978	0.3811	0.2348	0.3374



Chromaticity Diagram CIE 1931, 2 degree

Wavelength in nm	Spectral Flux in mW/nm	Wavelength in nm	Spectral Flux in mW/nm
350	0.0311	610	3.8924
360	0.0302	620	7.3626
370	0.0301	630	3.0646
380	0.0218	640	1.2178
390	0.0332	650	0.8302
400	0.0357	660	0.6434
410	0.0821	670	0.5046
420	0.4190	680	0.4012
430	1.3744	690	0.3171
440	3.0902	700	0.2536
450	2.4276	710	0.1988
460	1.0861	720	0.1555
470	0.5510	730	0.1207
480	0.4430	740	0.1062
490	0.6532	750	0.0884
500	1.1475	760	0.0608
510	1.7883	770	0.0525
520	2.4730	780	0.0435
530	3.0135	790	0.0404
540	3.0338	800	0.0399
550	2.8132	810	0.0154
560	2.6115	820	0.0204
570	2.4102	830	0.0000
580	2.2635	840	0.0386
590	2.2319	850	0.0406
600	2.4889		



TESTING WAS PERFORMED IN ACCORDANCE WITH IES LM-79-08. Approved By: MG

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LTL NUMBER: 16699 DATE: 09-24-2009
PREPARED FOR: LEDNOVATION
CATALOG NUMBER: LEDA-19-25-1N-I
LUMINAIRE: CAST ALUMINUM HOUSING, TRANSLUCENT WHITE ENCLOSURE.
LAMP: ONE VBU 25 WATT A19 LED REPLACEMENT LAMP
LAMP CATALOG NUMBER: LEDNOVATION LEDA-19-25-1N-I
BALLAST: LED POWER SUPPLY: INTERNAL
ELECTRICAL VALUES: 120.0VAC, 0.0195A, 2.137W, PF=0.914
NOTE: THIS TEST WAS PERFORMED USING THE CALIBRATED PHOTODETECTOR METHOD OF ABSOLUTE PHOTOMETRY.*

Candela Distribution

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	Flux
0	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	
5	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	3.5
15	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	10.2
25	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	15.8
35	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	19.9
45	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	22.2
55	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	22.8
65	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.7
75	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	19.3
85	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	16.0
90	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	
95	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	12.5
105	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	9.0
115	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
125	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.4
135	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.7
145	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.6
155	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
165	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Zonal Lumen Summary

Zone	Lumens	% of Lamp	% of Luminaire
0-30	29.4	N/A	15.9%
0-40	49.3	N/A	26.7%
0-60	94.3	N/A	51.1%
0-90	151.4	N/A	82.0%
90-180	33.3	N/A	18.0%
0-180	184.6	N/A	100.0%

Total lumen Output 184.6 Lumens
Luminaire efficacy: 86.4 Lumens per Watt
CIE Type: Semi-Direct
Spacing Criterion: 1.33

Luminaire

Approved By: MG

*DATA WAS ACQUIRED USING THE CALIBRATED PHOTODETECTOR METHOD OF ABSOLUTE PHOTOMETRY. A UDT MODEL #211 PHOTODETECTOR AND UDT MODEL #S370 OPTOMETER COMBINATION WERE USED AS A STANDARD. A SPECTRAL MISMATCH CORRECTION FACTOR WAS EMPLOYED BASED ON THE SPECTRAL RESPONSIVITY OF THE PHOTODETECTOR AND THE SPECTRAL POWER DISTRIBUTION OF THE TEST SUBJECT.

TESTING WAS PERFORMED IN ACCORDANCE WITH IES LM-79-08.

TEST ANGULAR INCREMENTS AND REPORT FORMATTING WAS BASED ON IES LM-41-98 AND LM-46-04.

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Candela Tabulation (5 degree Vertical Increments)

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1
5	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9
10	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
15	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
20	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1
25	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1
30	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
35	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7
40	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3
45	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
50	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2
55	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
60	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7
65	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9
70	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
75	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2
80	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
85	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
90	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
95	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4
100	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
105	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
110	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
115	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
120	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
125	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
130	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
135	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
140	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
145	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
150	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
155	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
160	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
165	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Zonal Lumen Tabulation (5 degree zones)

Zone	Lumens		Zone	Lumens		Zone	Lumens		Zone	Lumens
0-5	0.9		45-50	11.3		90-95	6.7		135-140	0.7
5-10	2.6		50-55	11.4		95-100	5.8		140-145	0.4
10-15	4.3		55-60	11.4		100-105	4.9		145-150	0.2
15-20	5.9		60-65	11.1		105-110	4.1		150-155	0.1
20-25	7.3		65-70	10.6		110-115	3.3		155-160	0.0
25-30	8.5		70-75	10.0		115-120	2.6		160-165	0.0
30-35	9.5		75-80	9.3		120-125	2.0		165-170	0.0
35-40	10.3		80-85	8.5		125-130	1.5		170-175	0.0
40-45	10.9		85-90	7.6		130-135	1.0		175-180	0.0

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Utilization of Lumens - Zonal Cavity Method												
Effective Floor Cavity Reflectance 20%												
Ceiling Cavity Reflectance	90				80				70			
Wall Reflectance	70	50	30	10	70	50	30	10	70	50	30	10
Room Cavity Ratio (RCR)	** Values are expressed as Lumens delivered to the task surface **											
0	221.1	221.1	221.1	221.1	211.9	211.9	211.9	211.9	203.1	203.1	203.1	203.1
1	195.5	182.6	171.2	160.9	186.3	174.7	164.3	155	177.5	167.1	157.8	149.3
2	175.6	155.4	138.9	125.2	166.8	148.7	133.6	121	158.5	142.2	128.5	116.9
3	158.8	134.3	115.6	100.9	150.6	128.5	111.4	97.76	142.9	123	107.3	94.69
4	144.5	117.6	98.15	83.51	137	112.6	94.72	81.07	129.9	107.8	91.38	78.66
5	132.2	104	84.66	70.56	125.4	99.73	81.82	68.6	118.9	95.62	79.05	66.66
6	121.6	92.88	73.99	60.63	115.3	89.17	71.61	59.01	109.5	85.6	69.28	57.41
7	112.3	83.61	65.4	52.81	106.6	80.37	63.37	51.46	101.3	77.25	61.38	50.12
8	104.1	75.8	58.35	46.53	98.97	72.96	56.61	45.38	94.12	70.22	54.9	44.24
9	96.93	69.17	52.5	41.39	92.26	66.66	50.99	40.41	87.84	64.24	49.5	39.42
10	90.57	63.47	47.58	37.13	86.32	61.25	46.26	36.27	82.29	59.1	44.95	35.42

Ceiling Cavity Reflectance	50				30			10			0
Wall Reflectance	70	50	30	10	50	30	10	50	30	10	0
Room Cavity Ratio (RCR)	** Values are expressed as Lumens delivered to the task surface **										
0	186.6	186.6	186.6	186.6	171.6	171.6	171.6	157.8	157.8	157.8	151.4
1	161.3	153	145.4	138.4	139.9	133.8	128.2	127.9	123.1	118.6	112.2
2	143.1	130	118.8	109.1	118.8	109.7	101.6	108.4	101	94.49	88.3
3	128.7	112.5	99.46	88.72	102.8	92.03	82.97	93.84	84.99	77.41	71.59
4	116.9	98.81	84.94	73.95	90.44	78.8	69.38	82.66	72.96	64.93	59.49
5	107	87.82	73.69	62.85	80.57	68.55	59.12	73.79	63.64	55.48	50.42
6	98.66	78.81	64.75	54.26	72.48	60.4	51.17	66.55	56.22	48.13	43.43
7	91.45	71.31	57.51	47.47	65.75	53.78	44.86	60.53	50.19	42.29	37.91
8	85.18	64.99	51.56	41.98	60.09	48.34	39.75	55.47	45.22	37.55	33.47
9	79.69	59.61	46.6	37.48	55.25	43.78	35.56	51.14	41.06	33.66	29.85
10	74.84	54.98	42.41	33.74	51.09	39.94	32.07	47.41	37.54	30.41	26.85

Average Luminance Table (cd/m²)

	0	45	90
0	10617	10617	10617
45	11649	11649	11649
55	13110	13110	13110
65	12339	12339	12339
75	11670	11670	11670
85	11325	11325	11325

THIS TEST WAS CONDUCTED USING PHOTOMETRY TECHNIQUES ACCORDING TO STANDARD IES PROCEDURES. THE USER MUST THEREFORE USE CAUTION IN THE FOLLOWING SITUATIONS: 1) THIS TEST WAS PERFORMED USING A SPECIFIC BALLAST/LAMP COMBINATION. EXTRAPOLATION OF THESE DATA FOR OTHER BALLAST/LAMP COMBINATIONS MAY PRODUCE ERRONEOUS RESULTS. 2) THIS TEST WAS CONDUCTED IN A CONTROLLED LABORATORY ENVIRONMENT WHERE THE AMBIENT TEMPERATURE WAS HELD AT 25°C ±1°C. FIELD PERFORMANCE MAY DIFFER PARTICULARLY IN REGARDS TO CHANGE IN LUMINOUS OUTPUT AS A RESULT OF DIFFERENCE IN AMBIENT TEMPERATURE AND METHOD OF MOUNTING THE LUMINAIRE.

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