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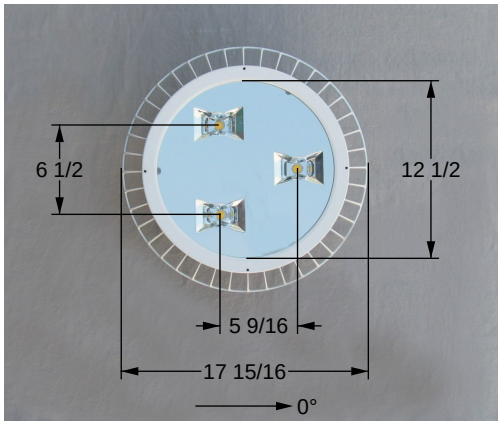
THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

NVLAP LAB CODE: 200925-0

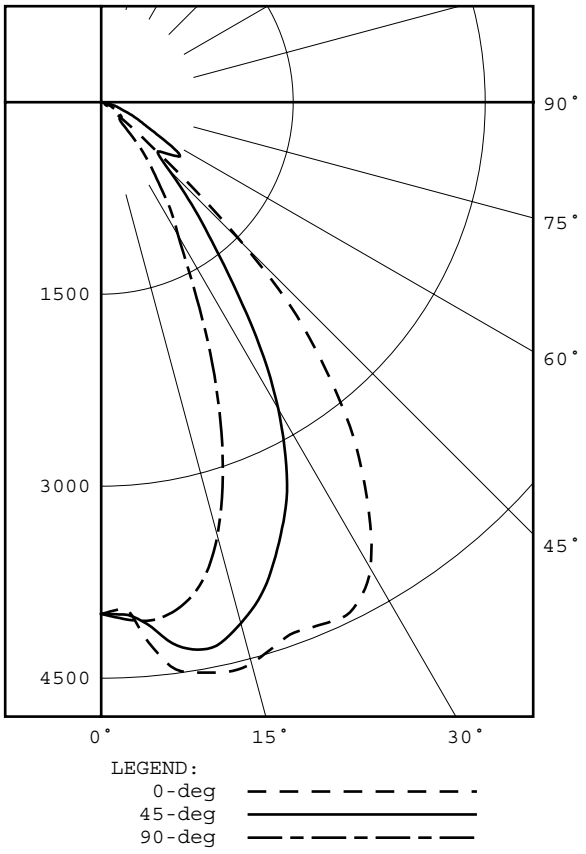
INDEPENDENT TESTING LABORATORIES, INC.
4066 CAMELOT CIRCLE, LONGMONT, CO 80504 USA
PHONE: (303) 442-1255 • FAX: (970) 535-3114 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

REPORT NUMBER: ITL80273 PAGE: 1 OF 5
ISSUE DATE: 12/31/13
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: AISLED78N (FLAT GLASS LENS - CEILING AND/OR PENDENT MOUNT - AISLE DISTRIBUTION)
LUMINAIRE: CAST 2-PIECE WHITE PAINTED FINNED METAL HOUSING, 3 FLAT METAL HEAT SINKS, 3 CIRCUIT BOARDS EACH WITH 1 LED AND MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, MOLDED PLASTIC TRIM WITH SPECULAR FINISH AND 1 APERTURE PER LED, CLEAR FLAT GLASS LENS IN CAST WHITE PAINTED METAL LENS FRAME.
LAMPS: THREE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.
TOTAL INPUT WATTS = 88.9 AT 120.0 VOLTS
LED DRIVERS: THREE RAB RDF25U7-02
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120VAC, 60Hz) TO THE DRIVERS.
TEST PROCEDURE: IESNA LM-79-08
TEST DISTANCE = 35.0 FEET



CANDELA DISTRIBUTION

	0.0	25.0	45.0	65.0	90.0	FLUX
0	3997	3997	3997	3997	3997	
5	4235	4206	4091	4009	4067	399
15	4539	4526	4214	3708	3506	1145
25	4446	4524	3427	2243	1870	1516
35	3566	3803	1919	888	806	1372
45	1579	2521	749	291	224	840
55	81	1101	740	210	191	449
65	30	617	313	103	97	250
75	30	26	117	65	44	71
85	3	2	2	1	8	6
90	0	0	0	0	0	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	3060	50.6
0- 40	4432	73.3
0- 60	5721	94.6
0- 90	6047	100.0
90-180	0	0.0
0-180	6047	100.0

EFFICACY = 68.0 lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG	
SPACING CRITERIA	: 1.39	0.79	
BEAM ANGLE (50%)	: 84.8 X	45.4	DEGREES
FIELD ANGLE (10%)	: 99.0 X	81.5	DEGREES

LUMINOUS DIAMETER: 12.500

LUMINANCE DATA IN CANDELA/SQ M

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	28205.	13379.	4001.
55	1784.	16295.	4206.
65	897.	9354.	2899.
75	1464.	5710.	2147.
85	435.	290.	1159.

Checked *B HYRE*
Approved *N WHITE*
Lighting Engineer

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CANDELA DISTRIBUTION
LATERAL ANGLE

	0.0	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0	90.0
0.0	3997	3997	3997	3997	3997	3997	3997	3997	3997	3997	3997
2.5	3956	3956	3961	3985	3985	4006	4001	4020	4034	4043	4041
5.0	4235	4235	4216	4206	4149	4091	4013	4009	4049	4067	4067
7.5	4470	4469	4470	4459	4375	4264	4114	4011	3993	4036	4035
10.0	4525	4521	4526	4531	4476	4343	4140	4006	3903	3947	3944
12.5	4558	4553	4556	4529	4426	4326	4099	3918	3782	3772	3776
15.0	4539	4537	4546	4526	4402	4214	3977	3708	3546	3490	3506
17.5	4467	4472	4491	4489	4348	4079	3765	3444	3217	3132	3154
20.0	4410	4422	4445	4474	4277	3888	3445	3082	2828	2735	2747
22.5	4425	4433	4470	4479	4202	3663	3090	2662	2402	2304	2312
25.0	4446	4456	4499	4524	4118	3427	2721	2243	1982	1872	1870
27.5	4375	4383	4444	4500	4003	3117	2330	1877	1651	1503	1479
30.0	4205	4214	4297	4393	3814	2765	1893	1499	1362	1246	1206
32.5	3914	3909	4023	4153	3498	2364	1462	1142	1068	1038	1025
35.0	3566	3559	3675	3803	3100	1919	1097	888	814	807	806
37.5	3193	3178	3352	3469	2698	1523	845	704	648	639	647
40.0	2732	2750	2992	3205	2392	1222	673	540	505	495	505
42.5	2260	2289	2595	2909	2150	971	535	402	357	335	339
45.0	1579	1614	2015	2521	1810	749	407	291	250	225	224
47.5	827	870	1318	1941	1445	610	333	232	212	195	195
50.0	364	415	801	1391	1177	601	322	217	206	188	195
52.5	151	210	595	1123	1166	666	337	215	209	187	199
55.0	81	131	553	1101	1205	740	329	210	210	186	191
57.5	47	68	512	1091	1094	678	292	194	183	167	167
60.0	36	40	341	990	967	503	237	160	161	157	156
62.5	32	32	153	821	839	385	180	134	134	131	131
65.0	30	30	59	617	744	313	134	103	104	99	97
67.5	26	28	32	390	659	244	96	72	92	85	78
70.0	26	26	26	221	518	178	60	69	87	76	60
72.5	28	27	26	101	333	143	24	76	78	65	46
75.0	30	30	23	26	136	117	9	65	64	54	44
77.5	28	29	20	12	36	72	8	43	53	42	43
80.0	23	23	13	9	17	39	6	18	30	29	26
82.5	10	11	7	5	7	13	3	4	10	14	13
85.0	3	3	2	2	1	2	1	1	2	6	8
87.5	0	0	0	0	0	0	0	0	0	1	1
90.0	0	0	0	0	0	0	0	0	0	0	0

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	97
5- 10	302
10- 15	498
15- 20	646
20- 25	738
25- 30	778
30- 35	738
35- 40	634
40- 45	510
45- 50	330
50- 55	234
55- 60	215
60- 65	153
65- 70	96
70- 75	51
75- 80	20
80- 85	5
85- 90	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	399
0- 20	1543
0- 30	3060
0- 40	4432
0- 50	5272
0- 60	5721
0- 70	5971
0- 80	6041
0- 90	6047

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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	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	112	109	106	103	110	107	104	101	102	100	98	99	97	95	95	94	92	91
2	105	99	94	90	103	97	93	89	94	90	87	91	88	85	88	85	83	81
3	98	90	84	79	96	89	83	78	86	81	77	83	79	76	81	78	75	73
4	92	82	76	71	90	81	75	70	79	74	69	77	72	68	75	71	68	66
5	86	76	69	63	84	75	68	63	73	67	63	71	66	62	69	65	61	60
6	81	70	63	57	79	69	62	57	67	61	57	66	60	56	64	60	56	54
7	76	65	57	52	74	64	57	52	63	56	52	61	56	52	60	55	51	50
8	71	60	53	48	70	59	53	48	58	52	48	57	52	48	56	51	47	46
9	67	56	49	44	66	55	49	44	54	48	44	53	48	44	52	47	44	42
10	64	52	46	41	62	52	45	41	51	45	41	50	45	41	49	44	41	39

ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS TEST SAMPLE.

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ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

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REPORT NUMBER: ITL80276
DATE: 01/03/14
PREPARED FOR: RAB LIGHTING, INC.
CATALOG NUMBER: AISLED78N (FLAT GLASS LENS - CEILING AND/OR PENDENT MOUNT - AISLE DISTRIBUTION)

ADDRESS: 170 LUDLOW AVE
NORTHVALE, NJ 07647

LUMINAIRE: CAST 2-PIECE WHITE PAINTED FINNED METAL HOUSING, 3 FLAT METAL HEAT SINKS, 3 CIRCUIT BOARDS EACH WITH 1 LED AND MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, MOLDED PLASTIC TRIM WITH SPECULAR FINISH AND 1 APERTURE PER LED, CLEAR FLAT GLASS LENS IN CAST WHITE PAINTED METAL LENS FRAME.

LAMP: THREE WHITE MULTI-CHIP LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

DRIVERS: THREE RAB RDF25U7-02

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (120.0 AND 277.0 VAC, 60Hz) TO THE DRIVERS.

INSTRUMENTS:		Calibration Due:
	Associated Power Technologies APT5040 AC Power Source	N/A
	Yokogawa WT210 Digital Power Meter #8	12/31/14
	Ocean Optics QE65000 Spectroradiometer	10/16/14
	ITL 2.0m Diameter Integrating Sphere S20-2, 4PI Geometry	10/16/14

OBJECT OF TEST: Measure the Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRIa,1-14), Chromaticity Coordinates (x,y; u'v'), ANSI C78.377 Duv, and electrical data including ANSI C82.77-2002 Power Factor (PF) and Total Harmonic Distortion (THD) to the test sample. Report Off-State Power. Measure electrical data including Total Harmonic Distortion (THD) at maximum rated voltage.

PROCEDURE: The test sample was provided by the customer and had an unknown number of operating hours. The test sample was mounted inside the integrating sphere and allowed to stabilize. After stabilization occurred, measurements were taken. In order to measure mean performance, multiple data sets were recorded and averaged. Readings were taken with the test sample operating at 120.0 VAC input. Electrical data was also recorded at maximum nominal rated input voltage (277.0 VAC). All testing performed in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. All data are traceable to the National Institute of Standards and Technology. Off-State Power was reported with no voltage applied to the sample.

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

RESULTS: (continued subsequent pages)

Checked *N THOMAS*
Approved *P O'CONNOR*
SPHERE LAB SUPERVISOR

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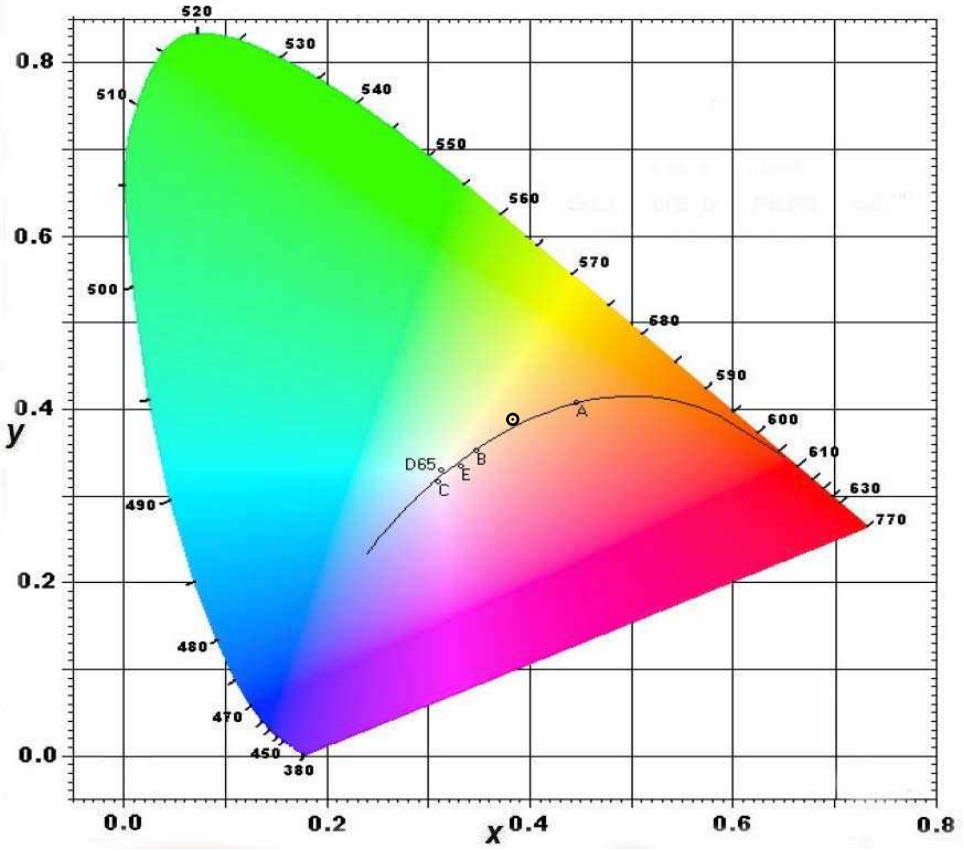
CIE Chromaticity Diagram



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RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3829
Chromaticity Ordinate y	0.3879
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2223
Chromaticity Ordinate v'	0.5068
Correlated Color Temp CCT (K)	4015
ANSI C78.377-2008 Duv	0.004
Total Radiant Flux (milliWatts)	17925 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.749
Input Power (Watts)	89.0
Input Power Factor (%)	99.0
Input Current THD (%)	13.7
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.371
Input Power (Watts)	89.2
Input Power Factor (%)	86.8
Input Current THD (%)	20.8
Input Voltage THD (%)	0.1

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	82
R1 Light greyish red	80
R2 Dark greyish yellow	85
R3 Strong yellowish green	91
R4 Moderate yellowish green	83
R5 Light bluish green	80
R6 Light blue	82
R7 Light violet	87
R8 Light reddish purple	65
R9 Strong red	3
R10 Strong yellow	67
R11 Strong green	83
R12 Strong blue	60
R13 Light yellowish pink (skin)	81
R14 Moderate olive green (leaf)	95

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

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RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.463	515	71.969	650	51.623
385	0.469	520	76.757	655	45.800
390	0.502	525	79.963	660	40.420
395	0.588	530	81.921	665	35.402
400	0.769	535	82.877	670	30.876
405	1.135	540	83.404	675	26.810
410	1.888	545	83.912	680	23.202
415	3.427	550	84.652	685	20.031
420	6.637	555	85.775	690	17.219
425	12.927	560	87.568	695	14.789
430	23.860	565	89.829	700	12.665
435	40.536	570	92.567	705	10.836
440	66.782	575	95.400	710	9.253
445	98.217	580	98.255	715	7.898
450	102.331	585	100.686	720	6.747
455	74.153	590	102.335	725	5.743
460	50.276	595	103.097	730	4.897
465	37.042	600	102.637	735	4.155
470	27.254	605	100.979	740	3.549
475	22.115	610	98.147	745	3.037
480	21.821	615	94.064	750	2.606
485	24.702	620	89.081	755	2.229
490	30.394	625	83.338	760	1.906
495	38.583	630	77.049	765	1.636
500	48.053	635	70.704	770	1.409
505	57.235	640	64.212	775	1.217
510	65.474	645	57.744	780	1.050