

LM-79-08 Test Report

For

Antec Lighting Inc

(Brand Name: **AOK**)
Quality, Honesty, Service and Innovation

Uniy C, 3979 E Guasti Road, Ontario, CA 91761

Architectural Flood and Spot Luminaires

Model name(s): AOK-400WoF-NV-X5-XX-XX70-30-P

Remark: The first "XX" can be "00" for without sensor or "SN" for with Photocontrol function. The second "XX" represents different CCT as below: 30=3000K, 40=4000K, 50=5000K, 57=5700K; "P" can be blank, "A" or "B", blank is ceiling and wall mounted, "A" stands for Ceiling mounted only, "B" stands for Wall mounted only.

Representative (Tested) Model:
AOK-400WoF-NV-X5-00-3070-30-A
AOK-400WoF-NV-X5-00-5770-30-A

Model Difference: All construction and rating are the same, except CCT.

Test & Report By:

Clint Chen

Engineer: Clint Chen

Date: Jul.29,2018

Review By:

John Li

Manager: John Li

Note: 1. The results contained in this report pertain only to the tested samples.

2. This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Laboratory: Standard-Tech Co., Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2


Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

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<http://www.standard-tech.com>

1.1 Product Information:

Organization Name	Antec Lighting Inc	
Brand Name	 Quality, Honesty, Service and Innovation	
Model Number	AOK-400WoF-NV-X5-XX-XX70-30-P	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Architectural Flood and Spot Luminaires	
Rated Voltage / Frequency	100-277V ac, 50/60 Hz	
Nominal Power	400W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K, 4000K, 5000K, 5700K.	
LED Manufacturer	Lumileds	
LED Model	L150-3070500600000 L150-5770500600000	
Sample Number	JAE180410-F1(3000K), F2(5700K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo

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1.2 Test Specifications:

Date of Receipt	Jul.23,2018
Date of Test	Jul.25,2018
Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2018-07-25	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	AOK-400WoF-NV-X5-00-3070-30-A		

Electrical Measurement :

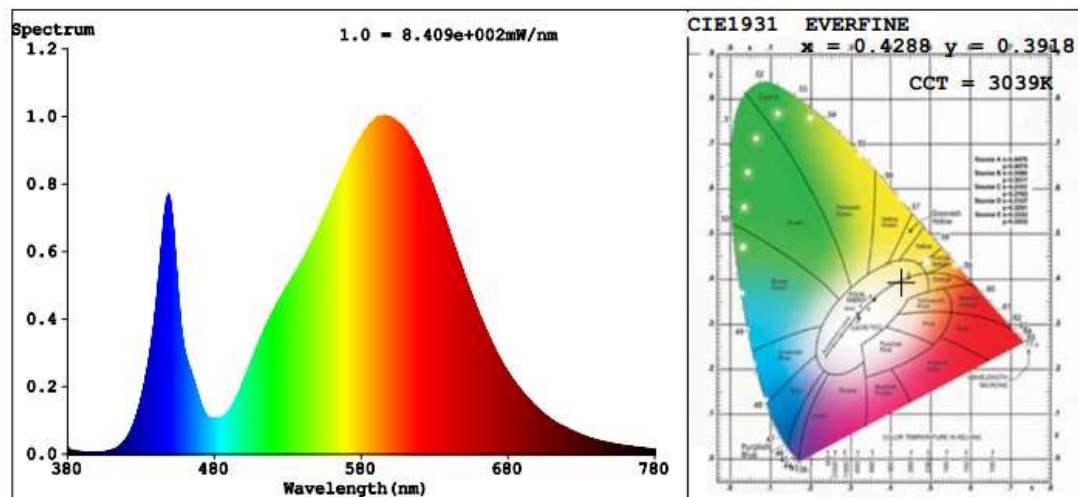
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180410	120.0	60	3.4096	406.9	0.9945	5.24
-F1	277.0	60	1.4941	391.1	0.9450	10.31
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	72	R9	0
Frequency (Hz)	60	R2	84	R10	62
CCT (K)	3039	R3	93	R11	66
Duv	-0.0039	R4	71	R12	54
Chromaticity (x, y)	x=0.4288 y=0.3918	R5	71	R13	74
Chromaticity (u', v')	u'=0.2506 v'=0.5152	R6	77	R14	96
Color Rendering Index (CRI)	74.9	R7	79	R15	67
R9	0	R8	51	--	--

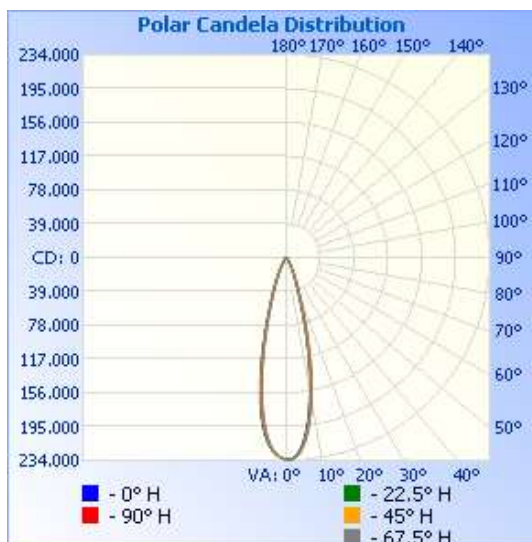
Photometric Measurement –Goniophotometer Method:

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	62969	62917	>=30000(-10%)	
Luminous Efficacy (lm/W)	154.75	160.87	Standard: >= 100(-3%)	Premium: >= 120(-3%)
Most Worst Luminous/Highest Watts	154.63			
Zonal lumens in the 0-90 °zone (%)	99.7	--	>=85(-3)	
Beam Angle (°)	26.6	--	--	
Center Beam Candle Power (cd)	232764	--	--	

Spectral Power Distribution & Chromaticity Diagram

Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	54,527.2	86.7%
0-40	57,940.7	92.1%
0-60	61,106.4	97.1%
60-90	1,604.8	2.6%
70-100	605.3	1%
90-120	12.2	0%
0-90	62,711.2	99.7%
90-180	205.1	0.3%
0-180	62,916.3	100%

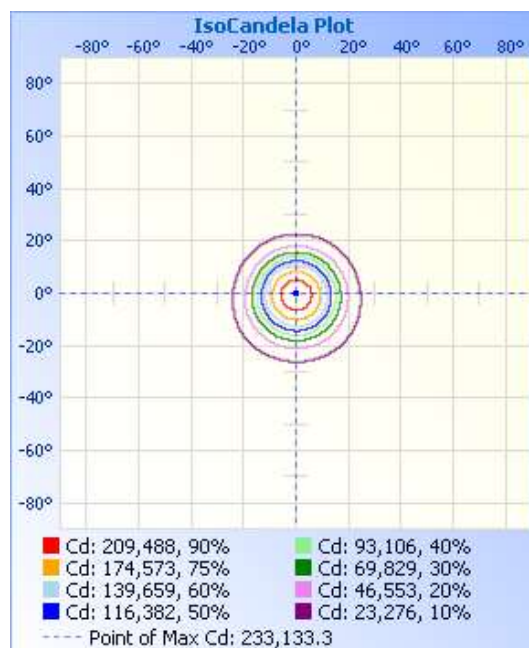
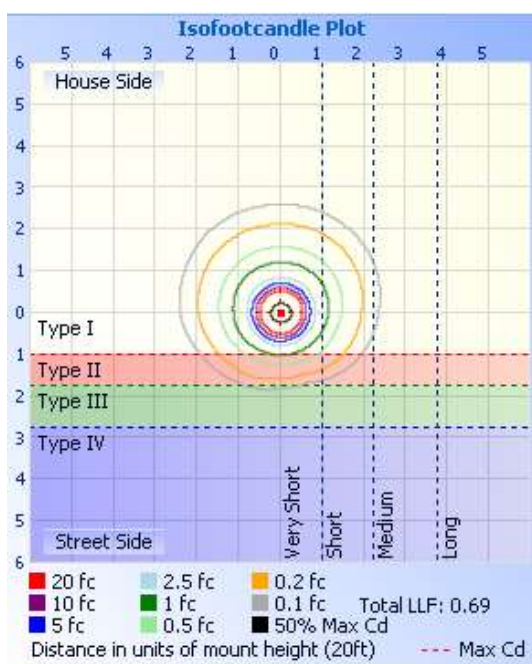
Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	19,019.2	30.2%	90-100	5.6	0%
10-20	25,298.0	40.2%	100-110	3.0	0%
20-30	10,210.0	16.2%	110-120	3.5	0%
30-40	3,413.6	5.4%	120-130	5.2	0%
40-50	1,745.8	2.8%	130-140	14.0	0%
50-60	1,419.8	2.3%	140-150	40.2	0.1%
60-70	1,005.1	1.6%	150-160	65.9	0.1%
70-80	495.9	0.8%	160-170	50.0	0.1%
80-90	103.8	0.2%	170-180	17.7	0%

Photometric Data


Illuminance at a Distance

Center Beam fc	Beam Width
17.0ft	805.4 fc
34.0ft	201.4 fc
51.0ft	89.5 fc
68.0ft	50.3 fc
85.0ft	32.2 fc
102.0ft	22.4 fc

Vert. Spread: 26.7°
Horiz. Spread: 26.7°



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Table--1

UNIT: *100cd

C (DEG) Y (DEG)	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	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	
5	2156	2158	2153	2151	2152	2171	2185	2191	2191	2191	2181	2185	2185	2181	2171	2160	
10	1609	1577	1561	1562	1569	1582	1610	1644	1674	1704	1715	1722	1717	1702	1684	1650	
15	906	864	836	827	822	840	864	905	956	994	1004	1017	1012	987	957	930	
20	425	391	368	354	347	361	381	402	437	479	486	501	499	490	468	450	
25	208	187	177	173	166	169	180	192	213	238	252	257	258	254	245	233	
30	102	91.6	87.2	85.4	79.6	80.1	84.1	91.8	101	114	124	122	123	121	120	114	
35	52.1	46.9	44.2	41.8	39.8	40.4	42.9	47.0	51.4	56.5	60.7	59.6	59.3	58.6	59.0	57.3	
40	29.5	26.7	24.5	22.5	21.8	22.4	23.8	26.4	29.1	32.6	34.7	34.5	34.3	34.1	34.3	33.3	
45	23.1	21.0	18.8	16.5	15.8	16.8	17.9	19.9	22.7	25.0	26.5	26.8	26.5	26.4	26.6	25.6	
50	19.8	17.4	14.9	12.7	11.9	13.0	14.5	16.0	19.0	21.6	23.4	23.6	23.3	23.3	23.2	22.1	
55	17.1	14.4	11.7	9.97	8.55	9.22	11.9	13.1	16.0	18.8	20.6	20.9	20.7	20.7	20.6	19.2	
60	14.6	11.4	9.11	7.84	5.39	5.45	9.02	11.1	13.2	16.2	17.9	18.4	18.1	18.3	18.2	16.5	
65	11.9	8.62	5.94	3.43	2.05	2.30	5.66	8.56	10.4	13.3	15.0	15.7	15.3	15.7	15.4	13.8	
70	8.72	6.19	2.09	0.10	0.06	0.11	2.68	5.51	7.73	10.1	11.6	12.3	12.0	12.3	12.1	10.6	
75	5.49	3.47	0.86	0.03	0.01	0.04	1.23	3.24	5.02	6.64	7.82	8.34	8.19	8.51	8.27	7.19	
80	2.85	1.56	0.35	0.02	0.02	0.05	0.53	1.62	2.59	3.54	4.31	4.61	4.57	4.68	4.59	3.96	
85	0.88	0.43	0.09	0.03	0.05	0.06	0.14	0.42	0.73	1.09	1.40	1.55	1.51	1.51	1.51	1.30	
90	0.03	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.09	0.15	0.20	0.21	0.20	0.18	0.12	
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.08	0.11	0.11	0.10	0.09	0.05	
100	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.05	0.06	0.05	0.04	0.02	
105	0.03	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
110	0.04	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	0.01	0.02	0.02	0.02	
115	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02	
120	0.06	0.04	0.06	0.05	0.05	0.05	0.05	0.03	0.06	0.03	0.02	0.02	0.02	0.02	0.02	0.02	
125	0.09	0.09	0.08	0.07	0.07	0.06	0.06	0.07	0.06	0.06	0.03	0.03	0.03	0.03	0.03	0.04	
130	0.14	0.14	0.10	0.10	0.10	0.10	0.10	0.12	0.11	0.08	0.05	0.04	0.06	0.05	0.05	0.08	
135	0.25	0.23	0.15	0.16	0.15	0.16	0.16	0.23	0.21	0.17	0.11	0.11	0.15	0.13	0.11	0.22	
140	0.45	0.43	0.24	0.29	0.23	0.26	0.22	0.41	0.43	0.40	0.20	0.30	0.41	0.33	0.28	0.53	
145	0.60	0.73	0.38	0.52	0.39	0.45	0.31	0.72	0.62	0.82	0.36	0.79	0.96	0.71	0.58	1.06	
150	1.30	1.26	0.71	0.85	0.71	0.77	0.31	1.16	1.30	1.32	0.98	1.34	1.54	1.26	0.57	1.68	
155	1.82	1.73	0.72	1.20	1.24	1.13	0.67	1.39	1.75	1.65	1.50	1.50	1.91	1.79	1.20	2.17	
160	2.14	1.92	1.21	1.57	1.85	1.43	1.33	1.54	1.95	2.01	1.76	1.60	2.24	2.06	1.68	2.12	
165	1.80	1.41	1.41	1.44	2.11	1.41	1.40	1.52	1.99	2.03	1.74	1.96	2.20	2.08	1.88	1.86	
170	1.59	1.76	1.49	1.57	1.89	1.59	1.54	1.67	1.50	1.51	1.86	2.13	1.92	1.97	1.95	2.02	
175	1.94	1.84	1.91	1.76	1.64	1.76	2.07	1.79	1.90	1.91	1.95	2.12	1.86	1.77	1.93	2.12	
180	1.86	1.85	2.05	1.87	1.65	1.95	2.14	1.82	1.84	1.85	1.82	2.04	1.85	1.65	1.88	2.13	

2.2 Electrical, Photometric and Chromaticity Measurements*(Refer to Work Instruction QD25)*

Test date	2018-07-25	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	AOK-400WoF-NV-X5-00-5770-30-A		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180410	120.0	60	3.3744	402.5	0.9940	5.34
-F2	277.0	60	1.4797	386.8	0.9437	10.43
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

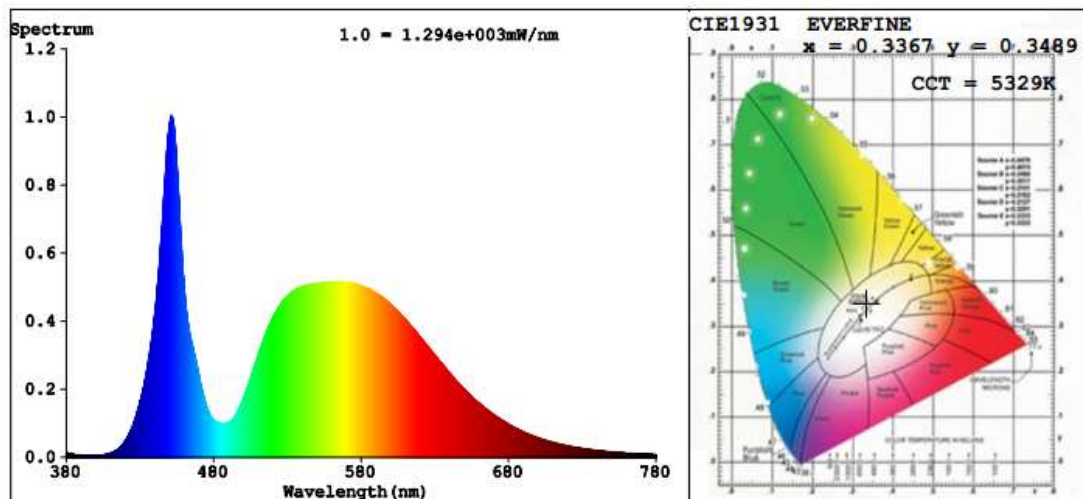
Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	72	R9	0
Frequency (Hz)	60	R2	78	R10	47
CCT (K)	5329	R3	81	R11	71
Duv	0.0021	R4	75	R12	41
Chromaticity (x, y)	x=0.3367 y=0.3489	R5	73	R13	73
Chromaticity (u', v')	u'=0.2067 v'=0.4821	R6	70	R14	89
Color Rendering Index (CRI)	74.2	R7	83	R15	68
R9	0	R8	62	--	--

Photometric Measurement –Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	66445	66379	>=30000(-10%)	
Luminous Efficacy (lm/W)	165.08	171.61	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	164.92		100(-3%)	120(-3%)

Spectral Power Distribution & Chromaticity Diagram



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2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
AOK-400WoF-NV-X5-00-3070-30-A	3000	62969	406.9	154.75
AOK-400WoF-NV-X5-00-4070-30-A	4000	64359 ^{*1}	404.7 ^{*2}	159.03 ^{*3}
AOK-400WoF-NV-X5-00-5070-30-A	5000	65750 ^{*1}	404.7 ^{*2}	162.47 ^{*3}
AOK-400WoF-NV-X5-00-5770-30-A	5700	66445	402.5	165.08

*1: This value is calculated and the calculation formula is as below:

$$64359 = (66445 - 62969) / 5 * 2 + 62969$$

$$65750 = (66445 - 62969) / 5 * 4 + 62969$$

*2: This value is calculated and the calculation formula is as below:

$$404.7 = (406.9 + 402.5) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$159.03 = 64359 / 404.7$$

$$162.47 = 65750 / 404.7$$

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2018-07-01	2019-06-30
ST-R-327	Spectral analysis system HAAS-2000	2018-07-01	2019-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2018-07-01	2019-06-30
GO-R5000	Goniophotometer system	2018-07-01	2019-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2018-07-07	2019-07-06
Expand Uncertainty: Photometric Measurement (Sphere):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

******* END OF REPORT *******