

LM-79-08 Test Report

For

Antec Lighting Inc

(Brand Name: )

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

Architectural Flood and Spot Luminaires

Model name(s): AOK-460WoF-HV-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-460WoF-HV-X5-00-3070-30-A

AOK-460WoF-HV-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		
Model Number	AOK-460WoF-HV-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	200-480V ac, 50/60 Hz	
Nominal Power	460W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K, 4000K, 5000K, 5700K.	
LED Manufacturer	Lumileds	
LED Model	L150-3070500600000 L150-5770500600000	
Sample Number	JAE180410-I1(3000K), I2(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-460WoF-HV-X5-00-3070-30-A		

Electrical Measurement :

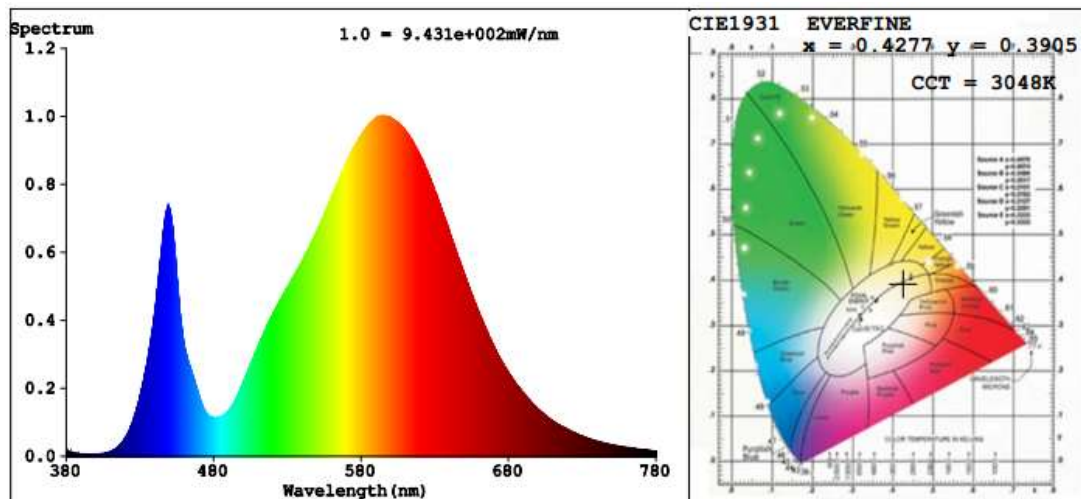
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180410	277.0	60	1.7214	468.1	0.9817	10.05
-I1	480.0	60	1.0092	463.1	0.9560	11.00
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	72	R9	0
Frequency (Hz)	60	R2	84	R10	63
CCT (K)	3048	R3	93	R11	66
Duv	-0.0042	R4	71	R12	55
Chromaticity (x, y)	x=0.4277 y=0.3905	R5	71	R13	74
Chromaticity (u', v')	u'=0.2505 v'=0.5145	R6	77	R14	96
Color Rendering Index (CRI)	74.8	R7	79	R15	67
R9	0	R8	51	--	--

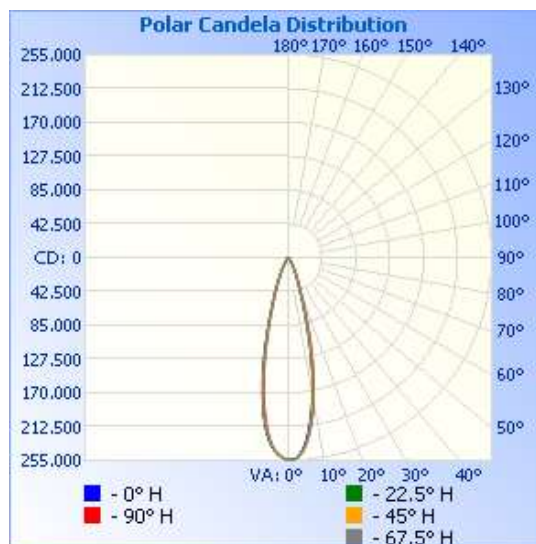
Photometric Measurement –Goniophotometer Method:

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	277.0	480.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	68931	68506	>=30000(-10%)	
Luminous Efficacy (lm/W)	147.26	147.93	Standard: >= 10(-3%)	Premium: >= 120(-3%)
Most Worst Luminous/Highest Watts	146.35			
Zonal lumens in the 0-90 °zone (%)	99.7	--	>=85(-3)	
Beam Angle (°)	26.7	--	--	
Center Beam Candle Power (cd)	254063	--	--	

Spectral Power Distribution & Chromaticity Diagram

Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	59,697.6	86.7%
0-40	63,438.1	92.1%
0-60	66,891.0	97.1%
60-90	1,747.6	2.5%
70-100	658.6	1%
90-120	13.8	0%
0-90	68,638.6	99.7%
90-180	234.4	0.3%
0-180	68,873.0	100%

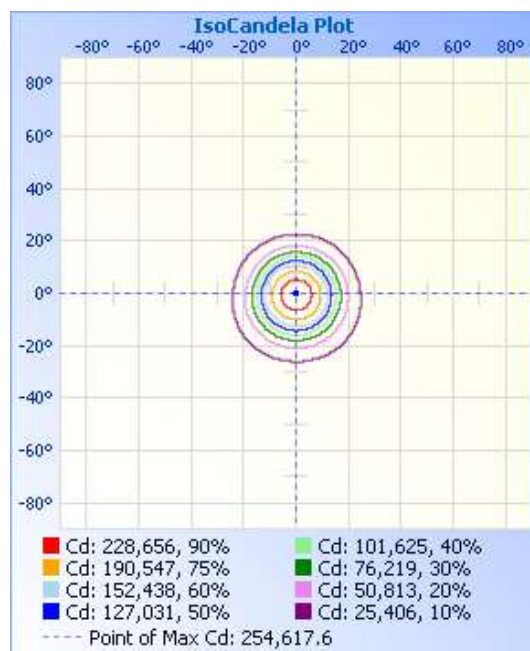
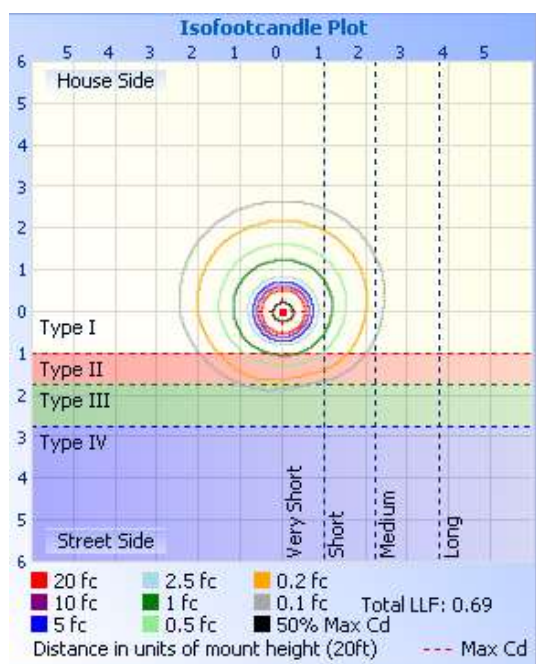
Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-10	20,778.4	30.2%	90-100	6.2	0%
10-20	27,735.3	40.3%	100-110	3.5	0%
20-30	11,183.8	16.2%	110-120	4.1	0%
30-40	3,740.5	5.4%	120-130	6.0	0%
40-50	1,906.0	2.8%	130-140	16.7	0%
50-60	1,546.8	2.2%	140-150	47.6	0.1%
60-70	1,095.2	1.6%	150-160	75.3	0.1%
70-80	539.4	0.8%	160-170	55.7	0.1%
80-90	113.1	0.2%	170-180	19.3	0%

Photometric Data


Illuminance at a Distance

	Center Beam fc	Beam Width
17.0ft	879.1 fc	8.1 ft 8.1 ft
34.0ft	219.8 fc	16.1 ft 16.2 ft
51.0ft	97.7 fc	24.2 ft 24.3 ft
68.0ft	54.9 fc	32.3 ft 32.4 ft
85.0ft	35.2 fc	40.4 ft 40.5 ft
102.0ft	24.4 fc	48.4 ft 48.6 ft

■ Vert. Spread: 26.7°
 ■ Horiz. Spread: 26.8°



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Table--1 UNIT: *100cd

C (DEG) γ (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	2541	2541	2541	2541	2541	2541	2541	2541	2541	2541	2541	2541	2541	2541	2541	2541	
5	2356	2356	2355	2353	2357	2373	2389	2391	2393	2387	2381	2381	2383	2378	2367	2357	
10	1760	1730	1716	1720	1724	1740	1767	1804	1835	1861	1870	1874	1865	1853	1834	1801	
15	996	953	922	913	913	932	956	998	1055	1089	1097	1109	1100	1074	1042	1013	
20	466	429	405	391	384	398	421	442	480	522	531	545	541	531	509	489	
25	228	206	196	191	182	187	199	212	234	261	274	280	280	276	267	253	
30	112	101	96.4	94.3	88.1	88.2	93.0	101	112	125	137	133	134	133	131	125	
35	57.2	51.5	48.8	46.2	43.8	44.5	47.3	51.5	56.2	61.8	66.6	65.0	64.8	64.2	64.6	62.8	
40	32.3	29.2	26.9	24.7	23.8	24.6	26.2	28.9	32.6	34.8	37.0	36.8	36.5	36.4	36.7	35.6	
45	25.2	22.9	20.6	18.1	17.4	18.4	19.5	21.7	24.7	27.1	28.9	29.1	28.8	28.7	28.9	27.8	
50	21.5	19.0	16.4	14.0	13.1	14.2	15.9	17.5	20.7	23.5	25.4	25.6	25.3	25.4	25.2	24.0	
55	18.6	15.7	12.8	11.0	9.42	10.1	13.1	14.2	17.3	20.4	22.4	22.7	22.5	22.5	22.4	20.9	
60	15.9	12.5	10.0	8.71	5.95	6.01	9.90	12.1	14.4	17.5	19.5	20.0	19.7	19.9	19.7	18.0	
65	12.9	9.43	6.57	3.89	2.29	2.54	6.24	9.35	11.4	14.4	16.3	17.1	16.6	17.0	16.8	15.0	
70	9.49	6.77	2.32	0.12	0.08	0.13	2.98	6.06	8.41	10.9	12.6	13.3	13.0	13.4	13.1	11.6	
75	5.98	3.81	0.95	0.03	0.01	0.04	1.37	3.57	5.47	7.20	8.47	9.06	8.88	9.21	8.99	7.84	
80	3.12	1.71	0.39	0.03	0.02	0.05	0.60	1.80	2.81	3.84	4.64	4.98	4.95	5.06	4.98	4.31	
85	0.99	0.49	0.11	0.03	0.05	0.07	0.15	0.47	0.81	1.17	1.50	1.66	1.63	1.62	1.64	1.43	
90	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.10	0.17	0.22	0.22	0.21	0.19	0.13	
95	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.09	0.12	0.12	0.11	0.10	0.06	
100	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.04	0.06	0.06	0.06	0.04	0.02	
105	0.03	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.03	0.02	0.02	
110	0.04	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01	0.02	0.02	0.02	
115	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.03	0.02	0.02	0.02	0.02	0.03	
120	0.07	0.05	0.07	0.06	0.06	0.05	0.06	0.04	0.05	0.04	0.03	0.03	0.03	0.03	0.02	0.03	
125	0.08	0.10	0.09	0.09	0.08	0.07	0.08	0.07	0.06	0.06	0.04	0.03	0.03	0.04	0.03	0.05	
130	0.17	0.15	0.12	0.12	0.12	0.12	0.12	0.14	0.13	0.10	0.06	0.05	0.07	0.06	0.06	0.10	
135	0.29	0.27	0.19	0.20	0.20	0.20	0.19	0.26	0.24	0.20	0.13	0.13	0.17	0.16	0.14	0.26	
140	0.51	0.49	0.30	0.36	0.34	0.34	0.29	0.47	0.50	0.45	0.25	0.35	0.48	0.38	0.34	0.61	
145	0.74	0.83	0.46	0.65	0.60	0.61	0.41	0.83	0.77	0.95	0.41	0.90	1.09	0.83	0.72	1.20	
150	1.47	1.42	0.85	1.02	1.02	1.01	0.42	1.33	1.46	1.51	1.08	1.53	1.76	1.42	0.77	1.88	
155	2.03	1.95	0.85	1.41	1.59	1.36	0.67	1.58	1.96	1.87	1.71	1.76	2.17	2.02	1.33	2.43	
160	2.38	2.15	1.28	1.83	2.14	1.68	1.38	1.74	2.17	2.23	1.96	1.68	2.53	2.32	1.89	2.43	
165	2.03	1.63	1.57	1.68	2.37	1.63	1.61	1.72	2.20	2.24	1.96	2.05	2.47	2.34	2.09	2.04	
170	1.72	1.92	1.63	1.74	2.12	1.74	1.67	1.82	1.64	1.66	2.01	2.31	2.14	2.19	2.15	2.20	
175	2.13	2.01	2.07	1.92	1.80	1.91	2.25	1.96	2.08	2.08	2.13	2.31	2.03	1.95	2.11	2.31	
180	2.03	2.01	2.24	2.03	1.79	2.06	2.33	1.97	2.01	2.01	1.98	2.22	2.02	1.79	2.04	2.31	

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-460WoF-HV-X5-00-5770-30-A		

Electrical Measurement :

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180410	277.0	60	1.7228	468.9	0.9826	9.98
-I2	480.0	60	1.0092	463.8	0.9574	10.85
DLC Pass Criteria					$\geq 0.9(-3\%)$	$\leq 20(+5)$

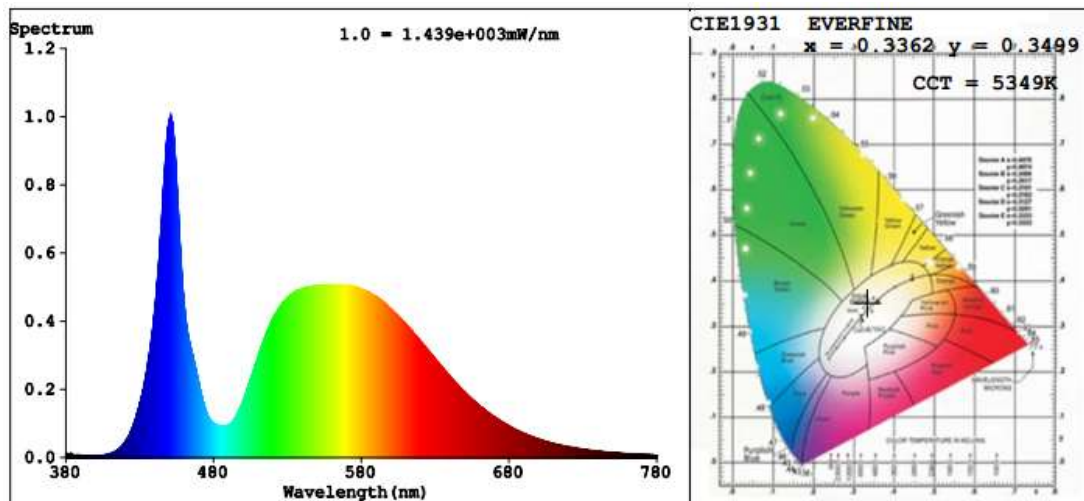
Chromaticity Measurement -Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	277.0	R1	71	R9	0
Frequency (Hz)	60	R2	77	R10	45
CCT (K)	5349	R3	80	R11	71
Duv	0.0029	R4	74	R12	40
Chromaticity (x, y)	x=0.3362 y=0.3499	R5	72	R13	72
Chromaticity (u', v')	u'=0.2060 v'=0.4825	R6	69	R14	89
Color Rendering Index (CRI)	73.4	R7	83	R15	67
R9	0	R8	61	--	--

Photometric Measurement –Spectroradiometer Method:

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	277.0	480.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	73640	72923	>=30000(-10%)	
Luminous Efficacy (lm/W)	157.05	157.23	Standard: >= 100(-3%)	Premium: >= 120(-3%)
Most Worst Luminous/Highest Watts	155.52			

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-460W _o F-HV-X5-00-3070-30-A	3000	68931	468.1	147.26
AOK-460W _o F-HV-X5-00-4070-30-A	4000	70815 ^{*1}	468.5 ^{*2}	151.15 ^{*3}
AOK-460W _o F-HV-X5-00-5070-30-A	5000	72698 ^{*1}	468.5 ^{*2}	155.17 ^{*3}
AOK-460W _o F-HV-X5-00-5770-30-A	5700	73640	468.9	157.05

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

$$70815 = (73640 - 68931) / 5 * 2 + 68931$$

$$72698 = (73640 - 68931) / 5 * 4 + 68931$$

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

$$468.5 = (468.1 + 468.9) / 2$$

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

$$151.15 = 70815 / 468.5$$

$$155.17 = 72698 / 468.5$$

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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	2018-07-12	2019-07-11
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	2018-07-12	2019-07-11
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 *******