

IES LM-79-08



MEASUREMENT AND TEST REPORT

For

Eiko Limited

23220 W. 84th Street, Shawnee, KS, USA

Test Model: LEDP-20WPAR38/NFL/830-DIM

Report Type:	Electrical and Photometric tests including: Luminous Flux, Color, Luminous Intensity Distribution, Spatial Non-uniformity of Chromaticity
Test Engineer:	Jack Zhou 
Report Number:	RSZ130131522-10
Test Date:	2013-01-18 to 2013-01-22
Report Date:	2013-02-01
Reviewed By:	Jeanne Han/Safety Manager 
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008
Test Facility	Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.
Note:	This report (Report # RSZ130131522-10) is based on previous report (Report # RSZ130116505-10).
Accreditation:	The NVLAP Lab Code is 200707-0.

STATEMENT: This test may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). The test data was only valid for the test sample(s). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

1. Product Description

General Information:

One sample was received on 2013-01-17 and used for testing.

Model Tested: LEDP-20WPAR38/NFL/830-DIM
 Manufacturer: EikoLimited
 Product Designation: 120V LED lamps
 Burning Time Before Test: 0 hours

Rated Values:

Rated Voltage/Frequency: 120V AC 60Hz
 Rated Power: 20W
 Nominal CCT: 3000K

2. Standards Used

- IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date
Standard Light Source	EVERFINE	D204	10120020	24V/100W	2012-03-15
1.5m Temperature Integrating Sphere	SENSING	SPR-600	S09008	Wave length 350-800nm, length :1.2m, 0-10000lumen	2012-03-08
Thermometer	SENSING	N/A	N/A	25\50℃	2012-03-02
Fast Spectral Radiation Analyzer	SENSING	SPR3000	90902027	350nm~800nm	2012-03-08
Digital Power Meter	YOKOGAWA	WT-210	91J926132	15/30/60/150/300/600 V	2012-03-02
Precision Frequency Power Supply	ALL Power	APW-105N	970613	220V±10% 50Hz	2012-03-02
Itech Dc Source Meter	SENSING	IT6154	0061 0417 6471 0010 19	60V/9A	2012-03-02
Electrical Parameter Tester	YOKOGAWA	WT-210	91KB35700	15/30/60/150/300/600 V	2012-03-02
Distribution photometer controller	EVERFINE	CT400	1009002	N/A	N/A
Turntable Power Control	EVERFINE	GO-R	N/A	N/A	N/A
Full-Field Speed Goniophotometer	EVERFINE	GO-R5000	YG108492N1 0120001	Luminous Intensity Distribution/ Color Spatial Uniformity	2012-03-08
Digital Cc&Cv Dc Power Supply	EVERFINE	WY12010	1009009	30V/5A	2012-03-02

Device	Manufacture	Model No	Serial No	Test Range	Calibration date
Ac Power Supply	EVERFINE	VPS1060 PWM	1101006	0-150V, 0-300V	2012-03-02
GO-R Bracket 2	EVERFINE	N/A	N/A	N/A	N/A
Standard Light Source	EVERFINE	D908	1012004	N/A	2012-03-15
Hygrometer	VICTOR	VC230	N/A	0~50°C	2012-03-05

4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at 25°C±1°C during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.

4π geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement. The standard light source has been calibrated regularly and traceable to the National Primary Standards.

Type C goniophotometer was used for measuring total luminous flux, luminous intensity distribution, and color spatial uniformity. The product was operated in its intended orientation in application and was recorded in this report.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.5 hours**

Test orientation: **Base up**

Electrical Measurement

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60.0	0.198	18.82	0.793

Photometric Measurement

Luminous Flux (lm)	Radiant Flux (W)	Efficacy (lm/W)	CCT (K)	Duv
1211.535	3.471	64.375	3065	-2.00E-03

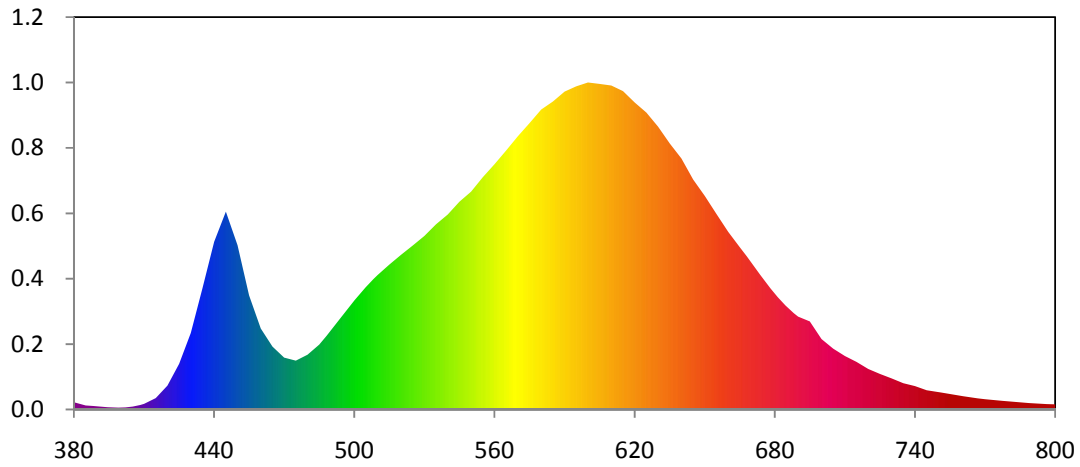
Chromaticity Coordinate

x	y	u	v	u'	v'
0.4297	0.3967	0.2491	0.3449	0.2491	0.5174

Color Rendering Index

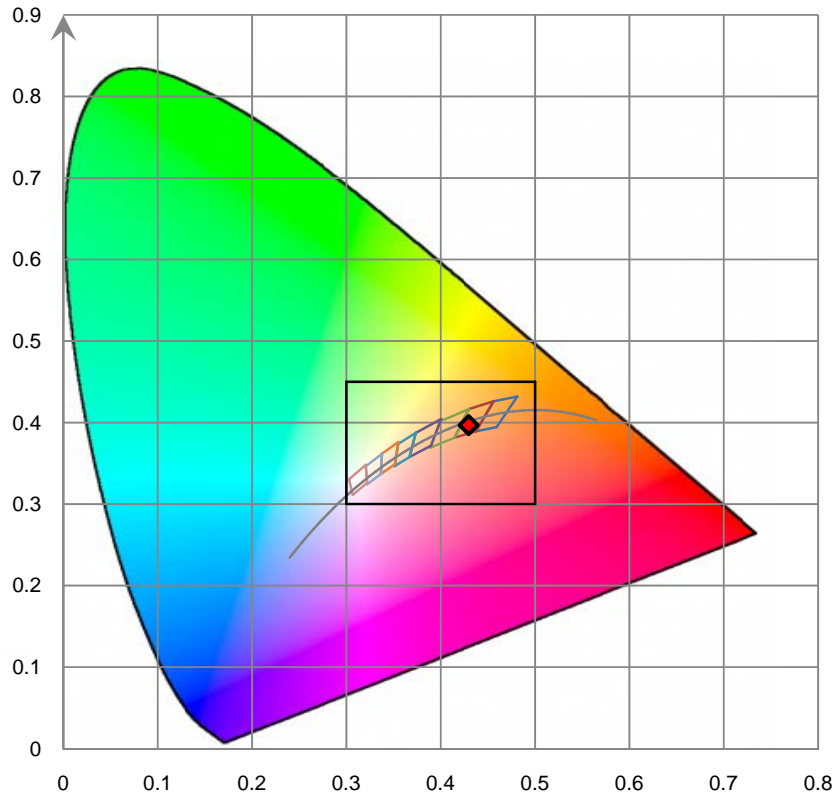
Ra			
81.8			
R1	R2	R3	R4
80	88	95	81
R5	R6	R7	R8
80	84	84	63
R9	R10	R11	R12
13	73	79	71
R13	R14	R15	
82	97	75	

Relative Spectral Power Distribution

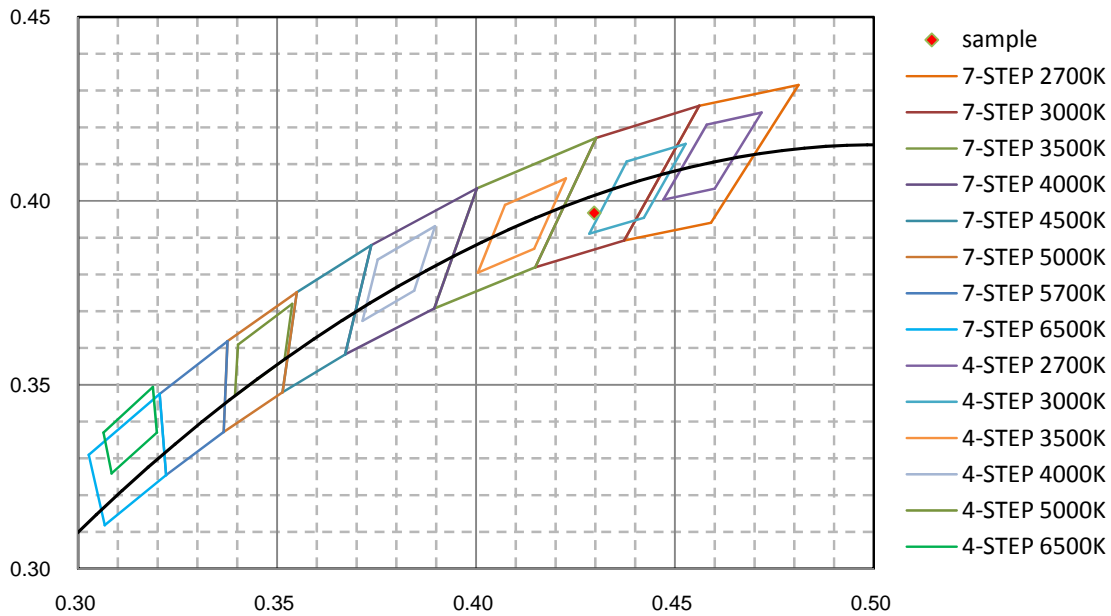


nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	2.346E-03	465	2.034E-02	550	7.028E-02	635	8.583E-02	720	1.309E-02
385	1.328E-03	470	1.676E-02	555	7.493E-02	640	8.095E-02	725	1.151E-02
390	1.063E-03	475	1.578E-02	560	7.911E-02	645	7.421E-02	730	1.006E-02
395	7.288E-04	480	1.767E-02	565	8.357E-02	650	6.891E-02	735	8.514E-03
400	6.768E-04	485	2.095E-02	570	8.813E-02	655	6.304E-02	740	7.574E-03
405	9.681E-04	490	2.547E-02	575	9.238E-02	660	5.733E-02	745	6.242E-03
410	1.841E-03	495	3.046E-02	580	9.678E-02	665	5.231E-02	750	5.635E-03
415	3.679E-03	500	3.507E-02	585	9.932E-02	670	4.726E-02	755	4.927E-03
420	7.726E-03	505	3.950E-02	590	1.025E-01	675	4.222E-02	760	4.456E-03
425	1.474E-02	510	4.338E-02	595	1.042E-01	680	3.737E-02	765	3.774E-03
430	2.471E-02	515	4.676E-02	600	1.055E-01	685	3.330E-02	770	3.317E-03
435	3.917E-02	520	4.989E-02	605	1.050E-01	690	2.997E-02	775	2.992E-03
440	5.413E-02	525	5.289E-02	610	1.045E-01	695	2.841E-02	780	2.599E-03
445	6.385E-02	530	5.600E-02	615	1.027E-01	700	2.273E-02	785	2.333E-03
450	5.300E-02	535	5.978E-02	620	9.902E-02	705	1.965E-02	790	2.035E-03
455	3.685E-02	540	6.292E-02	625	9.580E-02	710	1.726E-02	795	1.788E-03
460	2.618E-02	545	6.702E-02	630	9.122E-02	715	1.538E-02	800	1.664E-03

CIE 1931 x y Chromaticity Diagram



7-Step & 4-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.5 hours**

Test orientation: **Base up**

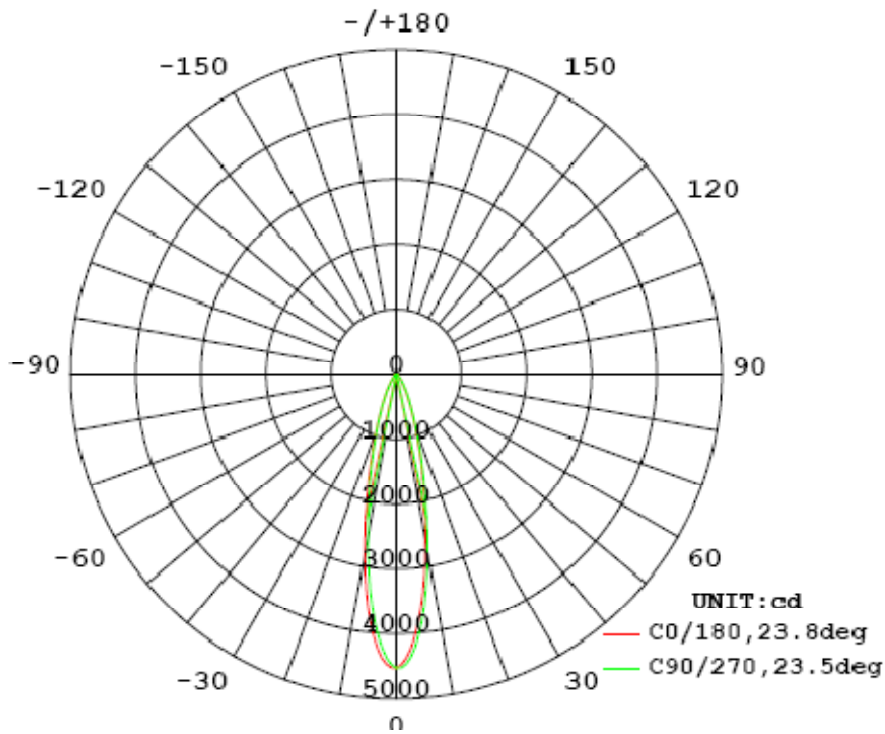
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.1955	18.91	0.8059

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	CBCP (cd)	S/MH (C0/180)	S/MH (C90/270)
1228.88	64.99	4518	0.42	0.39

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% Imax):	23.8	23.7	23.5	23.5	23.6
Field Angle (10% Imax):	51.5	51.7	51.8	51.6	51.7

Luminous Intensity (cd) Distribution Data

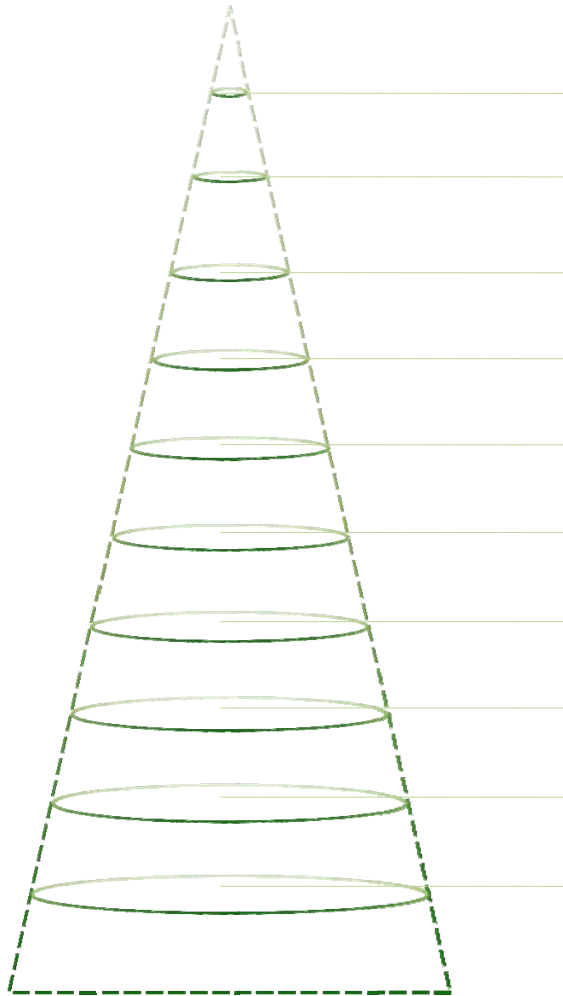
C \ Y	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	4517	4517	4517	4517	4517	4517	4517	4517
5.0°	4053	4007	3943	3889	3835	3816	3814	3842
10.0°	2857	2803	2724	2647	2583	2558	2557	2593
15.0°	1670	1639	1583	1556	1525	1526	1521	1545
20.0°	906	897	867	864	858	863	866	881
25.0°	501	503	499	485	486	489	505	506
30.0°	289	308	296	277	267	273	285	290
35.0°	158	175	167	153	143	148	155	159
40.0°	93	100	98	89	84	86	89	91
45.0°	61	61	61	60	58	59	59	59
50.0°	46	46	46	46	44	45	44	44
55.0°	36	36	36	35	34	34	33	33
60.0°	27	27	27	26	25	26	25	25
65.0°	20	20	20	19	19	19	19	19
70.0°	15	15	15	15	14	14	14	14
75.0°	11	11	10	10	10	9	9	9
80.0°	6	6	6	6	6	5	5	5
85.0°	3	3	3	3	2	2	2	2
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Luminous Intensity (cd) Distribution Data (cont.)

C Y	180°	202.5°	225°	247.5°	270°	292.5°	315°	337.5°
0.0°	4517	4517	4517	4517	4517	4517	4517	4517
5.0°	4053	4007	3943	3889	3835	3816	3814	3842
10.0°	2857	2803	2724	2647	2583	2558	2557	2593
15.0°	1670	1639	1583	1556	1525	1526	1521	1545
20.0°	906	897	867	864	858	863	866	881
25.0°	501	503	499	485	486	489	505	506
30.0°	289	308	296	277	267	273	285	290
35.0°	158	175	167	153	143	148	155	159
40.0°	93	100	98	89	84	86	89	91
45.0°	61	61	61	60	58	59	59	59
50.0°	46	46	46	46	44	45	44	44
55.0°	36	36	36	35	34	34	33	33
60.0°	27	27	27	26	25	26	25	25
65.0°	20	20	20	19	19	19	19	19
70.0°	15	15	15	15	14	14	14	14
75.0°	11	11	10	10	10	9	9	9
80.0°	6	6	6	6	6	5	5	5
85.0°	3	3	3	3	2	2	2	2
90.0°	0	0	0	0	0	0	0	0
95.0°	0	0	0	0	0	0	0	0
100.0°	0	0	0	0	0	0	0	0
105.0°	0	0	0	0	0	0	0	0
110.0°	0	0	0	0	0	0	0	0
115.0°	0	0	0	0	0	0	0	0
120.0°	0	0	0	0	0	0	0	0
125.0°	0	0	0	0	0	0	0	0
130.0°	0	0	0	0	0	0	0	0
135.0°	0	0	0	0	0	0	0	0
140.0°	0	0	0	0	0	0	0	0
145.0°	0	0	0	0	0	0	0	0
150.0°	0	0	0	0	0	0	0	0
155.0°	0	0	0	0	0	0	0	0
160.0°	0	0	0	0	0	0	0	0
165.0°	0	0	0	0	0	0	0	0
170.0°	0	0	0	0	0	0	0	0
175.0°	0	0	0	0	0	0	0	0
180.0°	0	0	0	0	0	0	0	0

Average Area Illumination Figure

Angle: 23.6°. Flux out: 438.6 lm.



Height (m)	Diameter (cm)	E _{avg} (lx)	E _{max} (lx)
0.5	20.8	12360.00	18080.00
1.0	41.6	3090.00	4520.00
1.5	62.4	1373.00	2009.00
2.0	83.2	772.50	1130.00
2.5	104.0	494.40	723.20
3.0	125.4	343.30	502.20
3.5	146.2	252.20	369.00
4.0	167.1	193.10	282.50
4.5	188.0	152.60	223.20
5.0	208.9	123.60	180.80

Zonal Lumen Density Measurement

Deg	Flux (lm)	%
0-5	100.9	8.21
5-10	234.8	19.11
10-15	247.8	20.16
15-20	197.3	16.05
20-25	139.0	11.31
25-30	95.3	7.76
30-35	62.0	5.05
35-40	39.7	3.23
40-45	26.9	2.19
45-50	20.8	1.70
50-55	17.2	1.40
55-60	13.9	1.14
60-65	11.0	0.89
65-70	8.6	0.70
70-75	6.4	0.52
75-80	4.2	0.34
80-85	2.2	0.18
85-90	0.6	0.05
90-95	0.1	0.01
95-100	0.0	0.00
100-105	0.0	0.00
105-110	0.0	0.00
110-115	0.0	0.00
115-120	0.0	0.00
120-125	0.0	0.00
125-130	0.0	0.00
130-135	0.0	0.00
135-140	0.0	0.00
140-145	0.0	0.00
145-150	0.0	0.00
150-155	0.0	0.00
155-160	0.0	0.00
160-165	0.0	0.00
165-170	0.0	0.00
170-175	0.0	0.00
175-180	0.0	0.00

Deg	Flux (lm)	%
0-5	100.9	8.21
0-10	335.7	27.32
0-15	583.5	47.48
0-20	780.7	63.53
0-25	919.7	74.84
0-30	1015.1	82.60
0-35	1077.1	87.65
0-40	1116.8	90.88
0-45	1143.8	93.07
0-50	1164.6	94.77
0-55	1181.8	96.17
0-60	1195.8	97.31
0-65	1206.8	98.20
0-70	1215.4	98.90
0-75	1221.8	99.42
0-80	1226.0	99.76
0-85	1228.2	99.94
0-90	1228.8	99.99
0-95	1228.9	100.00
0-100	1228.9	100.00
0-105	1228.9	100.00
0-110	1228.9	100.00
0-115	1228.9	100.00
0-120	1228.9	100.00
0-125	1228.9	100.00
0-130	1228.9	100.00
0-135	1228.9	100.00
0-140	1228.9	100.00
0-145	1228.9	100.00
0-150	1228.9	100.00
0-155	1228.9	100.00
0-160	1228.9	100.00
0-165	1228.9	100.00
0-170	1228.9	100.00
0-170	1228.9	100.00
0-180	1228.9	100.00

Color Spatial Uniformity

Average Weighted
u': 0.2491, v':0.5173

$\gamma \setminus C0-180$	u'	v'	Du'v'
-20	0.2482	0.5173	0.0009
-15	0.2486	0.5172	0.0005
-10	0.2488	0.5171	0.0003
-5	0.2497	0.5175	0.0006
0	0.2499	0.5177	0.0009
5	0.2498	0.5176	0.0008
10	0.2493	0.5173	0.0002
15	0.2487	0.5170	0.0004
20	0.2483	0.5170	0.0008

$\gamma \setminus C90-270$	u'	v'	Du'v'
-20	0.2483	0.5170	0.0009
-15	0.2484	0.5168	0.0009
-10	0.2490	0.5170	0.0002
-5	0.2496	0.5175	0.0006
0	0.2499	0.5177	0.0009
5	0.2498	0.5176	0.0008
10	0.2492	0.5172	0.0002
15	0.2485	0.5170	0.0006
20	0.2479	0.5168	0.0013

6. Product Photo



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