



Shenzhen Belling Efficiency Testing Lab Co., Ltd



Report No.: BL241101005-9

Date of issue 2024-11-12

Version 1.0

Total pages 22

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric

Measurements of Solid-State Lighting Products

Applicant:

AGC Lighting Co., Ltd.

Address:

Building A, Jian'an Road No.3, Fuyong, BAO'AN DISTRICT Shenzhen 518103
China

For Product:

Outdoor Pole/Arm-Mounted Decorative Luminaires

Model No.:

ST52-60WS-3CS-C

Test laboratory: Shenzhen Belling Efficiency Testing Lab Co., Ltd, 1Floor, No.1 Building, Meibaohe Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong Prov.518101 China.

Complied by: Sam Chen

Review by: Jason Zhou

Project Engineer

Technical Manager

Note 1: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Shenzhen Belling Efficiency Testing Lab Co., Ltd. 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. Government.

Note 2: This report contains data that are not covered by the NVLAP accreditation. See the following description: TM-15-11 test are not in NVLAP accreditation scope.



1 General

1.1 Product Information

Manufacturer	AGC Lighting Co., Ltd.
Manufacturer Address	Building A, Jian'an Road No.3, Fuyong, BAO'AN DISTRICT Shenzhen 518103 China
Brand Name	AGC Lighting
Luminaire Type	Outdoor Pole/Arm-Mounted Decorative Luminaires
Model Number	ST52-60WS-3CS-C
Rated Inputs	AC 120-347V, 50/60Hz
Field-Adjustable Product	Yes, Wattage setting: 60W, 45W, 30W, 18W
Color-Tunable Product	Yes, CCT setting: 3000K, 4000K, 5000K
Dimming Capability	Continuous
Integral Control Sensors	Yes
Date of Receipt Samples	2024-11-01
Date of test	2024-11-04 to 2024-11-07
Burning Time Before Test	0hour(For New Products)

1.2 Standards or methods

- ANSI C78.377-2017:Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C82.77-10:2014:Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment - Solid State
- CIE Publication No.13.3-1995:Method of Measuring and Specifying Color Rendering of Light Sources
- IESNA LM-79-08 Approved Method: Electric & Photometric Measurement of Solid-state Lighting Products
- IES TM-15-11: Backlight, Uplight, and Glare (BUG) Ratings



1.3 Equipment list

Device	Manufacture	Model No.	Serial No.	Calibration due date
Goniophotometric System	SENSING	GMS-3000	M101758514120011	2025-04-09
AC Power Source	ALL POWER	ALL POWER	970780	2025-04-17
Total Luminous Flux Standard Lamp	SENSING	110V/100W	S13100188	2025-04-16
Total Luminous Flux Standard Lamp	OSRAM	12V/20W	LSD12201737	2025-04-16
Total Spectral Radiant Flux Standard Lamp	Everfine	D204	M133806CA1411205	2025-04-16
Digital Power Meter	YOKOGAWA	WT310	C2QM02030V	2025-04-17
Thermostatic stabilized photometric sphere	SENSING	SPR-600M	N.A	2025-04-09
Plant spectral photosynthetically radiometer	Everfine	SP-20	P612946CF1411115	2025-04-09
Digital Power Meter	YOKOGAWA	WT210	91L929742	2025-04-17
Spectral radiometer	SENSING	SPR-3000	S1101108	2025-04-09
Environment Measurer	XUYAO	HS-1	N/A	2025-04-11
Environment Measurer	XUYAO	HS-1	N/A	2025-04-11
Stop watch	KISLO	K610	N/A	2025-04-17
Digital Anemometer	TECMAN	TD8901	026141	2025-09-05

Statement of Traceability: Shenzhen Belling Efficiency Testing Lab Co., Ltd attests that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).



2 Test conducted and method

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within ± 0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 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.

Integrating Sphere Uncertainty: The uncertainty of the light output (luminous flux) measurements is $U=1.8\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=20\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=1.8(K=2)$, at the 95% confidence level. The uncertainty of power meter AC current $U=0.18\%$ of rdg, AC Voltage $U=0.16\%$ of rdg, Power $U=0.20\%$ ($K=2$), at the 95% confidence level.



2.5 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. The method according to IESNA LM-79-08 following chapter.

Goniophotometer Uncertainty: The uncertainty of the luminous intensity is $U=1.6\%$ ($K=2$), at the 95% confidence level.



3 Test Result Summary

3.1 Integrating Sphere System (Total operating time for integrating sphere test: 1.0 hour)

3.1.1 Model Number: ST52-60WS-3CS-C, 3000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.08	60	0.521	62.43	0.997

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
8384.65	134.3	3049

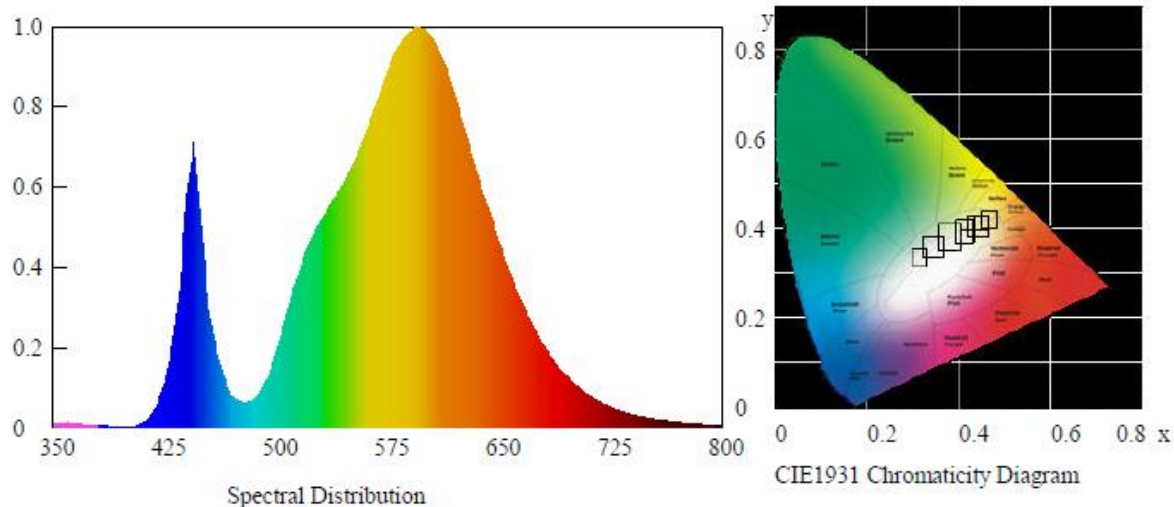
Chromaticity Coordinate

Duv	x	y	u'	v'
-0.00063	0.4326	0.4010	0.2491	0.5195

Color Rendering

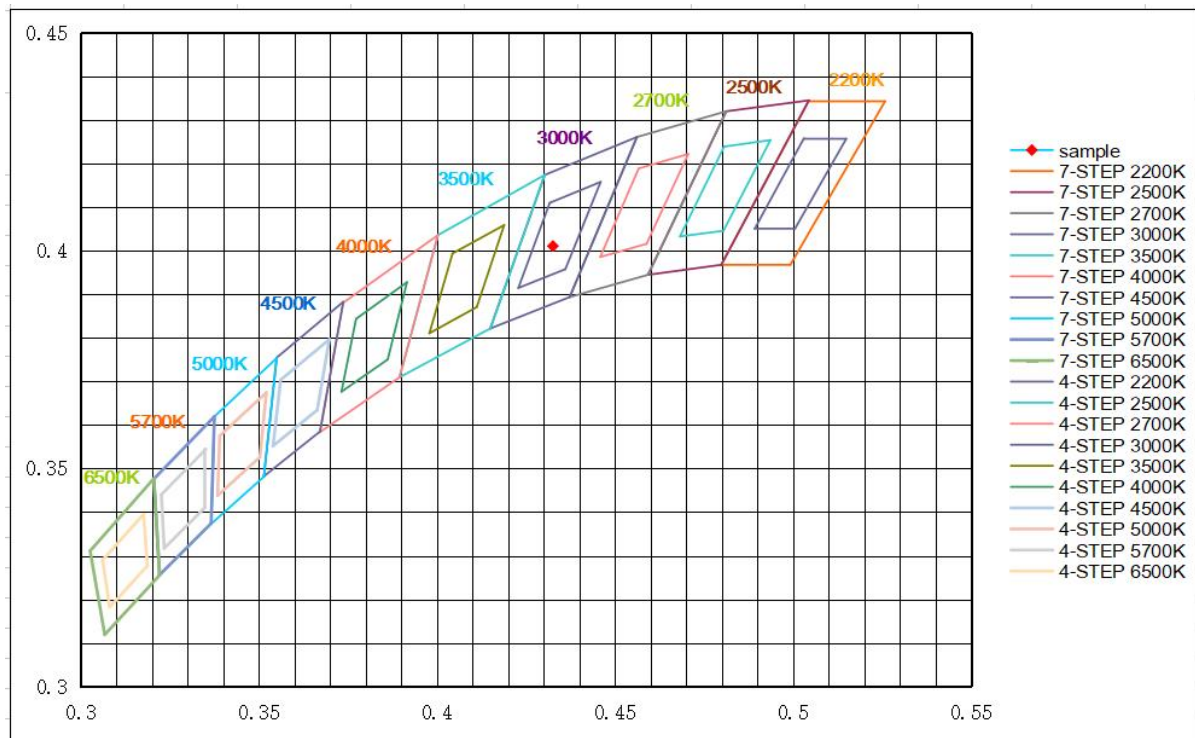
CRI	R9	Rf	Rg	Rcs,h1(%)
71.7	-30	72	97	-16

Spectral Distribution





7/4 Step Quadrangle



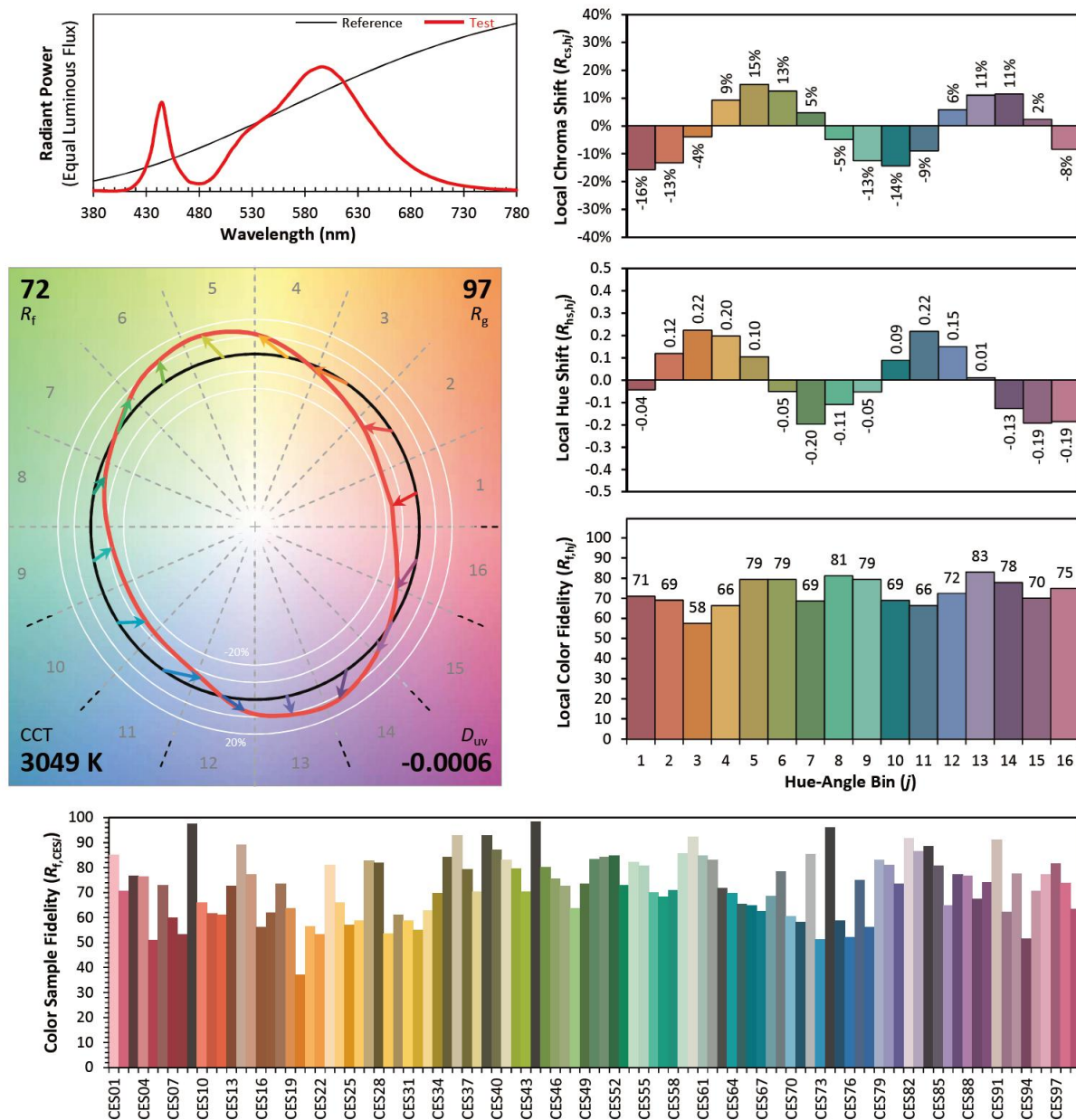
**ANSI/IES TM-30-18 Color Rendition Report**

Source: BL241101005-9

Manufacturer: AGC Lighting Co., Ltd.

Date: 2024-11-12

Model: ST52-60WS-3CS-C, 3000K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.4326
 y 0.4010
 u' 0.2491
 v' 0.5195

CIE 13.3-1995
(CRI)

R_a 72
 R_g -31

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



3.1.2 Model Number: ST52-60WS-3CS-C, 4000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.09	60	0.508	60.79	0.997

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
8705.56	143.2	3988

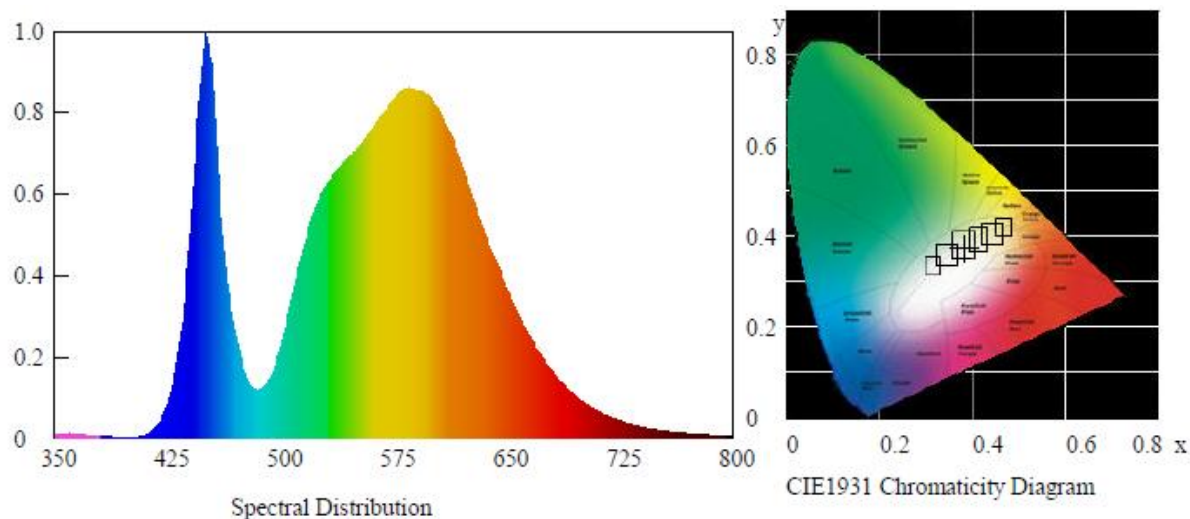
Chromaticity Coordinate

Duv	x	y	u'	v'
-0.00099	0.3803	0.3746	0.2259	0.5006

Color Rendering

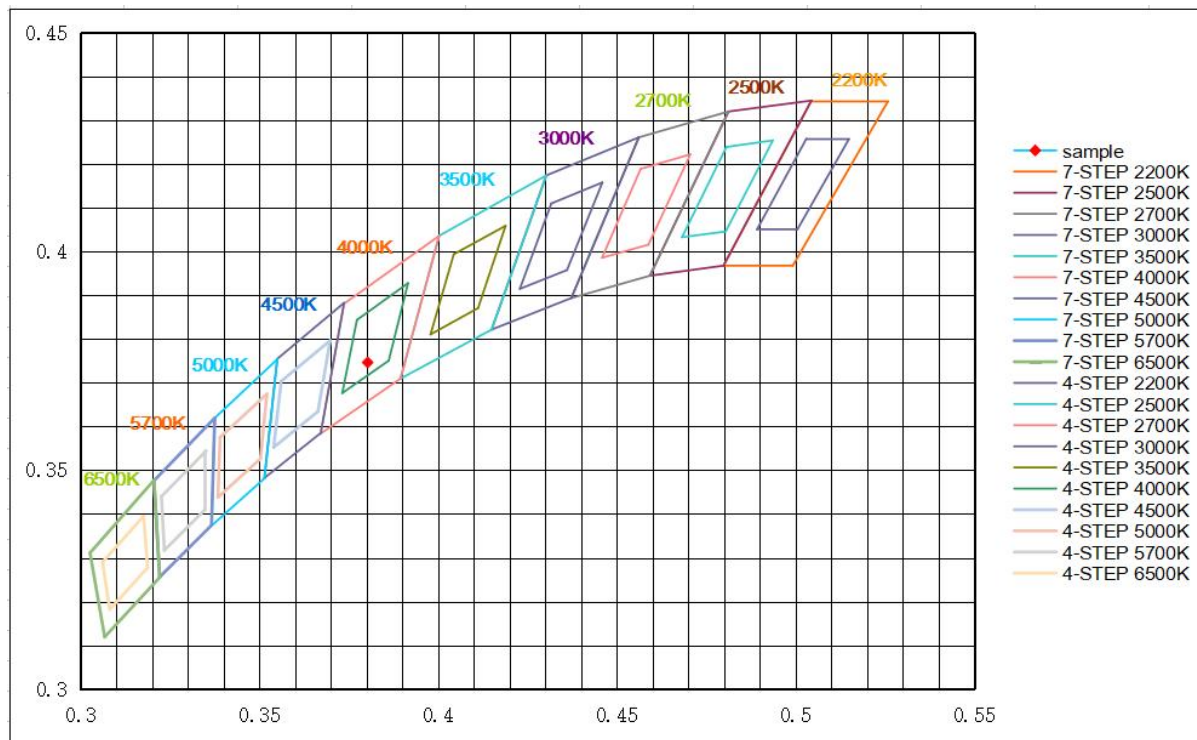
CRI	R9	Rf	Rg	Rcs,h1(%)
74.8	-18	76	95	-16

Spectral Distribution





7/4 Step Quadrangle



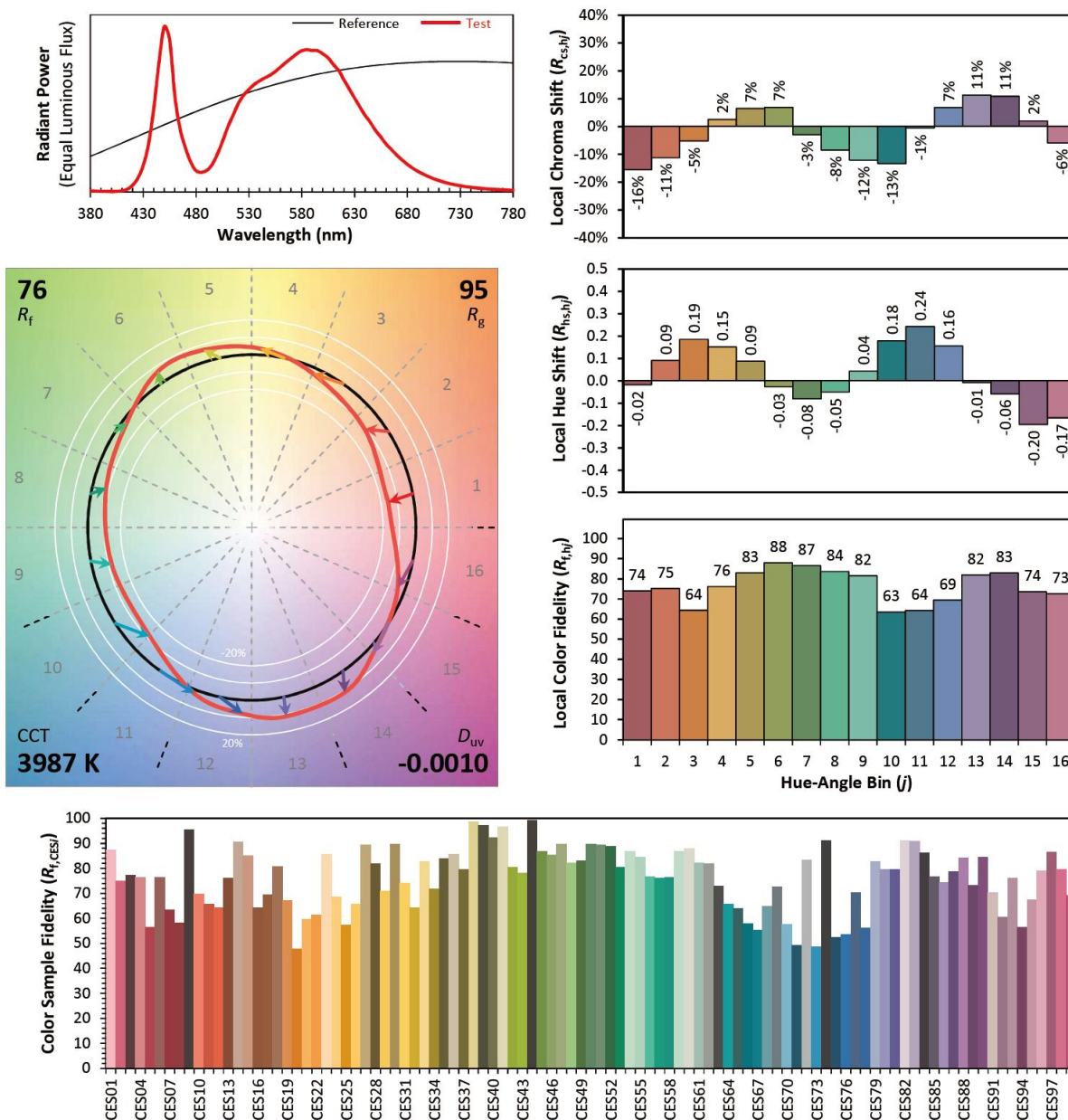
**ANSI/IES TM-30-18 Color Rendition Report**

Source: BL241101005-9

Manufacturer: AGC Lighting Co., Ltd.

Date: 2024-11-12

Model: ST52-60WS-3CS-C, 4000K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3803
 y 0.3746
 u' 0.2259
 v' 0.5006

CIE 13.3-1995
(CRI)
 R_a 75
 R_9 -19

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



3.1.3 Model Number: ST52-60WS-3CS-C, 5000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.14	60	0.525	62.85	0.997

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	CCT (K)
8560.12	136.2	5146

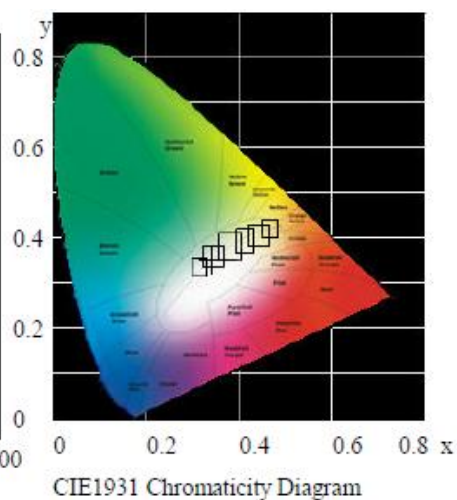
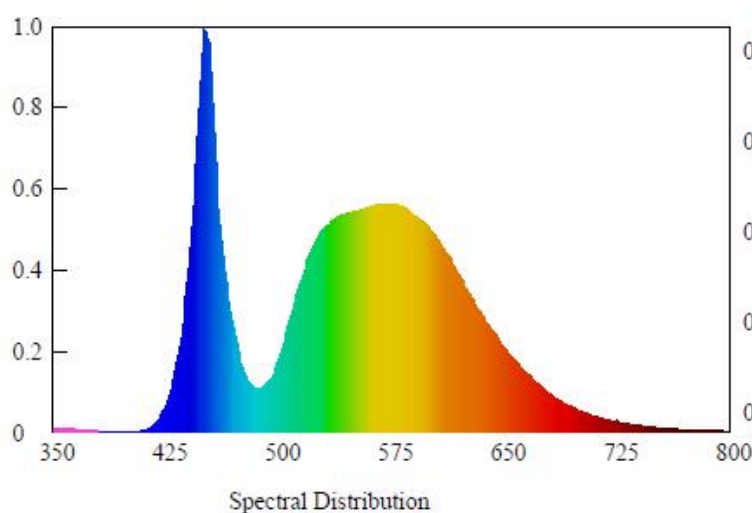
Chromaticity Coordinate

Duv	x	y	u'	v'
+0.00191	0.3414	0.3524	0.2086	0.4845

Color Rendering

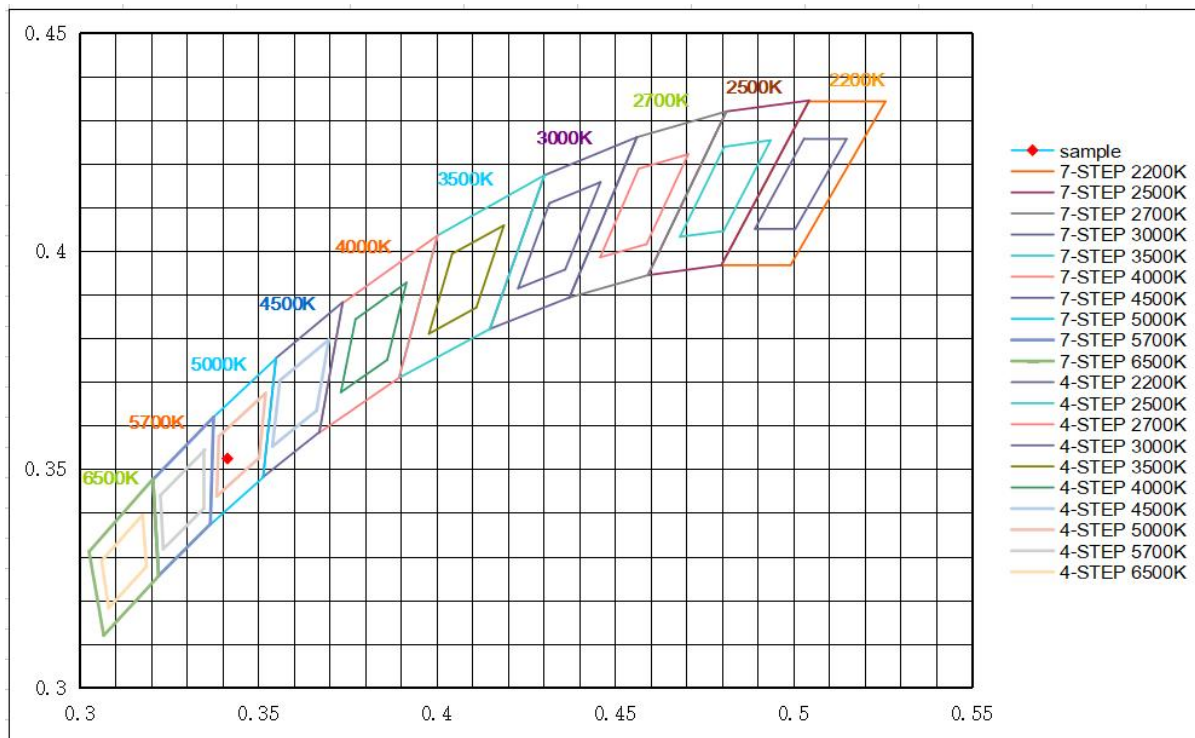
CRI	R9	Rf	Rg	Rcs,h1(%)
74.3	-21	75	94	-17

Spectral Distribution





7/4 Step Quadrangle



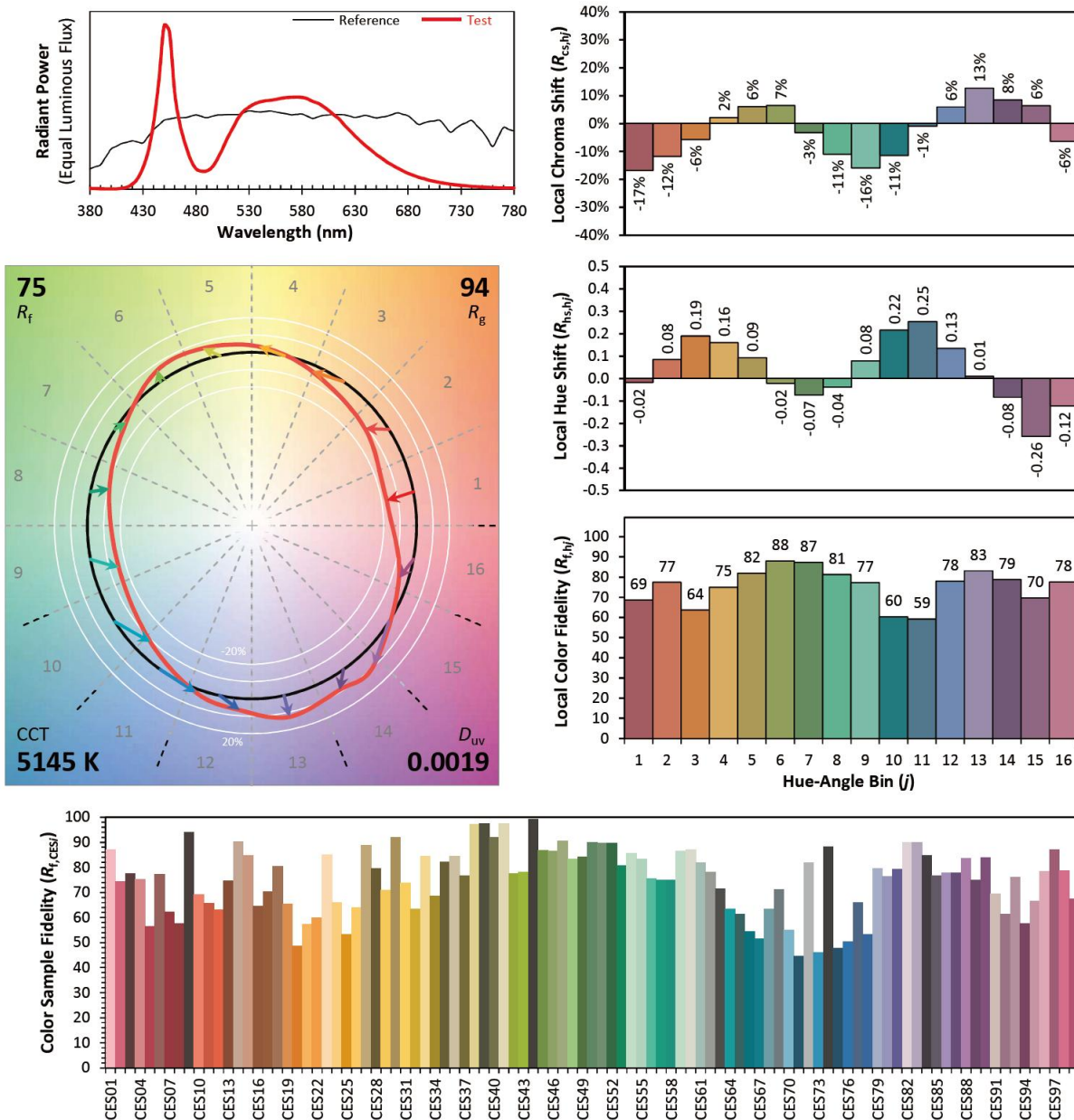
**ANSI/IES TM-30-18 Color Rendition Report**

Source: BL241101005-9

Manufacturer: AGC Lighting Co., Ltd.

Date: 2024-11-12

Model: ST52-60WS-3CS-C, 5000K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3414
 y 0.3524
 u' 0.2086
 v' 0.4845

CIE 13.3-1995
(CRI)

R_a 74
 R_g -21

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.



3.2 Goniophotometer System (Total operating time for luminous intensity distribution: 1.0 hour)

3.2.1 Model Number: ST52-60WS-3CS-C, 3000K

Electrical data

Input Voltage(V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.07	60	0.5220	62.46	0.9968

Photometric data

Luminous Flux (lm)	Efficacy (lm/W)	Zonal Lumen in 0-90°(%lm)
8405.56	134.58	93.71

IESNA Luminaire Flux Distribution Table:

	Lumens	% Luminaire
FL - Front-Low (0-30)	732.8	8.7
FM - Front-Medium (30-60)	1889.0	22.5
FH - Front-High (60-80)	981.4	11.7
FVH - Front-Very High (80-90)	295.6	3.5

BL - Back-Low (0-30)	735.1	8.7
BM - Back-Medium (30-60)	1910.9	22.7
BH - Back-High (60-80)	1018.6	12.1
BVH - Back-Very High (80-90)	313.6	3.7

UL - Uplight-Low (90-100)	334.9	4.0
UH - Uplight-High (100-180)	193.7	2.3
Total	8405.6	100.0

BUG Rating	B3-U3-G3
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**Zonal Flux Diagram**

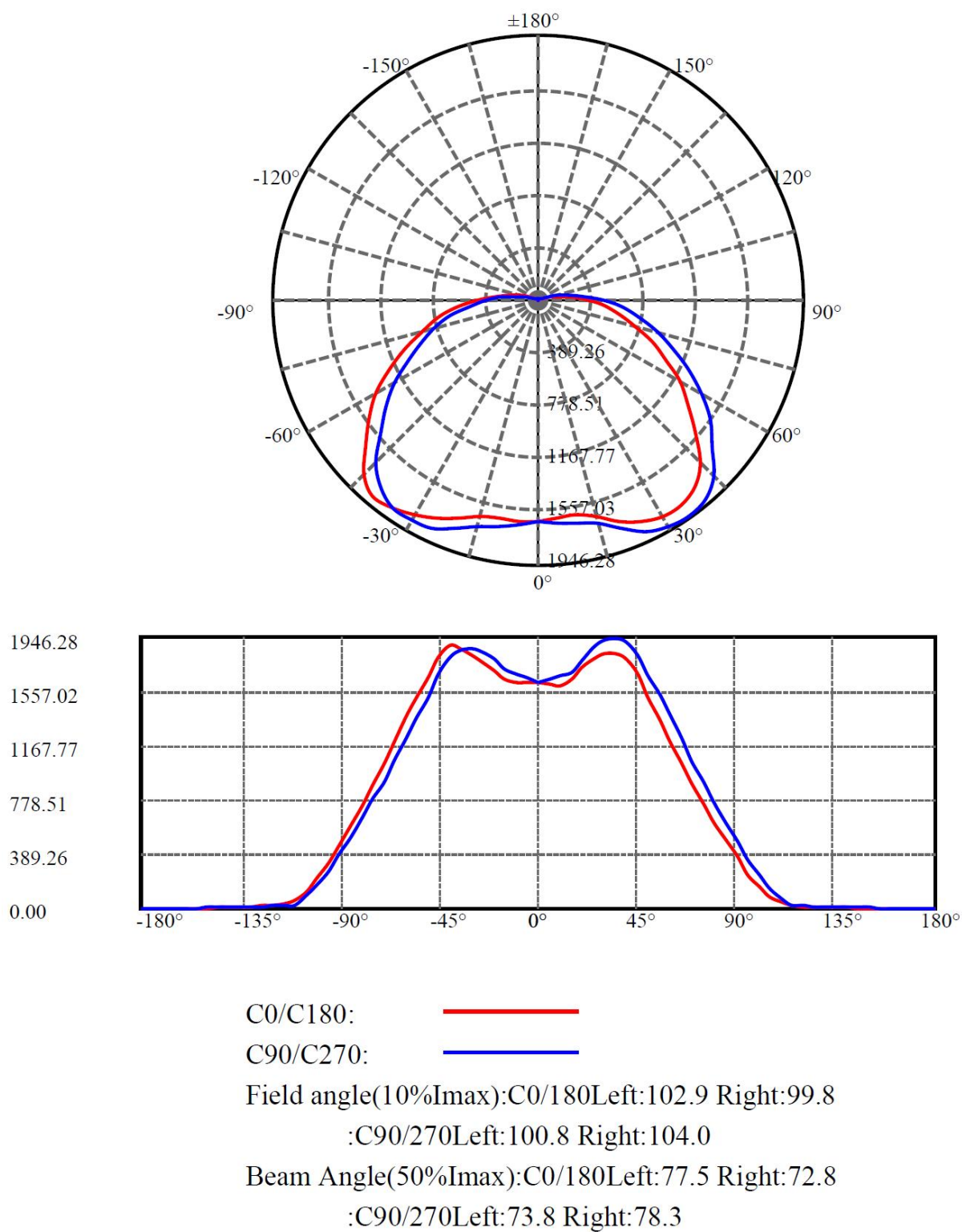
Zonal flux distribution table

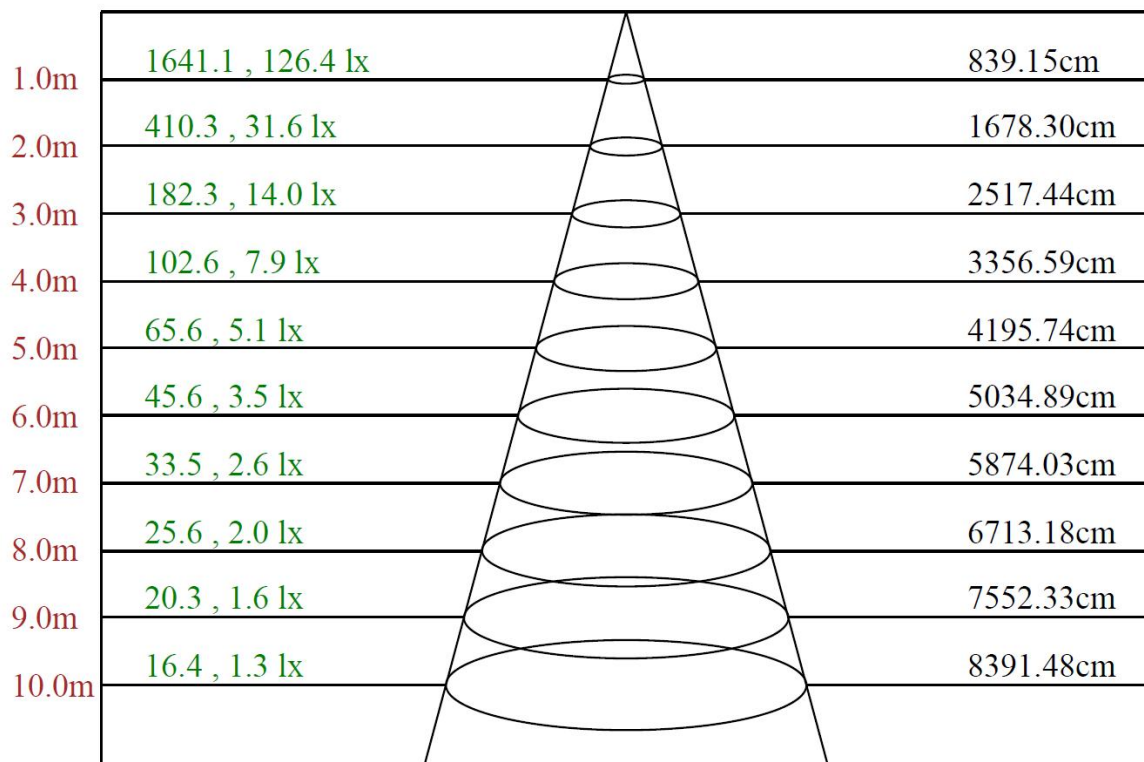
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	1624.035	0.000	0	0.00%	0.00%
5.0	1622.464	38.811	38.811	0.00%	0.46%
10.0	1630.363	116.364	155.175	0.00%	1.85%
15.0	1663.141	195.368	350.543	0.00%	4.17%
20.0	1739.962	280.464	631.007	0.00%	7.51%
25.0	1811.238	372.455	1003.462	0.00%	11.94%
30.0	1858.659	464.429	1467.891	0.00%	17.46%
35.0	1872.781	549.481	2017.371	0.00%	24.00%
40.0	1846.385	620.515	2637.886	0.00%	31.38%
45.0	1747.991	665.528	3303.414	0.00%	39.30%
50.0	1589.497	674.388	3977.802	0.00%	47.32%
55.0	1441.228	658.981	4636.783	0.00%	55.16%
60.0	1288.842	631.048	5267.831	0.00%	62.67%
65.0	1129.656	587.941	5855.772	0.00%	69.67%
70.0	973.935	532.643	6388.415	0.00%	76.00%
75.0	830.257	471.587	6860.001	0.00%	81.61%
80.0	693.770	407.787	7267.788	0.00%	86.46%
85.0	558.034	340.145	7607.933	0.00%	90.51%
90.0	424.536	269.035	7876.969	0.00%	93.71%
95.0	301.233	198.721	8075.69	0.00%	96.08%
100.0	200.081	136.219	8211.909	0.00%	97.70%
105.0	116.661	84.751	8296.66	0.00%	98.70%
110.0	53.919	44.587	8341.247	0.00%	99.23%
115.0	26.887	20.461	8361.707	0.00%	99.48%
120.0	20.231	11.454	8373.162	0.00%	99.61%
125.0	16.563	8.505	8381.666	0.00%	99.72%
130.0	14.108	6.669	8388.335	0.00%	99.80%
135.0	11.451	5.165	8393.5	0.00%	99.86%
140.0	8.852	3.759	8397.259	0.00%	99.90%
145.0	6.541	2.568	8399.827	0.00%	99.93%
150.0	5.300	1.744	8401.571	0.00%	99.95%
155.0	4.866	1.287	8402.857	0.00%	99.97%
160.0	4.708	1.004	8403.861	0.00%	99.98%
165.0	4.491	0.758	8404.619	0.00%	99.99%
170.0	4.318	0.523	8405.142	0.00%	100.00%
175.0	4.376	0.311	8405.453	0.00%	100.00%
180.0	4.635	0.108	8405.561	0.00%	100.00%



Luminous Intensity Distribution Diagram

Light Distribution Curve [Unit:cd]



**Lux distance Curve**

Max , Ave

Beam angle of C315 plane 153.19

**Luminous Intensity Distribution Data**

C/ γ (°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	1624.04	1602.96	1596.26	1640.15	1734.65	1791.95	1830.07	1828.45	1785.94
22.5	1624.04	1596.95	1594.41	1625.14	1706.92	1804.42	1850.86	1850.86	1806.04
45.0	1624.04	1598.80	1597.87	1624.21	1707.85	1773.93	1817.82	1844.39	1843.70
67.5	1624.04	1602.49	1622.59	1657.48	1721.48	1801.65	1871.66	1890.14	1871.66
90.0	1624.04	1641.31	1663.03	1693.99	1775.77	1870.04	1916.94	1933.34	1904.69
112.5	1624.04	1635.53	1655.40	1693.99	1787.33	1860.33	1912.78	1938.43	1918.56
135.0	1624.04	1632.07	1651.01	1687.29	1769.54	1847.17	1891.99	1905.39	1871.42
157.5	1624.04	1627.68	1634.15	1658.87	1731.65	1816.44	1877.89	1895.68	1877.20
180.0	1624.04	1623.98	1620.28	1640.38	1703.00	1763.99	1815.51	1864.03	1880.67
202.5	1624.04	1619.82	1615.20	1642.46	1712.93	1797.49	1839.54	1837.69	1800.03
225.0	1624.04	1612.20	1618.44	1654.48	1733.03	1786.40	1824.75	1829.84	1792.18
247.5	1624.04	1606.19	1625.83	1659.79	1722.17	1776.70	1815.28	1827.76	1800.26
270.0	1624.04	1660.02	1682.43	1721.94	1785.25	1840.47	1864.72	1854.10	1800.03
292.5	1624.04	1646.39	1668.80	1700.69	1761.22	1811.35	1850.40	1861.49	1841.39
315.0	1624.04	1635.07	1636.23	1670.42	1772.77	1844.39	1913.47	1946.28	1927.10
337.5	1624.04	1617.97	1603.88	1639.00	1713.86	1793.10	1844.85	1856.64	1821.29
360.0	1624.04	1602.96	1596.26	1640.15	1734.65	1791.95	1830.07	1828.45	1785.94

C/ γ (°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	1674.58	1511.70	1352.74	1200.25	1041.53	892.28	747.65	616.18	491.42
22.5	1690.29	1528.10	1381.16	1231.21	1072.49	917.92	775.83	642.06	514.30
45.0	1752.90	1589.32	1430.83	1276.73	1122.16	965.98	814.88	685.03	552.65
67.5	1778.55	1628.37	1474.50	1313.69	1151.73	999.25	853.69	714.38	569.51
90.0	1819.21	1670.88	1536.88	1385.55	1216.43	1054.93	905.45	763.36	618.96
112.5	1834.23	1669.26	1520.01	1370.07	1206.95	1041.30	891.58	740.48	602.78
135.0	1773.46	1631.84	1505.00	1349.97	1182.00	1020.97	874.26	731.01	590.77
157.5	1808.35	1655.63	1499.45	1342.57	1186.85	1022.58	873.79	729.39	591.92
180.0	1802.34	1653.32	1514.01	1372.15	1202.79	1038.29	887.66	739.33	592.85
202.5	1700.45	1547.51	1399.41	1249.70	1099.75	960.66	830.82	697.97	564.66
225.0	1685.21	1524.40	1380.70	1230.29	1076.88	925.78	795.47	667.71	541.56
247.5	1705.54	1542.89	1395.71	1241.15	1091.66	937.10	799.40	672.79	546.64
270.0	1674.81	1512.62	1365.22	1215.04	1058.39	909.60	781.38	653.61	513.60
292.5	1738.11	1581.47	1439.38	1295.67	1149.66	995.78	846.76	704.21	558.19
315.0	1814.59	1647.55	1484.89	1327.56	1159.82	997.63	846.76	713.91	571.13
337.5	1715.24	1537.11	1379.77	1219.89	1055.39	902.90	758.74	628.89	507.60
360.0	1674.58	1511.70	1352.74	1200.25	1041.53	892.28	747.65	616.18	491.42

C/ γ (°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	372.21	246.98	158.26	90.11	45.75	22.87	17.79	14.09	12.01
22.5	387.69	275.17	180.67	105.82	53.37	27.73	20.79	16.87	14.09
45.0	417.26	304.05	198.93	113.90	57.53	29.34	21.72	15.94	11.32
67.5	424.42	297.35	195.00	110.90	29.57	21.49	15.94	16.64	15.25
90.0	484.49	350.03	238.66	144.40	77.86	25.41	19.18	14.56	15.48
112.5	463.47	330.39	223.19	131.46	66.31	20.56	17.10	14.32	15.25
135.0	454.92	323.69	215.33	126.84	66.77	33.50	23.10	18.25	12.71
157.5	452.38	322.07	219.03	128.92	65.85	33.04	24.26	19.41	16.40
180.0	449.60	321.15	213.25	124.76	64.23	32.12	23.57	18.95	16.40
202.5	431.81	308.21	209.78	123.38	62.38	30.96	22.87	18.48	15.48
225.0	416.57	295.27	196.15	115.75	60.07	29.34	21.26	16.64	11.32
247.5	418.88	297.12	199.85	117.37	40.89	19.64	16.17	12.94	13.17
270.0	382.37	270.55	174.44	98.19	28.88	21.72	18.25	16.87	15.71
292.5	421.19	298.04	189.92	106.74	28.42	23.34	16.87	17.79	15.94
315.0	428.58	305.67	201.70	116.44	58.22	29.80	22.41	16.40	11.78
337.5	386.76	274.01	187.14	111.59	56.61	29.34	22.41	16.87	13.40
360.0	372.21	246.98	158.26	90.11	45.75	22.87	17.79	14.09	12.01



C/ γ (°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	9.94	7.39	5.31	4.62	4.39	4.39	4.39	4.62	4.62
22.5	10.86	7.39	5.08	5.08	4.62	4.85	4.39	4.16	4.39
45.0	9.47	8.55	6.93	5.78	5.08	4.85	4.62	4.16	4.39
67.5	12.01	8.78	6.70	5.55	5.08	4.85	4.39	4.16	4.39
90.0	13.86	10.86	8.32	6.47	5.31	5.08	4.62	4.16	4.39
112.5	12.25	9.47	6.93	5.55	5.08	4.85	4.39	4.16	4.16
135.0	8.78	7.16	6.70	5.31	4.85	4.39	4.16	4.39	4.39
157.5	13.63	9.94	6.01	4.85	4.62	4.39	4.39	3.93	3.93
180.0	13.63	10.63	6.70	4.62	4.39	4.62	4.39	4.16	4.16
202.5	12.71	9.24	6.01	5.08	4.62	4.39	4.39	4.16	4.39
225.0	8.09	7.16	6.24	5.08	4.62	4.85	4.39	4.39	4.16
247.5	10.86	8.55	6.47	5.08	4.85	4.85	4.39	4.39	4.16
270.0	13.40	10.40	7.62	6.24	5.31	5.08	5.31	5.08	5.08
292.5	13.17	10.17	7.39	5.55	5.31	4.62	4.85	4.39	4.62
315.0	10.17	8.78	6.70	5.08	4.85	4.62	4.62	4.39	4.39
337.5	10.40	7.16	5.55	4.85	4.85	4.62	4.16	4.39	4.39
360.0	9.94	7.39	5.31	4.62	4.39	4.39	4.39	4.62	4.62
C/ γ (°)	180.0								
0.0	4.64								
22.5	4.64								
45.0	4.64								
67.5	4.64								
90.0	4.64								
112.5	4.64								
135.0	4.64								
157.5	4.64								
180.0	4.64								
202.5	4.64								
225.0	4.64								
247.5	4.64								
270.0	4.64								
292.5	4.64								
315.0	4.64								
337.5	4.64								
360.0	4.64								



4 Additional Test

Electrical data

Model Number	CCT(K)	Test Voltage (V)	Frequency (Hz)	Power Factor	THD(%)
ST52-60WS-3CS-C	3000	120	60	0.997	5.7
		277	60	0.971	10.4
		347	60	0.963	11.1
	4000	347	60	0.966	10.9
	5000	347	60	0.967	10.7

5 Data reporting for white-tunable submissions

ANSI CCT Quadrangle (omit any outside product range) / Worst-Case Value	Actual CCT (K)	Power Consumption (W)	Lumen Output (lm)	Input Control Signal Applied
3000K	3049	62.43	8384.65	0%
4000K	3988	60.79	8705.56	50%
5000K	5146	62.85	8560.12	100%
Lowest Efficacy	3049	62.43	8384.65	0%
Maximum Power	5146	62.85	8560.12	100%



Photo Document



****End of test report****