



IES LM-79-08

MEASUREMENT AND TEST REPORT

For

ATG Electronics Corp

10700 7th Street Rancho Cucamonga, CA 91730, USA

Test Model: AA-35-40-T2

Report Type:	Electrical and Photometric tests including: Luminous Flux, Chromaticity, Luminous Intensity Distribution, THD
Test Engineer:	George Yang <i>George Yang</i>
Report Number:	RKSB181017003-10
Test Date:	2018-05-15 to 2018-05-17
Report Date:	2018-10-18
Reviewed By:	Ray Gao/EE Engineer <i>Ray Gao</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan). No.248 Chenghu Road, Kunshan, Jiangsu province, China. Tel: +86-0512-86175000 Fax: +86-0512-88934268
Test Facility:	Test facility was located at No.248 Chenghu Road, Kunshan, Jiangsu province, China.
Accreditation:	The IAS Accreditation Number TL-749.

Note: 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 Bay Area Compliance Laboratories Corp. (Kunshan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

1. Product Description

General Information:

One sample was received on 2018-05-02 and used for testing.

Model Tested: AA-35-40-T2
 Manufacturer: ATG Electronics Corp
 Brand Name: ATG
 Product Designation: Outdoor Pole/Arm-mounted Area and Roadway Luminaires
 Aging Time Before Test: 0hour(For New Products)

Rated Values:

Rated Voltage/Frequency: 120-277 VAC 60Hz
 Rated Power: 35 W
 Nominal CCT: 4000K
 Nominal Lumen Output: 4025 lm

Note:

1. The applicant *ATG Electronics Corp* declared that their product with model AA-35-40-T2 is the same to the product in report# RKS180502030-10 and is authorized by original applicant to use their test data.
2. All the data in previous report (RKS180502030-10) is shared in report.

2. Standards Used

- IES LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-10-2014: Harmonic Emission Limits – Related Power Quality Requirements for Lighting Equipment
- IES TM-30-15: IES Method for Evaluating Light Source Color Rendition

3. Description of Test Equipment

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Integrating Sphere	INVENTFINE	Dia 1.5m	JWWCV090112	2018-01-24	2019-01-24
Power Meter	INVENTFINE	WT500	GSJWQ20009	2018-04-08	2019-04-08
Spectral photometer	INVENTFINE	CMS-3S	GSGSE100017	2018-01-24	2019-01-24
AC Power Supply	INVENTFINE	CHP500	JWJSD010071	2018-04-08	2019-04-08
Standard Light Source	INVENTFINE	N/A	JWWCR020106	2018-01-24	2019-01-24
Thermal Meter	KEJIAN	TA298	N/A	2017-11-14	2018-11-14
DC Power Supply	INVENTFINE	WL3005	JWWCP020069	2018-04-08	2019-04-08
AC Power Supply	INVENTFINE	CHP-5KVA	900511765	2018-04-08	2019-04-08
DC Power Supply	INVENTFINE	WL3010	JWDMP030001	2018-04-08	2019-04-08
Power Meter	INVENTFINE	WT500	GSDSQ200007	2018-04-08	2019-04-08
Goniophotometer	INVENTFINE	GPM-1900	YWGCF120001	2018-01-24	2019-01-24

Device	Manufacture	Model No	Serial No	Calibration date	Calibration due date
Wireless Weather Station	ZHONGXING	KG218	N/A	2017-11-14	2018-11-14
Standard Light Source	INVENTFINE	N/A	JWBYR040007	2018-01-24	2019-01-24

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$ during measurement. And relative humidity is less than 65%.

Integrating Sphere System

The system includes AC power source, digital power meter, DC power supply, Spectroradiometer, and integrating sphere. The integrating sphere system is calibrated by standard spectrum light source before measurement.

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

The uncertainty of the light output (luminous flux) measurements is $U=2.6\%$ ($K=2$), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is $U=24\text{K}$ ($K=2$), at the 95% confidence level. The uncertainty of the CRI is $U=2.5(K=2)$, at the 95% confidence level.

The uncertainty of power meter AC current $U=0.16\%$ of rdg, AC Voltage $U=0.18\%$ of rdg, Power $U=0.14\%$ ($K=2$), at the 95% confidence level.

Goniophotometer System

The goniophotometer system is calibrated by standard light source before measurement.

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 vertical angle (γ) test intervals were set no more than 1 degree while data for 5 degree intervals is reported. The horizontal angle (C plane) test intervals were set no more than 22.5 degree.

The uncertainty of the luminous flux is $U=2.6\%$ ($K=2$), at the 95% confidence level.

Additional Test

The Additional Test item may not be covered by IESNA LM-79-2008. Additional test including power factor, off-state power and THD, was measured by Digital Power Meter after stabilized at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. Test voltage for THD and power factor test would be equal to rated voltage or, in case of a voltage range, maximum value of that range.

The uncertainty of power meter AC current $U=0.16\%$ of rdg, AC Voltage $U=0.18\%$ of rdg, Power $U=0.14\%$ ($K=2$), at the 95% confidence level.

Fidelity Index and Gamut Index Calculation

The R_i , R_g was calculated according to IES TM-30-15 by using calculation tools. The calculation was based on the measured SPD from 380nm to 780nm with 1nm intervals. All the colors in this report is for reference only.

5. Test Result

[Integrating Sphere System]

Total operating time for integrating sphere test: **1.0 hour**

Test orientation: **Downward**

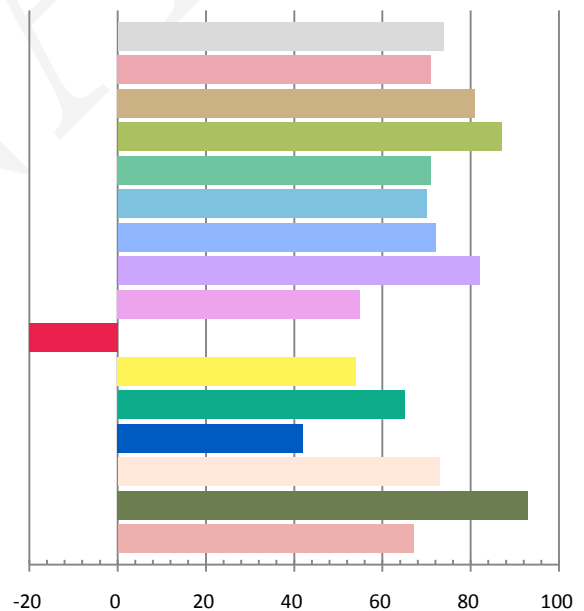
Photometric and Electrical Measurement Result

Voltage (V)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Luminous Flux(lm)	Efficacy (lm/W)
120.0	60	0.2904	34.63	0.9938	4059.7	117.23

Radiant Flux (W)	CCT (K)	Duv	x	y	u'	v'
11.793	3993	-0.00014	0.3807	0.3766	0.2253	0.5015

Color Rendering Index

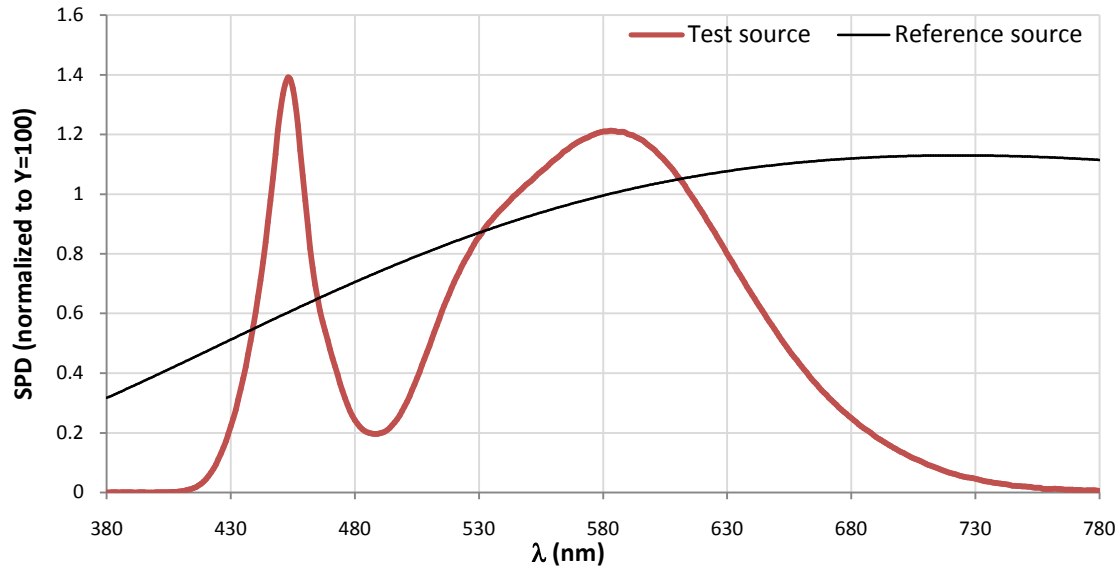
Ra 73.8			
R1 71	R2 81	R3 87	R4 71
R5 70	R6 72	R7 82	R8 55
R9 -20	R10 54	R11 65	R12 42
R13 73	R14 93	R15 67	



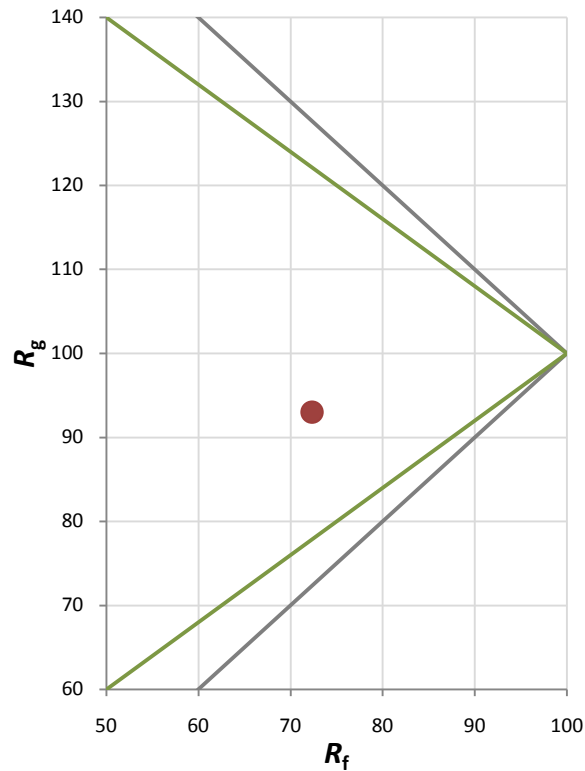
Fidelity Index and Gamut Index

Fidelity Index R_f	72
Gamut Index R_g	93

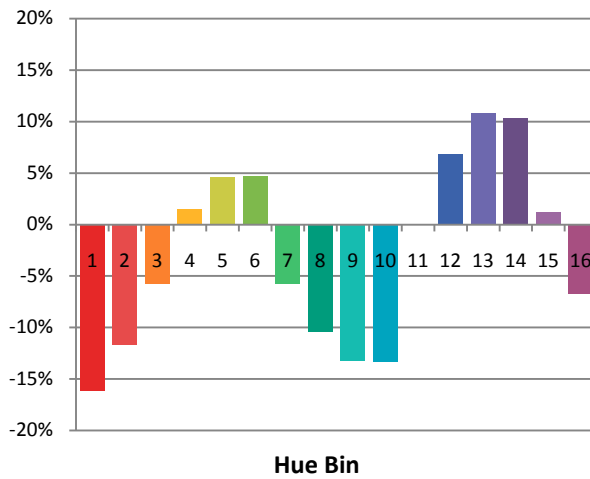
Spectral Power Distribution Comparison



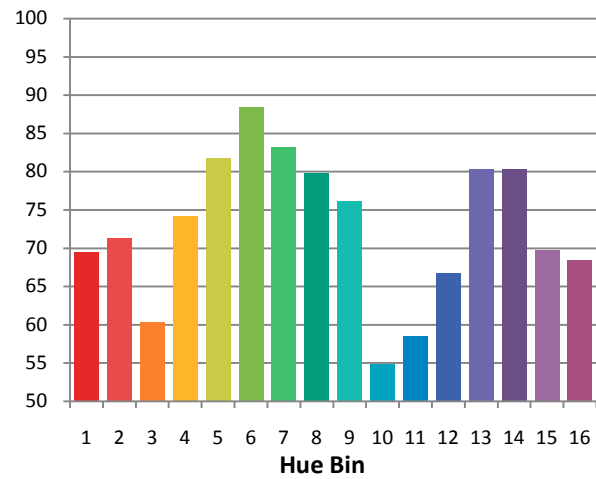
Plot of R_g versus R_f



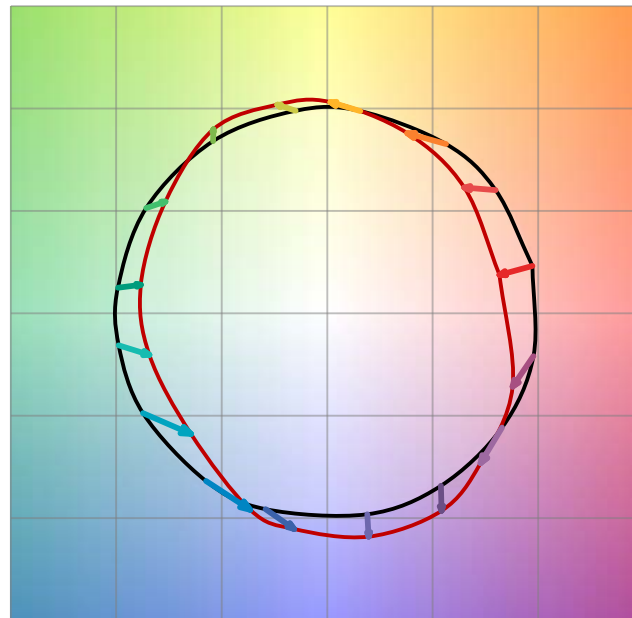
Chroma Shift by Hue



R_t by Hue

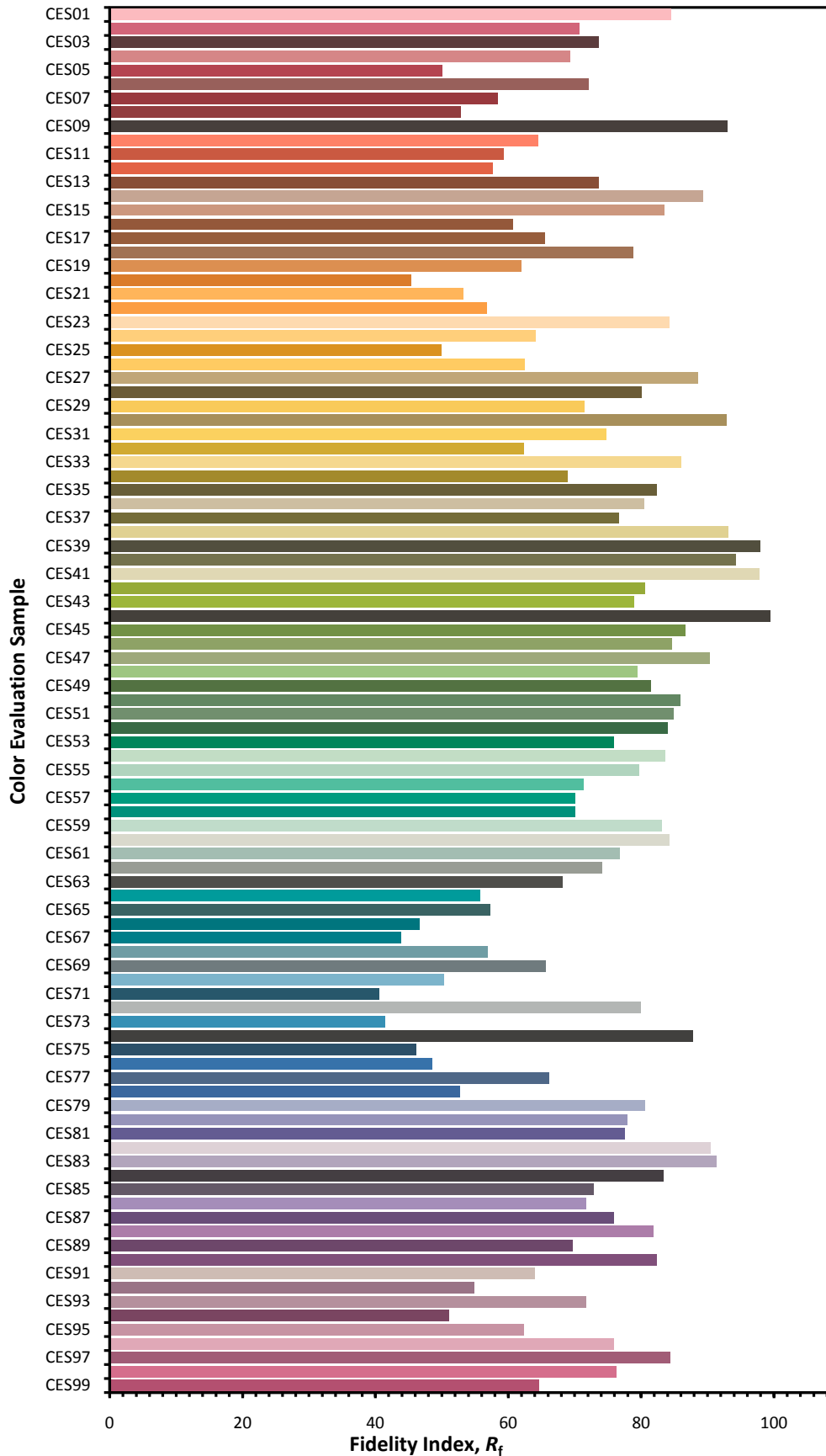


Color Vector Graphic

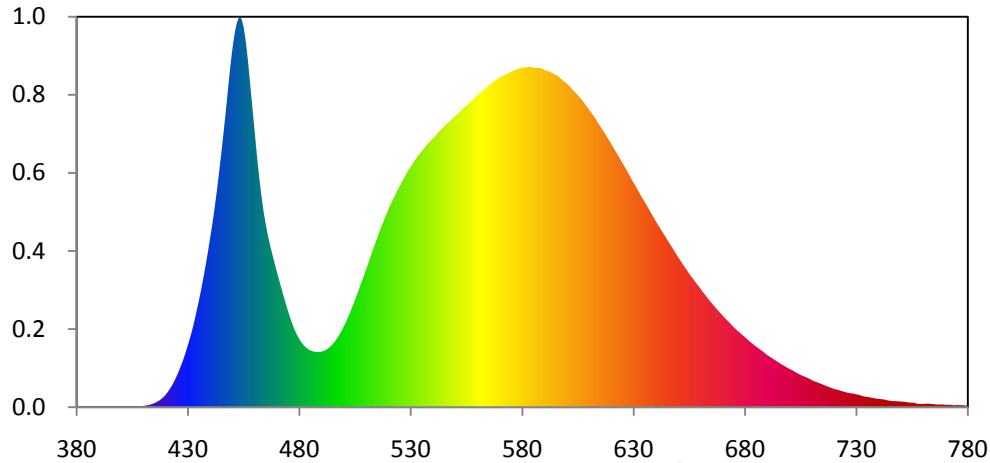


— Reference Illuminat — Test Source

Color Fidelity by CES Sample



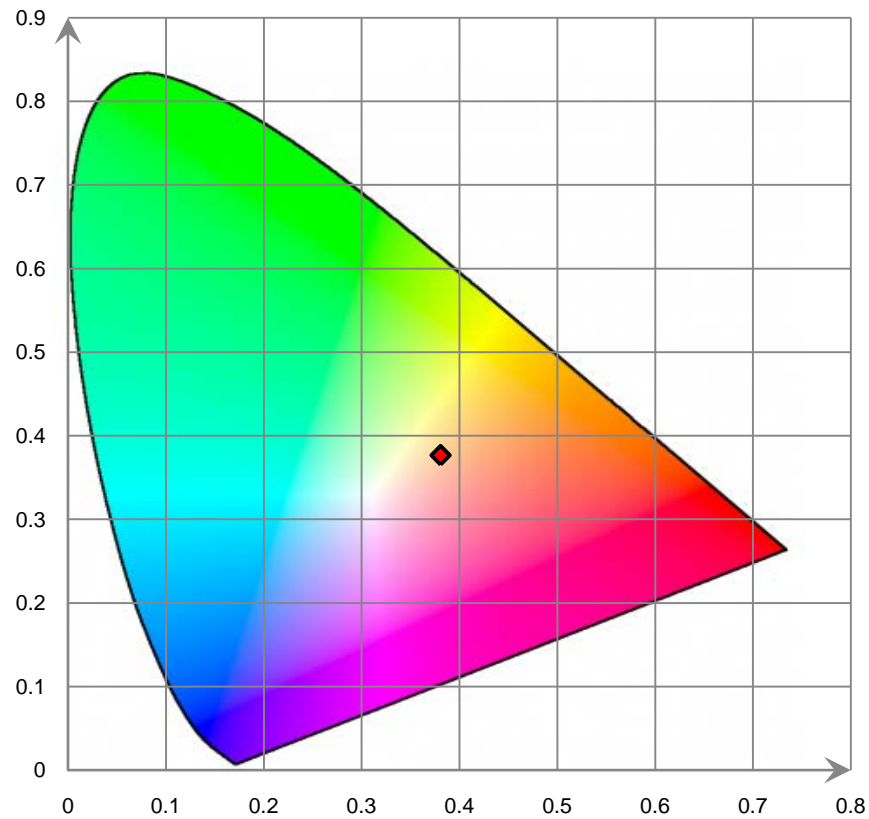
Relative Spectral Power Distribution



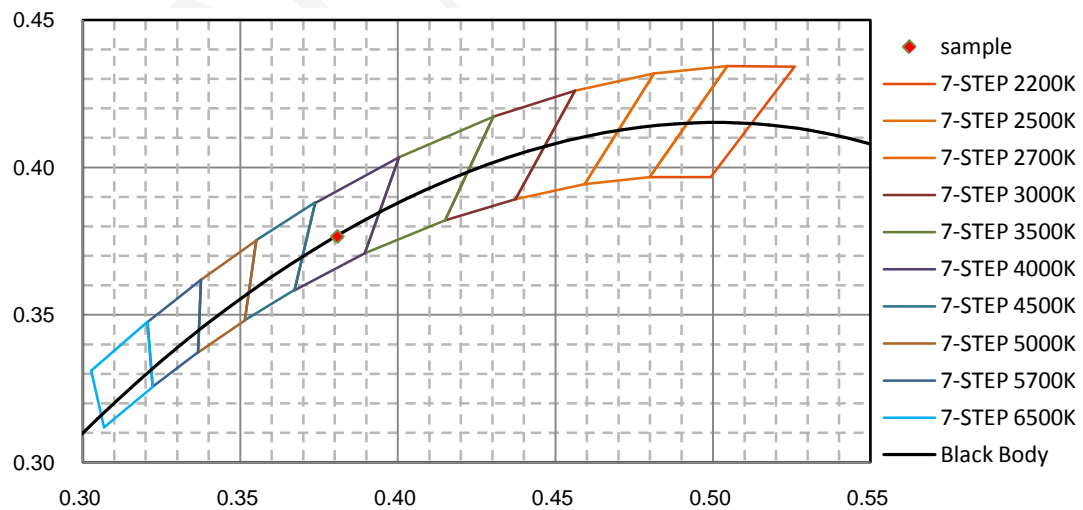
nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
380	3.890E-02	421	3.251E+00	462	4.865E+01	503	2.030E+01	544	5.899E+01
381	2.370E-02	422	3.953E+00	463	4.472E+01	504	2.150E+01	545	5.941E+01
382	3.820E-02	423	4.736E+00	464	4.132E+01	505	2.272E+01	546	5.988E+01
383	4.560E-02	424	5.636E+00	465	3.853E+01	506	2.399E+01	547	6.034E+01
384	4.700E-02	425	6.633E+00	466	3.612E+01	507	2.528E+01	548	6.078E+01
385	2.600E-02	426	7.734E+00	467	3.405E+01	508	2.658E+01	549	6.127E+01
386	2.810E-02	427	8.926E+00	468	3.216E+01	509	2.790E+01	550	6.167E+01
387	2.810E-02	428	1.021E+01	469	3.031E+01	510	2.921E+01	551	6.205E+01
388	2.820E-02	429	1.162E+01	470	2.855E+01	511	3.054E+01	552	6.253E+01
389	3.760E-02	430	1.317E+01	471	2.678E+01	512	3.191E+01	553	6.304E+01
390	3.620E-02	431	1.478E+01	472	2.511E+01	513	3.328E+01	554	6.352E+01
391	2.260E-02	432	1.648E+01	473	2.345E+01	514	3.458E+01	555	6.390E+01
392	1.920E-02	433	1.847E+01	474	2.180E+01	515	3.593E+01	556	6.433E+01
393	3.030E-02	434	2.060E+01	475	2.025E+01	516	3.723E+01	557	6.471E+01
394	3.080E-02	435	2.274E+01	476	1.877E+01	517	3.843E+01	558	6.518E+01
395	2.780E-02	436	2.504E+01	477	1.746E+01	518	3.958E+01	559	6.569E+01
396	1.750E-02	437	2.755E+01	478	1.629E+01	519	4.072E+01	560	6.611E+01
397	1.110E-02	438	3.015E+01	479	1.528E+01	520	4.186E+01	561	6.645E+01
398	5.300E-03	439	3.294E+01	480	1.442E+01	521	4.296E+01	562	6.686E+01
399	3.000E-03	440	3.593E+01	481	1.370E+01	522	4.394E+01	563	6.732E+01
400	3.740E-02	441	3.893E+01	482	1.311E+01	523	4.491E+01	564	6.777E+01
401	6.320E-02	442	4.224E+01	483	1.262E+01	524	4.585E+01	565	6.811E+01
402	7.020E-02	443	4.587E+01	484	1.226E+01	525	4.675E+01	566	6.845E+01
403	6.430E-02	444	4.981E+01	485	1.200E+01	526	4.763E+01	567	6.891E+01
404	6.750E-02	445	5.388E+01	486	1.184E+01	527	4.851E+01	568	6.923E+01
405	8.170E-02	446	5.819E+01	487	1.172E+01	528	4.941E+01	569	6.953E+01
406	9.500E-02	447	6.265E+01	488	1.167E+01	529	5.028E+01	570	6.987E+01
407	1.098E-01	448	6.738E+01	489	1.168E+01	530	5.093E+01	571	7.010E+01
408	1.396E-01	449	7.206E+01	490	1.177E+01	531	5.159E+01	572	7.036E+01
409	2.137E-01	450	7.599E+01	491	1.191E+01	532	5.237E+01	573	7.057E+01
410	2.740E-01	451	7.927E+01	492	1.214E+01	533	5.309E+01	574	7.073E+01
411	3.368E-01	452	8.147E+01	493	1.244E+01	534	5.370E+01	575	7.103E+01
412	4.105E-01	453	8.268E+01	494	1.285E+01	535	5.422E+01	576	7.123E+01
413	5.381E-01	454	8.229E+01	495	1.336E+01	536	5.480E+01	577	7.142E+01
414	6.937E-01	455	8.050E+01	496	1.392E+01	537	5.539E+01	578	7.160E+01
415	8.754E-01	456	7.736E+01	497	1.459E+01	538	5.595E+01	579	7.174E+01
416	1.110E+00	457	7.309E+01	498	1.535E+01	539	5.645E+01	580	7.190E+01
417	1.371E+00	458	6.814E+01	499	1.621E+01	540	5.689E+01	581	7.192E+01
418	1.718E+00	459	6.309E+01	500	1.713E+01	541	5.741E+01	582	7.194E+01
419	2.135E+00	460	5.812E+01	501	1.812E+01	542	5.794E+01	583	7.206E+01
420	2.645E+00	461	5.314E+01	502	1.919E+01	543	5.851E+01	584	7.203E+01

nm	mW	nm	mW	nm	mW	nm	mW	nm	mW
585	7.193E+01	626	5.090E+01	667	2.098E+01	708	6.214E+00	749	1.222E+00
586	7.185E+01	627	5.009E+01	668	2.042E+01	709	6.004E+00	750	1.199E+00
587	7.182E+01	628	4.925E+01	669	1.990E+01	710	5.744E+00	751	1.149E+00
588	7.183E+01	629	4.836E+01	670	1.941E+01	711	5.507E+00	752	1.118E+00
589	7.168E+01	630	4.753E+01	671	1.888E+01	712	5.352E+00	753	1.023E+00
590	7.139E+01	631	4.674E+01	672	1.840E+01	713	5.157E+00	754	9.700E-01
591	7.124E+01	632	4.593E+01	673	1.792E+01	714	4.979E+00	755	9.680E-01
592	7.111E+01	633	4.505E+01	674	1.743E+01	715	4.786E+00	756	9.314E-01
593	7.084E+01	634	4.423E+01	675	1.694E+01	716	4.588E+00	757	7.718E-01
594	7.062E+01	635	4.347E+01	676	1.648E+01	717	4.407E+00	758	6.882E-01
595	7.038E+01	636	4.266E+01	677	1.605E+01	718	4.220E+00	759	6.937E-01
596	7.013E+01	637	4.183E+01	678	1.565E+01	719	4.036E+00	760	6.921E-01
597	6.975E+01	638	4.098E+01	679	1.525E+01	720	3.867E+00	761	7.151E-01
598	6.928E+01	639	4.019E+01	680	1.483E+01	721	3.743E+00	762	7.591E-01
599	6.887E+01	640	3.939E+01	681	1.441E+01	722	3.643E+00	763	7.173E-01
600	6.853E+01	641	3.860E+01	682	1.399E+01	723	3.468E+00	764	6.774E-01
601	6.813E+01	642	3.783E+01	683	1.358E+01	724	3.330E+00	765	6.220E-01
602	6.757E+01	643	3.708E+01	684	1.321E+01	725	3.199E+00	766	5.683E-01
603	6.706E+01	644	3.632E+01	685	1.284E+01	726	3.069E+00	767	5.749E-01
604	6.658E+01	645	3.555E+01	686	1.249E+01	727	2.977E+00	768	5.776E-01
605	6.606E+01	646	3.480E+01	687	1.216E+01	728	2.906E+00	769	5.558E-01
606	6.549E+01	647	3.405E+01	688	1.182E+01	729	2.840E+00	770	5.050E-01
607	6.494E+01	648	3.332E+01	689	1.142E+01	730	2.715E+00	771	4.958E-01
608	6.437E+01	649	3.255E+01	690	1.105E+01	731	2.625E+00	772	5.082E-01
609	6.367E+01	650	3.180E+01	691	1.073E+01	732	2.479E+00	773	4.411E-01
610	6.301E+01	651	3.107E+01	692	1.042E+01	733	2.330E+00	774	4.014E-01
611	6.237E+01	652	3.035E+01	693	1.012E+01	734	2.220E+00	775	4.411E-01
612	6.174E+01	653	2.964E+01	694	9.811E+00	735	2.164E+00	776	4.417E-01
613	6.103E+01	654	2.896E+01	695	9.511E+00	736	2.082E+00	777	4.210E-01
614	6.025E+01	655	2.827E+01	696	9.210E+00	737	1.977E+00	778	4.135E-01
615	5.950E+01	656	2.760E+01	697	8.923E+00	738	1.893E+00	779	3.655E-01
616	5.878E+01	657	2.698E+01	698	8.637E+00	739	1.819E+00	780	3.190E-01
617	5.808E+01	658	2.636E+01	699	8.352E+00	740	1.756E+00		
618	5.731E+01	659	2.574E+01	700	8.108E+00	741	1.703E+00		
619	5.652E+01	660	2.511E+01	701	7.884E+00	742	1.669E+00		
620	5.577E+01	661	2.448E+01	702	7.604E+00	743	1.580E+00		
621	5.496E+01	662	2.388E+01	703	7.310E+00	744	1.456E+00		
622	5.411E+01	663	2.326E+01	704	7.078E+00	745	1.361E+00		
623	5.334E+01	664	2.265E+01	705	6.825E+00	746	1.307E+00		
624	5.253E+01	665	2.207E+01	706	6.622E+00	747	1.291E+00		
625	5.172E+01	666	2.153E+01	707	6.429E+00	748	1.264E+00		

CIE 1931 x y Chromaticity Diagram



7-Step Chromaticity Quadrangles



[Goniophotometer System]

Total operating time for luminous intensity distribution: **1.0 hours**

Test orientation: **Downward**

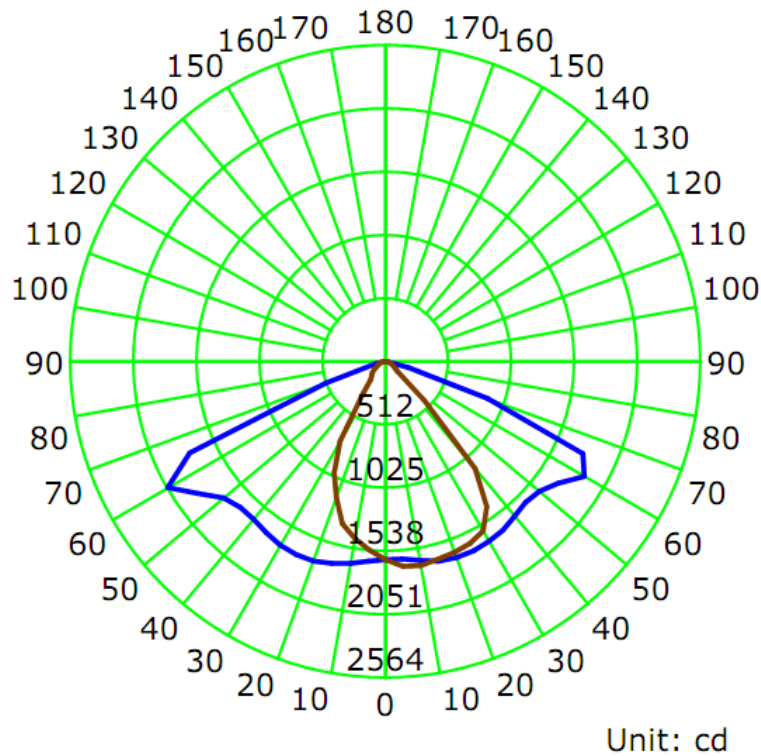
Electrical Measurement

Input Voltage (V)	Frequency (Hz)	Input Current (A)	Power (W)	Power Factor
120.0	60	0.2900	34.66	0.9960

Photometric Measurement

Luminous Flux (lm)	Efficacy (lm/W)	I_{max} (cd)	S/MH (C0/180)	S/MH (C90/270)
4083.7	117.87	2051.3	1.58	1.11

Luminous Intensity Distribution



	C0/180	C45/225	C90/270	C135/315	AVG.
Beam Angle (50% I_{max}):	137.2	88.1	70.3	86.9	95.6
Field Angle (10% I_{max}):	148.6	119.1	94.2	117.8	119.9

Luminous Intensity (cd) Distribution Data

C γ	0°	22.5°	45°	67.5°	90°	112.5°	135°	157.5°
0.0°	1606	1606	1606	1606	1606	1606	1606	1606
5.0°	1608	1635	1647	1661	1668	1666	1661	1648
10.0°	1636	1673	1686	1680	1680	1696	1707	1701
15.0°	1675	1716	1706	1668	1661	1693	1740	1743
20.0°	1694	1745	1712	1655	1647	1685	1754	1771
25.0°	1696	1756	1718	1651	1631	1687	1762	1779
30.0°	1687	1751	1730	1642	1589	1677	1781	1780
35.0°	1668	1753	1755	1556	1435	1602	1809	1792
40.0°	1637	1792	1742	1364	1133	1410	1799	1835
45.0°	1614	1851	1659	897	452	910	1700	1898
50.0°	1636	1938	1380	203	127	180	1382	1964
55.0°	1724	1962	674	108	95	106	619	1936
60.0°	1867	1645	109	85	77	83	103	1516
65.0°	1771	698	77	68	63	67	74	500
70.0°	884	72	54	50	47	48	53	68
75.0°	192	34	33	29	26	28	32	36
80.0°	16	12	13	9	8	8	12	13
85.0°	0	0	0	0	0	0	0	0
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	1
145.0°	1	1	0	0	0	0	0	1
150.0°	1	1	1	0	0	1	1	2
155.0°	2	2	2	1	1	2	1	2
160.0°	2	3	2	2	2	2	2	3
165.0°	2	3	3	2	3	3	2	3
170.0°	3	4	4	3	4	3	3	4
175.0°	3	4	4	4	4	4	4	4
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°	1606	1606	1606	1606	1606	1606	1606	1606
5.0°	1624	1600	1570	1546	1532	1542	1556	1581
10.0°	1660	1603	1530	1480	1456	1468	1511	1576
15.0°	1695	1597	1484	1400	1360	1393	1476	1574
20.0°	1724	1577	1421	1250	1176	1247	1420	1562
25.0°	1727	1551	1301	1038	996	1055	1296	1534
30.0°	1717	1502	1111	782	747	805	1109	1484
35.0°	1696	1421	852	432	325	442	837	1398
40.0°	1671	1335	555	229	192	239	504	1280
45.0°	1674	1307	398	174	167	182	340	1195
50.0°	1723	1307	346	148	140	153	290	1147
55.0°	1866	1259	270	121	112	123	234	1048
60.0°	2051	1123	169	99	88	101	159	928
65.0°	1761	825	106	80	70	80	105	783
70.0°	517	220	78	60	62	61	76	325
75.0°	90	47	52	39	41	42	47	49
80.0°	8	10	16	2	0	3	15	9
85.0°	0	0	0	0	0	0	0	0
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	1	1	1	0	0	0	1
145.0°	0	1	2	2	2	1	1	2
150.0°	1	2	2	2	2	2	2	2
155.0°	1	3	3	3	3	3	3	3
160.0°	1	3	3	4	3	4	3	3
165.0°	2	3	4	4	4	4	4	4
170.0°	3	4	4	5	4	4	4	4
175.0°	3	4	4	5	4	4	4	4
180.0°	0	0	0	0	0	0	0	0

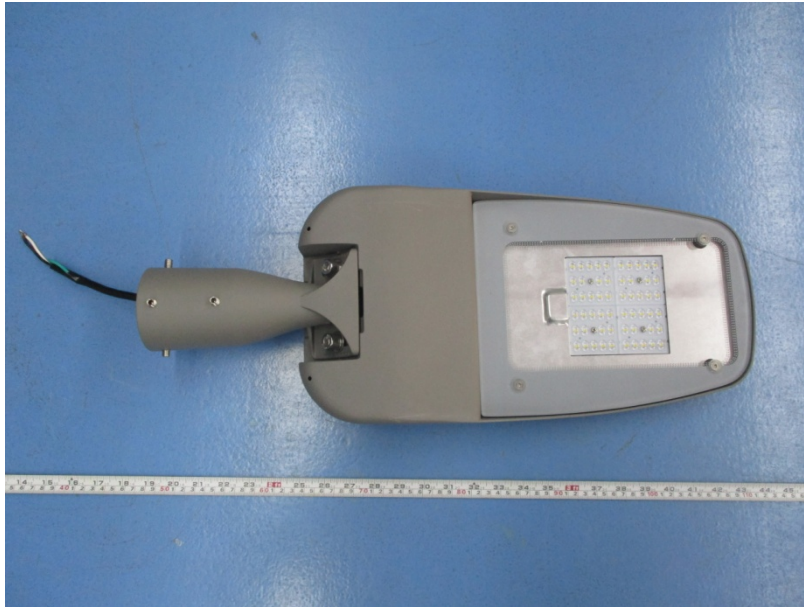
Zonal Lumen Density Measurement

Deg	Flux (lm)	%	Deg	Flux (lm)	%
0-5	38.4	0.94	0-5	38.4	0.94
5-10	115.1	2.82	0-10	153.6	3.76
10-15	190.3	4.66	0-15	343.8	8.42
15-20	260.7	6.38	0-20	604.6	14.80
20-25	322.6	7.90	0-25	927.2	22.70
25-30	372.3	9.12	0-30	1299.5	31.82
30-35	401.9	9.84	0-35	1701.4	41.66
35-40	411.8	10.08	0-40	2113.1	51.75
40-45	406.6	9.96	0-45	2519.7	61.70
45-50	384.9	9.43	0-50	2904.7	71.13
50-55	357.6	8.76	0-55	3262.3	79.89
55-60	324.5	7.95	0-60	3586.8	87.83
60-65	263.3	6.45	0-65	3850.1	94.28
65-70	155.1	3.80	0-70	4005.1	98.08
70-75	57.1	1.40	0-75	4062.2	99.47
75-80	16.2	0.40	0-80	4078.4	99.87
80-85	2.6	0.06	0-85	4081.0	99.93
85-90	0.0	0.00	0-90	4081.0	99.93
90-95	0.0	0.00	0-95	4081.0	99.93
95-100	0.0	0.00	0-100	4081.0	99.93
100-105	0.0	0.00	0-105	4081.0	99.93
105-110	0.0	0.00	0-110	4081.0	99.93
110-115	0.0	0.00	0-115	4081.0	99.93
115-120	0.0	0.00	0-120	4081.0	99.93
120-125	0.0	0.00	0-125	4081.0	99.93
125-130	0.0	0.00	0-130	4081.0	99.93
130-135	0.0	0.00	0-135	4081.0	99.93
135-140	0.1	0.00	0-140	4081.0	99.93
140-145	0.2	0.00	0-145	4081.2	99.94
145-150	0.3	0.01	0-150	4081.5	99.95
150-155	0.4	0.01	0-155	4082.0	99.96
155-160	0.5	0.01	0-160	4082.5	99.97
160-165	0.5	0.01	0-165	4083.0	99.98
165-170	0.4	0.01	0-170	4083.4	99.99
170-175	0.3	0.01	0-175	4083.6	100.00
175-180	0.0	0.00	0-180	4083.7	100.00

[Additional Test]

Test Item	Test Voltage (V)	Frequency (Hz)	Test Result
Total Harmonic Distortion:	120.0	60	3.86%
Total Harmonic Distortion:	277.0	60	13.47%
Power Factor:	277.0	60	0.9377

6. Product Photo



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