



DesignLights Consortium Test Report

Reference Standards

UL1598-2008

ANSI C82.77-10-2014

IES LM-79-2008

Prepared For

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065

Test Laboratory:

UL-CCIC Company Limited

Test Laboratory Address:

No.2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, China

Catalog Number

55682

Project Number

4790888268

Report Number

4790888268_13

Test Date

2023-06-19~2023-06-27

Issue Date

2023-07-12

Revision Date

N/A

Prepared By

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Zhao, Elaine

Approved By

Elvis Wu

Wu, Elvis

The results contained in this report pertain only to the tested sample.

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Test Summary

DLC Technical Requirements V5.1- issued 2020-02-14

Requirement Category	Test Method	Requirements	Tolerance	Test Result
Minimum Light Output (lm/ft)-Luminaires	IES LM-79-2008	≥375	-10%	1113.33
Zonal Lumen Requirement 1(0°-60°)	IES LM-79-2008	≥40%	-3%	43.70%
Minimum Luminaire Efficacy (lm/W)-Luminaires	IES LM-79-2008	≥115	-3%	134.18
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3439
Allowable CCT (4000K)	IES LM-79-2008/ANSI C78.377-2015	3985±275	N/A	4157
Allowable CCT (5000K)	IES LM-79-2008/ANSI C78.377-2015	5029±283	N/A	5074
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3434
Allowable CCT (3500K)	IES LM-79-2008/ANSI C78.377-2015	3465±245	N/A	3430
Minimum CRI	IES LM-79-2008/CIE 13.3-1995	≥80	-1	81
Minimum R9	IES LM-79-2008	≥0	-1	4.0
Minimum Rf	IES LM-79-2008	≥70	-1	82
Minimum Rg	IES LM-79-2008	≥89	-1	96
Rcs,h1	IES LM-79-2008	-12%-23%	-1%	-12%
L70 Lumen maintenance (Hours)	N/A	≥50000	N/A	≥50000
L90 Lumen maintenance (Hours)	N/A	≥36000	N/A	≥36000
Power Factor	ANSI C82.77-10-2014	≥0.9	-0.03	0.9221
Total Harmonic Distortion (A%)	ANSI C82.77-10-2014	≤20%	5%	8.58%
In-Situ Temperature Measurement Test for LED 1 (°C)	UL1598-2008	≤105	N/A	52.4
In-Situ Temperature Measurement Test for Driver 1 (°C)	UL1598-2008	≤90	N/A	54.6
Max Chromaticity Shift (1000-6000h)	N/A	≤0.004	0.0004	0.0022
Minimum Luminaire Warranty (Years)	N/A	≥5	N/A	≥5

Test List

Sample Received Date:

Test Item	Test Date	Model Number	Tests Conducted By
Integrating Sphere Test	2023-06-21	55682-25W-35K	Yang, Gavin X
Integrating Sphere Test	2023-06-21	55682-25W-40K	Yang, Gavin X
Integrating Sphere Test	2023-06-21	55682-25W-50K	Yang, Gavin X
Integrating Sphere Test	2023-06-21	55682-20W-35K	Yang, Gavin X
Integrating Sphere Test	2023-06-21	55682-15W-35K	Yang, Gavin X
Goniophotometer Test	2023-06-19	55682-25W-35K	Yang, Gavin X
Goniophotometer Test	2023-06-20	55682-25W-50K	Yang, Gavin X
THD and PF Test	2023-06-19	55682-25W-35K	Yang, Gavin X
THD and PF Test	2023-06-19	55682-25W-40K	Yang, Gavin X
THD and PF Test	2023-06-19	55682-25W-50K	Yang, Gavin X
THD and PF Test	2023-06-19	55682-20W-35K	Yang, Gavin X
THD and PF Test	2023-06-19	55682-15W-35K	Yang, Gavin X
In-Situ Temperature Measurement Test	2023-06-27	55682-25W-35K	Yang, Gavin X

Remark (if any)

1. UL test equipment information is recorded on Meter Use in UL’s Aurora database.
2. The accuracy method decision rule is applied when the compliance or verdict is made to the results of this report.

Product Description

Lamp/Luminaire Description: Direct Linear Ambient Luminaires

Model Number: 55682

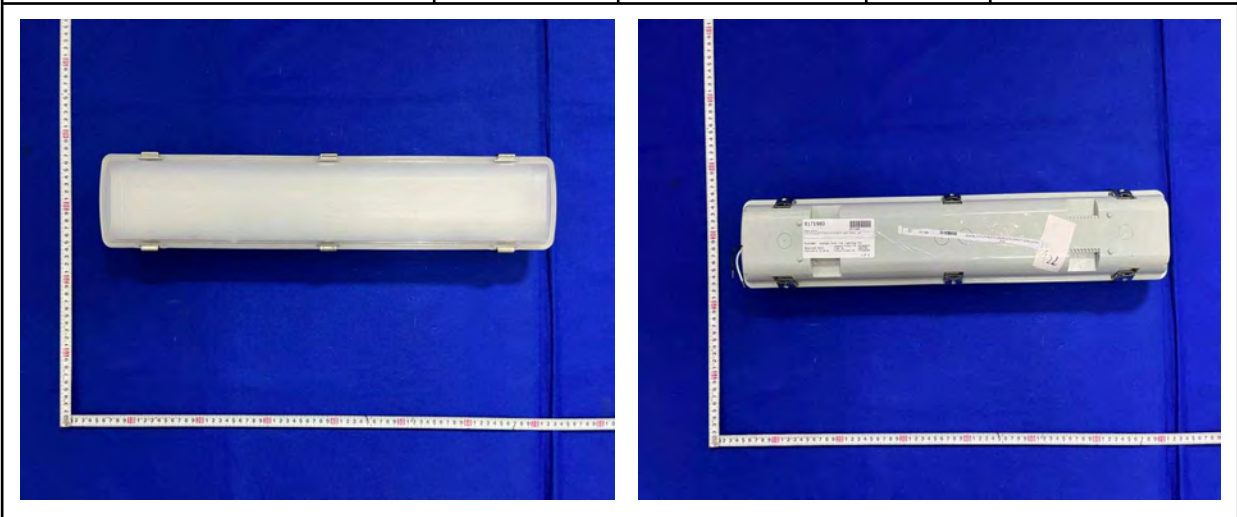
Electrical Parameter: 120-277V, 50/60Hz

LED Package: BXEN-xxE-21M-3AS

Dimming Information: Continuous dimming capability

Products Scaled Value

Model Number	CCT	Luminous Flux	Power	Luminous Efficacy
55682-25W-35K	3500K	3325	25	133
55682-25W-40K	4000K	3575	25	143
55682-25W-50K	5000K	3375	25	135
55682-20W-35K	3500K	2740	20	137
55682-20W-40K	4000K	2940	20	147
55682-20W-50K	5000K	2780	20	139
55682-15W-35K	3500K	2115	15	141
55682-15W-40K	4000K	2265	15	151
55682-15W-50K	5000K	2145	15	143



Integrating Sphere Test

Model No.	55682-25W-35K		Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

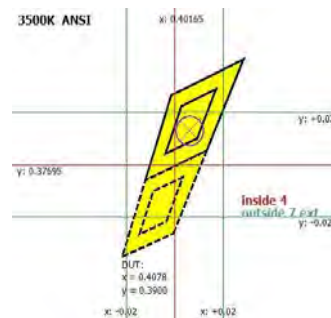
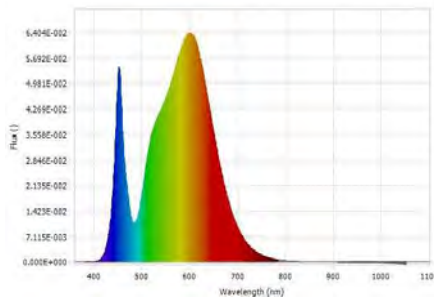
1. The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.6	119.98	60	0.2071	24.707	0.9944	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3439	81	4.0	-0.0009	3322.21	134.46	1661.11



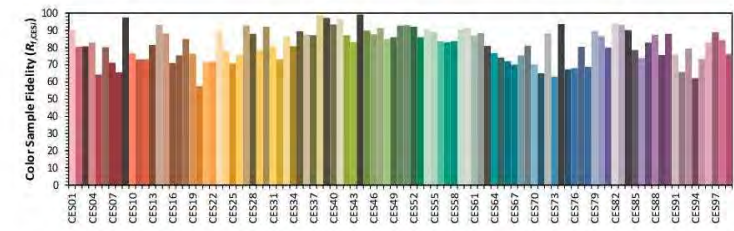
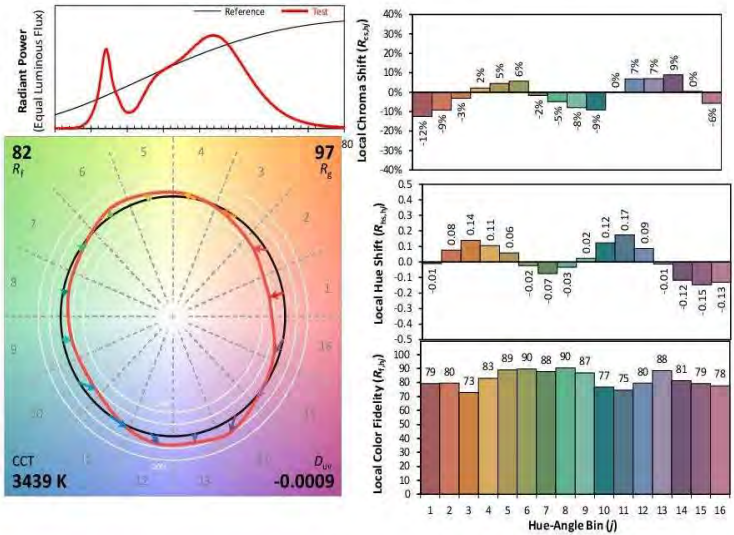
Luminous Flux (lm)	3322.21	Chrom x	0.4078
Chrom y	0.3900	Chrom u	0.2377
Chrom v	0.3409	Duv	-0.0009
Chrom u'	0.2377	Chrom v'	0.5113
CCT (K)	3439	Luminous Efficacy (lm/W)	134.46
Ra	81	R1	79.0
R2	87.0	R3	93.0
R4	80.0	R5	79.0
R6	82.0	R7	84.0
R8	61.0	R9	4.0
R10	70.0	R11	78.0
R12	59.0	R13	81.0
R14	96.0	R15	73.0
Rf	82	Rg	97
Rcs,h1	-12%		

Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-xxE-21M-3AS Manufacturer: P.Q.L., Inc.
 Date: 6/21/2023 Model: 55682-25W-35K



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

x	0.4078
y	0.3900
u'	0.2377
v'	0.5113

CIE 13.3-1995 (CRI)	
R_a	81
R_g	4

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

Integrating Sphere Test

Model No.	55682-25W-40K		Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

1. The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.

2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.

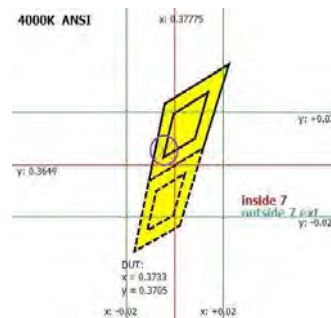
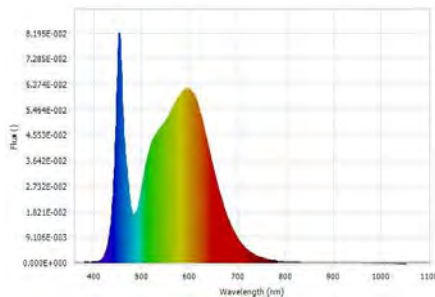
3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.6	120	60	0.2009	23.988	0.9951	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
4157	83	12.0	-0.0008	3539.6	147.56	1769.8



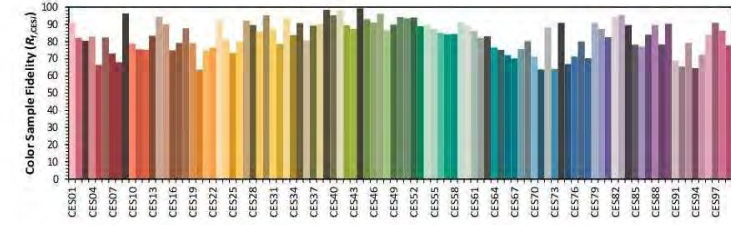
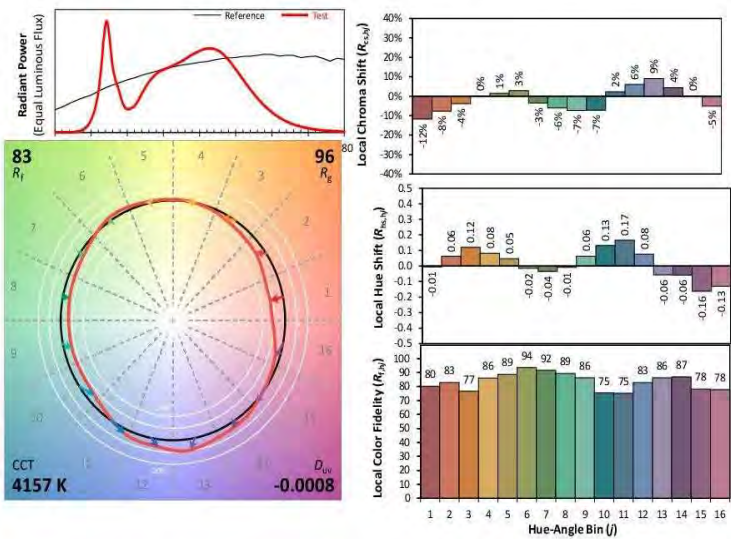
Luminous Flux (lm)	3539.6	Chrom x	0.3733
Chrom y	0.3705	Chrom u	0.2229
Chrom v	0.3318	Duv	-0.0008
Chrom u'	0.2229	Chrom v'	0.4977
CCT (K)	4157	Luminous Efficacy (lm/W)	147.56
Ra	83	R1	82.0
R2	89.0	R3	93.0
R4	82.0	R5	82.0
R6	84.0	R7	87.0
R8	66.0	R9	12.0
R10	73.0	R11	81.0
R12	59.0	R13	84.0
R14	96.0	R15	76.0
Rf	83	Rg	96
Rcs,h1	-12%		

Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-xxE-21M-3AS Manufacturer: P.Q.L., Inc.
 Date: 6/21/2023 Model: 55682-25W-40K



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

x 0.3733
 y 0.3705
 u' 0.2229
 v' 0.4977

CIE 13.3-1995 (CRI)
R_a 83
R_g 12

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

Integrating Sphere Test

Model No.	55682-25W-50K		Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

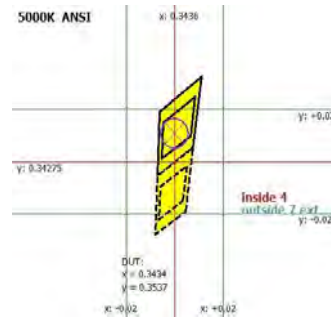
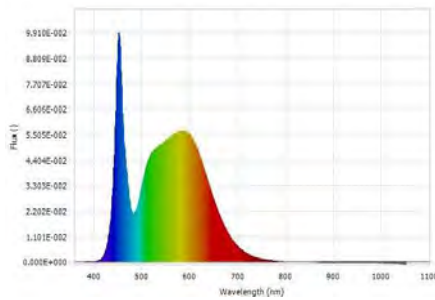
1. The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.6	119.98	60	0.2078	24.795	0.9944	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
5074	83	7.0	0.0018	3488.74	140.70	1744.37



Luminous Flux (lm)	3488.74	Chrom x	0.3434
Chrom y	0.3537	Chrom u	0.2094
Chrom v	0.3236	Duv	0.0018
Chrom u'	0.2094	Chrom v'	0.4855
CCT (K)	5074	Luminous Efficacy (lm/W)	140.70
Ra	83	R1	81.0
R2	88.0	R3	92.0
R4	83.0	R5	82.0
R6	83.0	R7	87.0
R8	67.0	R9	7.0
R10	71.0	R11	83.0
R12	61.0	R13	83.0
R14	96.0	R15	76.0
Rf	83	Rg	97
Rcs,h1	-12%		

Integrating Sphere Test (Cont'd)

TM-30 Report

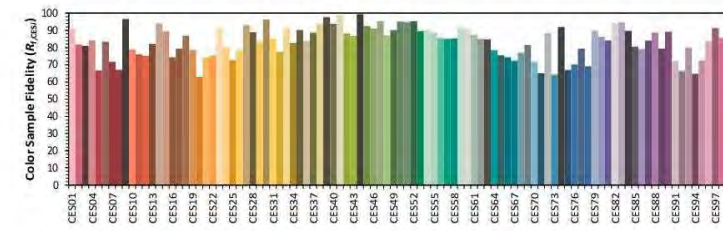
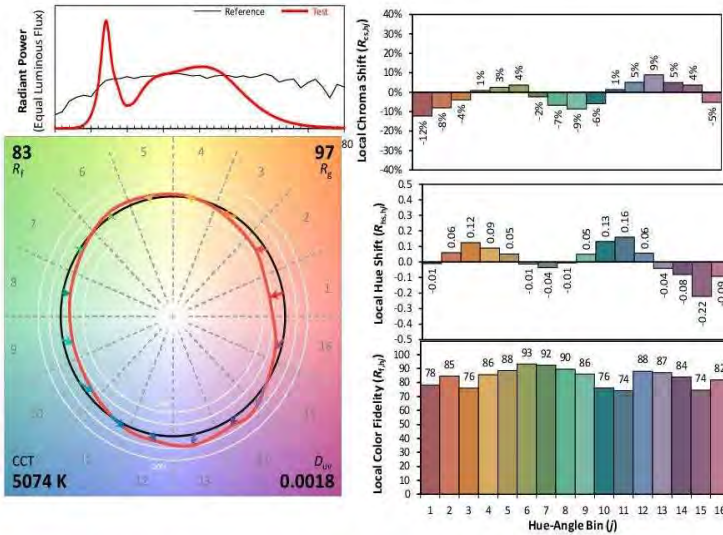
ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-xxE-21M-3AS

Manufacturer: P.Q.L., Inc.

Date: 6/21/2023

Model: 55682-25W-50K



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

x 0.3433
y 0.3537
u' 0.2094
v' 0.4854

CIE 13.3-1995
(CRI)
R_a 83
R_g 7

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

Integrating Sphere Test

Model No.	55682-20W-35K		Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

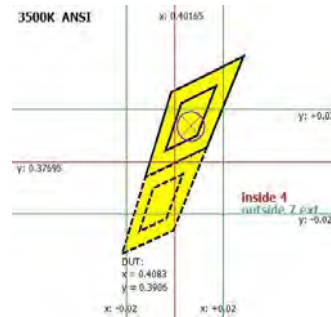
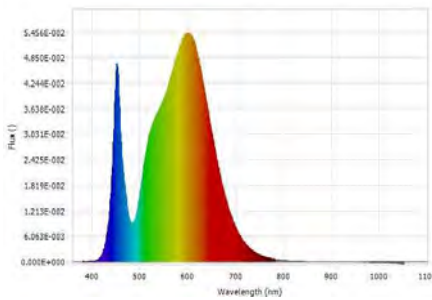
1. The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.6	120.01	60	0.1724	20.554	0.9934	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3434	81	4.0	-0.0007	2826.81	137.53	1413.41



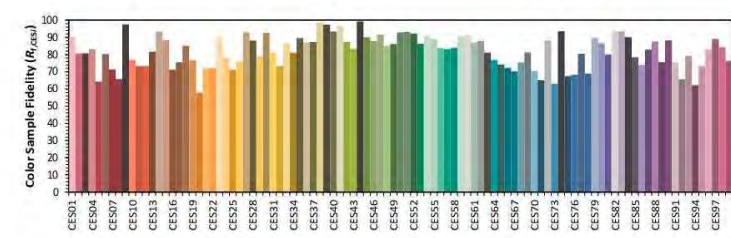
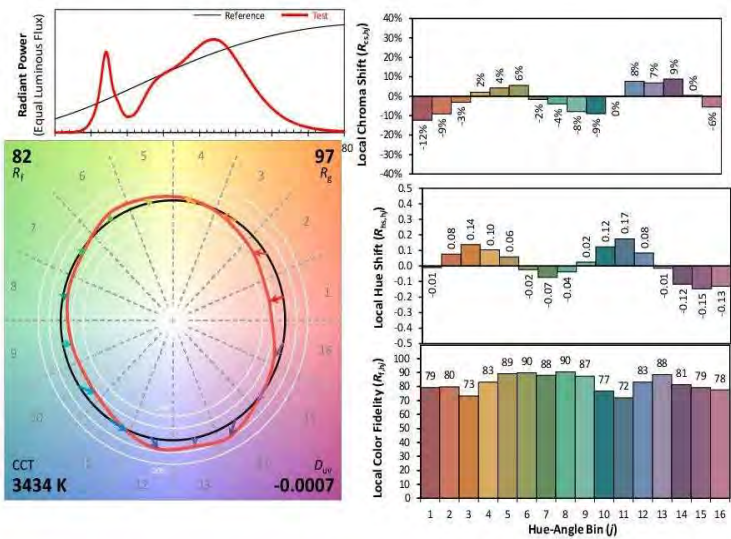
Luminous Flux (lm)	2826.81	Chrom x	0.4083
Chrom y	0.3906	Chrom u	0.2377
Chrom v	0.3411	Duv	-0.0007
Chrom u'	0.2377	Chrom v'	0.5117
CCT (K)	3434	Luminous Efficacy (lm/W)	137.53
Ra	81	R1	79.0
R2	87.0	R3	93.0
R4	80.0	R5	79.0
R6	83.0	R7	85.0
R8	61.0	R9	4.0
R10	70.0	R11	78.0
R12	59.0	R13	81.0
R14	96.0	R15	73.0
Rf	82	Rg	97
Rcs,h1	-12%		

Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-xxE-21M-3AS Manufacturer: P.Q.L., Inc.
 Date: 6/21/2023 Model: 55682-20W-35K



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

x	0.4083
y	0.3906
u'	0.2377
v'	0.5117

CIE 13.3-1995 (CRI)	
R_a	81
R_g	4

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Integrating Sphere Test

Model No.	55682-15W-35K		Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45	

Test Method

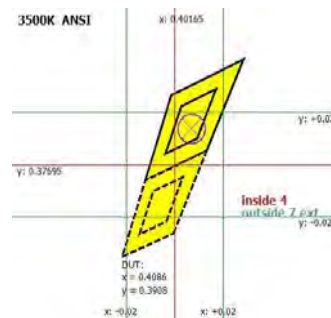
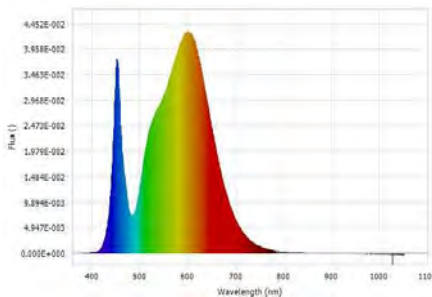
1. The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
 2. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25 °C ± 1 °C. The reference standard lamp is rated current 2.679A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
 3. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Coating reflectance of the integrating sphere was 90% to 98%. Photometric measurement conditions was using 4π geometry. The self-absorption factor is applied in the final test result. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Integrating Sphere Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.6	120.06	60	0.1335	15.877	0.9905	Horizontal

Test Results

CCT (K)	CRI (Ra)	R9	Duv	Flux (lm)	Luminous Efficacy (lm/W)	Efficacy(lm/ft)
3430	81	5.0	-0.0007	2226.66	140.24	1113.33



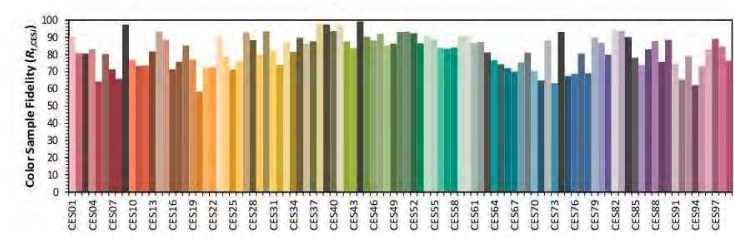
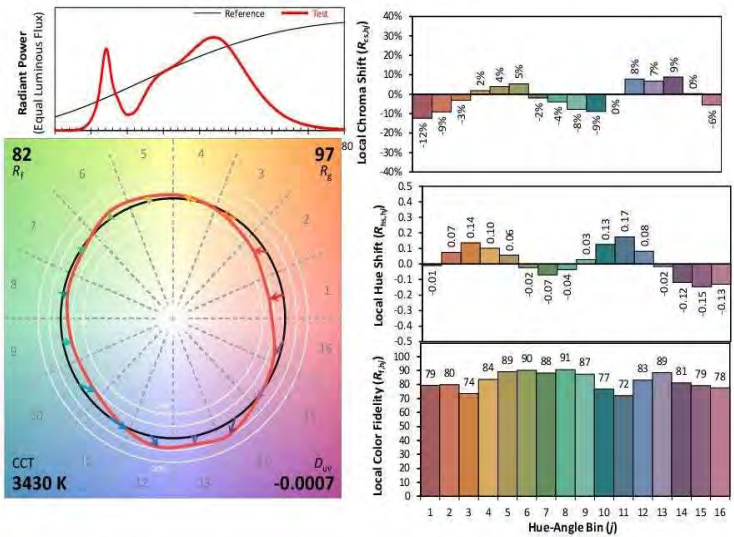
Luminous Flux (lm)	2226.66	Chrom x	0.4086
Chrom y	0.3908	Chrom u	0.2378
Chrom v	0.3412	Duv	-0.0007
Chrom u'	0.2378	Chrom v'	0.5118
CCT (K)	3430	Luminous Efficacy (lm/W)	140.24
Ra	81	R1	80.0
R2	88.0	R3	94.0
R4	80.0	R5	79.0
R6	83.0	R7	85.0
R8	61.0	R9	5.0
R10	70.0	R11	78.0
R12	59.0	R13	81.0
R14	96.0	R15	73.0
Rf	82	Rg	97
Rcs,h1	-12%		

Integrating Sphere Test (Cont'd)

TM-30 Report

ANSI/IES TM-30-18 Color Rendition Report

Source: BXEN-xxE-21M-3AS Manufacturer: P.Q.L., Inc.
 Date: 6/21/2023 Model: 55682-15W-35K



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

x	0.4086
y	0.3908
u'	0.2378
v'	0.5118

CIE 13.3-1995 (CRI)	
R_a	81
R_g	5

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

Goniophotometer Test

Model No.	55682-25W-35K	Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

- 1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.01	60	0.2074	24.77	0.9949	4.26%	Horizontal

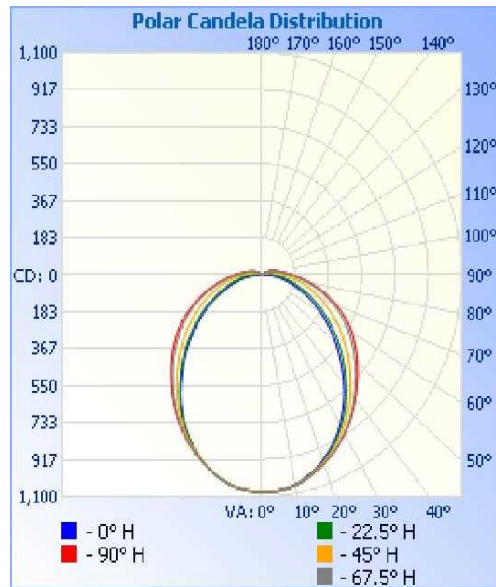
Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	20°-50°	N/A	Horizontal Spread	Vertical Spread	
3323.6	43.90%	N/A	121.7	98.9	134.18

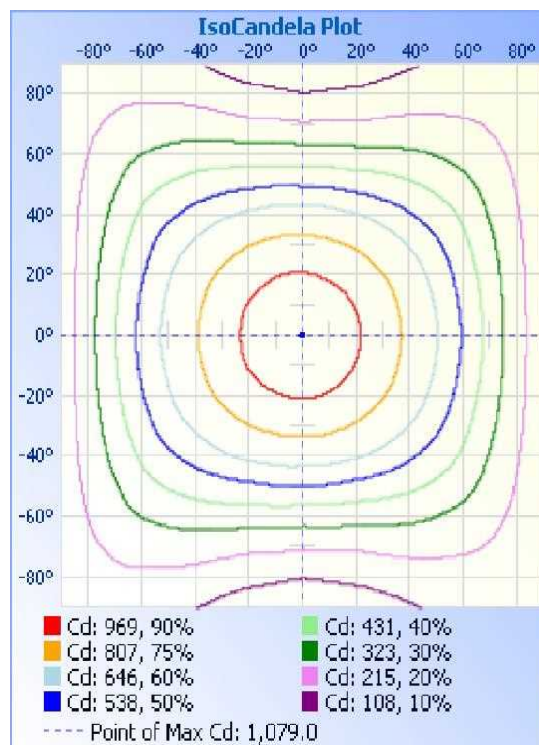
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
N/A	N/A	N/A	N/A

Goniophotometer Test (Cont'd)
Polar Candela Distribution



IsoCandela Plot



Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	820.8	24.70%
0-40	1329.1	40.00%
0-60	2319.8	69.80%
60-90	825.5	24.80%
70-100	525.9	15.80%
90-120	160.0	4.80%
0-90	3145.3	94.60%
90-180	178.3	5.40%
0-180	3323.6	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	25.7	0.80%	90-95	50.3	1.50%
5-10	76.1	2.30%	95-100	37.6	1.10%
10-15	123.3	3.70%	100-105	28.0	0.80%
15-20	165.3	5.00%	105-110	20.4	0.60%
20-25	201.1	6.10%	110-115	14.2	0.40%
25-30	229.3	6.90%	115-120	9.4	0.30%
30-35	249.0	7.50%	120-125	5.8	0.20%
35-40	259.3	7.80%	125-130	3.4	0.10%
40-45	261.2	7.90%	130-135	2.0	0.10%
45-50	256.4	7.70%	135-140	1.3	0.00%
50-55	245.0	7.40%	140-145	1.2	0.00%
55-60	228.1	6.90%	145-150	1.0	0.00%
60-65	207.0	6.20%	150-155	0.9	0.00%
65-70	180.5	5.40%	155-160	0.8	0.00%
70-75	151.7	4.60%	160-165	0.7	0.00%
75-80	122.8	3.70%	165-170	0.6	0.00%
80-85	94.3	2.80%	170-175	0.4	0.00%
85-90	69.2	2.10%	175-180	0.1	0.00%

Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076	1076
1	1076	1079	1076	1078	1075	1078	1077	1074	1075	1077	1074	1076	1074	1076	1076	1073	1075
2	1076	1078	1076	1078	1075	1077	1076	1073	1075	1076	1074	1075	1073	1075	1075	1073	1074
3	1075	1078	1076	1078	1075	1077	1076	1073	1074	1076	1073	1075	1072	1074	1074	1072	1074
4	1074	1077	1076	1077	1074	1076	1074	1071	1072	1074	1072	1074	1071	1072	1072	1070	1072
5	1072	1076	1074	1076	1073	1074	1072	1069	1070	1072	1070	1071	1068	1071	1069	1067	1070
6	1069	1073	1072	1074	1072	1074	1071	1067	1067	1069	1067	1069	1066	1068	1068	1065	1068
7	1067	1071	1069	1072	1070	1071	1068	1064	1065	1067	1064	1066	1064	1066	1065	1062	1066
8	1063	1068	1066	1069	1067	1068	1066	1061	1062	1063	1061	1063	1060	1063	1062	1059	1062
9	1060	1063	1063	1066	1063	1065	1062	1057	1057	1058	1056	1059	1055	1058	1057	1055	1058
10	1055	1059	1059	1062	1059	1061	1058	1052	1052	1053	1051	1053	1051	1054	1052	1050	1053
11	1050	1053	1053	1056	1055	1057	1053	1047	1046	1047	1045	1048	1046	1049	1048	1045	1047
12	1043	1048	1047	1052	1050	1052	1048	1041	1040	1041	1039	1042	1040	1044	1042	1039	1042
13	1036	1042	1042	1046	1044	1046	1042	1035	1034	1035	1032	1035	1034	1038	1036	1033	1036
14	1029	1035	1035	1040	1038	1040	1036	1028	1027	1028	1025	1028	1027	1031	1030	1026	1029
15	1022	1028	1028	1034	1032	1034	1028	1021	1019	1020	1018	1021	1020	1023	1022	1018	1022
16	1015	1020	1021	1026	1025	1026	1021	1013	1011	1012	1010	1013	1011	1015	1014	1010	1013
17	1008	1012	1013	1019	1018	1018	1013	1005	1003	1003	1002	1004	1004	1005	1004	1002	1005
18	998	1003	1005	1012	1011	1010	1005	996	993	994	993	996	995	997	995	993	996
19	989	994	998	1005	1004	1002	996	986	984	985	983	988	987	989	986	983	987
20	978	985	990	998	997	995	986	976	974	975	976	980	979	980	978	973	977
25	925	934	944	957	958	955	941	925	919	921	926	934	935	935	928	921	923
30	859	871	889	908	911	906	886	862	853	856	866	880	884	882	872	858	859
35	784	801	827	852	858	849	822	791	778	784	801	822	828	823	805	786	784
40	702	721	757	791	800	788	752	712	693	703	730	759	768	760	732	706	700
45	616	640	686	729	742	725	681	631	608	621	658	696	709	696	660	625	616
50	533	562	618	670	686	665	609	551	525	541	587	634	650	632	588	543	532
55	451	481	546	609	630	604	537	471	442	460	516	570	589	569	515	464	450
60	372	405	477	547	571	544	471	397	366	384	446	506	527	507	449	391	374
65	300	332	410	483	507	481	404	324	293	313	379	440	459	440	380	318	300
70	230	263	343	414	434	411	336	255	223	245	312	370	388	371	313	249	230
75	168	203	281	345	362	342	275	196	163	187	253	305	319	305	254	190	169
80	115	151	223	276	290	274	218	144	109	137	197	242	253	242	198	139	114
85	68	104	169	212	223	211	165	99	63	93	148	186	195	188	150	97	68
90	32	69	125	160	169	160	121	65	29	62	110	141	149	142	110	63	31
95	23	48	92	121	127	120	90	46	23	44	82	108	113	107	82	43	23
100	19	33	69	93	99	92	67	32	19	30	62	83	89	83	62	31	19
105	15	22	50	72	78	71	49	21	16	20	45	64	70	64	45	20	16
110	12	13	36	55	61	54	34	13	13	12	31	49	54	49	32	12	13
115	10	9	22	40	47	40	22	9	10	8	19	36	42	36	19	8	10
120	8	7	12	26	32	26	12	6	7	6	11	23	29	24	11	7	8
125	6	6	6	16	21	16	6	5	6	5	6	14	19	14	6	5	6
130	4	4	4	9	12	9	4	4	5	4	4	8	11	8	3	4	4
135	4	3	3	5	7	5	4	4	3	3	3	4	6	4	3	3	3
140	3	3	3	4	4	4	4	3	3	3	3	4	4	4	4	3	3
145	3	4	4	3	4	4	3	3	4	3	3	4	4	4	4	3	4
150	3	4	4	3	4	4	3	4	4	4	3	4	4	4	4	3	4
155	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
160	4	4	4	4	4	4	4	5	4	5	4	4	4	4	4	4	4
165	5	5	5	4	4	5	5	5	5	5	5	5	4	4	4	5	5
170	5	5	5	5	5	5	6	5	5	6	6	5	5	5	5	6	5
175	6	6	5	5	5	5	5	6	6	6	5	5	5	6	6	6	6
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Goniophotometer Test

Model No.	55682-25W-50K	Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

- 1.The sample was tested according to the IES LM-79-2008, and the product is assume to be brand new without seasoning.
- 2.Photometric parameters were measured using a type C goniophotometer and software.
- 3.The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The reference standard lamp is rated current 3.8581A, 3.8558A, 3.8466A omni-directional Incandescent lamp and was calibrated by National Institute of Metrology P.R.China.
- 4.The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonallumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals. Photometric distance was more than five times of the largest dimension of the test SSL product.

Goniophotometer Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
25.1	120.02	60	0.2074	24.76	0.9949	4.18%	Horizontal

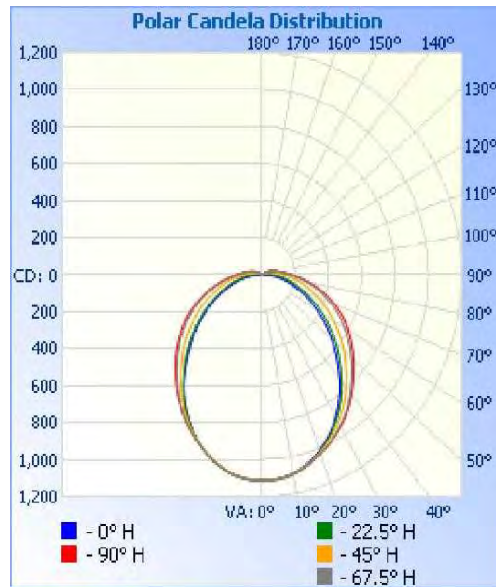
Test Results

Luminous Flux (lm)	Zonal Lumen Requirement 1	Zonal Lumen Requirement 2	Beam Angle (50%)		Luminous Efficacy (lm/W)
	20°-50°	N/A	Horizontal Spread	Vertical Spread	
3461.9	43.70%	N/A	122.7	99.4	139.82

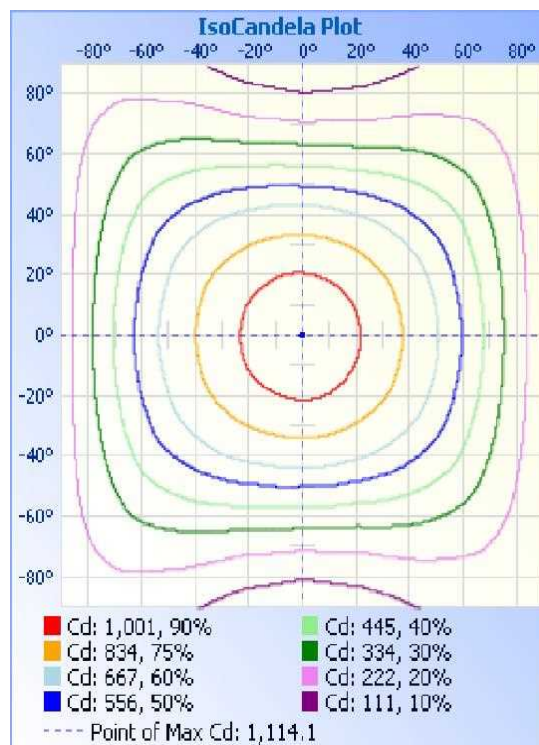
Backlight	Uplight	Glare
N/A	N/A	N/A

UGR		Spacing Criteria (0-180°)	Spacing Criteria (90°-270°)
Crosswise	Endwise		
N/A	N/A	N/A	N/A

Goniophotometer Test (Cont'd)
Polar Candela Distribution



IsoCandela Plot



Goniophotometer Test (Cont'd)
Zonal Lumen Summary

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	849.1	24.50%
0-40	1377.0	39.80%
0-60	2409.3	69.60%
60-90	866.0	25.00%
70-100	553.4	16.00%
90-120	167.7	4.80%
0-90	3275.4	94.60%
90-180	186.5	5.40%
0-180	3461.9	100.00%

Lumens Per Zone

Lumens Per Zone					
Zone	Lumens	%Total	Zone	Lumens	%Total
0-5	26.5	0.80%	90-95	53.1	1.50%
5-10	78.7	2.30%	95-100	39.5	1.10%
10-15	127.5	3.70%	100-105	29.4	0.80%
15-20	170.9	4.90%	105-110	21.2	0.60%
20-25	208.0	6.00%	110-115	14.8	0.40%
25-30	237.5	6.90%	115-120	9.7	0.30%
30-35	258.2	7.50%	120-125	5.9	0.20%
35-40	269.7	7.80%	125-130	3.5	0.10%
40-45	271.7	7.80%	130-135	2.0	0.10%
45-50	267.0	7.70%	135-140	1.4	0.00%
50-55	255.7	7.40%	140-145	1.2	0.00%
55-60	237.9	6.90%	145-150	1.1	0.00%
60-65	216.2	6.20%	150-155	1.0	0.00%
65-70	189.1	5.50%	155-160	0.9	0.00%
70-75	159.1	4.60%	160-165	0.8	0.00%
75-80	129.2	3.70%	165-170	0.6	0.00%
80-85	99.4	2.90%	170-175	0.4	0.00%
85-90	73.0	2.10%	175-180	0.1	0.00%

Goniophotometer Test (Cont'd)
Intensity Data(cd)

Candela Table - Type C

	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112	1112
1	1112	1114	1111	1113	1111	1113	1112	1110	1111	1113	1111	1113	1111	1113	1112	1110	1111
2	1112	1114	1112	1113	1110	1113	1112	1110	1111	1113	1110	1112	1110	1112	1111	1108	1111
3	1111	1113	1111	1113	1110	1113	1111	1109	1110	1112	1110	1111	1108	1111	1110	1108	1110
4	1109	1113	1110	1112	1109	1112	1110	1108	1109	1111	1109	1111	1108	1109	1108	1106	1109
5	1106	1111	1108	1111	1108	1110	1108	1105	1107	1109	1107	1109	1106	1108	1106	1104	1108
6	1105	1108	1107	1109	1106	1108	1106	1103	1105	1107	1104	1106	1103	1105	1103	1101	1104
7	1102	1106	1104	1107	1104	1106	1104	1100	1102	1104	1102	1103	1100	1102	1101	1098	1101
8	1098	1102	1101	1104	1101	1103	1101	1097	1099	1101	1098	1100	1097	1099	1098	1095	1098
9	1095	1099	1097	1100	1098	1100	1098	1094	1095	1097	1094	1096	1093	1095	1094	1091	1094
10	1090	1093	1092	1096	1094	1096	1094	1089	1090	1092	1089	1090	1088	1091	1089	1086	1089
11	1084	1087	1086	1091	1089	1092	1089	1084	1084	1086	1083	1085	1082	1085	1084	1080	1083
12	1077	1082	1080	1085	1084	1086	1084	1078	1078	1079	1076	1078	1075	1079	1078	1074	1077
13	1070	1075	1074	1079	1078	1081	1078	1071	1071	1072	1069	1071	1069	1072	1071	1068	1070
14	1063	1068	1067	1073	1072	1075	1071	1064	1065	1066	1062	1063	1062	1066	1064	1061	1064
15	1056	1061	1060	1066	1066	1068	1065	1057	1058	1058	1054	1057	1054	1058	1057	1053	1057
16	1048	1053	1054	1059	1058	1060	1057	1050	1050	1050	1046	1049	1046	1049	1049	1045	1049
17	1040	1044	1046	1052	1050	1052	1048	1041	1040	1041	1038	1040	1038	1040	1040	1036	1040
18	1031	1035	1037	1045	1043	1044	1039	1032	1031	1032	1030	1031	1028	1031	1030	1027	1030
19	1021	1025	1029	1037	1035	1036	1030	1022	1021	1022	1020	1022	1019	1022	1020	1017	1020
20	1010	1016	1020	1029	1028	1028	1021	1012	1011	1012	1010	1014	1011	1012	1010	1006	1010
25	955	963	974	989	991	988	975	960	956	958	960	967	966	966	960	952	955
30	887	899	917	941	947	941	920	895	888	891	898	912	914	911	899	886	887
35	810	828	857	889	897	887	856	823	811	818	833	855	858	852	831	812	810
40	724	745	787	828	839	825	786	741	724	734	760	790	798	787	757	729	724
45	635	662	716	764	778	762	713	658	635	647	685	723	735	720	681	644	635
50	550	582	646	702	718	697	640	578	551	567	613	662	675	656	607	562	551
55	466	499	571	637	658	633	565	495	465	483	539	596	613	590	532	479	465
60	385	421	498	573	599	571	494	417	385	403	467	528	547	524	461	401	385
65	310	345	430	509	535	507	424	342	309	330	398	460	479	457	392	328	310
70	237	273	360	439	462	436	353	268	235	259	328	387	404	384	322	255	236
75	173	211	296	368	388	365	290	206	173	198	265	319	333	316	259	194	174
80	118	157	235	296	312	294	230	152	117	145	208	255	266	252	203	142	118
85	70	109	179	229	241	227	174	104	68	99	156	195	204	194	153	97	70
90	32	72	133	174	182	172	128	67	31	65	116	149	156	148	113	62	32
95	24	49	98	130	137	128	93	45	24	46	86	114	120	112	83	43	24
100	20	34	73	100	106	98	69	31	19	32	65	88	93	87	62	30	19
105	16	23	54	77	83	75	50	19	15	21	48	68	74	67	46	20	16
110	13	14	38	59	65	57	34	11	12	13	33	51	58	50	32	12	13
115	10	9	24	44	50	42	21	8	10	8	20	38	44	36	19	8	10
120	8	7	14	28	34	27	12	6	8	6	11	24	30	23	11	7	8
125	6	6	7	17	21	16	7	5	6	5	6	15	19	14	6	5	6
130	5	4	4	9	13	9	4	4	4	4	4	8	11	8	4	4	5
135	4	3	3	5	7	5	3	3	4	4	3	4	6	4	3	3	4
140	3	3	3	4	4	4	3	4	3	4	4	4	4	4	4	3	3
145	3	4	3	4	4	4	4	3	4	4	4	4	4	4	4	4	4
150	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4
155	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
160	4	4	4	4	4	4	4	4	5	5	4	4	4	4	4	4	5
165	5	5	5	5	5	5	5	5	6	6	5	5	4	5	5	5	5
170	6	5	5	5	5	6	5	6	6	6	6	5	5	5	6	6	6
175	6	6	5	5	5	6	6	6	6	6	6	5	5	5	6	6	6
180	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

THD and PF Test

Model No.	55682-25W-35K	Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.01	60	0.2074	24.77	0.9949	4.26%	Horizontal
24.8	276.99	60	0.0933	24.87	0.9620	5.54%	Horizontal

THD and PF Test

Model No.	55682-25W-40K	Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.00	60	0.2010	24.05	0.9972	4.15%	Horizontal
24.8	276.99	60	0.0908	24.13	0.9595	6.18%	Horizontal

THD and PF Test

Model No.	55682-25W-50K	Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	119.96	60	0.2076	24.83	0.9968	4.18%	Horizontal
24.8	276.99	60	0.0933	24.88	0.9621	5.57%	Horizontal

THD and PF Test

Model No.	55682-20W-35K	Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	119.99	60	0.1717	20.53	0.9962	3.94%	Horizontal
24.8	276.98	60	0.0790	20.73	0.9468	7.48%	Horizontal

THD and PF Test

Model No.	55682-15W-35K	Sample ID.	6171980
Operate time (Min.)	90	Stabilization time (Min.)	45

Test Method

1. The samples were tested according to the ANSI C82.77-10-2014.
2. The ambient temperature condition was maintained at 25 °C ± 1 °C. The sample measurement was made using a digital power meter and power supply. The sample was operated at rated voltage and stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Test Results

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.8	120.01	60	0.1328	15.87	0.9950	4.16%	Horizontal
24.8	276.98	60	0.0634	16.20	0.9221	8.58%	Horizontal

In-Situ Temperature Measurement Test

Model No.	55682-25W-35K	Sample ID.	6171980
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Test Method

- In-Situ Temperature Measurement Test is conducted according to the UL 1598-2008, Section 14.
- The testing was conducted in a room with ambient temperature of 25 °C ± 5 °C. The apparatus construction followed those described in UL1598-2008 for normal temperature testing. Thermocouples were placed on the LED package in the locations indicated by LM-80 report. Thermocouples were placed on the LED driver case in the locations specified by the manufacture if necessary. The temperature was recorded after the lamp was operated by 7.5 hours.
- The data and photos in LM-80 test report is provided by the customer/ The data and photos in driver specification is provided by the customer.

In-Situ Temperature Measurement Test Conditions

Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Current THD	Orientation
24.3	120.01	60	0.2074	24.77	0.9949	4.26%	Horizontal

Test Results (LEDs)

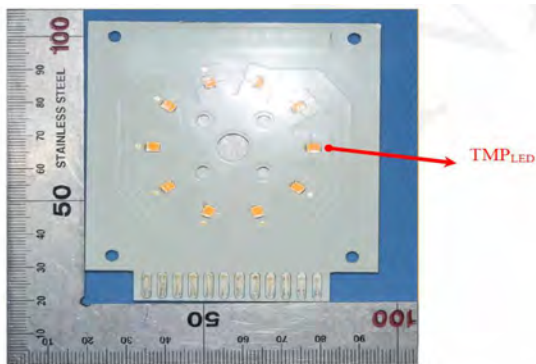
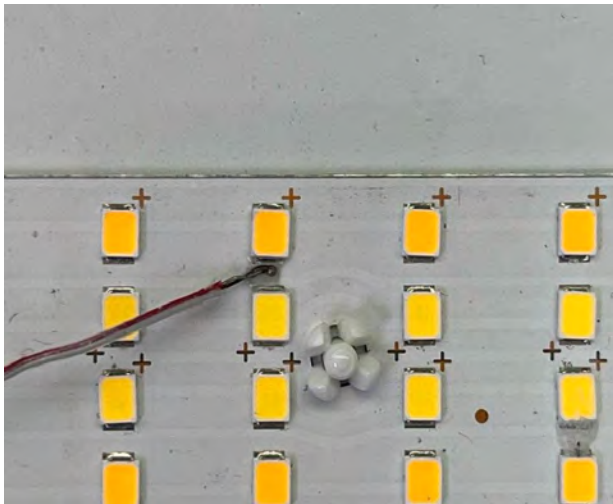
Thermocouple Location	Declared Light Source Current (mA)	Temperature for Light Source (°C)		Max Chromaticity Shift (1000-6000h)	LED Model Number	LM-80 Limit Current (mA)	LM-80 Limit Temp (°C)
		Test Result	Test Result (Correct to 25 °C)				
Ambient TEMP	N/A	24.3	25.0				
TMP of Location 1	80	51.7	52.4	0.0022	BXEN-xxE-21M-3AS	150	105

Test Results (Drivers)

Thermocouple Location	Temperature for Driver (°C)		Driver Model Number	Driver Limit Temp (°C)
	Test Result	Test Result (Correct to 25 °C)		
Ambient TEMP	24.3	25.0		
TMP of Location 1	53.9	54.6	SIL50-I550 120-277 W D1S+D3 R	90

In-Situ Temperature Measurement Test (Cont'd)

Test Photos for Ts Point of Light Sources & Tc Point of Drivers





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