



Report No.: GZE160475-M

NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

Builders Pack

(Brand Name: Builders Pack)

ShenFuBao Industry Park, Bonded area, Futian District, Shenzhen, China

1x4 Luminaires for Ambient Lighting of Interior Commercial Spaces

Model name(s): 64-PL-612-45W-XXK-D-S-28A1

Remark: The suffix of the model name "XX" stand for different color temperature as below: 30=3000K, 35=3500K, 40=4000K, 45=4500K, 50=5000K.

Representative (Tested) Model: 64-PL-612-45W-30K-D-S-28A1

64-PL-612-45W-50K-D-S-28A1

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Jul.20,2016

Review By:

Tommy Liang

Manager: Tommy Liang

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

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1.1 Product Information:

Organization Name	Builders Pack	
Brand Name	Builders Pack	
Model Number	64-PL-612-45W-XXK-D-S-28A1	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	1x4 Luminaires for Ambient Lighting of Interior Commercial Spaces	
Rated Voltage / Frequency	100 -277Vac, 50/60 Hz	
Nominal Power	45W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K,4500K,5000K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO.,LTD	
LED Model	67-21S Series	
Sample Number	GZE160475-M1(3000K), M2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Jul.15, 2016
Date of Test	Jul.17, 2016
Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

<p>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</p> <p>Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1 ° vertical intervals and 22.5 ° horizontal intervals.</p>
<p>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</p> <p>Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.</p>
<p>3) Electrical Measurements:</p> <p>Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.</p>

2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	64-PL-612-45W-30K-D-S-28A1		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160475-	120.0	60	0.3596	42.92	0.9945	7.59
M1	277.0	60	0.1695	42.33	0.9017	12.83
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

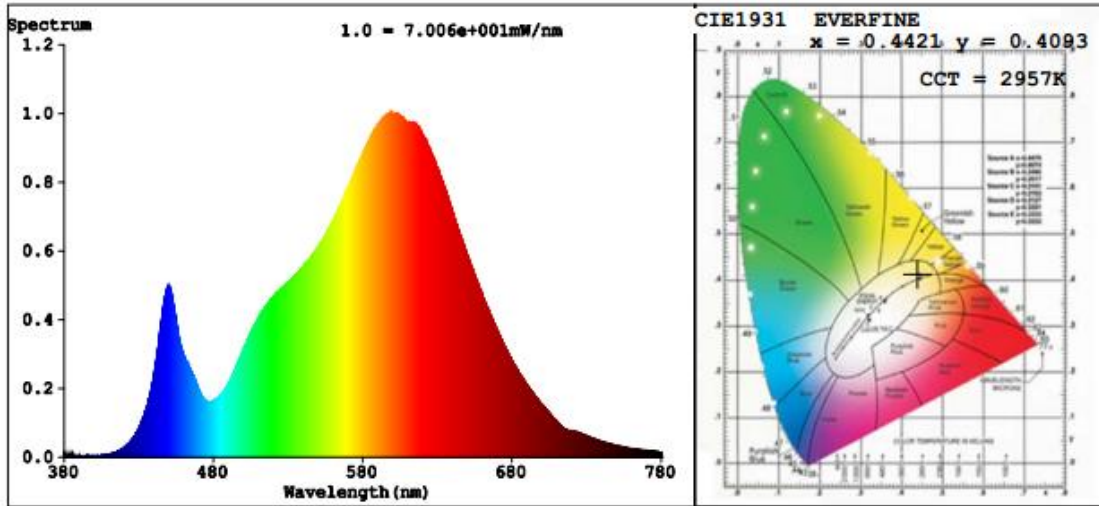
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	5
Frequency (Hz)	60	R2	89	R10	76
CCT (K)	2957	R3	97	R11	80
Duv	0.0014	R4	80	R12	69
Chromaticity (x, y)	x=0.4421 y=0.4093	R5	80	R13	82
Chromaticity (u', v')	u'=0.2517 v'=0.5242	R6	87	R14	99
Color Rendering Index (CRI)	81.9	R7	83	R15	72
R9	5	R8	58	--	--

Photometric Measurement – Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4346.1	4332.2	>=1500(-10%)	
Luminous Efficacy (lm/W)	101.26	102.34	Standard: >= 100(-3%)	Premium: >= 125(-3%)
Zonal lumens in the 0-60 °zone (%)	78	--	>= 75(-3)	
SC: 0-180 °(if applicable)	1.26	--	1.0-2.0(±0.1)	
SC: 90-270 °(if applicable)	1.25	--	1.0-2.0(±0.1)	
Beam Angle (°)	112.6	--	--	
Center Beam Candle Power (cd)	1508	--	--	

Spectral Power Distribution & Chromaticity Diagram

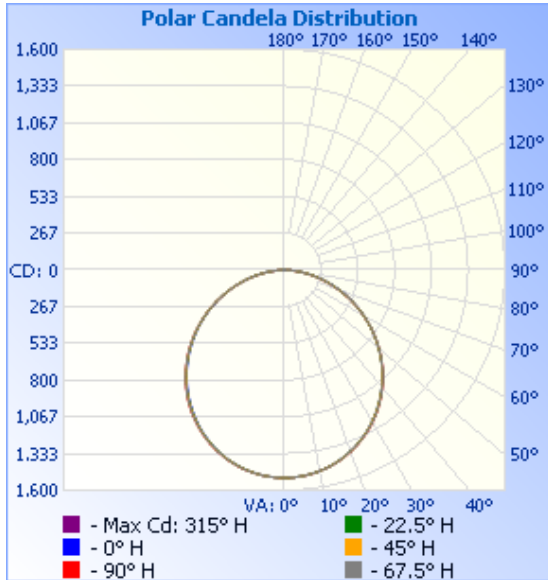


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,170.6	26.9%
0-40	1,917.2	44.1%
0-60	3,391.5	78%
60-90	952.3	21.9%
70-100	413.7	9.5%
90-120	0.3	0%
0-90	4,343.8	100%
90-180	1.8	0%
0-180	4,345.7	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	142.7	3.3%	90-100	0.1	0%
10-20	408.6	9.4%	100-110	0.1	0%
20-30	619.3	14.3%	110-120	0.1	0%
30-40	746.5	17.2%	120-130	0.2	0%
40-50	774.1	17.8%	130-140	0.3	0%
50-60	700.2	16.1%	140-150	0.3	0%
60-70	538.7	12.4%	150-160	0.3	0%
70-80	320.4	7.4%	160-170	0.2	0%
80-90	93.3	2.1%	170-180	0.1	0%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	5.22 fc	50.8 ft	51.1 ft
34.0ft	1.30 fc	101.7 ft	102.2 ft
51.0ft	0.58 fc	152.5 ft	153.3 ft
68.0ft	0.33 fc	203.3 ft	204.4 ft
85.0ft	0.21 fc	254.1 ft	255.4 ft
102.0ft	0.14 fc	305.0 ft	306.5 ft

■ Vert. Spread: 112.4°
■ Horiz. Spread: 112.7°

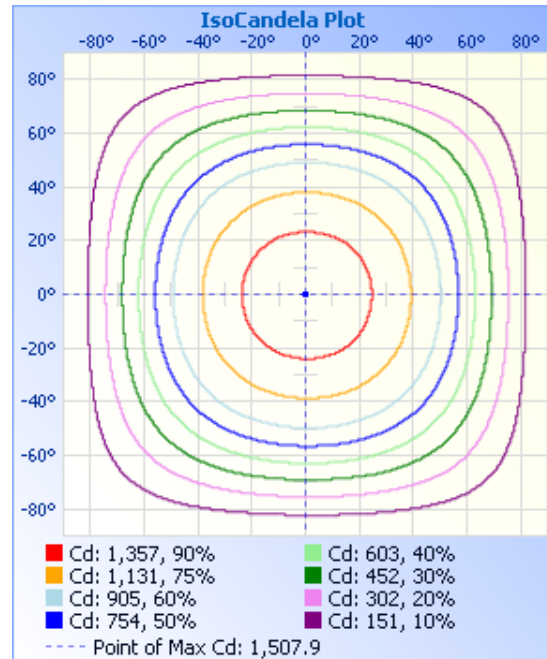
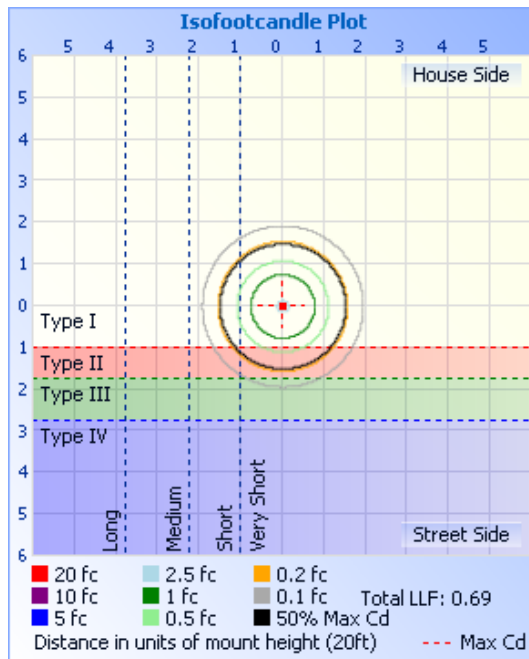


Table--1

UNIT: cd

C (DEG) y (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338	
0	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508	
5	1502	1502	1502	1501	1501	1501	1501	1501	1501	1501	1500	1501	1501	1501	1501	1502	1502
10	1483	1483	1483	1481	1480	1480	1481	1481	1481	1480	1479	1480	1481	1481	1482	1482	
15	1451	1451	1451	1447	1447	1447	1447	1448	1449	1447	1446	1446	1447	1447	1449	1450	
20	1406	1406	1405	1401	1400	1400	1401	1402	1404	1401	1399	1399	1402	1401	1403	1405	
25	1349	1349	1347	1342	1341	1342	1342	1345	1346	1343	1341	1340	1341	1343	1345	1348	
30	1280	1280	1278	1272	1271	1272	1272	1275	1277	1274	1271	1269	1270	1273	1275	1279	
35	1200	1200	1198	1192	1190	1191	1191	1195	1196	1193	1190	1188	1189	1192	1195	1199	
40	1110	1110	1108	1102	1100	1101	1100	1104	1106	1102	1099	1097	1098	1102	1104	1109	
45	1010	1010	1008	1003	1002	1001	1002	1005	1006	1002	999	997	999	1003	1005	1009	
50	903	903	901	897	896	895	896	898	898	894	892	890	893	896	899	902	
55	788	788	787	784	783	783	783	784	784	780	779	778	780	784	786	789	
60	669	669	669	667	667	666	665	665	664	661	660	661	664	667	669	671	
65	546	545	547	547	548	546	544	544	541	538	539	540	544	546	548	548	
70	423	422	424	426	428	425	423	421	418	415	416	419	424	425	426	426	
75	301	301	304	307	309	307	304	299	297	295	296	300	305	307	307	304	
80	185	187	190	192	194	192	189	184	182	181	183	187	192	193	192	190	
85	81.7	83.5	84.6	85.7	86.6	84.3	82.3	78.8	79.0	78.1	79.0	80.7	83.9	84.8	85.7	85.8	
90	0.07	0.05	0.06	0.26	0.52	0.21	0.04	0.03	0.00	0.00	0.00	0.00	0.41	0.16	0.00	0.00	
95	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.26	0.00	0.00	
100	0.00	0.00	0.00	0.10	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.46	0.00	0.00	
105	0.00	0.00	0.00	0.15	0.34	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.41	0.05	0.00	
110	0.00	0.00	0.00	0.31	0.37	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.16	0.00	
115	0.00	0.00	0.10	0.35	0.40	0.19	0.00	0.00	0.00	0.00	0.02	0.00	0.20	0.31	0.41	0.00	
120	0.00	0.00	0.39	0.31	0.05	0.18	0.21	0.00	0.00	0.00	0.08	0.26	0.00	0.41	0.44	0.09	
125	0.00	0.16	0.52	0.77	0.05	0.46	0.41	0.00	0.00	0.00	0.13	0.72	0.00	0.93	0.53	0.18	
130	0.00	0.22	0.57	0.81	0.05	0.47	0.42	0.14	0.08	0.00	0.26	0.82	0.15	1.08	0.56	0.31	
135	0.00	0.28	0.64	0.86	0.05	0.50	0.44	0.12	0.18	0.05	0.32	0.91	0.20	1.10	0.59	0.42	
140	0.05	0.32	0.59	0.87	0.05	0.52	0.45	0.41	0.25	0.15	0.35	0.96	0.26	1.11	0.61	0.67	
145	0.12	0.36	0.66	0.87	0.05	0.54	0.48	0.38	0.29	0.26	0.41	1.03	0.46	1.13	0.88	0.76	
150	0.16	0.46	0.75	1.08	0.10	0.57	0.57	0.42	0.34	0.30	0.58	1.14	0.51	0.93	1.10	0.93	
155	0.20	0.50	1.29	1.19	0.26	0.62	0.62	0.45	0.33	0.36	0.62	1.08	0.56	0.67	1.24	1.04	
160	0.24	0.54	1.39	1.17	0.46	0.66	0.62	0.49	0.34	0.38	0.66	1.03	0.78	0.64	1.24	1.19	
165	0.28	0.58	1.39	1.11	0.49	0.70	0.78	0.54	0.41	0.41	0.63	1.03	1.13	0.62	1.19	1.46	
170	0.31	0.62	1.39	1.13	0.53	0.97	1.19	0.63	0.48	0.43	0.65	1.15	1.17	0.60	1.09	1.49	
175	0.44	0.63	1.39	1.10	0.56	1.11	1.36	0.73	0.51	0.46	0.66	1.28	1.08	0.58	0.88	1.43	
180	0.47	0.67	1.50	1.03	0.57	0.98	1.40	0.78	0.52	0.47	0.67	1.34	0.93	0.57	0.88	1.40	

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2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-17	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	64-PL-612-45W-50K-D-S-28A1		

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160475-	120.0	60	0.3595	42.86	0.9935	7.42
M2	277.0	60	0.1689	42.16	0.9012	12.33
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

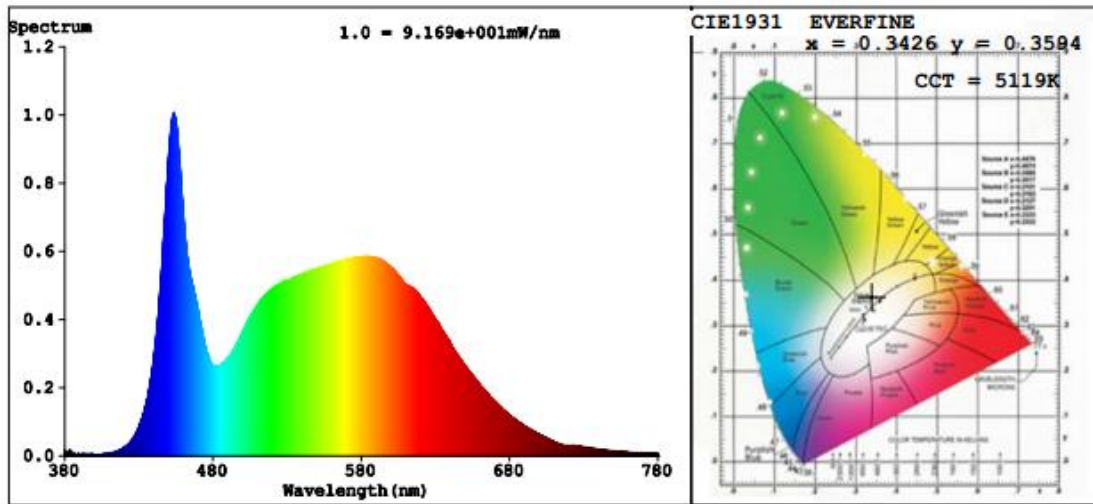
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	6
Frequency (Hz)	60	R2	89	R10	74
CCT (K)	5119	R3	94	R11	80
Duv	0.0049	R4	81	R12	59
Chromaticity (x, y)	x=0.3426 y=0.3594	R5	81	R13	83
Chromaticity (u', v')	u'=0.2067 v'=0.4881	R6	85	R14	97
Color Rendering Index (CRI)	83.1	R7	87	R15	75
R9	6	R8	66	--	--

Photometric Measurement – Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	4463	4425	>=1500(-10%)	
Luminous Efficacy (lm/W)	104.12	104.95	Standard: >= 100(-3%)	Premium: >= 125(-3%)

Spectral Power Distribution & Chromaticity Diagram



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3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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