

**LM-79-08 Test Report**

For

**Keystone Technologies****(Brand Name: Keystone)**

1390 Welsh Rd North Wales, PA 19454

**High Bay Luminaires for Commercial and Industrial  
Buildings**

Model name(s): KT-RHLED150-12C-8xx-VDIM-P

Remark: The “xx” stands for different CCT as bellow: 40=4000K,  
50=5000K.This is multiple listed report, the Project Number of the original report is  
JAE180630-BRepresentative (Tested) Model: KT-RHLED150-12C-840-VDIM-P  
KT-RHLED150-12C-850-VDIM-P

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

Test &amp; Report By:

*Garman Mo*

Engineer: Garman Mo

Date: Oct.26,2018

Review By:

*John Li*

Manager: John Li

Note: 1. The results contained in this report pertain only to the tested samples.

2. 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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<http://www.standard-tech.com>

**1.1 Product Information:**

Organization Name	Keystone Technologies	
Brand Name	Keystone	
Model Number	KT-RHLED150-12C-8xx-VDIM-P	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	High Bay Luminaires for Commercial and Industrial Buildings	
Rated Voltage / Frequency	100-277V ac, 50/60 Hz	
Nominal Power	150W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K, 5000K.	
LED Manufacturer	Samsung Electronics Co., LTD.	
LED Model	4000K: SPMWH1228FD5WATOSG 5000K: SPMWH1228FD5WAROSG	
Sample Number	JAE180630-B1(4000K), B2(5000K)	
Lamp Length	--	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

**Photo**



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**1.2 Test Specifications:**

Date of Receipt	Jun.29,2018
Date of Test	Jun.29,2018
Test item	<ol style="list-style-type: none"> <li>1. Total Luminous Flux</li> <li>2. Luminous Distribution Intensity</li> <li>3. Luminous Efficacy</li> <li>4. Correlated Color Temperature</li> <li>5. Color Rendering Index</li> <li>6. Chromaticity Coordinate</li> <li>7. Electrical Parameters</li> </ol>
Reference Standard	<ol style="list-style-type: none"> <li>1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products</li> <li>2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products</li> <li>3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources</li> <li>4. CIE 15-2004 Technical Report Colorimetry</li> <li>5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source</li> <li>6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems</li> </ol>
Reference Work Instruction	QD25

**1.3 Test Methods**

<p><b>1) Photometric and Light Distribution Measurement – Goniophotometer Method:</b>  Photometric parameters were measured using the goniophotometer and software. 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 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><b>2) Chromaticity Measurement – Sphere-Spectroradiometer Method:</b>  Chromaticity 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 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><b>3) Electrical Measurements:</b>  Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at 25 °C ± 1 °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)

<b>Test date</b>	2018-06-29	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	KT-RHLED150-12C-840-VDIM-P		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180630	120.0	60	1.2815	152.7	0.9930	8.18
-B1	277.0	60	0.5776	148.0	0.9251	10.67
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

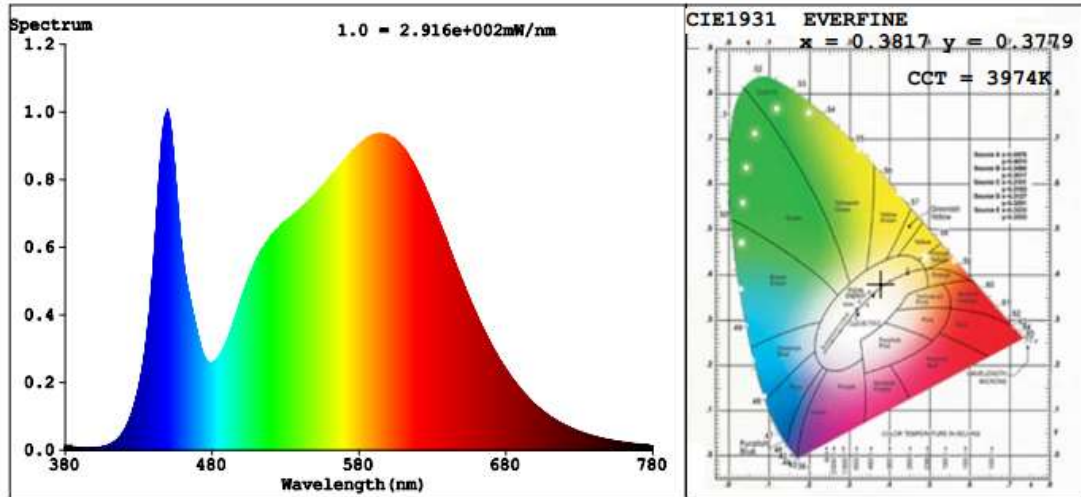
**Chromaticity Measurement -Spectroradiometer Method:**

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	12
Frequency (Hz)	60	R2	89	R10	73
CCT (K)	3974	R3	94	R11	82
Duv	0.0002	R4	83	R12	64
Chromaticity (x, y)	x=0.3817 y=0.3779	R5	82	R13	83
Chromaticity (u', v')	u'=0.2255 v'=0.5023	R6	85	R14	97
Color Rendering Index (CRI)	83.4	R7	87	R15	76
R9	12	R8	66	--	--

**Photometric Measurement –Goniophotometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	19744	19418	≥10000	
Luminous Efficacy (lm/W)	129.30	131.20	Standard: ≥105(-3%)	Premium: ≥130(-3%)
Most Worst Luminous/Highest Watts	127.16			
Zonal lumens in the 20-50 ° zone (%)	54.0	--	≥30(-10)	
Beam Angle ( °)	112.8	--	--	
Center Beam Candle Power (cd)	7193	--	--	

**Spectral Power Distribution & Chromaticity Diagram**

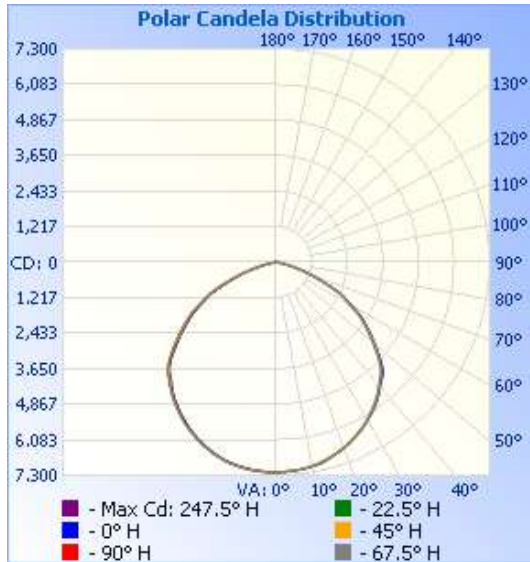


**Zonal Lumen Tabulation**

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	5,672.4	28.7%
0-40	9,387.5	47.6%
0-60	16,704.7	84.6%
60-90	2,975.0	15.1%
70-100	757.1	3.8%
90-120	17.0	0.1%
0-90	19,679.7	99.7%
90-180	62.2	0.3%
0-180	19,742.0	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	Total
0-10	682.1	3.5%	90-100	2.5	0%
10-20	1,969.9	10.0%	100-110	5.3	0%
20-30	3,020.4	15.3%	110-120	9.3	0%
30-40	3,715.0	18.8%	120-130	10.5	0.1%
40-50	3,933.7	19.9%	130-140	10.8	0.1%
50-60	3,383.6	17.1%	140-150	9.6	0%
60-70	2,220.3	11.2%	150-160	7.6	0%
70-80	714.1	3.6%	160-170	4.8	0%
80-90	40.6	0.2%	170-180	1.9	0%

**Photometric Data**



**Illuminance at a Distance**

	Center Beam fc	Beam Width	
17.0ft	24.9 fc	51.3 ft	51.0 ft
34.0ft	6.2 fc	102.5 ft	102.1 ft
51.0ft	2.8 fc	153.8 ft	153.1 ft
68.0ft	1.6 fc	205.1 ft	204.1 ft
85.0ft	1.0 fc	256.3 ft	255.2 ft
102.0ft	0.7 fc	307.6 ft	306.2 ft

■ Vert. Spread: 112.9°  
 ■ Horiz. Spread: 112.7°

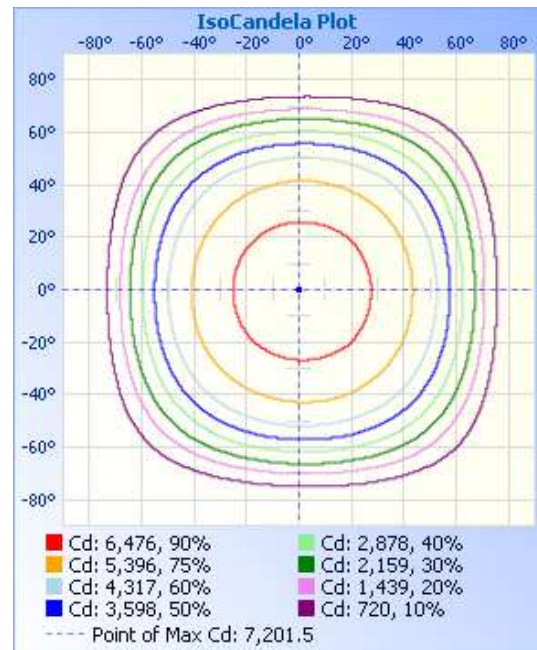
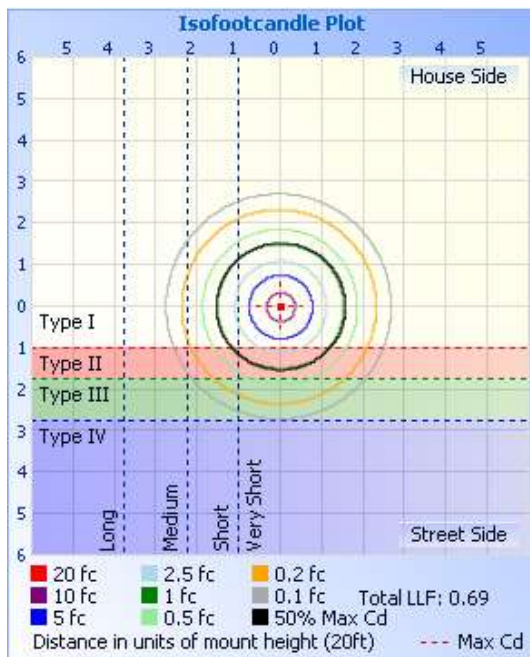


Table--1

UNIT: cd

C (DEG) γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5
0	7193	7193	7193	7193	7193	7193	7193	7193	7193	7193	7193	7193	7193	7193	7193	7193
5	7170	7176	7183	7178	7164	7160	7158	7157	7154	7167	7162	7152	7160	7178	7175	7191
10	7103	7113	7128	7107	7101	7089	7085	7075	7078	7096	7095	7094	7105	7112	7127	7127
15	6995	7001	7006	6983	6962	6969	6939	6939	6941	6958	6967	6963	6990	6996	7007	7021
20	6821	6823	6823	6793	6769	6766	6752	6755	6745	6753	6768	6779	6792	6812	6833	6830
25	6592	6594	6589	6557	6532	6537	6514	6504	6502	6507	6522	6533	6555	6573	6596	6597
30	6306	6304	6300	6276	6247	6236	6228	6220	6210	6222	6232	6239	6258	6290	6322	6323
35	5983	5989	5967	5939	5935	5918	5890	5877	5879	5888	5924	5930	5958	5979	5996	5995
40	5623	5603	5579	5564	5528	5501	5483	5466	5486	5495	5510	5538	5583	5611	5622	5631
45	5242	5249	5198	5174	5143	5097	5026	5037	5071	5113	5161	5155	5195	5214	5216	5249
50	4614	4553	4546	4487	4430	4370	4388	4336	4353	4370	4383	4464	4539	4554	4610	4610
55	3915	3904	3853	3793	3739	3714	3674	3665	3662	3699	3742	3781	3824	3871	3890	3924
60	3220	3194	3131	3075	3013	2943	2923	2919	2899	2885	2940	3037	3092	3172	3209	3230
65	2496	2469	2412	2328	2268	2196	2136	2104	2145	2141	2202	2259	2349	2391	2446	2481
70	1537	1503	1448	1375	1323	1277	1238	1235	1215	1237	1286	1346	1413	1462	1502	1521
75	745	707	664	622	587	549	528	519	527	544	551	593	647	703	717	744
80	228	203	189	179	165	148	136	131	131	136	151	180	204	207	223	236
85	17.6	15.7	12.6	9.39	7.56	6.36	5.76	5.55	5.06	5.27	5.78	7.44	9.85	12.9	15.6	16.8
90	2.73	2.58	2.38	2.22	2.22	2.17	2.12	2.17	2.36	1.70	1.65	2.50	2.75	2.01	2.67	2.26
95	2.10	1.85	1.91	2.26	2.06	2.25	2.32	0.02	1.96	1.96	1.91	2.01	2.01	1.96	2.12	1.86
100	3.09	3.09	3.19	3.24	3.40	3.61	3.71	3.97	3.19	3.04	2.84	2.83	2.84	2.68	2.73	2.63
105	4.89	4.99	5.00	5.25	5.41	5.62	5.77	5.88	4.59	4.53	4.59	4.48	4.33	4.33	4.07	4.08
110	8.08	6.34	7.42	8.91	8.50	8.92	8.20	8.04	7.78	6.50	6.38	7.69	7.08	6.97	6.45	5.84
115	11.0	10.8	9.37	9.53	10.5	10.0	10.1	11.2	9.99	9.89	7.99	7.88	8.97	7.74	7.48	8.72
120	13.2	13.1	11.1	10.6	11.0	10.4	11.9	12.9	10.8	10.5	9.08	8.65	9.49	8.05	8.92	10.3
125	14.1	14.0	13.0	12.1	11.8	11.2	13.3	14.3	11.1	11.1	10.00	9.79	9.90	8.78	9.78	10.8
130	14.4	14.3	13.1	14.2	15.4	14.6	13.5	15.0	12.0	11.6	11.3	12.0	13.0	11.3	10.7	11.2
135	14.8	14.8	13.0	15.7	16.0	15.7	13.9	15.4	12.7	12.6	13.0	14.5	14.3	13.7	12.2	12.3
140	16.0	15.5	12.9	16.8	16.3	16.5	14.4	16.0	14.0	13.7	13.3	15.7	15.3	14.6	12.7	13.0
145	15.8	15.4	14.3	17.1	15.8	16.8	15.1	16.1	14.2	14.6	14.3	15.9	15.5	16.3	13.8	13.7
150	16.3	15.5	16.0	17.7	17.6	17.3	15.3	16.3	14.8	15.7	15.3	16.0	16.1	16.2	15.7	14.2
155	15.8	15.7	17.6	17.7	18.5	18.1	17.4	17.2	15.1	16.5	15.6	16.4	15.9	16.2	17.2	15.6
160	14.7	15.7	18.1	18.1	18.8	18.0	17.6	17.6	14.1	15.4	15.6	16.7	16.5	16.3	16.6	15.4
165	15.2	15.8	18.6	18.3	18.8	18.0	18.1	17.8	14.9	14.3	16.1	17.0	16.9	16.7	16.3	16.4
170	16.4	17.5	20.6	19.5	19.2	20.0	20.6	18.2	16.5	16.4	18.2	20.5	20.2	19.9	19.4	20.1
175	16.5	18.6	21.7	20.7	22.8	20.9	21.9	18.7	17.2	17.0	19.3	21.9	22.1	23.5	20.6	22.0
180	16.4	19.3	21.3	21.3	22.7	20.6	22.2	18.9	16.1	16.4	18.9	21.0	21.2	22.6	20.5	21.7

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**2.2 Electrical, Photometric and Chromaticity Measurements**  
*(Refer to Work Instruction QD25)*

<b>Test date</b>	2018-06-29	<b>Test Ambient:</b>	25.2 °C
<b>Test Orientation</b>	Horizontal	<b>Stabilization Time (min)</b>	90
<b>Model Number</b>	KT-RHLED150-12C-850-VDIM-P		

**Electrical Measurement :**

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE180630	120.0	60	1.2903	153.2	0.9894	9.87
-B2	277.0	60	0.5867	149.3	0.9187	11.53
<b>DLC Pass Criteria</b>					>= 0.9(-3%)	<= 20(+5)

**Chromaticity Measurement -Spectroradiometer Method:**

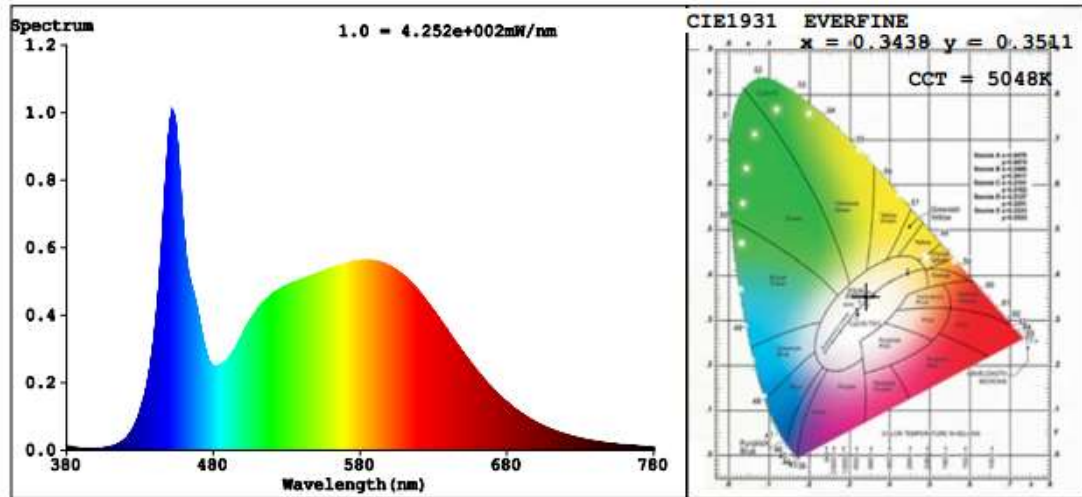
Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	85	R9	21
Frequency (Hz)	60	R2	91	R10	77
CCT (K)	5048	R3	94	R11	84
Duv	0.0003	R4	85	R12	64
Chromaticity (x, y)	x=0.3438 y=0.3511	R5	85	R13	86
Chromaticity (u', v')	u'=0.2108 v'=0.4842	R6	86	R14	97
Color Rendering Index (CRI)	85.5	R7	88	R15	80
R9	21	R8	71	--	--

**Photometric Measurement –Spectroradiometer Method:**

Parameter	Result		DLC V4.3 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	20101	19770	>=10000(-10%)	
Luminous Efficacy (lm/W)	131.21	132.42	Standard: >=	Premium: >=
Most Worst Luminous/Highest Watts	129.05		105(-3%)	130(-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-331	2 meter Integrating Sphere	2017-07-01	2018-06-30
ST-R-327	Spectral analysis system HAAS-2000	2017-07-01	2018-06-30
D204	Standard Lamp	2017-07-12	2018-07-11
PF2010	Power Meter for Integrating Sphere	2017-07-01	2018-06-30
GO-R5000	Goniophotometer system	2017-07-01	2018-06-30
D908S	Standard Lamp	2017-07-12	2018-07-11
PF210	Power Meter for Goniophotometer	2017-07-07	2018-07-06

Expand Uncertainty:  
Photometric Measurement (Sphere):2.04%, k=2  
Chromaticity Measurement(Sphere):28.8K, k=2  
Photometric Measurement(Goniophotometer):2.36%, k=2

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

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