

LM-79-08 Test Report

For

Keystone Technologies

(Brand Name: Keystone Technologies)

2750 Morris rd, Lansdale, PA 19446

High-bay Luminaires for Commercial and Industrial Buildings

Model name(s): KT-RHLED135HT-14C-8xx-VDIM-P

Remark: The xx stands for different CCT as bellow:

40=4000K, 50=5000K, 57=5700K.

This is multiple listed report, the Project Number of the original report is JAE190823-B.

Representative (Tested) Model: KT-RHLED135HT-14C-840-VDIM-P
KT-RHLED135HT-14C-857-VDIM-P

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

Test & Report By:

Leo Wang

Engineer: Leo Wang

Date: Nov.18,2019

Review By:

Garman Mo

Manager: Garman Mo

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 A2LA, or any agency of the Federal Government.

1.1 Product Information:

Organization Name	Keystone Technologies.	
Brand Name	Keystone Technologies	
Model Number	KT-RHLED135HT-14C-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	100-277Vac, 50/60Hz	
Nominal Power	135W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K,5700K	
LED Manufacturer	Lumileds	
LED Model	LUXEON 3030 2D	
Sample Number	JAE190823-B1(4000K),B2(5700K)	
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	Aug.17,2019
Date of Test	Aug.19,2019
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

1.3 Test Methods**1) Photometric and Light Distribution Measurement – Goniophotometer Method:**

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.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

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.

3) Electrical Measurements:

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.

2.1 Electrical, Photometric and Chromaticity Measurements

Test date	2019-08-19	Test Ambient:	25.1 °C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	KT-RHLED135HT-14C-840-V DIM-P	Total Operating Time (min)	90

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE190823-	120.0	60	1.169	139.5	0.9942	4.80
B1	277.0	60	0.5485	135.5	0.8918	12.01
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

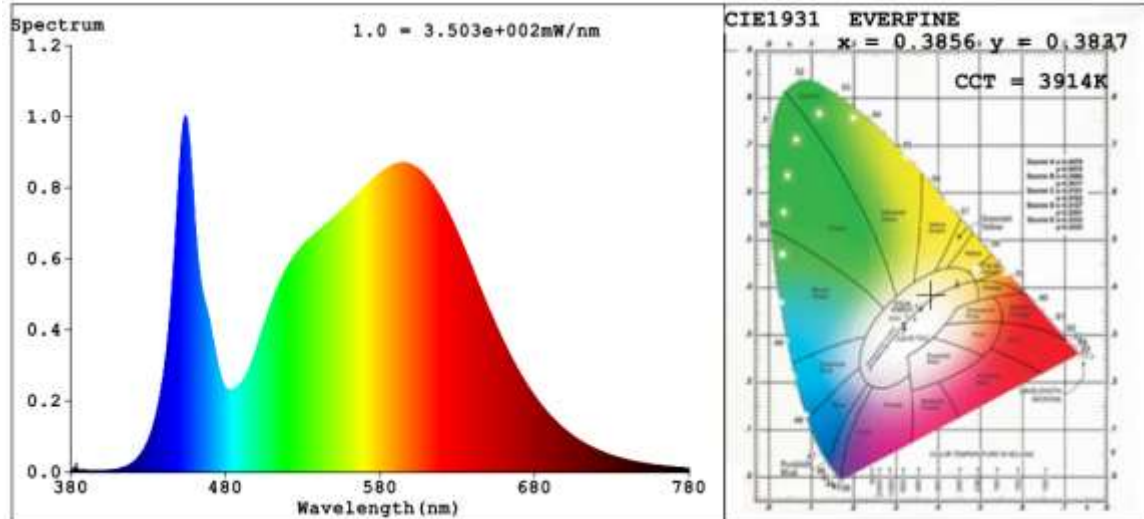
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	9
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	3914	R3	94	R11	78
Duv	0.0018	R4	80	R12	56
Chromaticity (x, y)	x=0.3856 y=0.3837	R5	80	R13	83
Chromaticity (u', v')	u'=0.2257 v'=0.5054	R6	84	R14	97
Color Rendering Index (CRI)	82.3	R7	87	R15	75
R9	9	R8	65	--	--

Photometric Measurement – Goniophotometer Method (Test Distance: 26.000m):

Parameter	Result		DLC V4.4 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	21368	21311	>=10000 (-10%)	
Luminous Efficacy (lm/W)	153.18	157.28	Standard: >= 105(-3%)	Premium: >= 130(-3%)
Zonal lumens in the 20-50 °zone (%)	60.6	--	>= 30(-10)	
Beam Angle (°)	101.8	--	--	
Center Beam Candle Power (cd)	9296	--	--	

Spectral Power Distribution & Chromaticity Diagram

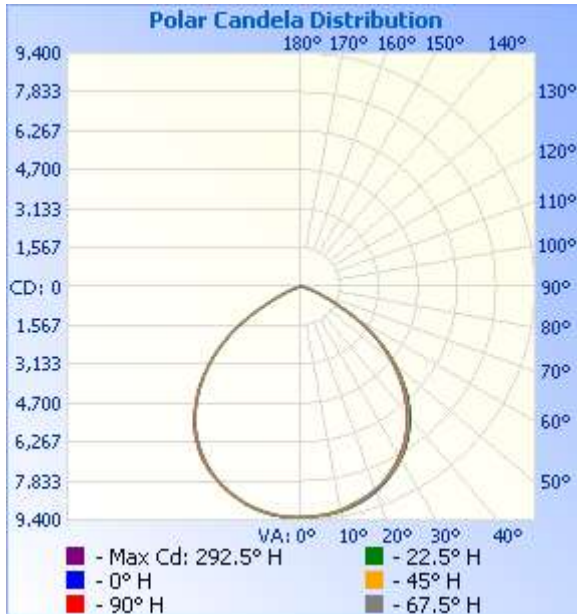


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	7,271.5	34%
0-40	11,870.6	55.6%
0-60	19,662.6	92%
60-90	1,631.2	7.6%
70-100	310.3	1.5%
90-120	13.1	0.1%
0-90	21,293.8	99.7%
90-180	70.8	0.3%
0-180	21,364.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	880.9	4.1%	90-100	1.3	0%
10-20	2,533.7	11.9%	100-110	3.7	0%
20-30	3,856.9	18.1%	110-120	8.1	0%
30-40	4,599.1	21.5%	120-130	11.5	0.1%
40-50	4,479.8	21.0%	130-140	13.8	0.1%
50-60	3,312.2	15.5%	140-150	13.0	0.1%
60-70	1,322.2	6.2%	150-160	10.3	0%
70-80	285.9	1.3%	160-170	6.5	0%
80-90	23.1	0.1%	170-180	2.6	0%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
4.0ft	581.0 fc	9.9 ft	9.8 ft
8.0ft	145.3 fc	19.8 ft	19.6 ft
12.0ft	64.6 fc	29.7 ft	29.3 ft
16.0ft	36.3 fc	39.6 ft	39.1 ft
20.0ft	23.2 fc	49.4 ft	48.9 ft

■ Vert. Spread: 102.1°
■ Horiz. Spread: 101.4°

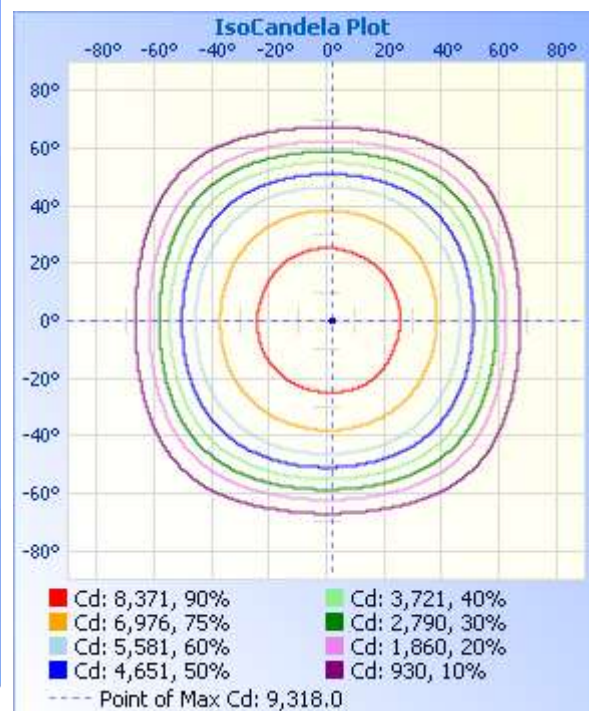
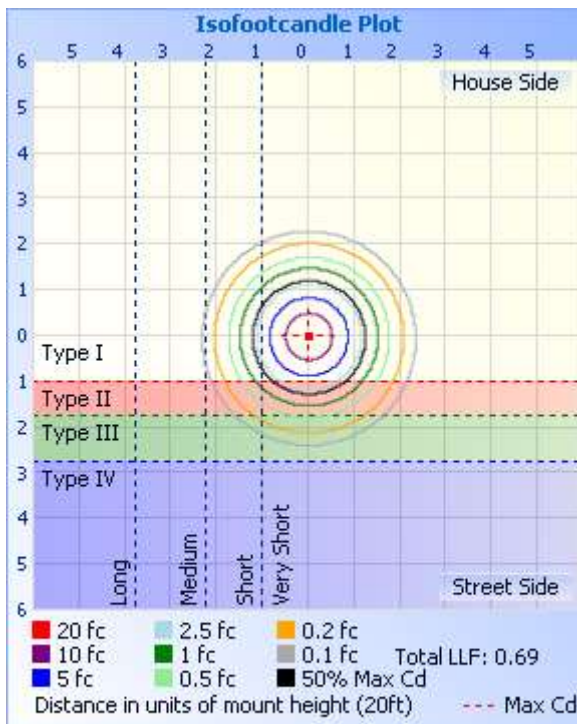


Table--1 UNIT: cd

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	9296	9296	9296	9296	9296	9296	9296	9296	9296	9296	9296	9296	9296	9296	9296	9296		
5	9284	9300	9256	9244	9260	9263	9271	9230	9246	9258	9257	9254	9276	9293	9262	9255		
10	9190	9181	9156	9161	9189	9187	9159	9121	9140	9130	9127	9137	9166	9185	9157	9158		
15	9003	9029	8979	8992	9022	8999	8973	8921	8945	8942	8935	8947	8974	8991	8987	8969		
20	8745	8758	8740	8742	8787	8763	8720	8688	8686	8672	8651	8672	8700	8691	8734	8710		
25	8389	8415	8413	8413	8442	8419	8383	8316	8344	8331	8321	8327	8342	8375	8379	8358		
30	7974	7995	7994	7991	8013	8002	7961	7894	7871	7858	7867	7858	7880	7921	7904	7904		
35	7402	7450	7466	7465	7476	7456	7399	7337	7310	7291	7289	7298	7335	7321	7338	7346		
40	6675	6748	6763	6797	6806	6784	6706	6631	6596	6613	6597	6600	6610	6620	6616	6611		
45	5836	5897	5940	5957	5978	5944	5873	5792	5771	5779	5772	5769	5769	5759	5768	5760		
50	4806	4925	4985	4992	4977	4971	4922	4851	4800	4823	4804	4798	4783	4783	4778	4783		
55	3705	3810	3867	3862	3862	3853	3843	3764	3710	3717	3705	3669	3638	3635	3665	3684		
60	2448	2524	2582	2583	2607	2588	2562	2490	2433	2390	2365	2340	2330	2325	2369	2403		
65	1226	1264	1360	1387	1407	1380	1356	1271	1240	1176	1170	1143	1154	1146	1173	1186		
70	572	603	625	621	644	630	625	592	570	537	535	523	529	522	547	540		
75	240	262	260	260	264	257	260	244	238	225	218	214	217	218	224	226		
80	84.9	94.2	103	100	99.6	92.7	99.7	87.0	82.6	77.6	77.8	75.5	76.3	77.3	78.5	79.5		
85	8.53	9.08	9.85	10.5	10.8	10.1	8.96	8.31	8.23	6.88	5.72	5.11	5.23	5.86	6.47	7.69		
90	1.36	1.52	1.26	1.26	1.48	1.58	1.42	1.41	1.05	0.99	0.94	0.94	1.00	1.05	1.05	1.10		
95	1.05	1.31	1.10	1.05	1.21	1.16	1.21	1.26	1.10	1.05	1.10	0.94	1.00	1.11	1.10	1.05		
100	1.83	1.68	1.57	1.57	1.52	1.58	1.68	1.67	1.62	1.57	1.62	0.02	1.63	1.69	1.63	1.67		
105	4.02	3.71	3.60	3.50	3.52	3.57	3.51	3.60	2.99	2.88	3.09	3.15	3.58	3.37	3.20	2.98		
110	7.12	6.65	6.22	6.13	6.25	6.04	6.19	6.48	5.03	4.98	4.97	4.88	5.26	5.10	5.15	5.13		
115	9.95	9.90	9.26	8.43	8.88	8.41	9.18	9.46	7.34	7.34	7.22	6.87	7.05	6.94	7.19	7.58		
120	13.7	13.1	11.9	10.2	10.9	10.3	12.0	12.6	10.3	9.54	9.06	8.33	9.37	8.41	9.19	10.1		
125	16.5	16.2	15.0	13.1	12.2	12.3	14.8	15.9	11.5	11.7	11.0	10.2	10.5	10.1	11.1	12.0		
130	18.5	17.8	16.6	17.5	18.7	17.5	16.0	17.6	13.6	13.1	13.4	14.0	15.4	14.4	13.1	13.3		
135	20.4	20.0	16.6	20.7	21.1	20.9	17.5	19.4	15.4	15.1	16.6	17.7	17.7	18.0	16.0	15.3		
140	22.4	21.6	17.6	22.2	22.3	22.9	19.2	21.2	17.5	16.9	17.1	20.3	20.0	19.8	17.1	16.9		
145	22.8	22.0	19.5	23.4	21.7	23.2	21.0	21.7	18.3	18.5	18.9	21.1	21.3	21.8	18.7	18.0		
150	23.1	22.4	21.9	24.2	24.8	25.1	21.0	22.1	19.2	20.0	19.6	21.1	21.8	21.8	21.2	19.2		
155	23.1	22.4	24.9	24.3	26.0	25.9	23.0	23.5	19.2	21.2	20.3	21.8	21.1	21.8	23.4	20.5		
160	20.6	22.4	26.0	25.1	26.6	25.5	23.5	24.2	17.4	20.4	20.6	21.9	22.1	21.3	22.1	19.3		
165	21.2	21.7	26.1	25.2	26.0	25.5	24.5	24.6	18.7	18.8	20.9	22.3	22.0	22.0	21.6	21.0		
170	21.7	24.0	29.2	26.0	26.1	27.7	28.8	24.9	20.2	20.4	24.3	27.9	27.1	27.4	26.2	26.7		
175	21.3	25.8	30.3	28.4	31.8	29.3	30.3	25.0	21.3	21.3	26.7	30.1	30.8	32.9	28.4	30.0		
180	19.9	26.7	28.3	28.1	31.4	28.1	29.4	24.6	20.2	20.4	26.2	28.2	28.3	31.2	28.1	29.1		

2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2019-08-19	Test Ambient:	25.1 °C
Test Orientation	As intended	Stabilization Time (min)	60
Model Number	KT-RHLED135HT-14C-857-V DIM-P	Total Operating Time (min)	90

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JAE190823-	120.0	60	1.172	140.0	0.9951	4.51
B2	277.0	60	0.5453	136.0	0.9004	11.73
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

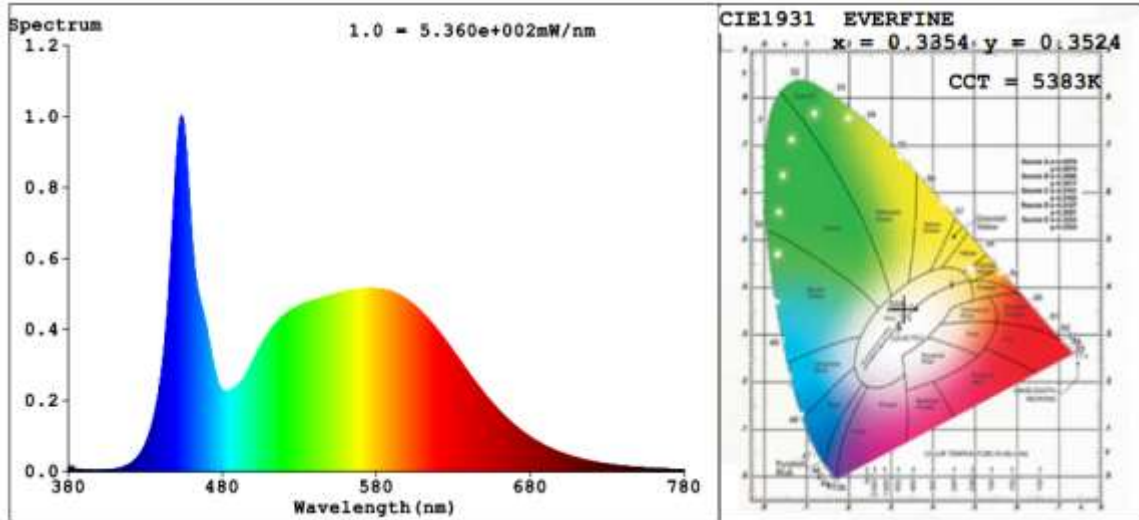
Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	4
Frequency (Hz)	60	R2	89	R10	72
CCT (K)	5383	R3	93	R11	79
Duv	0.0044	R4	81	R12	56
Chromaticity (x, y)	x=0.3354 y=0.3524	R5	81	R13	83
Chromaticity (u', v')	u'=0.2046 v'=0.4836	R6	84	R14	97
Color Rendering Index (CRI)	82.5	R7	87	R15	75
R9	4	R8	66	--	--

Photometric Measurement –Spectroradiometer Method:

Parameter	Result		DLC V4.4 Pass Criteria	
Test Voltage (V)	120.0	277.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	21645	21587	>=10000 (-10%)	
Luminous Efficacy (lm/W)	154.61	158.73	Standard: >= 105(-3%)	Premium: >= 130(-3%)

Spectral Power Distribution & Chromaticity Diagram



Laboratory: Standard-Tech Co., Ltd. Testing Center

Report Format Number STD-QP019-409-B/0

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

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Fax: 8620-32290422

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

2.3 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
KT-RHLED135HT-14C-840-VDIM-P	4000K	21368	139.5	153.18
KT-RHLED135HT-14C-850-VDIM-P	5000K	21553 ^{*1}	139.8 ^{*2}	154.17 ^{*3}
KT-RHLED135HT-14C-857-VDIM-P	5700K	21645	140.0	154.61

*1: This value is calculated and the calculation formula is as below:

$$21553 = (21645 - 21368) / 3 * 2 + 21368$$

*2: This value is calculated and the calculation formula is as below:

$$139.8 = (139.5 + 140.0) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$154.17 = 21553 / 139.8$$

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-423	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-327	Spectral analysis system HAAS-2000	Verified by D204 standard lamp	
ST-R-332	Standard Lamp	2019-07-03	2020-07-02
ST-R-333	Power Meter for Integrating Sphere	2019-06-27	2020-06-26
ST-R-355	Goniophotometer system	Verified by D908S standard lamp	
ST-R-359	Standard Lamp	2019-07-03	2020-07-02
ST-R-358	Power Meter for Goniophotometer	2019-06-27	2020-06-26

Expand Uncertainty:

Photometric Measurement (Sphere):2.66%, k=2

Chromaticity Measurement(Sphere):28.6K, k=2

Photometric Measurement(Goniophotometer):2.76%, k=2

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