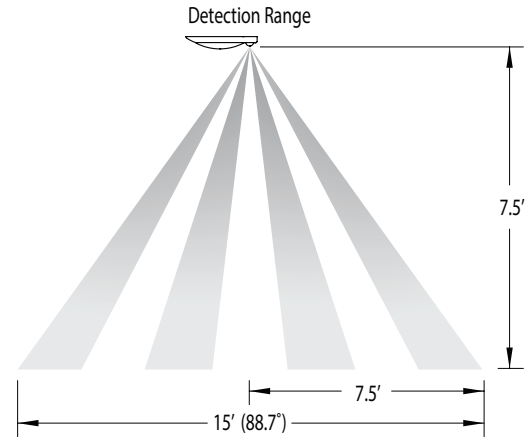
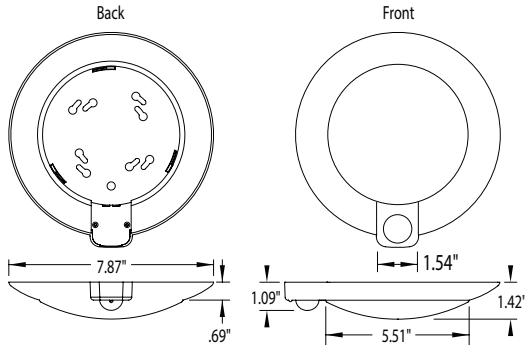


# MOTION CLOSET FIXTURE - 155FM



Wave Lighting's 155FM adds a contemporary look to any interior closet. This fixture is available in dedicated LED and comes standard with occupancy sensor with indicator light. Light turns on when motion is detected and turns off after 3 minutes of no movement. This fixture can be used to comply with 2016 Title 24 Part 6 High Efficacy LED Light Source Requirements. Wave Lighting's 155FM is designed for ceiling applications and mounting hardware is included.



## LED SOURCE OPTIONS

### LIGHTWAVE LED - LR/LT

- 120V, 50/60 Hz
- AC Driver-On-Board Array
- Estimated 50,000 Hrs L<sub>70</sub>
- Low Flicker (LT models)
- Surge Supression
- High Efficacy LED Light Source
- 3000K CCT; 80\*\* or 90CRI
- 5 Year Warranty
- Energy Star





## SPECIFICATIONS

- White Housing
- Mounting Hardware Included
- Frost Polycarbonate Diffuser
- Occupancy Sensor w/Indicator Light

### GUIDE: 155FM-LR12W-WH

### CALL FOR PHOTOMETRIC INFORMATION

ITEM #	LENS	LIGHT SOURCE		COLOR
155FM	Frost	LED LIGHT SOURCE		WH-White
		LIGHTWAVE LED		
		LR12-12W 1000lm 80CRI  **	CCT W-3K	
		LT12-12W 1040lm 90CRI 		

\*\* Not JA8 Compliant. ★ Lamp Included Energy Star Qualified Product

REFER TO CATALOG FOR OPTION SPECIFICATIONS - Specifications subject to change without notice - FIXTURE SPEC 1/19

WAVE LIGHTING • wavelighting.com • 877-870-9283

# TEST REPORT

REPORT NO.: 180800011SHA-102

REPORT DATE: 30 October, 2018

## SUMMARY

<b>MODEL NO.:</b>	FD384-LE900W-WFM
<b>CLASSIFICATION:</b>	Directional
<b>CATEGORY:</b>	Inseparable SSL Luminaire(indoor use)
<b>LED MODEL NO.:</b>	HL-AT-2835FVW-S1-08-PCT-HR3
<b>DRIVER MODEL NO.:</b>	INTERNAL DRIVER
<b>MODEL SIMILARITY OR WILDCARDS:</b>	None

CRITERIA	RESULT	STATUS
Luminaire Efficacy (LPW)	97.17	Pass
Luminaire Minimum Light Output (Lumens)	1090.21	Pass
Luminaire Zonal Lumen Density in 0-60° Zone (%)	74.00	-
Correlated Color Temperature (CCT- K)	2972	Pass
Chromaticity Coordinate (x)	0.4374	-
Chromaticity Coordinate (y)	0.4015	-
Color Rendering Index (Ra)	82.8	Pass
Color Rendering Index (R9)	9	Pass
Color Angular Uniformity (Max Δ, u'v')	0.0003	-
Source Start Time (s)	0.421	Pass
Power Factor ( )	0.9428	Pass
Transient Protection	Survival	Pass
Standby Power Consumption (W)	N/A	-
Operating Frequency (Hz)	120.0	Pass
Operating Frequency - Dimming Level: Highest (Hz)	N/A	-
Operating Frequency -Dimming Level: Lowest (Hz)	N/A	-
Noise to Class A During Low Dimming (dBA) <sup>1)</sup>	N/A	-
Dimming (%) <sup>1)</sup>	N/A	-
Maximum Power Supply Case Temperature (°C)	46.7	Pass
Maximum LED Source In-Situ Temperature (°C)	65.9	Pass
Maximum LED Source In-Situ Current (ma)	62.1	Pass
L70 life projection Hours (hours)	61000H	Pass

**Note 1).** This item is not covered by the NVLAP Accreditation.

## TEST REPORT

REPORT NO.: 180800011SHA-102

REPORT DATE: 30 October, 2018

## ENERGY STAR REQUIREMENTS – DIRECTIONAL LUMINAIRE

SECTION	PROPERTY	REQUIREMENTS		
		Luminaire Efficacy (lm/W)	Minimum Light Output (Lumens)	Zonal Lumens
9.2	Cove or Under Cabinet Mount	50	125 Lumens per Linear Foot	60% min in 0-60° zone (symmetric)
9.2	Downlights (Recessed, Surface, or Pendant)	55	345 ≤ 4.5" aperture 575 > 4.5" aperture	75% min in 0-60° zone (axially symmetric)
9.2	SSL Downlight Retrofit	60	345 ≤ 4.5" aperture 575 > 4.5" aperture	75% min in 0-60° zone (axially symmetric)
9.2	Accent (track or directional ceiling fan light kits)	55	200 per head	80% min in 0-60° zone (axially symmetric)
9.2	Outdoor (Wall, Porch, Pendant, Post, and Security)	60	300	95% in 0-85° zone (symmetric) and 0.5% max above 90° (Dark Sky approved exempt)
9.2	Portable Desk Task	50	200	60% min in 0-75° zone (symmetric)
9.2	Inseparable SSL	70	200	None
9.3	Correlated Color Temperature (CCT) (Outdoor exempt)	The luminaire shall have one of the following nominal correlated color temperatures (CCTs): 2700K, 3000K, 3500K, 4000K, 5000K. The chromaticity shall fall within the corresponding 7-step quadrangle. -1 complete luminaire shall be tested.		
9.4	Color Rendering Index (CRI) (Outdoor exempt)	The luminaire shall meet or exceed $R_a \geq 80$ and $R_9 > 0$ . -1 complete luminaire shall be tested.		
9.5	Color Angular Uniformity (Outdoor exempt)	Throughout the beam angle, the variation of chromaticity shall be within 0.006 from the weighted average point on the CIE 1976 ( $u'$ , $v'$ ) diagram. Note: scanning resolution shall be in 1 degree vertical increments on 0 and 90 horizontal planes. -1 complete luminaire shall be tested.		
11.1	Source Start Time (Outdoor exempt)	Light source shall remain continuously illuminated within 750ms of application of electrical power. Connected luminaires shall remain continuously illuminated within 1 second (1000ms) of application of electrical power. -1 platform shall be tested.		
15.1	Dimming#	The luminaire and its components shall provide continuous dimming from 100% to 20% of total light output. -1 complete luminaire shall be tested.		
11.3	Power Factor	Input Power ≤ 5W: ≥ 0.5 Input Power > 5W: ≥ 0.7 -1 platform shall be tested.		
11.4	Transient Protection	Survive 7 strikes of a 2.5kV, 100kHz Ringwave.		

## TEST REPORT

REPORT NO.: **180800011SHA-102**

REPORT DATE: 30 October, 2018

		If projecting life by using option 2, use the max delta measured during life testing during the first 6000 hours of testing.
10.1 and 10.2	Lumen Maintenance and Lifetime Projections	<p><u>Option 1:</u> Using the Insitu data, the LM-80 lumen maintenance data, and the TM-21 calculator, minimum projected life at L70 shall be <math>\geq 25,000</math> hours for indoor products, <math>\geq 35,000</math> hours for outdoor products, or <math>\geq 50,000</math> hours for inseparable products. -1 complete luminaire shall be tested for Insitu.</p> <p><u>Option 2:</u> Using real time test data for lumen maintenance for a minimum of 6000 hours on the entire luminaire and TM-28-14, the projected life at L70 shall be <math>\geq 25,000</math> hours for indoor products, <math>\geq 35,000</math> hours for outdoor products, or <math>\geq 50,000</math> hours for inseparable products. -3 complete luminaires shall be tested.</p>

#Tests do not fall under the NVLAP accreditation.

## EQUIPMENT LIST

DATE LAST USED	EQUIPMENT USED	MODEL NUMBER	CONTROL NUMBER	LAST CALIBRATION DATE	CALIBRATION DUE DATE
2018.3.25	Fluke Temperature Meter	52	EC4842	2018.3.27	2019.3.26
2018.4.04	Everfine- DC Power Supply	WY12010	EC4753-9	2018.4.06	2019.4.05
2018.4.09	Everfine- AC power source for Integrating Sphere System	VPS1010 PWM	EC4760-12	2018.4.01	2019.4.10
2018.7.23	Everfine - AC power source for Goniophotometer System	VPS1060 PWM	EC4753-8	2018.7.25	2019.7.24
/	Two meter integrating sphere unit	Everfine – 2M	EC4760	2012.6.19	/
2018.5.30	YOKOGAWA – Digital Power Meter	WT-210	EC4169	2018.06.01	2019.5.31
2018.9.08	Everfine – Digital Power Meter	PF2010A	EC4753-6	2018.9.10	2019.9.09
2018.09.05	Everfine – Goniophotometer	Go-R5000	EC4753	2018.09.07	2019.09.06
2018.3.26	KONICA MINOLTA - Illuminance meter	T-10	EC3808	2018.3.28	2019.3.27
2017.11.28	Tektronix - Digital Phosphor Oscilloscope	DPO4034B	EC4734	2017.11.30	2018.11.29
2018.8.20	Life tester	-	EC4865	2018.8.22	2019.8.21

## TEST REPORT

### TEST METHODS

#### SEASONING IN SAMPLE ORIENTATION – LED PRODUCTS

No seasoning was performed in accordance with IESNA LM-79.

#### PHOTOMETRIC AND ELECTRICAL MEASUREMENTS – INTEGRATING SPHERE METHOD

A spectroradiometer and integrating sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

#### PHOTOMETRIC AND ELECTRICAL MEASUREMENTS – DISTRIBUTION METHOD

A mirror goniometer was used to measure the intensity (candelas) at each angle of distribution for the SSL sample.

Ambient temperature was measured equal to the height of the sample mounted on the goniometer equipment. The SSL sample was operated on the client provided driver at rated input volts in its designated orientation. The SSL sample was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

Some graphics were created with Photometrics Plus software.

#### STARTING DELAY TESTS AT AMBIENT TEMPERATURE (25°C +/- 1°C)

The starting delay tests at ambient temperature were performed on one sample. A regulated power supply and an oscilloscope was used to measure the starting time. Each sample was operated at rated input voltage in its designated orientation during the tests.

## TEST REPORT

REPORT NO.: **180800011SHA-102**

REPORT DATE: 30 October, 2018

### TEST METHODS (CONT'D)

#### NOISE AT LOW DIM

Each test sample was operated on a dimmer at the same output electricals measured during the dimming test. A sound level meter was used to measure the overall dBA Sound Level from the ballast at a distance of one meter.

Note: There are no current industry standards for sound ratings of ballasts/ drivers. However, the major ballast manufacturers assign a letter rating of A (quietest) through F (noisiest) to their products. The table below can be used to estimate ballast noise

BALLAST SOUND RATINGS	
SOUND RATINGS	AVERAGE NOISE RATING (DBA)
A	20-24
B	25-30
C	31-36
D	37-42
E	43-48
F	49 and up

#### TRANSIENT PROTECTION

The transient protection tests at ambient temperature were performed on one fixture sample. Each sample was operated at rated input voltage in its designated orientation during the tests. A surge test system with an 100kHz Ring Wave Module and a Coupler/Decoupler Module was used to generate the 2500 volt ring wave transient strike across the lamp base contacts. Each wave consisted of a 0.5 microsecond rise time. Seven strikes were performed on each sample in accordance with ANSI/IEEE C62.41 (Category A): Recommended Practice on Surge Voltages in Low – Voltage AC Circuits.

#### OPERATING FREQUENCY

Operating frequency was measured on one lamp sample with a photodetector, transimpedance amplifier, and oscilloscope. Light output waveform measurements were recorded at the LED source. A digital graphic of the amplitude was recorded. Operating frequency at dimming levels was also checked if applicable.

## TEST REPORT

### TEST METHODS (CONT'D)

#### COLOR SPATIAL UNIFORMITY

The spatial distribution of chromaticity coordinates ( $u'$   $v'$ ) were measured within two vertical planes (CIE),  $0^\circ$  and  $90^\circ$  in  $1^\circ$  vertical increments throughout the required beam angle. The averaged weighted chromaticity coordinate was calculated from these points. The data was then analyzed to check for maximum delta color differences of the  $u'$ ,  $v'$  chromaticity coordinates.

#### DIMMING

Dimming test was performed on one sample with a photometer or oscilloscope. Each sample was allowed to stabilize at its highest dimming point and a relative light output measurement was taken. The sample was then dimmed to its lowest point without flickering and another relative light output measurement was taken. The dimming range percentage was then calculated.

#### IN-SITU MAXIMUM MEASURED POWER SUPPLY CASE AND LED SOURCE POINT TEMPERATURE

Power supply case and/or LED source operating temperature measurements were taken on one test sample per model with a thermocouple and temperature meter. Power supply or source temperature measurements were measured at the  $TMP_{PS}$  or  $T_S$  point as indicated by the included diagram in accordance with manufacturers declared hot spot location. The luminaire was allowed to reach thermal equilibrium for three and a half to seven and a half hours before measurements were taken. The maximum temperature was recorded for the sample. A simulated ceiling or other enclosure may be used in accordance to ANSI/UL 1598, ANSI/UL 1574 or ANSI/UL 153 as applicable.

#### AVERAGE RATED LIFE TEST

The life hour rating was projected using the insitu temperature and current measurements, the provided LM-80 report, and TM-21 calculations.

**TEST REPORT**

REPORT NO.: **180800011SHA-102**

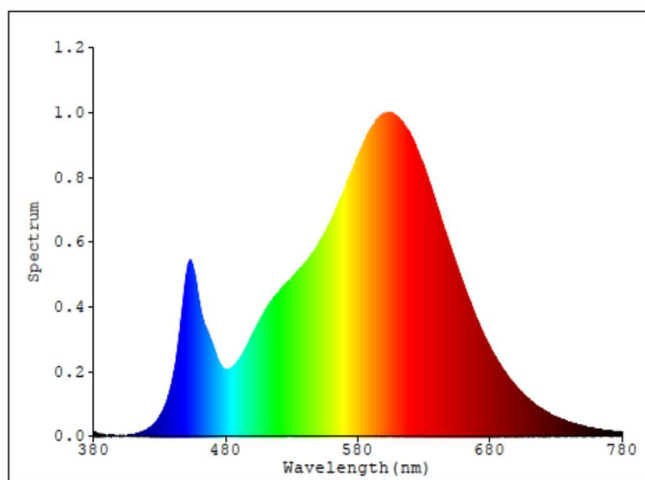
REPORT DATE: 30 October, 2018

**RESULTS OF TESTS**

**SPECTRAL DISTRIBUTION OVER VISIBLE WAVELENGTHS**

Intertek Sample No.: 0181012-05-001

Nm	mW/nm	Nm	mW/nm	Nm	mW/nm	Nm	mW/nm
380	0.0117	490	0.2362	600	0.9974	710	0.1138
385	0.0062	495	0.2701	605	0.9984	715	0.0977
390	0.0041	500	0.3124	610	0.9850	720	0.0832
395	0.0044	505	0.3519	615	0.9625	725	0.0712
400	0.0038	510	0.3901	620	0.9307	730	0.0612
405	0.0042	515	0.4185	625	0.8844	735	0.0519
410	0.0064	520	0.4426	630	0.8349	740	0.0447
415	0.0117	525	0.4658	635	0.7754	745	0.0384
420	0.0207	530	0.4900	640	0.7118	750	0.0333
425	0.0355	535	0.5096	645	0.6496	755	0.0284
430	0.0603	540	0.5348	650	0.5881	760	0.0244
435	0.1029	545	0.5625	655	0.5277	765	0.0208
440	0.1762	550	0.5899	660	0.4703	770	0.0185
445	0.3101	555	0.6268	665	0.4171	775	0.0159
450	0.4877	560	0.6693	670	0.3654	780	0.0154
455	0.5269	565	0.7153	675	0.3182		
460	0.4170	570	0.7629	680	0.2765		
465	0.3367	575	0.8142	685	0.2392		
470	0.2860	580	0.8629	690	0.2072		
475	0.2301	585	0.9112	695	0.1791		
480	0.2074	590	0.9491	700	0.1541		
485	0.2117	595	0.9803	705	0.1326		





TEST REPORT

REPORT NO.: 180800011SHA-102

REPORT DATE: 30 October, 2018

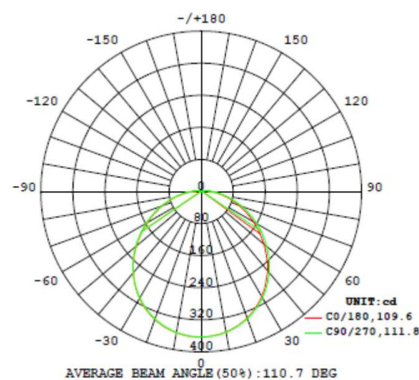
RESULTS OF TESTS (CONT'D)

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS – DISTRIBUTION METHOD

INTERTEK SAMPLE NO.	BASE ORIENTATION	INPUT VOLTAGE (Vac)	INPUT CURRENT (MA)	INPUT POWER (WATTS)	INPUT POWER FACTOR	ABSOLUTE LUMINOUS FLUX (LUMENS)	LUMEN EFFICACY (LUMENS PER WATT)
0181012-05-001	/	120.0	99.10	11.22	0.9428	1090.21	97.17

INTENSITY (CANDLEPOWER) SUMMARY AT 25°C - CANDELAS

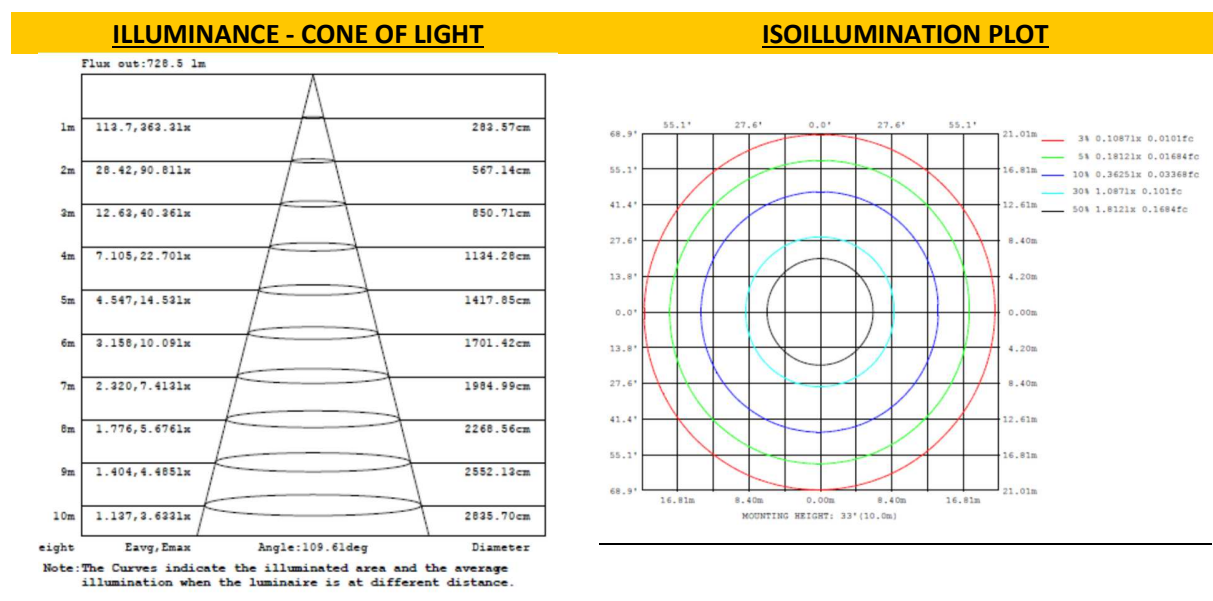
Angle	HORIZONTAL ANGLES				
	0	22.5	45	67.5	90
0	362.9	362.9	362.9	362.9	362.9
5	361.5	361.5	361.2	361.1	360.8
10	356.7	356.6	356.4	356.2	355.5
15	348.9	348.7	348.4	348.0	347.3
20	337.9	337.5	337.2	336.7	335.5
25	323.7	323.4	322.8	322.0	320.4
30	306.6	306.2	305.4	304.2	302.1
35	286.5	286.1	285.2	283.5	280.8
40	264.2	263.8	262.5	260.2	256.9
45	239.7	239.3	237.6	235.0	231.1
50	213.6	213.2	211.3	208.1	204.2
55	186.3	186.0	183.9	180.7	177.1
60	158.7	158.5	156.2	153.5	150.3
65	131.4	131.3	129.2	126.9	124.4
70	105.0	105.1	103.2	101.5	99.4
75	80.6	80.5	79.0	77.6	76.0
80	59.0	58.9	57.4	56.2	54.9
85	40.2	40.1	38.9	38.0	37.1
90	25.3	25.1	24.2	23.5	23.2



## TEST REPORT

## RESULTS OF TESTS (CONT'D)

## ILLUMINATION PLOTS



## ZONAL LUMEN SUMMARY AND PERCENTAGES AT 25°C

ZONE	LUMENS	% LUMINAIRE
0-30	281.41	25.81
0-60	806.94	74.02
0-80	1019.31	93.50
0-90	1062.64	97.47
0-180	1090.21	100.00

**TEST REPORT**

**REPORT NO.:** 180800011SHA-102

**REPORT DATE:** 30 October , 2018

**RESULTS OF TESTS (CONT'D)**

**COLOR SPATIAL UNIFORMITY**

Intertek Sample No.: 0181012-05-001

VERTICAL ANGLE (°)	HORIZONTAL ANGLE = 0°		HORIZONTAL ANGLE = 90°	
	CIE' 1976 CHROMATICITY	CIE' 1976 CHROMATICITY	CIE' 1976 CHROMATICITY	CIE' 1976 CHROMATICITY
	u'	v'	u'	v'
0	0.2519	0.5204	0.2519	0.5204
1	0.2518	0.5204	0.2518	0.5204
2	0.2518	0.5204	0.2518	0.5204
3	0.2518	0.5204	0.2518	0.5204
4	0.2518	0.5204	0.2518	0.5204
5	0.2518	0.5204	0.2518	0.5204
6	0.2518	0.5204	0.2518	0.5204
7	0.2518	0.5204	0.2518	0.5204
8	0.2518	0.5204	0.2518	0.5204
9	0.2519	0.5204	0.2518	0.5204
10	0.2518	0.5204	0.2518	0.5204
11	0.2518	0.5204	0.2519	0.5205
12	0.2519	0.5204	0.2519	0.5205
13	0.2519	0.5204	0.2518	0.5205
14	0.2519	0.5205	0.2519	0.5205
15	0.2519	0.5205	0.2519	0.5205
16	0.2519	0.5205	0.2519	0.5205
17	0.2519	0.5205	0.2519	0.5205
18	0.2519	0.5205	0.2519	0.5205
19	0.2520	0.5205	0.2520	0.5205
20	0.2520	0.5205	0.2520	0.5206
21	0.2520	0.5205	0.2519	0.5206
22	0.2520	0.5206	0.2519	0.5206
23	0.2520	0.5206	0.2519	0.5206
24	0.2521	0.5206	0.2519	0.5206
25	0.2521	0.5206	0.2519	0.5206
26	0.2521	0.5206	0.2520	0.5206
27	0.2521	0.5206	0.2520	0.5206
28	0.2521	0.5207	0.2520	0.5207
29	0.2521	0.5207	0.2520	0.5207
30	0.2522	0.5207	0.2520	0.5207

TEST REPORT

REPORT NO.: 180800011SHA-102

REPORT DATE: 30 October, 2018

RESULTS OF TESTS (CONT'D)

COLOR SPATIAL UNIFORMITY – MEASURED (CONT'D)

VERTICAL ANGLE (°)	HORIZONTAL ANGLE = 0°		HORIZONTAL ANGLE = 90°	
	CIE' 1976 CHROMATICITY	CIE' 1976 CHROMATICITY	CIE' 1976 CHROMATICITY	CIE' 1976 CHROMATICITY
	u'	v'	u'	v'
31	0.2522	0.5207	0.2519	0.5207
32	0.2522	0.5207	0.2519	0.5207
33	0.2522	0.5207	0.2520	0.5207
34	0.2522	0.5208	0.2520	0.5207
35	0.2520	0.5207	0.2520	0.5208
36	0.2521	0.5207	0.2521	0.5208
37	0.2521	0.5207	0.2521	0.5208
38	0.2521	0.5208	0.2520	0.5208
39	0.2521	0.5208	0.2520	0.5208
40	0.2522	0.5208	0.2520	0.5208
41	0.2522	0.5208	0.2520	0.5208
42	0.2522	0.5208	0.2520	0.5208
43	0.2522	0.5208	0.2521	0.5209
44	0.2522	0.5208	0.2520	0.5208
45	0.2520	0.5208	0.2520	0.5209
46	0.2521	0.5208	0.2520	0.5209
47	0.2521	0.5208	0.2520	0.5209
48	0.2520	0.5208	0.2519	0.5209
49	0.2520	0.5208	0.2520	0.5209
50	0.2521	0.5208	0.2520	0.5209
51	0.2521	0.5208	0.2520	0.5209
52	0.2519	0.5208	0.2519	0.5209
53	0.2519	0.5208	0.2519	0.5209
54	0.2519	0.5208	0.2519	0.5209
55	0.2519	0.5208	0.2520	0.5209
56	0.2519	0.5208	0.2519	0.5209
57	0.2519	0.5208	0.2519	0.5209
58	0.2518	0.5207	0.2519	0.5209
59	0.2518	0.5207	0.2519	0.5209
60	0.2517	0.5207	0.252	0.5209

TEST REPORT

REPORT NO.: 180800011SHA-102

REPORT DATE: 30 October, 2018

RESULTS OF TESTS (CONT'D)

COLOR SPATIAL UNIFORMITY – MEASURED (CONT'D)

WEIGHTED AVERAGE

u'	v'
0.2520	0.5206

TOTAL Δ FROM WEIGHTED AVERAGE

VERTICAL ANGLE (°)	HORZ. 0 Δu'v'	HORZ. 90 Δu'v'	VERTICAL ANGLE (°)	HORZ. 0 Δu'v'	HORZ. 90 Δu'v'	VERTICAL ANGLE (°)	HORZ. 0 Δu'v'	HORZ. 90 Δu'v'
0	0.0002	0.0003	21	0.0001	0.0001	42	0.0003	0.0001
1	0.0003	0.0003	22	0.0000	0.0001	43	0.0003	0.0003
2	0.0003	0.0003	23	0.0000	0.0001	44	0.0003	0.0001
3	0.0003	0.0003	24	0.0001	0.0001	45	0.0002	0.0002
4	0.0003	0.0003	25	0.0001	0.0001	46	0.0002	0.0002
5	0.0003	0.0003	26	0.0001	0.0001	47	0.0002	0.0002
6	0.0003	0.0003	27	0.0001	0.0001	48	0.0002	0.0002
7	0.0003	0.0003	28	0.0001	0.0001	49	0.0002	0.0002
8	0.0003	0.0003	29	0.0001	0.0001	50	0.0002	0.0002
9	0.0002	0.0003	30	0.0002	0.0001	51	0.0002	0.0002
10	0.0003	0.0003	31	0.0002	0.0000	52	0.0002	0.0002
11	0.0003	0.0002	32	0.0002	0.0000	53	0.0002	0.0002
12	0.0002	0.0002	33	0.0002	0.0001	54	0.0002	0.0002
13	0.0002	0.0002	34	0.0003	0.0001	55	0.0002	0.0002
14	0.0002	0.0002	35	0.0001	0.0001			
15	0.0002	0.0002	36	0.0001	0.0002			
16	0.0002	0.0002	37	0.0001	0.0002			
17	0.0002	0.0002	38	0.0002	0.0001			
18	0.0002	0.0002	39	0.0002	0.0001			
19	0.0001	0.0002	40	0.0003	0.0001			
20	0.0001	0.0001	41	0.0003	0.0001			

MAXIMUM Δ FROM  
WEIGHTED AVERAGE

Δu'v'  
0.0003

**TEST REPORT**

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**RESULTS OF TESTS (CONT'D)**

**STANDBY POWER**

INTERTEK SAMPLE NO.	USER FUNCTION THAT TRIGGERS STANDBY POWER MODE	INPUT POWER IN OFF STATE (WATTS)
0181012-05-001	N/A	N/A

**NOISE AT LOW DIM**

INTERTEK SAMPLE NO.	SOUND LEVEL IN dBA
0181012-05-001	N/A

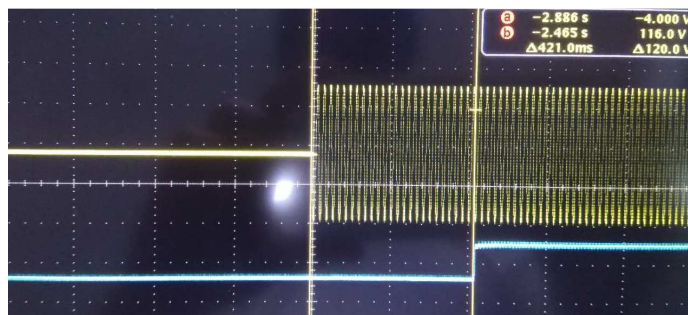
This item is not covered by the NVLAP accreditation.

**TRANSIENT PROTECTION TESTS**

INTERTEK SAMPLE NO.	TRANSIENT PROTECTION TEST - SEVEN STRIKES
0181012-05-001	Pass

**SOURCE START TIME**

INTERTEK SAMPLE NO	STARTING DELAY TIME (s)
0181012-05-001	0.421



**TEST REPORT**

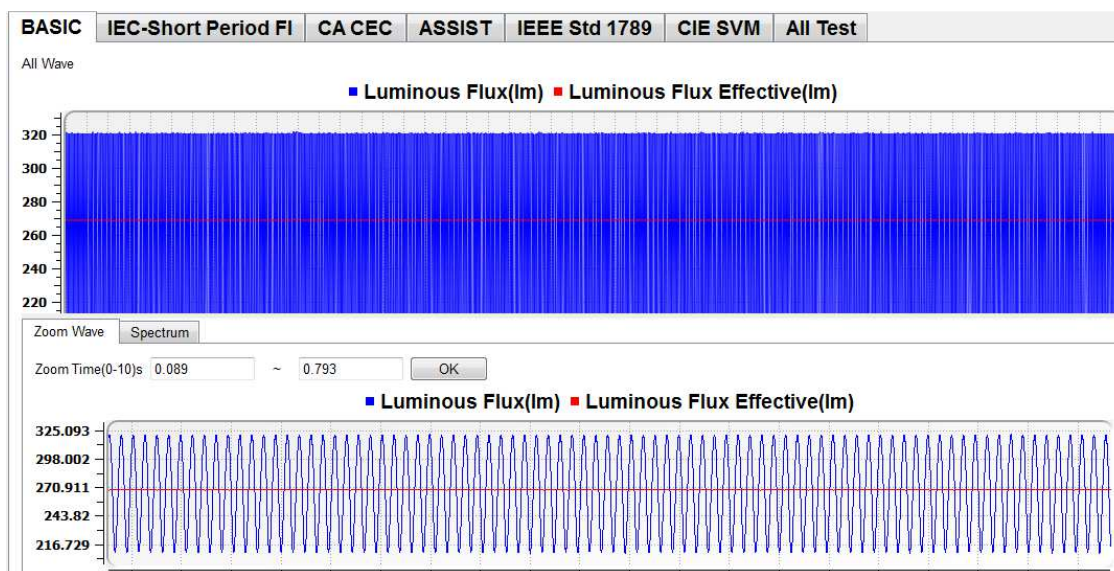
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**RESULTS OF TESTS (CONT'D)**

**OPERATING FREQUENCY**

INTERTEK SAMPLE NO.	OPERATING FREQUENCY (Hz)	OPERATING FREQUENCY-LOW DIM (Hz)	OPERATING FREQUENCY - HIGH DIM (Hz)
0181012-05-001	120	N/A	N/A



## TEST REPORT

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### DIMMING

Compatible dimmer model used: N/A

INTERTEK SAMPLE NO.	DRIVER SAMPLE NO. (IF APPLICABLE)	MAXIMUM LIGHT OUTPUT (?)	MINIMUM LIGHT OUTPUT (?)	RESULT (%)
0181012-05-001	N/A	N/A	N/A	N/A

Note: Non-Phase cut and continuous dimmable.

<u>LUTRON</u>	N/A	N/A	<u>LEVITON</u>	N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A
	N/A	N/A		N/A

This item is not covered by the NVLAP accreditation.



**TEST REPORT**

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**RESULTS OF TESTS (CONT'D)**

**IN-SITU MAXIMUM MEASURED LED SOURCE TEMPERATURE**

**MANUFACTURER SUPPLIED DOCUMENTATION:** Guangzhou Hongli Opto-electronic Co., Ltd.

LED identified as: HL-AT-2835FVW-S1-08-PCT-HR3

**Electrical / Optical Characteristics at Ta=25°C 电性与光学特性**

Parameter (参数)	Symbol (符号)	Min. (最小)	Typ. (平均)	Max. (最大)	Units (单位)	Test Conditions 测试条件
Forward Voltage 正向电压	VF	8.0	9.0	10.0	V	IF=120mA
Viewing Angle 角度	2θ1/2	--	120	--	Deg	IF=120mA
Color Rendering Index 显色性指数	Ra	80	--	--		IF=120mA

**Absolute Maximum Ratings at Ta=25°C 绝对最大额定值**

Parameter (参数)	Symbol (符号)	Rating (值)	Units (单位)
Power Dissipation (功耗)	Pd	1080	mW
Forward Current (正向电流)	IF	120	mA
Peak Forward Current [1] (峰值正向电流)	IFP	150	mA
Electrostatic Discharge (HBM) (静电)	ESD	1000	V
Operating Temperature (操作温度)	Topr	-40 ~ +85	°C
Storage Temperature (保存温度)	Tstg	-40 ~ +100	°C
Thermal Resistance (Junction / Soldering point) 热阻	Rthj-s	18	°C/W
Junction Temperature 结温	TJ	115	°C

**TEST REPORT**

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**RESULTS OF TESTS (CONT'D)**

**IN-SITU MAXIMUM MEASURED LED SOURCE TEMPERATURE**

Maximum Junction Temperature from LED specification ( $T_j$ ) = 115 °C

Thermal Resistance Formula from LED specification = 18°C/W

Maximum Forward Voltage ( $V_f$ ) from LED specification = 10.0V

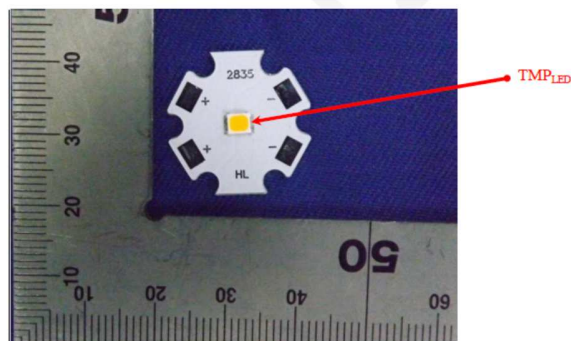
Measured LED Current = 62.1mA

Calculated LED Wattage =  $V_f \times \text{Measured LED Current}$  = 0.621W

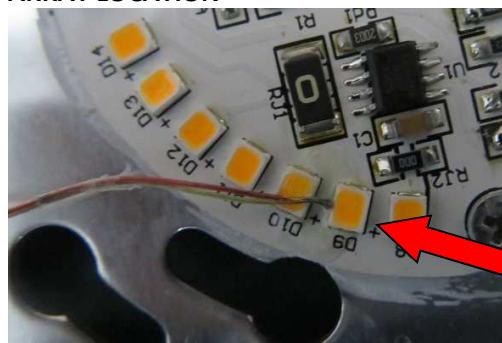
Maximum Source Temperature ( $T_s$ ) =  $T_j - (\text{LED Wattage} \times \text{Thermal Resistance})$  = 103.8°C

SAMPLE NO.	MAXIMUM MEASURED SOURCE TEMPERATURE (°C)	UL THERMAL TEST BOX USED	<<MODEL OF COMPATIBLE RECESSED CAN USED>>	MAXIMUM RATED SOURCE TEMPERATURE (°C)
0181012-05-001	65.9	N/A	N/A	103.8

**TMP**



**ARRAY LOCATION**




TEST REPORT

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RESULTS OF TESTS (CONT'D)

TM-21:



**TM-21 Inputs**

**Instructions**

Yellow fields are completed by the user. Fields not used should be left blank. Cyan fields are calculated based on user entries.

First, enter a description of the LED light source tested. Then complete the fields labeled "LM-80 Testing Details". Test duration must be at least 6,000 hours. If only one case temperature data set is to be used (no interpolation), complete only "Tested case temperature 1". For only two case temperature data sets, complete 1 and 2.

Next, further to the right, in the corresponding box(es) for each tested case temperature, enter the test data along with the time (in hours) at which each measurement was taken. Data entered must be normalized then averaged measured data (per TM-21 sections 5.2.1 and 5.2.2).

Enter drive current, *in-situ* temperature data and the percentage of initial lumens to project to in the fields labeled "*In-Situ* Inputs".

Results can be tailored to estimate lumen maintenance at a specific time by entering a value (t) in the yellow field.

A complete TM-21 report will appear on the next tab labeled "Report".

Description of LED Light Source Tested (manufacturer, model, catalog number)		LM-80 Test Inputs					
Manufacturer : Guangzhou Hongli Opto-Electronic Co., Ltd Model : HL-AT-2835FVW-S1-08-PCT-HR3		Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Tested Case Temperature 3	
		Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
		0	100.00%	0	100.00%		
		1000	100.22%	1000	99.67%		
		2000	99.71%	2000	99.21%		
		3000	99.34%	3000	98.67%		
		4000	98.63%	4000	97.98%		
		5000	98.32%	5000	97.28%		
		6000	97.82%	6000	96.58%		
		7000	97.33%	7000	95.87%		
		8000	96.76%	8000	95.16%		
		9000	96.31%	9000	94.54%		

LM-80 Testing Details	
Total number of units tested per case temperature	25
Number of failures:	0
Number of units measured:	25
Test duration (hours):	9000
Tested drive current (mA):	120
Tested case temperature 1 (T <sub>a</sub> , °C):	55
Tested case temperature 2 (T <sub>a</sub> , °C):	85
Tested case temperature 3 (T <sub>a</sub> , °C):	

In-Situ Inputs	
Drive current for each LED package/array/module (mA):	62.1
<i>In-situ</i> case temperature (T <sub>a</sub> , °C):	65.9
Percentage of initial lumens to project to (e.g. for L <sub>70</sub> , enter 70):	70

Results	
Time (t) at which to estimate lumen maintenance (hours):	61,000
Lumen maintenance at time (t) (%):	70.17%
Calculated L70 (hours):	61,000
Reported L70 (hours):	>54000