

EDISON OPTO Laboratory Test Report

IES LM-80-08

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCE

Report Number	Q131203
Test Sample	2T0301WW38000001
Rating	DC 200mA 1.4W
Normal CCT	2,700 K
Test Date	December 10, 2013 to October 21, 2014
Test Address	9F, NO.800, Chung-Cheng Rd., Chung-Ho Dist., New Taipei City 235, Taiwan
Test Standard	IES LM-80-08 Approved Method : Measuring Lumen Maintenance of Led Lighting Sources
Temp. Measure point	See page 3
Description of test equipment	See page 3
Test Engineer	Amos Huang <i>Amos Huang</i>
Review By	Kenny Yen <i>Kenny yen</i>

Notes:

1. The test center executes the test operations with prudent manners. All the test results are detail stated in the report. All test service meet under the regulations of ISO/IEC 17025.
2. The report is only responsible to the assigned test. It shall not be any of the bases of Compliance judgments.
3. There are 11 pages in the test report (include the cover page). It is invalid when being used separately.
4. The test report is forbidden to reproduce in separate pages. The complete report copy is unrestricted.
5. The recorded contents in this report shall not be used as advertising, publications or merchandising purposes without written permissions by the test center.
6. Lumen maintenance(lm) uncertainty=1.601%(K=1.97) at 95% confidence level.
7. Chromaticity(x,y) uncertainty=0.000018 (K=2) at 95% confidence level.

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According to section 3 item 7 and section 4 item 5 of ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products, the test report also applies to the following products:

Part Number	Normal CCT	Watt	W/mm ²
2T0301WW2300001	2700K/3000K/3500K	1.4W	0.143
2T0301NW23000001	4000K	1.4W	0.143
2T0301CW23000001	5000K/5700K/6500K	1.4W	0.143
2T0301WW11000003	2700K/3000K/3500K	1.4W	0.143
2T0301NW11000003	4000K	1.4W	0.143
2T0301CW11000002	5000K/5700K/6500K	1.4W	0.143
2T0301WW11000004	2700K/3000K/3500K	1.4W	0.143
2T0301NW11000005	4000K	1.4W	0.143
2T0301CW11000004	5000K/5700K/6500K	1.4W	0.143
2T0301WW38000001	2670~3800K	1.4W	0.143
2T0301NW38000001	3800~5000K	1.4W	0.143
2T0301CW38000001	5000~10000K	1.4W	0.143

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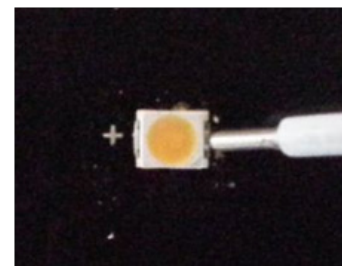
1. Test Summary

Case temperature (Ts)	83°C ≤ Ts	103°C ≤ Ts
Ambient conditions (T _A)	80°C ≤ T _A R.H. < 65 % Minimized airflow	100°C ≤ T _A R.H. < 65 % Minimized airflow
Sample Size	20	20
Drive current of the LED	200mA	200mA
Initial flux (lm) / V _F (V)	123.2 / 6.95	121.8 / 6.97
Lumen maintenance at 7,000 hrs	97.41% Page 5	95.68% Page 8
LED failure	0	0
Monitoring interval (hrs)	0,1000,2000,3000,4000,5000,6000,7000	
Chromaticity shift	Page 7	Page 10

2. Case and ambient temperature

The case temperature T_s is the temperature on the substrate; the ambient temperature T_A is the temperature of the air at a distance of 50 mm above substrate.

Ts Measurement Point



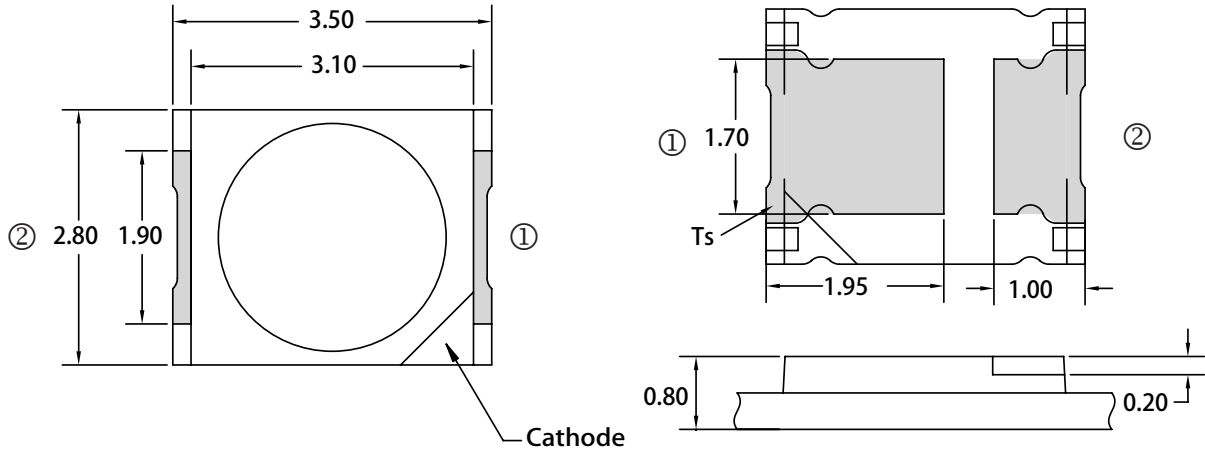
3. Description of test equipment

Equipment	Model No. / Serial No.	Cal. Laboratory	Report No.	Effective Date
Integrating sphere	ISP250 45392012	Standard Light Source L7386A	O130434A	03.12.2014
DC power source	KEITHLEY 2425 1347276	SGS Taiwan Ltd.	ECAC1606814	16.06.2015
Temperature controlled test	VEKTREX/ SpikeSafe 200 1080030009	SGS Taiwan Ltd.	ECAC0780614A	27.03.2015
	VEKTREX/ ITCS 428		ECAC0780214A	
	VEKTREX/ ITCS 429		ECAC0780314A	
	VEKTREX/ ITCS 430		ECAC0780414A	
	VEKTREX/ ITCS 454		ECAC0780514A	

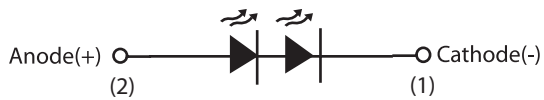
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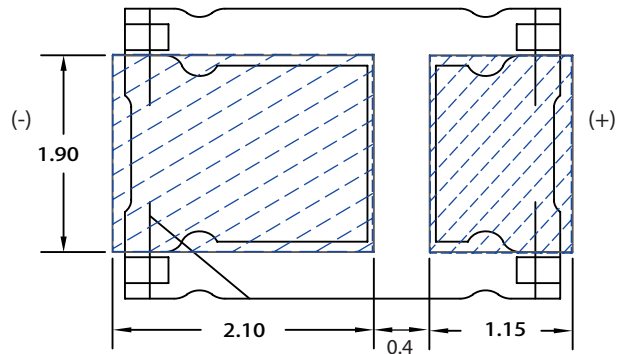
Emitter Type Dimension



Circuit



Solder Pad



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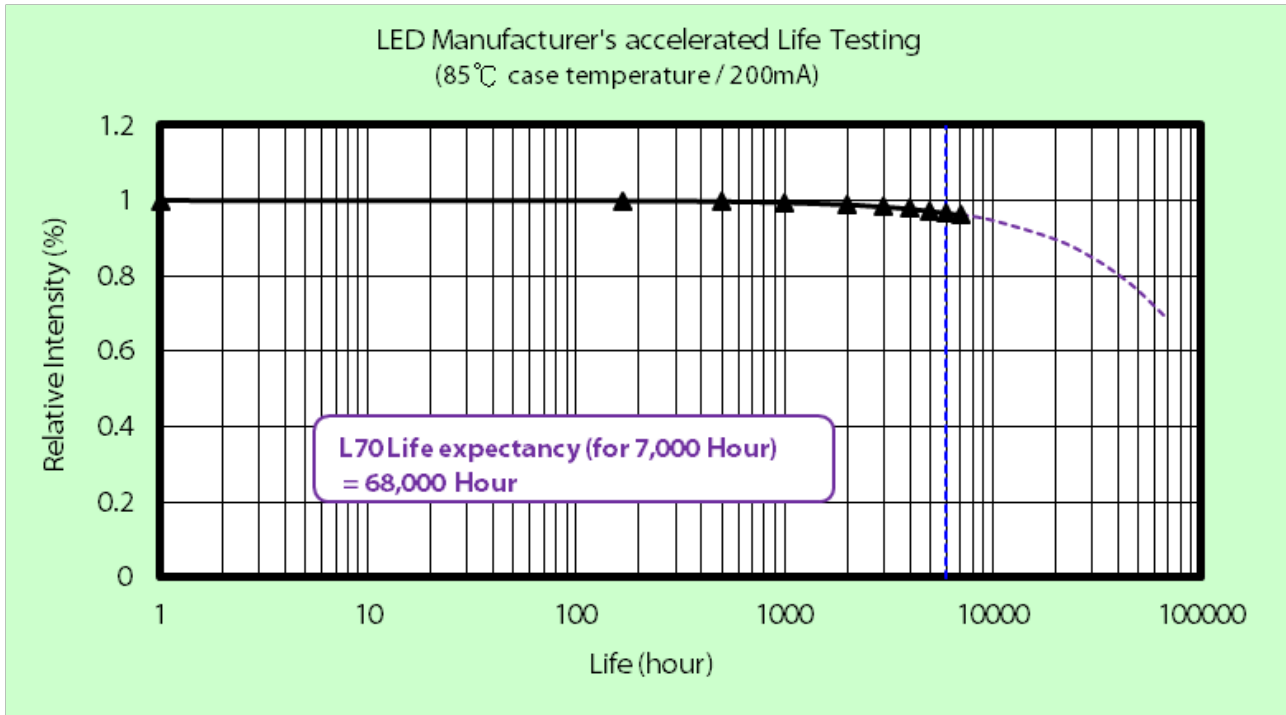
4. Test Results

4.1 Lumen and Color Maintenance data (85 °C)

■ Lumen Maintenance data (85 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h	7000h
1	120.26	1.000	1.020	1.011	1.002	0.998	0.996	0.990	0.983
2	120.61	1.000	1.013	1.008	0.997	0.992	0.982	0.979	0.973
3	127.55	1.000	1.009	1.000	0.958	0.957	0.953	0.954	0.946
4	124.42	1.000	1.010	1.012	1.003	1.002	1.001	0.994	0.985
5	122.04	1.000	1.015	1.004	0.997	0.995	0.99	0.988	0.982
6	121.88	1.000	1.008	1.004	1.004	0.992	0.993	0.986	0.972
7	121.90	1.000	1.014	1.002	0.990	0.988	0.977	0.983	0.977
8	123.59	1.000	1.018	1.002	0.993	0.990	0.981	0.988	0.977
9	124.63	1.000	1.023	1.009	0.995	0.995	0.983	0.990	0.977
10	125.46	1.000	1.012	1.003	1.002	0.990	0.987	0.989	0.975
11	119.50	1.000	1.027	1.018	1.010	1.003	1.002	0.997	0.984
12	122.35	1.000	1.021	1.010	0.989	0.983	0.983	0.974	0.967
13	122.80	1.000	1.007	0.993	0.990	0.987	0.979	0.980	0.972
14	124.46	1.000	1.007	0.998	0.988	0.985	0.981	0.983	0.972
15	127.10	1.000	1.014	1.006	0.979	0.980	0.972	0.969	0.967
16	124.27	1.000	1.013	1.004	0.989	0.984	0.984	0.988	0.976
17	123.18	1.000	1.006	1.001	0.991	0.989	0.978	0.979	0.974
18	119.36	1.000	1.022	1.018	1.012	1.006	1.001	1.002	0.991
19	122.41	1.000	0.998	0.994	0.983	0.986	0.983	0.974	0.961
20	125.99	1.000	1.005	0.999	0.993	0.987	0.983	0.980	0.970
AVG	123.19	1.000	1.013	1.005	0.993	0.989	0.985	0.983	0.974
MIN	119.36	1.000	0.998	0.993	0.958	0.957	0.953	0.954	0.946
MAX	127.55	1.000	1.027	1.018	1.012	1.006	1.002	1.002	0.991

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Test Condition 1 - 85°C Case Temp	
Sample size	20
Number of failures	0
DUT drive current used in the test (mA)	200
Test duration (hours)	7,000
Test duration used for projection (hour to hour)	2,000 - 7,000
Tested case temperature (°C)	85
α	5.431E-06
B	1.013
Calculated L70(7k) (hours)	68,000
Reported L70(7k) (hours)	>42000

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■ Color Maintenance data (85 °C)

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No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h	7000h
1	2676.82	0	0.0013	0.0014	0.0014	0.0013	0.0017	0.0019	0.0022
2	2679.83	0	0.0011	0.0012	0.0012	0.0013	0.0015	0.0016	0.0019
3	2772.43	0	0.0016	0.0013	0.0016	0.0016	0.0018	0.0019	0.0020
4	2723.99	0	0.0016	0.0016	0.0017	0.0018	0.0020	0.0022	0.0026
5	2685.95	0	0.0013	0.0012	0.0012	0.0012	0.0015	0.0017	0.0022
6	2715.93	0	0.0012	0.0011	0.0011	0.0013	0.0016	0.0018	0.0021
7	2685.49	0	0.0014	0.0015	0.0014	0.0015	0.0020	0.0021	0.0024
8	2687.55	0	0.0014	0.0013	0.0012	0.0012	0.0016	0.0017	0.0021
9	2675.09	0	0.0013	0.0014	0.0014	0.0014	0.0016	0.0017	0.0020
10	2706.77	0	0.0016	0.0017	0.0017	0.0018	0.0021	0.0022	0.0026
11	2695.16	0	0.0006	0.0007	0.0007	0.0008	0.0015	0.0016	0.0017
12	2665.11	0	0.0011	0.0008	0.0007	0.0009	0.0017	0.0019	0.0022
13	2686.06	0	0.0015	0.0016	0.0017	0.0017	0.0021	0.0023	0.0024
14	2691.09	0	0.0014	0.0015	0.0014	0.0014	0.0019	0.0020	0.0024
15	2663.51	0	0.0015	0.0017	0.0017	0.0018	0.0021	0.0023	0.0025
16	2693.50	0	0.0015	0.0016	0.0015	0.0015	0.0022	0.0024	0.0027
17	2687.18	0	0.0016	0.0016	0.0016	0.0017	0.0021	0.0022	0.0025
18	2680.30	0	0.0012	0.0012	0.0012	0.0013	0.0017	0.0019	0.0021
19	2741.96	0	0.0013	0.0014	0.0013	0.0017	0.0024	0.0026	0.0029
20	2661.75	0	0.0013	0.0013	0.0012	0.0013	0.0019	0.0021	0.0025
AVG	2693.77	0	0.0013	0.0014	0.0013	0.0014	0.0019	0.0020	0.0023
MIN	2661.75	0	0.0006	0.0007	0.0007	0.0008	0.0015	0.0016	0.0017
MAX	2772.43	0	0.0016	0.0017	0.0017	0.0018	0.0024	0.0026	0.0029



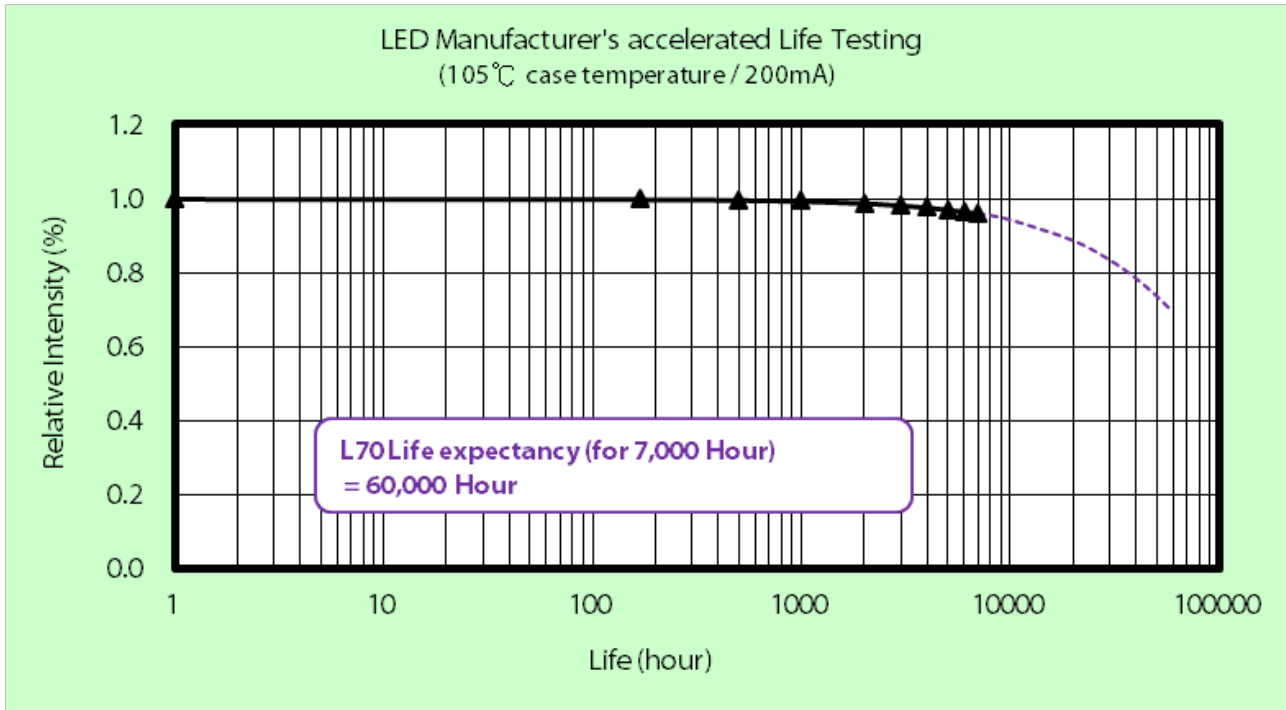
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4.2 Lumen and Color Maintenance data (105 °C)

■ Lumen Maintenance data (105 °C)

No.	Im(Initial)	0h	1000h	2000h	3000h	4000h	5000h	6000h	7000h
1	124.12	1.000	0.993	0.969	0.965	0.971	0.960	0.962	0.940
2	117.51	1.000	1.034	1.005	1.007	1.000	0.997	0.991	0.976
3	122.29	1.000	0.984	0.968	0.965	0.964	0.965	0.953	0.934
4	124.99	1.000	0.999	0.982	0.974	0.970	0.968	0.961	0.942
5	120.93	1.000	0.997	0.978	0.974	0.974	0.975	0.964	0.947
6	117.43	1.000	1.058	1.032	1.029	1.024	1.016	1.012	0.997
7	122.55	1.000	1.003	0.977	0.962	0.963	0.957	0.954	0.935
8	126.21	1.000	0.987	0.961	0.946	0.946	0.940	0.943	0.927
9	126.32	1.000	1.000	0.972	0.973	0.966	0.962	0.961	0.940
10	116.11	1.000	1.051	1.032	1.033	1.032	1.029	1.017	0.997
11	121.53	1.000	1.012	0.985	0.989	0.988	0.983	0.982	0.964
12	124.21	1.000	1.012	0.986	0.986	0.981	0.973	0.973	0.955
13	123.89	1.000	1.011	0.993	0.983	0.985	0.975	0.976	0.957
14	121.26	1.000	1.001	0.983	0.979	0.977	0.973	0.973	0.955
15	123.54	1.000	1.026	1.004	1.000	0.996	0.988	0.985	0.960
16	123.28	1.000	1.008	0.984	0.982	0.981	0.975	0.974	0.955
17	115.75	1.000	1.061	1.046	1.037	1.036	1.024	1.020	0.999
18	121.22	1.000	1.002	0.985	0.975	0.969	0.973	0.963	0.942
19	119.28	1.000	1.029	1.008	1.008	1.004	1.003	0.996	0.972
20	123.48	1.000	0.991	0.976	0.974	0.982	0.974	0.968	0.951
AVG	121.80	1.000	1.013	0.991	0.987	0.985	0.980	0.976	0.957
MIN	115.75	1.000	0.984	0.961	0.946	0.946	0.940	0.943	0.927
MAX	126.32	1.000	1.061	1.046	1.037	1.036	1.029	1.020	0.999

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Test Condition 2 - 105°C Case Temp	
Sample size	20
Number of failures	0
DUT drive current used in the test (mA)	200
Test duration (hours)	7,000
Test duration used for projection (hour to hour)	2,000 - 7,000
Tested case temperature (°C)	105
α	6.070E-06
B	1.006
Calculated L70(7k) (hours)	60,000
Reported L70(7k) (hours)	>42000

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■ Color Maintenance data (105 °C)

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No.	CCT Initial	0h	1000h	2000h	3000h	4000h	5000h	6000h	7000h
1	2727.26	0	0.0012	0.0014	0.0015	0.0016	0.0019	0.0022	0.0026
2	2676.29	0	0.0012	0.0014	0.0014	0.0015	0.0017	0.0021	0.0027
3	2759.98	0	0.0008	0.0012	0.0013	0.0017	0.0021	0.0024	0.0029
4	2677.16	0	0.0011	0.0014	0.0013	0.0016	0.0022	0.0025	0.0027
5	2703.62	0	0.0010	0.0011	0.0014	0.0015	0.0024	0.0028	0.0031
6	2853.76	0	0.0011	0.0012	0.0014	0.0015	0.0025	0.0028	0.0034
7	2649.20	0	0.0013	0.0013	0.0014	0.0016	0.0021	0.0024	0.0030
8	2636.77	0	0.0012	0.0015	0.0017	0.0018	0.0025	0.0028	0.0029
9	2791.25	0	0.0012	0.0014	0.0016	0.0017	0.0025	0.0028	0.0030
10	2714.05	0	0.0011	0.0013	0.0015	0.0017	0.0024	0.0027	0.0033
11	2697.55	0	0.0010	0.0012	0.0016	0.0016	0.0024	0.0027	0.0031
12	2721.34	0	0.0011	0.0011	0.0012	0.0013	0.0018	0.0021	0.0026
13	2721.66	0	0.0010	0.0013	0.0015	0.0016	0.0023	0.0028	0.0034
14	2748.41	0	0.0013	0.0014	0.0013	0.0017	0.0021	0.0023	0.0028
15	2742.60	0	0.0013	0.0014	0.0016	0.0019	0.0026	0.0029	0.0032
16	2744.33	0	0.0012	0.0014	0.0015	0.0017	0.0022	0.0025	0.0027
17	2739.19	0	0.0007	0.0012	0.0013	0.0016	0.0023	0.0026	0.0030
18	2664.49	0	0.0010	0.0012	0.0014	0.0014	0.0019	0.0023	0.0026
19	2691.56	0	0.0012	0.0014	0.0016	0.0018	0.0022	0.0025	0.0030
20	2710.90	0	0.0014	0.0015	0.0016	0.0018	0.0023	0.0026	0.0031
AVG	2718.57	0	0.0011	0.0013	0.0015	0.0016	0.0022	0.0025	0.0030
MIN	2636.77	0	0.0007	0.0011	0.0012	0.0013	0.0017	0.0021	0.0026
MAX	2853.76	0	0.0014	0.0015	0.0017	0.0019	0.0026	0.0029	0.0034



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5. EPA Recognized Certification Laboratory Information

EPA Recognized Certification Bodies (CBs) and Laboratories List Results

Notes:

1. Only accredited laboratories are listed on this page. Laboratories that are EPA-recognized through enrolling in a Certification Body's WMTL or SMTL program are not listed here.
2. EPA encourages manufacturers to contact laboratories directly to ensure they have the capability and availability to test the particular products for which certification is sought, as some product types may require special testing equipment or capabilities. Manufacturers must also confirm with an EPA-recognized certification body (CB) that the laboratory is acceptable under the CB's program for that product type.
3. Windows, Doors, and Skylights partners are advised to contact the National Fenestration Rating Council(www.nfrc.org [EXIT ↗](#)) for a complete list of EPA-recognized laboratories for these products.
4. [Lighting \(CFLs, ILLs, Luminaires, and Decorative Light Strings\) Labs](#) and [CBs](#) are listed separately.
5. Please note, EPA recognizes the Association of Home Appliance Manufacturers (AHAM) only for administering verification testing.

Organization ID	Organization Name	Type of Recognized Body	If Lab is it 1st Party?	Programs	Organization Address	City	State	Country
1114690	Edison Opto Corporation - OPTO Testing Laboratory	Accredited Laboratory	Y	Luminaires	4F, NO.800, Chung-Cheng Rd., Chung-Ho Dist.,	New Taipei City	-	TW

About Edison Opto

Edison Opto is a leading manufacturer of high power LED and a solution provider experienced in LDMS. LDMS is an integrated program derived from the four essential technologies in LED lighting applications- Thermal Management, Electrical Scheme, Mechanical Refinement, Optical Optimization, to provide customer with various LED components and modules. More Information about the company and our products can be found at www.edison-opto.com

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