



Edixeon® Reliability Document

As part of Edison Opto's commitment for quality products, this document presents, in accordance to the latest industry standards and stress criteria, the results of ongoing, long-term stress testing of high power LED.

This reliability document defines in the context such that high power LEDs can be measured and evaluated with lifetime projection. Also it describes the color temperature maintenance of white light products for it is an essential factor for the general lighting specifications.

Through continuous advancement and dynamic evolving technology in LED industry, Edison Opto continues to offer industry leading, reliable, competent products with definitive performance over time.

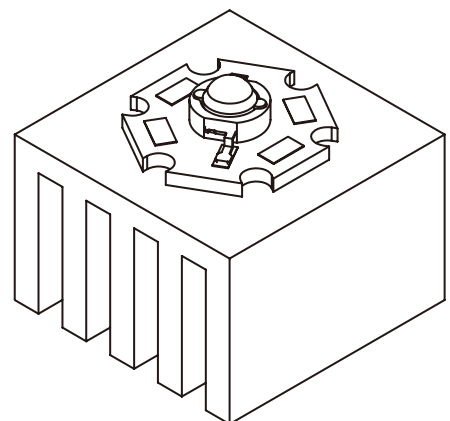
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When electrical current is applied to the LEDs, photons are generated from the LED p-n junction where light is emitted. While emitting light, some forms of energy is being converted to heat. The reliability and lifetime of a semiconductor relies on the temperature at which the LED is being operated. Throughout this document, commonly recognized abbreviations used among LED industry are listed below.

List of abbreviations

LED	Light emitting diode
AllnGaP	Semiconductor material for Amber, Deep Red, Red LEDs
InGaN	Semiconductor material for Blue, Cyan, Dental Blue, Royal Blue, Green, UV, White LEDs
V_F	Forward operating voltage
I_F	Forward operating current
T_J	Junction temperature of LED
R_{th}	Thermal resistance
R_H	Relative humidity
L_{70}	The time at which the intensity is 70% of maximum
L_{50}	The time at which the intensity is 50% of maximum
$L_{@6,000hrs}$	Lumen maintenance at 6,000hrs
B_{50}	Half of total testing samples



Description of test equipment and conditions

For Lumen maintenance test, each Edixeon® LED is placed in thermal chamber for long term reliability test. The temperature of heat-plate is precisely maintained by the fluid cooling system in the chamber with minimal ambient airflow. Multiple temperature probes are placed within chamber for stable temperature control and optimized thermal management.

Luminous flux and chromaticity data are gathered and logged through the use of integrating sphere with programmable constant current-source meter. At specific time, test samples are brought to room temperature and measured for its photometric performance every 1,000 hours. After measuring, samples are placed back in the chamber for continuous on-going lumen maintenance test. Figure 1 below illustrates the architecture of the test chamber.

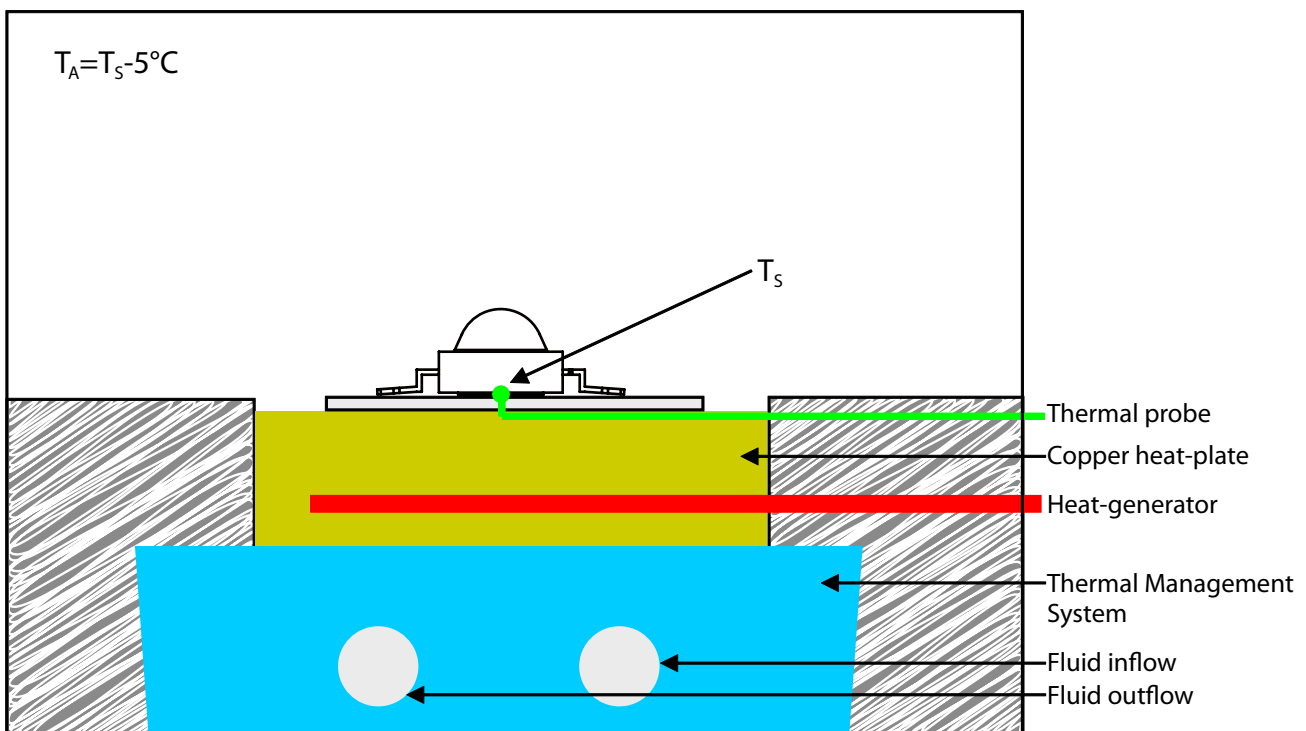


Fig 1. Architecture of Reliability Test Chamber

Equipments	Parameter	Uncertainty
Integrating sphere / spectrometer	Luminous flux (lm)	±4%
	Color coordinates (u, v)	±0.002
DC Power source	Forward voltage	±3%
	Forward current	±3%
Test Chamber	Case temperature (T_s)	±2%
	Humidity (%RH)	±5%

Edixeon® S Series Lumen Maintenance

Description of LED test samples

The data below summarizes the lumen maintenance for 1W Edixeon® S series driven at 350mA under three case temperatures (T_s), 55°C, 65°C and 85°C. With ten samples at each specified case temperature, a total of 30 LED samples were tested.

Edixeon® S Series Lumen Maintenance ($I_f = 350\text{mA}$)							
Sample ($T_s = 55^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9910	0.9920	0.9889	0.9785	0.9770	79,126
2	1.0000	0.9968	0.9867	0.9846	0.9766	0.9657	52,367
3	1.0000	0.9965	0.9870	0.9901	0.9849	0.9621	55,477
4	1.0000	0.9939	0.9900	0.9819	0.9833	0.9789	84,769
5	1.0000	0.9904	0.9938	0.9882	0.9782	0.9671	59,360
6	1.0000	0.9921	0.9932	0.9831	0.9822	0.9623	53,775
7	1.0000	0.9949	0.9895	0.9816	0.9847	0.9753	76,024
8	1.0000	0.9951	0.9921	0.9878	0.9753	0.9659	52,412
9	1.0000	0.9971	0.9878	0.9895	0.9768	0.9771	71,056
10	1.0000	0.9936	0.9886	0.9812	0.9820	0.9734	70,290
Mean	1.0000	0.9941	0.9901	0.9857	0.9802	0.9705	65,466
Std	0.0000	0.0024	0.0026	0.0035	0.0036	0.0065	
Min	1.0000	0.9904	0.9867	0.9812	0.9753	0.9621	
Max	1.0000	0.9971	0.9938	0.9901	0.9849	0.9789	
Sample ($T_s = 65^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9846	0.9882	0.9761	0.9631	0.9543	39,956
2	1.0000	0.9843	0.9816	0.9672	0.9636	0.9654	49,061
3	1.0000	0.9922	0.9784	0.9735	0.9643	0.9583	41,077
4	1.0000	0.9969	0.9832	0.9724	0.9751	0.9554	40,842
5	1.0000	0.9862	0.9770	0.9812	0.9699	0.9610	51,090
6	1.0000	0.9968	0.9775	0.9775	0.9592	0.9616	40,143
7	1.0000	0.9884	0.9820	0.9722	0.9677	0.9619	46,586
8	1.0000	0.9894	0.9869	0.9773	0.9751	0.9524	42,008
9	1.0000	0.9839	0.9870	0.9810	0.9617	0.9639	48,307
10	1.0000	0.9948	0.9772	0.9796	0.9594	0.9601	40,289
Mean	1.0000	0.9897	0.9819	0.9758	0.9659	0.9594	43,936
Std	0.0000	0.0051	0.0044	0.0045	0.0059	0.0042	
Min	1.0000	0.9839	0.9770	0.9672	0.9592	0.9524	
Max	1.0000	0.9969	0.9882	0.9812	0.9751	0.9654	
Sample ($T_s = 85^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9734	0.9707	0.9551	0.9388	0.9167	22,296
2	1.0000	0.9776	0.9519	0.9528	0.9224	0.9269	22,571
3	1.0000	0.9780	0.9764	0.9361	0.9161	0.9114	17,772
4	1.0000	0.9771	0.9750	0.9590	0.9230	0.9088	18,748
5	1.0000	0.9974	0.9802	0.9639	0.9412	0.9206	20,657
6	1.0000	0.9971	0.9783	0.9586	0.9460	0.9194	20,857
7	1.0000	0.9828	0.9727	0.9360	0.9323	0.9270	21,677
8	1.0000	0.9825	0.9744	0.9541	0.9255	0.9013	17,333
9	1.0000	0.9910	0.9747	0.9525	0.9259	0.9204	19,453
10	1.0000	0.9851	0.9697	0.9323	0.9324	0.9278	21,565
Mean	1.0000	0.9842	0.9724	0.9500	0.9303	0.9180	20,293
Std	0.0000	0.0084	0.0079	0.0111	0.0095	0.0087	
Min	1.0000	0.9734	0.9519	0.9323	0.9161	0.9013	
Max	1.0000	0.9974	0.9802	0.9639	0.9460	0.9278	

* Normalized at 1,000 hours. The first 1,000 hours of operation are being referring to as the seasoning period which are not accounted for data extrapolation.

Edixeon® S Series Lumen Maintenance

Description of LED test samples

The data below summarizes the lumen maintenance for 3W Edixeon® S series driven at 700mA under three case temperatures (T_s), 55°C, 65°C and 85°C. With ten samples at each specified case temperature, a total of 30 LED samples were tested.

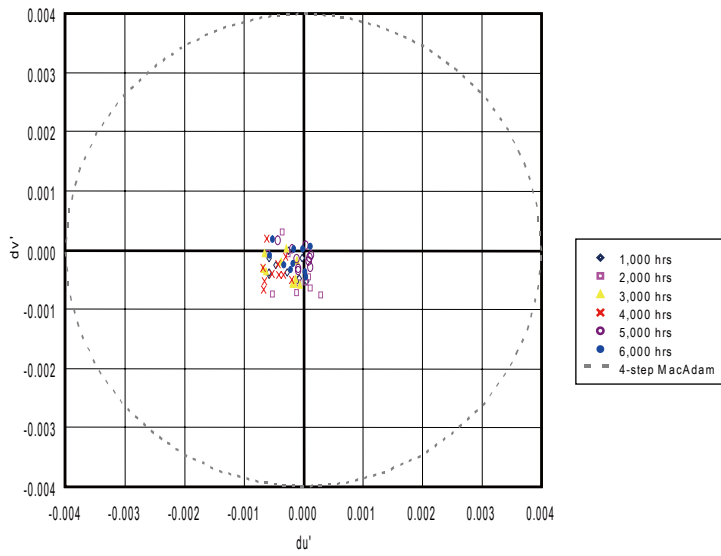
Edixeon® S Series Lumen Maintenance ($I_f = 700 \text{ mA}$)							
Sample ($T_s = 55^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9925	0.9852	0.9815	0.9741	0.9561	43,852
2	1.0000	0.9921	0.9911	0.9728	0.9660	0.9584	40,153
3	1.0000	0.9982	0.9863	0.9856	0.9721	0.9631	46,578
4	1.0000	0.9932	0.9928	0.9803	0.9701	0.9317	28,549
5	1.0000	0.9940	0.9923	0.9757	0.9753	0.9682	53,052
6	1.0000	0.9956	0.9871	0.9797	0.9739	0.9397	32,466
7	1.0000	0.9980	0.9904	0.9807	0.9685	0.9615	42,153
8	1.0000	0.9880	0.9832	0.9768	0.9714	0.9692	58,365
9	1.0000	0.9971	0.9810	0.9742	0.9727	0.9657	48,803
10	1.0000	0.9984	0.9860	0.9735	0.9720	0.9636	44,863
Mean	1.0000	0.9947	0.9875	0.9781	0.9716	0.9577	43,884
Std	0.0000	0.0034	0.0040	0.0041	0.0028	0.0124	
Min	1.0000	0.9880	0.9810	0.9728	0.9660	0.9317	
Max	1.0000	0.9984	0.9928	0.9856	0.9753	0.9692	
Sample ($T_s = 65^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9939	0.9576	0.9616	0.9381	0.9265	22,654
2	1.0000	0.9748	0.9745	0.9670	0.9231	0.9168	20,607
3	1.0000	0.9867	0.9732	0.9450	0.9488	0.9168	21,467
4	1.0000	0.9681	0.9704	0.9418	0.9448	0.9160	23,051
5	1.0000	0.9727	0.9828	0.9668	0.9294	0.9273	23,534
6	1.0000	0.9754	0.9653	0.9461	0.9313	0.9166	21,009
7	1.0000	0.9880	0.9790	0.9558	0.9455	0.9119	20,235
8	1.0000	0.9915	0.9815	0.9591	0.9303	0.9329	22,234
9	1.0000	0.9963	0.9704	0.9543	0.9410	0.9185	20,360
10	1.0000	0.9851	0.9791	0.9558	0.9302	0.9338	23,185
Mean	1.0000	0.9833	0.9734	0.9553	0.9362	0.9217	21,833
Std	0.0000	0.0098	0.0078	0.0088	0.0086	0.0077	
Min	1.0000	0.9681	0.9576	0.9418	0.9231	0.9119	
Max	1.0000	0.9963	0.9828	0.9670	0.9488	0.9338	
Sample ($T_s = 85^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9936	0.9132	0.9046	0.8931	0.8490	10,876
2	1.0000	0.9983	0.9309	0.9276	0.8661	0.8560	10,343
3	1.0000	0.9808	0.9507	0.9129	0.9026	0.8498	11,310
4	1.0000	0.9452	0.9469	0.9010	0.8854	0.8810	14,201
5	1.0000	0.9565	0.9434	0.8979	0.8944	0.8813	14,142
6	1.0000	0.9655	0.9556	0.9312	0.8671	0.8667	11,742
7	1.0000	0.9796	0.9191	0.9201	0.9121	0.8723	13,930
8	1.0000	0.9642	0.9323	0.8917	0.9062	0.8594	12,633
9	1.0000	0.9419	0.9136	0.9255	0.8672	0.8823	14,499
10	1.0000	0.9978	0.9405	0.9222	0.9010	0.8456	10,724
Mean	1.0000	0.9723	0.9346	0.9135	0.8895	0.8643	12,440
Std	0.0000	0.0209	0.0154	0.0139	0.0173	0.0143	
Min	1.0000	0.9419	0.9132	0.8917	0.8661	0.8456	
Max	1.0000	0.9983	0.9556	0.9312	0.9121	0.8823	

*The first 1,000 hours of operation are being referring to as the seasoning period which are not accounted for data extrapolation.

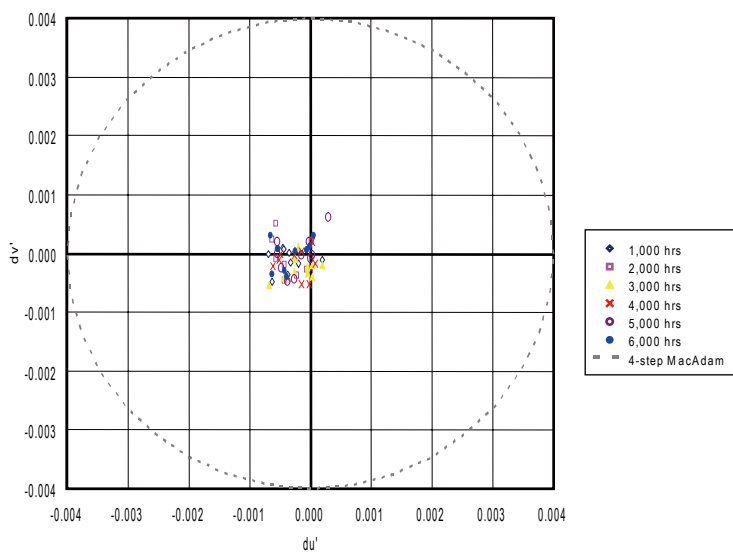
Edixeon® S Series Chromaticity Maintenance

Edixeon® S Series Chromaticity Maintenance ($I_c = 350 \text{ mA}$)												
Sample ($T_s = 55^\circ \text{C}$)	du'						dv'					
	1,000	2,000	3,000	4,000	5,000	6,000	1,000	2,000	3,000	4,000	5,000	6,000
1	-0.0003	-0.0004	-0.0002	-0.0006	-0.0006	0.0000	-0.0001	-0.0002	-0.0001	-0.0004	-0.0001	0.0006
2	-0.0004	-0.0003	0.0000	-0.0002	-0.0002	-0.0002	-0.0006	-0.0004	-0.0002	-0.0006	-0.0003	0.0001
3	-0.0002	-0.0002	-0.0001	-0.0004	0.0000	0.0005	-0.0006	-0.0004	-0.0004	-0.0011	-0.0002	0.0001
4	-0.0003	-0.0003	-0.0001	0.0004	0.0001	0.0002	-0.0002	-0.0006	-0.0004	-0.0002	0.0000	0.0002
5	-0.0004	-0.0004	-0.0005	0.0010	0.0010	0.0000	-0.0005	-0.0001	-0.0006	-0.0005	0.0000	0.0003
6	-0.0003	-0.0002	-0.0002	-0.0004	-0.0001	0.0000	-0.0001	-0.0001	-0.0003	-0.0005	-0.0002	-0.0004
7	-0.0002	-0.0004	-0.0003	-0.0003	0.0000	0.0003	-0.0003	-0.0003	-0.0002	-0.0001	0.0001	-0.0002
8	-0.0006	-0.0003	-0.0004	0.0000	-0.0002	-0.0002	0.0000	-0.0004	-0.0001	-0.0004	-0.0002	-0.0003
9	-0.0003	-0.0002	0.0000	0.0003	0.0003	0.0001	-0.0001	0.0000	-0.0001	0.0011	0.0002	0.0002
10	-0.0004	-0.0002	0.0001	-0.0005	0.0003	-0.0001	-0.0001	-0.0004	0.0000	-0.0001	0.0004	-0.0002
Mean	-0.0003	-0.0003	-0.0002	-0.0001	0.0001	0.0001	-0.0003	-0.0003	-0.0002	-0.0003	0.0000	0.0000
Std	0.0000	0.0001	0.0002	0.0005	0.0004	0.0002	0.0000	0.0002	0.0002	0.0006	0.0002	0.0003
Min	-0.0006	-0.0004	-0.0005	-0.0006	-0.0006	-0.0002	-0.0006	-0.0006	-0.0006	-0.0011	-0.0003	-0.0004
Max	-0.0002	-0.0002	0.0001	0.0010	0.0010	0.0005	0.0000	0.0000	0.0000	0.0011	0.0004	0.0006
Sample ($T_s = 65^\circ \text{C}$)	du'						dv'					
	1,000	2,000	3,000	4,000	5,000	6,000	1,000	2,000	3,000	4,000	5,000	6,000
1	-0.0004	-0.0005	-0.0003	-0.0004	-0.0001	0.0001	-0.0005	-0.0006	-0.0006	-0.0004	-0.0001	0.0004
2	-0.0004	-0.0003	-0.0001	-0.0004	-0.0002	-0.0002	-0.0004	-0.0006	-0.0005	-0.0006	0.0000	0.0004
3	-0.0005	-0.0006	-0.0001	-0.0004	0.0000	0.0001	-0.0005	-0.0012	-0.0011	-0.0011	-0.0002	0.0003
4	-0.0003	-0.0003	-0.0001	0.0002	0.0001	0.0002	-0.0006	-0.0007	-0.0008	-0.0002	0.0001	0.0005
5	-0.0004	-0.0004	-0.0005	0.0002	0.0003	0.0000	-0.0005	-0.0007	-0.0012	-0.0005	-0.0003	0.0003
6	-0.0008	-0.0007	-0.0007	-0.0006	-0.0006	-0.0006	-0.0007	-0.0007	-0.0008	-0.0005	-0.0008	-0.0006
7	-0.0005	-0.0004	-0.0004	-0.0002	0.0000	-0.0006	-0.0006	-0.0006	-0.0007	-0.0001	0.0001	-0.0002
8	-0.0007	-0.0006	-0.0004	-0.0005	-0.0002	-0.0004	-0.0004	-0.0005	-0.0007	-0.0004	-0.0002	-0.0003
9	-0.0003	-0.0002	0.0000	0.0010	0.0012	0.0000	-0.0001	0.0000	0.0000	0.0011	0.0017	0.0001
10	-0.0004	-0.0002	0.0000	0.0000	0.0002	0.0000	-0.0002	-0.0002	0.0000	-0.0001	0.0005	0.0000
Mean	-0.0005	-0.0004	-0.0003	-0.0001	0.0001	-0.0001	-0.0005	-0.0006	-0.0006	-0.0003	0.0001	0.0001
Std	0.0000	0.0002	0.0002	0.0005	0.0005	0.0003	0.0000	0.0003	0.0004	0.0006	0.0007	0.0004
Min	-0.0008	-0.0007	-0.0007	-0.0006	-0.0006	-0.0006	-0.0007	-0.0012	-0.0012	-0.0011	-0.0008	-0.0006
Max	-0.0003	-0.0002	0.0000	0.0010	0.0012	0.0002	-0.0001	0.0000	0.0000	0.0011	0.0017	0.0005
Sample ($T_s = 85^\circ \text{C}$)	du'						dv'					
	1,000	2,000	3,000	4,000	5,000	6,000	1,000	2,000	3,000	4,000	5,000	6,000
1	-0.0006	-0.0006	-0.0005	-0.0004	-0.0003	0.0001	-0.0001	-0.0003	-0.0004	-0.0002	-0.0001	-0.0003
2	-0.0012	0.0000	-0.0002	-0.0005	-0.0005	-0.0003	-0.0006	-0.0008	-0.0005	-0.0002	-0.0003	0.0001
3	-0.0007	-0.0002	-0.0004	-0.0008	-0.0002	-0.0005	-0.0005	-0.0006	-0.0004	-0.0005	-0.0001	-0.0003
4	-0.0003	-0.0001	0.0004	-0.0002	0.0001	-0.0006	-0.0011	-0.0004	-0.0004	0.0000	0.0001	-0.0002
5	-0.0004	-0.0005	0.0003	-0.0005	0.0000	0.0000	-0.0005	-0.0004	-0.0005	-0.0004	-0.0003	0.0001
6	-0.0006	-0.0004	-0.0002	-0.0005	-0.0003	-0.0002	-0.0005	-0.0004	-0.0008	-0.0001	-0.0004	-0.0004
7	-0.0001	-0.0006	-0.0005	-0.0001	0.0001	-0.0001	-0.0006	-0.0005	-0.0002	-0.0001	0.0001	-0.0004
8	-0.0001	-0.0003	-0.0005	-0.0005	-0.0006	-0.0002	-0.0004	-0.0006	-0.0002	-0.0005	-0.0002	-0.0001
9	-0.0005	-0.0002	-0.0003	0.0001	0.0003	0.0000	-0.0008	-0.0004	-0.0001	0.0003	0.0000	0.0002
10	-0.0005	-0.0001	-0.0004	0.0002	-0.0002	-0.0002	-0.0005	-0.0002	-0.0006	-0.0004	-0.0002	-0.0002
Mean	-0.0005	-0.0003	-0.0002	-0.0003	-0.0002	-0.0002	-0.0006	-0.0005	-0.0004	-0.0002	-0.0001	-0.0002
Std	0.0000	0.0002	0.0003	0.0003	0.0003	0.0002	0.0000	0.0002	0.0002	0.0003	0.0002	0.0002
Min	-0.0012	-0.0006	-0.0005	-0.0008	-0.0006	-0.0006	-0.0011	-0.0008	-0.0008	-0.0005	-0.0004	-0.0004
Max	-0.0001	0.0000	0.0004	0.0002	0.0003	0.0001	-0.0001	-0.0002	-0.0001	0.0003	0.0001	0.0002

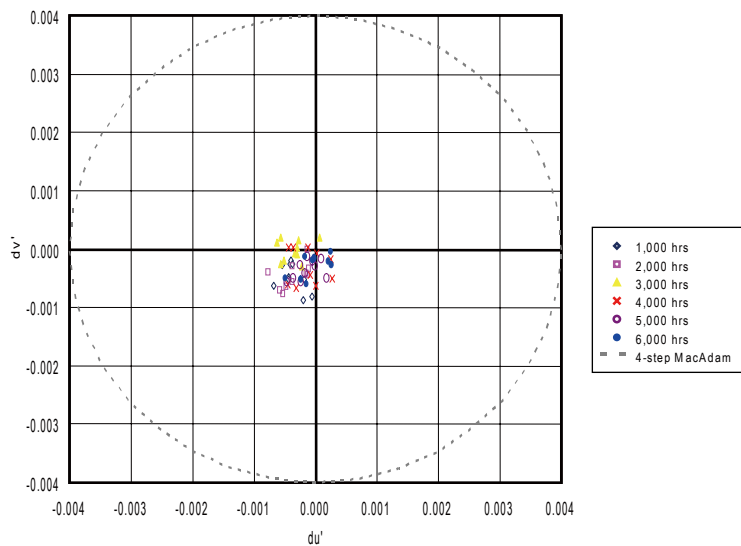
Chromaticity Maintenance at $T_s=55^\circ\text{C}$



Chromaticity Maintenance at $T_s=65^\circ\text{C}$



Chromaticity Maintenance at $T_s=85^\circ\text{C}$



Edixeon® A Series Lumen Maintenance

Description of LED test samples

The data below summarizes the lumen maintenance for 1W Edixeon® A series driven at 350mA under three case temperatures (T_s), 55°C, 65°C and 85°C. With ten samples at each specified case temperature, a total of 30 LED samples were tested.

Edixeon® A Series Lumen Maintenance ($I_f = 350 \text{ mA}$)							
Sample ($T_s = 55^\circ \text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9983	0.9875	0.9866	0.9801	0.9747	67,764
2	1.0000	0.9944	0.9863	0.9882	0.9773	0.9624	51,702
3	1.0000	0.9939	0.9895	0.9851	0.9773	0.9685	58,007
4	1.0000	0.9923	0.9896	0.9869	0.9784	0.9615	51,723
5	1.0000	0.9911	0.9944	0.9818	0.9787	0.9669	56,931
6	1.0000	0.9952	0.9947	0.9892	0.9795	0.9619	50,485
7	1.0000	0.9928	0.9916	0.9840	0.9781	0.9662	55,663
8	1.0000	0.9963	0.9936	0.9817	0.9797	0.9779	71,620
9	1.0000	0.9989	0.9947	0.9899	0.9799	0.9708	59,332
10	1.0000	0.9908	0.9877	0.9820	0.9756	0.9635	52,437
Mean	1.0000	0.9944	0.9910	0.9855	0.9785	0.9674	57,566
Std	0.0000	0.0028	0.0033	0.0031	0.0014	0.0056	
Min	1.0000	0.9908	0.9863	0.9817	0.9756	0.9615	
Max	1.0000	0.9989	0.9947	0.9899	0.9801	0.9779	
Sample ($T_s = 65^\circ \text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	1.0000	0.9886	0.9772	0.9658	0.9637	41,509
2	1.0000	0.9895	0.9758	0.9779	0.9686	0.9537	41,731
3	1.0000	0.9990	0.9878	0.9733	0.9610	0.9637	39,510
4	1.0000	0.9887	0.9775	0.9726	0.9704	0.9601	47,174
5	1.0000	0.9923	0.9850	0.9693	0.9633	0.9649	44,041
6	1.0000	0.9868	0.9845	0.9697	0.9666	0.9523	38,791
7	1.0000	0.9948	0.9871	0.9716	0.9596	0.9617	39,076
8	1.0000	0.9904	0.9772	0.9738	0.9750	0.9515	41,765
9	1.0000	0.9888	0.9889	0.9776	0.9693	0.9513	38,924
10	1.0000	0.9907	0.9899	0.9685	0.9666	0.9645	45,113
Mean	1.0000	0.9921	0.9842	0.9731	0.9666	0.9587	41,764
Std	0.0000	0.0045	0.0054	0.0035	0.0046	0.0058	
Min	1.0000	0.9868	0.9758	0.9685	0.9596	0.9513	
Max	1.0000	1.0000	0.9899	0.9779	0.9750	0.9649	
Sample ($T_s = 85^\circ \text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9712	0.9717	0.9410	0.9175	0.9057	17,880
2	1.0000	0.9967	0.9505	0.9424	0.9189	0.9201	18,673
3	1.0000	0.9850	0.9554	0.9519	0.9325	0.9115	19,769
4	1.0000	0.9815	0.9578	0.9408	0.9386	0.9303	24,324
5	1.0000	0.9942	0.9822	0.9344	0.9455	0.9109	18,713
6	1.0000	0.9927	0.9647	0.9367	0.9303	0.9031	17,010
7	1.0000	0.9849	0.9598	0.9408	0.9416	0.9153	20,911
8	1.0000	0.9871	0.9809	0.9561	0.9418	0.9277	23,047
9	1.0000	0.9824	0.9694	0.9479	0.9207	0.9121	18,438
10	1.0000	0.9860	0.9743	0.9619	0.9463	0.9248	23,684
Mean	1.0000	0.9862	0.9667	0.9454	0.9334	0.9161	20,245
Std	0.0000	0.0073	0.0108	0.0088	0.0111	0.0093	
Min	1.0000	0.9712	0.9505	0.9344	0.9175	0.9031	
Max	1.0000	0.9967	0.9822	0.9619	0.9463	0.9303	

* Normalized at 1,000 hours. The first 1,000 hours of operation are being referred to as the seasoning period which are not accounted for data extrapolation.

Description of LED test samples

The data below summarizes the lumen maintenance for 3W Edixeon® A series driven at 700mA under three case temperatures (T_s), 55°C, 65°C and 85°C. With ten samples at each specified case temperature, a total of 30 LED samples were tested.

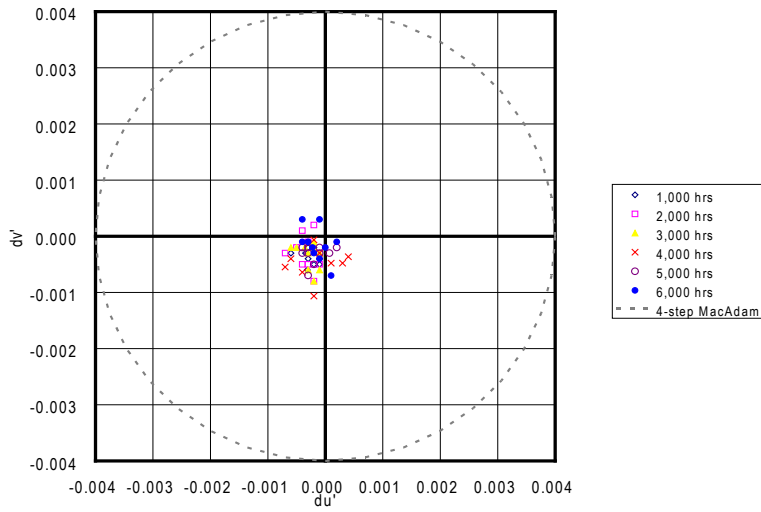
Edixeon® A Series Lumen Maintenance ($I_f = 700\text{mA}$)							
Sample ($T_s = 55^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9945	0.9798	0.9790	0.9700	0.9526	39,222
2	1.0000	0.9962	0.9838	0.9810	0.9771	0.9450	36,310
3	1.0000	0.9995	0.9801	0.9824	0.9764	0.9696	56,205
4	1.0000	0.9950	0.9857	0.9830	0.9676	0.9428	32,764
5	1.0000	0.9974	0.9876	0.9806	0.9702	0.9437	32,845
6	1.0000	0.9954	0.9923	0.9833	0.9684	0.9651	46,350
7	1.0000	0.9978	0.9899	0.9791	0.9658	0.9411	30,275
8	1.0000	0.9964	0.9823	0.9742	0.9681	0.9340	28,628
9	1.0000	0.9881	0.9907	0.9805	0.9755	0.9633	52,944
10	1.0000	0.9869	0.9881	0.9848	0.9749	0.9595	50,570
Mean	1.0000	0.9947	0.9860	0.9808	0.9714	0.9517	40,611
Std	0.0000	0.0041	0.0044	0.0030	0.0042	0.0121	
Min	1.0000	0.9869	0.9798	0.9742	0.9658	0.9340	
Max	1.0000	0.9995	0.9923	0.9848	0.9771	0.9696	
Sample ($T_s = 65^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9943	0.9712	0.9432	0.9240	0.9177	18,391
2	1.0000	0.9861	0.9535	0.9458	0.9278	0.9315	22,883
3	1.0000	0.9825	0.9797	0.9456	0.9335	0.9261	21,792
4	1.0000	0.9839	0.9578	0.9569	0.9246	0.9145	19,685
5	1.0000	0.9799	0.9740	0.9663	0.9505	0.9236	25,133
6	1.0000	0.9678	0.9720	0.9489	0.9212	0.9068	18,887
7	1.0000	0.9699	0.9575	0.9515	0.9302	0.9295	25,089
8	1.0000	0.9793	0.9771	0.9424	0.9316	0.9278	22,266
9	1.0000	0.9859	0.9818	0.9635	0.9303	0.9298	22,421
10	1.0000	0.9847	0.9791	0.9540	0.9368	0.9270	22,511
Mean	1.0000	0.9814	0.9704	0.9518	0.9310	0.9234	21,906
Std	0.0000	0.0078	0.0104	0.0083	0.0083	0.0080	
Min	1.0000	0.9678	0.9535	0.9424	0.9212	0.9068	
Max	1.0000	0.9943	0.9818	0.9663	0.9505	0.9315	
Sample ($T_s = 85^\circ\text{C}$)	Monitoring Intervals (hrs)*						L70 Projection
	1,000	2,000	3,000	4,000	5,000	6,000	
1	1.0000	0.9413	0.9574	0.9161	0.8795	0.8449	11,444
2	1.0000	0.9820	0.9626	0.8925	0.8803	0.8517	10,350
3	1.0000	0.9815	0.9384	0.9366	0.8658	0.8755	11,967
4	1.0000	0.9583	0.9374	0.8988	0.9077	0.8425	11,759
5	1.0000	0.9827	0.9309	0.8928	0.9022	0.8476	11,098
6	1.0000	0.9425	0.9307	0.9271	0.9060	0.8474	13,134
7	1.0000	0.9728	0.9196	0.9220	0.8715	0.8540	11,184
8	1.0000	0.9868	0.9335	0.8866	0.8888	0.8406	10,117
9	1.0000	0.9793	0.9660	0.9301	0.8793	0.8529	10,795
10	1.0000	0.9820	0.9545	0.9279	0.8605	0.8761	11,499
Mean	1.0000	0.9709	0.9431	0.9130	0.8842	0.8533	11,335
Std	0.0000	0.0172	0.0158	0.0185	0.0166	0.0126	
Min	1.0000	0.9413	0.9196	0.8866	0.8605	0.8406	
Max	1.0000	0.9868	0.9660	0.9366	0.9077	0.8761	

*The first 1,000 hours of operation are being referring to as the seasoning period which are not accounted for data extrapolation.

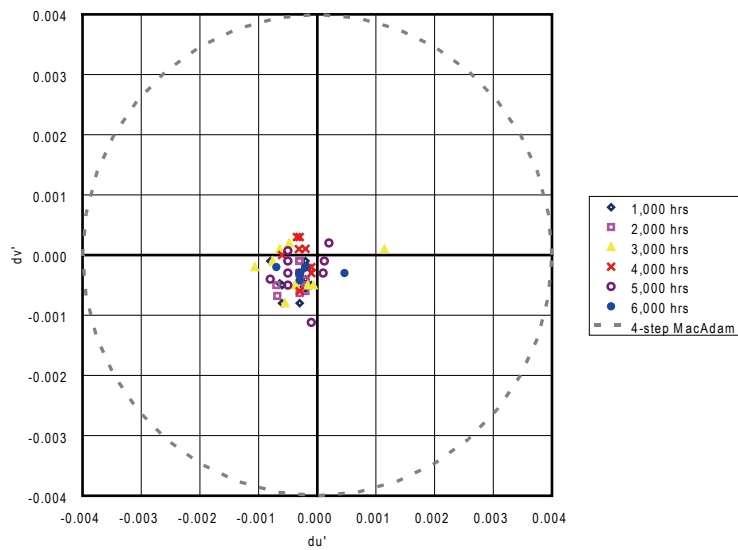
Edixeon® A Series Chromaticity Maintenance

Edixeon® A Series Chromaticity Maintenance ($I_p = 350\text{mA}$)												
Sample ($T_s = 55^\circ\text{C}$)	du'						dv'					
	1,000	2,000	3,000	4,000	5,000	6,000	1,000	2,000	3,000	4,000	5,000	6,000
1	-0.0001	-0.0003	-0.0006	-0.0002	-0.0003	0.0002	-0.0005	-0.0005	-0.0002	-0.0011	-0.0003	-0.0001
2	-0.0003	-0.0007	-0.0003	-0.0004	-0.0003	-0.0001	-0.0004	-0.0003	-0.0003	-0.0006	-0.0007	-0.0004
3	-0.0002	-0.0003	-0.0002	-0.0001	-0.0001	-0.0004	-0.0002	-0.0001	-0.0002	-0.0003	-0.0003	-0.0001
4	-0.0003	-0.0004	-0.0002	0.0004	0.0001	-0.0002	-0.0006	-0.0005	-0.0008	-0.0004	-0.0003	-0.0002
5	-0.0006	-0.0002	-0.0003	0.0003	0.0002	-0.0004	-0.0003	0.0002	-0.0006	-0.0005	-0.0002	0.0003
6	-0.0003	-0.0002	-0.0001	-0.0007	-0.0004	0.0001	-0.0002	-0.0008	-0.0003	-0.0005	-0.0002	-0.0007
7	-0.0002	-0.0005	-0.0005	-0.0003	-0.0002	-0.0002	-0.0005	-0.0002	-0.0002	-0.0001	-0.0005	-0.0003
8	-0.0003	-0.0001	-0.0004	-0.0006	-0.0004	-0.0003	-0.0002	-0.0005	-0.0002	-0.0004	-0.0003	-0.0001
9	-0.0003	-0.0004	-0.0001	0.0001	-0.0003	-0.0001	-0.0003	0.0001	-0.0006	-0.0005	-0.0002	0.0003
10	-0.0001	-0.0002	-0.0002	-0.0002	-0.0001	0.0000	-0.0004	-0.0005	-0.0001	-0.0001	-0.0002	-0.0002
Mean	-0.0003	-0.0003	-0.0003	-0.0002	-0.0002	-0.0001	-0.0004	-0.0003	-0.0004	-0.0004	-0.0003	-0.0002
Std	0.0000	0.0002	0.0002	0.0004	0.0002	0.0002	0.0000	0.0003	0.0002	0.0003	0.0002	0.0003
Min	-0.0006	-0.0007	-0.0006	-0.0007	-0.0004	-0.0004	-0.0006	-0.0008	-0.0008	-0.0011	-0.0007	-0.0007
Max	-0.0001	-0.0001	-0.0001	0.0004	0.0002	0.0002	-0.0002	0.0002	-0.0001	-0.0001	-0.0002	0.0003
Sample ($T_s = 65^\circ\text{C}$)	du'						dv'					
	1,000	2,000	3,000	4,000	5,000	6,000	1,000	2,000	3,000	4,000	5,000	6,000
1	-0.0002	-0.0003	-0.0004	-0.0001	-0.0005	-0.0003	-0.0001	-0.0006	-0.0005	-0.0003	-0.0003	-0.0003
2	-0.0003	-0.0007	-0.0006	-0.0003	-0.0003	-0.0007	-0.0008	-0.0005	0.0001	0.0003	-0.0003	-0.0002
3	-0.0006	-0.0007	-0.0008	-0.0002	0.0001	0.0005	-0.0005	-0.0007	-0.0001	-0.0002	-0.0001	-0.0003
4	-0.0008	-0.0003	-0.0002	-0.0003	-0.0005	-0.0003	-0.0001	-0.0003	-0.0005	0.0001	0.0001	-0.0003
5	-0.0006	-0.0002	-0.0005	-0.0006	0.0002	-0.0002	-0.0005	-0.0004	0.0002	0.0000	0.0002	-0.0002
6	-0.0003	-0.0002	-0.0005	-0.0003	-0.0008	-0.0002	-0.0005	-0.0006	-0.0008	-0.0003	-0.0004	-0.0002
7	-0.0002	-0.0003	-0.0011	-0.0002	-0.0001	-0.0003	-0.0006	-0.0001	-0.0002	0.0001	-0.0011	-0.0003
8	-0.0002	-0.0003	-0.0004	-0.0003	-0.0005	-0.0003	-0.0004	-0.0001	-0.0005	-0.0006	-0.0005	-0.0004
9	-0.0006	-0.0002	0.0011	-0.0003	0.0001	-0.0002	-0.0008	-0.0005	0.0001	0.0003	-0.0003	-0.0002
10	-0.0001	-0.0002	-0.0001	-0.0001	-0.0005	-0.0002	-0.0005	-0.0005	-0.0005	-0.0002	-0.0001	-0.0002
Mean	-0.0004	-0.0003	-0.0003	-0.0003	-0.0003	-0.0002	-0.0005	-0.0004	-0.0003	-0.0001	-0.0003	-0.0003
Std	0.0000	0.0002	0.0006	0.0001	0.0003	0.0003	0.0000	0.0002	0.0003	0.0003	0.0004	0.0001
Min	-0.0008	-0.0007	-0.0011	-0.0006	-0.0008	-0.0007	-0.0008	-0.0007	-0.0008	-0.0006	-0.0011	-0.0004
Max	-0.0001	-0.0002	0.0011	-0.0001	0.0002	0.0005	-0.0001	-0.0001	0.0002	0.0003	0.0002	-0.0002
Sample ($T_s = 85^\circ\text{C}$)	du'						dv'					
	1,000	2,000	3,000	4,000	5,000	6,000	1,000	2,000	3,000	4,000	5,000	6,000
1	-0.0002	-0.0003	-0.0006	-0.0007	-0.0001	-0.0002	-0.0006	-0.0003	-0.0006	-0.0003	-0.0006	0.0002
2	-0.0003	-0.0001	-0.0003	-0.0003	-0.0003	-0.0003	-0.0008	-0.0007	-0.0003	-0.0004	-0.0003	-0.0002
3	-0.0006	0.0000	-0.0003	-0.0002	-0.0002	-0.0001	-0.0002	-0.0003	-0.0002	-0.0001	-0.0001	-0.0005
4	-0.0008	-0.0003	-0.0008	-0.0003	-0.0003	-0.0003	-0.0003	-0.0004	-0.0002	0.0001	0.0001	-0.0002
5	-0.0006	-0.0004	-0.0003	-0.0006	-0.0006	-0.0002	-0.0006	-0.0002	-0.0003	0.0003	0.0002	-0.0004
6	-0.0003	-0.0006	-0.0006	-0.0003	-0.0003	-0.0002	0.0000	-0.0002	-0.0006	-0.0007	-0.0004	0.0000
7	-0.0008	-0.0001	-0.0003	-0.0002	-0.0002	-0.0003	-0.0004	-0.0005	-0.0005	-0.0005	-0.0001	-0.0002
8	0.0004	-0.0008	-0.0004	-0.0003	-0.0003	-0.0003	-0.0005	-0.0004	-0.0004	-0.0006	-0.0005	-0.0003
9	0.0003	-0.0005	-0.0001	-0.0003	-0.0003	-0.0002	-0.0003	-0.0004	-0.0004	-0.0004	-0.0003	-0.0006
10	-0.0007	-0.0005	-0.0002	-0.0001	-0.0001	-0.0002	-0.0008	-0.0002	-0.0002	-0.0002	-0.0001	-0.0004
Mean	-0.0004	-0.0004	-0.0004	-0.0003	-0.0003	-0.0002	-0.0005	-0.0004	-0.0004	-0.0003	-0.0002	-0.0003
Std	0.0000	0.0003	0.0002	0.0002	0.0001	0.0001	0.0000	0.0002	0.0002	0.0003	0.0003	0.0002
Min	-0.0008	-0.0008	-0.0008	-0.0007	-0.0006	-0.0003	-0.0008	-0.0007	-0.0006	-0.0007	-0.0006	-0.0006
Max	0.0004	0.0000	-0.0001	-0.0001	-0.0001	-0.0001	0.0000	-0.0002	-0.0002	0.0003	0.0002	0.0002

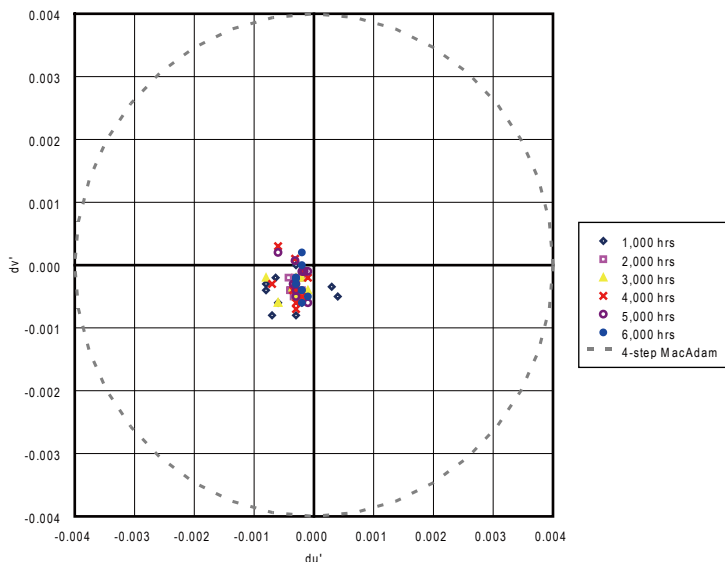
Chromaticity Maintainance at $T_s=55^\circ\text{C}$



Chromaticity Maintainance at $T_s=65^\circ\text{C}$



Chromaticity Maintainance at $T_s=85^\circ\text{C}$





About Edison Opto

Edison Opto is a leading high power LED manufacturer and a solution provider experienced in optical design and thermal management for the emerging SSL market. With R&D headquarter in Taiwan, as well as distribution network over twenty-six countries, Edison Opto offers a diverse range of high power LED products to worldwide commercial, industrial, retail, and residential markets.

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