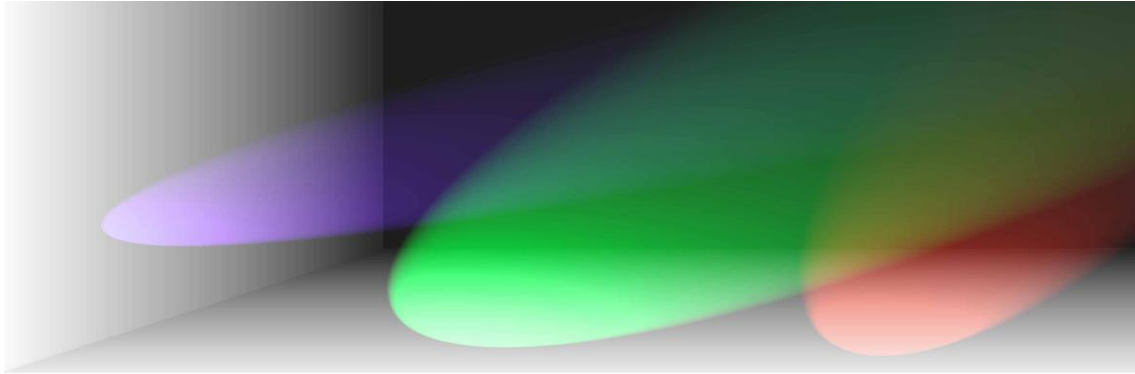


TEMPERATURE AND TM21 TEST REPORT



Asselum luminotècnics, SL

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Customer: AIRFAL INTERNATIONAL, S.L.

Address: Calle Río Ésera, 5

City: 50830 Villanueva de Gállego

Location: España

Phone: 976 18 58 09

Product name¹: PYROS LED

Product Code¹: 14ATEX0064X

Sample number RM19111401

Test code: CL089A19T001

¹ Information provided by the test applicant, Asselum is not responsible for this information, nor for the identifying marks included in the sample.

Informe revisado:

Marc Ballbè
Responsable
laboratorio

*The results obtained in this report refer only to the sample tested described on section 1.1. No part of this report may be reproduced without the permission of **ASSELUM assessors luminotècnics, S.L.**
The uncertainty of the measurements included in this report are available upon express request.*

REPORT INDEX

Temperature test and TM21	3
Product Datasheet	3
Sample image	3
Electrical test parameters	4
Environmental conditions.....	4
Temperature test and TM21 results	5
Temperature Test ISTMT.....	5
Flow maintenance extrapolation accoding to TM 21	5
Test information according to LM 80¹	6
Lm 80 Inputs	6
TM 21 Inputs	7
Temperature test image	7

Temperature test and TM21

Product Datasheet

Type	Luminary
Product Code ¹	14ATEX0064X
Name ¹	PYROS LED
Light source type	LED

Sample image



Electrical test parameters

Source type	Stabilized power supply
Power supply	230± 0.4%
Harmonic distortion	< 0,5%
Frequency	50 Hz ± 0.1%

Environmental conditions

Laboratory temperature [°C]	25°C ± 1°C
Relative humidity	60%
Air movement	< 0,25 m/s

Instruments used

Data logger Thermometer	DIGITAL THERMOMETER PCE-T 390 N° identificativo: E-018
Thermocouple	Thermocouple de 2m K type +250°C

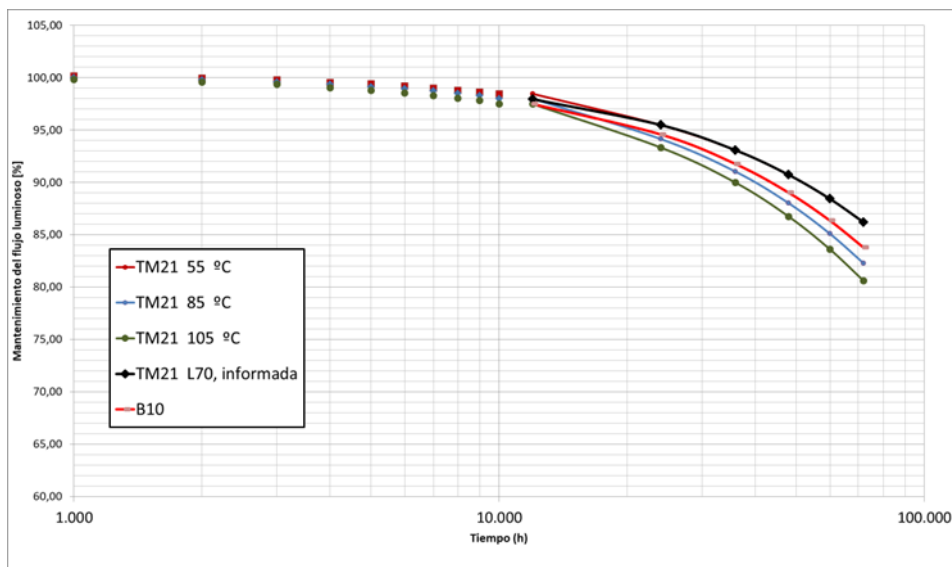
Temperature test and TM21 results

Temperature Test ISTMT

Test Time (h)	8
External Temperature (°C)	25
LED Temperature $T_{s,i}$ (°C)	36,6
Alimentación de cada LED ¹ (mA)	160

Flow maintenance extrapolation according to TM 21

L90(10k) B50 proyectado	51.692
L90(10k) B50 informado	51.692
L90(10k) B10 proyectado	43.603
L90(10k) B10 informado	43.603
L80(10k) B50 proyectado	> 72.000 h
L80(10k) B50 informado	106.963
L80(10k) B10 proyectado	> 72.000 h
L80(10k) B10 informado	90.210
L70(10k) B50 proyectado	> 72.000 h
L70(10k) B50 informado	169.623
L70(10k) B10 proyectado	> 72.000 h
L70(10k) B10 informado	143.049



* According to the TM21 method, the maintenance of the luminous flux can only be extrapolated 6 times the time measured in the Im80 test. Any value outside the aforementioned scope is excluded from the TM21 procedure.

Test information according to LM 80 ¹			
Report made by:	Bay Area Compliance Laboratories Corp. (Dongguan)		
Report Date :	11/08/2018		
Manufacturer:	Samsung Electronics CO., LTD		
LED model:	SPMWHX228FD5WAW0XX		
Samples Tested:	25		
LED power supply:	160		
Case No.	1	2	3
Temperature	55 °C	85 °C	105 °C
Flow maintenance at 12.000 h	97,81%	97,23%	96,70%

Lm 80 Inputs																									
Description of LED Light Source Tested (manufacturer, model, catalog number)		LM-80 Test Inputs																							
		Test Data for 55°C Case Temperature		Test Data for 85°C Case Temperature		Test Data for 105°C Case Temperature																			
		Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)																		
<table border="1"> <thead> <tr> <th colspan="2">LM-80 Testing Details</th> </tr> </thead> <tbody> <tr> <td>Total number of units tested per case temperature</td> <td>25</td> </tr> <tr> <td>Number of failures:</td> <td>0</td> </tr> <tr> <td>Number of units measured:</td> <td>25</td> </tr> <tr> <td>Test duration (hours):</td> <td>12000</td> </tr> <tr> <td>Tested drive current (mA):</td> <td>160</td> </tr> <tr> <td>Tested case temperature 1 (T_c, °C):</td> <td>55</td> </tr> <tr> <td>Tested case temperature 2 (T_c, °C):</td> <td>85</td> </tr> <tr> <td>Tested case temperature 3 (T_c, °C):</td> <td>105</td> </tr> </tbody> </table>		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):	12000	Tested drive current (mA):	160	Tested case temperature 1 (T _c , °C):	55	Tested case temperature 2 (T _c , °C):	85	Tested case temperature 3 (T _c , °C):	105	1.000	100.15%	1.000	99.99%	1.000	99.82%
		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):	12000																						
		Tested drive current (mA):	160																						
		Tested case temperature 1 (T _c , °C):	55																						
		Tested case temperature 2 (T _c , °C):	85																						
		Tested case temperature 3 (T _c , °C):	105																						
		2.000	99.96%	2.000	99.78%	2.000	99.58%																		
		3.000	99.78%	3.000	99.58%	3.000	99.37%																		
4.000	99.54%	4.000	99.37%	4.000	99.04%																				
5.000	99.39%	5.000	99.11%	5.000	98.77%																				
6.000	99.17%	6.000	98.95%	6.000	98.53%																				
7.000	98.99%	7.000	98.72%	7.000	98.27%																				
8.000	98.78%	8.000	98.48%	8.000	98.01%																				
9.000	98.60%	9.000	98.26%	9.000	97.82%																				
10.000	98.45%	10.000	97.98%	10.000	97.47%																				
11.000	98.12%	11.000	97.59%	11.000	97.08%																				
12.000	97.90%	12.000	97.30%	12.000	96.72%																				
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TM 21 Inputs

Table 1: Report at each LM-80 Test Condition					
Description of LED Light Source Tested (manufacturer, model, catalog number)		Test Condition 1 - 55 Case Temp		Test Condition 2 - 85 Case Temp	
Sample size	25	Sample size	25	Sample size	25
Number of failures	0	Number of failures	0	Number of failures	0
DUT drive current used in the test (mA)	160	DUT drive current used in the test (mA)	160	DUT drive current used in the test (mA)	160
Test duration (hours)	12.000	Test duration (hours)	12.000	Test duration (hours)	12.000
Test duration used for projection (hour to hour)	6000,0 - 12000,0	Test duration used for projection (hour to hour)	6000,0 - 12000,0	Test duration used for projection (hour to hour)	6000,0 - 12000,0
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	105
α	2,131E-06	α	2,806E-06	α	3,054E-06
B	1,005	B	1,007	B	1,004
Reported L70(12k) (hours)	>72000	Reported L70(12k) (hours)	>72000	Reported L70(12k) (hours)	>72000

Table 2: Interpolation Report (projection based on <i>in-situ</i> temperature entered)	
$T_{s,1}$ (°C)	55,00
$T_{s,1}$ (K)	328,15
α_1	2,131E-06
B_1	1,005
$T_{s,2}$ (°C)	-
$T_{s,2}$ (K)	-
α_2	-
B_2	-
E_a/k_b	-
A	-
B_0	1,005
$T_{s,i}$ (°C)	36,60
$T_{s,i}$ (K)	309,75
α_i	2,131E-06
Reported L70(12k) at	>72000

Temperature test image

