LIGHTING LUMINAIRE	DIMON TECHNOLOGY	Issued: 4/7/2019
TUNOLA-18W	**L70 TESTING REPORT**	REV: 00
Report No. L70-TUNOLA-18W	**Energy Star TM-21 Calculation**	PAG: 1

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

Description of LED Light Source Tested (manufacturer, model, catalog number)
Model: TUNOLA-18W, manufactured by DIMON Technology Ltd

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):	10800
Tested drive current (mA):	60
Tested case temperature 1 (T_c, ºC):	55
Tested case temperature 2 (T_c, ºC):	85
Tested case temperature 3 (T_c, ºC):	105

LM-80 Test Inputs

Test Data for 55ºC Case Temperature		Test Data for 85ºC Case Temperature		Test Data for 105ºC Case Temperature	
Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)	Time (hours)	Lumen Maintenance (%)
0	100.00%	0	100.00%	0	100.00%
542	99.30%	542	98.50%	541	97.50%
1010	99.50%	1009	98.40%	1010	97.00%
1699	99.50%	1698	98.20%	1699	96.40%
2372	99.40%	2370	97.90%	2372	95.80%
3124	99.10%	3123	97.60%	3125	95.40%
3812	99.00%	3811	97.60%	3812	95.20%
4520	98.80%	4515	97.30%	4520	94.80%
5185	98.90%	5181	97.20%	5186	94.60%
6019	98.90%	6014	97.20%	6019	94.50%
6780	98.60%	6776	96.80%	6781	94.10%
7577	98.60%	7573	96.80%	7577	94.00%
8411	98.40%	8407	96.50%	8412	93.70%
9239	98.00%	9234	96.10%	9239	93.20%
10074	98.30%	10070	96.30%	10074	93.40%

In-Situ Inputs

Drive current for each LED package/array/module (mA):	30
In-situ case temperature (T_c, ºC):	56.3
Percentage of initial lumens to project to (e.g. for L_{70}, enter 70):	70

Results

Time (t) at which to estimate lumen maintenance (hours):	10,070
Lumen maintenance at time (t) (%):	97.42%
Calculated L70 (hours):	202,000
Reported L70 (hours):	>65000

TM-21 Report

Table 1: Report at each LM-80 Test Condition

Description of LED Light Source Tested (manufacturer, model, catalog number)	Model: TUNOLA-18W, manufactured by DIMON Technology Ltd				
Test Condition 1 - 55ºC Case Temp		**Test Condition 2 - 85ºC Case Temp**		**Test Condition 3 - 105ºC 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)	60	DUT drive current used in the test (mA)	60	DUT drive current used in the test (mA)	60
Test duration (hours)	10,800	Test duration (hours)	10,800	Test duration (hours)	10,800
Test duration used for projection (hour to hour)	5,185 - 10,074	Test duration used for projection (hour to hour)	5,185 - 10,074	Test duration used for projection (hour to hour)	5,185 - 10,074
Tested case temperature (ºC)	55	Tested case temperature (ºC)	85	Tested case temperature (ºC)	105
α	1.693E-06	α	2.362E-06	α	3.087E-06
B	0.998	B	0.985	B	0.962
Calculated L70(11k) (hours)	210,000	Calculated L70(11k) (hours)	144,000	Calculated L70(11k) (hours)	103,000
Reported L70(11k) (hours)	>65000	Reported L70(11k) (hours)	>65000	Reported L70(11k) (hours)	>65000

Table 2: Interpolation Report (projection based on *in-situ* temperature entered)

$T_{s,1}$ (ºC)	55.00
$T_{s,1}$ (K)	328.15
α_1	1.693E-06
B_1	0.998
$T_{s,2}$ (ºC)	85.00
$T_{s,2}$ (K)	358.15
α_2	2.362E-06
B_2	0.985
E_a/k_b	1.30E+03
A	8.997E-05
B_0	0.991
$T_{s,i}$ (ºC)	56.30
$T_{s,i}$ (K)	329.45
α_i	1.720E-06
Projected L70(11k) at	202,000
Reported L70(11k) at 56.3ºC (hours)	>65000

Report Generated By: Fish Tan	Notes: N.A
Company: DIMON Technology Limited	
Date: July . 4, 2019	