

Issue Date: January 14, 2019
Project No. G103554929
Quote No.: Qu-00891500

Contact: Stella Su
Email: stella@nanhua.com
Phone No. 8602139126868-850

Report No. 103554929CRT-001

Shanghai Nanhua Electronics Co., Ltd.

Building #9
1755 Wenbei Rd, Jiading
Shanghai 201802
China

Standards

International Civil Aviation Organization (ICAO), Aerodromes, Annex 14, Volume 1, Eighth Edition, dated July 2018

Test Purpose	Performance Testing for ICAO Low Intensity Type B Steady Burning Light
Test Dates	September 12, 2018 - November 7, 2018



Jennifer Barnoski
Project Engineer
Lighting



Christopher W. Metcalf
Engineering Supervisor
Lighting

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Test Plan and Datasheets			
Client	Shanghai Nanhua Electronics Co., Ltd.	Engineer	Jennifer Barnoski
Report #	103554929CRT-001	Reviewer	Christopher W. Metcalf
Product	Low Intensity Type B	Model(s)	LT810B
Standard	ICAO, Annex 14, Volume 1, dated July 2018		

Spec	Test name	Clause	Results
ICAO	Photometry	Tbl. 6-1 + Tbl. 6-2	Pass
ICAO	Chromaticity	App. 1	Pass

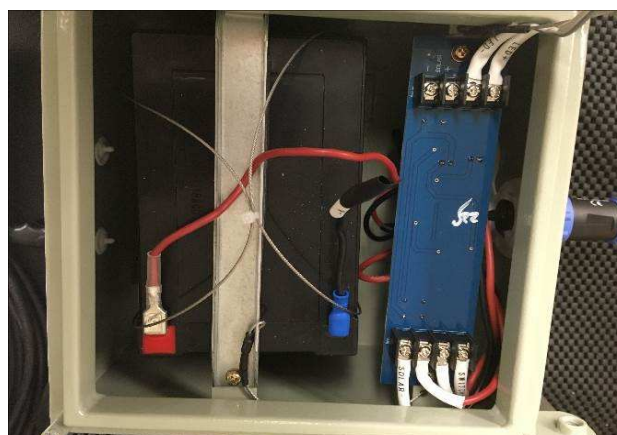
Results Key	
Pass	Compliant
Fail	Non-compliant
NC	Not Completed
NT	Not Tested in this project
NA	Test not Applicable

Sample Information				
Date Rec.	Intertek ID	Description	Condition	Model No.
8/23/2018	CRT1808231456-001	Low Intensity Type B Solar Light	Production	LT810B
11/2/2018	CRT1811021345-001	New control board	Production	NA

Further Sample Description	
Type:	Low Intensity Type B Light
Options:	NA
Light Source:	LED: (1) Red, Osram, GA CSSPM1.23
Lens:	Polymeric: Clear Polycarbonate, Sabic, LUX9130T
Approx Size:	8.25" x 8.25" x 13"
Electrical Input:	Solar Powered - 12VDC battery
LED Supply Location:	Internal to flash head box
Cable:	NA
Min Cable Length:	NA
Max Cable Length:	NA
Casting Material:	Powder coated aluminum alloy
Mounting:	(4) Through Holes on base box

Sample Modification Log	
Date	Modification description
11/5/18	Replaced control board with new one increasing current to LEDs

Picture(s)



Photometry

Energize each light fixture and test for compliance with the photometric requirements. Operate the fixture until stabilized before taking measurements. Each light will be measured independently while steady burning.

Results

Sample	Voltage Variation	Voltage	Position	Measured	Factor	Result
CRT1808231456-001 + CRT1811021345-001	Input Voltage*	12VDC	0,0	91.6	NA	NA
	Input Voltage +10%	13.2VDC	0,0	91.5	0.999	NA
	Input Voltage -10%	10.8VDC	0,0	NA	NA	NA

Inoperable at 10.8Vdc

* Distribution test voltage

Luminous Intensity (cd)												
Vertical Position (deg.)	Horizontal Position (deg.)											
	0	30	60	90	120	150	180	210	240	270	300	330
22.0	3.6	3.4	3.1	3.5	4.4	3.4	3.1	3.7	3.9	3.2	3.4	3.2
21.0	4.9	3.6	3.7	3.9	5.1	4.0	3.7	4.3	5.0	3.1	3.6	4.4
20.0	4.9	3.9	4.5	4.5	5.8	4.4	4.4	4.7	5.8	3.8	4.0	4.4
19.0	5.1	4.7	4.5	4.7	5.8	4.8	4.9	5.5	5.3	4.2	4.5	4.4
18.0	5.0	4.6	5.1	4.9	5.9	5.3	5.0	5.4	5.1	4.4	4.9	4.7
17.0	4.7	4.8	5.6	4.9	5.7	5.7	5.1	5.7	5.3	4.6	4.9	4.5
16.0	5.6	5.3	6.8	5.2	5.7	6.7	5.3	6.6	6.4	5.0	5.3	5.1
15.0	6.1	5.4	8.4	5.6	7.7	9.1	6.2	8.6	8.9	5.6	6.1	6.4
14.0	6.9	6.8	10.8	6.4	10.5	13.5	7.1	11.7	13.8	6.0	7.3	8.8
13.0	8.2	10.0	15.9	10.1	16.3	19.0	11.8	18.6	21.4	9.3	10.6	13.6
12.0	12.3	16.3	22.5	14.7	27.2	23.9	18.4	28.7	28.0	15.8	18.2	19.8
11.0	20.7	26.0	30.1	27.5	36.9	30.2	35.8	38.8	35.0	31.0	28.4	27.7
10.0	48.1	42.7	43.2	52.6	54.8	47.6	62.4	64.0	54.7	67.0	50.4	45.9
9.0	85.0	76.2	73.3	88.3	80.9	85.3	99.6	94.8	87.3	95.4	79.4	77.5
8.0	109.8	99.0	86.2	112.6	101.3	95.8	117.2	104.3	100.5	104.7	99.8	90.2
7.0	106.5	98.8	95.1	107.3	106.0	89.9	115.2	109.6	102.0	99.0	106.1	89.8
6.0	110.0	102.3	101.9	103.3	110.9	93.7	115.3	113.2	109.9	100.0	112.8	95.1
5.0	113.8	106.8	111.7	100.5	110.4	101.5	108.1	106.8	112.3	100.2	110.8	102.6
4.0	108.3	104.3	109.3	97.9	105.9	104.0	102.5	99.7	112.8	93.2	101.9	104.3
3.0	104.3	102.5	106.7	98.1	100.3	98.1	96.4	95.8	110.0	90.3	97.2	107.6
2.0	102.1	102.2	100.7	92.3	96.4	86.0	88.6	88.7	98.5	84.5	96.4	102.6
1.0	98.4	99.4	91.6	89.4	89.1	72.3	78.5	78.2	85.7	83.7	89.2	94.4
0.0	92.0	86.9	80.2	77.4	76.5	62.6	68.3	69.4	74.7	76.1	81.6	81.5
-1.0	80.9	76.0	72.1	67.6	67.7	54.3	61.9	62.2	63.3	68.6	72.2	75.9
-2.0	66.2	61.0	56.5	58.8	52.2	42.3	48.7	48.7	50.6	55.7	58.1	62.2
-3.0	53.9	44.1	44.4	44.4	42.0	34.6	36.7	38.1	43.1	42.9	48.4	50.7
-4.0	39.9	35.2	37.0	32.8	32.2	25.3	26.9	27.4	32.8	29.7	36.4	41.0
-5.0	28.1	25.5	27.1	26.0	24.2	18.0	20.9	16.8	24.6	22.2	25.0	28.9
-6.0	23.6	21.5	22.3	19.2	18.8	12.3	14.0	12.8	16.0	14.3	19.2	23.1
-7.0	15.7	11.8	13.6	12.7	13.9	9.8	12.0	12.5	14.5	11.3	14.3	15.4
-8.0	14.3	9.9	12.6	11.5	13.2	8.6	11.1	12.2	13.7	9.6	12.7	14.8
-9.0	12.3	8.3	10.7	9.4	11.0	6.8	8.7	10.8	9.7	7.1	10.0	12.1
-10.0	9.8	7.7	9.7	7.6	7.5	4.9	6.2	7.3	6.3	5.2	7.7	8.5
-11.0	6.0	5.0	6.6	5.5	5.7	4.4	4.8	5.2	5.0	3.8	5.1	6.0
-12.0	4.5	4.3	4.9	4.4	4.3	3.7	4.0	4.4	4.1	3.9	4.1	4.6

ICAO Low-intensity Type A (fixed obstacle)												
Min 2°-10°	48.1	42.7	43.2	52.6	54.8	47.6	62.4	64.0	54.7	67.0	50.4	45.9
Upper (°)	16	16	18	16	21	18	17	19	20	16	16	16
Lower (°)	-11	-11	-11	-11	-11	-9	-10	-11	-11	-10	-11	-11
Spread (°)	27	27	29	27	32	27	27	30	31	26	27	27

ICAO Low-intensity Type B (fixed obstacle)												
Min 2°-10°	48.1	42.7	43.2	52.6	54.8	47.6	62.4	64.0	54.7	67.0	50.4	45.9
Upper (°)	11	12	12	11	13	13	12	13	13	11	12	12
Lower (°)	-6	-6	-6	-6	-6	-5	-5	-5	-5	-5	-6	-6
Spread (°)	17	18	18	17	19	18	17	18	18	16	18	18

Note: Test table was confirmed level before mounting sample to table.

Complies: YES NO

Tested By:	Brittany James	Signature or initials:	<i>BJ</i>	Comp. Date	11/7/18
Reviewed By:	cwm	Signature or initials:	<i>cwm</i>		
Test Equipment Used:	13, 14, 15				
Amb (°C):	24.3	RH%	30.2		

Chromaticity

Test the fixture with the lamp, filter and optical system for color of light emitted. Chromaticity Coordinates are to be calculated from a spectral distribution measured in 2nm increments for LEDs, and 5nm increments for incandescent. Measure the color after stabilization at rated input at the main beam center.

Results



Sample	Color	Input	Location	x	y	z
CRT1808231456-001	Red	12.026	(0,0)	0.679	0.320	0.000

Results

The aviation red must be per ICAO Annex 14, Volume 1, Appendix 1, Colors for Aeronautical Ground Lights, at operating temperature within the following chromaticity boundaries

Boundary	Line Equation	Calc.
Purple Boundary	$y \geq 0.980 - x$	0.301
Yellow Boundary	$y \leq 0.335$	0.320

Complies: YES NO

Tested By:	Craig Small	Signature or initials:		Comp. Date	9/12/18
Reviewed By:	cwm	Signature or initials:			
Test Equipment Used:	6,7,8,9,10,11,12				
Amb (°C):	25.1	RH%	49.3		

Equipment list				
#	Intertek ID No.	Description	Manufacturer	Calibration Due
1	T1555	Hygro-Thermometer	Extech	03-Jun-2019
2	M135	Multimeter	Fluke	12-Apr-2019
3	E466	Oscilloscope	Tektroniks	06-Aug-2019
4	L178	100 Foot Room Goniometer	Labsphere	18-Apr-2019
5	L061	IL1700	International Light	Calibrated with use
6	E288	OL-750 Spectroradiometer	Optronic Laboratories	20-Sep-2018
7	M282	Hygrometer	Testo	18-Apr-2019
8	E536	Digital Power Meter	Yokogowa	19-Jan-2019
9	A208	Current Transformer	Pearson Electric	27-Jun-2019
10	N721	Steel Ruler	Products Engineering Corp	12-Jul-2019
11	E499	Digital Level	Smart Tool	29-Jun-2019
12	N1335	Tape Measure	Stanley	19-Jan-2019
13	N1311	Level	Starrett	10-Sep-2019
14	L178	Goniophotometer	Labsphere	18-Apr-2019
15	M273	Hygrometer	Testo	17-Nov-2018
16				
17				
18				
19				
20				

Note: For measurement uncertainty, refer to the calibration certificates for all the test equipment located in the equipment files