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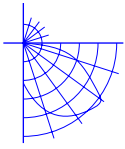
Report of Test

LL13795-R01

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This report supercedes Test Report LL13795

Client Shanghai Nanhua Electronics Company

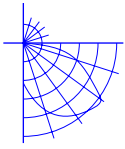
Contact Agatha Zeng

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Shanghai-201802

Device Tested One LED Type B obstruction light, Cat No. LS708. The device comprises a cast aluminium, yellow painted housing supporting a red plastic cylinder (nominally 90mm diameter) embedded with LEDs. The LEDs are arranged in five staggered horizontal rows of 32 each; rows are spaced at 10mm intervals. LEDs are 5mm diameter cylindrical clear jacketed and emit red light, each projects 4mm nominally from the plastic cylinder.

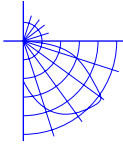
Device markings: Nanhua LS708, Weatherproof Aviation Obstruction Light, AC110V - AC 240V 7W, www.nanhua.com





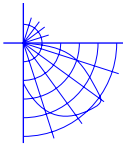
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Test Report Number LL13795-R01
This report supercedes Test Report LL13795

Nature of Tests	To determine the luminous intensity distribution and chromaticity coordinates of the device and its conformance to the requirements of applicable sections of the document: ICAO International Standards and Recommended Practices, Aerodromes, Annex 14, Volume 1 Fourth Edition - July 2004.
Procedure	<p>The device was operated in circuit at rated 240 Vac supply voltage from a stabilised ac source. The photometric output of the device was monitored until stability was achieved and then the tests performed.</p> <p>The device was mounted on an A-α format goniophotometer with a photometric test distance of 4.0m. The device was tested with the upper surface of the housing horizontal and with the optical axis in the plane of the centre row of LEDs and intersecting the vertical median.</p> <p>Photometric testing was conducted in accordance with the requirements of ICAO International Standards and Recommended Practices for Aerodromes, Annex 14, Volume 1 Fourth Edition - July 2004 Table 6-3. Luminous intensity values were recorded in two formats: (1) a coarse format with 10 degree steps in azimuth and from a 10 degree declination to a 50 degree elevation in 0.5 degree steps and (2) a fine format with 2 degree steps in azimuth and from a 4 degree inclination to a 12 degree inclination in elevation in 0.5 degree steps. The luminous intensity values were sampled with a $V(\lambda)$ corrected silicon cell. Electrical parameters were recorded and are summarised in Table 1. The test results in this report have been compared with the specified limits listed in Table 6-3 of the Standard.</p> <p>The spectral distribution was then sampled using a 256 pixel spectrometer from which the CIE tri-chromaticity coordinates were derived.</p>
Instruments Used	<p>In the course of testing the following instruments were employed:</p> <p>LightLab Model A100 goniophotometer Keithley Model 486 Picoammeter Voltech PM100 Extech 6210 stabilised ac source Photo Research PR670 spectrometer</p>
Sample Selection	The laboratory has not exercised control over the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent to which the test sample is representative of production units.



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Conformance to Requirements

- (1) Colorimetric requirements – Meets requirements
Refer Table 4 of this report

- (2) Flash rate – Meets requirements
Device emitted a steady light when energised

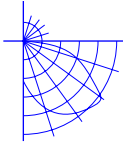
- (3) Peak Intensity requirements – Meets requirements
Refer Table 3 of this report

- (4) Vertical beam spread - Meets requirements
Refer Table 3 of this report

- (5) Intensity at given elevation angles – Meets requirements
Refer Table 2 of this report

- (6) Conspicuity of the device over the range of vertical angles from 0° to +50° - Meets requirements
Refer Diagram 2 of this report

In summary, the tested device meets the requirements for luminous intensity and colorimetry for a Type B Low Intensity Fixed Obstacle Light of Table 6-3 of ICAO International Standards and Recommended Practices, Aerodromes, Annex 14, Volume 1 Fourth Edition - July 2004.



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Test Results

Supply/Environmental Measurements	Value
Supply current	104 mA
Supply voltage	240.0 Vac
Supply wattage	10.8 W
Ambient temperature	24.8 °C

Table 1

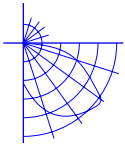
Luminous Intensity values at the +6 deg and +10 deg elevations				
Parameter	Measured value at elevation (cd)		Specified Limit (cd)	Result
	+6 deg	+10 deg		
Maximum luminous intensity	102.0	93.9	Not Specified	---
Minimum luminous intensity	78.3	66.8	>= 32 cd	Pass
Mean luminous intensity	90.9	82.2	Not Specified	---

Table 2

Extent of beam and intensity measurements			
Parameter (@ measured elevation)	Measured Value(s)	Specified Limit	Result
Peak luminous intensity (@ 6°)	101.6 cd	>= 32 cd	Pass
Beam extent low elevation (@ -10°)	> 16 cd	>= 16 cd	---
Beam extent high elevation (@ 35°)	16.1 cd		---
Beam spread (high elevation – low elevation)	> 45°	>= 10°	Pass

Table 3





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Results (cont)

Colorimetry			
Measured Values (x) (y)		Specified Limits	Result
0.699	0.301	Yellow boundary $y < 0.335$	Pass
		Purple boundary $y > 0.98 - x$	Pass

Table 4

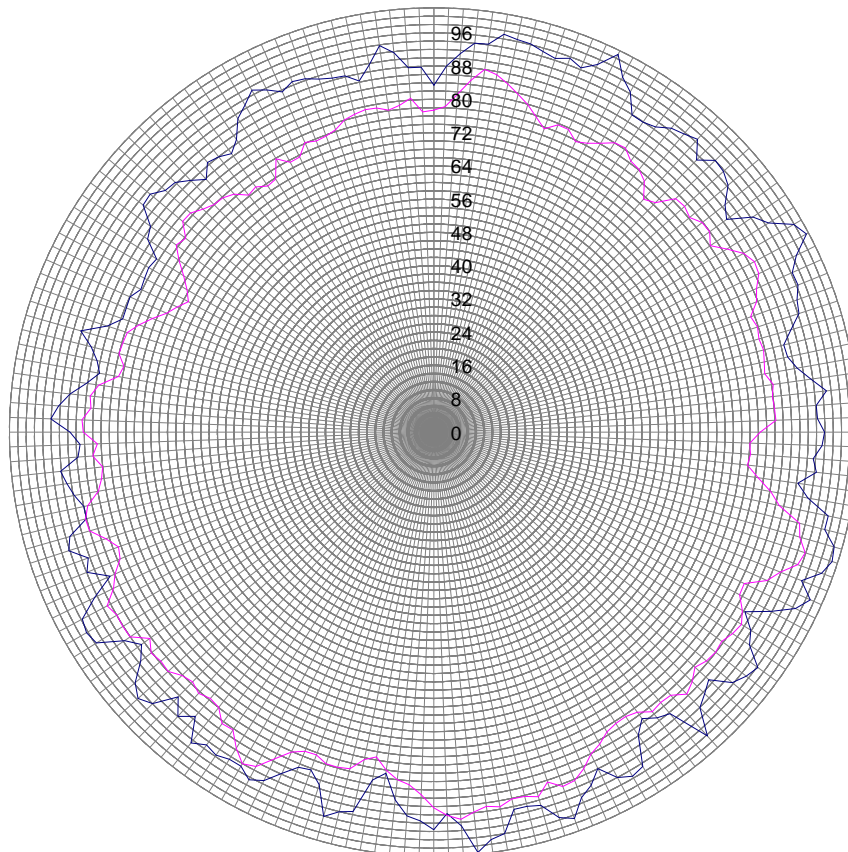
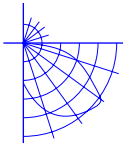


Diagram 1 – Luminous intensity distribution about device at fixed elevations
circumferential scale degrees, radial scale cd





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Results (cont)

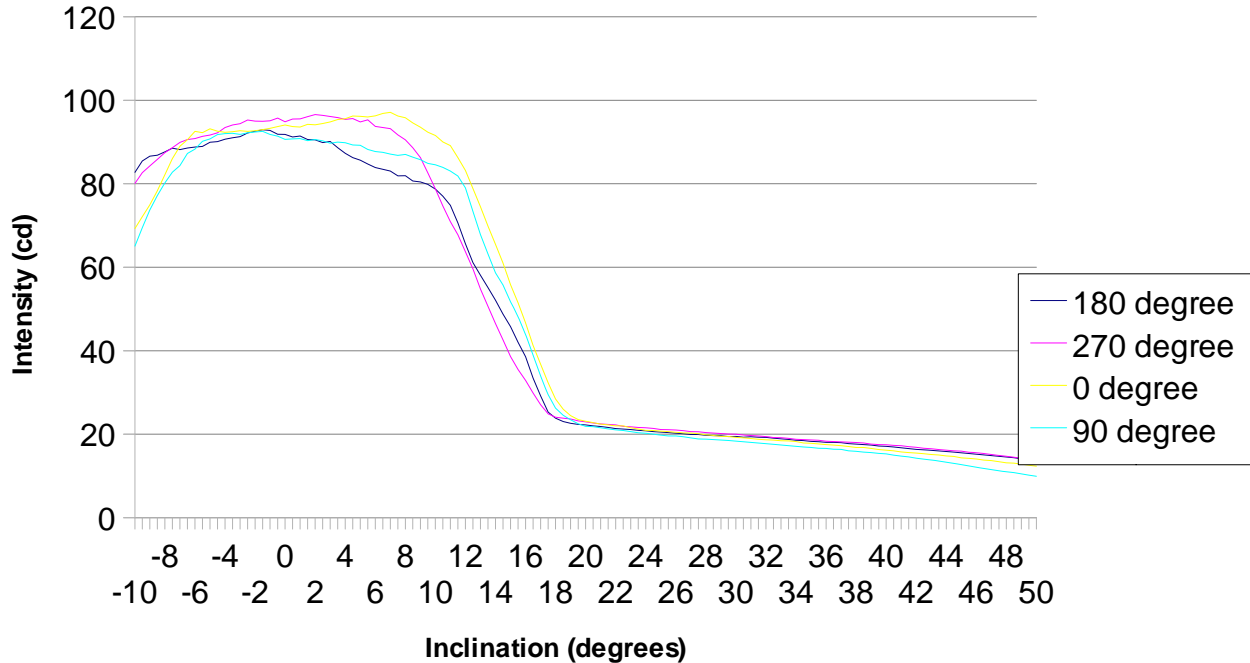


Diagram 2 – Luminous intensity distribution for given vertical planes at the azimuth angles specified

Uncertainties At the 95% confidence level with a confidence factor k = 2, the estimated uncertainties in measurement for this test are:

Temperature	± 1° Celsius
Luminous Intensity	± 4.0%
Voltage	± 0.5%
Current	± 0.5%
Power	± 1%
CIE Trichromatic Co-ordinates	± 0.003 units

Authorised Signatory

(P. Lawrance)

Date of Test 6th July 2010
Date of Report 22nd July 2010

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Document Revision 1.3

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