
Test Report: Lightbar "M" ICAO Type D

Test Report No. FR_087_19011

SUBJECT

Verification of a device with the requirements of:

- International Standards and recommended practices, Annex 14 to the convention on International Civil Aviation Organisation (ICAO) , AERODROMES, Volume 1: Aerodrome Design and Operations
- EASA, Annex to ED Decision 2014/013/R - Certification Specifications (CS) and Guidance Material (GM) for Aerodromes Design - CS-ADR-DSN

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1 General specifications

Applicant	MERCURA 4 Rue Louis Pasteur ZA Les Gailletrous 41260 LA CHAUSSEE SAINT VICTOR FRANCE
Trade name or mark	Mercura
Type	Lightbar "M" range ICAO Type D
Category	low-intensity obstacle light – type D
Manufacturer's name and address	Mercura 4 Rue Louis Pasteur ZA Les Gailletrous 41260 LA CHAUSSEE SAINT VICTOR FRANCE

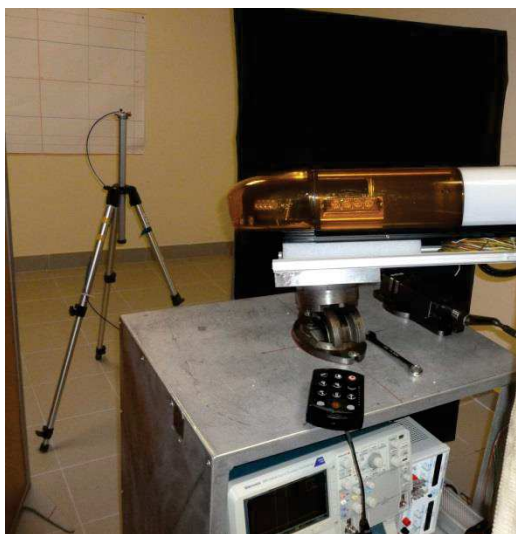


figure 1: Lightbar "M" ICAO type D

CONCLUSION: *The object submitted to tests meet the specification of the requirements mentioned in the subject.*

2 Test conditions

Location: Light Laboratory, Mercura SAS, La Haye-Fouassière

Measurement done: Mercura SAS

Date: 26.02.2019

Measurement distance: 1 m

Power supply: 13,5V DC

Test Equipment:

Description	Type
Power supply	Elektro-Automatik – Reference : EA-PS 2042-20B
Photometer	Ocean-Optics – reference USB4000 (Sensor + PC Software)
Oscilloscope	Tektronix - reference DPO 2002B
Orientable table	Model OTMT 38371250 (2 axels -45/+45°V 360°H)

Software for data acquisition and analysis:

Description	Version
Ocean-Optics SpectraSuite	Version 5.1

3 Test results

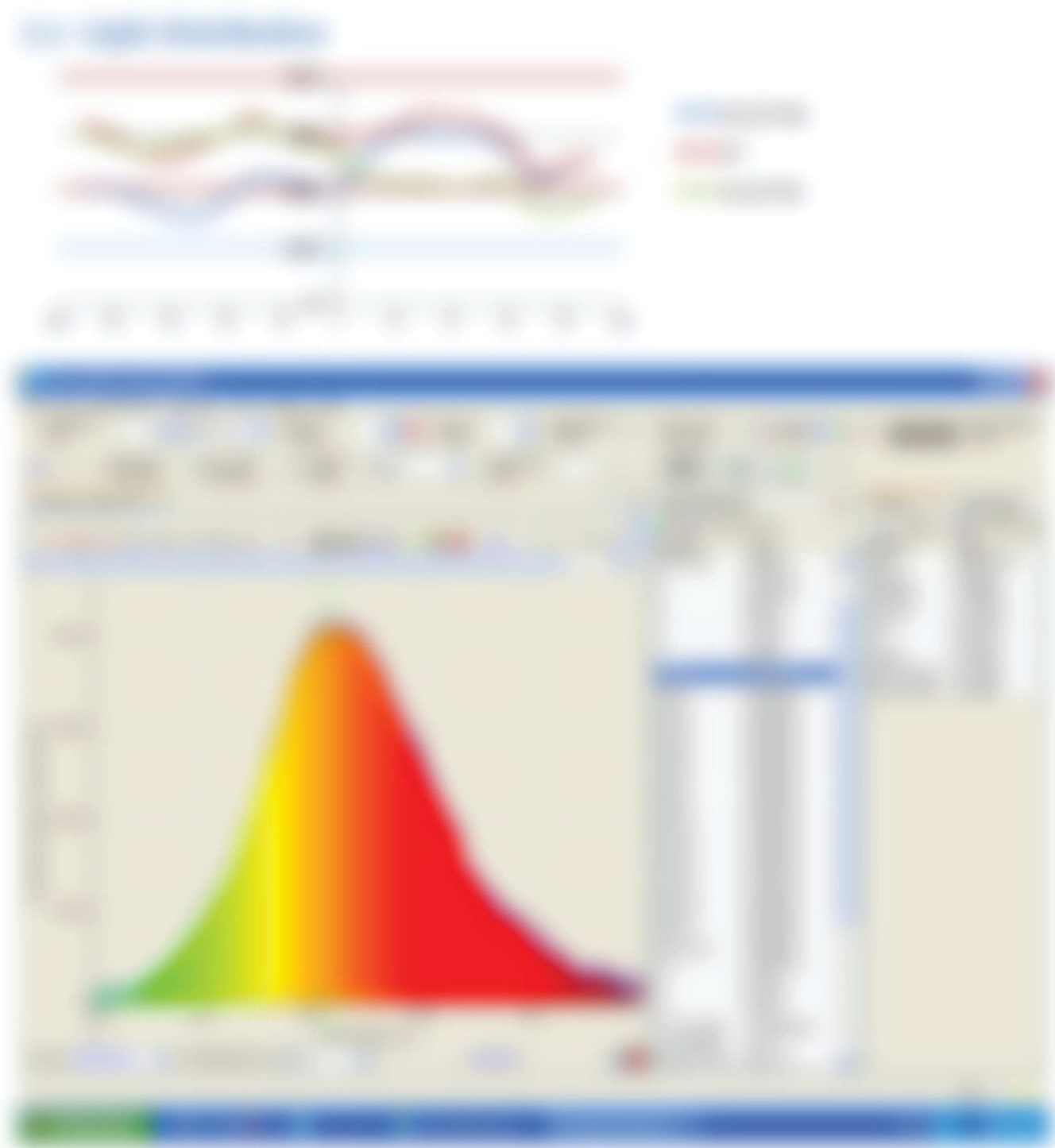
3.1 Test summary

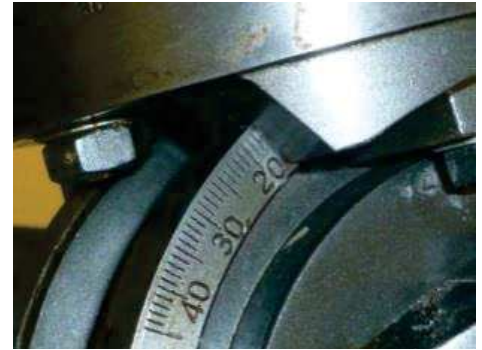
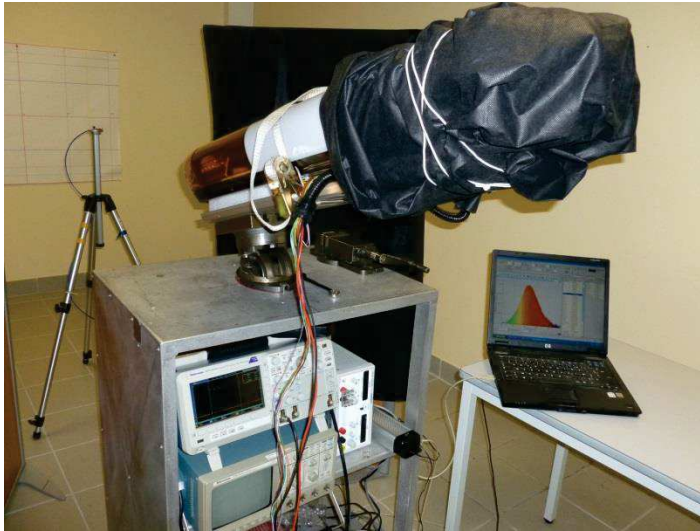
Method for testing:

- Inclination set on +17° for the measurement, then +23° and +11° for measures at +/-8° vertical (Vertical Projection angle 12°)
- For each angle a -90° to +90° rotation is done for measurement.
- Control of each value on 180° for a result between 200Cd to 400 Cd light range at 17°, and between 100 Cd to 400 Cd at 11° and 23°.

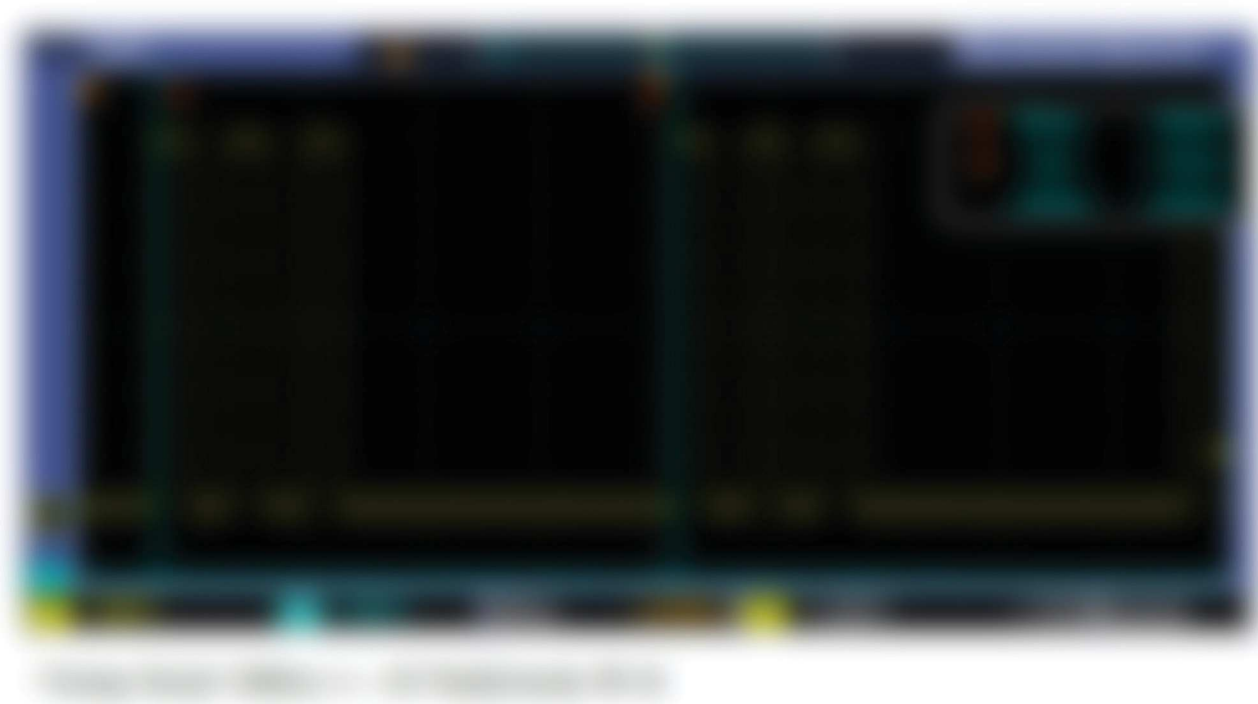
- Light intensity: all measurement meet the specification of requirements please see the report here below
→ OK

Horizontal \ Vertical	-90°	-80°	-70°	-60°	-50°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
23° (17°+6°)																			
17°																			
11° (17°-6°)																			





- Colorimetry: $x=0.5880$ / $y=0.4050$ → OK



----- end of report -----

Annex 14 — Aerodromes

V

Table 6-3. Characteristics of obstacle lights

1	2	3	4		5	6	7	8				12
			Peak intensity (cd) at given Background Luminance					Intensity (cd) at given Elevation Angles when the light unit is levelled (d)				
Light Type	Colour	Signal type/ (flash rate)	Above 500 cd/m ²	Below 50 cd/m ²	50–500 cd/m ²	Vertical Beam Spread (c)	-10° (e)	±0° (f)	+6°	+10°		
Low-intensity, Type A (fixed obstacle)	Red	Fixed	N/A	10 mmm	10 mmm	10°	—	—	10 mmm (g)	10 mmm (g)	—	
Low-intensity, Type B (fixed obstacle)	Red	Fixed	N/A	32 mmm	32 mmm	10°	—	—	32 mmm (g)	32 mmm (g)	—	
Low-intensity, Type C (mobile obstacle)	Yellow/Blue (a)	Flashing (60–90 fpm)	N/A	40 mmm (b) 400 max	40 mmm (b) 400 max	12° (b)	—	—	—	—	—	
Low-intensity, Type D (follow-me vehicle)	Yellow	Flashing (60–90 fpm)	N/A	200 mmm (b) 400 max	200 mmm (b) 400 max	12° (i)	—	—	—	—	—	
Medium-intensity, Type A	White	Flashing (20–60 fpm)	20 000 (b) ±25%	2 000 (b) ±25%	2 000 (b) ±25%	3° mmm	3% max	50% mmm 75% max	100% mmm	100% mmm	—	
Medium-intensity, Type B	Red	Flashing (20–60 fpm)	N/A	N/A	2 000 (b) ±25%	3° mmm	—	50% mmm 75% max	100% mmm	100% mmm	—	
Medium-intensity, Type C	Red	Fixed	N/A	N/A	2 000 (b) ±25%	3° mmm	—	50% mmm 75% max	100% mmm	100% mmm	—	
High-intensity, Type A	White	Flashing (40–60 fpm)	200 000 (b) ±25%	20 000 (b) ±25%	20 000 (b) ±25%	3°–7°	3% max	50% mmm 75% max	100% mmm	100% mmm	—	
High-intensity, Type B	White	Flashing (40–60 fpm)	100 000 (b) ±25%	20 000 (b) ±25%	20 000 (b) ±25%	3°–7°	3% max	50% mmm 75% max	100% mmm	100% mmm	—	

Note.— This table does not include recommended horizontal beam spreads. 6.3.22 requires 360° coverage around an obstacle. Therefore, the number of lights needed to meet this requirement will depend on the horizontal beam spreads of each light as well as the shape of the obstacle. Thus, with narrower beam spreads, more lights will be required.

- a) See 6.3.25.
- b) Effective intensity, as determined in accordance with the *Aerodrome Design Manual* (Doc 9157), Part 4.
- c) Beam spread is defined as the angle between two directions in a plane for which the intensity is equal to 50% of the lower tolerance value of the intensity shown in columns 4, 5 and 6. The beam pattern is not necessarily symmetrical about the elevation angle at which the peak intensity occurs.
- d) Elevation (vertical) angles are referenced to the horizontal.
- e) Intensity at any specified horizontal radial as a percentage of the actual peak intensity at the same radial when operated at each of the intensities shown in columns 4, 5 and 6.
- f) Intensity at any specified horizontal radial as a percentage of the lower tolerance value of the intensity shown in columns 4, 5 and 6.
- g) In addition to specified values, lights shall have sufficient intensity to ensure conspicuity at elevation angles between ±0° and 50°.
- h) Peak intensity should be located at approximately 2.5° vertical.
- i) Peak intensity should be located at approximately 17° vertical.

fpm — flashes per minute, N/A — not applicable

CS-ADR-DSN – BOOK 1
 CHAPTER Q – VISUAL AIDS FOR DENOTING OBSTACLES

1	2	3	4		5	6	7	8				11	12
			Peak intensity (cd) at given background luminance					Vertical beam spread ^a	Intensity (cd) at given elevation angles when the light unit is levelled ^d				
Light type	Colour	Signal type/flash rate	Above 500 cd/m ²	50-500 cd/m ²	Below 50 cd/m ²		-10° ^e		-1° ^e f	±0° f	+6°	+10°	
Low-intensity Type A (fixed obstacle)	Red	Fixed	N/A	10 mnm	10 mnm	10°	—	—	—	10 mnm ^g	10 mnm ^g		
Low-intensity Type B (fixed obstacle)	Red	Fixed	N/A	32 mnm	32 mnm	10°	—	—	—	32 mnm ^g	32 mnm ^g		
Low-intensity Type C (mobile obstacle)	Yellow/blue ^a	Flashing (60-90 fpm)	N/A	40 mnm ^b 400 max	40 mnm ^b 400 max	12° ^h	—	—	—	—	—		
Low-intensity Type D (follow-me vehicle)	Yellow	Flashing (60-90 fpm)	N/A	200 mnm ^b 400 max	200 mnm ^b 400 max	12° ⁱ	—	—	—	—	—		
Medium-intensity Type A	White	Flashing (20-60 fpm)	20 000 ^b ±25 %	20 000 ^b ±25 %	2 000 ^b ±25 %	3° mnm	3°% max	50 % mnm 75 % max	100 % mnm	—	—		
Medium-intensity Type B	Red	Flashing (20-60 fpm)	N/A	N/A	2 000 ^b ±25 %	3° mnm	—	50 % mnm 75 % max	100 % mnm	—	—		