SAE / DOT
Photometric Test Report

Test Name CARBON 2 DRIVE

Test Date:	02/05/2025	**Tested By:**	JW
LAMP TESTED:	CARBON 2 DRIVE	**Test Result:**	**PASS**
Special Aiming Requirement:	*To comply with the regulation limits, and when installed on a vehicle, the lamp should be aimed so that the point of peak intensity is aimed at the horizon.*		

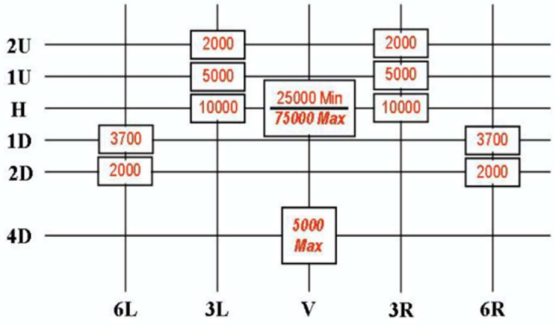
Aims/Goals of Test:

- To verify that the tested lamps comply with the optical requirements of SAE J581 and DOT FMVSS108 (Upper Beam Headlamp).
- Secondary To confirm if there is any special aiming which is required in order to meet the photometric requirements of J581.

SAE J581 Stabilized FEB2011 Page 5 of 5

6.1.6 Photometry

The lamp under test shall meet the photometric requirements contained in Figure 2.



1. Values shown are minimum cd requirements except at H-V and 4D-V locations where the maximum values are shown in **Italics/Bold.**
2. A tolerance of ± 1/4 degree in location may be allowed at any test point.

FIGURE 2 - PHOTOMETRIC REQUIREMENTS
Minimum Luminous Intensity (cd)

RESULTS

Detailed results are shown on page 2 and beyond. Only page 1 is uploaded to our website, in order to protect our Intellectual Property interests.

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REPORT No. PC25060182

THIS REPORT CONTAINS THE TEST RESULTS OF THE BELOW UPPER BEAM LAMP FOR VEHICLES LESS THAN 2032MM IN OVERALL WIDTH TO DEMONSTRATE COMPLIANCE WITH THE APPLICABLE REQUIREMENTS OF SEVERAL TESTS OF FMVSS108 AND SAE J575 AUG2018

Test component	:	Carbon 2
Manufacturer	:	Lazer Lamps Ltd Calder House, Central Road Harlow, Essex CM20 2ST
Test Laboratory	:	IDIADA, L'Albornar - Santa Oliva (Tarragona) Spain
Report date	:	16/06/2025

Applus **IDIADA** Group is officially accredited by **AMECA**
(Automotive Manufacturers Equipment Compliance Agency, Inc)

SUMMARY

TEST (FMVSS-108, SAE J575 AUG2018)
Upper beam lamp

Moisture test .....PASSED
Corrosion test.....PASSED
Dust test .....PASSED
Warpage test .....PASSED
Vibration test.....PASSED
Color test.....PASSED

Performed by

Laura Zapata Sala
TEST ENGINEER

Revised by:

Ramon Santafè Guiu
DEPARTMENT MANAGER

VIBRATION TEST

Test performed by: Joan Fonts
Date: May-June, 2025

MOISTURE TEST

At completion of test, the accumulation of moisture inside the device is less than 2cc and there is no visible moisture in the sealed reflex unit.

The sample tested FULFILS with the moisture test requirements

Samples after moisture test

CORROSION TEST

At completion of test, there is no evidence of corrosion which would affect the proper function of the device.

The sample tested FULFILS with the corrosion test requirements

Sample after corrosion test

DUST TEST

After the Dust test, photometric intensity requirements are fulfilled.	**CORRECT**

Test Points (degrees)		UB2 - Photometric intensity (cd)			
		Min.	Max.	Before dust test	After dust test
2U	V	1500	-	**50820**	**51330**
1U	3L	5000	-	**49270**	**49280**
1U	3R	5000	-	**50020**	**48360**
H	V	40000	75000	**41730**	**40420**
H	3L	15000	-	**38310**	**38030**
H	3R	15000	-	**38320**	**36680**
H	6L	5000	-	**27050**	**26890**
H	6R	5000	-	**27100**	**25910**
H	9L	3000	-	**17640**	**17630**
H	9R	3000	-	**17090**	**16390**
H	12L	1500	-	**11460**	**11340**
H	12R	1500	-	**11300**	**10940**
1.5D	V	5000	-	**15530**	**14880**
1.5D	9L	2000	-	**8697**	**8160**
1.5D	9R	2000	-	**10100**	**9834**
2.5D	V	2500	-	**5453**	**5234**
2.5D	12L	1000	-	**2759**	**2544**
2.5D	12R	1000	-	**4730**	**4729**
4D	V	-	12000	**1361**	**1324**
Maximum		-	-	**56078**	**55298**

Sample after dust test

VIBRATION TEST

The device completed the vibration test without evidence of material physical weakness, lens or reflector rotation, displacement or rupture of parts except bulb failures.

The sample tested FULFILS with the vibration test requirements

Sample after vibration test

WARPAGE TEST

If warpage is observed, it does not affect the compliance of other tests.	**CORRECT**

COLOR TEST

Test method: Tristimulus method

~~Bulb operated at rated mean spherical candlepower~~ / Device measured at design voltage

Test distance: 3.16 m. (10.4 ft)

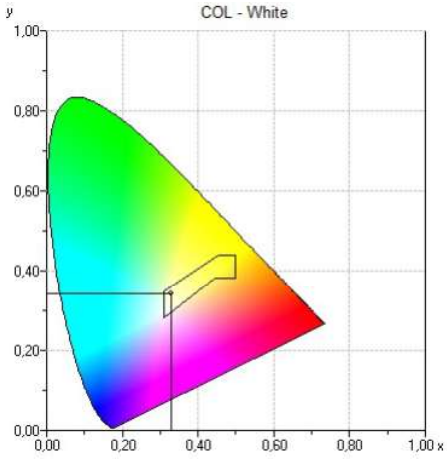
WHITE ZONE:

The color of light emitted must fall within the following boundaries:

- limit towards the blue: x = 0.31
- limit towards the yellow: x = 0.50
- limit towards the green: y = 0.15 + 0.64x
- limit towards the green: y = 0.44
- limit towards the purple: y = 0.05 + 0.75x
- limit towards the red: y = 0.38

Trichromatic co-ordinates	Sample
x	**0.329**
y	**0.343**
z	**0.328**

The sample device has uniform spectral characteristics in all useful directions.



The sample tested FULFILS with the color test requirements**.**

Test place: L'Albornar, E-43710 Santa Oliva (Tarragona)
Test date: May-June, 2025

TECHNICAL DOCUMENTATION

Calder House, Central Road
Harlow, Essex, CM20 2ST
T: +44 (0)1992 377674

DATE: 29/04/2025

DOCUMENT VERSION 1

TRADE NAME: Lazer Lamps Ltd

TYPE: CARBON-2

REVISION TABLE

Revision #	Description	Date	Approved
1	Initial Release	29/04/2025	BRS

Representatives Address:
Lazer Lamps EU Bv
Industriestraat 18/C bus Unit 7,
8755 Ruiselede
Belgium

Manufacture Address:
Lazer Lamps Ltd
Calder House, Central Road
Harlow, Essex
CM20 2ST

Overview

The *"CARBON-2"* is an auxiliary HIGH BEAM LAMP and is compliant with DOT FMVSS108 requirements. This document is intended to provide a detailed explanation for the device.

Device Technical Description

The Driving Light function is designed for both LH and RH traffic. The lamp is designed for fitment on the centreline of a vehicle. The headlamp does not contain an adjustable reflector. Alignment of the headlamp is controlled by an adjustable mount to the vehicle. The light source is LED.

Lens Material

A choice of different materials will be used depending on availability and market conditions. The lens will be either:

- Exolon GP + UVHC3000K (sheet equivalent to Makrolon 3107)
- Exolon GP + Momentive PHC587C2 (sheet equivalent to Makrolon 3107)

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Operating Voltage

The device is compatible with both 12V and 24V electrical systems.

Thermal Management

There is a microchip on the LED module which analyses the temperature reading of a thermistor on the board. If the temperature on the board hits the trigger temperature, the microcontroller uses Pulse Width Modulation to reduce the drive current of the Reg 149 LEDs. The reduction in drive current isn't visible to the driver of the vehicle, as we reduce 3% for every 1C above the trigger temperature until equalisation has occurred. This safety mechanism may engage when the lamp has been switched on for around 30 minutes, and the ambient temperature around the lamp is 25C without air flow.

Other Functions

The lamp also contains other functions when the customer is using the lamp in a State (or country) where DOT FMVSS108 photometric limits aren't required, or where they are driving off-highway. These include a yellow dipped beam light for off-road driving in foggy or dusty conditions, and a white and amber decorative back-light function.

Conformity of Production:

The manufacturing site is approved to ISO 9001, 2015, with specific conformity procedures having been established to monitor the Lazer product quality and ensure that conformity requirements are achieved.

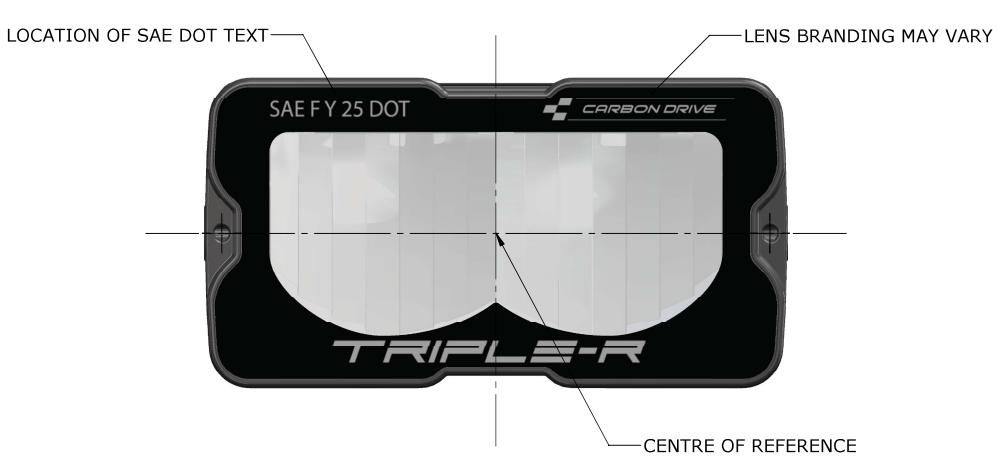
A dedicated dark room with 10m light measurement area and light measurement equipment has been established to monitor Driving beam performance. Lazer uses the candela readings to confirm that production lamps remain within Conformity of Production requirements.

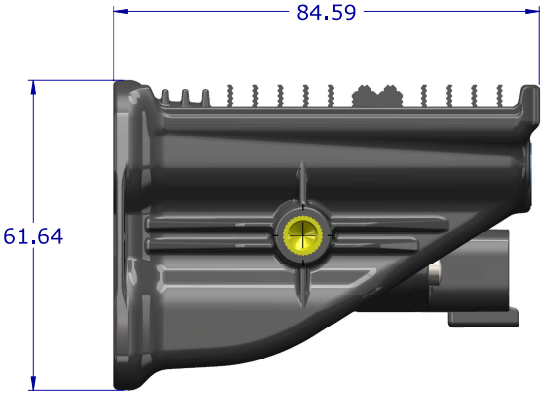
The manufacturing site was successfully audited by the Spanish Ministry in May 2020.

SIGNED: Ben Russell-Smith
Director – Lazer Lamps Ltd

IDIADA PC25060182

CN	REV	CREATED	APP	DATE	DETAILS
-	01	MG	BRS	30-04-25	INITIAL RELEASE





CARBON-2 LAMP SPECIFICATION

1. OPERATING VOLTAGE 12V/24V (WORKING RANGE 10V-32V)
2. POWER CONSUMPTION = 29W
3. LENS MATERIAL: A CHOICE OF DIFFERENT MATERIALS WILL BE USED, DEPENDING ON AVAILABILITY AND MARKET CONDITIONS. THE LENS WILL BE ONE OF THE FOLLOWING:
   - EXOLON GP + UVHC3000K (SHEET EQUIVALENT TO MAKROLON 3107)
   - EXOLON GP + MOMENTIVE PHC587C2 (SHEET EQUIVALENT TO MAKROLON 3107)
4. WEIGHT: 0.205KG
5. DUST AND WATER RESISTANT TO IP68
6. TEMPERATURE OPERATING RANGE = -40C TO + 80C
7. DRIVING BEAM LEDS : 6X LUXEON Z-ES

CREATED BY: MG	DATE: 29-04-25	PROCESS: ASSEMBLED PART	
INSP CHK BY: -	DATE: -	WEIGHT: N/A	
ENG CHK BY: -	DATE: -	FINISH: N/A	
MGMT APVD BY: BRS	DATE: 30-04-25	MATERIAL: N/A	

GENERAL NOTES:
1. IF IN DOUBT - ASK
2. ALL DIMENSIONS IN MM
3. ALL WEIGHTS IN GRAMS
4. BREAK ALL SHARP CORNERS 0.2mm
5. ALL MOULDED PARTS TO BE FREE FROM MOULD FLASH
6. ALL DIE CAST PARTS TO BE FREE FROM POROSITY AND FLASH
7. COMPONENT MATERIAL WILL BE XRF ANALYSED TO VERIFY COMPLIANCE. NON COMPLIANT PARTS WILL BE REJECTED

TOLERANCES- UNLESS STATED OTHERWISE:
1. ANGLES - X.X = ±1.0° X.XX = ± 0.5° X.XXX± 0.1°
2. DECIMALS - X.X = ±0.4 X.XX = ± 0.2 X.XXX± 0.05
3. ALL METRIC THREADS TO 6H/6G FIT
4. ALL HOLES ⌖ 0.2
5. ALL SURFACES ⌓ 0.5
6. MACHINED SURFACES 3.2

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DESCRIPTION: CARBON-2 SAE

PART NUMBER: CARBON-2 SAE

REV: 01

3RD ANGLE PROJECTION | SIZE: A3 | SCALE: 1:1 | SHEET: 1 OF 1

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