SAE International™

SURFACE VEHICLE STANDARD

SAE J583

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Superseding J583 AUG2004

(R) Front Fog Lamp

TABLE OF CONTENTS

1. Scope

This SAE standard provides test procedures, performance requirements, design guidelines and installation guidelines for front fog lamps.

1.1 Rationale

The following statements provide the rationale for the latest changes and modifications contained within this version of J583.

To make this document more consist for front fog lamp and harmonized front fog lamp designs, the revision has been made to allow asymmetrical lamps and symmetrically opposite lamps for both cases. The requirements for front fog lamp have been added in Sections. 6.4.2.1 and 6.4.2.2. The re-aim methods are the same for both design cases. The values of test points for the asymmetrical lamps and symmetrically opposite lamps are listed referring to Table 1.

2. References

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of the SAE Publications shall apply.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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2.1.1 SAE PUBLICATIONS

SAE publications are available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or at www.sae.org.

SAE J387—Terminology
SAE J575—Tests for Motor Vehicle Lighting Devices and Components
SAE J576—Plastic Materials for Use in Optical Parts Such as Lenses and Reflectors of Motor Vehicle Lighting Devices
SAE J578—Color Specification
SAE J588—Turn Signal Lamps for Use on Motor Vehicles Less than 2032 mm in Overall Width
SAE J599—Lighting Inspection Code
SAE J759—Lighting Identification Code
SAE J1383—Performance Requirements for Motor Vehicle Headlamps
SAE J2139—Tests for Lighting Devices and Components Used on Vehicles 2032 mm or More in Overall Width
SAE J2442—Harmonized Installation Provision for Installation of Lamps and Retro-Reflective Devices

2.1.2 CMVSS PUBLICATIONS

Available from Transport Canada, Road Safety and Motor Vehicle Regulation Directorate, P.O. Box 8880, Ottawa Post Terminal, Ottawa, Ontario, K1G.3J2 or at www.tc.gc.ca.

CMVSS 108—Canadian Motor Vehicle Safety Standard for Exterior Lighting

2.1.3 ECE PUBLICATIONS

Available from United Nations Economic Commission for Europe, Palais Des Nations, CH-1211, Geneva 10, Switzerland or at http://www.unece.org/.

ECE R19—Uniform Provisions concerning the approval of Motor Vehicle Front Fog Lamps

3. Definitions

3.1 Front Fog Lamp

A lighting device designed to provide illumination forward of the vehicle under conditions of fog, rain, snow, or dust.

3.2 Gradient

A measure of the change in light level over a change in location within the beam. It is an objective means to measure cutoff sharpness and determine cutoff location.

3.3 Cutoff

A generally horizontal, visual/optical aiming cue in the beam that marks a separation between areas of higher and lower luminance.

3.4 Cutoff Line

The line where the maximum vertical photometric gradient is located.

3.5 Asymmetrical Lamps

Specifically designed lamps intended to be used together on a vehicle having beam patterns that are not symmetrical with respect to the vertical axis through H-V.

3.6 Symmetrically Opposite Lamps

Lamps with beam patterns that are mirror images of each other with respect to the vertical axis through H-V.

3.7 Harmonized Front Fog Lamp

A lamp for use with or without headlamps providing illumination forward of the vehicle under adverse weather conditions designed to harmonize with international front fog lamp requirements.

4. Lighting Identification Code, Markings and Notices

Front fog lamps meeting the requirements of Photometry Table 1 of this document may be identified by the code "F" in accordance with SAE J759. Front fog lamps meeting the requirements of Photometry Table 2 of this document may be identified by the code "F3" in accordance with SAE J759.

5. Tests

5.1 Test Voltage

The test voltage shall be the design voltage ±0.1 VDC measured at the terminals of the lamp under test unless otherwise specified.

5.2 The following test procedures of SAE J575 apply to this document; however, front fog lamps designed for universal mounting applications or for vehicles having an overall width greater than 2032 mm shall be tested according to test procedures of SAE J2139:

5.2.1 VIBRATION TEST

5.2.2 MOISTURE TEST

5.2.3 DUST TEST

5.2.4 CORROSION TEST

5.2.5 PHOTOMETRY TEST

5.3 The following test procedures of SAE J1383 as specified for headlamps apply to this document:

5.3.1 IMPACT TEST

5.3.2 AIMING ADJUSTMENT TEST

5.3.3 CHEMICAL RESISTANCE TEST

5.3.4 ABRASION TEST OF PLASTIC HEADLAMP LENS MATERIAL

5.3.5 THERMAL CYCLE TEST

5.3.6 HUMIDITY TEST

5.3.7 INTERNAL HEAT TEST

5.4 Photometry Test

The front fog lamp shall be mounted on a test fixture, which simulates the vehicle mounting system and any optically significant surrounding structures (e.g., grille, fascia, etc.) in its design operating position and orientation, at a distance of at least 10 m from the photometer. The aperture of the receiving photocell shall be no greater than 1/1000 of the measuring distance. Light sources used for testing shall meet the requirements of SAE J575 with an accurate rated light source operated at rated luminous flux. The optical axis of the front fog lamp to be tested shall be centered horizontally on the photometer axis with maximum gradient positioned as determined in Section 5.4.2.

5.4.1 GRADIENT MEASUREMENT PROCEDURE

Conduct a vertical scan of the lamp beam pattern along the vertical line at 1 degree right and 1 degree left of the V-V line over a sufficient vertical distance to locate the maximum gradient and determine the shape of the gradient curve. The gradient G_{log} should be calculated using the mathematical expression: $G_{log} = \log_{10} I(\alpha) - \log_{10} I(\alpha+0.1)$. Where I is the measured candela value and α is the vertical angular position in degrees. Plot the results G_{log} vs. α.

5.4.2 GRADIENT POSITION IN THE BEAM PATTERN

The lamp aim shall be adjusted until the vertical angular position at which the maximum value of the gradient, as determined in Section 5.4.1, is located at 0.75 degree down for a front fog lamp designed to conform to the requirements of photometry Table 1 of this document or 1 degree down for a front fog lamp designed to conform to the requirements of photometry Table 2 of this document. The front fog lamp shall then be tested photometrically per SAE J575.

5.4.3 If the front fog lamp is combined with a headlamp such that it cannot be aimed separately from the headlamp, the headlamp shall be aimed correctly and the front fog lamp shall then be photometered per SAE J575.

5.5 Color Test

SAE J578 applies for this document.

5.6 Plastic Materials

Plastic materials used in optical parts shall be tested in accordance with the procedures in SAE J576.

5.7 Sealed Beam Unit Tests

Sealed beam units designed for use as front fog lamps are not subject to moisture, dust, and corrosion tests.

6. Requirements

6.1 Test Voltage

All performance requirements shall be met at the design voltage as measured at the terminals of the front fog lamp unless otherwise specified.

6.2 SAE J575 Requirements or SAE J2139 Requirements

A device, when tested in accordance with the test procedures specified in Section 5.2, shall meet the following requirements of SAE J575 or SAE J2139 if tested according to SAE J2139:

6.2.1 VIBRATION

6.2.2 MOISTURE

6.2.3 DUST

6.2.4 CORROSION

6.3 SAE J1383 Performance Requirements

A device, when tested in accordance with the test procedures specified in Section 5.3, shall meet the following requirements of SAE J1383:

6.3.1 IMPACT TEST

6.3.2 AIMING ADJUSTMENT TEST

6.3.3 CHEMICAL RESISTANCE TEST

6.3.4 ABRASION TEST OF PLASTIC HEADLAMP LENS MATERIAL

6.3.5 THERMAL CYCLE TEST

6.3.6 HUMIDITY TEST

6.3.7 INTERNAL HEAT TEST

6.4 Photometry

6.4.1 GRADIENT

The maximum vertical gradient G_{log} as measured in Section 5.5.1 shall be ≥ 0.08. The graphical plot of G_{log} vs. α in $\log_{10}$ units shall demonstrate a well defined single peak. The cutoff line shall be essentially flat from 2.5L to 2.5R.

6.4.2 LIGHT DISTRIBUTION FOR FRONT FOG LAMP

The lamp shall be designed to conform to the light intensity distribution (candela) values as shown in Table 1 when tested in accordance with section 5.4. If the front fog lamp does not pass the photometric requirements of Table 1, it may be re-aimed vertically, provided the location of the maximum gradient falls within the range of 0.5 degree down to 1.0 degree down.

TABLE 1—PHOTOMETRIC REQUIREMENTS FOR FRONT FOG LAMPS

Designation	Test[1]	Vertical Position	Horizontal Position	Candela (cd) Max	Candela (cd) Min
Zone 1[2]	Entire Zone	10U – 60U	15L – 15R	125	–
Line 2	All line	2U	15L – 15R	240	–
Line 3	All line	1U	15L – 15R	360	–
Line 4	All line	H	10L – 10R	480	–
Point 5	Point	1.5D	3L & 3R	10000	2000
Point 6	Point	1.5D	9L & 9R	–	1000
Point 7	Point	3D	15L & 15R	–	1000

1. A tolerance of ±0.25 degrees in location is allowed at any test points or lines.
2. A scan shall be performed in Zone 1 in 1-degree increments both horizontally and vertically. If any point exceeds 125 cd during the scan, a maximum of 550 cd is permissible if contained within a ±2-degree angle.

6.4.2.1 Asymmetrical Lamps

Sum the left and right hand lamp test point 3D/15L light intensities and the left and right hand lamp test point 3D/15R light intensities. The sum of the recorded candela values at 3D/15L and the sum of the recorded candela values at 3D/15R shall each equal or exceed twice the requirement for Point 7.

6.4.2.2 Symmetrically Opposite Lamps

Sum the test points 3D/15L and 3D/15R light intensities for a single lamp. The sum of the recorded candela values shall equal or exceed twice the requirement for Point 7.

6.4.3 LIGHT DISTRIBUTION FOR HARMONIZED FRONT FOG LAMP

The lamp shall be designed to conform to the light intensity distribution (candela) values as shown in Table 2 when tested in accordance with Section 5.4. If the front fog lamp does not pass the photometric requirements of Table 2, it may be re-aimed vertically, provided the location of the maximum gradient falls within the range of 0.75 degree down to 1.25 degree down.

TABLE 2—PHOTOMETRIC REQUIREMENTS FOR HARMONIZED FRONT FOG LAMPS

Designation	Test[1]	Vertical Position	Horizontal Position	Candela (cd) Max	Candela (cd) Min
Zone 1[2]	Entire Zone	10U – 60U	35L – 35R	125	–
Line 1	All line	8U	26L – 26R	125	–
Line 2	All line	4U	26L – 26R	150	–
Line 3	All line	2U	26L – 26R	240	–
Line 4	All line	1U	26L – 26R	360	–
Line 5	All line	0	10L – 10R	480	–
Line 6	All line	2.5D	10L – 10R	-	2400
Line 7	All line	6.0D	10L – 10R	≤ 0.5 of Line 6 max	-
Line 8	A point on line	1.5D – 4.5D	22L & 22R	–	1000
Line 9	A point on line	1.5D – 4.5D	35L & 35R	–	400
Zone 2	Entire Zone	1D – 3D	10L – 10R	12000	-

1. A tolerance of ±0.25 degrees in location is allowed at any test points or lines.
2. A scan shall be performed in Zone 1in 1-degree increments both horizontally and vertically. If any point exceeds 125 cd during the scan, a maximum of 550 cd is permissible if contained within a ±2-degree angle.

6.4.3.1 Asymmetrical Lamps

Sum the left and right hand lamp's 22L maximum light intensities and the left and right hand lamp's 22R maximum light intensities. The sum of the recorded candela values at 22L and the sum of the recorded candela values at 22R shall each equal or exceed twice the requirement for Line 8. Sum the left and right hand lamp's 35L maximum light intensities and the left and right hand lamp's 35R maximum light intensities. The sum of the recorded candela values at 35L and the sum of the recorded candela values at 35R shall each equal or exceed twice the requirement for Line 9.

6.4.3.2 Symmetrically Opposite Lamps

Sum the 22L and 22R maximum light intensities for a single lamp and sum the 35L and 35R maximum light intensities for a single lamp. The sum of the recorded candela values at 22 degrees shall equal or exceed twice the requirement for Line 8. The sum of the recorded candela values at 35 degrees shall equal or exceed twice the requirement for Line 9.

6.5 Color

The color of the light from a front fog lamp shall be white to yellow within the limits specified in SAE J578.