SAE International™ SURFACE VEHICLE STANDARD

SAE J583 MAR2011

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Superseding J583 15SEP2005

(R) Front Fog Lamp

RATIONALE

Replaced Table 1 with Figure 1 and Table 2 with Figure 2 as requested by Lighting Advisory Group. Changed all related references to Table 1 and Table 2.

Figure 1 and Figure 2 photometric values revised to a reference luminous flux of a light source at 13.2 V rather than the traditional 12.8 V.

The original SAE photometric table based on a reference luminous flux for a design voltage of 12.8 V was developed to harmonize with ECE R19, whose photometric table was based on a reference luminous flux for a design voltage of 12.0 V. The SAE table was converted from the 12.0 V ECE Conformity of Production (COP) intensity values to 12.8 V using a multiplication factor to compensate for the voltage difference. However, constant current light sources like the ones used for LEDs and HID were not fully considered during this development. A constant current light source lamp will output the same intensity at any given test point at 12.0 V and 12.8 V. A filament light source over the same two voltages would output approximately a 20% difference in intensity using the equation:

$$12.8v * (\text{desired voltage} / 12.8v)^{3.2}$$

This results in a greater restriction in terms of harmonization for constant current light source front fog lamps.

ECE R19 originally resolved this issue by including a 1.43 multiplication factor (1.0/0.7) for HID light sources. This factor was not included in the SAE document. To resolve this issue, ECE R19 moved from a 12.0 V photometric table to 13.2 V photometric table and removed the 0.7 multiplication factor for constant current light sources. Reference ECE-TRANS-WP29-GRE-62-01e. Moving to a reference luminous flux representative of 13.2 V also aligns with the agreement that ECE and SAE would migrate to a common design voltage of 13.2 V. To harmonize with ECE R19 and to resolve the constant current light source issue, it was decided to update the SAE photometric tables to be based on the reference luminous flux representative of 13.2 V.

To aid test labs with the transition to 13.2 V, a note was added to each figure which allows filament light source front fog lamps to be tested at the rated luminous flux representative of 12.8 V provided that the measured values at each test point is scaled by a factor of 1.10 based on the equation above. This eliminates the requirement for each test lamp to replace their 12.8 V accurate rated light sources with 13.2 V accurate rated light sources.

In Figure 2, replaced Zone 1 with 10 separate photometric test maximums to harmonize with ECE R19.

Included a note in 5.2.5 referencing the 13.2 V value.

Restricted the color of a front fog lamp used like a bending lamp or cornering lamp to white and lamps without this functionality from white to selective yellow to harmonize with ECE.

With these changes, SAE J583 and ECE R19 are harmonized for photometry requirements for an “F3” front fog lamp.

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1. SCOPE

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

2. REFERENCES

2.1 Applicable Documents

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

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J387 Terminology - Motor Vehicle Lighting

SAE J575 Test Methods and Equipment for Lighting Devices for Use on Vehicles Less than 2032 mm in Overall Width

SAE J576 Plastic Material or Materials for Use in Optical Parts Such as Lenses and Reflex 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 Test for Signal and Marking Devices Used on Vehicles 2032 mm or More in Overall Width

SAE J2442 Harmonized Provisions for Installation of Lamps and Retro-Reflecting Devices on Road Vehicles Except Motorcycles

2.1.2 CMVSS Publication

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

CMVSS 108 Canadian Motor Vehicle Safety Standard for Exterior Lighting

2.1.3 ECE Publication

Available from United Nations Economic Commission for Europe, Palais des Nations, CH-1211, Geneva 10, Switzerland, Tel: +41-0-22-917-12-34, 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 Figure 1 of this document may be identified by the code “F” in accordance with SAE J759. Front fog lamps meeting the requirements of Photometry Figure 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 Vrms 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

The 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.

Light sources used for testing shall meet the requirements of SAE J575. For lamps requiring incandescent bulbs, accurate rated bulbs operated at their rated luminous flux based on a design voltage of 13.2 V shall be used. Alternatively, an accurate rated incandescent bulb operated at its rated luminous flux based on a design voltage of 12.8 V can be used for testing provided that the photometric candela measurements are scaled by a factor of 1.10.

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 5.2.5.1.

5.2.5.1 Gradient Measurement Procedure

Conduct a vertical scan of the lamp beam pattern along the V-V line and 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.

5.2.5.2 Gradient Position in the Beam Pattern

The lamp aim shall be adjusted until the vertical angular position at which the maximum gradient measured along the V-V line is located at 0.75 degree down for a front fog lamp designed to conform to the requirements of photometry Figure 1 of this document or 1 degree down for a front fog lamp designed to conform to the requirements of photometry Figure 2 of this document. The front fog lamp shall then be tested photometrically per SAE J575.

5.2.5.3 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.

5.2.6 Impact Test

5.2.7 Chemical Resistance Test

5.2.8 Abrasion Test of Plastic Headlamp Lens Material

5.2.9 Thermal Cycle Test

5.2.10 Humidity Test

5.2.11 Internal Heat Test

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

5.3.1 Aiming Adjustment Test

5.3.2 Color Test

SAE J578 applies for this document.

5.4 Plastic Materials

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

5.5 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 5.2, shall meet the following requirements of SAE J575 or SAE J2139, whichever is applicable:

6.2.1 Vibration

6.2.2 Moisture

6.2.3 Dust

6.2.4 Corrosion

6.2.5 Photometry

6.2.5.1 Gradient - The lamp shall be designed to conform to the following requirements:

6.2.5.1.1 The maximum vertical gradient G_{log} along the V-V line as measured in 5.2.5.1 shall be ≥0.08.

6.2.5.1.2 The graphical plot of G_{log} versus α in $\log_{10}$ units shall demonstrate a well defined single peak.

6.2.5.1.3 The cutoff line shall be essentially flat from 2.5L to 2.5R. The vertical location of the highest gradient at the ends of the minimum width shall be within ±0.2 degree of the vertical location of the maximum gradient measured at V-V.

6.2.5.2 Light Distribution for Front Fog Lamp

The lamp shall be designed to conform to the light intensity distribution (candela) values as shown in Figure 1 when tested in accordance with 5.2.5. If the front fog lamp does not pass the photometric requirements of Figure 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.

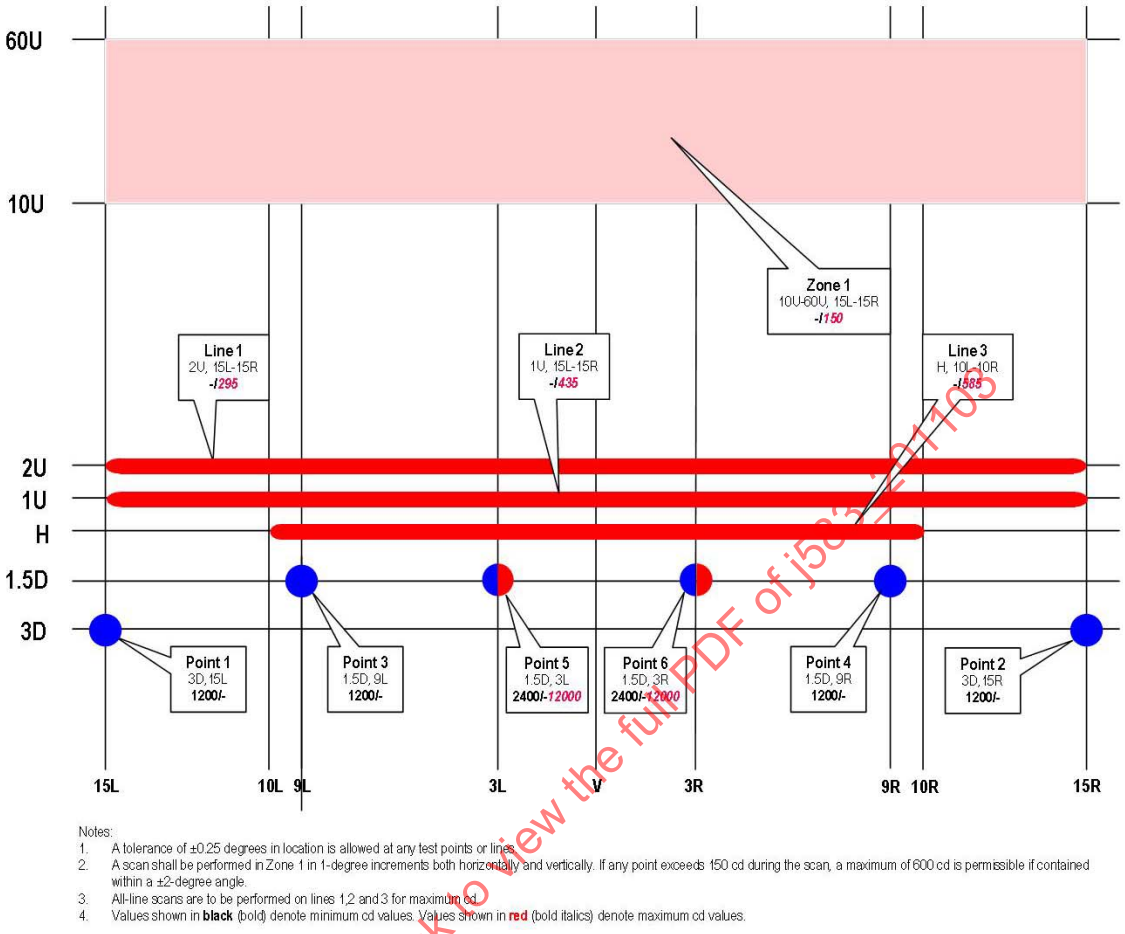


FIGURE 1 - PHOTOMETRIC REQUIREMENTS FOR FRONT FOG LAMPS
LUMINOUS INTENSITY (cd)

6.2.5.2.1 Asymmetrical Lamps

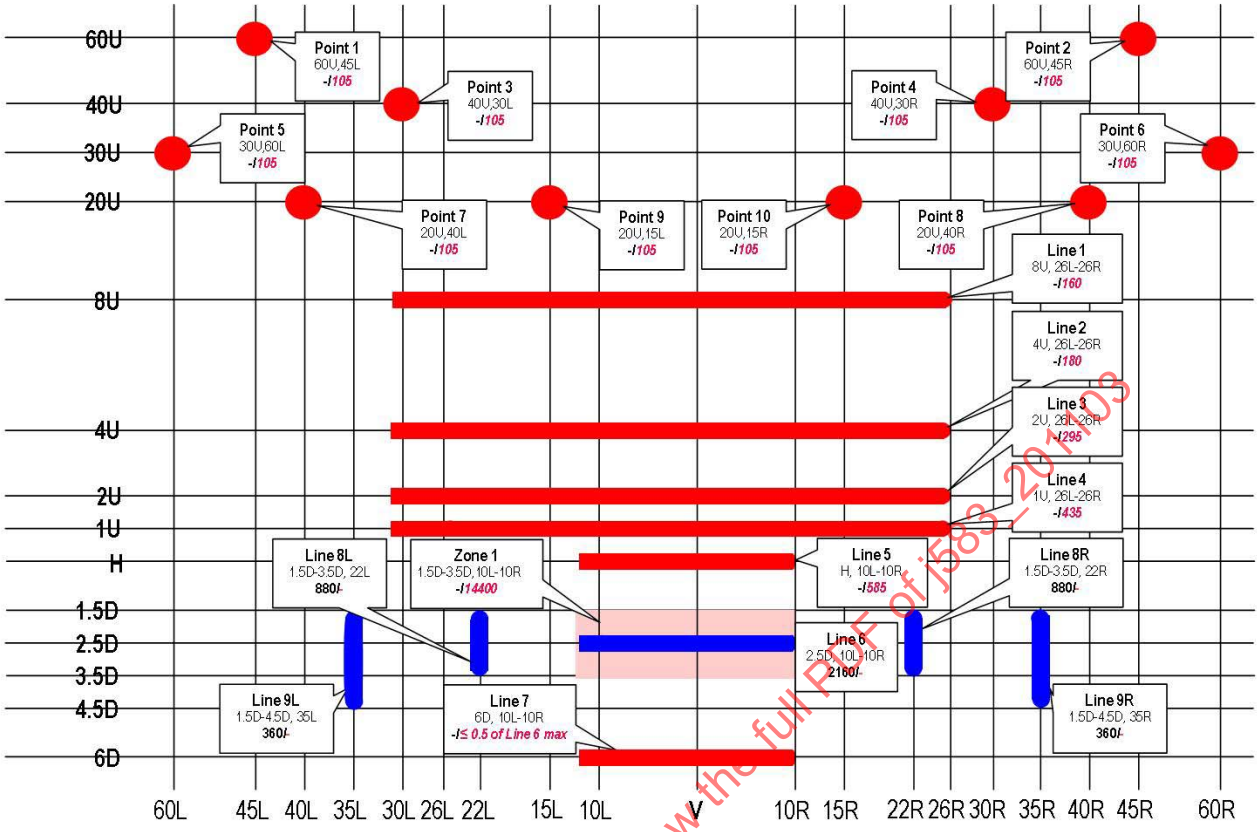
Sum the left and right hand lamp test point 3D/15L light intensities and the left and right hand lamp test point 3D/15R light intensities. The sum of the recorded candela values at 3D/15L and the sum of the recorded candela values at 3D/15R shall each equal or exceed twice the requirement for Point 7.

6.2.5.2.2 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.

6.2.5.3 Light Distribution for Harmonized Front Fog Lamp

The lamp shall be designed to conform to the light intensity distribution (candela) values as shown in Figure 2 when tested in accordance with 5.2.5. If the front fog lamp does not pass the photometric requirements of Figure 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.



Notes:
1. A tolerance of ±0.25 degrees in location is allowed at any test points or lines.
2. All-line scans shall be performed on lines 1 thru 5 for maximum cd.
3. All-line scan shall be performed on line 6 for minimum cd value. All-line scan shall be performed on line 7 for maximum cd value as a ratio of line 6 minimum value.
4. A point on lines 8L/R and 9L/R shall meet the minimum cd value shown.
5. Values shown in **black** (bold) denote minimum cd values. Values shown in **red** (bold italics) denote maximum cd values.

FIGURE 2 - PHOTOMETRIC REQUIREMENTS FOR HARMONIZED FRONT FOG LAMP LUMINOUS INTENSITY (cd)

6.2.5.3.1 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 8L. 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 9L.

6.2.5.3.2 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 8L. The sum of the recorded candela values at 35 degrees shall equal or exceed twice the requirement for Line 9L.

6.2.6 Impact Test

6.2.7 Chemical Resistance Test

6.2.8 Abrasion Test of Plastic Headlamp Lens Material