

(R) Front Fog Lamp

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1. Scope—This SAE Standard provides performance requirements, test procedures, and design and installation guidelines for front fog lamps. The front fog lamp is designed to be used in adverse weather conditions.

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 SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

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 J759—Lighting Identification Code

SAE J1383—Performance Requirements for Motor Vehicle Headlamps

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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 Line**—The line where the maximum vertical photometric gradient is located.

4. Lighting Identification Code, Markings, and Notices—Front fog lamps meeting the requirements of this document may be identified by the code “F” in accordance with SAE J759.

5. Tests

5.1 Test Voltage—The test voltage shall be design voltage ± 0.1 V DC measured at the terminals of the lamp under test (i.e., design voltage) unless otherwise specified.

5.2 The following test procedures of SAE J575 apply to this document:

- 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 SAE J1383 Abrasion Test of Plastic Headlamp Lens Material applies to this document.

5.4 Internal Heat Test

- 5.4.1 The front fog lamp light source shall be seasoned by energizing the filament of a bulb at design voltage for a period of time equal to 1% of design life or 10 hours maximum, whichever is shorter. The photometry performance shall be tested according to the test points in Table 1 with lens clean.
- 5.4.2 The front fog lamp shall be rigidly mounted in a test fixture in design operating position and orientation.
- 5.4.3 A dust and water mixture shall be sprayed uniformly on the face of the lens and allowed to dry until the light intensity at V-2D is reduced to $\leq 50\%$ of its original value.
- 5.4.4 The front fog lamp shall be placed in a chamber at $35^\circ\text{C} \pm 3^\circ\text{C}$ (still air) until the temperature is stabilized. At this point, the lamp shall be powered at its design voltage ± 0.1 V DC for 30 min. Then, disconnect power and remove the lamp from the chamber and allow the lamp to return to the room temperature.
- 5.4.5 After the lamp reaches the room temperature, the lens surface shall be cleaned and the lamp re-photometered according to the test points in Table 1.

5.5 Photometry Test—The front fog lamp shall be mounted on a test fixture 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.

- 5.5.1 **GRADIENT MEASUREMENT PROCEDURE**—Conduct a vertical scan of the fog lamp beam pattern along the V-V line of the lamp from 5U to 5D or 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:

$$G_{\log} = \log_{10} I(\alpha) - \log_{10} I(\alpha + 0.1) \quad (\text{Eq. 1})$$

where:

I is the measured candela value

α is the vertical angular position in degrees

Plot the results $G_{\log}$ versus α .

- 5.5.2 **GRADIENT POSITION IN THE BEAM PATTERN**—The fog lamp aim shall be adjusted until the vertical angular position at which the maximum value of the gradient, as determined in 5.5.1, occurs is 0.75 degrees down. The fog lamp shall then be tested photometrically per SAE J575. If the 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.

- 5.5.3 If the front fog lamp is combined with a headlamp such that it can not be aimed separately from the headlamp, the front fog lamp shall be aimed at the correct aim setting of the headlamp, then photometered per SAE J575.

- 5.6 **Color Test**—SAE J578 applies for this document.

- 5.7 **Plastic Materials**—Plastic materials used in optical parts shall be tested in accordance with the procedures in SAE J576.

- 5.8 **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.

- 6.2 **SAE J575 Performance Requirements**—A device, when tested in accordance with the test procedures specified in 5.2, shall meet the following requirements of SAE J575:

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 5.3, shall meet the requirements of SAE J1383 Abrasion Test of Plastic Headlamp Lens Material.

- 6.4 **Internal Heat Test**—The photometric values measured after the internal heat test shall not vary by more than $\pm 20\%$ from the values before the test.

6.5 Photometry

- 6.5.1 **GRADIENT**—The maximum vertical gradient G_{log} as measured in 5.5.1 shall be ≥ 0.08 . The graphical plot of G_{log} versus α in $\log_{10}$ units shall demonstrate a well defined single peak. The cutoff line shall be essentially flat from 4L to 4R.
- 6.5.2 **LIGHT DISTRIBUTION**—The front fog lamp, as tested in accordance with 5.5, shall be designed to conform to the light intensity distribution (candela) values as shown in Table 1.

TABLE 1—PHOTOMETRIC REQUIREMENTS FOR FRONT FOG LAMPS

Designation	Test ⁽¹⁾	Horizontal Position	Vertical Position	Candela (cd) Max	Candela (cd) Min
Zone 1 ⁽²⁾	Zone	15L – 15R	10U – 60U	125	—
Line 2	All line	15L – 15R	2U	250	—
Line 3	All line	15L – 15R	1U	300	—
Line 4	All line	10L – 10R	H	400	—
Point 5	Point	3L and 3R	1.5D	10000	2000
Point 6	Point	9L and 9R	1.5D	—	1000
Point 7	Point	15L and 15R	3D	—	1000

1. A tolerance of $\pm 1/4$ degree in location is allowed at any test points or lines.
2. From the normally exposed surface of the lens scan Zone 1 in one degree vertical and horizontal increments. In Zone 1, maximum of 550 cd is permissible if contained within a ± 2 degree.

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

- 6.7 **Plastic Materials**—The plastic materials used in optical parts shall meet the material performance requirements as listed in SAE J576.

7. Guidelines

- 7.1 **Mounting Height**—The top edge of the projected luminous lens area of the front fog lamp shall be no higher than the top edge of the projected luminous lens area of the low beam headlamp. If the front fog lamp is physically or optically combined with a headlamp assembly the top edge of the front fog lamp reflector shall be no higher than the top edge of the low beam headlamp reflector.

- 7.2 **Front Turn Signal Lamp Masking**—Reference SAE J588 for front turn signal luminous intensity multiplier requirements for front turn signal spacing relative to the front fog lamp.

7.3 Vehicle Aim

- 7.3.1 The vertical inclination of the beam shall be specified by the manufacturer. However, depending on the maximum height (h) of the lower edge of the light emitting surface to the ground, the vertical inclination of the cutoff shall be:

Equal or lower than 0.75 degrees down for $h \leq 0.65$ m;

Equal or lower than 1.00 degree down for $h > 0.65$ m.

- 7.3.2 Visual/optical horizontal aiming of front fog lamps equipped with horizontal adjusters shall be made by covering one fog lamp and aiming according to manufacturers aiming instructions. Repeat the process for the opposite front fog lamp.

- 7.4 Adjustment Provisions**—Independently mounted front fog lamps uniquely designed for specific vehicles and front fog lamps combined within a head lamp assembly need only have means for vertical aim adjustment. Front fog lamps designed for universal mounting applications where the mounting orientation in the horizontal plane can vary to fit various vehicle makes and models, shall provide means for vertical and horizontal aim adjustment. The range of vertical adjustment shall not be less than ± 4 degrees from the design aim position on the laboratory fixture. The range of horizontal adjustment shall not be less than ± 2.5 degrees from the design aim position on the laboratory fixture.
- 7.5 Front Fog Lamp Switching**—Parking, tail, side marker, and license plate lamps shall be activated whenever the front fog lamps are activated. It is permissible to switch the front fog lamps on and off independently of the low beam headlamps. Front fog lamps shall not be switched on when high beam headlamps are activated, unless the high beam headlamps are flashed for signaling purposes. The switch for the front fog lamps shall be reset to an "off" position whenever the headlamp lighting switch or the vehicle ignition are switched to the "off" position.
- 7.6** The user is also cautioned that the mounting and use of the front fog lamps are specified by various regulatory agencies.
- 8. Notes**
- 8.1 Marginal Indicia**—The change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

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