

TURN SIGNAL LAMPS FOR USE ON MOTOR VEHICLES LESS THAN 2032 mm IN OVERALL WIDTH—SAE J588 DEC94 SAE Standard

Report of the Lighting Division approved February 1927. Completely revised by the Lighting Committee November 1984. Rationale statement available. Revised by the SAE Lighting Coordinating Committee and the SAE Signalling and Marking Devices Standards Committee June 1991 and December 1994. Rationale statement available.

1. Scope—This SAE Standard provides test procedures, requirements, and guidelines for turn signal lamps intended for use on vehicles of less than 2032 mm in overall width.

2. References

2.1 Applicable Documents—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

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

SAE J567—Lamp Bulb Retention System

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 J579—Lighting Code Identification

SAE J1050—Describing and Measuring the Driver's Field of View

2.2 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

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

SAE J222—Parking Lamps (Front Position Lamps)

SAE J585—Tail Lamps (Rear Position Lamps) for Use on Motor Vehicles Less Than 2032 mm in Overall Width

SAE J586 FEB84—Stop Lamps for Use on Motor Vehicles Less Than 2032 mm in Overall Width

SAE J588 NOV84—Turn Signal Lamps for Use on Motor Vehicles Less Than 2032 mm in Overall Width

SAE J592—Clearance, Side Marker, and Identification Lamps

SAE J594—Reflex Reflectors

SAE J1395 MAY85—Front and Rear Turn Signal Lamps for Use on Motor Vehicles 2032 mm or More in Overall Width

SAE J1398—Stop Lamps for Use on Motor Vehicles 2032 mm or More in Overall Width

SAE J1957—Central High Mounted Stop Lamp Standard for Use on Vehicles Less than 2032 mm Overall Width

SAE J2040—Tail Lamps (Rear Position Lamps) for Use on Vehicles 2032 mm or More in Overall Width

SAE J2042—Clearance, Sidemarker, and Identification Lamps for Use on Motor Vehicles 2032 mm or More in Overall Width

2.2.2 NHTSA PUBLICATION—Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FMVSS108 56 FR 64733 - 64737

3. Definitions

3.1 Turn Signal Lamps—The signalling elements of a turn signal system which indicate an intention to turn by giving a flashing light on the side toward which the turn will be made.

4. Lighting Identification Code—Turn signal lamps for use on vehicles less than 2032 mm in overall width may be identified by the codes I, I2, I3, I4, or I5 in accordance with SAE J759.

5. Tests

5.1 SAE J575 is a part of this document. The following tests are applicable with modifications as indicated.

5.1.1 VIBRATION TEST

5.1.2 MOISTURE TEST

5.1.3 DUST TEST

5.1.4 CORROSION TEST

5.1.5 PHOTOMETRY TEST

5.1.5.1 Photometric measurements shall be made with the light source of the signal lamp at least 3 m from the photometer. The H-V axis shall be taken as parallel to the longitudinal axis of the vehicle.

5.1.5.2 Photometric measurements shall be made with the bulb filament steadily burning. Photometric measurements of multiple compartment lamps or

multiple lamp arrangements shall be made by either of the following methods by aligning the axis of each lamp or compartment with the photometer:

5.1.5.2.1 All compartments or lamps shall be photometered together provided that a line from the light source of each compartment or lamp to the center of the photometer sensing device does not make an angle of more than 0.6 degree with the photometer H-V axis. When compartments or lamps are photometered together, the H-V axis shall intersect the midpoint between their light sources.

5.1.5.2.2 Each compartment or lamp shall be photometered separately. The photometric measurement for the entire multiple compartment lamp or multiple lamp arrangement shall be determined by adding the photometric outputs from each individual lamp or component at corresponding test points.

5.1.6 WARPAGE TEST FOR DEVICES WITH PLASTIC COMPONENTS

5.2 Color Test—SAE J578 is a part of this document.

6. Requirements

6.1 Performance Requirements—A device when tested in accordance with the test procedures specified in Section 5, shall meet the following requirements:

6.1.1 VIBRATION—SAE J575

6.1.2 MOISTURE—SAE J575

6.1.3 DUST—SAE J575

6.1.4 CORROSION—SAE J575

6.1.5 PHOTOMETRY—SAE J575

6.1.5.1 The lamp under test shall meet the photometric performance requirements contained in Table 1 and its footnotes. The summation of the luminous intensity measurements at the specified test points in a zone shall be at least the value shown.

6.1.5.2 A multiple compartment lamp or multiple lamps may be used to meet the photometric requirements of a turn signal lamp. If a multiple compartment or multiple lamps are used and the distance between adjacent light sources does not exceed 560 mm for two compartments or lamp arrangements and does not exceed 410 mm for three compartments or lamp arrangements, then the combination of the compartments or lamps must be used to meet the photometric requirements for the corresponding number of lighted sections (see Table 1). If the distance between adjacent light sources exceeds the previous dimensions, each compartment or lamp shall comply with the photometric requirements for one lighted section (see Table 1).

6.1.5.3 When a tail lamp or parking lamp is combined with the turn signal lamp, the signal lamp shall not be less than three times the luminous intensity (a) of the tail lamp at any test point, or (b) of the parking lamp at any test point on or above horizontal except that at H-V, H-5L, H-5R, and 5U-V, the signal lamp shall not be less than five times the luminous intensity of the tail lamp or parking lamp. If a multiple compartment or multiple lamp arrangement is used and the distance between optical axis for both the tail lamp (parking lamp) and the turn signal is within the dimensions specified in 6.1.5.2, the ratio of the signal to the tail lamp (parking lamp) shall be computed with all the compartments or lamps lighted. If a multiple compartment or multiple lamp arrangement is used and the distance between optical axis for one of the functions exceeds the dimensions specified in 6.1.5.2, the ratio shall be computed for only those compartments or lamps where the tail lamp (parking lamp) and turn signal are optically combined. Where the tail lamp is combined with the turn signal lamp, and the maximum luminous intensity of the tail lamp is located below horizontal and within an area generated by a 0.5 degree radius around a test point, the ratio for the test point may be computed using the lowest value of the tail lamp luminous intensity within the generated area.

6.1.5.4 In the case where the front turn signal is mounted in close proximity to the low beam headlamp or any additional lamp used to supplement or used in lieu of the low beam, such as an auxiliary low beam or fog lamp, Table 2 shall be used to modify Table 1 as follows:

6.1.5.4.1 Spacing for a direct light source type design front turn signal lamp, that is, a lamp primarily employing a lens to meet photometric requirements (for example, a lamp that does not employ a reflector) shall be measured from the light source to the lighted edge of the low beam headlamp or any additional lamp used to supplement or used in lieu of the lower beam, such as an auxiliary low beam or fog lamp

6.1.5.4.2 Spacing for a front turn signal lamp which primarily employs a reflector (for example, one of parabolic section) in conjunction with a lens to meet photometric requirements, shall be measured from the geometric centroid of the front turn signal functional lighted area to the lighted edge of the low beam headlamp or any additional lamp used to supplement or used in lieu of the lower beam, such as an auxiliary low beam or fog lamp.

6.1.6 WARPAGE—SAE J575

6.1.7 COLOR—The color of light from the turn signal lamps shall be red or yellow to the rear and yellow to the front of the vehicle as specified in SAE J578.

TABLE 1—PHOTOMETRIC REQUIREMENTS³

| Zone Lighted Sections | Test Points ¹ (deg) Lighted Sections | Minimum Luminous Intensity (cd) ⁴ Front Signals Yellow | Minimum Luminous Intensity (cd) ⁴ Front Signals Yellow | Minimum Luminous Intensity (cd) ⁴ Front Signals Yellow | Minimum Luminous Intensity (cd) ⁴ Rear Signals Red | Minimum Luminous Intensity (cd) ⁴ Rear Signals Red | Minimum Luminous Intensity (cd) ⁴ Rear Signals Red | Minimum Luminous Intensity (cd) ⁴ Rear Signals Yellow | Minimum Luminous Intensity (cd) ⁴ Rear Signals Yellow | Minimum Luminous Intensity (cd) ⁴ Rear Signals Yellow |
|-----------------------|---|---|---|---|---|---|---|--|--|--|
| | | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 1 | 10U-5L | 130 | 155 | 180 | 50 | 60 | 70 | 80 | 100 | 120 |
| | 5U-20L | | | | | | | | | |
| | 5D-20L | | | | | | | | | |
| | 10D-5L | | | | | | | | | |
| 2 | 5U-10L | 250 | 295 | 340 | 100 | 115 | 135 | 165 | 185 | 220 |
| | H-10L | | | | | | | | | |
| | 5D-10L | | | | | | | | | |
| 3 | 5U-V | 950 | 1130 | 1295 | 380 | 445 | 320 | 610 | 710 | 825 |
| | H-5L | | | | | | | | | |
| | H-V | | | | | | | | | |
| | H-5R | | | | | | | | | |
| 4 | 5U-10R | 250 | 295 | 340 | 100 | 115 | 135 | 165 | 185 | 220 |
| | H-10R | | | | | | | | | |
| | 5D-10R | | | | | | | | | |
| 5 | 10U-5R | 130 | 155 | 180 | 50 | 60 | 70 | 80 | 100 | 120 |
| | 5U-20R | | | | | | | | | |
| | 5D-20R | | | | | | | | | |
| | 10D-5R | | | | | | | | | |

Maximum Luminous Intensity (cd)

| | | | | | | | | | |
|------------------------------|---|---|---|-----|-----|-----|-----|-----|------|
| Rear Lamps Only ² | — | — | — | 300 | 360 | 420 | 750 | 900 | 1050 |
|------------------------------|---|---|---|-----|-----|-----|-----|-----|------|

¹ The measured values at each test point shall not be less than 60% of the minimum value in Table 3.

² The listed maximum shall not be exceeded over any area larger than that generated by a 0.5 degree radius within the solid angle defined by the test points in Table 1.

³ Ratio requirements of 6.1.5.3 apply.

⁴ Multipliers of Table 2 are applicable per 6.1.5.4.

TABLE 2—LUMINOUS INTENSITY MULTIPLIERS FOR FRONT TURN SIGNAL SPACINGS

| Spacing to Lighted Edge of Low Beam Headlamp ¹ | Multiplier of Table 1 and 3 Values to Obtain Required Minimum Luminous Intensities |
|---|--|
| 100 mm or greater | 1.0 |
| 75 mm to less than 100 mm | 1.5 |
| 60 mm to less than 75 mm | 2.0 |
| Less than 60 mm | 2.5 |

¹ See 6.1.5 for methods to be used for measurements of spacings.

6.2 Materials Requirements—Plastic materials used in the optical parts shall meet the requirements of SAE J576.

6.3 Design Requirements

6.3.1 If a turn signal is optically combined with the tail lamp and a two-filament bulb used, the bulb shall have an indexing base and the socket shall be designed so that bulbs with nonindexing bases cannot be used. Removable sockets shall have an indexing feature so that they cannot be reinserted into lamp housings in random positions, unless the lamp will perform its intended function with random light source orientation.

6.3.2 The functional lighted lens area of a single compartment lamp shall be at least 37.5 cm² for a rear lamp and at least 22 cm² for a front lamp.

6.3.3 If a multiple compartment lamp or multiple lamps are used to meet the photometric requirements of a rear turn signal lamp, the functional lighted lens area of each compartment or lamp shall be at least 22 cm² provided the combined area is at least 37.5 cm².

(R) **6.4 Installation Requirements**—Turn signal lamps shall meet the following requirements as installed on the vehicle:

6.4.1 Each turn signal lamp shall be designed to comply with all photometric requirements of Table 1 with all vehicular obstructions considered.

6.4.2 Turn signal lamps shall be designed to comply with one of the following visibility requirements:

- a. Each lamp must provide a minimum of 13 cm² of unobstructed projected area when the light emitting surface area of the lens, excluding reflex

reflector area, is projected parallel to a horizontal plane in any direction from 45 degrees outboard to 20 degrees inboard of the vehicle longitudinal axis, and parallel to a longitudinal, vertical plane in any direction from 15 degrees above to 15 degrees below* the horizontal (see Figure 1).

- b. Each lamp must provide a luminous intensity not less than 0.3 cd throughout the photometric pattern defined by the corner points specified in Figure 2:

15 degrees above horizontal, 45 degrees inward, and 80 degrees outward
 15 degrees below horizontal*, 45 degrees inward, and 80 degrees outward

7. Guidelines

7.1 Photometric Design Guidelines—Guidelines for turn signal lamps, when tested in accordance with 5.1.5 of this document, are contained in Table 3 and its footnotes. Depending on the spacing of the front turn signal relative to the forward illumination lamps as defined in 6.1.5 of this document, the multipliers specified in Table 2 are applicable to the values to Table 3.

7.2 Installation Guidelines—The following guidelines apply to front and/or rear signal lamps as used on the vehicle and shall not be considered part of the requirements.

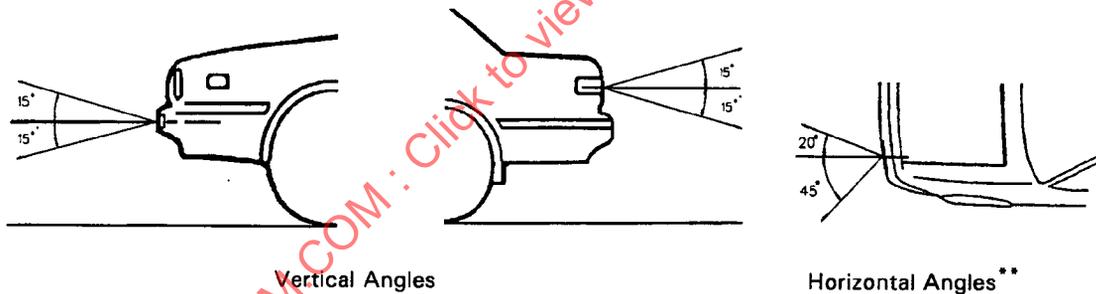
7.2.1 Signal lamps on the front and rear of the vehicle should be spaced as far apart laterally as practicable, so that the direction of turn will be clearly understood.

7.2.2 The luminous intensity of incandescent filament bulbs will vary with applied voltage. The electrical power system of the vehicle should, under normal running conditions, provide design voltage to the lamp as closely as practical bearing in mind the inherent variability of such systems.

7.2.3 Performance of lamps may deteriorate significantly as a result of dirt, grime, and/or snow accumulation on the optical surfaces. Installation of lamps on vehicles should be considered to minimize the effect of these factors.

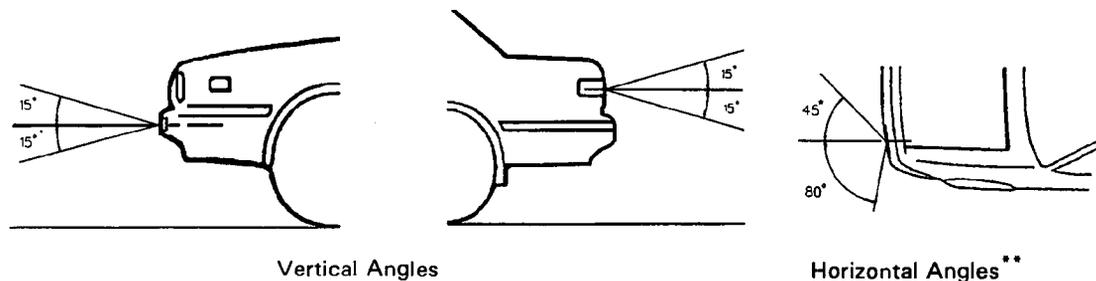
7.2.4 Where it is expected that lamps must perform in severe environments, e.g., be totally immersed in water periodically, the user should specify lamps designed for such use.

8. Additional Information—As a matter of additional information, attention is called to SAE J567 for requirements and gages to be used in socket design.



* The downward angle may be reduced to 5 degrees if the lower lighted edge of the lamp is less than 750 mm above the ground.
 ** Left side shown; right side symmetrically opposite.

FIGURE 1—TAIL LAMP VISIBILITY REQUIREMENTS—UNOBSTRUCTED PROJECTED AREA



* The downward angle may be reduced to 5 degrees if the lower lighted edge of the lamp is less than 750 mm above the ground.
 ** Left side shown; right side symmetrically opposite.

FIGURE 2—TAIL LAMP VISIBILITY REQUIREMENTS—LUMINOUS INTENSITY