SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J588

REV. MAR2000

Issued 1927-02
Revised 2000-03

Superseding J588 DEC1994

Submitted for recognition as an American National Standard

Turn Signal Lamps for Use on Motor Vehicles Less than 2032 mm in Overall Width

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 Publications—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, 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

TO PLACE A DOCUMENT ORDER; (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS http://www.sae.org

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 shall be designed to conform to the zone total photometric requirements of Tables 1A and 1B and its footnotes. The summation of the luminous intensity measurements at the 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 Tables 1A and 1B. 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 Tables 1A and 1B.)

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 1B 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.

TABLE 1A—PHOTOMETRIC REQUIREMENTS[1][2]—REAR TURN SIGNAL LAMPS—RED AND YELLOW

Zone	Test Point Location (degrees)		Test Point Location Minimum Luminous Intensity (cd)[3][4] Rear Signals Red 1 Lighted Section	Test Point Location Minimum Luminous Intensity (cd)[3][4] Rear Signals Red 2 Lighted Sections	Test Point Location Minimum Luminous Intensity (cd)[3][4] Rear Signals Red 3 Lighted Sections	Test Point Location Minimum Luminous Intensity (cd)[3][4] Rear Signals Yellow 1 Lighted Section	Test Point Location Minimum Luminous Intensity (cd)[3][4] Rear Signals Yellow 2 Lighted Sections	Test Point Location Minimum Luminous Intensity (cd)[3][4] Rear Signals Yellow 3 Lighted Sections	Zone total Minimum Luminous Intensity (cd)[5] Rear Signals Red 1 Lighted Section	Zone total Minimum Luminous Intensity (cd)[5] Rear Signals Red 2 Lighted Sections	Zone total Minimum Luminous Intensity (cd)[5] Rear Signals Red 3 Lighted Sections	Zone total Minimum Luminous Intensity (cd)[5] Rear Signals Yellow 1 Lighted Section	Zone total Minimum Luminous Intensity (cd)[5] Rear Signals Yellow 2 Lighted Sections	Zone total Minimum Luminous Intensity (cd)[5] Rear Signals Yellow 3 Lighted Sections
	10U	5L	16	19	22	26	30	35						
I	5U	20L	10	12	15	15	20	25	52	62	74	82	100	120
	5D	20L	10	12	15	15	20	25						
	10D	5L	16	19	22	26	30	35						
	5U		30	35	40	50	55	65						
II	H	10L	40	47	55	65	75	90	100	117	135	165	185	220
	5D		30	35	40	50	55	65						
	5U	V	70	82	95	110	130	150						
	H	5L	80	95	110	130	150	175						
III	H	V	80	95	110	130	150	175	380	449	520	610	710	825
	H	5R	80	95	110	130	150	175						
	5D	V	70	82	95	110	130	150						
	5U	10R	30	35	40	50	55	65						
IV	H	10R	40	47	55	65	75	90	100	117	135	165	185	220
	5D	10R	30	35	40	50	55	65						
	10U	5R	16	19	22	26	30	35						
V	5U	20R	10	12	15	15	20	25	52	62	74	82	100	120
	5D	20R	10	12	15	15	20	25						
	10D	5R	16	19	22	26	30	35						
	Maximum Luminous Intensity (cd)[6]								300	360	420	750	900	1050

1. Ratio requirements of 6.1.5.3 apply.
2. Multiple compartment lamp or multiple lamsp requirements of 6.1.5.2 apply.
3. The measured values at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
4. Multipliers of Table 2 are applicable per 6.1.5.4.
5. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the Zone Total Luminous Intensity shown according to the number of lighted sections.
6. 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.

TABLE 1B—PHOTOMETRIC REQUIREMENTS[1][2]—FRONT TURN SIGNAL LAMPS—YELLOW

Zone	Test Points (degrees)	Test Point Location Minimum Luminous Intensity (cd)[3][4] Front Signals Yellow 1 Lighted Section	Test Point Location Minimum Luminous Intensity (cd)[3][4] Front Signals Yellow 2 Lighted Sections	Test Point Location Minimum Luminous Intensity (cd)[3][4] Front Signals Yellow 3 Lighted Sections	Zone Total[5] Front Signals Yellow 1	Zone Total[5] Front Signals Yellow 2	Zone Total[5] Front Signals Yellow 3
	10U 5L	40	48	55			
I	5U 20L	25	30	35	130	156	180
	5D 20L	25	30	35			
	10D 5L	40	48	55			
	5U	75	88	100			
II	H 10L	100	120	140	250	296	340
	5D	75	88	100			
	5U V	175	205	235			
	H 5L	200	240	275			
III	H V	200	240	275	950	1130	1295
	H 5R	200	240	275			
	5D V	175	205	235			
	5U	75	88	100			
IV	H 10R	100	120	140	250	296	340
	5D	75	88	100			
	10U 5R	40	48	55			
V	5U 20R	25	30	35	130	156	180
	5D 20R	25	30	35			
	10D 5R	40	48	55			
Maximum Luminous Intensity (cd)					—	—	—

1. Ratio requirements of 6.1.5.3 apply.
2. Multiple compartment lamp or multiple lamsp requirements of 6.1.5.2 apply.
3. The measured values at each test point shall not be less than 60% of the required minimum value shown for that individual test point location.
4. Multipliers of Table 2 are applicable per 6.1.5.4.
5. The sum of the luminous intensity measurements at each test point within a zone shall not be less than the Zone Total Luminous Intensity shown according to the number of lighted sections.

TABLE 2—LUMINOUS INTENSITY MULTIPLIERS FOR FRONT TURN SIGNAL SPACINGS

Spacing to Lighted Edge of Low Beam Headlamp(1)	Multiplier of Table 1B 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.

6.1.5.4.2 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.

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 cm^2 for a rear lamp and at least 22 cm^2 for a front lamp.

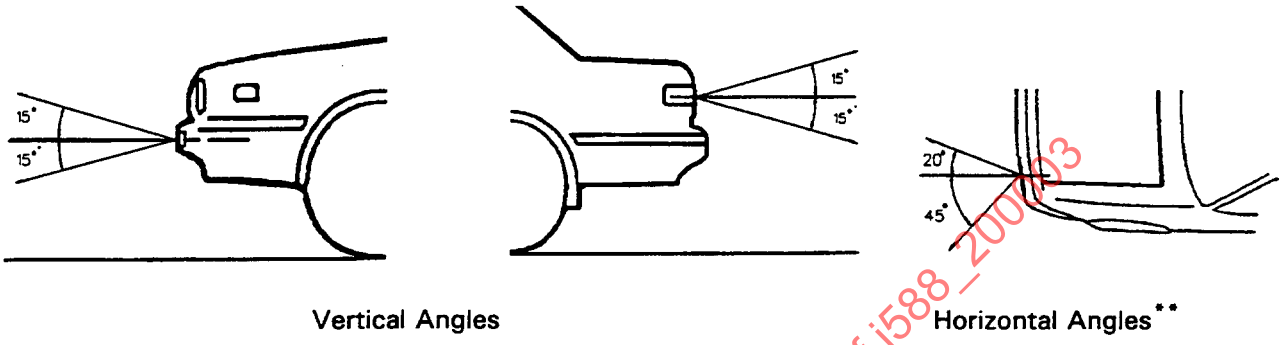
6.3.3 If a multiple compartment lamp or multiple lamps are used to meet the photometric requirements of a rear turn signal lamp, the functional lighted lens area of each compartment or lamp shall be at least 22 cm^2 provided the combined area is at least 37.5 cm^2.

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 cm^2 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).

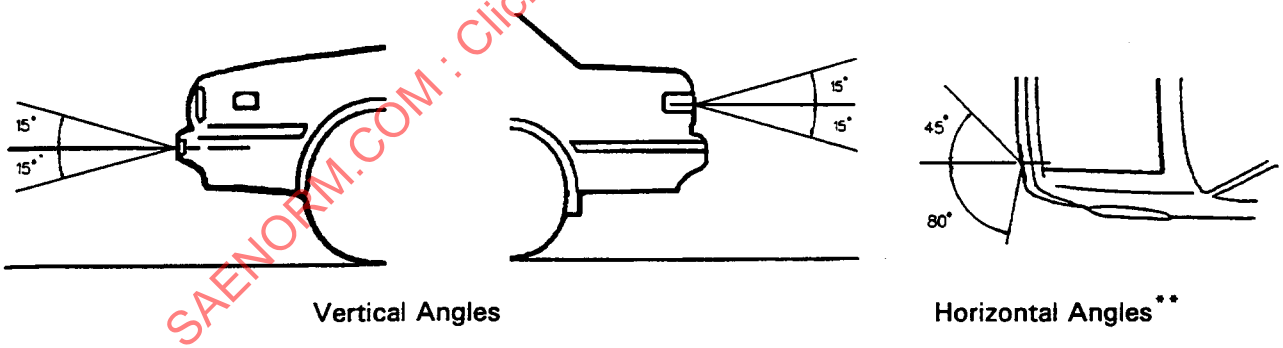


* The downward angle may be reduced to 5 degrees if the lower lighted edge of the lamp is less than 750 mm above the ground.
** Left side shown; right side symmetrically opposite.

FIGURE 1—TAIL LAMP VISIBILITY REQUIREMENTS—UNOBSTRUCTED PROJECTED AREA

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



* 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

7. Guidelines

7.1 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.

7.1.1 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.

7.1.2 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.

7.1.3 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.

7.1.4 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.

9. Notes

9.1 Marginal Indicia—The change bar (l) 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.

PREPARED BY THE SAE LIGHTING COORDINATING COMMITTEE AND THE
SAE SIGNALLING AND MARKING DEVICES STANDARDS COMMITTEE