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

SURFACE VEHICLE STANDARD

Submitted for recognition as an American National Standard

SAE J593 | REV. OCT95

Issued 1947-08
Revised 1995-10

Superseding J593 FEB95

(R) BACKUP LAMPS (REVERSING LAMPS)

1. ***Scope***—This SAE Standard provides installation requirements, test procedures, design guidelines, and performance requirements for backup lamps.

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—Test Methods and Equipment for Lighting Devices and Components for Use on Vehicles Less than 2032 mm in Overall Width
SAE J576—Plastic Materials for use in Optical Parts such as Lenses and Reflectors of Motor Vehicle Lighting Devices
SAE J578—Color Specification
SAE J759—Lighting Identification Code
SAE J1330—Photometry Laboratory Accuracy Guidelines

3. ***Definitions***

3.1 Backup Lamp—A lighting device used to provide illumination behind the vehicle and to provide a warning signal to pedestrians and other drivers when the vehicle is backing up or is about to back up.

3.2 Point of Visibility—Any point on the lens surface which is within an area bounded by the intersection of the lens surface with a 25 mm diameter cylinder, the centerline of which passes through the light source center and is oriented horizontally and parallel with the longitudinal axis of the vehicle.

4. ***Lighting Identification Code***—Backup Lamps may be identified by the code "R" in accordance with SAE J759.

5. ***Tests***

5.1 SAE J575 is a part of this report. 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 PHOTOMETRIC TEST

5.1.5.1 Photometric tests shall be made with the photometer at a distance of at least 3 m from the lamp. The H-V Axis shall be taken as the horizontal line through the light source and parallel with the longitudinal axis of the vehicle.

5.1.5.2 Photometric measurements shall be made with the bulb filament steadily burning.

5.1.6 WARPAGE TEST ON DEVICES WITH PLASTIC COMPONENTS

5.2 Color Test—SAE J578 is part of this report.

5.3 Materials Test—SAE J576 is part of this report.

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 A single lamp, when used in a two-lamp system, shall meet the photometric performance requirements contained in Table 1 and its footnotes. The summation of luminous intensity measurements at the specified test points in a zone shall be at least the value shown. When two lamps of the same or symmetrically opposite design are used, the photometric readings along the vertical axis and the averages of the readings for the same angles left and right of vertical for one lamp may be used to determine compliance with the requirements of Table 1. If two lamps of differing designs are used, they shall be tested individually, and the photometric values added to determine that the combined units meet twice the candela requirements of Table 1.

6.1.5.2 When only one backup lamp is used on the vehicle, it shall meet twice the photometric requirements of Table 1.

TABLE 1—PHOTOMETRIC PERFORMANCE REQUIREMENTS[1,2]

Zone	Minimum Luminous Intensity Test Points (deg)	Minimum Luminous Intensity Zone (cd)
1	45L-5U 45L-H 45L-5D	45
2	30L-H 30L-5D	50
3	10L-10U 10L-5U V-10U V-5U 10R-10U 10R-5U	100
4	10L-H 10L-5D V-H V-5D 10R-H 10R-5D	360
5	30R-H 30R-5D	50
6	45R-5U 45R-H 45R-5D	45

[1] The measured value for any test point in a given zone, shall not be less than 60% of the minimum value for that test point specified in Table 2.
[2] Maximum candela per lamp at H and above shall be 300 for a two lamp system and 500 for a single lamp system.

TABLE 2—PHOTOMETRIC DESIGN GUIDELINES (MINIMUM LUMINOUS INTENSITY (cd))

Test Points (degrees)	45L	30L	10L	V	10R	30R	45R
10U	—	—	10	15	10	—	—
5U	15	—	20	25	20	—	15
H	15	25	50	80	50	25	15
5D	15	25	50	80	50	25	15

NOTE—Maximum candela per lamp at H and above shall be 300 for a two lamp system and 500 for a single lamp system.

6.1.5.3 If a backup lamp has portions of its lens which project nonwhite light, that light shall be excluded from measurements made to determine compliance with 6.1.5.1 and 6.1.5.2. The lamp or lamps shall meet the photometric requirements of this document with white light alone.

6.1.6 WARPAGE—SAE J575

6.1.7 COLOR—The color of the light from a backup lamp shall be white, as specified in SAE J578. A backup lamp may project incidental red, yellow, or white light through the reflectors or lenses that are adjacent to, close to, or part of the lamp assembly. If a lamp has portions of its lens which project nonwhite light, that light shall be regarded as incidental if, when only the nonwhite light is measured at each test point specified in Table 1, the sum of such measurements does not exceed 20% of the sum of the test point measurements of the total light output (white plus nonwhite).

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

6.3 Installation Requirements

6.3.1 Backup lamps shall be mounted so that the point of visibility of at least one of the lamps is visible from any eye point that is (a) 0.6 to 1.8 m above the horizontal plane on which the vehicle is standing and (b) rearward of a vertical plane perpendicular to the longitudinal axis of the vehicle, 0.9 m to the rear of the vehicle and extending 0.9 m beyond each side of the vehicle.

6.3.2 Visibility and photometric performance of the backup lamp within the test angles shown in Tables 1 and 2 shall not be obstructed by any portion of the vehicle unless the lamp is designed to comply with all requirements when the obstruction is considered.

6.3.3 The backup lamp shall be lighted only when the ignition switch is energized and reverse gear is engaged.

7. Guidelines

7.1 Photometric design guidelines for backup lamps, when tested in accordance with 5.1.5 of this document, are contained in Table 2 and its footnote. When two asymmetrical lamps of the same or symmetrically opposite design are used, the photometric readings along the vertical axis and the averages of the readings for the same angles left and right of vertical for one lamp may be used to determine compliance with the requirements of Table 2. If two lamps of differing designs are used, they shall be tested individually, and the photometric values added to determine that the combined units meet twice the candlepower requirements of Table 2.

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

7.2.1 The luminous intensity of incandescent filament bulbs will vary with applied voltage. The electrical wiring in the vehicle should be adequate to supply design voltage to the lamp filament.

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

7.2.3 Where it is expected that lamps must perform in extremely severe environments, such as off-highway, mining or fuel haulage, or where it is expected that they will be totally immersed in water, the user should specify lamps specifically designed for such use.

7.3 For requirements and gauges to be used in socket designs, refer to SAE J567.

7.4 For additional information on photometric test accuracy guidelines, refer to SAE J1330.

8. Notes

8.1 Marginal Indicia—The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

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