SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

HIGHWAY VEHICLE STANDARD

an American National Standard

SAE J593

Issued Aug. 1947
Revised June 1987

Supersedes J593 AUG81

Ø BACKUP LAMPS (REVERSING LAMPS)

1. SCOPE: This SAE Standard provides test procedures, requirements, and guidelines for backup lamps.

2. DEFINITIONS:

2.1 A backup lamp is a 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.

2.2 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 normal to the longitudinal axis of the vehicle.

3. LIGHTING IDENTIFICATION CODE:

Backup lamps may be identified by the code "R" in accordance with SAE J759 - Lighting Identification Code.

4. TESTS:

4.1 SAE J575, Tests for Motor Vehicle Lighting Devices and Components, is a part of this report. The following tests are applicable with the modifications as indicated.

4.1.1 Vibration Test:

4.1.2 Moisture Test:

4.1.3 Dust Test:

4.1.4 Corrosion Test:

4.1.5 Photometric Test:

4.1.5.1 Photometric tests shall be made with the photometer at a distance of at least 3 mm from the lamp. The H-V axis shall be taken as parallel with the longitudinal axis of the vehicle.

4.1.6 Warpage Test for Devices with Plastic Components.

4.2 Color Test: SAE J578 is a part of this report.

5. REQUIREMENTS:

5.1 Performance Requirements: A device, when tested in accordance with the test procedures specified in Section 4, shall meet the requirements indicated in following sections of the SAE J575:

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: In addition to the requirements in SAE J575, the following apply:

5.1.5.1 The light from a single lamp, when used in a two-lamp system, shall meet the photometric requirements shown in Table 1.

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

5.1.5.3 When two asymmetrical lamps of the same or symmetrically opposite design are used, the reading along the vertical axis and the averages of the readings for the same angles left and right of vertical for one lamp shall 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 values added to determine that the combined units meet twice the candlepower requirements of Table 1.

5.1.6 Warpage: SAE J575

5.1.7 Color: The color of the light from a backup lamp shall be white, in accordance with SAE J578. A backup lamp may project incidental red, yellow, or white light through reflectors or lenses that are adjacent, close to, or a 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, quantitatively, it does not exceed 20% of the total device output at all specified test points; the lamp shall also meet the photometric requirements of this standard with white light alone.

5.2 Materials Requirements: Plastic materials used in the optical parts shall meet the requirements of SAE J576, Plastic Materials For Use in Optical Parts Such As Lenses and Reflectors of Motor Vehicle Lighting Devices.

5.3 Installation Requirements:

5.3.1 Backup lamps shall be mounted on the rear 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.

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

6. GUIDELINES:

6.1 Photometric Design Guidelines for backup lamps, when tested in accordance with paragraph 4.1.5 of this report, are contained in Table 2 - Photometric Design Guidelines and its footnote.

6.2 Installation Guidelines: The following guidelines apply to taillamps as used on the vehicle and shall not be considered part of the requirements:

6.2.1 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.

6.2.2 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.

6.2.3 Where it is expected that lamps must perform in extremely severe environments, such as in off-highway, mining, 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. APPENDIX: As a matter of information, attention is called to SAE J567, Lamp Bulb Retention System, for requirements and gauges used in socket design.

TABLE 1 - PHOTOMETRIC REQUIREMENTS 1,2

TABLE 4 - MINIMUM LUMINOUS INTENSITY REQUIREMENTS FOR BACKUP LAMPS

ZONE	TEST POINTS (DEG)	MINIMUM LUMINOUS INTENSITY (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 10L - H 10L - 5D V - H	100
4	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 at each test point shall not be less than 60% of the minimum value specified for that test point in Table 2.

2. The maximum per lamp at H and the above shall be 300 cd for a two lamp system, and 500 cd for a single lamp system.

TABLE 2 - PHOTOMETRIC DESIGN GUIDELINES

MINIMUM LUMINOUS INTENSITY (cd)

TEST POINTS (DEG)	45L	30L	10L	V	10R	30R	45R
10U	-	-	10	15	10	-	-
5U	15	-	20	25	20	0	15
H	15	25	50	80	50	25	15
5D	15	25	50	80	50	25	15

* The maximum per lamp at H and above shall be 300 cd for a two-lamp system and 500 cd for a single lamp system.

RATIONALE:

This standard has been revised to conform with the recommendations suggested by the EAC and endorsed by the Steering Committee. Test procedures, requirements and guideline information have been placed in separate sections.

Definitions for Requirements (Design and Performance) and Guidelines have been established in SAE J387 - Terminology - Motor Vehicle Lighting.

1 SCOPE - Editorial change using common language per standardized format.

3 Lighting identification Code lifted from SAE J759c.

4 TESTS - Test procedures separated from performance requirements.

5 REQUIREMENTS - Requirements separated from Test procedures and design guidelines.

5.2 Editorial change to comply with standardized phrases and to clarify intent.

6 Original Photometric Design Table retitled Design Guidelines in accordance with intended use, actual industry use and terminology.

Table 1 - Photometric Requirements lifted from SAE J256b Table 4.

FOOTNOTES TO TABLE 1 -

Original footnotes "b" and "d" have been eliminated in accordance with S4.1.1.22 of FMVSS 108 and instruction of the Steering Committee of May 10, 1983.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

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 for Electric Signal Lighting Devices

APPLICATION:

This SAE Standard provides test procedures, requirements, and guidelines for backup lamps.

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