

	SURFACE VEHICLE RECOMMENDED PRACTICE	J1432	REV. APR2006
		Issued 1988-10 Revised 2006-04	
		Superseding J1432 MAR2000	
Rear High Mounted Stop Lamps and Rear High Mounted Turn Signal Lamps for Use on Vehicles 2032 mm or More in Overall Width			

RATIONALE

The SAE Heavy Duty Lighting Committee decided that a standard was needed for high-mounted turn signal lamps for the rear of large vehicles. Since most vehicles use the same or very similar lamp(s) for stop lamps and turn signal lamps it was decided to use the high-mounted stop lamp as the basis for the high-mounted turn signal lamp. Therefore high-mounted turn signal lamps were included in SAE J1432.

The photometric requirements and physical tests are the same for both lamps. Provision has been made to allow the use of yellow high mounted turn signal lamps when the required turn signal lamps are yellow. It should be noted, however, that red clearance lamps are required on the rear of the vehicle which precludes combining these two lamps in that scenario. The HMTSL can be installed adjacent to the red clearance lamp if the clearance lamp(s) are not installed at the lower rear sill of the vehicle.

The HDLC believes the photometric values for these lamps need to be higher than for the required CHMSL on automobiles due to the fact that they are mounted higher and the direction of viewing these lamps could be more toward the sun than a regular CHMSL. A review of a study conducted by the University of Michigan Transportation Research Institute (UMTRI) Authored by Paul L. Olson entitled *Evaluation of a New High-Mounted Stop Lamp* (UMTRI 870065) indicates that in fact there is a need for higher candela requirements when daylight observation is taken into account.

The study was conducted using two age groups of responders 25 to 45 years old and 45 to 80 years old. The test determined the response time for tungsten type lamps and LED lamps when viewed near and far and in darkness and ambient illumination. The results indicate that a tungsten lamp when viewed from afar had 44 misses for the younger group and 16 for the older group. In darkness there were no misses in these groups from afar. LED lamps were better but still had 8 misses in the younger group and 2 in the older group in daytime. If the aspect ratio was changed to a thin longer type LED lamp the results were 12 misses for the younger group and 4 for the older group. The results indicate a signal is more likely to be missed in the daytime than at night.

A comparison of response times indicated respondents viewing the tungsten lamp showed an increase in response time of 40% in daytime versus the response time at night. The LED lamp showed an increase of 29% in the same comparison. Both the tungsten lamp and the LED lamp had an intensity of 42.3 cd at H-V. The LED lamp was 20% brighter but was equalized by placing an 80% transmission neutral filter over the LED unit to reduce its output from 51 cd to 42.3 cd.

Based on this study, the photometric requirements for HMSL's and HMTSL's used on large vehicles have been increased by 60% from the baseline established by FMVSS-108 Figure 10 for required CHMSL's used on smaller vehicles.

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Another change is the ratio between the red and yellow values in Table 2. The traditional method of using 2 ½ times the values of a red lamp to obtain the yellow values are not appropriate for yellow LED lamps. The 2 ½ times ratio was based on the photometric transmission factor of the red and yellow materials used in the plastic lenses. Saturated colors all appear brighter than they should relative to a photometrically equivalent white, and among colors, red is perceived as brighter than yellow when they are photometrically equivalent. This means that a yellow lamp that is about 1.6 times the photometric value of a red lamp should look about equal to the human eye.

The references to multiple lamp arrangements was removed from the standard because heavy duty vehicles, such as trailers, use industry standard lamps that are replaceable from several manufacturers and with several varieties of lamps, it is possible to replace one lamp of a multiple lamp arrangement with a lamp that would cause the arrangement to be in non-compliance with this standard, therefore each supplemental HMSL and/or HMTSL installed on the vehicle must comply with this standard.

1. SCOPE

This SAE Recommended Practice provides test procedures, requirements, and guidelines for high-mounted stop lamps and high-mounted turn signal lamps intended for use on vehicles 2032 mm or more in overall width. This document applies to trucks, motor coaches, van type trailers, and other vehicles with permanent structure greater than 2800 mm high.

This document does not apply to school buses, truck tractors, pole trailers, flat-bed trailers, pick-up truck with dual wheels and trailer converter dollies. The purpose of the high-mounted stop lamp(s) and high-mounted turn signal lamp(s) is to provide a signal over intervening vehicles to the driver of following vehicles.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J387	Terminology—Motor Vehicle Lighting
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 J2139	Tests for Lighting Devices, Reflective Devices, and Components Used on Vehicles 2032 mm or More in Overall Width
SAE J2261	Stop Lamps and Front and Rear Turn Signal Lamps for Use on Vehicles 2032 mm or More in Overall Width

2.1.2 Other Publications

Truck Trailer Manufacturers Association RP-9

Technology and Maintenance Council RP-702

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, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J567 Lamp Bulb Retention System for Requirements and Gages Used in Retention System Design

SAE J1957 Center High-Mounted Stop Lamp Standard for Vehicles Less than 2032 mm in Overall Width

SAE J1889 L.E.D. Signal and Marking Lighting Devices

SAE J2577 Heavy Duty Lamp Electrical Connector Standard

2.2.2 Canadian Federal Publications

Available from Transport Canada, Motor Vehicle Standards and Research Branch, 330 Sparks Street, Ottawa, Ontario K1A 0N5, Canada, Tel: 613-990-2309, www.tc.gc.ca.

Canadian Motor Vehicle Safety Standard-108 (CMVSS-108)

2.2.3 FMVSS Publications

Available from the Superintendent of Documents, U. S. Government Printing Office, Mail Stop: SSOP, Washington, DC 20402-9320.

Federal Motor Vehicle Safety Standard 49 CFR 571.108

Federal Highway Administration 49 CFR PART 393 Subpart B

3. DEFINITIONS

3.1 High-Mounted Stop Lamp

The signaling element of a pedal operated stop lamp system giving a brake actuated, steady burning warning light to the rear of the vehicle. It is intended to provide a signal to the operators of following vehicles. High-mounted stop lamps are supplemental to, and should not be confused with stop lamps as described in SAE J2261.

3.2 High-Mounted Turn Signal Lamp

The signaling element of a switch operated turn signal lamp system giving a flashing signal to indicate the vehicles intended change in direction. The signal is provided to the rear of the vehicle and is intended to provide a signal to the operators of following vehicles. High-mounted turn signal lamps are supplemental to, and should not be confused with turn signal lamps as described in SAE J2261.

4. LIGHTING IDENTIFICATION CODE

High-mounted stop lamps and high-mounted turn signal lamps for use on vehicles 2032 mm or more in overall width, may be identified by the code U in accordance with SAE J759.

5. TESTS

5.1 The device shall be tested according to the procedures specified in SAE J2139. The following tests are applicable with modification as indicated.

5.1.1 Vibration

5.1.2 Moisture

5.1.3 Dust

5.1.4 Corrosion

5.1.5 Warpage Test

The lamp shall have its light emitting lens surface pressed into a vinyl covered (PVC) cushion so that the light emitting surface is fully enveloped by the vinyl cover. The cushion shall consist of a pure vinyl (PVC) covering over padding consisting of 20 lb density urethane foam, 6 inches thick.

5.1.5.1 The lamp shall be positioned in the normal mounting position as used on the vehicle.

5.1.5.2 All light sources of the lamp shall be powered for the duration of the test. The lamp(s) shall be operated at 12.8 V for a 12-V system; and 25.6 V for a 24-V system.

5.1.5.3 The test shall be conducted at an ambient temperature of $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$.

5.1.5.4 The duration of the test shall be 1 h.

5.1.6 Photometry

5.1.6.1 Photometric measurement shall be made with the light source of the device at least 3 m from the photometer. The H-V axis of the device shall be taken parallel to the longitudinal axis of the vehicle. Photometric measurements shall be made with the light source steady burning.

5.2 Color

SAE J578 is a part of this document.

5.3 Plastic Materials

SAE J576 is a part of this document.

6. REQUIREMENTS

6.1 Performance Requirements

The device when tested in accordance with the test procedures of this document shall meet the requirements of SAE J2139 or as indicated.

6.1.1 Vibration

6.1.2 Moisture

6.1.3 Dust

6.1.4 Corrosion

6.1.5 Warpage

Upon completion of the test, the device shall be visually examined for warpage of plastic components. If warpage is observed that could result in failure of other tests contained in this document, the test(s) shall be performed on the warped sample to ensure compliance.

6.1.6 Photometry

The lamp shall be designed to conform to the zone total photometric requirements of Table 1 and its footnotes. The summation of the luminous intensity measurements at the test points in a zone shall be at least the value shown.

6.1.6.1 **A HMSL and/or HMTSL combined with a clearance lamp** shall have an intensity not less than three times the luminous intensity of the clearance lamp at any test point, except that at H-V, H-5L, H-5R, 5U-V, and 5D-V, the combined lamp's intensity shall be not less than five times the luminous intensity of the clearance lamp.

6.1.6.1.1 Lamps combined with clearance lamps shall be red.

6.1.6.1.2 When the maximum intensity of the clearance lamp is located below the horizontal and is within an area generated by a 1.0 degree radius around a test point, the ratio for the test point may be computed using the lowest value of the clearance lamp's luminous intensity within the generated area.

6.1.6.2 **A HMSL combined with identification lamp(s)** shall have an intensity not less than three times the luminous intensity of the identification lamp at any test point, except that at H-V, H-5L, H-5R, 5U-V, and 5D-V, the combined lamp's intensity shall be not less than five times the luminous intensity of the identification lamp.

6.1.6.2.1 When the maximum intensity of the identification lamp is located below the horizontal and is within an area generated by a 1.0 degree radius around a test point, the ratio for the test point may be computed using the lowest value of the identification lamp(s) luminous intensity within the generated area.

6.2 Color

The color of the light from the high-mounted stop lamp or high-mounted turn signal lamp shall be as specified in SAE J578 for the following combinations.

HMSL combined with Identification lamps—Red

HMSL combined with clearance lamps—Red

HMTSL combined with clearance lamp(s)—Red

HMTSL mounted adjacent to the clearance lamp(s) and the required turn signal lamps are yellow—Yellow

6.3 Plastic Materials

The plastic materials used in the optical parts shall meet the requirements of SAE J576.

6.4 Design Requirements

6.4.1 If a high-mounted stop lamp or high-mounted turn signal lamp is combined with a clearance lamp or identification lamp, and a replaceable multiple light source is used, the light source retention system shall be designed with an indexing means so that the light source is properly indexed to avoid improper orientation of the light source. Removable light source retention systems shall have an indexing feature so that they cannot be reinserted into the lamp housing in a random position, unless the lamp will perform its intended function with random light source orientation.

6.4.2 The effective projected luminous lens area, as defined in SAE J387, of a single lamp shall be at least 50 cm².