SURFACE VEHICLE RECOMMENDED PRACTICE

J1133 JUL2015

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Superseding J1133 NOV2004

School Bus Stop Arm Lamp

RATIONALE

J1133 has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

This document provides design guidelines, test procedure references, and performance requirements for stop arm lamp devices on school bus vehicles which are used to alert traffic to stop when passengers are loading and unloading

2. REFERENCES

2.1 Applicable Documents

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.

Federal, State, and/or local regulations supersede this Recommended Practice, and should be consulted during the development and use of products described in this Recommended Practice.

2.1.1 SAE Publications

Available from SAE International, 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 J576 Plastic Material or Materials for Use in Optical Parts Such as Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices

SAE J578 Color Specification

SAE J759 Lighting Identification Code

SAE J1330 Photometry Laboratory Accuracy Guidelines

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

SAE J2139 Tests for Signal and Marking Devices Used on Vehicles 2032 mm or More in Overall Width

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
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SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/J1133_201507

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 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

2.2.2 Federal Publications

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

CFR Title 49 Part 571.131 School Bus Pedestrian Safety Devices (FMVSS 131)
http://www.gpoaccess.gov/cfr/index/html.

2.2.3 Canadian Federal Publications

Available from Transport Canada, Motor Vehicle Standards and Research Branch, Ottawa, Ontario K1A 0N5.

CMVSS 131 School Bus Pedestrian Safety Devices

3. DEFINITIONS

3.1 SCHOOL BUS STOP ARM

A school bus stop arm is an auxiliary device used in accordance with FMVSS 131 and CMVSS 131 to signal a school bus has stopped to load or unload passengers.

3.2 SCHOOL BUS STOP ARM LAMP

A flashing optical warning device attached to a school bus stop arm which projects light horizontally from 20 degrees left to 20 degrees right and vertically from 10 degrees up to 10 degrees down. The flashes of light may be a repetitive signal or a non-repetitive signal. If a non-repetitive signal is used it shall be a block of repetitive signals that have been characterized.

3.3 LIGHT SOURCE

Any single, independently mounted, light-emitting component in the lighting system. A light source may consist of a single optical element or a fixed array of any number of optical elements whose geometric positioning relative to each other is fixed by the manufacturer of the light source and not intended to be modified. To be considered a single source the elements must be adjacent, and operate simultaneously in all modes if the light source is vehicle operator adjustable.

3.4 OPTICAL ELEMENT

Any discrete light emitter such as, but not limited to, an incandescent filament, HID or individual light emitting diode (L.E.D.).

3.5 LIGHT PULSE

A single, visually continuous emission of optical energy. High frequency modulation is permitted.

3.6 FLASH

A light pulse or a train of light pulses, where a dark interval of at least 160 ms separates the light pulse or the last pulse of the train of light pulses from the next pulse or the first pulse of the next train of light pulses. To be considered a train of light pulses, each pulse in the train must begin within 100 ms after the end of the preceding light pulse. Dark interval luminous intensity shall not exceed 2% of the maximum luminous intensity of a flash.

3.7 OPTICAL POWER

The integration of the luminous intensity of the flashing light source for a time of 60 s ($\int I dt$). Units are candela·seconds/minute.

4. LIGHTING IDENTIFICATION CODE, MARKINGS, AND NOTICES

4.1 In accordance with SAE J759, the optical warning device on a school bus stop arm may be identified by the code “W6”.

5. TESTS

All tests are to be made per test voltages indicated in Table 1 below:

TABLE 1 - TEST VOLTAGES

System Voltage[1]	Test Voltage	Tolerance	Extreme Low System Voltage	Extreme High System Voltage
12 (IC)	12.8	±0.1	9	16
24 (IC)	25.6	±0.2	18	32
36 (E)	38.4	±0.3	27	42
42 (IC)[2]	44.8	±0.35	32	56
48 (E)	51.2	±0.4	36	56
72 (E)	76.8	±0.6	54	84
80 (E)	85.3	±0.66	60	94

[1] IC – Internal Combustion E – Electric (Battery Powered)
[2] New European Electrical System

The Extreme High System Voltages for System Voltages of 36, 48, 72, and 80 V are equal to the Nominal System Voltages because these are battery powered and will not be subjected to possible alternator failures causing excessively high voltages as in the 12, 24, and 42 V internal combustion electrical systems. Adequate care must be exercised however, in order to maintain a safe test environment when handling voltages higher than 36 V.

Tests are to be made using the wiring supplied by the device manufacturer or wire of the minimum size recommended by the device manufacturer. For devices intended to be hard wired into the vehicle electrical system, the voltage shall be measured at 300 mm from the point at which the wiring exits the device. For portable devices equipped with an electrical connector, the voltage shall be measured at the supply side of the connector.

5.1 SAE J2139 is a part of this document. The following tests are applicable with the modifications as indicated.

5.1.1 Vibration Test

5.1.2 Moisture Test

5.1.3 Dust Test

The change in intensity may be measured at H-V.

5.1.4 Corrosion Test

5.1.5 Warpage Test for Plastic Components

The device shall be operated in the mode with the highest optical power.

5.2 Photometry

5.2.1 All photometric measurements shall be made with the front face of the lamp at a distance of at least 18 m from the photometer. The lamp axis shall be taken as the horizontal line through the light source parallel to what would be the longitudinal axis of the vehicle, if the lamp were mounted in its normal position on the vehicle.

5.2.2 In addition to the test procedures in SAE J2139, the photometric performance shall be determined by measuring optical power and through direct measurement or calculation, the peak intensity of each flash. Photometry shall be performed with the light source flashing.

5.2.3 All light sources shall operate until the output is stable prior to testing as defined in SAE J1889.

5.2.4 An integrating photometer shall be used to determine the optical power projected over 60 s. Any measurement period not less than 20 s may be used. These measurements shall then be corrected to obtain the optical power in units of cd-seconds/minute. If the flasher or power supply/flasher has more than one flash pattern, the optical power shall be measured and recorded for each pattern.

5.3 Flash Rate

Any device, incorporating an integral flasher, an external flasher or a combined power supply and flasher supplied by the manufacturer of the device, shall be tested with this flasher.

5.3.1 If a flasher is required and no flasher is supplied by the manufacturer of the device, the device shall be tested using a flasher having a flash rate of 1.20 Hz ± 0.14 Hz with a 50% ± 2% current on time.

5.3.2 The characteristics, including peak intensities, flash rate, period, number of pulses per flash, on time (electrical), off time (electrical) and pulse separation, shall be measured and recorded. If the flasher or power supply/flasher has more than one flash pattern, the characteristics shall be measured and recorded for each pattern.

5.4 Color Test

SAE J578 is a part of this report. The device shall meet color requirements in each mode and at all times. Incandescent devices may be measured while in a steady-state mode at design voltage.

5.5 Additional Tests

5.5.1 High Temperature Flash Rate Test

The device shall be subjected to an ambient temperature of 50 °C ± 3 °C for a period of 6 h. The device shall be off (not operating) during the first hour and shall operate continuously for the next 5 h of the test. The flash rate shall be measured starting 3 min after the device is activated and at the conclusion of the test. If the device has multiple flash patterns then the pattern with the highest optical power shall be used. The start time shall be measured at time of activation.

5.5.2 Low Temperature Flash Rate Test

The device shall be subjected to an ambient temperature of –30 °C ± 3 °C for a period of 6 h. The device shall be off (not operating) during the first 5 h and shall operate continuously for the last hour of the test. The flash rate shall be measured starting 3 min after the device is activated and at the conclusion of the test. If the device has multiple flash patterns then the pattern with the lowest optical power shall be used. The start time shall be measured at time of activation.

5.5.3 Durability Flash Rate Test

The device shall be operated continuously for 200 h at an ambient temperature of 25 °C ± 3 °C in cycles consisting of 50 min on and 10 min off. The flash rate shall be measured starting 3 min after the device is activated and at the conclusion of the test. If the device has multiple flash patterns then the pattern with the highest optical power shall be used.

5.6 Materials Test

SAE J576 is a part of this report.

6. PERFORMANCE REQUIREMENTS

6.1 Performance Requirements

A device, when tested in accordance with the test procedures specified in Section 5, shall meet the following requirements of SAE J2139.

6.1.1 Vibration

6.1.2 Moisture

6.1.3 Dust

On completion of the test, the test device shall be considered to have met all the requirements of the dust test when complying with either of the following requirements:

No dust shall be found on the interior surface of the test device, or the maximum or HV luminous intensity measured after the dust exposure test shall be at least 90% of the initial maximum or HV luminous intensity measured before the test.

6.1.4 Corrosion

6.1.5 Warpage

6.2 Photometry

All device flash patterns shall meet the peak luminous intensity photometric requirements contained in Figure 1 and the footnotes. The summation of the peak luminous intensity measurements at the specified test points in a zone shall be at least the value shown. Additionally, the optical power of all device flash patterns shall meet the optical power photometric requirements contained in Figure 2 and the footnotes. The summation of the optical power measurements at the specified test points in a zone shall be at least the value shown.

In the case of gaseous discharge devices, only compliance to the optical power requirements is required.

6.3 Flash Rate

The flash rate for devices shall be at least 1.0 Hz and not more than 4.0 Hz at all times.

6.4 Design Requirements

6.4.1 Lighting devices shall be activated at the commencement of the stop arm extension cycle and deactivated when the stop arm is retracted.

6.5 Color

The color of light emitted from the school bus stop arm lighting device shall be red as specified in SAE J578.

6.6 Additional Requirements

6.6.1 High Temperature Flash Rate Test

There shall be no evidence of operating conditions which would result in failure to comply with Section 6 of this document. Operation of the device shall begin and continue within 5 s of the beginning of each operating cycle. The measured flash rates shall not vary by more than 20% from the ambient flash rate.

6.6.2 Low Temperature Flash Rate Test

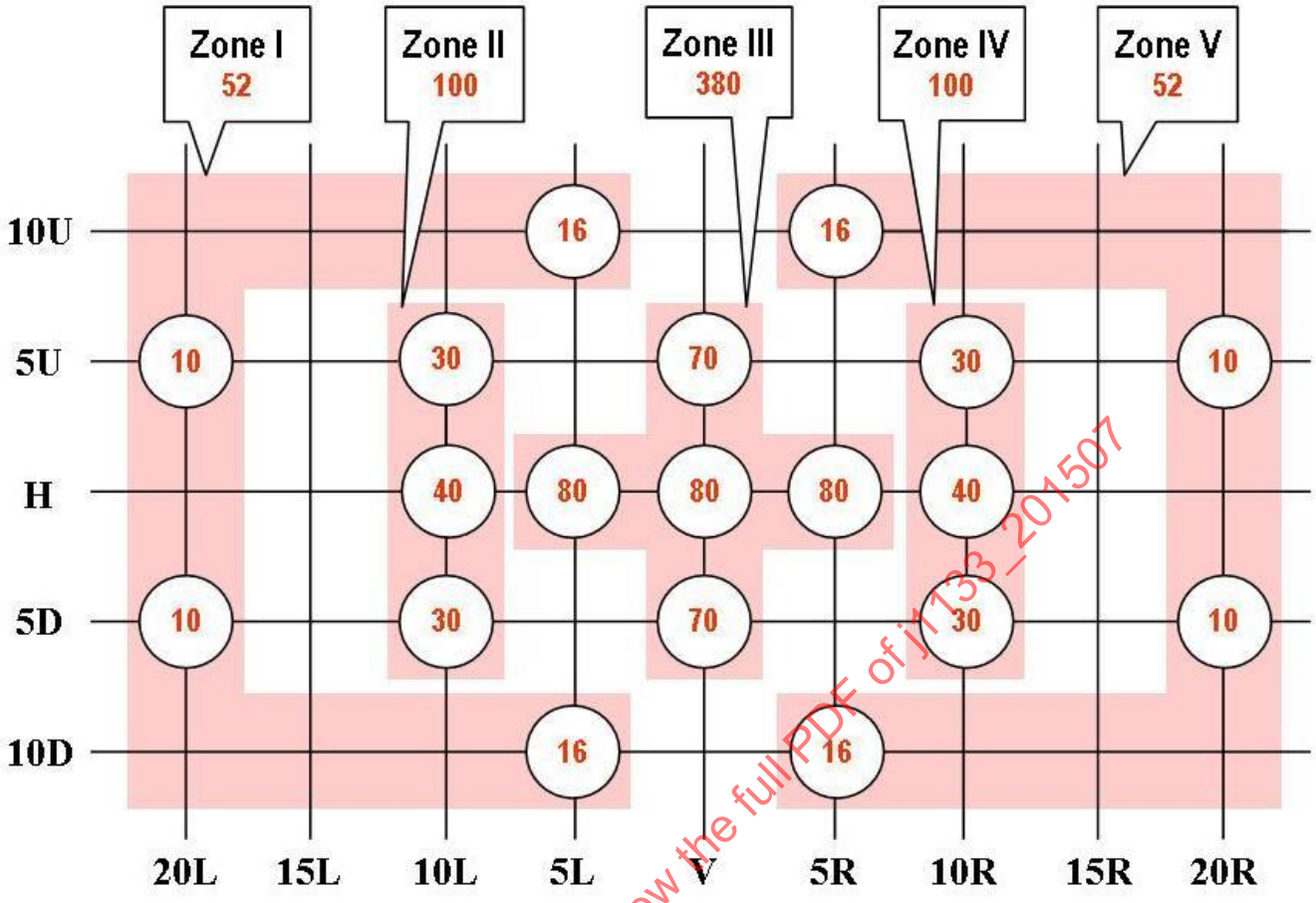
There shall be no evidence of operating conditions which would result in failure to comply with Section 6 of this document. Operation of the device shall begin and continue within 5 s of the beginning of each operating cycle. The measured flash rates shall not vary by more than 20% from the ambient flash rate.

6.6.3 Durability Flash Rate Test

There shall be no evidence of operating conditions which would result in failure to comply with Section 6 of the document. The final measured flash rates shall not vary by more than 20% from the initial.

6.7 Material Requirements

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



1. The maximum peak luminous intensity is 300cd within the photometric pattern shown.
2. The Measured value at each test point shall not be less than 60% of the required minimum value for that individual test point location.
3. The sum of the peak luminous intensity measurements at each test point within a zone shall not be less than the zone total shown. The peak luminous intensity measurements at each discrete test point shown within the corresponding zone are the values used to calculate the specified zone total.
4. An adjustment in device orientation from the design position of ±1-degree in any direction may be made providing all zones comply after this reaim.

FIGURE 1 - PHOTOMETRIC REQUIREMENTS
Minimum Peak Luminous Intensity (cd)