SURFACE VEHICLE RECOMMENDED PRACTICE

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(R) Directional Flashing Optical Warning Devices
for Authorized Emergency, Maintenance, and Service Vehicles

RATIONALE

The color green was added to the photometric and color requirements for Class 3 devices to reflect the use of green warning lamps to identify an incident command post, the private vehicles of volunteer firefighters or EMS personnel, or private security vehicles as described in U.S. Fire Administration document FA-336/February 2014 “Emergency Vehicle Safety Initiative.” Due to societal associations of the color green with the concept of normalcy (green GO signal of traffic lights, green indicator lamps to signify a device is operating within its normal operating limits, etc.), the color green shall not be used on its own for applications that require Class 1 or 2 performance levels.

Electromagnetic interference guidelines were added for devices containing electronic controlling elements, converters, regulators, or actuators. Emergency, maintenance, and service vehicles utilize two-way radio communication devices that can be adversely affected by excessive electromagnetic emissions from warning devices.

2.1.1: Document SAE J1889 is no longer an applicable document since the definition of photometric stability was added to this document. SAE J2357 was added because it is now referenced in the electromagnetic interference guidelines.

Section 3: Reordered and renumbered definitions to place them in alphabetic order per ANSI guidelines.

3.1: The phrase “to call for the right-of-way” was added to the definitions to clarify conditions that indicate the need for Class 1 performance and to provide common language with SAE J2498.

3.5: The definition of the term “duty-cycle” was added to clarify its meaning within the document.

3.6: The limitation of “in all modes if the mode of the device is vehicle operator adjustable” was removed from the determination of when multiple EWD lamp assemblies can be considered as a single device because it is unneeded.

3.7: The definition of the term “emergency warning device photometric stability” was added to clarify its meaning within the document.

3.9: The definition of the term “flash energy” was added to clarify its meaning within the document.

3.11: The definition of the term “on-time” was added to clarify its meaning within the document.

3.14: The definition of the term “peak intensity” was added to clarify its meaning within the document.

3.17: The definition of the term “pulse width modulation” was added to clarify its meaning within the document.

3.19: The definition of the term “Talbot’s law” was added to clarify its meaning within the document.

3.20: The definition of the term “warning mode” was added to clarify its meaning within the document.

Section 4: Modified the language in the Class definition to include single warning mode allowance. Added the appending of the letter “M” to the device marking code to indicate devices that contain warning modes of different performance.

Section 5: Renumbered the section to improve clarity.

5.1.1: Added random vibration allowance.

5.1.5: This section was re-written to clarify the measurement procedure and match the practices of test laboratories. Methods are provided to determine the photometric performance of un-tested flash patterns by photometric testing of a single flash pattern and determining an adjustment factor that can be applied to the photometric test results of the tested flash pattern. References to SAE J1330 and SAE J1889 removed.

5.2: Revised the text to clarify incandescent sources may be operated steady burning and that device chromaticity be tested at 1 minute and when photometric stability has been reached.

5.4: Revised the flash characteristics that must be measured to the ones needed to determine compliance to the definition of a flash.

6.4: References to the definitions of a light pulse and flash were added to the requirements to eliminate ambiguity. The list of required characteristics that must be included in a report was deleted.

1. SCOPE

This document provides design guidelines, test procedure references, and performance requirements for directional, single color, flashing optical warning devices used on authorized emergency, maintenance, and service vehicles. It is intended to apply to, but is not limited to, surface land vehicles.

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.

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 +1 724-776-4970 (outside USA), www.sae.org.

SAE J575 Test Methods and Equipment for Lighting Devices for Use on Vehicles Less than 2032 mm in Overall Width

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

SAE J578 Chromaticity Requirements for Ground Vehicle Lamps and Lighting Equipment

SAE J759 Lighting Identification Code

SAE J1330 Photometry Laboratory Accuracy Guidelines

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

SAE J2357 Application Guidelines for Electronically Driven and/or Controlled Exterior Automotive Lighting Equipment

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 +1 724-776-4970 (outside USA), www.sae.org.

SAE J387 Terminology - Motor Vehicle Lighting

SAE J845 Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles

SAE J2498 Minimum Performance of the Warning Light System Used on Emergency Vehicles

3. DEFINITIONS

3.1 CLASS 1 DIRECTIONAL OPTICAL WARNING DEVICE

A device utilized on authorized vehicles to capture the attention of motorists and pedestrians to call for the right-of-way or warn of a potentially hazardous activity or emergency situation.

3.2 CLASS 2 DIRECTIONAL OPTICAL WARNING DEVICE

A device utilized on authorized vehicles to capture the attention of motorists and pedestrians and warn of traffic hazards such as a lane blockage or a slow moving vehicle.

3.3 CLASS 3 DIRECTIONAL OPTICAL WARNING DEVICE

A device utilized on authorized vehicles to identify them to pedestrians and motorists.

3.4 DIRECTIONAL FLASHING OPTICAL WARNING DEVICE

An optical warning device that projects light in a minimum area horizontally from 20 degrees right to 20 degrees left and vertically from 10 degrees up to 10 degrees down. It will project flashes of light to an observer positioned at a fixed location within the area of coverage.

3.5 DUTY-CYCLE

The on-time divided by the flash period.

3.6 EMERGENCY WARNING DEVICE (EWD) LAMP ASSEMBLY

Any single, independently mounted, light-emitting component in the lighting system. An emergency warning device (EWD) lamp assembly 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 device and not intended to be modified. To be considered a single source, the optical elements must be adjacent and operate simultaneously in the mode under consideration.

3.7 EMERGENCY WARNING DEVICE PHOTOMETRIC STABILITY

The point at which the photometry value is stable to within ±3% within any 15-minute period.