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SURFACE VEHICLE STANDARD

SAE J774

REV.
DEC89

Issued 1961-06
Revised 1989-12

Superseding J774c

Submitted for recognition as an American National Standard

(R) EMERGENCY WARNING DEVICE (TRIANGULAR SHAPE)

1. SCOPE:

This document provides test procedures, performance requirements and guidelines for emergency warning devices (triangular shape) that are designed to be carried in motor vehicles and intended for highway use.

2. REFERENCES:

SAE J575 DEC88, Tests for Motor Vehicle Lighting Devices and Components

SAE J576 SEP86, Plastic Materials for Use in Optical Parts Such as Lenses and Reflectors of Motor Vehicle Lighting Devices

SAE J578 MAY88, Color Specification

SAE J594 MAY89, Reflex Reflectors

SAE J759 DEC87, Lighting Identification Code

SAE J774c revised January 1971 for information on "TYPE 2, DOT over DOT" Flare design

Federal Motor Vehicle Safety Standard 125

Federal Highway Administration Parts and Accessories Necessary for Safe Operation Subpart "H", 393.95, Emergency Equipment

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SAE J774 Revision DEC89**3. DEFINITIONS:**

- 3.1 **EMERGENCY WARNING DEVICE:** A triangular shaped device placed on the highway to warn the driver of an approaching vehicle of a stationary hazard (disabled vehicle) by reflection of light from the headlamps of the approaching vehicle at night or by a fluorescent area in the daytime.
- 3.2 **FLUORESCENT:** The property of emitting visible light due to the absorption of radiation of a shorter wavelength which may be outside the visible spectrum.

4. IDENTIFICATION CODE:

- 4.1 Emergency warning devices (triangular shape) may be identified by the code W4 in accordance with SAE J759.

5. TESTS:

- 5.1 Emergency warning device (triangular shape) sample submitted for test shall be representative of the device as regularly manufactured and marketed.
- 5.2 SAE J575 is a part of this document. The following tests are applicable with the modifications as detailed. All tests shall be run on a single device in the order listed. At the conclusion of all tests, the device shall be photometered and shall meet the specified photometric values.
- 5.2.1 **Vibration Test:** The complete device in its opaque container shall be tested in the stored position. If a means is not provided to attach the device securely to the vehicle, the device in its container shall be vibration tested in a metal box on the test equipment with a clearance of 25 mm (1 in) to the closest surface of the device when the device is at rest.
- 5.2.2 **Dust Test:** The device shall be tested in its functional position. All units shall be subjected to this test whether sealed or not sealed.
- 5.2.3 **Moisture Test:** The device shall be tested in its functional position.
- 5.2.4 **Corrosion Test:** The device shall be tested in its functional position.
- 5.2.5 **Photometric Test:**
- 5.2.5.1 Submit the warning device to the following conditioning sequence, returning the device after each step in the sequence to ambient air at 20°C (68°F) for at least 2 h.
- 5.2.5.1.1 **Low Temperature Test:** The device in its functional position shall be conditioned at $-40^{\circ}\text{C} \pm 3$ ($-40^{\circ}\text{F} \pm 5$) for 16 h in a circulating air chamber using ambient air, which would have not less than 30% and not more than 70% relative humidity at 20°C (70°F).

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- 5.2.5.1.2 High Temperature Test: The device in its functional position shall be conditioned at $65^{\circ}\text{C} \pm 3$ ($150^{\circ}\text{F} \pm 5$) for 16 h in a circulating air chamber using ambient air, which would have not less than 30% and not more than 70% relative humidity at 20°C (70°F).
- 5.2.5.1.3 Humidity Test: The device in its functional position shall be conditioned at 38°C (100°F) and 90% relative humidity for 16 h.
- 5.2.5.1.4 Immersion Test: The device in its functional position shall be immersed for 2 h in water at a temperature of 38°C (100°F).
- 5.2.5.2 Reflex Reflector Area: Prevent the orange fluorescent material from affecting the photometric measurements of the reflectivity of the reflex reflector by masking.

The device shall be tested in its functional position in accordance with SAE J594, except that the candela return for each side and at each test point shall be not less than the values specified in Table 1. The total area for each side of the device shall be photometered either in whole or in parts with particular caution regarding beam uniformity.

TABLE 1 - Photometric Requirements for the Red Reflex Reflector Area, Each Side of the Emergency Warning Device

OBS. ANGLE	ENT. ANGLE	MINIMUM CANDELA PER INCIDENT FOOTCANDLE	MINIMUM MILLI-CANDELA PER INCIDENT LUX
0.2	V-10U	80	7430
	H-30L	8	745
	H-20L	40	3715
	H-V	80	7430
	H-20R	40	3715
	H-30R	8	745
1.5	V-10D	80	7430
	V-10U	0.8	74
	H-30L	0.08	7
	H-20L	0.4	37
	H-V	0.8	74
	H-20R	0.4	37
	H-30L	0.08	7

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5.2.5.3 Fluorescent Area: Prevent the red reflex reflective material from affecting the photometric measurement of the luminance of the orange fluorescent material by masking.

Using a 150 watt high pressure xenon compact arc lamp as the light source, illuminate the test sample at an angle of incidence of 45 deg and an angle of observation of 90 deg. Measure the luminance of the material at a perpendicular viewing angle with no ray of the viewing beam more than 5 deg from the perpendicular to the specimen.

Repeat the procedure for a flat magnesium oxide surface, and compute the quotient (percentage) of the luminance of the material relative to that of the magnesium oxide surface.

5.3 Stability Test (Wind Test): The device in its functional position shall be placed on a horizontal brushed concrete surface both with and against the brush marks and subjected to a horizontal wind of 65 km/h (40 mph). The wind shall be directed for 3 min in each position: perpendicular to the device face, first on one side and then the other side and then at three intermediate positions.

5.4 Color:

5.4.1 Reflex Reflector Area: The test sample may be either the reflex reflector or a disc of the same material, technique of fabrication, and dye formulation as the reflex reflector. If a disc is used, the thickness shall be twice the thickness of the reflector as measured from the face of the reflector to the apexes of the reflecting elements.

5.4.2 Fluorescent Material Area: A 150 watt high pressure xenon compact arc lamp shall illuminate the sample using the unmodified spectrum at an angle of incidence of 45 deg and an observation of 90 deg.

6. REQUIREMENTS:

6.1 Material Requirements: The plastic material used in optical parts shall meet the requirements of SAE J576.

6.2 Performance Requirements: The device when tested in accordance with the test procedures of SAE J575 and with the modifications detailed in this document shall meet the following requirements:

6.2.1 Vibration: The reflex reflector sections shall show no evidence of surface abrasion at the conclusion of the test.

6.2.2 Moisture: There shall be no visible moisture within the device at the conclusion of the test.

6.2.3 Photometric:

6.2.3.1 Reflex Reflector: Both before and after the device has been conditioned the intensity for each side shall be not less than the values specified in Table 1.

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6.2.3.2 Fluorescent: Both before and after the device has been conditioned the relative luminance shall not be less than 25% of a flat magnesium oxide surface and a minimum product of that relative luminance and width in inches of 44.

6.2.4 Color:

6.2.4.1 Reflex Reflector Area: The color of the reflected light shall be red, as specified in SAE J578.

6.2.4.2 Fluorescent Area: The fluorescent material shall be orange and shall have the following characteristics when the source of illumination is a 150 watt high pressure xenon compact arc lamp, expressed in terms of the International Commission on Illumination (CIE) 1931 standard colorimetric observer system. The chromaticity coordinates of the orange fluorescent material shall lie within the region bounded by the spectrum locus and the lines on the diagram defined by the following:

YELLOW	$y = 0.49x + 0.17$
WHITE	$y = 0.93 - x$
RED	$y = 0.35$

6.2.5 Stability Test (Wind Test): No part of the device shall slide more than 75 mm (3 in) from its initial position.

The triangular portion shall not tilt to a position that is more than 10 deg from vertical.

The device shall not turn through a horizontal angle of more than 10 deg in either direction from the initial position.

6.2.6 Durability: After all testing has been completed, the device shall be functional and no part of the device shall be warped or separated from the rest of the device.

6.3 Design Requirements:

6.3.1 The emergency warning device (triangular shape) shall form an equilateral triangle and each side shall display both a daytime and a nighttime warning area. The device shall stand in a plane not more than 10 deg from the vertical, with the lower base of the triangle horizontal and not less than 25 mm (1 in) above the road surface.

6.3.2 The daytime warning shall be an orange fluorescent area meeting the color and luminance requirements specified.

6.3.3 The nighttime warning shall be a red retroreflective area meeting the color and photometric requirements specified.

6.3.4 Each of the three legs of the triangular portion of the warning device shall not be less than 430 mm (17 in) and not more than 560 mm (22 in) and not more than 75 mm (3 in) wide. See Figure 1.

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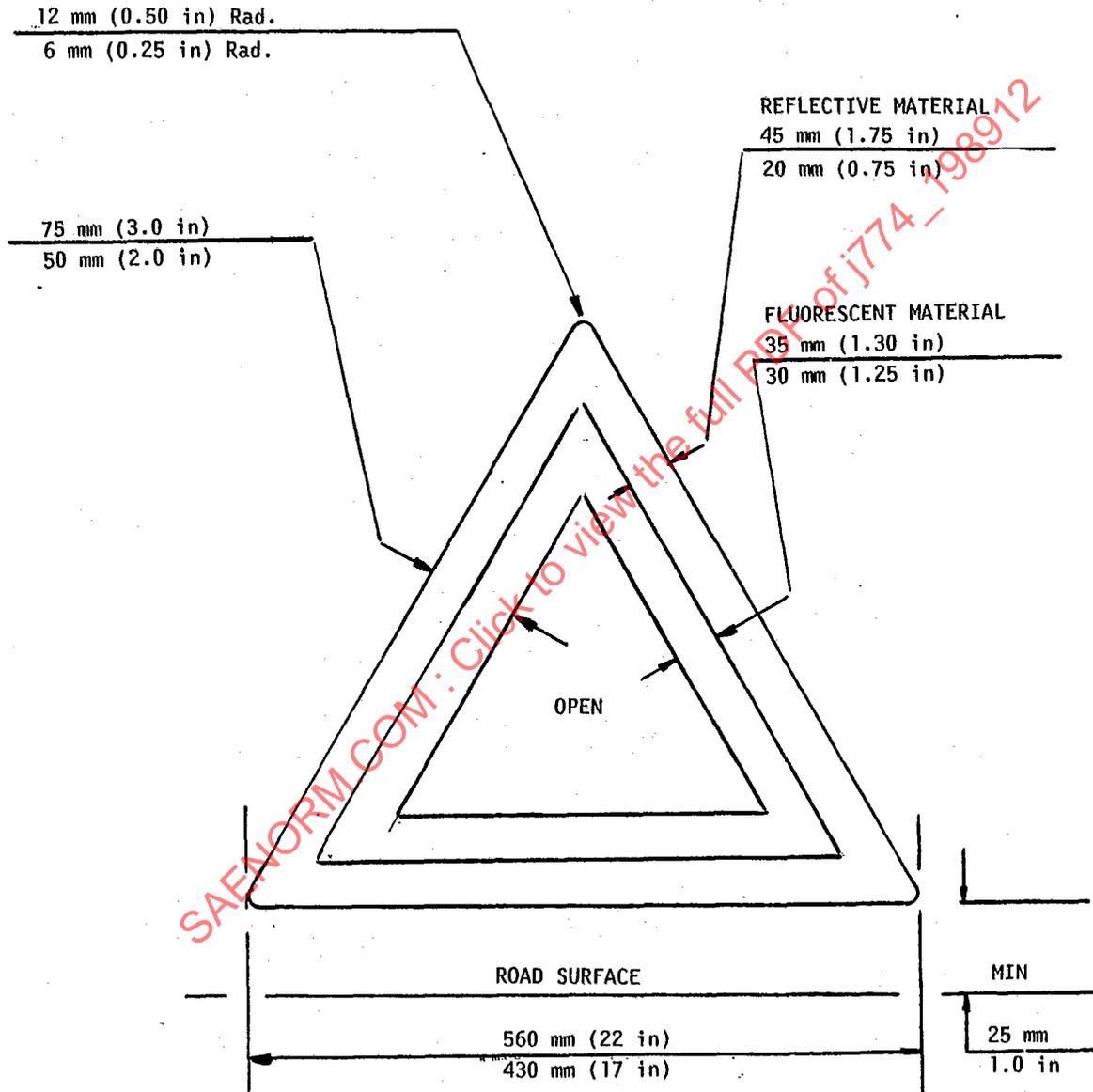


FIGURE 1 - Dimensions of the Emergency Warning Device (Triangular Shape)

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- 6.3.5 Each face of the triangular portion of the warning device shall have an outer border of red reflex reflective material of uniform width not less than 20 mm (0.75 in) and not more than 45 mm (1.75 in) wide and an inner border of orange fluorescent material of uniform width not less than 30 mm (1.25 in) and not more than 35 mm (1.30 in) wide.
- 6.3.6 Each vertex of the triangular portion of the device shall have a radius of not less than 6 mm (0.25 in) and not more than 13 mm (0.5 in).
- 6.3.7 Each device shall have instructions for its erection and display. The instructions shall be either indelibly printed on the warning device or attached in such a manner that they cannot be easily removed.
- 6.3.8 The instructions shall include a recommendation that the driver activate the vehicular hazard warning signal lamps before leaving the vehicle to erect the warning devices.
- 6.3.9 Instructions shall include an illustration indicating the recommended positioning of the warning device on the highway. See Figure 2.

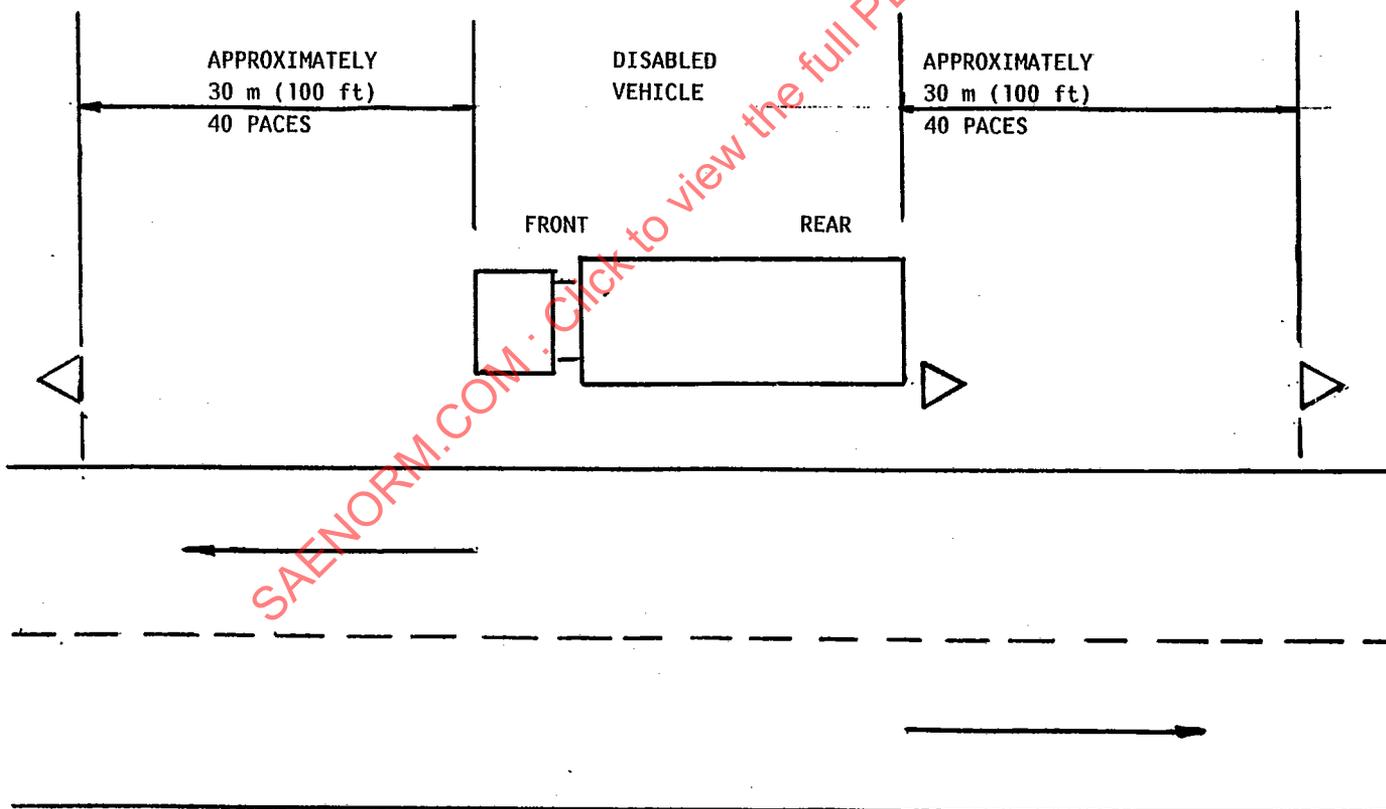


FIGURE 2 - Recommended Warning Device Positioning on the Roadway

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.

J774 DEC89RATIONALE:

The rewrite of SAE J774 includes the current format requirements and updating to current requirements.

Since the emergency warning device (triangular shape) is the only legal device as required by FMVSS 125, the "TYPE 2, DOT over DOT" requirements have been removed from the document. A reference to SAE J774c revised January 1971 appears in the reference section.

Photometric tests for the fluorescent material has been added to the document. The test procedure and requirements are the same as currently specified in FMVSS 125.

Additional tests for conditioning the device have also been added; low temperature, high temperature, humidity and immersion. These conditioning tests are the same as required in FMVSS 125.

The photometric requirements of the red reflector section of the device have also been upgraded and are the same as required in FMVSS 125.

A diagram has been added showing the dimensional requirements of the device. FIGURE 1.

A diagram has been added showing the display of the device on the highway. FIGURE 2.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

SAE J575 DEC88, Tests for Motor Vehicle Lighting Devices and Components

SAE J576 SEP86, Plastic Materials for Use in Optical Parts Such as Lenses and Reflectors of Motor Vehicle Lighting Devices

SAE J578 MAY88, Color Specification

SAE J594 MAY89, Reflex Reflectors

SAE J759 DEC87, Lighting Identification Code

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Federal Motor Vehicle Safety Standard 125

Federal Highway Administration Parts and Accessories Necessary for Safe Operation Subpart "H", 393.95, Emergency Equipment