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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J945

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Vehicular Hazard Warning Flashers

1. ***Scope***—This SAE Standard defines the test conditions, procedures, and minimum design requirements for nominal 6, 12, and 24 V hazard warning flashers.

2. ***References***

2.1 **Applicable Publications**—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J759—Lighting Identification Code
SAE J823—Flasher Test
SAE J910—Hazard Warning Signal Switch

3. ***Definitions***

3.1 **Hazard Warning Flasher**—A device installed in a vehicle lighting system which has the primary function of causing the turn signal lamps to flash when the hazard warning switch is actuated. Secondary functions may include the visible pilot indication for the hazard system (required by SAE J910) and an audible signal to indicate when the flasher is operating.

4. ***Flasher Identification Code***—Flashers conforming to this document may be identified by the code J945 in accordance with SAE J759.

5. ***Tests***

5.1 **Test Equipment**—The standard test equipment and circuitry for performing flasher tests shall conform with the specifications in SAE J823.

5.2 **Test Procedures**—All of the following tests shall be performed at 12.8 V (or 6.4 V or 25.6 V) at the bulbs unless otherwise specified.

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5.2.1 START TIME—The start time of a normally closed type flasher is the time to open the circuit after the voltage is applied, provided the closed circuit remains closed for a minimum of 0.10 s. If the closed circuit opens in less than 0.10 s, the flasher shall be considered a normally open type flasher for this test. The start time of a normally open type flasher is the time to complete one cycle (close the circuit and then open the circuit) after the voltage is applied. For a fixed load flasher, the test shall be made with the specific ampere design load connected. For a variable load flasher, the test shall be made with both the minimum and maximum ampere design loads. The test shall be made in an ambient temperature of 24 °C ± 5 °C. The start time shall be measured and recorded for three starts, each of which is separated by a cooling interval of at least 5 min.

5.2.2 VOLTAGE DROP—The voltage drop across the flasher shall be measured between the input and the load terminals at the flasher and during the "on" period of each cycle. After the flasher has been operating for five consecutive cycles, the lowest voltage drop observed during each of three consecutive cycles shall be measured and recorded. For a fixed load flasher, the test shall be conducted with the specific ampere design load connected. For a variable load flasher, the test shall be conducted with both the minimum and maximum ampere design loads. The test shall be conducted in an ambient temperature of 24 °C ± 5 °C.

5.2.3 FLASH RATE AND PERCENT CURRENT ON TIME—The flash rate and percent current on time shall be measured and recorded after the flasher has completed five consecutive cycles and shall be the average of at least three consecutive cycles at each of the following bulb voltages and ambient temperature conditions:

a. 12.8 V (or 6.4 V or 25.6 V) and 24 °C ± 5 °C
b. 11.0 V (or 5.5 V or 22.0 V) and −17 °C ± 3 °C
c. 13.0 V (or 6.5 V or 26.0 V) and −17 °C ± 3 °C
d. 11.0 V (or 5.5 V or 22.0 V) and 50 °C ± 3 °C
e. 13.0 V (or 6.5 V or 26.0 V) and 50 °C ± 3 °C

The flashers shall be temperature stabilized before each test. For a fixed load flasher, the test shall be conducted with the specific ampere design load connected. For a variable load flasher, the test shall be conducted with both the minimum and maximum design loads connected.

5.2.4 EXTREME TEMPERATURE—The flasher shall be subjected to ambient temperatures of 63 °C ± 3 °C and −32 °C ± 3 °C until stabilized. The start time and flash rate shall be measured and recorded at each extreme temperature. The flash rate measurement must be completed within the first minute of energization. Otherwise, the procedure shall be as specified in 5.2.1 and 5.2.3a.

5.2.5 DURABILITY—The durability test shall be conducted under the following conditions:

a. 24 °C ± 5 °C ambient temperature
b. 13.0 V (6.5 V or 25.6 V) applied to the input terminals of the test circuit
c. Maximum specified ampere design load
d. Continuous flasher operation for 36 h

6. Performance Requirements

6.1 Start Time—The average of the three start time measurements (5.2.1) shall not exceed 1.5 s. No single measurement shall exceed 2.0 s.

6.2 Voltage Drop—The average of the three voltage drop measurements (5.2.2) shall not exceed 0.5 V. No single measurement shall exceed 0.8 V.

6.3 Flash Rate and Percent Current On Time—The average flash rate and percent current on time shall fall within 60 to 120 flashes per minute and 30 to 75% on time, respectively, under all conditions of 5.2.3.

6.4 **Extreme Temperature**—At the extreme temperature conditions, start time shall not exceed 3 s and flash rate shall be 50 to 130 flashes per minute.

6.5 **Durability**—The flasher shall conform to 6.1, 6.2, and 6.3 (under test condition 5.2.3a only) at the start and conclusion of the test.

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