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## TURN SIGNAL FLASHERS

**Foreword**—This document has also changed to comply with the new SAE Technical Standards Board format. Definitions has become Section 3. All other section numbers have changed.

The development of this SAE Standard was based on the premise that it described the requirements for all turn signal flashers regardless of the electrical load. Since this document was first introduced, the predominant load for passenger car use has been two lamp bulbs, one at the front and one at the rear of the vehicle and the vehicles have used fixed load flashers. The load for trucks can vary from two to as many as ten depending on the vehicle. Trucks with trailers generally use variable load flashers. Passenger cars with trailers should use a variable load flasher. Federal Motor Vehicle Safety Standard 108 requires vehicles to be equipped to indicate the loss of one or more turn signal lamps except when a variable load flasher is required.

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

### **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.

SAE J588—Turn Signal Lamps for Use on Motor Vehicles Less Than 2032 mm in Overall Width

SAE J759—Lighting Identification Code

SAE J823—Flasher Test

### **3. Definition**

**3.1 Flasher**—The flasher is a device installed in a vehicle lighting system which has the primary function of causing the turn signal lamps to flash when the turn signal switch is actuated. Secondary functions may include the visible pilot indication for the turn signal system (required by SAE J588) an audible signal to indicate when the flasher is operating, and an indication of turn signal lamp outage.

**4. Flasher Identification Code**—Flashers conforming to this document may be identified by the code J590 in accordance with SAE J759.

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## 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 and or 25.6 V) at the bulbs unless otherwise specified.

**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 then open the circuit) after 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 load. The test shall be made in an ambient temperature of  $24\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ . 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 lowest voltage drop across the flasher shall be measured between the input and the load terminals at the flasher and during the "on" period. The voltage drop shall be measured and recorded during any three cycles after the flasher has been operating for five consecutive cycles. For fixed-load flashers, the voltage drop is measured with the specific ampere design load connected. For variable load flashers, the voltage drop shall be measured with the maximum ampere design load connected. The test shall be made in an ambient temperature of  $24\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .

**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 an 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  $24\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$
- b. 12.0 V (or 6.0 V or 24.0 V) and  $-17\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$
- c. 15.0 V (or 7.5 V or 30.0 V) and  $-17\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$
- d. 11.0 V (or 5.5 V or 22.0 V) and  $50\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$
- e. 14.0 V (or 7.0 V or 28.0 V) and  $50\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$

The flashers shall be temperature stabilized before each test. 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 load connected.

**5.2.4 EXTREME TEMPERATURE**—The flasher shall be subjected to ambient temperatures of  $63\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$  and  $-32\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$  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 paragraphs 5.2.1 and 5.2.3a.

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

- a.  $24\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  ambient temperature
- b. 14.0 V (7.0 V or 28.0 V) applied to the input terminals of the test circuit
- c. Specific ampere design load for fixed load flashers and maximum specified ampere design load for variable load flashers
- d. 100 hours of intermittent flashing (15 seconds on, 15 seconds off) followed by 50 hours of continuous flashing

## 6. Performance Requirements

- 6.1 Start Time**—The average and maximum of the three start time measurements (see 5.2.1) for the flasher shall not exceed the values shown in Table 1.

TABLE 1—START TIME, s

| Flasher Type    | Average Time | Maximum Time |
|-----------------|--------------|--------------|
| Normally closed | 1.3          | 2.0          |
| Normally open   | 1.5          | 2.0          |

- 6.2 Voltage Drop**—The average of the three voltage drop measurements (see 5.2.2) for the flasher 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 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 min.
- 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.

## 7. Notes

- 7.1 Marginal Indicia**—The change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

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