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INTERNATIONAL
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HIGHWAY VEHICLE PRACTICE

an American National Standard

SAE J590

Issued: March 1960
Revised: July 1986

Supersedes: J590e

TURN SIGNAL FLASHERS

1. SCOPE: This recommended practice defines the test conditions, procedures and minimum design requirements for nominal 6, 12 and 24 volt turn signal flashers.

2. DEFINITION: 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.

3. FLASHER IDENTIFICATION CODE: Flashers conforming to this recommended practice may be identified by the code J590 in accordance with SAE J759, Lighting Identification Code.

4. TESTS:

4.1 Test Equipment: The standard test equipment and circuitry for performing flasher tests shall conform with the specifications in SAE J823, Flasher Test Equipment.

4.2 Test Procedures: All of the following tests shall be performed at 12.8V (or 6.4V and or 25.6V) at the bulbs unless otherwise specified.

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4.2.1 Start Time: The start time of a normally closed type flasher is the time to open the circuit after the voltage is applied. 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 ± 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.

4.2.2 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 ± 5°C.

4.2.3 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. 12.8V (or 6.4V or 25.6V) and 24 ± 5°C
b. 12.0V (or 6.0V or 24.0V) and -17 ± 3°C
c. 15.0V (or 7.5V or 30.0V) and -17 ± 3°C
d. 11.0V (or 5.5V or 22.0V) and 50 ± 3°C
e. 14.0V (or 7.0V or 28.0V) and 50 ± 3°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.

4.2.4 Extreme Temperature: The flasher shall be subjected to ambient temperatures of 63 ± 3°C and -32 ± 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 paragraphs 4.2.1 and 4.2.3a.

4.2.5 Durability: The durability test shall be conducted under the following conditions:

a. 24 + 5°C ambient temperature
b. 14.0V (7.0V or 28.0V) 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

5. PERFORMANCE REQUIREMENTS:

5.1 Start Time: The average and maximum of the three start time measurements (paragraph 4.2.1) 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	

5.2 Voltage Drop: The average of the three voltage drop measurements (paragraph 4.2.2) for the flasher shall not exceed 0.5V. No single measurement shall exceed 0.8V.

5.3 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 percent on under all conditions of paragraph 4.2.3.

5.4 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.

5.5 Durability: The flasher shall conform to paragraphs 5.1, 5.2 and 5.3 (under test condition 4.2.3a only) at the start and conclusion of the test.

RATIONALE:

The present turn signal flasher standards are encompassed into two companion documents, SAE J590, Turn Signal Flashers and SAE J1055, Service Performance Requirements for Turn Signal Flashers. J590 is essentially a design standard and describes the performance parameters for the flasher. J1055 essentially describes how to assure that a particular flasher design conforms to the design specification by use of a specific number of flashers submitted to group testing. The format of J1055 has been interpreted as a quality control type document since it uses sampling plans with allowances for non-conformances to design standard. A request was made by the Lighting Committee and the Motor Vehicle Council to eliminate the sampling plan features of J1055 and to bring the flasher standard in line with SAE policy and regulations on scope and content. The revisions proposed incorporates the pertinent features and allowable elements of these two documents into one document and thus eliminates the need for J1055.

In addition new SAE guidelines for the writing of standards have been used and thus the format of the existing standards have been modified to suit these guidelines.

Also the document content is being updated to include 24 volt flashers. This was done because many commercial vehicles (buses and trucks) now on the road have 24 volt electrical systems and guidelines were needed for describing the operating characteristics for the flashers used on these vehicles.

Because of the complexity of the revisions made and the extensive reformatting required the rationale will be presented by paragraph as relates to the newly drafted document.

1. Scope - Standard is revised to Recommended Practice and reference to J1055 is deleted. Since there are major revisions to the Standard, it should be relegated to "Recommended Practice" until it has been in use for a sufficient period of time.

2. Function - was formally "Definition" - This revision is mainly to bring document into line with SAE guidelines. This paragraph now incorporates some features of J590e paragraph 5 "Pilot Indication". Also, added lamp outage indication as an allowable feature of the flasher. Lamp outage indication was part of Turn Signal Lamp Standard J588e (para. 4.5.1). This feature was deleted in revision 'f'. It is a feature required by FMVSS Std. 108 for new cars but not required on replacement flashers. It is, therefore, recommended that this be added as an allowable feature of this standard.

3. Flasher Identification Code - This is a new paragraph and was added to bring document into line with new format.

RATIONALE (Cont'd.):

4. Tests &
5. Performance Requirements - Performance Requirements were previously encompassed in paragraphs "6. Performance Requirements" & "7. Durability Test Requirements of J590". This is format change to conform to the recommended structure of SAE specifications. There were some content revisions made during the restructuring. They are:

a) Start Time - Performance specifications were 1.0 seconds for 2 lamp normally closed flasher, 1.25 seconds for 3 lamp normally closed flasher and 1.5 seconds for normally open flashers, (all avg of 3 starts). Performance specification revised to 1.3 seconds avg. of 3 readings with no reading over 2.0 seconds for all normally closed type flashers and 1.5 seconds avg. of 3 readings with no reading over 2.0 seconds or all normally open type flashers. There is no technical justification to maintain the difference of start time between 2 lamp and 3 lamp flashers, therefore, 1.25 seconds should apply to both. The rounding to 1.3 seconds is not significant in of itself. The restriction of keeping all of the readings below 2.0 seconds is to limit the variability of performance.

b) Voltage Drop - Performance specs were 0.4 volts for 2 lamp, 0.45 volts for 3 lamp and 0.50 volts for 4 lamp flashers for an average of 3 measurements. Specifications changed to 0.50 volts with no single measurement exceeding 0.8 volts. Again, there is no technical justification to maintain the differences of voltage drop between 2, 3 or 4 lamp flashers. Therefore, 0.5 volts should be the minimum performance specification. The added restriction of having no single measurement over 0.8 volts is to keep the variability of performance within useful limits.

c) Flash Rate & Percent Current on Time - Removed the restriction of shaded portion of the polygon for normally closed type units. Since the specifications are to describe the minimums of operation it is not consistent to have a dual operating range for different design flashers.

d) Extreme Temperature - Flash rate at temperature conditions outside the normal range of operating temperatures was revised from 60-120 flashes per minute (fpm) to 50-130 fpm. The intent of this specification is to have the flasher provide a recognizable signal under ambient temperatures somewhat outside the normal operating temperature range. The operating specifications and temperature conditions are consistent with those in International Standards Organization (ISO) Flasher Standards. In addition, a study performed by David Post at the Highway Research Safety Institute on flasher signals showed that signals in the 50-130 fpm range are recognizable.

RATIONALE (Cont'd.):

e) Durability - Changed from 100 hr continuous to 100 hrs of intermittent (15 seconds on - 15 seconds off) followed by 50 hrs of continuous flashing. The operating time of the unit has not changed i.e. both spec. have 100 hrs of operation of the flasher. The revised spec. more nearly exposes the unit during test to two basic types of field experience the unit might experience. In normal turns and lane changes the 15 seconds on - 15 seconds off would more nearly duplicate that performance. During stops while awaiting traffic light changes and possibly combined with heavy traffic conditions the flasher could operate continuously for several minutes or more hence continuous mode of operation would more nearly duplicate these conditions.

The Flasher Task Force has responded to the request of the Lighting Committee and the Motor Vehicle Technical Council with substantial effort applied to the drafting of the attached document J590f over the past two year period and now recommends that this draft be adopted as a Recommended Practice. In addition, as a corresponding event, the Task Force also recommends that J1055 "Service Performance Requirements for Turn Signal Flashers" be deleted as an SAE document.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

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 Equipment

APPLICATION:

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