

Blade Type Electric Fuses — SAE J1284 DEC79

SAE Standard
Approved December 1979

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Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096



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Report of the Electrical Equipment Committee, approved December 1979. Rationale statement available.

PART 1—DESIGN PARAMETERS

1. **Scope**—The fuses shown are for use in motor vehicles, boats, and trailers to protect electrical wiring and equipment. This standard is for the construction shown and is not intended to restrict the design and use of other configurations and materials capable of meeting the vehicle requirements.

2. **Definition**—A fuse is a device designed to interrupt the electrical circuit when subjected to overcurrents. This action is to be nonreversible, and the fuse is intended to be replaced after the circuit malfunction has been corrected.

3. **Materials**—The fuses shall have transparent non-conductive bodies capable of withstanding vehicle environmental conditions as set forth in this standard. Terminals shall have a suitable finish which will assure corrosion protection and satisfactory mechanical and electrical properties.

4. **Construction**—Fuse terminals shall be tightly attached to the fuse body. Fuse elements shall be clearly visible through the body. Typical overall dimensions are shown in Fig. 1.

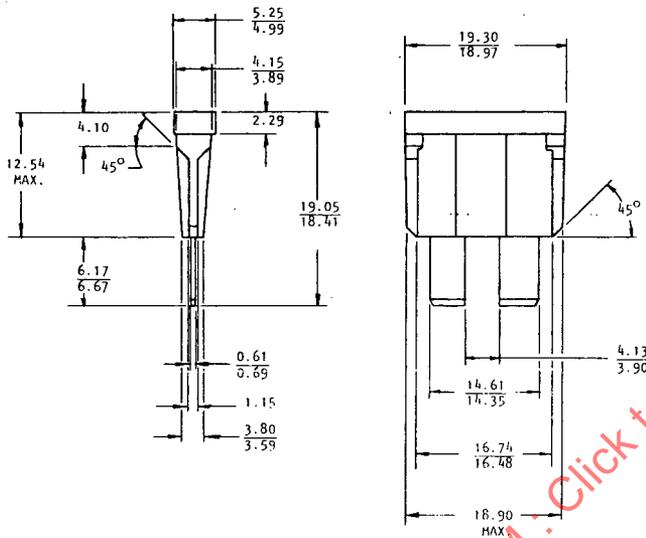


FIG. 1—FUSE DIMENSIONS

5. **Marking (Initially and After Environmental Exposure)**—Fuses shall be marked on the fuse body with the amperage, voltage rating, and the manufacturer's name or trademark. In addition, the fuse may be color coded provided that the element remains clearly visible through the non-conductive body. All color coding shall be as shown in Table 1. Marking shall be legible at the conclusion of all tests set forth in this standard.

TABLE 1—FUSE COLOR CODES

Ampere Rating	Color
3	Violet
4	Pink
5	Tan
7½	Brown
10	Red
15	Light Blue
20	Yellow
25	Natural (White)
30	Light Green

PART 2—PERFORMANCE REQUIREMENTS

1. **Ampere Rating**—This standard covers ampere ratings up to and including 30 A. Preferred ampere ratings are shown in Table 1. These rat-

ings are determined at 24°C ambient temperature using a test procedure detailed in Part 3, Section 1 of this standard.

The specific ampere capacity of the fuses is a function of the particular electrical system being utilized. To aid in determining the actual capacity change, several factors should be considered by the application engineer.

1.1 **Wire**—Fig. 2 represents the approximate capacity change due to cable sizes other than 5 mm².

1.2 **Temperature**—Fig. 3 represents the approximate capacity change with respect to ambient temperature. The use of fuses in ambient temperatures beyond the limits shown is not recommended.

1.3 **Loading**—It is recommended that fuses not be loaded above 100% of their adjusted capacity based on ambient temperatures and the use of cable sizes other than 5 mm².

In addition, it is further recommended that actual performance be verified through testing experimentally in the vehicle.

2. **Voltage Rating**—Fuses shall be capable of interrupting at any voltage up to and including 32 V.

3. **Maximum Voltage Drop**—The maximum voltage drop (in millivolts) at rated current across the fuse only shall be as shown in Fig. 4.

4. **Performance**—Tests shall be conducted within an ambient temperature range of 19–29°C.

4.1 **Ampere Rating Tests**—Fuses shall carry 110% of rated current continuously for a minimum of 100 h; shall open in not less than 0.75 s or more than 1800 s at 135% of rated current; shall open in not less than 0.15 s or more than 5 s at 200% of rated current; and shall not open in less than 0.080 s at 350% of rated current.

4.2 **Current Cycling Test**—Fuses shall meet the requirements of Part 2, paragraph 4.1 after current cycling for a minimum of 250 000 cycles.

4.3 **Transient Current Cycling**—Fuses shall meet the requirements of Part 2, paragraph 4.1 after a minimum of 50 000 cycles of transient current cycling.

5. **Vibration Test**—Fuses shall meet the requirements of Part 2, paragraph 4.1 after undergoing six (6) h of vibration conditioning.

6. **Environmental Exposure**—Fuses shall meet the requirements of Part 2, paragraph 4.1 after sequential exposure to dust and accelerated aging conditioning.

PART 3—TEST PROCEDURE

1. **Procedure**—The fuses, with the exceptions noted in the vibration and accelerated aging tests, shall be mounted horizontally. When testing two or more fuses in series, the fuses shall be mounted no less than 150 mm apart and with no less than 600 mm of interconnecting cable, except as noted for the transient current cycling test. All electrical tests shall be made using 5 mm² copper cable and a standard test module (as shown in Fig. 5) or a suitable equivalent. The interface voltage drop (V_{CD}–V_{AB}) of the fixture should not exceed 2 mV/A. The total voltage drop (V_{EF}) should not exceed 4 mV/A. The voltage checks shall be made using a solid copper dummy with dimensions as shown in Fig. 6.

2. **Voltage Drop**—The voltage drop (in millivolts) at rated current across the fuse only shall be measured at the indicated points across the fuse from terminal to terminal as shown in Fig. 4.

3. **Current Cycling Test**

3.1 Resistors should be employed as load(s) to adjust the current to 70% of the fuse rating as shown in Fig. 7.

3.2 The test system voltage can be any convenient voltage up to and including 32 V (regulation ±0.2 V).

4. **Transient Current Cycling Test**

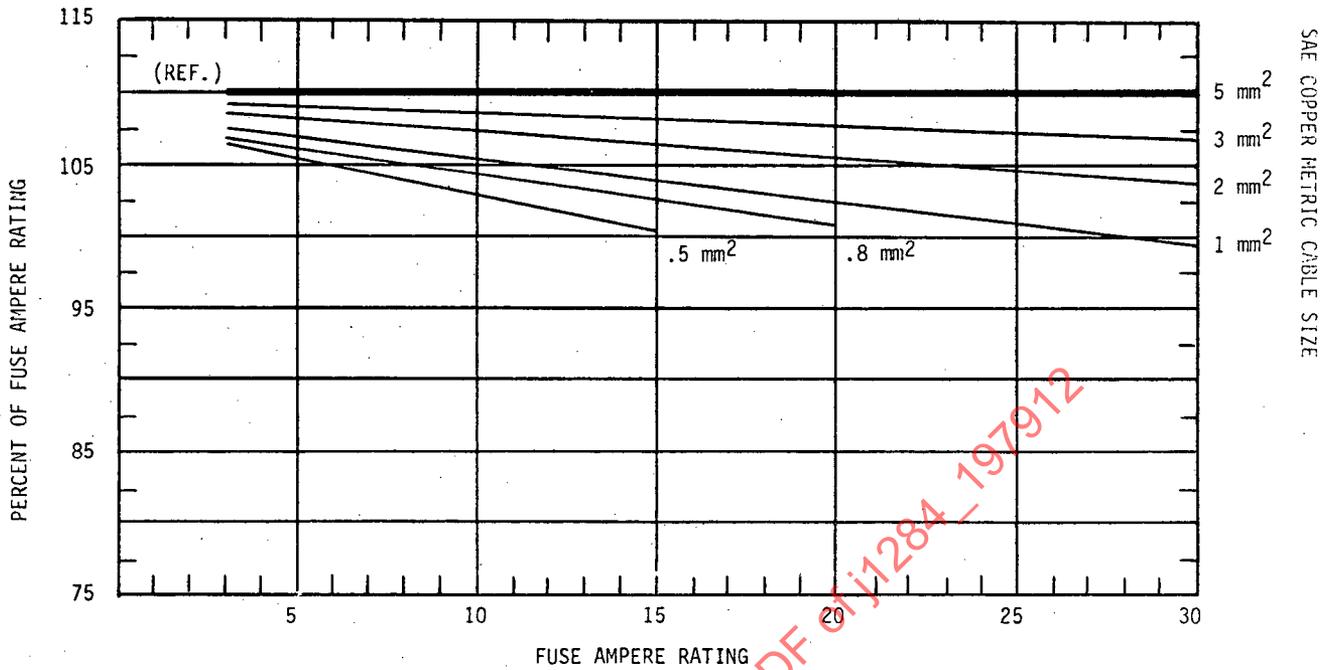
4.1 Lamps bulbs (EX. 1157, 194, and 168) should be employed as loads to adjust the initial peak transient current to the percent of fuse rating as shown in Fig. 8 and the initial steady-state current to 100% of the fuse rating. The test system voltage should be 14 ± 0.2 V.

4.2 It is acceptable if current levels decrease below initial stated values during current cycling as a result of normal lamp aging. Lamp bulbs that burn out must be replaced.

5. **Vibration Test**—Suitably mounted samples shall be subjected to a simple harmonic motion having an amplitude of 0.76 mm travel (1.52 mm total excursion). The frequency shall be varied uniformly between the limits of 10–55 Hz. The entire range of 10–55 Hz and returning back to 10 Hz shall be traversed in approximately 1 min. The motion shall be applied for a period of 2 h in each of three mutually perpendicular directions (total of 6 h). (Testing to be performed without current passing through fuse.)

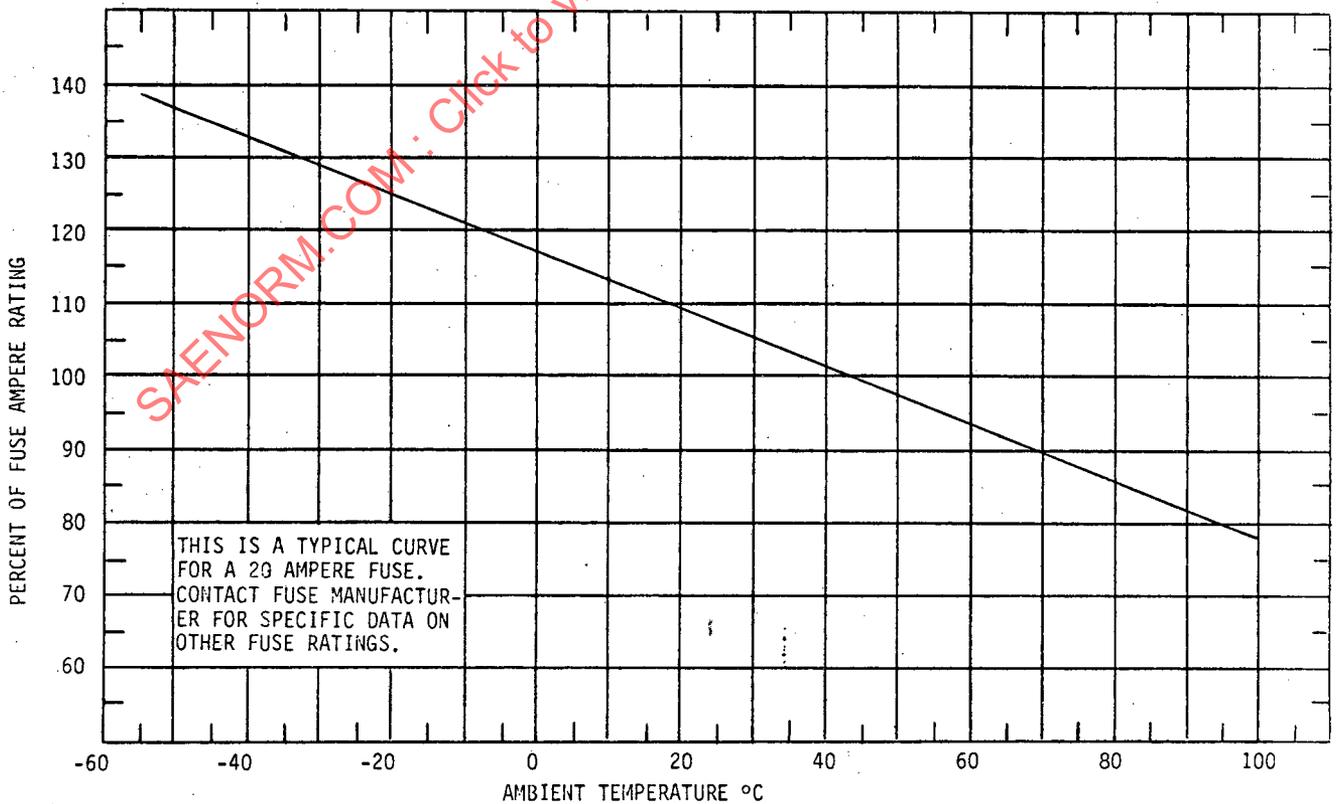
6. **Environmental Exposure**

6.1 **Dust**—Fuses shall be placed in a dust chamber, Fig. 9, unmounted and lying on their side. The chamber shall contain about 1 kg of coarse



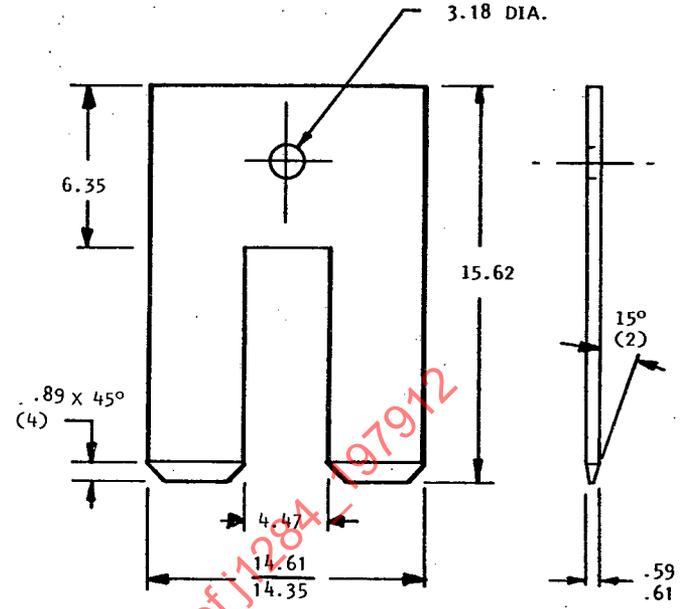
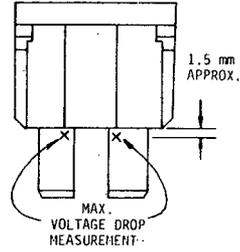
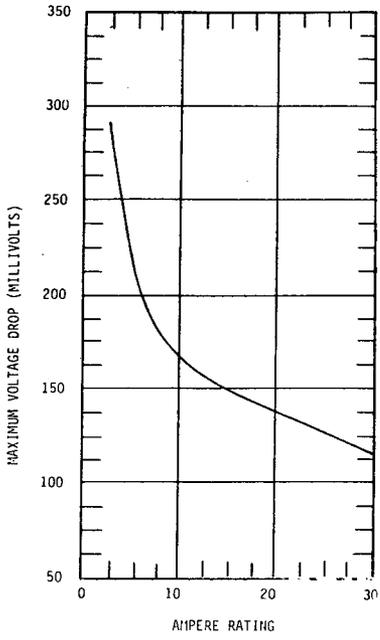
NOTE: THIS CURVE BASED ON 110 PER CENT OF RATED CURRENT USING 5 mm² COPPER CABLE AT 24°C, TEST IN STANDARD TEST MODULE

FIG. 2—CHANGE IN FUSE CURRENT CARRYING CAPACITY FOR VARIOUS CABLE SIZES AT 24°C



NOTE: THIS CURVE BASED ON 110 PER CENT OF RATED CURRENT USING 5 mm² COPPER CABLE, TESTED IN STANDARD TEST MODULE

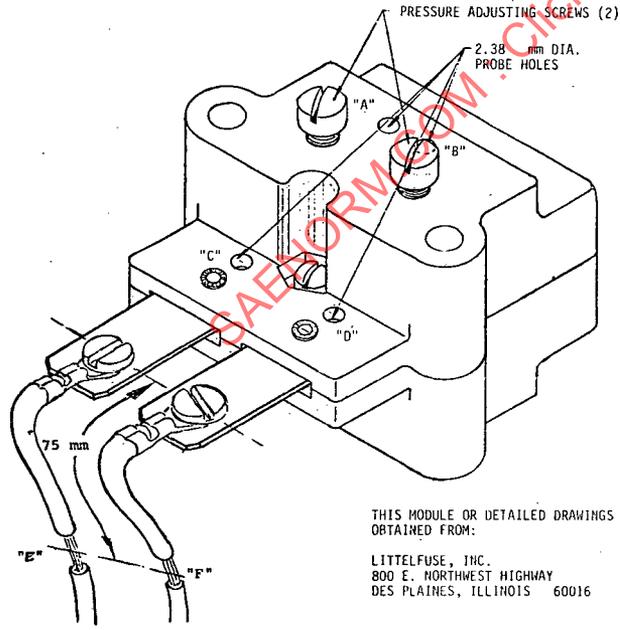
FIG. 3—CHANGE IN FUSE CURRENT CARRYING CAPACITY WITH CHANGES IN AMBIENT TEMPERATURE



NOTE: ALL DIMENSIONS ARE IN MILLIMETERS
COPPER ALLOY #CA110

FIG. 4—MAXIMUM VOLTAGE DROP OF FUSE AT RATED CURRENT

FIG. 6—DUMMY SLUG



THIS MODULE OR DETAILED DRAWINGS CAN BE OBTAINED FROM:
LITTELFUSE, INC.
800 E. NORTHWEST HIGHWAY
DES PLAINES, ILLINOIS 60016

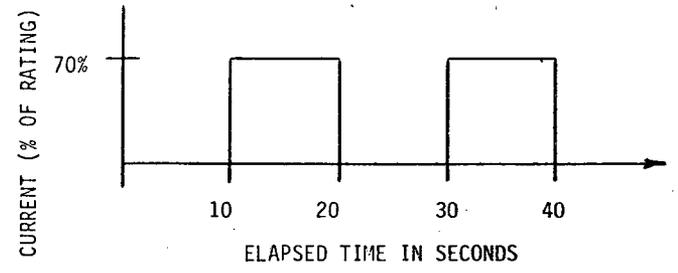


FIG. 7—CURRENT CYCLING WAVEFORM

FIG. 5—STANDARD TEST MODULE