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LOW TENSION WIRING AND CABLE TERMINALS AND SPLICE CLIPS

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. **Scope**—The SAE Recommended Practice covers the application requirements for terminals and splice clips attached to stranded low tension wiring and cable as shown in J878 and J558. In addition, it covers maximum voltage drop limits for friction type connections.

2. References

2.1 Related Publications

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

SAE J558—Low Tension Cable

SAE J878—Low Tension Cable Thermosetting Insulation

3. **Use Of Terminals**—Friction (quick disconnect) type brass connections should be used only where the maximum temperature (environmental ambient plus rise due to current), measured at the center of the terminal surface, does not exceed the capabilities of the physical properties of the material. Maximum temperatures for terminal materials other than brass should also be determined prior to using so as to be compatible with the physical properties of these materials.

Electrical connections and splices of standard types must be protected, as application dictates, from moisture, salt, soil accumulation, acid, or corrosive vapor which will deteriorate the connection beyond the limits of this recommended practice.

4. **Performance Requirements (Electrical)**—Terminals or splice clips shall be attached to wire or cable in such a manner that, following the humidity test, the voltage drop across the attachment shall not exceed the values in Table 1. Friction connections (terminal to terminal) shall be such that following four repeated insertions and the humidity test, the voltage drop across the connection shall not exceed the values in Table 2. For a terminal to be acceptable, all specimens tested must meet the requirements.

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TABLE 1—WIRE TO TERMINAL OR WIRE TO WIRE (SPLICE CLIP METHOD) VOLTAGE DROP (AFTER HUMIDITY TEST)

Wire/Cable (SAE Gage)	Test Current, A	Drop, mV	
		Uninsulated Terminal	Preinsulated Terminal
20	5	3	3.5
18	10	5	5.5
16	15	8	9
14	20	10	11
12	30	15	17
10	40	20	22
8	50	25	--
6	60	15	--
4	70	18	--
2	80	20	--
0	90	23	--
00	100	25	--

TABLE 2—FRICTION VOLTAGE DROP (AFTER HUMIDITY TEST AND FOUR INSERTIONS)

Wire/Cable (SAE Gage)	Test Current, A	Drop, mV
20	5	7.5
18	10	15
16	15	22.5
14	20	30
12	30	45
10	40	60
8	50	75

5. **Test Procedure**—Tests shall be conducted at 73 ± 5 °F (23 ± 3 °C). Test samples shall consist of terminals or splice clips attached to 12 in (305 mm) of wire. It is suggested that at least 10 specimens of each wire size be subjected to each test.
6. **Voltage Drop Test**—Measurements shall be made after the temperature of the specimen has stabilized (2 h under test load).

Measurements across a wire to terminal attachment shall be made between the center of the conductor grip and a point on the cable core 3 in (76.2 mm) behind the conductor grip. Probe point on the cable core shall be stripped and solder dapped. For preinsulated terminals, the measurements shall be made between a point in front of the conductor grip within 1/16 in (1.6 mm) of the end of the insulation and a point on the cable core 3 in (76.2 mm) behind the conductor grip. The voltage drop across the attachment is defined as the difference between this reading and the voltage drop through the 3 in (76.2 mm) of wire.

Measurements across a splice clip connection shall be made between points on cable cores 3 in (76.2 mm) behind the center of the conductor grip crimp. Probe points on the cable core shall be stripped and solder dapped. The voltage drop across the splice is defined as the difference between this reading and the voltage drop through the 6 in (152 mm) of wire. Measurements shall be made across each combination of conductor pairs in the splice. The current value shall be selected according to the smaller gage cable in the cable pair being measured.

Measurements across a friction connection shall be made between the centers of the conductor grips of two joined line connector type terminals and from the center of the conductor grip of a line terminal to a similar point on a joined fixed terminal.

For preinsulated terminals, the voltage drop across the wire to terminal attachment plus the 3 in (76.2 mm) of cable shall be determined first per the above procedure. Then the terminals shall be connected and measurements across the connection shall be made from the stripped solder dapped points on the cable cores of two joined line connector type terminals and from the same point on the cable core to a point on a joined fixed terminal equivalent to that used for uninsulated terminals. The voltage drop across the friction connection is defined as the difference between this reading and the previous measurement(s) for the same specimen(s) (wire drop plus attachment drop).

7. **Humidity Test**—The humidity test shall consist of 100 h at 95 to 100% relative humidity at 100 ± 5 °F (38 ± 3 °C). (Demineralized water shall be used.) Specimens shall be prepared as follows:

1. Mounted at least 1 in (25.4 mm) apart on test boards.
2. Placed in the humidity cabinet with the axis of each specimen in a horizontal plane and such that it has all surfaces of the terminal completely exposed and not in contact with other objects.
3. Removed from the cabinet after the prescribed exposure period and allowed to dry 24 h at room condition before final MVD test.

PREPARED BY THE SAE ELECTRICAL EQUIPMENT COMMITTEE