

1. **Scope**—The purpose of this SAE Recommended Practice is to establish minimum performance and user information requirements for battery booster cable sets used with 6 OR 12-VOLT BATTERIES. Such sets may be used to provide a temporary connection of a surface vehicle battery to another similar battery to provide emergency power when required. This document DOES NOT ENDORSE NOR RECOMMEND the potentially hazardous procedure of jump-starting a vehicle.

2. References

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

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

SAE J1127—Battery Cable

SAE J1128—Low Tension Primary Cable

SAE J1654—High Voltage Primary Cable

SAE J1678—Ultra Thin Wall Primary Cable

SAE J2183—60 V and 600 V Single Core Cables—Test Methods, Dimensions and Requirements

2.2 **Related Publications**—The following publications are provided for information purposes only and are not a required part of this specification.

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

SAE J156—Fusible Links

SAE J1067—Seven Conductor Jacketed Cable for Truck Trailer Connections

SAE J1292—Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring

SAE J1673—High Voltage Automotive Wiring

SAEJ2501—Round, Unscreened, 60 V and 600 V Multicore Sheathed Cables—Basic and High Performance Test Methods and Requirements

SAE Dictionary of Materials and Testing

2.2.2 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 1—Standard Specification for Hard-Drawn Copper Wire

ASTM B 3—Standard Specification for Soft or Annealed Copper Wire

ASTM B 8—Concentric-Lay-Stranded Copper conductors, Hard, Medium-Hard, or Soft

ASTM B 174—Standard Specification for Bunch-Stranded Copper Conductors for Electrical Conductors

ASTM B 787—19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation

ASTM D 573—Specification for Nickel-Molybdenum-Chromium-Iron Alloy (UNS N 10003) Rod

3. **Definitions**—The battery booster cable sets covered by this specification shall have a minimum rating as shown as follows, when tested in accordance with 4.3.

- a. Light Duty - 125 A minimum
- b. Medium Duty - 225 A minimum
- c. Heavy-Duty - 350 A minimum
- d. Extra Heavy-Duty - 500 A minimum
- e. Super Heavy-Duty - 750 A minimum

4. **Technical Requirements**

4.1 **Cable**

- a. **General**—The cable shall meet the following requirements of SAE J1127, J1128, J1654, J1678, or J2183 for the applicable cable type:
 1. Conductor
 2. Dimensions
 3. Dielectric or Withstand Voltage
 4. Cold Bend or Winding Test at Low Temperature
 5. Flame Resistance or Resistance to Flame Propagation
- b. **Temperature Class Rating**—The cable shall meet the Mechanical Properties requirements for SGT cable in SAE J1127 except that the test temperature shall be $90\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

4.2 **Connectors**

- a. **Connector Devices**—All connector devices shall provide a sound mechanical and good electrical connection to the point of attachment such as a battery terminal, stud, or metallic ground. The connector devices shall be free from burrs and sharp corners. The temper of the connectors shall be sufficiently soft to permit the connectors being assembled to the cable from showing any fracture or cracks that would impair the strength of the assembly. All connector devices shall be insulated to protect the user against cuts, burns, and scratches.
- b. **Connector Attachment**—The connectors may be attached to the cables by crimping, swaging or a combination of both. Each end of a cable connected to a connector device must be able to withstand a tensile force of 445 N (100 lb) applied in an axial direction without affecting the cable/connector device interface or the integrity of the current carrying connection.
- c. **Connector Identification**—The color black and any contrasting color, except white, connectors must be used at the battery contact point. If “+”, “POS”, and/or “POSITIVE” is marked on a connector, it must appear on the contrasting color clamp. If “-”, “NEG”, and/or “NEGATIVE” is marked on a connector, it must appear on the black clamp.

4.3 Current Rating—The following procedure should be performed at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ ($73^{\circ}\text{F} \pm 9\text{ }^{\circ}\text{F}$) in order to determine the battery booster cable set rating as shown in Section 3.

a. Recommended Equipment

1. Source of constant DC current with sufficient capacity to allow a 2.5 V minimum drop on each cable with a current measuring capability of $\pm 1\%$ accuracy.
2. Stainless steel electrodes per Figure 1 attached to current source electrodes.
3. Voltmeter (accurate to 0.01 V).
4. Timing device.
5. Thermocouple (iron/constantan type).
6. Chart recorder with $121\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ ($250\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$) maximum reading accurate to 0.25% full scale.

b. Test Procedure

1. Attach one of the cables of the battery booster cable set to the current source by clamping to the stainless steel electrode area A (see Figure 1) in the manner the clamps would normally be used.
2. Attach the thermocouple to the battery booster cable clamp handle by taping tightly to the outer surface at a mid-point between the pivot and the rear of the current carrying clamp. If nonpermanent attached grips are used, slide the grip off the handle and apply thermocouple directly to the handle.

NOTE— (Thermocouple is attached in an area normally gripped by the user). Attach the other end of the thermocouple lead to the chart recorder.

3. Select a test current and apply to the cable.
4. After 10 s, measure and record the voltage drop from one stainless steel electrode to the other.
5. After 15 s, turn off the current.
6. Monitor the temperature of the handle for an additional 2 min and record the maximum temperature. The maximum temperature permitted is $66\text{ }^{\circ}\text{C}$ ($150\text{ }^{\circ}\text{F}$).

NOTE— Some clamps will be at a maximum temperature immediately after the current is turned off, others will continue to rise for various periods.

7. Repeat steps 1 through 6 with the other cable of the battery booster cable set.
8. Repeat steps 1 through 7 with successive greater test currents until the test current produces a combined total voltage drop of 5.0 V for both cables in the battery booster cable set. The cables should be allowed to cool for approximately 15 min before retesting.
9. Repeat steps 1 through 8 with the battery booster cable clamp attached to area B (see Figure 1) of the stainless steel electrode.
10. Using the test data from area A and B, determine the largest of the test currents that does not cause a combined total voltage drop of more than 5.0 V or a temperature of more than $66\text{ }^{\circ}\text{C}$ ($150\text{ }^{\circ}\text{F}$) on the handle. The rating of the cable set shall be the lowest amperage rating of the results of tests performed using Clamping Area A and Clamping Area B.