SURFACE VEHICLE STANDARD

J2174™ MAR2026

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Superseding J2174 FEB2020

Heavy-Duty Wiring Systems for Trailers 2032 mm or More in Width

RATIONALE

Revision is to confirm that this document is only for 12 VDC nominal applications in light of future discussions and documents where multi-voltage systems are considered.

SAE J2174 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Standard establishes the minimum performance requirements for electrical distribution systems for use in dollies and trailers in single or multiple configurations for 12 VDC nominal applications.

2. REFERENCES

2.1 Applicable Documents

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 International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J163	Low Tension Wiring and Cable Terminals and Splice Clips
SAE J447	Prevention of Corrosion of Motor Vehicle Body and Chassis Components
SAE J560	Primary and Auxiliary Seven Conductor Electrical Connector for Truck-Trailer Jumper Cable
SAE J1128	Low Voltage Primary Cable
SAE J1455	Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications
SAE J2139	Tests for Signal and Marking Devices Used on Vehicles 2032 mm or More in Overall Width
SAE J2202	Heavy-Duty Wiring Systems for On-Highway Trucks

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SAE J2394 Seven Conductor Cable for ABS Power - Truck and Bus

SAE J2549 Single Conductor Cable for Heavy-Duty Applications - Truck and Bus

SAE J2577 Heavy Duty Lamp Electrical Connector Standard

2.1.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org

ASTM B117 Standard Method of Salt Spray (Fog) Testing

ASTM D471 Standard Test Method for Rubber Property-Effect of Liquids

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J575 Test Methods and Equipment for Lighting Devices and Components for Use on Vehicles Less than 2032 mm in Overall Width

SAE J2247 Truck Tractor Power Output for Trailer ABS

2.2.2 TMC Publications

Available from the Technology and Maintenance Council, American Trucking Associations, 950 North Glebe Road, Suite 210, Arlington, VA 22203-4181, Tel: (703) 838-1763, www.truckline.com.

TMC RP 166 Low Voltage Primary Electrical Cable Specification for Heavy Duty Electrical Repair

TMC RP 114 Wiring Harness Protection

TMC RP 137 Antilock Electrical Supply from Tractors through the SAE J560 Seven Pin Connector

TMC RP 141 Trailer ABS Power Supply Requirements

TMC RP 153 Lamp to Connector Interface

2.2.3 TTMA Publications

Available from Truck Trailer Manufacturers Association, 1020 Princess Street, Alexandria, VA 22314-2247, Tel: 703-549-3010, www.ttmanet.org.

TTMA RP97-97 Trailer Antilock Braking System Wiring

TTMA RP111 Electrical System Maintenance and Repair for Trailers Without Sealed Wiring Harness Systems

TTMA RP119 Electrical Interface for Truck-Trailer Interconnection

Design and Installation of Lighting Systems for Trailers

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2.2.4 Military Specifications

Available from IHS Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704, Tel: 877-413-5184, www.global.ihs.com.

MIL-STD-1344A Test Methods for Electrical Connectors

3. DEFINITIONS

3.1 CONNECTOR

A coupling device which provides an electrical and mechanical junction between two multiconductor cables, or between a cable and an electrical component.

3.2 TERMINAL

A device attached to a wire or cable to provide the electrical interface between two cables or a cable and an electrical component.

3.3 DOLLY

A chassis equipped with one or more axles, a fifth wheel and/or equivalent mechanism, and drawbar, the attachment of which converts a semitrailer to a full trailer.

3.4 ELECTRICAL DISTRIBUTION SYSTEM

The electrical wiring system includes all cables and wiring, connectors and terminations, coverings, seals, any other incorporated items to maintain the integrity and performance of the electrical system, and the connector to any mating device with the exception of the SAE J560 connector where only the electrical performance requirements apply. The electrical wiring system does not include the functional devices to which the wiring system is attached such as lamps, ABS electronic control modules, or sensors.

3.5 SEALED

A condition which provides a nonleaking union between two mechanical components or any place within an electrical distribution system. A sealed union is defined as one which does not allow the ingress of moisture.

4. TESTS

4.1 Test Procedures

Conformance to the requirements of this document shall be determined by subjecting each device to each test procedure listed in this document. Unless otherwise stated, the tests are to be performed at 25 °C ± 5 °C and at 12.5 VDC ± 0.1 VDC or per the manufacturers recommendations. Sample sizes shall be statistically valid. The tests shall be conducted in the sequence as follows:

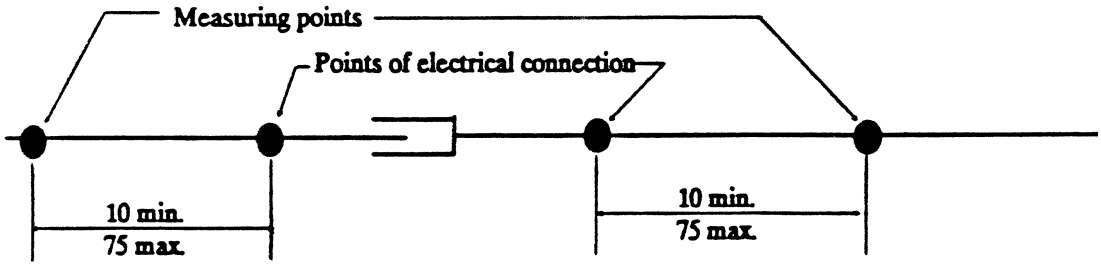
4.1.1 Voltage Drop
4.1.10 Insulation Resistance - Multiconductor Assemblies
4.1.2 Connector Durability
4.1.3 Salt Fog
4.1.4 Thermal Cycle
4.1.5 Thermal Shock
4.1.6 Oil Absorption
4.1.7 Salt Water Immersion
4.1.8 Steam Clean and Pressure Wash
4.1.9 Vibration
4.1.11 Tensile Strength - Wire to Terminal
4.1.12 Tensile Strength - Wire to Wire

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4.1.13 Connector Pull Force
4.1.14 Connector Misengagement Force
4.1.15 Connector Terminal Retention Force
4.1.1 Voltage Drop
4.1.10 Insulation Resistance - Multiconductor Assemblies

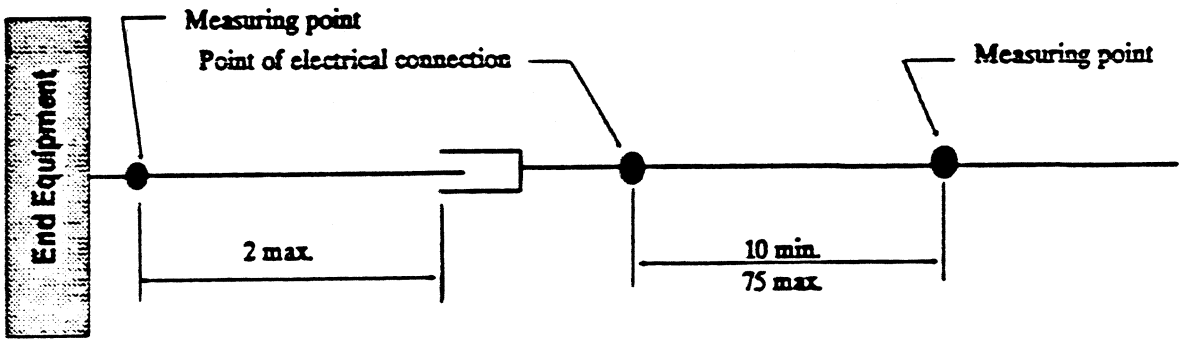
4.1.1 Voltage Drop

The measurement of connection voltage drop shall be per SAE J163 and Figures 1 and 2. The voltage drop of the cables shall be subtracted from the measured values. Except for connectors specified by SAE J560, the voltage drop shall be measured at the current specified in Table 1 of this document.



NOTE—All dimensions are in millimeters.

Figure 1 - Cable-to-cable assembly



NOTE—All dimensions are in millimeters.

Figure 2 - Cable-to-component assembly

4.1.2 Connector Durability

a. An assembled connector with terminals shall be mated and unmated 25 times.

b. Using the procedure described in 4.1.1, measure the millivolt drop of the mated terminal pair.

4.1.3 Salt Fog

Testing shall be performed per ASTM B117-73 test method for 240 hours. During the test, each circuit shall be operating at the test currents specified in Table 1. The SAE J560 connector plug-to-receptacle interface may be tested to the SAE J560 requirements.

4.1.4 Thermal Cycle

Connector and cable assemblies shall be connected to their mating parts. The assemblies shall be exposed to 25 cycles of the thermal cycle profile shown in Figure 3. The assemblies shall be energized with test voltage commencing at point “A” of Figure 3 and de-energized at point “B” of each cycle. The current shall be limited to 1.0 A.

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