
 <b>SURFACE VEHICLE STANDARD</b>	 <b>J2030 JUN2009</b>
	Issued 1994-11 Revised 2009-06
	Superseding J2030 MAY2007
<b>Heavy-Duty Electrical Connector Performance Standard</b>	

## RATIONALE

With the increasing use of urea for emissions, aqueous urea solution is added to the Fluid Immersion test.

## FOREWORD

**NOTICE:** Some test procedures are potentially dangerous. SAE Technical Reports do not purport to address all of the safety problems, if any, associated with their use. It is the responsibility of the user of an SAE Technical Report to establish and employ appropriate safety practices. Tests should only be conducted by individuals who have been properly trained in the test procedure and who are aware of any hazards which may be present. Appropriate safety and health precautions must be employed when conducting any test.

### 1. SCOPE

This SAE Standard encompasses connectors between two cables or between a cable and an electrical component and focuses on the connectors external to the electrical component. This document provides environmental test requirements and acceptance criteria for the application of connectors for direct current electrical systems of 50 V or less in the majority of heavy-duty applications typically used in off-highway machinery. Severe applications may require higher test levels, or field-testing on the intended application.

### 2. REFERENCES

#### 2.1 Applicable Publications

The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision 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 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

- |           |  |
|-----------|--|
| SAE J163  | Low Tension Wiring and Cable Terminals and Splice Clips  |
| SAE J726  | Air Cleaner Test Code  |
| SAE J1455 | Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications |
| SAE J1614 | Wiring Distribution Systems for Construction, Agricultural, and Off-Road Work Machines                 |

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2009 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

**TO PLACE A DOCUMENT ORDER:** Tel: 877-606-7323 (inside USA and Canada)  
 Tel: 724-776-4970 (outside USA)  
 Fax: 724-776-0790  
 Email: [CustomerService@sae.org](mailto:CustomerService@sae.org)  
<http://www.sae.org>

### 2.1.2 ASABE Publication

Available from the American Society of Agricultural and Biological Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659, Tel: 269-429-0030, [www.asabe.org](http://www.asabe.org).

ASAE455 Environmental Considerations in Development of Mobile Agricultural Electrical/Electronic Components

### 2.1.3 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](http://www.astm.org).

ASTM D 471 Standard Test Method for Rubber Property—Effect of Liquids

ASTM G 153 Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

ASTM G 154 Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

### 2.1.4 MIL Specification

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <http://assist.daps.dla.mil/quicksearch/>.

MIL-STD-1344A Method 3002.1 Low-Signal Level Contact Resistance

## 2.2 Related Publications

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

### 2.2.1 API Publication

Available from American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005-4070, Tel: 202-682-8000, [www.api-ec.api.org](http://www.api-ec.api.org).

API 1560 Lubricant Service Designation for Automotive Manual Transmissions and Axles

### 2.2.2 ISO Publication

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, [www.ansi.org](http://www.ansi.org).

ISO 8092 Road vehicles—Connections for on-board electrical harnesses

## 3. DEFINITIONS

### 3.1 Connector

A coupling device, which provides an electrical and/or mechanical junction between two cables or between a cable(s) and an electrical component. It can also provide for mechanical stability and geometric arrangement.

### 3.2 Terminal

An electrically conductive device attached to a cable to facilitate connection to an electrical component, cable, or termination.

### 3.3 Sealed

A system that creates a nonleaking union between mechanical elements when submerged in a water solution as defined in the tests within this document.

### 3.4 Signal Level Circuit

A circuit in which open circuit voltage is typically less than 5 V and current is typically less than 0.05 A. Circuits of this energy level typically are not able to break through oxides, sulfides, or other contaminants, which may build up on the contact surfaces and prevent continuity.

### 3.5 Power Circuit

A system using two or more cables where current flows from the source to one or more electronic/electrical devices and back again to the source. The electrical energy is supplied at high levels of current and typical system voltage (system battery voltage).

### 3.6 Cable

Insulated stranded electrical conductor used to establish a single current path.

### 3.7 Wiring

Collectively, the cables, harnesses, connectors, terminations, and supporting components used in the electrical wiring distribution system.

## 4. SAMPLE PREPARATION

Samples shall be made on the connector manufacturer's recommended tooling and checked for conformance to the connector manufacturer's standards.

### 4.1 Assembly

All connector cavities shall be wired with manufacturer's minimum approved cable outside diameter size except for test groups 'A' and 'D' which will be wired with manufacturer's maximum approved conductor size in lengths sufficient to accommodate testing. Cable diameter shall be checked and be within the connector's manufacturing specification. Crimp characteristics (i.e., height, width, etc.) shall be checked. To prevent capillary action on sealed connectors, all loose wire ends and test points (i.e., millivolt test connection) shall be sealed with alcohol-base RTV silicone or equivalent.

## 5. TEST SEQUENCE

For qualification testing, test samples shall be subjected to the tests in the order shown in Table 1 with a quantity of 6 for each group. The tests are to be carried out in the numerical sequence as described in each group's column. It is permissible to use separate sample sets for Low Voltage Resistance and Insulation Resistance when both are required in the same test sequence. For those sequences requiring both Low Voltage Resistance and Insulation Resistance, two groups of 6 may be tested, one group going through the test sequence including Insulation Resistance without Low Voltage Resistance, and the second group going through the test sequence including Low Voltage Resistance without Insulation Resistance.

Group 'A' emphasizes mechanical, fluid, and thermal performance for sealed signal connectors

Group 'B' emphasizes mechanical and thermal performance for signal connectors

Group 'C' emphasizes thermal performance for all connectors

Group 'D' emphasizes mechanical performance for all connectors

Group 'E' emphasizes mechanical, fluid, and thermal performance for sealed power connectors

Group 'F' emphasizes mechanical and thermal performance for power connectors