

	SURFACE VEHICLE RECOMMENDED PRACTICE	J1455	REV. JUN2006
		Issued 1988-01 Revised 2006-06 Superseding J1455 AUG1994	
(R) Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications			

RATIONALE

The last review of this document was August, 1994. The task force was reformed and the entire document was reviewed for current practices. Minor changes were made for previous typos. The new areas identified that need to be addressed with further research are new corrosion tests due to the new chemicals that are being used on the roadways and a second test alternative to be added for a higher pressure spray. When the work is completed it will be incorporated into the document via the proper procedures.

1. SCOPE

The scope of this recommended practice encompasses the range of environments which influence the performance and reliability of the electronic equipment designed for heavy duty on and off road vehicles, as well as any appropriate stationary applications which also use these vehicle derived components. A few examples of such vehicles are on and off highway trucks, trailers, buses, construction equipment and agricultural equipment including implements.

1.1 Purpose

This document is intended to aid the designer of commercial vehicle electronic systems and components by providing guidelines that may be used to develop environmental design goals. Specific test requirements are to be agreed upon by the customer and supplier.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of the publications shall apply.

2.1.1 SAE Publications

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

SAE J400 Test for Chip Resistance of Surface Coatings

SAE J726 Air Cleaner Test Code

SAE J1113 Electromagnetic Susceptibility Procedures for Vehicle Components (Except Aircraft)

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SAE J1211 Recommended Environmental Practices for Electronic Equipment Design

SAE J1812 Function Performance Status Classification for EMC Susceptibility Testing of Automotive Electronic and Electrical Devices

2.2 ASTM Publications

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

ASTM C 150 Specification for Portland Cement

ASTM B 117 Standard Method of Salt Spray (Fog) Testing

ASTM D 5276 Method for Drop Test for Loaded Boxes

ASTM D 880 Method for Incline Impact Test for Shipping Containers

2.3 Military Publications

Available from U.S. Government, DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-2179, <http://assist.daps.mil> or <http://stinet.dtic.mil>.

MIL-STD-810F Environmental Test Methods and Engineering Guidelines MIL-STD-202G—Test Methods for Electronic and Electrical Component Parts

2.4 Related Publications

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

TAPPI T801 Impact Resistance of Fiberboard Shipping Container

TAPPI T802 Drop Test for Fiberboard Shipping Containers

3. APPLICATION

3.1 Environmental Data and Test Method Validity

The information included in the following sections is based upon test results achieved by major North American truck manufacturers and component equipment suppliers. Operating extremes were measured at test installations normally used by manufacturers to simulate environmental extremes for vehicles and original equipment components. They are offered as a design starting point. Generally, they cannot be used directly as a set of operating specifications because some environmental conditions may change significantly with relatively minor physical location changes. This is particularly true of vibration, engine compartment temperature, and electromagnetic compatibility. Actual measurements should be made as early as practicable to verify these preliminary design baselines.

The proposed test methods are currently being used for laboratory simulation or are considered to be a realistic approach to environmental design validation. They are not intended to replace actual operational tests under adverse conditions. The recommended methods describe standard cycles for each type of test. The designer must specify the number of cycles over which the vehicle electronic components should be tested, as well as the specific pass and fail criterion for the conducted tests prior to testing. The number of cycles will vary depending upon equipment, location, and function. While the standard test cycle is representative of an actual short term environmental cycle, no attempt is made to equate this cycle to an acceleration factor for reliability or durability. These considerations are beyond the scope of this document.

3.2 Organization of Test Methods and Environmental Extremes Information

3.2.1 Data presented in this document are contained in Sections 4 and 5. Section 4, Environmental Factors and Test Methods, describes the thirteen characteristics of the expected environment that have an impact on the performance and reliability of truck and bus electronic systems. These descriptions are titled:

- a. Temperature
- b. Humidity
- c. Salt Spray Atmosphere
- d. Immersion and Splash (Water, Chemicals, and Oils)
- e. Steam Cleaning and Pressure Washing
- f. Fungus
- g. Dust, Sand, and Gravel Bombardment
- h. Altitude
- i. Mechanical Vibration
- j. Mechanical Shock
- k. General Heavy-Duty Truck Electrical Environment
- l. Steady State Electrical Characteristics
- m. Transient, Noise, and Electrostatic Characteristics
- n. Electromagnetic Compatibility/Electromagnetic Interference

They are organized to cover three facets of each factor:

1. Definition of the factor
2. Description of its effect on control, performance, and long-term reliability
3. A review of proposed test methods for simulating environmental stress

3.2.2 In Section 5

- a. Underhood
 1. Engine (Lower Portion)
 2. Engine (Upper Portion)
 3. Bulkhead
- b. Interior (cab)
 1. Floor
 2. Instrument Panel