

	SURFACE VEHICLE RECOMMENDED PRACTICE	SAE J2282 FEB2011
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Distributed Lighting Systems (DLS)		

RATIONALE

The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

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1. Scope—This SAE Recommended Practice applies to motor vehicle Distributed Lighting Systems (DLS) which use light generated by remote sources. It provides test methods, requirements, and guidelines applicable to these systems. This document is intended to be a guide to standard practice and is subject to change dependent upon additional experience and technical advances. This document covers Headlamp, Fog lamp, Auxiliary lamp, plus Signal and Marking lamp functions.

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

SAE J578—Color Specification

SAE J583—Front Fog Lamps

SAE J759—Lighting Identification Code

SAE J1113-1—Electromagnetic Compatibility Measurement Procedures for Vehicle Components (Except Aircraft) (60Hz to 18GHz)

SAE J1113-2—Electromagnetic Compatibility Measurement Procedures and Limits for Vehicle Components (Except Aircraft)—Conducted Immunity, 30 Hz to 250 kHz—All Leads

SAE J1113-3—Conducted Immunity, 250 kHz to 5000 MHz, Direct Injection of Radio Frequency (RF) Power

SAE J1113-4—Immunity to Radiated Electromagnetic Fields—Bulk Current Injection (BCI) Method

SAE J1113-11—Immunity to Conducted Transients on Power Leads

SAE J1113-13—Electromagnetic Susceptibility Measurement Procedures for Vehicle Components—Part 13: Electrostatic Discharge
SAE J1113-21—Road Vehicles—Electrical Disturbances By Narrowband Radiated Electromagnetic Energy—Component Test Methods—Part 21: Absorber Lined Chamber
SAE J1113-22—Electromagnetic Compatibility Measurement Procedure for Vehicle Components—Part 22: Immunity to Radiated Magnetic Fields From Power Lines
SAE J1113-23—Electromagnetic Compatibility Measurement Procedure for Vehicle Components—Part 23: Immunity to Radiated Electromagnetic Fields, 10 kHz to 200 MHz, Stripline Method
SAE J1113-24—Electromagnetic Compatibility Measurement Procedure for Vehicle Components—Part 24: Immunity to Radiated Electromagnetic Fields, 10 kHz to 200 MHz, TEM Cell Method
SAE J1113-25—Electromagnetic Compatibility Measurement Procedure for Vehicle Components—Part 25: Immunity to Radiated Electromagnetic Fields, 10 kHz to 200 MHz—Tri-Plate Method
SAE J1113-27—Electromagnetic Compatibility Measurements Procedure for Vehicle Components—Part 27: Immunity to Radiated Electromagnetic Fields
SAE J1113-41—Limits and Methods of Measurement of Radio Disturbance Characteristics of Components and Modules for the Protection of Receivers used On Board Vehicles
SAE J1113-42—Electromagnetic Compatibility—Component Test Procedure—Part 42: Conducted Transient Emissions
SAE J1211—Recommended Environmental Practices for Electronic Equipment Design
SAE J1383—Performance Requirements for Motor Vehicle Headlamps
SAE J1889—L.E.D. Lighting Devices
SAE J2009—Discharge Forward Lighting System
SAE J2139—Test for Lighting Devices and Components used on Vehicles 2032 mm or More in Overall Width
SAE J2320—Discharge Signal Lighting System
SAE J2357—Application Guidelines for Electronically Driven and/or Controlled Exterior Automotive Lighting Equipment

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 ANSI PUBLICATION—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ANSI C78.376-1996—Specifications for the Chromaticity of Fluorescent Lamps

2.2.2 CIE PUBLICATION—Available from Commission Internationale de L'eclairage, 52 Bd Malesherbes, F-75008 Paris, France.

CIE Publication 13.2—Method of Measuring and Specifying Color Rendering

3. Definitions

3.1 Photometric Maintenance—Change in luminous intensity of the test points of the beam pattern over time.

3.2 Life—Time in hours and starting cycles of a DLS during which it meets specified operational characteristics.

3.3 Rated Laboratory Life—Specified by the manufacturer as the period of time during which the DLS meets the performance specifications.

3.4 Color CRI—Measure of the degree of color shift objects undergo when illuminated by the light source as compared with the color of those same objects when illuminated by a reference source of comparable color temperature.

- 3.5 Distributed Lighting System (DLS)**—A system that transmits light from a remote source to one or more lighting function(s).
- 3.6 Leakage current breakdown**—An electronic measurement technique used on electronic devices/modules to determine if a final current (amps) measurement differs from an initial current (amps) measurement by a defined value. The resulting measurement indicates whether a breakdown in the electrical circuit has occurred causing the current (amps) level to change after exposure to a durability or environmental test procedure.
- 3.7 With controls**—Any mechanical or electrical device that effects the DLS state other than the manually activated on/off switch.”
- 4. Lighting Identification Codes, Markings and Notices**
- 4.1** Lamps may be marked in accordance with SAE J759.
- 4.2** A DLS containing High Voltage Components shall be marked to indicate the presence of high voltage, e.g., the ISO electric shock hazard symbol (“lightning bolt”) where applicable.
- 5. Tests**—Sample systems shall be seasoned per the SAE standards applicable for the light source employed by the DLS prior to being subjected to the tests below. A separate DLS may be used for each test. Testing shall be accomplished on a complete system (i.e., light source, interconnections, and lamp) as required unless otherwise specified in the specific test. If “orientation” affects the performance of any component, the component shall be maintained in its design orientation throughout the test. A system component shall be tested to the most severe condition the specific component would be subjected to in application —(e.g., under hood conditions if it passes through the under-hood region). See Table 1.

NOTE—The power supply of a distributed lighting system that employs a ballast shall have its output isolated from the input to prevent any potential danger to laboratory personnel when running tests as required.

TABLE 1—DLS LAMP FUNCTIONS AND TYPES

FUNCTION	TEST GROUP
HEADLAMP (A)	A1 = DISCHARGE SOURCE A2 = INCANDESCENT SOURCE A3 = INCANDESCENT w/Controls
FOG/AUX. LAMP (B)	B1 = DISCHARGE SOURCE B2 = INCANDESCENT SOURCE B3 = INCANDESCENT w/Controls
SIGNAL /MARKING (C)	C1 = DISCHARGE SOURCE C2 = INCANDESCENT SOURCE C3 = INCANDESCENT w/controls C4 = DISCHARGE w/controls C5 = LED SOURCE

- 5.1 Lamp/System Starting Procedures**—The lamp shall be held in its vehicle operating position and aimed per the appropriate SAE standard. Tests shall be conducted at room temperature ($23^{\circ}\text{C} \pm 3^{\circ}\text{C}$), at design voltage $\pm 0.1\text{ V DC}$, and for a duration required to obtain a reading. The response time of the measurement instrument shall be less than 100 ms.

- 5.1.1 INITIAL START-UP**—Systems shall be tested as follows:

Group A1, A3, B1, B3:	SAE J2009 Initial Start-Up
Group A2, B2, C2, C5:	Not applicable
Group C1, C3, C4:	SAE J2320 Light rise up-time

5.1.2 SWITCHING (OF BEAMS)—Systems shall be tested as follows:

Group A1, A3, B1, B3:	SAE J2009 Switching
Group A2, B2, C2, C5:	Not applicable
Group C1, C3, C4:	SAE J2320 Light rise-up time

5.2 Electrical Characteristics**5.2.1 SYSTEM OPERATING WATTAGE RANGE—The DLS shall be tested as follows:**

Group A1, B1:	SAE J2009 Operating Wattage
Group A2, A3:	SAE J1383 Operating Wattage
Group B2, B3, C1, C2, C3, C4, C5:	Not applicable

5.2.2 SYSTEM OPERATING VOLTAGE RANGE—Systems shall be tested as follows:

Group A1, B1:	SAE J2009 Operating Voltage
Group A2, A3, B2, B3:	Not applicable
Group C1, C4:	SAE J2320 Operating Voltage
Group C2, C3:	SAE J2357 Operating Voltage
Group C5:	SAE J1889 Operating Voltage

5.2.3 TEST EQUIPMENT REQUIREMENTS—Test equipment shall conform to the following requirements:

Group A1, B1:	SAE J2009 Equipment Requirements
Group A2, A3, B2, B3, C2:	Not applicable
Group C1, C3, C4, C5:	SAE J2320 Equipment Requirements

5.3 Source Photometric Maintenance—Sources shall be tested in a system as follows:

Group A1:	SAE J2009 Photometric Maintenance
Group A2, A3:	SAE J1383 Photometric Maintenance
Group C1, C4:	SAE J2320 Photometric Maintenance
Group B1, B2, B3, C2, C3, C5:	Not Applicable

5.4 Color and CRI—Systems shall be tested as follows:**5.4.1 COLOR**

Group - All:	The color coordinates shall be tested per SAE J578 for the applicable function
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5.4.2 COLOR RENDERING INDEX (CRI - SOURCE FOR "WHITE LIGHT" APPLICATIONS ONLY):

Group A1, B1:	Systems shall be tested per SAE J2009 Color Rendering.
Group - All Other:	Not applicable.

5.5 Leakage Current/Breakdown Test—Systems shall be tested as follows:

Group A1, B1, C1, C4:	System electric components shall be tested per SAE J2009 Leakage
Group A2, A3, B2, B3, C2, C3, C5:	Not applicable.