SURFACE VEHICLE RECOMMENDED PRACTICE

J1330	SEP2014
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(R) Photometry Laboratory Accuracy Guidelines

RATIONALE

At this time we would like to reaffirm J1330 in its current revision. A full rewrite is being prepared by the task force at this time to include many new technologies and measurement techniques to improve the measurement accuracy of photometric laboratories. Many of the topics are going to be discussed with general terms, and also specific examples of various industries, so that more than one industry can use this standard. This includes at this time both the automotive and aerospace aircraft lighting industries.

Some changes included will be:

a. Measurement of PWM (Pulse Width Modulated) and other modulated sources.

b. Measurement of Chromaticity, UV Content, Red (and other color) Content, retro-reflex color.

c. Measurement of Low Light Level sources, including Low-light Visibility.

d. Added to “Related Publications” SAE J2382 as a method of high-speed photometric measurement that references this document.

e. Measurement of Luminance, including License Plate Lamps and other luminance measurements.

f. Measurement of Flashing Light sources.

g. Measurement of Total Luminous Flux using an Integrating Sphere.

h. Added references to IESNA documents

1. SCOPE

The purpose of this SAE Information Report is to list and explain major equipment, instrumentation, and procedure variables which can affect inter-laboratory differences and repeatability of photometric measurements of various lighting devices listed in SAE Technical Reports. The accuracy guidelines listed in the report are for the purpose of controlling variables that are not a direct function of the lighting device being measured. The control of these individual variables is necessary to control the overall accuracy of photometric measurements. These accuracy guidelines apply to the measurement of the luminous intensities and reflected intensities of devices at the specified geometrically distributed test points and areas. These guidelines do not apply to photometric equipment used to measure license plate lamps.

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http://www.sae.org/technical/standards/J1330_201409

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of 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 J387 Terminology—Motor Vehicle Lighting

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

SAE J2139 Tests for Signal and Marking Devices Used on Vehicles 2032 mm or More in Overall Width

2.1.2 ASTM Publications

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

ASTM E 380-85 Standard Practice for Computing the Colors of Objects by Using the CIE System

2.1.3 IESNA Publications

Available from IESNA, 120 Wall Street, 17th Floor, New York, NY 10005-4001, Tel. 212-248-5000, www.iesna.org

IESNA LM-75-01 Goniometer Types and Photometric Coordinates

IESNA LM-35-02 Photometric Testing of Floodlights Using High Intensity Discharge or Incandescent Filament Lamps

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 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 J1889 L.E.D. Signal and Marking Lighting Devices

SAE J2009 Discharge Forward Lighting System and Subsystems

SAE J2650 Performance Requirements for Light Emitting Diode (LED) Road Illumination Device Systems

2.2.2 Other References

I.E.S.N.A. Lighting Handbook, Ninth Edition, 2000, Illuminating Engineering Society of North America

Journal of I.E.S., October 1971—Practical Guide to Photometry

Illuminating Engineering, March and April, 1955—I.E.S. General Guide to Photometry

3. ACCURACY GUIDELINES AND LIMITATIONS

The accuracy limit guidelines suggested in this report are intended as a reference guide to photometric laboratories of various accuracy parameters to help maintain correlation of photometric measurements between laboratories. The guidelines are not intended as specifications to be applied to all photometric equipment, test fixtures, and measurements. Actual photometric performance of various functions and the designs of lighting devices and test fixtures may vary considerably. The use of the guideline information in this report as rigid specifications applied to all types of photometric measurements would be impractical and in some cases would result in equipment with unnecessary accuracy restrictions. These guidelines should be used to aid laboratory personnel in their awareness of the major variables and to provide information on equipment, instrumentation, and procedure accuracies which may affect overall laboratory differences and repeatability.

3.1 Accuracy Guidelines for Mechanical Positioning

3.1.1 Device Positioning

The lighting device to be photometered should be mounted on a rigid test fixture in a position corresponding to the design nominal operating position of the device on the vehicle. For devices designed for a specific vehicle, the designed nominal position should be determined from the vehicle manufacturer's specifications. For devices designed for multiple vehicle use, the designed nominal position should be determined from the device manufacturer's specifications or instructions. Multiple-use devices should be tested in each position in which they are designed for use, or the equivalent, by mathematically translating axis angles and test points.

One of the factors which can significantly affect the device mounting attitude is the torque used to fasten the device to the test stand. This is particularly important when the device floats on a compression-type gasket. Mounting torques should be specified for all devices, and these torques should be sufficient to compress the specified gaskets so that “floating” of parts does not occur unless certain parts are so designed as a means of absorbing shock and vibration.

3.1.2 Test Fixture Positioning

Numerous factors affect the ability of the test fixture to position the test device in its designed nominal position. Some of these accuracy factors are the rigidity and flatness of the base, the rigidity of the test fixture structure, and the length of the machined alignment edge or the spacing between alignment pins. Each test fixture should be built from a manufacturer's test fixture design standard to minimize these errors. One suggested example of a test fixture design guide is shown in Appendix A. Other test fixture designs may be equally satisfactory (for example, specialized fixtures for sealed beam units) if they provide proper positioning accuracy.

3.1.3 Positioning Tolerance

Tolerance guidelines for positioning the device are listed as follows:

3.1.3.1 Lighting Devices except Headlamp Units

The tolerance for positioning the device in the test fixture should be ±0.1 degree in each axis.

3.1.3.2 Headlamp Units

The positioning of headlamp units is generally more critical than other lighting devices. The tolerance for positioning of headlamp units in the test fixture should be ±0.05 degree in each axis.