

Submitted for recognition as an American National Standard

MEASUREMENT OF SOLAR HEATING EFFECT

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. **Scope**—This SAE Recommended Practice is applicable to off-road, self-propelled work machines from Section 1 to 5 of SAE J1116 when equipped with an operator enclosure system.

1.1 **Purpose**—This document provides a procedure for applying a simulated solar load while performing A/C tests in the laboratory and determining the radiant heat energy affecting an operator enclosure system by an artificial light source or a natural solar load.

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.

SAE J1116—Categories of Off-Road Self-Propelled Work Machines

SAE J1503—Performance Test for Air-Conditioned, Heated, and Ventilated Off-Road Self-Propelled Work Machines

3. Test Procedure

3.1 General Procedure

3.1.1 The intended result of this procedure is to record the radiant energy affecting an operator enclosure during tests of the air-conditioning system.

3.1.2 This procedure is recommended for use with the test procedure of SAE J1503.

3.2 Procedure for Measuring the Radiant Energy of a Solar Load

3.2.1 An appropriate measuring device, with an accuracy of $\pm 3\%$ of the observed values, such as a Pyranometer shall be placed in the same general area as the enclosure under test. Readings shall be made at 10 min intervals during the test period. These readings shall be averaged and recorded as part of the reported results.

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3.2.2 A measured average energy of $950 \text{ W/m}^2 \pm 95 \text{ W/m}^2$ is considered 'normal' test conditions.

3.3 Procedure for Simulating the Effects of Solar Heating During Laboratory Tests

3.3.1 Lamps shall be placed in banks above the enclosure being tested and in a horizontal plane.

3.3.2 The area within the perimeter of the light banks should extend a minimum of 25% beyond the projected area of the enclosure under test when measured in all four directions.

3.3.3 In order to simulate the effects of solar heating, the light source shall have 45% or more of its radiated energy above 700 nm. It is recommended that the method of controlling the intensity not change the spectral distribution of the lamps.

3.4 Calibration Procedure for Measuring Radiant Energy from a Simulated Solar Load

3.4.1 A Pyranometer shall be mounted on a tripod and maintained on a horizontal plane.

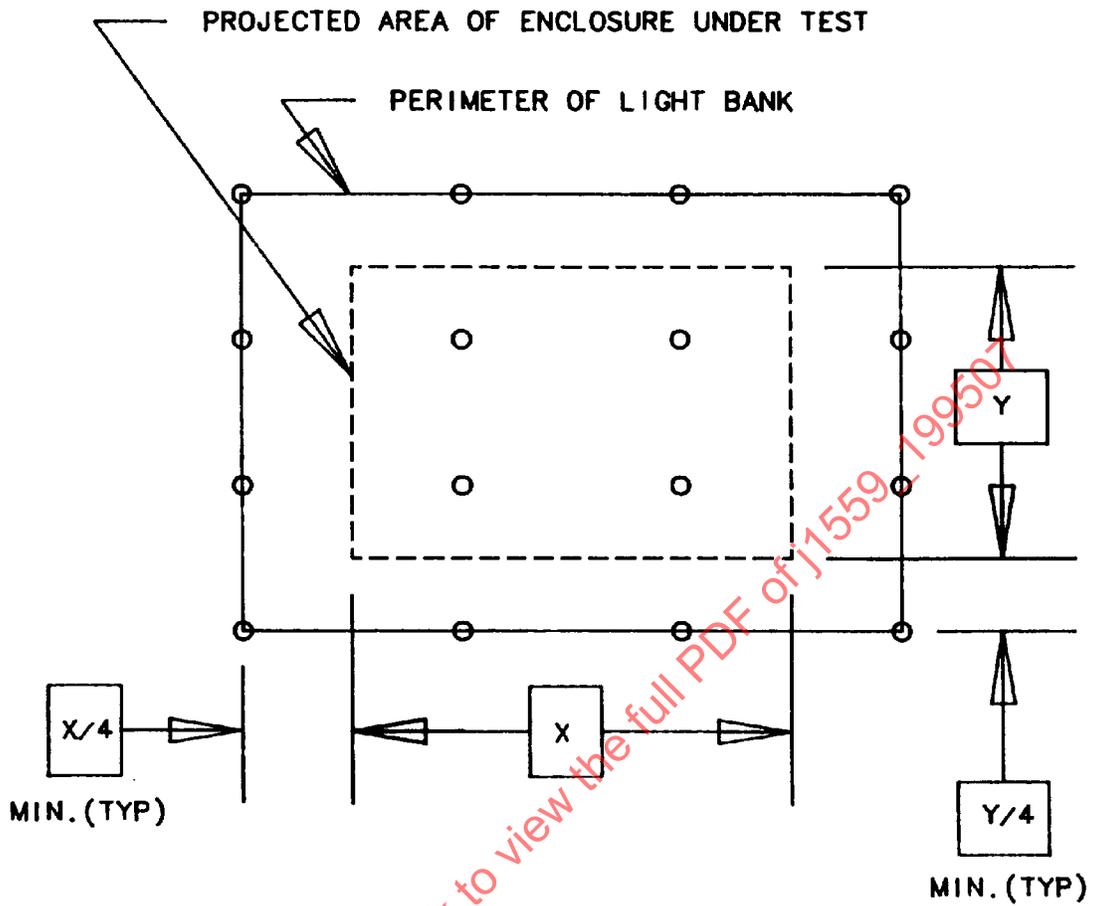
3.4.2 The plane of measurement shall be $100 \text{ mm} \pm 100 \text{ mm}$ lower than the roof line of the enclosure under test.

3.4.3 Readings shall be taken at points on and within the perimeter of the area of uniform intensity as shown in Figure 1. Enough measurements should be made to ensure uniformity and the maximum distance between measuring points shall be 1200 mm.

3.4.4 The intensity level shall be adjusted to an average of $950 \text{ W/m}^2 \pm 95 \text{ W/m}^2$. No individual reading shall vary by more than 10% from the average.

3.4.5 The intensity level shall be recalibrated every 6 months or every time the elevation of the roof line of the test enclosure is changed.

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NOTE: X AND Y ARE DIMENSIONS OF LARGEST ENCLOSURE TO BE TESTED

O REPRESENTS LOCATION OF PYRANOMETER FOR RADIATION INTENSITY MEASUREMENTS

FIGURE 1—CALIBRATION PROCEDURE

PREPARED BY THE SAE HUMAN FACTORS TECHNICAL COMMITTEE SC-6—OPERATOR ACCOMMODATION