

Vehicle Display System Light Efficiency

RATIONALE

New display technologies for automotive applications have electrical power partially dependent on variables such as image content and environmental conditions (e.g., ambient lighting effects), so automotive situations should be specified for proper electrical power assessment.

The objective of this recommended practice is to standardize a metric to help determine the vehicle display system with highest optical performance (luminance and contrast) and lowest power density (total power/active area) based on typical automotive usage (such as ambient temperature, lighting, and usage).

The display system light efficiency $K_{DS} = (K_{50}, K_{\text{night}}, K_{\text{daytime}}, K_{\text{high-ambient}})$ was selected.

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Full document details: SAE J1757-3_202104

For more information on this standard, visit
https://www.sae.org/standards/content/J1757-3_202104

Documents

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1. SCOPE

This SAE Recommended Practice provides test protocols with performance requirements for vehicular flat panel display systems efficiency. The standard help determine vehicle the display system light efficiency vector $K_{DS} = (K_{50}, K_{night}, K_{daytime}, K_{high-ambient})$ with the highest optical performance (such as luminance, contrast) and lowest power density (defined as total power divided by active area of the display), based on typical automotive usage such as ambient lighting.

In this standard, we are measuring L_{amb} to determine E_{amb} value such as 1.592 cd/m^2 measured off a 0.99 standard diffuser equivalent to 5k lux illumination environment, same as in SAE J1757-1.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue 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 +1 724-776-4970 (outside USA), www.sae.org.

SAE J670 Vehicle Dynamics Terminology

SAE J1757-1 Standard Metrology for Vehicular Displays

SAE J1757-2 Standard - Optical System HUD for Automotive

2.1.2 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 9241-305 Ergonomics of Human-System Interaction - Part 305: Optical Laboratory Test Methods for Electronic Visual Displays

ISO 15008 Road Vehicles - Ergonomic Aspects of Transport Information and Control Systems - Specifications and Test Procedures for In-Vehicle Visual Presentation

ISO 16505 Road Vehicles - Ergonomic and Performance Aspects of Camera Monitor Systems - Requirements and Test Procedures

3. TERMS AND DEFINITIONS

3.1 A

Active area of the display is the area determined by pixels and measured in m^2 .

3.2 L_w

Luminance of full-screen white.

3.3 L_k

Luminance of full-screen black with power applied to the display.

3.4 $L_{[amb-d,k]}$

Luminance [due to high diffuse illumination, black display image].