

SURFACE VEHICLE RECOMMENDED PRACTICE

J1767

JAN2014

Issued 1995-01
Reaffirmed 2014-01

Superseding J1767 JAN1995

Instrumental Color Difference Measurements for Colorfastness of Automotive Interior Trim Materials

RATIONALE

J1767 has been reaffirmed to comply with the SAE five-year review policy.

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

1. Scope—The practice described applies to textile and flexible plastic parts and materials used in automotive vehicles. Special care should be taken when high pile carpet samples are being evaluated.

1.1 Purpose—The intent of this SAE Recommended Practice is to specify procedures for the instrumental measurement of color differences brought about by the exposure of textile and flexible plastic automotive parts to various colorfastness tests. It may be used for the specification of limits of color differences which may be tolerated in a specific test.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein.

2.1.1 CIE PUBLICATION—Available from U.S. National Committee, CIE (Commission Internationale de l'Eclairage), c/o Mr. Tom Lemons, TLA, Lighting Consultants, 7 Pond Street, Salem, MA 01970, 508-745-6870, Fax 508-741-4420.

CIE Publication No. 15.2—Colorimetry, 2nd edition, 1986

2.1.2 AATCC PUBLICATION—Available from American Association of Textile Chemists & Colorists, 1 Davis Drive, P.O. Box 12215, Research Triangle Park, NC 27709-2215, 919-549-8141, Fax 919-549-8933.

AATCC Method 173-1992—Calculation of Small Color Differences for Acceptability

3. Definitions

3.1 Colorfastness—The resistance of a material to change in any of its color characteristics, to transfer its colorant(s) to adjacent materials, or both, as a result of the exposure of the material to any environment that might be encountered during testing.

3.2 Color Difference—A color change in a sample or in a fabric, in which color has been altered or transferred from the sample as a result of testing.

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- 3.2.1 **COLOR CHANGE**—A change in color of any kind, whether in lightness, hue, or chroma that may be measured instrumentally by comparing materials before and after testing.

4. **Basic Color Measurement Specifications**

- 4.1 **Uniform Color Space**—All measurements and calculations will be made using CIE 1976 $L^*a^*b^*$ Uniform Color Space, which may be abbreviated CIELAB (see 2.1.1).
- 4.2 **Standard Illuminant**—The Standard Illuminant for colorimetric determinations will be the CIE illuminant D65 (see 2.1.1). No other illuminant may be used except by agreement between contractual parties.
- 4.3 **Standard Observer**—The Standard Observer for colorimetric determinations will be the CIE 10 degrees observer. No other observer may be used except by agreement between contractual parties.

5. **Color Difference Calculations**—Three sets of color difference calculations may be used:

5.1 **Delta L^*, a^*, b^***

$$DL^* = (L_t^* - L_o^*) \quad (\text{Eq. 1})$$

$$Da^* = (a_t^* - a_o^*) \quad (\text{Eq. 2})$$

$$Db^* = (b_t^* - b_o^*) \quad (\text{Eq. 3})$$

$$DE^* = \{(DL^*)^2 - (Da^*)^2 + (Db^*)^2\}^{1/2} \quad (\text{Eq. 4})$$

where subscripts 'o' and 't' refer to measurements in the original and final material.

5.2 **Delta L^*, C^*, H^***

$$DL^* = (L_t^* - L_o^*) \quad (\text{Eq. 5})$$

$$DC^* = \left\{ (a_t^{*2} + b_t^{*2})^{1/2} - (a_o^{*2} + b_o^{*2})^{1/2} \right\} \quad (\text{Eq. 6})$$

$$DH^* = (DE^*)^2 - (DL^*)^2 - (DC^*)^2 \quad (\text{Eq. 7})$$

- 5.3 **Delta CMC**—The CMC method of color difference measurement is one which is being used with increasing frequency and the necessary calculations are given in 2.2.1 (reference only).
6. **Color Difference Specifications**—Color difference specifications shall be determined by the contractual parties. The specifications should be in the form described in Section 4.
7. **Color Measuring Instruments**—The instruments used to determine color must have capabilities to meet the requirements set forth in Section 3. If a sphere instrument is used, the specular component must be included in the measurement. The angle between the specimen normal and the illuminating beam or vice-versa in the sphere instruments must not exceed 10 degrees.