Designation: B979 – 12 (Reapproved 2018)

Standard Specification for Non-Specular (NS) Surface Finish on Overhead Aluminum Electrical Conductors[1]

This standard is issued under the fixed designation B979; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers non-specular surface finishes on overhead aluminum electrical conductors. Overhead aluminum electrical conductors, when installed, typically have a shiny surface appearance. This "reflective" or "specular" surface can make a transmission line more noticeable in appearance against the background landscape. A factory treatment process of the outer surface of the aluminum wires can render the surface finish into a dull, non-reflective, matte grey finish. This non-reflective or "de-glared" surface finish allows the conductor to become less visible when observed from a distance and enables the transmission line to blend in with the skyline or landscape background.[2]

1.2 This specification is intended, by means of diffuse reflectance measurement, to establish a uniformity of conductor finish which is acceptable to the user. Such a specification will furnish a basis for consistent manufacturing process control.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 The following documents, in effect on the date of material purchase, form part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*[3]

B354 Terminology Relating to Uninsulated Metallic Electrical Conductors

3. Terminology

3.1 For definitions of terms relating to conductors, refer to definitions found in Terminology B354.

3.2 *Definitions:*

3.2.1 *specular*—a shiny, reflective appearance.

3.2.2 *non-specular*—a matte, non-shiny appearance.

3.2.3 *de-glared*—another term for non-specular.

3.2.4 *diffuse reflection*—reflection in which light energy is scattered in many directions by diffusion at or below the surface.

4. Ordering Information

4.1 Orders for material under this specification shall include the following information:

4.1.1 Aluminum overhead electrical conductor to have a non-specular, Type "NS" surface finish.

4.1.2 Unless otherwise specified the default non-specular gray finish requirement shall have an average maximum diffuse reflectivity of not more than 32 %.

5. Equipment

5.1 To measure diffuse reflectance, a portable reflectance meter[4] shall be employed with search units "Y" or "T," equipped with a green tristimulus filter.

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[1] This test method is under the jurisdiction of ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.02 on Methods of Test and Sampling Procedure.

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[2] The historical origin of this standard is based upon AA/ANSI Standard C7.69 originally developed by the Aluminum Association, Inc. and adopted for recognition as an American National Standard in 1975.

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[4] The sole source of supply of the apparatus (Photovolt Reflectance Meter, Model No. 577 or 577–A) known to the committee at this time is Photovolt Instruments, Inc. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

5.2 For calibration, use a matte gray reference standard having a diffuse reflection value between 23 and 29 %.

6. Test Procedure

6.1 Four test measurements shall be made on every 1 000 000 ft (305 000 m) or fraction thereof produced per order, per conductor size, with no more than one measurement per reel. Test measurements may be made either on the conductor during processing or on samples approximately 15 in. (380 mm) long removed from the reel. Care must be taken to minimize surface marks and loose stranding due to sample handling. Samples should be free of any foreign materials such as oil, grease, dirt, and metal particles.

6.2 A 13⁄16 in. (0.8125 in./20.64 mm) diameter aperture should be used for measuring 397 500 cmil (200 mm^2) area conductors and larger. For smaller conductor, a ¼ in. (0.25 in./6.35 mm), or ⅜ in. (0.375 in./9.52 mm) aperture should be used.

6.3 Prior to each diffuse reflectance measurement, the measuring instrument shall be calibrated against a matte gray reference standard having a diffuse reflection value between 23 and 29 %. The instrument is to be checked against the reference standard before and after each series of readings to ensure reliability and reproducibility of results (see Explanatory Note 1). Caution should be exercised that the search unit is not pointed towards brightly lighted areas during measurements.

6.4 To allow for slight variations in conductor surface color and contour, a minimum of three areas of the sample shall be evaluated. The maximum reflectance for each area is determined by placing the conductor's surface centered over the aperture of the measuring device and moving the sample longitudinally back and forth to obtain the maximum reading. The average of the three maximum readings so obtained constitutes the acceptance criterion for diffuse reflectivity of the sample.

7. Requirements

7.1 All four test measurements of the conductor outer surface shall have a matte, non-specular gray finish with an average maximum diffuse reflectivity of not more than 32 % when determined by applying the equipment and test procedure outlined by this specification.

8. Retest

8.1 If two or more of the four test measurements fail, samples from each reel shall be tested. The test on the sample taken from each reel will now determine whether the reel passes or fails to meet this specification.

8.2 If only one of the test measurements fails, then an additional four random measurements should be made. If one or more of the additional four measurements fails the test, then samples from each reel will now determine whether each reel passes or fails to meet this specification. If the additional four measurements all pass, the test the conductor represented by the original four measurements meets this specification.

9. Keywords

9.1 deglared; non-specular; overhead electrical conductors

EXPLANATORY NOTES

NOTE 1—The search unit is to be calibrated in the same orientation direction that the search unit is used when measuring the reflectivity of the conductor samples. For example, if the search unit is to be used with light pointing down on top of the sample, then the calibration procedure is to be conducted with the search unit pointing down onto the reflectance standard. The photocells inside the detection unit are thermally sensitive and it is best to keep the unit in the same orientation from calibration to measurement.