



Designation: E1862 – 14

Standard Practice for Measuring and Compensating for Reflected Temperature Using Infrared Imaging Radiometers¹

This standard is issued under the fixed designation E1862; 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 practice covers procedures for measuring and compensating for reflected temperature when measuring the surface temperature of a specimen with an infrared imaging radiometer.²

1.2 These procedures may involve use of equipment and materials in the presence of heated or electrically energized equipment, or both.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

- 2.1 *ASTM Standards:*³
E1316 Terminology for Nondestructive Examinations

3. Terminology

3.1 Definitions:

3.1.1 *diffuse reflector, n*—a surface that produces a diffuse image of a reflected source.

3.1.2 *infrared thermographer, n*—the person using an infrared imaging radiometer.

3.1.3 *infrared reflector, n*—a material with a reflectance as close as possible to 1.00.

3.1.4 *reflected temperature, n*—the temperature of the energy incident upon and reflected from the measurement surface of a specimen.

¹ This practice is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and are the direct responsibility of Subcommittee E07.10 on Specialized NDT Methods.

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² This practice was originally adapted in 1997, by agreement, from the *Guideline for Measuring and Compensating for Reflected Temperature, Emittance and Transmittance* developed by Infraspection Institute, 425 Ellis Street, Burlington, NJ 08016.

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.

3.1.5 *specular reflector, n*—a surface that produces a direct image of a reflected source.

3.2 See also Terminology E1316.

4. Summary of Procedure

4.1 Two procedures are given for measuring the reflected temperature of a specimen, the Reflector Method and the Direct Method.

4.2 A procedure is also given for compensating for the error produced by reflected temperature using the computer built into an infrared imaging radiometer.

5. Significance and Use

5.1 The infrared energy that is reflected by a specimen can cause measurement errors for an infrared thermographer measuring its surface temperature. Two procedures are provided for measuring and compensating for this reflected temperature error source, the Reflector Method and the Direct Method.

5.2 These procedures can be used in the field or laboratory using commonly available materials.

5.3 These procedures can be used with any infrared radiometers that have the required computer capabilities.

5.4 Due to the nature of the specimens, the repeatability and reproducibility are subjective. However, a measure of the precision of the procedures can be inferred from the results of the replicate procedures specified in 8.1.6 and 8.2.7.

6. Interferences

6.1 Reflector Method:

6.1.1 This procedure uses an infrared reflector with an assumed reflectance of 1.00, which is an ideal property. Errors can be minimized by using a reflector having a reflectance as close as possible to 1.00.

6.1.2 Specimens vary in that they can be diffuse or spectral reflectors, or both. Use of an infrared reflector with reflectance properties as close as possible to those of the specimen will reduce errors.

6.2 Direct Method:

6.2.1 The Direct Method usually does not account for the heat from the infrared thermographer's body as a source of

*A Summary of Changes section appears at the end of this standard