



Standard Guide for Examining Electrical and Mechanical Equipment with Infrared Thermography¹

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1. Scope

1.1 This guide lists the responsibilities of the end user and the infrared thermographer when examining electrical and mechanical systems.

1.2 This guide outlines the specific content required to document qualitative and quantitative infrared examinations of electrical and mechanical equipment.²

1.3 *This guide may involve use of equipment and materials in the presence of heated, moving or all of these or electrically energized equipment.*

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 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 *end user*—the person responsible for using the information provided by an infrared examination.

3.1.2 *exception*—an abnormally warm or cool connector, conductor or component.

3.1.3 *infrared examination*—the use of an infrared imaging system to provide thermal data about a structure, system, object or process.

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

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² This guide is adapted from the *Guideline for Infrared Inspection and Mechanical Systems* 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.

3.1.4 *inventory list*—a list of the equipment by the infrared thermographer.

3.1.5 *qualified assistant*—a person provided and authorized by the end user to perform the tasks required by the infrared thermographer. He/she shall be knowledgeable of the operation and history of the equipment to be examined and of all safety practices and rules of the end user.

3.1.6 *qualitative infrared inspection*—an infrared examination that provides images of exceptions but not temperature data.

3.1.7 *quantitative infrared inspection*—an infrared examination that provides both images of exceptions and temperature data.

3.2 See also Terminology E1316.

4. Significance and Use

4.1 This guide can be used by an end user to specify infrared examinations of electrical and mechanical equipment and an infrared thermographer to perform them.

4.2 This guide lists the joint responsibilities of the end user and the infrared thermographer when using infrared thermography.

4.3 The purpose of an infrared examination is to identify and document exceptions in the end user's electrical or mechanical systems, or both.

4.3.1 In electrical equipment, warm exceptions are usually created by an increase in resistance caused by loose or deteriorated connections, short circuits, overloads, load imbalances or faulty, mismatched or improperly installed components. Cool exceptions are usually caused by failed components.

4.3.2 In mechanical equipment, warm exceptions are usually created by friction caused by improper lubrication, misalignment, worn components or mechanical loading anomalies. Cool exceptions are usually caused by failed components.

4.3.3 Exceptions in insulation systems are usually caused by missing or deteriorated materials, improper installation or insufficient amounts of material.

4.4 Providing opinions about the causes of exceptions, the integrity of the equipment or recommendations for corrective actions require knowledge and skills beyond those of infrared thermography.