



# Standard Practice for Thermographic Inspection of Insulation Installations in Envelope Cavities of Frame Buildings<sup>1</sup>

This standard is issued under the fixed designation C1060; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice is a guide to the proper use of infrared imaging systems for conducting qualitative thermal inspections of building walls, ceilings, roofs, and floors, framed in wood or metal, that contain insulation in the spaces between framing members. This procedure allows the detection of cavities where insulation is inadequate or missing and allows identification of areas with apparently adequate insulation.

1.2 This practice offers reliable means for detecting suspected missing insulation. It also offers the possibility of detecting partial-thickness insulation, improperly installed insulation, or insulation damaged in service. Proof of missing insulation or a malfunctioning envelope requires independent validation. Validation techniques, such as visual inspection or *in-situ* R-value measurement, are beyond the scope of this practice.

1.3 This practice is limited to frame construction even though thermography is used on all building types. (ISO 6781)

1.4 Instrumentation and calibration required under a variety of environmental conditions are described. Instrumentation requirements and measurement procedures are considered for inspections from both inside and outside the structure. Each vantage point offers visual access to areas hidden from the other side.

1.5 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.

1.6 *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.* Specific precautionary statements are given in **Note 1** and **Note 3**.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

**C168 Terminology Relating to Thermal Insulation**

**E1213 Practice for Minimum Resolvable Temperature Difference for Thermal Imaging Systems**

### 2.2 ISO Standards:<sup>3</sup>

**ISO 6781 :1983 Thermal Insulation—Qualitative detection of Thermal Irregularities in Building Envelopes—Infrared Method**

## 3. Terminology

3.1 *Definitions*—Definitions pertaining to insulation are defined in Terminology **C168**.

### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *anomalous thermal image*—an observed thermal pattern of a structure that is not in accordance with the expected thermal pattern.

3.2.2 *envelope*—the construction, taken as a whole or in part, that separates the indoors of a building from the outdoors.

3.2.3 *field-of-view (FOV)*—the total angular dimensions, expressed in degrees or radians, within which objects can be imaged, displayed, and recorded by a stationary imaging device.

3.2.4 *framing spacing*—distance between the centerlines of joists, studs, or rafters.

3.2.5 *infrared imaging system*—an instrument that converts the spatial variations in infrared radiance from a surface into a two-dimensional image of that surface, in which variations in radiance are displayed as a range of colors or tones.

3.2.6 *infrared thermography*—the process of generating thermal images that represent temperature and emittance variations over the surfaces of objects.

3.2.7 *masonry veneer*—frame construction with a non-load bearing exterior masonry surface.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee **C16** on Thermal Insulation and is the direct responsibility of Subcommittee **C16.30** on Thermal Measurement.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from International Organization for Standardization, ISO Secretariat, BIBC II, Cheminde Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.