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# International Standard



# 6781

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## **Thermal insulation — Qualitative detection of thermal irregularities in building envelopes — Infrared method**

*Isolation thermique — Détection qualitative d'irrégularités thermiques dans des enveloppes de bâtiments — Méthode infrarouge*

**First edition — 1983-12-15**

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**UDC 699.86 : 620.19**

**Ref. No. ISO 6781-1983 (E)**

**Descriptors:** buildings, thermal insulation, tests, infrared radiation, fault detectors, sensors.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6781 was developed by Technical Committee ISO/TC 163, *Thermal insulation*, and was circulated to the member bodies in December 1982.

It has been approved by the member bodies of the following countries:

Australia	Egypt, Arab Rep. of	Norway
Austria	Finland	Spain
Belgium	France	Sweden
Canada	Italy	USA
Denmark	Japan	

The member bodies of the following countries expressed disapproval of the document on technical grounds:

Germany, F.R.  
Netherlands

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# Thermal insulation – Qualitative detection of thermal irregularities in building envelopes – Infrared method

## 0 Introduction

Irregularities in the thermal properties of the components constituting the external envelope of a building result in temperature variations over the surfaces of the structure. The surface temperature is also influenced by air flow within and/or through the envelope of the building. The surface temperature distribution can thus be used to detect thermal irregularities due, for example, to insulation defects, moisture content and/or air leakage, in the components constituting the external envelope of the building.

Thermography is a method of indicating and representing the temperature distribution over a part of a building envelope. In the context of this International Standard, thermography is carried out by means of an infrared radiation sensing system which produces an image based on the apparent radiance temperature. The thermal radiation (infrared radiation density) which depends on the surface temperature, is converted by the infrared radiation sensing system to produce a thermal image representing the relative intensity of thermal radiation from different parts of the surface. The radiation intensity is a function of the surface temperature, the characteristics of the surface and the sensor, and the ambient conditions. The procedure also involves interpretation of the thermal images (thermograms).

Valuable information for the application of this International Standard will be given in a Technical Report. This information, which was not regarded as suitable for inclusion in this International Standard, will cover the practical application of building thermography and the problems involved, instrumentation, test reports, educational requirements and certification, together with a bibliography.

## 1 Scope and field of application

This International Standard specifies a qualitative method, by thermographic examination, for detecting thermal irregularities in building envelopes. The method is used initially to identify wide variations in the thermal properties, including air tightness, of the components constituting the external envelopes of buildings.

The results obtained by means of this method have to be interpreted and assessed by persons who are specially trained for this purpose. (See annex D.)

This International Standard does not apply to the determination of the degree of thermal insulation and air tightness of a structure. For such determinations, examinations by other methods are required.

## 2 Definitions<sup>1)</sup>

For the purposes of this International Standard, the following definitions apply.

**2.1 thermography:** Determination and representation of surface temperature distribution by measuring the infrared radiation density from a surface, including interpretation of thermal images.

**2.2 thermal image:** Image which is given by an infrared radiation sensing system and which represents the apparent radiance temperature distribution over a surface.

**2.3 thermogram:** A recording of a thermal image.

**2.4 radiance:** Total amount of energy emanating from a surface per unit solid angle and unit projected area.

Radiance includes emitted radiation from a surface as well as reflected and transmitted radiation.

**2.5 apparent radiance temperature:** Temperature determined from the measured radiance.

This temperature is the equivalent black body temperature which would produce the radiance.

**2.6 isotherm image:** Thermal image with isotherms.

**2.7 isotherm:** A region of points having the same temperature.

In this context, an isotherm may refer to a feature used to outline, on the display, the points, lines or areas having the same infrared radiation density.

1) A vocabulary relating to thermal insulation will form the subject of ISO 7345.