

Thermal insulation in buildings — Determination of air change in buildings — Tracer gas dilution method

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British Standard

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National foreword

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The UK participation in its preparation was entrusted by Technical Committee RHE/9, Thermal insulating materials, to Subcommittee RHE/9/2, Thermal properties of insulating materials, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to v, a blank page, pages 1 to 22, the annex ZA page and a back cover.

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des Luftwechsels in Gebäuden - Indikatorgasverfahren
(ISO 12569:2000)

This European Standard was approved by CEN on 1 November 2000.

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Foreword

The text of the International Standard ISO 12569:2000 has been prepared by Technical Committee ISO/TC 163 "Thermal insulation" in collaboration with Technical Committee CEN/TC 89 "Thermal performance of buildings and building components", the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 12569:2000 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to International Standards are listed in annex ZA (normative).

INTERNATIONAL STANDARD

EN ISO 12569:2000

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Thermal performance of buildings — Determination of air change in buildings — Tracer gas dilution method

*Performances thermiques des bâtiments — Détermination du
renouvellement d'air dans les bâtiments — Méthode de dilution de gaz
traceurs*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights other than those identified above. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 12569 was prepared by Technical Committee ISO/TC 163, *Thermal insulation*, Subcommittee SC 1, *Test and measurement methods*.

Annexes A to G of this International Standard are for information only.

Introduction

Air change often accounts for a significant portion of the heating or air-conditioning load of a building. It also affects the moisture and contaminant levels in the building. Moisture-laden air passing through cracks in the building envelope under the influence of air pressure differences and through structural elements under the influence of vapour pressure differences can condense and cause material degradation. Air flow and air change rates depend on the size and distribution of air leakage sites, pressure differences induced by wind and temperature, mechanical system operation, and occupant behaviour. An appropriate level of ventilation is also required in all buildings for hygiene reasons.

This International Standard presents three test methods that use the measurement of tracer gas concentrations to determine air change in a building or other enclosure that can be characterized as a single zone. The measurement of tracer gas concentration, and sometimes the volume rate of flow at which the tracer gas is injected into the zone, allows calculation of the volume rate of air flow leaving the zone. The volume rate of incoming air flow can be inferred from this. The three test methods presented are:

- a) tracer gas decay (5.4), which tracks the decay rate of tracer gas concentration after an initial injection of tracer gas,
- b) constant injection (5.5), which tracks the tracer gas concentration resulting from a known, constant injection rate of tracer gas, and
- c) constant concentration (5.6), which tracks the amount of tracer gas required to maintain it at a constant concentration at a constant level.

Each test method employs specific tracer gas injection and sampling strategies. Other techniques exist, but are beyond the scope of these test methods.

Because air change depends on such variable conditions as building operation, wind speed, and indoor-outdoor temperatures, this International Standard does not provide information about building airtightness directly. ISO 9972 should be used to measure airtightness.

Thermal performance of buildings — Determination of air change in buildings — Tracer gas dilution method

1 Scope

This International Standard describes the use of tracer gas dilution for determining the air change in a single zone as induced by weather conditions or mechanical ventilation. The procedures for tracer gas dilution include concentration decay, constant injection and constant concentration. Tracer gas concentration is determined by a gas analyser. Air change rate is directly calculated from the rate of change of tracer gas concentration by the tracer gas decay method. Air flow rate is calculated directly from the tracer gas flow rate by the constant injection or constant concentration method.

These test methods are restricted to any single tracer gas. The associated data analysis assumes that the tracer gas concentration can be characterized within the zone with a single value.

NOTE The constant concentration test method given in 5.6 is usually used for multiple zones and allows the measurement of the air flow rate from the outside to each zone, if the residential zones are kept at the same concentration.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 7345, *Thermal insulation — Physical quantities and definitions*.

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 7345 and the following apply.

3.1 air flow rate

$\dot{V}$

total volume of air passing through the zone to and from the outdoors per unit of time

NOTE It is expressed in cubic metres per second or per hour (m^3/s , m^3/h).

3.2 air change rate

n

ratio of the total volume of air passing through the zone to and from the outdoors per unit of time to the volume of the zone

NOTE It is expressed in reciprocal seconds or reciprocal hours ($1/\text{s}$, $1/\text{h}$).