
**Thermal insulating products for
building equipment and industrial
installations — Determination of the
coefficient of thermal expansion**

*Produits isolants thermiques pour l'équipement du bâtiment et
les installations industrielles — Détermination du coefficient de
dilatation thermique*



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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 1, *Test and measurement methods*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 88, *Thermal insulating materials and products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 18099:2013), which has been technically revised.

The main changes are as follows:

- EN 13471:2001 and ISO 18099:2013 have been merged into one document;
- [Clause 2](#), Normative references, has been added and the numbering of the following clauses has been changed accordingly;
- editorial revisions.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Thermal insulating products for building equipment and industrial installations — Determination of the coefficient of thermal expansion

1 Scope

This document specifies the equipment and procedures for determining the coefficient of linear thermal expansion. It is applicable to thermal insulating products within the temperature range $-196\text{ }^{\circ}\text{C}$ to $850\text{ }^{\circ}\text{C}$, subject to the possible temperature limitation of the test specimens. It is not applicable to products which experience dimensional changes during the test due to the loss of hydration water or which undergo other phase changes.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

linear thermal expansion

reversible changes in the length of a product resulting from a change in temperature

3.2

mean coefficient of linear thermal expansion, α_m , between different temperatures

reversible change in length divided by the length at the reference temperature and the temperature difference between the test temperatures

Note 1 to entry: See [Figure 1](#).

3.3

coefficient of thermal expansion, α_t , at the temperature T

limit value of α_m as the higher temperature approaches the lower temperature

Note 1 to entry: See [Figure 1](#).

Note 2 to entry: The definition of α_m and α_t assumes that the function giving the length variation in relation to the temperature variation is continuous. This excludes the use of the mean coefficient of linear thermal expansion, α_m , when the test specimen experiences physical change due to change of phase, e.g. recrystallisation or loss of water of hydration. The curve giving the length variation as a function of the temperature variation can be reported, but the mean coefficient of thermal expansion should not be calculated for parts of the curve, which are not continuous.