
**Thermal insulation products for building
equipment and industrial installations —
Calcium silicate products**

*Produits isolants thermiques pour l'équipement du bâtiment et les
installations industrielles — Produits en silicate de calcium*



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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms, definitions, symbols, units and abbreviated terms	3
3.1 Terms and definitions	3
3.2 Symbols, units and abbreviated terms	3
4 Requirements	4
4.1 General	4
4.2 For all applications	5
4.3 For specific applications	6
5 Test methods	8
5.1 Sampling	8
5.2 Conditioning	8
5.3 Testing	8
6 Designation code	11
7 Evaluation of conformity	11
8 Marking and labelling	12
Annex A (normative) Factory production control	13
Annex B (informative) Additional properties	14
Annex C (informative) Preparation of the test specimens to measure thermal conductivity	16
Annex D (informative) Determination of the minimum service temperature	17
Bibliography	21

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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8143 was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 3, *Thermal insulation products*.

Thermal insulation products for building equipment and industrial installations — Calcium silicate products

1 Scope

This International Standard specifies the requirements for factory-made calcium silicate products which are used for thermal insulation of industrial installations and building equipment with an operating temperature of up to approximately +1 100 °C.

NOTE Calcium silicate products can be used at temperatures lower than 0 °C. For operating temperatures below 0 °C, special tests, regarding the suitability of the product in the intended application, are advised (e.g. liquefaction of oxygen). It is advisable to seek the advice of the manufacturer(s) in all cases.

The products are manufactured in the form of boards, pipe sections, segments and prefabricated ware.

This International Standard describes product characteristics and includes procedures for testing, evaluation of conformity, marking and labelling.

Products covered by this International Standard are also used in prefabricated thermal insulation systems and composite panels; the structural performance of systems incorporating these products is not covered.

This International Standard does not specify the required level or class of a given property required to be achieved by a product in order to demonstrate fitness for purpose in a particular application. The levels required for a given application can be found in regulations and invitations to tender.

This International Standard is not applicable to

- a) products with a declared thermal conductivity greater than 0,6 W/(m·K) at 23 °C;
- b) products intended to be used for the insulation of the building structure;
- c) the acoustical aspects
 - 1) direct airborne sound insulation, and
 - 2) impact noise transmission index.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1182¹⁾, *Reaction to fire tests for products — Non-combustibility test*

1) To be published. (Revision of ISO 1182:2002)

ISO 1716²⁾, *Reaction to fire tests for products — Determination of the heat of combustion (calorific value)*

ISO 2477, *Shaped insulating refractory products — Determination of permanent change in dimensions on heating*

ISO 8894-1, *Refractory materials — Determination of thermal conductivity — Part 1: Hot-wire method (cross-array)*

ISO 8302, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Guarded hot plate apparatus*

ISO 8497, *Thermal insulation — Determination of steady-state thermal transmission properties of thermal insulation for circular pipes*

ISO 9229, *Thermal insulation — Vocabulary*

ISO 12576-1, *Thermal insulation — Insulating materials and products for buildings — Conformity control systems — Part 1: Factory-made products*

ISO 13787, *Thermal insulation products for building equipment and industrial installations — Determination of declared thermal conductivity*

ISO 21129, *Hygrothermal performance of building materials and products — Determination of water-vapour transmission properties — Box method*

ISO 29465, *Thermal insulating products for building applications — Determination of length and width*

ISO 29466, *Thermal insulating products for building applications — Determination of thickness*

ISO 29467, *Thermal insulating products for building applications — Determination of squareness*

ISO 29468, *Thermal insulating products for building applications — Determination of flatness*

ISO 29469:2008, *Thermal insulating products for building applications — Determination of compression behaviour*

ISO 29472, *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions*

ISO 29767, *Thermal insulating products for building applications — Determination of short-term water absorption by partial immersion*

EN 13467, *Thermal insulating products for building equipment and industrial installations — Determination of dimensions, squareness and linearity of preformed pipe insulation*

EN 13468, *Thermal insulating products for building equipment and industrial installations — Determination of trace quantities of water soluble chloride, fluoride, silicate, sodium ions and pH*

EN 13469:2002, *Thermal insulating products for building equipment and industrial installations — Determination of water vapour transmission properties of preformed pipe insulation*

EN 13472, *Thermal insulating products for building equipment and industrial installations — Determination of short term water absorption by partial immersion of preformed pipe insulation*

2) To be published. (Revision of ISO 1716:2002)

3 Terms, definitions, symbols, units and abbreviated terms

3.1 Terms and definitions

For the purposes of this document the terms and definitions given in ISO 9229 and the following apply.

3.1.1

production line

equipment that produces products in a continuous process

NOTE For initial type test (ITT) and factory production control (FPC), each line is considered separately.

3.1.2

production unit

equipment that produces products in a discontinuous process

NOTE For ITT and FPC, units using the same process in one factory are considered together (as one production line).

3.1.3

minimum service temperature

lowest temperature to which a thermal insulation product may be exposed at a given thickness and at which it will continue to function within specified limits of performance

NOTE The required performance may be in the areas of dimensional stability, thermal properties and mechanical properties.

3.2 Symbols, units and abbreviated terms

3.2.1 Symbols and units

Symbol	Quantity	Unit
d	inside diameter of pipe section	mm
b	width	mm
t	thickness	mm
t_{dec}	declared thickness of the product	mm
S_{lin}	deviation from linearity	mm
l	length	mm
S_{h}	deviation from squareness of boards on length and width	mm/m
S_{d}	deviation from squareness of boards on thickness	mm
S_{max}	deviation from flatness	mm
$\Delta\varepsilon_{\text{b}}$	relative change in width	%
$\Delta\varepsilon_{\text{d}}$	relative change in thickness	%
$\Delta\varepsilon_{\text{l}}$	relative change in length	%
λ	thermal conductivity	W/(m·K)
λ_{D}	declared thermal conductivity	W/(m·K)
μ	water vapour diffusion resistance factor	—
σ_5	compressive stress at 5 % deformation	kPa
σ_{m}	compressive strength	kPa
S_{p}	deviation from squareness for pipe insulation	mm
ρ_{a}	apparent density	kg/m ³

3.2.2 Abbreviated terms for declared properties

Abbreviated term	Declared property
CS(Y)	declared level for compressive strength
CS(5)	declared level for compressive stress at 5 % deformation
Cl	declared level for chloride content
F	declared level for fluoride content
Na	declared level for sodium
K	declared level for potassium content
pH	declared level for pH
L	declared class for length tolerances
MU	declared value for water vapour diffusion resistance factor
P	declared value for flatness tolerances
S	declared class for squareness tolerances
ST (+)	declared level for maximum service temperature
ST (–)	declared level for minimum service temperature
T	declared class for thickness tolerances
W	declared class for width tolerances

3.2.3 Abbreviated terms

Abbreviated term	Meaning
CS	Calcium silicate
ITT	Initial type test
ML	Manufacturer's literature
FPC	Factory production control

4 Requirements

4.1 General

Product properties shall be assessed in accordance with Clause 5. To comply with this International Standard, products shall meet the requirements of 4.2, and the requirements of 4.3, as appropriate.

The test methods to be used for determination of each property are given in Table 4, which also shows the required test specimen dimensions and the minimum number of test specimens required to give one test result.

One test result for a product property is the average of the measured values on the number of test specimens given in Table 4.

For FPC, see Annex A.