
**Solar energy — Collector components
and materials —**

**Part 5:
Insulation material durability and
performance**

*Énergie solaire — Composants et matériaux du collecteur —
Partie 5: Durabilité et performance des matériaux isolants*

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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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Introduction

The insulation material is a component of a solar collector, which is placed behind the panel in a flat plate solar collector or in the header of an evacuated tube solar collector through a specific filling process and is used as a heat insulation element.

This document provides test methods for measuring the common properties on insulation materials, including apparent density, apparent volume percentage of open cells of PU and PF, and dimension, bulk density of MW and mineral fibre. For each test, this document specifies sampling, apparatus and acceptance test procedure.

This document also provides test methods for determining the durability of insulation materials, including compression properties, water absorption, hygroscopic sorption properties, water vapor transmission properties, flammability, accelerated aged value of thermal resistance of PU and PF, and compression behaviour, water absorption, moisture content, water vapor transmission properties, maximum use temperature, non-combustibility of MW and mineral fibre. For each durability test, this document specifies principle, apparatus, sampling, acceptance test procedure, calculation and expression of results, or evaluation.

This document also provides test methods and acceptance test procedure for measuring performance of insulation materials, including thermal resistance and thermal conductivity.

This document also provides test methods and acceptance test procedure for measuring outgassing of insulation materials in solar flat-plate collector.

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Solar energy — Collector components and materials —

Part 5: Insulation material durability and performance

1 Scope

This document specifies the requirements on insulation materials for solar collectors and test methods for durability and performance of insulation materials used in solar collectors.

This document is applicable to all types of insulation material used in solar collectors, such as rigid polyurethane foam (PU), phenolic foam (PF), mineral wool (MW) and mineral fibre.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 844, *Rigid cellular plastics — Determination of compression properties*

ISO 845, *Cellular plastics and rubbers — Determination of apparent density*

ISO 1182:2010, *Reaction to fire tests for products — Non-combustibility test*

ISO 1663, *Rigid cellular plastics — Determination of water vapour transmission properties*

ISO 2796, *Cellular plastics, rigid — Test for dimensional stability*

ISO 2896, *Rigid cellular plastics — Determination of water absorption*

ISO 4590, *Rigid cellular plastics — Determination of the volume percentage of open cells and of closed cells*

ISO 8301, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Heat flow meter apparatus*

ISO 9050, *Glass in building — Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors*

ISO 11561:1999, *Ageing of thermal insulation materials — Determination of the long-term change in thermal resistance of closed-cell plastics (accelerated laboratory test methods)*

ISO 11925-2, *Reaction to fire tests — Ignitability of products subjected to direct impingement of flame — Part 2: Single-flame source test*

ISO 12570, *Hygrothermal performance of building materials and products — Determination of moisture content by drying at elevated temperature*

ISO 12571, *Hygrothermal performance of building materials and products — Determination of hygroscopic sorption properties*

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