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Cellular plastic — Cellulose foam thermal insulation — Material specification

Plastiques alvéolaires — Matériau d'isolation à base de mousse de cellulose — Spécifications

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Foreword

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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.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 10, *Cellular plastics*.

Introduction

The cellulose foam contains at least 50 % of paper by weight as the raw material, which is expanded with a starch mixture.

Cellular plastic — Cellulose foam thermal insulation — Material specification

1 Scope

This document specifies material requirements and identifies the test methods to be used to determine these requirements for cellulose foam for thermal insulation for buildings and other applications.

There are four categories of material characterized by the density of the material.

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

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

ISO 1209-1, *Rigid cellular plastics — Determination of flexural properties — Part 1: Basic bending 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 8301, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Heat flow meter apparatus*

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

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

ISO 16000-4, *Indoor air — Part 4: Determination of formaldehyde — Diffusive sampling method*

ISO 16000-9, *Indoor air — Part 9: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test chamber method*

3 Terms and definitions

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

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
cellular foam
cellular material made by combining cellulose material with starch in a manufacturing process

4 General requirements

4.1 Dyes and fluorescent whitening agent

In the event of using the dyestuff for colour collaboration during the manufacturing process, water soluble dye that is not harmful to human body shall be used. Fluorescent whitening agent shall not be used.

4.2 Foreign matters

In the event of pulping, the waste paper for recycling with pulper, films (synthetic resin laminating, glass addition, etc.) shall be removed, and no foreign matters shall be mixed in the process.

4.3 Manufacturing process

All the process shall be designed through sufficient consideration of the possible discharge of hazardous matters, odour, noise, and pollution of water.

4.4 Toxic substance

In the event of using chemical materials during the manufacturing process, hazardous materials shall not be added, and the safety data sheets (SDS) of the raw materials added and their quality management data shall be recorded and kept in a consistent manner.

4.5 Appearance

The material shall be composed of several fine uniform independent air bubbles that have no surface defect.

4.6 Performance

The material shall meet the requirements of Table 1 when the identified test method is used.

Table 1 — Material requirements

Property	Unit	Category				Test method
		I	II	III	IV	
Density (min.)	kg/m^3	20	25	30	35	ISO 845
Compressive strength or compressive stress at 10 % deformation or yield (min.)	kPa	7	7	10	13	ISO 844
Initial thermal conductivity (max.) 10 °C mean /28 d min. or 23 °C mean /28 d min.	mW/(mK)	38 40	35 37	33 35	32 34	ISO 8301
Long term thermal resistance (min.)	(m^{2}K)/W	0,70 actual to be declared				ISO 11561
Dimensional change after 48 h at 70 °C (max.)	%	5				ISO 2796
Water vapour permeability (max./min.) 23 °C/0 % to 50 % RH	ng/(m.s.Pa)	9,5/3,5 actual to be declared				ISO 1663
Water absorption (max.)	% by volume	5				ISO 2896

Table 1 *(continued)*

Property	Unit	Category				Test method
		I	II	III	IV	
Bending load at break (min.)	N	14	16	18	20	ISO 1209-1
Formaldehyde emission (7 d)	mg/(m²·h)	0,5				ISO 16000-4
VOCs emission (7 d)	mg/(m²·h)	0,125				ISO 16000-9

4.7 Dimension

Dimension tolerance of the material shall be not greater than indicated in Table 2. For length and width, average the value of three specimens measured to within 1 mm using a ruler with the specimens spread flatways. For thickness, average the value of three specimens measured to within 0,1 mm using a thickness gauge.

Table 2 — Dimensions

Tolerance mm			
	thickness	width	length
For product thickness of 20 mm to 100 mm	+5,0 −3,0	+10 −5	+10 −5

5 Test methods

5.1 Sampling

Enough material shall be selected randomly for the preparation of the test specimens in the required quantity. All samples shall be from the same production or batch. If the material is intended to be coated with a sheet, the samples shall be collected before the sheet is coated.

5.2 Specimen preparation

Prepare the test specimens in the size and quantity as required by the test method. In cases where the test method does not state the quantity, there shall be three specimens prepared and tested.

5.3 Appearance

Inspect the specimens for surface defects such as apparent scratches, deformation, large hollows, etc. Discard all specimens that have surface defects.

5.4 Conditioning of specimens

Condition the test specimens at:

(23 ± 2) °C and (50 ± 10) % relative humidity

or

(23 ± 2) °C and 50^{+20}_{-10} % relative humidity

or

(23 ± 2) °C and 65^{+20}_{-10} % relative humidity

for a minimum of 24 h.