International Standard

ISO 17880

Cellular plastics — Self-supporting metal faced sandwich panels

Plastiques alvéolaires — Panneaux sandwich à parements métalliques autoportants

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Foreword

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

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.

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Introduction

This document has been developed with cellular plastics as the core. It has been eventually modified to include other materials, such as mineral wool.

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Cellular plastics — Self-supporting metal faced sandwich panels

1 Scope

This document specifies requirements for factory made, self-supporting, double skin metal-faced insulating sandwich panels where the insulating core materials are intended to be but not limited to cellular plastics and mineral wool as defined below.

The sandwich panels are intended for discontinuous laying in the following applications:

a) roofs and roof cladding;

b) external walls and wall cladding.

The insulating core materials covered by this document are rigid polyurethane foam (PUR), polyisocyanurate foam (PIR), expanded polystyrene foam (EPS), extruded polystyrene foam (XPS), phenolic foam (PF) and mineral wool. Sandwich panels with edge details that utilize different materials from the main insulating core are included in this document. Sandwich panels used in outdoor cold storage applications are included in this document.

This document does not cover the following:

— sandwich panels with a declared thermal conductivity for the insulating core material greater than 0,06 W/m·K at 10 °C, or greater than 0,06 W/m·K at 23 °C;

— sandwich panels consisting of two or more clearly defined layers of different insulating core materials (multi-layered);

— sandwich panels consisting of more than one metal sheet per face;

— sandwich panels with perforated facing(s);

— curved sandwich panels;

— indoor cold storage applications.

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 354:2003, *Acoustics — Measurement of sound absorption in a reverberation room*

ISO 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation*

ISO 834-1, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*

ISO 834-4, *Fire-resistance tests — Elements of building construction — Part 4: Specific requirements for loadbearing vertical separating elements*

ISO 834-5, *Fire-resistance tests — Elements of building construction — Part 5: Specific requirements for loadbearing horizontal separating elements*

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ISO 834-8, *Fire-resistance tests — Elements of building construction — Part 8: Specific requirements for non-loadbearing vertical separating elements*

ISO 834-9, *Fire-resistance tests — Elements of building construction — Part 9: Specific requirements for non-loadbearing ceiling elements*

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

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

ISO 1716, *Reaction to fire tests for products — Determination of the gross heat of combustion (calorific value)*

ISO 4898, *Rigid cellular plastics — Thermal insulation products for buildings — Specifications*

ISO 6270-1, *Paints and varnishes — Determination of resistance to humidity — Part 1: Condensation (single-sided exposure)*

ISO 6361-2, *Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 2: Mechanical properties*

ISO 6361-3, *Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 3: Strips: Tolerances on shape and dimensions*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 6946, *Building components and building elements — Thermal resistance and thermal transmittance — Calculation methods*

ISO 8145, *Thermal insulation; mineral wool board for overdeck insulation of roofs — Specification*

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

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

ISO 9229, *Thermal insulation — Vocabulary*

ISO 9445-2:2009, *Continuously cold-rolled stainless steel — Tolerances on dimensions and form — Part 2: Wide strip and plate/sheet*

ISO 10140-1:2021, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 1: Application rules for specific products*

ISO 10140-2:2021, *Acoustics — Laboratory measurement of sound insulation of building elements — Part 2: Measurement of airborne sound insulation*

ISO 10211, *Thermal bridges in building construction — Heat flows and surface temperatures — Detailed calculations*

ISO 10456, *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*

ISO 11654, *Acoustics — Sound absorbers for use in buildings — Rating of sound absorption*

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

ISO 12468-1, *External exposure of roofs to fire — Part 1: Test method*

ISO/TR 12468-3, *External exposure of roofs to fire — Part 3: Commentary*

ISO 12491, *Statistical methods for quality control of building materials and components*

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ISO 13784-1:2014, *Reaction to fire test for sandwich panel building systems — Part 1: Small room test*

ISO 13784-2:2020, *Reaction-to-fire tests for sandwich panel building systems — Part 2: Test method for large rooms*

ISO 13785-1, *Reaction-to-fire tests for façades — Part 1: Intermediate-scale test*

ISO 13785-2, *Reaction-to-fire tests for façades — Part 2: Large-scale test*

ISO 13943, *Fire safety — Vocabulary*

ISO 14857, *Thermal performance in the built environment — Determination of air permeance of building materials*

ISO 16163, *Continuously hot-dipped coated steel sheet products — Dimensional and shape tolerances*

ISO 22111, *Bases for design of structures — General requirements*

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

ISO 29470, *Thermal insulating products for building applications — Determination of the apparent density*

ISO 29765, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*

EN 508-1, *Roofing products from metal sheet — Specification for self-supporting products of steel, aluminium or stainless steel sheet — Part 1: Steel*

EN 1172, *Copper and copper alloys — Sheet and strip for building purposes*

EN 1396, *Aluminium and aluminium alloys — Coil coated sheet and strip for general applications — Specifications*

EN 1990:2002 + A1:2005 + A1:2005/AC:2010, *Eurocode - Basis of structural design*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels*

EN 10143:2006, *Continuously hot-dip metal coated steel sheet and strip — Tolerances on dimensions and shape*

EN 10169, *Continuously organic coated (coil coated) steel flat products — Technical delivery conditions*

EN 10204, *Metallic products - Types of inspection documents*

EN 12865, *Hygrothermal performance of building components and building elements — Determination of the resistance of external wall systems to driving rain under pulsating air pressure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9229, ISO 13943 and the following 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/

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3.1
auto-adhesive bond
self-adhesion of the core to the face(s) occurring automatically without the use of an adhesive

Note 1 to entry: This technique is used for producing sandwich panels by foaming.

3.2
bending moment capacity
maximum bending moment recorded during a test on an individual panel

3.3
bending resistance
characteristic value of bending moment capacity determined on the basis of a test series

3.4
bond
bonding
adhesion between the face(s) and the core normally provided by an approved adhesive

3.5
core
layer of material, having thermal insulating properties, which is bonded between two metal faces, creating a sandwich panel

3.6
durability
ability of the panel to withstand the environmental effects and accommodate the consequent decrease in mechanical strength with time caused by factors such as temperature, humidity, freeze-thaw cycles and their various combinations

3.7
edge
longitudinal edge
side of the panel where adjacent panels join together in the same plane

3.8
face
facing
flat, lightly profiled or profiled thin metal sheet firmly bonded to the core

3.9
flat face
face without any rolled or pressed profile or raised strengthening rib

3.10
lightly profiled face
face with a rolled or pressed profile not exceeding 5 mm in depth

3.11
profiled face
face with a rolled or pressed profile exceeding 5 mm in depth

3.12
incompletely bonded panel
panel in which one or both faces is incompletely bonded

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3.13
joint
interface between two panels where the meeting edges have been designed to allow the panels to join together in the same plane

Note 1 to entry: The joint can incorporate interlocking parts that enhance the mechanical properties of the system as well as improving the thermal, acoustic and fire performance and restricting air movement.

Note 2 to entry: The term 'joint' does not refer to a junction between cut panels or a junction where the panels are not installed in the same plane.

3.14
lamella
core material consisting of mineral wool that has been cut and orientated with the fibres perpendicular to the facings prior to bonding

3.15
lightly profiled facing
facing with a rolled or pressed profile not exceeding 5 mm in depth

3.16
pre-manufactured
pre-formed
component or material that is supplied to the manufacturer ready for direct incorporation into the sandwich panel as a core

3.17
sandwich panel
building product consisting of two metal faces positioned on either side of a core that is a thermally insulating material, which is firmly bonded to both faces so that the three components act compositely when under load

3.18
self-supporting sandwich panel
panel capable of supporting, by virtue of its materials and shape, its self-weight and in the case of panels fixed to spaced structural supports all applied loadings (e.g. snow, wind, internal air pressure), and transmitting these loadings to the supports

3.19
shift
period of production during a working day, normally 6 h to 8 h but can be less

3.20
side lap
folded area of one or both facing materials along the longitudinal edge of the panel which engages with the adjacent panel to form an interlocking or overlapping joint

3.21
wrinkling strength
characteristic value of *wrinkling stress* (3.22)

3.22
wrinkling stress
stress in the compressed face of a panel undergoing failure in bending, where the failure mode takes the form of a "wrinkle" extending over the full width of the panel near the section of maximum bending moment

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