
**Tovarniško izdelane izolacijske plošče z obojestranskim kovinskim oplaščenjem
za konstrukcijsko uporabo**

Factory-made double skin metal faced insulating panels for structural applications

Werkmäßig hergestellte Elemente mit beidseitigen Metaldeckschichten für tragende Anwendungen

Panneaux isolants à deux parements métalliques manufacturés pour applications structurelles

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ICS:

91.100.60

Materiali za toplotno in
zvočno izolacijo

Thermal and sound insulating
materials

oSIST prEN 14509-2:2026

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**Factory-made double skin metal faced insulating panels
for structural applications**

Panneaux isolants à deux parements métalliques
manufacturés pour applications structurelles

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Metalldeckschichten für tragende Anwendungen

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European foreword

This document (prEN 14509-2:2026) has been prepared by Technical Committee CEN/TC 128 “Roof covering products for discontinuous laying and products for wall cladding”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

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1 Scope

This document covers structural double skin metal faced insulating sandwich panels intended to be used as elements for structural applications in construction works in roofs, in external and internal walls (including partitions) and in ceilings (hereafter referred to as structural sandwich panels).

The structural sandwich panels consist of two faces made of:

- steel;
- stainless steel;
- aluminium;
- aluminium alloys;
- copper

and insulating core made of

- rigid polyurethane foam (PU) (see 3.1.23);
- expanded polystyrene (EPS) (see 3.1.21);
- extruded polystyrene foam (XPS) (see 3.1.22);
- phenolic foam (PF) (see 3.1.20);
- mineral wool (MW) (see 3.1.19)

either by using an auto-adhesive bonding technique or by using a separate adhesive layer.

Products which are

- curved;
- perforated (perforated face);
- used for stabilization purposes having insulation core material of phenolic foam;
- consisting of two or more clearly specified layers of different insulating core materials (multi-layered) or of different materials per face;
- used as ceilings when fastening is under permanent tension load;
- parts of clean room kits, conditioning room kits, cold storage room kits and cold storage building envelope and building kits;
- reused

are excluded from this product definition.

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.

EN 485-2:2016+A1:2018, *Aluminium and aluminium alloys — Sheet, strip and plate — Part 2: Mechanical properties*

EN 485-4:1993, *Aluminium and aluminium alloys — Sheet, strip and plate — Part 4: Tolerances on shape and dimensions for cold-rolled products*

EN 1172:2011, *Copper and copper alloys — Sheet and strip for building purposes*

EN 1396:2023, *Aluminium and aluminium alloys — Coil coated sheet and strip for general applications — Specifications*

EN 10088-1:2023, *Stainless steels — Part 1: List of stainless steels*

EN 10088-2:2024, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resistant steels for general purposes*

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

EN 10169:2022, *Continuously organic coated (coil coated) steel flat products — Technical delivery conditions*

prEN 10346:2025, *Continuously hot-dip coated steel flat products for cold forming — Technical delivery conditions*

EN 13162:2012+A1:2015, *Thermal insulation products for buildings — Factory made mineral wool (MW) products — Specification*

EN 13163:2012+A2:2016, *Thermal insulation products for buildings — Factory made expanded polystyrene (EPS) products — Specification*

EN 13164:2012+A1:2015, *Thermal insulation products for buildings — Factory made extruded polystyrene foam (XPS) products — Specification*

EN 13165:2012+A2:2016, *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

EN 13166:2012+A2:2016, *Thermal insulation products for buildings — Factory made phenolic foam (PF) products — Specification*

EN 13501-1:2018, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13501-2:2023, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance and/or smoke control tests, excluding ventilation services*

EN 13501-5:2016, *Fire classification of construction products and building elements — Part 5: Classification using data from external fire exposure to roofs tests*

EN 13523-2:2021, *Coil coated metals — Test methods — Part 2: Gloss*

prEN 14509-3:2026, *Factory made double skin metal faced insulating sandwich panels — Part 3: Test methods for determining mechanical strength, building physical behaviour and durability*

prEN 14509-4:2026, *Factory made double skin metal faced insulating sandwich panels — Part 4: Test methods for fixing of panels and for determining restraining effect on substructure*

prEN 14509-5:2026, *Factory made double skin metal faced insulating sandwich panels — Part 5: Design methods — Determination criteria for combining actions and spans*

FprEN 15254-5:2026, *Extended application of results from fire resistance tests — Non-loadbearing walls — Part 5: Metal sandwich panel construction*

FprEN 15254-7:2026, *Extended application of results from fire resistance tests — Non-loadbearing ceilings — Part 7: Metal sandwich panel construction*

EN 15804:2012+A2:2019,¹ *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products*

EN 16516:2017+A1:2020, *Construction products: Assessment of release of dangerous substances — Determination of emissions into indoor air*

EN 16733:2016, *Reaction to fire tests for building products — Determination of a building product's propensity to undergo continuous smouldering*

prEN 18159:2025, *Double skin metal faced insulating sandwich panels for roofing and cladding — Environmental Product Declarations — Product category rules complementary to EN 15804 for double skin metal faced insulating sandwich panels for roofing and cladding*

EN ISO 6892-1:2019, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2019)*

EN ISO 9445-2:2010, *Continuously cold-rolled stainless steel — Tolerances on dimensions and form — Part 2: Wide strip and plate/sheet (ISO 9445-2:2009)*

EN ISO 12944-2:2017, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments (ISO 12944-2:2017)*

CEN/TS 1187:2012, *Test methods for external fire exposure to roofs*

¹ As impacted by EN 15804:2012+A2:2019/AC:2021.

3 Terms, definitions, symbols, subscripts and abbreviations

3.1 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/>

3.1.1

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.

3.1.2

bond

adhesion between the face(s) and the core

3.1.3

core

layer of material, having insulating properties, which is bonded between two metal faces

3.1.4

edge

side of the panel where adjacent sandwich panels join together in the same plane

3.1.5

face

flat, lightly profiled or profiled thin metal sheet bonded to the core

3.1.6

flat face

face without any rolled or pressed profile or raised strengthening rib

3.1.7

lightly profiled face

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

3.1.8

profiled face

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

3.1.9

incompletely bonded face

metal face whose bond to the core is adequate for sandwich action but does not include the entire surface of the core

Note 1 to entry: An example is a trapezoidally profiled face that has voids between the raised profiles and the core.

3.1.10**incompletely bonded panel**

panel in which one or both faces are incompletely bonded

3.1.11**fastener**

component (screw incl. washer, with or without sealant if relevant) used for fixing the panel to the supporting structure

3.1.12**fastening**

fastening is local interaction of a fastener (self tapping/self drilling screws) with a surrounding material of the connected elements

3.1.13**fixing**

mechanical connection between the sandwich panel and the supporting structure, typically with one fastener or more fasteners in a visible fixing (through the sandwich panel) or in a hidden fixing (placed in the longitudinal joint of the sandwich panel)

Note 1 to entry: Fixing is covering only the failure modes in sandwich panels caused by the fastening.

3.1.14**hidden fixing**

mechanical connection between the sandwich panel and the supporting structure, placed in the longitudinal joint of adjacent sandwich panels consisting of one or more fasteners (with or without washer) going through or connecting both sheets in a certain arrangement in relation to the sandwich panel geometry, with or without load spreading component

3.1.15**visible fixing**

one or more fasteners in a certain minimum distance to the sandwich panel edges and between themselves (if applicable), visible on the visible side of the face of the sandwich panel, penetrating the inner and the outer face and the core of the sandwich panel

Note 1 to entry: Visible fixings can be covered by flashings after installation.

3.1.16**joint**

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

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

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

3.1.17**lamella**

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

prEN 14509-2:2026 (E)**3.1.18****load spreading component**

flat or profiled metal component used to distribute the load from the fasteners to the panel

3.1.19**mineral wool****MW**

insulating wool produced from molten stone, slag or glass

[SOURCE: EN 13162:2012+A1:2015]

3.1.20**phenolic foam****PF**

rigid cellular foam, the polymer structure of which is made primarily from the polycondensation of phenol, its homologues and/or derivatives, with or without aldehydes or ketones

[SOURCE: EN 13166:2012+A2:2016]

3.1.21**expanded polystyrene****EPS**

rigid cellular plastic material, manufactured by moulding beads or granules of expandable polystyrene or one of its copolymers, with an air filled closed cellular structure

[SOURCE: EN 13163:2012+A2:2016]

3.1.22**extruded polystyrene foam****XPS**

rigid cellular plastics insulation material expanded and extruded with or without a skin, from polystyrene or one of its copolymers and which has a closed cell structure

[SOURCE: EN 13164:2012+A1:2015]

3.1.23**rigid polyurethane****PU**

family of rigid cellular thermoset polymeric insulation products with a substantially closed cell structure including both polymer types based on PIR and PUR

[SOURCE: EN 13165:2012+A2:2016]

3.1.24**pre-manufactured**

component or material that is supplied to the manufacturer ready for direct incorporation into the sandwich panel

3.1.25**product family**

group of products produced by one manufacturer for which the assessment results for one or more characteristics from any one product within the range are valid for all other products within this range

3.1.26**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

3.1.27**shift**

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

3.1.28**stiffness parameter**

parameter expressing stiffening effect on supporting structure given by sandwich panels when fastened to supporting structure

3.1.29**wrinkling strength**

characteristic value of wrinkling stress at the moment of failure

Note 1 to entry: wrinkling stress is the 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

3.1.30**ventilated cavity wall**

sandwich panel used as an additional layer on an existing wall with ventilated air gap

3.2 Symbols, subscripts and abbreviations**3.2.1 Symbols**

For the purposes of this document, the following symbols, subscripts and abbreviations apply.

A	elongation of face material
C	parameter used in connection to airborne sound insulation (C_{tr}), parameter describing the air permeability of a joint, rotational spring stiffness
D	overall thickness of the panel
E	modulus of elasticity
G	shear modulus
L	length of span, length of measurement
R	sound reduction index (R_w), strength,
T	temperature
U	thermal transmittance ($U_{d,s}$)
b	width of rib and valley in metal face profile bowing

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d	depth, continuous depth of core (d_c), depth of stiffener (d_s)
f	strength
h	depth of metal face profile
k	support distribution parameter, relation between strength after ageing and initial strength
n	parameter describing the air permeability of a joint
p	pitch of stiffeners and lightly profiled faces
s	parameter describing the water vapour permeability of a joint
t	thickness of face sheet
w	cover width
x, y, z	coordinates
α	sound absorption (α_w)
λ	thermal conductivity λ_D (design value)
φ	creep coefficient
σ	strength, stress, wrinkling strength (σ_w)

3.2.2 Subscripts

C	core
D	expressed thermal conductivity (λ_D)
R	resistance
S	sandwich
T	temperature
c	compression
d	design, expressed thermal transmittance including the influence of the joints $U_{d,s}$
h	head of the screw
k	characteristic
m	mean
rep	repeated
s	support, stiffener
t	tensile, tension, time, thickness

tol	tolerance
tr	traffic (C_{tr})
v	shear
w	wrinkling (σ_w), sound insulation index (R_w)
0	basic value, time (e.g. $t = 0$)
θ	compression creep index

3.2.3 Abbreviations

DUR	ageing method of tensile strength for determining durability performance
EPS	expanded polystyrene
GU	reflectivity
MW	mineral wool (covers stone wool and glass wool)
PCS	gross calorific potential
PE	polyester coating
PU	rigid polyurethane foam (covers also PIR)
PF	phenolic foam
SLS	serviceability limit state
ULS	ultimate limit state
XPS	extruded polystyrene foam

4 Characteristics

4.1 Characteristics of metallic faces

4.1.1 Yield strength – face

4.1.1.1 General

The tensile yield strength of the metal indicates the maximum stress that can be applied before permanent shape change is achieved in ductile materials.

4.1.1.2 Steel faces

When assessed in accordance with the assessment method given in Clause 5.1.1.1, relevant for the declared performance, the assessment result is expressed as indication of the used steel grade for each face if different.

The performance shall have a minimum value of 220 MPa for steel faces.

4.1.1.3 Stainless steel faces

When assessed in accordance with the assessment method given in Clause 5.1.1.2, relevant for the declared performance, the assessment result is expressed as indication of the used stainless steel grade together with the value of the yield strength in [MPa] for each face if different.

The performance (0,2 %-strain limit) shall have a minimum value of 220 MPa for stainless steel faces.