SLOVENSKI STANDARD
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Tovarniško izdelane izolacijske plošče z obojestranskim kovinskim oplaščenjem za samonosilne aplikacije

Factory-made double skin metal faced insulating panels for self-supporting applications

Werkmäßig hergestellte Elemente mit beidseitigen Metalldeckschichten für selbsttragende Anwendungen

Panneaux isolants à deux parements métalliques manufacturés pour applications autoportantes

Ta slovenski standard je istoveten z: **prEN 14509-1**

ICS:

91.100.60	Materiali za toplotno in zvočno izolacijo	Thermal and sound insulating materials

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English Version

Factory-made double skin metal faced insulating panels for self-supporting applications

Panneaux isolants à deux parements métalliques manufacturés pour applications autoportantes

Werkmäßig hergestellte Elemente mit beidseitigen Metalldeckschichten für selbsttragende Anwendungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 128.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 14509-1:2026) 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 will supersede EN 14509:2013.

EN 14509:2013 is completely revised. This document has been adapted to the new rules for harmonized standards and the standardization request M/616. Characteristics for propensity to undergo continuous smouldering, release of dangerous substances – indoor air, environmental sustainability have been added. Annexes A, B, C, D of EN 14509:2013 have been deleted; they will be part of a supporting standard.

The main changes with respect to the previous edition are listed below:

— main body of EN 14509:2013 is now EN 14509-1 revised according to the standardization request;

— EN 14509:2013, Annexes A to D are now EN 14509-3;

— EN 14509:2013, Annex E is now EN 14509-5.

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.

1 Scope

This document specifies characteristics of factory-made double skin metal faced insulating sandwich panels intended to be used as elements for self-supporting applications in construction works in roofs, external and internal walls (including partitions) and in ceilings (hereafter referred to as non-structural sandwich panels).

The non-structural sandwich panels consist of two faces made of:

— steel;

— stainless steel;

— aluminium;

— aluminium alloys;

— copper

and insulating core made of:

— rigid polyurethane (PU) (see 3.1.17);

— expanded polystyrene (EPS) (see 3.1.15);

— extruded polystyrene foam (XPS) (see 3.1.16);

— phenolic foam (PF) (see 3.1.14);

— mineral wool (MW) (see 3.1.13)

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

Products which are

— curved;

— perforated (perforated faces);

— used for stabilization purposes;

— 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.

Products intended to be used for structural applications 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 14509-5:2026, *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*

EN 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
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.

3.1.12
lamella
core material consisting of mineral wool that has been cut and orientated with the fibres perpendicular to the faces prior to bonding

3.1.13
mineral wool
MW
insulating wool produced from molten stone, slag or glass

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

3.1.14
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]

3.1.15
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]

3.1.16
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]

3.1.17
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]

3.1.18
pre-manufactured
component or material that is supplied to the manufacturer ready for direct incorporation into the sandwich panel

3.1.19
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

3.1.20
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

3.1.21
shift
period of production during a working day, normally 6 h to 8 h but can be less

3.1.22
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.

3.1.23
ventilated cavity wall
sandwich panel used as an additional layer on an existing wall with ventilated air gap

3.2 Symbols, subscripts and abbreviations

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

3.2.1 Symbols

A	elongation of face material
C	parameter used in connection to airborne sound insulation (C_{tr}), parameter describing the air permeability of a joint
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
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)
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

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)

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
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.

4.1.1.4 Aluminium faces

When assessed in accordance with the assessment method given in Clause 5.1.1.3, relevant for the declared performance, the assessment result is expressed as indication of the used aluminium alloy designation code together with the value of the yield strength [MPa] for each face if different.

The performance (0,2 %-strain limit) shall have a minimum value of 140 MPa for aluminium faces.

4.1.1.5 Copper faces

When assessed in accordance with the assessment method given in Clause 5.1.1.4, relevant for the declared performance, the assessment result is expressed as indication of the used copper number / material condition, with extension R. R is an indication on ultimate tensile strength in MPa, together with the value of the yield strength [MPa] for each face if different.

The performance (0,2 %-strain limit) shall have a minimum value of 140 MPa for copper faces.

4.1.2 Reflectivity

The reflectivity indicates the amount of reflection of light from a surface. When assessed with the method given in Clause 5.1.2, the result of the reflectivity GU is expressed as a gloss unit.

4.2 Characteristics of core material

4.2.1 Compressive strength – core material

The compressive strength of the core material, f_{Cc}, indicates the stress at failure of a specimen when tested in uniaxial unconfined compression. When tested in accordance with the method given in Clause 5.2.1, the result of the performance of the compressive strength is expressed in megapascal (MPa).

4.2.2 Compressive E-modulus – core material

The compressive E-modulus of the core material, E_{Cc}, indicates the proportional relationship between stress and strain during the deformation of the specimen with linear-elastic behaviour under compression. When tested in accordance with the method given in Clause 5.2.2, the performance of the compressive modulus is expressed in megapascals (MPa).

4.2.3 Thermal conductivity – core material

The thermal conductivity of the core material indicates heat flow through a unit length of material under the influence of a thermal gradient. In case of core materials with cell structure, the aged value shall be expressed. When tested in accordance with the method given in Clause 5.2.3, the thermal conductivity of the core material (aged value) λ_D is expressed in W/mK.

4.3 Characteristics for mechanical performance

4.3.1 Cross panel tensile strength

The cross panel tensile strength of the sandwich panel, f_{Ct}, indicates the tensile strength perpendicular to the panel faces. When tested in accordance with the method given in Clause 5.3.1, the performance of the cross panel tensile strength is expressed in megapascal (MPa). The result obtained for the characteristic value shall be equal or higher than 0,02 MPa.

4.3.2 Cross panel tensile modulus

The cross panel tensile modulus, E_{Ct}, indicates the proportional relationship between stress and strain during the deformation of the specimen perpendicular to the panel faces with linear-elastic behaviour under tension. When tested in accordance with the method given in Clause 5.3.2, the performance of the cross panel tensile modulus is expressed in megapascals (MPa).

4.3.3 Cross panel tensile strength – elevated temperature

The cross panel tensile strength at elevated temperature, $f_{Ct,+80^oC}$, indicates the tensile strength perpendicular to the panel faces of specimens which have been heated for 20 h to 24 h in a heating chamber at a temperature of 80°C (+3°/-1°). When tested in accordance with the method given in Clause 5.3.3, the performance of the cross panel tensile strength at elevated temperature is expressed in megapascals (MPa).

4.3.4 Shear strength for short-term loading

The shear strength for short term loading, f_{Cv}, indicates the strength of a sandwich panel against structural failure when the sandwich panel fails in shear. When tested in accordance with the method given in Clause 5.3.4, the performance of the shear strength for short-term loading is expressed in megapascals (MPa) together with test setup.

4.3.5 Shear modulus for short-term loading

The shear modulus, G_c, for short-term loading indicates the elastic shear stiffness of a material and is defined as the ratio of shear stress to the shear strain. When tested in accordance with the method given in Clause 5.3.5, the performance of the shear modulus of the sandwich panel is expressed in megapascals (MPa) together with test setup.

4.3.6 Shear strength after long-term loading t = 2 000 h (for roof applications)

The shear strength after long-term loading, $f_{Cv\,2000}$ (t = 2 000 h), indicates the strength of a sandwich panel against structural failure when the sandwich panel fails in shear after long-term loading. It is used for all panels carrying long-term, e.g. snow. When assessed in accordance with the method given in Clause 5.3.6, the performance of the shear strength after long term loading is expressed in megapascals (MPa), together with the test method and time duration.

4.3.7 Shear strength after long-term loading t = 100 000 h (for ceiling and roof applications)

The shear strength after long-term loading, $f_{Cv\,100000}$ (t = 100 000 h), indicates the strength of a sandwich panel against structural failure when the sandwich panel fails in shear after long-term loading. It is used for all panels carrying self-weight. When assessed in accordance with the method given in Clause 5.3.7, the performance of the shear strength after long term loading is expressed in megapascals (MPa), together with the test method and time duration.

4.3.8 Creep coefficient t = 2 000 h (for roof applications)

The creep coefficient, φ_t (t = 2 000 h), indicates the ratio of time-dependent creep deformation to elastic deformation after t = 2 000 h. When assessed in accordance with the method given in Clause 5.3.8, the performance of the creep coefficient of the sandwich panel is expressed as a single value for φ_{2000}, for load duration of 2 000 h.

4.3.9 Creep coefficient t = 100 000 h (for ceiling and roof applications)

The creep coefficient, φ_t (t = 100 000 h), indicates the ratio of time-dependent creep deformation to elastic deformation after t = 100 000 h. When assessed in accordance with the method given in Clause 5.3.9, the performance of the creep coefficients of the sandwich panel is expressed as a single value for φ_{100000}, for load duration 100 000 h.