



SLOVENSKI STANDARD
oSIST prEN 14509-1:2021
01-julij-2021

**Tovarniško izdelane izolacijske sendvič plošče z obojestranskim kovinskim
oplaščanjem - 1. del: Samonosilne**

Factory-made double skin metal faced insulating sandwich panels - Part 1: Self-supporting applications

Werkmäßig hergestellte Sandwich-Elemente mit beidseitigen Metalldeckschichten - Teil 1: Selbsttragende Anwendungen

Panneaux sandwichs isolants double peau à parements métalliques manufacturés - Partie 1 : Applications autoportantes

ITEH STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN 14509-1:2021
<https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pr-en-14509-1-2021>

Ta slovenski standard je istoveten z: prEN 14509-1

ICS:

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

oSIST prEN 14509-1:2021

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 14509-1:2021](https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021)

<https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 14509-1

May 2021

ICS 91.100.60

Will supersede EN 14509:2013

English Version

Factory-made double skin metal faced insulating sandwich panels - Part 1: Self-supporting applications

Panneaux sandwichs isolants double peau à parements
métalliques manufacturés - Partie 1 : Applications
autoportantes

Werkmäßig hergestellte Sandwich-Elemente mit
beidseitigen Metalldeckschichten - Teil 1:
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.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	8
3 Terms, definitions, symbols, subscripts and abbreviations	9
3.1 Terms and definitions	9
3.2 Symbols, subscripts and abbreviations	11
3.2.1 Symbols.....	11
3.2.2 Subscripts.....	11
3.2.3 Abbreviations	12
4 Characteristics.....	12
4.1 Mechanical resistance.....	12
4.1.1 General.....	12
4.1.2 Characteristics of metal faces.....	13
4.1.3 Shear strength (f_{Cv}) for short-term loading	15
4.1.4 Shear modulus (G_C) for short-term loading	15
4.1.5 Creep coefficient (φ_t)	16
4.1.6 Compressive strength (f_{Cc})	16
4.1.7 Compressive modulus (E_{Cc}).....	16
4.1.8 Shear strength after long-term loading (f_{Cv} long-term).....	16
4.1.9 Cross panel tensile strength (f_{Ct}).....	17
4.1.10 Cross panel tensile modulus (E_{Ct})	17
4.1.11 Wrinkling strength (σ_w)	17
4.1.12 Wrinkling strength at elevated temperature (σ_{wT})	17
4.1.13 Wrinkling strength over a central support (σ_{wS}).....	18
4.1.14 Wrinkling strength over a central support at elevated temperature (σ_{wST}).....	18
4.1.15 Stress distribution factor over a support (k).....	18
4.2 Thermal transmittance.....	18

4.3	Reaction to fire.....	18
4.4	Resistance to fire.....	19
4.5	External fire performance – roofs.....	19
4.6	Dimensional tolerances.....	20
4.7	Water permeability.....	21
4.7.1	Water permeability of the product.....	21
4.7.2	Water permeability of a joint.....	22
4.8	Air permeability.....	22
4.8.1	Air permeability of the product.....	22
4.8.2	Air permeability of a joint.....	22
4.9	Water vapour permeability.....	22
4.9.1	Water vapour permeability of the product.....	22
4.9.2	Water vapour permeability of a joint.....	22
4.10	Airborne sound insulation ($R_w(C;Ctr)$).....	23
4.11	Sound absorption (α_w).....	23
4.12	Durability.....	23
4.12.1	General.....	23
4.12.2	Reduction of cross panel tensile strength.....	23
4.12.3	Resistance to access loads.....	26
4.12.4	Corrosion resistance.....	26
5	Assessment and verification of constancy of performance - AVCP.....	27
5.1	General.....	27
5.2	Assessment of performance.....	27
5.2.1	General.....	27
5.2.2	Test samples, testing and assessment criteria.....	28
5.3	Verification of constancy of performance.....	30
5.3.1	Factory Production Control (FPC).....	30
5.3.2	Initial inspection of factory and of FPC.....	32

prEN 14509-1:2021 (E)

5.3.3 Continuous surveillance of FPC.....	32
Annex ZA (informative) Relationship of this European Standard with Regulation (EU) No.305/2011	34
Bibliography.....	41

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 14509-1:2021](https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021)
<https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021>

European foreword

This document (prEN 14509-1:2021) 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 together with prEN 14509-3:2021 and prEN 14509-5:2021.

EN 14509:2013 is completely revised.

This document has been prepared under two standardization requests given to CEN by the European Commission and the European Free Trade Association.

For relationship with Regulation (EU) No.305/2011 on construction products (CPR), see informative Annex ZA, which is an integral part of this document.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 14509-1:2021](https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021)

<https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021>

prEN 14509-1:2021 (E)

Introduction

In FprEN 14509-2:2020, the rules on assessment of performance for structural use are given, as this standard is for use as self-supporting panels.

The clarification of which application is self-supporting is given by national provisions.

In prEN 14509-3:2021, methods for the determination of characteristics given in this document are given.

In EN 14509-4:2020, methods for the determination of fixing performance of panels and restraining effect on substructures are given.

In EN 14509-5:2020, design rules and criteria for combing actions and spans are given.

**iTeh STANDARD PREVIEW
(standards.iteh.ai)**

[oSIST prEN 14509-1:2021](https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021)

<https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021>

1 Scope

This document specifies characteristics of factory-made double skin metal faced insulating sandwich panels for use in elements for self-supporting applications in roofs, in external and internal walls (including partitions) and in ceilings in buildings (hereafter sandwich panels).

The sandwich panels consist of two faces and insulating core either by using auto-adhesive bonding technique or by using a separate adhesive layer.

The face materials covered by this document are:

- steel,
- stainless steel,
- aluminium,

NOTE Aluminium covers aluminium alloys.

- copper.

The insulating cores covered by this document are:

- rigid polyurethane (PU) (see 3.1.15);
- expanded polystyrene (EPS) (see 3.1.13);
- extruded polystyrene foam (XPS) (see 3.1.14);
- phenolic foam (PF) (see 3.1.12);
- mineral wool (MW) (see 3.1.11).

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN 14509-1:2021
<https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021>

For sandwich panels, the coating of faces is either organic and/or metallic coating.

This document specifies procedures for assessment and verification of constancy (AVCP) of performance of characteristics of sandwich panels.

This document does not cover the following:

- sandwich panels consisting of two or more clearly defined layers of different insulating cores (multi-layered);
- sandwich panels consisting of more than one metal sheet per face;
- curved sandwich panels;
- sandwich panels with perforated faces;
- fasteners and fixings;
- sandwich panels, placed on the market as a part of clean room kits, conditioning room kits, cold storage room kits and cold storage building envelope and building kits.

prEN 14509-1:2021 (E)**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 1396:2015, *Aluminium and aluminium alloys — Coil coated sheet and strip for general applications — Specifications*

EN 10088-1:2014, *Stainless steels — Part 1: List of stainless steels*

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

EN 10346:2015, *Continuously hot-dip coated steel flat products for cold forming — Technical delivery conditions*

EN 13165:2012+A2:2016, *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) 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 13501-2:2016, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance 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*

prEN 14509-3:2021, *Factory made double skin metal faced insulating sandwich panels — Part 3: Test methods for determining mechanical strength, building physical behaviour and durability*

EN 15254-5:2018, *Extended application of results from fire resistance tests — Non-loadbearing walls — Part 5: Metal sandwich panel construction*

EN 15254-7:2018, *Extended application of results from fire resistance tests — Non-loadbearing ceilings — Part 7: Metal sandwich panel construction*

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

EN ISO 9445 (all parts:2010), *Continuously cold-rolled stainless steel — Tolerances on dimensions and form (ISO 9445)*

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

3 Terms, definitions, symbols, subscripts and abbreviations

3.1 Terms and definitions

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

3.1.1

auto-adhesion

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 by producing 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

Note 1 to entry: Panels with special edge details in the longitudinal joints may utilize different core materials from the main insulating core (e.g. for improved fire performance) if these edge details have no influence on the mechanical performance of the panel.

3.1.4

edge

side of the panel where adjacent 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

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.

3.1.8

incompletely bonded panel

panel in which one or both faces are incompletely bonded

3.1.9

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 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.

prEN 14509-1:2021 (E)

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.

**3.1.10
lamella**

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

**3.1.11
lightly profiled face**

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

**3.1.12
mineral wool (MW)**

insulating wool produced from molten stone, slag or glass

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

**3.1.13
phenolic foam (PF)**

insulating foam produced from PF

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

**3.1.14
expanded polystyrene (EPS)**

insulating foam produced from EPS (standards.iteh.ai)

[SOURCE: EN 13163:2012+A2:2016] [oSIST prEN 14509-1:2021
https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021](https://standards.iteh.ai/catalog/standards/sist/e8ab2495-248d-4034-b7c3-626e4b8d78d2/osist-pren-14509-1-2021)

**3.1.15
extruded polystyrene foam (XPS)**

insulating foam produced from XPS

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

**3.1.16
polyurethane (PU)**

insulating rigid foam produced from PUR or PIR

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

**3.1.17
pre-manufactured**

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

**3.1.18
shift**

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

**3.1.19
wrinkling strength**

strength representing the characteristic value of wrinkling stress at the moment of failure load

3.2 Symbols, subscripts and abbreviations

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

3.2.1 Symbols

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, load bearing capacity
T	temperature
U	thermal transmittance
b	width of rib and valley in metal face profile
d	depth, continuous depth of core d_c , depth of stiffener d_s
f	strength
h	depth of metal face profile
k	stress distribution factor over support, relation between strength after ageing and initial strength
m	mass
t	thickness of face sheet
w	cover width
x, y, z	coordinates
α	sound absorption (α_w),
λ	thermal conductivity, λ_{Design} (design value),
φ	creep coefficient
σ	wrinkling strength

3.2.2 Subscripts

C	core
D	expressed thermal conductivity (λ_D)
c	compression,
d	design, expressed thermal transmittance including the influence of the joints $U_{d,S}$
k	characteristic