Revision index	Date brought into application
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Product Guideline No.17

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

ASSOCIATION POUR LA CERTIFICATION DES MATERIAUX ISOLANTS
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CSTB - LNE

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1 PURPOSE

This Product Guideline supplements the provisions in the General Guidelines.

This Product Guideline concerns self-supporting double skin metal faced insulating panels, in accordance with harmonised European standard NF EN 14509.

2 Additional elements of the certificate application technical file

The technical file defined in paragraph 2.2 of the General Guidelines is supplemented by the following items.

2.1 Proof of fitness for use

NF P 75-401 (DTU 45.1) - *Thermal insulation of refrigerating buildings and of regulated temperature premises*, RAGE professional recommendations (☐ Couvertures en panneaux sandwich a deux parements en acier et à âme polyurethane ☐ and ☐ Bardages en panneaux sandwich a deux parements en acier et à âme polyurethane ☐), Technical assessment (ATec), Technical Application Document (DTA) or Technical Experimentation Assessment (ATEx) case A in progress and favourable or Professional regulations.

2.2 Description of the product

- Diagram of the right section – the main dimensions being rated (nominal thickness D, rib height, etc.);
- Installation method: wall, ceiling, roofing, etc.;
- Surface density of the sandwich panel;
- Steel grade;
- Thickness of facings used;
- Bonding type;
- Indoor facing combinations / core / exterior facings.

2.3 Grouping/Combination

The applicant agrees to specify the desired groupings or combinations for the mechanical characteristics, knowing that:

- The results obtained with a sandwich panel with flat facing enable the same values to be obtained with a sandwich panel with micro-rib or low rib facing (ribs < 5 mm);
- In roofing all types of ribs are tested;
- In cladding, panels with through fasteners and hidden fasteners are considered part of the same family according to EN14509;

If panel thicknesses greater than or less than those already concerned are integrated, thermal tests will be conducted in order to cover panel thickness minimums and maximums in all cases.

For thermal or reaction to fire characteristics, please refer to technical specification C.

3 Characteristics that can be certified

Characteristics that can be certified are the characteristics listed in paragraph 5.2 of the NF EN 14509 standard, supplemented by the following characteristics:

- Emissivity
- Specific heat capacity;
- Interlocking/overlapping.

4 Methods of determination of the certified characteristics by the pilot laboratories

The test methods applied by the pilot laboratory for each of the characteristics are defined in paragraph 6.2 of the NF EN 14509 standard, supplemented by the following provisions.

4.1 Thermal conductivity

The measures of paragraph 1.1 of Technical Specification No.1 apply. Determining thermal conductivity of the core is achieved according the provisions in the technical specifications corresponding to the core material.

4.2 Thermal resistance

Certified thermal resistance is defined according to the procedures in Technical Specification No.2 at the critical thickness, completed for high rib panels (profile height greater than 5 mm) of additional thickness due to profiles according to Appendix A.10.3 of the NF EN 14509 standard.

4.3 Heat transfer coefficient of a panel

Calculating the heat transfer coefficient of a panel (U) is completed according to Appendix A.10.3 of the NF EN 14509 standard. The core thermal conductivity used for calculation is the one obtained according to the above-mentioned instructions in §4.1.

4.4 Reaction to fire

The provisions in Technical Specification No.3 apply.

4.5 Emissivity

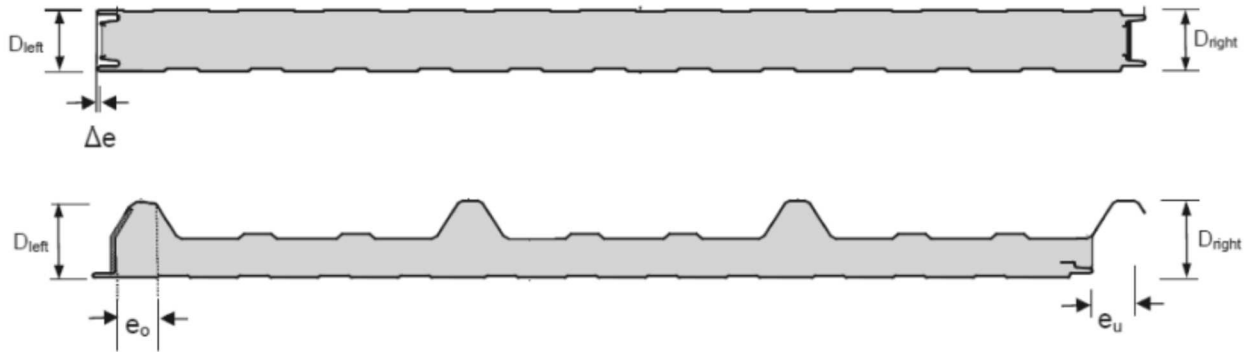
If the product has a surface coating for which the emissivity is certified, the procedures in Technical Specification No.7 apply.

4.6 Specific heat capacity

When the specific heat capacity is certified, the provisions in Technical Specification No.10 apply.

4.7 Interlocking/overlapping between panels

In order to ensure proper fastening of panels between one another, interlocking and overlapping should be certified as satisfactory.



Alignment and difference in measured thickness of joint

Compliance criteria and specific conditions:

- Alignment

Δe ≤ 3 mm
Δe: difference (overlapping) between inner and outer sheet at the joint ($l e_o - e_U l$) (The reference point of e_u and e_o has to be adapted to the individual geometry under responsibility of the pilot).

- Difference in measured thickness of joint

ΔD ≤ 2 mm
ΔD: difference of the panel thicknesses D_{right} and D_{left} at the both edges.

Detail A:

Edge waviness

- Longitudinal edge length

hu ≥ 15 mm

- Edge waviness

W = ± 2 mm over 500 mm length

5 Factory production control

Production control in the production unit satisfies the requirements of paragraph 6.3 of European standard NF EN 14509.

In addition to these provisions, for the following certified characteristics for the purposes of these guidelines and described in detail in the various Technical Specifications, the procedures (methods and minimum test frequencies) provided for in this Technical Specification apply:

- Emissivity
- Specific heat capacity

In addition, the following specific measures must be complied with.

5.1 Dimensional inspection

Measurements are taken respecting the following minimum provisions:

- measuring equipment: the accuracy of the instrument used must be compatible with the stated tolerances. Avoid using the tape measure as the sole means of measurement for thickness controls.
- sampling: the measurements are made on a life-sized panel. If it is impossible to measure such dimensions, the minimum dimensions may be reduced, with the agreement of the lead member, based on specific proof that the sample for thickness measurements is representative.

Interlocking and overlapping between panels (§4.7) are verified at a minimum frequency of once every 6-8 hours per team.

5.2 Thermal conductivity check

The minimum frequency is one measurement per production day.

6 Tests performed during examination

For manufacturer requested characteristics, tests are carried out according to the below table.

The tests are conducted in accordance with the provisions in European standard NF EN 14509, supplemented if applicable by the procedures described in the Technical Specifications corresponding to the characteristics tested. Except for thermal test, test reports not carried out by a pilot member may be accepted after evaluation of these ones (According to ACERMI PG19 general procedure).

Characteristics (NF EN 14509)	**Test methods**	**Place of performance of the tests**
Thermal resistance – Thermal conductivity	NF EN 12667 NF EN 12939	Pilot laboratory
Thickness	Appendix D.2.1 of NF EN 14509	Pilot laboratory
- Flatness - Profile height - Strut height - Length - Useful length - Squaring - Straightness - Curve - Profile pitch - Width of crests and valleys	Appendix D.2.2 to 11 of NF EN 14509	Pilot laboratory
- interlocking/overlapping	§4.7	Pilot laboratory
Reaction to fire	EN13501-1	Pilot laboratory
Perpendicular tensile strength with facings and modulus of elasticity	Appendix A.1 of NF EN 14509	Pilot laboratory
Compressive strength and modulus of elasticity of the core	Appendix A.2 of NF EN 14509	Pilot laboratory
Shear strength and shear modulus of the core	Appendix A.3 of NF EN 14509	Pilot laboratory
Shear properties of a complete panel	Appendix A.4 of NF EN 14509	Pilot laboratory
Bending moment capacity of a simply supported panel	Appendix A.5 of NF EN 14509	Pilot laboratory

Characteristics (NF EN 14509)	**Test methods**	**Place of performance of the tests**
Creep coefficient	Appendix A.6 of NF EN 14509	Pilot laboratory
Interaction between bending moment and support force	Appendix A.7 of NF EN 14509	Pilot laboratory
Core density	NF EN 1602 (Appendix A.8 of NF EN 14509)	Pilot laboratory
Roofing or ceiling panels	Appendix A.9.1	Pilot laboratory

7 Tests performed during follow-up

For characteristics requiring monitoring, random tests are conducted at least once a year according to the table below when relevant to the product in question.

The tests are conducted in accordance with the provisions in European standard NF EN 14509, supplemented if applicable by the procedures described in the Technical Specifications corresponding to the characteristics tested.

Characteristics (NF EN 14509)	**Test methods**	**Place of performance of the tests**
Thermal resistance – Thermal conductivity	NF EN 12667 NF EN 12939	Pilot laboratory
Thickness	Appendix D.2.1 of NF EN 14509	Production unit and pilot laboratory
- Flatness - Depth of metal profile - Depth of stiffeners - Length - Cover width - Squareness - Straightness - Bowing - Profile pitch - Widths of rib and valley	Appendix D.2.2 to 11 of NF EN 14509	Production unit and pilot laboratory (except for length, squareness and bowing, in production unit only)
- interlocking/overlapping	§4.7	Production unit and pilot laboratory
Reaction to fire	Table 8 of NF EN 14509	Production unit
Perpendicular tensile strength and modulus of elasticity	Appendix A.1 of NF EN 14509	Production unit

Characteristics (NF EN 14509)	**Test methods**	**Place of performance of the tests**
Compressive strength and modulus of elasticity of the core	Appendix A.2 of NF EN 14509	Production unit
Shear strength and shear modulus of the core	Appendix A.3 of NF EN 14509	Production unit
Shear properties of a complete panel	Appendix A.4 of NF EN 14509	Production unit or pilot laboratory (To do if done initially)
Bending moment capacity of a simply supported panel	Appendix A.5 of NF EN 14509	Production unit or pilot laboratory
Core density	NF EN 1602 (Appendix A.8 of NF EN 14509)	Production unit

The certifying body may also perform verification tests to verify other characteristics not listed in the table below, in particular if there is any doubt as to the compliance of the certified values.

8 Certificate maintenance rules

The certificate maintenance rules are defined in paragraph 4 of the General Guidelines.

Based on the results of the tests performed by the pilot body, product compliance is verified:

- For the dimensional characteristics according to the requirements of paragraph 5.2.5 of European standard NF EN 14509;
- For thermal performance according to paragraphs 2.1 or 2.2 of Technical Specification E;
- For the reaction to fire according to the requirements of paragraph 6.3.5.3 of European standard NF EN 14509;
- For the mechanical characteristics according to the requirements of paragraph 5.2 of European standard NF EN 14509.

9 Marking rules

The marking rules laid out in Technical Specification D apply.

In particular, the information label complies with the measures in paragraph 3.1.1 of this Technical Specification D.