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European Assessment Document for

Thin steel roof and wall cladding panels



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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD specifies assessment methods for factory-made, self-supporting steel sheets and tiles for roofing and wall cladding. In this document, the product covered by the EAD shall be referred to as “thin steel panels”.

The product is coated (metallic, organic, inorganic or multi-layer) and is usually available in a range of colours.

The nominal thickness of the product, including its coating, is larger than or equal to 0,30 mm and smaller than 0,40 mm, with tolerances according to Table 1 of EN 10143¹. The product is not fully covered by EN 14782, since this harmonised standard covers steel roof and wall cladding panels with a nominal thickness, including its coating, larger than or equal to 0,40 mm. The assessment methods of this harmonised standard are applicable for the assessment of the products covered by this EAD, as the material, finishing, shape, overall size (excluding thickness) and intended use are the same.

Ancillary products, such as associated accessories (e.g., ridges, junctions, end caps, barges and flashings) and installation material (e.g., nails), referred to in the ETA, as a part of installation provisions or in the framework of determining performances, that are used in the installation of the thin steel panel are not covered by this EAD.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or, in the absence of such instructions, according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

The thin steel panels are intended to be used as discontinuously laid roof coverings and wall claddings.

1.2.2 Working life / durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the product for the intended use of 10 years when installed in the works, provided that the product is subject to appropriate installation (see 1.1). These provisions are based upon the current state of the art and the available knowledge and experience.

¹ All undated references to standards or to EADs in this EAD are to be understood as references to the dated versions listed in chapter 4.

When assessing the product, the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works².

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

² The real working life of a product incorporated in a specific works depends on the environmental conditions the works is subjected to, as well as on the particular conditions of the design, execution, use and maintenance of those works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than those referred to.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1.1 shows how the performance of the thin steel panels is assessed in relation to the essential characteristics.

Table 2.1.1 Essential characteristics of the product and assessment methods and criteria for the performance of the product in relation to those essential characteristics

No	Essential characteristic	Method of verification and assessment	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	EN 14782 clause 5.2	Class
2	External fire performance of roofs*	EN 14782 clause 5.1	Class
Basic Works Requirement 3: Hygiene, health and the environment			
3	Content, emission and/or release of dangerous substances	2.2.1	Description
4	Water permeability	EN 14782 clause 4.4	Description
Basic Works Requirement 4: Safety and accessibility in use			
5	Mechanical resistance	EN 14782 clause 4.3	Description
6	Dimensional variation	2.2.2	Level
Aspects of durability			
7	Durability	2.2.3	Description
* Not relevant for thin steel panels only intended to be used for wall cladding			

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

2.2.1 Content, emission and/or release of dangerous substances

The performance of the product regarding the emissions and/or release and, where appropriate, the content of dangerous substances will be assessed on the basis of the information provided by the manufacturer³

³ The manufacturer may be asked to provide to the TAB the REACH related information which shall accompany the DoP (cf. Article 6(5) of Regulation (EU) No 305/2011).

after identifying the release scenarios taking into account the intended use(s) of the product and the Member States where the manufacturer intends his product to be made available on the market.

The identified intended release scenarios for this product and intended use with respect to dangerous substances are:

IA2: Product with indirect contact to indoor air (e.g. covered products) but possible impact on indoor air

S/W2: Product with indirect contact to soil, ground- and surface water

2.2.1.1 SVOC and VOC

For the intended use covered by the release scenario IA2 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516. The loading factor used for emission testing shall be 1,4 m²/m³ (for wall and roof use).

If the product contains no organic coating (only inorganic coating or coating without intentionally added organic compounds), the product does not have to be tested.

The preparation of the test specimen is performed by using a representative sample of the product installed in accordance with the manufacturer's product installation instructions or in absence of such instructions the usual practice of the product installation.

Once the test specimen has been produced, as described above, it should immediately be placed in the emission test chamber. This time is considered the starting time of the emission test.

The test results have to be reported for the relevant parameters (e.g. chamber size, temperature and relative humidity, air exchange rate, loading factor, size of test specimen, conditioning, production date, arrival date, test period, test result) after 3 and/or 28 days testing.

The product performance shall be stated in the ETA [unit mg/m³ or mg/m³].

2.2.1.2 Leachable substances

For the intended use covered by the release scenario S/W2, the performance of the product concerning leachable substances has to be assessed. A leaching test with subsequent eluate analysis must take place, each in duplicate. Leaching tests of the exterior skins conducted according to CEN/TS 16637-2. The leachant shall be pH-neutral demineralised water and the ratio of liquid volume to surface area must be (80 ± 10) l/m².

Samples shall be prepared according to clause 8.2 of CEN/TS 16637-2.

In eluates of "6 hours" and/or "64 days", the following biological tests shall be conducted:

- Acute toxicity test with *Daphnia magna* Straus according to EN ISO 6341
- Toxicity test with algae according to EN ISO 15799
- Luminescent bacteria test according to EN ISO 11348-1, EN ISO 11348-2 or EN ISO 11348-3. The test methods EN ISO 11348-1, EN ISO 11348-2 and EN ISO 11348-3 are equivalent and produce similar results.

For each biological test, EC20-values shall be determined for dilution ratios 1:2, 1:4, 1:6, 1:8 and 1:16.

The manufacturer may **not** be asked to:

- provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or
- provide a written declaration to the TAB stating whether the product (or constituents of the product) contain(s) substances which are classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS, taking into account the installation conditions of the construction product and the release scenarios resulting from there.

Any information provided by the manufacturer regarding the chemical composition of the products is not to be distributed to EOTA or to the TABs.

If the parameter TOC is higher than 10 mg/l, the following biological tests shall be conducted with the eluates of "6 hours" and/or "64 days" eluates:

- Biological degradation according to OECD Test Guideline 301 part A, B or E.

Determined toxicity in biological tests must be expressed as EC20-values for each dilution ratio. Maximum determined biological degradability must be expressed as "...% within ...hours/days". The respective test methods for analysis must be specified.

2.2.2 Dimensional variation

The thermal expansion coefficient α shall be assessed and stated in the ETA; the thermal expansion shall be calculated as the arithmetic mean from measurements of the length and width at two different temperatures, as follows (example for length):

$$\alpha = \frac{1}{L_1} \frac{L_2 - L_1}{T_2 - T_1}$$

With:

α : thermal expansion coefficient (1/K)

L_1 : length at low temperature (mm)

T_1 : low temperature (K)

L_2 : length at high temperature (mm)

T_2 : high temperature (K)

A range from which to select the temperatures is not given, because the material dimensional variation related to thermal expansion is linear. The length of the specimens and the temperatures shall be determined by the TAB, related to the accuracy of available measuring means, to obtain a value with two significant digits, without problems for comparability of results.

The ETA shall state the thermal expansion coefficient, expressed in K^{-1} , rounded to two significant digits.

2.2.3 Durability

The resistance to corrosion shall be assessed according to EN 10169 in function of the field of application, corrosion resistance category (RC1 to RC5 and RC5+) and the corrosivity of atmospheres (corrosivity category C1 [very low corrosivity] to C5 [very high corrosivity]) defined in EN ISO 9223, clause 5, table 1 and Annex C, table C.1.

The evaluation shall be performed according to EN 10169, clause 6.3.3.3.

The product material, thickness, type of coating and the average value of thickness of the coating and category of corrosion resistance related to the corrosivity of atmosphere according to EN ISO 9223 shall be specified in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance

For the product covered by this EAD the applicable European legal act is Commission Decision 98/436/EC, as amended by Commission Decision 2001/596/EC (for roof coverings) or Commission Decision 98/437/EC, as amended by Commission Decision 2001/596/EC (for wall finishes).

The applicable AVCP system is 4 for any use except for uses subject to regulations on reaction to fire, external fire performance or on dangerous substances.

For uses subject to regulations on reaction to fire the applicable AVCP systems regarding reaction to fire are 1, or 3, or 4 depending on the conditions defined in the said Decision.

For uses subject to regulations on external fire performance the applicable AVCP systems regarding external fire performance are 3 or 4 depending on the conditions defined in the said Decision.

For uses subject to regulations on dangerous substances the applicable AVCP system is 3.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the process of assessment and verification of constancy of performance are laid down in table 3.2.1.

Table 3.2.1 Control plan for the manufacturer; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
Incoming materials					
1	Quality of the metal	Check of documentation accompanying delivery, supplier certificates / report	Check of conformity with purchase order	-	Each delivery
2	Thickness	Check of documentation accompanying delivery, supplier certificates / report	Check of conformity with purchase order	-	Each delivery
3	Mechanical resistance: yield strength (grade of metal)	Check of documentation accompanying delivery, supplier certificates / report	Check of conformity with purchase order	-	Each delivery
4	Durability / quality of the coating	Check of documentation accompanying delivery, supplier certificates / report	Check of conformity with purchase order	-	Each delivery
5	Release of regulated dangerous substances	2.2.1	Shall be specified in the detailed Control Plan	Shall be specified in the detailed Control Plan	Initial on new material
Final product					
6	Mechanical resistance: resistance to concentrated forces	EN 14782 clause 4.3	Shall be specified in the detailed Control Plan	1	Initial on new material or new manufacturing process
7	Dimensional tolerances: initial set up of the manufacturing machines	2.2.2	Shall be specified in the detailed Control Plan	3	Initial on new material or new manufacturing process
8	Dimensional tolerances: length and other characteristics	2.2.2	Shall be specified in the detailed Control Plan	3	1/batch
9	Water permeability	EN 14782 clause 4.4	Shall be specified in the detailed Control Plan	3	1/batch
10	External fire performance	EN 14782 clause 4.9	Shall be specified in the detailed Control Plan	EN 14782 clause 5.1	Initial on new material
11	Reaction to fire	EN 14782 clause 4.10	Shall be specified in the detailed Control Plan	EN 14782 clause 5.2	Initial on new material

3.3 Tasks of the notified body

The intervention of the notified body under AVCP system 1 is only necessary for reaction to fire for products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material).

In this case the cornerstones of the tasks to be undertaken by the notified body under AVCP system 1 are laid down in Table 3.3.1.

Table 3.3.1 Control plan for the notified body; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire					
1	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 are fulfilled for reaction to fire, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material).	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire					
2	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 in the Decisions regarding reaction to fire are fulfilled, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g., an addition of fire retardants or a limiting of organic material)	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in Table 3.2.1	As defined in the control plan agreed between the TAB and the manufacturer	As defined in the control plan agreed between the TAB and the manufacturer	1/year

4 REFERENCE DOCUMENTS

EN 14782:2006	Self-supporting metal sheet for roofing, external cladding and internal lining - Product specification and requirements
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
EN 16516:2017+A1:2020	Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air
EN ISO 6341: 2012	Water quality - Determination of the inhibition of the mobility of Daphnia magna Straus (Cladocera, Crustacea) - Acute toxicity test
EN ISO 9223:2012	Corrosion of metals and alloys - Corrosivity of atmospheres - Classification, determination and estimation
EN ISO 11348-1:2008/A1:2018	Water quality – Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) – Part 1: Method using freshly prepared bacteria
EN ISO 11348-2: 2008/A1:2018	Water quality – Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) – Part 2: Method using liquid-dried bacteria
EN ISO 11348-3: 2008/A1:2018	Water quality – Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) – Part 3: Method using freeze-dried bacteria
CEN/TS 16637-2: 2014	Construction products – Assessment of release of dangerous substances – Part 2: Horizontal dynamic surface leaching test
EN ISO 15799:2022	Soil quality - Guidance on the ecotoxicological characterization of soils and soil materials
OECD Test Guideline 301:1992	OECD Guideline for testing of chemicals no. 301 – Ready Biodegradability