EAD **200188-00-1202**

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May 2021

European Assessment Document for

Anti-corrosion paint for steel

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) No 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

Contents

1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD covers the assessment of liquid-applied anti-corrosion paints for uncoated structural steel (in the following referred to as anti-corrosion paint).

The anti-corrosion paint is not covered by a harmonised European standard (hEN).

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 absence of such instructions) according to the usual practice of the building professionals. Advice on appropriate methods for preparing metallic surfaces prior to application of the product can be found in the EN ISO 12944 suite of standards.

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 anti-corrosion paint is intended for internal or external use as corrosion protection layer for uncoated structural steel.

The anti-corrosion paint is intended to be used for the protection of uncoated structural steel in atmospheric corrosion categories up to and including C5, as described and categorised in EN ISO 12944-2[1] Table 1.

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 anti-corrosion paint for the intended use of 25 years. These provisions are based upon the current state of the art and the available knowledge and experience.

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 works[2].

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.

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

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

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 anti-corrosion paint is assessed in relation to the essential characteristics.

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

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 1: Mechanical resistance and stability			
1	Protective effect against cyclic ageing	2.2.1	Description
Basic Works Requirement 2: Safety in case of fire			
2	Reaction to fire	2.2.2	Class
Basic Works Requirement 3: Hygiene, health and the environment			
3	Content, emission and/or release of dangerous substances	2.2.3	Level

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 Protective effect against cyclic ageing

The uncoated steel test panels shall be prepared in accordance with the provisions of EN ISO 12944-6 clause 5.1.1.

Test panels shall be prepared as described in EN ISO 12944-6 section 5.1.1, 5.1.2 and/or 5.1.3 depending on the range of steels to be covered by the ETA with a thickness of minimum 3 mm. Three test panels shall be tested.

Note. The corrosion prevention of a coating system is not influenced by the thickness of the substrate, so the performance assessed on test panels tested on at least 3 mm thick test panels apply to all steel thicknesses.

The test panels shall be coated with the anti-corrosion paint to be tested and the final thickness of the applied product shall be checked for compliance in accordance with the criterial set down in EN ISO 12944-6 clause 5.4.

Before the test, the test panels shall be tested in accordance with EN ISO 12944-6 clause 6.2. to ensure that the test panels are appropriate for the continued testing. If the test panels are not appropriate for testing, new test panels shall be prepared until they are appropriate for testing.

The adhesion of the coating before artificial ageing shall be tested according to EN ISO 4624, Method B. The test requirements are defined in EN ISO 12944-6 clause 6.2.

The test shall be conducted in accordance with the cyclic ageing test, as defined in EN ISO 12944-6 with the method and duration corresponding to the relevant corrosivity category, and with the durability range at least “high” in order to be consistent with section 1.2.2 of this EAD.

At the end of the exposure period the coating shall be assessed in accordance with EN ISO 12944-6 clause 6.3.

The adhesion of the coating after artificial ageing shall be tested according to EN ISO 4624, Method B. The test requirements are defined in EN ISO 12944-6 clause 6.3.

The thickness of the tested coating and the corrosivity category and immersion category in accordance with table 1 and 2 respectively in EN ISO 12944-6 shall be stated in the ETA. The test result obtained is applicable for coatings of equal or greater thickness than the one tested.

Note. See clause 4.9 of EN 1090-1.

2.2.2 Reaction to fire

The anti-corrosion paint shall be tested using the relevant test method(s) for the corresponding reaction to fire classes according to EN 13501-1 and classified according to Delegated Regulation (EU) 2016/364.

The following mounting and fixing rules for testing in accordance with EN 13823 (SBI test) shall be observed:

- Three test panels shall be tested
- The test panels shall be placed with an air gap of 80 mm to the backing board
- The long specimen wing shall not not provided with a vertical joint
- The substrate used for test shall be made from steel with thickness 5 mm (non-combustible class A1/A2 in accordance with EN 13238)
- A primer shall be applied if the coating systems specifies this
- The classification applies to the thickness and surface density (coverage) that are tested

The class shall be given in the ETA together with those conditions for which the classification is valid.

2.2.3 Content, emission and/or release of dangerous substances

The performance of the anti-corrosion paint related to the emissions and/or release and, where appropriate, the content of dangerous substances shall be assessed on the basis of the information provided by the manufacturer[3] after identifying the release scenarios taking into account the intended use of the product and the Member States where the manufacturer intends his product to be made available on the market.

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

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3 The manufacturer may be asked to provide to the TAB the REACH related information which he must accompany the DoP with (cf. Article 6(5) of Regulation (EU) No 305/2011).
The manufacturer is not obliged:
- to provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or
- to 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.

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

IA1: Product with direct contact to indoor air.
S/W1: Product with direct contact to soil, ground- and surface water

2.2.3.1 SVOC and VOC

For the intended use covered by the release scenario IA1 semi-volatile organic compounds (SVOC) and volatile organic compounds (VOC) shall be determined in accordance with EN 16516. The respective loading factor [m^2/m^3] used for emission testing can be taken from the following table:

Table 2.2 Loading factor L, depending on the product type (in accordance with EN 16516)

Intended use	Loading factor [m^2/m^3]
Walls	1,0
Floor, ceiling	0,4

The preparation of the test specimen shall be 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. The size of the test specimen shall be be chosen in consideration of the test chamber size and the intended loading factor (see above).

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

The test results shall be 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 expressed in [µg/m^3 or mg/m^3] and stated in the ETA.

2.2.3.2 Leachable substances

For the intended use covered by the release scenario S/W1, the performance of the product concerning leachable substances shall be assessed.

A leaching test with subsequent eluate analysis shall take place, each in duplicate.. The leachant shall be pH-neutral demineralized water and the ratio of liquid volume to surface area shall be (80 ± 10) l/m^2.

Test panels shall be prepared according to clause 8.2 of CEN/TS 16637-2

In eluates of "6 hours" and "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.

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

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 shall be expressed as EC20-values for each dilution ratio. Maximum determined biological degradability shall be expressed as "…% within …hours/days". The respective test methods for analysis shall be specified.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the anti-corrosion paint covered by this EAD the applicable European legal act is: Decision 98/214/EC

The system is: 2+

In addition, with regard to reaction to fire for products covered by this EAD the applicable European legal act is: Decision 98/214/EC

The systems are: 1

Note. Both AVCP level 1 and 2+ can be applicable depending on the footnotes concerning the reaction to fire in the mentioned Decision.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure 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)					
1	Identification of incoming raw materials	Examination of supplied information	To be defined in control plan	N/A	Every batch
2	Viscosity - spindle speed 50 rpm - spindle speed 100 rpm	EN ISO 2884-2	To be defined in control plan	1	Every batch
3	Density	EN ISO 2811-1	To be defined in control plan	1	Every batch
4	Cross-cut adhesion	EN ISO 2409	To be defined in control plan	1	Twice per year
5	Percentage solids	EN ISO 3251	To be defined in control plan	1	Twice per year
6	Reaction to fire	2.2.2	To be defined in control plan	1	Once per year

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for the anti-corrosion paint 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					
1	Notified Body will ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing of the anti-corrosion paint	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	According to Control plan	According to Control plan	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control					
2	The Notified Body will ascertain that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan.	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	According to Control plan	According to Control plan	1/year

The intervention of the notified body under AVCP system 1 are necessary for reaction to fire for products 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 3.3.2.

Table 3.3.2 Control plan for the notified body; cornerstones

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				
The Notified Body will ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing related to reaction to fire, taking into account productions stages limiting of organic material and/or the addition of fire retardants.	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	According to Control plan	According to Control plan	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control				
The Notified Body will ascertain that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan related to reaction to fire, taking into account productions stages limiting of organic material and/or the addition of fire retardants.	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	According to Control plan	According to Control plan	1/year

4 REFERENCE DOCUMENTS

EN 13501-1: 2018	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests
EN ISO 12944-2: 2017	Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 2 : Classification of environments
EN ISO 12944-6: 2018	Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 6 : Laboratory performance test methods
EN ISO 4624:2016	Paints and varnishes – Pull-off test for adhesion
EN 16516:2017+A1:2020	Construction products: Assessment of release of dangerous substances – Determination of emissions into indoor air
EN ISO 15799:2022	Soil quality - Guidance on the ecotoxicological characterization of soils and soil materials.
EN ISO 6341:2012	Water quality - Determination of the inhibition of the mobility of Daphnia magna Straus (Cladocera, Crustacea) - Acute toxicity test
CEN/TS 16637-2:2014	Construction products - Assessment of release of dangerous substances - Part 2: Horizontal dynamic surface leaching test.
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.
EN ISO 2884-2:2006	Paints and varnishes – Determination of viscosity using rotary viscometers – Part 2: Disc or ball viscometer operated at a specified speed
EN ISO 2811-1:2023	Paints and varnishes – Determination of density – Part 1: Pycnometer method
EN ISO 2409:2020	Paints and varnishes – Cross-cut test
EN ISO 3251:2019	Paints, varnishes and plastics – Determination of non-volatile-matter content
EN 13823:2020+A1:2022	Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item
EN 13238:2010	Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates
OECD Test Guideline 301	
part A, B or E:1992	OECD Guidelines for testing chemicals
EN 1090-1:2009+A1:2011	Execution of steel structures and aluminium structures – Part 1: Requirements for conformity assessment of structural components