UBAtc
Union belge pour l'Agrément technique de la construction

member of EOTA and UEAtc

European Technical Assessment

ETA 11/0043
Version 01
Date of issue: 2018-05-12

UBAtc Assessment Operator:
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Technical Assessment Body issuing the European Technical Assessment: UBAtc.

UBAtc has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment)

Trade name of the construction product:	PROMASPRAY® P300
Product family to which the construction product belongs:	Fire protective products – Renderings and rendering kits intended for fire resisting applications
Manufacturer:	ETEX Building Performance NV Bormstraat 24 B-2830 Tisselt (Belgium)
Manufacturing plant(s):	ETEX Building Performance production plant 22 and 24
Website:	www.promat-international.com
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	European Assessment Document (EAD): EAD 350140-00-1106
This version replaces:	ETA 11/0043 issued on 2013/06/27
This European Technical Assessment contains:	31 pages, including 2 annexes, which form an integral part of the document.

European Organisation for Technical Assessment

Legal bases and general conditions

1 This European Technical Assessment is issued by UBAtc (Union belge pour l'Agrément technique de la construction, i.e. Belgian Union for technical Approval in construction), in accordance with:

- Regulation (EU) No 305/2011[1] of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC
- Commission Implementing Regulation (EU) No 1062/2013[2] of 30 October 2013 on the format of the European Technical Assessment for construction products
- European Assessment Document: 350140-00-1106

2 Under the provisions of Regulation (EU) No 305/2011, UBAtc is not authorized to check whether the provisions of this European Technical Assessment are met once the ETA has been issued.

3 The responsibility for the conformity of the performances of the products with this European Technical Assessment and the suitability of the products for the intended use remains with the holder of the European Technical Assessment.

4 Depending on the applicable Assessment and verification of constancy of performance (AVCP) system, (a) notified body(ies) may carry out third-party tasks in the process of assessment and verification of constancy of performance under this Regulation once the European Technical Assessment has been issued.

5 This European Technical Assessment allows the manufacturer of the construction product covered by this ETA to draw up a declaration of performance for the construction product.

6 CE marking should be affixed to all construction products for which the manufacturer has drawn up a declaration of performance.

7 This European Technical Assessment is not to be transferred to other manufacturers, agents of manufacturers, or manufacturing plants other than those indicated on page 1 of this European Technical Assessment.

8 The European Technical Assessment holder confirms to guarantee that the product(-s) to which this assessment relates, is/are produced and marketed in accordance with and comply with all applicable legal and regulatory provisions, including, without limitation, national and European legislation on the safety of products and services. The ETA-holder shall notify the UBAtc immediately in writing of any circumstance affecting the aforementioned guarantee. This assessment is issued under the condition that the aforementioned guarantee by the ETA-holder will be continuously observed.

9 According to Article 11(6) of Regulation (EU) No 305/2011, when making a construction product available on the market, the manufacturer shall ensure that the product is accompanied by instructions and safety information in a language determined by the Member State concerned which can be easily understood by users. These instructions and safety information should fully correspond with the technical information about the product and its intended use which the manufacturer has submitted to the responsible Technical Assessment Body for the issuing of the European Technical Assessment.

10 Pursuant to Article 11(3) of Regulation (EU) No 305/2011, manufacturers shall adequately take into account changes in the product-type and in the applicable harmonised technical specifications. Therefore, when the contents of the issued European Technical Assessment do not any longer correspond to the product-type, the manufacturer should refrain from using this European Technical Assessment as the basis for their declaration of performance.

11 All rights of exploitation in any form and by any means of this European Technical Assessment is reserved for UBAtc and the ETA-holder, subject to the provisions of the applicable UBAtc regulations.

12 Reproduction of this European Technical Assessment including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of UBAtc. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Assessment.

13 Subject to the application introduced, this European Technical Assessment is issued in English and may be issued by the UBAtc in its official languages. The translations correspond fully to the English reference version circulated in EOTA.

14 A European Technical Approval was issued by UBAtc on 27 June 2013. Compared with that European Technical Approval, the current European Technical Assessment, issued on 12 May 2018, comprises no technical changes, but – given that EAD 350140-00-1106 replaced ETA-Guideline 018-3 in the meantime, editorial changes have been made to ensure the ETA corresponds with the requirements of the EAD. In addition, one production facility has been removed, another one has been added.

[1] OJEU, L 88 of 2011/04/04
[2] OJEU, L 289 of 2013/10/31

Technical Provisions

1 Technical description of the product

1.1 General

This ETA covers a fire protective final assembly comprising the dry mix and the bonding agent, option 3 as described in the clause 1.1 of EAD 350140-00-1106 intended for:

- Internal use (EAD 350140-00-1106, type Z_2)

PROMASPRAY® P300 is a lightweight rendering that provides fire resistance to steel and concrete frames, metal floor and roof decks and to return air plenums.

PROMASPRAY® P300 is a spray applied, single package factory controlled dry mix, based on vermiculite and gypsum. Application through batch mix or continuous mix equipment is possible. However the chosen method will have an effect on the applied density. When requested the surface may be smoothed using a trowel. Small repair may be realised by trowel application.

PROMASPRAY® P300 may be applied in thicknesses between 9 mm and 73 mm, according to the requirements given in Annex 2

PROMASPRAY® P300 is manufactured at ETEX Building Performance production plants 22 and 24 (known at UBAtc).

1.1.1 Dry mix

Properties	Test method	
Description	Visual	Flocky powder
Fingerprint	XRD and DSC	See technical records, kept by approval body
Colour	Visual	Off white
Apparent density	Manufacturer's internal test method	221-262 g/l

1.1.2 Fresh mortar (when batch mixed)

Properties	Test method	
Mixing ratio		34 – 38 litres/bag
Density	Manufacturer's internal test method based on EN 1015-6:1998	657 – 737 g/l

1.1.3 Rendering

Properties	Test method	
Description	Visual	Monolithic sprayed texture
Colour	Visual	Off white
Density	Manufacturer's internal test method based on EN 1015-10:1999	Spray application using the batch mix method: 310 kg/m³ ± 15% Spray application using the continuous mix method: 450 kg/m³ ± 15%

1.2 Conditioning

PROMASPRAY® P300 is available in 20 kg bags. It has to be mixed with 34 to 38 litres of potable water per bag when the batch mix method applied. For the continuous mix method, with a dry material rate of 220 kg/h, 380 – 420 l/h will be required.

1.3 Ancillary products

Ancillary products referred to in this ETA, as a part of installation provisions or in the framework of determining performances (e.g. fire resistance tests), are not covered by this ETA and cannot be CE-marked on the basis of it.

Depending on the nature of structures to be protected, PROMASPRAY® P300 may require a bonding agent. A styrene acrylic copolymer bonding agent, such as CAFCO® BOND-SEAL, may be required for applications to primed steel, galvanised steel and concrete according to the requirements given in Annex 2.

Depending on the nature of structures to be protected PROMASPRAY® P300 may require a lath such as GRIFF LATT or RIBLATH + Paper or similar according to the requirements given in Annex 2.

2 Specification of the intended use(s) in accordance with the applicable EAD

2.1 Intended uses

This ETA covers fire protective rendering PROMASPRAY® P300 intended for:

Internal use (EAD 350140-00-1106 type Z_2)

PROMASPRAY® P300 is intended for the fire protection of construction elements or to be used in assemblies as specified in Table 1.

Table 1 : Intended use

Protection of	EAD 350140-00-1106 reference
Horizontal membrane protection	Type 1
Vertical membrane protection	Type 2
Load-bearing concrete elements	Type 3
Load-bearing steel elements	Type 4
Load-bearing flat concrete profiled sheet composite elements	Type 5
Load-bearing concrete filled hollow steel columns	Type 6
Load-bearing timber elements	Type 7
Fire separating assemblies with no load-bearing requirements	Type 8
Technical services assemblies in buildings	Type 9
Uses not covered by types 1-9	Type 10

Table 1 shows the possible intended uses of the renderings. Not all of these have been assessed in the framework of this ETA with regard to fire resistance performance. Annex 2 shows a list of the uses for which fire resistance assessment was carried out. This ETA covers assemblies installed in accordance with the provisions given in Annex 2.

The provisions made in this European Technical Assessment are based on an assumed intended working life of 25 years, provided that the assembled product is subject to appropriate use and maintenance, in accordance with this ETA.

Indications given regarding the working life cannot be interpreted as a guarantee given by the producer or the UBAtc, but shall be regarded only as a means for choosing the appropriate product(s) in relation to the expected economically reasonable working life of the construction works.

2.2 Assumptions

2.2.1 Manufacturing directives

This European Technical Assessment is issued for PROMASPRAY® P300 on the basis of agreed data/information, deposited with the UBAtc, which identifies the product that has been assessed. Changes to the product/production process which could result in the deposited data/information being incorrect should be notified to the UBAtc before the changes are introduced.

The raw materials are mixed in a continuous process. The mix is put into bags. Each bag is marked in accordance with paragraph 6 of this ETA. PROMASPRAY® P300 bags are examined for visual defects and non-compliant bags are rejected.

2.2.2 Installation

2.2.2.1 General

The fire protection rendering shall be installed according to the manufacturer's instructions that may be found in the PROMASPRAY® P300 Application Guide. It is the manufacturer's responsibility to provide correct information about the application to the users.

Minimum requirements for satisfactory installing of the product in respect of training, competence and experience are identified in the installation and application instructions. On request of the applicator, the manufacturer may provide a technical training on site for the use of the PROMASPRAY® 300 product.

2.2.2.2 Tools and equipment for application

2.2.2.2.1 Batch mix method

2.2.2.2.1.1 General

The PROMASPRAY® P300 is premixed with water until constant volume and then pumped to a nozzle where compressed air is used to spray the wet mix to the substrate.

2.2.2.2.1.2 Mixer

A paddle of ribbon-type plaster mixer, with a safety cover, rubber tipped blades and provisions for quick dumping of mix directly into the pump hopper is required. Mixers with a 155 litres capacity or larger with minimum operating speeds of 35-40 rpm are required.

A water metering device is required to ensure constant quality of the mix. All water meters shall be calibrated to ensure proper water to product ratio.

2.2.2.2.1.3 Pumps

Piston pumps as well as rotor/stator pumps may be used.

Piston pumps should be equipped with a pressure release valve, blow-out cap and ball, rated for about 5.5 – 6.9 MPa at the manifold.

Only open throat, screw feed rotor/stator pumps with a soft rubber stator are recommended, e.g. Putzmeister SP11.

Hoses, couplings, nozzles and other additional equipment shall respect the instructions of the ETA-holder.

2.2.2.2.2 Continuous mix method

2.2.2.2.2.1 General

PROMASPRAY® P300 is mixed with the required quantity of water when leaving the pump. This mix is pumped to a nozzle where compressed air is used to spray the wet mix to the substrate.

2.2.2.2.2.2 Pumps

Typical machines used to spray PROMASPRAY® P300 are welded steel built. They usually comprise a supply hopper, a spiral screw, a worm pump, water supply and a compressor. For example a typical spraying machine could be the PFT G4 or PFT G5 of Knauf. A water metering device is required to ensure constant quality of the mix. All water meters shall be calibrated to ensure proper water to product ratio.

Hoses, couplings, nozzles and other additional equipment shall respect the instructions of the ETA-holder

2.2.2.2.3 Verification of the density of the fresh mortar.

Verification of density of the fresh mortar is described is clause 9 of in the application manual. Evaluation values are given in annex A of the latter document.

2.2.2.3 Requirements for substrate

2.2.2.3.1 Inspection of substrate

Before application, the substrate should be inspected and prepared. The inspection consists of the verification of the surfaces to be sprayed. The following conditions should not exist before applying PROMASPRAY® P300

- Oily steel decks (residual roll oils)
- Loose mill scale, loose rust or dirt
- Concrete form oils
- Foreign materials that may prevent proper bonding to the substrate.

The substrate shall be rigid, free of deformations or excessive vibrations before PROMASPRAY® P300 has set. Mid span deflection of deck spans should not be greater than L/240.

PROMASPRAY® P300 may be applied directly to clean bare steel structural members or steel structural members with generic primers (see 2.2.2.3.2) or to metallic laths.

Galvanised steel structural members or concrete may first be treated with a styrene acrylic copolymer bonding agent such as CAFCO® BOND-SEAL.

Clips, hangers, supports, sleeves and other attachments to the substrate shall be placed by others prior to the application of PROMASPRAY® P300. Ducts, piping, conduit or other suspended equipment shall be installed after the application of PROMASPRAY® P300.

2.2.2.3.2 Accepted corrosion protection primers

Corrosion protection primers that have been a part of the test assemblies and thus are covered by this ETA are within the following two generic families:

- short/medium oil alkyd primers
- two component epoxy primers

Non-primed galvanized steel has also been a part of the test assemblies and is covered by this ETA.

2.2.2.3.3 Bonding agents

Bonding agents for PROMASPRAY® P300 are described in clause 1.3.

2.2.2.4 *Additional bonding reinforcement*

For timber floors a metallic lath shall be used. Unlike 2.2.2.3.1 a styrene acrylic copolymer bonding agent, such as CAFCO® BOND-SEAL, is not necessary when the metallic lath is galvanized.

2.2.2.5 *Environmental conditions during mixing, application and construction*

An air and substrate temperature of 40°C minimum shall be maintained for 24 hours prior to application, during application and for a minimum of 24 hours after application. Substrate temperature should be at least 2°C above dew point. Maximum air and substrate temperature is 45°C.

Envisage an adequate ventilation to allow the product to dry after being sprayed. In closed areas, where the ventilation is inadequate, it is necessary to install a ventilation and air circulation device sufficient to obtain a renewing of air at least 4 times per hour. During winter time, special considerations shall be taken according to recommendations from the manufacturer.

As given in clause 1.1, the product is intended for internal conditions Z_2, excluding temperatures below 0°C, with humidity classes other than Z_1. Special provisions for temporarily protection of the exposed rendering being subjected to rain during construction shall be taken.

2.2.2.6 *Application of rendering*

Application instructions provided by the ETA-holder should be respected.

The application of a styrene acrylic copolymer bonding agent, such as CAFCO® BOND-SEAL, is given in the Annex 2. In general the application of such styrene acrylic copolymer bonding agent is necessary for concrete and for concrete/profiled sheet galvanized steel composite slabs (trapezoidal or re-entrant). For clean bare steel, steel with an approved primer or for metallic laths the application of such styrene acrylic copolymer bonding agent is not necessary.

PROMASPRAY® P300 should be sprayed in coats of regular thickness, depending on the requested thickness as follows:

The thickness of the initial coat of PROMASPRAY® P300 is 9 mm to 17 mm. Subsequent coats, with thickness between 19 mm and 25 mm, may be applied until the final thickness is achieved. Allow the material to set between coats. If the surface of the applied PROMASPRAY® P300 is dry, pre-wet this surface with a water mist before applying the next coat.

When spraying beams PROMASPRAY® P300 is sprayed first on top side of the lower flange. Thereafter the section may be sprayed in any order.

Spray application of PROMASPRAY® P300 results in a bold textured finish. If a smoother finish is desired, the final spray applied coat of PROMASPRAY® P300 may be either lightly trowelled or during spraying the air pressure may be increased, improving the appearance, but also resulting in a higher density of the top coat.

Depending on the temperature on the jobsite and the relative humidity, PROMASPRAY® P300 will obtain an initial set in about 3 to 6 hours.

2.2.2.7 *Site tests*

The adhesion of the dry rendering to the substrate should be tested on site. A suitable method for site measurement is based on EGOLF Agreement EA 05:1999.

The person responsible for works will decide on the adequacy of the site tests results taking into account the reference values given in clause 3.7. For their acceptability, whether recommendations given in EAD 350140-00-1106, or other existing criteria may be applied, under the responsibility of the person responsible for works.

The thickness should be measured at a frequency sufficient to determine the mean and minimum thickness. A suitable method for thickness measurement is given in EAD 350140-00-1106, clause 5.0.2. The location of the measurements, with a minimum of 10 per controlled specimen, will be geometrically uniformly distributed over the surface of the controlled specimen, and shall include visible cracks.

The density of the rendering should be measured and be within the tolerances specified in table 1. A suitable method for density measurement is given in EAD 350140-00-1106, clause 5.0.2, except that the number of samples may be reduced to an appropriate level.

2.2.2.8 *Surface treatments and protection*

This ETA covers only rendering without topcoats.

The resistance to mechanical impact from hard and soft bodies have not been assessed. The use of the rendering is therefore limited to applications where the rendering is protected from such impacts. The accessible structure exposed to friction or impact related to the activity on site should be covered with adapted protection depending on the site configuration. The protection is to be independent from the PROMASPRAY® P300 rendering.

The vapour permeability of the product has not been assessed.

2.2.2.9 *Assembly*

PROMASPRAY® P300 rendering shall be applied as specified in the assemblies in Annex 2.

2.3 Recommendations

2.3.1 Recommendations on packaging, transport and storage

PROMASPRAY® P300 shall be stored in a dry environment. It should be stored off the ground, under a weatherproof cover, and protected from damp surfaces or areas of high humidity.

PROMASPRAY® P300 should be protected from frost, heat above 45°C and strong radiant sunlight. The temperature of the PROMASPRAY® P300 dry mix at the mixing should be at least 4°C.

PROMASPRAY® P300 may be stored up to 6 months from date of manufacture or according to manufacturer's recommendations, under dry conditions. Material damaged by moisture (open or damaged bags) should not be used. Throw away bags that have been exposed to water.

2.3.2 Recommendations on use, maintenance and repair

This assessment is based on the assumption that damage, for example caused by accidental impact, is repaired. It is further assumed that replacement of components during maintenance/repair will be undertaken using materials specified by this ETA.

PROMASPRAY® P300 that has been damaged or removed may be repaired by spraying or hand trowelling freshly mixed product to the affected areas. The maximum area that may be patched by hand trowelling is 0,3 m². If the thickness of the patch is greater than 13 mm, multiple coats will be necessary

Use water spray to pre-wet the area before commencing repair procedures. The previous surface should be rough in texture to achieve the best possible adhesion.

3 Performance of the product and references to the methods used for its assessment

3.1 Reaction to fire

The fire protective rendering PROMASPRAY® P300 has a reaction to fire classification A1 according to EN 13501-1:2007.

3.2 Fire resistance

The resistance to fire performance PROMASPRAY® P300, according to EN 13501-2:2003, EN 13501-3:2005 and EN 13501-4:2005 for various thicknesses and intended uses of the fire protective renderings, is presented in Annex 2.

3.3 Content, emission and/or release of dangerous substances

No performance assessed.

3.4 Water vapour permeability

No performance assessed.

3.5 Mechanical resistance and stability

No performance assessed.

3.6 Resistance to impact/movement

No performance assessed.

3.7 Adhesion

Adhesion tests have been performed in accordance with EAD 350140-00-1106 and EGOLF Agreement EA 05:1999. The adhesion/cohesion of the PROMASPRAY® P300 fire protective product depends on the installed thickness and on the preparation of the substrate.

Almost all adhesion tests lead to cohesive failures. As an example, the tensile bonding strength of PROMASPRAY® P300 on several substrates are given in the table below.

These values are guidance values and do not reflect a statistical evaluation, or minimum guaranteed values.

Surface	Thickness (mm)	Tensile bond strength (kPa)
		Avg
Steel Unprimed	60	34,47
Steel Unprimed	15	31,33
Steel Alkyd primer	60	28,61
Steel Alkyd primer	15	14,17
Steel Epoxy primer	60	20,94
Steel Epoxy primer	15	16,77
Concrete / SE*	58	83,53
Concrete / SE*	12	203,97***
Concrete / MO**	58	76,01
Concrete / MO**	12	175,33***
Galvanised steel	25	15,9

* Soluble emulsion release agent
** Soluble mineral oil release agent
*** Generally cohesive failures, but some were adhesive

3.8 Airborne sound insulation

No performance assessed.

3.9 Sound absorption

No performance assessed.

3.10 Impact sound insulation

No performance assessed.

3.11 Thermal insulation

No performance assessed.

3.12 Aspects of durability, serviceability and identification

PROMASPRAY® P300 has been assessed for a working life of a working life of 25 years for the intended use Z2 (internal use).

3.13 Serviceability

This characteristic is not relevant for the intended use Z_2 (internal use).

4 Assessment and verification of constancy of performance (AVCP) system applied

4.1 Assessment and verification of constancy of performance

4.1.1 For fire protective uses

The system of assessment and verification of constancy of performance is specified in the EC Decision 99/454/EC[3], as amended by EC Decision 2001/596/EC[4] (system 1).

4.1.2 Uses subject to reaction to fire regulations

The systems of assessment and verification of constancy of performance are specified in the EC Decision 99/454/EC, as amended by EC Decision 2001/596/EC, depending on the class(es) declared.

4.2 Responsibilities

4.2.1 Tasks of the manufacturer

4.2.1.1 Factory production control

4.2.1.1.1 General

The ETA-holder exercises permanent internal control of the production. All the elements, requirements and provisions adopted by the ETA-holder are being documented in a systematic manner in the form of written policies and procedures. This factory production control system ensures that the products are in conformity with the European Technical Assessment (ETA).

The personnel involved in the production process have been identified, sufficiently qualified and trained to operate and maintain the production equipment. Machinery equipment is being regularly maintained and this is being documented. All processes and procedures of production are being recorded at regular intervals.

The ETA-holder maintains a traceable documentation of the production process from purchasing or delivery of raw or basic raw materials up to the storage and delivery of finished products.

The factory production control system for the product includes relevant design specifications, including adequate drawings and written instructions for:

- type and quality of all materials
- packaging and transport protection

The production control system specifies how the control measures are carried out, and at which frequencies.

Products that do not comply with requirements as specified in the ETA are being separated from the conforming products and marked as such. The ETA-holder registers non-compliant production and action(-s) taken to prevent further non-conformities. External complaints are also being documented, as well as actions taken.

[3] OJ L 178, 14.7.1999, p.52
[4] OJ L 209, 2.8.2001, p.33

4.2.1.1.2 Maintenance, calibration of testing equipment

All testing equipment is being maintained, calibrated and/or checked against equipment or test specimens traceable to relevant international or nationally recognised reference test specimens (standards).

The ETA-holder ensures that handling, preservation and storage of test equipment is such that its accuracy and fitness for purpose is maintained

The calibration of all test equipment shall be repeated if any repair or failure occurs which could upset the calibration of the test equipment.

4.2.1.2 Other tasks of the ETA-holder

The following table specifies properties that should be controlled and minimum frequencies of control. The test method and threshold have been laid down in the control plan.

4.2.1.2.1 *Dry mix*

Property	Test method	Minimum frequency of tests
Incoming materials	Verification of the declaration of conformity, based on ETA-Holder's specification	Every batch supplied
Bulk density of dry mix	ETA-Holder's specification	five times per day (24h) at regular intervals
General dry grading	ETA-Holder's specification	once per day

4.2.1.2.2 Fresh mortar

Properties	Test method	Minimum frequency of tests
Density	ETA-Holder's specification	five times per day (24h) at regular intervals
Foam Concentration	ETA-Holder's specification	five times per day (24h) at regular intervals
Setting time	ETA-Holder's specification	five times per day (24h) at regular intervals

4.2.1.2.3 Rendering (hardened mortar)

Properties	Test method	Minimum frequency of tests
Density	As established in assessment tests	once per month
Adhesion / Cohesion	As established in assessment tests	once per month
Insulation Efficiency	Time to 500°C	once per month

4.2.2 Tasks of notified bodies

4.2.2.1 Assessment of the performance of the construction product

The assessment tests have been conducted by the assessment body in accordance with EAD 350140-00-1106, chapter 2, as relevant, and the technical assessment body has assessed the results of these tests, as part of the ETA issuing procedure. In accordance with Regulation (EU) N° 305/2011, Annex V, 1.6, notified bodies and manufacturers shall not undertake the assessment of the performance of the product.

4.2.2.2 Initial inspection of the manufacturing plant and of the factory production control system and continuous surveillance, assessment and evaluation of the factory production control system

Assessment of the factory production control system is the responsibility of the notified body.

An assessment shall be carried out of the production unit to demonstrate that the factory production control is in conformity with the ETA and any subsidiary information. This assessment shall be based on an initial inspection of the factory. The relevant production unit has been specified in the ETA.

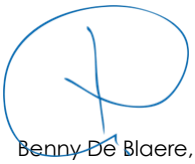
Subsequently continuous surveillance of factory production control is necessary to ensure continuing conformity with the ETA. It is recommended that Surveillance inspections shall be conducted at least twice a year.

4.3 Other marking and/or information

Each bag of dry mix is marked with the product name and a traceability code.

UBAtc asbl is a non-profit organization according to Belgian law. It is a Technical Assessment Body notified by the Belgian notifying authority, the Federal Public Services Economy, SMEs, Self-Employed and Energy, on 17 July 2013 in the framework of Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC and is member of the European Organisation for Technical Assessment, EOTA (www.eota.eu).

This European Technical Assessment has been issued by UBAtc asbl, in Sint-Stevens-Woluwe, on the basis of the technical work carried out by the Assessment Operator, BCCA.

On behalf of UBAtc asbl,	On behalf of the Assessment Operator, BCCA, responsible for the technical content of the ETA,
	
Peter Wouters, director	Benny De Blaere, director general

The most recent version of this European Technical Assessment may be consulted on the UBAtc website (www.ubatc.be).

Annexes

Annex I: References

Reference number 350140-00-1106
Document title Fire protective products – Renderings and rendering kits intended for fire resisting applications.

Reference number EN 13501-1:2002
Document title Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests

Reference number EN 13501-2:2003
Document title Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services

Reference number EN 13501-3:2005
Document title Fire classification of construction products and building elements - Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers

Reference number EN 13501-4:2005
Document title Fire classification of construction products and building elements - Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers

Reference number EGOLF EA5:1999 (2007)
Document title Method for the measurement of bonding properties of fire protection materials applied to steel, concrete and steel / concrete composite structures

Reference number EN 1015-6:1998
Document title Methods of test for mortar for masonry – Part 6: Determination of bulk density of fresh mortar

Reference number EN 1015-10:1999
Document title Methods of test for mortar for masonry – Part 6: Determination of dry bulk density of hardened mortar

Reference number EN 1365-2:1999
Document title Fire resistance tests for loadbearing elements - Part 2: Floors and roofs

Reference number ENV 13381-3:2002
Document title Test methods for determining the contribution to the fire resistance of structural members - Part 3: Applied protection to concrete members

Reference number ENV 13381-4:2002
Document title Test methods for determining the contribution to the fire resistance of structural members - Part 4: Applied protection to steel members

Reference number ENV 13381-5:2002
Document title Test methods for determining the contribution to the fire resistance of structural members - Part 5: Applied protection to concrete/profiled sheet steel composite members

Reference number EN 1363-1:2002
Document title Fire resistance tests - Part 1: General requirements

Reference number EN 1992-1-2:2005
Document title Eurocode 3 : Design of concrete structures – Part 1-2 : General rules – Structural fire design

Reference number EN 10025-1:2005
Document title Hot rolled products of structural steels - Part 1: General technical delivery conditions

Reference number EN 1994-1-2:2005
Document title Eurocode 4 - Design of composite steel and concrete structures - Part 1-2: General rules - Structural fire design

NOTE: The editions of reference documents given above are those which have been adopted by the UBAtc for its specific use when establishing this ETA. When new editions become available, these supersede the editions mentioned only when confirmed by the UBAtc.

Annex II : Fire resistance performances and assembly methods for uses of renderings covered by this ETA

A 2.1 Overview of fire resistance performances for PROMASPRAY® P300 assemblies

The fire protective assemblies given in Table A2.1 have been assessed within the framework of this ETA. Assemblies and applications installed according to the provisions given in this Annex 2 are covered by this ETA.

Table A2.1

Assemblies assessed within the framework of this ETA	Classification according to EN 13501-2	Test Standard	Intended use category according to EAD 350140-00-1106	Installation details	Date of addition to this ETA
Load bearing timber floor protected by PROMASPRAY® P300, thickness 59 mm	REI 120	EN 1365-2:1999	Type 7	Annex A.2.2	2011-04-19
Protection of load-bearing concrete elements, thickness 9 to 50 mm	Assessment: See Annex A.2.3	ENV 13381-3:2002 Annex C	Type 3	Annex A.2.3	2011-04-19
Protection of load-bearing steel elements, thickness 10 to 50 mm	Assessment: See Annex A.2.4	ENV 13381-4:2002, Annex H	Type 4	Annex A.2.4	2011-04-19
Protection of load-bearing flat concrete profiled sheet composite elements, thickness 13 to 73 mm	Assessment: See Annex A.2.5	ENV 13381-5:2002	Type 5	Annex A.2.5	2011-04-19

Annex 2.2: Specification of a load-bearing timber floor assembly (intended use type 7) protected by the PROMASPRAY® P300 rendering, 59 mm in thickness, sprayed on a metallic lath.

A.2.2.1 Date of addition to this ETA

This annex was added to the ETA 11/0043 on 2011-04-19. This assembly was not covered by this ETA prior to the addition of this annex.

A.2.2.2 Classification

The assembly described in this annex has been tested according to EN 1365-2:1999 and classified REI 120 in accordance with EN 13501-2:2003.

A.2.2.3 Installation requirements

A.2.2.3.1 Supporting structure

The supporting structure is a timber floor that consists of timber joists and a covering made of chipboards.

The timber structure is constituted by 6 softwood joists, density 450 kg/m³, minimum section of 220 x 75 mm (h x w) at maximum 600 mm centres, connected with cross members with the same density, minimum section of 175 x 40 mm (h x w) at midspan of the floor, and a chipboard flooring with tongue and groove joints, of minimum 22 mm thick with a density of minimum 647 kg/m3, laid perpendicular to the joists and nailed down.

A metallic lath type GRIFF LATT + Paper (RICHTER SYSTEM) or similar is fixed directly on the bottom sides of the timber joists with staples.

The corrugated sheets are laid perpendicular to the joists, with a minimum overlap of one corrugation in the longitudinal direction and minimum 100 mm at the end in the transversal direction.

The maximum applied load per timber joist shall not be greater than that corresponding with the maximum bending moment and shear forces of a load of 170 daN/ml on a soft wood timber joist of 220 x 75 mm (h x w) with a span of 4900 mm, uniformly applied above its axis.

The minimum height of the cavity is 220 mm.

It is not allowed to install or fix equipment in or on the metallic lath membrane.

It is not allowed to install combustible material in the plenum, with exception of the timber floor members.

Specifications for the components are given in Table A.2.2.3.1

Table A.2.2.3.1

Element	Identification	Characteristics	Mounting and fixing
Load bearing timber joist member	Softwood	≥(220 x 75) mm (w x h) Length: corresponding with permissible load Density ca. 450 kg/m³	Installed at ≤ 600 mm centres
Cross member	Softwood	≥ (175 x 40) mm (w x h) Density ca. 450 kg/m³	Installed at ≤ 2450 mm centres
flooring	Chipboard	≥ 22 mm density ca. 650 kg/m³	Nailed upon the timber joist with steel nails
Metallic lath	Griff Latt + paper (RICHTER system) or similar	2 sides galvanized corrugated steel sheet	Installed with steel staples perpendicular, under and directly against the timber joist. In longitudinal direction overlap ≥ 1 corrugation, In transversal direction overlap at the ends ≥ 100 mm

A.2.2.3.2 Insulation

None

A.2.2.3.3 Fire protective rendering

The fire protective product PROMASPRAY® P300 is sprayed using the continuous mix method.

A first layer of PROMASPRAY® P300 is sprayed directly on the metallic lath and is scrubbed with a broom to create a bonding undercoat. Then, PROMASPRAY® P300 is sprayed in to successive layers with few minutes stop between them, until the required thickness is reached.

During the application, the thickness of protective material is regularly checked with a thickness gauge.

Specifications for the components are given in Table A.2.2.3.3

Table A.2.2.3.3

Element	Identification	Characteristics	Mounting and fixing
Rendering	PROMASPRAY® P300	Average Thickness ≥ 59 mm Density: 450 kg/m³ ± 15% kg/m³	Sprayed, using the continuous mix method, in one or more layers with maximum thickness of 25 mm, without finishing

Annex 2.3: Specification and assessment of fire protection of a load bearing concrete assembly (intended use type 3) protected by PROMASPRAY® P300 rendering.

A.2.3.1 Date of addition to this ETA

This annex was added to the ETA 11/0043 on 2011-04-19. This assembly was not covered by this ETA prior to the addition of this annex.

A.2.3.2 Classification

The assembly described in this annex has been tested and assessed according to ENV 13381-3:2002 and classified in accordance with EN 13501-2:2003.

The maximum duration of the exposure to the standard time temperature curve as defined in EN 1363-1:2002, 5.1.1, is 360 min, depending on the type of concrete structures and the thickness of the PROMASPRAY® P300 applied.

The assessment of the insulation efficiency and the equivalent thickness of concrete is given in A.2.3.4.

A2.3.3 Installation requirements

A2.3.3.1 Supporting structure

PROMASPRAY® P300 shall be applied by using a bonding agent to dense concrete beams and slabs, and to walls that are exposed on 1 side only.

Specifications for the components are given in Table A.2.3.3.1

Table A.2.3.3.1

Element	Identification	Characteristics	Mounting and fixing
Load bearing concrete beam	Concrete, siliceous aggregates	Strength class C25/30 Density 2330 kg/m³ ± 15 % Width of the beam ≥ 150 mm	Casted with release agent applied in the mould, belonging to the families of mineral oil or emulsions. Surface shall be free of dust and bare.
Load bearing concrete slab or wall	Concrete, siliceous aggregates	Strength class C25/30 Density 2330 kg/m³ ± 15 % Thickness: ≥ 120 mm	Casted with release agent applied in the mould, belonging to the families of mineral oil or emulsions. Surface shall be free of dust and bare.

A.2.3.3.2 Bonding agent prior to application of PROMASPRAY® P300

Whatever is the release agent used to cast the concrete as mentioned above, the concrete structures are treated with a styrene acrylic copolymer bonding agent, such as CAFCO® BOND-SEAL, before the application of PROMASPRAY® P300.

The styrene acrylic copolymer bonding agent CAFCO® BOND-SEAL is used not diluted and is applied with a roll and/or a brush on all parts to be protected with PROMASPRAY® P300.

Applied quantity: ca 150 g/m².

PROMASPRAY® P300 is applied some minutes after the application of the styrene acrylic copolymer bonding agent, when the bonding agent starts to tack.

Specifications for the components are given in Table A.2.3.3.2

Table A.2.3.3.2

Element	Identification	Characteristics	Mounting and fixing
Bonding agent	Styrene acrylic copolymer bonding agent, such as CAFCO® BOND-SEAL	Density: ca.1 kg/l	Roll or brush applied to all parts to be protected by PROMASPRAY® P300. Applied quantity: ca. 150 g/m² (liquid).

A.2.3.3.3 Fire protective rendering

PROMASPRAY® P300 is applied on the apparent sides of the concrete structures to be protected, by following its shape

PROMASPRAY® P300 is sprayed using the continuous mix method, in one or more layers of maximum 25 mm each to reach the required thickness, with one day between 2 successive layers. During the application, the thickness of the protective material is regularly controlled with a thickness gauge. After reaching the required thickness, it is kept without finishing.

Specifications for the components are given in Table A.2.3.3.3

Table A.2.3.3.3

Element	Identification	Characteristics	Mounting and fixing
Rendering	PROMASPRAY® P300	Average thicknesses: from 9 to 50 mm, according to the assessment rules. Density: 450 kg/m³ ± 15 %	Sprayed, using the continuous mix method, in one or more layers with maximum thickness of 25 mm, without finishing

A.2.3.4 Assessment of the fire performance of PROMASPRAY® P300 on concrete structures

A.2.3.4.1 Protection of concrete slabs and walls

The insulation efficiency of the protective material when applied on slabs and walls is determined in function of :

- the thickness of protective material applied (mm) ;
- the standard concrete temperature comprised between [300,650] (°C) ;
- the duration of the thermal exposure under the standard time temperature curve as defined in EN 1363-1:2002, 5.1.1

A.2.3.4.1.1 Concrete slab protected by 10 mm of PROMASPRAY® P300

Depth (mm)	Temperatures inside concrete slab (°C)			
	Duration of exposure under EN 1363-1 (min)			
	30	60	90	120
0	273	370	458	533
15	128	214	296	366
30	90	142	196	257
45	64	113	142	184
60	47	91	122	141
75	36	74	107	122
120	20	36	56	74

A.2.3.4.1.2 Concrete slab protected by 50 mm of PROMASPRAY® P300

Depth (mm)	Temperatures inside concrete slab (°C)											
	Duration of exposure under EN 1363-1 (min)											
	30	60	90	120	150	180	210	240	270	300	330	360
0	45	74	88	117	140	156	170	184	199	214	231	248
15	31	55	72	89	103	116	129	141	154	168	183	198
30	24	43	59	73	88	101	110	120	128	138	148	160
45	21	35	51	64	77	90	99	107	115	123	131	139
60	19	30	43	56	68	80	89	98	104	111	118	125
75	18	26	38	50	61	73	82	91	98	104	109	115
120	17	19	25	33	39	46	53	59	65	70	74	78

A2.3.4.2 Protection of rectangular concrete beams of minimum 150 mm width.

The insulation efficiency of the protective material when applied on rectangular beams or columns of minimum 150 mm width is determined in function of :

- the thickness of protective material applied (mm) ;
- the standard concrete temperature comprised between [300,650] (°C) ;
- along a vertical, horizontal and diagonal axis ;
- the duration of the thermal exposure under the standard time temperature curve as defined in EN 1363-1:2002, 5.1.1

NOTE : The results below are depending on the release agent used to cast the concrete beams

A2.3.4.2.1 Concrete beam protected with 9mm PROMASPRAY® P300

Along a vertical axis

Depth (mm)	Release agent	Temperatures inside concrete beam along vertical axis (°C)		
		Duration of exposure under EN 1363-1 (min)		
		30	60	90
0	Mineral oil	302	498	637
	Emulsion	285	507	653
17		147	314	451
75		90	128	206
150		57	110	138
450		35	86	114

Along an horizontal axis

Depth (mm)	Release agent	Temperatures inside concrete beam along horizontal axis (°C)		
		Duration of exposure under EN 1363-1 (min)		
		30	60	90
0	Mineral oil	261	366	473
	Emulsion	243	325	440
17		125	242	356
75		57	110	138

Along a diagonal axis

Depth (mm)	Temperatures inside concrete beam along diagonal axis (°C)		
	Duration of exposure under EN 1363-1 (min)		
	30	60	90
44	142	301	436
78	107	169	285
106	90	128	206

A.2.3.4.2.2 Concrete beam protected with 49mm PROMASPRAY® P300

Along a vertical axis

Depth (mm)	Release agent	Temperatures inside concrete beam along vertical axis (°C)											
		Duration of exposure under EN 1363-1 (min)											
		30	60	90	120	150	180	210	240	270	300	330	360
0	Mineral oil	45	79	96	133	165	194	232	277	320	365	411	463
	Emulsion	49	85	99	145	176	211	256	304	350	396	440	482
17		33	67	89	111	135	167	204	245	287	329	372	416
75		18	43	67	91	108	122	138	158	181	213	252	290
150		16	34	57	76	98	112	123	132	144	160	183	214
450		15	29	47	68	88	99	102	107	115	125	138	152

Along an horizontal axis

Depth (mm)	Release agent	Temperatures inside concrete beam along horizontal axis (°C)											
		Duration of exposure under EN 1363-1 (min)											
		30	60	90	120	150	180	210	240	270	300	330	360
0	Mineral oil	48	75	95	141	167	190	210	231	255	281	314	349
	Emulsion	46	71	89	115	149	165	183	203	223	247	276	311
17		28	54	75	96	114	130	149	169	190	213	242	275
75		16	34	57	76	98	112	123	132	144	160	183	214

Along a diagonal axis

Depth (mm)	Temperatures inside concrete beam along diagonal axis (°C)											
	Duration of exposure under EN 1363-1 (min)											
	30	60	90	120	150	180	210	240	270	300	330	360
44	37	69	96	118	146	179	214	254	294	335	378	421
78	23	52	77	100	116	132	157	189	223	261	300	341
106	18	43	67	91	108	122	138	158	181	213	252	290

A.2.3.4.3 Equivalent thickness of concrete for the protective product PROMASPRAY® P300

The equivalent thicknesses of concrete induced by the protective material PROMASPRAY® P300, has been determined according to requirements of Annex C of standard ENV 13381-3:2002 and according to requirements of Annex A of document EN 1992-1-2 : "Eurocode 3 : Design of concrete structures – Part 1-2 : General rules – Structural fire design" – October 2005.

Type of concrete structure	Thickness of PROMASPRAY-P300 (mm)	Equivalent thickness of concrete (mm)					
		Duration of exposure under EN 1363-1					
		30 min	60 min	90 min	120 min	180 min	240 min
Slab	10	33	40	41	40	*	*
	50	>85	>85	>85	>85	>85	>85
Beam	9	10	27	25	*	*	*
	49	24	74	80	87	111	114

A.2.3.4.4 Stickability of protective product PROMASPRAY® P300 on concrete structures

The stickability of protective material PROMASPRAY® P300 has been determined according to requirements of paragraph 13.5. of standard ENV 13381-3:2002, in function of :

- the thickness of protective material applied (mm) ;
- the concrete structure, beam or slab ;
- the type of release agent used to cast the concrete.

Type of concrete structure	Type of release agent	Thickness of PROMASPRAY-P300 (mm)	Maximum interface temperature (°C)
Slab	Mineral oil	10	630
	Emulsion	10	535
	Mineral oil	50	259
	Emulsion	50	254
Beam	Mineral oil	9	682
	Emulsion	9	771
	Mineral oil	49	469
	Emulsion	49	484

Annex 2.4. Specification and assessment of fire protection of load bearing steel elements (intended use type 4) protected by PROMASPRAY® P300 rendering.

A.2.4.1 Date of addition to this ETA

This annex was added to the ETA 11/0043 on 2011-04-19. This assembly was not covered by this ETA prior to the addition of this annex.

A.2.4.2 Classification

The assembly described in this annex has been tested and assessed according to ENV 13381-4:2002 and classified in accordance with EN 13501-2:2003.

The maximum duration of the exposure to the standard time temperature curve as defined in EN 1363-1:2002, 5.1.1, is 240 min, depending on the section factor of the load bearing steel element, the critical temperature and the thickness of the PROMASPRAY® P300. The critical temperature is assessed from 350°C up to 550°C in steps of 50°C.

The assessment of the required thickness of PROMASPRAY® P300 in function of the section factor, the critical temperature of the steel and the exposure time is given in A.2.4.4.

A.2.4.3 Installation requirements

A.2.4.3.1 Supporting structure

PROMASPRAY® P300 is directly applicable to I/H steel beams and columns, with section factors between 60 and 340 m^{-1}, exposed on 3 or 4 sides.

PROMASPRAY® P300 is also directly applicable to rectangular, square or circular hollow sections, under condition that the required thickness is corrected according to the ENV 13381-4:2002, Annex B, B.1.1.3.

PROMASPRAY® P300 is applicable to load bearing steel elements for critical steel temperatures of 350°C up to 550°C.

Specifications for the components are given in Table A.2.4.3.1

Table A.2.4.3.1

Element	Identification	Characteristics	Mounting and fixing
Load bearing steel sections	Steel, grade according to EN 10025-1:2005 and ENV 13381-4:2002	Section factor from 60(1) to 340 m^{-1} I/H sections, Circular, rectangular and square hollow sections.	surface of steel: see A.2.4.3.2 Surface shall be clean, dry and free of dust

(1) A steel member with section factor ≤ 60 m^{-1} shall be protected with the thickness of PROMASPRAY® P300 determined for the steel member with section factor equal to 60 m^{-1} ;

A.2.4.3.2. Surface of steel members

PROMASPRAY® P300 sprayed product can be applied directly on steel members with following surface conditions:

- Bare steel
- Steel members painted with a primer against corrosion

Acceptable primers against corrosion shall have following characteristics:

Table A.2.4.3.2

Primer	Type	Average applied DFT* (µm)
1	Alkyd	40
2	Epoxy	45

* DFT : dry film thickness

A.2.4.3.3. Bonding agent prior to application of PROMASPRAY® P300

No bonding agent was applied before the application of PROMASPRAY® P300.

A.2.4.3.4 Fire protective rendering

PROMASPRAY® P300 is applied on the apparent sides of the steel member to be protected, by following its shape.

PROMASPRAY® P300 is sprayed using the batch mix method, in one or more layers, each with a maximum thickness of 25 mm, whatever is the required thickness. During the application, the thickness of the protective material is regularly controlled with a thickness gauge. After reaching the required thickness, it is kept without finishing.

Specifications for the components are given in Table A.2.4.3.4

Table A.2.4.3.4

Element	Identification	Characteristics	Mounting and fixing
Rendering	PROMASPRAY® P300	Average thicknesses: from 10 to 50 mm, according to the assessment rules. Density: 310 kg/m³ ± 15 %	Sprayed, using the batch mix method, in one or more layers with maximum thickness of 25 mm, without finishing

A.2.4.4 Assessment

A.2.4.4.1 Fire performance of PROMASPRAY® P300 on steel structures

The assessment method used to assess the fire protection performances of product PROMASPRAY® P300 when applied on steel structures is as follows :

Type of structure	Standard used for assessment
Steel	ENV 13381-4:2002 / Annex H Numerical regression analysis

A.2.4.4.2 Required minimum thicknesses of PROMASPRAY® P300 to keep the profile temperature below 350°C

Section Factor (m^{-1})	Classification of Fire Resistance					350 °C	
	R15	R30	R60	R90	R120	R180	R240
≤ 65	*10*	*10*	*13*	*22*	*31*	*48*	----
70	10	10	14	23	32	50	----
75	10	10	15	25	34	*52*	----
80	10	10	16	26	35	----	----
85	10	10	17	27	36	----	----
90	10	10	18	28	38	----	----
95	10	10	18	29	39	----	----
100	10	10	19	29	40	----	----
110	10	10	20	31	42	----	----
120	10	10	21	32	43	----	----
130	10	11	22	34	45	----	----
140	10	12	23	35	46	----	----
150	10	12	24	36	47	----	----
160	10	13	25	37	49	----	----
170	10	13	25	37	50	----	----
180	10	13	26	38	50	----	----
190	10	14	26	39	*51*	----	----
200	10	14	27	39	*52*	----	----
210	10	15	27	40	----	----	----
220	10	15	28	41	----	----	----
230	10	15	28	41	----	----	----
240	10	15	28	42	----	----	----
250	10	16	29	42	----	----	----
260	10	16	29	42	----	----	----
270	10	16	29	43	----	----	----
280	10	16	30	43	----	----	----
290	10	16	30	43	----	----	----
300	10	17	30	44	----	----	----
310	10	17	30	44	----	----	----
320	*10*	*17*	*31*	*44*	----	----	----
330	*10*	*17*	*31*	*45*	----	----	----
340	*10*	*17*	*31*	*45*	----	----	----

A.2.4.4.3 Required minimum thicknesses of PROMASPRAY® P300 to keep the profile temperature below 400°C

Section Factor (m^{-1})	Classification of Fire Resistance					400 °C	
	R15	R30	R60	R90	R120	R180	R240
≤ 65	*10*	*10*	*11*	*18*	*26*	*42*	----
70	10	10	12	20	28	44	----
75	10	10	12	21	29	46	----
80	10	10	13	22	31	48	----
85	10	10	14	23	32	50	----
90	10	10	15	24	33	*51*	----
95	10	10	16	25	34	----	----
100	10	10	16	26	35	----	----
110	10	10	18	27	37	----	----
120	10	10	19	29	39	----	----
130	10	10	20	30	40	----	----
140	10	10	20	31	42	----	----
150	10	10	21	32	43	----	----
160	10	11	22	33	44	----	----
170	10	11	23	34	45	----	----
180	10	12	23	35	46	----	----
190	10	12	24	35	47	----	----
200	10	13	24	36	48	----	----
210	10	13	25	37	49	----	----
220	10	13	25	37	49	----	----
230	10	14	26	38	50	----	----
240	10	14	26	38	*51*	----	----
250	10	14	26	39	*51*	----	----
260	10	14	27	39	*52*	----	----
270	10	15	27	40	*52*	----	----
280	10	15	27	40	----	----	----
290	10	15	28	40	----	----	----
300	10	15	28	41	----	----	----
310	10	15	28	41	----	----	----
320	*10*	*16*	*28*	*41*	----	----	----
330	*10*	*16*	*29*	*42*	----	----	----
340	*10*	*16*	*29*	*42*	----	----	----

A.2.4.4.4 Required minimum thicknesses of PROMASPRAY® P300 to keep the profile temperature below 450°C

Section Factor (m^{-1})	Classification of Fire Resistance					450 °C	
	R15	R30	R60	R90	R120	R180	R240
≤ 65	*10*	*10*	*10*	*16*	*23*	*37*	*51*
70	10	10	10	17	24	39	----
75	10	10	10	18	26	41	----
80	10	10	11	19	27	43	----
85	10	10	12	20	28	44	----
90	10	10	13	21	29	46	----
95	10	10	13	22	30	47	----
100	10	10	14	23	31	49	----
110	10	10	15	24	33	*51*	----
120	10	10	16	26	35	----	----
130	10	10	17	27	37	----	----
140	10	10	18	28	38	----	----
150	10	10	19	29	39	----	----
160	10	10	20	30	40	----	----
170	10	10	20	31	41	----	----
180	10	10	21	32	42	----	----
190	10	11	22	32	43	----	----
200	10	11	22	33	44	----	----
210	10	12	23	34	45	----	----
220	10	12	23	34	46	----	----
230	10	12	24	35	46	----	----
240	10	12	24	35	47	----	----
250	10	13	24	36	48	----	----
260	10	13	25	36	48	----	----
270	10	13	25	37	49	----	----
280	10	13	25	37	49	----	----
290	10	14	26	38	50	----	----
300	10	14	26	38	50	----	----
310	10	14	26	38	50	----	----
320	*10*	*14*	*26*	*39*	*51*	----	----
330	*10*	*14*	*27*	*39*	*51*	----	----
340	*10*	*15*	*27*	*39*	*52*	----	----

A.2.4.4.5 Required minimum thicknesses of PROMASPRAY® P300 to keep the profile temperature below 500°C

Section Factor (m^{-1})	Classification of Fire Resistance					500 °C	
	R15	R30	R60	R90	R120	R180	R240
≤ 65	*10*	*10*	*10*	*13*	*20*	*33*	*46*
70	10	10	10	14	21	35	48
75	10	10	10	15	22	37	*51*
80	10	10	10	17	24	38	----
85	10	10	10	18	25	40	----
90	10	10	11	18	26	41	----
95	10	10	11	19	27	43	----
100	10	10	12	20	28	44	----
110	10	10	13	22	30	47	----
120	10	10	14	23	32	49	----
130	10	10	15	24	33	*51*	----
140	10	10	16	25	35	----	----
150	10	10	17	27	36	----	----
160	10	10	18	27	37	----	----
170	10	10	18	28	38	----	----
180	10	10	19	29	39	----	----
190	10	10	20	30	40	----	----
200	10	10	20	31	41	----	----
210	10	10	21	31	42	----	----
220	10	11	21	32	42	----	----
230	10	11	22	32	43	----	----
240	10	11	22	33	44	----	----
250	10	11	22	33	44	----	----
260	10	12	23	34	45	----	----
270	10	12	23	34	45	----	----
280	10	12	23	35	46	----	----
290	10	12	24	35	46	----	----
300	10	13	24	35	47	----	----
310	10	13	24	36	47	----	----
320	*10*	*13*	*25*	*36*	*48*	----	----
330	*10*	*13*	*25*	*37*	*48*	----	----
340	*10*	*13*	*25*	*37*	*49*	----	----

A.2.4.4.6 Required minimum thicknesses of PROMASPRAY® P300 to keep the profile temperature below 550°C

Section Factor (m^{-1})	Classification of Fire Resistance					550°C	
	R15	R30	R60	R90	R120	R180	R240
≤ 65	*10*	*10*	*10*	*11*	*17*	*29*	*41*
70	10	10	10	12	19	31	43
75	10	10	10	13	20	33	46
80	10	10	10	14	21	35	48
85	10	10	10	15	22	36	50
90	10	10	10	16	23	38	*52*
95	10	10	10	17	24	39	----
100	10	10	10	18	25	40	----
110	10	10	12	19	27	43	----
120	10	10	13	21	29	45	----
130	10	10	14	22	30	47	----
140	10	10	15	23	32	49	----
150	10	10	15	24	33	*51*	----
160	10	10	16	25	34	*52*	----
170	10	10	17	26	35	----	----
180	10	10	17	27	36	----	----
190	10	10	18	28	37	----	----
200	10	10	19	28	38	----	----
210	10	10	19	29	39	----	----
220	10	10	20	30	40	----	----
230	10	10	20	30	40	----	----
240	10	10	20	31	41	----	----
250	10	10	21	31	42	----	----
260	10	11	21	32	42	----	----
270	10	11	21	32	43	----	----
280	10	11	22	33	43	----	----
290	10	11	22	33	44	----	----
300	10	12	22	33	44	----	----
310	10	12	23	34	45	----	----
320	*10*	*12*	*23*	*34*	*45*	----	----
330	*10*	*12*	*23*	*34*	*45*	----	----
340	*10*	*12*	*23*	*35*	*46*	----	----

Annex 2.5 Specification and assessment of fire protection of load bearing composite concrete/profiled steel sheets elements (intended use type 5) protected by PROMASPRAY® P300 rendering.

A.2.5.1 Date of addition to this ETA

This annex was added to the ETA 11/0043 on 2011-04-19. This assembly was not covered by this ETA prior to the addition of this annex.

A.2.5.2 Classification

The assembly described in this annex has been tested and assessed according to ENV 13381-5:2002 and classified in accordance with EN 13501-2:2003.

The maximum duration of the exposure to the standard time temperature curve as defined in EN 1363-1:2002, 5.1.1, is 360 min, depending on the type of profiled steel sheet and the thickness of the applied PROMASPRAY® P300.

The assessment of the required thickness of PROMASPRAY® P300 in function of type of profiled steel sheet and the exposure time for the characteristic steel sheet temperature rise to 350°C, the equivalent thickness of concrete and the insulation performances are given in A.2.5.4

A.2.5.3 Installation requirements

A.2.5.3.1 Supporting structure

PROMASPRAY® P300 shall be applied by using a bonding agent to profiled steel sheets of composite slabs casted with dense concrete.

Two types of profiled steel sheets can be protected by PROMASPRAY® P300 sprayed product:

- Type 1 : Trapezoidal profiled steel sheets as COFRAPLUS 60 (PAB),
- Type 2 : Re-entrant (dovetails) profiled steel sheets as COFRASTRA 40 (PAB).

Specifications for the components are given in Table A.2.5.3.1

Table A.2.5.3.1

Element	Identification	Characteristics	Mounting and fixing
Profiled steel sheet	Trapezoidal profiled steel sheet Re-entrant (dovetails) profiled steel sheet	Thickness of the profiled steel sheet ≥ 0.75mm Width of the ribs ≤ 187mm Height of the ribs ≤ 87mm Galvanised Z 275	Surface shall be free of dust, oil and grease
Concrete	Concrete, siliceous aggregates	Strength class ≥ C25/30 Density 2295 kg/m³ ± 15 %	The concrete may or may not contain additional reinforcing bars for load bearing purpose

A.2.5.3.2. Surface of steel members

No specific preliminary preparation of the profiled steel sheets to be protected by PROMASPRAY® P300 is required.

However, they must be free of dust, oil and grease

A.2.5.3.3. Bonding agent prior to application of PROMASPRAY® P300

Whatever is the type of profiled galvanized steel sheets used for the composite slabs as mentioned in A.2.5.3.1, the profiled steel sheets are treated with a styrene acrylic copolymer bonding agent, such as CAFCO® BOND-SEAL, before the application of PROMASPRAY® P300.

The styrene acrylic copolymer bonding agent CAFCO® BOND-SEAL is applied with a roll and/or a brush on all parts to be protected with PROMASPRAY® P300.

Applied quantity : ca 150 g/m²

PROMASPRAY® P300 is applied some minutes after the application of the styrene acrylic copolymer bonding agent CAFCO® BOND-SEAL, when it starts to tack.

Specifications for the components are given in Table A.2.5.3.3

Table A.2.5.3.3

Element	Identification	Characteristics	Mounting and fixing
bonding agent	styrene acrylic copolymer CAFCO® BOND-SEAL	Density: ca.1 kg/l	Roll or brush applied to all parts to be protected by PROMASPRAY® P300. Applied quantity: ca. 150 g/m² (liquid).

A.2.5.3.4 Fire protective rendering

PROMASPRAY® P300 is applied on the apparent sides of the profiled steel sheet to be protected, by following its corrugation, for exposure to fire from the steel side of the composite slab.

PROMASPRAY® P300 is sprayed using the continuous mix method, in one or more layers with a maximum thickness of 25 mm. During the application, the thickness of the protective material is regularly controlled with a thickness gauge. After reaching the required thickness, it is kept without finishing.

Specifications for the components are given in Table A.2.5.3.4

Table A.2.5.3.4

Element	Identification	Characteristics	Mounting and fixing
Rendering	PROMASPRAY® P300 applied on trapezoidal profiled steel sheet	Average thicknesses: from 13 to 66 mm, according to the assessment rules. Density: 450 kg/m³ ± 15 %	Sprayed, using the continuous mix method, in one or more layers with maximum thickness of 25 mm, without finishing
	PROMASPRAY® P300 applied on re-entrant (dovetail) profiled steel sheet	Average thicknesses: from 16 to 73 mm, according to the assessment rules. Density: 450 kg/m³ ± 15 %	Sprayed, using the continuous mix method, in one or more layers with maximum thickness of 25 mm, without finishing

A.2.5.4. Assessment of the fire performance of PROMASPRAY® P300 on composite concrete/profiled steel sheet elements.

A.2.5.4.1 General

The assessment method used to assess the fire protection performances of product PROMASPRAY® P300 when applied on composite concrete/profiled steel sheet elements is as follows :

Type of structure	Standard used for assessment
Composite concrete/Profiled steel sheet element	ENV 13381-5:2002

A.2.5.4.2 Standard profiled steel sheets temperature 350°C

The time to reach 350°C in the profiled steel sheets has been determined according to requirements of standard ENV 13381-5:2002, paragraph 13.2. and are given in table A.2.5.4.2

Table A.2.5.4.2

Type	description	Thickness of PROMASPRAY® P300 in mm	Time to reach 350 °C In min
1	Trapezoidal	13	45
1	Trapezoidal	66	360
2	Re-entrant	16	165
2	Re-entrant	73	278

A.2.5.4.3 Equivalent thickness of concrete Heq

The effective thickness H_{eff} , the equivalent effective thickness H_e and the equivalent thickness of concrete H_{eq} induced by the protective material PROMASPRAY® P300 applied on both types of profiled steel sheets have been determined according to the requirements of the standard ENV 13381-5:2002, paragraph 13.3 and are given in table A.2.5.4.3.

Table A.2.5.4.3

Profiled steel sheets	Thickness of	H_{eff}	H_e	H_{eq}	Limiting time for

	PROMASPRAY® P300 in mm	(mm)	(mm)	(mm)	applicability In min.
Trapezoidal	13	73	106	33	240
Trapezoidal	66	83	220	137	240
Re-entrant	16	80	162	82	360
Re-entrant	73	90	214	124	360

The equivalent effective thickness He in function of the thickness of by the protective material PROMASPRAY® P300 is given in figure A2.5.4.3-1.

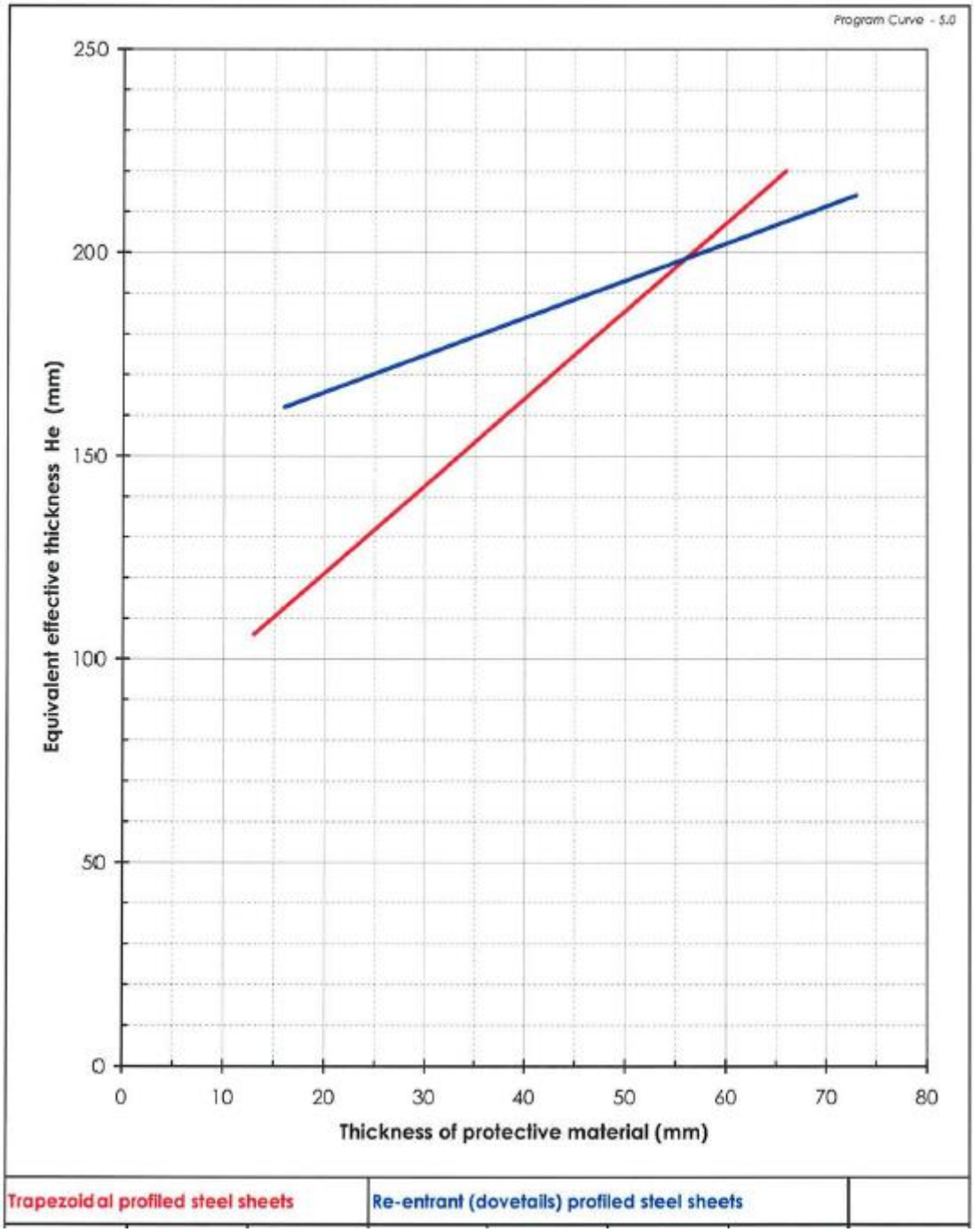


Figure A.2.5.4.3-1. The equivalent effective thickness He in function of the thickness of by the protective material PROMASPRAY® P300

The equivalent thickness of concrete Heq in function of the thickness of by the protective material PROMASPRAY® P300 is given in figure A.2.5.4.3.-2.

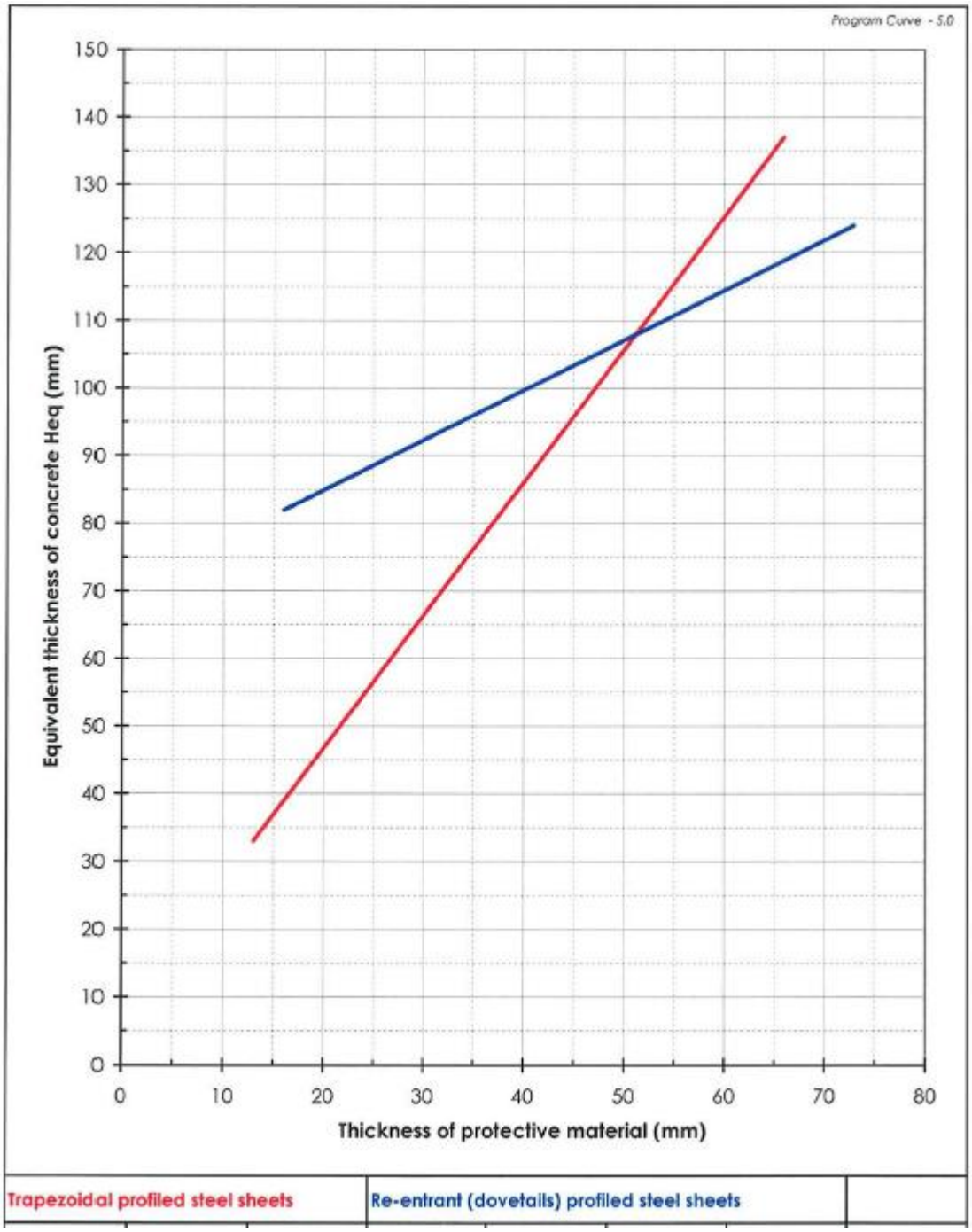


Figure A.2.5.4.3-2 The equivalent thickness of concrete Heq in function of the thickness of by the protective material PROMASPRAY® P300

A.2.5.4.4 Stickability performance

The times for which the stickability of the protective material PROMASPRAY® P300 applied on both types of profiled steel sheets is ensured, have been determined according to the requirements of the standard ENV 13381-5:2002, paragraph 13.4. and are given in table A.2.5.4.4

Table A.2.5.4.4

Profiled steel sheets	Thickness of PROMASPRAY® P300 in mm	Stickability of protective material in minutes
Trapezoidal	13	160
Trapezoidal	66	360
Re-entrant	16	232
Re-entrant	73	277

A.2.5.4.5. REI classification in function of total thickness of the composite slab and minimum thickness of PROMASPRAY® P300

The minimum thickness of the protective material PROMASPRAY® P300 to apply to comply with a REI performance as shown in Table A.2.5.4.5 has been determined in accordance with the requirements of the standard EN 1994-1-2:2005, paragraph 4.3.2 and 4.3.3 by linear interpolation.

The performance R deals with a temperature of the profiled steel sheet not exceeding 350°C at the considered time.

Table A.2.5.4.5

Type	description	Total thickness range of composite slab(h_1+h_2)[(1)] (mm)	Minimum thickness of PROMASPRAY® P300 (mm)					
			REI 30	REI 60	REI 90	REI 120	REI 180	REI 240
1	Trapezoidal	100 to 280	13	16	21	26	36	46
2	Re-entrant	80 to 200	16	16	16	16	24	54
[(1)] see figure 2.5.4.5								

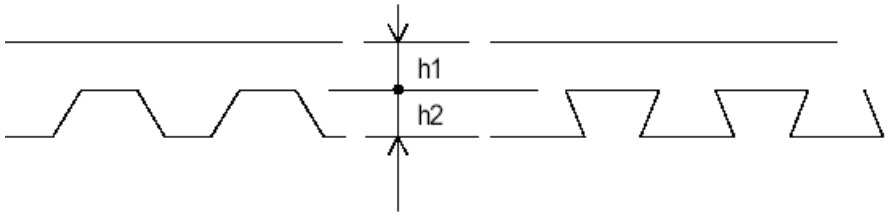


Figure 2.5.4.5 - Trapezoidal profiled steel sheet
Re-entrant (Dovetails) profiled steel sheet