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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA 17/0661
of 01.08.2017

General part

Technical Assessment Body issuing the ETA: ITeC ITeC 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	**Pyrolite® 15**
Product family to which the construction product belongs	Rendering intended for fire resisting applications.
Manufacturer	**PERLITA Y VERMICULITA SLU** Garraf s/n Polígono Industrial Can Prunera ES-08759 Vallirana (Barcelona) Spain
Manufacturing plant(s)	According to Annex N kept by ITeC.
This European Technical Assessment contains	16 pages including 2 annexes which form an integral part of this assessment and Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of	ETAG 018, Part 1 edition April 2013 and Part 3 edition May 2012, used as European Assessment Document (EAD).

General comments

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential annex(es)).

Specific parts of the European Technical Assessment

1 Technical description of the product

Pyrolite® 15 is a wet-mix spray-applied fire protective rendering made of gypsum and lightweight, expanded vermiculite among other compounds. The binder is included as part of the dry mix.

The rendering considered in this ETA does not require any additional product for its installation (ETA under option 1 as described in the foreword of ETAG 018-3).

Properties of the applied rendering such as thickness range, density, adhesion values, etc., are described in Annex 2.

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

Pyrolite® 15 is intended for the fire protection uses as described in table 1, which also shows the related environmental use conditions.

Table 1: Intended use categories related to the protected element and the environmental conditions.

Fire protection uses		**Environmental conditions**
ETAG 018-1 reference	**Element intended to be protected**	**ETAG 018-3 reference**
Type 3	Loadbearing concrete elements	Type Z_2

The environmental use categories are specified in ETAG 018-3, section 2.2.2:

- Type Z_2: internal conditions with temperature of at least 0 °C and humidity lower than 85 % RH.

The provisions made in this ETA are based on a working life of Pyrolite® 15 of at least 25 years, provided that the conditions laid down in the manufacturer's instructions for the installation, use and maintenance are met. These provisions are based upon the current state of the art and the available knowledge and experience.

The indications given as to the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the appropriate product(s) in relation to the expected economically reasonable working life of the works.

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

3.1 Performance of the product

The assessment of the Pyrolite® 15 for the relevant intended uses, considering the basic requirements for construction works 2 and 3, was performed following the ETAG 018 for *Fire Protective Products, Part 1: General (April 2013) and Part 3: Renderings and rendering kits intended for fire resisting applications (May 2012)*, used as EAD.

Table 2: Performance of Pyrolite® 15.

Product: Pyrolite® 15		**Intended use:** Fire resisting applications
Basic requirement	**Essential characteristic**	**Performance**
BWR 2 Safety in case of fire	Reaction to fire	A1
	Resistance to fire	See Annex 2
BWR 3 Hygiene, health and the environment	Content, emission and/or release of dangerous substances	No dangerous substances (see 3.2.3)
General aspects relating to the performance of the product	Durability	Type Z_2
	Adhesion (bond strength)	See 3.2.4 and Annex 2

The rest of characteristics included in ETAG 018-3 has not been assessed in this ETA.

3.2 Methods used for the assessment

3.2.1 Reaction to fire

The rendering has been tested according to EN ISO 1182 [1] and EN ISO 1716 [2]. Classification is given in accordance with EN 13501-1 [3] and Regulation (EU) 2016/364.

3.2.2 Fire resistance

Fire resistance performance, classified in accordance with EN 13501-2 [4], has been determined following the test and evaluation methods given in Annex 2.

[1] EN ISO 1182. Reaction to fire tests for products. Non-combustibility test.

[2] EN ISO 1716. Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value).

[3] EN 13501-1. Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests.

[4] EN 13501-2. Fire classification of construction products and building elements. Part 2: Classification using data from fire resistance tests, excluding ventilation services implemented.

3.2.3 Content, emission and/or release of dangerous substances

According to the manufacturer's declaration, Pyrolite® 15 does not contain dangerous substances given in Annex VI to Regulation (EC) No 1272/2008 and EOTA TR 034[5].

In particular, substances classified according to Regulation (EC) No 1272/2008 as EU-cat. Carcinogenic 1A and/or 1B, Mutagenic 1A and/or 1B, Acute Toxic 1, 2 and/or 3, Toxic for reproduction 1A and/or 1B, STOT SE 1 and/or STOT RE 1, are not used.

In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the products falling within its scope. In order to meet the provisions of the EU Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.2.4 General aspects relating to the performance of the product

Durability of the rendering has been assessed according to ETAG 018-3, section 5.7.1, in relation to its fire protective intended uses as defined in table 1.

Adhesion (bond strength) has been determined in accordance with ETAG 018-3 and EGOLF EA 05[6]. The adhesion of the rendering depends on the installed thickness and the preparation of the substrate. Bond strength guidance values of the rendering and the conditions under which they were achieved are given in the relevant annexes.

The ETA is issued for Pyrolite® 15 on the basis of agreed data/information, deposited with the ITeC, in accordance with ETAG 018-3, section 5.7.3.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

According to the Decision 1999/454/EC of the European Commission, the system of AVCP (see EC Delegated Regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table applies.

Table 4: AVCP System.

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Fire protective products	For fire compartmentation and/or fire protection or fire performance	Any	1

[5] EOTA Technical Report 034 Edition October 2015: General ER 3 Checklist for ETAGs/CUAPs/ETAs. Content and/or release of dangerous substances in products/kits.

[6] EGOLF EA 05 (SM5:1999): Fire testing. Method for the measurement of bonding properties of fire protection materials applied to steel, concrete and steel/concrete composite structures.

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

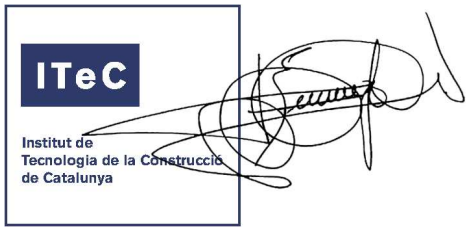
All the necessary technical details for the implementation of the AVCP system are laid down in the Control Plan deposited with the ITeC and agreed in accordance with ETAG 018-3, section 8.

The Control Plan is a confidential part of the ETA and only handed over to the notified product certification body involved in the assessment and verification of constancy of performance.

The factory production control operated by the manufacturer shall be in accordance with the above-mentioned Control Plan.

Issued in Barcelona on 1 August 2017

by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart
Technical Director, ITeC

ANNEX 1. Fire resistance performance and installation provisions

A.1.1 Overview of the assessed fire resistance performance

The assessed constructive elements fire protected with Pyrolite® 15 are shown in table A.1.1.

Table A.1.1: Fire protected constructive elements.

Intended use according to ETAG 018		Test standard	Classification	Installation details
Type 3	Loadbearing concrete elements	EN 13381-3 [7]	EN 13501-2, see Annex 2	Annex 2

A.1.2 Installation provisions related to the elements protected with Pyrolite® 15

The system installation should be carried out in accordance with the manufacturer's instructions and the provisions given in this ETA.

The product is intended for environmental use category Type Z_2. Special provisions shall be taken for temporary protection of the rendering exposed to outdoor conditions during construction.

Before application the substrate should be inspected and prepared. Surfaces to be sprayed shall be free from oil, grease, primers, sealing agents or of any other substance that will impair adhesion. If dirt is detected on the substrate, it is recommended to clean the substrate by spraying water with a hose.

Clips, hangers, supports, sleeves and other attachments to the substrate can be placed by others prior or after the application of Pyrolite® 15. Ducts, piping, conduits or other suspended equipment can be installed after the application of Pyrolite® 15, in which case later inspection will be required and, when necessary, reparation of the rendering. See Annex 2 for substrate specification.

A.1.3 Verifications on site

The thickness should be measured at sufficient points to determine the mean and minimum thickness. A suitable method for thickness measurement is given in ETAG 018-3, section 5.0.2.

The density of the hardened rendering should be measured within the tolerances specified in the relevant annex.

The bond strength of the rendering to the substrate should be tested on site. A suitable method is EGOLF Agreement EA 05, which can be used as a base for the site tests. The person responsible for the works will decide on the adequacy of the site tests results taking into account the reference values given in the relevant annex. For their acceptability, the recommendations given in ETAG 018-3, section 7.3.1, or other existing criteria can be applied, under the responsibility of the person responsible for works.

[7] EN 13381-3. Test methods for determining the contribution to the fire resistance of structural members. Part 3: Applied protection to concrete members.

ANNEX 2. Specification and assessment of fire performance of loadbearing concrete elements protected by Pyrolite® 15 (intended use Type 3)

A.2.1 Loadbearing concrete beams and columns

A.2.1.1 Classification

The constructive elements described in this annex have been tested and assessed according to EN 13381-3 and classified in accordance with EN 13501-2.

The equivalent thickness of concrete and the insulation performance are given in section A.2.1.3.

A.2.1.2 Installation requirements

The system installation should be carried out in accordance with the provisions in A.1.2 and the following specification.

A.2.1.2.1 Supporting structural element

Pyrolite® 15 can be applied on concrete beams and columns exposed to fire from more than one side. Specification of the supporting structural element is given in table A.2.1.

Table A.2.1: Specification of the concrete structural element.

Element	Characteristics	Mounting and fixing
Loadbearing concrete beam and column	Height of the section ≥ 450 mm* Width of the section ≥ 150 mm Density: 2300 kg/m^3 ± 15% Compressive strength ≥ 38,0 N/mm^2 Made with any type of aggregate	Reinforced concrete Concrete release from the mould without agent Surface free of oil, grease, dust, etc.

* The height may be decreased provided the section surface remains the same or is higher, by increasing the width.

A.2.1.2.2 Fire protective rendering

Pyrolite® 15 is directly applied on the apparent sides of the concrete structure to be protected by following their shape. Pyrolite® 15 is sprayed in one coat of regular thickness to reach the requested thickness according to this annex. Hairline cracks in the dry rendering are not accepted.

Specification of the fire protective rendering is given in table A.2.2.

Table A.2.2: Specification of the applied rendering.

Product	Characteristics	Mounting and fixing
Pyrolite® 15 (Hardened rendering)	Thickness: 11,9 mm to 20,0 mm Density: 412 kg/m^3 ± 15 %	Rendering is kept without finishing after application Spray-applied rendering without: - Primer or bonding agent - Topcoat or sealing coat - Mechanical fixings or reinforcement - Additives out of dry mix

A.2.1.2.3 Bonding properties of Pyrolite® 15 on concrete beams and columns

Assessment of the bonding properties of Pyrolite® 15, when directly applied on concrete structures, has been carried out according to EGOLF EA 05 procedure.

The indicated values are representative of adhesive/cohesive failure at the substrate surface or within the sprayed thickness of Pyrolite® 15. These values are guidance values, and they do not reflect a statistical evaluation, nor minimum guaranteed values.

Table A.2.3: Tensile bond strength on concrete substrates.

Surface	Thickness of Pyrolite® 15 (mm)	Mean tensile bond strength (MPa)	Failure mode
Concrete substrate according EGOLF EA 05	11,9	0,046	95 % adhesive 5 % cohesive
	20,0	0,038	50 % adhesive 50 % cohesive

A.2.1.3 Assessment of the fire performance of Pyrolite® 15 on concrete beams and columns

A.2.1.3.1 General

The assessment method used to assess the fire protection performance of Pyrolite® 15 when applied on concrete elements is according to paragraph 13 of EN 13381-3.

A.2.1.3.2 Insulation performance

The average temperature of the 11,9 mm protected concrete beam unexposed surface exceeded 140ºC the initial temperature at minute 161.

The average temperature of the 20,0 mm protected concrete beam unexposed surface exceeded 140ºC the initial temperature at minute 121.

A.2.1.3.3 Stickability performance

The stickability of Pyrolite® 15 when applied on concrete beams and columns is determined according to the requirements of paragraph 13.5 of EN 13381-3.

Between the minute 51 and minute 101 the maximum recorded temperature on the exposed surface of the 11,9 mm protected concrete beam was more than 50 % above the mean value of all recorded temperatures (without failure).

The maximum recorded temperature on the exposed surface of the 20,0 mm protected concrete beam was more than 50 % above the mean value of all recorded temperatures during the entire test (loss of stickability).

A.2.1.3.4 Protection of concrete beams and columns

The insulation efficiency of the 11,9 mm and 20,0 mm thickness protective material when applied on concrete beams and columns as specified in table A.2.1, subject to the thermal exposure under the standard time-temperature curve as defined in paragraph 5.1.1 of EN 1363-1, is given in the next tables in a range of concrete temperatures within 200 ºC – 650 ºC along a vertical, horizontal and diagonal axis.

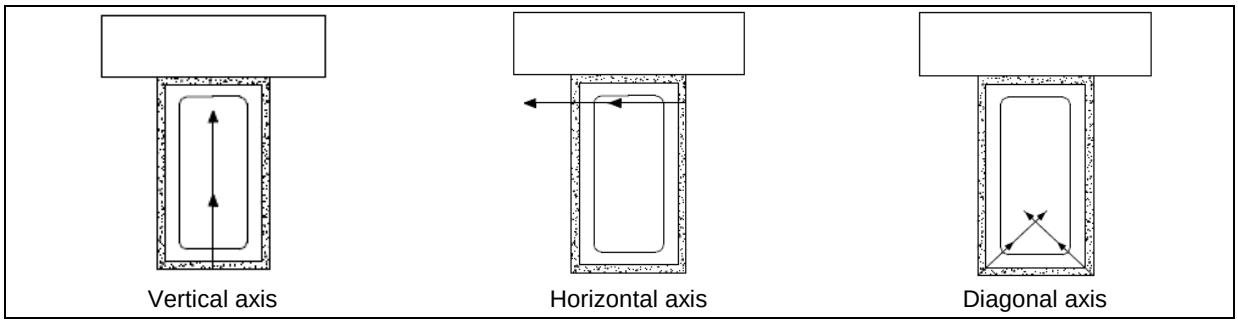


Figure A.2.1: Direction inside the concrete depth of a beam [8].

Table A.2.4: Concrete depth vs critical temperature for 11,9 mm thickness of Pyrolite® 15.

Vertical axis										
Time period (minutes)	**Depth of critical temperatures inside the concrete (mm)**									
	200 ºC	**250 ºC**	**300 ºC**	**350 ºC**	**400 ºC**	**450 ºC**	**500 ºC**	**550 ºC**	**600 ºC**	**650 ºC**
30	-	-	-	-	-	-	-	-	-	-
60	15	8	1	-	-	-	-	-	-	-
90	63	41	20	12	6	-	-	-	-	-
120	118	74	58	41	24	14	8	1	-	-
150	-	133	102	72	56	39	22	13	7	1
Horizontal axis										
Time period (minutes)	**Depth of critical temperatures inside the concrete (mm)**									
	200 ºC	**250 ºC**	**300 ºC**	**350 ºC**	**400 ºC**	**450 ºC**	**500 ºC**	**550 ºC**	**600 ºC**	**650 ºC**
30	-	-	-	-	-	-	-	-	-	-
60	12	-	-	-	-	-	-	-	-	-
90	39	17	5	-	-	-	-	-	-	-
120	64	44	26	12	1	-	-	-	-	-
150	-	71	55	39	23	12	2	-	-	-
Diagonal axis										
Time period (minutes)	**Depth of critical temperatures inside the concrete (mm)**									
	200 ºC	**250 ºC**	**300 ºC**	**350 ºC**	**400 ºC**	**450 ºC**	**500 ºC**	**550 ºC**	**600 ºC**	**650 ºC**
30	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-
90	91	67	43	-	-	-	-	-	-	-
120	-	105	86	66	44	-	-	-	-	-
150	-	-	-	103	84	63	40	-	-	-

[8] In case of columns, the vertical axis refers to the long axis and the horizontal to the short one.

Table A.2.5: Concrete depth vs critical temperature for 20,0 mm thickness of Pyrolite® 15.

Vertical axis										
Time period (minutes)	**Depth of critical temperatures inside the concrete (mm)**									
	200 ºC	**250 ºC**	**300 ºC**	**350 ºC**	**400 ºC**	**450 ºC**	**500 ºC**	**550 ºC**	**600 ºC**	**650 ºC**
90	27	3	-	-	-	-	-	-	-	-
120	80	45	14	-	-	-	-	-	-	-
150	122	88	57	27	6	-	-	-	-	-
180	-	124	96	69	41	13	-	-	-	-
210	-	-	132	106	81	54	26	7	-	-
Horizontal axis										
Time period (minutes)	**Depth of critical temperatures inside the concrete (mm)**									
	200 ºC	**250 ºC**	**300 ºC**	**350 ºC**	**400 ºC**	**450 ºC**	**500 ºC**	**550 ºC**	**600 ºC**	**650 ºC**
30	12	9	7	4	1	-	-	-	-	-
60	15	13	10	7	5	2	-	-	-	-
90	17	14	12	9	6	4	1	-	-	-
120	19	16	14	11	8	6	3	1	-	-
150	43	19	16	13	11	8	6	3	1	-
180	-	45	19	17	14	11	9	6	3	1
210	-	-	55	20	17	15	12	9	7	4
Diagonal axis										
Time period (minutes)	**Depth of critical temperatures inside the concrete (mm)**									
	200 ºC	**250 ºC**	**300 ºC**	**350 ºC**	**400 ºC**	**450 ºC**	**500 ºC**	**550 ºC**	**600 ºC**	**650 ºC**
120	-	38	-	-	-	-	-	-	-	-
150	-	-	53	-	-	-	-	-	-	-
180	-	-	-	77	52	-	-	-	-	-
210	-	-	-	-	-	82	61	41	-	-

A.2.1.3.5 Equivalent thickness of concrete

The equivalent thickness of concrete induced by the protective rendering Pyrolite® 15, applied at 11,9 mm and 20,0 mm on concrete beams or columns, is determined according to Annex C of EN 13381-3 and given in the table A.2.6.

Table A.2.6: Equivalent thickness of concrete induced by Pyrolite® 15.

Time period (minutes)		**30**	**60**	**90**	**120**	**180**
Equivalent thickness of concrete (mm)	Pyrolite® 15 at 11,9 mm	35	43	45	46	-
	Pyrolite® 15 at 20,0 mm	56	75	75	78	69

The equivalent thickness of concrete H_{eq} in function of the thickness of Pyrolite® 15 is given in figures A.2.2, A.2.3, A.2.4 and A.2.5 for a time period of 30, 60, 90 and 120 minutes respectively.

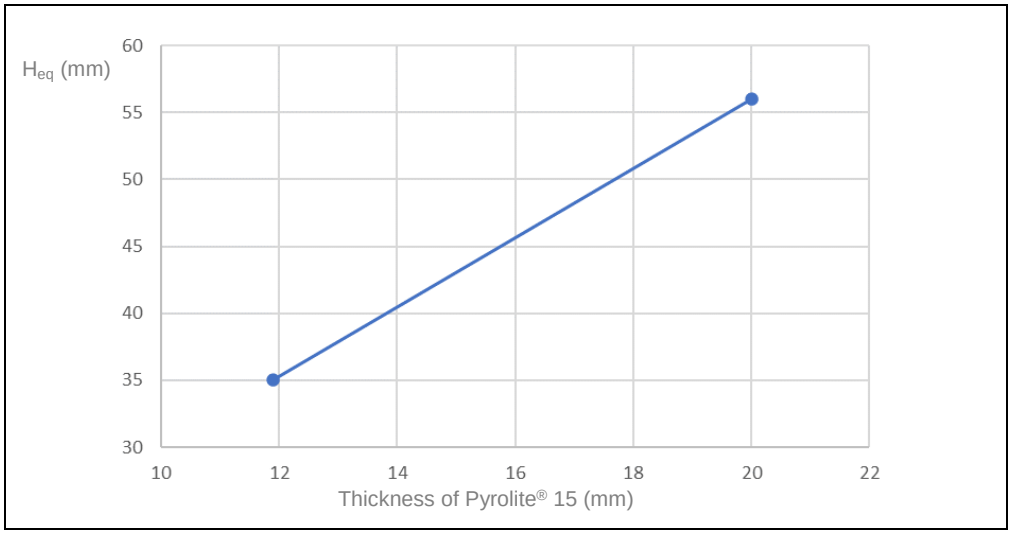


Figure A.2.2: Equivalent thickness of concrete (30 minutes).

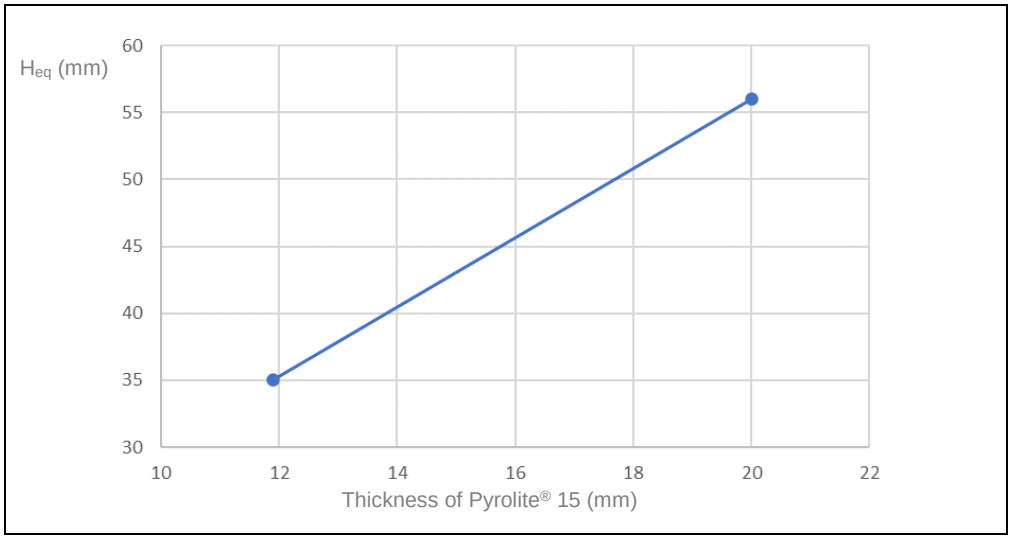


Figure A.2.3: Equivalent thickness of concrete (60 minutes).

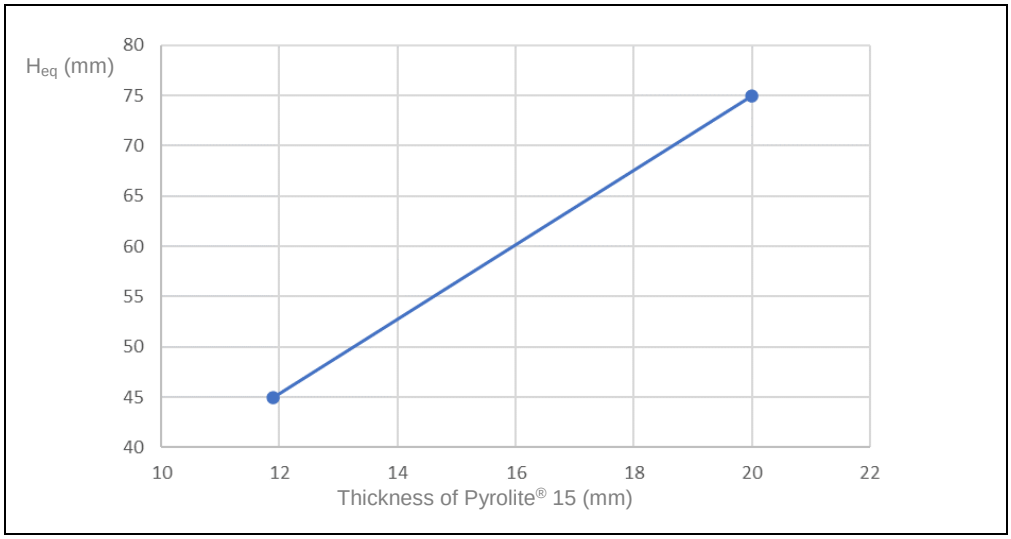


Figure A.2.4: Equivalent thickness of concrete (90 minutes).

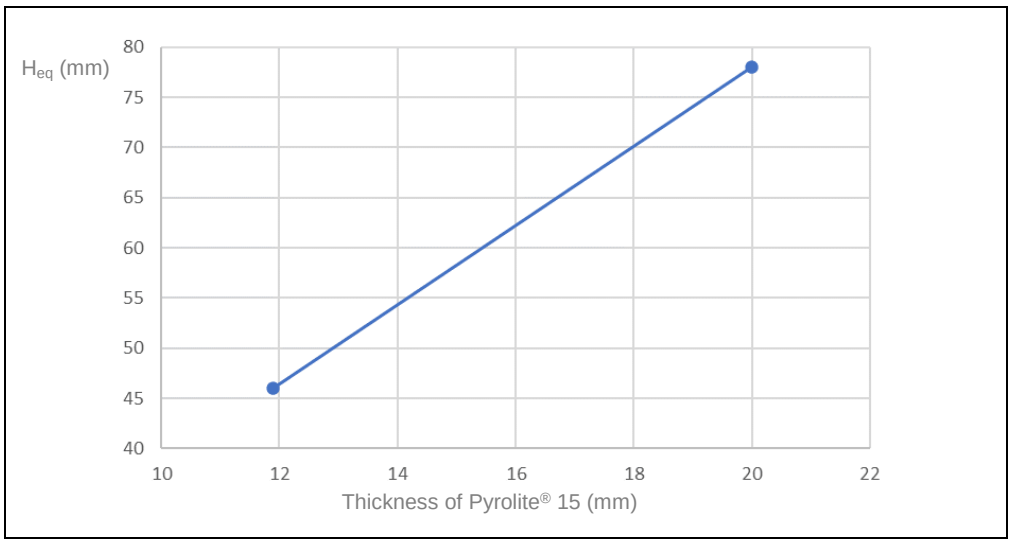


Figure A.2.5: Equivalent thickness of concrete (120 minutes).

A.2.2 Loadbearing concrete slabs and walls

A.2.2.1 Classification

The constructive elements described in this annex has been tested and assessed according to EN 13381-3 and classified in accordance with EN 13501-2.

The equivalent thickness of concrete and the insulation performance are given in section A.2.2.3.

A.2.2.2 Installation requirements

The system installation should be carried out in accordance with the provisions in A.1.2 and the following specification.

A.2.2.2.1 Supporting structural element

Pyrolite® 15 can be applied on concrete slabs exposed to fire from one side, both in horizontal (floors) and vertical (walls) orientation. Specification of the supporting structural element is given in table A.2.7.

Table A.2.7: Specification of the concrete structural element.

Element	Characteristics	Mounting and fixing
Loadbearing concrete slab and wall	Thickness of the slab/wall ≥ 150 mm Density: 2300 kg/m^3 ± 15 % Compressive strength ≥ 25 N/mm^2 Made with any type of aggregate	Reinforced concrete Concrete released from the mould without agent Surface free of oil, grease, dust, etc.

A.2.2.2.2 Fire protective rendering

Pyrolite® 15 is directly applied on the concrete structure in one coat of regular thickness to reach the requested thickness according to this annex. Hairline cracks in the dry rendering are not accepted.

Specification of the fire protective rendering is given in table A.2.8.

Table A.2.8. Specification of the applied rendering.

Product	Characteristics	Mounting and fixing
Pyrolite® 15 (Hardened rendering)	Thickness: 14,0 mm Density: 376 kg/m^3 ± 15 %	Rendering is kept without finishing after application Spray-applied rendering without: - Primer or bonding agent - Topcoat or sealing coat - Mechanical fixings or reinforcement - Additives out of dry mix

A.2.2.2.3 Bonding properties of Pyrolite® 15 on concrete slabs and walls

Assessment of the bonding properties of Pyrolite® 15, when directly applied on concrete structures, has been carried out according to EGOLF EA 05 procedure.

The indicated values are representative of adhesive/cohesive failure at the substrate surface or within the sprayed thickness of Pyrolite® 15. These values are guidance values, and they do not reflect a statistical evaluation, nor minimum guaranteed values.

Table A.2.9. Tensile bond strength on concrete substrates.

Surface	Thickness of Pyrolite® 15 (mm)	Mean tensile bond strength (MPa)	Failure mode
Concrete substrate according EGOLF EA 05	14,0 mm	0,035 MPa	90 % adhesive 10 % cohesive

A.2.2.3 Assessment of the fire performance of Pyrolite® 15 on concrete slabs and walls

A.2.2.3.1 General

The assessment method used to assess the fire protection performance of Pyrolite® 15 when applied on concrete elements is according to paragraph 13 of EN 13381-3.

A.2.2.3.2 Insulation performance

The insulation criteria according to EN 1363-1 was kept until the end of the resistance to fire test (300 minutes), thus maintaining its separating function:

a. Increase of the average temperature of the concrete slab unexposed surface below 140 ºC.
b. Increase of the maximum temperature of the concrete slab unexposed surface below 180 ºC.

A.2.2.3.3 Stickability performance

The stickability of Pyrolite® 15 when applied on concrete slabs and walls is determined according to the requirements of paragraph 13.5 of EN 13381-3.

Between the minute 16 and minute 61 the maximum recorded temperature on the exposed surface of the concrete slab was more than 50 % above the mean value of all recorded temperatures (without failure).

A.2.2.3.4 Protection of concrete slabs and walls

The insulation efficiency of the 14,0 mm thickness protective material when applied on concrete slabs and walls as specified in table A.2.7, subject to the thermal exposure under the standard time-temperature curve as defined in paragraph 5.1.1 of EN 1363-1, is given in the next table in a range of concrete temperatures within 300 ºC – 650 ºC.

Table A.2.10: Concrete depth vs critical temperature for 14,0 mm thickness of Pyrolite® 15.

Time period (minutes)	Depth of critical temperatures inside the concrete (mm)							
	300 ºC	350 ºC	400 ºC	450 ºC	500 ºC	550 ºC	600 ºC	650 ºC
30	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-
90	1	-	-	-	-	-	-	-
120	9	4	-	-	-	-	-	-
150	16	10	6	1	-	-	-	-
180	25	17	11	6	2	-	-	-
210	35	24	17	11	7	3	-	-
240	48	32	23	16	11	6	2	-

A.2.2.3.5 Equivalent thickness of concrete

The equivalent thickness of concrete induced by the protective rendering Pyrolite® 15, applied at a thickness of 14,0 mm on concrete slabs or walls, is determined according to Annex C of EN 13381-3 and given in table A.2.11.

Table A.2.11. Equivalent thickness of concrete induced by 14,0 mm of Pyrolite® 15.

Time period (minutes)	**30**	**60**	**90**	**120**	**180**	**240**
Equivalent thickness of concrete (mm)	34	47	53	57	59	59