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INSTITUTO DE CIENCIAS DE LA CONSTRUCCIÓN EDUARDO TORROJA
C/ Serrano Galvache, 4. 28033 Madrid (Spain)
Tel.: (+34) 91 302 0440 www.ietcc.csic.es
gestiondit@ietcc.csic.es
dit.ietcc.csic.es

European Technical Assessment

ETA 18/ 0672
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English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)
Trade name of the construction product	**PERLIFOC HP**
Product family to which the construction product belongs	Rendering intended for Fire Resisting Application of building elements
Manufacturer	**PERLITA Y VERMICULITA S.L.U.** C/ Numància n.º 185, Entresuelo. 08034 Barcelona. Spain
Manufacturing plant(s)	C/ Garraf s/n. Pol. Ind. Can Prunera. 08759 VALLIRANA (Barcelona). Spain
This European Technical Assessment contains	41 pages including 1 Annex, which form an integral part of this assessment. Annex 2. Contain confidential information and is not included in the ETA when that assessment is publicly available.
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 350140-00-1106. Renderings and rendering kits intended for fire resisting applications
This version replace	ETA 18/0672, issued 29/ 05/ 2020

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Specific parts

1 Technical description of the product

PERLIFOC HP product is a mortar of fine granule based in calcium sulphate. This product is lightened with expanded minerals and others raw materials and formulated with several additives to improve the application and its performances with hardened density of **550 kg/m^3 ± 15 %.** The application is performed by spray; the product powder is mixed with water in appropriated machines, or manually. Once the mortar is hardened, conforms a continuous rendering completely bonded to the support (concrete, steel with and without primer, galvanized steel and sheet of galvanized steel).

The thickness of the applied product ranges from 9 – 41mm (48,5 mm for type 10), with a consumption of 4.1 ± 15% kg/m^2/cm thickness.

The final assembly contains a rendering and several primers (two component epoxy primer, alkyd primer, zinc rich epoxy primer and zinc silicate primer) when it is applied on steel supports (optional). According to EAD 350140-00-1106, this ETA is assessed under use conditions: Option 3.

2 Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

2.1 Intended use(s)

The intended use of the PERLIFOC HP mortar is the rendering of indoor building load-bearing and non load-bearing constructive elements to increase the fire resistance in case of fire, keeping the resistance, integrity and insulation (REI) of the building elements until the fire extinction or the building evacuation.

This Product fulfils the Basic works requirements n.º 2 (Safety in case of fire), n.º 3 (Hygiene, health and the environment) and n.º 4 (Safety in use) of the Construction Products Regulation 305/2011.

This product has a category of use related to environmental conditions:

Type Y (included Z1, Z2): Renderings intended for internal and semi-exposed conditions (semi exposed conditions include temperatures below 0°C, but not exposed to rain and limited exposure to UV).

Use category related to the element(s) intended to be protected:

- Type 3: Fire Protective Products to protect load-bearing concrete elements.
- Type 4: Fire Protective Products to protect load-bearing steel elements. Beams and columns with 3 and 4 exposed faces and hollow sections. With a section factor of < 478 m^{-1}. Temperature ranges from 350 ºC to 750 ºC. R15, R30, R45, R60, R90, R120, R180 y R240
- Type 5: Fire Protective Products to protect flat concrete profiled sheet composite elements.
- Type 8. Fire Protective Products that contribute to the fire resistance of the fire separating assembles with no load bearing requirements.
- Type 10. Further intended uses, related to fire compartmentalisation or protection of fire performance, not covered by above Types.

2.2 Relevant general conditions for the use of the kit

The provisions made in this European Technical Assessment are based on an assumed working life of 25 years from installation in the works, according to EAD 350140-00-1106, provided that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met.

The indications given on the working life cannot be interpreted as a guarantee given neither by the product manufacturer nor by EOTA nor by the Technical Assessment Body issuing this ETA, but are regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.

The real working life may be, in normal use conditions, considerably longer without major degradation affecting the Basic works requirements.

Application on site. The suitability of use of this product can only be assumed if this is applied according to the manufacturer's instructions, which are part of the MTD to this ETA placed at IETcc.

A) Particularly, it is recommended to consider:

- The application must be carried out by skilled people,
- Only the components of the product indicated in this ETA can be used
- It is necessary to control the thickness of the applied product during application
- The elements to be protected must be very clean, dry and without dust or grease in order not to affect the adhesion of PERLIFOC HP.
- The recommended mixing water/plaster ratio is 0,80 to 1, so for one sack of PERLIFOC HP (17 kg) is necessary to use 15,3 ±1,7 L of water.
- The application must be performed by a spraying machine. The powder is mixed with water in usual mixing machines. There are different types and brands of these types of machines; depending on the model, it varies the type of shirt-rotor, pumping pressure, distance and height, pressure of mixing water, air pressure, hose lengths and sections, etc. All these characteristics are included in the machines technical specifications and instructions of use. The water flow of the machine must be regulated until achieving a slurry consistency that covers uniformly the steel elements and does not fall down. In order to achieve a uniform surface of PERLIFOC HP, nozzles diameter must be 10 or 12 mm.
- On site adhesion tests should be done in order to determine the product adhesion on the steel element; this adhesion should be at least 80% of the values enclosed in this ETA. This test will be performed by portable adherence equipment, with a sheet metal of 100 mm of diameter. (EGOLF SM 5).
- The density of the applied rendering on site will not vary more than **550 kg/m^3 ± 15 %.** If it was more than 15%, it would be needed to carry out adherence tests.
- The hardened product will not present cracks, according to the test performed in this evaluation.
- Before the application of PERLIFOC HP, it is recommended to read its safety data sheet.

B) Requirements to use primers on different supports and its compatibility with its rendering:

- The alkyd, epoxy, zinc rich epoxy and silicate zinc primers are compatible with PERLIFOC HP. However, the application of PERLIFOC HP can be carried out directly on clean steel because it does not cause directly any corrosion on steel. Adherence can vary from one primer to another, depending on the primer quality and the finishing state of the surface**.** Oily primers and those, which give off pigments, are not recommended.
- For galvanized steel sheet, and galvanized steel supports, the use of primers is not necessary.
- The EAD is not designed to cover the application of rendering over any existing coating (*e.g.* 'old' existing paint) or rendering. It is therefore assumed that:
    - any existing coating or rendering must be completely removed before the application.
    - if it could not be removed, the compatibility and adhesion between the new rendering and the existing coating or rendering must not be less than 80% of the one that exists between the rendering and the steel element.
- Non compatibility with other fire protection materials. In these special cases, it is needed to check it with manufacturer.

C) Circumstances in which the rendering needs reinforcements.

- Steel Beams and columns and concrete elements. Although, it has not been evaluated in this ETA, in cases where: the mechanical resistance needs to be improved, concrete surface could not offer a right stickability and the steel beams and columns are only applied on one face; it is recommended to place a steel mesh. In cases that the state of the surface of the primer does not assure an adequate adherence, please check it with the manufacturer.
- Compartmentation Wall. Steel mesh is necessary and it has to be fixed to tubular steel structure with screws every 200 mm approx.

D) Finishing of the final aspect of the rendering.

Any repairing required may be performed manually by using a trowel, etc. Its finishing is rough but, if desired; it can be smoothed using a trowel or any other brickwork tool intended for this use.

E) Application limitations due to certain environments

- The recommended environmental temperature of the product to be applied will be between 5 ºC and 40 ºC and it will be not admitted support temperatures upper to 45 ºC. In other conditions, it will need to follow the manufacturer's instructions.
- During the application and drying time, the product has to be protected against the water rain.

- Curing and drying must not be exposed to strong winds during projection to avoid a rapid dry.

F) Incompatibility with other Fire protection materials. For these special cases, it is needed to check it with the manufacturer.

Recommendations of use, maintenance and repair. It is recommended to carry out yearly control inspections to check the state of the product (damages, cracks, cleanliness, etc). The repair procedure will be carried out by:

- complete disposal of the damaged product,
- preparation of the support (cleanliness),
- new application of PERLIFOC HP sprayed or manually according to the reparation size. When the area to repair manually is significant, a mesh fixed to the support shall be used.

Further application details are laid down in the MTD place at IETcc.

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

The identification tests and the assessment for the intended use of PERLIFOC HP according to the Basic Work Requirements (BWR) were carried out in compliance with EAD 350140-00-1106, The characteristics of each system shall correspond to the respective values laid down in following tables of this ETA, checked by IETcc.

3.1 Safety in case of fire (BWR 2)

<table>
<tr><th colspan="7">Basic requirement for construction works 2: Safety in case of fire</th></tr>
<tr><th colspan="3">Essential characteristic</th><th>Relevant clause in EAD</th><th colspan="3">Performance</th></tr>
<tr><td colspan="3">Reaction to fire</td><td>2.2.1.1</td><td colspan="3">A1</td></tr>
<tr><td colspan="3">Fire resistance</td><td rowspan="9">2.2.2</td><td colspan="3">Performance</td></tr>
<tr><td>Support</td><td colspan="2">Thickness of the product</td><td colspan="3"></td></tr>
<tr><td>Steel</td><td colspan="2">9 to 41 mm</td><td colspan="3">R 15 to R 240</td></tr>
<tr><td>Flat concrete profiled sheet composite</td><td colspan="2">10.2 to 30 mm</td><td colspan="3">See annex I</td></tr>
<tr><td>Wall and slab of concrete</td><td colspan="2">10.3 mm</td><td colspan="3">REI 30 to REI 240</td></tr>
<tr><td>Beam and column of concrete</td><td colspan="2">10.9 to 25.4 mm</td><td colspan="3">R 30 to R 240</td></tr>
<tr><td>Compartmentation Wall</td><td colspan="2">48.5 mm</td><td colspan="3">EI 120</td></tr>
<tr><td>Compartmentation Wall between wall and ceiling fixed mechanically</td><td colspan="2">46.3 mm</td><td colspan="3">EI 180</td></tr>
<tr><td>Vertical protection of concrete blocks with no load bearing requirements</td><td colspan="2">25.2 mm</td><td colspan="3">EI 240</td></tr>
<tr><td colspan="3">Durability</td><td>2.2.12</td><td>Adherence (MPa)</td><td>Thermal efficiency</td><td>Visual aspect</td></tr>
<tr><td rowspan="2">Resistance to deterioration caused by high humidity[1] (4 weeks at 32 ºC, 95% HR)</td><td>Concrete</td><td rowspan="6">2.2.12.3</td><td>0.23</td><td>----------</td><td>Correct</td></tr>
<tr><td>Steel</td><td>0.17</td><td>1h:57 min</td><td>Correct</td></tr>
<tr><td rowspan="2">Resistance to deterioration caused by heat and cold[1] (5 cycles)</td><td>Concrete</td><td>0.23</td><td>----------</td><td>Correct</td></tr>
<tr><td>Steel</td><td>0.24</td><td>2h:04 min</td><td>Correct</td></tr>
<tr><td rowspan="2">Resistance to deterioration caused by freezing and thawing[1] (25 cycles)</td><td>Concrete</td><td>0.17</td><td>----------</td><td>Correct</td></tr>
<tr><td>Steel</td><td>0.24</td><td>2h:04 min</td><td>Correct</td></tr>
<tr><td colspan="6">Reference value 1h:52min</td></tr>
</table>

3.2 Hygiene, health and environment (BWR 3)

Basic requirement for construction works 3: Hygiene, health, and the environment		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Content, emission and/or release of dangerous substances.	2.2.3	NPA
Resistance to water vapour	2.2.4	μ = 9,8 (thickness 1 cm)

[1] Adherence and thermal efficiency values alter ageing, must not be inferior to 80 % (variation ≤ 20 % and 85 % (variation ≤ 15 %) respectively from initial value.

3.3 Safety and accessibility in use (BWR 4)

Basic requirement for construction works 4: Safety and accessibility in use		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Mechanical resistance and stability	2.2.5	Not relevant
- Pull off resistance of discontinuous fixings (timber, mansory or concrete)	2.2.5.1	Not relevant
- Bending resitance of discontinuous fixing (for steel)	2.2.5.2	Not relevant
- Pull off resistance of keying mesh	2.2.5.3	Not relevant
Resistance to impact / movement	2.2.6	
- Resistance to functional failure from hard body impact load – 0.5 kg steel ball	2.2.6.1	NPA
- Resistance to functional failure from soft body impact load – 50 kg bag	2.2.6.2	NPA
Adhesion	2.2.7	
Support	**Thickness (mm)**	**Adherence (N/mm^2/MPa)**
Concrete	45	0,1
	25	0.20
	10	0.25
Steel	45	0,15
	25	0.12
	10	0,19
Steel + primer alkyd	25	0,12
Steel + primer epoxi	25	0.12
Steel + primer silicate Zn	25	0,21
Steel + Epoxi Zn	25	0,21
Galvanized steel	25	0,10
Failure of the test was cohesive in the mortar, except with EPOXI primer that it was adhesive.		

3.4 Protection against noise (BWR 5)

Basic requirement for construction works 5: Protection against noise		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Airbone sound insulation	2.2.8	
Sound absorption	2.2.9	αw = 0.20, class E
Impact sound insulation	2.2.10	

3.5 Energy economy and heat retention (BWR 6)

Basic requirement for construction works 6: Energy economy and heat retention		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Thermal insulation	2.2.11	0.087 W/mK (with a density of 463 kg/m^3)

3.6 Serviceability

Serviceability		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Additional primers	2.2.14.4	
Support	**Thermal efficiency ≤ 15%***	**Visual aspect**
Steel + Alkyd	1h: 36 min	Correct
Steel + Epoxi	2h: 00 min	Correct
Steel + Silicate Zn	1h: 56 min	Correct
Steel + Epoxi Zn	2h: 01 min	Correct
Galvanized steel	2h: 29 min	Correct
*Refence value 1h:52min		
Resistance to corrosion of a steel substrate induced by the rendering	2.2.14.4	
Support	**23 ºC 60% HR**	**23 ºC 95% HR**
Steel (weight lost %)	$4\ 10^{-5}$	$6{,}2\ 10^{-5}$
Galvanised Steel (weight lost %)	$0{,}5\ 10^{-5}$	$0{,}3\ 10^{-5}$

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

According to mandate Construct 98/311, Annex 3 (taking into account decision 1999/454/EC of the Commission) on the procedure of attestation of conformity for the procedure of attestation of conformity (Annex III of EU Regulation 305/2011) has laid down for this type of material:

Product	Intended uses	Level or Classes	System
PERLIFOC HP	Rendering intended for Fire Resisting Application of building elements	Any	1

The system 1 provides:

Tasks for the manufacturer: factory production control and further testing of samples taken at the factory by the manufacturer in accordance with the "Control Plan".

Tasks for the notified body: initial type-testing of the product, initial inspection of factory and of factory production control and two annual surveillances, assessment and approval of factory production control of the manufacturer.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at IETcc[(2)].

5.1 Tasks for the manufacturer

Factory production control. The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this ETA.

The manufacturer may only use components stated in the technical documentation of this ETA including Control Plan. The incoming raw materials are subjected to verifications by the manufacturer before acceptance.

The factory production control shall be in accordance with the Control Plan. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

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

The documentation shall be kept for at least five years. In the next table are enclosed the controls and the minimum frequency performed by the manufacturer.

Property	Frequency
Raw Material	Batch
Bulk density of the components	Batch
Bulk density of dry product	Batch
Bulk density of paste product	Batch
Consistence	Batch
Bulk density of hardened	Monthly
Adherence	Monthly
Insulation efficiency	Monthly

Other tasks of manufacturer. The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 4 in order to undertake the actions laid down in this clause. For this purpose, the control plan shall be handed over by the manufacturer to the notified bodies involved.

The manufacturer shall make a declaration of conformity, stating that this product is in conformity with the provisions of this ETA.

5.2 Tasks for the Notified body

Initial type-testing of the product. The initial type-testing have been carried out by the IETcc to issue this ETA which corresponds to EAD 350140-00-1106. Renderings and rendering kits intended for fire resisting applications

The initial type-testing of this ETA have been carried out by the IETcc on samples from the current production. The IETcc has assessed the results of these tests in accordance with chapter 6 of this ETA – Guideline, as part of the ETA issuing procedure.

Initial inspection of factory and production control. The IETcc has checked that, in accordance with the MTD, factory conditions and production control allow the manufacturer to ensure the consistency and homogeneity of the manufactured product and its traceability, in order to assure the final characteristics of the product.

Continuous surveillance, assessment and approval of Factory Production Control. The Notified body shall visit the factory at least once year. Surveillance of the manufacturing process shall include:

- Inspection of the documentation of factory production control, to ensure continuing compliance with the provisions of the ETA,
- Identification of changes by comparing data obtained during the initial inspection or during the last visit.

In cases where the provisions of the European Technical Assessment and its “Control Plan” are no longer fulfilled the certification body (IETcc) shall withdraw the certificate of conformity.

Issued in Madrid on 25 of december 2023

Director
on behalf of Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc – CSIC)

Annex I. Fire resistance tests

I.1 Flat concrete profiled sheet composite.

The hardened density of the product for this test was 518 kg/m^3.

Temperature of the Steel profiled sheet (UNE-EN 13381-5:2016). The characteristic temperature of the steel profiled sheet is the average of the medium and maximum temperature registered in all the points of the measurement. The next table shows the time needed to reach the characteristic temperature of 350 ºC.

	Maximum thickness of protection ≡ dp_{max} 30 (mm)	Minimum thickness of protection ≡ dp_{min} 10,2 (mm)
Time(min) / TºC characteristic = 350ºC	194	49

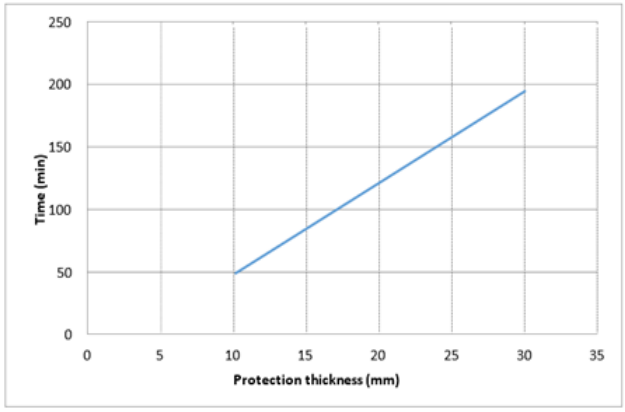


Figure. Graphic time to increase T until to 350ºC – protection thickness.

Equivalent thickness of concrete. The final Equivalent thickness of concrete was obtained according to part 13.3 of UNE-EN 13381-5-2016 and are the followings:

Thickness of the protection System (mm) d_p	Equivalent thickness of concrete (mm) h_{eq}
30.0	69
10,2	66

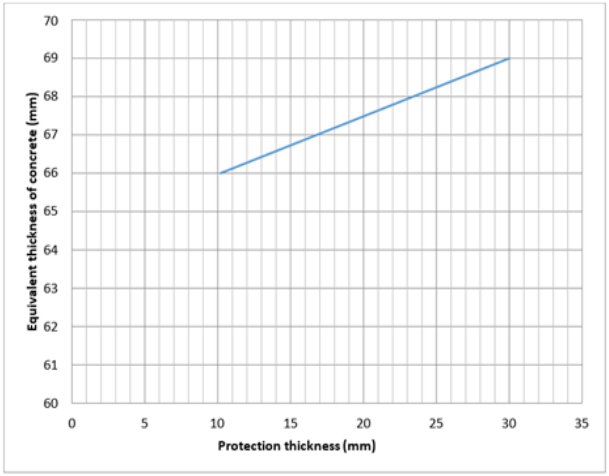


Figure. Equivalent thickness graph – actual thickness of the protection system

Limit time of exposition. This limit time of exposition is related with the adhesion to the system and the protection to the mixed slab, according to part 13.4 of UNE-EN 13381-5-2016:

Thickness of the protection system (mm) d_p	Limit time of exposition (min)
30.0	194
10,2	64

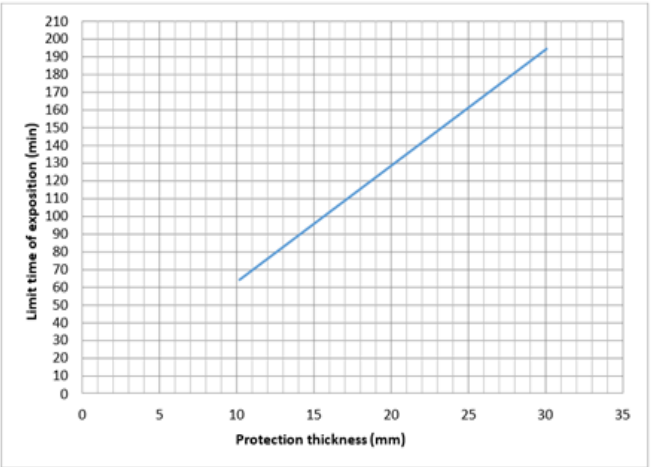


Figure – Thickness of the protection system in relation to its limit exposure time

Insulation. The thermal insulation of the mixed slab + the protection according to EN 1363-1 is:

	Maximun thickness of protection $dp_{max} \equiv 30$ mm	Minimun thickness of protection $dp_{min} \equiv 10,2$ mm
Time (min) EN 1363-1:2000	194	185

The application limitations of the results obtained are the following:

- The test results, according to the performance of the fire protection system in accordance with this method, can be applied to slabs composed of concrete/steel with profiled steel sheet, which may or may not contain framework steel bars for the purpose of load resistance.
- The results of the assessment are applicable to the mixed slabs of concrete/steel with exposition to fire next to the steel and in accordance with the following:
  - The sheet's thickness is superior or equal to 0,75 mm of thickness.
  - The width of the rib (lp1), to which the fire protection material is directly fixed, should not be superior to 1.5 times as much the width of the specimen tested. Thus, lp1 $\leq$ 181.5 mm.
  - The height of the rib (h2) should not be superior to 1,5 times as much the height of the specimen tested, that is, $h_2 \leq 88,5$ mm.
- The equivalent thickness of concrete for a given thickness of the fire protection system is applicable within the corresponding Limiting Exposure Time (according to graphic).
- The results of the assessment are valid solely for slabs composed of concrete/sheet made with trapezoidal profiled steel sheet.
- The results of the assessment can only be applied to slabs made of concrete/sheet whose concrete's density is comprised between 0.85-1.15 times the concrete tested (1.955 / 2.645 kg/m^3).
- The results of the assessment are applicable to concrete elements whose concrete's strength is equal or greater to the resistance of the concrete tested, that is: 30.9 MPa within 28 days.
- The results of the assessment are applicable to all of those concrete elements whose concrete has been made of siliceous aggregates.
- The results of the assessment can only be applied to slabs made of concrete/steel where the effective thickness of the slab is equal or superior to the slab tested (87 mm).
- The results of the assessment can only be applied to fire protection systems where the fixation system used is equal to the one used in the system tested.
- The results of the assessment can only be applied to protections of maximum one coat.

I.2. Concrete slabs and walls

Thickness of PERLIFOC HP 10.3 mm: The hardened density of the product for this test was 611 kg/m^3.

Final equivalent thickness of concrete obtained according to Annex C of the standard EN 13381-3. "Test methods for determining the contribution to the fire resistance of structural members - Part 3: Applied protection to concrete members" has been:

	Time (min)					
	30	**60**	**90**	**120**	**180**	**240**
d_{pmin} = 10,3 mm Total mean thickness of application.	36	46	48	48	44	38
	Values of equivalent thickness of concrete in mm					

The limits of applicability of the results of the assessment obtained are the next:

- Results valid only for slabs and walls (vertical and horizontal) of concrete with fire exposure from one side.
- Result applicable to densities of concrete within the range 18870 kg/m^3 to 2555 kg/m^3. (Densities of concrete tested 2220 kg/m^3).
- Result applicable to concrete members with strength equal to or superior of the tested ones (C 30/37) according to EN 206.
- Results valid for application system of coating as the tested one and framework as the tested one.

Thickness of PERLIFOC HP: 25.2 mm. Test and assessment report 21/25361128-1 Applus. EN 13381-3:2015). The hardened density of the product for this test was 580 kg/m^3.

According to the standard of reference EN 13381:3-2015, during the course of the test were not detected temperatures on the exposed side higher than 50% of the mean temperature of this side, consequently, the loss of stickability of the protection product was not registered.

Final equivalent thickness of concrete obtained according to Annex C of the standard EN 13381-3. "Test methods for determining the contribution to the fire resistance of structural members - Part 3: Applied protection to concrete members" has been:

	Time (min)					
	30	**60**	**90**	**120**	**180**	**240**
d_{pmin} = 25.2 mm Total mean thickness of application.	58	76	86	92	95	93
	Values of equivalent thickness of concrete in mm					

The limits of applicability of the results of the assessment obtained are the next:

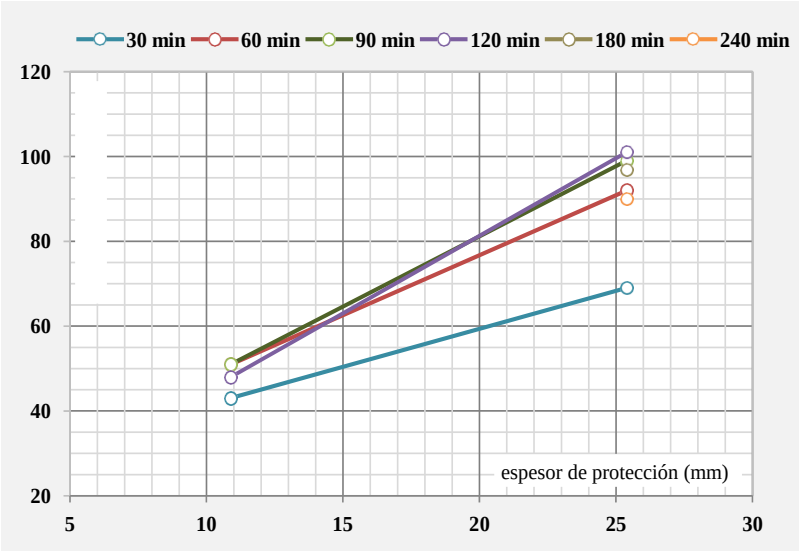
- Results valid only for slabs and walls (vertical and horizontal) of concrete with fire exposure from one side.
- Result applicable to densities of concrete within the range tested 2384 kg/m^3 ± 15 %.
- Result applicable to concrete members with strength equal to or superior of the tested ones (HA-30/B/20/IIa) according to EN 206.
- Results valid for application system of coating as the tested one and framework as the tested one.

I.3. Concrete beams and columns.

The hardened density of the product for this tests was 602 kg/m^3.

Final equivalent thickness of concrete obtained according to Annex C of the standard EN 13381-3. “Test methods for determining the contribution to the fire resistance of structural members - Part 3: Applied protection to concrete members” has been:

	Time (min)					
	30	**60**	**90**	**120**	**180**	**240**
d_{pmin} = 10,9 mm Total average thickness of application.	43	51	51	48	---	----
d_{pmax} = 25,4 mm Total average thickness of application.	69	92	99	101	97	90
	Values of equivalent thickness of concrete in mm					



The limits on the application of the results obtained are the following:

- Results valid only for concrete beams and columns in horizontal as well as vertical position.
- Result applicable to densities of concrete within the range 1946 kg/m^3 to 2632 kg/m^3. (Densities of concrete tested 2289 kg/m^3).
- Result applicable to concretes with resistances ≥ HA-25/B/20/IIa.
- Results applicable to beams with the width in their base equal to a higher than 150 mm.
- A thickness of the protection system is allowed up to 5% above the maximum thickness tested and up to 5% below the minimum thickness tested: minimum protection thickness: 10.5 mm and Maximum protection thickness: 26.7 mm.

I.4. Compartmentation Wall

The hardened density of the product for this test was 590 kg/m^3.

The non-bearing division has been tested and evaluated according to EN 1364-1:2015 and rated EI 120 according to EN 13501-2.

Constructive solution: Non-bearing wall formed by nervometal mesh placed on horizontal tubular steel profiles and 40 x 40 x 2 (mm) bolted onto vertical tubular steel profiles and 50 x 30 x 2 (mm). The vertical profiles have been fixed to the test frame by 2 spit 8 x 70 mm and anchor plate at each junction. Once assembled the structure is projected Perlifoc HP mortar on the Nervometal mesh with a thickness of 48.5 mm.

The limits on the application of the results obtained are the following:

Parameter	Allowed modifcations	Tested samples
External dimensions	Decrease of height	3000 x 3000 mm
	Increasing wall thickness by increasing material thickness	48,5 mm mortar thickness applied
	Increase in unlimited width, keeping the construction system tested.	At maximum dimensions (3000 mm) and with a free-moving edge
	Height increase to 1,0 m more.	Tested at a height of 3000 mm without supporting work
		The maximum deformation does not exceed 100 mm.
		Expansion tolerances increase proportionally
Constructive details	Decrease the distance between profiles	1000 mm between vertical and horizontal profiles.
Supports admited in works	Valid to fix it to high-density support works: ≥ 850 kg/m^3	Rehearsed without support work

I.5 Columns of steel 4 exposed faces or less.

The hardened density of the product for this test was 592 kg/m^3.

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *350* ºC							
68	9	9	9	9	10	15	25	---
70	9	9	9	9	10	15	26	---
80	9	9	9	9	11	16	26	---
90	9	9	9	9	12	17	27	---
100	9	9	9	9	12	18	28	---
110	9	9	9	10	13	19	28	---
120	9	9	9	10	13	20	29	---
130	9	9	9	10	14	21	30	---
140	9	9	9	10	14	22	31	---
150	9	9	9	10	15	24	31	---
160	9	9	9	10	16	25	32	---
170	9	9	9	11	16	25	33	---
180	9	9	9	11	17	25	34	---
190	9	9	9	11	17	26	34	---
200	9	9	9	11	18	26	35	---
210	9	9	9	12	18	26	36	---
220	9	9	10	12	19	26	38	---
230	9	9	10	12	19	26	40	---
240	9	9	10	12	19	27	41	---
250	9	9	10	13	20	27	---	---
260	9	9	10	13	20	27	---	---
270	9	9	11	13	20	27	---	---
280	9	9	11	13	21	28	---	---
290	9	9	11	13	21	28	---	---
300	9	9	11	14	21	28	---	---
310	9	9	11	14	21	29	---	---
320	9	9	12	14	22	29	---	---
330	9	9	12	14	22	29	---	---
340	9	9	*12*	14	22	29	---	---
350	9	9	12	15	22	29	---	---
360	9	9	12	15	23	30	---	---
370	9	9	12	15	23	30	---	---
380	9	9	13	15	23	30	---	---
390	9	9	13	16	24	30	---	---
400	9	9	13	16	24	31	---	---
410	9	9	13	16	24	31	---	---
420	9	9	13	16	24	31	---	---
430	9	9	14	16	25	31	---	---
440	9	9	14	17	25	32	---	---
450	9	9	14	17	25	32	---	---
460	9	9	14	17	26	32	---	---
470	9	9	14	17	26	32	---	---
475	9	9	14	18	26	32	---	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *400* ºC							
68	9	9	9	9	9	9	22	32
70	9	9	9	9	9	9	22	33
80	9	9	9	9	10	10	24	35
90	9	9	9	9	10	11	25	39
100	9	9	9	9	11	12	26	---
110	9	9	9	9	11	13	27	---
120	9	9	9	9	12	15	27	---
130	9	9	9	9	12	16	28	---
140	9	9	9	9	13	17	29	---
150	9	9	9	10	14	19	29	---
160	9	9	9	10	14	20	30	---
170	9	9	9	10	15	21	31	---
180	9	9	9	10	15	23	32	---
190	9	9	9	10	16	24	32	---
200	9	9	9	11	16	25	33	---
210	9	9	9	11	17	25	34	---
220	9	9	9	11	17	25	34	---
230	9	9	9	11	18	26	35	---
240	9	9	9	12	18	26	36	---
250	9	9	9	12	18	26	37	---
260	9	9	9	12	19	26	39	---
270	9	9	9	12	19	27	40	---
280	9	9	9	12	19	27	---	---
290	9	9	9	13	19	27	---	---
300	9	9	9	13	20	28	---	---
310	9	9	9	13	20	28	---	---
320	9	9	10	13	20	28	---	---
330	9	9	10	14	21	28	---	---
340	9	9	10	14	21	29	---	---
350	9	9	10	14	21	29	---	---
360	9	9	10	14	22	29	---	---
370	9	9	11	14	22	29	---	---
380	9	9	11	15	22	30	---	---
390	9	9	11	15	23	30	---	---
400	9	9	11	15	23	30	---	---
410	9	9	11	15	23	30	---	---
420	9	9	12	15	24	31	---	---
430	9	9	12	16	24	31	---	---
440	9	9	12	16	24	31	---	---
450	9	9	12	16	25	31	---	---
460	9	9	13	16	25	32	---	---
470	9	9	13	17	25	32	---	---
475	9	9	13	17	25	32	---	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *450* ºC							
68	9	9	9	9	9	11	20	29
70	9	9	9	9	9	11	20	30
80	9	9	9	9	9	12	22	32
90	9	9	9	9	10	13	24	34
100	9	9	9	9	10	14	25	36
110	9	9	9	9	11	15	26	40
120	9	9	9	9	11	16	26	---
130	9	9	9	9	11	17	26	---
140	9	9	9	9	12	17	27	---
150	9	9	9	9	12	18	27	---
160	9	9	9	9	13	19	28	---
170	9	9	9	9	13	20	28	---
180	9	9	9	9	14	21	29	---
190	9	9	9	10	14	22	29	---
200	9	9	9	10	15	23	30	---
210	9	9	9	10	15	23	30	---
220	9	9	9	10	16	24	31	---
230	9	9	9	11	16	25	31	---
240	9	9	9	11	17	25	32	---
250	9	9	9	11	17	25	32	---
260	9	9	9	11	17	26	33	---
270	9	9	9	11	18	26	33	---
280	9	9	9	12	18	26	34	---
290	9	9	9	12	18	26	34	---
300	9	9	9	12	19	27	35	---
310	9	9	9	12	19	27	35	---
320	9	9	9	13	19	27	36	---
330	9	9	9	13	20	27	37	---
340	9	9	9	13	20	28	38	---
350	9	9	9	13	20	28	39	---
360	9	9	9	13	21	28	40	---
370	9	9	9	14	21	28	41	---
380	9	9	9	14	21	29	---	---
390	9	9	9	14	22	29	---	---
400	9	9	9	14	22	29	---	---
410	9	9	9	15	22	29	---	---
420	9	9	10	15	23	30	---	---
430	9	9	10	15	23	30	---	---
440	9	9	10	15	23	30	---	---
450	9	9	10	15	24	30	---	---
460	9	9	11	16	24	31	---	---
470	9	9	11	16	24	31	---	---
475	9	9	11	16	25	31	---	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *500* ºC							
68	9	9	9	9	9	10	17	26
70	9	9	9	9	9	10	18	27
80	9	9	9	9	9	11	20	28
90	9	9	9	9	9	12	21	30
100	9	9	9	9	10	12	23	32
110	9	9	9	9	10	13	25	33
120	9	9	9	9	10	14	25	35
130	9	9	9	9	11	15	25	38
140	9	9	9	9	11	16	26	41
150	9	9	9	9	12	16	26	---
160	9	9	9	9	12	17	26	---
170	9	9	9	9	12	18	27	---
180	9	9	9	9	13	19	27	---
190	9	9	9	9	13	20	27	---
200	9	9	9	9	13	20	28	---
210	9	9	9	10	14	21	28	---
220	9	9	9	10	14	22	28	---
230	9	9	9	10	15	22	29	---
240	9	9	9	10	15	23	29	---
250	9	9	9	10	15	23	29	---
260	9	9	9	11	16	24	29	---
270	9	9	9	11	16	25	30	---
280	9	9	9	11	17	25	30	---
290	9	9	9	11	17	25	30	---
300	9	9	9	12	17	25	31	---
310	9	9	9	12	18	26	31	---
320	9	9	9	12	18	26	31	---
330	9	9	9	12	18	26	32	---
340	9	9	9	12	19	26	32	---
350	9	9	9	13	19	27	32	---
360	9	9	9	13	19	27	33	---
370	9	9	9	13	20	27	33	---
380	9	9	9	13	20	27	33	---
390	9	9	9	13	21	28	33	---
400	9	9	9	14	21	28	34	---
410	9	9	9	14	21	28	34	---
420	9	9	9	14	22	28	34	---
430	9	9	10	14	22	29	35	---
440	9	9	10	14	22	29	35	---
450	9	9	10	15	23	29	35	---
460	9	9	10	15	23	29	36	---
470	9	9	10	15	23	30	37	---
475	9	9	11	15	24	30	37	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *550* ºC							
68	9	9	9	9	9	9	16	24
70	9	9	9	9	9	9	16	24
80	9	9	9	9	9	10	18	26
90	9	9	9	9	9	10	19	27
100	9	9	9	9	9	11	21	29
110	9	9	9	9	9	12	23	31
120	9	9	9	9	10	13	24	33
130	9	9	9	9	10	13	25	34
140	9	9	9	9	10	14	25	36
150	9	9	9	9	11	15	26	39
160	9	9	9	9	11	15	26	41
170	9	9	9	9	11	16	26	---
180	9	9	9	9	12	17	27	---
190	9	9	9	9	12	18	27	---
200	9	9	9	9	12	18	27	---
210	9	9	9	9	13	19	28	---
220	9	9	9	9	13	20	28	---
230	9	9	9	9	13	20	28	---
240	9	9	9	9	14	21	28	---
250	9	9	9	9	14	21	29	---
260	9	9	9	9	14	22	29	---
270	9	9	9	10	15	22	29	---
280	9	9	9	10	15	23	30	---
290	9	9	9	10	15	23	30	---
300	9	9	9	10	16	24	30	---
310	9	9	9	11	16	24	31	---
320	9	9	9	11	16	25	31	---
330	9	9	9	11	17	25	31	---
340	9	9	9	11	17	25	32	---
350	9	9	9	11	17	26	32	---
360	9	9	9	12	18	26	32	---
370	9	9	9	12	18	26	32	---
380	9	9	9	12	19	26	33	---
390	9	9	9	12	19	27	33	---
400	9	9	9	13	19	27	33	---
410	9	9	9	13	20	27	34	---
420	9	9	9	13	20	27	34	---
430	9	9	9	13	21	28	34	---
440	9	9	9	14	21	28	34	---
450	9	9	9	14	21	28	35	---
460	9	9	9	14	22	28	35	---
470	9	9	9	14	22	29	36	---
475	9	9	9	14	22	29	36	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *600* ºC							
68	9	9	9	9	9	9	14	21
70	9	9	9	9	9	9	14	21
80	9	9	9	9	9	9	16	23
90	9	9	9	9	9	10	17	25
100	9	9	9	9	9	10	19	27
110	9	9	9	9	9	11	20	28
120	9	9	9	9	9	11	22	30
130	9	9	9	9	9	12	23	31
140	9	9	9	9	10	13	25	32
150	9	9	9	9	10	13	25	34
160	9	9	9	9	10	14	25	35
170	9	9	9	9	11	14	26	37
180	9	9	9	9	11	15	26	39
190	9	9	9	9	11	15	26	41
200	9	9	9	9	11	16	27	---
210	9	9	9	9	12	17	27	---
220	9	9	9	9	12	17	27	---
230	9	9	9	9	12	18	27	---
240	9	9	9	9	13	18	28	---
250	9	9	9	9	13	18	28	---
260	9	9	9	9	13	19	28	---
270	9	9	9	9	13	19	29	---
280	9	9	9	9	14	20	29	---
290	9	9	9	9	14	20	29	---
300	9	9	9	9	14	20	30	---
310	9	9	9	9	15	21	30	---
320	9	9	9	9	15	21	30	---
330	9	9	9	9	15	22	31	---
340	9	9	9	10	15	22	31	---
350	9	9	9	10	16	22	31	---
360	9	9	9	10	16	23	31	---
370	9	9	9	10	16	23	32	---
380	9	9	9	11	16	24	32	---
390	9	9	9	11	17	24	32	---
400	9	9	9	11	17	24	32	---
410	9	9	9	11	17	25	33	---
420	9	9	9	12	18	25	33	---
430	9	9	9	12	18	25	33	---
440	9	9	9	12	19	26	34	---
450	9	9	9	12	19	26	34	---
460	9	9	9	13	20	26	34	---
470	9	9	9	13	20	27	35	---
475	9	9	9	13	20	27	35	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *650* ºC							
68	9	9	9	9	9	9	13	19
70	9	9	9	9	9	9	13	19
80	9	9	9	9	9	9	14	21
90	9	9	9	9	9	9	16	24
100	9	9	9	9	9	9	17	25
110	9	9	9	9	9	10	18	26
120	9	9	9	9	9	10	19	26
130	9	9	9	9	9	11	21	27
140	9	9	9	9	9	11	22	28
150	9	9	9	9	9	12	23	28
160	9	9	9	9	10	12	25	29
170	9	9	9	9	10	13	25	29
180	9	9	9	9	10	13	25	30
190	9	9	9	9	10	14	26	31
200	9	9	9	9	11	14	26	31
210	9	9	9	9	11	15	26	32
220	9	9	9	9	11	15	26	33
230	9	9	9	9	11	16	27	33
240	9	9	9	9	12	16	27	34
250	9	9	9	9	12	17	27	34
260	9	9	9	9	12	17	27	35
270	9	9	9	9	12	18	28	36
280	9	9	9	9	13	18	28	37
290	9	9	9	9	13	18	28	39
300	9	9	9	9	13	18	28	40
310	9	9	9	9	13	19	29	41
320	9	9	9	9	14	19	29	---
330	9	9	9	9	14	19	29	---
340	9	9	9	9	14	19	29	---
350	9	9	9	9	14	20	29	---
360	9	9	9	9	15	20	30	---
370	9	9	9	9	15	20	30	---
380	9	9	9	9	15	21	30	---
390	9	9	9	9	16	21	31	---
400	9	9	9	9	16	21	31	---
410	9	9	9	9	16	21	31	---
420	9	9	9	9	16	22	31	---
430	9	9	9	9	17	22	32	---
440	9	9	9	10	17	22	32	---
450	9	9	9	10	17	22	32	---
460	9	9	9	10	17	23	32	---
470	9	9	9	10	18	23	33	---
475	9	9	9	10	18	23	33	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *700* ºC							
68	9	9	9	9	9	9	10	17
70	9	9	9	9	9	9	10	17
80	9	9	9	9	9	9	11	19
90	9	9	9	9	9	9	13	22
100	9	9	9	9	9	9	14	24
110	9	9	9	9	9	9	15	25
120	9	9	9	9	9	10	17	26
130	9	9	9	9	9	10	18	26
140	9	9	9	9	9	10	19	27
150	9	9	9	9	9	11	21	27
160	9	9	9	9	9	11	22	28
170	9	9	9	9	9	12	24	29
180	9	9	9	9	9	12	25	29
190	9	9	9	9	9	13	25	30
200	9	9	9	9	10	13	26	30
210	9	9	9	9	10	13	26	31
220	9	9	9	9	10	14	26	31
230	9	9	9	9	10	14	26	32
240	9	9	9	9	11	15	27	33
250	9	9	9	9	11	15	27	33
260	9	9	9	9	11	15	27	34
270	9	9	9	9	11	16	27	34
280	9	9	9	9	12	16	28	35
290	9	9	9	9	12	17	28	36
300	9	9	9	9	12	17	28	37
310	9	9	9	9	12	18	28	37
320	9	9	9	9	13	18	29	38
330	9	9	9	9	13	18	29	39
340	9	9	9	9	13	19	29	40
350	9	9	9	9	13	19	30	---
360	9	9	9	9	14	20	30	---
370	9	9	9	9	14	20	30	---
380	9	9	9	9	14	21	30	---
390	9	9	9	9	14	21	31	---
400	9	9	9	9	15	22	31	---
410	9	9	9	9	15	22	31	---
420	9	9	9	9	15	22	31	---
430	9	9	9	9	16	23	32	---
440	9	9	9	9	16	23	32	---
450	9	9	9	9	16	23	32	---
460	9	9	9	9	16	24	33	---
470	9	9	9	9	17	24	33	---
475	9	9	9	9	17	25	33	---

Results also apply to I-H section beams exposed on all four sides

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Columns)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *750* ºC							
68	9	9	9	9	9	9	9	14
70	9	9	9	9	9	9	9	14
80	9	9	9	9	9	9	9	17
90	9	9	9	9	9	9	10	19
100	9	9	9	9	9	9	12	21
110	9	9	9	9	9	9	13	23
120	9	9	9	9	9	9	14	25
130	9	9	9	9	9	9	15	25
140	9	9	9	9	9	9	16	26
150	9	9	9	9	9	10	18	26
160	9	9	9	9	9	10	19	27
170	9	9	9	9	9	10	20	27
180	9	9	9	9	9	11	21	28
190	9	9	9	9	9	11	22	28
200	9	9	9	9	9	11	23	28
210	9	9	9	9	9	12	25	29
220	9	9	9	9	9	12	25	29
230	9	9	9	9	9	13	25	30
240	9	9	9	9	9	13	26	30
250	9	9	9	9	9	13	26	31
260	9	9	9	9	10	14	26	31
270	9	9	9	9	10	14	26	32
280	9	9	9	9	10	14	27	32
290	9	9	9	9	10	15	27	32
300	9	9	9	9	11	15	27	33
310	9	9	9	9	11	15	27	33
320	9	9	9	9	11	16	28	34
330	9	9	9	9	11	16	28	34
340	9	9	9	9	12	16	28	35
350	9	9	9	9	12	17	28	35
360	9	9	9	9	12	17	29	36
370	9	9	9	9	12	17	29	37
380	9	9	9	9	13	18	29	38
390	9	9	9	9	13	18	29	39
400	9	9	9	9	13	19	30	39
410	9	9	9	9	13	19	30	40
420	9	9	9	9	14	20	30	41
430	9	9	9	9	14	20	30	---
440	9	9	9	9	14	21	31	---
450	9	9	9	9	15	21	31	---
460	9	9	9	9	15	22	31	---
470	9	9	9	9	15	22	31	---
475	9	9	9	9	15	22	31	---

Results also apply to I-H section beams exposed on all four sides

I.6. Beam of steel 3 exposed faces or less.

The hardened density of the product for this test was 592 kg/m^3.

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *350* ºC							
68	10	10	10	10	10	15	25	---
70	10	10	10	10	10	15	26	---
80	10	10	10	10	11	16	26	---
90	10	10	10	10	12	17	27	---
100	10	10	10	10	12	18	28	---
110	10	10	10	10	13	19	28	---
120	10	10	10	10	13	20	29	---
130	10	10	10	10	14	21	30	---
140	10	10	10	10	14	22	31	---
150	10	10	10	10	15	24	31	---
160	10	10	10	10	16	25	32	---
170	10	10	10	11	16	25	33	---
180	10	10	10	11	17	25	34	---
190	10	10	10	11	17	26	34	---
200	10	10	10	11	18	26	35	---
210	10	10	10	12	18	26	36	---
220	10	10	10	12	19	26	38	---
230	10	10	10	12	19	26	40	---
240	10	10	10	12	19	27	41	---
250	10	10	10	13	20	27	---	---
260	10	10	10	13	20	27	---	---
270	10	10	11	13	20	27	---	---
280	10	10	11	13	21	28	---	---
290	10	10	11	13	21	28	---	---
300	10	10	11	14	21	28	---	---
310	10	10	11	14	21	29	---	---
320	10	10	12	14	22	29	---	---
330	10	10	12	14	22	29	---	---
340	10	10	12	14	22	29	---	---
350	10	10	12	15	22	29	---	---
360	10	10	12	15	23	30	---	---
370	10	10	12	15	23	30	---	---
380	10	10	13	15	23	30	---	---
390	10	10	13	16	24	30	---	---
400	10	10	13	16	24	31	---	---
410	10	10	13	16	24	31	---	---
420	10	10	13	16	24	31	---	---
430	10	10	14	16	25	31	---	---
440	10	10	14	17	25	32	---	---
450	10	10	14	17	25	32	---	---
460	10	10	14	17	26	32	---	---
470	10	10	14	17	26	32	---	---
475	10	10	14	18	26	32	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *400* ºC							
68	10	10	10	10	10	10	22	32
70	10	10	10	10	10	10	22	33
80	10	10	10	10	10	10	24	35
90	10	10	10	10	10	11	25	39
100	10	10	10	10	11	12	26	---
110	10	10	10	10	11	13	27	---
120	10	10	10	10	12	15	27	---
130	10	10	10	10	12	16	28	---
140	10	10	10	10	13	17	29	---
150	10	10	10	10	14	19	29	---
160	10	10	10	10	14	20	30	---
170	10	10	10	10	15	21	31	---
180	10	10	10	10	15	23	32	---
190	10	10	10	10	16	24	32	---
200	10	10	10	11	16	25	33	---
210	10	10	10	11	17	25	34	---
220	10	10	10	11	17	25	34	---
230	10	10	10	11	18	26	35	---
240	10	10	10	12	18	26	36	---
250	10	10	10	12	18	26	37	---
260	10	10	10	12	19	26	39	---
270	10	10	10	12	19	27	40	---
280	10	10	10	12	19	27	---	---
290	10	10	10	13	19	27	---	---
300	10	10	10	13	20	28	---	---
310	10	10	10	13	20	28	---	---
320	10	10	10	13	20	28	---	---
330	10	10	10	14	21	28	---	---
340	10	10	10	14	21	29	---	---
350	10	10	10	14	21	29	---	---
360	10	10	10	14	22	29	---	---
370	10	10	11	14	22	29	---	---
380	10	10	11	15	22	30	---	---
390	10	10	11	15	23	30	---	---
400	10	10	11	15	23	30	---	---
410	10	10	11	15	23	30	---	---
420	10	10	12	15	24	31	---	---
430	10	10	12	16	24	31	---	---
440	10	10	12	16	24	31	---	---
450	10	10	12	16	25	31	---	---
460	10	10	13	16	25	32	---	---
470	10	10	13	17	25	32	---	---
475	10	10	13	17	25	32	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *450* °C							
68	10	10	10	10	10	11	20	29
70	10	10	10	10	10	11	20	30
80	10	10	10	10	10	12	22	32
90	10	10	10	10	10	13	24	34
100	10	10	10	10	10	14	25	36
110	10	10	10	10	11	15	26	40
120	10	10	10	10	11	16	26	---
130	10	10	10	10	11	17	26	---
140	10	10	10	10	12	17	27	---
150	10	10	10	10	12	18	27	---
160	10	10	10	10	13	19	28	---
170	10	10	10	10	13	20	28	---
180	10	10	10	10	14	21	29	---
190	10	10	10	10	14	22	29	---
200	10	10	10	10	15	23	30	---
210	10	10	10	10	15	23	30	---
220	10	10	10	10	16	24	31	---
230	10	10	10	11	16	25	31	---
240	10	10	10	11	17	25	32	---
250	10	10	10	11	17	25	32	---
260	10	10	10	11	17	26	33	---
270	10	10	10	11	18	26	33	---
280	10	10	10	12	18	26	34	---
290	10	10	10	12	18	26	34	---
300	10	10	10	12	19	27	35	---
310	10	10	10	12	19	27	35	---
320	10	10	10	13	19	27	36	---
330	10	10	10	13	20	27	37	---
340	10	10	10	13	20	28	38	---
350	10	10	10	13	20	28	39	---
360	10	10	10	13	21	28	40	---
370	10	10	10	14	21	28	41	---
380	10	10	10	14	21	29	---	---
390	10	10	10	14	22	29	---	---
400	10	10	10	14	22	29	---	---
410	10	10	10	15	22	29	---	---
420	10	10	10	15	23	30	---	---
430	10	10	10	15	23	30	---	---
440	10	10	10	15	23	30	---	---
450	10	10	10	15	24	30	---	---
460	10	10	11	16	24	31	---	---
470	10	10	11	16	24	31	---	---
475	10	10	11	16	25	31	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *500* ºC							
68	10	10	10	10	10	10	17	26
70	10	10	10	10	10	10	18	27
80	10	10	10	10	10	11	20	28
90	10	10	10	10	10	12	21	30
100	10	10	10	10	10	12	23	32
110	10	10	10	10	10	13	25	33
120	10	10	10	10	10	14	25	35
130	10	10	10	10	11	15	25	38
140	10	10	10	10	11	16	26	41
150	10	10	10	10	12	16	26	---
160	10	10	10	10	12	17	26	---
170	10	10	10	10	12	18	27	---
180	10	10	10	10	13	19	27	---
190	10	10	10	10	13	20	27	---
200	10	10	10	10	13	20	28	---
210	10	10	10	10	14	21	28	---
220	10	10	10	10	14	22	28	---
230	10	10	10	10	15	22	29	---
240	10	10	10	10	15	23	29	---
250	10	10	10	10	15	23	29	---
260	10	10	10	11	16	24	29	---
270	10	10	10	11	16	25	30	---
280	10	10	10	11	17	25	30	---
290	10	10	10	11	17	25	30	---
300	10	10	10	12	17	25	31	---
310	10	10	10	12	18	26	31	---
320	10	10	10	12	18	26	31	---
330	10	10	10	12	18	26	32	---
340	10	10	10	12	19	26	32	---
350	10	10	10	13	19	27	32	---
360	10	10	10	13	19	27	33	---
370	10	10	10	13	20	27	33	---
380	10	10	10	13	20	27	33	---
390	10	10	10	13	21	28	33	---
400	10	10	10	14	21	28	34	---
410	10	10	10	14	21	28	34	---
420	10	10	10	14	22	28	34	---
430	10	10	10	14	22	29	35	---
440	10	10	10	14	22	29	35	---
450	10	10	10	15	23	29	35	---
460	10	10	10	15	23	29	36	---
470	10	10	10	15	23	30	37	---
475	10	10	11	15	24	30	37	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *550* ºC							
68	10	10	10	10	10	10	16	24
70	10	10	10	10	10	10	16	24
80	10	10	10	10	10	10	18	26
90	10	10	10	10	10	10	19	27
100	10	10	10	10	10	11	21	29
110	10	10	10	10	10	12	23	31
120	10	10	10	10	10	13	24	33
130	10	10	10	10	10	13	25	34
140	10	10	10	10	10	14	25	36
150	10	10	10	10	11	15	26	39
160	10	10	10	10	11	15	26	41
170	10	10	10	10	11	16	26	---
180	10	10	10	10	12	17	27	---
190	10	10	10	10	12	18	27	---
200	10	10	10	10	12	18	27	---
210	10	10	10	10	13	19	28	---
220	10	10	10	10	13	20	28	---
230	10	10	10	10	13	20	28	---
240	10	10	10	10	14	21	28	---
250	10	10	10	10	14	21	29	---
260	10	10	10	10	14	22	29	---
270	10	10	10	10	15	22	29	---
280	10	10	10	10	15	23	30	---
290	10	10	10	10	15	23	30	---
300	10	10	10	10	16	24	30	---
310	10	10	10	11	16	24	31	---
320	10	10	10	11	16	25	31	---
330	10	10	10	11	17	25	31	---
340	10	10	10	11	17	25	32	---
350	10	10	10	11	17	26	32	---
360	10	10	10	12	18	26	32	---
370	10	10	10	12	18	26	32	---
380	10	10	10	12	19	26	33	---
390	10	10	10	12	19	27	33	---
400	10	10	10	13	19	27	33	---
410	10	10	10	13	20	27	34	---
420	10	10	10	13	20	27	34	---
430	10	10	10	13	21	28	34	---
440	10	10	10	14	21	28	34	---
450	10	10	10	14	21	28	35	---
460	10	10	10	14	22	28	35	---
470	10	10	10	14	22	29	36	---
475	10	10	10	14	22	29	36	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *600* ºC							
68	10	10	10	10	10	10	14	21
70	10	10	10	10	10	10	14	21
80	10	10	10	10	10	10	16	23
90	10	10	10	10	10	10	17	25
100	10	10	10	10	10	10	19	27
110	10	10	10	10	10	11	20	28
120	10	10	10	10	10	11	22	30
130	10	10	10	10	10	12	23	31
140	10	10	10	10	10	13	25	32
150	10	10	10	10	10	13	25	34
160	10	10	10	10	10	14	25	35
170	10	10	10	10	11	14	26	37
180	10	10	10	10	11	15	26	39
190	10	10	10	10	11	15	26	41
200	10	10	10	10	11	16	27	---
210	10	10	10	10	12	17	27	---
220	10	10	10	10	12	17	27	---
230	10	10	10	10	12	18	27	---
240	10	10	10	10	13	18	28	---
250	10	10	10	10	13	18	28	---
260	10	10	10	10	13	19	28	---
270	10	10	10	10	13	19	29	---
280	10	10	10	10	14	20	29	---
290	10	10	10	10	14	20	29	---
300	10	10	10	10	14	20	30	---
310	10	10	10	10	15	21	30	---
320	10	10	10	10	15	21	30	---
330	10	10	10	10	15	22	31	---
340	10	10	10	10	15	22	31	---
350	10	10	10	10	16	22	31	---
360	10	10	10	10	16	23	31	---
370	10	10	10	10	16	23	32	---
380	10	10	10	11	16	24	32	---
390	10	10	10	11	17	24	32	---
400	10	10	10	11	17	24	32	---
410	10	10	10	11	17	25	33	---
420	10	10	10	12	18	25	33	---
430	10	10	10	12	18	25	33	---
440	10	10	10	12	19	26	34	---
450	10	10	10	12	19	26	34	---
460	10	10	10	13	20	26	34	---
470	10	10	10	13	20	27	35	---
475	10	10	10	13	20	27	35	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *650* ºC							
68	10	10	10	10	10	10	13	19
70	10	10	10	10	10	10	13	19
80	10	10	10	10	10	10	14	21
90	10	10	10	10	10	10	16	24
100	10	10	10	10	10	10	17	25
110	10	10	10	10	10	10	18	26
120	10	10	10	10	10	10	19	26
130	10	10	10	10	10	11	21	27
140	10	10	10	10	10	11	22	28
150	10	10	10	10	10	12	23	28
160	10	10	10	10	10	12	25	29
170	10	10	10	10	10	13	25	29
180	10	10	10	10	10	13	25	30
190	10	10	10	10	10	14	26	31
200	10	10	10	10	11	14	26	31
210	10	10	10	10	11	15	26	32
220	10	10	10	10	11	15	26	33
230	10	10	10	10	11	16	27	33
240	10	10	10	10	12	16	27	34
250	10	10	10	10	12	17	27	34
260	10	10	10	10	12	17	27	35
270	10	10	10	10	12	18	28	36
280	10	10	10	10	13	18	28	37
290	10	10	10	10	13	18	28	39
300	10	10	10	10	13	18	28	40
310	10	10	10	10	13	19	29	41
320	10	10	10	10	14	19	29	---
330	10	10	10	10	14	19	29	---
340	10	10	10	10	14	19	29	---
350	10	10	10	10	14	20	29	---
360	10	10	10	10	15	20	30	---
370	10	10	10	10	15	20	30	---
380	10	10	10	10	15	21	30	---
390	10	10	10	10	16	21	31	---
400	10	10	10	10	16	21	31	---
410	10	10	10	10	16	21	31	---
420	10	10	10	10	16	22	31	---
430	10	10	10	10	17	22	32	---
440	10	10	10	10	17	22	32	---
450	10	10	10	10	17	22	32	---
460	10	10	10	10	17	23	32	---
470	10	10	10	10	18	23	33	---
475	10	10	10	10	18	23	33	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *700* ºC							
68	10	10	10	10	10	10	10	17
70	10	10	10	10	10	10	10	17
80	10	10	10	10	10	10	11	19
90	10	10	10	10	10	10	13	22
100	10	10	10	10	10	10	14	24
110	10	10	10	10	10	10	15	25
120	10	10	10	10	10	10	17	26
130	10	10	10	10	10	10	18	26
140	10	10	10	10	10	10	19	27
150	10	10	10	10	10	11	21	27
160	10	10	10	10	10	11	22	28
170	10	10	10	10	10	12	24	29
180	10	10	10	10	10	12	25	29
190	10	10	10	10	10	13	25	30
200	10	10	10	10	10	13	26	30
210	10	10	10	10	10	13	26	31
220	10	10	10	10	10	14	26	31
230	10	10	10	10	10	14	26	32
240	10	10	10	10	11	15	27	33
250	10	10	10	10	11	15	27	33
260	10	10	10	10	11	15	27	34
270	10	10	10	10	11	16	27	34
280	10	10	10	10	12	16	28	35
290	10	10	10	10	12	17	28	36
300	10	10	10	10	12	17	28	37
310	10	10	10	10	12	18	28	38
320	10	10	10	10	13	18	29	39
330	10	10	10	10	13	18	29	40
340	10	10	10	10	13	19	29	---
350	10	10	10	10	13	19	30	---
360	10	10	10	10	14	20	30	---
370	10	10	10	10	14	20	30	---
380	10	10	10	10	14	21	30	---
390	10	10	10	10	14	21	31	---
400	10	10	10	10	15	22	31	---
410	10	10	10	10	15	22	31	---
420	10	10	10	10	15	22	31	---
430	10	10	10	10	16	23	32	---
440	10	10	10	10	16	23	32	---
450	10	10	10	10	16	23	32	---
460	10	10	10	10	16	24	33	---
470	10	10	10	10	17	24	33	---
475	10	10	10	10	17	25	33	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Beams)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *750* ºC							
68	10	10	10	10	10	10	10	14
70	10	10	10	10	10	10	10	14
80	10	10	10	10	10	10	10	17
90	10	10	10	10	10	10	10	19
100	10	10	10	10	10	10	12	21
110	10	10	10	10	10	10	13	23
120	10	10	10	10	10	10	14	25
130	10	10	10	10	10	10	15	25
140	10	10	10	10	10	10	16	26
150	10	10	10	10	10	10	18	26
160	10	10	10	10	10	10	19	27
170	10	10	10	10	10	10	20	27
180	10	10	10	10	10	11	21	28
190	10	10	10	10	10	11	22	28
200	10	10	10	10	10	11	23	28
210	10	10	10	10	10	12	25	29
220	10	10	10	10	10	12	25	29
230	10	10	10	10	10	13	25	30
240	10	10	10	10	10	13	26	30
250	10	10	10	10	10	13	26	31
260	10	10	10	10	10	14	26	31
270	10	10	10	10	10	14	26	32
280	10	10	10	10	10	14	27	32
290	10	10	10	10	10	15	27	32
300	10	10	10	10	11	15	27	33
310	10	10	10	10	11	15	27	33
320	10	10	10	10	11	16	28	34
330	10	10	10	10	11	16	28	34
340	10	10	10	10	12	16	28	35
350	10	10	10	10	12	17	28	35
360	10	10	10	10	12	17	29	36
370	10	10	10	10	12	17	29	37
380	10	10	10	10	13	18	29	38
390	10	10	10	10	13	18	29	39
400	10	10	10	10	13	19	30	39
410	10	10	10	10	13	19	30	40
420	10	10	10	10	14	20	30	41
430	10	10	10	10	14	20	30	---
440	10	10	10	10	14	21	31	---
450	10	10	10	10	15	21	31	---
460	10	10	10	10	15	22	31	---
470	10	10	10	10	15	22	31	---
475	10	10	10	10	15	22	31	---

I.7. Hollow Sections of steel 4 exposed faces or less.

The hardened density of the product for this test was 592 kg/m^3. Values according to interpretation of Annex A Test standard EN 13381-4:2013.

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *350* ºC							
68	10	10	10	10	11	16	27	---
70	10	10	10	10	11	16	28	---
80	10	10	10	10	12	17	28	---
90	10	10	10	10	13	19	29	---
100	10	10	10	10	13	20	31	---
110	10	10	10	11	14	21	31	---
120	10	10	11	11	15	22	32	---
130	10	10	11	11	16	24	34	---
140	10	10	11	11	16	25	35	---
150	10	10	11	12	17	28	36	---
160	10	10	11	12	19	29	37	---
170	11	11	11	13	19	29	39	---
180	11	11	11	13	20	30	40	---
190	11	11	11	13	20	31	40	---
200	11	11	11	13	22	31	---	---
210	11	11	11	15	22	31	---	---
220	11	11	12	15	23	32	---	---
230	11	11	12	15	23	32	---	---
240	11	11	12	15	24	33	---	---
250	11	11	13	16	25	34	---	---
260	11	11	13	16	25	34	---	---
270	11	11	14	16	25	34	---	---
280	11	11	14	16	26	35	---	---
290	11	11	14	16	26	35	---	---
300	11	11	14	18	26	35	---	---
310	11	11	14	18	26	36	---	---
320	11	11	15	18	28	36	---	---
330	11	11	15	18	28	36	---	---
340	11	11	*15*	18	28	36	---	---
350	11	11	*15*	19	28	36	---	---
360	11	11	*15*	19	29	38	---	---
370	11	11	*15*	19	29	38	---	---
380	11	11	16	19	29	38	---	---
390	11	11	16	20	30	38	---	---
400	11	11	16	20	30	39	---	---
410	11	11	16	20	30	39	---	---
420	11	11	16	20	30	39	---	---
430	11	11	18	20	31	39	---	---
440	11	11	18	21	31	40	---	---
450	11	11	18	21	31	40	---	---
460	11	11	18	21	33	40	---	---
470	11	11	18	21	33	40	---	---
475	11	11	18	23	33	40	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *400* ºC							
68	10	10	10	10	10	10	23	34
70	10	10	10	10	10	10	24	35
80	10	10	10	10	11	11	26	38
90	10	10	10	10	11	12	27	---
100	10	10	10	10	12	13	29	---
110	10	10	10	10	12	14	30	---
120	10	10	10	10	13	17	30	---
130	10	10	10	10	14	18	32	---
140	10	10	10	10	15	19	33	---
150	10	10	11	12	16	22	33	---
160	10	10	11	12	16	23	35	---
170	11	11	11	12	18	25	36	---
180	11	11	11	12	18	27	38	---
190	11	11	11	12	19	29	38	---
200	11	11	11	13	19	30	40	---
210	11	11	11	13	21	30	41	---
220	11	11	11	13	21	31	41	---
230	11	11	11	14	22	32	---	---
240	11	11	11	15	22	32	---	---
250	11	11	11	15	23	33	---	---
260	11	11	11	15	24	33	---	---
270	11	11	11	15	24	34	---	---
280	11	11	11	15	24	34	---	---
290	11	11	11	16	24	34	---	---
300	11	11	11	16	25	35	---	---
310	11	11	11	16	25	35	---	---
320	11	11	13	16	25	35	---	---
330	11	11	13	18	26	35	---	---
340	11	11	13	18	26	36	---	---
350	11	11	13	18	26	36	---	---
360	11	11	13	18	28	36	---	---
370	11	11	14	18	28	36	---	---
380	11	11	14	19	28	38	---	---
390	11	11	14	19	29	38	---	---
400	11	11	14	19	29	38	---	---
410	11	11	14	19	29	38	---	---
420	11	11	15	19	30	39	---	---
430	11	11	15	20	30	39	---	---
440	11	11	15	20	30	39	---	---
450	11	11	15	20	31	39	---	---
460	11	11	16	20	31	39	---	---
470	11	11	16	21	31	40	---	---
475	11	11	16	21	31	40	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *450* °C							
68	10	10	10	10	10	12	21	31
70	10	10	10	10	10	12	21	32
80	10	10	10	10	10	13	24	35
90	10	10	10	10	11	14	26	37
100	10	10	10	10	11	15	28	40
110	10	10	10	10	12	17	29	---
120	10	10	10	10	12	18	29	---
130	10	10	10	10	12	19	29	---
140	10	10	10	10	14	19	31	---
150	10	10	10	10	14	21	31	---
160	10	10	10	10	15	22	32	---
170	11	11	11	11	15	23	33	---
180	11	11	11	11	17	25	34	---
190	11	11	11	12	17	26	35	---
200	11	11	11	12	18	28	36	---
210	11	11	11	12	18	28	36	---
220	11	11	11	12	20	29	38	---
230	11	11	11	14	20	31	38	---
240	11	11	11	14	21	31	40	---
250	11	11	11	14	21	31	40	---
260	11	11	11	14	21	33	41	---
270	11	11	11	14	23	33	41	---
280	11	11	11	15	23	33	---	---
290	11	11	11	15	23	33	---	---
300	11	11	11	15	24	34	---	---
310	11	11	11	15	24	34	---	---
320	11	11	11	16	24	34	---	---
330	11	11	11	16	25	34	---	---
340	11	11	11	16	25	35	---	---
350	11	11	11	16	25	35	---	---
360	11	11	11	16	26	35	---	---
370	11	11	11	18	26	35	---	---
380	11	11	11	18	26	36	---	---
390	11	11	11	18	28	36	---	---
400	11	11	11	18	28	36	---	---
410	11	11	11	19	28	36	---	---
420	11	11	13	19	29	38	---	---
430	11	11	13	19	29	38	---	---
440	11	11	13	19	29	38	---	---
450	11	11	13	19	30	38	---	---
460	11	11	14	20	30	39	---	---
470	11	11	14	20	30	39	---	---
475	11	11	14	20	31	39	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *500* ºC							
68	10	10	10	10	10	10	18	28
70	10	10	10	10	10	11	19	29
80	10	10	10	10	10	12	22	30
90	10	10	10	10	10	13	23	33
100	10	10	10	10	11	13	25	35
110	10	10	10	10	11	14	28	37
120	10	10	10	10	12	16	28	39
130	10	10	10	10	12	17	28	---
140	10	10	10	10	13	18	30	---
150	10	10	10	10	14	18	30	---
160	10	10	10	10	14	20	30	---
170	11	11	11	11	14	21	32	---
180	11	11	11	11	15	22	32	---
190	11	11	11	11	15	24	32	---
200	11	11	11	11	16	24	34	---
210	11	11	11	12	17	25	34	---
220	11	11	11	12	17	27	34	---
230	11	11	11	12	18	27	36	---
240	11	11	11	12	19	29	36	---
250	11	11	11	13	19	29	36	---
260	11	11	11	14	20	30	36	---
270	11	11	11	14	20	31	38	---
280	11	11	11	14	21	31	38	---
290	11	11	11	14	21	31	38	---
300	11	11	11	15	21	31	39	---
310	11	11	11	15	23	33	39	---
320	11	11	11	15	23	33	39	---
330	11	11	11	15	23	33	40	---
340	11	11	11	15	24	33	40	---
350	11	11	11	16	24	34	40	---
360	11	11	11	16	24	34	41	---
370	11	11	11	16	25	34	41	---
380	11	11	11	16	25	34	41	---
390	11	11	11	16	26	35	41	---
400	11	11	11	18	26	35	---	---
410	11	11	11	18	26	35	---	---
420	11	11	11	18	28	35	---	---
430	11	11	13	18	28	36	---	---
440	11	11	13	18	28	36	---	---
450	11	11	13	19	29	36	---	---
460	11	11	13	19	29	36	---	---
470	11	11	13	19	29	38	---	---
475	11	11	14	19	30	38	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *550* ºC							
68	10	10	10	10	10	10	17	26
70	10	10	10	10	10	10	17	26
80	10	10	10	10	10	11	19	28
90	10	10	10	10	10	11	21	29
100	10	10	10	10	10	12	23	32
110	10	10	10	10	10	13	26	34
120	10	10	10	10	11	15	27	37
130	10	10	10	10	11	15	28	38
140	10	10	10	10	11	16	29	41
150	10	10	10	10	13	17	30	---
160	10	10	10	10	13	17	30	---
170	11	11	11	11	13	19	30	---
180	11	11	11	11	14	20	32	---
190	11	11	11	11	14	21	32	---
200	11	11	11	11	14	22	32	---
210	11	11	11	11	16	23	34	---
220	11	11	11	11	16	24	34	---
230	11	11	11	11	16	25	34	---
240	11	11	11	11	17	26	35	---
250	11	11	11	11	18	26	36	---
260	11	11	11	11	18	28	36	---
270	11	11	11	13	19	28	36	---
280	11	11	11	13	19	29	38	---
290	11	11	11	13	19	29	38	---
300	11	11	11	13	20	30	38	---
310	11	11	11	14	20	30	39	---
320	11	11	11	14	20	31	39	---
330	11	11	11	14	21	31	39	---
340	11	11	11	14	21	31	40	---
350	11	11	11	14	21	33	40	---
360	11	11	11	15	23	33	40	---
370	11	11	11	15	23	33	40	---
380	11	11	11	15	24	33	41	---
390	11	11	11	15	24	34	41	---
400	11	11	11	16	24	34	41	---
410	11	11	11	16	25	34	---	---
420	11	11	11	16	25	34	---	---
430	11	11	11	16	26	35	---	---
440	11	11	11	18	26	35	---	---
450	11	11	11	18	26	35	---	---
460	11	11	11	18	28	35	---	---
470	11	11	11	18	28	36	---	---
475	11	11	11	18	28	36	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *600* ºC							
68	10	10	10	10	10	10	15	22
70	10	10	10	10	10	10	15	22
80	10	10	10	10	10	10	17	25
90	10	10	10	10	10	11	19	27
100	10	10	10	10	10	11	21	30
110	10	10	10	10	10	12	22	31
120	10	10	10	10	10	12	25	34
130	10	10	10	10	10	14	26	35
140	10	10	10	10	11	15	29	36
150	10	10	10	10	12	15	29	39
160	10	10	10	10	12	16	29	41
170	11	11	11	11	13	16	30	---
180	11	11	11	11	13	18	31	---
190	11	11	11	11	13	18	31	---
200	11	11	11	11	13	19	32	---
210	11	11	11	11	15	21	33	---
220	11	11	11	11	15	21	33	---
230	11	11	11	11	15	22	33	---
240	11	11	11	11	16	22	35	---
250	11	11	11	11	16	23	35	---
260	11	11	11	11	16	24	35	---
270	11	11	11	11	16	24	36	---
280	11	11	11	11	18	25	36	---
290	11	11	11	11	18	25	36	---
300	11	11	11	11	18	25	38	---
310	11	11	11	11	19	26	38	---
320	11	11	11	11	19	26	38	---
330	11	11	11	11	19	28	39	---
340	11	11	11	13	19	28	39	---
350	11	11	11	13	20	28	39	---
360	11	11	11	13	20	29	39	---
370	11	11	11	13	20	29	40	---
380	11	11	11	14	20	30	40	---
390	11	11	11	14	21	30	40	---
400	11	11	11	14	21	30	40	---
410	11	11	11	14	21	31	41	---
420	11	11	11	15	23	31	41	---
430	11	11	11	15	23	31	41	---
440	11	11	11	15	24	33	---	---
450	11	11	11	15	24	33	---	---
460	11	11	11	16	25	33	---	---
470	11	11	11	16	25	34	---	---
475	11	11	11	16	25	34	---	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *650* ºC							
68	10	10	10	10	10	10	13	20
70	10	10	10	10	10	10	14	20
80	10	10	10	10	10	10	15	23
90	10	10	10	10	10	10	17	26
100	10	10	10	10	10	10	19	28
110	10	10	10	10	10	11	20	29
120	10	10	10	10	10	11	21	29
130	10	10	10	10	10	12	24	31
140	10	10	10	10	10	13	25	32
150	10	10	10	10	10	14	26	32
160	10	10	10	10	12	14	29	34
170	11	11	11	11	12	15	29	34
180	11	11	11	11	12	15	30	35
190	11	11	11	11	12	17	31	37
200	11	11	11	11	13	17	31	37
210	11	11	11	11	13	18	31	39
220	11	11	11	11	13	18	32	40
230	11	11	11	11	14	20	33	41
240	11	11	11	11	15	20	33	---
250	11	11	11	11	15	21	34	---
260	11	11	11	11	15	21	34	---
270	11	11	11	11	15	22	35	---
280	11	11	11	11	16	23	35	---
290	11	11	11	11	16	23	35	---
300	11	11	11	11	16	23	35	---
310	11	11	11	11	16	23	36	---
320	11	11	11	11	18	24	36	---
330	11	11	11	11	18	24	36	---
340	11	11	11	11	18	24	36	---
350	11	11	11	11	18	25	36	---
360	11	11	11	11	19	25	38	---
370	11	11	11	11	19	25	38	---
380	11	11	11	11	19	26	38	---
390	11	11	11	11	20	26	39	---
400	11	11	11	11	20	26	39	---
410	11	11	11	11	20	26	39	---
420	11	11	11	11	20	28	39	---
430	11	11	11	11	21	28	40	---
440	11	11	11	13	21	28	40	---
450	11	11	11	13	21	28	40	---
460	11	11	11	13	21	29	40	---
470	11	11	11	13	23	29	41	---
475	11	11	11	13	23	29	41	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *700* °C							
68	10	10	10	10	10	10	11	18
70	10	10	10	10	10	10	11	18
80	10	10	10	10	10	10	12	21
90	10	10	10	10	10	10	14	24
100	10	10	10	10	10	10	15	26
110	10	10	10	10	10	10	17	28
120	10	10	10	10	10	11	19	29
130	10	10	10	10	10	11	20	29
140	10	10	10	10	10	11	22	31
150	10	10	10	10	10	13	24	31
160	10	10	10	10	10	13	26	32
170	11	11	11	11	11	14	28	34
180	11	11	11	11	11	14	30	34
190	11	11	11	11	11	15	30	36
200	11	11	11	11	12	16	31	36
210	11	11	11	11	12	16	31	38
220	11	11	11	11	12	17	32	38
230	11	11	11	11	12	17	32	39
240	11	11	11	11	14	19	33	41
250	11	11	11	11	14	19	34	41
260	11	11	11	11	14	19	34	---
270	11	11	11	11	14	20	34	---
280	11	11	11	11	15	20	35	---
290	11	11	11	11	15	21	35	---
300	11	11	11	11	15	21	35	---
310	11	11	11	11	15	23	35	---
320	11	11	11	11	16	22	36	---
330	11	11	11	11	16	23	36	---
340	11	11	11	11	16	24	36	---
350	11	11	11	11	16	24	38	---
360	11	11	11	11	18	25	38	---
370	11	11	11	11	18	25	38	---
380	11	11	11	11	18	26	38	---
390	11	11	11	11	18	26	39	---
400	11	11	11	11	19	28	39	---
410	11	11	11	11	19	28	39	---
420	11	11	11	11	19	28	39	---
430	11	11	11	11	20	29	40	---
440	11	11	11	11	20	29	40	---
450	11	11	11	11	20	29	40	---
460	11	11	11	11	20	30	41	---
470	11	11	11	11	21	30	41	---
475	11	11	11	11	21	31	41	---

Section factor A_m/V (m^{-1})	Classification of Fire Resistance (Hollow Section)							
	R15	R30	R45	R60	R90	R120	R180	R240
	Protection thickness (mm). Perlifoc HP - *750* ºC							
68	10	10	10	10	10	10	10	15
70	10	10	10	10	10	10	10	15
80	10	10	10	10	10	10	10	18
90	10	10	10	10	10	10	11	21
100	10	10	10	10	10	10	13	23
110	10	10	10	10	10	10	14	26
120	10	10	10	10	10	10	16	28
130	10	10	10	10	10	10	17	28
140	10	10	10	10	10	10	18	30
150	10	10	10	10	10	12	21	30
160	10	10	10	10	10	12	22	31
170	11	11	11	11	11	12	23	32
180	11	11	11	11	11	13	25	33
190	11	11	11	11	11	13	26	33
200	11	11	11	11	11	13	28	34
210	11	11	11	11	11	15	30	35
220	11	11	11	11	11	15	31	35
230	11	11	11	11	11	16	31	37
240	11	11	11	11	11	16	32	37
250	11	11	11	11	11	16	33	39
260	11	11	11	11	13	18	33	39
270	11	11	11	11	13	18	33	41
280	11	11	11	11	13	18	34	41
290	11	11	11	11	13	19	34	41
300	11	11	11	11	14	19	34	---
310	11	11	11	11	14	19	34	---
320	11	11	11	11	14	19	35	---
330	11	11	11	11	14	20	35	---
340	11	11	11	11	15	20	35	---
350	11	11	11	11	15	21	35	---
360	11	11	11	11	15	21	36	---
370	11	11	11	11	15	21	36	---
380	11	11	11	11	16	23	36	---
390	11	11	11	11	16	23	36	---
400	11	11	11	11	16	24	38	---
410	11	11	11	11	16	24	38	---
420	11	11	11	11	18	25	38	---
430	11	11	11	11	18	25	38	---
440	11	11	11	11	18	26	39	---
450	11	11	11	11	19	26	39	---
460	11	11	11	11	19	28	39	---
470	11	11	11	11	19	28	39	---
475	11	11	11	11	19	28	39	---

The evaluation results within which the product can be used are:

- Section Factor between 68 m^{-1} and 479 m^{-1}
- Protection thicknesses assessed between 9 mm and 41 mm.
- Critical temperature from 350 ºC to 750 ºC

In the same way, the evaluation results are applicable to:

- Open sections columns and beams with 3 or 4 faces exposed.
- Hollow sections with 3 or 4 faces exposed.
- Other grades of steel in accordance to EN 10025 and EN 10113

I.7. Vertical protection of concrete blocks with no load bearing requirements.

Test Report APPLUS 21/24890-493. The hardened density of the product for this test was 591,8 kg/m^3.

The non-load-bearing wall exposed to fire on one side has been tested and evaluated in accordance with the procedure given in the UNE EN 13501-2:2019 standard (equivalent to EN 13501-2:2016) and classified EI 240.

The constructive solution; Non-load-bearing wall made of 140 mm thick dense and unsolid aggregate concrete block, with mortared joints with cement mortar. Once the wall is assembled, PERLIFOC HP mortar is projected onto the block support with a thickness of 25 mm of fireproof mortar.

Samples	**21/493-A**	
Critery	**Faiulare time**	**Reazon**
Integrity	-	The integrity criterion is maintained throughout the entire trial, 245 minutes
Thermal insulation	--	The thermal insulation criterion is maintained throughout the entire test, 245 minutes.

Fields and limits of application;

Characteristics	**Tested samples reference**	**Modification permitted**
High	- Total height 3000 mm. - Max. deformation <100 mm. - Sample rehearsed without supporting work. - Proportionally increased expansion tolerances.	- Decrease permitted. - Allowed to be increased up to 4000 mm.
Width	- Total width 3000 mm. - Sample rehearsed without supporting work. - Free right side edge (seen from non-exposed face).	Allowed to be increased in construction identical to the one tested.
Thickness	165 mm.	Increase permitted.
Thickness of the components	- 140 mm thick block of dense unsolidified aggregate. - PERLIFOC HP mortar ref. with an average thickness of 25.2 mm.	Increase permitted.
Measure pannels/ plates	No tested	No proceed
Distance between profiles	No tested	No proceed
Distance from center of bindings	No tested	No proceed
Vertical and horizontal joints	Mortar joint joints between concrete blocks. (See Test Report No. 21/24890-493 for more information	Installation with mortar joints between concrete blocks of the same type as those tested is permitted
Accesories	No tested	No procede
Support in works	Tested without supporting work.	Applicable to rigid high-density support works with the same fire resistance as the tested sample.

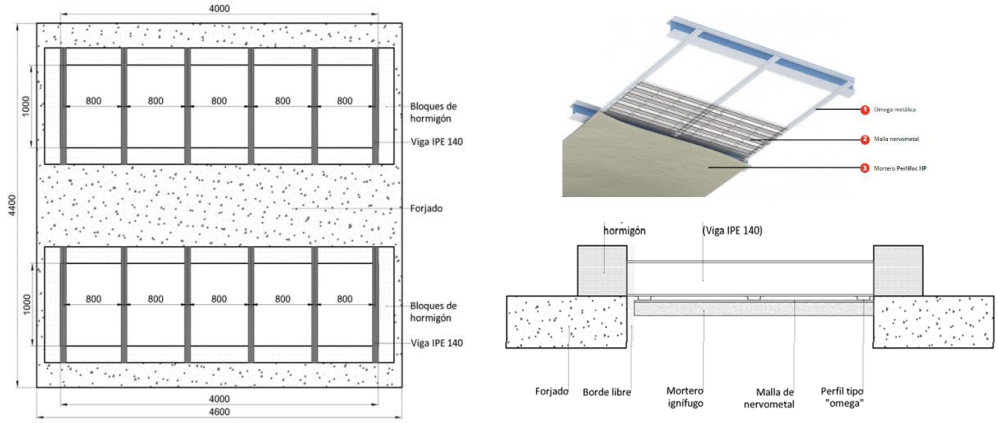
* The reference values of the tested sample not indicated in this paragraph are described in section 3 "Sample tested" of file number:21/24890-493.

I.8. Firewall strip attached to deck straps.

Test Report AFITI LICOF num, 3869T19-2. The hardened density of the product for this test was 545,5 kg/m^3.

A covered party strip fixed to the support structure of the roof. Composed of Perlifoc HP fireproof mortar, applied on nerve metal mesh and profiles to fix to the roof structure. This classification has been made in accordance with section 11 of the "Technical Application Guide: Fire Safety Regulations in Industrial Establishments. Appendix B. February 2019 Edition" and classified EI 180.

The constructive solution; IPE 140 beam runs spaced 800 mm apart (simulating the covered structure) are mounted. The "omega" type profiles of a thickness of 0.5 mm thick are mounted transversely, anchored with a self-drilling hexagon-head screw, with dimensions' diameter 5.5 mm * 40 mm, two fixings per meeting, to anchor the omega profile to the IPE beam. On top of the omega profile, the nervometal mesh of dimensions (2,500 (length) x 600 (width) x 0.5 (thickness of the material) is fixed, anchored with a phosphate self-tapping screw, with dimensions of 3.5*25 mm, by means of fixings every 100 mm.



Fields and limits of application:

Característica	Variación permitida	Valour of reference (1)
Type of strip	No variation allowed	Supported on the load-bearing structure of the roof
Instalation of the strip	Installation of the strip on both sides of the partition wall with a dimension such that its horizontal projection is equal to or greater than 500 mm on each side of the wall.	1000 mm tested horizontal projection
Dimensionss of the stripanja	Unlimited increase in length by repeating the anchoring and sealing conditions of the fixed edge along the entire length.	4000 mm of length
	Increase in width by 20% as long as additional anchors are available, so that the weight supported by each anchor is not exceeded.	1000 mm horizontal projection width.
Support of the strip	No variation allowed	Supported on the load-bearing structure of the roof by a strap
	The distance between straps may not be increased, but may be decreased	Distance between straps: 800mm
	An increase in the number of fixings per linear meter of the strip is allowed, but not a decrease.	Bindings: - Nervometal mesh to "omega" type profiles: every 100 mm - "Omega" type profiles to straps: 2 bindings every 800 mm (at each meeting
Strip Slope	Permissible range from 0° to 25°	Slope of 0°