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CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

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## European Technical Assessment

**ETA 14/0226**  
of 20/ 04/ 2015

English translation prepared by IETcc. Original version in Spanish language

### General Part

**Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) N°305/2011:**

Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)

**Trade name of the construction product**

**VERMIPLASTER® BD  
MP 75 SL FIRE**

**Product family to which the construction product belongs**

Rendering intended for Fire Resisting Application of building elements

**Manufacturer**

**KNAUF Gips KG**  
Am Bahnhof 7. 97346 Iphofen – Germany

**Manufacturing plant(s)**

Carretera. de Incar, km 2,8 Escúzar  
18130 (Granada) – Spain

**This European Technical Assessment contains**

15 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) N° 305/2011, on the basis of**

Guideline for European Technical Assessment (ETAG) n° 018 part 1-3, used as European Assessment Document (EAD)

**This version replaces**

ETA 14/0226 issued on 14/ 07/ 2014

Nu poa fi utilizat conform cu originalul SPECIMEN EN Official



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## SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

### 1 Technical description of the product

The VERMIPLASTER® BD/ MP 75 SL FIRE product is a mortar of fine granule based in calcium sulphate. This product is lightened with expansive minerals and formulated with several additives to improve the application and its performances. 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 (steel with and without primer, galvanized steel and sheet of galvanized steel).

The thickness of the applied product ranges from 6 - 42 mm, with a consumption of 4,5-5 kg/m<sup>2</sup>/cm thickness.

The final assembly contains a rendering, several primers (base epoxy, alkyd and silicate zinc) when it is applied on steel supports (optional).

According to ETAG 018-3, this ETA is assessed under use conditions: Option 3.

### 2 Specification of the intended use in accordance with the applicable EAD

The intended use of this product is the rendering of indoor building 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 Essential Requirements n° 2 (Safety in case of fire), n° 3 (Hygiene, health and the environment) and n° 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 4: Fire Protective Products to protect load-bearing steel elements. Beams and columns with 3 and 4 exposed faces. With a section factor of <math><300\text{ m}^{-1}</math>. Temperature ranges from 350°C to 650°C. R15-R240.
- Type 10. Further intended uses, related to fire compartmentalisation or protection of fire performance, not covered by above Types.

The provisions made in this European Technical Approval (ETA) are based on an assumed intended working life of the system of 25 years, provided that the product is subject to appropriate use and maintenance in accordance with Chapter 5. The indication given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are only to be regarded as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

"Assumed intended working life" means that, when an assessment following the ETAG provisions is made, and when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the Essential 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.

#### **Particularly, it is recommended to consider.**

- The application has to be carried out by skilled labor,
- It can only be used the components of the Product indicated in this ETA,
- It is necessary to control the thickness of the applied product during application,
- The support to protect must be clean, dry and without dust or grease in order not to affect the adherence of VERMIPLASTER® BD/ MP 75 SL FIRE mortar.
- The recommended mixing water (water/powder) is 1,1 to 1,3 so for a VERMIPLASTER® BD/ MP75 SL FIRE sacks is necessary 12 ± 2 L of water.



- The application must be performed by spray, mixing the product with water in the projection machine, or manually. Usually the powder is mixed with water in usual mixing machines. The water flow of the machine must be regulated until achieving a mass/paste/plasticity that covers uniformly and does not fall down. In order to achieve a uniform finishing of VERMIPLASTER® BD/ MP75 SL FIRE it must be used nozzles from 10 to 12 mm.
- The adherence test in situ should be at least 80% of the values enclosed in this ETA.
- The density of the applied rendering on site will not vary more than  $490 \text{ kg/m}^3 \pm 15\%$ . 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 installation of VERMIPLASTER® BD/ MP 75 SL FIRE, it is recommended to read its security card.

#### **Requirements to use primers on different supports and its compatibility with its rendering**

- The alkyd, epoxy and silicate zinc primers are compatible with VERMIPLASTER® BD/ MP75 SL FIRE, however, the application of VERMIPLASTER® BD/ MP75 SL FIRE 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.
- The ETA-Guideline 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:
  - o Any existing coating or rendering must be completely removed before the application.
  - o If it could not be removed, it must be consult with the manufacturer.

**Circumstances in which the rendering needs reinforcements.** Although it has not been evaluated in this ETA, in cases where the mechanical resistance needs to be improved, it is recommended to place a mesh. In cases that the state of the surface does not assure an adequate adherence, please check it with the manufacturer.

**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.

#### **Application limitations due to certain environments**

- The recommended environmental temperature of the product to be applied will be between 5°C and 40°C and it will be not admitted support temperatures upper to 45°C. 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.

**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 regularly 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) and new application of VERMIPLASTER® BD / MP75 SL FIRE sprayed or manually if the reparation size is small (< 1000 cm<sup>2</sup>). When the area to repair is significant, it is recommend to use 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 assessment of the fitness of the VERMIPLASTER® BD/ MP75 SL FIRE for the intended use regard to the Essential Requirements nº 2, 3 and 4 was performed in compliance with the "Guideline for European Technical Approval of Fire Protective Products, ETAG 018, Part 1"General" and Part 3 "Renderings and Rendering Kits Intended for Fire Resisting Applications".



### 3.1 Characteristics of Product "VERMIPLASTER® BD/ MP75 SL FIRE"<sup>1</sup>

#### 3.1.1 ER. 2 Safety in case of fire

**Reaction to fire.** Classification A1 according to EN 13501-1. Product does not require to be tested because of its composition.

**Fire resistance.** The tests were performed according to the standards ENV 13381-3:2004, 13381-4:2005, ENV 13381-5:2005 and EN 13501-2 (annex I).

Support	Thickness of the product	Classification
Steel	6,0- 42,0 mm	R 15 - R 240

#### 3.1.2 ER. 3 Hygiene, health and environment

**Emission of dangerous substances.** According to the manufacturer's declaration taking account of EOTA TR 034, the product installed does not contain and release any dangerous substance.

**Resistance to water vapour** (EN 12086).  $\mu = 4$  (thickness 1 cm)

#### 3.1.3 ER. 4 Safety in use. See Serviceability aspect.

#### 3.1.4 Aspects of durability.

**Resistance to deterioration caused by high humidity<sup>2</sup>** (4 weeks at 32°C, 95%HR)

Support	Adherence (MPa)	Thermal efficiency	Visual aspect
Steel	≤ 20%	≤ 15%	Correct

**Resistance to deterioration caused by heat and cold<sup>2</sup>** (5 cycles)

Support	Adherence (MPa)	Thermal efficiency	Visual aspect
Steel	≤ 20%	≤ 15%	Correct

**Resistance to deterioration caused by freezing and thawing<sup>2</sup>** (25 cycles)

Support	Adherence (MPa)	Thermal efficiency	Visual aspect
Steel	≤ 20%	≤ 15%	Correct

**Resistance to corrosion of a steel substrate by the rendering** (240h, 23°C at 60% and at 95% HR). The thickness of the sample was 6 mm and the obtained weight lost was of  $4,1 \cdot 10^{-5} \text{ g/mm}^2$  and  $5,1 \cdot 10^{-5} \text{ g/mm}^2$  at 60% and 90% HR conditions respectively.

#### 3.1.5 Serviceability aspects

**Resistance to functional failure from hard body impact load – 0.5 kg steel ball** (TR 001, modified according to ETAG 018-3 on concrete support)

Thickness (mm)	Print (mm)		Aspect
	3J	10J	
25	28	39	non cracks, non delamination
10	24	29	non cracks, non delamination

**Resistance to functional failure from soft body impact load – 50 kg bag** (TR 001, modified according to ETAG 018-3). The product was applied on concrete support and an impact of 500 J does not produce cracks lost of delaminating, nor lost of adherence.

**Flexural performance.** NPD

<sup>(1)</sup> These tests are valid for hardened density of applied rendering between  $490 \pm 15\% \text{ kg/m}^3$ .

<sup>(2)</sup> Adherence and thermal efficiency values after ageing, must not be inferior to 80% (variation ≤ 20% and 85% (variation ≤ 15%) respectively from initial value.



Air erosion. NPD

Adherence (EGOLF SM/5)

Support	Thickness	Adherence (MPa)
Steel	42 mm	≥ 0.06
	25 mm	
	6 mm	
Steel + Epoxy primer	42 mm	
	25 mm	
	6 mm	
Steel + Alkyd primer	42 mm	
	25 mm	
	6 mm	
Steel + Silicate Zinc primer	42 mm	
	25 mm	
	6 mm	
Galvanized steel	25 mm	
	10 mm	

### Thermal efficiency and aspect with the different primers

Support	Thermal efficiency	Visual aspect
Steel + Epoxy primer	≤ 15% <sup>3</sup>	Correct
Steel + Alkyd primer	≤ 15%	Correct
Steel + Silicate Zinc primer	≤ 15%	Correct
Galvanized steel	≤ 15%	Correct

### 3.2 Identification of components

The characteristics of the components of this product show the following values, which are within the respective requirements and tolerances stated in the Manufacture Technical Dossier (MTD).

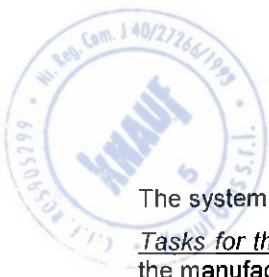
Properties	VERMIPLASTER BD
Binder content (volume)	24 %
TG / ATD	IETcc
Mixing ratio (water/powder)	1,0-1,2
Colour	White
Density	
Powder (kg/m <sup>3</sup> )	402 (320-420)
Paste (EN 1015-6)	1080 (900-1200)
Hardened (EN 1015-10)	490 (420-565)
Dry extract 45°C (% weight residue)	> 99
Ash content 450°C (% weight residue)	> 95
Flexural strength (EN 1015-11) (MPa)	> 0.2
Compressive strength (EN 1015-11) (MPa)	> 0.4

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

**System of attestation of conformity.** The European Commission 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
VERMIPLASTER BD MP 75 SL FIRE	Rendering intended for Fire Resisting Application of building elements	Any	1

<sup>(3)</sup> Variation of the test time respect to the same sample un-primed steel sheet



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 approved 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 the applicable EAD

The ETA is issued for these products on the basis of agreed data/information, deposited at IETcc, which identifies the product that has been assessed and judged. It is the manufacturer's responsibility to make sure that all those who use the kit are appropriately informed of specific conditions according to sections 1, 2, 4 and 5 including the annexes of this ETA. Changes of the product's components or their production process, which could result in this deposited data/information being incorrect, should be notified to the IETcc before the changes are introduced. IETcc will decide whether or not such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

### 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<sup>(4)</sup> which is part of the Technical Documentation of this ETA. The Control Plan has been agreed between the manufacturer and the IETcc and is laid down in the context of the factory production control system operated by the manufacturer and deposited at the IETcc. The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

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

Further information concerning tests, frequencies and tolerances are included in the test's plan, which is part of the MTD to this ETA placed at IETcc.

**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.

(4) The control plan is a confidential part of this European Technical Assessment and only handed over to the notified body involved in the procedure of attestation of conformity.



## 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 chapter 5 of the Guideline for European Technical Approval of Fire Protective Products, ETAG 018, Part 1 "General" and Part 3 "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 twice a 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 Approval and its "Control Plan" are no longer fulfilled the certification body (IETcc) shall withdraw the certificate of conformity.

Issued in Madrid on 20 April 2015  
by

Instituto de Ciencias de la Construcción Eduardo Torroja

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On behalf of the Instituto de Ciencias de la Construcción Eduardo Torroja

Marta Castellote Armero  
Directora





## Annex I. Fire resistance tests

Beams and Columns of steel with 3 or 4 exposed faces (Report of test AFITI LICOF 1811T09-2) according to annex H ENV 13381-4:2005).

Section factor (m <sup>-1</sup> )	Classification of Fire Resistance						350°C	
	R15	R30	R45	R60	R90	R120	R180	R240
≤ 65	6	8	11	14	19	25	37	---
70	6	8	11	14	20	26	38	---
75	6	9	12	15	21	27	39	---
80	6	9	12	15	21	27	40	---
85	6	9	12	15	22	28	41	---
90	6	9	12	16	22	29	41	---
95	6	9	13	16	22	29	42	---
100	6	10	13	16	23	30	---	---
110	7	10	13	17	24	30	---	---
120	7	10	14	17	24	31	---	---
130	7	10	14	18	25	32	---	---
140	7	11	14	18	25	32	---	---
150	7	11	15	18	26	33	---	---
160	7	11	15	19	26	33	---	---
170	7	11	15	19	26	34	---	---
180	8	11	15	19	27	34	---	---
190	8	12	15	19	27	35	---	---
200	8	12	16	19	27	35	---	---
210	8	12	16	20	27	35	---	---
220	8	12	16	20	28	36	---	---
230	8	12	16	20	28	36	---	---
240	8	12	16	20	28	36	---	---
250	8	12	16	20	28	36	---	---
260	8	12	16	20	28	36	---	---
270	8	12	16	20	29	37	---	---
280	8	12	16	21	29	37	---	---
290	8	12	17	21	29	37	---	---
300	8	13	17	21	29	37	---	---
Minimum thickness (mm) of product to keep the profile temperature below 350°C								

Note: The cursive figures correspond to extrapolated values.



Official

Section factor (m <sup>-1</sup> )	Classification of Fire Resistance						400°C	
	R15	R30	R45	R60	R90	R120	R180	R240
≤ 65	6	6	9	12	17	22	33	---
70	6	7	10	12	18	23	34	---
75	6	7	10	13	18	24	35	---
80	6	7	10	13	19	24	36	---
85	6	8	11	13	19	25	37	---
90	6	8	11	14	20	26	38	---
95	6	8	11	14	20	26	38	---
100	6	8	11	14	21	27	39	---
110	6	9	12	15	21	28	40	---
120	6	9	12	15	22	28	41	---
130	6	9	13	16	23	29	42	---
140	6	9	13	16	23	30	---	---
150	6	10	13	17	24	30	---	---
160	6	10	13	17	24	31	---	---
170	7	10	14	17	24	31	---	---
180	7	10	14	17	25	32	---	---
190	7	10	14	18	25	32	---	---
200	7	11	14	18	25	33	---	---
210	7	11	14	18	26	33	---	---
220	7	11	15	18	26	33	---	---
230	7	11	15	18	26	33	---	---
240	7	11	15	19	26	34	---	---
250	7	11	15	19	26	34	---	---
260	7	11	15	19	27	34	---	---
270	7	11	15	19	27	34	---	---
280	8	11	15	19	27	35	---	---
290	8	11	15	19	27	35	---	---
300	8	12	15	19	27	35	---	---

Minimum thickness (mm) of product to keep the profile temperature below 400°C

Note: The cursive figures correspond to extrapolated values.



Section factor (m <sup>-1</sup> )	Classification of Fire Resistance					450°C		
	R15	R30	R45	R60	R90	R120	R180	R240
≤ 65	6	6	8	10	15	20	29	39
70	6	6	8	11	16	21	31	41
75	6	6	8	11	16	21	32	42
80	6	6	9	11	17	22	33	
85	6	6	9	12	17	23	33	---
90	6	7	9	12	18	23	34	---
95	6	7	10	13	18	24	35	---
100	6	7	10	13	19	24	36	---
110	6	7	10	13	19	25	37	---
120	6	8	11	14	20	26	38	---
130	6	8	11	14	21	27	39	---
140	6	8	12	15	21	28	40	---
150	6	9	12	15	22	28	41	---
160	6	9	12	15	22	29	42	---
170	6	9	12	16	22	29		---
180	6	9	13	16	23	30	---	---
190	6	9	13	16	23	30	---	---
200	6	10	13	17	23	30	---	---
210	6	10	13	17	24	31	---	---
220	6	10	13	17	24	31	---	---
230	6	10	14	17	24	31	---	---
240	7	10	14	17	25	32	---	---
250	7	10	14	17	25	32	---	---
260	7	10	14	18	25	32	---	---
270	7	10	14	18	25	32	---	---
280	7	11	14	18	25	33	---	---
290	7	11	14	18	25	33	---	---
300	7	11	14	18	26	33	---	---
Minimum thickness (mm) of product to keep the profile temperature below 450°C								

Note: The cursive figures correspond to extrapolated values..



Section factor (m <sup>-1</sup> )	Classification of Fire Resistance						500°C		
	R15	R30	R45	R60	R90	R120	R180	R240	
≤ 65	6	6	6	9	13	18	27	36	
70	6	6	7	9	14	18	28	37	
75	6	6	7	10	14	19	29	38	
80	6	6	8	10	15	20	30	40	
85	6	6	8	10	15	21	31	41	
90	6	6	8	11	16	21	31	42	
95	6	6	9	11	16	22	32		
100	6	6	9	11	17	22	33	---	
110	6	6	9	12	18	23	34	---	
120	6	7	10	13	18	24	36	---	
130	6	7	10	13	19	25	37	---	
140	6	7	10	13	19	25	38	---	
150	6	8	11	14	20	26	38	---	
160	6	8	11	14	20	27	39	---	
170	6	8	11	15	21	27	40	---	
180	6	8	12	15	21	28	41	---	
190	6	9	12	15	22	28	41	---	
200	6	9	12	15	22	28	42	---	
210	6	9	12	16	22	29	42	---	
220	6	9	12	16	22	29		---	
230	6	9	13	16	23	30	---	---	
240	6	9	13	16	23	30	---	---	
250	6	9	13	16	23	30	---	---	
260	6	10	13	16	23	30	---	---	
270	6	10	13	17	24	31	---	---	
280	6	10	13	17	24	31	---	---	
290	6	10	13	17	24	31	---	---	
300	6	10	13	17	24	31	---	---	
Minimum thickness (mm) of product to keep the profile temperature below 500°C									

Note: The cursive figures correspond to extrapolated values.



Section factor (m <sup>-1</sup> )	Classification of Fire Resistance						550°C		
	R15	R30	R45	R60	R90	R120	R180	R240	
≤ 65	6	6	6	7	12	16	24	33	
70	6	6	6	8	12	17	25	34	
75	6	6	6	8	13	17	26	35	
80	6	6	7	9	13	18	27	36	
85	6	6	7	9	14	19	28	38	
90	6	6	7	10	14	19	29	39	
95	6	6	7	10	15	20	30	40	
100	6	6	8	10	15	20	30	41	
110	6	6	8	11	16	21	32	42	
120	6	6	9	11	17	22	33		
130	6	6	9	12	17	23	34	---	
140	6	7	9	12	18	24	35	---	
150	6	7	10	13	19	24	36	---	
160	6	7	10	13	19	25	37	---	
170	6	7	10	13	19	25	37	---	
180	6	8	11	14	20	26	38	---	
190	6	8	11	14	20	26	39	---	
200	6	8	11	14	20	27	39	---	
210	6	8	11	14	21	27	40	---	
220	6	8	11	15	21	27	40	---	
230	6	8	12	15	21	28	41	---	
240	6	9	12	15	22	28	41	---	
250	6	9	12	15	22	28	42	---	
260	6	9	12	15	22	29	42	---	
270	6	9	12	16	22	29	42	---	
280	6	9	12	16	22	29		---	
290	6	9	12	16	23	29	---	---	
300	6	9	13	16	23	30	---	---	
Minimum thickness (mm) of product to keep the profile temperature below								550°C	

Note: The cursive figures correspond to extrapolated values.



Section factor (m <sup>-1</sup> )	Classification of Fire Resistance						600°C		
	R15	R30	R45	R60	R90	R120	R180	R240	
≤ 65	6	6	6	6	10	14	22	30	
70	6	6	6	7	11	15	23	31	
75	6	6	6	7	12	16	24	33	
80	6	6	6	8	12	16	25	34	
85	6	6	6	8	13	17	26	35	
90	6	6	6	9	13	18	27	36	
95	6	6	7	9	14	18	28	37	
100	6	6	7	9	14	19	28	38	
110	6	6	7	10	15	20	30	40	
120	6	6	8	10	15	21	31	41	
130	6	6	8	11	16	21	32	42	
140	6	6	9	11	17	22	33		
150	6	6	9	12	17	23	34	---	
160	6	6	9	12	18	23	35	---	
170	6	7	9	12	18	24	35	---	
180	6	7	10	13	18	24	36	---	
190	6	7	10	13	19	25	37	---	
200	6	7	10	13	19	25	37	---	
210	6	7	10	13	19	26	38	---	
220	6	8	11	14	20	26	38	---	
230	6	8	11	14	20	26	39	---	
240	6	8	11	14	20	27	39	---	
250	6	8	11	14	21	27	39	---	
260	6	8	11	14	21	27	40	---	
270	6	8	11	15	21	27	40	---	
280	6	8	12	15	21	28	41	---	
290	6	8	12	15	21	28	41	---	
300	6	8	12	15	22	28	41	---	
Minimum thickness (mm) of product to keep the profile temperature below 600°C									

Note: The cursive figures correspond to extrapolated values.



Section factor (m <sup>-1</sup> )	Classification of Fire Resistance					650°C		
	R15	R30	R45	R60	R90	R120	R180	R240
≤ 65	6	6	6	6	9	13	20	28
70	6	6	6	6	10	14	21	29
75	6	6	6	6	10	14	22	30
80	6	6	6	7	11	15	23	31
85	6	6	6	7	11	16	24	32
90	6	6	6	8	12	16	25	33
95	6	6	6	8	12	17	26	34
100	6	6	6	8	13	17	26	35
110	6	6	6	9	14	18	28	37
120	6	6	7	9	14	19	29	39
130	6	6	7	10	15	20	30	40
140	6	6	8	10	15	21	31	41
150	6	6	8	11	16	21	32	42
160	6	6	8	11	16	22	33	
170	6	6	9	11	17	22	33	---
180	6	6	9	12	17	23	34	---
190	6	6	9	12	18	23	35	---
200	6	7	9	12	18	24	35	---
210	6	7	10	13	18	24	36	---
220	6	7	10	13	19	24	36	---
230	6	7	10	13	19	25	37	---
240	6	7	10	13	19	25	37	---
250	6	7	10	13	19	25	38	---
260	6	7	10	14	20	26	38	---
270	6	8	11	14	20	26	38	---
280	6	8	11	14	20	26	39	---
290	6	8	11	14	20	26	39	---
300	6	8	11	14	20	27	39	---
	Minimum thickness (mm) of product to keep the profile temperature below 650°C							

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

- Section Factor between 65 m<sup>-1</sup> and 300 m<sup>-1</sup>
- Protection thicknesses assessed between 6 mm and 42 mm.
- Critical temperature of 650 °C

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

- "I" and "H" section profiles
- Those profiles of different type of section to the previous ones must be assessed expressly, according to the indications shown on ANNEX B of the ENV 13381-4:2005.
- Other grades of steel in accordance to EN 10025 and EN 10113
- Columns and beams with 3 or 4 faces exposed.