



The Catalonia
Institute of Construction
Technology

Wellington 19
ES-08018 Barcelona
Tel. +34 93 309 34 04
qualprod@itec.cat
www.itec.cat



European Technical Assessment

ETA 13/1054
of 21.07.2014



General part

| | |
|--|---|
| Trade name of the construction product | Hempacore AQ 48860 |
| Product family to which the construction product belongs | Reactive coatings for fire protection of steel elements |
| Manufacturer | HEMPEL A/S Lundtoftegårdsvej 91 DK-2800 Kgs. Lyngby Denmark |
| Manufacturing plant(s) | According to Annex N kept by ITeC |
| This European Technical Assessment contains | 40 pages including 1 Annex which forms an integral part of this assessment and Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available |
| This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of | ETAG 018, Part 1 edition April 2013 and Part 2 edition November 2011, used as European Assessment Document (EAD) |
| This version replaces | ETA 13/1054, issued on 29.01.2014 |

General comments

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

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

Specific parts of the European Technical Assessment

1 Technical description of the product

Hempacore AQ 48860 is a spray-applied or, for small areas, brush-applied water based reactive coating.

The reactive coating systems for fire protection consist of the primer, the intumescent coating and, depending on the environmental use conditions, the topcoat where appropriate (see section 2).

All the systems shown in Table 1 have been assessed in this ETA under option 3, as described in the foreword of ETAG 018 Part 2.

Table 1: Components of the reactive coating system.

| Primer | Reactive coating | Topcoat |
|---|-------------------------|-------------------------------|
| Two component epoxy, e.g: Hempel's Shopprimer E 15280 ⁽¹⁾ Hempadur 15570 ⁽¹⁾ Hemudur 18500 ⁽²⁾ Hempadur 15553 ^{(1) (3)} | Hempacore AQ 48860 | Hemucryl Enamel 58100 |
| | | Hempathane fast dry 55750 |
| | | Hempathane HS 55610 |
| | | Hempathane Topcoat 55210 |
| Short/medium oil alkyd, e.g: Hempaquick primer 13300 ⁽¹⁾ Hemulin primer 18310 ⁽²⁾ | | Hempatex Hi-build 46410 |
| | | Hempatex Enamel 56360 |
| Two component Zinc rich epoxy, e.g: Hempadur Zinc 17340 ⁽¹⁾ | | Hempel's Metallic Paint 52410 |
| | | Hempathane DTM 55620 |
| Acrylic, e.g: Hempel's 17020 ⁽¹⁾ Hemucryl primer 18100 ⁽²⁾ | | Hempel's polyenamel 55102 |
| | | Hempathane HS 55810 |
| Epoxy ester, e.g: Hempel's Uniprimer 13140 ⁽¹⁾ | Hempaquick enamel 53840 | |
| | Hempalin enamel 52140 | |

⁽¹⁾ solvent borne
⁽²⁾ water borne
⁽³⁾ only intended for applications on galvanised steel

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

Hempacore AQ 48860 is used as reactive coating system to fire protect beams and columns made of structural steel to achieve a fire resistance duration in accordance with EN 13501-2¹.

Hempacore AQ 48860 is intended to fire protect various sizes of open sections (H and I) and rectangular and circular hollow columns for up to a fire resistance classification in accordance with Annex 1, in the design temperatures range of 350 °C to 750 °C. The detailed field of application regarding fire protection of Hempacore AQ 48860 is given in Annex 1.

Regarding the environmental use conditions, the reactive coating systems are intended for the following uses:

- Hempacore AQ 48860 systems with a topcoat as defined in Table 1: use category Type Y
- Hempacore AQ 48860 systems without topcoat: use category Type Z₁

¹ EN 13501-2: 2007+A1:2009. Fire classification of construction products and building elements Part 2: Classification using data from fire resistance tests, excluding ventilation services implemented.

The environmental use categories are specified in ETAG 018 Part 2, section 2.2.2:

- Type Y: internal use and semi-exposed conditions (including Type Z₁ and Type Z₂)
- Type Z₁: internal use with high humidity conditions (including Type Z₂)
- Type Z₂: internal use

The provisions made in this ETA are based on an assumed working life of the reactive coating Hempacore AQ 48860 for fire protection of at least 10 years, provided that the conditions laid down in the manufacturer's instructions for the installation, use and maintenance are met. These provisions are based upon the current state of the art and the available knowledge and experience.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee, but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

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

3.1 Performance of the product

The assessment of the Hempacore AQ 48860 for the intended use considering the basic requirements for construction works 2 and 3 was performed following the ETAG 018 for *Fire Protective Products, Part 1: General (April 2013) and Part 2: Reactive coatings for fire protection of steel elements (November 2011)*, used as EAD.

Table 2: Performance of the product.

| Product: Hempacore AQ 48860 | | Intended use: Fire protection of structural steel members | |
|--|---------------------------------|---|---------------------|
| Basic requirement | Essential characteristic | Performance | |
| BWR 2 Safety in case of fire | Reaction to fire | B-s1,d0 | |
| | Resistance to fire | See Annex 1 | |
| | Smouldering fire exposure | Compliance with EN 13381-8 | |
| BWR 3 Hygiene, health and the environment | Release of dangerous substances | No dangerous substances (see 3.1.4) | |
| General aspects relating to the performance of the product | Durability | with topcoat acc. to Table 1 | Type Y |
| | | without topcoat | Type Z ₁ |

3.2 Methods used for the assessment

3.2.1 Reaction to fire

The performance of the reactive coating system, including all the primers and topcoats listed in Table 1, has been determined according to EN 13501-1². The given Class applies to reactive coating systems on substrates of structural steel (S designation) and stainless steel.

² EN 13501-1: 2007+A1:2009. *Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests implemented.*

3.2.2 Fire resistance

Tested and assessed according to EN 13381-8³, the fire resistance classes have been defined according to EN 13501-2.

3.2.3 Smouldering fire exposure

The verification under exposure to the smouldering fire curve according to EN 13381-8, Annex A, has been carried out and the product meets the requirements established in EN 13381-8.

3.2.4 Release of dangerous substances

According to the manufacturer's declaration, the specification of Hempacore AQ 48860 has been compared with the regulated dangerous substances listed on the database established on the EC construction website, with the "Indicative list of regulated dangerous substances possibly associated with construction products under the CPD, DS 041/051 Rev.12, 22 March 2012" of the EC Experts Group, with Annex XVII and Annex XIV of REACH and with the ECHA *Candidate List of Substances of Very High Concern* to verify that the product does not contain such substances.

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

3.2.5 General aspects relating to the performance of the product

The primers indicated in Table 1, or other compatible primers of the same family as specified by the manufacturer, are compatible with the reactive coating in accordance with ETAG 018, Part 2, section 5.7.2.2.

Substrates of galvanised steel according to EN ISO 1461⁴ primed with Hempadur 15553, as well as substrates of stainless steel according to EN 10088⁵ and of TSA steel, both primed with Hempadur 15570, are compatible with the reactive coating in accordance with ETAG 018, Part 2, section 5.7.2.2.

The topcoats indicated in Table 1 are compatible with the reactive coating and intended for the environmental use category Type Y, as well as the reactive coating system without topcoat is intended for use category Type Z₁, in accordance with ETAG 018, Part 2, section 5.7.2.2.

The ETA is issued for the system on the basis of agreed data/information, deposited with the ITeC, which identifies the system components that have been assessed. Identification tests according to ETAG 018 Part 2, section 5.7.3, have been carried out on components, which confirm that the system under assessment conforms to its declared characteristics.

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

According to the decision 1999/454/EC⁶ of the European Commission, the system of AVCP (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) 305/2011) given in the following table applies.

³ EN 13381-8:2013. *Test methods for determining the contribution to the fire resistance of structural members. Part 8: Applied reactive protection to steel members.*

⁴ EN ISO 1461: 2009. *Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods.*

⁵ EN 10088-1 to 5: 2005-2009. *Stainless steels.*

⁶ Official Journal of the European Communities N° L178, 14.7.1999, p. 52.

Table 3: AVCP System.

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

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

All the necessary technical details for the implementation of the AVCP system are laid down in the *Control Plan* deposited with the ITeC⁷ and the factory production control shall be in accordance with it. The following table specifies properties that should be controlled and minimum frequencies of control.

Table 4: FPC test plan for Hempacore AQ 48860.

| Property | Control | Acceptance | Minimum frequency |
|-----------------------|---|------------------------------|-------------------|
| Incoming material | QC certificate check | Manufacturer's specification | Every delivery |
| Fineness of grinding | Internal procedure | Manufacturer's specification | Every batch |
| Specific gravity | Internal procedure | Manufacturer's specification | Every batch |
| Sag resistance | Internal procedure | Manufacturer's specification | Every batch |
| Viscosity | Internal procedure | Manufacturer's specification | Every batch |
| Drying | Internal procedure | Manufacturer's specification | Every batch |
| Non-volatile content | Internal procedure | Manufacturer's specification | Every batch |
| Char depth | Internal procedure | Manufacturer's specification | Every batch |
| Insulating efficiency | Internal procedure according to Annex A of ETAG 018-2 | Manufacturer's specification | Every batch |

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by the Catalonia Institute of Construction Technology.



Ferran Bermejo Nualart
Technical Director, ITeC

⁷ The *Control Plan* is a confidential part of the ETA and only handed over to the notified product certification body involved in the assessment and verification of constancy of performance.

ANNEX 1. Product performance: Fire resistance

1. This Annex relates to the use of Hempacore AQ 48860 for the fire protection of:
 - open sections ('H' and 'I' shaped) steel beams (see Tables A1.1 to A1.11),
 - open sections ('H' and 'I' shaped) steel columns (see Tables A1.12 to A1.22),
 - rectangular and circular hollow steel columns (see Tables A1.23 to A1.33).

The precise scope is given in the tables which specify the dry film thickness of intumescent coating (without primer and topcoat) required to achieve the classification R for various design temperatures and section factors.

2. The product is assessed on the basis of:
 - Testing in accordance with EN 13381-8 and ETAG 018, Part 1 and 2.
 - Design of the dry film thickness of intumescent coating for the fire protection of open sections following the graphical analysis in accordance with Annex E of EN 13381-8:2013.
 - Design of the dry film thickness of intumescent coating for the fire protection of hollow sections following the numerical regression analysis in accordance with Annex E of EN 13381-8:2013.
3. The data presented in this Annex for beams refer to a three-sided fire exposure and for columns to a four-sided fire exposure.
4. Dry film thickness (DFT) of Hempacore AQ 48860 for 4-sided open beams can be applied according to the Tables A1.12 to A1.22 in this Annex (columns, 4-sided open H- or I-sections), up to the maximum DFT of 1,053 mm.
5. The data presented in this Annex are applicable to structural steel (S designation) sections in accordance with EN 10025⁸, excluding S185, blast cleaned to ISO 8501-1 Sa 2 ½ or equivalent, primed with the compatible primers in accordance with clause 3.1.5. The data are also applicable to structural galvanised steel according to EN ISO 1461 primed with Hempadur 15553, as well as to structural stainless steel according to EN 10088 and thermally sprayed aluminium steel, both primed with Hempadur 15570.
6. The data are applicable to assemblies with or without topcoat.
7. The thicknesses given for open H- and I-sections also apply to steel sections of other shapes, e.g. U, L and T-sections under consideration of the same A/V value.
8. The application of the reactive coating on steel tension members made of structural steel in accordance with EN 10025 is not assessed by this ETA.

⁸ EN 10025-1 to 6: 2004-2005. *Hot rolled products of structural steels.*

Table A1.1: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 350 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,266 | 0,472 | 0,746 | - | - | - |
| 70 | 0,208 | 0,298 | 0,517 | 0,869 | - | - | - |
| 80 | 0,208 | 0,330 | 0,563 | 0,996 | - | - | - |
| 90 | 0,208 | 0,362 | 0,608 | - | - | - | - |
| 100 | 0,208 | 0,394 | 0,653 | - | - | - | - |
| 110 | 0,208 | 0,426 | 0,698 | - | - | - | - |
| 120 | 0,208 | 0,458 | 0,743 | - | - | - | - |
| 130 | 0,208 | 0,483 | 0,791 | - | - | - | - |
| 140 | 0,208 | 0,507 | 0,843 | - | - | - | - |
| 150 | 0,208 | 0,531 | 0,894 | - | - | - | - |
| 160 | 0,208 | 0,556 | 0,946 | - | - | - | - |
| 170 | 0,208 | 0,580 | 0,998 | - | - | - | - |
| 180 | 0,208 | 0,604 | 1,049 | - | - | - | - |
| 190 | 0,217 | 0,629 | - | - | - | - | - |
| 200 | 0,228 | 0,653 | - | - | - | - | - |
| 210 | 0,240 | 0,678 | - | - | - | - | - |
| 220 | 0,251 | 0,702 | - | - | - | - | - |
| 230 | 0,263 | 0,726 | - | - | - | - | - |
| 240 | 0,274 | 0,751 | - | - | - | - | - |
| 250 | 0,285 | 0,778 | - | - | - | - | - |
| 260 | 0,297 | 0,822 | - | - | - | - | - |
| 270 | 0,308 | 0,867 | - | - | - | - | - |
| 280 | 0,319 | 0,911 | - | - | - | - | - |
| 290 | 0,331 | 0,955 | - | - | - | - | - |
| 300 | 0,342 | 0,999 | - | - | - | - | - |
| 310 | 0,354 | 1,043 | - | - | - | - | - |
| 320 | 0,365 | - | - | - | - | - | - |

Table A1.2: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 400 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,341 | 0,492 | - | - | - |
| 70 | 0,208 | 0,208 | 0,379 | 0,539 | - | - | - |
| 80 | 0,208 | 0,220 | 0,416 | 0,587 | - | - | - |
| 90 | 0,208 | 0,236 | 0,453 | 0,635 | - | - | - |
| 100 | 0,208 | 0,252 | 0,481 | 0,682 | - | - | - |
| 110 | 0,208 | 0,268 | 0,507 | 0,730 | - | - | - |
| 120 | 0,208 | 0,284 | 0,534 | 0,780 | - | - | - |
| 130 | 0,208 | 0,301 | 0,560 | 0,843 | - | - | - |
| 140 | 0,208 | 0,317 | 0,586 | 0,905 | - | - | - |
| 150 | 0,208 | 0,333 | 0,613 | 0,968 | - | - | - |
| 160 | 0,208 | 0,349 | 0,639 | 1,031 | - | - | - |
| 170 | 0,208 | 0,365 | 0,665 | - | - | - | - |
| 180 | 0,208 | 0,381 | 0,692 | - | - | - | - |
| 190 | 0,208 | 0,397 | 0,718 | - | - | - | - |
| 200 | 0,208 | 0,413 | 0,744 | - | - | - | - |
| 210 | 0,208 | 0,429 | 0,771 | - | - | - | - |
| 220 | 0,208 | 0,445 | 0,816 | - | - | - | - |
| 230 | 0,208 | 0,464 | 0,862 | - | - | - | - |
| 240 | 0,208 | 0,495 | 0,908 | - | - | - | - |
| 250 | 0,208 | 0,526 | 0,954 | - | - | - | - |
| 260 | 0,210 | 0,557 | 1,000 | - | - | - | - |
| 270 | 0,218 | 0,589 | 1,046 | - | - | - | - |
| 280 | 0,226 | 0,620 | - | - | - | - | - |
| 290 | 0,234 | 0,651 | - | - | - | - | - |
| 300 | 0,243 | 0,682 | - | - | - | - | - |
| 310 | 0,251 | 0,714 | - | - | - | - | - |
| 320 | 0,259 | 0,745 | - | - | - | - | - |

Table A1.3: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 450 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,272 | 0,406 | 0,717 | - | - |
| 70 | 0,208 | 0,208 | 0,296 | 0,450 | 0,839 | - | - |
| 80 | 0,208 | 0,208 | 0,321 | 0,482 | 1,003 | - | - |
| 90 | 0,208 | 0,208 | 0,345 | 0,513 | - | - | - |
| 100 | 0,208 | 0,208 | 0,369 | 0,543 | - | - | - |
| 110 | 0,208 | 0,208 | 0,394 | 0,573 | - | - | - |
| 120 | 0,208 | 0,218 | 0,418 | 0,603 | - | - | - |
| 130 | 0,208 | 0,230 | 0,443 | 0,634 | - | - | - |
| 140 | 0,208 | 0,241 | 0,467 | 0,664 | - | - | - |
| 150 | 0,208 | 0,252 | 0,492 | 0,694 | - | - | - |
| 160 | 0,208 | 0,263 | 0,517 | 0,724 | - | - | - |
| 170 | 0,208 | 0,275 | 0,543 | 0,754 | - | - | - |
| 180 | 0,208 | 0,286 | 0,568 | 0,793 | - | - | - |
| 190 | 0,208 | 0,297 | 0,593 | 0,841 | - | - | - |
| 200 | 0,208 | 0,308 | 0,618 | 0,889 | - | - | - |
| 210 | 0,208 | 0,320 | 0,643 | 0,937 | - | - | - |
| 220 | 0,208 | 0,331 | 0,668 | 0,986 | - | - | - |
| 230 | 0,208 | 0,342 | 0,693 | 1,034 | - | - | - |
| 240 | 0,208 | 0,353 | 0,719 | - | - | - | - |
| 250 | 0,208 | 0,365 | 0,744 | - | - | - | - |
| 260 | 0,208 | 0,376 | 0,769 | - | - | - | - |
| 270 | 0,208 | 0,387 | 0,813 | - | - | - | - |
| 280 | 0,208 | 0,398 | 0,860 | - | - | - | - |
| 290 | 0,208 | 0,410 | 0,906 | - | - | - | - |
| 300 | 0,208 | 0,421 | 0,953 | - | - | - | - |
| 310 | 0,208 | 0,432 | 0,999 | - | - | - | - |
| 320 | 0,209 | 0,443 | 1,046 | - | - | - | - |

Table A1.4: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 500 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,212 | 0,324 | 0,564 | - | - |
| 70 | 0,208 | 0,208 | 0,229 | 0,357 | 0,622 | - | - |
| 80 | 0,208 | 0,208 | 0,245 | 0,389 | 0,680 | - | - |
| 90 | 0,208 | 0,208 | 0,262 | 0,422 | 0,738 | - | - |
| 100 | 0,208 | 0,208 | 0,278 | 0,454 | 0,826 | - | - |
| 110 | 0,208 | 0,208 | 0,295 | 0,480 | 0,952 | - | - |
| 120 | 0,208 | 0,208 | 0,311 | 0,506 | - | - | - |
| 130 | 0,208 | 0,208 | 0,327 | 0,531 | - | - | - |
| 140 | 0,208 | 0,208 | 0,344 | 0,557 | - | - | - |
| 150 | 0,208 | 0,208 | 0,360 | 0,582 | - | - | - |
| 160 | 0,208 | 0,208 | 0,377 | 0,608 | - | - | - |
| 170 | 0,208 | 0,208 | 0,393 | 0,633 | - | - | - |
| 180 | 0,208 | 0,211 | 0,410 | 0,659 | - | - | - |
| 190 | 0,208 | 0,222 | 0,426 | 0,684 | - | - | - |
| 200 | 0,208 | 0,233 | 0,443 | 0,710 | - | - | - |
| 210 | 0,208 | 0,244 | 0,460 | 0,735 | - | - | - |
| 220 | 0,208 | 0,255 | 0,492 | 0,760 | - | - | - |
| 230 | 0,208 | 0,266 | 0,525 | 0,807 | - | - | - |
| 240 | 0,208 | 0,277 | 0,557 | 0,867 | - | - | - |
| 250 | 0,208 | 0,288 | 0,589 | 0,928 | - | - | - |
| 260 | 0,208 | 0,299 | 0,622 | 0,988 | - | - | - |
| 270 | 0,208 | 0,310 | 0,654 | 1,049 | - | - | - |
| 280 | 0,208 | 0,321 | 0,686 | - | - | - | - |
| 290 | 0,208 | 0,332 | 0,719 | - | - | - | - |
| 300 | 0,208 | 0,343 | 0,751 | - | - | - | - |
| 310 | 0,208 | 0,354 | 0,789 | - | - | - | - |
| 320 | 0,208 | 0,365 | 0,835 | - | - | - | - |

Table A1.5: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 520 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,208 | 0,300 | 0,530 | - | - |
| 70 | 0,208 | 0,208 | 0,211 | 0,328 | 0,579 | - | - |
| 80 | 0,208 | 0,208 | 0,225 | 0,357 | 0,629 | - | - |
| 90 | 0,208 | 0,208 | 0,239 | 0,385 | 0,679 | - | - |
| 100 | 0,208 | 0,208 | 0,253 | 0,414 | 0,728 | - | - |
| 110 | 0,208 | 0,208 | 0,266 | 0,442 | 0,786 | - | - |
| 120 | 0,208 | 0,208 | 0,280 | 0,469 | 0,895 | - | - |
| 130 | 0,208 | 0,208 | 0,294 | 0,495 | 1,003 | - | - |
| 140 | 0,208 | 0,208 | 0,308 | 0,520 | - | - | - |
| 150 | 0,208 | 0,208 | 0,322 | 0,546 | - | - | - |
| 160 | 0,208 | 0,208 | 0,336 | 0,571 | - | - | - |
| 170 | 0,208 | 0,208 | 0,350 | 0,596 | - | - | - |
| 180 | 0,208 | 0,208 | 0,363 | 0,622 | - | - | - |
| 190 | 0,208 | 0,208 | 0,377 | 0,647 | - | - | - |
| 200 | 0,208 | 0,208 | 0,391 | 0,673 | - | - | - |
| 210 | 0,208 | 0,219 | 0,405 | 0,698 | - | - | - |
| 220 | 0,208 | 0,230 | 0,419 | 0,724 | - | - | - |
| 230 | 0,208 | 0,241 | 0,433 | 0,749 | - | - | - |
| 240 | 0,208 | 0,251 | 0,446 | 0,779 | - | - | - |
| 250 | 0,208 | 0,262 | 0,465 | 0,840 | - | - | - |
| 260 | 0,208 | 0,273 | 0,506 | 0,900 | - | - | - |
| 270 | 0,208 | 0,283 | 0,547 | 0,960 | - | - | - |
| 280 | 0,208 | 0,294 | 0,588 | 1,021 | - | - | - |
| 290 | 0,208 | 0,305 | 0,629 | - | - | - | - |
| 300 | 0,208 | 0,316 | 0,670 | - | - | - | - |
| 310 | 0,208 | 0,326 | 0,711 | - | - | - | - |
| 320 | 0,208 | 0,337 | 0,752 | - | - | - | - |

Table A1.6: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 550 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,208 | 0,271 | 0,486 | 0,779 | - |
| 70 | 0,208 | 0,208 | 0,208 | 0,294 | 0,528 | 1,022 | - |
| 80 | 0,208 | 0,208 | 0,208 | 0,317 | 0,570 | - | - |
| 90 | 0,208 | 0,208 | 0,216 | 0,340 | 0,611 | - | - |
| 100 | 0,208 | 0,208 | 0,227 | 0,362 | 0,653 | - | - |
| 110 | 0,208 | 0,208 | 0,239 | 0,385 | 0,694 | - | - |
| 120 | 0,208 | 0,208 | 0,250 | 0,408 | 0,736 | - | - |
| 130 | 0,208 | 0,208 | 0,262 | 0,431 | 0,785 | - | - |
| 140 | 0,208 | 0,208 | 0,273 | 0,453 | 0,871 | - | - |
| 150 | 0,208 | 0,208 | 0,285 | 0,479 | 0,958 | - | - |
| 160 | 0,208 | 0,208 | 0,296 | 0,506 | 1,045 | - | - |
| 170 | 0,208 | 0,208 | 0,308 | 0,533 | - | - | - |
| 180 | 0,208 | 0,208 | 0,319 | 0,559 | - | - | - |
| 190 | 0,208 | 0,208 | 0,330 | 0,586 | - | - | - |
| 200 | 0,208 | 0,208 | 0,342 | 0,613 | - | - | - |
| 210 | 0,208 | 0,208 | 0,353 | 0,640 | - | - | - |
| 220 | 0,208 | 0,213 | 0,365 | 0,666 | - | - | - |
| 230 | 0,208 | 0,222 | 0,376 | 0,693 | - | - | - |
| 240 | 0,208 | 0,232 | 0,388 | 0,720 | - | - | - |
| 250 | 0,208 | 0,241 | 0,399 | 0,746 | - | - | - |
| 260 | 0,208 | 0,251 | 0,410 | 0,774 | - | - | - |
| 270 | 0,208 | 0,260 | 0,422 | 0,818 | - | - | - |
| 280 | 0,208 | 0,270 | 0,433 | 0,863 | - | - | - |
| 290 | 0,208 | 0,280 | 0,445 | 0,907 | - | - | - |
| 300 | 0,208 | 0,289 | 0,456 | 0,951 | - | - | - |
| 310 | 0,208 | 0,299 | 0,508 | 0,995 | - | - | - |
| 320 | 0,208 | 0,308 | 0,567 | 1,039 | - | - | - |

Table A1.7: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 600 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,208 | 0,228 | 0,437 | 0,654 | - |
| 70 | 0,208 | 0,208 | 0,208 | 0,247 | 0,476 | 0,722 | - |
| 80 | 0,208 | 0,208 | 0,208 | 0,265 | 0,508 | 0,812 | - |
| 90 | 0,208 | 0,208 | 0,208 | 0,283 | 0,539 | 0,952 | - |
| 100 | 0,208 | 0,208 | 0,208 | 0,302 | 0,571 | - | - |
| 110 | 0,208 | 0,208 | 0,208 | 0,320 | 0,602 | - | - |
| 120 | 0,208 | 0,208 | 0,208 | 0,339 | 0,634 | - | - |
| 130 | 0,208 | 0,208 | 0,214 | 0,357 | 0,665 | - | - |
| 140 | 0,208 | 0,208 | 0,226 | 0,375 | 0,697 | - | - |
| 150 | 0,208 | 0,208 | 0,238 | 0,394 | 0,728 | - | - |
| 160 | 0,208 | 0,208 | 0,250 | 0,412 | 0,760 | - | - |
| 170 | 0,208 | 0,208 | 0,262 | 0,430 | 0,810 | - | - |
| 180 | 0,208 | 0,208 | 0,274 | 0,449 | 0,869 | - | - |
| 190 | 0,208 | 0,208 | 0,286 | 0,472 | 0,928 | - | - |
| 200 | 0,208 | 0,208 | 0,298 | 0,501 | 0,988 | - | - |
| 210 | 0,208 | 0,208 | 0,310 | 0,529 | 1,047 | - | - |
| 220 | 0,208 | 0,208 | 0,322 | 0,557 | - | - | - |
| 230 | 0,208 | 0,208 | 0,334 | 0,586 | - | - | - |
| 240 | 0,208 | 0,208 | 0,347 | 0,614 | - | - | - |
| 250 | 0,208 | 0,208 | 0,359 | 0,643 | - | - | - |
| 260 | 0,208 | 0,213 | 0,371 | 0,671 | - | - | - |
| 270 | 0,208 | 0,222 | 0,383 | 0,699 | - | - | - |
| 280 | 0,208 | 0,231 | 0,395 | 0,728 | - | - | - |
| 290 | 0,208 | 0,240 | 0,407 | 0,756 | - | - | - |
| 300 | 0,208 | 0,248 | 0,419 | 0,787 | - | - | - |
| 310 | 0,208 | 0,257 | 0,431 | 0,821 | - | - | - |
| 320 | 0,208 | 0,266 | 0,443 | 0,855 | - | - | - |

Table A1.8: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 620 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,208 | 0,208 | 0,401 | 0,614 | - |
| 70 | 0,208 | 0,208 | 0,208 | 0,223 | 0,446 | 0,674 | - |
| 80 | 0,208 | 0,208 | 0,208 | 0,239 | 0,480 | 0,734 | - |
| 90 | 0,208 | 0,208 | 0,208 | 0,255 | 0,509 | 0,819 | - |
| 100 | 0,208 | 0,208 | 0,208 | 0,271 | 0,539 | 0,947 | - |
| 110 | 0,208 | 0,208 | 0,208 | 0,287 | 0,568 | - | - |
| 120 | 0,208 | 0,208 | 0,208 | 0,304 | 0,597 | - | - |
| 130 | 0,208 | 0,208 | 0,208 | 0,320 | 0,627 | - | - |
| 140 | 0,208 | 0,208 | 0,208 | 0,336 | 0,656 | - | - |
| 150 | 0,208 | 0,208 | 0,209 | 0,352 | 0,686 | - | - |
| 160 | 0,208 | 0,208 | 0,221 | 0,368 | 0,715 | - | - |
| 170 | 0,208 | 0,208 | 0,233 | 0,385 | 0,744 | - | - |
| 180 | 0,208 | 0,208 | 0,246 | 0,401 | 0,776 | - | - |
| 190 | 0,208 | 0,208 | 0,258 | 0,417 | 0,831 | - | - |
| 200 | 0,208 | 0,208 | 0,270 | 0,433 | 0,885 | - | - |
| 210 | 0,208 | 0,208 | 0,283 | 0,449 | 0,940 | - | - |
| 220 | 0,208 | 0,208 | 0,295 | 0,473 | 0,995 | - | - |
| 230 | 0,208 | 0,208 | 0,307 | 0,506 | 1,049 | - | - |
| 240 | 0,208 | 0,208 | 0,320 | 0,539 | - | - | - |
| 250 | 0,208 | 0,208 | 0,332 | 0,572 | - | - | - |
| 260 | 0,208 | 0,208 | 0,345 | 0,605 | - | - | - |
| 270 | 0,208 | 0,208 | 0,357 | 0,638 | - | - | - |
| 280 | 0,208 | 0,210 | 0,369 | 0,670 | - | - | - |
| 290 | 0,208 | 0,218 | 0,382 | 0,703 | - | - | - |
| 300 | 0,208 | 0,227 | 0,394 | 0,736 | - | - | - |
| 310 | 0,208 | 0,235 | 0,406 | 0,769 | - | - | - |
| 320 | 0,208 | 0,243 | 0,419 | 0,801 | - | - | - |

Table A1.9: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 650 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,208 | 0,208 | 0,358 | 0,563 | - |
| 70 | 0,208 | 0,208 | 0,208 | 0,208 | 0,396 | 0,615 | - |
| 80 | 0,208 | 0,208 | 0,208 | 0,217 | 0,435 | 0,668 | - |
| 90 | 0,208 | 0,208 | 0,208 | 0,230 | 0,469 | 0,720 | - |
| 100 | 0,208 | 0,208 | 0,208 | 0,244 | 0,496 | 0,773 | - |
| 110 | 0,208 | 0,208 | 0,208 | 0,258 | 0,524 | 0,874 | - |
| 120 | 0,208 | 0,208 | 0,208 | 0,272 | 0,551 | 0,975 | - |
| 130 | 0,208 | 0,208 | 0,208 | 0,285 | 0,578 | - | - |
| 140 | 0,208 | 0,208 | 0,208 | 0,299 | 0,606 | - | - |
| 150 | 0,208 | 0,208 | 0,208 | 0,313 | 0,633 | - | - |
| 160 | 0,208 | 0,208 | 0,208 | 0,327 | 0,661 | - | - |
| 170 | 0,208 | 0,208 | 0,208 | 0,340 | 0,688 | - | - |
| 180 | 0,208 | 0,208 | 0,218 | 0,354 | 0,716 | - | - |
| 190 | 0,208 | 0,208 | 0,229 | 0,368 | 0,743 | - | - |
| 200 | 0,208 | 0,208 | 0,241 | 0,382 | 0,771 | - | - |
| 210 | 0,208 | 0,208 | 0,253 | 0,396 | 0,821 | - | - |
| 220 | 0,208 | 0,208 | 0,264 | 0,409 | 0,870 | - | - |
| 230 | 0,208 | 0,208 | 0,276 | 0,423 | 0,920 | - | - |
| 240 | 0,208 | 0,208 | 0,287 | 0,437 | 0,970 | - | - |
| 250 | 0,208 | 0,208 | 0,299 | 0,451 | 1,020 | - | - |
| 260 | 0,208 | 0,208 | 0,311 | 0,477 | - | - | - |
| 270 | 0,208 | 0,208 | 0,322 | 0,517 | - | - | - |
| 280 | 0,208 | 0,208 | 0,334 | 0,557 | - | - | - |
| 290 | 0,208 | 0,208 | 0,346 | 0,597 | - | - | - |
| 300 | 0,208 | 0,208 | 0,357 | 0,637 | - | - | - |
| 310 | 0,208 | 0,212 | 0,369 | 0,677 | - | - | - |
| 320 | 0,208 | 0,219 | 0,381 | 0,717 | - | - | - |

Table A1.10: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 700 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,208 | 0,208 | 0,297 | 0,497 | - |
| 70 | 0,208 | 0,208 | 0,208 | 0,208 | 0,328 | 0,536 | - |
| 80 | 0,208 | 0,208 | 0,208 | 0,208 | 0,359 | 0,576 | - |
| 90 | 0,208 | 0,208 | 0,208 | 0,208 | 0,390 | 0,615 | - |
| 100 | 0,208 | 0,208 | 0,208 | 0,208 | 0,420 | 0,654 | - |
| 110 | 0,208 | 0,208 | 0,208 | 0,208 | 0,451 | 0,694 | - |
| 120 | 0,208 | 0,208 | 0,208 | 0,219 | 0,478 | 0,733 | - |
| 130 | 0,208 | 0,208 | 0,208 | 0,232 | 0,503 | 0,774 | - |
| 140 | 0,208 | 0,208 | 0,208 | 0,245 | 0,529 | 0,867 | - |
| 150 | 0,208 | 0,208 | 0,208 | 0,259 | 0,554 | 0,959 | - |
| 160 | 0,208 | 0,208 | 0,208 | 0,272 | 0,580 | 1,052 | - |
| 170 | 0,208 | 0,208 | 0,208 | 0,286 | 0,605 | - | - |
| 180 | 0,208 | 0,208 | 0,208 | 0,299 | 0,631 | - | - |
| 190 | 0,208 | 0,208 | 0,208 | 0,313 | 0,657 | - | - |
| 200 | 0,208 | 0,208 | 0,208 | 0,326 | 0,682 | - | - |
| 210 | 0,208 | 0,208 | 0,208 | 0,339 | 0,708 | - | - |
| 220 | 0,208 | 0,208 | 0,214 | 0,353 | 0,733 | - | - |
| 230 | 0,208 | 0,208 | 0,226 | 0,366 | 0,759 | - | - |
| 240 | 0,208 | 0,208 | 0,237 | 0,380 | 0,813 | - | - |
| 250 | 0,208 | 0,208 | 0,249 | 0,393 | 0,894 | - | - |
| 260 | 0,208 | 0,208 | 0,260 | 0,406 | 0,975 | - | - |
| 270 | 0,208 | 0,208 | 0,271 | 0,420 | - | - | - |
| 280 | 0,208 | 0,208 | 0,283 | 0,433 | - | - | - |
| 290 | 0,208 | 0,208 | 0,294 | 0,447 | - | - | - |
| 300 | 0,208 | 0,208 | 0,306 | 0,464 | - | - | - |
| 310 | 0,208 | 0,208 | 0,317 | 0,502 | - | - | - |
| 320 | 0,208 | 0,208 | 0,329 | 0,539 | - | - | - |

Table A1.11: Beams, 3-sided H- or I- sections.

| Section Factor | Design Temperature 750 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 60 | 0,208 | 0,208 | 0,208 | 0,208 | 0,244 | 0,418 | 0,954 |
| 70 | 0,208 | 0,208 | 0,208 | 0,208 | 0,267 | 0,466 | - |
| 80 | 0,208 | 0,208 | 0,208 | 0,208 | 0,290 | 0,498 | - |
| 90 | 0,208 | 0,208 | 0,208 | 0,208 | 0,312 | 0,531 | - |
| 100 | 0,208 | 0,208 | 0,208 | 0,208 | 0,335 | 0,564 | - |
| 110 | 0,208 | 0,208 | 0,208 | 0,208 | 0,358 | 0,596 | - |
| 120 | 0,208 | 0,208 | 0,208 | 0,208 | 0,381 | 0,629 | - |
| 130 | 0,208 | 0,208 | 0,208 | 0,208 | 0,404 | 0,662 | - |
| 140 | 0,208 | 0,208 | 0,208 | 0,208 | 0,427 | 0,694 | - |
| 150 | 0,208 | 0,208 | 0,208 | 0,208 | 0,450 | 0,727 | - |
| 160 | 0,208 | 0,208 | 0,208 | 0,222 | 0,476 | 0,759 | - |
| 170 | 0,208 | 0,208 | 0,208 | 0,235 | 0,504 | 0,947 | - |
| 180 | 0,208 | 0,208 | 0,208 | 0,249 | 0,533 | - | - |
| 190 | 0,208 | 0,208 | 0,208 | 0,262 | 0,561 | - | - |
| 200 | 0,208 | 0,208 | 0,208 | 0,275 | 0,589 | - | - |
| 210 | 0,208 | 0,208 | 0,208 | 0,289 | 0,617 | - | - |
| 220 | 0,208 | 0,208 | 0,208 | 0,302 | 0,645 | - | - |
| 230 | 0,208 | 0,208 | 0,208 | 0,316 | 0,674 | - | - |
| 240 | 0,208 | 0,208 | 0,208 | 0,329 | 0,702 | - | - |
| 250 | 0,208 | 0,208 | 0,208 | 0,343 | 0,730 | - | - |
| 260 | 0,208 | 0,208 | 0,214 | 0,356 | 0,758 | - | - |
| 270 | 0,208 | 0,208 | 0,224 | 0,369 | 0,965 | - | - |
| 280 | 0,208 | 0,208 | 0,234 | 0,383 | - | - | - |
| 290 | 0,208 | 0,208 | 0,243 | 0,396 | - | - | - |
| 300 | 0,208 | 0,208 | 0,253 | 0,410 | - | - | - |
| 310 | 0,208 | 0,208 | 0,263 | 0,423 | - | - | - |
| 320 | 0,208 | 0,208 | 0,272 | 0,437 | - | - | - |

Table A1.12: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 350 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,285 | 0,519 | 0,979 | - | - | - |
| 80 | 0,219 | 0,311 | 0,588 | 1,157 | - | - | - |
| 90 | 0,219 | 0,337 | 0,658 | 1,211 | - | - | - |
| 100 | 0,219 | 0,362 | 0,726 | 1,264 | - | - | - |
| 110 | 0,219 | 0,388 | 0,795 | - | - | - | - |
| 120 | 0,219 | 0,413 | 0,863 | - | - | - | - |
| 130 | 0,222 | 0,439 | 0,931 | - | - | - | - |
| 140 | 0,233 | 0,464 | 1,000 | - | - | - | - |
| 150 | 0,244 | 0,490 | 1,068 | - | - | - | - |
| 160 | 0,255 | 0,640 | 1,134 | - | - | - | - |
| 170 | 0,266 | 0,682 | 1,187 | - | - | - | - |
| 180 | 0,277 | 0,714 | 1,240 | - | - | - | - |
| 190 | 0,288 | 0,745 | - | - | - | - | - |
| 200 | 0,299 | 0,777 | - | - | - | - | - |
| 210 | 0,310 | 0,809 | - | - | - | - | - |
| 220 | 0,321 | 0,840 | - | - | - | - | - |
| 230 | 0,332 | 0,872 | - | - | - | - | - |
| 240 | 0,343 | 0,904 | - | - | - | - | - |
| 250 | 0,354 | 0,935 | - | - | - | - | - |
| 260 | 0,365 | 0,967 | - | - | - | - | - |
| 270 | 0,376 | 0,998 | - | - | - | - | - |
| 280 | 0,387 | 1,030 | - | - | - | - | - |
| 290 | 0,398 | 1,062 | - | - | - | - | - |
| 300 | 0,409 | 1,093 | - | - | - | - | - |
| 310 | 0,420 | 1,114 | - | - | - | - | - |
| 320 | 0,431 | 1,012 | - | - | - | - | - |
| 330 | 0,442 | 0,910 | - | - | - | - | - |
| 340 | 0,453 | 0,807 | - | - | - | - | - |
| 350 | 0,464 | 0,705 | - | - | - | - | - |
| 360 | 0,475 | 0,603 | - | - | - | - | - |
| 370 | 0,486 | 0,501 | - | - | - | - | - |
| 380 | 0,497 | 0,398 | - | - | - | - | - |
| 390 | 0,510 | 0,296 | - | - | - | - | - |

Table A1.13: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 400 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,238 | 0,350 | 0,571 | - | - | - |
| 80 | 0,219 | 0,253 | 0,387 | 0,625 | - | - | - |
| 90 | 0,219 | 0,268 | 0,423 | 0,693 | - | - | - |
| 100 | 0,219 | 0,283 | 0,460 | 0,773 | - | - | - |
| 110 | 0,219 | 0,299 | 0,496 | 0,852 | - | - | - |
| 120 | 0,219 | 0,314 | 0,567 | 0,932 | - | - | - |
| 130 | 0,219 | 0,329 | 0,648 | 1,011 | - | - | - |
| 140 | 0,219 | 0,344 | 0,684 | 1,091 | - | - | - |
| 150 | 0,219 | 0,359 | 0,718 | 1,152 | - | - | - |
| 160 | 0,219 | 0,374 | 0,752 | 1,201 | - | - | - |
| 170 | 0,219 | 0,389 | 0,786 | 1,250 | - | - | - |
| 180 | 0,219 | 0,404 | 0,820 | - | - | - | - |
| 190 | 0,219 | 0,419 | 0,854 | - | - | - | - |
| 200 | 0,219 | 0,434 | 0,888 | - | - | - | - |
| 210 | 0,219 | 0,449 | 0,922 | - | - | - | - |
| 220 | 0,219 | 0,465 | 0,956 | - | - | - | - |
| 230 | 0,219 | 0,480 | 0,990 | - | - | - | - |
| 240 | 0,219 | 0,495 | 1,024 | - | - | - | - |
| 250 | 0,219 | 0,520 | 1,058 | - | - | - | - |
| 260 | 0,219 | 0,561 | 1,092 | - | - | - | - |
| 270 | 0,219 | 0,602 | 1,112 | - | - | - | - |
| 280 | 0,219 | 0,643 | 1,017 | - | - | - | - |
| 290 | 0,219 | 0,679 | - | - | - | - | - |
| 300 | 0,219 | 0,714 | - | - | - | - | - |
| 310 | 0,219 | 0,749 | - | - | - | - | - |
| 320 | 0,219 | 0,784 | - | - | - | - | - |
| 330 | 0,223 | 0,819 | - | - | - | - | - |
| 340 | 0,236 | 0,854 | - | - | - | - | - |
| 350 | 0,250 | 0,889 | - | - | - | - | - |
| 360 | 0,264 | 0,924 | - | - | - | - | - |
| 370 | 0,278 | 0,959 | - | - | - | - | - |
| 380 | 0,292 | 0,993 | - | - | - | - | - |
| 390 | 0,305 | 1,028 | - | - | - | - | - |

Table A1.14: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 450 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,287 | 0,429 | 1,054 | - | - |
| 80 | 0,219 | 0,219 | 0,311 | 0,481 | 1,164 | - | - |
| 90 | 0,219 | 0,226 | 0,336 | 0,539 | 1,213 | - | - |
| 100 | 0,219 | 0,239 | 0,360 | 0,601 | 1,263 | - | - |
| 110 | 0,219 | 0,252 | 0,384 | 0,661 | - | - | - |
| 120 | 0,219 | 0,264 | 0,409 | 0,709 | - | - | - |
| 130 | 0,219 | 0,277 | 0,433 | 0,756 | - | - | - |
| 140 | 0,219 | 0,290 | 0,457 | 0,804 | - | - | - |
| 150 | 0,219 | 0,303 | 0,482 | 0,852 | - | - | - |
| 160 | 0,219 | 0,316 | 0,510 | 0,900 | - | - | - |
| 170 | 0,219 | 0,329 | 0,583 | 0,948 | - | - | - |
| 180 | 0,219 | 0,341 | 0,654 | 0,996 | - | - | - |
| 190 | 0,219 | 0,354 | 0,688 | 1,044 | - | - | - |
| 200 | 0,219 | 0,367 | 0,722 | 1,092 | - | - | - |
| 210 | 0,219 | 0,380 | 0,756 | 1,158 | - | - | - |
| 220 | 0,219 | 0,393 | 0,791 | 1,254 | - | - | - |
| 230 | 0,219 | 0,405 | 0,825 | - | - | - | - |
| 240 | 0,219 | 0,418 | 0,859 | - | - | - | - |
| 250 | 0,219 | 0,431 | 0,893 | - | - | - | - |
| 260 | 0,219 | 0,444 | 0,927 | - | - | - | - |
| 270 | 0,219 | 0,457 | 0,962 | - | - | - | - |
| 280 | 0,219 | 0,469 | 0,996 | - | - | - | - |
| 290 | 0,219 | 0,482 | 1,030 | - | - | - | - |
| 300 | 0,219 | 0,495 | 1,064 | - | - | - | - |
| 310 | 0,219 | 0,508 | 1,098 | - | - | - | - |
| 320 | 0,219 | 0,523 | 1,103 | - | - | - | - |
| 330 | 0,219 | 0,538 | - | - | - | - | - |
| 340 | 0,219 | 0,553 | - | - | - | - | - |
| 350 | 0,219 | 0,568 | - | - | - | - | - |
| 360 | 0,219 | 0,582 | - | - | - | - | - |
| 370 | 0,219 | 0,597 | - | - | - | - | - |
| 380 | 0,219 | 0,612 | - | - | - | - | - |
| 390 | 0,219 | 0,627 | - | - | - | - | - |

Table A1.15: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 500 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,251 | 0,343 | 0,643 | - | - |
| 80 | 0,219 | 0,219 | 0,269 | 0,379 | 0,761 | - | - |
| 90 | 0,219 | 0,219 | 0,287 | 0,415 | 0,891 | - | - |
| 100 | 0,219 | 0,219 | 0,305 | 0,451 | 1,022 | - | - |
| 110 | 0,219 | 0,219 | 0,323 | 0,487 | 1,134 | - | - |
| 120 | 0,219 | 0,219 | 0,341 | 0,542 | 1,183 | - | - |
| 130 | 0,219 | 0,223 | 0,359 | 0,614 | 1,232 | - | - |
| 140 | 0,219 | 0,236 | 0,377 | 0,669 | 1,281 | - | - |
| 150 | 0,219 | 0,249 | 0,395 | 0,703 | - | - | - |
| 160 | 0,219 | 0,262 | 0,413 | 0,738 | - | - | - |
| 170 | 0,219 | 0,275 | 0,431 | 0,773 | - | - | - |
| 180 | 0,219 | 0,288 | 0,448 | 0,808 | - | - | - |
| 190 | 0,219 | 0,300 | 0,466 | 0,843 | - | - | - |
| 200 | 0,219 | 0,313 | 0,484 | 0,878 | - | - | - |
| 210 | 0,219 | 0,326 | 0,502 | 0,913 | - | - | - |
| 220 | 0,219 | 0,339 | 0,546 | 0,948 | - | - | - |
| 230 | 0,219 | 0,352 | 0,592 | 0,983 | - | - | - |
| 240 | 0,219 | 0,365 | 0,638 | 1,017 | - | - | - |
| 250 | 0,219 | 0,378 | 0,678 | 1,052 | - | - | - |
| 260 | 0,219 | 0,391 | 0,714 | 1,087 | - | - | - |
| 270 | 0,219 | 0,403 | 0,751 | 1,122 | - | - | - |
| 280 | 0,219 | 0,416 | 0,787 | - | - | - | - |
| 290 | 0,219 | 0,429 | 0,824 | - | - | - | - |
| 300 | 0,219 | 0,442 | 0,860 | - | - | - | - |
| 310 | 0,219 | 0,455 | 0,897 | - | - | - | - |
| 320 | 0,219 | 0,468 | 0,933 | - | - | - | - |
| 330 | 0,219 | 0,481 | 0,970 | - | - | - | - |
| 340 | 0,219 | 0,494 | 1,006 | - | - | - | - |
| 350 | 0,219 | 0,506 | 1,043 | - | - | - | - |
| 360 | 0,219 | 0,517 | 1,079 | - | - | - | - |
| 370 | 0,219 | 0,529 | 1,116 | - | - | - | - |
| 380 | 0,219 | 0,540 | 1,083 | - | - | - | - |
| 390 | 0,219 | 0,551 | 1,035 | - | - | - | - |

Table A1.16: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 520 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,219 | 0,269 | 0,613 | 1,207 | - |
| 80 | 0,219 | 0,219 | 0,219 | 0,308 | 0,677 | 1,270 | - |
| 90 | 0,219 | 0,219 | 0,233 | 0,346 | 0,775 | - | - |
| 100 | 0,219 | 0,219 | 0,251 | 0,385 | 0,874 | - | - |
| 110 | 0,219 | 0,219 | 0,270 | 0,424 | 0,973 | - | - |
| 120 | 0,219 | 0,219 | 0,289 | 0,463 | 1,072 | - | - |
| 130 | 0,219 | 0,219 | 0,308 | 0,501 | 1,146 | - | - |
| 140 | 0,219 | 0,219 | 0,326 | 0,575 | 1,195 | - | - |
| 150 | 0,219 | 0,219 | 0,345 | 0,652 | 1,243 | - | - |
| 160 | 0,219 | 0,219 | 0,364 | 0,685 | - | - | - |
| 170 | 0,219 | 0,219 | 0,383 | 0,719 | - | - | - |
| 180 | 0,219 | 0,228 | 0,401 | 0,752 | - | - | - |
| 190 | 0,219 | 0,242 | 0,420 | 0,786 | - | - | - |
| 200 | 0,219 | 0,256 | 0,439 | 0,820 | - | - | - |
| 210 | 0,219 | 0,269 | 0,458 | 0,853 | - | - | - |
| 220 | 0,219 | 0,283 | 0,476 | 0,887 | - | - | - |
| 230 | 0,219 | 0,297 | 0,495 | 0,920 | - | - | - |
| 240 | 0,219 | 0,311 | 0,520 | 0,954 | - | - | - |
| 250 | 0,219 | 0,325 | 0,552 | 0,987 | - | - | - |
| 260 | 0,219 | 0,339 | 0,583 | 1,021 | - | - | - |
| 270 | 0,219 | 0,353 | 0,615 | 1,054 | - | - | - |
| 280 | 0,219 | 0,367 | 0,646 | 1,088 | - | - | - |
| 290 | 0,219 | 0,381 | 0,686 | 1,122 | - | - | - |
| 300 | 0,219 | 0,395 | 0,727 | - | - | - | - |
| 310 | 0,219 | 0,408 | 0,769 | - | - | - | - |
| 320 | 0,219 | 0,422 | 0,810 | - | - | - | - |
| 330 | 0,219 | 0,436 | 0,852 | - | - | - | - |
| 340 | 0,219 | 0,450 | 0,893 | - | - | - | - |
| 350 | 0,219 | 0,464 | 0,935 | - | - | - | - |
| 360 | 0,219 | 0,478 | 0,977 | - | - | - | - |
| 370 | 0,219 | 0,492 | 1,018 | - | - | - | - |
| 380 | 0,219 | 0,505 | 1,060 | - | - | - | - |
| 390 | 0,219 | 0,516 | 1,101 | - | - | - | - |

Table A1.17: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 550 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,220 | 0,293 | 0,574 | 1,149 | - |
| 80 | 0,219 | 0,219 | 0,236 | 0,320 | 0,625 | 1,207 | - |
| 90 | 0,219 | 0,219 | 0,251 | 0,347 | 0,691 | 1,264 | - |
| 100 | 0,219 | 0,219 | 0,266 | 0,374 | 0,771 | - | - |
| 110 | 0,219 | 0,219 | 0,282 | 0,401 | 0,852 | - | - |
| 120 | 0,219 | 0,219 | 0,297 | 0,428 | 0,932 | - | - |
| 130 | 0,219 | 0,219 | 0,312 | 0,455 | 1,012 | - | - |
| 140 | 0,219 | 0,219 | 0,328 | 0,482 | 1,093 | - | - |
| 150 | 0,219 | 0,219 | 0,343 | 0,515 | 1,155 | - | - |
| 160 | 0,219 | 0,219 | 0,359 | 0,578 | 1,206 | - | - |
| 170 | 0,219 | 0,219 | 0,374 | 0,642 | 1,258 | - | - |
| 180 | 0,219 | 0,219 | 0,389 | 0,681 | - | - | - |
| 190 | 0,219 | 0,219 | 0,405 | 0,715 | - | - | - |
| 200 | 0,219 | 0,219 | 0,420 | 0,750 | - | - | - |
| 210 | 0,219 | 0,219 | 0,435 | 0,784 | - | - | - |
| 220 | 0,219 | 0,225 | 0,451 | 0,819 | - | - | - |
| 230 | 0,219 | 0,240 | 0,466 | 0,854 | - | - | - |
| 240 | 0,219 | 0,256 | 0,482 | 0,888 | - | - | - |
| 250 | 0,219 | 0,271 | 0,497 | 0,923 | - | - | - |
| 260 | 0,219 | 0,287 | 0,512 | 0,957 | - | - | - |
| 270 | 0,219 | 0,302 | 0,528 | 0,992 | - | - | - |
| 280 | 0,219 | 0,318 | 0,544 | 1,026 | - | - | - |
| 290 | 0,219 | 0,333 | 0,559 | 1,061 | - | - | - |
| 300 | 0,219 | 0,348 | 0,575 | 1,096 | - | - | - |
| 310 | 0,219 | 0,364 | 0,591 | 1,109 | - | - | - |
| 320 | 0,219 | 0,379 | 0,606 | - | - | - | - |
| 330 | 0,219 | 0,395 | 0,622 | - | - | - | - |
| 340 | 0,219 | 0,410 | 0,638 | - | - | - | - |
| 350 | 0,219 | 0,425 | 0,658 | - | - | - | - |
| 360 | 0,219 | 0,441 | 0,724 | - | - | - | - |
| 370 | 0,219 | 0,456 | 0,789 | - | - | - | - |
| 380 | 0,219 | 0,472 | 0,855 | - | - | - | - |
| 390 | 0,219 | 0,487 | 0,920 | - | - | - | - |

Table A1.18: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 600 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,219 | 0,262 | 0,476 | 0,772 | - |
| 80 | 0,219 | 0,219 | 0,219 | 0,282 | 0,535 | 1,050 | - |
| 90 | 0,219 | 0,219 | 0,223 | 0,303 | 0,592 | 1,154 | - |
| 100 | 0,219 | 0,219 | 0,237 | 0,324 | 0,649 | 1,197 | - |
| 110 | 0,219 | 0,219 | 0,251 | 0,345 | 0,705 | 1,240 | - |
| 120 | 0,219 | 0,219 | 0,264 | 0,366 | 0,760 | 1,283 | - |
| 130 | 0,219 | 0,219 | 0,278 | 0,386 | 0,816 | - | - |
| 140 | 0,219 | 0,219 | 0,292 | 0,407 | 0,871 | - | - |
| 150 | 0,219 | 0,219 | 0,306 | 0,428 | 0,927 | - | - |
| 160 | 0,219 | 0,219 | 0,320 | 0,449 | 0,982 | - | - |
| 170 | 0,219 | 0,219 | 0,334 | 0,469 | 1,038 | - | - |
| 180 | 0,219 | 0,219 | 0,348 | 0,490 | 1,093 | - | - |
| 190 | 0,219 | 0,219 | 0,362 | 0,522 | 1,156 | - | - |
| 200 | 0,219 | 0,219 | 0,376 | 0,577 | 1,227 | - | - |
| 210 | 0,219 | 0,219 | 0,390 | 0,632 | - | - | - |
| 220 | 0,219 | 0,219 | 0,404 | 0,674 | - | - | - |
| 230 | 0,219 | 0,219 | 0,418 | 0,708 | - | - | - |
| 240 | 0,219 | 0,219 | 0,432 | 0,742 | - | - | - |
| 250 | 0,219 | 0,219 | 0,446 | 0,776 | - | - | - |
| 260 | 0,219 | 0,219 | 0,460 | 0,810 | - | - | - |
| 270 | 0,219 | 0,219 | 0,473 | 0,845 | - | - | - |
| 280 | 0,219 | 0,219 | 0,487 | 0,879 | - | - | - |
| 290 | 0,219 | 0,219 | 0,501 | 0,913 | - | - | - |
| 300 | 0,219 | 0,219 | 0,515 | 0,947 | - | - | - |
| 310 | 0,219 | 0,219 | 0,529 | 0,981 | - | - | - |
| 320 | 0,219 | 0,219 | 0,543 | 1,016 | - | - | - |
| 330 | 0,219 | 0,219 | 0,557 | 1,050 | - | - | - |
| 340 | 0,219 | 0,219 | 0,570 | 1,084 | - | - | - |
| 350 | 0,219 | 0,219 | 0,584 | 1,118 | - | - | - |
| 360 | 0,219 | 0,235 | 0,598 | - | - | - | - |
| 370 | 0,219 | 0,262 | 0,612 | - | - | - | - |
| 380 | 0,219 | 0,290 | 0,625 | - | - | - | - |
| 390 | 0,219 | 0,317 | 0,639 | - | - | - | - |

Table A1.19: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 620 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,219 | 0,246 | 0,428 | 0,647 | - |
| 80 | 0,219 | 0,219 | 0,219 | 0,265 | 0,484 | 0,961 | - |
| 90 | 0,219 | 0,219 | 0,219 | 0,284 | 0,539 | 1,139 | - |
| 100 | 0,219 | 0,219 | 0,219 | 0,303 | 0,594 | 1,172 | - |
| 110 | 0,219 | 0,219 | 0,230 | 0,322 | 0,650 | 1,204 | - |
| 120 | 0,219 | 0,219 | 0,244 | 0,341 | 0,698 | 1,236 | - |
| 130 | 0,219 | 0,219 | 0,258 | 0,360 | 0,747 | 1,268 | - |
| 140 | 0,219 | 0,219 | 0,272 | 0,379 | 0,795 | - | - |
| 150 | 0,219 | 0,219 | 0,286 | 0,398 | 0,844 | - | - |
| 160 | 0,219 | 0,219 | 0,300 | 0,417 | 0,892 | - | - |
| 170 | 0,219 | 0,219 | 0,314 | 0,436 | 0,940 | - | - |
| 180 | 0,219 | 0,219 | 0,327 | 0,455 | 0,989 | - | - |
| 190 | 0,219 | 0,219 | 0,341 | 0,474 | 1,037 | - | - |
| 200 | 0,219 | 0,219 | 0,355 | 0,493 | 1,086 | - | - |
| 210 | 0,219 | 0,219 | 0,369 | 0,518 | 1,158 | - | - |
| 220 | 0,219 | 0,219 | 0,383 | 0,553 | - | - | - |
| 230 | 0,219 | 0,219 | 0,397 | 0,588 | - | - | - |
| 240 | 0,219 | 0,219 | 0,411 | 0,623 | - | - | - |
| 250 | 0,219 | 0,219 | 0,425 | 0,658 | - | - | - |
| 260 | 0,219 | 0,219 | 0,438 | 0,692 | - | - | - |
| 270 | 0,219 | 0,219 | 0,452 | 0,726 | - | - | - |
| 280 | 0,219 | 0,219 | 0,466 | 0,761 | - | - | - |
| 290 | 0,219 | 0,219 | 0,480 | 0,795 | - | - | - |
| 300 | 0,219 | 0,219 | 0,494 | 0,829 | - | - | - |
| 310 | 0,219 | 0,219 | 0,507 | 0,864 | - | - | - |
| 320 | 0,219 | 0,219 | 0,519 | 0,898 | - | - | - |
| 330 | 0,219 | 0,219 | 0,531 | 0,932 | - | - | - |
| 340 | 0,219 | 0,219 | 0,543 | 0,967 | - | - | - |
| 350 | 0,219 | 0,219 | 0,555 | 1,001 | - | - | - |
| 360 | 0,219 | 0,219 | 0,567 | 1,035 | - | - | - |
| 370 | 0,219 | 0,219 | 0,578 | 1,070 | - | - | - |
| 380 | 0,219 | 0,229 | 0,590 | 1,104 | - | - | - |
| 390 | 0,219 | 0,253 | 0,602 | 1,110 | - | - | - |

Table A1.20: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 650 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,219 | 0,233 | 0,387 | 0,616 | - |
| 80 | 0,219 | 0,219 | 0,219 | 0,251 | 0,433 | 0,791 | - |
| 90 | 0,219 | 0,219 | 0,219 | 0,268 | 0,479 | 1,129 | - |
| 100 | 0,219 | 0,219 | 0,219 | 0,286 | 0,530 | 1,152 | - |
| 110 | 0,219 | 0,219 | 0,219 | 0,303 | 0,587 | 1,175 | - |
| 120 | 0,219 | 0,219 | 0,219 | 0,321 | 0,644 | 1,198 | - |
| 130 | 0,219 | 0,219 | 0,228 | 0,338 | 0,685 | 1,221 | - |
| 140 | 0,219 | 0,219 | 0,243 | 0,356 | 0,724 | 1,244 | - |
| 150 | 0,219 | 0,219 | 0,257 | 0,374 | 0,763 | 1,266 | - |
| 160 | 0,219 | 0,219 | 0,272 | 0,391 | 0,802 | 1,289 | - |
| 170 | 0,219 | 0,219 | 0,286 | 0,409 | 0,840 | - | - |
| 180 | 0,219 | 0,219 | 0,301 | 0,426 | 0,879 | - | - |
| 190 | 0,219 | 0,219 | 0,315 | 0,444 | 0,918 | - | - |
| 200 | 0,219 | 0,219 | 0,330 | 0,461 | 0,956 | - | - |
| 210 | 0,219 | 0,219 | 0,344 | 0,479 | 0,995 | - | - |
| 220 | 0,219 | 0,219 | 0,359 | 0,496 | 1,034 | - | - |
| 230 | 0,219 | 0,219 | 0,373 | 0,517 | 1,073 | - | - |
| 240 | 0,219 | 0,219 | 0,388 | 0,542 | 1,111 | - | - |
| 250 | 0,219 | 0,219 | 0,403 | 0,567 | - | - | - |
| 260 | 0,219 | 0,219 | 0,417 | 0,591 | - | - | - |
| 270 | 0,219 | 0,219 | 0,432 | 0,616 | - | - | - |
| 280 | 0,219 | 0,219 | 0,446 | 0,641 | - | - | - |
| 290 | 0,219 | 0,219 | 0,461 | 0,668 | - | - | - |
| 300 | 0,219 | 0,219 | 0,475 | 0,699 | - | - | - |
| 310 | 0,219 | 0,219 | 0,490 | 0,730 | - | - | - |
| 320 | 0,219 | 0,219 | 0,504 | 0,760 | - | - | - |
| 330 | 0,219 | 0,219 | 0,515 | 0,791 | - | - | - |
| 340 | 0,219 | 0,219 | 0,525 | 0,822 | - | - | - |
| 350 | 0,219 | 0,219 | 0,535 | 0,852 | - | - | - |
| 360 | 0,219 | 0,219 | 0,546 | 0,883 | - | - | - |
| 370 | 0,219 | 0,219 | 0,556 | 0,914 | - | - | - |
| 380 | 0,219 | 0,219 | 0,567 | 0,944 | - | - | - |
| 390 | 0,219 | 0,219 | 0,577 | 0,975 | - | - | - |

Table A1.21: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 700 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,219 | 0,219 | 0,332 | 0,556 | - |
| 80 | 0,219 | 0,219 | 0,219 | 0,222 | 0,368 | 0,603 | - |
| 90 | 0,219 | 0,219 | 0,219 | 0,238 | 0,405 | 0,651 | - |
| 100 | 0,219 | 0,219 | 0,219 | 0,254 | 0,441 | 1,150 | - |
| 110 | 0,219 | 0,219 | 0,219 | 0,270 | 0,477 | 1,165 | - |
| 120 | 0,219 | 0,219 | 0,219 | 0,286 | 0,518 | 1,180 | - |
| 130 | 0,219 | 0,219 | 0,219 | 0,302 | 0,571 | 1,194 | - |
| 140 | 0,219 | 0,219 | 0,219 | 0,318 | 0,624 | 1,209 | - |
| 150 | 0,219 | 0,219 | 0,219 | 0,334 | 0,671 | 1,223 | - |
| 160 | 0,219 | 0,219 | 0,219 | 0,350 | 0,711 | 1,238 | - |
| 170 | 0,219 | 0,219 | 0,219 | 0,366 | 0,752 | 1,253 | - |
| 180 | 0,219 | 0,219 | 0,225 | 0,382 | 0,792 | 1,267 | - |
| 190 | 0,219 | 0,219 | 0,242 | 0,398 | 0,833 | 1,282 | - |
| 200 | 0,219 | 0,219 | 0,259 | 0,414 | 0,874 | - | - |
| 210 | 0,219 | 0,219 | 0,275 | 0,430 | 0,914 | - | - |
| 220 | 0,219 | 0,219 | 0,292 | 0,446 | 0,955 | - | - |
| 230 | 0,219 | 0,219 | 0,308 | 0,462 | 0,995 | - | - |
| 240 | 0,219 | 0,219 | 0,325 | 0,478 | 1,036 | - | - |
| 250 | 0,219 | 0,219 | 0,342 | 0,494 | 1,076 | - | - |
| 260 | 0,219 | 0,219 | 0,358 | 0,509 | 1,117 | - | - |
| 270 | 0,219 | 0,219 | 0,375 | 0,522 | - | - | - |
| 280 | 0,219 | 0,219 | 0,391 | 0,536 | - | - | - |
| 290 | 0,219 | 0,219 | 0,408 | 0,549 | - | - | - |
| 300 | 0,219 | 0,219 | 0,424 | 0,563 | - | - | - |
| 310 | 0,219 | 0,219 | 0,441 | 0,576 | - | - | - |
| 320 | 0,219 | 0,219 | 0,458 | 0,590 | - | - | - |
| 330 | 0,219 | 0,219 | 0,474 | 0,603 | - | - | - |
| 340 | 0,219 | 0,219 | 0,491 | 0,617 | - | - | - |
| 350 | 0,219 | 0,219 | 0,506 | 0,630 | - | - | - |
| 360 | 0,219 | 0,219 | 0,514 | 0,643 | - | - | - |
| 370 | 0,219 | 0,219 | 0,522 | 0,666 | - | - | - |
| 380 | 0,219 | 0,219 | 0,530 | 0,704 | - | - | - |
| 390 | 0,219 | 0,219 | 0,538 | 0,742 | - | - | - |

Table A1.22: Columns, 4-sided H- or I- sections.

| Section Factor | Design Temperature 750 °C | | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min | 180 min |
| 70 | 0,219 | 0,219 | 0,219 | 0,219 | 0,289 | 0,464 | 1,214 |
| 80 | 0,219 | 0,219 | 0,219 | 0,219 | 0,317 | 0,521 | 1,246 |
| 90 | 0,219 | 0,219 | 0,219 | 0,219 | 0,345 | 0,570 | 1,278 |
| 100 | 0,219 | 0,219 | 0,219 | 0,219 | 0,373 | 0,619 | - |
| 110 | 0,219 | 0,219 | 0,219 | 0,229 | 0,401 | 0,724 | - |
| 120 | 0,219 | 0,219 | 0,219 | 0,245 | 0,429 | 0,934 | - |
| 130 | 0,219 | 0,219 | 0,219 | 0,261 | 0,457 | 1,125 | - |
| 140 | 0,219 | 0,219 | 0,219 | 0,277 | 0,485 | 1,147 | - |
| 150 | 0,219 | 0,219 | 0,219 | 0,292 | 0,522 | 1,169 | - |
| 160 | 0,219 | 0,219 | 0,219 | 0,308 | 0,575 | 1,191 | - |
| 170 | 0,219 | 0,219 | 0,219 | 0,324 | 0,629 | 1,212 | - |
| 180 | 0,219 | 0,219 | 0,219 | 0,340 | 0,683 | 1,234 | - |
| 190 | 0,219 | 0,219 | 0,219 | 0,356 | 0,738 | 1,256 | - |
| 200 | 0,219 | 0,219 | 0,219 | 0,371 | 0,793 | 1,278 | - |
| 210 | 0,219 | 0,219 | 0,219 | 0,387 | 0,847 | - | - |
| 220 | 0,219 | 0,219 | 0,219 | 0,403 | 0,902 | - | - |
| 230 | 0,219 | 0,219 | 0,219 | 0,419 | 0,957 | - | - |
| 240 | 0,219 | 0,219 | 0,219 | 0,435 | 1,012 | - | - |
| 250 | 0,219 | 0,219 | 0,219 | 0,450 | 1,066 | - | - |
| 260 | 0,219 | 0,219 | 0,219 | 0,466 | 1,121 | - | - |
| 270 | 0,219 | 0,219 | 0,219 | 0,482 | 1,253 | - | - |
| 280 | 0,219 | 0,219 | 0,219 | 0,498 | - | - | - |
| 290 | 0,219 | 0,219 | 0,219 | 0,511 | - | - | - |
| 300 | 0,219 | 0,219 | 0,236 | 0,523 | - | - | - |
| 310 | 0,219 | 0,219 | 0,266 | 0,535 | - | - | - |
| 320 | 0,219 | 0,219 | 0,296 | 0,547 | - | - | - |
| 330 | 0,219 | 0,219 | 0,326 | 0,559 | - | - | - |
| 340 | 0,219 | 0,219 | 0,356 | 0,571 | - | - | - |
| 350 | 0,219 | 0,219 | 0,387 | 0,583 | - | - | - |
| 360 | 0,219 | 0,219 | 0,417 | 0,595 | - | - | - |
| 370 | 0,219 | 0,219 | 0,447 | 0,607 | - | - | - |
| 380 | 0,219 | 0,219 | 0,477 | 0,619 | - | - | - |
| 390 | 0,219 | 0,219 | 0,505 | 0,631 | - | - | - |

Table A1.23: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 350 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,872 | 1,544 | 2,216 | 3,559 | - |
| 60 | 0,303 | 1,100 | 1,896 | 2,692 | 4,284 | - |
| 70 | 0,404 | 1,322 | 2,239 | 3,157 | - | - |
| 80 | 0,503 | 1,538 | 2,574 | 3,610 | - | - |
| 90 | 0,599 | 1,750 | 2,901 | 4,052 | - | - |
| 100 | 0,692 | 1,956 | 3,220 | - | - | - |
| 110 | 0,784 | 2,158 | 3,532 | - | - | - |
| 120 | 0,873 | 2,355 | 3,836 | - | - | - |
| 130 | 0,961 | 2,547 | 4,134 | - | - | - |
| 140 | 1,046 | 2,735 | - | - | - | - |
| 150 | 1,130 | 2,919 | - | - | - | - |
| 160 | 1,211 | 3,099 | - | - | - | - |
| 170 | 1,291 | 3,275 | - | - | - | - |
| 180 | 1,369 | 3,447 | - | - | - | - |
| 190 | 1,446 | 3,615 | - | - | - | - |
| 200 | 1,521 | 3,780 | - | - | - | - |
| 210 | 1,594 | 3,941 | - | - | - | - |
| 220 | 1,665 | 4,099 | - | - | - | - |
| 230 | 1,736 | 4,254 | - | - | - | - |
| 235 | 1,770 | - | - | - | - | - |

Table A1.24: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 400 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,734 | 1,403 | 2,072 | 3,410 | - |
| 60 | 0,293 | 0,955 | 1,748 | 2,541 | 4,128 | - |
| 70 | 0,293 | 1,171 | 2,085 | 3,000 | - | - |
| 80 | 0,348 | 1,381 | 2,415 | 3,448 | - | - |
| 90 | 0,438 | 1,587 | 2,736 | 3,885 | - | - |
| 100 | 0,527 | 1,789 | 3,051 | - | - | - |
| 110 | 0,613 | 1,986 | 3,358 | - | - | - |
| 120 | 0,697 | 2,178 | 3,659 | - | - | - |
| 130 | 0,779 | 2,366 | 3,953 | - | - | - |
| 140 | 0,860 | 2,550 | 4,241 | - | - | - |
| 150 | 0,939 | 2,731 | - | - | - | - |
| 160 | 1,016 | 2,907 | - | - | - | - |
| 170 | 1,092 | 3,080 | - | - | - | - |
| 180 | 1,166 | 3,249 | - | - | - | - |
| 190 | 1,238 | 3,415 | - | - | - | - |
| 200 | 1,309 | 3,577 | - | - | - | - |
| 210 | 1,379 | 3,736 | - | - | - | - |
| 220 | 1,447 | 3,892 | - | - | - | - |
| 230 | 1,514 | 4,045 | - | - | - | - |
| 235 | 1,547 | 4,120 | - | - | - | - |

Table A1.25: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 450 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,597 | 1,263 | 1,929 | 3,261 | - |
| 60 | 0,293 | 0,811 | 1,601 | 2,392 | 3,972 | - |
| 70 | 0,293 | 1,021 | 1,932 | 2,844 | - | - |
| 80 | 0,293 | 1,225 | 2,256 | 3,286 | - | - |
| 90 | 0,293 | 1,426 | 2,572 | 3,719 | - | - |
| 100 | 0,361 | 1,622 | 2,882 | 4,143 | - | - |
| 110 | 0,442 | 1,813 | 3,185 | - | - | - |
| 120 | 0,520 | 2,001 | 3,482 | - | - | - |
| 130 | 0,598 | 2,185 | 3,773 | - | - | - |
| 140 | 0,673 | 2,365 | 4,057 | - | - | - |
| 150 | 0,747 | 2,542 | - | - | - | - |
| 160 | 0,820 | 2,715 | - | - | - | - |
| 170 | 0,891 | 2,884 | - | - | - | - |
| 180 | 0,961 | 3,050 | - | - | - | - |
| 190 | 1,029 | 3,213 | - | - | - | - |
| 200 | 1,096 | 3,372 | - | - | - | - |
| 210 | 1,162 | 3,529 | - | - | - | - |
| 220 | 1,226 | 3,683 | - | - | - | - |
| 230 | 1,290 | 3,833 | - | - | - | - |
| 235 | 1,321 | 3,908 | - | - | - | - |

Table A1.26: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 500 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,461 | 1,125 | 1,788 | 3,114 | - |
| 60 | 0,293 | 0,669 | 1,456 | 2,243 | 3,818 | - |
| 70 | 0,293 | 0,871 | 1,780 | 2,689 | - | - |
| 80 | 0,293 | 1,070 | 2,098 | 3,126 | - | - |
| 90 | 0,293 | 1,264 | 2,409 | 3,553 | - | - |
| 100 | 0,293 | 1,455 | 2,714 | 3,972 | - | - |
| 110 | 0,293 | 1,642 | 3,012 | - | - | - |
| 120 | 0,344 | 1,825 | 3,305 | - | - | - |
| 130 | 0,416 | 2,004 | 3,592 | - | - | - |
| 140 | 0,486 | 2,180 | 3,873 | - | - | - |
| 150 | 0,555 | 2,352 | 4,149 | - | - | - |
| 160 | 0,623 | 2,521 | - | - | - | - |
| 170 | 0,690 | 2,687 | - | - | - | - |
| 180 | 0,755 | 2,850 | - | - | - | - |
| 190 | 0,819 | 3,010 | - | - | - | - |
| 200 | 0,881 | 3,166 | - | - | - | - |
| 210 | 0,943 | 3,320 | - | - | - | - |
| 220 | 1,004 | 3,471 | - | - | - | - |
| 230 | 1,063 | 3,620 | - | - | - | - |
| 235 | 1,092 | 3,693 | - | - | - | - |

Table A1.27: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 520 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,408 | 1,070 | 1,732 | 3,056 | - |
| 60 | 0,293 | 0,612 | 1,398 | 2,184 | 3,756 | - |
| 70 | 0,293 | 0,812 | 1,720 | 2,628 | - | - |
| 80 | 0,293 | 1,008 | 2,035 | 3,062 | - | - |
| 90 | 0,293 | 1,200 | 2,344 | 3,487 | - | - |
| 100 | 0,293 | 1,388 | 2,646 | 3,905 | - | - |
| 110 | 0,293 | 1,573 | 2,943 | - | - | - |
| 120 | 0,293 | 1,754 | 3,234 | - | - | - |
| 130 | 0,343 | 1,931 | 3,519 | - | - | - |
| 140 | 0,411 | 2,105 | 3,799 | - | - | - |
| 150 | 0,478 | 2,276 | 4,074 | - | - | - |
| 160 | 0,544 | 2,444 | - | - | - | - |
| 170 | 0,609 | 2,608 | - | - | - | - |
| 180 | 0,672 | 2,770 | - | - | - | - |
| 190 | 0,734 | 2,928 | - | - | - | - |
| 200 | 0,795 | 3,084 | - | - | - | - |
| 210 | 0,855 | 3,236 | - | - | - | - |
| 220 | 0,914 | 3,386 | - | - | - | - |
| 230 | 0,972 | 3,534 | - | - | - | - |
| 235 | 1,000 | 3,607 | - | - | - | - |

Table A1.28: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 550 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,327 | 0,987 | 1,648 | 2,968 | 4,289 |
| 60 | 0,293 | 0,527 | 1,311 | 2,096 | 3,665 | - |
| 70 | 0,293 | 0,723 | 1,629 | 2,535 | - | - |
| 80 | 0,293 | 0,915 | 1,941 | 2,966 | - | - |
| 90 | 0,293 | 1,104 | 2,246 | 3,389 | - | - |
| 100 | 0,293 | 1,289 | 2,546 | 3,803 | - | - |
| 110 | 0,293 | 1,470 | 2,840 | 4,209 | - | - |
| 120 | 0,293 | 1,648 | 3,128 | - | - | - |
| 130 | 0,293 | 1,822 | 3,411 | - | - | - |
| 140 | 0,299 | 1,994 | 3,689 | - | - | - |
| 150 | 0,363 | 2,162 | 3,961 | - | - | - |
| 160 | 0,426 | 2,327 | 4,229 | - | - | - |
| 170 | 0,487 | 2,489 | - | - | - | - |
| 180 | 0,548 | 2,649 | - | - | - | - |
| 190 | 0,607 | 2,805 | - | - | - | - |
| 200 | 0,665 | 2,959 | - | - | - | - |
| 210 | 0,723 | 3,110 | - | - | - | - |
| 220 | 0,779 | 3,258 | - | - | - | - |
| 230 | 0,834 | 3,404 | - | - | - | - |
| 235 | 0,861 | 3,476 | - | - | - | - |

Table A1.29: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 600 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,293 | 0,851 | 1,509 | 2,824 | 4,139 |
| 60 | 0,293 | 0,387 | 1,168 | 1,950 | 3,513 | - |
| 70 | 0,293 | 0,576 | 1,479 | 2,382 | 4,189 | - |
| 80 | 0,293 | 0,761 | 1,784 | 2,807 | - | - |
| 90 | 0,293 | 0,944 | 2,084 | 3,224 | - | - |
| 100 | 0,293 | 1,123 | 2,378 | 3,634 | - | - |
| 110 | 0,293 | 1,299 | 2,667 | 4,036 | - | - |
| 120 | 0,293 | 1,471 | 2,951 | - | - | - |
| 130 | 0,293 | 1,641 | 3,230 | - | - | - |
| 140 | 0,293 | 1,808 | 3,504 | - | - | - |
| 150 | 0,293 | 1,971 | 3,773 | - | - | - |
| 160 | 0,293 | 2,132 | 4,038 | - | - | - |
| 170 | 0,293 | 2,291 | 4,298 | - | - | - |
| 180 | 0,339 | 2,446 | - | - | - | - |
| 190 | 0,394 | 2,599 | - | - | - | - |
| 200 | 0,447 | 2,750 | - | - | - | - |
| 210 | 0,500 | 2,898 | - | - | - | - |
| 220 | 0,552 | 3,043 | - | - | - | - |
| 230 | 0,603 | 3,186 | - | - | - | - |
| 235 | 0,628 | 3,257 | - | - | - | - |

Table A1.30: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 620 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,293 | 0,797 | 1,453 | 2,766 | 4,079 |
| 60 | 0,293 | 0,331 | 1,111 | 1,891 | 3,452 | - |
| 70 | 0,293 | 0,517 | 1,419 | 2,321 | 4,126 | - |
| 80 | 0,293 | 0,700 | 1,722 | 2,744 | - | - |
| 90 | 0,293 | 0,880 | 2,019 | 3,159 | - | - |
| 100 | 0,293 | 1,057 | 2,311 | 3,566 | - | - |
| 110 | 0,293 | 1,230 | 2,598 | 3,966 | - | - |
| 120 | 0,293 | 1,401 | 2,880 | - | - | - |
| 130 | 0,293 | 1,568 | 3,157 | - | - | - |
| 140 | 0,293 | 1,733 | 3,430 | - | - | - |
| 150 | 0,293 | 1,895 | 3,698 | - | - | - |
| 160 | 0,293 | 2,054 | 3,961 | - | - | - |
| 170 | 0,293 | 2,211 | 4,220 | - | - | - |
| 180 | 0,293 | 2,365 | - | - | - | - |
| 190 | 0,308 | 2,516 | - | - | - | - |
| 200 | 0,360 | 2,666 | - | - | - | - |
| 210 | 0,411 | 2,812 | - | - | - | - |
| 220 | 0,461 | 2,956 | - | - | - | - |
| 230 | 0,510 | 3,098 | - | - | - | - |
| 235 | 0,534 | 3,169 | - | - | - | - |

Table A1.31: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 650 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,293 | 0,716 | 1,371 | 2,680 | 3,990 |
| 60 | 0,293 | 0,293 | 1,026 | 1,804 | 3,362 | - |
| 70 | 0,293 | 0,429 | 1,330 | 2,230 | 4,031 | - |
| 80 | 0,293 | 0,608 | 1,629 | 2,649 | - | - |
| 90 | 0,293 | 0,784 | 1,922 | 3,060 | - | - |
| 100 | 0,293 | 0,957 | 2,211 | 3,465 | - | - |
| 110 | 0,293 | 1,128 | 2,495 | 3,863 | - | - |
| 120 | 0,293 | 1,295 | 2,774 | 4,254 | - | - |
| 130 | 0,293 | 1,459 | 3,049 | - | - | - |
| 140 | 0,293 | 1,621 | 3,319 | - | - | - |
| 150 | 0,293 | 1,780 | 3,584 | - | - | - |
| 160 | 0,293 | 1,937 | 3,846 | - | - | - |
| 170 | 0,293 | 2,091 | 4,103 | - | - | - |
| 180 | 0,293 | 2,243 | - | - | - | - |
| 190 | 0,293 | 2,392 | - | - | - | - |
| 200 | 0,293 | 2,539 | - | - | - | - |
| 210 | 0,293 | 2,683 | - | - | - | - |
| 220 | 0,323 | 2,826 | - | - | - | - |
| 230 | 0,369 | 2,966 | - | - | - | - |
| 235 | 0,392 | 3,035 | - | - | - | - |

Table A1.32: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 700 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,293 | 0,582 | 1,234 | 2,538 | 3,842 |
| 60 | 0,293 | 0,293 | 0,884 | 1,660 | 3,212 | - |
| 70 | 0,293 | 0,293 | 1,182 | 2,079 | 3,875 | - |
| 80 | 0,293 | 0,456 | 1,474 | 2,492 | - | - |
| 90 | 0,293 | 0,626 | 1,762 | 2,897 | - | - |
| 100 | 0,293 | 0,793 | 2,045 | 3,297 | - | - |
| 110 | 0,293 | 0,957 | 2,323 | 3,690 | - | - |
| 120 | 0,293 | 1,119 | 2,597 | 4,076 | - | - |
| 130 | 0,293 | 1,278 | 2,867 | - | - | - |
| 140 | 0,293 | 1,434 | 3,133 | - | - | - |
| 150 | 0,293 | 1,589 | 3,395 | - | - | - |
| 160 | 0,293 | 1,741 | 3,653 | - | - | - |
| 170 | 0,293 | 1,891 | 3,907 | - | - | - |
| 180 | 0,293 | 2,038 | 4,157 | - | - | - |
| 190 | 0,293 | 2,183 | - | - | - | - |
| 200 | 0,293 | 2,326 | - | - | - | - |
| 210 | 0,293 | 2,468 | - | - | - | - |
| 220 | 0,293 | 2,607 | - | - | - | - |
| 230 | 0,293 | 2,744 | - | - | - | - |
| 235 | 0,293 | 2,811 | - | - | - | - |

Table A1.33: Columns, 4-sided hollow sections.

| Section Factor | Design Temperature 750 °C | | | | | |
|-----------------|--|--------|--------|--------|--------|---------|
| | Thickness (mm) required for the RF period – only intumescent coating | | | | | |
| m ⁻¹ | 15 min | 30 min | 45 min | 60 min | 90 min | 120 min |
| 50 | 0,293 | 0,293 | 0,450 | 1,099 | 2,397 | 3,695 |
| 60 | 0,293 | 0,293 | 0,744 | 1,517 | 3,063 | - |
| 70 | 0,293 | 0,293 | 1,034 | 1,929 | 3,719 | - |
| 80 | 0,293 | 0,305 | 1,320 | 2,335 | - | - |
| 90 | 0,293 | 0,468 | 1,601 | 2,735 | - | - |
| 100 | 0,293 | 0,628 | 1,878 | 3,129 | - | - |
| 110 | 0,293 | 0,786 | 2,152 | 3,517 | - | - |
| 120 | 0,293 | 0,942 | 2,421 | 3,899 | - | - |
| 130 | 0,293 | 1,096 | 2,686 | 4,276 | - | - |
| 140 | 0,293 | 1,247 | 2,948 | - | - | - |
| 150 | 0,293 | 1,397 | 3,205 | - | - | - |
| 160 | 0,293 | 1,544 | 3,460 | - | - | - |
| 170 | 0,293 | 1,689 | 3,710 | - | - | - |
| 180 | 0,293 | 1,832 | 3,957 | - | - | - |
| 190 | 0,293 | 1,973 | 4,201 | - | - | - |
| 200 | 0,293 | 2,112 | - | - | - | - |
| 210 | 0,293 | 2,250 | - | - | - | - |
| 220 | 0,293 | 2,385 | - | - | - | - |
| 230 | 0,293 | 2,519 | - | - | - | - |
| 235 | 0,293 | 2,585 | - | - | - | - |