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

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European Technical Assessment

ETA 22/0116 of 14.06.2022

General part

Technical Assessment Body issuing the ETA: ITeC ITeC has been designated according to Article 29 of Regulation (EU) No 305/2011 and is member of EOTA (European Organisation for Technical Assessment).	
Trade name of the construction product	**SLV Internal**
Product family to which the construction product belongs	Rendering intended for fire resisting applications.
Manufacturer	**NESTAAN NV** Leuzestraat 101 8510 Bellegem Belgium
Manufacturing plant(s)	According to Annex N kept by ITeC.
This European Technical Assessment contains	23 pages including 2 annexes which form an integral part of this assessment and Annex N, which contains confidential information and is not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with Regulation (EU) 305/2011, on the basis of	European Assessment Document EAD 350140-00-1106.

General comments

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full.

Specific parts of the European Technical Assessment

1 Technical description of the product

SLV Internal (Sprayed Limpet Vermiculite Internal) is a wet-mix spray-applied fire protective rendering made of exfoliated vermiculate, cementitious binders and additives, supplied as a dry mix. SLV-Internal mortar can also be applied by trowel, in particular for very small surfaces like repairs, in accordance with the manufacturer's installation instructions.

The rendering considered in this ETA is applied, when necessary, in conjunction with the additional components as specified in the annexes (ETA under option 3 as described in the scope of EAD 350140-00-1106).

Properties of the applied rendering such as thickness range, density, adhesion values, etc., are described in the annexes of this ETA.

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

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

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

Fire protection uses		**Environmental conditions**
EAD 350140-00-1106 reference	**Element intended to be protected**	**EAD 350140-00-1106 reference**
Type 4	Loadbearing steel elements	Type Z_2

The environmental use categories are specified in EAD 350140-00-1106, section 1.2.3:

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

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

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

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

3.1 Performance of the product

The assessment of SLV Internal has been performed in accordance with the EAD 350140-00-1106 for *Fire protective products – Renderings and rendering kits intended for fire resistant applications (September 2017)*.

Table 2: Performance of SLV Internal.

Product: SLV Internal		**Intended use:** Fire resisting applications
Basic requirement	**Essential characteristic**	**Performance**
BWR 2 Safety in case of fire	Reaction to fire	A1
	Resistance to fire	See Annex 2
	Durability	Type Z_2
BWR 4 Safety and accessibility in use	Adhesion (bond strength)	See 3.2.4 and Annex 2

The rest of characteristics included in EAD 350140-00-1106 have not been assessed in this ETA.

3.2 Methods used for the assessment

3.2.1 Reaction to fire

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

3.2.2 Resistance to fire

The resistance to fire has been determined following the test and evaluation method given in Annex 2 and has been classified in accordance with EN 13501-2 [4].

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

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

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

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

3.2.3 Durability

Durability of the rendering has been assessed according to EAD 350140-00-1106, section 2.2.12, in relation to its fire protective intended uses as defined in table 1.

3.2.4 Adhesion (bond strength)

Adhesion (bond strength) has been determined in accordance with EAD 350140-00-1106, section 2.2.7, and EGOLF EA 05 [5]. The adhesion of the rendering depends on the installed thickness and the preparation of the substrate. Bond strength guidance values of the rendering and the conditions under which they were attained are given in Annex 2 of this ETA.

3.2.5 Technical characterisation

The ETA is issued for the rendering based on data/information deposited with the ITeC in accordance with section 2.3.2 of EAD 350140-00-1106.

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

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

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

Table 4: AVCP System.

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

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

All the necessary technical details for the implementation of the AVCP system are laid down in the Control Plan deposited with the ITeC and agreed in accordance with EAD 350140-00-1106.

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

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

Issued in Barcelona on 14 June 2022

by the Catalonia Institute of Construction Technology.

Institut de Tecnologia de la Construcció de Catalunya

Ferran Bermejo Nualart

Technical Director, ITeC

ANNEX 1. Resistance to fire performance and installation provisions

A.1.1 Overview of the assessed resistance to fire performance

The assessed constructive elements fire protected with SLV Internal are shown in table A.1.1.

Table A.1.1: Fire protected constructive elements.

Intended use according to EAD		Test standard	Classification	Installation details
Type 4	Loadbearing steel elements	EN 13381-4 [6]	EN 13501-2	Annex 2

A.1.2 Installation provisions related to the elements protected with SLV Internal

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

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

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

Clips, hangers, supports, sleeves and other attachments to the substrate can be placed by others prior or after the application of SLV Internal. Ducts, piping, conduits or other suspended equipment can be installed after the application of SLV Internal, in which case later inspection will be required and, when necessary, reparation of the rendering.

A.1.3 Verifications on site

The thickness should be measured at sufficient points to determine the mean and minimum thickness. A suitable method for thickness measurement is given in EAD 350140-00-1106, section 2.3.4.

The density of the hardened rendering should be measured within the tolerances specified in Annex 2.

The bond strength of the rendering to the substrate should be tested on site. A suitable method is EGOLF Agreement EA 05, which can be used as a base for the site tests. The person responsible for the works will decide on the adequacy of the site tests results taking into account the reference values given in the annexes, when relevant. For their acceptability, the recommendations given in EAD, section G.4, or other existing criteria can be applied, under the responsibility of the person responsible for works.

[6] EN 13381-4 Test methods for determining the contribution to the fire resistance of structural members. Part 4: Applied passive protection to steel members.

ANNEX 2. Specification and assessment of the fire performance of loadbearing steel elements protected with SLV Internal (intended use Type 4)

A.2.1 Classification

The system described in this annex has been tested and evaluated according to EN 13381-4 and classified in accordance with EN 13501-2.

The assessment of the required thickness of SLV Internal rendering for the relevant resistance to fire period, at the design temperature within the range of 350 ºC to 650 ºC and in function of the section factor of the steel element, is given in section A.2.3.

A.2.2 Installation requirements

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

A.2.2.1 Supporting structure

The supporting structure consists of load-bearing steel elements with the following characteristics:

- 'H' or 'I' shaped beam and column sections.

  The protection thickness given for H/I sections (table A.2.3 to table A.2.16 of this ETA) also apply to steel sections of other shapes (e.g. U, L and T-sections) under consideration of the same section factor.

  The protection thickness for structural hollow sections shall be calculated according to Annex A of EN 13381-4.

- Structural steel grades (S designation) in accordance with EN 10025 [7] excluding S185.

- Section factors as given in table A.2.3 to table A.2.16 of this ETA.

  Steel beams with a section factor lower than 64 m^{-1} shall be protected with the thickness of SLV Internal rendering given for a beam with section factor equal to 64 m^{-1}.

  Steel columns with a section factor lower than 57 m^{-1} shall be protected with the thickness of SLV Internal rendering given for a column with section factor equal to 57 m^{-1}.

- Three-sided fire exposure for beams and four-sided fire exposure for columns.

  In case of beams or columns with fewer sides exposed to fire, thickness of the rendering can be applied according to table A.2.3 to table A.2.16 under consideration of the section factor calculated for the relevant case.

A.2.2.2 Surface of steel elements

The steel sections must be blast cleaned to ISO 8501-1 SA2½ or equivalent. The surface shall be bare, clean, dry and free of dust.

SLV Internal shall be applied on the steel elements coated with a two component epoxy primer (reference EPOXY ZINC 2 of VIBOL at a dry film thickness of 90 µm - 100 µm).

[7] EN 10025-1 to 6. *Hot rolled products of structural steels.*

A.2.2.3 Fire protective rendering

SLV Internal is applied on the apparent sides of the steel structural element to be protected by following their shape. SLV Internal is sprayed according to table A.2.1 to reach the requested thickness according to this annex. Surface hairline cracks may occur during the curing of the rendering. Specification of the fire protective rendering is given in table A.2.1.

Table A.2.1: Specification of the applied rendering.

Product	Characteristics	Mounting and fixing
SLV Internal (hardened rendering)	Thickness: 10 mm to 54 mm Density (*): 690 kg/m³ ± 15 % (at ambient conditions)	Rendering is kept without finishing after application. For thickness applications up to 25 mm, it is sprayed in one layer; beyond 25 mm, it is sprayed in two layers. Spray-applied rendering without: - Bonding agent - Topcoat or sealing coat - Mechanical fixings or reinforcement - Additives out of dry mix

(*) The given value of density is representative of the spray-applied hardened rendering at site conditions. The nominal dry density of the mortar is 350 kg/m³ – 400 kg/m³ measured according to EN 1015-10.

A.2.2.4 Bonding properties of SLV Internal on steel elements

Assessment of the bonding properties of SLV Internal, when applied on steel structures coated with a two component epoxy primer, has been carried out according to EGOLF EA 05 procedure.

The indicated values are representative of cohesive failure (near the rendering surface) within the sprayed thickness of SLV Internal. These values are guidance values, and they do not reflect a statistical evaluation, nor minimum guaranteed values.

Table A.2.2: Tensile bond strength on steel substrates.

Surface	Thickness of SLV Internal (mm)	Mean tensile bond strength (MPa)	Failure mode
Steel substrate according EGOLF EA 05	13	0,058	Cohesive
	54	0,070	

A.2.3 Assessment of the fire performance of SLV Internal on steel structures

The assessment of the fire resistance performance of SLV Internal when applied on steel structures has been done according to EN 13381-4, Annex E.5 Numerical Regression Analysis.

The resistance to fire performance of H/I columns is given in tables A.2.3 to A.2.9.

The resistance to fire performance of H/I beams is given in tables A.2.10 to A.2.16.

Table A.2.3: Resistance to fire of H/I-section columns for design steel temperature 350 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 350 ºC															
57	11	13	16	19	22	25	28	31	34	37	40	43	46	49	-	-
60	11	13	16	19	22	25	28	32	35	38	41	44	47	50	-	-
65	11	13	17	20	23	26	29	32	36	39	42	45	48	-	-	-
70	11	14	17	20	23	27	30	33	36	40	43	46	49	-	-	-
75	11	14	17	21	24	27	30	34	37	40	44	47	50	-	-	-
80	11	14	18	21	24	28	31	34	38	41	45	48	-	-	-	-
85	11	14	18	21	25	28	32	35	38	42	45	49	-	-	-	-
90	11	15	18	22	25	29	32	36	39	43	46	50	-	-	-	-
95	11	15	18	22	25	29	32	36	40	43	47	50	-	-	-	-
100	11	15	18	22	26	29	33	36	40	44	47	51	-	-	-	-
105	11	15	19	22	26	30	33	37	40	44	48	-	-	-	-	-
110	11	15	19	22	26	30	34	37	41	45	48	-	-	-	-	-
115	12	15	19	23	26	30	34	38	41	45	49	-	-	-	-	-
120	12	15	19	23	27	30	34	38	42	45	49	-	-	-	-	-
125	12	15	19	23	27	31	34	38	42	46	50	-	-	-	-	-
130	12	16	19	23	27	31	35	39	42	46	50	-	-	-	-	-
135	12	16	20	23	27	31	35	39	43	47	50	-	-	-	-	-
140	12	16	20	24	27	31	35	39	43	47	51	-	-	-	-	-
145	12	16	20	24	28	32	35	39	43	47	51	-	-	-	-	-
150	12	16	20	24	28	32	36	40	44	47	-	-	-	-	-	-
155	12	16	20	24	28	32	36	40	44	48	-	-	-	-	-	-
160	12	16	20	24	28	32	36	40	44	48	-	-	-	-	-	-
165	12	16	20	24	28	32	36	40	44	48	-	-	-	-	-	-
170	12	16	20	24	28	32	36	40	44	48	-	-	-	-	-	-
175	12	16	20	24	28	32	37	41	45	49	-	-	-	-	-	-
180	12	16	20	25	29	33	37	41	45	49	-	-	-	-	-	-
185	12	16	21	25	29	33	37	41	45	49	-	-	-	-	-	-
190	12	17	21	25	29	33	37	41	45	49	-	-	-	-	-	-
195	12	17	21	25	29	33	37	41	45	49	-	-	-	-	-	-
200	12	17	21	25	29	33	37	41	45	50	-	-	-	-	-	-
205	13	17	21	25	29	33	37	41	46	50	-	-	-	-	-	-
210	13	17	21	25	29	33	37	42	46	50	-	-	-	-	-	-
215	13	17	21	25	29	33	38	42	46	50	-	-	-	-	-	-
220	13	17	21	25	29	34	38	42	46	50	-	-	-	-	-	-
225	13	17	21	25	29	34	38	42	46	50	-	-	-	-	-	-
230	13	17	21	25	29	34	38	42	46	51	-	-	-	-	-	-
235	13	17	21	25	30	34	38	42	46	51	-	-	-	-	-	-
240	13	17	21	25	30	34	38	42	47	51	-	-	-	-	-	-
245	13	17	21	25	30	34	38	42	47	51	-	-	-	-	-	-
250	13	17	21	26	30	34	38	43	47	51	-	-	-	-	-	-
255	13	17	21	26	30	34	38	43	47	51	-	-	-	-	-	-
260	13	17	21	26	30	34	38	43	47	-	-	-	-	-	-	-
265	13	17	21	26	30	34	39	43	47	-	-	-	-	-	-	-
270	13	17	21	26	30	34	39	43	47	-	-	-	-	-	-	-
275	13	17	21	26	30	34	39	43	47	-	-	-	-	-	-	-
280	13	17	22	26	30	34	39	43	47	-	-	-	-	-	-	-
285	13	17	22	26	30	34	39	43	47	-	-	-	-	-	-	-
290	13	17	22	26	30	35	39	43	48	-	-	-	-	-	-	-
295	13	17	22	26	30	35	39	43	48	-	-	-	-	-	-	-
300	13	17	22	26	30	35	39	43	48	-	-	-	-	-	-	-
305	13	17	22	26	30	35	39	43	48	-	-	-	-	-	-	-
310	13	17	22	26	30	35	39	43	48	-	-	-	-	-	-	-
315	13	17	22	26	30	35	39	44	48	-	-	-	-	-	-	-
320	13	17	22	26	31	35	39	44	48	-	-	-	-	-	-	-
325	13	17	22	26	31	35	39	44	48	-	-	-	-	-	-	-
330	13	17	22	26	31	35	39	44	48	-	-	-	-	-	-	-
335	13	17	22	26	31	35	39	44	48	-	-	-	-	-	-	-
340	13	17	22	26	31	35	39	44	48	-	-	-	-	-	-	-
345	13	18	22	26	31	35	39	44	48	-	-	-	-	-	-	-
350	13	18	22	26	31	35	40	44	48	-	-	-	-	-	-	-
355	13	18	22	26	31	35	40	44	48	-	-	-	-	-	-	-
360	13	18	22	26	31	35	40	44	48	-	-	-	-	-	-	-

Table A.2.4: Resistance to fire of H/I-section columns for design steel temperature 400 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 400 ºC															
57	11	12	15	17	20	23	26	29	31	34	37	40	43	46	48	51
60	11	12	15	18	21	23	26	29	32	35	38	41	44	46	49	-
65	11	12	15	18	21	24	27	30	33	36	39	42	45	48	51	-
70	11	12	16	19	22	25	28	31	34	37	40	43	46	49	-	-
75	11	13	16	19	22	25	28	32	35	38	41	44	47	50	-	-
80	11	13	16	19	23	26	29	32	35	39	42	45	48	-	-	-
85	11	13	16	20	23	26	30	33	36	39	43	46	49	-	-	-
90	11	13	17	20	23	27	30	33	37	40	43	47	50	-	-	-
95	11	13	17	20	24	27	31	34	37	41	44	48	51	-	-	-
100	11	14	17	21	24	28	31	34	38	41	45	48	-	-	-	-
105	11	14	17	21	24	28	31	35	38	42	45	49	-	-	-	-
110	11	14	17	21	25	28	32	35	39	42	46	50	-	-	-	-
115	11	14	18	21	25	29	32	36	39	43	47	50	-	-	-	-
120	11	14	18	21	25	29	32	36	40	43	47	51	-	-	-	-
125	11	14	18	22	25	29	33	36	40	44	48	-	-	-	-	-
130	11	14	18	22	26	29	33	37	41	44	48	-	-	-	-	-
135	11	15	18	22	26	30	33	37	41	45	48	-	-	-	-	-
140	11	15	18	22	26	30	34	37	41	45	49	-	-	-	-	-
145	11	15	19	22	26	30	34	38	42	45	49	-	-	-	-	-
150	11	15	19	23	26	30	34	38	42	46	50	-	-	-	-	-
155	11	15	19	23	27	30	34	38	42	46	50	-	-	-	-	-
160	11	15	19	23	27	31	35	38	42	46	50	-	-	-	-	-
165	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-	-
170	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-	-
175	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-	-
180	11	15	19	23	27	31	35	39	43	47	-	-	-	-	-	-
185	11	15	19	23	27	31	35	40	44	48	-	-	-	-	-	-
190	11	15	19	23	28	32	36	40	44	48	-	-	-	-	-	-
195	11	15	19	24	28	32	36	40	44	48	-	-	-	-	-	-
200	11	15	20	24	28	32	36	40	44	48	-	-	-	-	-	-
205	11	16	20	24	28	32	36	40	44	48	-	-	-	-	-	-
210	11	16	20	24	28	32	36	40	44	49	-	-	-	-	-	-
215	11	16	20	24	28	32	36	41	45	49	-	-	-	-	-	-
220	12	16	20	24	28	32	36	41	45	49	-	-	-	-	-	-
225	12	16	20	24	28	32	37	41	45	49	-	-	-	-	-	-
230	12	16	20	24	28	33	37	41	45	49	-	-	-	-	-	-
235	12	16	20	24	28	33	37	41	45	49	-	-	-	-	-	-
240	12	16	20	24	29	33	37	41	45	50	-	-	-	-	-	-
245	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-	-
250	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-	-
255	12	16	20	24	29	33	37	42	46	50	-	-	-	-	-	-
260	12	16	20	25	29	33	37	42	46	50	-	-	-	-	-	-
265	12	16	20	25	29	33	37	42	46	50	-	-	-	-	-	-
270	12	16	20	25	29	33	38	42	46	50	-	-	-	-	-	-
275	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-	-
280	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-	-
285	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-	-
290	12	16	21	25	29	34	38	42	47	51	-	-	-	-	-	-
295	12	16	21	25	29	34	38	42	47	51	-	-	-	-	-	-
300	12	16	21	25	29	34	38	42	47	51	-	-	-	-	-	-
305	12	16	21	25	29	34	38	42	47	-	-	-	-	-	-	-
310	12	16	21	25	29	34	38	43	47	-	-	-	-	-	-	-
315	12	16	21	25	29	34	38	43	47	-	-	-	-	-	-	-
320	12	16	21	25	30	34	38	43	47	-	-	-	-	-	-	-
325	12	16	21	25	30	34	38	43	47	-	-	-	-	-	-	-
330	12	16	21	25	30	34	38	43	47	-	-	-	-	-	-	-
335	12	16	21	25	30	34	39	43	47	-	-	-	-	-	-	-
340	12	16	21	25	30	34	39	43	47	-	-	-	-	-	-	-
345	12	16	21	25	30	34	39	43	47	-	-	-	-	-	-	-
350	12	16	21	25	30	34	39	43	48	-	-	-	-	-	-	-
355	12	17	21	25	30	34	39	43	48	-	-	-	-	-	-	-
360	12	17	21	25	30	34	39	43	48	-	-	-	-	-	-	-

Table A.2.5: Resistance to fire of H/I-section columns for design steel temperature 450 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 450 ºC															
57	11	11	13	16	19	21	24	27	29	32	34	37	40	42	45	48
60	11	11	14	16	19	22	24	27	30	33	35	38	41	43	46	49
65	11	11	14	17	20	22	25	28	31	34	36	39	42	45	48	50
70	11	11	14	17	20	23	26	29	32	35	38	40	43	46	49	-
75	11	12	15	18	21	24	27	30	33	36	39	42	45	47	50	-
80	11	12	15	18	21	24	27	30	33	36	39	43	46	49	-	-
85	11	12	15	18	21	25	28	31	34	37	40	43	47	50	-	-
90	11	12	15	19	22	25	28	31	35	38	41	44	48	51	-	-
95	11	12	16	19	22	25	29	32	35	39	42	45	48	-	-	-
100	11	13	16	19	23	26	29	33	36	39	43	46	49	-	-	-
105	11	13	16	19	23	26	30	33	36	40	43	47	50	-	-	-
110	11	13	16	20	23	27	30	34	37	40	44	47	51	-	-	-
115	11	13	16	20	23	27	30	34	37	41	44	48	-	-	-	-
120	11	13	17	20	24	27	31	34	38	41	45	49	-	-	-	-
125	11	13	17	20	24	28	31	35	38	42	46	49	-	-	-	-
130	11	13	17	21	24	28	31	35	39	42	46	50	-	-	-	-
135	11	13	17	21	24	28	32	35	39	43	47	50	-	-	-	-
140	11	13	17	21	25	28	32	36	40	43	47	51	-	-	-	-
145	11	14	17	21	25	29	32	36	40	44	47	51	-	-	-	-
150	11	14	17	21	25	29	33	36	40	44	48	-	-	-	-	-
155	11	14	18	21	25	29	33	37	41	44	48	-	-	-	-	-
160	11	14	18	22	25	29	33	37	41	45	49	-	-	-	-	-
165	11	14	18	22	26	29	33	37	41	45	49	-	-	-	-	-
170	11	14	18	22	26	30	34	37	41	45	49	-	-	-	-	-
175	11	14	18	22	26	30	34	38	42	46	50	-	-	-	-	-
180	11	14	18	22	26	30	34	38	42	46	50	-	-	-	-	-
185	11	14	18	22	26	30	34	38	42	46	50	-	-	-	-	-
190	11	14	18	22	26	30	34	38	42	46	50	-	-	-	-	-
195	11	14	18	22	26	30	35	39	43	47	51	-	-	-	-	-
200	11	14	18	22	27	31	35	39	43	47	51	-	-	-	-	-
205	11	14	18	23	27	31	35	39	43	47	-	-	-	-	-	-
210	11	14	19	23	27	31	35	39	43	47	-	-	-	-	-	-
215	11	15	19	23	27	31	35	39	43	48	-	-	-	-	-	-
220	11	15	19	23	27	31	35	39	44	48	-	-	-	-	-	-
225	11	15	19	23	27	31	35	40	44	48	-	-	-	-	-	-
230	11	15	19	23	27	31	36	40	44	48	-	-	-	-	-	-
235	11	15	19	23	27	32	36	40	44	48	-	-	-	-	-	-
240	11	15	19	23	27	32	36	40	44	48	-	-	-	-	-	-
245	11	15	19	23	27	32	36	40	44	49	-	-	-	-	-	-
250	11	15	19	23	28	32	36	40	45	49	-	-	-	-	-	-
255	11	15	19	23	28	32	36	40	45	49	-	-	-	-	-	-
260	11	15	19	23	28	32	36	41	45	49	-	-	-	-	-	-
265	11	15	19	24	28	32	36	41	45	49	-	-	-	-	-	-
270	11	15	19	24	28	32	37	41	45	49	-	-	-	-	-	-
275	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-	-
280	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-	-
285	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-	-
290	11	15	19	24	28	33	37	41	46	50	-	-	-	-	-	-
295	11	15	20	24	28	33	37	41	46	50	-	-	-	-	-	-
300	11	15	20	24	28	33	37	41	46	50	-	-	-	-	-	-
305	11	15	20	24	28	33	37	42	46	50	-	-	-	-	-	-
310	11	15	20	24	28	33	37	42	46	50	-	-	-	-	-	-
315	11	15	20	24	28	33	37	42	46	51	-	-	-	-	-	-
320	11	15	20	24	29	33	37	42	46	51	-	-	-	-	-	-
325	11	15	20	24	29	33	37	42	46	51	-	-	-	-	-	-
330	11	15	20	24	29	33	38	42	46	51	-	-	-	-	-	-
335	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
340	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
345	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
350	11	15	20	24	29	33	38	42	47	-	-	-	-	-	-	-
355	11	15	20	24	29	33	38	42	47	-	-	-	-	-	-	-
360	11	15	20	24	29	33	38	42	47	-	-	-	-	-	-	-

Table A.2.6: Resistance to fire of H/I-section columns for design steel temperature 500 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 500 ºC															
57	11	11	12	15	17	20	22	25	27	30	32	35	37	40	42	45
60	11	11	13	15	18	20	23	25	28	30	33	35	38	41	43	46
65	11	11	13	16	18	21	23	26	29	31	34	37	39	42	45	47
70	11	11	13	16	19	21	24	27	30	32	35	38	41	44	46	49
75	11	11	13	16	19	22	25	28	31	33	36	39	42	45	48	51
80	11	11	14	17	20	23	25	28	31	34	37	40	43	46	49	-
85	11	11	14	17	20	23	26	29	32	35	38	41	44	47	50	-
90	11	11	14	17	20	24	27	30	33	36	39	42	45	48	-	-
95	11	11	14	18	21	24	27	30	33	37	40	43	46	49	-	-
100	11	11	15	18	21	24	28	31	34	37	41	44	47	50	-	-
105	11	12	15	18	21	25	28	31	35	38	41	45	48	51	-	-
110	11	12	15	18	22	25	28	32	35	39	42	45	49	-	-	-
115	11	12	15	19	22	25	29	32	36	39	43	46	49	-	-	-
120	11	12	15	19	22	26	29	33	36	40	43	47	50	-	-	-
125	11	12	16	19	23	26	30	33	37	40	44	47	51	-	-	-
130	11	12	16	19	23	26	30	34	37	41	44	48	-	-	-	-
135	11	12	16	20	23	27	30	34	38	41	45	48	-	-	-	-
140	11	12	16	20	23	27	31	34	38	42	45	49	-	-	-	-
145	11	12	16	20	24	27	31	35	38	42	46	49	-	-	-	-
150	11	13	16	20	24	27	31	35	39	42	46	50	-	-	-	-
155	11	13	16	20	24	28	31	35	39	43	47	50	-	-	-	-
160	11	13	17	20	24	28	32	36	39	43	47	51	-	-	-	-
165	11	13	17	20	24	28	32	36	40	43	47	51	-	-	-	-
170	11	13	17	21	24	28	32	36	40	44	48	-	-	-	-	-
175	11	13	17	21	25	29	32	36	40	44	48	-	-	-	-	-
180	11	13	17	21	25	29	33	37	41	44	48	-	-	-	-	-
185	11	13	17	21	25	29	33	37	41	45	49	-	-	-	-	-
190	11	13	17	21	25	29	33	37	41	45	49	-	-	-	-	-
195	11	13	17	21	25	29	33	37	41	45	49	-	-	-	-	-
200	11	13	17	21	25	29	33	37	42	46	50	-	-	-	-	-
205	11	13	17	21	25	30	34	38	42	46	50	-	-	-	-	-
210	11	13	17	22	26	30	34	38	42	46	50	-	-	-	-	-
215	11	13	18	22	26	30	34	38	42	46	50	-	-	-	-	-
220	11	13	18	22	26	30	34	38	42	47	51	-	-	-	-	-
225	11	14	18	22	26	30	34	38	43	47	51	-	-	-	-	-
230	11	14	18	22	26	30	34	39	43	47	51	-	-	-	-	-
235	11	14	18	22	26	30	35	39	43	47	-	-	-	-	-	-
240	11	14	18	22	26	30	35	39	43	47	-	-	-	-	-	-
245	11	14	18	22	26	31	35	39	43	48	-	-	-	-	-	-
250	11	14	18	22	26	31	35	39	43	48	-	-	-	-	-	-
255	11	14	18	22	27	31	35	39	44	48	-	-	-	-	-	-
260	11	14	18	22	27	31	35	40	44	48	-	-	-	-	-	-
265	11	14	18	22	27	31	35	40	44	48	-	-	-	-	-	-
270	11	14	18	23	27	31	35	40	44	48	-	-	-	-	-	-
275	11	14	18	23	27	31	36	40	44	49	-	-	-	-	-	-
280	11	14	18	23	27	31	36	40	44	49	-	-	-	-	-	-
285	11	14	18	23	27	31	36	40	45	49	-	-	-	-	-	-
290	11	14	18	23	27	32	36	40	45	49	-	-	-	-	-	-
295	11	14	18	23	27	32	36	40	45	49	-	-	-	-	-	-
300	11	14	18	23	27	32	36	40	45	49	-	-	-	-	-	-
305	11	14	19	23	27	32	36	41	45	49	-	-	-	-	-	-
310	11	14	19	23	27	32	36	41	45	50	-	-	-	-	-	-
315	11	14	19	23	27	32	36	41	45	50	-	-	-	-	-	-
320	11	14	19	23	28	32	36	41	45	50	-	-	-	-	-	-
325	11	14	19	23	28	32	37	41	45	50	-	-	-	-	-	-
330	11	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
335	11	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
340	11	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
345	11	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
350	11	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
355	11	14	19	23	28	32	37	42	46	51	-	-	-	-	-	-
360	11	14	19	23	28	33	37	42	46	51	-	-	-	-	-	-

Table A.2.7: Resistance to fire of H/I-section columns for design steel temperature 550 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 550 ºC															
57	11	11	11	14	16	18	21	23	25	28	30	32	35	37	39	42
60	11	11	12	14	16	19	21	24	26	28	31	33	36	38	41	43
65	11	11	12	14	17	19	22	24	27	30	32	35	37	40	42	45
70	11	11	12	15	17	20	23	25	28	31	33	36	38	41	44	46
75	11	11	12	15	18	21	23	26	29	32	34	37	40	42	45	48
80	11	11	13	16	18	21	24	27	30	32	35	38	41	44	46	49
85	11	11	13	16	19	22	25	27	30	33	36	39	42	45	48	51
90	11	11	13	16	19	22	25	28	31	34	37	40	43	46	49	-
95	11	11	13	16	20	23	26	29	32	35	38	41	44	47	50	-
100	11	11	14	17	20	23	26	29	32	35	39	42	45	48	51	-
105	11	11	14	17	20	23	27	30	33	36	39	43	46	49	-	-
110	11	11	14	17	20	24	27	30	34	37	40	43	47	50	-	-
115	11	11	14	17	21	24	27	31	34	37	41	44	47	51	-	-
120	11	11	14	18	21	24	28	31	35	38	41	45	48	-	-	-
125	11	11	14	18	21	25	28	32	35	38	42	45	49	-	-	-
130	11	11	15	18	22	25	29	32	36	39	42	46	49	-	-	-
135	11	11	15	18	22	25	29	32	36	39	43	47	50	-	-	-
140	11	11	15	18	22	26	29	33	36	40	44	47	51	-	-	-
145	11	11	15	19	22	26	30	33	37	40	44	48	-	-	-	-
150	11	12	15	19	22	26	30	33	37	41	44	48	-	-	-	-
155	11	12	15	19	23	26	30	34	38	41	45	49	-	-	-	-
160	11	12	15	19	23	27	30	34	38	42	45	49	-	-	-	-
165	11	12	16	19	23	27	31	34	38	42	46	50	-	-	-	-
170	11	12	16	19	23	27	31	35	39	42	46	50	-	-	-	-
175	11	12	16	20	23	27	31	35	39	43	47	50	-	-	-	-
180	11	12	16	20	24	27	31	35	39	43	47	51	-	-	-	-
185	11	12	16	20	24	28	32	36	39	43	47	51	-	-	-	-
190	11	12	16	20	24	28	32	36	40	44	48	-	-	-	-	-
195	11	12	16	20	24	28	32	36	40	44	48	-	-	-	-	-
200	11	12	16	20	24	28	32	36	40	44	48	-	-	-	-	-
205	11	12	16	20	24	28	32	36	40	45	49	-	-	-	-	-
210	11	12	16	20	24	29	33	37	41	45	49	-	-	-	-	-
215	11	12	16	21	25	29	33	37	41	45	49	-	-	-	-	-
220	11	12	16	21	25	29	33	37	41	45	49	-	-	-	-	-
225	11	12	17	21	25	29	33	37	41	46	50	-	-	-	-	-
230	11	12	17	21	25	29	33	37	42	46	50	-	-	-	-	-
235	11	13	17	21	25	29	33	38	42	46	50	-	-	-	-	-
240	11	13	17	21	25	29	34	38	42	46	50	-	-	-	-	-
245	11	13	17	21	25	30	34	38	42	46	51	-	-	-	-	-
250	11	13	17	21	25	30	34	38	42	47	51	-	-	-	-	-
255	11	13	17	21	25	30	34	38	43	47	51	-	-	-	-	-
260	11	13	17	21	26	30	34	38	43	47	-	-	-	-	-	-
265	11	13	17	21	26	30	34	39	43	47	-	-	-	-	-	-
270	11	13	17	21	26	30	34	39	43	47	-	-	-	-	-	-
275	11	13	17	21	26	30	35	39	43	48	-	-	-	-	-	-
280	11	13	17	22	26	30	35	39	43	48	-	-	-	-	-	-
285	11	13	17	22	26	30	35	39	44	48	-	-	-	-	-	-
290	11	13	17	22	26	30	35	39	44	48	-	-	-	-	-	-
295	11	13	17	22	26	31	35	39	44	48	-	-	-	-	-	-
300	11	13	17	22	26	31	35	40	44	48	-	-	-	-	-	-
305	11	13	17	22	26	31	35	40	44	49	-	-	-	-	-	-
310	11	13	17	22	26	31	35	40	44	49	-	-	-	-	-	-
315	11	13	18	22	26	31	35	40	44	49	-	-	-	-	-	-
320	11	13	18	22	27	31	35	40	44	49	-	-	-	-	-	-
325	11	13	18	22	27	31	36	40	45	49	-	-	-	-	-	-
330	11	13	18	22	27	31	36	40	45	49	-	-	-	-	-	-
335	11	13	18	22	27	31	36	40	45	49	-	-	-	-	-	-
340	11	13	18	22	27	31	36	40	45	49	-	-	-	-	-	-
345	11	13	18	22	27	31	36	40	45	50	-	-	-	-	-	-
350	11	13	18	22	27	31	36	41	45	50	-	-	-	-	-	-
355	11	13	18	22	27	32	36	41	45	50	-	-	-	-	-	-
360	11	13	18	22	27	32	36	41	45	50	-	-	-	-	-	-

Table A.2.8: Resistance to fire of H/I-section columns for design steel temperature 600 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 600 ºC															
57	11	11	11	13	15	17	19	22	24	26	28	30	33	35	37	39
60	11	11	11	13	15	18	20	22	24	27	29	31	34	36	38	40
65	11	11	11	13	16	18	21	23	25	28	30	33	35	37	40	42
70	11	11	11	14	16	19	21	24	26	29	31	34	36	39	41	44
75	11	11	12	14	17	19	22	25	27	30	32	35	38	40	43	45
80	11	11	12	14	17	20	23	25	28	31	33	36	39	41	44	47
85	11	11	12	15	18	20	23	26	29	31	34	37	40	43	45	48
90	11	11	12	15	18	21	24	27	29	32	35	38	41	44	47	50
95	11	11	12	15	18	21	24	27	30	33	36	39	42	45	48	51
100	11	11	13	16	19	22	25	28	31	34	37	40	43	46	49	-
105	11	11	13	16	19	22	25	28	31	34	38	41	44	47	50	-
110	11	11	13	16	19	22	26	29	32	35	38	41	45	48	51	-
115	11	11	13	16	20	23	26	29	32	36	39	42	45	49	-	-
120	11	11	13	17	20	23	26	30	33	36	40	43	46	49	-	-
125	11	11	13	17	20	23	27	30	34	37	40	44	47	50	-	-
130	11	11	14	17	20	24	27	31	34	37	41	44	48	51	-	-
135	11	11	14	17	21	24	28	31	34	38	41	45	48	-	-	-
140	11	11	14	17	21	24	28	31	35	38	42	45	49	-	-	-
145	11	11	14	18	21	25	28	32	35	39	42	46	50	-	-	-
150	11	11	14	18	21	25	28	32	36	39	43	47	50	-	-	-
155	11	11	14	18	22	25	29	32	36	40	43	47	51	-	-	-
160	11	11	14	18	22	25	29	33	36	40	44	48	-	-	-	-
165	11	11	14	18	22	26	29	33	37	41	44	48	-	-	-	-
170	11	11	15	18	22	26	30	33	37	41	45	48	-	-	-	-
175	11	11	15	18	22	26	30	34	37	41	45	49	-	-	-	-
180	11	11	15	19	22	26	30	34	38	42	45	49	-	-	-	-
185	11	11	15	19	23	26	30	34	38	42	46	50	-	-	-	-
190	11	11	15	19	23	27	31	34	38	42	46	50	-	-	-	-
195	11	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-
200	11	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-
205	11	11	15	19	23	27	31	35	39	43	47	-	-	-	-	-
210	11	11	15	19	23	27	31	35	39	44	48	-	-	-	-	-
215	11	11	15	19	23	28	32	36	40	44	48	-	-	-	-	-
220	11	11	15	19	24	28	32	36	40	44	48	-	-	-	-	-
225	11	11	15	20	24	28	32	36	40	44	48	-	-	-	-	-
230	11	11	16	20	24	28	32	36	40	45	49	-	-	-	-	-
235	11	11	16	20	24	28	32	36	41	45	49	-	-	-	-	-
240	11	11	16	20	24	28	32	37	41	45	49	-	-	-	-	-
245	11	11	16	20	24	28	33	37	41	45	50	-	-	-	-	-
250	11	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-
255	11	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-
260	11	12	16	20	24	29	33	37	42	46	50	-	-	-	-	-
265	11	12	16	20	25	29	33	38	42	46	50	-	-	-	-	-
270	11	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-
275	11	12	16	20	25	29	33	38	42	47	51	-	-	-	-	-
280	11	12	16	20	25	29	34	38	42	47	51	-	-	-	-	-
285	11	12	16	21	25	29	34	38	43	47	-	-	-	-	-	-
290	11	12	16	21	25	29	34	38	43	47	-	-	-	-	-	-
295	11	12	16	21	25	30	34	38	43	47	-	-	-	-	-	-
300	11	12	16	21	25	30	34	39	43	47	-	-	-	-	-	-
305	11	12	16	21	25	30	34	39	43	48	-	-	-	-	-	-
310	11	12	16	21	25	30	34	39	43	48	-	-	-	-	-	-
315	11	12	16	21	25	30	34	39	43	48	-	-	-	-	-	-
320	11	12	16	21	25	30	35	39	44	48	-	-	-	-	-	-
325	11	12	17	21	26	30	35	39	44	48	-	-	-	-	-	-
330	11	12	17	21	26	30	35	39	44	48	-	-	-	-	-	-
335	11	12	17	21	26	30	35	39	44	49	-	-	-	-	-	-
340	11	12	17	21	26	30	35	40	44	49	-	-	-	-	-	-
345	11	12	17	21	26	30	35	40	44	49	-	-	-	-	-	-
350	11	12	17	21	26	31	35	40	44	49	-	-	-	-	-	-
355	11	12	17	21	26	31	35	40	44	49	-	-	-	-	-	-
360	11	12	17	21	26	31	35	40	45	49	-	-	-	-	-	-

Table A.2.9: Resistance to fire of H/I-section columns for design steel temperature 650 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 650 ºC															
57	11	11	11	12	14	16	18	20	22	25	27	29	31	33	35	37
60	11	11	11	12	14	16	19	21	23	25	27	30	32	34	36	38
65	11	11	11	12	15	17	19	22	24	26	29	31	33	35	38	40
70	11	11	11	13	15	18	20	22	25	27	30	32	34	37	39	42
75	11	11	11	13	16	18	21	23	26	28	31	33	36	38	41	43
80	11	11	11	13	16	19	21	24	26	29	32	34	37	39	42	45
85	11	11	11	14	16	19	22	25	27	30	33	35	38	41	43	46
90	11	11	11	14	17	20	22	25	28	31	33	36	39	42	45	47
95	11	11	11	14	17	20	23	26	29	31	34	37	40	43	46	49
100	11	11	12	15	18	20	23	26	29	32	35	38	41	44	47	50
105	11	11	12	15	18	21	24	27	30	33	36	39	42	45	48	51
110	11	11	12	15	18	21	24	27	30	34	37	40	43	46	49	-
115	11	11	12	15	18	22	25	28	31	34	37	40	44	47	50	-
120	11	11	12	15	19	22	25	28	32	35	38	41	44	48	51	-
125	11	11	12	16	19	22	25	29	32	35	39	42	45	48	-	-
130	11	11	13	16	19	23	26	29	33	36	39	43	46	49	-	-
135	11	11	13	16	19	23	26	30	33	36	40	43	47	50	-	-
140	11	11	13	16	20	23	27	30	33	37	40	44	47	51	-	-
145	11	11	13	16	20	23	27	30	34	37	41	44	48	-	-	-
150	11	11	13	17	20	24	27	31	34	38	41	45	48	-	-	-
155	11	11	13	17	20	24	28	31	35	38	42	45	49	-	-	-
160	11	11	13	17	21	24	28	31	35	39	42	46	50	-	-	-
165	11	11	13	17	21	24	28	32	35	39	43	46	50	-	-	-
170	11	11	13	17	21	25	28	32	36	40	43	47	51	-	-	-
175	11	11	14	17	21	25	29	32	36	40	44	47	-	-	-	-
180	11	11	14	17	21	25	29	33	36	40	44	48	-	-	-	-
185	11	11	14	18	21	25	29	33	37	41	44	48	-	-	-	-
190	11	11	14	18	22	25	29	33	37	41	45	49	-	-	-	-
195	11	11	14	18	22	26	30	34	37	41	45	49	-	-	-	-
200	11	11	14	18	22	26	30	34	38	42	46	50	-	-	-	-
205	11	11	14	18	22	26	30	34	38	42	46	50	-	-	-	-
210	11	11	14	18	22	26	30	34	38	42	46	50	-	-	-	-
215	11	11	14	18	22	26	30	34	39	43	47	51	-	-	-	-
220	11	11	14	18	22	27	31	35	39	43	47	51	-	-	-	-
225	11	11	14	18	23	27	31	35	39	43	47	-	-	-	-	-
230	11	11	14	19	23	27	31	35	39	43	48	-	-	-	-	-
235	11	11	14	19	23	27	31	35	40	44	48	-	-	-	-	-
240	11	11	15	19	23	27	31	36	40	44	48	-	-	-	-	-
245	11	11	15	19	23	27	32	36	40	44	48	-	-	-	-	-
250	11	11	15	19	23	27	32	36	40	44	49	-	-	-	-	-
255	11	11	15	19	23	28	32	36	40	45	49	-	-	-	-	-
260	11	11	15	19	23	28	32	36	41	45	49	-	-	-	-	-
265	11	11	15	19	23	28	32	36	41	45	49	-	-	-	-	-
270	11	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-
275	11	11	15	19	24	28	32	37	41	46	50	-	-	-	-	-
280	11	11	15	19	24	28	33	37	41	46	50	-	-	-	-	-
285	11	11	15	19	24	28	33	37	42	46	50	-	-	-	-	-
290	11	11	15	20	24	28	33	37	42	46	51	-	-	-	-	-
295	11	11	15	20	24	29	33	37	42	46	51	-	-	-	-	-
300	11	11	15	20	24	29	33	38	42	46	51	-	-	-	-	-
305	11	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-
310	11	11	15	20	24	29	33	38	42	47	-	-	-	-	-	-
315	11	11	15	20	24	29	33	38	42	47	-	-	-	-	-	-
320	11	11	15	20	24	29	34	38	43	47	-	-	-	-	-	-
325	11	11	15	20	25	29	34	38	43	47	-	-	-	-	-	-
330	11	11	15	20	25	29	34	38	43	48	-	-	-	-	-	-
335	11	11	15	20	25	29	34	38	43	48	-	-	-	-	-	-
340	11	11	16	20	25	29	34	39	43	48	-	-	-	-	-	-
345	11	11	16	20	25	29	34	39	43	48	-	-	-	-	-	-
350	11	11	16	20	25	30	34	39	43	48	-	-	-	-	-	-
355	11	11	16	20	25	30	34	39	44	48	-	-	-	-	-	-
360	11	11	16	20	25	30	34	39	44	48	-	-	-	-	-	-

Table A.2.10: Resistance to fire of H/I-section beams for design steel temperature 350 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 350 ºC															
64	10	13	16	20	23	26	29	32	35	39	42	45	48	51	-	-
65	10	13	17	20	23	26	29	32	36	39	42	45	48	51	-	-
70	10	14	17	20	23	27	30	33	36	40	43	46	49	53	-	-
75	11	14	17	21	24	27	30	34	37	40	44	47	50	54	-	-
80	11	14	18	21	24	28	31	34	38	41	45	48	51	-	-	-
85	11	14	18	21	25	28	32	35	38	42	45	49	52	-	-	-
90	11	15	18	22	25	29	32	36	39	43	46	50	53	-	-	-
95	11	15	18	22	25	29	32	36	40	43	47	50	54	-	-	-
100	11	15	18	22	26	29	33	36	40	44	47	51	-	-	-	-
105	11	15	19	22	26	30	33	37	40	44	48	51	-	-	-	-
110	11	15	19	22	26	30	34	37	41	45	48	52	-	-	-	-
115	12	15	19	23	26	30	34	38	41	45	49	52	-	-	-	-
120	12	15	19	23	27	30	34	38	42	45	49	53	-	-	-	-
125	12	15	19	23	27	31	34	38	42	46	50	53	-	-	-	-
130	12	16	19	23	27	31	35	39	42	46	50	-	-	-	-	-
135	12	16	20	23	27	31	35	39	43	47	50	-	-	-	-	-
140	12	16	20	24	27	31	35	39	43	47	51	-	-	-	-	-
145	12	16	20	24	28	32	35	39	43	47	51	-	-	-	-	-
150	12	16	20	24	28	32	36	40	44	47	51	-	-	-	-	-
155	12	16	20	24	28	32	36	40	44	48	52	-	-	-	-	-
160	12	16	20	24	28	32	36	40	44	48	52	-	-	-	-	-
165	12	16	20	24	28	32	36	40	44	48	52	-	-	-	-	-
170	12	16	20	24	28	32	36	40	44	48	52	-	-	-	-	-
175	12	16	20	24	28	32	37	41	45	49	53	-	-	-	-	-
180	12	16	20	25	29	33	37	41	45	49	53	-	-	-	-	-
185	12	16	21	25	29	33	37	41	45	49	53	-	-	-	-	-
190	12	17	21	25	29	33	37	41	45	49	53	-	-	-	-	-
195	12	17	21	25	29	33	37	41	45	49	54	-	-	-	-	-
200	12	17	21	25	29	33	37	41	45	50	54	-	-	-	-	-
205	13	17	21	25	29	33	37	41	46	50	-	-	-	-	-	-
210	13	17	21	25	29	33	37	42	46	50	-	-	-	-	-	-
215	13	17	21	25	29	33	38	42	46	50	-	-	-	-	-	-
220	13	17	21	25	29	34	38	42	46	50	-	-	-	-	-	-
225	13	17	21	25	29	34	38	42	46	50	-	-	-	-	-	-
230	13	17	21	25	29	34	38	42	46	51	-	-	-	-	-	-
235	13	17	21	25	30	34	38	42	46	51	-	-	-	-	-	-
240	13	17	21	25	30	34	38	42	47	51	-	-	-	-	-	-
245	13	17	21	25	30	34	38	42	47	51	-	-	-	-	-	-
250	13	17	21	26	30	34	38	43	47	51	-	-	-	-	-	-
255	13	17	21	26	30	34	38	43	47	51	-	-	-	-	-	-
260	13	17	21	26	30	34	38	43	47	51	-	-	-	-	-	-
265	13	17	21	26	30	34	39	43	47	51	-	-	-	-	-	-
270	13	17	21	26	30	34	39	43	47	51	-	-	-	-	-	-
275	13	17	21	26	30	34	39	43	47	52	-	-	-	-	-	-
280	13	17	22	26	30	34	39	43	47	52	-	-	-	-	-	-
285	13	17	22	26	30	34	39	43	47	52	-	-	-	-	-	-
290	13	17	22	26	30	35	39	43	48	52	-	-	-	-	-	-
295	13	17	22	26	30	35	39	43	48	52	-	-	-	-	-	-
300	13	17	22	26	30	35	39	43	48	52	-	-	-	-	-	-
305	13	17	22	26	30	35	39	43	48	52	-	-	-	-	-	-
310	13	17	22	26	30	35	39	43	48	52	-	-	-	-	-	-
315	13	17	22	26	30	35	39	44	48	52	-	-	-	-	-	-
320	13	17	22	26	31	35	39	44	48	52	-	-	-	-	-	-
325	13	17	22	26	31	35	39	44	48	52	-	-	-	-	-	-
330	13	17	22	26	31	35	39	44	48	52	-	-	-	-	-	-
335	13	17	22	26	31	35	39	44	48	53	-	-	-	-	-	-
340	13	17	22	26	31	35	39	44	48	53	-	-	-	-	-	-
345	13	18	22	26	31	35	39	44	48	53	-	-	-	-	-	-
350	13	18	22	26	31	35	40	44	48	53	-	-	-	-	-	-
355	13	18	22	26	31	35	40	44	48	53	-	-	-	-	-	-
360	13	18	22	26	31	35	40	44	48	53	-	-	-	-	-	-

Table A.2.11: Resistance to fire of H/I-section beams for design steel temperature 400 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 400 ºC															
64	10	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
65	10	12	15	18	21	24	27	30	33	36	39	42	45	48	51	-
70	10	12	16	19	22	25	28	31	34	37	40	43	46	49	52	-
75	10	13	16	19	22	25	28	32	35	38	41	44	47	50	54	-
80	10	13	16	19	23	26	29	32	35	39	42	45	48	52	-	-
85	10	13	16	20	23	26	30	33	36	39	43	46	49	53	-	-
90	10	13	17	20	23	27	30	33	37	40	43	47	50	54	-	-
95	10	13	17	20	24	27	31	34	37	41	44	48	51	-	-	-
100	10	14	17	21	24	28	31	34	38	41	45	48	52	-	-	-
105	10	14	17	21	24	28	31	35	38	42	45	49	52	-	-	-
110	10	14	17	21	25	28	32	35	39	42	46	50	53	-	-	-
115	10	14	18	21	25	29	32	36	39	43	47	50	-	-	-	-
120	11	14	18	21	25	29	32	36	40	43	47	51	-	-	-	-
125	11	14	18	22	25	29	33	36	40	44	48	51	-	-	-	-
130	11	14	18	22	26	29	33	37	41	44	48	52	-	-	-	-
135	11	15	18	22	26	30	33	37	41	45	48	52	-	-	-	-
140	11	15	18	22	26	30	34	37	41	45	49	53	-	-	-	-
145	11	15	19	22	26	30	34	38	42	45	49	53	-	-	-	-
150	11	15	19	23	26	30	34	38	42	46	50	53	-	-	-	-
155	11	15	19	23	27	30	34	38	42	46	50	-	-	-	-	-
160	11	15	19	23	27	31	35	38	42	46	50	-	-	-	-	-
165	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-	-
170	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-	-
175	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-	-
180	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-	-
185	11	15	19	23	27	31	35	40	44	48	52	-	-	-	-	-
190	11	15	19	23	28	32	36	40	44	48	52	-	-	-	-	-
195	11	15	19	24	28	32	36	40	44	48	52	-	-	-	-	-
200	11	15	20	24	28	32	36	40	44	48	52	-	-	-	-	-
205	11	16	20	24	28	32	36	40	44	48	53	-	-	-	-	-
210	11	16	20	24	28	32	36	40	44	49	53	-	-	-	-	-
215	11	16	20	24	28	32	36	41	45	49	53	-	-	-	-	-
220	12	16	20	24	28	32	36	41	45	49	53	-	-	-	-	-
225	12	16	20	24	28	32	37	41	45	49	53	-	-	-	-	-
230	12	16	20	24	28	33	37	41	45	49	54	-	-	-	-	-
235	12	16	20	24	28	33	37	41	45	49	54	-	-	-	-	-
240	12	16	20	24	29	33	37	41	45	50	-	-	-	-	-	-
245	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-	-
250	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-	-
255	12	16	20	24	29	33	37	42	46	50	-	-	-	-	-	-
260	12	16	20	25	29	33	37	42	46	50	-	-	-	-	-	-
265	12	16	20	25	29	33	37	42	46	50	-	-	-	-	-	-
270	12	16	20	25	29	33	38	42	46	50	-	-	-	-	-	-
275	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-	-
280	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-	-
285	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-	-
290	12	16	21	25	29	34	38	42	47	51	-	-	-	-	-	-
295	12	16	21	25	29	34	38	42	47	51	-	-	-	-	-	-
300	12	16	21	25	29	34	38	42	47	51	-	-	-	-	-	-
305	12	16	21	25	29	34	38	42	47	51	-	-	-	-	-	-
310	12	16	21	25	29	34	38	43	47	51	-	-	-	-	-	-
315	12	16	21	25	29	34	38	43	47	51	-	-	-	-	-	-
320	12	16	21	25	30	34	38	43	47	52	-	-	-	-	-	-
325	12	16	21	25	30	34	38	43	47	52	-	-	-	-	-	-
330	12	16	21	25	30	34	38	43	47	52	-	-	-	-	-	-
335	12	16	21	25	30	34	39	43	47	52	-	-	-	-	-	-
340	12	16	21	25	30	34	39	43	47	52	-	-	-	-	-	-
345	12	16	21	25	30	34	39	43	47	52	-	-	-	-	-	-
350	12	16	21	25	30	34	39	43	48	52	-	-	-	-	-	-
355	12	17	21	25	30	34	39	43	48	52	-	-	-	-	-	-
360	12	17	21	25	30	34	39	43	48	52	-	-	-	-	-	-

Table A.2.12: Resistance to fire of H/I-section beams for design steel temperature 450 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 450 ºC															
64	10	11	14	17	19	22	25	28	31	33	36	39	42	45	47	50
65	10	11	14	17	20	22	25	28	31	34	36	39	42	45	48	50
70	10	11	14	17	20	23	26	29	32	35	38	40	43	46	49	52
75	10	12	15	18	21	24	27	30	33	36	39	42	45	47	50	53
80	10	12	15	18	21	24	27	30	33	36	39	43	46	49	52	-
85	10	12	15	18	21	25	28	31	34	37	40	43	47	50	53	-
90	10	12	15	19	22	25	28	31	35	38	41	44	48	51	-	-
95	10	12	16	19	22	25	29	32	35	39	42	45	48	52	-	-
100	10	13	16	19	23	26	29	33	36	39	43	46	49	53	-	-
105	10	13	16	19	23	26	30	33	36	40	43	47	50	53	-	-
110	10	13	16	20	23	27	30	34	37	40	44	47	51	-	-	-
115	10	13	16	20	23	27	30	34	37	41	44	48	52	-	-	-
120	10	13	17	20	24	27	31	34	38	41	45	49	52	-	-	-
125	10	13	17	20	24	28	31	35	38	42	46	49	53	-	-	-
130	10	13	17	21	24	28	31	35	39	42	46	50	53	-	-	-
135	10	13	17	21	24	28	32	35	39	43	47	50	-	-	-	-
140	10	13	17	21	25	28	32	36	40	43	47	51	-	-	-	-
145	10	14	17	21	25	29	32	36	40	44	47	51	-	-	-	-
150	10	14	17	21	25	29	33	36	40	44	48	52	-	-	-	-
155	10	14	18	21	25	29	33	37	41	44	48	52	-	-	-	-
160	10	14	18	22	25	29	33	37	41	45	49	52	-	-	-	-
165	10	14	18	22	26	29	33	37	41	45	49	53	-	-	-	-
170	10	14	18	22	26	30	34	37	41	45	49	53	-	-	-	-
175	10	14	18	22	26	30	34	38	42	46	50	53	-	-	-	-
180	10	14	18	22	26	30	34	38	42	46	50	-	-	-	-	-
185	10	14	18	22	26	30	34	38	42	46	50	-	-	-	-	-
190	10	14	18	22	26	30	34	38	42	46	50	-	-	-	-	-
195	10	14	18	22	26	30	35	39	43	47	51	-	-	-	-	-
200	10	14	18	22	27	31	35	39	43	47	51	-	-	-	-	-
205	10	14	18	23	27	31	35	39	43	47	51	-	-	-	-	-
210	10	14	19	23	27	31	35	39	43	47	51	-	-	-	-	-
215	10	15	19	23	27	31	35	39	43	48	52	-	-	-	-	-
220	10	15	19	23	27	31	35	39	44	48	52	-	-	-	-	-
225	10	15	19	23	27	31	35	40	44	48	52	-	-	-	-	-
230	10	15	19	23	27	31	36	40	44	48	52	-	-	-	-	-
235	11	15	19	23	27	32	36	40	44	48	53	-	-	-	-	-
240	11	15	19	23	27	32	36	40	44	48	53	-	-	-	-	-
245	11	15	19	23	27	32	36	40	44	49	53	-	-	-	-	-
250	11	15	19	23	28	32	36	40	45	49	53	-	-	-	-	-
255	11	15	19	23	28	32	36	40	45	49	53	-	-	-	-	-
260	11	15	19	23	28	32	36	41	45	49	53	-	-	-	-	-
265	11	15	19	24	28	32	36	41	45	49	54	-	-	-	-	-
270	11	15	19	24	28	32	37	41	45	49	54	-	-	-	-	-
275	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-	-
280	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-	-
285	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-	-
290	11	15	19	24	28	33	37	41	46	50	-	-	-	-	-	-
295	11	15	20	24	28	33	37	41	46	50	-	-	-	-	-	-
300	11	15	20	24	28	33	37	41	46	50	-	-	-	-	-	-
305	11	15	20	24	28	33	37	42	46	50	-	-	-	-	-	-
310	11	15	20	24	28	33	37	42	46	50	-	-	-	-	-	-
315	11	15	20	24	28	33	37	42	46	51	-	-	-	-	-	-
320	11	15	20	24	29	33	37	42	46	51	-	-	-	-	-	-
325	11	15	20	24	29	33	37	42	46	51	-	-	-	-	-	-
330	11	15	20	24	29	33	38	42	46	51	-	-	-	-	-	-
335	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
340	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
345	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
350	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
355	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-
360	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-	-

Table A.2.13: Resistance to fire of H/I-section beams for design steel temperature 500 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 500 ºC															
64	10	10	13	15	18	21	23	26	29	31	34	37	39	42	44	47
65	10	10	13	16	18	21	23	26	29	31	34	37	39	42	45	47
70	10	10	13	16	19	21	24	27	30	32	35	38	41	44	46	49
75	10	11	13	16	19	22	25	28	31	33	36	39	42	45	48	51
80	10	11	14	17	20	23	25	28	31	34	37	40	43	46	49	52
85	10	11	14	17	20	23	26	29	32	35	38	41	44	47	50	53
90	10	11	14	17	20	24	27	30	33	36	39	42	45	48	51	-
95	10	11	14	18	21	24	27	30	33	37	40	43	46	49	52	-
100	10	11	15	18	21	24	28	31	34	37	41	44	47	50	53	-
105	10	12	15	18	21	25	28	31	35	38	41	45	48	51	-	-
110	10	12	15	18	22	25	28	32	35	39	42	45	49	52	-	-
115	10	12	15	19	22	25	29	32	36	39	43	46	49	53	-	-
120	10	12	15	19	22	26	29	33	36	40	43	47	50	54	-	-
125	10	12	16	19	23	26	30	33	37	40	44	47	51	-	-	-
130	10	12	16	19	23	26	30	34	37	41	44	48	51	-	-	-
135	10	12	16	20	23	27	30	34	38	41	45	48	52	-	-	-
140	10	12	16	20	23	27	31	34	38	42	45	49	53	-	-	-
145	10	12	16	20	24	27	31	35	38	42	46	49	53	-	-	-
150	10	13	16	20	24	27	31	35	39	42	46	50	54	-	-	-
155	10	13	16	20	24	28	31	35	39	43	47	50	-	-	-	-
160	10	13	17	20	24	28	32	36	39	43	47	51	-	-	-	-
165	10	13	17	20	24	28	32	36	40	43	47	51	-	-	-	-
170	10	13	17	21	24	28	32	36	40	44	48	52	-	-	-	-
175	10	13	17	21	25	29	32	36	40	44	48	52	-	-	-	-
180	10	13	17	21	25	29	33	37	41	44	48	52	-	-	-	-
185	10	13	17	21	25	29	33	37	41	45	49	53	-	-	-	-
190	10	13	17	21	25	29	33	37	41	45	49	53	-	-	-	-
195	10	13	17	21	25	29	33	37	41	45	49	53	-	-	-	-
200	10	13	17	21	25	29	33	37	42	46	50	54	-	-	-	-
205	10	13	17	21	25	30	34	38	42	46	50	-	-	-	-	-
210	10	13	17	22	26	30	34	38	42	46	50	-	-	-	-	-
215	10	13	18	22	26	30	34	38	42	46	50	-	-	-	-	-
220	10	13	18	22	26	30	34	38	42	47	51	-	-	-	-	-
225	10	14	18	22	26	30	34	38	43	47	51	-	-	-	-	-
230	10	14	18	22	26	30	34	39	43	47	51	-	-	-	-	-
235	10	14	18	22	26	30	35	39	43	47	51	-	-	-	-	-
240	10	14	18	22	26	30	35	39	43	47	52	-	-	-	-	-
245	10	14	18	22	26	31	35	39	43	48	52	-	-	-	-	-
250	10	14	18	22	26	31	35	39	43	48	52	-	-	-	-	-
255	10	14	18	22	27	31	35	39	44	48	52	-	-	-	-	-
260	10	14	18	22	27	31	35	40	44	48	52	-	-	-	-	-
265	10	14	18	22	27	31	35	40	44	48	53	-	-	-	-	-
270	10	14	18	23	27	31	35	40	44	48	53	-	-	-	-	-
275	10	14	18	23	27	31	36	40	44	49	53	-	-	-	-	-
280	10	14	18	23	27	31	36	40	44	49	53	-	-	-	-	-
285	10	14	18	23	27	31	36	40	45	49	53	-	-	-	-	-
290	10	14	18	23	27	32	36	40	45	49	53	-	-	-	-	-
295	10	14	18	23	27	32	36	40	45	49	54	-	-	-	-	-
300	10	14	18	23	27	32	36	40	45	49	54	-	-	-	-	-
305	10	14	19	23	27	32	36	41	45	49	-	-	-	-	-	-
310	10	14	19	23	27	32	36	41	45	50	-	-	-	-	-	-
315	10	14	19	23	27	32	36	41	45	50	-	-	-	-	-	-
320	10	14	19	23	28	32	36	41	45	50	-	-	-	-	-	-
325	10	14	19	23	28	32	37	41	45	50	-	-	-	-	-	-
330	10	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
335	10	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
340	10	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
345	10	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
350	10	14	19	23	28	32	37	41	46	50	-	-	-	-	-	-
355	10	14	19	23	28	32	37	42	46	51	-	-	-	-	-	-
360	10	14	19	23	28	33	37	42	46	51	-	-	-	-	-	-

Table A.2.14: Resistance to fire of H/I-section beams for design steel temperature 550 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 550 ºC															
64	10	10	12	14	17	19	22	24	27	29	32	34	37	39	42	44
65	10	10	12	14	17	19	22	24	27	30	32	35	37	40	42	45
70	10	10	12	15	17	20	23	25	28	31	33	36	38	41	44	46
75	10	10	12	15	18	21	23	26	29	32	34	37	40	42	45	48
80	10	10	13	16	18	21	24	27	30	32	35	38	41	44	46	49
85	10	10	13	16	19	22	25	27	30	33	36	39	42	45	48	51
90	10	10	13	16	19	22	25	28	31	34	37	40	43	46	49	52
95	10	10	13	16	20	23	26	29	32	35	38	41	44	47	50	53
100	10	10	14	17	20	23	26	29	32	35	39	42	45	48	51	-
105	10	11	14	17	20	23	27	30	33	36	39	43	46	49	52	-
110	10	11	14	17	20	24	27	30	34	37	40	43	47	50	53	-
115	10	11	14	17	21	24	27	31	34	37	41	44	47	51	-	-
120	10	11	14	18	21	24	28	31	35	38	41	45	48	51	-	-
125	10	11	14	18	21	25	28	32	35	38	42	45	49	52	-	-
130	10	11	15	18	22	25	29	32	36	39	42	46	49	53	-	-
135	10	11	15	18	22	25	29	32	36	39	43	47	50	54	-	-
140	10	11	15	18	22	26	29	33	36	40	44	47	51	-	-	-
145	10	11	15	19	22	26	30	33	37	40	44	48	51	-	-	-
150	10	12	15	19	22	26	30	33	37	41	44	48	52	-	-	-
155	10	12	15	19	23	26	30	34	38	41	45	49	52	-	-	-
160	10	12	15	19	23	27	30	34	38	42	45	49	53	-	-	-
165	10	12	16	19	23	27	31	34	38	42	46	50	53	-	-	-
170	10	12	16	19	23	27	31	35	39	42	46	50	-	-	-	-
175	10	12	16	20	23	27	31	35	39	43	47	50	-	-	-	-
180	10	12	16	20	24	27	31	35	39	43	47	51	-	-	-	-
185	10	12	16	20	24	28	32	36	39	43	47	51	-	-	-	-
190	10	12	16	20	24	28	32	36	40	44	48	52	-	-	-	-
195	10	12	16	20	24	28	32	36	40	44	48	52	-	-	-	-
200	10	12	16	20	24	28	32	36	40	44	48	52	-	-	-	-
205	10	12	16	20	24	28	32	36	40	45	49	53	-	-	-	-
210	10	12	16	20	24	29	33	37	41	45	49	53	-	-	-	-
215	10	12	16	21	25	29	33	37	41	45	49	53	-	-	-	-
220	10	12	16	21	25	29	33	37	41	45	49	54	-	-	-	-
225	10	12	17	21	25	29	33	37	41	46	50	-	-	-	-	-
230	10	12	17	21	25	29	33	37	42	46	50	-	-	-	-	-
235	10	13	17	21	25	29	33	38	42	46	50	-	-	-	-	-
240	10	13	17	21	25	29	34	38	42	46	50	-	-	-	-	-
245	10	13	17	21	25	30	34	38	42	46	51	-	-	-	-	-
250	10	13	17	21	25	30	34	38	42	47	51	-	-	-	-	-
255	10	13	17	21	25	30	34	38	43	47	51	-	-	-	-	-
260	10	13	17	21	26	30	34	38	43	47	51	-	-	-	-	-
265	10	13	17	21	26	30	34	39	43	47	52	-	-	-	-	-
270	10	13	17	21	26	30	34	39	43	47	52	-	-	-	-	-
275	10	13	17	21	26	30	35	39	43	48	52	-	-	-	-	-
280	10	13	17	22	26	30	35	39	43	48	52	-	-	-	-	-
285	10	13	17	22	26	30	35	39	44	48	52	-	-	-	-	-
290	10	13	17	22	26	30	35	39	44	48	52	-	-	-	-	-
295	10	13	17	22	26	31	35	39	44	48	53	-	-	-	-	-
300	10	13	17	22	26	31	35	40	44	48	53	-	-	-	-	-
305	10	13	17	22	26	31	35	40	44	49	53	-	-	-	-	-
310	10	13	17	22	26	31	35	40	44	49	53	-	-	-	-	-
315	10	13	18	22	26	31	35	40	44	49	53	-	-	-	-	-
320	10	13	18	22	27	31	35	40	44	49	53	-	-	-	-	-
325	10	13	18	22	27	31	36	40	45	49	54	-	-	-	-	-
330	10	13	18	22	27	31	36	40	45	49	54	-	-	-	-	-
335	10	13	18	22	27	31	36	40	45	49	-	-	-	-	-	-
340	10	13	18	22	27	31	36	40	45	49	-	-	-	-	-	-
345	10	13	18	22	27	31	36	40	45	50	-	-	-	-	-	-
350	10	13	18	22	27	31	36	41	45	50	-	-	-	-	-	-
355	10	13	18	22	27	32	36	41	45	50	-	-	-	-	-	-
360	10	13	18	22	27	32	36	41	45	50	-	-	-	-	-	-

Table A.2.15: Resistance to fire of H/I-section beams for design steel temperature 600 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 600 ºC															
64	10	10	11	13	16	18	20	23	25	28	30	32	35	37	39	42
65	10	10	11	13	16	18	21	23	25	28	30	33	35	37	40	42
70	10	10	11	14	16	19	21	24	26	29	31	34	36	39	41	44
75	10	10	12	14	17	19	22	25	27	30	32	35	38	40	43	45
80	10	10	12	14	17	20	23	25	28	31	33	36	39	41	44	47
85	10	10	12	15	18	20	23	26	29	31	34	37	40	43	45	48
90	10	10	12	15	18	21	24	27	29	32	35	38	41	44	47	50
95	10	10	12	15	18	21	24	27	30	33	36	39	42	45	48	51
100	10	10	13	16	19	22	25	28	31	34	37	40	43	46	49	52
105	10	10	13	16	19	22	25	28	31	34	38	41	44	47	50	53
110	10	10	13	16	19	22	26	29	32	35	38	41	45	48	51	-
115	10	10	13	16	20	23	26	29	32	36	39	42	45	49	52	-
120	10	10	13	17	20	23	26	30	33	36	40	43	46	49	53	-
125	10	10	13	17	20	23	27	30	34	37	40	44	47	50	54	-
130	10	10	14	17	20	24	27	31	34	37	41	44	48	51	-	-
135	10	10	14	17	21	24	28	31	34	38	41	45	48	52	-	-
140	10	10	14	17	21	24	28	31	35	38	42	45	49	52	-	-
145	10	10	14	18	21	25	28	32	35	39	42	46	50	53	-	-
150	10	10	14	18	21	25	28	32	36	39	43	47	50	54	-	-
155	10	11	14	18	22	25	29	32	36	40	43	47	51	-	-	-
160	10	11	14	18	22	25	29	33	36	40	44	48	51	-	-	-
165	10	11	14	18	22	26	29	33	37	41	44	48	52	-	-	-
170	10	11	15	18	22	26	30	33	37	41	45	48	52	-	-	-
175	10	11	15	18	22	26	30	34	37	41	45	49	53	-	-	-
180	10	11	15	19	22	26	30	34	38	42	45	49	53	-	-	-
185	10	11	15	19	23	26	30	34	38	42	46	50	54	-	-	-
190	10	11	15	19	23	27	31	34	38	42	46	50	-	-	-	-
195	10	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-
200	10	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-
205	10	11	15	19	23	27	31	35	39	43	47	51	-	-	-	-
210	10	11	15	19	23	27	31	35	39	44	48	52	-	-	-	-
215	10	11	15	19	23	28	32	36	40	44	48	52	-	-	-	-
220	10	11	15	19	24	28	32	36	40	44	48	52	-	-	-	-
225	10	11	15	20	24	28	32	36	40	44	48	53	-	-	-	-
230	10	11	16	20	24	28	32	36	40	45	49	53	-	-	-	-
235	10	11	16	20	24	28	32	36	41	45	49	53	-	-	-	-
240	10	11	16	20	24	28	32	37	41	45	49	53	-	-	-	-
245	10	11	16	20	24	28	33	37	41	45	50	54	-	-	-	-
250	10	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-
255	10	12	16	20	24	29	33	37	41	46	50	-	-	-	-	-
260	10	12	16	20	24	29	33	37	42	46	50	-	-	-	-	-
265	10	12	16	20	25	29	33	38	42	46	50	-	-	-	-	-
270	10	12	16	20	25	29	33	38	42	46	51	-	-	-	-	-
275	10	12	16	20	25	29	33	38	42	47	51	-	-	-	-	-
280	10	12	16	20	25	29	34	38	42	47	51	-	-	-	-	-
285	10	12	16	21	25	29	34	38	43	47	51	-	-	-	-	-
290	10	12	16	21	25	29	34	38	43	47	52	-	-	-	-	-
295	10	12	16	21	25	30	34	38	43	47	52	-	-	-	-	-
300	10	12	16	21	25	30	34	39	43	47	52	-	-	-	-	-
305	10	12	16	21	25	30	34	39	43	48	52	-	-	-	-	-
310	10	12	16	21	25	30	34	39	43	48	52	-	-	-	-	-
315	10	12	16	21	25	30	34	39	43	48	52	-	-	-	-	-
320	10	12	16	21	25	30	35	39	44	48	53	-	-	-	-	-
325	10	12	17	21	26	30	35	39	44	48	53	-	-	-	-	-
330	10	12	17	21	26	30	35	39	44	48	53	-	-	-	-	-
335	10	12	17	21	26	30	35	39	44	49	53	-	-	-	-	-
340	10	12	17	21	26	30	35	40	44	49	53	-	-	-	-	-
345	10	12	17	21	26	30	35	40	44	49	53	-	-	-	-	-
350	10	12	17	21	26	31	35	40	44	49	54	-	-	-	-	-
355	10	12	17	21	26	31	35	40	44	49	54	-	-	-	-	-
360	10	12	17	21	26	31	35	40	45	49	-	-	-	-	-	-

Table A.2.16: Resistance to fire of H/I-section beams for design steel temperature 650 ºC.

Section factor A_m/V (m^{-1})	Fire resistance period (minutes)															
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240
	SLV Internal thickness (mm) for a design temperature of 650 ºC															
64	10	10	10	12	15	17	19	21	24	26	28	31	33	35	37	40
65	10	10	10	12	15	17	19	22	24	26	29	31	33	35	38	40
70	10	10	10	13	15	18	20	22	25	27	30	32	34	37	39	42
75	10	10	11	13	16	18	21	23	26	28	31	33	36	38	41	43
80	10	10	11	13	16	19	21	24	26	29	32	34	37	39	42	45
85	10	10	11	14	16	19	22	25	27	30	33	35	38	41	43	46
90	10	10	11	14	17	20	22	25	28	31	33	36	39	42	45	47
95	10	10	11	14	17	20	23	26	29	31	34	37	40	43	46	49
100	10	10	12	15	18	20	23	26	29	32	35	38	41	44	47	50
105	10	10	12	15	18	21	24	27	30	33	36	39	42	45	48	51
110	10	10	12	15	18	21	24	27	30	34	37	40	43	46	49	52
115	10	10	12	15	18	22	25	28	31	34	37	40	44	47	50	53
120	10	10	12	15	19	22	25	28	32	35	38	41	44	48	51	-
125	10	10	12	16	19	22	25	29	32	35	39	42	45	48	52	-
130	10	10	13	16	19	23	26	29	33	36	39	43	46	49	52	-
135	10	10	13	16	19	23	26	30	33	36	40	43	47	50	53	-
140	10	10	13	16	20	23	27	30	33	37	40	44	47	51	-	-
145	10	10	13	16	20	23	27	30	34	37	41	44	48	51	-	-
150	10	10	13	17	20	24	27	31	34	38	41	45	48	52	-	-
155	10	10	13	17	20	24	28	31	35	38	42	45	49	53	-	-
160	10	10	13	17	21	24	28	31	35	39	42	46	50	53	-	-
165	10	10	13	17	21	24	28	32	35	39	43	46	50	-	-	-
170	10	10	13	17	21	25	28	32	36	40	43	47	51	-	-	-
175	10	10	14	17	21	25	29	32	36	40	44	47	51	-	-	-
180	10	10	14	17	21	25	29	33	36	40	44	48	52	-	-	-
185	10	10	14	18	21	25	29	33	37	41	44	48	52	-	-	-
190	10	10	14	18	22	25	29	33	37	41	45	49	53	-	-	-
195	10	10	14	18	22	26	30	34	37	41	45	49	53	-	-	-
200	10	10	14	18	22	26	30	34	38	42	46	50	54	-	-	-
205	10	10	14	18	22	26	30	34	38	42	46	50	-	-	-	-
210	10	10	14	18	22	26	30	34	38	42	46	50	-	-	-	-
215	10	10	14	18	22	26	30	34	39	43	47	51	-	-	-	-
220	10	10	14	18	22	27	31	35	39	43	47	51	-	-	-	-
225	10	10	14	18	23	27	31	35	39	43	47	51	-	-	-	-
230	10	10	14	19	23	27	31	35	39	43	48	52	-	-	-	-
235	10	10	14	19	23	27	31	35	40	44	48	52	-	-	-	-
240	10	10	15	19	23	27	31	36	40	44	48	52	-	-	-	-
245	10	10	15	19	23	27	32	36	40	44	48	53	-	-	-	-
250	10	10	15	19	23	27	32	36	40	44	49	53	-	-	-	-
255	10	10	15	19	23	28	32	36	40	45	49	53	-	-	-	-
260	10	10	15	19	23	28	32	36	41	45	49	53	-	-	-	-
265	10	11	15	19	23	28	32	36	41	45	49	54	-	-	-	-
270	10	11	15	19	24	28	32	37	41	45	50	-	-	-	-	-
275	10	11	15	19	24	28	32	37	41	46	50	-	-	-	-	-
280	10	11	15	19	24	28	33	37	41	46	50	-	-	-	-	-
285	10	11	15	19	24	28	33	37	42	46	50	-	-	-	-	-
290	10	11	15	20	24	28	33	37	42	46	51	-	-	-	-	-
295	10	11	15	20	24	29	33	37	42	46	51	-	-	-	-	-
300	10	11	15	20	24	29	33	38	42	46	51	-	-	-	-	-
305	10	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-
310	10	11	15	20	24	29	33	38	42	47	51	-	-	-	-	-
315	10	11	15	20	24	29	33	38	42	47	52	-	-	-	-	-
320	10	11	15	20	24	29	34	38	43	47	52	-	-	-	-	-
325	10	11	15	20	25	29	34	38	43	47	52	-	-	-	-	-
330	10	11	15	20	25	29	34	38	43	48	52	-	-	-	-	-
335	10	11	15	20	25	29	34	38	43	48	52	-	-	-	-	-
340	10	11	16	20	25	29	34	39	43	48	52	-	-	-	-	-
345	10	11	16	20	25	29	34	39	43	48	53	-	-	-	-	-
350	10	11	16	20	25	30	34	39	43	48	53	-	-	-	-	-
355	10	11	16	20	25	30	34	39	44	48	53	-	-	-	-	-
360	10	11	16	20	25	30	34	39	44	48	53	-	-	-	-	-