Warrington Certification
Holmesfield Road
Warrington
WA1 2DS
United Kingdom

T : +44 (0) 1925 646 669
W: www.warringtoncertification.com
E: etass@exova.com

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

Member of www.eota.eu

European Technical Assessment

ETA 12/0049
of 01/02/17

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: Warrington Certification	
Trade name of the construction product	**FIRETEX FX2002 and FIRETEX FX1002**
Product family to which the construction product belongs	35. Fire Protective Products Reactive Coating for the Fire Protection of Steel Elements
Manufacturer	**Sherwin-Williams Protective and Marine Coatings TowerWorks, Kestor Street, BL2 2AL, Bolton, UK**
Manufacturing plant(s)	**Sherwin-Williams Protective and Marine Coatings TowerWorks, Kestor Street, BL2 2AL, Bolton, UK**
This European Technical Assessment contains	39 pages including 1 Annex which form an integral part of this assessment.
	Annex B and Annex C contain confidential information and are not included in the European Technical Assessment when that assessment is publicly available.
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	ETAG 018-1 edition April 2013 and ETAG 018-2 edition November 2011 used as European Assessment Document (EAD)
This version replaces:	The previous ETApp with the same number issued on 30th June 2013

General Comments

1. This European Technical Assessment is issued by Warrington Certification on the basis ETAG 018 Fire Protective Products Part 1: General and Part 2: Reactive Coatings For Fire Protection of Steel Elements, Used as European Assessment Document.

2. This European Technical Assessment is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1.

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

4. Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identifies as such.

SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical Description of the Product

FIRETEX FX2002/FX1002 is a spray or brush/roller applied intumescent paint formulated for the fire protection of structural steel elements.

In accordance with ETAG 018-2 (foreword), FIRETEX FX2002/FX1002 may be considered as a reactive coating kit that includes one or more primers and/or topcoats (Option 3).

According to the manufacturer's declaration, the product specification has been compared with Annex XVII of REACH and the ECHA Candidate List of Substances of Very High Concern to verify that that it does not contain such substances.

2 Specification Of The Intended Use In Accordance With The Relevant EAD

The intended use of FIRETEX FX2002/FX1002 is to fire protect various sizes of structural steel 'I' and 'H' shaped beam and column sections and hollow (rectangular/square and circular) column sections for up to a fire resistance classification of R120 and for design temperatures in the range of 350°C to 750°C. Table of results for additional times also form part of the evaluation.

The fire protection coating has been exposed to the slowing heating regime (IncSlow) defined in Annex A of EN 13381-8 and has satisfied the requirements to provide classification according to EN 13501-2.

The fire protection coating in conjunction with FIRETEX C69 primer has a performance determined for a reaction to fire classification in accordance with EN 13501-1 of Class C-s1, d0.

The fire protection coating in conjunction with a galvanised steel substrate treated with Mordant Wash L703 has a performance determined for a reaction to fire classification in accordance with EN 13501-1 of Class B-s1, d0.

The fire protection coating in conjunction with FIRETEX C69 primer and Acrolon C237 topcoat has a performance determined for a reaction to fire classification in accordance with EN 13501-1 of Class B-s1, d0.

The provisions made in this ETA are based on an assumed working life of the applied coating for the intended use of 10 years, provided that it is subject to appropriate use and maintenance according to manufacturer's instruction. The indications given on the intended working life cannot be interpreted as a guarantee given by the producer, but are to be used as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

FIRETEX FX2002/FX1002 and the primers and topcoats mentioned in this document have been subjected to the identification testing in accordance with the methods of identification defined in Table 5.3 of ETAG 018 Part 2.

FIRETEX FX2002/FX1002 has been assessed as being compatible with the following primers and primer sets:

Primers and Primer Sets	
Primer Reference	**Primer Type**
Firetex C69	Two component epoxy[1]
Sherwin M600	Alkyd[1]
Macropoxy C400v3	Two component epoxy[1]
Zinc Clad IV E (80%)	Zinc rich epoxy[1]
Macropoxy C400v3 / Acrolon C137v2	(A multi-functional epoxy zinc phosphate primer / Fast drying acrylic urethane gloss finish)[2]
Mordant Wash L703 / Macropoxy K267 (galvanised)[4]	(Blue mordant solution / Two pack epoxy primer)[3]
Mordant Wash L703 (galvanised)[5]	Blue mordant solution[3]

[1] The generic approval is applicable to other primers from the same generic group. The approval does not cover galvanizes steel

[2] The approval is applicable to specific primer set. The approval does not cover galvanizes steel

[3] The approval is applicable to specific primer/primer set. The approval covers galvanizes steel

[4] Galvanised steel plate. Galvanised steel panel was cleaned with solution referenced 'Mordant Wash L703' before primer application

[5] Galvanised steel plate. Galvanised steel panel was cleaned with solution referenced 'Mordant Wash L703' before intumescent protection application

An alternative solvent system for the intumescent (referenced FIRETEX FX1002) has been tested and has been judged to meet the requirements for compatibility.

FIRETEX FX2002/FX1002 has been assessed as being compatible with the following top coats:

Top Coats	
Top Coat Reference[1]	**Top Coat Description**
FIRETEX M71V2	Sheen decorative topcoat
FIRETEX M71V3	Sheen decorative topcoat
Acrolon C137V2	Fast drying acrylic urethane gloss finish
Acrolon C237	Fast drying acrylic urethane sheen finish

[1] The approval is limited to the specific product.

FIRETEX FX2002/FX1002 has been assessed as having passed the requirements for durability according to ETAG 018 Part 2 with and without the following top coats:

Top Coat Reference[1]	**Top Coat Description**	**Durability Approvals Based On The Carried Out Testing**			
		Type Z_2	**Type Z_1**	**Type Y**	**Type X**
No Top Coat	-	✓	✓		
FIRETEX M71V2	Sheen decorative topcoat	✓	✓	✓	
FIRETEX M71V3	Sheen decorative topcoat	✓	✓	✓	
Acrolon C137V2	Fast drying acrylic urethane gloss finish	✓	✓	✓	✓ (two coats)
Acrolon C237	Fast drying acrylic urethane sheen finish	✓	✓	✓	✓ (two coats)

[1] The approval is limited to the specific product.

3 Performance Of The Product And References To The Methods Used For Its Assessment

Product: Reactive coating		Intended use: Fire protection of structural steel elements
Verification method	Product characteristic	Performance
MECHANICAL RESISTANCE AND STABILITY		
-	-	-
SAFETY IN CASE OF FIRE		
EN 13501-1	Reaction to fire	up to Class B-s1, d0 (classification depends on the protection system components)
EN 13501-2	Fire resistance	(R15 to R120) - IncSlow (I/H Beams and Columns) and (Rectangular/Square and Circular Hollow Columns) (see Annex A)
HYGIENE, HEALTH AND THE ENVIRONMENT		
Manufacturer's declaration	Release of dangerous substances	Product specification doesn't contain dangerous substances given in Annex XVII of REACH and the ECHA Candidate List of Substances of Very High Concern
SAFETY IN USE		
-	-	-
PROTECTION AGAINST NOISE		
-	-	-
ENERGY ECONOMY AND HEAT RETENTION		
-	-	-
ASPECTS OF SERVICEABILITY, DURABILITY AND IDENTIFICATION		
ETAG 018 Part 2 Clause 5.7.1 and Clause 5.7.2.2	Durability and serviceability	• Primer and top coat compatibility • Type X durability • Type Y durability • Type Z_1 durability • Type Z_2 durability
ETAG 018 Part 2 Clause 5.7.3	Identification	Thermoanalytical analyses (TG) and Infrared spectroscopy analyses (IR)

In addition to the specific clauses relating to dangerous substances contained in this European technical assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

4 Assessment And Verification Of Constancy Of Performance (Hereinafter AVCP) System Applied, With References To Its Legal base

According to the decision 1999/454/EC of the European Commission Decision of date 22 June 1999 on the procedure for attesting the conformity of construction products pursuant to Article 20(2) of Council Directive 89/106/EEC as regards fire stopping, fire sealing and fire protective products, the system of assessment and verification of constancy of performance (see Annex V to the Regulation (EU) No 305/2011) given in the following table apply:

Products	Intended uses	Level or Class	System
Fire protective products (including coatings)	Fire protection of steel elements	Any	1

5 Technical Details Necessary For The Implementation Of The AVCP System, As Provided For In The Applicable EAD.

The manufacturer shall exercise permanent internal control, record and evaluate the results of factory production in accordance with the provisions laid down in the "Control Plan" related to this European Technical Assessment. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. The production control system shall ensure that the product is in conformity with this European Technical Assessment.

The manufacturer may only use verified by Technical Assessment Body initial/raw/constituent materials stated in the technical documentations related to this European Technical Assessment.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

In cases where the provisions of the European technical assessment and its "Control Plan" are no longer fulfilled the certification body shall withdraw the Certificate of Constancy and inform the relevant authorities e.g. NANDO, EOTA.

The Table 8.1 in ETAG 018 Part 2 presents an example of the properties that shall be controlled and minimum frequencies of control. The exact test method and threshold have been laid down in the factory production control plan, operated by the manufacturer and deposited at Warrington Certification.

Signatories


Responsible Officer D. Podolski* - Certification Engineer


Approved J. Yuan* - Group Chief Engineer

* For and on behalf of Warrington Certification.

Annex A - Product Performance: Fire Resistance

1 This Annex relates to the use of FIRETEX FX2002/FX1002 for the fire protection of 'I' and 'H' shaped beam and column sections and rectangular/square and circular hollow column sections. The precise scope is given in Tables 1 to 32 which show the total dry film thickness of FIRETEX FX2002/FX1002 (excluding primer and top coat) required to provide classifications of R15 to R120 for various design temperatures and section factors. Table of results for additional times also form part of this European Technical Assessment.

2 The product is approved on the basis of:

i) Approval testing in accordance with the principles of EN 13381-8:2010.

ii) A design appraisal against this ETA adopting the graphical analysis defined in Annex E of EN 13381-8:2013.

3 The data presented in the tables in this Annex refers to both beams (three-sided fire exposure) and columns (surface area and four sided exposure).

4 The data shown is applicable to steel sections blast cleaned to ISO 8501-1 Sa2.5 or equivalent and primed with the compatible primers and top coats listed in this ETA. Based on the test data the total dry film thickness of primer and top coat together should not exceed 0.20mm.

5 The data for the 'I' and 'H' shaped beams and columns applies also to other shaped steel sections that have re-entrant details such as channels, angles and tees.

6. The reactive coating has been exposed to the slowing heating regime (IncSlow) defined in Annex A of EN 13381-8:2010 and has satisfied the requirements to provide classification according to EN 13501-2.

Tables of Results

'I/H' Section Beams and 'I/H' Section Columns

Section Factor up to m^{-1}	Table 1: I-Section Beams: Fire Resistance Period: 15 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
50	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
55	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
60	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
65	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
70	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
75	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
80	0.199	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
85	0.206	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
90	0.214	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
95	0.221	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
100	0.228	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
105	0.235	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
110	0.242	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
115	0.249	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
120	0.256	0.196	0.195	0.195	0.195	0.195	0.195	0.195	0.195
125	0.263	0.201	0.195	0.195	0.195	0.195	0.195	0.195	0.195
130	0.270	0.206	0.195	0.195	0.195	0.195	0.195	0.195	0.195
135	0.277	0.211	0.195	0.195	0.195	0.195	0.195	0.195	0.195
140	0.284	0.216	0.195	0.195	0.195	0.195	0.195	0.195	0.195
145	0.291	0.221	0.195	0.195	0.195	0.195	0.195	0.195	0.195
150	0.299	0.226	0.195	0.195	0.195	0.195	0.195	0.195	0.195
155	0.306	0.232	0.195	0.195	0.195	0.195	0.195	0.195	0.195
160	0.313	0.237	0.195	0.195	0.195	0.195	0.195	0.195	0.195
165	0.320	0.242	0.195	0.195	0.195	0.195	0.195	0.195	0.195
170	0.327	0.247	0.195	0.195	0.195	0.195	0.195	0.195	0.195
175	0.334	0.252	0.195	0.195	0.195	0.195	0.195	0.195	0.195
180	0.341	0.257	0.195	0.195	0.195	0.195	0.195	0.195	0.195
185	0.348	0.262	0.195	0.195	0.195	0.195	0.195	0.195	0.195
190	0.355	0.267	0.199	0.195	0.195	0.195	0.195	0.195	0.195
195	0.362	0.273	0.203	0.195	0.195	0.195	0.195	0.195	0.195
200	0.369	0.278	0.208	0.195	0.195	0.195	0.195	0.195	0.195
205	0.376	0.283	0.212	0.195	0.195	0.195	0.195	0.195	0.195
210	0.384	0.288	0.216	0.195	0.195	0.195	0.195	0.195	0.195
215	0.391	0.293	0.221	0.195	0.195	0.195	0.195	0.195	0.195
220	0.398	0.298	0.225	0.195	0.195	0.195	0.195	0.195	0.195
225	0.405	0.303	0.229	0.195	0.195	0.195	0.195	0.195	0.195
230	0.412	0.308	0.233	0.195	0.195	0.195	0.195	0.195	0.195
235	0.419	0.314	0.238	0.195	0.195	0.195	0.195	0.195	0.195
240	0.426	0.319	0.242	0.195	0.195	0.195	0.195	0.195	0.195
245	0.433	0.324	0.246	0.195	0.195	0.195	0.195	0.195	0.195
250	0.440	0.329	0.251	0.195	0.195	0.195	0.195	0.195	0.195
255	0.447	0.334	0.255	0.195	0.195	0.195	0.195	0.195	0.195
260	0.454	0.339	0.259	0.195	0.195	0.195	0.195	0.195	0.195
265	0.461	0.344	0.264	0.195	0.195	0.195	0.195	0.195	0.195
270	0.468	0.349	0.268	0.195	0.195	0.195	0.195	0.195	0.195
275	0.476	0.354	0.272	0.195	0.195	0.195	0.195	0.195	0.195
280	0.483	0.360	0.277	0.195	0.195	0.195	0.195	0.195	0.195
285	0.490	0.365	0.281	0.195	0.195	0.195	0.195	0.195	0.195
290	0.497	0.370	0.285	0.195	0.195	0.195	0.195	0.195	0.195
295	0.504	0.375	0.289	0.199	0.195	0.195	0.195	0.195	0.195
300	0.511	0.380	0.294	0.203	0.195	0.195	0.195	0.195	0.195
305	0.523	0.385	0.298	0.206	0.195	0.195	0.195	0.195	0.195
310	0.538	0.390	0.302	0.210	0.195	0.195	0.195	0.195	0.195
315	0.553	0.395	0.307	0.214	0.195	0.195	0.195	0.195	0.195
320	0.568	0.401	0.311	0.218	0.195	0.195	0.195	0.195	0.195
325	0.582	0.406	0.315	0.221	0.195	0.195	0.195	0.195	0.195
330	0.597	0.411	0.320	0.225	0.195	0.195	0.195	0.195	0.195

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 2: I-Section Beams: Fire Resistance Period: 30 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	0.400	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
50	0.400	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
55	0.427	0.195	0.195	0.195	0.195	0.195	0.195	0.195	0.195
60	0.473	0.225	0.195	0.195	0.195	0.195	0.195	0.195	0.195
65	0.520	0.242	0.198	0.195	0.195	0.195	0.195	0.195	0.195
70	0.566	0.260	0.208	0.195	0.195	0.195	0.195	0.195	0.195
75	0.613	0.278	0.219	0.195	0.195	0.195	0.195	0.195	0.195
80	0.660	0.296	0.229	0.199	0.195	0.195	0.195	0.195	0.195
85	0.706	0.314	0.240	0.206	0.195	0.195	0.195	0.195	0.195
90	0.753	0.331	0.250	0.213	0.195	0.195	0.195	0.195	0.195
95	0.799	0.349	0.261	0.220	0.195	0.195	0.195	0.195	0.195
100	0.830	0.367	0.271	0.226	0.195	0.195	0.195	0.195	0.195
105	0.859	0.385	0.282	0.233	0.199	0.195	0.195	0.195	0.195
110	0.889	0.402	0.292	0.240	0.205	0.195	0.195	0.195	0.195
115	0.918	0.420	0.303	0.246	0.211	0.195	0.195	0.195	0.195
120	0.947	0.438	0.313	0.253	0.217	0.195	0.195	0.195	0.195
125	0.976	0.456	0.323	0.260	0.223	0.195	0.195	0.195	0.195
130	1.006	0.473	0.334	0.267	0.228	0.195	0.195	0.195	0.195
135	1.035	0.491	0.344	0.273	0.234	0.195	0.195	0.195	0.195
140	1.064	0.509	0.355	0.280	0.240	0.195	0.195	0.195	0.195
145	1.094	0.527	0.365	0.287	0.246	0.197	0.195	0.195	0.195
150	1.123	0.544	0.376	0.293	0.251	0.202	0.195	0.195	0.195
155	1.152	0.562	0.386	0.300	0.257	0.207	0.195	0.195	0.195
160	1.181	0.580	0.397	0.307	0.263	0.212	0.195	0.195	0.195
165	1.211	0.598	0.407	0.314	0.269	0.217	0.195	0.195	0.195
170	1.241	0.615	0.418	0.320	0.275	0.222	0.195	0.195	0.195
175	1.271	0.633	0.428	0.327	0.280	0.227	0.195	0.195	0.195
180	1.302	0.651	0.439	0.334	0.286	0.232	0.195	0.195	0.195
185	1.332	0.669	0.449	0.340	0.292	0.238	0.195	0.195	0.195
190	1.362	0.687	0.460	0.347	0.298	0.243	0.195	0.195	0.195
195	1.392	0.704	0.470	0.354	0.304	0.248	0.195	0.195	0.195
200	1.423	0.722	0.481	0.361	0.309	0.253	0.195	0.195	0.195
205	1.453	0.740	0.491	0.367	0.315	0.258	0.195	0.195	0.195
210	1.483	0.758	0.502	0.374	0.321	0.263	0.195	0.195	0.195
215	1.514	0.775	0.512	0.381	0.327	0.268	0.195	0.195	0.195
220	1.544	0.793	0.524	0.387	0.332	0.273	0.195	0.195	0.195
225	1.574	0.811	0.536	0.394	0.338	0.279	0.195	0.195	0.195
230	1.604	0.827	0.547	0.401	0.344	0.284	0.195	0.195	0.195
235	1.635	0.844	0.559	0.408	0.350	0.289	0.195	0.195	0.195
240	1.665	0.861	0.571	0.414	0.356	0.294	0.195	0.195	0.195
245	1.695	0.878	0.583	0.421	0.361	0.299	0.197	0.195	0.195
250	1.725	0.895	0.594	0.428	0.367	0.304	0.202	0.195	0.195
255	1.756	0.912	0.606	0.434	0.373	0.309	0.207	0.195	0.195
260	1.786	0.929	0.618	0.441	0.379	0.314	0.212	0.195	0.195
265	1.816	0.946	0.630	0.448	0.384	0.319	0.217	0.195	0.195
270	1.847	0.963	0.641	0.454	0.390	0.325	0.222	0.195	0.195
275	1.877	0.980	0.653	0.461	0.396	0.330	0.227	0.195	0.195
280	1.907	0.997	0.665	0.468	0.402	0.335	0.232	0.195	0.195
285	1.937	1.014	0.676	0.475	0.408	0.340	0.237	0.195	0.195
290	1.968	1.031	0.688	0.481	0.413	0.345	0.242	0.195	0.195
295	1.998	1.048	0.700	0.488	0.419	0.350	0.247	0.195	0.195
300	2.028	1.065	0.712	0.495	0.425	0.355	0.252	0.195	0.195
305	2.058	1.082	0.723	0.501	0.431	0.360	0.257	0.195	0.195
310	2.089	1.099	0.735	0.508	0.436	0.365	0.262	0.195	0.195
315	2.119	1.116	0.747	0.517	0.442	0.371	0.267	0.195	0.195
320	2.149	1.133	0.759	0.532	0.448	0.376	0.272	0.195	0.195
325	2.180	1.150	0.770	0.547	0.454	0.381	0.277	0.195	0.195
330	2.210	1.167	0.782	0.562	0.460	0.386	0.282	0.195	0.195

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 3: I-Section Beams: Fire Resistance Period: 45 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	0.979	0.525	0.305	0.195	0.195	0.195	0.195	0.195	0.195
50	0.979	0.525	0.305	0.199	0.195	0.195	0.195	0.195	0.195
55	0.979	0.557	0.326	0.218	0.195	0.195	0.195	0.195	0.195
60	1.031	0.612	0.358	0.236	0.206	0.195	0.195	0.195	0.195
65	1.238	0.667	0.391	0.254	0.219	0.195	0.195	0.195	0.195
70	1.322	0.722	0.423	0.272	0.231	0.202	0.195	0.195	0.195
75	1.407	0.778	0.455	0.290	0.244	0.210	0.195	0.195	0.195
80	1.492	0.832	0.488	0.308	0.257	0.218	0.196	0.195	0.195
85	1.576	0.887	0.520	0.326	0.270	0.226	0.202	0.195	0.195
90	1.661	0.942	0.553	0.344	0.283	0.234	0.208	0.195	0.195
95	1.745	0.997	0.585	0.363	0.295	0.242	0.214	0.195	0.195
100	1.830	1.052	0.618	0.381	0.308	0.250	0.221	0.195	0.195
105	1.915	1.106	0.650	0.399	0.321	0.258	0.227	0.195	0.195
110	1.999	1.161	0.682	0.417	0.334	0.266	0.233	0.195	0.195
115	2.084	1.211	0.715	0.435	0.347	0.274	0.240	0.198	0.195
120	2.169	1.239	0.747	0.453	0.360	0.282	0.246	0.204	0.195
125	2.253	1.268	0.780	0.471	0.372	0.290	0.252	0.209	0.195
130	2.338	1.296	0.809	0.490	0.385	0.298	0.258	0.215	0.195
135	2.376	1.324	0.830	0.508	0.398	0.306	0.265	0.220	0.195
140	2.409	1.353	0.851	0.526	0.411	0.314	0.271	0.226	0.195
145	2.442	1.381	0.872	0.544	0.424	0.322	0.277	0.232	0.195
150	2.475	1.409	0.893	0.562	0.436	0.330	0.284	0.237	0.195
155	2.508	1.438	0.915	0.580	0.449	0.338	0.290	0.243	0.195
160	2.541	1.466	0.936	0.598	0.462	0.346	0.296	0.248	0.195
165	2.574	1.494	0.957	0.617	0.475	0.354	0.303	0.254	0.195
170	2.607	1.523	0.978	0.635	0.488	0.362	0.309	0.260	0.198
175	2.640	1.551	0.999	0.653	0.500	0.370	0.315	0.265	0.203
180	2.673	1.579	1.020	0.671	0.513	0.378	0.321	0.271	0.208
185	2.706	1.608	1.041	0.689	0.523	0.386	0.328	0.276	0.213
190	2.739	1.636	1.063	0.707	0.533	0.394	0.334	0.282	0.219
195	2.772	1.664	1.084	0.725	0.543	0.402	0.340	0.288	0.224
200	2.805	1.693	1.105	0.744	0.553	0.410	0.347	0.293	0.229
205	2.838	1.721	1.126	0.762	0.563	0.418	0.353	0.299	0.234
210	2.871	1.749	1.147	0.780	0.573	0.426	0.359	0.304	0.239
215	2.904	1.778	1.168	0.798	0.584	0.433	0.365	0.310	0.245
220	2.937	1.806	1.190	0.816	0.594	0.441	0.372	0.316	0.250
225	2.970	1.834	1.214	0.833	0.604	0.449	0.378	0.321	0.255
230	3.003	1.863	1.249	0.850	0.614	0.457	0.384	0.327	0.260
235	3.036	1.891	1.285	0.868	0.624	0.465	0.391	0.332	0.266
240	3.069	1.919	1.321	0.885	0.634	0.473	0.397	0.338	0.271
245	3.102	1.948	1.356	0.903	0.644	0.481	0.403	0.344	0.276
250	3.135	1.976	1.392	0.920	0.654	0.489	0.409	0.349	0.281
255	3.168	2.004	1.427	0.937	0.664	0.497	0.416	0.355	0.287
260	3.201	2.032	1.463	0.955	0.674	0.505	0.422	0.360	0.292
265	3.234	2.061	1.499	0.972	0.684	0.513	0.428	0.366	0.297
270	3.267	2.089	1.534	0.990	0.694	0.526	0.435	0.372	0.302
275	3.300	2.117	1.570	1.007	0.704	0.538	0.441	0.377	0.307
280	3.332	2.146	1.605	1.024	0.714	0.551	0.447	0.383	0.313
285	3.365	2.174	1.641	1.042	0.724	0.563	0.454	0.388	0.318
290	3.398	2.202	1.677	1.059	0.734	0.575	0.460	0.394	0.323
295	3.431	2.231	1.712	1.077	0.744	0.588	0.466	0.400	0.328
300	3.464	2.259	1.748	1.094	0.754	0.600	0.472	0.405	0.334
305	3.497	2.287	1.784	1.111	0.764	0.613	0.479	0.411	0.339
310	3.530	2.316	1.819	1.129	0.774	0.625	0.485	0.416	0.344
315	3.563	2.344	1.855	1.146	0.784	0.637	0.491	0.422	0.349
320	3.596	2.403	1.890	1.164	0.794	0.650	0.498	0.428	0.355
325	3.629	2.465	1.926	1.181	0.807	0.662	0.504	0.433	0.360
330	3.662	2.527	1.962	1.198	0.838	0.674	0.510	0.439	0.365

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 4: I-Section Beams: Fire Resistance Period: 60 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	1.724	1.002	0.595	0.425	0.316	0.204	0.195	0.195	0.195
50	1.724	1.002	0.595	0.425	0.316	0.207	0.195	0.195	0.195
55	1.815	1.002	0.629	0.452	0.337	0.223	0.202	0.195	0.195
60	1.976	1.055	0.689	0.493	0.363	0.238	0.215	0.196	0.195
65	2.138	1.285	0.748	0.535	0.389	0.253	0.228	0.204	0.195
70	2.299	1.380	0.809	0.577	0.414	0.268	0.241	0.213	0.195
75	2.393	1.474	0.895	0.618	0.440	0.283	0.254	0.221	0.195
80	2.458	1.569	0.980	0.660	0.466	0.298	0.267	0.229	0.197
85	2.523	1.663	1.066	0.702	0.492	0.313	0.280	0.238	0.203
90	2.588	1.758	1.151	0.743	0.518	0.328	0.293	0.246	0.210
95	2.653	1.852	1.222	0.785	0.544	0.343	0.306	0.255	0.217
100	2.718	1.947	1.265	0.826	0.570	0.358	0.319	0.263	0.224
105	2.783	2.041	1.308	0.866	0.596	0.373	0.332	0.271	0.231
110	2.848	2.136	1.352	0.905	0.622	0.388	0.345	0.280	0.238
115	2.913	2.230	1.395	0.945	0.648	0.403	0.358	0.288	0.245
120	2.978	2.325	1.438	0.985	0.673	0.418	0.371	0.296	0.252
125	3.043	2.372	1.482	1.025	0.699	0.433	0.384	0.305	0.258
130	3.108	2.405	1.525	1.065	0.725	0.448	0.397	0.313	0.265
135	3.173	2.438	1.568	1.105	0.751	0.463	0.410	0.322	0.272
140	3.238	2.471	1.612	1.145	0.777	0.478	0.423	0.330	0.279
145	3.303	2.504	1.655	1.185	0.803	0.493	0.436	0.338	0.286
150	3.368	2.537	1.698	1.220	0.822	0.508	0.449	0.347	0.293
155	3.433	2.570	1.742	1.251	0.841	0.523	0.462	0.355	0.300
160	3.498	2.603	1.785	1.282	0.860	0.538	0.475	0.364	0.307
165	3.563	2.636	1.828	1.313	0.879	0.553	0.488	0.372	0.313
170	3.628	2.669	1.872	1.344	0.898	0.569	0.501	0.380	0.320
175	3.693	2.701	1.915	1.374	0.917	0.584	0.514	0.389	0.327
180	3.759	2.734	1.958	1.405	0.936	0.599	0.524	0.397	0.334
185	3.824	2.767	2.002	1.436	0.955	0.614	0.534	0.405	0.341
190	3.889	2.800	2.045	1.467	0.974	0.629	0.544	0.414	0.348
195	3.954	2.833	2.089	1.498	0.993	0.644	0.554	0.422	0.355
200	4.019	2.866	2.132	1.529	1.012	0.659	0.564	0.431	0.362
205	4.084	2.899	2.175	1.559	1.031	0.674	0.574	0.439	0.368
210		2.932	2.219	1.590	1.050	0.689	0.584	0.447	0.375
215		2.965	2.262	1.621	1.069	0.704	0.594	0.456	0.382
220		2.998	2.305	1.652	1.088	0.719	0.604	0.464	0.389
225		3.031	2.349	1.683	1.107	0.734	0.614	0.472	0.396
230		3.064	2.393	1.714	1.126	0.749	0.624	0.481	0.403
235		3.097	2.437	1.744	1.145	0.764	0.634	0.489	0.410
240		3.129	2.481	1.775	1.164	0.779	0.644	0.498	0.417
245		3.162	2.526	1.806	1.183	0.794	0.654	0.506	0.423
250		3.195	2.570	1.837	1.202	0.814	0.664	0.515	0.430
255		3.228	2.614	1.868	1.239	0.839	0.674	0.526	0.437
260		3.261	2.658	1.899	1.283	0.865	0.684	0.538	0.444
265		3.294	2.703	1.929	1.327	0.890	0.694	0.550	0.451
270		3.327	2.747	1.960	1.371	0.916	0.704	0.561	0.458
275		3.360	2.791	1.991	1.414	0.942	0.714	0.573	0.465
280		3.393	2.835	2.022	1.458	0.967	0.724	0.584	0.472
285		3.426	2.880	2.053	1.502	0.993	0.734	0.596	0.478
290		3.459	2.924	2.083	1.545	1.019	0.744	0.608	0.485
295		3.492	2.968	2.114	1.589	1.044	0.754	0.619	0.492
300		3.525	3.012	2.145	1.633	1.070	0.764	0.631	0.499
305		3.558	3.057	2.176	1.677	1.095	0.774	0.642	0.506
310		3.590	3.101	2.207	1.720	1.121	0.784	0.654	0.513
315		3.623	3.145	2.238	1.764	1.147	0.794	0.666	0.524
320		3.656	3.189	2.268	1.808	1.172	0.806	0.677	0.535
325		3.689	3.234	2.299	1.852	1.198	0.845	0.689	0.545
330		3.722	3.278	2.330	1.895	1.246	0.885	0.700	0.556

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 5: I-Section Beams: Fire Resistance Period: 75 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49		1.695	1.028	0.668	0.535	0.398	0.307	0.219	0.195
50		1.695	1.028	0.668	0.535	0.398	0.307	0.220	0.195
55		1.784	1.082	0.705	0.566	0.423	0.326	0.232	0.195
60		1.951	1.234	0.769	0.613	0.458	0.348	0.245	0.205
65		2.118	1.350	0.848	0.659	0.492	0.371	0.257	0.218
70		2.285	1.467	0.946	0.705	0.527	0.393	0.269	0.231
75		2.387	1.583	1.044	0.751	0.561	0.415	0.282	0.244
80		2.450	1.699	1.142	0.798	0.596	0.437	0.294	0.257
85		2.514	1.816	1.229	0.850	0.630	0.459	0.306	0.271
90		2.578	1.932	1.295	0.902	0.665	0.482	0.319	0.284
95		2.641	2.048	1.361	0.955	0.699	0.504	0.331	0.297
100		2.705	2.164	1.427	1.007	0.734	0.526	0.344	0.310
105		2.768	2.281	1.493	1.060	0.768	0.548	0.356	0.323
110		2.832	2.362	1.559	1.113	0.803	0.570	0.368	0.336
115		2.895	2.396	1.626	1.165	0.834	0.592	0.381	0.350
120		2.959	2.430	1.692	1.213	0.866	0.615	0.393	0.363
125		3.023	2.464	1.758	1.246	0.898	0.637	0.405	0.376
130		3.086	2.498	1.824	1.279	0.930	0.659	0.418	0.389
135		3.150	2.532	1.890	1.312	0.962	0.681	0.430	0.402
140		3.213	2.566	1.956	1.345	0.993	0.703	0.442	0.416
145		3.277	2.600	2.023	1.378	1.025	0.725	0.455	0.429
150		3.340	2.634	2.089	1.411	1.057	0.748	0.467	0.442
155		3.404	2.668	2.155	1.444	1.089	0.770	0.480	0.455
160		3.468	2.702	2.221	1.476	1.120	0.792	0.492	0.468
165		3.531	2.736	2.287	1.509	1.152	0.813	0.504	0.482
170		3.595	2.770	2.351	1.542	1.184	0.833	0.517	0.495
175		3.658	2.804	2.389	1.575	1.217	0.853	0.529	0.508
180		3.722	2.838	2.427	1.608	1.253	0.873	0.541	0.519
185		3.785	2.872	2.466	1.641	1.289	0.893	0.554	0.528
190		3.849	2.905	2.504	1.674	1.325	0.913	0.566	0.538
195		3.913	2.939	2.542	1.707	1.361	0.933	0.578	0.547
200		3.976	2.973	2.580	1.739	1.397	0.954	0.591	0.557
205		4.040	3.007	2.619	1.772	1.433	0.974	0.603	0.566
210			3.041	2.657	1.805	1.469	0.994	0.616	0.576
215			3.075	2.695	1.838	1.505	1.014	0.628	0.585
220			3.109	2.733	1.871	1.541	1.034	0.640	0.594
225			3.143	2.772	1.904	1.577	1.054	0.653	0.604
230			3.177	2.810	1.937	1.613	1.074	0.665	0.613
235			3.211	2.848	1.969	1.649	1.094	0.677	0.623
240			3.245	2.886	2.002	1.685	1.114	0.690	0.632
245			3.279	2.925	2.035	1.721	1.134	0.702	0.642
250			3.313	2.963	2.068	1.757	1.154	0.714	0.651
255			3.347	3.001	2.101	1.793	1.174	0.727	0.661
260			3.381	3.039	2.134	1.829	1.194	0.739	0.670
265			3.415	3.078	2.167	1.865	1.227	0.752	0.680
270			3.449	3.116	2.200	1.901	1.278	0.764	0.689
275			3.483	3.154	2.232	1.937	1.329	0.776	0.698
280			3.517	3.192	2.265	1.973	1.379	0.789	0.708
285			3.551	3.231	2.298	2.009	1.430	0.801	0.717
290			3.585	3.269	2.331	2.045	1.480	0.844	0.727
295			3.619	3.307	2.388	2.081	1.531	0.892	0.736
300			3.653	3.345	2.466	2.117	1.582	0.940	0.746
305			3.687	3.384	2.545	2.153	1.632	0.988	0.755
310			3.721	3.422	2.624	2.189	1.683	1.037	0.765
315			3.755	3.460	2.702	2.225	1.733	1.085	0.774
320			3.789	3.498	2.781	2.261	1.784	1.133	0.783
325			3.823	3.537	2.860	2.297	1.835	1.181	0.793
330			3.857	3.575	2.938	2.333	1.885	1.235	0.802

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 6: I-Section Beams: Fire Resistance Period: 90 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49			1.677	1.146	0.748	0.600	0.483	0.373	0.243
50			1.677	1.146	0.748	0.600	0.483	0.373	0.243
55			1.765	1.146	0.787	0.635	0.512	0.396	0.259
60			1.948	1.261	0.880	0.688	0.550	0.423	0.276
65			2.130	1.398	0.972	0.742	0.589	0.450	0.294
70			2.313	1.535	1.063	0.795	0.628	0.476	0.311
75			2.406	1.673	1.155	0.855	0.666	0.503	0.328
80			2.479	1.810	1.245	0.916	0.705	0.530	0.346
85			2.552	1.947	1.333	0.977	0.744	0.557	0.363
90			2.625	2.084	1.422	1.037	0.782	0.583	0.380
95			2.698	2.222	1.510	1.098	0.824	0.610	0.398
100			2.771	2.351	1.599	1.159	0.869	0.637	0.415
105			2.844	2.395	1.687	1.220	0.914	0.663	0.433
110			2.917	2.440	1.775	1.281	0.958	0.690	0.450
115			2.990	2.484	1.864	1.343	1.003	0.717	0.467
120			3.063	2.528	1.952	1.404	1.048	0.743	0.485
125			3.136	2.573	2.041	1.466	1.093	0.770	0.502
130			3.209	2.617	2.129	1.527	1.138	0.797	0.519
135			3.282	2.661	2.218	1.588	1.183	0.827	0.537
140			3.355	2.706	2.306	1.650	1.222	0.857	0.554
145			3.428	2.750	2.367	1.711	1.256	0.888	0.571
150			3.501	2.794	2.405	1.772	1.290	0.919	0.589
155			3.574	2.839	2.443	1.834	1.323	0.950	0.606
160			3.647	2.883	2.480	1.895	1.357	0.981	0.623
165			3.720	2.927	2.518	1.956	1.391	1.011	0.641
170			3.793	2.972	2.556	2.018	1.425	1.042	0.658
175			3.866	3.016	2.593	2.079	1.458	1.073	0.675
180			3.939	3.060	2.631	2.140	1.492	1.104	0.693
185			4.012	3.105	2.669	2.202	1.526	1.135	0.710
190			4.085	3.149	2.706	2.263	1.559	1.165	0.728
195				3.193	2.744	2.324	1.593	1.196	0.745
200				3.238	2.782	2.373	1.627	1.233	0.762
205				3.282	2.819	2.415	1.661	1.272	0.780
210				3.326	2.857	2.456	1.694	1.311	0.797
215				3.371	2.895	2.497	1.728	1.350	0.819
220				3.415	2.932	2.539	1.762	1.389	0.844
225				3.459	2.970	2.580	1.796	1.428	0.869
230				3.504	3.008	2.621	1.829	1.467	0.893
235				3.548	3.045	2.663	1.863	1.506	0.918
240				3.592	3.083	2.704	1.897	1.545	0.943
245				3.637	3.121	2.745	1.931	1.584	0.967
250				3.681	3.159	2.787	1.964	1.623	0.992
255				3.725	3.196	2.828	1.998	1.662	1.017
260				3.770	3.234	2.870	2.032	1.701	1.042
265				3.814	3.272	2.911	2.066	1.740	1.066
270				3.859	3.309	2.952	2.099	1.779	1.091
275				3.903	3.347	2.994	2.133	1.818	1.116
280				3.947	3.385	3.035	2.167	1.857	1.140
285				3.992	3.422	3.076	2.201	1.896	1.165
290				4.036	3.460	3.118	2.234	1.935	1.190
295				4.080	3.498	3.159	2.268	1.974	1.228
300					3.535	3.200	2.302	2.013	1.292
305					3.573	3.242	2.335	2.052	1.356
310					3.611	3.283	2.399	2.091	1.420
315					3.648	3.325	2.479	2.130	1.483
320					3.686	3.366	2.559	2.169	1.547
325					3.724	3.407	2.638	2.208	1.611
330					3.761	3.449	2.718	2.247	1.675

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 7: I-Section Beams: Fire Resistance Period: 105 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49				1.645	1.079	0.817	0.658	0.528	0.372
50				1.645	1.079	0.817	0.658	0.528	0.372
55				1.732	1.136	0.860	0.695	0.559	0.396
60				1.931	1.274	0.951	0.750	0.600	0.425
65				2.130	1.432	1.041	0.806	0.641	0.455
70				2.329	1.589	1.132	0.877	0.683	0.484
75					1.746	1.228	0.948	0.724	0.513
80					1.903	1.349	1.019	0.765	0.543
85					2.060	1.471	1.089	0.807	0.572
90					2.218	1.592	1.160	0.863	0.602
95					2.357	1.714	1.234	0.919	0.631
100					2.415	1.835	1.314	0.974	0.661
105					2.473	1.957	1.393	1.030	0.690
110					2.530	2.078	1.473	1.086	0.719
115					2.588	2.200	1.552	1.142	0.749
120					2.646	2.321	1.631	1.198	0.778
125					2.703	2.375	1.711	1.246	0.813
130					2.761	2.411	1.790	1.294	0.874
135					2.819	2.447	1.870	1.341	0.936
140					2.877	2.482	1.949	1.388	0.997
145					2.934	2.518	2.029	1.436	1.059
150					2.992	2.554	2.108	1.483	1.121
155					3.050	2.590	2.187	1.531	1.182
160					3.107	2.625	2.267	1.578	1.228
165					3.165	2.661	2.346	1.625	1.263
170					3.223	2.697	2.385	1.673	1.298
175					3.280	2.733	2.424	1.720	1.334
180					3.338	2.768	2.463	1.768	1.369
185					3.396	2.804	2.501	1.815	1.405
190					3.454	2.840	2.540	1.862	1.440
195					3.511	2.876	2.579	1.910	1.476
200					3.569	2.911	2.617	1.957	1.511
205					3.627	2.947	2.656	2.005	1.546
210					3.684	2.983	2.695	2.052	1.582
215					3.742	3.019	2.733	2.099	1.617
220					3.800	3.054	2.772	2.147	1.653
225					3.858	3.090	2.810	2.194	1.688
230					3.915	3.126	2.849	2.242	1.724
235					3.973	3.162	2.888	2.289	1.759
240					4.031	3.197	2.926	2.336	1.794
245					4.088	3.233	2.965	2.387	1.830
250						3.269	3.004	2.438	1.865
255						3.305	3.042	2.490	1.901
260						3.340	3.081	2.541	1.936
265						3.376	3.120	2.593	1.971
270						3.412	3.158	2.644	2.007
275						3.448	3.197	2.696	2.042
280						3.483	3.236	2.747	2.078
285						3.519	3.274	2.799	2.113
290						3.555	3.313	2.850	2.149
295						3.591	3.352	2.902	2.184
300						3.626	3.390	2.953	2.219
305						3.662	3.429	3.004	2.255
310						3.698	3.468	3.056	2.290
315						3.734	3.506	3.107	2.326
320						3.769	3.545	3.159	2.379
325						3.805	3.584	3.210	2.458
330						3.841	3.622	3.262	2.538

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 8: I-Section Beams: Fire Resistance Period: 120 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49					1.602	1.088	0.863	0.682	0.501
50					1.602	1.088	0.863	0.682	0.501
55					1.686	1.145	0.908	0.719	0.531
60					1.902	1.298	1.004	0.775	0.572
65					2.118	1.489	1.101	0.844	0.614
70					2.334	1.681	1.197	0.926	0.655
75						1.873	1.334	1.007	0.696
80						2.065	1.475	1.089	0.738
85						2.256	1.616	1.170	0.779
90						2.379	1.757	1.261	0.848
95						2.441	1.898	1.358	0.952
100						2.502	2.039	1.456	1.056
105						2.564	2.180	1.554	1.160
110						2.625	2.322	1.651	1.242
115						2.687	2.380	1.749	1.307
120						2.748	2.420	1.847	1.372
125						2.810	2.461	1.944	1.437
130						2.871	2.501	2.042	1.502
135						2.933	2.541	2.139	1.567
140						2.994	2.582	2.237	1.632
145						3.056	2.622	2.335	1.697
150						3.117	2.662	2.380	1.762
155						3.179	2.703	2.417	1.827
160						3.240	2.743	2.454	1.892
165						3.302	2.783	2.491	1.957
170						3.363	2.824	2.529	2.022
175						3.424	2.864	2.566	2.087
180						3.486	2.904	2.603	2.152
185						3.547	2.945	2.641	2.217
190						3.609	2.985	2.678	2.282
195						3.670	3.025	2.715	2.347
200						3.732	3.066	2.753	2.390
205						3.793	3.106	2.790	2.433
210						3.855	3.146	2.827	2.476
215						3.916	3.187	2.864	2.519
220						3.978	3.227	2.902	2.562
225						4.039	3.267	2.939	2.605
230							3.308	2.976	2.648
235							3.348	3.014	2.691
240							3.389	3.051	2.734
245							3.429	3.088	2.777
250							3.469	3.125	2.820
255							3.510	3.163	2.863
260							3.550	3.200	2.906
265							3.590	3.237	2.949
270							3.631	3.275	2.992
275							3.671	3.312	3.035
280							3.711	3.349	3.078
285							3.752	3.386	3.121
290							3.792	3.424	3.164
295							3.832	3.461	3.207
300							3.873	3.498	3.250
305							3.913	3.536	3.294
310							3.953	3.573	3.337
315							3.994	3.610	3.380
320							4.034	3.648	3.423
325							4.074	3.685	3.466
330								3.722	3.509

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 9: I-Section Columns: Fire Resistance Period: 15 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
50	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
55	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
60	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
65	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
70	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
75	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
80	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
85	0.194	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
90	0.202	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
95	0.210	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
100	0.218	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
105	0.226	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
110	0.233	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
115	0.241	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
120	0.249	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
125	0.257	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
130	0.265	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
135	0.273	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
140	0.281	0.202	0.201	0.201	0.201	0.201	0.201	0.201	0.201
145	0.288	0.208	0.201	0.201	0.201	0.201	0.201	0.201	0.201
150	0.296	0.214	0.201	0.201	0.201	0.201	0.201	0.201	0.201
155	0.304	0.220	0.201	0.201	0.201	0.201	0.201	0.201	0.201
160	0.312	0.226	0.201	0.201	0.201	0.201	0.201	0.201	0.201
165	0.320	0.232	0.201	0.201	0.201	0.201	0.201	0.201	0.201
170	0.328	0.238	0.201	0.201	0.201	0.201	0.201	0.201	0.201
175	0.335	0.243	0.201	0.201	0.201	0.201	0.201	0.201	0.201
180	0.343	0.249	0.201	0.201	0.201	0.201	0.201	0.201	0.201
185	0.351	0.255	0.201	0.201	0.201	0.201	0.201	0.201	0.201
190	0.359	0.261	0.201	0.201	0.201	0.201	0.201	0.201	0.201
195	0.367	0.267	0.201	0.201	0.201	0.201	0.201	0.201	0.201
200	0.375	0.273	0.201	0.201	0.201	0.201	0.201	0.201	0.201
205	0.382	0.279	0.201	0.201	0.201	0.201	0.201	0.201	0.201
210	0.390	0.285	0.201	0.201	0.201	0.201	0.201	0.201	0.201
215	0.398	0.291	0.206	0.201	0.201	0.201	0.201	0.201	0.201
220	0.406	0.297	0.211	0.201	0.201	0.201	0.201	0.201	0.201
225	0.414	0.302	0.217	0.201	0.201	0.201	0.201	0.201	0.201
230	0.422	0.308	0.222	0.201	0.201	0.201	0.201	0.201	0.201
235	0.429	0.314	0.228	0.201	0.201	0.201	0.201	0.201	0.201
240	0.437	0.320	0.234	0.201	0.201	0.201	0.201	0.201	0.201
245	0.445	0.326	0.239	0.201	0.201	0.201	0.201	0.201	0.201
250	0.453	0.332	0.245	0.201	0.201	0.201	0.201	0.201	0.201
255	0.461	0.338	0.250	0.201	0.201	0.201	0.201	0.201	0.201
260	0.469	0.344	0.256	0.201	0.201	0.201	0.201	0.201	0.201
265	0.476	0.350	0.261	0.201	0.201	0.201	0.201	0.201	0.201
270	0.484	0.356	0.267	0.201	0.201	0.201	0.201	0.201	0.201
275	0.492	0.361	0.272	0.201	0.201	0.201	0.201	0.201	0.201
280	0.500	0.367	0.278	0.201	0.201	0.201	0.201	0.201	0.201
285	0.508	0.373	0.283	0.201	0.201	0.201	0.201	0.201	0.201
290	0.516	0.379	0.289	0.201	0.201	0.201	0.201	0.201	0.201
295	0.523	0.385	0.295	0.201	0.201	0.201	0.201	0.201	0.201
300	0.531	0.391	0.300	0.201	0.201	0.201	0.201	0.201	0.201
305	0.539	0.397	0.306	0.201	0.201	0.201	0.201	0.201	0.201
310	0.547	0.403	0.311	0.201	0.201	0.201	0.201	0.201	0.201
315	0.555	0.409	0.317	0.201	0.201	0.201	0.201	0.201	0.201
320	0.563	0.415	0.322	0.201	0.201	0.201	0.201	0.201	0.201
325	0.571	0.420	0.328	0.201	0.201	0.201	0.201	0.201	0.201
330	0.578	0.426	0.333	0.201	0.201	0.201	0.201	0.201	0.201
335	0.586	0.432	0.339	0.205	0.201	0.201	0.201	0.201	0.201
340	0.594	0.438	0.344	0.210	0.201	0.201	0.201	0.201	0.201
345	0.602	0.444	0.350	0.214	0.201	0.201	0.201	0.201	0.201
350	0.610	0.450	0.356	0.219	0.201	0.201	0.201	0.201	0.201
355	0.618	0.456	0.361	0.224	0.201	0.201	0.201	0.201	0.201
360	0.625	0.462	0.367	0.229	0.201	0.201	0.201	0.201	0.201
365	0.633	0.468	0.372	0.233	0.201	0.201	0.201	0.201	0.201
370	0.641	0.474	0.378	0.238	0.201	0.201	0.201	0.201	0.201
375	0.649	0.479	0.383	0.243	0.201	0.201	0.201	0.201	0.201

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Section Factor up to m^{-1}	Table 10: I-Section Columns: Fire Resistance Period: 30 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	0.421	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
50	0.421	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
55	0.449	0.201	0.201	0.201	0.201	0.201	0.201	0.201	0.201
60	0.503	0.215	0.201	0.201	0.201	0.201	0.201	0.201	0.201
65	0.557	0.239	0.201	0.201	0.201	0.201	0.201	0.201	0.201
70	0.611	0.262	0.201	0.201	0.201	0.201	0.201	0.201	0.201
75	0.666	0.285	0.208	0.201	0.201	0.201	0.201	0.201	0.201
80	0.720	0.309	0.221	0.201	0.201	0.201	0.201	0.201	0.201
85	0.769	0.332	0.234	0.201	0.201	0.201	0.201	0.201	0.201
90	0.815	0.355	0.246	0.202	0.201	0.201	0.201	0.201	0.201
95	0.862	0.378	0.259	0.211	0.201	0.201	0.201	0.201	0.201
100	0.908	0.402	0.271	0.220	0.201	0.201	0.201	0.201	0.201
105	0.954	0.425	0.284	0.228	0.201	0.201	0.201	0.201	0.201
110	1.000	0.448	0.297	0.237	0.201	0.201	0.201	0.201	0.201
115	1.046	0.472	0.309	0.246	0.206	0.201	0.201	0.201	0.201
120	1.092	0.495	0.322	0.255	0.214	0.201	0.201	0.201	0.201
125	1.138	0.518	0.334	0.263	0.221	0.201	0.201	0.201	0.201
130	1.171	0.542	0.347	0.272	0.228	0.201	0.201	0.201	0.201
135	1.197	0.565	0.360	0.281	0.235	0.201	0.201	0.201	0.201
140	1.223	0.588	0.372	0.289	0.243	0.201	0.201	0.201	0.201
145	1.249	0.612	0.385	0.298	0.250	0.201	0.201	0.201	0.201
150	1.275	0.635	0.398	0.307	0.257	0.204	0.201	0.201	0.201
155	1.301	0.658	0.410	0.316	0.264	0.210	0.201	0.201	0.201
160	1.327	0.682	0.423	0.324	0.271	0.217	0.201	0.201	0.201
165	1.353	0.705	0.435	0.333	0.279	0.223	0.201	0.201	0.201
170	1.379	0.728	0.448	0.342	0.286	0.229	0.201	0.201	0.201
175	1.405	0.753	0.461	0.350	0.293	0.235	0.201	0.201	0.201
180	1.431	0.778	0.473	0.359	0.300	0.241	0.201	0.201	0.201
185	1.457	0.804	0.486	0.368	0.308	0.247	0.201	0.201	0.201
190	1.483	0.830	0.498	0.377	0.315	0.254	0.201	0.201	0.201
195	1.509	0.856	0.511	0.385	0.322	0.260	0.201	0.201	0.201
200	1.534	0.882	0.524	0.394	0.329	0.266	0.203	0.201	0.201
205	1.560	0.908	0.536	0.403	0.337	0.272	0.208	0.201	0.201
210	1.586	0.933	0.549	0.411	0.344	0.278	0.213	0.201	0.201
215	1.612	0.959	0.561	0.420	0.351	0.285	0.219	0.201	0.201
220	1.638	0.985	0.574	0.429	0.358	0.291	0.224	0.201	0.201
225	1.664	1.011	0.587	0.438	0.366	0.297	0.229	0.201	0.201
230	1.690	1.037	0.599	0.446	0.373	0.303	0.234	0.201	0.201
235	1.716	1.063	0.612	0.455	0.380	0.309	0.240	0.201	0.201
240	1.742	1.088	0.624	0.464	0.387	0.315	0.245	0.201	0.201
245	1.768	1.114	0.637	0.472	0.394	0.322	0.250	0.201	0.201
250	1.794	1.140	0.650	0.481	0.402	0.328	0.256	0.201	0.201
255	1.820	1.166	0.662	0.490	0.409	0.334	0.261	0.201	0.201
260	1.846	1.192	0.675	0.499	0.416	0.340	0.266	0.201	0.201
265	1.872	1.217	0.688	0.507	0.423	0.346	0.271	0.201	0.201
270	1.898	1.243	0.700	0.516	0.431	0.352	0.277	0.201	0.201
275	1.924	1.269	0.713	0.525	0.438	0.359	0.282	0.201	0.201
280	1.950	1.295	0.725	0.533	0.445	0.365	0.287	0.201	0.201
285	1.976	1.321	0.738	0.542	0.452	0.371	0.293	0.201	0.201
290	2.002	1.347	0.761	0.551	0.460	0.377	0.298	0.201	0.201
295	2.027	1.372	0.788	0.560	0.467	0.383	0.303	0.201	0.201
300	2.053	1.398	0.814	0.568	0.474	0.390	0.308	0.201	0.201
305	2.079	1.424	0.841	0.577	0.481	0.396	0.314	0.201	0.201
310	2.105	1.450	0.867	0.586	0.488	0.402	0.319	0.201	0.201
315	2.131	1.476	0.894	0.594	0.496	0.408	0.324	0.201	0.201
320	2.157	1.501	0.920	0.603	0.503	0.414	0.329	0.203	0.201
325	2.183	1.527	0.947	0.612	0.510	0.420	0.335	0.207	0.201
330	2.209	1.553	0.973	0.620	0.517	0.427	0.340	0.212	0.201
335	2.235	1.579	1.000	0.629	0.525	0.433	0.345	0.217	0.201
340	2.261	1.605	1.027	0.638	0.532	0.439	0.351	0.221	0.201
345	2.287	1.631	1.053	0.647	0.539	0.445	0.356	0.226	0.201
350	2.313	1.656	1.080	0.655	0.546	0.451	0.361	0.231	0.201
355	2.339	1.682	1.106	0.664	0.554	0.457	0.366	0.235	0.201
360	2.365	1.708	1.133	0.673	0.561	0.464	0.372	0.240	0.201
365	2.391	1.734	1.159	0.681	0.568	0.470	0.377	0.244	0.201
370	2.417	1.760	1.186	0.690	0.575	0.476	0.382	0.249	0.201
375	2.443	1.786	1.212	0.699	0.583	0.482	0.387	0.254	0.201

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Section Factor up to m^{-1}	Table 11: I-Section Columns: Fire Resistance Period: 45 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	1.096	0.555	0.311	0.201	0.201	0.201	0.201	0.201	0.201
50	1.096	0.555	0.311	0.201	0.201	0.201	0.201	0.201	0.201
55	1.127	0.587	0.333	0.211	0.201	0.201	0.201	0.201	0.201
60	1.194	0.652	0.377	0.239	0.201	0.201	0.201	0.201	0.201
65	1.260	0.717	0.421	0.267	0.214	0.201	0.201	0.201	0.201
70	1.326	0.778	0.465	0.294	0.230	0.201	0.201	0.201	0.201
75	1.393	0.837	0.508	0.322	0.246	0.204	0.201	0.201	0.201
80	1.459	0.897	0.552	0.350	0.261	0.213	0.201	0.201	0.201
85	1.526	0.956	0.596	0.378	0.277	0.222	0.200	0.201	0.201
90	1.592	1.015	0.640	0.405	0.293	0.232	0.208	0.201	0.201
95	1.658	1.074	0.684	0.433	0.309	0.241	0.216	0.201	0.201
100	1.725	1.134	0.728	0.461	0.324	0.251	0.224	0.201	0.201
105	1.791	1.174	0.756	0.489	0.340	0.260	0.232	0.201	0.201
110	1.858	1.204	0.776	0.516	0.356	0.269	0.240	0.205	0.201
115	1.924	1.234	0.797	0.544	0.372	0.279	0.248	0.212	0.201
120	1.990	1.263	0.818	0.572	0.387	0.288	0.256	0.219	0.201
125	2.057	1.293	0.839	0.600	0.403	0.298	0.264	0.226	0.201
130	2.123	1.323	0.860	0.627	0.419	0.307	0.272	0.233	0.201
135	2.189	1.353	0.881	0.655	0.435	0.317	0.280	0.240	0.201
140	2.256	1.383	0.902	0.683	0.450	0.326	0.289	0.247	0.201
145	2.322	1.413	0.923	0.711	0.466	0.335	0.297	0.254	0.201
150	2.389	1.443	0.944	0.738	0.482	0.345	0.305	0.261	0.201
155	2.455	1.473	0.965	0.768	0.498	0.354	0.313	0.268	0.201
160	2.521	1.503	0.986	0.797	0.513	0.364	0.321	0.275	0.203
165	2.588	1.533	1.006	0.827	0.529	0.373	0.329	0.282	0.209
170	2.654	1.563	1.027	0.856	0.545	0.382	0.337	0.289	0.215
175	2.721	1.593	1.048	0.886	0.561	0.392	0.345	0.296	0.221
180	2.770	1.623	1.069	0.915	0.576	0.401	0.353	0.302	0.227
185	2.804	1.653	1.090	0.945	0.592	0.411	0.361	0.309	0.233
190	2.838	1.683	1.111	0.974	0.608	0.420	0.369	0.316	0.238
195	2.873	1.713	1.132	1.004	0.624	0.429	0.377	0.323	0.244
200	2.907	1.743	1.153	1.033	0.639	0.439	0.385	0.330	0.250
205	2.941	1.773	1.186	1.063	0.655	0.448	0.394	0.337	0.256
210	2.975	1.803	1.221	1.093	0.671	0.458	0.402	0.344	0.262
215	3.009	1.832	1.255	1.122	0.687	0.467	0.410	0.351	0.268
220	3.043	1.862	1.290	1.152	0.702	0.476	0.418	0.358	0.274
225	3.078	1.892	1.324	1.181	0.718	0.486	0.426	0.365	0.279
230	3.112	1.922	1.358	1.211	0.734	0.495	0.434	0.372	0.285
235	3.146	1.952	1.393	1.240	0.761	0.505	0.442	0.379	0.291
240	3.180	1.982	1.427	1.270	0.799	0.514	0.450	0.386	0.297
245	3.214	2.012	1.461	1.299	0.837	0.523	0.458	0.393	0.303
250	3.249	2.042	1.496	1.329	0.875	0.533	0.466	0.400	0.309
255	3.283	2.072	1.530	1.358	0.912	0.542	0.474	0.407	0.314
260	3.317	2.102	1.564	1.388	0.950	0.552	0.482	0.413	0.320
265	3.351	2.132	1.599	1.417	0.988	0.561	0.490	0.420	0.326
270	3.385	2.162	1.633	1.447	1.025	0.570	0.498	0.427	0.332
275	3.419	2.192	1.667	1.476	1.063	0.580	0.507	0.434	0.338
280	3.454	2.222	1.702	1.506	1.101	0.589	0.515	0.441	0.344
285	3.488	2.252	1.736	1.535	1.139	0.599	0.523	0.448	0.350
290	3.522	2.282	1.771	1.565	1.172	0.608	0.531	0.455	0.355
295	3.556	2.312	1.805	1.594	1.202	0.618	0.539	0.462	0.361
300	3.590	2.342	1.839	1.624	1.231	0.627	0.547	0.469	0.367
305	3.624	2.372	1.874	1.653	1.261	0.636	0.555	0.476	0.373
310	3.659	2.401	1.908	1.683	1.291	0.646	0.563	0.483	0.379
315	3.693	2.431	1.942	1.712	1.321	0.655	0.571	0.490	0.385
320	3.727	2.461	1.977	1.742	1.351	0.665	0.579	0.497	0.390
325	3.761	2.491	2.011	1.771	1.381	0.674	0.587	0.504	0.396
330	3.795	2.521	2.045	1.801	1.411	0.741	0.595	0.511	0.402
335	3.830	2.551	2.080	1.831	1.441	1.173	0.603	0.518	0.408
340	3.864	2.581	2.114	1.860	1.471	1.200	0.612	0.524	0.414
345	3.898	2.611	2.149	1.890	1.501	1.227	0.620	0.531	0.420
350	3.932	2.641	2.183	1.919	1.530	1.254	0.628	0.538	0.426
355	3.966	2.671	2.217	1.949	1.560	1.282	0.636	0.545	0.431
360	4.000	2.701	2.252	1.978	1.590	1.309	0.644	0.552	0.437
365	4.035	2.731	2.286	2.008	1.620	1.336	0.652	0.559	0.443
370	4.069	2.773	2.320	2.037	1.650	1.363	0.660	0.566	0.449
375	4.103	2.844	2.355	2.067	1.680	1.391	0.668	0.573	0.455

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Section Factor up to m^{-1}	Table 12: I-Section Columns: Fire Resistance Period: 60 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	1.746	1.096	0.704	0.433	0.333	0.211	0.201	0.201	0.201
50	1.746	1.096	0.704	0.433	0.333	0.211	0.201	0.201	0.201
55	1.838	1.138	0.704	0.461	0.355	0.227	0.201	0.201	0.201
60	1.972	1.220	0.710	0.512	0.394	0.256	0.214	0.201	0.201
65	2.106	1.302	0.798	0.562	0.432	0.285	0.232	0.203	0.201
70	2.240	1.384	0.886	0.613	0.471	0.314	0.249	0.213	0.201
75	2.374	1.467	0.974	0.664	0.509	0.343	0.267	0.223	0.201
80	2.508	1.549	1.062	0.714	0.548	0.371	0.284	0.232	0.201
85	2.642	1.631	1.150	0.760	0.586	0.400	0.302	0.242	0.201
90	2.766	1.713	1.198	0.801	0.625	0.429	0.319	0.252	0.201
95	2.844	1.795	1.244	0.841	0.663	0.458	0.337	0.261	0.210
100	2.921	1.878	1.290	0.882	0.702	0.487	0.355	0.271	0.218
105	2.999	1.960	1.336	0.922	0.740	0.516	0.372	0.281	0.227
110	3.076	2.042	1.382	0.963	0.760	0.544	0.390	0.290	0.235
115	3.154	2.124	1.428	1.003	0.780	0.573	0.407	0.300	0.244
120	3.232	2.207	1.474	1.043	0.800	0.602	0.425	0.310	0.252
125	3.309	2.289	1.521	1.084	0.819	0.631	0.442	0.319	0.261
130	3.387	2.371	1.567	1.124	0.839	0.660	0.460	0.329	0.269
135	3.465	2.453	1.613	1.163	0.859	0.689	0.478	0.339	0.277
140	3.542	2.535	1.659	1.198	0.878	0.718	0.495	0.348	0.286
145	3.620	2.618	1.705	1.233	0.898	0.745	0.513	0.358	0.294
150	3.697	2.700	1.751	1.268	0.918	0.767	0.530	0.368	0.303
155	3.775	2.766	1.797	1.303	0.938	0.788	0.548	0.378	0.311
160	3.853	2.803	1.843	1.338	0.957	0.810	0.565	0.387	0.320
165	3.930	2.840	1.889	1.373	0.977	0.831	0.583	0.397	0.328
170	4.008	2.877	1.935	1.408	0.997	0.853	0.601	0.407	0.337
175	4.086	2.914	1.981	1.443	1.016	0.875	0.618	0.416	0.345
180	4.163	2.951	2.027	1.478	1.036	0.896	0.636	0.426	0.354
185	4.241	2.988	2.073	1.513	1.056	0.918	0.653	0.436	0.362
190	4.318	3.025	2.119	1.548	1.075	0.939	0.671	0.445	0.371
195	4.396	3.062	2.165	1.583	1.095	0.961	0.688	0.455	0.379
200		3.099	2.211	1.618	1.115	0.982	0.706	0.465	0.388
205		3.136	2.257	1.653	1.134	1.004	0.724	0.474	0.396
210		3.173	2.303	1.688	1.154	1.026	0.741	0.484	0.405
215		3.210	2.349	1.723	1.195	1.047	0.775	0.494	0.413
220		3.248	2.395	1.758	1.236	1.069	0.809	0.504	0.422
225		3.285	2.441	1.793	1.277	1.090	0.842	0.513	0.430
230		3.322	2.487	1.828	1.318	1.112	0.876	0.523	0.439
235		3.359	2.534	1.863	1.359	1.134	0.910	0.533	0.447
240		3.396	2.580	1.898	1.400	1.156	0.944	0.542	0.456
245		3.433	2.626	1.933	1.441	1.194	0.977	0.552	0.464
250		3.470	2.672	1.968	1.481	1.231	1.011	0.562	0.473
255		3.507	2.718	2.003	1.522	1.269	1.045	0.571	0.481
260		3.544	2.763	2.038	1.563	1.307	1.079	0.581	0.490
265		3.581	2.805	2.073	1.604	1.344	1.112	0.591	0.498
270		3.618	2.848	2.108	1.645	1.382	1.146	0.600	0.507
275		3.655	2.891	2.143	1.686	1.420	1.180	0.610	0.515
280		3.692	2.933	2.178	1.727	1.458	1.214	0.620	0.524
285		3.730	2.976	2.213	1.768	1.495	1.247	0.630	0.532
290		3.767	3.018	2.248	1.809	1.533	1.281	0.639	0.541
295		3.804	3.061	2.283	1.849	1.571	1.315	0.649	0.549
300		3.841	3.104	2.318	1.890	1.608	1.348	0.659	0.558
305		3.878	3.146	2.353	1.931	1.646	1.382	0.741	0.566
310		3.915	3.189	2.388	1.972	1.684	1.416	1.159	0.575
315		3.952	3.231	2.423	2.013	1.721	1.449	1.188	0.583
320		3.989	3.274	2.458	2.054	1.759	1.483	1.217	0.592
325		4.026	3.316	2.493	2.095	1.797	1.517	1.246	0.600
330		4.063	3.359	2.528	2.136	1.834	1.550	1.276	0.609
335		4.100	3.402	2.563	2.176	1.872	1.584	1.305	0.617
340		4.137	3.444	2.598	2.217	1.910	1.618	1.334	0.626
345		4.174	3.487	2.633	2.258	1.948	1.651	1.363	0.634
350		4.211	3.529	2.668	2.299	1.985	1.685	1.392	0.643
355		4.249	3.572	2.703	2.340	2.023	1.719	1.422	0.741
360		4.286	3.615	2.738	2.381	2.061	1.752	1.451	1.171
365		4.323	3.657	2.794	2.422	2.098	1.786	1.480	1.195
370		4.360	3.700	2.864	2.463	2.136	1.820	1.509	1.220
375		4.397	3.742	2.934	2.504	2.174	1.853	1.538	1.245

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Section Factor up to m^{-1}	Table 13: I-Section Columns: Fire Resistance Period: 75 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49	2.442	1.684	1.118	0.704	0.557	0.421	0.333	0.246	0.201
50	2.442	1.684	1.118	0.704	0.557	0.421	0.333	0.246	0.201
55	2.571	1.773	1.177	0.704	0.589	0.448	0.356	0.263	0.201
60	2.752	1.914	1.280	0.806	0.648	0.496	0.391	0.289	0.201
65		2.055	1.384	0.913	0.707	0.545	0.427	0.316	0.202
70		2.197	1.487	1.020	0.763	0.593	0.463	0.342	0.220
75		2.338	1.591	1.127	0.815	0.642	0.498	0.368	0.239
80		2.479	1.694	1.209	0.866	0.690	0.534	0.394	0.258
85		2.620	1.798	1.282	0.918	0.739	0.570	0.420	0.276
90		2.758	1.901	1.355	0.969	0.770	0.605	0.447	0.295
95		2.842	2.005	1.427	1.021	0.800	0.641	0.473	0.313
100		2.927	2.108	1.500	1.073	0.831	0.677	0.499	0.332
105		3.012	2.212	1.573	1.124	0.861	0.712	0.525	0.351
110		3.097	2.315	1.646	1.175	0.891	0.745	0.551	0.369
115		3.181	2.419	1.719	1.226	0.922	0.765	0.578	0.388
120		3.266	2.522	1.792	1.277	0.952	0.786	0.604	0.406
125		3.351	2.626	1.865	1.328	0.983	0.806	0.630	0.425
130		3.435	2.729	1.938	1.378	1.013	0.827	0.656	0.444
135		3.520	2.794	2.011	1.429	1.043	0.847	0.682	0.462
140		3.605	2.847	2.084	1.480	1.074	0.867	0.709	0.481
145		3.690	2.900	2.157	1.530	1.104	0.888	0.735	0.499
150		3.774	2.953	2.230	1.581	1.135	0.908	0.759	0.518
155		3.859	3.007	2.303	1.632	1.168	0.929	0.781	0.536
160		3.944	3.060	2.376	1.682	1.208	0.949	0.804	0.555
165		4.028	3.113	2.449	1.733	1.248	0.969	0.827	0.574
170		4.113	3.166	2.522	1.784	1.288	0.990	0.850	0.592
175		4.198	3.220	2.595	1.835	1.328	1.010	0.873	0.611
180		4.283	3.273	2.668	1.885	1.368	1.031	0.896	0.629
185		4.367	3.326	2.741	1.936	1.407	1.051	0.919	0.648
190			3.379	2.781	1.987	1.447	1.072	0.942	0.667
195			3.433	2.815	2.037	1.487	1.092	0.965	0.685
200			3.486	2.850	2.088	1.527	1.112	0.988	0.704
205			3.539	2.884	2.139	1.567	1.133	1.011	0.722
210			3.592	2.918	2.190	1.607	1.153	1.034	0.741
215			3.646	2.953	2.240	1.646	1.196	1.057	0.778
220			3.699	2.987	2.291	1.686	1.239	1.080	0.815
225			3.752	3.022	2.342	1.726	1.282	1.103	0.852
230			3.805	3.056	2.392	1.766	1.326	1.126	0.889
235			3.859	3.090	2.443	1.806	1.369	1.149	0.926
240			3.912	3.125	2.494	1.846	1.413	1.184	0.963
245			3.965	3.159	2.545	1.886	1.456	1.222	1.000
250			4.018	3.193	2.595	1.925	1.499	1.260	1.037
255			4.072	3.228	2.646	1.965	1.543	1.299	1.074
260			4.125	3.262	2.697	2.005	1.586	1.337	1.112
265			4.178	3.296	2.747	2.045	1.630	1.375	1.149
270			4.231	3.331	2.794	2.085	1.673	1.413	1.182
275			4.285	3.365	2.840	2.125	1.717	1.452	1.216
280			4.338	3.399	2.887	2.164	1.760	1.490	1.249
285			4.391	3.434	2.933	2.204	1.803	1.528	1.282
290				3.468	2.979	2.244	1.847	1.566	1.315
295				3.502	3.026	2.284	1.890	1.605	1.348
300				3.537	3.072	2.324	1.934	1.643	1.381
305				3.571	3.118	2.364	1.977	1.681	1.414
310				3.605	3.165	2.404	2.021	1.719	1.448
315				3.640	3.211	2.443	2.064	1.758	1.481
320				3.674	3.257	2.483	2.107	1.796	1.514
325				3.708	3.304	2.523	2.151	1.834	1.547
330				3.743	3.350	2.563	2.194	1.872	1.580
335				3.777	3.396	2.603	2.238	1.911	1.613
340				3.811	3.442	2.643	2.281	1.949	1.647
345				3.846	3.489	2.682	2.325	1.987	1.680
350				3.880	3.535	2.722	2.368	2.025	1.713
355				3.914	3.581	2.772	2.411	2.064	1.746
360				3.949	3.628	2.852	2.455	2.102	1.779
365				3.983	3.674	2.932	2.498	2.140	1.812
370				4.017	3.720	3.012	2.542	2.178	1.846
375				4.052	3.767	3.092	2.585	2.216	1.879

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Section Factor up to m^{-1}	Table 14: I-Section Columns: Fire Resistance Period: 90 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49		2.296	1.652	1.144	0.813	0.631	0.514	0.408	0.238
50		2.296	1.652	1.144	0.813	0.631	0.514	0.408	0.238
55		2.417	1.739	1.204	0.856	0.666	0.545	0.433	0.258
60		2.626	1.894	1.327	0.947	0.734	0.597	0.475	0.303
65		2.835	2.048	1.451	1.038	0.796	0.650	0.516	0.348
70			2.203	1.574	1.129	0.857	0.702	0.558	0.394
75			2.358	1.697	1.222	0.919	0.752	0.599	0.439
80			2.513	1.820	1.316	0.980	0.794	0.640	0.484
85			2.667	1.944	1.410	1.042	0.836	0.682	0.530
90			2.822	2.067	1.504	1.103	0.877	0.723	0.575
95				2.190	1.598	1.166	0.919	0.757	0.620
100				2.313	1.692	1.239	0.961	0.786	0.666
105				2.437	1.786	1.311	1.002	0.815	0.711
110				2.560	1.880	1.383	1.044	0.843	0.748
115				2.683	1.974	1.455	1.086	0.872	0.768
120				2.786	2.068	1.527	1.127	0.900	0.788
125				2.862	2.161	1.599	1.173	0.929	0.808
130				2.938	2.255	1.671	1.225	0.958	0.828
135				3.013	2.349	1.743	1.277	0.986	0.848
140				3.089	2.443	1.815	1.330	1.015	0.868
145				3.165	2.537	1.888	1.382	1.044	0.887
150				3.241	2.631	1.960	1.434	1.072	0.907
155				3.317	2.725	2.032	1.487	1.101	0.927
160				3.393	2.789	2.104	1.539	1.129	0.947
165				3.469	2.841	2.176	1.591	1.160	0.967
170				3.545	2.893	2.248	1.644	1.201	0.987
175				3.621	2.945	2.320	1.696	1.241	1.007
180				3.697	2.997	2.392	1.748	1.282	1.027
185				3.773	3.049	2.465	1.801	1.323	1.047
190				3.849	3.101	2.537	1.853	1.364	1.067
195				3.925	3.153	2.609	1.905	1.405	1.087
200				4.001	3.205	2.681	1.958	1.446	1.107
205				4.077	3.257	2.753	2.010	1.487	1.127
210				4.153	3.308	2.792	2.062	1.527	1.147
215				4.229	3.360	2.831	2.115	1.568	1.181
220				4.305	3.412	2.871	2.167	1.609	1.223
225				4.381	3.464	2.910	2.219	1.650	1.264
230					3.516	2.949	2.271	1.691	1.306
235					3.568	2.989	2.324	1.732	1.347
240					3.620	3.028	2.376	1.772	1.389
245					3.672	3.067	2.428	1.813	1.431
250					3.724	3.107	2.481	1.854	1.472
255					3.776	3.146	2.533	1.895	1.514
260					3.828	3.185	2.585	1.936	1.556
265					3.880	3.225	2.638	1.977	1.597
270					3.932	3.264	2.690	2.017	1.639
275					3.984	3.304	2.742	2.058	1.680
280					4.036	3.343	2.793	2.099	1.722
285					4.088	3.382	2.844	2.140	1.764
290					4.139	3.422	2.895	2.181	1.805
295					4.191	3.461	2.945	2.222	1.847
300					4.243	3.500	2.996	2.262	1.889
305					4.295	3.540	3.047	2.303	1.930
310					4.347	3.579	3.097	2.344	1.972
315					4.399	3.618	3.148	2.385	2.013
320						3.658	3.199	2.426	2.055
325						3.697	3.249	2.467	2.097
330						3.737	3.300	2.508	2.138
335						3.776	3.351	2.548	2.180
340						3.815	3.401	2.589	2.222
345						3.855	3.452	2.630	2.263
350						3.894	3.503	2.671	2.305
355						3.933	3.553	2.712	2.346
360						3.973	3.604	2.753	2.388
365						4.012	3.655	2.826	2.430
370						4.051	3.705	2.899	2.471
375						4.091	3.756	2.971	2.513

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Section Factor up to m^{-1}	Table 15: I-Section Columns: Fire Resistance Period: 105 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49			2.187	1.616	1.147	0.875	0.704	0.570	0.469
50			2.187	1.616	1.147	0.875	0.704	0.570	0.469
55			2.302	1.701	1.207	0.921	0.732	0.603	0.500
60			2.508	1.870	1.345	1.011	0.802	0.659	0.567
65			2.714	2.038	1.484	1.101	0.871	0.715	0.633
70				2.207	1.622	1.199	0.940	0.769	0.700
75				2.375	1.761	1.311	1.009	0.821	0.754
80				2.544	1.899	1.422	1.079	0.873	0.788
85				2.712	2.037	1.533	1.148	0.925	0.821
90					2.176	1.644	1.235	0.977	0.855
95					2.314	1.755	1.324	1.029	0.889
100					2.453	1.866	1.413	1.081	0.922
105					2.591	1.977	1.502	1.132	0.956
110					2.729	2.088	1.591	1.192	0.989
115					2.836	2.200	1.680	1.257	1.023
120					2.937	2.311	1.769	1.322	1.057
125					3.037	2.422	1.858	1.387	1.090
130					3.138	2.533	1.947	1.452	1.124
135					3.238	2.644	2.036	1.517	1.158
140					3.339	2.754	2.125	1.582	1.202
145					3.439	2.833	2.214	1.647	1.246
150					3.540	2.911	2.303	1.713	1.290
155					3.641	2.989	2.392	1.778	1.334
160					3.741	3.067	2.482	1.843	1.377
165					3.842	3.146	2.571	1.908	1.421
170					3.942	3.224	2.660	1.973	1.465
175					4.043	3.302	2.749	2.038	1.509
180					4.143	3.380	2.799	2.103	1.553
185					4.244	3.459	2.848	2.168	1.596
190					4.344	3.537	2.897	2.233	1.640
195						3.615	2.946	2.298	1.684
200						3.694	2.995	2.363	1.728
205						3.772	3.044	2.428	1.772
210						3.850	3.093	2.493	1.816
215						3.928	3.143	2.558	1.859
220						4.007	3.192	2.623	1.903
225						4.085	3.241	2.688	1.947
230						4.163	3.290	2.753	1.991
235						4.241	3.339	2.794	2.035
240						4.320	3.388	2.835	2.078
245						4.398	3.437	2.876	2.122
250							3.486	2.918	2.166
255							3.535	2.959	2.210
260							3.584	3.000	2.254
265							3.633	3.041	2.297
270							3.682	3.082	2.341
275							3.731	3.124	2.385
280							3.780	3.165	2.429
285							3.829	3.206	2.473
290							3.878	3.247	2.517
295							3.927	3.288	2.560
300							3.976	3.330	2.604
305							4.025	3.371	2.648
310							4.074	3.412	2.692
315							4.123	3.453	2.736
320							4.172	3.494	2.790
325							4.221	3.536	2.850
330							4.271	3.577	2.910
335							4.320	3.618	2.971
340							4.369	3.659	3.031
345								3.700	3.091
350								3.742	3.151
355								3.783	3.212
360								3.824	3.272
365								3.865	3.332
370								3.906	3.392
375								3.948	3.453

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Section Factor up to m^{-1}	Table 16: I-Section Columns: Fire Resistance Period: 120 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
49				2.088	1.568	1.154	0.917	0.740	0.704
50				2.088	1.568	1.154	0.917	0.740	0.704
55				2.198	1.651	1.215	0.965	0.779	0.740
60				2.412	1.830	1.365	1.056	0.856	0.791
65				2.626	2.009	1.516	1.147	0.933	0.842
70					2.187	1.666	1.271	1.010	0.892
75					2.366	1.817	1.397	1.087	0.943
80					2.545	1.967	1.524	1.166	0.994
85					2.724	2.118	1.651	1.266	1.045
90						2.268	1.778	1.365	1.095
95						2.418	1.905	1.464	1.146
100						2.569	2.032	1.564	1.218
105						2.719	2.158	1.663	1.294
110						2.853	2.285	1.762	1.370
115						2.983	2.412	1.862	1.446
120						3.113	2.539	1.961	1.522
125						3.242	2.666	2.060	1.598
130						3.372	2.781	2.159	1.675
135						3.502	2.871	2.259	1.751
140						3.631	2.961	2.358	1.827
145						3.761	3.052	2.457	1.903
150						3.891	3.142	2.557	1.979
155						4.020	3.232	2.656	2.055
160						4.150	3.322	2.754	2.131
165						4.280	3.412	2.811	2.207
170							3.503	2.868	2.283
175							3.593	2.925	2.359
180							3.683	2.982	2.435
185							3.773	3.040	2.511
190							3.863	3.097	2.587
195							3.954	3.154	2.663
200							4.044	3.211	2.739
205							4.134	3.268	2.783
210							4.223	3.325	2.821
215							4.312	3.382	2.858
220							4.401	3.440	2.896
225								3.497	2.934
230								3.554	2.971
235								3.611	3.009
240								3.668	3.047
245								3.725	3.084
250								3.783	3.122
255								3.840	3.159
260								3.897	3.197
265								3.954	3.235
270								4.011	3.272
275								4.068	3.310
280								4.125	3.348
285								4.183	3.385
290								4.240	3.423
295								4.297	3.461
300								4.354	3.498
305									3.536
310									3.573
315									3.611
320									3.649
325									3.686
330									3.724
335									3.762
340									3.799
345									3.837
350									3.874
355									3.912
360									3.950
365									3.987
370									4.025
375									4.063

Thickness is intumescent only.
Results also apply to I/H-section beams exposed on all four sides up to the maximum dry film thickness of 4.095mm.

Hollow Section Columns

Section Factor up to m^{-1}	Table 17: Rectangular Hollow Columns: Fire Resistance Period: 15 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
65	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
70	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
75	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
80	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
85	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
90	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
95	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
100	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
105	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
110	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
115	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
120	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
125	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
130	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
135	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
140	0.466	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
145	0.495	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
150	0.524	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
155	0.553	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
160	0.582	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
165	0.612	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
170	0.641	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
175	0.670	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
180	0.699	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
185	0.728	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
190	0.757	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
195	0.786	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
200	0.815	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
205	0.845	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
210	0.874	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
215	0.903	0.472	0.462	0.462	0.462	0.462	0.462	0.462	0.462
220	0.932	0.490	0.462	0.462	0.462	0.462	0.462	0.462	0.462
225	0.972	0.508	0.462	0.462	0.462	0.462	0.462	0.462	0.462
230	1.019	0.526	0.462	0.462	0.462	0.462	0.462	0.462	0.462
235	1.066	0.544	0.462	0.462	0.462	0.462	0.462	0.462	0.462
240	1.113	0.562	0.462	0.462	0.462	0.462	0.462	0.462	0.462
245	1.159	0.580	0.462	0.462	0.462	0.462	0.462	0.462	0.462
250	1.206	0.598	0.462	0.462	0.462	0.462	0.462	0.462	0.462
255	1.253	0.616	0.462	0.462	0.462	0.462	0.462	0.462	0.462
260	1.300	0.634	0.462	0.462	0.462	0.462	0.462	0.462	0.462
265	1.347	0.652	0.462	0.462	0.462	0.462	0.462	0.462	0.462
270	1.393	0.670	0.462	0.462	0.462	0.462	0.462	0.462	0.462
275	1.440	0.688	0.462	0.462	0.462	0.462	0.462	0.462	0.462
280	1.487	0.706	0.470	0.462	0.462	0.462	0.462	0.462	0.462
285	1.534	0.724	0.484	0.462	0.462	0.462	0.462	0.462	0.462
290	1.581	0.742	0.499	0.462	0.462	0.462	0.462	0.462	0.462
295	1.628	0.761	0.514	0.462	0.462	0.462	0.462	0.462	0.462
300	1.674	0.779	0.528	0.462	0.462	0.462	0.462	0.462	0.462
305	1.721	0.797	0.543	0.462	0.462	0.462	0.462	0.462	0.462
310	1.768	0.815	0.557	0.462	0.462	0.462	0.462	0.462	0.462
315	1.815	0.833	0.572	0.462	0.462	0.462	0.462	0.462	0.462
320	1.862	0.851	0.587	0.462	0.462	0.462	0.462	0.462	0.462
325	1.909	0.869	0.601	0.462	0.462	0.462	0.462	0.462	0.462
330	1.955	0.887	0.616	0.462	0.462	0.462	0.462	0.462	0.462
335	2.002	0.905	0.630	0.462	0.462	0.462	0.462	0.462	0.462
340	2.049	0.923	0.645	0.462	0.462	0.462	0.462	0.462	0.462
345	2.096	0.941	0.660	0.469	0.462	0.462	0.462	0.462	0.462
350	2.143	1.005	0.674	0.481	0.462	0.462	0.462	0.462	0.462

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 18: Rectangular Hollow Columns: Fire Resistance Period: 30 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60	0.637	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
65	0.637	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
70	0.702	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462
75	0.792	0.425	0.462	0.462	0.462	0.462	0.462	0.462	0.462
80	0.882	0.490	0.462	0.462	0.462	0.462	0.462	0.462	0.462
85	0.976	0.554	0.462	0.462	0.462	0.462	0.462	0.462	0.462
90	1.081	0.618	0.462	0.462	0.462	0.462	0.462	0.462	0.462
95	1.186	0.682	0.462	0.462	0.462	0.462	0.462	0.462	0.462
100	1.291	0.747	0.469	0.462	0.462	0.462	0.462	0.462	0.462
105	1.395	0.811	0.513	0.462	0.462	0.462	0.462	0.462	0.462
110	1.500	0.875	0.556	0.462	0.462	0.462	0.462	0.462	0.462
115	1.605	0.939	0.600	0.462	0.462	0.462	0.462	0.462	0.462
120	1.709	1.010	0.643	0.462	0.462	0.462	0.462	0.462	0.462
125	1.814	1.080	0.687	0.478	0.462	0.462	0.462	0.462	0.462
130	1.919	1.150	0.731	0.508	0.462	0.462	0.462	0.462	0.462
135	2.023	1.221	0.774	0.538	0.462	0.462	0.462	0.462	0.462
140	2.128	1.291	0.818	0.569	0.462	0.462	0.462	0.462	0.462
145	2.233	1.362	0.861	0.599	0.462	0.462	0.462	0.462	0.462
150	2.345	1.432	0.905	0.629	0.462	0.462	0.462	0.462	0.462
155	2.462	1.503	0.953	0.659	0.462	0.462	0.462	0.462	0.462
160	2.579	1.573	1.033	0.689	0.462	0.462	0.462	0.462	0.462
165	2.696	1.644	1.112	0.719	0.462	0.462	0.462	0.462	0.462
170	2.813	1.714	1.192	0.749	0.487	0.462	0.462	0.462	0.462
175	2.930	1.785	1.271	0.779	0.516	0.462	0.462	0.462	0.462
180	3.047	1.855	1.351	0.809	0.544	0.462	0.462	0.462	0.462
185	3.165	1.926	1.431	0.839	0.573	0.462	0.462	0.462	0.462
190	3.282	1.996	1.510	0.869	0.602	0.462	0.462	0.462	0.462
195	3.399	2.066	1.590	0.899	0.630	0.462	0.462	0.462	0.462
200	3.456	2.137	1.670	0.930	0.659	0.462	0.462	0.462	0.462
205	3.492	2.207	1.749	0.996	0.688	0.462	0.462	0.462	0.462
210	3.527	2.284	1.829	1.093	0.717	0.462	0.462	0.462	0.462
215	3.563	2.508	1.909	1.190	0.745	0.462	0.462	0.462	0.462
220	3.598	2.733	1.988	1.286	0.774	0.462	0.462	0.462	0.462
225	3.634	2.957	2.068	1.383	0.803	0.462	0.462	0.462	0.462
230	3.670	3.181	2.148	1.480	0.831	0.466	0.462	0.462	0.462
235	3.705	3.405	2.227	1.576	0.860	0.491	0.462	0.462	0.462
240	3.741	3.460	2.348	1.673	0.889	0.516	0.462	0.462	0.462
245	3.776	3.494	2.529	1.770	0.918	0.541	0.462	0.462	0.462
250	3.812	3.527	2.710	1.866	0.958	0.565	0.462	0.462	0.462
255	3.847	3.561	2.891	1.963	1.088	0.590	0.462	0.462	0.462
260	3.883	3.595	3.072	2.059	1.219	0.615	0.462	0.462	0.462
265	3.919	3.628	3.253	2.156	1.349	0.640	0.462	0.462	0.462
270	3.954	3.662	3.431	2.253	1.479	0.665	0.462	0.462	0.462
275	3.990	3.696	3.465	2.399	1.609	0.690	0.462	0.462	0.462
280	4.025	3.729	3.499	2.559	1.740	0.714	0.462	0.462	0.462
285	4.061	3.763	3.534	2.720	1.870	0.739	0.462	0.462	0.462
290	4.096	3.797	3.568	2.881	2.000	0.764	0.462	0.462	0.462
295	4.132	3.830	3.602	3.041	2.131	0.789	0.466	0.462	0.462
300	4.168	3.864	3.636	3.202	2.261	0.814	0.490	0.462	0.462
305	4.203	3.898	3.671	3.362	2.377	0.838	0.513	0.462	0.462
310	4.239	3.931	3.705	3.450	2.492	0.863	0.537	0.462	0.462
315	4.274	3.965	3.739	3.484	2.607	0.888	0.561	0.462	0.462
320	4.310	3.999	3.774	3.519	2.721	0.913	0.584	0.462	0.462
325	4.345	4.032	3.808	3.553	2.836	0.938	0.608	0.462	0.462
330	4.381	4.066	3.842	3.588	2.951	1.129	0.631	0.462	0.462
335	4.417	4.100	3.877	3.622	3.065	1.365	0.655	0.462	0.462
340	4.452	4.133	3.911	3.657	3.180	1.601	0.679	0.462	0.462
345	4.488	4.167	3.945	3.691	3.295	1.838	0.702	0.462	0.462
350	4.523	4.201	3.979	3.726	3.410	2.074	0.726	0.462	0.462

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 19: Rectangular Hollow Columns: Fire Resistance Period: 45 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60	1.842	0.896	0.604	0.462	0.462	0.462	0.462	0.462	0.462
65	1.842	0.896	0.604	0.463	0.462	0.462	0.462	0.462	0.462
70	1.939	1.045	0.665	0.464	0.462	0.462	0.462	0.462	0.462
75	2.299	1.254	0.753	0.523	0.462	0.462	0.462	0.462	0.462
80	2.432	1.463	0.842	0.592	0.462	0.462	0.462	0.462	0.462
85	2.564	1.673	0.930	0.660	0.462	0.462	0.462	0.462	0.462
90	2.697	1.882	1.090	0.729	0.516	0.462	0.462	0.462	0.462
95	2.829	2.091	1.262	0.797	0.578	0.462	0.462	0.462	0.462
100	2.962	2.288	1.434	0.865	0.640	0.462	0.462	0.462	0.462
105	3.094	2.393	1.606	0.934	0.702	0.471	0.462	0.462	0.462
110	3.227	2.498	1.778	1.062	0.764	0.521	0.462	0.462	0.462
115	3.359	2.603	1.950	1.200	0.826	0.571	0.462	0.462	0.462
120	3.487	2.708	2.122	1.339	0.888	0.621	0.462	0.462	0.462
125	3.610	2.812	2.287	1.477	0.957	0.671	0.462	0.462	0.462
130	3.734	2.917	2.400	1.615	1.076	0.721	0.462	0.462	0.462
135	3.857	3.022	2.513	1.753	1.196	0.770	0.471	0.462	0.462
140	3.980	3.127	2.626	1.891	1.315	0.820	0.514	0.462	0.462
145	4.103	3.232	2.738	2.029	1.435	0.870	0.556	0.462	0.462
150	4.226	3.337	2.851	2.168	1.554	0.920	0.598	0.462	0.462
155	4.350	3.439	2.964	2.304	1.674	0.998	0.640	0.462	0.462
160	4.473	3.520	3.077	2.437	1.793	1.098	0.683	0.462	0.462
165	4.596	3.602	3.190	2.569	1.913	1.199	0.725	0.462	0.462
170	4.719	3.683	3.303	2.701	2.033	1.299	0.767	0.462	0.462
175	4.842	3.764	3.416	2.833	2.152	1.400	0.810	0.462	0.462
180	4.965	3.845	3.483	2.966	2.272	1.500	0.852	0.462	0.462
185	5.080	3.926	3.544	3.098	2.409	1.601	0.894	0.462	0.462
190		4.007	3.605	3.230	2.547	1.701	0.937	0.462	0.462
195		4.088	3.665	3.362	2.685	1.802	1.039	0.477	0.462
200		4.169	3.726	3.456	2.822	1.903	1.152	0.513	0.462
205		4.250	3.787	3.510	2.960	2.003	1.265	0.550	0.462
210		4.331	3.848	3.563	3.098	2.104	1.378	0.586	0.462
215		4.412	3.909	3.617	3.236	2.204	1.491	0.622	0.462
220		4.493	3.970	3.670	3.374	2.327	1.604	0.658	0.462
225		4.574	4.030	3.724	3.463	2.501	1.717	0.694	0.462
230		4.655	4.091	3.778	3.518	2.676	1.830	0.730	0.462
235		4.736	4.152	3.831	3.573	2.851	1.943	0.766	0.462
240		4.817	4.213	3.885	3.628	3.026	2.056	0.803	0.462
245		4.898	4.274	3.938	3.683	3.201	2.169	0.839	0.462
250		4.979	4.335	3.992	3.738	3.376	2.284	0.875	0.462
255		5.060	4.395	4.045	3.793	3.472	2.432	0.911	0.462
260			4.456	4.099	3.848	3.532	2.580	0.965	0.462
265			4.517	4.153	3.903	3.593	2.728	1.157	0.462
270			4.578	4.206	3.958	3.653	2.876	1.349	0.462
275			4.639	4.260	4.013	3.714	3.024	1.541	0.462
280			4.699	4.313	4.068	3.774	3.171	1.733	0.462
285			4.760	4.367	4.123	3.834	3.319	1.925	0.462
290			4.821	4.420	4.178	3.895	3.446	2.117	0.464
295			4.882	4.474	4.233	3.955	3.509	2.297	0.496
300			4.943	4.527	4.288	4.016	3.572	2.418	0.528
305			5.004	4.581	4.344	4.076	3.635	2.539	0.560
310			5.064	4.635	4.399	4.137	3.698	2.661	0.593
315				4.688	4.454	4.197	3.761	2.782	0.625
320				4.742	4.509	4.257	3.824	2.903	0.657
325				4.795	4.564	4.318	3.888	3.025	0.689
330				4.849	4.619	4.378	3.951	3.146	0.721
335				4.902	4.674	4.439	4.014	3.267	0.753
340				4.956	4.729	4.499	4.077	3.389	0.786
345				5.010	4.784	4.560	4.140	3.474	0.818
350					4.839	4.620	4.203	3.542	0.850

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 20: Rectangular Hollow Columns: Fire Resistance Period: 60 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60	3.299	2.303	1.418	0.896	0.630	0.462	0.462	0.462	0.462
65	3.341	2.328	1.418	0.896	0.630	0.463	0.462	0.462	0.462
70	3.593	2.541	1.662	0.896	0.696	0.502	0.462	0.462	0.462
75	3.846	2.753	1.965	1.122	0.792	0.582	0.462	0.462	0.462
80	4.098	2.966	2.267	1.380	0.888	0.662	0.462	0.462	0.462
85	4.350	3.178	2.418	1.638	1.035	0.742	0.518	0.462	0.462
90	4.602	3.391	2.565	1.897	1.254	0.822	0.588	0.462	0.462
95	4.855	3.627	2.712	2.155	1.472	0.901	0.658	0.462	0.462
100		3.869	2.859	2.339	1.691	1.024	0.727	0.466	0.462
105		4.111	3.006	2.459	1.910	1.193	0.797	0.506	0.462
110		4.353	3.153	2.578	2.129	1.363	0.866	0.566	0.462
115		4.595	3.299	2.698	2.314	1.532	0.936	0.625	0.462
120		4.837	3.464	2.817	2.432	1.701	1.068	0.684	0.462
125		5.079	3.772	2.937	2.549	1.870	1.208	0.744	0.462
130			4.080	3.057	2.667	2.039	1.347	0.803	0.462
135			4.388	3.176	2.785	2.208	1.486	0.863	0.462
140			4.696	3.296	2.903	2.353	1.626	0.922	0.462
145			5.004	3.415	3.020	2.482	1.765	1.016	0.462
150				3.743	3.138	2.610	1.904	1.129	0.485
155				4.100	3.256	2.739	2.044	1.242	0.542
160				4.457	3.373	2.868	2.183	1.354	0.598
165				4.814	3.559	2.996	2.322	1.467	0.655
170					3.807	3.125	2.460	1.580	0.712
175					4.055	3.253	2.599	1.692	0.768
180					4.304	3.382	2.737	1.805	0.825
185					4.552	3.570	2.875	1.918	0.882
190					4.800	3.793	3.014	2.030	0.938
195					5.049	4.017	3.152	2.143	1.062
200						4.240	3.290	2.255	1.191
205						4.464	3.429	2.411	1.321
210						4.687	3.591	2.576	1.451
215						4.910	3.754	2.741	1.580
220							3.917	2.905	1.710
225							4.079	3.070	1.839
230							4.242	3.235	1.969
235							4.405	3.400	2.098
240							4.568	3.526	2.228
245							4.730	3.644	2.384
250							4.893	3.762	2.555
255							5.040	3.879	2.727
260								3.997	2.898
265								4.115	3.069
270								4.232	3.240
275								4.350	3.411
280								4.468	3.523
285								4.586	3.628
290								4.703	3.732
295								4.821	3.837
300									3.942
305									4.046
310									4.151
315									4.255
320									4.360
325									4.465
330									4.569
335									4.674
340									4.778
345									4.883
350									4.988

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 21: Rectangular Hollow Columns: Fire Resistance Period: 75 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60		3.777	2.808	2.161	1.226	0.806	0.624	0.462	0.462
65		3.779	2.814	2.161	1.226	0.806	0.624	0.463	0.462
70		4.138	3.106	2.216	1.470	0.848	0.691	0.482	0.462
75		4.496	3.398	2.467	1.789	1.104	0.789	0.566	0.462
80		4.855	3.773	2.719	2.108	1.358	0.887	0.650	0.462
85			4.158	2.970	2.356	1.611	1.032	0.734	0.462
90			4.543	3.221	2.525	1.865	1.244	0.818	0.462
95			4.928	3.518	2.694	2.118	1.455	0.902	0.535
100				4.036	2.864	2.325	1.666	1.033	0.618
105				4.555	3.033	2.455	1.877	1.210	0.701
110				5.074	3.203	2.585	2.088	1.386	0.784
115					3.372	3.372	2.335	1.563	0.867
120					3.430	3.430	2.637	1.740	0.955
125						4.030	2.940	1.916	1.096
130						4.355	3.242	2.093	1.236
135						4.680	3.545	2.269	1.376
140						5.005	3.847	2.399	1.517
145							4.150	2.528	1.657
150							4.452	2.656	1.798
155							4.755	2.784	1.938
160							5.057	2.913	2.079
165								3.041	2.219
170								3.170	2.366
175								3.298	2.517
180								3.430	2.667
185									2.818
190									2.969
195									3.119
200									3.270
205									3.421
210									3.430

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 22: Rectangular Hollow Columns: Fire Resistance Period: 90 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60			4.399	3.272	2.365	1.585	1.040	0.757	0.508
65			4.260	3.272	2.365	1.585	1.040	0.757	0.508
70			4.878	3.717	2.671	1.853	1.253	0.797	0.563
75				4.287	3.004	2.182	1.536	0.980	0.673
80				4.857	3.338	2.464	1.819	1.221	0.784
85					3.982	2.727	2.102	1.463	0.894
90					4.745	2.991	2.468	1.705	1.053
95						3.254	2.950	1.946	1.251
100						3.430	3.430	2.188	1.449
105							3.914	2.544	1.646
110							4.396	2.994	1.844
115							4.878	3.444	2.041
120								3.894	2.239
125								4.344	2.622
130								4.794	3.056
135									3.490
140									3.924
145									4.358
150									4.792

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 23: Rectangular Hollow Columns: Fire Resistance Period: 105 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60					4.000	2.715	2.161	1.326	0.896
65					4.000	2.715	2.161	1.326	0.896
70					4.544	2.858	2.165	1.566	1.013
75						3.687	2.517	1.870	1.268
80						4.833	2.869	2.174	1.523
85							3.221	2.647	1.778
90							3.430	3.267	2.033
95								3.887	2.275
100								4.507	2.895
105									3.515
110									4.135
115									4.755

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 24: Rectangular Hollow Columns: Fire Resistance Period: 120 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
60							3.259	2.161	1.530
65							3.259	2.161	1.530
70							3.671	2.434	1.785
75							4.878	2.867	2.096
80								3.430	2.581
85								5.040	3.346
90									4.111
95									4.876

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 25: Circular Hollow Columns: Fire Resistance Period: 15 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
38	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
40	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
45	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
50	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
55	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
60	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
65	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
70	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
75	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
80	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
85	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
90	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
95	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
100	0.397	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
105	0.425	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
110	0.453	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
115	0.482	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
120	0.510	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
125	0.539	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
130	0.567	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
135	0.595	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
140	0.624	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
145	0.652	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
150	0.680	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
155	0.709	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
160	0.737	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
165	0.766	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
170	0.794	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
175	0.822	0.409	0.396	0.396	0.396	0.396	0.396	0.396	0.396
180	0.851	0.436	0.396	0.396	0.396	0.396	0.396	0.396	0.396
185	0.879	0.464	0.396	0.396	0.396	0.396	0.396	0.396	0.396
190	0.908	0.491	0.396	0.396	0.396	0.396	0.396	0.396	0.396
195	0.936	0.518	0.396	0.396	0.396	0.396	0.396	0.396	0.396
200	0.964	0.546	0.396	0.396	0.396	0.396	0.396	0.396	0.396
205	0.993	0.573	0.396	0.396	0.396	0.396	0.396	0.396	0.396
210	1.021	0.600	0.396	0.396	0.396	0.396	0.396	0.396	0.396
215	1.050	0.628	0.396	0.396	0.396	0.396	0.396	0.396	0.396
220	1.078	0.655	0.396	0.396	0.396	0.396	0.396	0.396	0.396
225	1.102	0.682	0.396	0.396	0.396	0.396	0.396	0.396	0.396
230	1.124	0.709	0.396	0.396	0.396	0.396	0.396	0.396	0.396
235	1.145	0.737	0.396	0.396	0.396	0.396	0.396	0.396	0.396
240	1.166	0.764	0.396	0.396	0.396	0.396	0.396	0.396	0.396
245	1.187	0.791	0.396	0.396	0.396	0.396	0.396	0.396	0.396
250	1.209	0.819	0.396	0.396	0.396	0.396	0.396	0.396	0.396
255	1.230	0.846	0.396	0.396	0.396	0.396	0.396	0.396	0.396
260	1.251	0.873	0.396	0.396	0.396	0.396	0.396	0.396	0.396
265	1.272	0.901	0.396	0.396	0.396	0.396	0.396	0.396	0.396
270	1.293	0.928	0.396	0.396	0.396	0.396	0.396	0.396	0.396
275	1.315	0.955	0.396	0.396	0.396	0.396	0.396	0.396	0.396
280	1.336	0.982	0.396	0.396	0.396	0.396	0.396	0.396	0.396
285	1.357	1.010	0.396	0.396	0.396	0.396	0.396	0.396	0.396
290	1.378	1.037	0.396	0.396	0.396	0.396	0.396	0.396	0.396
295	1.400	1.064	0.396	0.396	0.396	0.396	0.396	0.396	0.396
300	1.421	1.091	0.396	0.396	0.396	0.396	0.396	0.396	0.396
305	1.442	1.109	0.396	0.396	0.396	0.396	0.396	0.396	0.396
310	1.463	1.127	0.396	0.396	0.396	0.396	0.396	0.396	0.396
315	1.485	1.145	0.396	0.396	0.396	0.396	0.396	0.396	0.396
320	1.506	1.163	0.396	0.396	0.396	0.396	0.396	0.396	0.396
325	1.527	1.181	0.443	0.396	0.396	0.396	0.396	0.396	0.396
330	1.548	1.199	0.498	0.396	0.396	0.396	0.396	0.396	0.396
335	1.569	1.217	0.554	0.396	0.396	0.396	0.396	0.396	0.396
340	1.591	1.235	0.610	0.396	0.396	0.396	0.396	0.396	0.396
345	1.612	1.253	0.665	0.396	0.396	0.396	0.396	0.396	0.396
350	1.665	1.271	0.721	0.396	0.396	0.396	0.396	0.396	0.396

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 26: Circular Hollow Columns: Fire Resistance Period: 30 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
38	0.452	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
40	0.452	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
45	0.479	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
50	0.571	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
55	0.663	0.396	0.396	0.396	0.396	0.396	0.396	0.396	0.396
60	0.756	0.441	0.396	0.396	0.396	0.396	0.396	0.396	0.396
65	0.848	0.504	0.396	0.396	0.396	0.396	0.396	0.396	0.396
70	0.940	0.568	0.396	0.396	0.396	0.396	0.396	0.396	0.396
75	1.032	0.632	0.396	0.396	0.396	0.396	0.396	0.396	0.396
80	1.118	0.695	0.432	0.396	0.396	0.396	0.396	0.396	0.396
85	1.192	0.759	0.477	0.396	0.396	0.396	0.396	0.396	0.396
90	1.266	0.823	0.521	0.396	0.396	0.396	0.396	0.396	0.396
95	1.340	0.886	0.565	0.396	0.396	0.396	0.396	0.396	0.396
100	1.415	0.950	0.610	0.403	0.396	0.396	0.396	0.396	0.396
105	1.489	1.014	0.654	0.433	0.396	0.396	0.396	0.396	0.396
110	1.563	1.077	0.698	0.463	0.396	0.396	0.396	0.396	0.396
115	1.635	1.134	0.743	0.493	0.396	0.396	0.396	0.396	0.396
120	1.703	1.188	0.787	0.523	0.396	0.396	0.396	0.396	0.396
125	1.771	1.242	0.831	0.553	0.396	0.396	0.396	0.396	0.396
130	1.839	1.297	0.876	0.583	0.396	0.396	0.396	0.396	0.396
135	1.906	1.351	0.920	0.613	0.396	0.396	0.396	0.396	0.396
140	1.974	1.405	0.964	0.643	0.424	0.396	0.396	0.396	0.396
145	2.042	1.460	1.008	0.673	0.453	0.396	0.396	0.396	0.396
150	2.110	1.514	1.053	0.703	0.482	0.396	0.396	0.396	0.396
155	2.178	1.568	1.097	0.733	0.512	0.396	0.396	0.396	0.396
160	2.246	1.624	1.139	0.764	0.541	0.396	0.396	0.396	0.396
165	2.313	1.687	1.182	0.794	0.570	0.396	0.396	0.396	0.396
170	2.381	1.750	1.224	0.824	0.599	0.396	0.396	0.396	0.396
175	2.449	1.813	1.267	0.854	0.628	0.396	0.396	0.396	0.396
180	2.517	1.876	1.309	0.884	0.657	0.396	0.396	0.396	0.396
185	2.585	1.940	1.352	0.914	0.686	0.402	0.396	0.396	0.396
190	2.652	2.003	1.394	0.944	0.715	0.432	0.396	0.396	0.396
195	2.720	2.066	1.437	0.974	0.744	0.461	0.396	0.396	0.396
200	2.788	2.129	1.479	1.004	0.773	0.490	0.396	0.396	0.396
205	2.856	2.192	1.522	1.034	0.802	0.519	0.396	0.396	0.396
210	2.924	2.255	1.564	1.064	0.832	0.548	0.396	0.396	0.396
215	2.991	2.319	1.607	1.094	0.861	0.577	0.396	0.396	0.396
220	3.059	2.382	1.671	1.132	0.890	0.607	0.396	0.396	0.396
225	3.127	2.445	1.742	1.169	0.919	0.636	0.396	0.396	0.396
230	3.200	2.508	1.813	1.206	0.948	0.665	0.396	0.396	0.396
235	3.279	2.571	1.884	1.243	0.977	0.694	0.396	0.396	0.396
240	3.358	2.635	1.954	1.280	1.006	0.723	0.396	0.396	0.396
245	3.437	2.698	2.025	1.317	1.035	0.752	0.396	0.396	0.396
250	3.516	2.761	2.096	1.354	1.064	0.782	0.396	0.396	0.396
255	3.595	2.824	2.167	1.391	1.093	0.811	0.396	0.396	0.396
260	3.674	2.887	2.238	1.428	1.122	0.840	0.396	0.396	0.396
265	3.753	2.950	2.309	1.465	1.151	0.869	0.396	0.396	0.396
270	3.832	3.014	2.380	1.502	1.180	0.898	0.396	0.396	0.396
275	3.911	3.077	2.450	1.539	1.209	0.928	0.396	0.396	0.396
280	3.990	3.140	2.521	1.577	1.238	0.957	0.396	0.396	0.396
285	4.069	3.212	2.592	1.614	1.267	0.986	0.396	0.396	0.396
290	4.148	3.290	2.663	1.702	1.296	1.015	0.413	0.396	0.396
295	4.227	3.368	2.734	1.794	1.325	1.044	0.459	0.396	0.396
300	4.306	3.446	2.805	1.886	1.354	1.073	0.505	0.396	0.396
305	4.385	3.524	2.876	1.978	1.383	1.102	0.551	0.396	0.396
310	4.464	3.602	2.946	2.070	1.412	1.131	0.597	0.396	0.396
315	4.543	3.680	3.017	2.162	1.440	1.159	0.643	0.396	0.396
320	4.622	3.758	3.088	2.254	1.469	1.187	0.689	0.396	0.396
325	4.701	3.836	3.159	2.346	1.498	1.216	0.735	0.396	0.396
330	4.780	3.914	3.236	2.438	1.527	1.244	0.781	0.396	0.396
335	4.859	3.992	3.313	2.530	1.556	1.273	0.827	0.396	0.396
340	4.938	4.070	3.390	2.621	1.585	1.301	0.873	0.396	0.396
345	5.017	4.147	3.467	2.713	1.614	1.329	0.918	0.396	0.396
350	5.096	4.225	3.544	2.805	1.710	1.358	0.964	0.396	0.396

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 27: Circular Hollow Columns: Fire Resistance Period: 45 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
38	1.036	0.625	0.396	0.396	0.396	0.396	0.396	0.396	0.396
40	1.036	0.625	0.396	0.396	0.396	0.396	0.396	0.396	0.396
45	1.041	0.675	0.426	0.396	0.396	0.396	0.396	0.396	0.396
50	1.180	0.797	0.528	0.396	0.396	0.396	0.396	0.396	0.396
55	1.320	0.919	0.631	0.413	0.396	0.396	0.396	0.396	0.396
60	1.460	1.040	0.734	0.493	0.396	0.396	0.396	0.396	0.396
65	1.599	1.154	0.836	0.574	0.396	0.396	0.396	0.396	0.396
70	1.808	1.261	0.939	0.655	0.435	0.396	0.396	0.396	0.396
75	2.026	1.368	1.042	0.735	0.497	0.396	0.396	0.396	0.396
80	2.243	1.476	1.134	0.816	0.558	0.396	0.396	0.396	0.396
85	2.461	1.583	1.216	0.896	0.620	0.429	0.396	0.396	0.396
90	2.679	1.695	1.298	0.977	0.682	0.470	0.396	0.396	0.396
95	2.897	1.809	1.380	1.058	0.743	0.511	0.396	0.396	0.396
100	3.114	1.923	1.462	1.132	0.805	0.552	0.396	0.396	0.396
105	3.222	2.037	1.544	1.202	0.867	0.594	0.415	0.396	0.396
110	3.297	2.151	1.626	1.272	0.928	0.635	0.446	0.396	0.396
115	3.373	2.265	1.701	1.343	0.990	0.676	0.476	0.396	0.396
120	3.449	2.379	1.777	1.413	1.052	0.717	0.507	0.396	0.396
125	3.525	2.493	1.852	1.483	1.111	0.758	0.538	0.396	0.396
130	3.600	2.606	1.928	1.553	1.168	0.799	0.568	0.396	0.396
135	3.676	2.720	2.004	1.624	1.224	0.840	0.599	0.396	0.396
140	3.752	2.834	2.079	1.699	1.280	0.881	0.630	0.414	0.396
145	3.827	2.948	2.155	1.774	1.337	0.922	0.660	0.444	0.396
150	3.903	3.062	2.230	1.849	1.393	0.963	0.691	0.474	0.396
155	3.979	3.173	2.306	1.924	1.449	1.004	0.722	0.505	0.396
160	4.054	3.260	2.382	1.999	1.506	1.046	0.752	0.535	0.396
165	4.130	3.348	2.457	2.074	1.562	1.087	0.783	0.565	0.396
170	4.206	3.435	2.533	2.149	1.620	1.149	0.813	0.596	0.396
175	4.281	3.523	2.608	2.224	1.699	1.213	0.844	0.626	0.396
180	4.357	3.610	2.684	2.299	1.779	1.278	0.875	0.656	0.396
185	4.433	3.697	2.760	2.374	1.859	1.342	0.905	0.686	0.396
190	4.508	3.785	2.835	2.449	1.939	1.407	0.936	0.717	0.396
195	4.584	3.872	2.911	2.523	2.018	1.471	0.967	0.747	0.396
200	4.660	3.960	2.986	2.598	2.098	1.536	0.997	0.777	0.396
205	4.735	4.047	3.062	2.673	2.178	1.600	1.028	0.807	0.396
210	4.811	4.134	3.138	2.748	2.258	1.678	1.059	0.838	0.396
215	4.887	4.222	3.242	2.823	2.338	1.759	1.089	0.868	0.396
220	4.962	4.309	3.360	2.898	2.417	1.840	1.117	0.898	0.396
225	5.038	4.397	3.479	2.973	2.497	1.921	1.145	0.929	0.396
230	5.114	4.484	3.597	3.048	2.577	2.003	1.172	0.959	0.431
235	5.189	4.571	3.716	3.123	2.657	2.084	1.200	0.989	0.475
240	5.265	4.659	3.834	3.219	2.737	2.165	1.228	1.019	0.519
245	5.341	4.746	3.953	3.340	2.816	2.247	1.255	1.050	0.563
250		4.834	4.071	3.461	2.896	2.328	1.283	1.080	0.608
255		4.921	4.190	3.582	2.976	2.409	1.311	1.105	0.652
260		5.008	4.309	3.703	3.056	2.491	1.338	1.128	0.696
265		5.096	4.427	3.824	3.135	2.572	1.366	1.151	0.740
270		5.183	4.546	3.945	3.245	2.653	1.394	1.173	0.784
275		5.271	4.664	4.065	3.371	2.735	1.421	1.196	0.828
280		5.358	4.783	4.186	3.496	2.816	1.449	1.218	0.873
285			4.901	4.307	3.622	2.897	1.476	1.241	0.917
290			5.020	4.428	3.747	2.978	1.504	1.263	0.961
295			5.138	4.549	3.873	3.060	1.532	1.286	1.005
300				4.670	3.998	3.141	1.559	1.309	1.049
305				4.790	4.124	3.250	1.587	1.331	1.092
310				4.911	4.249	3.370	1.615	1.354	1.108
315				5.032	4.375	3.489	1.831	1.376	1.124
320				5.153	4.500	3.609	2.057	1.399	1.140
325					4.626	3.728	2.283	1.422	1.156
330					4.751	3.848	2.510	1.444	1.172
335					4.877	3.968	2.736	1.467	1.188
340					5.002	4.087	2.962	1.489	1.204
345					5.128	4.207	3.176	1.512	1.220
350					5.253	4.326	3.298	1.535	1.236

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 28: Circular Hollow Columns: Fire Resistance Period: 60 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
38	1.535	1.036	0.798	0.587	0.396	0.396	0.396	0.396	0.396
40	1.535	1.036	0.798	0.587	0.396	0.396	0.396	0.396	0.396
45	1.535	1.153	0.880	0.634	0.401	0.396	0.396	0.396	0.396
50	2.009	1.316	1.038	0.772	0.524	0.396	0.396	0.396	0.396
55	2.510	1.478	1.172	0.909	0.647	0.435	0.396	0.396	0.396
60	3.010	1.666	1.295	1.046	0.771	0.530	0.396	0.396	0.396
65	3.286	1.994	1.417	1.158	0.894	0.624	0.423	0.396	0.396
70	3.464	2.322	1.539	1.258	1.017	0.718	0.494	0.396	0.396
75	3.641	2.650	1.700	1.358	1.122	0.812	0.566	0.396	0.396
80	3.818	2.978	1.925	1.458	1.201	0.906	0.637	0.431	0.396
85	3.996	3.205	2.150	1.557	1.280	1.001	0.709	0.481	0.396
90	4.173	3.301	2.375	1.680	1.358	1.094	0.780	0.530	0.396
95	4.350	3.398	2.599	1.834	1.437	1.170	0.852	0.580	0.396
100	4.528	3.494	2.824	1.988	1.516	1.245	0.923	0.629	0.396
105	4.705	3.591	3.049	2.143	1.594	1.321	0.994	0.679	0.427
110	4.883	3.687	3.207	2.297	1.692	1.396	1.066	0.728	0.464
115	5.060	3.784	3.297	2.451	1.797	1.472	1.122	0.778	0.500
120	5.237	3.880	3.386	2.605	1.902	1.548	1.171	0.827	0.536
125		3.977	3.476	2.760	2.007	1.624	1.219	0.877	0.572
130		4.073	3.565	2.914	2.112	1.707	1.267	0.927	0.609
135		4.170	3.654	3.068	2.217	1.790	1.315	0.976	0.645
140		4.266	3.744	3.202	2.322	1.873	1.364	1.026	0.681
145		4.363	3.833	3.304	2.427	1.955	1.412	1.075	0.718
150		4.459	3.923	3.406	2.532	2.038	1.460	1.117	0.754
155		4.555	4.012	3.508	2.638	2.121	1.508	1.156	0.790
160		4.652	4.102	3.610	2.743	2.204	1.557	1.195	0.826
165		4.748	4.191	3.712	2.848	2.287	1.605	1.233	0.863
170		4.845	4.280	3.814	2.953	2.370	1.692	1.272	0.899
175		4.941	4.370	3.916	3.058	2.453	1.790	1.310	0.935
180		5.038	4.459	4.018	3.163	2.535	1.889	1.349	0.972
185		5.134	4.549	4.120	3.299	2.618	1.987	1.388	1.008
190		5.231	4.638	4.222	3.435	2.701	2.086	1.426	1.044
195		5.327	4.728	4.324	3.572	2.784	2.185	1.465	1.080
200			4.817	4.426	3.708	2.867	2.283	1.504	1.108
205			4.907	4.528	3.845	2.950	2.382	1.542	1.131
210			4.996	4.630	3.981	3.033	2.480	1.581	1.154
215			5.085	4.732	4.117	3.115	2.579	1.627	1.178
220			5.175	4.834	4.254	3.233	2.678	1.750	1.201
225			5.264	4.936	4.390	3.399	2.776	1.873	1.225
230				5.038	4.526	3.564	2.875	1.997	1.248
235				5.140	4.663	3.729	2.973	2.120	1.272
240					4.799	3.895	3.072	2.243	1.295
245					4.936	4.060	3.176	2.366	1.318
250					5.072	4.225	3.347	2.489	1.342
255					5.208	4.391	3.518	2.612	1.365
260					5.345	4.556	3.689	2.736	1.389
265						4.721	3.859	2.859	1.412
270						4.887	4.030	2.982	1.436
275						5.052	4.201	3.105	1.459
280						5.217	4.372	3.244	1.482
285							4.543	3.397	1.506
290							4.714	3.549	1.529
295							4.884	3.702	1.553
300							5.055	3.855	1.576
305							5.226	4.007	1.600
310								4.160	1.772
315								4.313	2.296
320								4.466	2.820
325								4.618	3.200
330								4.771	3.308
335								4.924	3.417
340								5.076	3.525
345								5.229	3.633
350								5.378	3.741

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 29: Circular Hollow Columns: Fire Resistance Period: 75 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
38	3.163	1.535	1.182	1.036	0.763	0.548	0.396	0.396	0.396
40	3.163	1.535	1.182	1.036	0.763	0.548	0.396	0.396	0.396
45	3.163	1.611	1.295	1.087	0.844	0.591	0.396	0.396	0.396
50		2.276	1.456	1.217	1.024	0.742	0.503	0.396	0.396
55		2.941	1.618	1.347	1.155	0.892	0.628	0.423	0.396
60		3.336	2.112	1.477	1.258	1.042	0.754	0.511	0.396
65		3.595	2.606	1.607	1.360	1.156	0.879	0.600	0.396
70		3.855	3.101	1.947	1.463	1.251	1.004	0.688	0.454
75		4.114	3.329	2.304	1.566	1.346	1.112	0.777	0.521
80		4.374	3.519	2.660	1.748	1.442	1.182	0.865	0.588
85		4.633	3.709	3.016	2.007	1.537	1.252	0.954	0.655
90		4.893	3.898	3.251	2.266	1.647	1.321	1.042	0.722
95		5.152	4.088	3.399	2.525	1.820	1.391	1.119	0.789
100			4.278	3.548	2.784	1.993	1.461	1.182	0.856
105			4.468	3.697	3.043	2.167	1.530	1.245	0.923
110			4.658	3.845	3.228	2.340	1.600	1.308	0.990
115			4.848	3.994	3.349	2.513	1.718	1.371	1.057
120			5.038	4.143	3.470	2.686	1.850	1.433	1.113
125			5.227	4.292	3.591	2.860	1.983	1.496	1.157
130				4.440	3.712	3.033	2.115	1.559	1.202
135				4.589	3.833	3.193	2.247	1.625	1.246
140				4.738	3.954	3.311	2.380	1.726	1.290
145				4.886	4.075	3.430	2.512	1.826	1.335
150				5.035	4.196	3.549	2.645	1.926	1.379
155				5.184	4.317	3.668	2.777	2.026	1.423
160				5.333	4.438	3.787	2.909	2.126	1.468
165					4.559	3.906	3.042	2.226	1.512
170					4.680	4.024	3.176	2.326	1.556
175					4.800	4.143	3.329	2.426	1.601
180					4.921	4.262	3.482	2.527	1.695
185					5.042	4.381	3.634	2.627	1.816
190					5.163	4.500	3.787	2.727	1.936
195					5.284	4.618	3.940	2.827	2.057
200						4.737	4.093	2.927	2.177
205						4.856	4.246	3.027	2.298
210						4.975	4.399	3.127	2.419
215						5.094	4.552	3.292	2.539
220						5.212	4.704	3.492	2.660
225							4.857	3.692	2.780
230							5.010	3.892	2.901
235							5.163	4.092	3.021
240							5.316	4.292	3.142
245								4.492	3.283
250								4.691	3.428
255								4.891	3.573
260								5.091	3.718
265								5.291	3.863
270									4.009
275									4.154
280									4.299
285									4.444
290									4.590
295									4.735
300									4.880
305									5.025
310									5.170

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 30: Circular Hollow Columns: Fire Resistance Period: 90 Minutes									
	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
38			1.610	1.283	1.214	1.107	0.903	0.684	0.473	0.396
40			1.610	1.283	1.214	1.107	0.903	0.684	0.473	0.396
45			1.805	1.392	1.321	1.211	0.950	0.752	0.504	0.396
50			2.702	1.552	1.462	1.338	1.163	0.926	0.632	0.421
55				2.021	1.603	1.466	1.280	1.096	0.761	0.520
60				2.696	2.153	1.593	1.396	1.188	0.889	0.619
65				3.254	2.745	2.024	1.513	1.279	1.018	0.718
70				3.551	3.240	2.523	1.655	1.370	1.128	0.817
75				3.847	3.505	3.022	1.994	1.461	1.215	0.916
80				4.144	3.770	3.334	2.333	1.552	1.302	1.015
85				4.440	4.035	3.573	2.672	1.698	1.389	1.107
90				4.736	4.299	3.811	3.012	1.971	1.475	1.177
95				5.033	4.564	4.049	3.262	2.244	1.562	1.247
100				5.329	4.829	4.288	3.440	2.517	1.689	1.317
105					5.093	4.526	3.619	2.791	1.883	1.388
110					5.358	4.764	3.797	3.064	2.077	1.458
115						5.003	3.976	3.264	2.270	1.528
120						5.241	4.154	3.424	2.464	1.598
125							4.333	3.583	2.658	1.720
130							4.511	3.742	2.851	1.861
135							4.690	3.901	3.045	2.001
140							4.868	4.061	3.216	2.142
145							5.047	4.220	3.352	2.282
150							5.225	4.379	3.488	2.423
155								4.538	3.623	2.563
160								4.698	3.759	2.704
165								4.857	3.895	2.844
170								5.016	4.031	2.985
175								5.175	4.167	3.125
180								5.335	4.302	3.267
185									4.438	3.409
190									4.574	3.551
195									4.710	3.692
200									4.846	3.834
205									4.981	3.976
210									5.117	4.118
215									5.253	4.260
220										4.402
225										4.544
230										4.686
235										4.828
240										4.970
245										5.112
250										5.254

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 31: Circular Hollow Columns: Fire Resistance Period: 105 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
38				1.845	1.353	1.179	1.036	0.734	0.526
40				1.845	1.353	1.179	1.036	0.734	0.526
45				1.942	1.458	1.286	1.123	0.808	0.564
50				3.163	1.610	1.425	1.236	0.975	0.695
55					1.616	1.564	1.348	1.124	0.826
60					3.215	1.975	1.461	1.235	0.956
65					3.590	2.549	1.573	1.346	1.087
70					3.965	3.122	1.905	1.457	1.185
75					4.341	3.420	2.370	1.568	1.281
80					4.716	3.696	2.835	1.807	1.378
85					5.091	3.972	3.239	2.145	1.475
90						4.248	3.496	2.483	1.571
95						4.524	3.753	2.822	1.757
100						4.800	4.010	3.160	2.017
105						5.076	4.267	3.366	2.278
110						5.352	4.524	3.571	2.539
115							4.781	3.775	2.800
120							5.038	3.980	3.061
125							5.295	4.185	3.236
130								4.390	3.356
135								4.595	3.477
140								4.799	3.597
145								5.004	3.717
150								5.209	3.837
155									3.958
160									4.078
165									4.198
170									4.319
175									4.439
180									4.559
185									4.679
190									4.800
195									4.920
200									5.040
205									5.160
210									5.281

Thickness is intumescent only.

Section Factor up to m^{-1}	Table 32: Circular Hollow Columns: Fire Resistance Period: 120 Minutes								
	Thickness (mm) Required for a Design Temperature of								
	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C	750°C
38					2.021	1.408	1.535	1.036	0.747
40					2.021	1.408	1.535	1.036	0.747
45					2.127	1.482	1.328	1.114	0.822
50						1.942	1.461	1.249	0.984
55						2.832	1.595	1.384	1.133
60						3.402	2.216	1.519	1.257
65						3.781	2.931	1.764	1.381
70						4.161	3.407	2.284	1.504
75						4.541	3.769	2.805	1.656
80						4.921	4.131	3.257	2.068
85						5.301	4.492	3.556	2.480
90							4.854	3.855	2.893
95							5.216	4.154	3.232
100								4.452	3.432
105								4.751	3.632
110								5.050	3.832
115								5.349	4.032
120									4.233
125									4.433
130									4.633
135									4.833
140									5.033
145									5.234

Thickness is intumescent only.