CERTIFICATE OF APPROVAL
No CF 5601

This is to certify that, in accordance with
TS00 General Requirements for Certification of Fire Protection Products
The undermentioned products of

KCC CORPORATION

764 Gwahak-ro, Bongdong-eup, Wanju-gun, Jeonbuk, 55323, Korea
TEL: 82-62-260-7000

Have been assessed against the requirements of the Technical Schedule(s) denoted below and are approved for use subject to the conditions appended hereto:

CERTIFIED PRODUCT	TECHNICAL SCHEDULE
Firemask SQ476	**TS 15 INTUMESCENT COATINGS FOR STEELWORK**

Signed and sealed for and on behalf of Exova (UK) Limited trading as Warrington Certification

Paul Duggan
Certification Manager

Issued: 2nd November 2017
Valid to: 1st November 2022

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KCC CORPORATION

ANNEX A: Approved Fire Resistance Performance

1. This approval relates to the use of FIREMASK SQ476 for the fire protection of I/H-shaped steel beam and column sections. The precise scope is given in Tables 1 to 17 of Annex A, which show the total dry film thickness of Firemask SQ476 (excluding primer and top sealer) required to provide fire resistance periods in accordance with BS476: Part 21: 1987 of up to 150 minutes for I/H beams and up to 120 minutes for I/H columns, for differing sections, section factors and design temperatures.

2. This certification is designed to demonstrate compliance of the product or system specifically with Approved Document B (England and Wales), Section 2 of the Technical Standards (Scotland), Technical Booklet E (N. Ireland). If compliance is required to other regulatory or guidance documents there may be additional considerations or conflict to be taken into account.

3. The products are approved on the basis of:
   i) Initial type testing
   ii) A design appraisal against TS15
   iii) Certification of quality management system to ISO 9001
   iv) Inspection and surveillance of factory production control
   v) Audit testing

4. The data referring to three-sided fire exposure of beams relate to beams supporting concrete floor slabs. Separate consideration is required where this is not the case.

5. The data shown is applicable to steel sections blast cleaned to ISO 8501-1 Sa2.5 or equivalent and primed with a suitable and compatible primer. Specifications of surface preparations, primers and top sealers are available from KCC CORPORATION whose responsibility it is to ensure that Firemask SQ476 is compatible for use in respect of both ambient and fire conditions.

6. The data shown is applicable to FIREMASK SQ476 applied by spray or brush or roller to horizontal, vertical, flexural and compression steel members supporting loads up to the maximum design loads specified in BS449: Part 2.

7. The approval relates to ongoing production. Product and/or its immediate packaging is identified with the manufacturers' name, the product name or number, the CERTIFIRE name or name and mark, together with the CERTIFIRE certificate number and application where appropriate.

8. The data shown in the tables is based on assessments which comply with the criteria for acceptability now incorporated within the CERTIFIRE scheme.

9. Tables relating to I/H-sections also apply to structural sections with re-entrant details including channels, angles and Tees.

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Table 1: I/H Beam Sections 15 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
45	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
50	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
55	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
60	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
65	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
70	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
75	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
80	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
85	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
90	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
95	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
100	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
105	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
110	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
115	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
120	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
125	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
130	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
135	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
140	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
145	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
150	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
155	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
160	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
165	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
170	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
175	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
180	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
185	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
190	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
195	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
200	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
205	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
210	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
215	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
220	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
225	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
230	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
235	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
240	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
245	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
250	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
255	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
260	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
265	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
270	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
275	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
280	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
285	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
290	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
295	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
300	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
305	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
310	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
315	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
320	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
325	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
330	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
335	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
340	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
345	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
350	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
355	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
360	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
365	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
370	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
375	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 2: I/H Beam Sections 30 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
45	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
50	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
55	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
60	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
65	0.334	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
70	0.347	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
75	0.360	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
80	0.373	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
85	0.387	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
90	0.400	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
95	0.413	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
100	0.426	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
105	0.439	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
110	0.452	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
115	0.466	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
120	0.479	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
125	0.492	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
130	0.505	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
135	0.518	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
140	0.531	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
145	0.545	0.328	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
150	0.558	0.340	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
155	0.571	0.352	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
160	0.584	0.364	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
165	0.597	0.377	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
170	0.610	0.389	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
175	0.624	0.401	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
180	0.637	0.413	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
185	0.650	0.426	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
190	0.663	0.438	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
195	0.676	0.450	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
200	0.689	0.462	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
205	0.703	0.475	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
210	0.716	0.487	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
215	0.729	0.499	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
220	0.742	0.511	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
225	0.755	0.524	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
230	0.768	0.536	0.326	0.324	0.324	0.324	0.324	0.324	0.324	0.324
235	0.782	0.548	0.338	0.324	0.324	0.324	0.324	0.324	0.324	0.324
240	0.795	0.560	0.349	0.324	0.324	0.324	0.324	0.324	0.324	0.324
245	0.808	0.573	0.361	0.324	0.324	0.324	0.324	0.324	0.324	0.324
250	0.821	0.585	0.372	0.324	0.324	0.324	0.324	0.324	0.324	0.324
255	0.834	0.597	0.384	0.324	0.324	0.324	0.324	0.324	0.324	0.324
260	0.847	0.609	0.395	0.324	0.324	0.324	0.324	0.324	0.324	0.324
265	0.860	0.622	0.406	0.324	0.324	0.324	0.324	0.324	0.324	0.324
270	0.874	0.634	0.418	0.324	0.324	0.324	0.324	0.324	0.324	0.324
275	0.887	0.646	0.429	0.324	0.324	0.324	0.324	0.324	0.324	0.324
280	0.900	0.658	0.441	0.324	0.324	0.324	0.324	0.324	0.324	0.324
285	0.913	0.671	0.452	0.324	0.324	0.324	0.324	0.324	0.324	0.324
290	0.926	0.683	0.464	0.324	0.324	0.324	0.324	0.324	0.324	0.324
295	0.939	0.695	0.475	0.324	0.324	0.324	0.324	0.324	0.324	0.324
300	0.953	0.707	0.486	0.324	0.324	0.324	0.324	0.324	0.324	0.324
305	0.966	0.720	0.498	0.324	0.324	0.324	0.324	0.324	0.324	0.324
310	0.979	0.732	0.509	0.324	0.324	0.324	0.324	0.324	0.324	0.324
315	0.992	0.744	0.521	0.324	0.324	0.324	0.324	0.324	0.324	0.324
320	1.005	0.756	0.532	0.324	0.324	0.324	0.324	0.324	0.324	0.324
325	1.018	0.769	0.544	0.324	0.324	0.324	0.324	0.324	0.324	0.324
330	1.032	0.781	0.555	0.324	0.324	0.324	0.324	0.324	0.324	0.324
335	1.045	0.793	0.566	0.324	0.324	0.324	0.324	0.324	0.324	0.324
340	1.058	0.805	0.578	0.331	0.324	0.324	0.324	0.324	0.324	0.324
345	1.071	0.818	0.589	0.341	0.324	0.324	0.324	0.324	0.324	0.324
350	1.084	0.830	0.601	0.352	0.324	0.324	0.324	0.324	0.324	0.324
355	1.097	0.842	0.612	0.363	0.324	0.324	0.324	0.324	0.324	0.324
360	1.111	0.854	0.624	0.373	0.324	0.324	0.324	0.324	0.324	0.324
365	1.124	0.866	0.635	0.384	0.324	0.324	0.324	0.324	0.324	0.324
370	1.137	0.879	0.646	0.394	0.324	0.324	0.324	0.324	0.324	0.324
375	1.150	0.891	0.658	0.405	0.324	0.324	0.324	0.324	0.324	0.324

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 3: I/H Beam Sections 45 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	0.536	0.335	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
45	0.553	0.351	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
50	0.570	0.367	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
55	0.586	0.383	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
60	0.603	0.399	0.324	0.324	0.324	0.324	0.324	0.324	0.324	0.324
65	0.620	0.415	0.338	0.324	0.324	0.324	0.324	0.324	0.324	0.324
70	0.637	0.431	0.353	0.324	0.324	0.324	0.324	0.324	0.324	0.324
75	0.653	0.447	0.367	0.324	0.324	0.324	0.324	0.324	0.324	0.324
80	0.670	0.463	0.381	0.324	0.324	0.324	0.324	0.324	0.324	0.324
85	0.687	0.479	0.395	0.324	0.324	0.324	0.324	0.324	0.324	0.324
90	0.704	0.495	0.410	0.324	0.324	0.324	0.324	0.324	0.324	0.324
95	0.721	0.512	0.424	0.324	0.324	0.324	0.324	0.324	0.324	0.324
100	0.737	0.528	0.438	0.324	0.324	0.324	0.324	0.324	0.324	0.324
105	0.754	0.544	0.452	0.324	0.324	0.324	0.324	0.324	0.324	0.324
110	0.771	0.560	0.466	0.324	0.324	0.324	0.324	0.324	0.324	0.324
115	0.788	0.576	0.481	0.336	0.324	0.324	0.324	0.324	0.324	0.324
120	0.804	0.592	0.495	0.349	0.324	0.324	0.324	0.324	0.324	0.324
125	0.821	0.608	0.509	0.362	0.324	0.324	0.324	0.324	0.324	0.324
130	0.838	0.624	0.523	0.375	0.324	0.324	0.324	0.324	0.324	0.324
135	0.855	0.640	0.537	0.388	0.324	0.324	0.324	0.324	0.324	0.324
140	0.872	0.656	0.552	0.401	0.324	0.324	0.324	0.324	0.324	0.324
145	0.888	0.672	0.566	0.414	0.324	0.324	0.324	0.324	0.324	0.324
150	0.905	0.688	0.580	0.427	0.324	0.324	0.324	0.324	0.324	0.324
155	0.922	0.705	0.594	0.440	0.324	0.324	0.324	0.324	0.324	0.324
160	0.939	0.721	0.608	0.453	0.324	0.324	0.324	0.324	0.324	0.324
165	0.955	0.737	0.623	0.466	0.324	0.324	0.324	0.324	0.324	0.324
170	0.972	0.753	0.637	0.479	0.324	0.324	0.324	0.324	0.324	0.324
175	0.989	0.769	0.651	0.492	0.333	0.324	0.324	0.324	0.324	0.324
180	1.006	0.785	0.665	0.505	0.346	0.324	0.324	0.324	0.324	0.324
185	1.022	0.801	0.680	0.519	0.359	0.327	0.324	0.324	0.324	0.324
190	1.039	0.817	0.694	0.532	0.371	0.339	0.324	0.324	0.324	0.324
195	1.056	0.833	0.708	0.545	0.384	0.352	0.324	0.324	0.324	0.324
200	1.073	0.849	0.722	0.558	0.397	0.364	0.324	0.324	0.324	0.324
205	1.090	0.865	0.736	0.571	0.410	0.377	0.324	0.324	0.324	0.324
210	1.106	0.881	0.751	0.584	0.422	0.389	0.324	0.324	0.324	0.324
215	1.123	0.897	0.765	0.597	0.435	0.401	0.324	0.324	0.324	0.324
220	1.140	0.914	0.779	0.610	0.448	0.414	0.324	0.324	0.324	0.324
225	1.157	0.930	0.793	0.623	0.460	0.426	0.324	0.324	0.324	0.324
230	1.173	0.946	0.807	0.636	0.473	0.439	0.324	0.324	0.324	0.324
235	1.190	0.962	0.822	0.649	0.486	0.451	0.324	0.324	0.324	0.324
240	1.207	0.978	0.836	0.662	0.498	0.463	0.324	0.324	0.324	0.324
245	1.224	0.994	0.850	0.675	0.511	0.476	0.324	0.324	0.324	0.324
250	1.241	1.010	0.864	0.688	0.524	0.488	0.324	0.324	0.324	0.324
255	1.257	1.026	0.878	0.701	0.536	0.501	0.324	0.324	0.324	0.324
260	1.274	1.042	0.893	0.715	0.549	0.513	0.340	0.324	0.324	0.324
265	1.291	1.058	0.907	0.728	0.562	0.525	0.363	0.324	0.324	0.324
270	1.308	1.074	0.921	0.741	0.574	0.538	0.386	0.324	0.324	0.324
275	1.324	1.090	0.935	0.754	0.587	0.550	0.408	0.324	0.324	0.324
280	1.341	1.107	0.950	0.767	0.600	0.563	0.431	0.324	0.324	0.324
285	1.358	1.123	0.964	0.780	0.612	0.575	0.454	0.324	0.324	0.324
290	1.375	1.139	0.978	0.793	0.625	0.587	0.476	0.336	0.324	0.324
295	1.392	1.155	0.992	0.806	0.638	0.600	0.499	0.358	0.324	0.324
300	1.408	1.171	1.006	0.819	0.650	0.612	0.522	0.380	0.324	0.324
305	1.425	1.187	1.021	0.832	0.663	0.625	0.545	0.402	0.324	0.324
310	1.442	1.203	1.035	0.845	0.676	0.637	0.567	0.425	0.324	0.324
315	1.459	1.219	1.049	0.858	0.688	0.649	0.590	0.447	0.324	0.324
320	1.475	1.235	1.063	0.871	0.701	0.662	0.613	0.469	0.324	0.324
325	1.492	1.251	1.077	0.884	0.714	0.674	0.635	0.491	0.324	0.324
330	1.509	1.267	1.092	0.898	0.726	0.687	0.658	0.513	0.324	0.324
335	1.526	1.283	1.106	0.911	0.739	0.699	0.681	0.535	0.324	0.324
340	1.543	1.300	1.120	0.924	0.752	0.711	0.704	0.557	0.324	0.324
345	1.559	1.316	1.134	0.937	0.764	0.726	0.726	0.580	0.333	0.324
350	1.576	1.332	1.148	0.950	0.777	0.749	0.749	0.602	0.355	0.324
355	1.593	1.348	1.163	0.963	0.790	0.772	0.772	0.624	0.376	0.324
360	1.610	1.364	1.177	0.976	0.802	0.794	0.794	0.646	0.398	0.324
365	1.626	1.380	1.191	0.989	0.817	0.817	0.817	0.668	0.419	0.324
370	1.643	1.396	1.205	1.002	0.840	0.840	0.840	0.690	0.440	0.324
375	1.700	1.412	1.220	1.015	0.863	0.863	0.863	0.712	0.462	0.324

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 4: I/H Beam Sections 60 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	0.983	0.674	0.430	0.324	0.324	0.324	0.324	0.324	0.324	0.324
45	1.038	0.693	0.447	0.338	0.324	0.324	0.324	0.324	0.324	0.324
50	1.093	0.711	0.465	0.354	0.324	0.324	0.324	0.324	0.324	0.324
55	1.147	0.730	0.482	0.370	0.324	0.324	0.324	0.324	0.324	0.324
60	1.202	0.748	0.499	0.386	0.337	0.324	0.324	0.324	0.324	0.324
65	1.257	0.767	0.517	0.402	0.352	0.334	0.324	0.324	0.324	0.324
70	1.311	0.785	0.534	0.418	0.367	0.348	0.324	0.324	0.324	0.324
75	1.366	0.804	0.552	0.434	0.381	0.362	0.324	0.324	0.324	0.324
80	1.421	0.822	0.569	0.450	0.396	0.376	0.324	0.324	0.324	0.324
85	1.475	0.841	0.587	0.466	0.410	0.391	0.324	0.324	0.324	0.324
90	1.530	0.859	0.604	0.482	0.425	0.405	0.324	0.324	0.324	0.324
95	1.585	0.877	0.621	0.498	0.440	0.419	0.324	0.324	0.324	0.324
100	1.639	0.896	0.639	0.514	0.454	0.434	0.324	0.324	0.324	0.324
105	1.682	0.914	0.656	0.530	0.469	0.448	0.324	0.324	0.324	0.324
110	1.718	0.933	0.674	0.546	0.484	0.462	0.324	0.324	0.324	0.324
115	1.754	0.951	0.691	0.562	0.498	0.477	0.343	0.324	0.324	0.324
120	1.791	0.970	0.709	0.578	0.513	0.491	0.370	0.324	0.324	0.324
125	1.827	0.988	0.726	0.594	0.527	0.505	0.396	0.324	0.324	0.324
130	1.863	1.007	0.743	0.610	0.542	0.519	0.423	0.324	0.324	0.324
135	1.900	1.025	0.761	0.626	0.557	0.534	0.450	0.324	0.324	0.324
140	1.936	1.044	0.778	0.642	0.571	0.548	0.476	0.324	0.324	0.324
145	1.972	1.062	0.796	0.658	0.586	0.562	0.503	0.330	0.324	0.324
150	2.009	1.081	0.813	0.674	0.601	0.577	0.529	0.357	0.324	0.324
155	2.045	1.099	0.831	0.690	0.615	0.591	0.556	0.384	0.324	0.324
160	2.081	1.117	0.848	0.706	0.630	0.605	0.583	0.411	0.324	0.324
165	2.118	1.136	0.865	0.722	0.644	0.620	0.609	0.437	0.324	0.324
170	2.154	1.154	0.883	0.738	0.659	0.636	0.636	0.464	0.324	0.324
175	2.190	1.173	0.900	0.754	0.674	0.663	0.663	0.491	0.324	0.324
180	2.226	1.191	0.918	0.770	0.689	0.689	0.689	0.518	0.324	0.324
185	2.263	1.210	0.935	0.786	0.716	0.716	0.716	0.545	0.346	0.324
190	2.299	1.228	0.953	0.802	0.743	0.743	0.743	0.572	0.372	0.324
195	2.335	1.247	0.970	0.818	0.769	0.769	0.769	0.598	0.399	0.324
200	2.372	1.265	0.987	0.834	0.796	0.796	0.796	0.625	0.425	0.324
205	2.408	1.284	1.005	0.850	0.822	0.822	0.822	0.652	0.451	0.324
210	2.444	1.302	1.022	0.866	0.849	0.849	0.849	0.679	0.478	0.324
215	2.481	1.321	1.040	0.882	0.876	0.876	0.876	0.706	0.504	0.324
220	2.517	1.339	1.057	0.902	0.902	0.902	0.902	0.732	0.530	0.324
225	2.553	1.358	1.074	0.929	0.929	0.929	0.929	0.759	0.557	0.324
230	2.590	1.376	1.092	0.956	0.956	0.956	0.956	0.786	0.583	0.324
235	2.626	1.394	1.109	0.982	0.982	0.982	0.982	0.813	0.609	0.324
240	2.662	1.413	1.127	1.009	1.009	1.009	1.009	0.840	0.635	0.337
245	2.699	1.431	1.144	1.035	1.035	1.035	1.035	0.867	0.662	0.362
250	2.735	1.450	1.162	1.062	1.062	1.062	1.062	0.893	0.688	0.387
255	2.771	1.468	1.179	1.089	1.089	1.089	1.089	0.920	0.714	0.411
260	2.808	1.487	1.196	1.115	1.115	1.115	1.115	0.947	0.741	0.436
265	2.844	1.505	1.214	1.142	1.142	1.142	1.142	0.974	0.767	0.460
270	2.880	1.524	1.231	1.169	1.169	1.169	1.169	1.001	0.793	0.485
275	2.917	1.542	1.249	1.195	1.195	1.195	1.195	1.028	0.820	0.509
280	2.995	1.561	1.266	1.222	1.222	1.222	1.222	1.054	0.846	0.534
285	3.076	1.579	1.284	1.248	1.248	1.248	1.248	1.081	0.872	0.558
290	3.156	1.598	1.301	1.275	1.275	1.275	1.275	1.108	0.899	0.583
295	3.237	1.616	1.318	1.302	1.302	1.302	1.302	1.135	0.925	0.607
300	3.317	1.634	1.336	1.328	1.328	1.328	1.328	1.162	0.951	0.632
305	3.397	1.653	1.355	1.355	1.355	1.355	1.355	1.188	0.978	0.656
310	3.478	1.743	1.382	1.382	1.382	1.382	1.382	1.215	1.004	0.681
315	3.558	1.854	1.408	1.408	1.408	1.408	1.408	1.242	1.030	0.705
320	3.639	1.964	1.435	1.435	1.435	1.435	1.435	1.269	1.057	0.730
325	3.719	2.075	1.462	1.462	1.462	1.462	1.462	1.296	1.083	0.754
330	3.800	2.185	1.488	1.488	1.488	1.488	1.488	1.323	1.109	0.779
335	3.880	2.296	1.515	1.515	1.515	1.515	1.515	1.349	1.136	0.803
340	3.961	2.406	1.541	1.541	1.541	1.541	1.541	1.376	1.162	0.828
345	4.041	2.517	1.568	1.568	1.568	1.568	1.568	1.403	1.188	0.852
350	4.122	2.628	1.595	1.595	1.595	1.595	1.595	1.430	1.214	0.877
355	4.202	2.738	1.621	1.621	1.621	1.621	1.621	1.457	1.241	0.901
360	4.282	2.849	1.648	1.648	1.648	1.648	1.648	1.484	1.267	0.926
365	4.363	2.953	1.675	1.675	1.675	1.675	1.675	1.510	1.293	0.951
370	4.443	3.047	1.701	1.701	1.701	1.701	1.701	1.537	1.320	0.975
375	4.524	3.142	1.728	1.728	1.728	1.728	1.728	1.564	1.346	1.000

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 5: I/H Beam Sections 75 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	1.425	1.060	0.780	0.551	0.397	0.352	0.324	0.324	0.324	0.324
45	1.534	1.113	0.804	0.568	0.414	0.369	0.324	0.324	0.324	0.324
50	1.644	1.166	0.828	0.585	0.431	0.386	0.335	0.324	0.324	0.324
55	1.699	1.218	0.852	0.602	0.449	0.404	0.358	0.324	0.324	0.324
60	1.746	1.271	0.876	0.619	0.466	0.421	0.382	0.347	0.324	0.324
65	1.793	1.324	0.900	0.637	0.483	0.439	0.406	0.377	0.324	0.324
70	1.840	1.377	0.925	0.654	0.501	0.456	0.429	0.407	0.324	0.324
75	1.888	1.430	0.949	0.671	0.518	0.473	0.453	0.437	0.346	0.324
80	1.935	1.482	0.973	0.688	0.535	0.491	0.476	0.467	0.375	0.324
85	1.982	1.535	0.997	0.705	0.553	0.508	0.500	0.497	0.404	0.324
90	2.030	1.588	1.021	0.722	0.570	0.527	0.527	0.527	0.432	0.324
95	2.077	1.641	1.045	0.740	0.588	0.557	0.557	0.557	0.461	0.324
100	2.124	1.685	1.069	0.757	0.605	0.587	0.587	0.587	0.490	0.324
105	2.172	1.726	1.093	0.774	0.622	0.616	0.616	0.616	0.518	0.324
110	2.219	1.767	1.117	0.791	0.646	0.646	0.646	0.646	0.547	0.324
115	2.266	1.807	1.141	0.808	0.676	0.676	0.676	0.676	0.576	0.324
120	2.314	1.848	1.165	0.825	0.706	0.706	0.706	0.706	0.605	0.324
125	2.361	1.889	1.189	0.843	0.736	0.736	0.736	0.736	0.633	0.324
130	2.408	1.930	1.213	0.860	0.766	0.766	0.766	0.766	0.662	0.343
135	2.456	1.970	1.237	0.877	0.796	0.796	0.796	0.796	0.691	0.371
140	2.503	2.011	1.261	0.894	0.826	0.826	0.826	0.826	0.720	0.400
145	2.550	2.052	1.285	0.911	0.856	0.856	0.856	0.856	0.748	0.428
150	2.598	2.092	1.309	0.928	0.886	0.886	0.886	0.886	0.777	0.456
155	2.645	2.133	1.333	0.945	0.916	0.916	0.916	0.916	0.806	0.485
160	2.692	2.174	1.357	0.963	0.946	0.946	0.946	0.946	0.835	0.513
165	2.740	2.214	1.381	0.980	0.976	0.976	0.976	0.976	0.863	0.541
170	2.787	2.255	1.405	1.005	1.005	1.005	1.005	1.005	0.892	0.569
175	2.834	2.296	1.429	1.035	1.035	1.035	1.035	1.035	0.921	0.598
180	2.881	2.337	1.453	1.065	1.065	1.065	1.065	1.065	0.950	0.626
185	3.046	2.377	1.477	1.095	1.095	1.095	1.095	1.095	0.978	0.654
190	3.609	2.418	1.501	1.125	1.125	1.125	1.125	1.125	1.007	0.683
195	4.171	2.459	1.525	1.155	1.155	1.155	1.155	1.155	1.036	0.711
200	-	2.499	1.549	1.185	1.185	1.185	1.185	1.185	1.065	0.739
205	-	2.540	1.573	1.215	1.215	1.215	1.215	1.215	1.093	0.767
210	-	2.581	1.597	1.245	1.245	1.245	1.245	1.245	1.122	0.796
215	-	2.622	1.621	1.275	1.275	1.275	1.275	1.275	1.151	0.824
220	-	2.662	1.645	1.305	1.305	1.305	1.305	1.305	1.180	0.852
225	-	2.703	1.687	1.335	1.335	1.335	1.335	1.335	1.208	0.880
230	-	2.744	1.745	1.365	1.365	1.365	1.365	1.365	1.237	0.909
235	-	2.784	1.803	1.394	1.394	1.394	1.394	1.394	1.266	0.937
240	-	2.825	1.861	1.424	1.424	1.424	1.424	1.424	1.295	0.965
245	-	2.866	1.920	1.454	1.454	1.454	1.454	1.454	1.323	0.994
250	-	2.907	1.978	1.484	1.484	1.484	1.484	1.484	1.352	1.022
255	-	2.968	2.036	1.514	1.514	1.514	1.514	1.514	1.381	1.050
260	-	3.036	2.094	1.544	1.544	1.544	1.544	1.544	1.410	1.078
265	-	3.105	2.152	1.574	1.574	1.574	1.574	1.574	1.438	1.107
270	-	3.174	2.210	1.604	1.604	1.604	1.604	1.604	1.467	1.135
275	-	3.243	2.268	1.634	1.634	1.634	1.634	1.634	1.496	1.163
280	-	3.312	2.326	1.664	1.664	1.664	1.664	1.664	1.525	1.192
285	-	3.381	2.384	1.694	1.694	1.694	1.694	1.694	1.553	1.220
290	-	3.450	2.442	1.724	1.724	1.724	1.724	1.724	1.582	1.248
295	-	3.519	2.500	1.753	1.753	1.753	1.753	1.753	1.611	1.276
300	-	3.587	2.559	1.783	1.783	1.783	1.783	1.783	1.640	1.305
305	-	3.656	2.617	1.813	1.813	1.813	1.813	1.813	1.668	1.333
310	-	3.725	2.675	1.843	1.843	1.843	1.843	1.843	1.697	1.361
315	-	3.794	2.733	1.873	1.873	1.873	1.873	1.873	1.726	1.390
320	-	3.863	2.791	1.903	1.903	1.903	1.903	1.903	1.755	1.418
325	-	3.932	2.849	1.933	1.933	1.933	1.933	1.933	1.783	1.446
330	-	4.001	2.907	1.963	1.963	1.963	1.963	1.963	1.812	1.474
335	-	4.070	3.014	1.993	1.993	1.993	1.993	1.993	1.841	1.503
340	-	4.139	3.133	2.023	2.023	2.023	2.023	2.023	1.870	1.531
345	-	4.207	3.252	2.053	2.053	2.053	2.053	2.053	1.898	1.559
350	-	4.276	3.370	2.083	2.083	2.083	2.083	2.083	1.927	1.588
355	-	4.345	3.489	2.113	2.113	2.113	2.113	2.113	1.956	1.616
360	-	4.414	3.607	2.142	2.142	2.142	2.142	2.142	1.984	1.644
365	-	4.483	3.726	2.172	2.172	2.172	2.172	2.172	2.013	1.672
370	-	-	3.844	2.202	2.202	2.202	2.202	2.202	2.042	1.701
375	-	-	3.963	2.232	2.232	2.232	2.232	2.232	2.071	1.729

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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KCC CORPORATION

Table 6: I/H Beam Sections 90 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	2.199	1.441	1.123	0.871	0.703	0.654	0.462	0.396	0.324	0.324
45	2.348	1.541	1.178	0.896	0.722	0.671	0.498	0.431	0.358	0.324
50	2.496	1.641	1.232	0.921	0.740	0.687	0.533	0.466	0.391	0.324
55	2.644	1.699	1.287	0.947	0.758	0.704	0.569	0.501	0.425	0.324
60	2.793	1.750	1.341	0.972	0.776	0.720	0.604	0.536	0.458	0.350
65	2.974	1.800	1.396	0.997	0.795	0.737	0.640	0.571	0.492	0.381
70	3.340	1.850	1.450	1.023	0.813	0.753	0.676	0.606	0.525	0.412
75	3.706	1.901	1.505	1.048	0.831	0.770	0.711	0.641	0.559	0.443
80	4.071	1.951	1.559	1.073	0.850	0.786	0.747	0.676	0.593	0.474
85	4.437	2.001	1.614	1.098	0.868	0.803	0.782	0.710	0.626	0.505
90	-	2.052	1.666	1.124	0.886	0.819	0.818	0.745	0.660	0.536
95	-	2.102	1.711	1.149	0.904	0.853	0.853	0.780	0.693	0.567
100	-	2.152	1.757	1.174	0.923	0.889	0.889	0.815	0.727	0.599
105	-	2.203	1.802	1.200	0.941	0.925	0.925	0.850	0.760	0.630
110	-	2.253	1.847	1.225	0.960	0.960	0.960	0.885	0.794	0.661
115	-	2.304	1.893	1.250	0.996	0.996	0.996	0.920	0.827	0.692
120	-	2.354	1.938	1.275	1.031	1.031	1.031	0.955	0.861	0.723
125	-	2.404	1.983	1.301	1.067	1.067	1.067	0.989	0.894	0.754
130	-	2.455	2.029	1.326	1.102	1.102	1.102	1.024	0.928	0.785
135	-	2.505	2.074	1.351	1.138	1.138	1.138	1.059	0.962	0.816
140	-	2.555	2.119	1.377	1.174	1.174	1.174	1.094	0.995	0.847
145	-	2.606	2.164	1.402	1.209	1.209	1.209	1.129	1.029	0.878
150	-	2.656	2.210	1.427	1.245	1.245	1.245	1.164	1.062	0.909
155	-	2.706	2.255	1.452	1.280	1.280	1.280	1.199	1.096	0.940
160	-	2.757	2.300	1.478	1.316	1.316	1.316	1.234	1.129	0.971
165	-	2.807	2.346	1.503	1.351	1.351	1.351	1.269	1.163	1.002
170	-	2.857	2.391	1.528	1.387	1.387	1.387	1.303	1.196	1.033
175	-	2.908	2.436	1.554	1.423	1.423	1.423	1.338	1.230	1.064
180	-	3.288	2.482	1.579	1.458	1.458	1.458	1.373	1.264	1.096
185	-	3.755	2.527	1.604	1.494	1.494	1.494	1.408	1.297	1.127
190	-	4.223	2.572	1.629	1.529	1.529	1.529	1.443	1.331	1.158
195	-	-	2.617	1.655	1.565	1.565	1.565	1.478	1.364	1.189
200	-	-	2.663	1.716	1.600	1.600	1.600	1.513	1.398	1.220
205	-	-	2.708	1.780	1.636	1.636	1.636	1.548	1.431	1.251
210	-	-	2.753	1.845	1.671	1.671	1.671	1.582	1.465	1.282
215	-	-	2.799	1.909	1.707	1.707	1.707	1.617	1.498	1.313
220	-	-	2.844	1.973	1.743	1.743	1.743	1.652	1.532	1.344
225	-	-	2.889	2.038	1.778	1.778	1.778	1.687	1.565	1.375
230	-	-	2.955	2.102	1.814	1.814	1.814	1.722	1.599	1.406
235	-	-	3.057	2.167	1.849	1.849	1.849	1.757	1.633	1.437
240	-	-	3.159	2.231	1.885	1.885	1.885	1.792	1.666	1.468
245	-	-	3.261	2.296	1.920	1.920	1.920	1.827	1.700	1.499
250	-	-	3.363	2.360	1.956	1.956	1.956	1.862	1.733	1.530
255	-	-	3.465	2.425	1.992	1.992	1.992	1.896	1.767	1.561
260	-	-	3.567	2.489	2.027	2.027	2.027	1.931	1.800	1.593
265	-	-	3.669	2.554	2.063	2.063	2.063	1.966	1.834	1.624
270	-	-	3.771	2.618	2.098	2.098	2.098	2.001	1.867	1.655
275	-	-	3.873	2.683	2.134	2.134	2.134	2.036	1.901	1.686
280	-	-	3.975	2.747	2.169	2.169	2.169	2.071	1.934	1.717
285	-	-	4.077	2.812	2.205	2.205	2.205	2.106	1.968	1.748
290	-	-	4.179	2.876	2.241	2.241	2.241	2.141	2.002	1.779
295	-	-	4.281	2.957	2.276	2.276	2.276	2.175	2.035	1.810
300	-	-	4.383	3.069	2.312	2.312	2.312	2.210	2.069	1.841
305	-	-	4.485	3.180	2.347	2.347	2.347	2.245	2.102	1.872
310	-	-	-	3.291	2.383	2.383	2.383	2.280	2.136	1.903
315	-	-	-	3.402	2.418	2.418	2.418	2.315	2.169	1.934
320	-	-	-	3.514	2.454	2.454	2.454	2.350	2.203	1.965
325	-	-	-	3.625	2.490	2.490	2.490	2.385	2.236	1.996
330	-	-	-	3.736	2.664	2.525	2.525	2.420	2.270	2.027
335	-	-	-	3.847	2.839	2.561	2.561	2.455	2.303	2.058
340	-	-	-	3.959	3.012	2.596	2.596	2.489	2.337	2.090
345	-	-	-	4.070	3.185	2.632	2.632	2.524	2.371	2.121
350	-	-	-	4.181	3.358	3.061	2.667	2.559	2.404	2.152
355	-	-	-	4.293	3.531	3.238	2.703	2.594	2.438	2.183
360	-	-	-	4.404	3.704	3.416	2.738	2.629	2.471	2.214
365	-	-	-	4.515	3.877	3.594	2.774	2.664	2.505	2.245
370	-	-	-	-	4.050	3.771	2.810	2.699	2.538	2.276
375	-	-	-	-	4.223	3.949	2.845	2.734	2.572	2.307

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 7: I/H Beam Sections 105 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	3.372	2.129	1.462	1.184	1.007	0.953	0.743	0.671	0.559	0.378
45	3.892	2.292	1.559	1.240	1.035	0.978	0.781	0.708	0.596	0.414
50	4.412	2.456	1.655	1.295	1.064	1.004	0.819	0.745	0.632	0.449
55	-	2.619	1.708	1.351	1.092	1.029	0.857	0.783	0.669	0.485
60	-	2.783	1.760	1.407	1.121	1.054	0.895	0.820	0.706	0.520
65	-	2.981	1.812	1.462	1.149	1.080	0.933	0.858	0.743	0.556
70	-	3.342	1.864	1.518	1.178	1.105	0.971	0.895	0.780	0.591
75	-	3.703	1.916	1.574	1.207	1.130	1.009	0.933	0.816	0.627
80	-	4.063	1.968	1.629	1.235	1.156	1.046	0.970	0.853	0.662
85	-	4.424	2.020	1.681	1.264	1.181	1.084	1.007	0.890	0.698
90	-	-	2.072	1.729	1.292	1.207	1.122	1.045	0.927	0.734
95	-	-	2.124	1.777	1.321	1.232	1.160	1.082	0.964	0.769
100	-	-	2.176	1.824	1.349	1.257	1.198	1.120	1.000	0.805
105	-	-	2.228	1.872	1.378	1.283	1.236	1.157	1.037	0.840
110	-	-	2.280	1.920	1.406	1.308	1.274	1.195	1.074	0.876
115	-	-	2.332	1.968	1.435	1.333	1.312	1.232	1.111	0.911
120	-	-	2.384	2.016	1.464	1.359	1.350	1.269	1.148	0.947
125	-	-	2.436	2.064	1.492	1.387	1.387	1.307	1.184	0.982
130	-	-	2.488	2.111	1.521	1.425	1.425	1.344	1.221	1.018
135	-	-	2.540	2.159	1.549	1.463	1.463	1.382	1.258	1.053
140	-	-	2.592	2.207	1.578	1.501	1.501	1.419	1.295	1.089
145	-	-	2.644	2.255	1.606	1.539	1.539	1.457	1.332	1.124
150	-	-	2.696	2.303	1.635	1.577	1.577	1.494	1.369	1.160
155	-	-	2.749	2.351	1.671	1.615	1.615	1.532	1.405	1.195
160	-	-	2.801	2.398	1.735	1.653	1.653	1.569	1.442	1.231
165	-	-	2.918	2.446	1.799	1.691	1.691	1.606	1.479	1.266
170	-	-	2.905	2.494	1.863	1.728	1.728	1.644	1.516	1.302
175	-	-	2.891	2.542	1.927	1.766	1.766	1.681	1.553	1.338
180	-	-	2.878	2.590	1.991	1.804	1.804	1.719	1.589	1.373
185	-	-	2.864	2.638	2.055	1.842	1.842	1.756	1.626	1.409
190	-	-	2.851	2.685	2.119	1.880	1.880	1.794	1.663	1.444
195	-	-	2.837	2.733	2.183	1.918	1.918	1.831	1.700	1.480
200	-	-	2.824	2.781	2.247	1.966	1.956	1.868	1.737	1.515
205	-	-	2.829	2.829	2.311	2.039	1.994	1.906	1.773	1.551
210	-	-	2.877	2.877	2.375	2.112	2.032	1.943	1.810	1.586
215	-	-	2.977	2.977	2.438	2.185	2.069	1.981	1.847	1.622
220	-	-	3.417	3.417	2.502	2.258	2.107	2.018	1.884	1.657
225	-	-	3.857	3.857	2.566	2.331	2.145	2.056	1.921	1.693
230	-	-	4.297	4.297	2.630	2.404	2.183	2.093	1.957	1.728
235	-	-	-	-	2.694	2.477	2.221	2.131	1.994	1.764
240	-	-	-	-	2.758	2.550	2.259	2.168	2.031	1.799
245	-	-	-	-	2.822	2.623	2.297	2.205	2.068	1.835
250	-	-	-	-	2.886	2.696	2.335	2.243	2.105	1.870
255	-	-	-	-	2.997	2.769	2.373	2.280	2.141	1.906
260	-	-	-	-	3.154	2.842	2.410	2.318	2.178	1.942
265	-	-	-	-	3.312	2.915	2.448	2.355	2.215	1.977
270	-	-	-	-	3.469	3.034	2.486	2.393	2.252	2.013
275	-	-	-	-	3.627	3.156	2.524	2.430	2.289	2.048
280	-	-	-	-	3.785	3.277	2.562	2.467	2.326	2.084
285	-	-	-	-	3.942	3.399	2.600	2.505	2.362	2.119
290	-	-	-	-	4.100	3.520	2.638	2.542	2.399	2.155
295	-	-	-	-	4.258	3.641	2.676	2.580	2.436	2.190
300	-	-	-	-	4.415	3.763	2.714	2.617	2.473	2.226
305	-	-	-	-	-	3.884	2.751	2.655	2.510	2.261
310	-	-	-	-	-	4.006	2.789	2.692	2.546	2.297
315	-	-	-	-	-	4.127	2.827	2.729	2.583	2.332
320	-	-	-	-	-	4.249	2.865	2.767	2.620	2.368
325	-	-	-	-	-	4.370	2.903	2.804	2.657	2.403
330	-	-	-	-	-	4.491	3.059	2.842	2.694	2.439
335	-	-	-	-	-	-	3.292	2.879	2.730	2.474
340	-	-	-	-	-	-	3.525	2.917	2.767	2.510
345	-	-	-	-	-	-	3.759	3.149	2.804	2.546
350	-	-	-	-	-	-	3.992	3.388	2.841	2.581
355	-	-	-	-	-	-	4.226	3.627	2.878	2.617
360	-	-	-	-	-	-	4.459	3.866	2.914	2.652
365	-	-	-	-	-	-	-	4.105	3.144	2.688
370	-	-	-	-	-	-	-	4.345	3.394	2.723
375	-	-	-	-	-	-	-	-	3.644	2.759

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 8: I/H Beam Sections 120 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	-	3.186	1.494	1.494	1.301	1.243	1.030	0.950	0.828	0.622
45	-	3.744	1.588	1.588	1.366	1.301	1.058	0.974	0.849	0.660
50	-	4.303	1.785	1.699	1.431	1.358	1.085	0.999	0.870	0.698
55	-	-	2.163	1.856	1.496	1.416	1.112	1.023	0.891	0.736
60	-	-	2.542	2.012	1.561	1.473	1.140	1.047	0.912	0.774
65	-	-	2.923	2.169	1.626	1.531	1.167	1.071	0.933	0.812
70	-	-	3.519	2.325	1.713	1.589	1.194	1.095	0.954	0.850
75	-	-	4.116	2.482	1.819	1.646	1.222	1.120	0.975	0.888
80	-	-	-	2.639	1.925	1.741	1.249	1.144	0.996	0.926
85	-	-	-	2.795	2.031	1.844	1.277	1.168	1.017	0.964
90	-	-	-	2.952	2.137	1.947	1.304	1.192	1.038	1.002
95	-	-	-	3.108	2.243	2.051	1.331	1.216	1.059	1.040
100	-	-	-	3.265	2.349	2.154	1.359	1.241	1.080	1.078
105	-	-	-	3.422	2.455	2.257	1.386	1.265	1.116	1.116
110	-	-	-	3.578	2.561	2.361	1.413	1.289	1.154	1.154
115	-	-	-	3.735	2.666	2.464	1.441	1.313	1.192	1.192
120	-	-	-	3.891	2.772	2.567	1.468	1.337	1.230	1.230
125	-	-	-	4.048	2.878	2.670	1.496	1.361	1.267	1.267
130	-	-	-	4.205	2.984	2.774	1.523	1.386	1.305	1.305
135	-	-	-	4.361	3.090	2.877	1.550	1.410	1.343	1.343
140	-	-	-	4.518	3.196	2.980	1.578	1.434	1.381	1.381
145	-	-	-	-	3.302	3.084	1.605	1.458	1.419	1.419
150	-	-	-	-	3.408	3.187	1.633	1.482	1.457	1.457
155	-	-	-	-	3.514	3.290	1.664	1.507	1.495	1.495
160	-	-	-	-	3.620	3.393	1.733	1.533	1.533	1.533
165	-	-	-	-	3.726	3.497	1.802	1.571	1.571	1.571
170	-	-	-	-	3.832	3.600	1.872	1.609	1.609	1.609
175	-	-	-	-	3.937	3.703	1.941	1.647	1.647	1.647
180	-	-	-	-	4.043	3.807	2.010	1.685	1.685	1.685
185	-	-	-	-	4.149	3.910	2.079	1.723	1.723	1.723
190	-	-	-	-	4.255	4.013	2.148	1.761	1.761	1.761
195	-	-	-	-	4.361	4.117	2.217	1.799	1.799	1.799
200	-	-	-	-	4.467	4.220	2.286	1.878	1.837	1.837
205	-	-	-	-	-	4.323	2.355	1.958	1.875	1.875
210	-	-	-	-	-	4.426	2.424	2.038	1.913	1.913
215	-	-	-	-	-	4.530	2.493	2.117	1.951	1.951
220	-	-	-	-	-	-	2.562	2.197	1.988	1.988
225	-	-	-	-	-	-	2.631	2.276	2.026	2.026
230	-	-	-	-	-	-	2.700	2.356	2.064	2.064
235	-	-	-	-	-	-	2.769	2.436	2.102	2.102
240	-	-	-	-	-	-	2.838	2.515	2.140	2.140
245	-	-	-	-	-	-	2.907	2.595	2.178	2.178
250	-	-	-	-	-	-	3.308	2.674	2.216	2.216
255	-	-	-	-	-	-	3.768	2.754	2.254	2.254
260	-	-	-	-	-	-	4.228	2.834	2.292	2.292
265	-	-	-	-	-	-	-	2.913	2.330	2.330
270	-	-	-	-	-	-	-	3.132	2.368	2.368
275	-	-	-	-	-	-	-	3.359	2.414	2.406
280	-	-	-	-	-	-	-	3.587	2.516	2.444
285	-	-	-	-	-	-	-	3.814	2.618	2.482
290	-	-	-	-	-	-	-	4.042	2.720	2.520
295	-	-	-	-	-	-	-	4.269	2.822	2.558
300	-	-	-	-	-	-	-	4.497	2.929	2.596
305	-	-	-	-	-	-	-	-	3.112	2.634
310	-	-	-	-	-	-	-	-	3.295	2.672
315	-	-	-	-	-	-	-	-	3.478	2.709
320	-	-	-	-	-	-	-	-	3.661	2.747
325	-	-	-	-	-	-	-	-	3.844	2.785
330	-	-	-	-	-	-	-	-	4.027	2.823
335	-	-	-	-	-	-	-	-	4.210	2.861
340	-	-	-	-	-	-	-	-	4.393	2.899
345	-	-	-	-	-	-	-	-	-	3.073
350	-	-	-	-	-	-	-	-	-	3.379
355	-	-	-	-	-	-	-	-	-	3.685
360	-	-	-	-	-	-	-	-	-	3.991
365	-	-	-	-	-	-	-	-	-	4.298
370	-	-	-	-	-	-	-	-	-	-
375	-	-	-	-	-	-	-	-	-	-

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 9: I/H Beam Sections 150 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	-	-	-	2.835	2.254	2.007	1.570	1.479	1.339	1.112
45	-	-	-	3.533	2.430	2.418	1.677	1.562	1.406	1.154
50	-	-	-	4.469	2.828	2.828	1.912	1.646	1.473	1.195
55	-	-	-	-	3.239	3.239	2.147	1.821	1.541	1.237
60	-	-	-	-	3.649	3.649	2.382	2.009	1.608	1.278
65	-	-	-	-	-	4.060	2.617	2.198	1.692	1.320
70	-	-	-	-	-	4.470	2.853	2.386	1.820	1.361
75	-	-	-	-	-	-	3.088	2.575	1.948	1.403
80	-	-	-	-	-	-	3.323	2.763	2.076	1.444
85	-	-	-	-	-	-	3.558	2.952	2.204	1.486
90	-	-	-	-	-	-	3.793	3.140	2.331	1.527
95	-	-	-	-	-	-	4.028	3.329	2.459	1.569
100	-	-	-	-	-	-	4.263	3.518	2.587	1.610
105	-	-	-	-	-	-	4.498	3.706	2.715	1.652
110	-	-	-	-	-	-	-	3.895	2.843	1.766
115	-	-	-	-	-	-	-	4.083	2.971	1.891
120	-	-	-	-	-	-	-	4.272	3.098	2.015
125	-	-	-	-	-	-	-	4.460	3.226	2.140
130	-	-	-	-	-	-	-	-	3.354	2.265
135	-	-	-	-	-	-	-	-	3.482	2.390
140	-	-	-	-	-	-	-	-	3.610	2.515
145	-	-	-	-	-	-	-	-	3.738	2.639
150	-	-	-	-	-	-	-	-	3.865	2.764
155	-	-	-	-	-	-	-	-	3.993	2.889
160	-	-	-	-	-	-	-	-	4.121	3.014
165	-	-	-	-	-	-	-	-	4.249	3.138
170	-	-	-	-	-	-	-	-	4.377	3.263
175	-	-	-	-	-	-	-	-	4.505	3.388
180	-	-	-	-	-	-	-	-	-	3.513
185	-	-	-	-	-	-	-	-	-	3.637
190	-	-	-	-	-	-	-	-	-	3.762
195	-	-	-	-	-	-	-	-	-	3.887
200	-	-	-	-	-	-	-	-	-	4.012
205	-	-	-	-	-	-	-	-	-	4.136
210	-	-	-	-	-	-	-	-	-	4.261
215	-	-	-	-	-	-	-	-	-	4.386
220	-	-	-	-	-	-	-	-	-	4.511
225	-	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-	-
235	-	-	-	-	-	-	-	-	-	-
240	-	-	-	-	-	-	-	-	-	-
245	-	-	-	-	-	-	-	-	-	-
250	-	-	-	-	-	-	-	-	-	-
255	-	-	-	-	-	-	-	-	-	-
260	-	-	-	-	-	-	-	-	-	-
265	-	-	-	-	-	-	-	-	-	-
270	-	-	-	-	-	-	-	-	-	-
275	-	-	-	-	-	-	-	-	-	-
280	-	-	-	-	-	-	-	-	-	-
285	-	-	-	-	-	-	-	-	-	-
290	-	-	-	-	-	-	-	-	-	-
295	-	-	-	-	-	-	-	-	-	-
300	-	-	-	-	-	-	-	-	-	-
305	-	-	-	-	-	-	-	-	-	-
310	-	-	-	-	-	-	-	-	-	-
315	-	-	-	-	-	-	-	-	-	-
320	-	-	-	-	-	-	-	-	-	-
325	-	-	-	-	-	-	-	-	-	-
330	-	-	-	-	-	-	-	-	-	-
335	-	-	-	-	-	-	-	-	-	-
340	-	-	-	-	-	-	-	-	-	-
345	-	-	-	-	-	-	-	-	-	-
350	-	-	-	-	-	-	-	-	-	-
355	-	-	-	-	-	-	-	-	-	-
360	-	-	-	-	-	-	-	-	-	-
365	-	-	-	-	-	-	-	-	-	-
370	-	-	-	-	-	-	-	-	-	-
375	-	-	-	-	-	-	-	-	-	-

Thickness is intumescent only. Results apply to I/H-section beams with concrete slabs with 3 sided fire exposure.

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Table 10: I/H Column Sections 15 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
45	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
50	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
55	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
60	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
65	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
70	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
75	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
80	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
85	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
90	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
95	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
100	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
105	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
110	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
115	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
120	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
125	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
130	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
135	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
140	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
145	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
150	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
155	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
160	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
165	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
170	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
175	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
180	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
185	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
190	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
195	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
200	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
205	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
210	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
215	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
220	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
225	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
230	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
235	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
240	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
245	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
250	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
255	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
260	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
265	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
270	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
275	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
280	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
285	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
290	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
295	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
300	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
305	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
310	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
315	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
320	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
325	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
330	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
335	0.320	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
340	0.329	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
345	0.338	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
350	0.347	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
355	0.356	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
360	0.365	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
365	0.374	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
370	0.383	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
375	0.392	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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Table 11: I/H Column Sections 30 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
45	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
50	0.327	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
55	0.341	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
60	0.355	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
65	0.369	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
70	0.383	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
75	0.397	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
80	0.411	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
85	0.425	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
90	0.439	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
95	0.453	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
100	0.467	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
105	0.481	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
110	0.495	0.321	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
115	0.509	0.334	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
120	0.523	0.346	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
125	0.537	0.358	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
130	0.552	0.371	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
135	0.566	0.383	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
140	0.580	0.396	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
145	0.594	0.408	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
150	0.608	0.420	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
155	0.622	0.433	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
160	0.636	0.445	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
165	0.650	0.457	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
170	0.664	0.470	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
175	0.678	0.482	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
180	0.692	0.495	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
185	0.706	0.507	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
190	0.720	0.519	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
195	0.734	0.532	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
200	0.748	0.544	0.315	0.313	0.313	0.313	0.313	0.313	0.313	0.313
205	0.762	0.557	0.327	0.313	0.313	0.313	0.313	0.313	0.313	0.313
210	0.776	0.569	0.338	0.313	0.313	0.313	0.313	0.313	0.313	0.313
215	0.790	0.581	0.350	0.313	0.313	0.313	0.313	0.313	0.313	0.313
220	0.804	0.594	0.362	0.313	0.313	0.313	0.313	0.313	0.313	0.313
225	0.818	0.606	0.374	0.313	0.313	0.313	0.313	0.313	0.313	0.313
230	0.832	0.618	0.386	0.313	0.313	0.313	0.313	0.313	0.313	0.313
235	0.846	0.631	0.398	0.313	0.313	0.313	0.313	0.313	0.313	0.313
240	0.860	0.643	0.409	0.313	0.313	0.313	0.313	0.313	0.313	0.313
245	0.874	0.656	0.421	0.313	0.313	0.313	0.313	0.313	0.313	0.313
250	0.888	0.668	0.433	0.313	0.313	0.313	0.313	0.313	0.313	0.313
255	0.902	0.680	0.445	0.313	0.313	0.313	0.313	0.313	0.313	0.313
260	0.916	0.693	0.457	0.313	0.313	0.313	0.313	0.313	0.313	0.313
265	0.930	0.705	0.468	0.313	0.313	0.313	0.313	0.313	0.313	0.313
270	0.944	0.717	0.480	0.313	0.313	0.313	0.313	0.313	0.313	0.313
275	0.958	0.730	0.492	0.313	0.313	0.313	0.313	0.313	0.313	0.313
280	0.972	0.742	0.504	0.313	0.313	0.313	0.313	0.313	0.313	0.313
285	0.986	0.755	0.516	0.313	0.313	0.313	0.313	0.313	0.313	0.313
290	1.000	0.767	0.527	0.313	0.313	0.313	0.313	0.313	0.313	0.313
295	1.014	0.779	0.539	0.313	0.313	0.313	0.313	0.313	0.313	0.313
300	1.028	0.792	0.551	0.321	0.313	0.313	0.313	0.313	0.313	0.313
305	1.042	0.804	0.563	0.332	0.313	0.313	0.313	0.313	0.313	0.313
310	1.057	0.816	0.575	0.344	0.313	0.313	0.313	0.313	0.313	0.313
315	1.071	0.829	0.586	0.355	0.313	0.313	0.313	0.313	0.313	0.313
320	1.085	0.841	0.598	0.366	0.313	0.313	0.313	0.313	0.313	0.313
325	1.099	0.854	0.610	0.377	0.313	0.313	0.313	0.313	0.313	0.313
330	1.113	0.866	0.622	0.388	0.313	0.313	0.313	0.313	0.313	0.313
335	1.127	0.878	0.634	0.399	0.313	0.313	0.313	0.313	0.313	0.313
340	1.141	0.891	0.645	0.410	0.313	0.313	0.313	0.313	0.313	0.313
345	1.155	0.903	0.657	0.421	0.313	0.313	0.313	0.313	0.313	0.313
350	1.169	0.915	0.669	0.432	0.318	0.313	0.313	0.313	0.313	0.313
355	1.183	0.928	0.681	0.443	0.328	0.313	0.313	0.313	0.313	0.313
360	1.197	0.940	0.693	0.454	0.338	0.313	0.313	0.313	0.313	0.313
365	1.211	0.953	0.704	0.465	0.348	0.313	0.313	0.313	0.313	0.313
370	1.225	0.965	0.716	0.476	0.358	0.313	0.313	0.313	0.313	0.313
375	1.239	0.977	0.728	0.487	0.368	0.313	0.313	0.313	0.313	0.313

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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Table 12: I/H Column Sections 45 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	0.650	0.349	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
45	0.667	0.366	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
50	0.683	0.383	0.320	0.313	0.313	0.313	0.313	0.313	0.313	0.313
55	0.700	0.400	0.334	0.313	0.313	0.313	0.313	0.313	0.313	0.313
60	0.716	0.417	0.349	0.313	0.313	0.313	0.313	0.313	0.313	0.313
65	0.732	0.434	0.364	0.313	0.313	0.313	0.313	0.313	0.313	0.313
70	0.749	0.450	0.379	0.313	0.313	0.313	0.313	0.313	0.313	0.313
75	0.765	0.467	0.394	0.313	0.313	0.313	0.313	0.313	0.313	0.313
80	0.782	0.484	0.409	0.313	0.313	0.313	0.313	0.313	0.313	0.313
85	0.798	0.501	0.424	0.324	0.313	0.313	0.313	0.313	0.313	0.313
90	0.815	0.518	0.438	0.338	0.313	0.313	0.313	0.313	0.313	0.313
95	0.831	0.535	0.453	0.351	0.313	0.313	0.313	0.313	0.313	0.313
100	0.848	0.552	0.468	0.364	0.313	0.313	0.313	0.313	0.313	0.313
105	0.864	0.569	0.483	0.378	0.313	0.313	0.313	0.313	0.313	0.313
110	0.881	0.586	0.498	0.391	0.313	0.313	0.313	0.313	0.313	0.313
115	0.897	0.603	0.513	0.405	0.313	0.313	0.313	0.313	0.313	0.313
120	0.914	0.620	0.527	0.418	0.313	0.313	0.313	0.313	0.313	0.313
125	0.930	0.637	0.542	0.432	0.313	0.313	0.313	0.313	0.313	0.313
130	0.947	0.654	0.557	0.445	0.313	0.313	0.313	0.313	0.313	0.313
135	0.963	0.671	0.572	0.458	0.313	0.313	0.313	0.313	0.313	0.313
140	0.980	0.688	0.587	0.472	0.321	0.313	0.313	0.313	0.313	0.313
145	0.996	0.705	0.602	0.485	0.334	0.313	0.313	0.313	0.313	0.313
150	1.013	0.722	0.617	0.499	0.347	0.313	0.313	0.313	0.313	0.313
155	1.029	0.738	0.631	0.512	0.360	0.313	0.313	0.313	0.313	0.313
160	1.046	0.755	0.646	0.526	0.373	0.325	0.313	0.313	0.313	0.313
165	1.062	0.772	0.661	0.539	0.386	0.338	0.313	0.313	0.313	0.313
170	1.079	0.789	0.676	0.552	0.400	0.351	0.313	0.313	0.313	0.313
175	1.095	0.806	0.691	0.566	0.413	0.364	0.313	0.313	0.313	0.313
180	1.112	0.823	0.706	0.579	0.426	0.377	0.313	0.313	0.313	0.313
185	1.128	0.840	0.721	0.593	0.439	0.390	0.313	0.313	0.313	0.313
190	1.145	0.857	0.735	0.606	0.452	0.403	0.313	0.313	0.313	0.313
195	1.161	0.874	0.750	0.619	0.465	0.416	0.313	0.313	0.313	0.313
200	1.178	0.891	0.765	0.633	0.478	0.429	0.313	0.313	0.313	0.313
205	1.194	0.908	0.780	0.646	0.491	0.442	0.313	0.313	0.313	0.313
210	1.211	0.925	0.795	0.660	0.505	0.455	0.313	0.313	0.313	0.313
215	1.227	0.942	0.810	0.673	0.518	0.468	0.315	0.313	0.313	0.313
220	1.244	0.959	0.824	0.687	0.531	0.481	0.339	0.313	0.313	0.313
225	1.260	0.976	0.839	0.700	0.544	0.494	0.363	0.313	0.313	0.313
230	1.277	0.993	0.854	0.713	0.557	0.507	0.387	0.313	0.313	0.313
235	1.293	1.010	0.869	0.727	0.570	0.520	0.411	0.313	0.313	0.313
240	1.310	1.026	0.884	0.740	0.583	0.533	0.434	0.319	0.313	0.313
245	1.326	1.043	0.899	0.754	0.596	0.547	0.458	0.342	0.313	0.313
250	1.343	1.060	0.914	0.767	0.610	0.560	0.482	0.365	0.313	0.313
255	1.359	1.077	0.928	0.780	0.623	0.573	0.506	0.388	0.313	0.313
260	1.375	1.094	0.943	0.794	0.636	0.586	0.530	0.411	0.313	0.313
265	1.392	1.111	0.958	0.807	0.649	0.599	0.553	0.435	0.313	0.313
270	1.408	1.128	0.973	0.821	0.662	0.612	0.577	0.458	0.313	0.313
275	1.425	1.145	0.988	0.834	0.675	0.625	0.601	0.481	0.313	0.313
280	1.441	1.162	1.003	0.848	0.688	0.638	0.625	0.504	0.313	0.313
285	1.458	1.179	1.017	0.861	0.701	0.651	0.649	0.527	0.313	0.313
290	1.474	1.196	1.032	0.874	0.715	0.672	0.672	0.550	0.322	0.313
295	1.491	1.213	1.047	0.888	0.728	0.696	0.696	0.573	0.345	0.313
300	1.507	1.230	1.062	0.901	0.741	0.720	0.720	0.596	0.367	0.313
305	1.524	1.247	1.077	0.915	0.754	0.744	0.744	0.619	0.389	0.313
310	1.540	1.264	1.092	0.928	0.768	0.768	0.768	0.643	0.412	0.313
315	1.557	1.281	1.107	0.942	0.792	0.792	0.792	0.666	0.434	0.313
320	1.573	1.298	1.121	0.955	0.815	0.815	0.815	0.689	0.457	0.313
325	1.590	1.314	1.136	0.968	0.839	0.839	0.839	0.712	0.479	0.313
330	1.606	1.331	1.151	0.982	0.863	0.863	0.863	0.735	0.502	0.313
335	1.623	1.348	1.166	0.995	0.887	0.887	0.887	0.758	0.524	0.313
340	1.639	1.365	1.181	1.009	0.911	0.911	0.911	0.781	0.546	0.313
345	1.656	1.382	1.196	1.022	0.934	0.934	0.934	0.804	0.569	0.313
350	1.896	1.399	1.211	1.035	0.958	0.958	0.958	0.828	0.591	0.313
355	2.156	1.416	1.225	1.049	0.982	0.982	0.982	0.851	0.614	0.313
360	2.415	1.433	1.240	1.062	1.006	1.006	1.006	0.874	0.636	0.313
365	2.674	1.450	1.255	1.076	1.030	1.030	1.030	0.897	0.658	0.321
370	2.923	1.467	1.270	1.089	1.054	1.054	1.054	0.920	0.681	0.341
375	3.016	1.484	1.285	1.103	1.077	1.077	1.077	0.943	0.703	0.362

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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Table 13: I/H Column Sections 60 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	1.127	0.757	0.504	0.342	0.313	0.313	0.313	0.313	0.313	0.313
45	1.200	0.781	0.521	0.359	0.323	0.313	0.313	0.313	0.313	0.313
50	1.272	0.805	0.539	0.376	0.338	0.326	0.313	0.313	0.313	0.313
55	1.345	0.829	0.556	0.393	0.354	0.341	0.313	0.313	0.313	0.313
60	1.418	0.853	0.573	0.410	0.369	0.356	0.313	0.313	0.313	0.313
65	1.490	0.877	0.591	0.427	0.385	0.371	0.313	0.313	0.313	0.313
70	1.563	0.901	0.608	0.444	0.400	0.386	0.313	0.313	0.313	0.313
75	1.636	0.925	0.626	0.461	0.416	0.401	0.313	0.313	0.313	0.313
80	1.685	0.950	0.643	0.477	0.431	0.416	0.318	0.313	0.313	0.313
85	1.724	0.974	0.661	0.494	0.447	0.432	0.346	0.313	0.313	0.313
90	1.763	0.998	0.678	0.511	0.462	0.447	0.373	0.313	0.313	0.313
95	1.803	1.022	0.695	0.528	0.478	0.462	0.401	0.313	0.313	0.313
100	1.842	1.046	0.713	0.545	0.493	0.477	0.428	0.333	0.313	0.313
105	1.881	1.070	0.730	0.562	0.509	0.492	0.456	0.361	0.313	0.313
110	1.921	1.094	0.748	0.579	0.524	0.507	0.484	0.388	0.313	0.313
115	1.960	1.118	0.765	0.596	0.540	0.522	0.511	0.415	0.313	0.313
120	1.999	1.142	0.783	0.613	0.555	0.539	0.539	0.442	0.313	0.313
125	2.039	1.166	0.800	0.630	0.571	0.566	0.566	0.469	0.313	0.313
130	2.078	1.190	0.817	0.647	0.594	0.594	0.594	0.496	0.313	0.313
135	2.117	1.214	0.835	0.663	0.622	0.622	0.622	0.523	0.313	0.313
140	2.156	1.238	0.852	0.680	0.649	0.649	0.649	0.550	0.313	0.313
145	2.196	1.262	0.870	0.697	0.677	0.677	0.677	0.578	0.325	0.313
150	2.235	1.286	0.887	0.714	0.705	0.705	0.705	0.605	0.353	0.313
155	2.274	1.310	0.904	0.732	0.732	0.732	0.732	0.632	0.380	0.313
160	2.314	1.334	0.922	0.760	0.760	0.760	0.760	0.659	0.408	0.313
165	2.353	1.358	0.939	0.787	0.787	0.787	0.787	0.686	0.435	0.313
170	2.392	1.382	0.957	0.815	0.815	0.815	0.815	0.713	0.463	0.313
175	2.432	1.406	0.974	0.843	0.843	0.843	0.843	0.740	0.490	0.313
180	2.471	1.430	0.992	0.870	0.870	0.870	0.870	0.767	0.517	0.313
185	2.510	1.454	1.009	0.898	0.898	0.898	0.898	0.795	0.545	0.313
190	2.549	1.478	1.026	0.925	0.925	0.925	0.925	0.822	0.572	0.313
195	2.589	1.502	1.044	0.953	0.953	0.953	0.953	0.849	0.600	0.313
200	2.628	1.526	1.061	0.981	0.981	0.981	0.981	0.876	0.627	0.333
205	2.667	1.550	1.079	1.008	1.008	1.008	1.008	0.903	0.655	0.359
210	2.707	1.574	1.096	1.036	1.036	1.036	1.036	0.930	0.682	0.385
215	2.746	1.598	1.114	1.064	1.064	1.064	1.064	0.957	0.709	0.411
220	2.785	1.622	1.131	1.091	1.091	1.091	1.091	0.984	0.737	0.437
225	2.825	1.646	1.148	1.119	1.119	1.119	1.119	1.012	0.764	0.464
230	2.864	1.687	1.166	1.146	1.146	1.146	1.146	1.039	0.792	0.490
235	2.903	1.741	1.183	1.174	1.174	1.174	1.174	1.066	0.819	0.516
240	2.963	1.796	1.202	1.202	1.202	1.202	1.202	1.093	0.847	0.542
245	3.034	1.851	1.229	1.229	1.229	1.229	1.229	1.120	0.874	0.568
250	3.106	1.905	1.257	1.257	1.257	1.257	1.257	1.147	0.902	0.594
255	3.177	1.960	1.285	1.285	1.285	1.285	1.285	1.174	0.929	0.620
260	3.249	2.014	1.312	1.312	1.312	1.312	1.312	1.201	0.956	0.646
265	3.320	2.069	1.340	1.340	1.340	1.340	1.340	1.229	0.984	0.673
270	3.392	2.124	1.367	1.367	1.367	1.367	1.367	1.256	1.011	0.699
275	3.463	2.178	1.395	1.395	1.395	1.395	1.395	1.283	1.039	0.725
280	3.535	2.233	1.423	1.423	1.423	1.423	1.423	1.310	1.066	0.751
285	3.606	2.288	1.450	1.450	1.450	1.450	1.450	1.337	1.094	0.777
290	3.678	2.342	1.478	1.478	1.478	1.478	1.478	1.364	1.121	0.803
295	3.749	2.397	1.505	1.505	1.505	1.505	1.505	1.391	1.148	0.829
300	3.821	2.451	1.533	1.533	1.533	1.533	1.533	1.418	1.176	0.855
305	3.892	2.506	1.561	1.561	1.561	1.561	1.561	1.446	1.203	0.881
310	3.964	2.561	1.588	1.588	1.588	1.588	1.588	1.473	1.231	0.908
315	4.035	2.615	1.616	1.616	1.616	1.616	1.616	1.500	1.258	0.934
320	4.107	2.670	1.644	1.644	1.644	1.644	1.644	1.527	1.286	0.960
325	4.178	2.724	1.671	1.671	1.671	1.671	1.671	1.554	1.313	0.986
330	4.250	2.779	1.699	1.699	1.699	1.699	1.699	1.581	1.341	1.012
335	4.321	2.834	1.726	1.726	1.726	1.726	1.726	1.608	1.368	1.038
340	4.393	2.888	1.754	1.754	1.754	1.754	1.754	1.635	1.395	1.064
345	4.464	2.965	1.782	1.782	1.782	1.782	1.782	1.663	1.423	1.090
350	4.536	3.067	1.809	1.809	1.809	1.809	1.809	1.690	1.450	1.117
355	-	3.170	1.837	1.837	1.837	1.837	1.837	1.717	1.478	1.143
360	-	3.272	1.864	1.864	1.864	1.864	1.864	1.744	1.505	1.169
365	-	3.375	1.892	1.892	1.892	1.892	1.892	1.771	1.533	1.195
370	-	3.477	1.920	1.920	1.920	1.920	1.920	1.798	1.560	1.221
375	-	3.580	1.947	1.947	1.947	1.947	1.947	1.825	1.588	1.247

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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Table 14: I/H Column Sections 75 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	1.600	1.163	0.874	0.654	0.501	0.458	0.320	0.313	0.313	0.313
45	1.701	1.229	0.902	0.671	0.518	0.475	0.354	0.322	0.313	0.313
50	1.775	1.295	0.930	0.688	0.535	0.492	0.387	0.354	0.313	0.313
55	1.849	1.361	0.957	0.705	0.552	0.510	0.420	0.386	0.326	0.313
60	1.923	1.427	0.985	0.723	0.570	0.527	0.453	0.418	0.357	0.313
65	1.997	1.493	1.013	0.740	0.587	0.544	0.486	0.450	0.387	0.313
70	2.071	1.560	1.041	0.757	0.604	0.562	0.520	0.483	0.418	0.313
75	2.145	1.626	1.068	0.774	0.621	0.579	0.553	0.515	0.448	0.313
80	2.219	1.680	1.096	0.791	0.639	0.596	0.586	0.547	0.479	0.313
85	2.293	1.723	1.124	0.809	0.656	0.619	0.619	0.579	0.510	0.340
90	2.367	1.766	1.152	0.826	0.673	0.652	0.652	0.611	0.540	0.369
95	2.441	1.809	1.180	0.843	0.690	0.686	0.686	0.643	0.571	0.398
100	2.515	1.852	1.207	0.860	0.719	0.719	0.719	0.675	0.601	0.427
105	2.589	1.896	1.235	0.877	0.752	0.752	0.752	0.707	0.632	0.456
110	2.663	1.939	1.263	0.895	0.785	0.785	0.785	0.739	0.662	0.485
115	2.737	1.982	1.291	0.912	0.818	0.818	0.818	0.771	0.693	0.514
120	2.811	2.025	1.318	0.929	0.851	0.851	0.851	0.803	0.724	0.543
125	2.885	2.068	1.346	0.946	0.885	0.885	0.885	0.835	0.754	0.572
130	2.975	2.111	1.374	0.963	0.918	0.918	0.918	0.867	0.785	0.601
135	3.078	2.155	1.402	0.981	0.951	0.951	0.951	0.899	0.815	0.629
140	3.181	2.198	1.429	0.998	0.984	0.984	0.984	0.931	0.846	0.658
145	3.283	2.241	1.457	1.017	1.017	1.017	1.017	0.963	0.876	0.687
150	3.386	2.284	1.485	1.051	1.051	1.051	1.051	0.996	0.907	0.716
155	3.489	2.327	1.513	1.084	1.084	1.084	1.084	1.028	0.938	0.745
160	3.592	2.370	1.541	1.117	1.117	1.117	1.117	1.060	0.968	0.774
165	3.695	2.414	1.568	1.150	1.150	1.150	1.150	1.092	0.999	0.803
170	3.798	2.457	1.596	1.183	1.183	1.183	1.183	1.124	1.029	0.832
175	3.901	2.500	1.624	1.217	1.217	1.217	1.217	1.156	1.060	0.861
180	4.003	2.543	1.652	1.250	1.250	1.250	1.250	1.188	1.091	0.890
185	4.106	2.586	1.701	1.283	1.283	1.283	1.283	1.220	1.121	0.919
190	4.209	2.630	1.755	1.316	1.316	1.316	1.316	1.252	1.152	0.948
195	4.312	2.673	1.810	1.349	1.349	1.349	1.349	1.284	1.182	0.976
200	4.415	2.716	1.864	1.382	1.382	1.382	1.382	1.316	1.213	1.005
205	4.518	2.759	1.919	1.416	1.416	1.416	1.416	1.348	1.243	1.034
210	-	2.802	1.973	1.449	1.449	1.449	1.449	1.380	1.274	1.063
215	-	2.845	2.027	1.482	1.482	1.482	1.482	1.412	1.305	1.092
220	-	2.889	2.082	1.515	1.515	1.515	1.515	1.444	1.335	1.121
225	-	2.941	2.136	1.548	1.548	1.548	1.548	1.476	1.366	1.150
230	-	3.015	2.191	1.582	1.582	1.582	1.582	1.508	1.396	1.179
235	-	3.089	2.245	1.615	1.615	1.615	1.615	1.541	1.427	1.208
240	-	3.162	2.299	1.648	1.648	1.648	1.648	1.573	1.457	1.237
245	-	3.236	2.354	1.681	1.681	1.681	1.681	1.605	1.488	1.266
250	-	3.309	2.408	1.714	1.714	1.714	1.714	1.637	1.519	1.295
255	-	3.383	2.462	1.747	1.747	1.747	1.747	1.669	1.549	1.324
260	-	3.456	2.517	1.781	1.781	1.781	1.781	1.701	1.580	1.352
265	-	3.530	2.571	1.814	1.814	1.814	1.814	1.733	1.610	1.381
270	-	3.603	2.626	1.847	1.847	1.847	1.847	1.765	1.641	1.410
275	-	3.677	2.680	1.880	1.880	1.880	1.880	1.797	1.672	1.439
280	-	3.750	2.734	1.913	1.913	1.913	1.913	1.829	1.702	1.468
285	-	3.824	2.789	1.947	1.947	1.947	1.947	1.861	1.733	1.497
290	-	3.897	2.843	1.980	1.980	1.980	1.980	1.893	1.763	1.526
295	-	3.971	2.898	2.013	2.013	2.013	2.013	1.925	1.794	1.555
300	-	4.045	2.980	2.046	2.046	2.046	2.046	1.957	1.824	1.584
305	-	4.118	3.078	2.079	2.079	2.079	2.079	1.989	1.855	1.613
310	-	4.192	3.176	2.113	2.113	2.113	2.113	2.021	1.886	1.642
315	-	4.265	3.274	2.146	2.146	2.146	2.146	2.054	1.916	1.671
320	-	4.339	3.373	2.179	2.179	2.179	2.179	2.086	1.947	1.699
325	-	4.412	3.471	2.212	2.212	2.212	2.212	2.118	1.977	1.728
330	-	4.486	3.569	2.245	2.245	2.245	2.245	2.150	2.008	1.757
335	-	4.559	3.668	2.278	2.278	2.278	2.278	2.182	2.038	1.786
340	-	-	3.766	2.312	2.312	2.312	2.312	2.214	2.069	1.815
345	-	-	3.864	2.631	2.345	2.345	2.345	2.246	2.100	1.844
350	-	-	3.963	2.947	2.378	2.378	2.378	2.278	2.130	1.873
355	-	-	4.061	3.090	2.411	2.411	2.411	2.310	2.161	1.902
360	-	-	4.159	3.232	2.444	2.444	2.444	2.342	2.191	1.931
365	-	-	4.258	3.374	2.478	2.478	2.478	2.374	2.222	1.960
370	-	-	4.356	3.516	2.511	2.511	2.511	2.406	2.253	1.989
375	-	-	4.454	3.658	2.544	2.544	2.544	2.438	2.283	2.018

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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CERTIFICATE No CF 5601
KCC CORPORATION

Table 15: I/H Column Sections 90 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	2.680	1.567	1.233	0.993	0.829	0.780	0.591	0.522	0.421	0.313
45	2.889	1.676	1.302	1.025	0.852	0.801	0.628	0.558	0.457	0.339
50	3.154	1.760	1.371	1.057	0.874	0.823	0.665	0.595	0.492	0.372
55	3.428	1.844	1.440	1.089	0.897	0.844	0.702	0.631	0.528	0.406
60	3.702	1.928	1.509	1.121	0.920	0.865	0.739	0.668	0.563	0.439
65	3.976	2.012	1.578	1.153	0.943	0.886	0.776	0.704	0.599	0.473
70	4.250	2.096	1.647	1.186	0.965	0.907	0.813	0.740	0.635	0.506
75	4.523	2.180	1.697	1.218	0.988	0.928	0.850	0.777	0.670	0.540
80	-	2.264	1.745	1.250	1.011	0.949	0.887	0.813	0.706	0.573
85	-	2.348	1.792	1.282	1.034	0.970	0.924	0.850	0.741	0.607
90	-	2.432	1.839	1.314	1.056	0.991	0.961	0.886	0.777	0.641
95	-	2.516	1.887	1.346	1.079	1.012	0.998	0.923	0.812	0.674
100	-	2.600	1.934	1.378	1.102	1.035	1.035	0.959	0.848	0.708
105	-	2.684	1.981	1.410	1.125	1.072	1.072	0.996	0.884	0.741
110	-	2.768	2.029	1.442	1.147	1.109	1.109	1.032	0.919	0.775
115	-	2.852	2.076	1.474	1.170	1.146	1.146	1.068	0.955	0.808
120	-	2.939	2.123	1.506	1.193	1.183	1.183	1.105	0.990	0.842
125	-	3.034	2.171	1.538	1.220	1.220	1.220	1.141	1.026	0.876
130	-	3.129	2.218	1.570	1.257	1.257	1.257	1.178	1.061	0.909
135	-	3.224	2.265	1.602	1.294	1.294	1.294	1.214	1.097	0.943
140	-	3.320	2.313	1.634	1.331	1.331	1.331	1.251	1.133	0.976
145	-	3.415	2.360	1.672	1.368	1.368	1.368	1.287	1.168	1.010
150	-	3.510	2.407	1.729	1.405	1.405	1.405	1.323	1.204	1.043
155	-	3.606	2.455	1.786	1.442	1.442	1.442	1.360	1.239	1.077
160	-	3.701	2.502	1.842	1.479	1.479	1.479	1.396	1.275	1.110
165	-	3.796	2.549	1.899	1.516	1.516	1.516	1.433	1.310	1.144
170	-	3.892	2.597	1.956	1.553	1.553	1.553	1.469	1.346	1.178
175	-	3.987	2.644	2.013	1.590	1.590	1.590	1.506	1.381	1.211
180	-	4.082	2.691	2.069	1.627	1.627	1.627	1.542	1.417	1.245
185	-	4.178	2.739	2.126	1.664	1.664	1.664	1.578	1.453	1.278
190	-	4.273	2.786	2.183	1.701	1.701	1.701	1.615	1.488	1.312
195	-	4.368	2.833	2.240	1.738	1.738	1.738	1.651	1.524	1.345
200	-	4.464	2.881	2.296	1.775	1.775	1.775	1.688	1.559	1.379
205	-	4.559	2.948	2.353	1.812	1.812	1.812	1.724	1.595	1.413
210	-	-	3.089	2.410	1.849	1.849	1.849	1.761	1.630	1.446
215	-	-	3.230	2.467	1.886	1.886	1.886	1.797	1.666	1.480
220	-	-	3.371	2.523	1.923	1.923	1.923	1.834	1.702	1.513
225	-	-	3.512	2.580	1.960	1.960	1.960	1.870	1.737	1.547
230	-	-	3.653	2.637	1.997	1.997	1.997	1.906	1.773	1.580
235	-	-	3.794	2.694	2.034	2.034	2.034	1.943	1.808	1.614
240	-	-	3.935	2.750	2.071	2.071	2.071	1.979	1.844	1.647
245	-	-	4.076	2.807	2.108	2.108	2.108	2.016	1.879	1.681
250	-	-	4.216	2.864	2.145	2.145	2.145	2.052	1.915	1.715
255	-	-	4.357	2.923	2.182	2.182	2.182	2.089	1.951	1.748
260	-	-	4.498	3.016	2.253	2.219	2.219	2.125	1.986	1.782
265	-	-	-	3.110	2.331	2.256	2.256	2.161	2.022	1.815
270	-	-	-	3.203	2.410	2.293	2.293	2.198	2.057	1.849
275	-	-	-	3.297	2.488	2.330	2.330	2.234	2.093	1.882
280	-	-	-	3.390	2.566	2.367	2.367	2.271	2.128	1.916
285	-	-	-	3.484	2.645	2.404	2.404	2.307	2.164	1.950
290	-	-	-	3.577	2.723	2.441	2.441	2.344	2.200	1.983
295	-	-	-	3.671	2.802	2.498	2.478	2.380	2.235	2.017
300	-	-	-	3.764	2.880	2.588	2.515	2.416	2.271	2.050
305	-	-	-	3.858	2.991	2.678	2.552	2.453	2.306	2.084
310	-	-	-	3.951	3.133	2.767	2.589	2.489	2.342	2.117
315	-	-	-	4.045	3.274	2.857	2.626	2.526	2.377	2.151
320	-	-	-	4.138	3.416	2.976	2.663	2.562	2.413	2.184
325	-	-	-	4.232	3.558	3.156	2.700	2.599	2.448	2.218
330	-	-	-	4.326	3.700	3.337	2.737	2.635	2.484	2.252
335	-	-	-	4.419	3.841	3.518	2.774	2.672	2.520	2.285
340	-	-	-	4.513	3.983	3.698	2.811	2.708	2.555	2.319
345	-	-	-	-	4.125	3.879	2.848	2.744	2.591	2.352
350	-	-	-	-	4.267	4.060	2.885	2.781	2.626	2.386
355	-	-	-	-	4.408	4.240	2.939	2.817	2.662	2.419
360	-	-	-	-	4.550	4.421	3.156	2.854	2.697	2.453
365	-	-	-	-	-	-	3.372	2.890	2.733	2.487
370	-	-	-	-	-	-	3.589	2.927	2.769	2.520
375	-	-	-	-	-	-	3.805	3.205	2.804	2.554

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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CERTIFICATE No CF 5601
KCC CORPORATION

Table 16: I/H Column Sections 105 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	-	2.508	1.591	1.325	1.150	1.098	0.902	0.825	0.714	0.528
45	-	2.723	1.700	1.398	1.197	1.137	0.925	0.847	0.731	0.565
50	-	2.945	1.803	1.471	1.243	1.177	0.948	0.868	0.747	0.602
55	-	3.238	1.906	1.544	1.290	1.217	0.972	0.889	0.764	0.639
60	-	3.531	2.009	1.618	1.337	1.257	0.995	0.910	0.781	0.677
65	-	3.823	2.113	1.680	1.383	1.297	1.018	0.931	0.797	0.714
70	-	4.116	2.216	1.730	1.430	1.336	1.042	0.952	0.814	0.751
75	-	4.409	2.319	1.779	1.477	1.376	1.065	0.973	0.831	0.789
80	-	-	2.422	1.829	1.523	1.416	1.088	0.994	0.847	0.826
85	-	-	2.525	1.878	1.570	1.456	1.112	1.016	0.864	0.863
90	-	-	2.628	1.928	1.617	1.496	1.135	1.037	0.901	0.901
95	-	-	2.731	1.978	1.664	1.535	1.158	1.058	0.938	0.938
100	-	-	2.834	2.027	1.714	1.575	1.182	1.079	0.975	0.975
105	-	-	2.937	2.077	1.764	1.615	1.205	1.100	1.013	1.013
110	-	-	3.038	2.126	1.814	1.655	1.228	1.121	1.050	1.050
115	-	-	3.140	2.176	1.864	1.707	1.252	1.142	1.087	1.087
120	-	-	3.241	2.226	1.914	1.759	1.275	1.163	1.124	1.124
125	-	-	3.343	2.275	1.965	1.812	1.298	1.185	1.162	1.162
130	-	-	3.444	2.325	2.015	1.865	1.322	1.206	1.199	1.199
135	-	-	3.546	2.374	2.065	1.918	1.345	1.236	1.236	1.236
140	-	-	3.648	2.424	2.115	1.971	1.369	1.274	1.274	1.274
145	-	-	3.749	2.474	2.165	2.023	1.392	1.311	1.311	1.311
150	-	-	3.851	2.523	2.215	2.076	1.415	1.348	1.348	1.348
155	-	-	3.952	2.573	2.265	2.129	1.439	1.386	1.386	1.386
160	-	-	4.054	2.622	2.316	2.182	1.462	1.423	1.423	1.423
165	-	-	4.155	2.672	2.366	2.235	1.485	1.460	1.460	1.460
170	-	-	4.257	2.722	2.416	2.287	1.509	1.497	1.497	1.497
175	-	-	4.358	2.771	2.466	2.340	1.535	1.535	1.535	1.535
180	-	-	4.460	2.821	2.516	2.393	1.572	1.572	1.572	1.572
185	-	-	4.562	2.871	2.566	2.446	1.609	1.609	1.609	1.609
190	-	-	-	2.931	2.616	2.498	1.647	1.647	1.647	1.647
195	-	-	-	3.234	2.666	2.551	1.684	1.684	1.684	1.684
200	-	-	-	3.538	2.717	2.604	1.721	1.721	1.721	1.721
205	-	-	-	3.841	2.767	2.657	1.759	1.759	1.759	1.759
210	-	-	-	4.145	2.817	2.710	1.796	1.796	1.796	1.796
215	-	-	-	4.448	2.867	2.762	1.880	1.833	1.833	1.833
220	-	-	-	-	2.917	2.815	1.964	1.870	1.870	1.870
225	-	-	-	-	3.140	2.868	2.048	1.908	1.908	1.908
230	-	-	-	-	3.365	2.929	2.132	1.945	1.945	1.945
235	-	-	-	-	3.591	3.134	2.217	1.982	1.982	1.982
240	-	-	-	-	3.816	3.339	2.301	2.020	2.020	2.020
245	-	-	-	-	4.042	3.544	2.385	2.057	2.057	2.057
250	-	-	-	-	4.267	3.749	2.469	2.094	2.094	2.094
255	-	-	-	-	4.493	3.954	2.554	2.132	2.132	2.132
260	-	-	-	-	-	4.159	2.638	2.169	2.169	2.169
265	-	-	-	-	-	4.364	2.722	2.222	2.206	2.206
270	-	-	-	-	-	4.569	2.806	2.322	2.243	2.243
275	-	-	-	-	-	-	2.891	2.422	2.281	2.281
280	-	-	-	-	-	-	3.010	2.522	2.318	2.318
285	-	-	-	-	-	-	3.145	2.623	2.355	2.355
290	-	-	-	-	-	-	3.281	2.723	2.393	2.393
295	-	-	-	-	-	-	3.417	2.823	2.430	2.430
300	-	-	-	-	-	-	3.553	2.927	2.467	2.467
305	-	-	-	-	-	-	3.688	3.102	2.505	2.505
310	-	-	-	-	-	-	3.824	3.277	2.542	2.542
315	-	-	-	-	-	-	3.960	3.452	2.579	2.579
320	-	-	-	-	-	-	4.096	3.627	2.617	2.617
325	-	-	-	-	-	-	4.231	3.802	2.654	2.654
330	-	-	-	-	-	-	4.367	3.977	2.847	2.691
335	-	-	-	-	-	-	4.503	4.153	3.179	2.728
340	-	-	-	-	-	-	-	4.328	3.464	2.766
345	-	-	-	-	-	-	-	4.503	3.748	2.803
350	-	-	-	-	-	-	-	-	4.033	2.840
355	-	-	-	-	-	-	-	-	4.318	2.878
360	-	-	-	-	-	-	-	-	-	2.915
365	-	-	-	-	-	-	-	-	-	3.198
370	-	-	-	-	-	-	-	-	-	3.504
375	-	-	-	-	-	-	-	-	-	3.809

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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CERTIFICATE No CF 5601
KCC CORPORATION

Table 17: I/H Column Sections 120 Minutes										
Section Factor up to m^{-1}	Thickness (mm) Required for a Design Temperature of									
	350°C	400°C	450°C	500°C	538°C	550°C	600°C	620°C	650°C	700°C
40	-	-	2.484	1.711	1.466	1.409	1.197	1.117	0.998	0.801
45	-	-	2.707	1.829	1.552	1.487	1.246	1.156	1.023	0.823
50	-	-	2.941	1.947	1.638	1.566	1.295	1.195	1.049	0.844
55	-	-	3.347	2.065	1.697	1.644	1.344	1.233	1.074	0.865
60	-	-	3.754	2.183	1.749	1.699	1.393	1.272	1.099	0.886
65	-	-	4.161	2.301	1.801	1.750	1.442	1.311	1.125	0.908
70	-	-	4.568	2.419	1.852	1.801	1.491	1.350	1.150	0.929
75	-	-	-	2.537	1.904	1.852	1.540	1.389	1.175	0.950
80	-	-	-	2.655	1.956	1.903	1.589	1.427	1.201	0.971
85	-	-	-	2.773	2.008	1.954	1.638	1.466	1.226	0.992
90	-	-	-	2.891	2.059	2.005	1.688	1.505	1.252	1.014
95	-	-	-	3.086	2.111	2.056	1.739	1.544	1.277	1.035
100	-	-	-	3.306	2.163	2.107	1.790	1.583	1.302	1.056
105	-	-	-	3.525	2.215	2.158	1.841	1.621	1.328	1.077
110	-	-	-	3.744	2.266	2.208	1.892	1.661	1.353	1.099
115	-	-	-	3.963	2.318	2.259	1.943	1.716	1.378	1.120
120	-	-	-	4.182	2.370	2.310	1.994	1.771	1.404	1.141
125	-	-	-	4.402	2.421	2.361	2.045	1.825	1.429	1.162
130	-	-	-	-	2.473	2.412	2.096	1.880	1.455	1.184
135	-	-	-	-	2.525	2.463	2.147	1.935	1.480	1.205
140	-	-	-	-	2.577	2.514	2.199	1.990	1.505	1.226
145	-	-	-	-	2.628	2.565	2.250	2.044	1.531	1.247
150	-	-	-	-	2.680	2.616	2.301	2.099	1.556	1.268
155	-	-	-	-	2.732	2.667	2.352	2.154	1.581	1.290
160	-	-	-	-	2.784	2.717	2.403	2.208	1.607	1.311
165	-	-	-	-	2.835	2.768	2.454	2.263	1.632	1.332
170	-	-	-	-	2.887	2.819	2.505	2.318	1.659	1.353
175	-	-	-	-	3.226	2.870	2.556	2.372	1.735	1.375
180	-	-	-	-	3.993	2.957	2.607	2.427	1.812	1.396
185	-	-	-	-	-	3.610	2.658	2.482	1.889	1.417
190	-	-	-	-	-	4.262	2.709	2.536	1.966	1.438
195	-	-	-	-	-	-	2.760	2.591	2.042	1.460
200	-	-	-	-	-	-	2.811	2.646	2.119	1.481
205	-	-	-	-	-	-	2.862	2.700	2.196	1.502
210	-	-	-	-	-	-	2.913	2.755	2.273	1.523
215	-	-	-	-	-	-	3.244	2.810	2.350	1.544
220	-	-	-	-	-	-	3.603	2.864	2.426	1.566
225	-	-	-	-	-	-	3.961	2.923	2.503	1.587
230	-	-	-	-	-	-	4.319	3.237	2.580	1.608
235	-	-	-	-	-	-	-	3.551	2.657	1.629
240	-	-	-	-	-	-	-	3.865	2.733	1.651
245	-	-	-	-	-	-	-	4.178	2.810	1.736
250	-	-	-	-	-	-	-	4.492	2.887	1.850
255	-	-	-	-	-	-	-	-	3.084	1.963
260	-	-	-	-	-	-	-	-	3.362	2.077
265	-	-	-	-	-	-	-	-	3.641	2.190
270	-	-	-	-	-	-	-	-	3.919	2.304
275	-	-	-	-	-	-	-	-	4.197	2.417
280	-	-	-	-	-	-	-	-	4.476	2.531
285	-	-	-	-	-	-	-	-	-	2.644
290	-	-	-	-	-	-	-	-	-	2.757
295	-	-	-	-	-	-	-	-	-	2.871
300	-	-	-	-	-	-	-	-	-	3.035
305	-	-	-	-	-	-	-	-	-	3.235
310	-	-	-	-	-	-	-	-	-	3.435
315	-	-	-	-	-	-	-	-	-	3.635
320	-	-	-	-	-	-	-	-	-	3.836
325	-	-	-	-	-	-	-	-	-	4.036
330	-	-	-	-	-	-	-	-	-	4.236
335	-	-	-	-	-	-	-	-	-	4.436
340	-	-	-	-	-	-	-	-	-	-
345	-	-	-	-	-	-	-	-	-	-
350	-	-	-	-	-	-	-	-	-	-
355	-	-	-	-	-	-	-	-	-	-
360	-	-	-	-	-	-	-	-	-	-
365	-	-	-	-	-	-	-	-	-	-
370	-	-	-	-	-	-	-	-	-	-
375	-	-	-	-	-	-	-	-	-	-

Thickness is intumescent only. Results also apply to I/H-section beams exposed on all four sides limited to a maximum protection thickness of 4.541mm.

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