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Testing. Advising. Assuring.

Title:

The Fire Resistance
Performance of Steel
Sections Protected with
Avikote WB 600: Analyses at
Various Design
Temperatures Ranging from
350°C to 750°C

WF Report No:

309568

Prepared for:

**Arabian Vermiculite
Industries**

P.O. Box 7137,
Dammam 31462,
Saudi Arabia

Date:

28th July 2011

Table A7 Beams: Steel temperature 620°C							
30 minutes		60 minutes				90 minutes	
Section factor m ⁻¹	Thickness mm	Section factor m ⁻¹	Thickness mm	Section factor m ⁻¹	Thickness mm	Section factor m ⁻¹	Thickness mm
260	0.201	70	0.207	195	0.383	44	0.208
265	0.204	71	0.208	200	0.390	50	0.250
270	0.208	75	0.214	205	0.397	55	0.284
275	0.212	80	0.221	210	0.404	60	0.319
280	0.215	85	0.228	215	0.412	65	0.354
285	0.219	90	0.235	220	0.419	70	0.388
290	0.222	95	0.242	225	0.426	75	0.423
295	0.226	100	0.249	230	0.433	80	0.441
300	0.230	105	0.256	235	0.441	85	0.448
305	0.233	110	0.263	240	0.450	90	0.455
310	0.237	115	0.270	245	0.460	95	0.462
315	0.240	120	0.277	250	0.469	100	0.469
320	0.244	125	0.284	255	0.478	105	0.476
		130	0.291	260	0.488	110	0.483
		135	0.298	265	0.497	115	0.490
		140	0.306	270	0.507	120	0.497
		145	0.313	275	0.516	125	0.504
		150	0.320	280	0.526	130	0.511
		155	0.327	285	0.535	135	0.518
		160	0.334	290	0.544	140	0.525
		165	0.341	295	0.554	145	0.532
		170	0.348	300	0.563	150	0.539
		175	0.355	305	0.573	155	0.546
		180	0.362	310	0.582	160	0.553
		185	0.369	315	0.592	165	0.560
		190	0.376	320	0.601	170	0.567
						175	0.574
						180	0.581

Thickness is intumescent thickness only.

Table applies to beams with concrete slab. Table also applies to structural steel sections with re-entrant details such as angles, channels and Tees.

Table B5 Columns: Steel temperature 550°C							
30 minutes		60 minutes				90 minutes	
Section factor m ⁻¹	Thickness mm	Section factor m ⁻¹	Thickness mm	Section factor m ⁻¹	Thickness mm	Section factor m ⁻¹	Thickness mm
225	0.205	55	0.200	190	0.549	40	0.230
230	0.212	60	0.212	195	0.562	45	0.262
235	0.218	65	0.225	200	0.575	50	0.295
240	0.225	67	0.230	205	0.593	55	0.327
244	0.230	70	0.238	210	0.614	60	0.360
250	0.238	75	0.251	215	0.635	65	0.392
255	0.244	80	0.264	220	0.656	70	0.424
260	0.251	85	0.277	225	0.678	75	0.457
265	0.257	90	0.290	230	0.699	80	0.489
270	0.264	95	0.303	235	0.720	85	0.522
275	0.270	100	0.316	240	0.779	90	0.554
280	0.277	105	0.329	245	0.838	95	0.592
285	0.283	110	0.341	250	0.897	100	0.652
290	0.290	115	0.354	255	0.956	105	0.713
295	0.296	120	0.367	260	1.015	110	0.773
300	0.303	125	0.380	265	1.063	115	0.833
305	0.309	130	0.393	270	1.094	120	0.893
310	0.316	135	0.406	275	1.125	125	0.954
315	0.322	140	0.419	280	1.156	130	1.014
320	0.329	145	0.432	285	1.188	135	1.074
		150	0.445	290	1.219	140	1.134
		155	0.458	295	1.250	145	1.195
		160	0.471	300	1.281	150	1.255
		165	0.484	305	1.313	155	1.315
		170	0.497	310	1.344	160	1.375
		175	0.510	315	1.375	165	1.436
		180	0.523	320	1.406		
		185	0.536				

Thickness is intumescent thickness only.

Table applicable to 4 sided beams up to 0.607mm. Table also applies to structural steel sections with re-entrant details such as angles, channels and Tees.

C3 Tables

Table C3.1: 30 Minutes: Rectangular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
190	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370
195	0.374	0.370	0.370	0.370	0.370	0.370	0.370	0.370
200	0.407	0.370	0.370	0.370	0.370	0.370	0.370	0.370
205	0.440	0.370	0.370	0.370	0.370	0.370	0.370	0.370
210	0.472	0.370	0.370	0.370	0.370	0.370	0.370	0.370
215	0.505	0.370	0.370	0.370	0.370	0.370	0.370	0.370
220	0.537	0.370	0.370	0.370	0.370	0.370	0.370	0.370
225	0.570	0.370	0.370	0.370	0.370	0.370	0.370	0.370
230	0.603	0.370	0.370	0.370	0.370	0.370	0.370	0.370
235	0.635	0.370	0.370	0.370	0.370	0.370	0.370	0.370
240	0.668	0.382	0.370	0.370	0.370	0.370	0.370	0.370
245	0.700	0.409	0.370	0.370	0.370	0.370	0.370	0.370
250	0.733	0.436	0.370	0.370	0.370	0.370	0.370	0.370
255	0.766	0.464	0.372	0.370	0.370	0.370	0.370	0.370
260	0.798	0.491	0.402	0.370	0.370	0.370	0.370	0.370
265	0.831	0.518	0.432	0.370	0.370	0.370	0.370	0.370
270	0.863	0.545	0.462	0.370	0.370	0.370	0.370	0.370
275	0.896	0.573	0.491	0.370	0.370	0.370	0.370	0.370
280	0.929	0.600	0.521	0.388	0.370	0.370	0.370	0.370
285	0.961	0.627	0.551	0.415	0.370	0.370	0.370	0.370
290	0.994	0.655	0.580	0.441	0.370	0.370	0.370	0.370
295	1.047	0.682	0.610	0.467	0.370	0.370	0.370	0.370
300	1.181	0.709	0.640	0.494	0.370	0.370	0.370	0.370
305	1.315	0.736	0.670	0.520	0.370	0.370	0.370	0.370
310	1.449	0.764	0.699	0.546	0.370	0.370	0.370	0.370
315	1.584	0.791	0.729	0.573	0.370	0.370	0.370	0.370
320		0.818	0.759	0.599	0.370	0.370	0.370	0.370

Thickness is intumescent only.

Table C3.2: 45 Minutes: Rectangular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
100	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370
105	0.420	0.370	0.370	0.370	0.370	0.370	0.370	0.370
110	0.479	0.385	0.370	0.370	0.370	0.370	0.370	0.370
115	0.538	0.429	0.370	0.370	0.370	0.370	0.370	0.370
120	0.596	0.472	0.403	0.370	0.370	0.370	0.370	0.370
125	0.655	0.516	0.445	0.370	0.370	0.370	0.370	0.370
130	0.714	0.559	0.487	0.370	0.370	0.370	0.370	0.370
135	0.773	0.603	0.528	0.370	0.370	0.370	0.370	0.370
140	0.832	0.646	0.570	0.370	0.370	0.370	0.370	0.370
145	0.891	0.690	0.612	0.372	0.370	0.370	0.370	0.370
150	0.949	0.733	0.653	0.420	0.370	0.370	0.370	0.370
155	1.008	0.777	0.695	0.468	0.370	0.370	0.370	0.370
160	1.057	0.820	0.737	0.515	0.370	0.370	0.370	0.370
165	1.103	0.863	0.778	0.563	0.370	0.370	0.370	0.370
170	1.150	0.907	0.820	0.610	0.370	0.370	0.370	0.370
175	1.196	0.950	0.862	0.658	0.370	0.370	0.370	0.370
180	1.243	0.994	0.903	0.706	0.374	0.370	0.370	0.370
185	1.289	1.042	0.945	0.753	0.420	0.370	0.370	0.370
190	1.335	1.096	0.987	0.801	0.466	0.370	0.370	0.370
195	1.382	1.150	1.032	0.849	0.512	0.370	0.370	0.370
200	1.428	1.204	1.090	0.896	0.558	0.370	0.370	0.370
205	1.474	1.259	1.148	0.944	0.605	0.370	0.370	0.370
210	1.521	1.313	1.205	0.991	0.651	0.380	0.370	0.370
215	1.567	1.367	1.263	1.044	0.697	0.420	0.370	0.370
220	1.613	1.421	1.321	1.103	0.743	0.460	0.370	0.370
225	1.660	1.476	1.379	1.162	0.789	0.500	0.370	0.370
230		1.530	1.437	1.222	0.835	0.540	0.370	0.370
235		1.584	1.495	1.281	0.882	0.580	0.370	0.370
240		1.639	1.553	1.340	0.928	0.620	0.370	0.370

Thickness is intumescent only.

Table C3.2 continued: 45 Minutes: Rectangular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
250			1.669	1.459	1.020	0.700	0.398	0.370
255				1.518	1.148	0.740	0.435	0.370
260				1.577	1.275	0.780	0.473	0.370
265				1.637	1.403	0.820	0.510	0.370
270					1.530	0.860	0.548	0.370
275					1.658	0.900	0.585	0.370
280						0.940	0.623	0.370
285						0.980	0.660	0.370
290						1.020	0.698	0.370
295						1.131	0.735	0.370
300						1.242	0.773	0.390
305						1.353	0.810	0.440
310						1.463	0.848	0.489
315						1.574	0.885	0.538
320						1.685	0.923	0.587

Thickness is intumescent only.

Table C3.3: 60 Minutes: Rectangular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
85	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370
90	0.446	0.370	0.370	0.370	0.370	0.370	0.370	0.370
95	0.577	0.401	0.370	0.370	0.370	0.370	0.370	0.370
100	0.707	0.495	0.437	0.377	0.370	0.370	0.370	0.370
105	0.837	0.589	0.520	0.449	0.370	0.370	0.370	0.370
110	0.968	0.683	0.603	0.520	0.420	0.370	0.370	0.370
115	1.058	0.776	0.687	0.591	0.477	0.372	0.370	0.370
120	1.122	0.870	0.770	0.663	0.533	0.420	0.370	0.370
125	1.186	0.964	0.853	0.734	0.590	0.468	0.370	0.370
130	1.250	1.039	0.937	0.806	0.646	0.515	0.370	0.370
135	1.313	1.086	1.020	0.877	0.703	0.563	0.370	0.370
140	1.377	1.133	1.067	0.949	0.760	0.610	0.370	0.370
145	1.441	1.181	1.114	1.020	0.816	0.658	0.370	0.370
150	1.505	1.228	1.162	1.070	0.873	0.706	0.370	0.370
155	1.568	1.275	1.209	1.120	0.929	0.753	0.370	0.370
160	1.632	1.322	1.256	1.170	0.986	0.801	0.370	0.370
165		1.369	1.303	1.220	1.041	0.849	0.370	0.370
170		1.417	1.351	1.270	1.094	0.896	0.406	0.370
175		1.464	1.398	1.320	1.148	0.944	0.477	0.370
180		1.511	1.445	1.370	1.201	0.991	0.549	0.370
185		1.558	1.492	1.420	1.254	1.040	0.620	0.370
190		1.606	1.539	1.470	1.307	1.091	0.691	0.370
195		1.653	1.587	1.520	1.360	1.142	0.763	0.370
200			1.634	1.570	1.413	1.193	0.834	0.393
205			1.681	1.620	1.466	1.244	0.906	0.460
210				1.670	1.519	1.295	0.977	0.527
215					1.573	1.346	1.044	0.593
220					1.626	1.397	1.103	0.660
225					1.679	1.448	1.162	0.727
230						1.499	1.222	0.793
235						1.550	1.281	0.860
240						1.601	1.340	0.927
245						1.652	1.400	0.993
250							1.459	1.087
255							1.518	1.197
260							1.577	1.308
265							1.637	1.419
270								1.530
275								1.641

Thickness is intumescent only.

Table C3.4: 75 Minutes: Rectangular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
40	0.716	0.370	0.370	0.370	0.370	0.370	0.370	0.370
45	0.778	0.370	0.370	0.370	0.370	0.370	0.370	0.370
50	0.839	0.370	0.370	0.370	0.370	0.370	0.370	0.370
55	0.901	0.370	0.370	0.370	0.370	0.370	0.370	0.370
60	0.963	0.370	0.370	0.370	0.370	0.370	0.370	0.370
65	1.024	0.370	0.370	0.370	0.370	0.370	0.370	0.370
70	1.086	0.370	0.370	0.370	0.370	0.370	0.370	0.370
75	1.148	0.370	0.370	0.370	0.370	0.370	0.370	0.370
80	1.209	0.370	0.370	0.370	0.370	0.370	0.370	0.370
85	1.271	0.500	0.385	0.370	0.370	0.370	0.370	0.370
90	1.333	0.700	0.561	0.446	0.370	0.370	0.370	0.370
95	1.394	0.900	0.738	0.577	0.399	0.370	0.370	0.370
100	1.456	1.059	0.914	0.707	0.503	0.386	0.370	0.370
105	1.518	1.157	1.054	0.837	0.606	0.471	0.370	0.370
110	1.579	1.255	1.139	0.968	0.710	0.557	0.407	0.370
115	1.641	1.353	1.224	1.063	0.813	0.643	0.473	0.370
120		1.452	1.309	1.133	0.917	0.729	0.540	0.370
125		1.550	1.394	1.204	1.020	0.814	0.607	0.370
130		1.648	1.479	1.275	1.074	0.900	0.673	0.370
135			1.564	1.346	1.129	0.986	0.740	0.420
140			1.649	1.417	1.183	1.049	0.807	0.495
145				1.488	1.237	1.098	0.873	0.570
150				1.558	1.291	1.148	0.940	0.645
155				1.629	1.346	1.197	1.007	0.720
160					1.400	1.246	1.061	0.795
165					1.454	1.295	1.112	0.870
170					1.508	1.344	1.163	0.945
175					1.563	1.393	1.214	1.020
180					1.617	1.442	1.265	1.074
185					1.671	1.491	1.316	1.129
190						1.540	1.367	1.183
195						1.589	1.418	1.237
200						1.638	1.469	1.291
205						1.687	1.520	1.346
210							1.571	1.400
215							1.622	1.454
220							1.673	1.508
225								1.563
230								1.617
235								1.671

Thickness is intumescent only.

Table C3.5: 90 Minutes: Rectangular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
40		1.020	0.690	0.420	0.370	0.370	0.370	0.370
45		1.069	0.775	0.520	0.370	0.370	0.370	0.370
50		1.118	0.860	0.620	0.370	0.370	0.370	0.370
55		1.167	0.945	0.720	0.370	0.370	0.370	0.370
60		1.216	1.030	0.820	0.370	0.370	0.370	0.370
65		1.265	1.096	0.920	0.370	0.370	0.370	0.370
70		1.314	1.162	1.020	0.370	0.370	0.370	0.370
75		1.363	1.227	1.087	0.370	0.370	0.370	0.370
80		1.412	1.293	1.154	0.370	0.370	0.370	0.370
85		1.461	1.359	1.221	0.420	0.370	0.370	0.370
90		1.510	1.425	1.288	0.608	0.391	0.370	0.370
95			1.491	1.356	0.795	0.534	0.370	0.370
100				1.423	0.983	0.677	0.464	0.370
105				1.490	1.105	0.820	0.576	0.370
110					1.211	0.963	0.687	0.456
115					1.318	1.064	0.798	0.547
120					1.424	1.137	0.909	0.638
125					1.530	1.209	1.020	0.729
130					1.636	1.282	1.074	0.820
135						1.355	1.129	0.911
140						1.428	1.183	1.002
145						1.501	1.237	1.063
150						1.574	1.291	1.116
155						1.647	1.346	1.169
160							1.400	1.222
165							1.454	1.275
170							1.508	1.328
175							1.563	1.381
180							1.617	1.434
185							1.671	1.488
190								1.541
195								1.594
200								1.647

Thickness is intumescent only.



D3 Tables

Table D3.1: 30 Minutes: Circular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
120	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370
125	0.405	0.370	0.370	0.370	0.370	0.370	0.370	0.370
130	0.442	0.370	0.370	0.370	0.370	0.370	0.370	0.370
135	0.479	0.370	0.370	0.370	0.370	0.370	0.370	0.370
140	0.516	0.370	0.370	0.370	0.370	0.370	0.370	0.370
145	0.553	0.370	0.370	0.370	0.370	0.370	0.370	0.370
150	0.590	0.370	0.370	0.370	0.370	0.370	0.370	0.370
155	0.627	0.370	0.370	0.370	0.370	0.370	0.370	0.370
160	0.664	0.370	0.370	0.370	0.370	0.370	0.370	0.370
165	0.701	0.370	0.370	0.370	0.370	0.370	0.370	0.370
170	0.739	0.370	0.370	0.370	0.370	0.370	0.370	0.370
175	0.776	0.370	0.370	0.370	0.370	0.370	0.370	0.370
180	0.813	0.370	0.370	0.370	0.370	0.370	0.370	0.370
185	0.850	0.370	0.370	0.370	0.370	0.370	0.370	0.370
190	0.887	0.403	0.370	0.370	0.370	0.370	0.370	0.370
195	0.924	0.445	0.370	0.370	0.370	0.370	0.370	0.370
200	0.961	0.488	0.370	0.370	0.370	0.370	0.370	0.370
205	0.998	0.530	0.370	0.370	0.370	0.370	0.370	0.370
210	1.041	0.572	0.392	0.370	0.370	0.370	0.370	0.370
215	1.094	0.614	0.438	0.370	0.370	0.370	0.370	0.370
220	1.148	0.657	0.485	0.370	0.370	0.370	0.370	0.370
225	1.201	0.699	0.531	0.377	0.370	0.370	0.370	0.370
230	1.254	0.741	0.577	0.420	0.370	0.370	0.370	0.370
235	1.307	0.783	0.623	0.463	0.370	0.370	0.370	0.370
240	1.360	0.826	0.669	0.507	0.370	0.370	0.370	0.370
245	1.413	0.868	0.715	0.550	0.370	0.370	0.370	0.370
250	1.466	0.910	0.762	0.594	0.370	0.370	0.370	0.370
255	1.519	0.952	0.808	0.637	0.370	0.370	0.370	0.370
260	1.573	0.995	0.854	0.681	0.370	0.370	0.370	0.370
265	1.626	1.088	0.900	0.724	0.370	0.370	0.370	0.370
270	1.679	1.258	0.946	0.768	0.370	0.370	0.370	0.370
275		1.428	0.992	0.811	0.370	0.370	0.370	0.370
280		1.598	1.084	0.855	0.370	0.370	0.370	0.370
285			1.243	0.898	0.410	0.370	0.370	0.370
290			1.403	0.942	0.461	0.370	0.370	0.370
295			1.562	0.985	0.512	0.370	0.370	0.370
300				1.056	0.562	0.370	0.370	0.370
305				1.239	0.613	0.370	0.370	0.370
310				1.421	0.664	0.370	0.370	0.370
315				1.603	0.715	0.370	0.370	0.370
320					0.766	0.370	0.370	0.370

Thickness is intumescent only.

Table D3.2: 45 Minutes: Circular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
80	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370
85	0.420	0.370	0.370	0.370	0.370	0.370	0.370	0.370
90	0.487	0.375	0.370	0.370	0.370	0.370	0.370	0.370
95	0.553	0.431	0.387	0.370	0.370	0.370	0.370	0.370
100	0.620	0.488	0.442	0.370	0.370	0.370	0.370	0.370
105	0.687	0.545	0.498	0.420	0.370	0.370	0.370	0.370
110	0.753	0.601	0.553	0.474	0.375	0.370	0.370	0.370
115	0.820	0.658	0.609	0.527	0.420	0.370	0.370	0.370
120	0.887	0.714	0.664	0.581	0.465	0.370	0.370	0.370
125	0.953	0.771	0.720	0.634	0.510	0.370	0.370	0.370
130	1.020	0.828	0.776	0.688	0.554	0.370	0.370	0.370
135	1.077	0.884	0.831	0.741	0.599	0.370	0.370	0.370
140	1.133	0.941	0.887	0.795	0.644	0.370	0.370	0.370
145	1.190	0.997	0.942	0.849	0.689	0.370	0.370	0.370
150	1.247	1.054	0.998	0.902	0.733	0.370	0.370	0.370
155	1.303	1.111	1.052	0.956	0.778	0.370	0.370	0.370
160	1.360	1.167	1.105	1.009	0.823	0.370	0.370	0.370
165	1.417	1.224	1.158	1.058	0.868	0.370	0.370	0.370
170	1.473	1.281	1.211	1.105	0.913	0.370	0.370	0.370
175	1.530	1.337	1.264	1.152	0.957	0.370	0.370	0.370
180	1.587	1.394	1.318	1.199	1.002	0.438	0.370	0.370
185	1.643	1.451	1.371	1.247	1.051	0.526	0.370	0.370
190		1.507	1.424	1.294	1.102	0.614	0.370	0.370
195		1.564	1.477	1.341	1.153	0.702	0.370	0.370
200		1.621	1.530	1.388	1.204	0.791	0.370	0.370
205		1.677	1.583	1.436	1.255	0.879	0.370	0.370
210			1.636	1.483	1.306	0.967	0.460	0.370
215				1.530	1.357	1.048	0.560	0.370
220				1.577	1.408	1.119	0.660	0.370

Thickness is intumescent only.



Table D3.2 continued: 45 Minutes: Circular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
225				1.624	1.459	1.190	0.760	0.370
230				1.672	1.510	1.261	0.860	0.370
235					1.561	1.332	0.960	0.370
240					1.612	1.403	1.053	0.370
245					1.663	1.473	1.135	0.370
250						1.544	1.217	0.370
255						1.615	1.300	0.400
260							1.382	0.500
265							1.464	0.600
270							1.546	0.700
275							1.629	0.800
280								0.900
285								1.000
290								1.096
295								1.190
300								1.284
305								1.379
310								1.473
315								1.568
320								1.662

Thickness is intumescent only.

Table D3.3: 60 Minutes: Circular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
40		0.555	0.546	0.539	0.370	0.370	0.370	0.370
45		0.589	0.578	0.569	0.370	0.370	0.370	0.370
50		0.622	0.609	0.598	0.370	0.370	0.370	0.370
55		0.656	0.641	0.628	0.370	0.370	0.370	0.370
60		0.690	0.673	0.658	0.370	0.370	0.370	0.370
65		0.723	0.704	0.687	0.370	0.370	0.370	0.370
70		0.757	0.736	0.717	0.370	0.370	0.370	0.370
75		0.791	0.767	0.747	0.370	0.370	0.370	0.370
80		0.824	0.799	0.776	0.370	0.370	0.370	0.370
85		0.858	0.831	0.806	0.370	0.370	0.370	0.370
90		0.892	0.862	0.836	0.434	0.370	0.370	0.370
95		0.926	0.894	0.866	0.502	0.370	0.370	0.370
100		0.959	0.925	0.895	0.570	0.433	0.370	0.370
105		0.993	0.957	0.925	0.638	0.495	0.370	0.370
110		1.046	0.988	0.955	0.706	0.558	0.408	0.370
115		1.173	1.020	0.984	0.775	0.620	0.468	0.370
120		1.301	1.131	1.014	0.843	0.683	0.528	0.370
125		1.428	1.242	1.082	0.911	0.745	0.588	0.370
130		1.556	1.353	1.159	0.979	0.808	0.648	0.370
135		1.683	1.463	1.236	1.047	0.870	0.708	0.370
140			1.574	1.314	1.114	0.933	0.768	0.370
145			1.685	1.391	1.181	0.995	0.828	0.370
150				1.468	1.248	1.054	0.888	0.370
155				1.545	1.315	1.111	0.948	0.370
160				1.623	1.382	1.167	1.008	0.370
165					1.449	1.224	1.063	0.458
170					1.517	1.281	1.118	0.645
175					1.584	1.337	1.172	0.833
180					1.651	1.394	1.226	1.020
185						1.451	1.280	1.081
190						1.507	1.335	1.141
195						1.564	1.389	1.202
200						1.621	1.443	1.263
205						1.677	1.497	1.324
210							1.552	1.384
215							1.606	1.445
220							1.660	1.506
225								1.568
230								1.632

Thickness is intumescent only.

Table D3.4: 75 Minutes: Circular Hollow Sections								
Section factor up to m⁻¹	Thickness (mm) for a Steel Temperature of							
	450°C	500°C	520°C	550°C	600°C	650°C	700°C	750°C
40			1.020	0.900	0.900	0.370	0.370	0.370
45			1.066	0.900	0.900	0.370	0.370	0.370
50			1.113	0.900	0.900	0.370	0.370	0.370
55			1.159	0.900	0.900	0.370	0.370	0.370
60			1.020	0.900	0.900	0.370	0.370	0.370
65			1.093	0.900	0.900	0.370	0.370	0.370
70			1.166	0.900	0.900	0.370	0.370	0.370
75			1.239	0.900	0.900	0.370	0.370	0.370
80			1.311	0.900	0.900	0.385	0.370	0.370
85			1.384	0.900	0.900	0.473	0.370	0.370
90			1.457	0.900	0.900	0.561	0.370	0.370
95			1.530	0.900	0.900	0.649	0.453	0.370
100			1.603	1.239	0.900	0.738	0.537	0.375
105				1.603	0.984	0.826	0.620	0.450
110					1.166	0.914	0.703	0.525
115					1.348	1.002	0.787	0.600
120					1.530	1.109	0.870	0.675
125						1.220	0.953	0.750
130						1.330	1.036	0.825
135						1.441	1.116	0.900
140						1.552	1.195	0.975
145						1.663	1.275	1.048
150							1.355	1.119
155							1.434	1.190
160							1.514	1.261
165							1.594	1.332
170							1.673	1.403
175								1.473
180								1.544
185								1.615
190								1.686

Thickness is intumescent only.

Section factor up to m ⁻¹	Table D3.5: 90 Minutes: Circular Hollow Sections	
	Thickness (mm) for a Steel Temperature of	
	700°C	750°C
40	0.370	0.370
45	0.370	0.370
50	0.370	0.370
55	0.370	0.370
60	0.370	0.370
65	0.370	0.370
70	0.370	0.370
75	0.379	0.370
80	0.482	0.370
85	0.586	0.370
90	0.689	0.459
95	0.792	0.555
100	0.896	0.652
105	0.999	0.749
110	1.177	0.846
115	1.373	0.943
120	1.569	1.046
125		1.173
130		1.301
135		1.428
140		1.556
145		1.683

Thickness is intumescent only.

