

# UL Product iQ®

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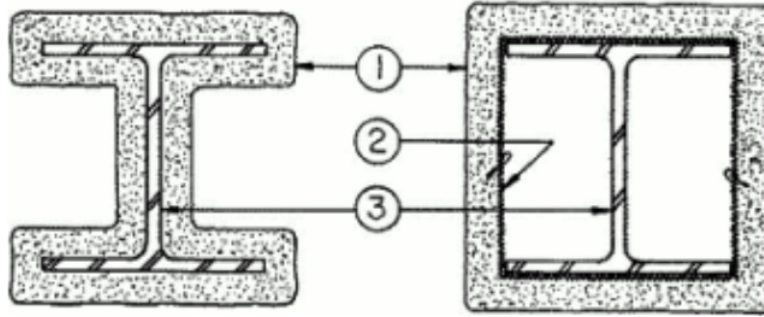
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Design No. X854

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### Ratings — 1, 1-1/2, 2, 3 and 4 h.

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1. **Spray-Applied Fire Resistive Materials\*** — Applied by mixing with water and spraying in more than one coat to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min avg and min ind density of 15/14 pcf respectively. Min avg and min ind density of 22/19 pcf respectively for Types Z-106, Z-106/G, Z-106/HY. Min avg and min ind density of 40/36 pcf respectively for Types Z-146, Z-146PC and Z-146T cementitious mixture. Min avg and min ind density of 50/45 pcf respectively for Types Z-156, Z-156T and Z-156PC. For method of density determination, see Design Information Section, Sprayed Material.

The thickness of Spray-Applied Fire Resistive Materials to be applied to all surfaces of the column (Item 3) required for rating periods of 1 h, 1-1/2 h, 2 h, 3 h, 4 h may be determined by the equation:

$$h = \frac{R}{1.05 (W/D) + 0.61}$$

Where:

h = Spray-Applied Fire Resistive Materials thickness in the range 0.25-3.875 in.

R = Fire resistance rating in hours (1 - 4 h)

D = Heated perimeter of steel column in inches

W = Weight of steel column in lbs per foot

W/D = 0.338 to 6.76

As an alternate to the equation, the minimum thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings of contour sprayed or boxed columns may be determined from the table below:

TABLE 1

Col Size	W/D	Min Thk (in.)				
		1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W4x13	0.556	11/16	1-3/16	1-5/8	2-1/2	3-3/8
W5x16	0.55	11/16	1-3/16	1-5/8	2-1/2	3-3/8
W5x19	0.644	5/8	1-1/8	1-7/16	2-5/16	3-1/8
W6x9	0.338	15/16	1-1/2	2	2-1/2	3-13/16
W6x12	0.448	13/16	1-3/8	1-13/16	2-1/2	3-3/4
W6x15	0.431	13/16	1-3/8	1-13/16	2-1/2	3-13/16
W6x16	0.584	11/16	1-3/16	1-9/16	2-7/16	3-5/16
W6x20	0.563	11/16	1-3/16	1-9/16	2-1/2	3-3/8
W6x25	0.696	5/8	1-1/16	1-3/8	2	2-11/16
W8x13	0.421	13/16	1-3/8	1-7/8	2-1/2	3-13/16
W8x15	0.481	3/4	1-5/16	1-3/4	2-1/2	3-5/8
W8x18	0.499	3/4	1-1/4	1-11/16	2-1/2	3-1/2

W8x21	0.577	11/16	1-3/16	1-9/16	2-1/2	3-5/16
W8x24	0.591	11/16	1-1/8	1-9/16	2-7/16	3-5/16
W8x28	0.688	5/8	1-1/16	1-3/8	2	2-11/16
W8x31	0.665	5/8	1-1/16	1-7/16	2-5/16	3-1/16
W8x35	0.749	9/16	1	1-5/16	2	2-11/16
W8x40	0.849	9/16	3/4	1-1/8	1-11/16	2-1/2
W8x48	1	1/2	3/4	1	1-11/16	2-5/16
W8x58	1.2	7/16	3/4	13/16	1-3/8	1-15/16
W8x67	1.37	3/8	5/8	3/4	1-1/4	1-11/16
W10x12	0.347	7/8	1-1/2	2	2-1/2	3-13/16
W10x15	0.429	13/16	1-3/8	1-7/8	2-1/2	3-13/16
W10x17	0.482	3/4	1-5/16	1-3/4	2-1/2	3-5/8
W10x19	0.538	3/4	1-1/4	1-5/8	2-1/2	3 7/16
W10x22	0.523	3/4	1-1/4	1-11/16	2-1/2	3-1/2
W10x26	0.612	11/16	1-1/8	1-1/2	2-3/8	3-1/4
W10x30	0.699	5/8	1-1/16	1-3/8	2	2-11/16
W10x33	0.661	5/8	1-1/16	1-7/16	2-5/16	3-1/8
W10x39	0.78	9/16	1	1-1/4	2	2-11/16
W10x45	0.888	1/2	3/4	1-1/8	1-11/16	2-1/2
W10x49	0.84	9/16	3/4	1-1/8	1-11/16	2-1/2
W10x54	0.922	1/2	3/4	1-1/16	1-11/16	2-1/2
W10x60	1.01	1/2	3/4	1	1-5/8	2-5/16
W10x68	1.15	7/16	3/4	7/8	1-7/16	2
W10x77	1.28	7/16	11/16	3/4	1-5/16	1-13/16
W10x88	1.45	3/8	5/8	11/16	1-3/16	1-5/8
W10x100	1.64	3/8	9/16	11/16	1-1/8	1-1/2
W10x112	1.81	5/16	1/2	11/16	1-1/8	1-1/2
W12x14	0.363	7/8	1-1/2	2	2-1/2	3-13/16
W12x16	0.41	13/16	1-7/16	1-7/8	2-1/2	3-13/16
W12x19	0.485	3/4	1-5/16	1-3/4	2-1/2	3-5/8
W12x22	0.56	11/16	1-3/16	1-5/8	2-1/2	3-3/8
W12x26	0.531	3/4	1-1/4	1-5/8	2-1/2	3 7/16
W12x30	0.607	11/16	1-1/8	1-1/2	2-7/16	3-1/4
W12x35	0.703	5/8	1-1/16	1-3/8	2	2-11/16
W12x40	0.734	5/8	1	1-5/16	2	2-11/16
W12x45	0.829	9/16	15/16	1-3/16	1-15/16	2-11/16
W12x50	0.909	1/2	3/4	1-1/16	1-11/16	2-1/2
W12x53	0.855	9/16	3/4	1-1/8	1-11/16	2-1/2
W12x58	0.925	1/2	3/4	1-1/16	1-11/16	2-7/16
W12x65	0.925	1/2	3/4	1-1/16	1-11/16	2-7/16
W12x72	1.02	1/2	3/4	15/16	1-5/8	2-1/4
W12x79	1.11	7/16	3/4	7/8	1-1/2	2-1/8
W12x87	1.22	7/16	11/16	13/16	1-3/8	1-15/16
W12x96	1.34	3/8	11/16	3/4	1-1/4	1-3/4
W12x106	1.47	3/8	5/8	11/16	1-3/16	1-5/8
W12x120	1.65	5/16	9/16	11/16	1-1/8	1-1/2
W12x136	1.86	5/16	1/2	11/16	1-1/8	1-1/2
W12x152	2.04	5/16	1/2	11/16	1-1/16	1-7/16
W12x170	2.26	1/4	7/16	5/8	15/16	1-5/16
W12x190	2.5	1/4	5/16	9/16	7/8	1-3/16
W12x210	2.73	1/4	5/16	1/2	13/16	1-1/8
W12x230	2.96	1/4	5/16	1/2	3/4	1-1/16
W12x252	3.2	1/4	5/16	7/16	3/4	1
W12x279	3.5	1/4	5/16	7/16	11/16	7/8
W12x305	3.76	1/4	5/16	3/8	5/8	7/8
W12x336	4.06	1/4	1/4	3/8	9/16	13/16

W14x22	0.476	3/4	1-5/16	1-3/4	2-1/2	3-5/8
W14x26	0.559	11/16	1-3/16	1-5/8	2-1/2	3-3/8
W14x30	0.562	11/16	1-3/16	1-9/16	2-1/2	3-3/8
W14x34	0.633	5/8	1-1/8	1-7/16	2-3/8	3 3/16
W14x38	0.706	5/8	1-1/16	1-3/8	2	2-11/16
W14x43	0.752	9/16	1	1-5/16	2	2-11/16
W14x48	0.835	9/16	15/16	1-3/16	1-15/16	2-11/16
W14x53	0.915	1/2	3/4	1-1/16	1-11/16	2-1/2
W14x61	0.928	1/2	3/4	1-1/16	1-11/16	2-7/16
W14x68	1.04	1/2	3/4	15/16	1-5/8	2-1/4
W14x74	1.12	7/16	3/4	7/8	1-1/2	2-1/16
W14x82	1.23	7/16	11/16	13/16	1-3/8	1-7/8
W14x90	1.08	7/16	3/4	7/8	1-9/16	2-1/8
W14x99	1.18	7/16	3/4	13/16	1-7/16	2
W14x109	1.29	7/16	11/16	3/4	1-5/16	1-13/16
W14x120	1.42	3/8	5/8	3/4	1-3/16	1-11/16
W14x132	1.56	3/8	9/16	11/16	1-1/8	1-9/16
W14x145	1.64	3/8	9/16	11/16	1-1/8	1-1/2
W14x159	1.78	5/16	9/16	11/16	1-1/8	1-1/2
W14x176	1.96	5/16	1/2	11/16	1-1/16	1-1/2
W14x193	2.14	5/16	7/16	5/8	1	1-3/8
W14x211	2.32	1/4	7/16	5/8	15/16	1-5/16
W14x233	2.55	1/4	5/16	9/16	7/8	1-3/16
W14x257	2.78	1/4	5/16	1/2	13/16	1-1/8
W14x283	3.03	1/4	5/16	1/2	3/4	1
W14x311	3.3	1/4	5/16	7/16	11/16	15/16
W14x342	3.58	1/4	5/16	7/16	5/8	7/8
W14x370	3.84	1/4	5/16	3/8	5/8	13/16
W14x398	4.09	1/4	1/4	3/8	9/16	13/16
W14x426	4.32	1/4	1/4	3/8	9/16	3/4
W14x455	4.59	1/4	1/4	5/16	1/2	11/16
W14x500	4.95	1/4	1/4	5/16	1/2	11/16
W14x550	5.34	1/4	1/4	5/16	7/16	5/8
W14x605	5.82	1/4	1/4	1/4	7/16	9/16
W14x665	6.21	1/4	1/4	1/4	3/8	9/16
W14x730	6.76	1/4	1/4	1/4	3/8	1/2
W16x26	0.499	3/4	1-1/4	1-11/16	2-1/2	3-1/2
W16x31	0.592	11/16	1-1/8	1-9/16	2-7/16	3-1/4
W16x36	0.617	11/16	1-1/8	1-1/2	2-3/8	3 3/16
W16x40	0.686	5/8	1-1/16	1-3/8	2-1/4	3-1/16
W16x45	0.767	9/16	1	1-1/4	2	2-11/16
W16x50	0.846	9/16	3/4	1-1/8	1-11/16	2-1/2
W16x57	0.963	1/2	3/4	1	1-11/16	2-3/8
W16x67	0.936	1/2	3/4	1-1/16	1-11/16	2-7/16
W16x77	1.07	7/16	3/4	15/16	1-9/16	2-3/16
W16x89	1.22	7/16	11/16	13/16	1-3/8	1-15/16
W16x100	1.37	3/8	5/8	3/4	1-1/4	1-11/16
W18x35	0.602	11/16	1-1/8	1-1/2	2-7/16	3-1/4
W18x40	0.688	5/8	1-1/16	1-3/8	2	2-11/16
W18x46	0.786	9/16	15/16	1-1/4	2	2-11/16
W18x50	0.778	9/16	1	1-1/4	2	2-11/16
W18x55	0.85	9/16	3/4	1-1/8	1-11/16	2-1/2
W18x60	0.923	1/2	3/4	1-1/16	1-11/16	2-7/16
W18x65	0.997	1/2	3/4	1	1-11/16	2-5/16
W18x71	1.08	7/16	3/4	7/8	1-9/16	2-1/8
W18x76	0.971	1/2	3/4	1	1-11/16	2-3/8

W18x86	1.09	7/16	3/4	7/8	1-9/16	2-1/8
W18x97	1.22	7/16	11/16	13/16	1-3/8	1-15/16
W18x106	1.33	3/8	11/16	3/4	1-1/4	1-3/4
W18x119	1.48	3/8	5/8	11/16	1-3/16	1-5/8
W21x44	0.672	5/8	1-1/16	1-3/8	2-1/4	3-1/16
W21x50	0.754	9/16	1	1-1/4	2	2-11/16
W21x57	0.857	9/16	3/4	1-1/8	1-11/16	2-1/2
W21x62	0.846	9/16	3/4	1-1/8	1-11/16	2-1/2
W21x68	0.926	1/2	3/4	1-1/16	1-11/16	2-7/16
W21x73	0.989	1/2	3/4	1	1-11/16	2-5/16
W21x83	1.12	7/16	3/4	7/8	1-1/2	2-1/16
W21x93	1.24	7/16	11/16	13/16	1-3/8	1-7/8
W21x101	1.13	7/16	3/4	7/8	1-1/2	2-1/16
W21x111	1.24	7/16	11/16	13/16	1-3/8	1-7/8
W21x122	1.35	3/8	11/16	3/4	1-1/4	1-3/4
W21x132	1.45	3/8	5/8	11/16	1-3/16	1-5/8
W21x147	1.61	3/8	9/16	11/16	1-1/8	1-1/2
W24x55	0.749	9/16	1	1-5/16	2	2-11/16
W24x62	0.844	9/16	3/4	1-1/8	1-11/16	2-1/2
W24x68	0.837	9/16	15/16	1-3/16	1-15/16	2-11/16
W24x76	0.933	1/2	3/4	1-1/16	1-11/16	2-7/16
W24x84	1.02	1/2	3/4	15/16	1-5/8	2-1/4
W24x94	1.14	7/16	3/4	7/8	1-1/2	2-1/16
W24x104	1.07	7/16	3/4	15/16	1-9/16	2-3/16
W24x117	1.2	7/16	3/4	13/16	1-3/8	1-15/16
W24x131	1.33	3/8	11/16	3/4	1-1/4	1-3/4
W24x146	1.48	3/8	5/8	11/16	1-3/16	1-5/8
W24x162	1.63	3/8	9/16	11/16	1-1/8	1-1/2
W27x84	0.921	1/2	3/4	1-1/16	1-11/16	2-1/2
W27x94	1.03	1/2	3/4	15/16	1-5/8	2-1/4
W27x102	1.11	7/16	3/4	7/8	1-1/2	2-1/8
W27x114	1.23	7/16	11/16	13/16	1-3/8	1-7/8
W27x146	1.35	3/8	11/16	3/4	1-1/4	1-3/4
W27x161	1.48	3/8	5/8	11/16	1-3/16	1-5/8
W27x178	1.63	3/8	9/16	11/16	1-1/8	1-1/2
W30x99	1	1/2	3/4	1	1-11/16	2-5/16
W30x108	1.09	7/16	3/4	7/8	1-9/16	2-1/8
W30x116	1.16	7/16	3/4	13/16	1-7/16	2
W30x124	1.24	7/16	11/16	13/16	1-3/8	1-7/8
W30x132	1.32	3/8	11/16	3/4	1-1/4	1-3/4
W30x173	1.47	3/8	5/8	11/16	1-3/16	1-5/8
W30x191	1.62	3/8	9/16	11/16	1-1/8	1-1/2
W30x211	1.76	5/16	9/16	11/16	1-1/8	1-1/2
W33x118	1.08	7/16	3/4	7/8	1-9/16	2-1/8
W33x130	1.18	7/16	3/4	13/16	1-7/16	2
W33x141	1.28	7/16	11/16	3/4	1-5/16	1-13/16
W33x152	1.37	3/8	5/8	3/4	1-1/4	1-11/16
W33x201	1.58	3/8	9/16	11/16	1-1/8	1-1/2
W33x221	1.73	5/16	9/16	11/16	1-1/8	1-1/2
W33x241	1.87	5/16	1/2	11/16	1-1/8	1-1/2
W36x135	1.15	7/16	3/4	7/8	1-7/16	2
W36x150	1.27	7/16	11/16	3/4	1-5/16	1-7/8
W36x160	1.35	3/8	11/16	3/4	1-1/4	1-3/4
W36x170	1.43	3/8	5/8	3/4	1-3/16	1-5/8
W36x182	1.52	3/8	5/8	11/16	1-1/8	1-9/16
W36x194	1.62	3/8	9/16	11/16	1-1/8	1-1/2

W36x210	1.74	5/16	9/16	11/16	1-1/8	1-1/2
W36x230	1.69	5/16	9/16	11/16	1-1/8	1-1/2
W36x245	1.79	5/16	9/16	11/16	1-1/8	1-1/2
W36x260	1.9	5/16	1/2	11/16	1-1/8	1-1/2
W36x280	2.03	5/16	1/2	11/16	1-1/16	1-7/16
W36x300	2.17	1/4	7/16	5/8	1	1-3/8

The thicknesses contained in the table below are applicable when the Spray-Applied Fire Resistive Materials applied to columns' flange tips are reduced to one-half that shown in the table below:

TABLE 2

Member	Min Col Size	W/D	Half Flange Tip Thickness			
			1 hr	1.5 hr	2 hr	3 hr
W4x13	0.556	7/8	1 5/16	1-11/16	2 9/16	3 3/8
W5x16	0.550	7/8	1 5/16	1-11/16	2 9/16	3 3/8
W5x19	0.644	13/16	1 3/16	1 9/16	2 3/8	3 1/8
W6x9	0.338	1-1/8	1 5/8	2 1/16	3 1/8	4 3/16
W6x12	0.448	15/16	1 7/16	1 7/8	2 13/16	3-13/16
W6x15	0.431	1	1 7/16	1-15/16	2 7/8	3-14/16
W6x16	0.584	7/8	1 1/4	1-11/16	2 1/2	3 5/16
W6x20	0.563	7/8	1 1/4	1-11/16	2 1/2	3 3/8
W6x25	0.696	3/4	1 1/8	1 1/2	2 1/4	2 15/16
W8x13	0.421	1	1 7/16	1-15/16	2 7/8	3-14/16
W8x15	0.481	15/16	1 3/8	1-13/16	2 3/4	3 11/16
W8x18	0.499	15/16	1 3/8	1-13/16	2-11/16	3 9/16
W8x21	0.577	7/8	1 1/4	1-11/16	2 1/2	3 5/16
W8x24	0.591	7/8	1 1/4	1-11/16	2 1/2	3 5/16
W8x28	0.688	13/16	1 3/16	1 1/2	2 1/4	2 15/16
W8x31	0.665	13/16	1 3/16	1 9/16	2 5/16	3 1/16
W8x35	0.749	3/4	1 1/8	1 7/16	2 3/16	2 7/8
W8x40	0.849	11/16	1	1 3/8	2	2-11/16
W8x48	1.000	5/8	15/16	1 1/4	1-13/16	2 7/16
W8x58	1.200	9/16	13/16	1 1/8	1 5/8	2 3/16
W8x67	1.370	1/2	3/4	1	1 1/2	2
W10x12	0.347	1-1/16	1 9/16	2 1/16	3 1/8	4 3/16
W10x15	0.429	1	1 7/16	1-15/16	2 7/8	3-14/16
W10x17	0.482	15/16	1 3/8	1-13/16	2 3/4	3 11/16
W10x19	0.538	7/8	1 5/16	1 3/4	2 9/16	3 7/16
W10x22	0.523	7/8	1 5/16	1 3/4	2 5/8	3 1/2
W10x26	0.612	13/16	1 1/4	1 5/8	2 7/16	3 1/4
W10x30	0.699	3/4	1 1/8	1 1/2	2 1/4	2 15/16
W10x33	0.661	13/16	1 3/16	1 9/16	2 5/16	3 1/8
W10x39	0.780	3/4	1 1/16	1 7/16	2 1/8	2 13/16
W10x45	0.888	11/16	1	1 5/16	2	2 5/8
W10x49	0.840	11/16	1 1/16	1 3/8	2 1/16	2-11/16
W10x54	0.922	11/16	1	1 5/16	1-15/16	2 9/16
W10x60	1.010	5/8	15/16	1 1/4	1-13/16	2 7/16
W10x68	1.150	9/16	7/8	1 1/8	1-11/16	2 1/4
W10x77	1.280	9/16	13/16	1 1/16	1 9/16	2 1/16
W10x88	1.450	1/2	3/4	1	1 7/16	1-15/16
W10x100	1.640	7/16	11/16	7/8	1 5/16	1 3/4
W10x112	1.810	7/16	5/8	13/16	1 1/4	1 5/8
W12x14	0.363	1-1/16	1 9/16	2 1/16	3 1/16	4 1/8
W12x16	0.410	1	1 1/2	1-15/16	2 15/16	3-15/16
W12x19	0.485	15/16	1 3/8	1-13/16	2-11/16	3 5/8
W12x22	0.560	7/8	1 5/16	1-11/16	2 9/16	3 3/8
W12x26	0.531	7/8	1 5/16	1 3/4	2 5/8	3 7/16
W12x30	0.607	13/16	1 1/4	1 5/8	2 7/16	3 1/4
W12x35	0.703	3/4	1 1/8	1 1/2	2 1/4	2 15/16

W12x40	0.734	3/4	1 1/8	1 1/2	2 3/16	2 15/16
W12x45	0.829	11/16	1 1/16	1 3/8	2 1/16	2 3/4
W12x50	0.909	11/16	1	1 5/16	1-15/16	2 9/16
W12x53	0.855	11/16	1	1 3/8	2	2-11/16
W12x58	0.925	11/16	1	1 5/16	1-15/16	2 9/16
W12x65	0.925	11/16	1	1 5/16	1-15/16	2 9/16
W12x72	1.020	5/8	15/16	1 1/4	1-13/16	2 7/16
W12x79	1.110	5/8	7/8	1 3/16	1 3/4	2 5/16
W12x87	1.220	9/16	13/16	1 1/16	1 5/8	2 1/8
W12x96	1.340	1/2	3/4	1	1 1/2	2
W12x106	1.470	1/2	3/4	15/16	1 7/16	1 7/8
W12x120	1.650	7/16	11/16	7/8	1 5/16	1 3/4
W12x136	1.860	7/16	5/8	13/16	1 3/16	1 9/16
W12x152	2.040	3/8	9/16	3/4	1 1/8	1 1/2
W12x170	2.260	3/8	9/16	11/16	1 1/16	1 3/8
W12x190	2.500	5/16	1/2	5/8	15/16	1 1/4
W12x210	2.730	5/16	7/16	5/8	7/8	1 3/16
W12x230	2.960	5/16	7/16	9/16	13/16	1 1/8
W12x252	3.200	5/16	7/16	9/16	13/16	1 1/16
W12x279	3.500	1/4	3/8	1/2	3/4	15/16
W12x305	3.760	1/4	3/8	1/2	11/16	15/16
W12x336	4.060	1/4	5/16	7/16	5/8	7/8
W14x22	0.476	15/16	1 3/8	1-13/16	2 3/4	3 11/16
W14x26	0.559	7/8	1 5/16	1-11/16	2 9/16	3 3/8
W14x30	0.562	7/8	1 1/4	1-11/16	2 1/2	3 3/8
W14x34	0.633	13/16	1 3/16	1 5/8	2 3/8	3 3/16
W14x38	0.706	3/4	1 1/8	1 1/2	2 1/4	2 15/16
W14x43	0.752	3/4	1 1/8	1 7/16	2 3/16	2 7/8
W14x48	0.835	11/16	1 1/16	1 3/8	2 1/16	2 3/4
W14x53	0.915	11/16	1	1 5/16	1-15/16	2 9/16
W14x61	0.928	11/16	1	1 5/16	1-15/16	2 9/16
W14x68	1.040	5/8	15/16	1 3/16	1-13/16	2 3/8
W14x74	1.120	9/16	7/8	1 1/8	1-11/16	2 1/4
W14x82	1.230	9/16	13/16	1 1/16	1 5/8	2 1/8
W14x90	1.080	5/8	7/8	1 3/16	1 3/4	2 5/16
W14x99	1.180	9/16	13/16	1 1/8	1 5/8	2 3/16
W14x109	1.290	9/16	13/16	1 1/16	1 9/16	2 1/16
W14x120	1.420	1/2	3/4	1	1 7/16	1-15/16
W14x132	1.560	1/2	11/16	15/16	1 3/8	1-13/16
W14x145	1.640	7/16	11/16	7/8	1 5/16	1 3/4
W14x159	1.780	7/16	5/8	13/16	1 1/4	1 5/8
W14x176	1.960	3/8	9/16	3/4	1 1/8	1 1/2
W14x193	2.140	3/8	9/16	3/4	1 1/16	1 7/16
W14x211	2.320	3/8	1/2	11/16	1	1 3/8
W14x233	2.550	5/16	1/2	5/8	15/16	1 1/4
W14x257	2.780	5/16	7/16	5/8	7/8	1 3/16
W14x283	3.030	5/16	7/16	9/16	13/16	1 1/16
W14x311	3.300	1/4	3/8	1/2	3/4	1
W14x342	3.580	1/4	3/8	1/2	11/16	15/16
W14x370	3.840	1/4	3/8	7/16	11/16	7/8
W14x398	4.090	1/4	5/16	7/16	5/8	7/8
W14x426	4.320	1/4	5/16	7/16	5/8	13/16
W14x455	4.590	1/4	5/16	3/8	9/16	3/4
W14x500	4.950	1/4	5/16	3/8	9/16	3/4
W14x550	5.340	1/4	1/4	3/8	1/2	11/16
W14x605	5.820	1/4	1/4	5/16	1/2	5/8

W14x665	6.210	1/4	1/4	5/16	7/16	9/16
W14x730	6.760	1/4	1/4	5/16	7/16	9/16
W16x26	0.499	15/16	1 3/8	1-13/16	2-11/16	3 9/16
W16x31	0.592	13/16	1 1/4	1 5/8	2 7/16	3 1/4
W16x36	0.617	13/16	1 1/4	1 5/8	2 7/16	3 3/16
W16x40	0.686	13/16	1 3/16	1 9/16	2 5/16	3 1/16
W16x45	0.767	3/4	1 1/16	1 7/16	2 1/8	2 7/8
W16x50	0.846	11/16	1 1/16	1 3/8	2 1/16	2-11/16
W16x57	0.963	5/8	15/16	1 1/4	1 7/8	2 1/2
W16x67	0.936	11/16	1	1 5/16	1-15/16	2 9/16
W16x77	1.070	5/8	7/8	1 3/16	1 3/4	2 5/16
W16x89	1.220	9/16	13/16	1 1/16	1 5/8	2 1/8
W16x100	1.370	1/2	3/4	1	1 1/2	2
W18x35	0.602	13/16	1 1/4	1 5/8	2 7/16	3 1/4
W18x40	0.688	13/16	1 3/16	1 1/2	2 1/4	2 15/16
W18x46	0.786	3/4	1 1/16	1 7/16	2 1/8	2 13/16
W18x50	0.778	3/4	1 1/16	1 7/16	2 1/8	2 13/16
W18x55	0.850	11/16	1	1 3/8	2	2-11/16
W18x60	0.923	11/16	1	1 5/16	1-15/16	2 9/16
W18x65	0.997	5/8	15/16	1 1/4	1-13/16	2 7/16
W18x71	1.080	5/8	7/8	1 3/16	1 3/4	2 5/16
W18x76	0.971	5/8	15/16	1 1/4	1 7/8	2 1/2
W18x86	1.090	5/8	7/8	1 3/16	1 3/4	2 5/16
W18x97	1.220	9/16	13/16	1 1/16	1 5/8	2 1/8
W18x106	1.330	1/2	3/4	1	1 1/2	2
W18x119	1.480	1/2	3/4	15/16	1 7/16	1 7/8
W21x44	0.672	13/16	1 3/16	1 9/16	2 5/16	3 1/16
W21x50	0.754	3/4	1 1/8	1 7/16	2 3/16	2 7/8
W21x57	0.857	11/16	1	1 3/8	2	2-11/16
W21x62	0.846	11/16	1 1/16	1 3/8	2 1/16	2-11/16
W21x68	0.926	11/16	1	1 5/16	1-15/16	2 9/16
W21x73	0.989	5/8	15/16	1 1/4	1 7/8	2 7/16
W21x83	1.120	9/16	7/8	1 1/8	1-11/16	2 1/4
W21x93	1.240	9/16	13/16	1 1/16	1 5/8	2 1/8
W21x101	1.130	9/16	7/8	1 1/8	1-11/16	2 1/4
W21x111	1.240	9/16	13/16	1 1/16	1 5/8	2 1/8
W21x122	1.350	1/2	3/4	1	1 1/2	2
W21x132	1.450	1/2	3/4	1	1 7/16	1-15/16
W21x147	1.610	7/16	11/16	7/8	1 5/16	1 3/4
W24x55	0.749	3/4	1 1/8	1 7/16	2 3/16	2 7/8
W24x62	0.844	11/16	1 1/16	1 3/8	2 1/16	2-11/16
W24x68	0.837	11/16	1 1/16	1 3/8	2 1/16	2-11/16
W24x76	0.933	11/16	1	1 5/16	1-15/16	2 9/16
W24x84	1.020	5/8	15/16	1 1/4	1-13/16	2 7/16
W24x94	1.140	9/16	7/8	1 1/8	1-11/16	2 1/4
W24x104	1.070	5/8	7/8	1 3/16	1 3/4	2 5/16
W24x117	1.200	9/16	13/16	1 1/8	1 5/8	2 3/16
W24x131	1.330	1/2	3/4	1	1 1/2	2
W24x146	1.480	1/2	3/4	15/16	1 7/16	1 7/8
W24x162	1.630	7/16	11/16	7/8	1 5/16	1 3/4
W27x84	0.921	11/16	1	1 5/16	1-15/16	2 9/16
W27x94	1.030	5/8	15/16	1 3/16	1-13/16	2 3/8
W27x102	1.110	5/8	7/8	1 3/16	1 3/4	2 5/16
W27x114	1.230	9/16	13/16	1 1/16	1 5/8	2 1/8
W27x146	1.350	1/2	3/4	1	1 1/2	2
W27x161	1.480	1/2	3/4	15/16	1 7/16	1 7/8

W27x178	1.630	7/16	11/16	7/8	1 5/16	1 3/4
W30x99	1.000	5/8	15/16	1 1/4	1-13/16	2 7/16
W30x108	1.090	5/8	7/8	1 3/16	1 3/4	2 5/16
W30x116	1.160	9/16	7/8	1 1/8	1-11/16	2 1/4
W30x124	1.240	9/16	13/16	1 1/16	1 5/8	2 1/8
W30x132	1.320	9/16	13/16	1 1/16	1 9/16	2 1/16
W30x173	1.470	1/2	3/4	15/16	1 7/16	1 7/8
W30x191	1.620	7/16	11/16	7/8	1 5/16	1 3/4
W30x211	1.760	7/16	5/8	7/8	1 1/4	1-11/16
W33x118	1.080	5/8	7/8	1 3/16	1 3/4	2 5/16
W33x130	1.180	9/16	13/16	1 1/8	1 5/8	2 3/16
W33x141	1.280	9/16	13/16	1 1/16	1 9/16	2 1/16
W33x152	1.370	1/2	3/4	1	1 1/2	2
W33x201	1.580	1/2	11/16	15/16	1 3/8	1-13/16
W33x221	1.730	7/16	5/8	7/8	1 1/4	1-11/16
W33x241	1.870	7/16	5/8	13/16	1 3/16	1 9/16
W36x135	1.150	9/16	7/8	1 1/8	1-11/16	2 1/4
W36x150	1.270	9/16	13/16	1 1/16	1 9/16	2 1/16
W36x160	1.350	1/2	3/4	1	1 1/2	2
W36x170	1.430	1/2	3/4	1	1 7/16	1-15/16
W36x182	1.520	1/2	11/16	15/16	1 3/8	1 7/8
W36x194	1.620	7/16	11/16	7/8	1 5/16	1 3/4
W36x210	1.740	7/16	5/8	7/8	1 1/4	1-11/16
W36x230	1.690	7/16	11/16	7/8	1 5/16	1-11/16
W36x245	1.790	7/16	5/8	13/16	1 1/4	1 5/8
W36x260	1.900	7/16	5/8	13/16	1 3/16	1 9/16
W36x280	2.030	3/8	9/16	3/4	1 1/8	1 1/2
W36x300	2.170	3/8	9/16	3/4	1 1/16	1 7/16

**ARABIAN VERMICULITE INDUSTRIES** — Types MK-6/HY, MK-6/HY Extended Set, MK-6/GF, MK-10 HB, MK-10 HB Extended Set, MK-10/HB White, MK-10/HB White Extended Set, MK-6/HB, MK-6s, Z-106, Z-106/G, Z-106/HY.

**GCP KOREA INC** — Types MK-6/HY, MK-6/HY Extended Set, MK-6/GF, MK-10 HB, MK-10 HB Extended Set, MK-10/HB White, MK-10/HB White Extended Set, MK-6/HB, MK-6s, Z-106, Z-106/G, Z-106/HY.

**GCP APPLIED TECHNOLOGIES INC** — Types MK-6/HY, MK-6/HY Extended Set, MK-6/GF, MK-10 HB, MK-10 HB Extended Set, MK-10/HB White, MK-10/HB White Extended Set, MK-6/HB, MK-6s, RG, Z-106, Z-106/G, Z-106/HY, MK-1000/HB, MK-1000/HB Extended Set, Z-146, Z-146PC, Z-146T, Z-156, Z-156T and Z-156PC (Types Z-146, Z-146T, Z-156, Z-156PC, Z-156T also investigated for exterior use).

**1A. Spray-Applied Fire Resistive Materials\*** — As an alternate to the wide flange shapes, re-entrant profiles (W/D between the range of 0.338 to 6.76) may be used. Some common sizes are listed below; refer to CHPX.R4339 and CHPX7.R4339 for additional re-entrant profiles. SFRM applied by mixing with water and spraying in more than one coat to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min avg and min ind density of 15/14 pcf respectively. Min avg and min ind density of 22/19 pcf respectively for Types Z-106, Z-106/G, Z-106/HY. Min avg and min ind density of 40/36 pcf respectively for Types Z-146, Z-146PC and Z-146T cementitious mixture. Min avg and min ind density of 50/45 pcf respectively for Types Z-156, Z-156T and Z-156PC. For method of density determination, see Design Information Section, Sprayed Material.

L Shapes	Steel Size	W/D	Min Thickness (in.) for Hourly Rating (hr.)				
			1	1.5	2	3	4
L	L2-1/2X1-1/2X1/4	0.399	1	1 1/2	2	2 15/16	NR
L	L8X8X1/2	0.825	11/16	1 1/16	1 3/8	2 1/16	2 3/4
L	L10X10X3/4	1.228	9/16	13/16	1 1/16	1 5/8	2 1/8
L	L12X12X1	1.621	7/16	11/16	7/8	1 5/16	1 3/4
L	L12X12X1-3/8	2.188	3/8	9/16	3/4	1 1/16	1 7/16
2L	2L2X2X3/16	0.407	1	1 1/2	1 15/16	2 15/16	3 7/8
2L	2L3-1/2X3-1/2X7/16	0.933	11/16	1	1 5/16	1 15/16	2 9/16
2L	2L6X6X3/4	1.594	1/2	11/16	15/16	1 3/8	1 13/16
2L	2L12X12X1	2.167	3/8	9/16	3/4	1 1/16	1 7/16
2L	2L12X12X1-3/8	2.917	5/16	7/16	9/16	7/8	1 1/8

NR = No Rating

C Shapes	Steel Size	W/D	Min Thickness (in.) for Hourly Rating (hr.)				
			1	1.5	2	3	4
C	C3X4.1	0.363	1 1/16	1 9/16	2 1/16	3 1/16	NR
C	C12X20.7	0.588	7/8	1 1/4	1 11/16	2 1/2	3 5/16
C	C8X18.75	0.746	3/4	1 1/8	1 7/16	2 3/16	2 7/8
C	C15X40	0.929	11/16	1	1 5/16	1 15/16	2 9/16

C	C15X50	1.151	9/16	7/8	1 1/8	1 11/16	2 1/4
MC	MC6X6.5	0.340	1 1/16	1 9/16	2 1/8	3 1/8	NR
MC	MC6X12	0.561	7/8	1 5/16	1 11/16	2 9/16	3 3/8
MC	MC4X13.8	0.812	11/16	1 1/16	1 3/8	2 1/16	2 3/4
MC	MC12X40	1.042	5/8	15/16	1 3/16	1 13/16	2 3/8
MC	MC12X50	1.286	9/16	13/16	1 1/16	1 9/16	2 1/16

NR = No Rating

T Shapes	Steel Size	W/D	Min Thickness (in.) for Hourly Rating (hr.)				
			1	1.5	2	3	4
MT	MT2.5X9.45	0.630	13/16	1 3/16	1 5/8	2 3/8	3 3/16
ST	ST1.5X2.85	0.372	1	1 1/2	2	3	NR
ST	ST3X8.6	0.654	13/16	1 3/16	1 9/16	2 3/8	3 1/8
ST	ST9X27.35	0.912	11/16	1	1 5/16	1 15/16	2 9/16
ST	ST12X45	1.176	9/16	7/8	1 1/8	1 11/16	2 3/16
ST	ST12X60.5	1.486	1/2	3/4	15/16	1 7/16	1 7/8
WT	WT6X7	0.352	1 1/16	1 9/16	2 1/16	3 1/16	NR
WT	WT6X7.6	1.963	3/8	9/16	3/4	1 1/8	1 1/2
WT	WT18X264.5	3.565	1/4	3/8	1/2	3/4	15/16
WT	WT18X401	5.102	1/4	5/16	3/8	9/16	11/16
WT	WT7X436.5	7.132	1/4	1/4	1/4	3/8	1/2

NR = No Rating

**ARABIAN VERMICULITE INDUSTRIES** — Types MK-6/HY, MK-6/HY Extended Set, MK-6/GF, MK-10 HB, MK-10 HB Extended Set, MK-10/HB White, MK-10/HB White Extended Set, MK-6/HB, MK-6s, Z-106, Z-106/G, Z-106/HY.

**GCP KOREA INC** — Types MK-6/HY, MK-6/HY Extended Set, MK-6/GF, MK-10 HB, MK-10 HB Extended Set, MK-10/HB White, MK-10/HB White Extended Set, MK-6/HB, MK-6s, Z-106, Z-106/G, Z-106/HY.

**GCP APPLIED TECHNOLOGIES INC** — Types MK-6/HY, MK-6/HY Extended Set, MK-6/GF, MK-10 HB, MK-10 HB Extended Set, MK-10/HB White, MK-10/HB White Extended Set, MK-6/HB, MK-6s, RG, Z-106, Z-106/G, Z-106/HY, MK-1000/HB, MK-1000/HB Extended Set, Z-146, Z-146PC, Z-146T, Z-156, Z-156T and Z-156PC (Types Z-146, Z-146PC, Z-146T, Z-156, Z-156PC, Z-156T also investigated for exterior use).

2. **Metal Lath** — (Required for box application - Optional for contour application) — 3.4 lb/sq yd galvanized or painted expanded steel lath. For box applications, lath shall be lapped 1 in. and tied together with No. 18 SWG galvanized steel; wire spaced vertically 6 in. O.C. For contour applications, lath is installed vertically with joints butted together and secured to the column with powder actuated fasteners located 18 inches on center at joints and as necessary to have the lath follow the column contour. As an alternate, welded fixing of pins to steel column are permitted.

3. **Steel Column** — Wide flange steel columns (36 ksi yield), min/max sizes as specified above.

**\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2024-09-05

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