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- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
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- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
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BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States
 BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

[See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States Design Criteria and Allowable Variances](#)

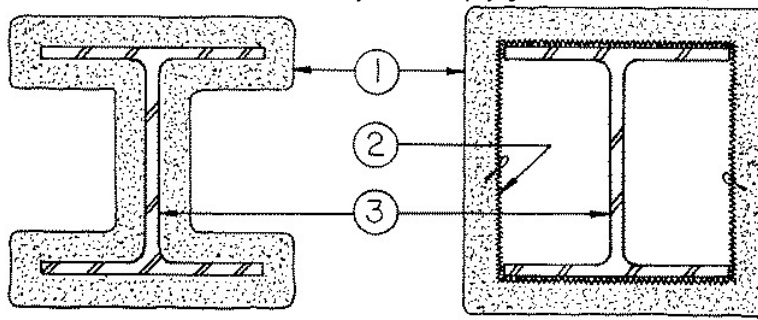
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Design No. X772

March 21, 2023

Ratings — 1, 1-1/2, 2, 3 and 4 h.

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



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 19/18 pcf respectively for Types 7GP and 7HD. 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 1) 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 = 0.33 to 6.62

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:

Min Col Size	W/D	Min Thk In.				
		1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W4x13	0.556	14/16	1 5/16	1 11/16	2 8/16	3 6/16
W5x16	0.550	14/16	1 5/16	1 11/16	2 8/16	3 6/16
W5x19	0.644	13/16	1 3/16	1 9/16	2 6/16	3 2/16
W6x9	0.338	1 1/16	1 8/16	2	2 8/16	3 13/16
W6x12	0.448	15/16	1 7/16	1 14/16	2 8/16	3 12/16
W6x15	0.431	1	1 7/16	1 15/16	2 8/16	3 13/16
W6x16	0.584	13/16	1 4/16	1 11/16	2 8/16	3 5/16
W6x20	0.563	14/16	1 4/16	1 11/16	2 8/16	3 6/16
W6x25	0.696	12/16	1 2/16	1 6/16	2	2 11/16
W8x10	0.327	1 1/16	1 10/16	2 2/16	3 3/16	N/A
W8x13	0.421	1	1 7/16	1 15/16	2 8/16	3 13/16
W8x15	0.481	15/16	1 6/16	1 13/16	2 8/16	3 10/16
W8x18	0.499	15/16	1 6/16	1 13/16	2 8/16	3 9/16
W8x21	0.577	14/16	1 4/16	1 11/16	2 8/16	3 5/16

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W8x24	0.591	13/16	1 4/16	1 11/16	2 8/16	3 5/16
W8x28	0.688	12/16	1 3/16	1 6/16	2	2 11/16
W8x31	0.665	13/16	1 3/16	1 9/16	2 5/16	3 1/16
W8x35	0.749	12/16	1 2/16	1 6/16	2	2 11/16
W8x40	0.849	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W8x48	1.000	10/16	1 4/16	1 2/16	1 11/16	2 7/16
W8x58	1.200	9/16	1 3/16	1 2/16	1 10/16	2 3/16
W8x67	1.370	8/16	1 2/16	1	1 8/16	2
W10x12	0.347	1 1/16	1 8/16	2	2 8/16	3 13/16
W10x15	0.429	1	1 7/16	1 15/16	2 8/16	3 13/16
W10x17	0.482	15/16	1 6/16	1 13/16	2 8/16	3 10/16
W10x19	0.538	14/16	1 5/16	1 12/16	2 8/16	3 7/16
W10x22	0.523	14/16	1 5/16	1 12/16	2 8/16	3 8/16
W10x26	0.612	13/16	1 4/16	1 10/16	2 7/16	3 4/16
W10x30	0.699	12/16	1 2/16	1 6/16	2	2 11/16
W10x33	0.661	13/16	1 3/16	1 9/16	2 5/16	3 2/16
W10x39	0.780	12/16	1 1/16	1 6/16	2	2 11/16
W10x45	0.888	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W10x49	0.840	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W10x54	0.922	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W10x60	1.010	10/16	1 4/16	1 2/16	1 11/16	2 7/16
W10x68	1.150	9/16	1 4/16	1 2/16	1 11/16	2 4/16
W10x77	1.280	9/16	1 3/16	1 1/16	1 9/16	2 1/16
W10x88	1.450	8/16	1 2/16	1	1 7/16	1 15/16
W10x100	1.640	7/16	1 1/16	1 4/16	1 5/16	1 12/16
W10x112	1.810	7/16	1 0/16	1 3/16	1 4/16	1 10/16
W12x14	0.363	1 1/16	1 8/16	2	2 8/16	3 13/16
W12x16	0.410	1	1 8/16	1 15/16	2 8/16	3 13/16
W12x19	0.485	15/16	1 6/16	1 13/16	2 8/16	3 10/16
W12x22	0.560	14/16	1 5/16	1 11/16	2 8/16	3 6/16
W12x26	0.531	14/16	1 5/16	1 12/16	2 8/16	3 7/16
W12x30	0.607	13/16	1 4/16	1 10/16	2 7/16	3 4/16
W12x35	0.703	12/16	1 2/16	1 6/16	2	2 11/16
W12x40	0.734	12/16	1 2/16	1 6/16	2	2 11/16
W12x45	0.829	11/16	1 1/16	1 6/16	2	2 11/16
W12x50	0.909	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W12x53	0.855	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W12x58	0.925	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W12x65	0.925	11/16	1 4/16	1 2/16	1 11/16	2 8/16
W12x72	1.020	10/16	1 4/16	1 2/16	1 11/16	2 7/16
W12x79	1.110	10/16	1 4/16	1 2/16	1 11/16	2 5/16
W12x87	1.220	9/16	1 3/16	1 1/16	1 10/16	2 2/16
W12x96	1.340	8/16	1 2/16	1	1 8/16	2
W12x106	1.470	8/16	1 2/16	1 5/16	1 7/16	1 14/16
W12x120	1.650	7/16	1 1/16	1 4/16	1 5/16	1 12/16
W12x136	1.860	7/16	1 0/16	1 3/16	1 3/16	1 9/16
W12x152	2.040	6/16	9/16	1 2/16	1 2/16	1 8/16
W12x170	2.260	6/16	9/16	1 1/16	1 1/16	1 6/16
W12x190	2.500	5/16	8/16	10/16	15/16	1 4/16
W12x210	2.730	5/16	7/16	9/16	14/16	1 3/16
W12x230	2.960	5/16	7/16	9/16	13/16	1 2/16
W12x252	3.200	5/16	7/16	9/16	13/16	1 1/16
W12x279	3.500	4/16	6/16	8/16	12/16	1 5/16
W12x305	3.760	4/16	6/16	8/16	11/16	1 5/16
W12x336	4.060	4/16	5/16	7/16	10/16	1 4/16
W14x22	0.476	15/16	1 6/16	1 13/16	2 8/16	3 10/16

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W14x26	0.559	14/16	1 5/16	1 11/16	2 8/16	3 6/16
W14x30	0.562	14/16	1 4/16	1 11/16	2 8/16	3 6/16
W14x34	0.633	13/16	1 3/16	1 10/16	2 6/16	3 3/16
W14x38	0.706	12/16	1 2/16	1 6/16	2	2 11/16
W14x43	0.752	12/16	1 2/16	1 6/16	2	2 11/16
W14x48	0.835	11/16	1 1/16	1 6/16	2	2 11/16
W14x53	0.915	11/16	14/16	1 2/16	1 11/16	2 8/16
W14x61	0.928	11/16	14/16	1 2/16	1 11/16	2 8/16
W14x68	1.040	10/16	14/16	1 2/16	1 11/16	2 6/16
W14x74	1.120	9/16	14/16	1 2/16	1 11/16	2 4/16
W14x82	1.230	9/16	13/16	1 1/16	1 10/16	2 2/16
W14x90	1.080	10/16	14/16	1 2/16	1 11/16	2 5/16
W14x99	1.180	9/16	13/16	1 2/16	1 10/16	2 3/16
W14x109	1.290	9/16	13/16	1 1/16	1 9/16	2 1/16
W14x120	1.420	8/16	12/16	1	1 7/16	1 15/16
W14x132	1.560	8/16	11/16	15/16	1 6/16	1 13/16
W14x145	1.640	7/16	11/16	14/16	1 5/16	1 12/16
W14x159	1.780	7/16	10/16	13/16	1 4/16	1 10/16
W14x176	1.960	6/16	9/16	12/16	1 2/16	1 8/16
W14x193	2.140	6/16	9/16	12/16	1 1/16	1 7/16
W14x211	2.320	6/16	8/16	11/16	1	1 6/16
W14x233	2.550	5/16	8/16	9/16	14/16	1 4/16
W14x257	2.780	5/16	7/16	9/16	14/16	1 3/16
W14x283	3.030	5/16	7/16	9/16	13/16	1 1/16
W14x311	3.300	4/16	6/16	8/16	12/16	1
W14x342	3.580	4/16	6/16	8/16	11/16	15/16
W14x370	3.840	4/16	6/16	7/16	11/16	14/16
W14x398	4.090	4/16	5/16	7/16	10/16	14/16
W14x426	4.320	4/16	5/16	7/16	10/16	13/16
W14x455	4.590	4/16	5/16	6/16	9/16	12/16
W14x500	4.950	4/16	5/16	6/16	9/16	12/16
W14x550	5.340	4/16	4/16	6/16	8/16	11/16
W14x605	5.820	4/16	4/16	5/16	8/16	10/16
W14x665	6.210	4/16	4/16	5/16	7/16	9/16
W14x730	6.760	4/16	4/16	5/16	6/16	9/16
W16x26	0.499	15/16	1 6/16	1 13/16	2 8/16	3 9/16
W16x31	0.592	13/16	1 4/16	1 10/16	2 7/16	3 4/16
W16x36	0.617	13/16	1 4/16	1 10/16	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	12/16	1 1/16	1 6/16	2	2 11/16
W16x50	0.846	11/16	14/16	1 2/16	1 11/16	2 8/16
W16x57	0.963	10/16	14/16	1 2/16	1 11/16	2 8/16
W16x67	0.936	11/16	14/16	1 2/16	1 11/16	2 8/16
W16x77	1.070	10/16	14/16	1 2/16	1 11/16	2 5/16
W16x89	1.220	9/16	13/16	1 1/16	1 10/16	2 2/16
W16x100	1.370	8/16	12/16	1	1 8/16	2
W18x35	0.602	13/16	1 4/16	1 10/16	2 7/16	3 4/16
W18x40	0.688	12/16	1 3/16	1 6/16	2	2 11/16
W18x46	0.786	12/16	1 1/16	1 6/16	2	2 11/16
W18x50	0.778	12/16	1 1/16	1 6/16	2	2 11/16
W18x55	0.850	11/16	14/16	1 2/16	1 11/16	2 8/16
W18x60	0.923	11/16	14/16	1 2/16	1 11/16	2 8/16
W18x65	0.997	10/16	14/16	1 2/16	1 11/16	2 7/16
W18x71	1.080	10/16	14/16	1 2/16	1 11/16	2 5/16
W18x76	0.971	10/16	14/16	1 2/16	1 11/16	2 8/16
W18x86	1.090	10/16	14/16	1 2/16	1 11/16	2 5/16

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W18x97	1.220	9/16	13/16	1 1/16	1 10/16	2 2/16
W18x106	1.330	8/16	12/16	1	1 8/16	2
W18x119	1.480	8/16	12/16	15/16	1 7/16	1 14/16
W21x44	0.672	13/16	1 3/16	1 9/16	2 5/16	3 1/16
W21x50	0.754	12/16	1 2/16	1 6/16	2	2 11/16
W21x57	0.857	11/16	14/16	1 2/16	1 11/16	2 8/16
W21x62	0.846	11/16	14/16	1 2/16	1 11/16	2 8/16
W21x68	0.926	11/16	14/16	1 2/16	1 11/16	2 8/16
W21x73	0.989	10/16	14/16	1 2/16	1 11/16	2 7/16
W21x83	1.120	9/16	14/16	1 2/16	1 11/16	2 4/16
W21x93	1.240	9/16	13/16	1 1/16	1 10/16	2 2/16
W21x101	1.130	9/16	14/16	1 2/16	1 11/16	2 4/16
W21x111	1.240	9/16	13/16	1 1/16	1 10/16	2 2/16
W21x122	1.350	8/16	12/16	1	1 8/16	2
W21x132	1.450	8/16	12/16	1	1 7/16	1 15/16
W21x147	1.610	7/16	11/16	14/16	1 5/16	1 12/16
W24x55	0.749	12/16	1 2/16	1 6/16	2	2 11/16
W24x62	0.844	11/16	14/16	1 2/16	1 11/16	2 8/16
W24x68	0.837	11/16	1 1/16	1 6/16	2	2 11/16
W24x76	0.933	11/16	14/16	1 2/16	1 11/16	2 8/16
W24x84	1.020	10/16	14/16	1 2/16	1 11/16	2 7/16
W24x94	1.140	9/16	14/16	1 2/16	1 11/16	2 4/16
W24x104	1.070	10/16	14/16	1 2/16	1 11/16	2 5/16
W24x117	1.200	9/16	13/16	1 2/16	1 10/16	2 3/16
W24x131	1.330	8/16	12/16	1	1 8/16	2
W24x146	1.480	8/16	12/16	15/16	1 7/16	1 14/16
W24x162	1.630	7/16	11/16	14/16	1 5/16	1 12/16
W27x84	0.921	11/16	14/16	1 2/16	1 11/16	2 8/16
W27x94	1.030	10/16	14/16	1 2/16	1 11/16	2 6/16
W27x102	1.110	10/16	14/16	1 2/16	1 11/16	2 5/16
W27x114	1.230	9/16	13/16	1 1/16	1 10/16	2 2/16
W27x146	1.350	8/16	12/16	1	1 8/16	2
W27x161	1.480	8/16	12/16	15/16	1 7/16	1 14/16
W27x178	1.630	7/16	11/16	14/16	1 5/16	1 12/16
W30x99	1.000	10/16	14/16	1 2/16	1 11/16	2 7/16
W30x108	1.090	10/16	14/16	1 2/16	1 11/16	2 5/16
W30x116	1.160	9/16	14/16	1 2/16	1 11/16	2 4/16
W30x124	1.240	9/16	13/16	1 1/16	1 10/16	2 2/16
W30x132	1.320	9/16	13/16	1 1/16	1 9/16	2 1/16
W30x173	1.470	8/16	12/16	15/16	1 7/16	1 14/16
W30x191	1.620	7/16	11/16	14/16	1 5/16	1 12/16
W30x211	1.760	7/16	10/16	14/16	1 4/16	1 11/16
W33x118	1.080	10/16	14/16	1 2/16	1 11/16	2 5/16
W33x130	1.180	9/16	13/16	1 2/16	1 10/16	2 3/16
W33x141	1.280	9/16	13/16	1 1/16	1 9/16	2 1/16
W33x152	1.370	8/16	12/16	1	1 8/16	2
W33x201	1.580	8/16	11/16	15/16	1 6/16	1 13/16
W33x221	1.730	7/16	10/16	14/16	1 4/16	1 11/16
W33x241	1.870	7/16	10/16	13/16	1 3/16	1 9/16
W36x135	1.150	9/16	14/16	1 2/16	1 11/16	2 4/16
W36x150	1.270	9/16	13/16	1 1/16	1 9/16	2 1/16
W36x160	1.350	8/16	12/16	1	1 8/16	2
W36x170	1.430	8/16	12/16	1	1 7/16	1 15/16
W36x182	1.520	8/16	11/16	15/16	1 6/16	1 14/16
W36x194	1.620	7/16	11/16	14/16	1 5/16	1 12/16
W36x210	1.740	7/16	10/16	14/16	1 4/16	1 11/16

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W36x230	1.690	7/16	11/16	14/16	1 5/16	1 11/16
W36x245	1.790	7/16	10/16	13/16	1 4/16	1 10/16
W36x260	1.900	7/16	10/16	13/16	1 3/16	1 9/16
W36x280	2.030	6/16	9/16	12/16	1 2/16	1 8/16
W36x300	2.170	6/16	9/16	12/16	1 1/16	1 7/16

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:

Min Col Size	W/D	Min Thk In.				
		1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W6x9	0.338	1-1/8	1-5/8	2-1/16	3-1/8	4-3/16
W6x16	0.584	7/8	1-5/16	1-3/4	2-9/16	3-3/8
W8x28	0.688	13/16	1-3/16	1-1/2	2-1/4	2-15/16
W10x49	0.840	3/4	1-1/16	1-3/8	2-1/16	2-3/4
W14x233	2.55	5/16	1/2	11/16	1-3/16	1-5/8
W14x730	6.76	5/16	5/16	5/16	9/16	3/4

As an alternate to the equation, the min thickness of Spray-Applied Fire Resistive Materials Types Z-146, Z-146PC, Z-146T, Z-156, Z-156T and Z-156PC required for various fire resistance ratings of contours sprayed or boxed wide flange columns are shown in the table below:

Column Size In.	Min Thkns In.				
	1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W6x9	1-1/16	1-7/16	1-1/2	2-1/4	3
W6x12	1	1-3/8	1-1/2	2-1/4	3
W6x16	13/16	1-1/4	1-1/2	2-1/4	2-15/16
W8x28	3/4	1-3/16	1-3/8	2	2-1/2
W10x49	11/16	7/8	1-1/8	1-9/16	1-15/16
W21x73	11/16	7/8	1-1/8	1-9/16	1-15/16
W12x106	9/16	7/8	1-1/8	1-9/16	1-15/16
W14x233	5/16	1/2	9/16	7/8	1-1/4
W14x730	5/16	5/16	5/16	3/8	9/16

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

PYROK INC — Type LD.

SOUTHWEST FIREPROOFING PRODUCTS CO — Types 4, 5, 5EF, 5GP, 5MD, 7GP, 7HD, 8EF, 8GP, 8MD, 9EF, 9GP, 9MD.

GCP APPLIED TECHNOLOGIES INC — Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, RG, Z-106, Z-106/G, Z-106/HY, 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 column, 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.

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