

# BYBU.XR731 - Fire-resistance Ratings - ANSI/UL 1709

## Design/System/Construction/Assembly Usage Disclaimer

- 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.
- Authorities Having Jurisdiction should be consulted before construction.
- 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.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

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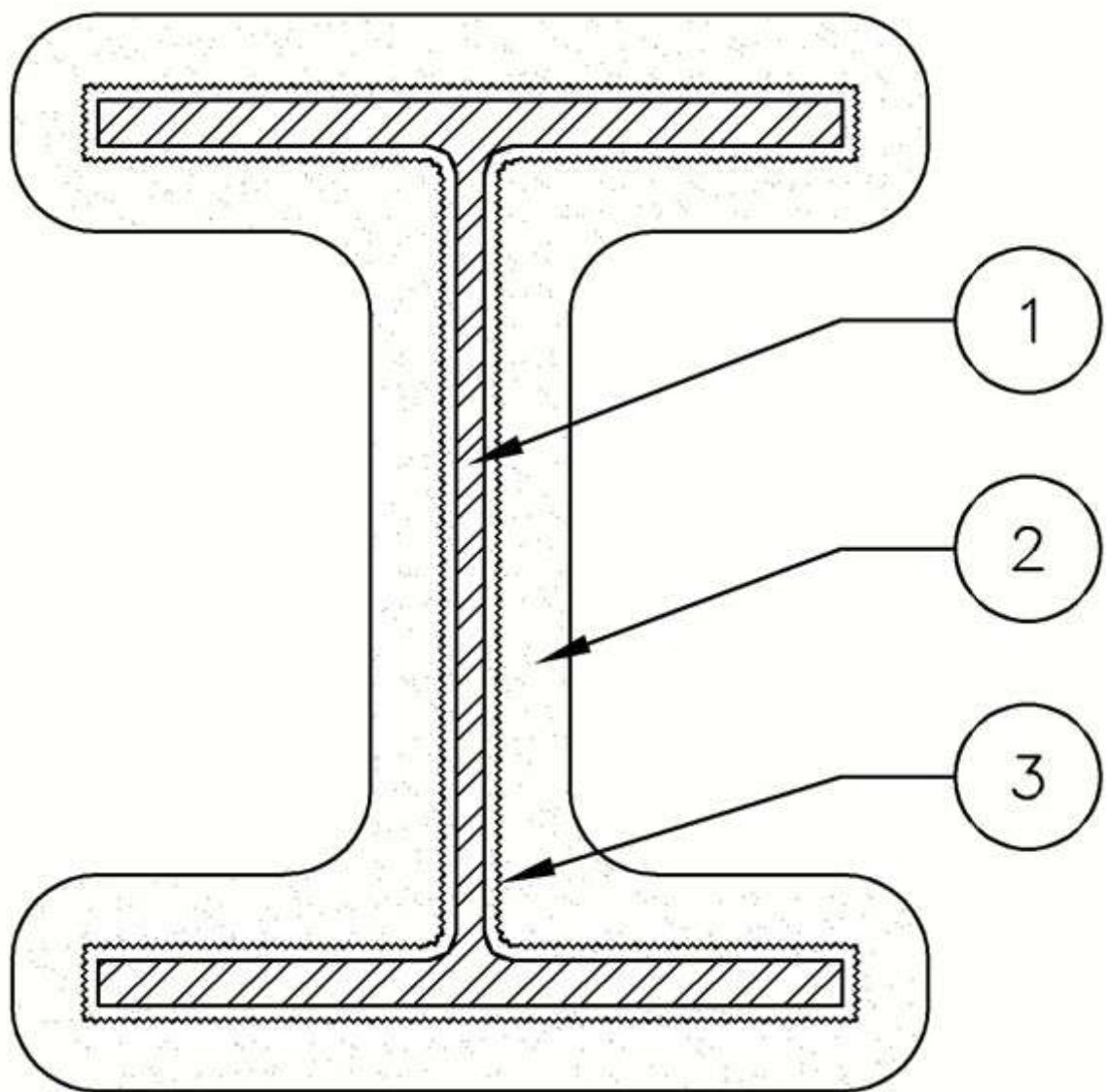
See General Information for Fire-resistance Ratings - ANSI/UL 1709

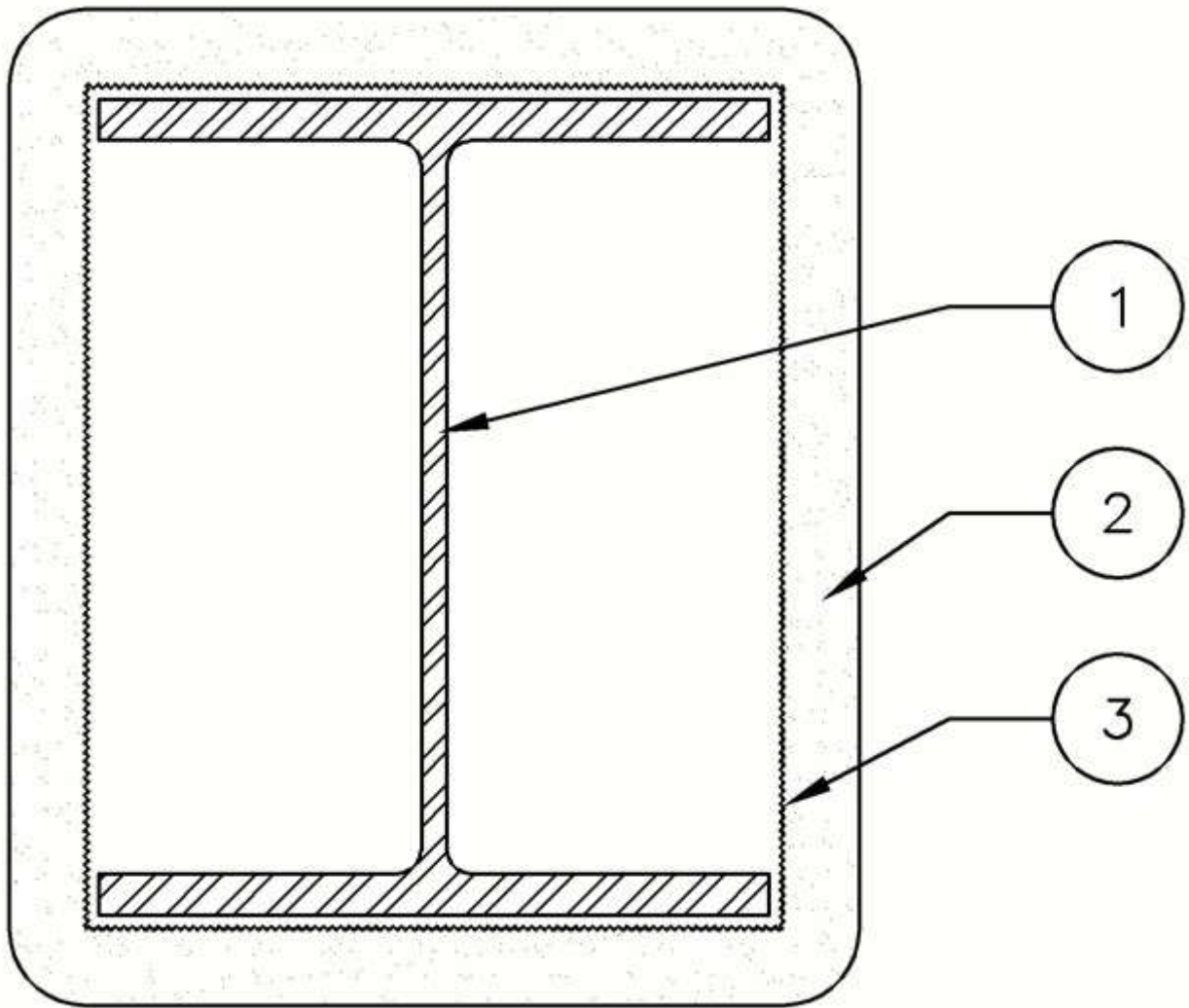
### Design No. XR731

January 29, 2021

### Ratings — 1, 1-1/2, 2, 2-1/2, 3, and 4 Hr

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





1. **Steel Column** — Min size W6X9.

2. **Spray-Applied Fire-Resistive Materials\*** — See table and equation below for appropriate thicknesses. Applied by mixing with water according to instructions printed on each bag of mixture and sprayed or hand applied in one or more coats, as necessary, directly to the column which must be clean and free of dirt, loose scale and oil. Min avg and min ind density of 50/46 pcf. For method of density determination, see Design Information Section. Types Z-156, Z-156PC, and Z-156T investigated for UL 2431 Classification Category I-A and Exterior Environmental Purpose.

$$T = \frac{(R + 61.28)}{(61.706 * (W/D) + 113.202)}$$

Where:

T = Required Thickness (1/2 to 2-1/16 inch)

R = Fire Resistance Rating (60 - 240 min.)

D = heated perimeter of steel column in inches

W = Weight of steel column in pounds per linear foot

W/D = Shape Factor of Column (0.338 to 2.55)

As an alternate to the equation, the min thickness in inches 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:

### Hourly Rating

Column Size	W/D	1 Hr+	1-1/2 Hr+	2 Hr+	2-1/2 Hr+	3 Hr+	4 Hr+
W6x9	0.338	11/16"	7/8"	1-1/8"	1-3/8"	1-5/8"	2-1/16"
W10x49	0.84	1/2"	11/16"	13/16"	1"	1-3/16"	1-1/2"
W14x233	2.55	1/2"	9/16"	11/16"	3/4"	7/8"	1-1/16"

+ When using item 4 or 4A, the thickness of the SFRM shall be increased by 1/8 in.

Or,

$$(R + 77.13)$$

$$T = \frac{(R + 77.13)}{100}$$

$$(-0.013 * (Hp/A) + 10.569)$$

Where:

T = Required Thickness (13 to 59 mm)

R = Fire Resistance Rating (60 to 240 min.)

Hp = Heated perimeter of steel column in meters (m)

A = Cross sectional area of steel column in meter squared (m<sup>2</sup>)

Hp/A = Shape Factor of Column (53 to 396)

As an alternate to the equation, the min thickness in millimeter 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:

### Hourly Rating

Metric Column Size	Hp/A	1 Hr+	1-1/2 Hr+	2 Hr+	2-1/2 Hr+	3 Hr+	4 Hr+
W150x14	396	18	23	29	35	42	53
W250x73	160	13	18	21	26	35	39
W360x347	53	13	15	18	20	23	27

+ When using item 4 or 4A, the thickness of the SFRM shall be increased by 3 mm.

**ARABIAN VERMICULITE INDUSTRIES** — Types Z-156, Z-156PC, and Z-156T

**GCP KOREA INC** — Types Z-156, Z-156PC, and Z-156T

**GCP APPLIED TECHNOLOGIES INC** — Types Z-156, Z-156PC, and Z-156T

For product Alternate Limiting Temperature Table click here: [XR731-1](#)

3. **Metal Lath** — Contour Application: Min. 2.5 lb per sq yd galvanized self-furred diamond mesh lath. Lath installed vertically, maximum 1/4 inch off the steel surface, with joints butted together and secured to the column with powder actuated fasteners located 12 inches on center at joints and as necessary to have the lath follow the column contour. As an alternate, either welded fixing or high temperature adhesive referenced "HTA Adhesive" (supplied by HTA Ltd), fixing of pins to steel column are permitted.

3A. **Metal Lath** — (As an alternate to Item 3) — Boxed Configuration: Min. 3.4 lb per sq yd expanded steel lath lapped 2 in. at joints and attached to column with powder actuated fasteners and washers, spaced 12 in. OC at overlap across the flange faces. The lath shall be spaced off the steel surface at a maximum 1/4 inch following installation. Overlap of lath should occur over steel surface only.

4. **Metal Lath** — (As an alternate to Item 3) — Contour Application: Min. 2.5 lb per sq yd galvanized flat (non-self-furred) diamond mesh lath. Lath installed vertically, maximum 1/4 inch off the steel surface, with joints butted together and secured to the column with powder actuated fasteners located 12 inches on center at joints and as necessary to have the lath follow the column contour. As an alternate, either welded fixing or high temperature adhesive referenced "HTA Adhesive" (supplied by HTA Ltd), fixing of pins to steel column are permitted.

4A. **Metal Lath** — (As an alternate to Item 3A) — Boxed Configuration: Min. 3.4 lb per sq yd expanded, non-self-furred steel lath lapped 2 in. at joints and attached to column with powder actuated fasteners and washers, spaced 12 in. OC at overlap across the flange faces. The lath shall be spaced off the steel surface at a maximum 1/4 inch following installation. Overlap of lath should occur over steel surface only.

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Last Updated on 2021-01-29

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