

## **FIRE-RESISTANCE DESIGN**

### **Assembly Usage Disclaimer**

#### **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

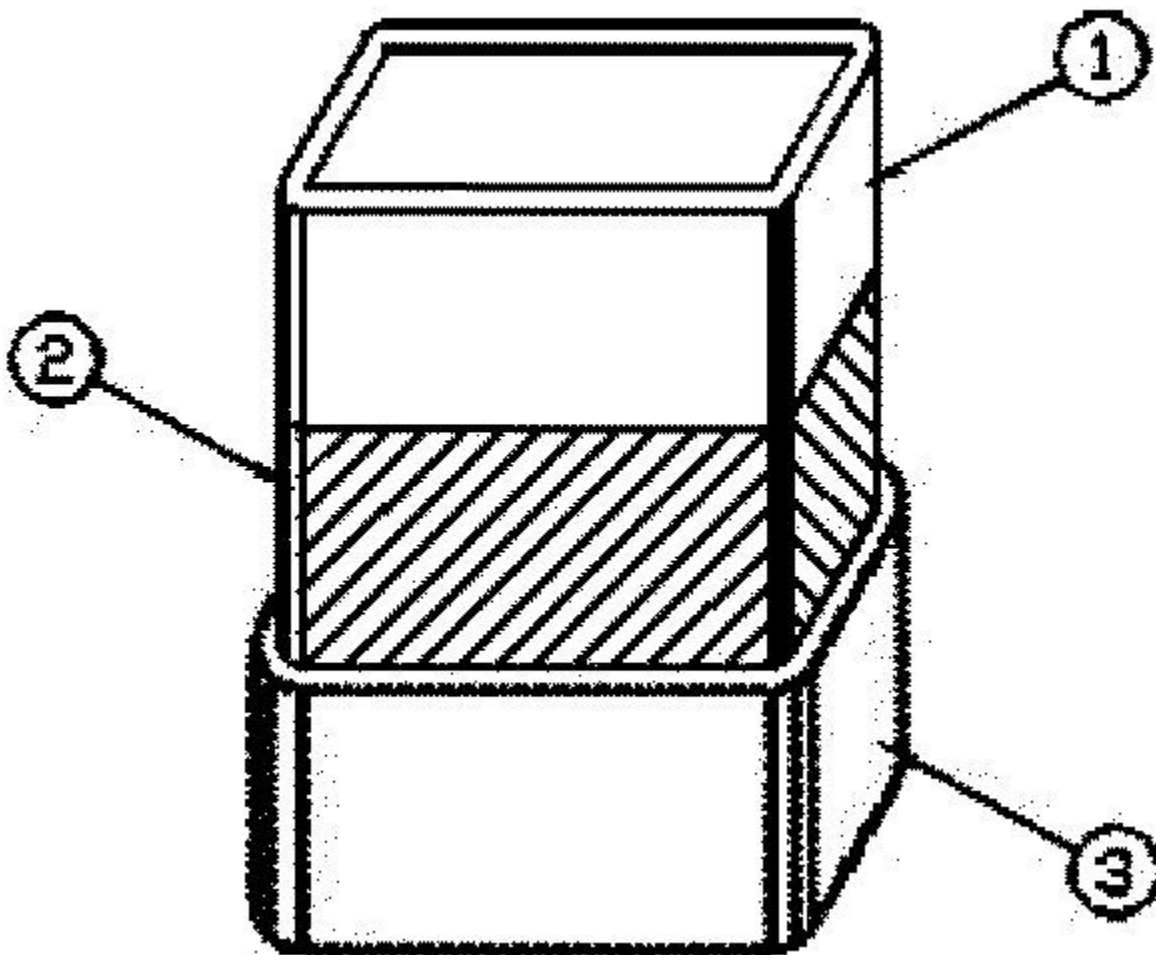
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada Design Criteria and Allowable Variances

### **Design No. X661**

December 11, 2013

**Ratings - 1, 1-1/2, 2, and 3 Hr. (See Item 3 and 4)**

**\* 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 Tube Column** — Hollow structural steel columns with the minimum sizes shown in the tables below. Columns shall be free of dirt, loose scale and oil.

2. **Primer Coating** — Two Component Epoxy or Phenolic Modified Alkyd applied at 0.002 in. dry film thickness.

3. **Mastic & Intumescent Coating\*** — Coating spray or brush applied in accordance with the manufacturer's instructions at the minimum average dry thickness shown in the table below. The thickness shown does not include primer thickness.

Size	A/P	1 Hr. In.	1-1/2 Hr. In.	2 Hr. In.	3 Hr. In.
TS4x4x 1/4	0.24	0.073	0.226	0.367	NR
TS4.5x4.5x 1/4	0.24	0.073	0.226	0.367	NR
TS5x4x 1/4	0.24	0.073	0.226	0.367	NR
TS5x5x 1/4	0.24	0.073	0.226	0.367	NR
TS6x4x 1/4	0.24	0.073	0.226	0.367	NR
TS5.5x5.5x 1/4	0.24	0.073	0.226	0.367	NR
TS6x5x 1/4	0.24	0.073	0.226	0.367	NR
TS7x4x 1/4	0.24	0.073	0.226	0.367	NR
TS6x6x 1/4	0.24	0.073	0.226	0.367	NR

TS7x5x 1/4	0.24	0.073	0.226	0.367	NR
TS8x4x 1/4	0.24	0.073	0.226	0.367	NR
TS7x7x 1/4	0.24	0.073	0.226	0.367	NR
TS8x6x 1/4	0.24	0.073	0.226	0.367	NR
TS9x5x 1/4	0.24	0.073	0.226	0.367	NR
TS10x4x 1/4	0.24	0.073	0.226	0.367	NR
TS10x5x 1/4	0.24	0.073	0.226	0.367	NR
TS8x8x 1/4	0.24	0.073	0.226	0.367	NR
TS9x7x 1/4	0.24	0.073	0.226	0.367	NR
TS10x6x 1/4	0.24	0.073	0.226	0.367	NR
TS12x4x 1/4	0.24	0.073	0.226	0.367	NR
TS9x9x 1/4	0.24	0.073	0.226	0.367	NR
TS10x8x 1/4	0.24	0.073	0.226	0.367	NR
TS12x6x 1/4	0.24	0.073	0.226	0.367	NR
TS14x4x 1/4	0.24	0.073	0.226	0.367	NR
TS10x10x 1/4	0.24	0.073	0.226	0.367	NR
TS12x8x 1/4	0.24	0.073	0.226	0.367	NR
TS14x6x 1/4	0.24	0.073	0.226	0.367	NR
TS16x4x 1/4	0.24	0.073	0.226	0.367	NR
TS12x10x 1/4	0.25	0.069	0.212	0.348	NR
TS12x12x 1/4	0.25	0.069	0.212	0.348	NR
TS14x10x 1/4	0.25	0.069	0.212	0.348	NR
TS16x8x 1/4	0.25	0.069	0.212	0.348	NR
TS18x6x 1/4	0.25	0.069	0.212	0.348	NR
TS20x4x 1/4	0.25	0.069	0.212	0.348	NR
TS16x16x 1/4	0.25	0.069	0.212	0.348	NR
TS4x4x 5/16	0.29	0.056	0.160	0.273	NR
TS4.5x4.5x 5/16	0.29	0.056	0.160	0.273	NR
TS5x4x 5/16	0.29	0.056	0.160	0.273	NR
TS5x5x 5/16	0.30	0.055	0.157	0.267	NR
TS6x4x 5/16	0.30	0.055	0.157	0.267	NR

TS5.5x5.5x 5/16	0.30	0.055	0.157	0.267	NR
TS6x5x 5/16	0.30	0.055	0.157	0.267	NR
TS7x4x 5/16	0.30	0.055	0.157	0.267	NR
TS6x6x 5/16	0.30	0.055	0.157	0.267	NR
TS7x5x 5/16	0.30	0.055	0.157	0.267	NR
TS8x4x 5/16	0.30	0.055	0.157	0.267	NR
TS7x7x 5/16	0.30	0.055	0.157	0.267	NR
TS8x6x 5/16	0.30	0.055	0.157	0.267	NR
TS9x5x 5/16	0.30	0.055	0.157	0.267	NR
TS10x4x 5/16	0.30	0.055	0.157	0.267	NR
TS10x5x 5/16	0.30	0.055	0.157	0.267	NR
TS8x8x 5/16	0.30	0.055	0.157	0.267	NR
TS9x7x 5/16	0.30	0.055	0.157	0.267	NR
TS10x6x 5/16	0.30	0.055	0.157	0.267	NR
TS12x4x 5/16	0.30	0.055	0.157	0.267	NR
TS9x9x 5/16	0.30	0.055	0.157	0.267	NR
TS10x8x 5/16	0.30	0.055	0.157	0.267	NR
TS12x6x 5/16	0.30	0.055	0.157	0.267	NR
TS14x4x 5/16	0.30	0.055	0.157	0.267	NR
TS10x10x 5/16	0.30	0.055	0.157	0.267	NR
TS12x8x 5/16	0.30	0.055	0.157	0.267	NR
TS14x6x 5/16	0.30	0.055	0.157	0.267	NR
TS16x4x 5/16	0.30	0.055	0.157	0.267	NR
TS12x10x 5/16	0.31	0.053	0.151	0.258	NR
TS12x12x 5/16	0.31	0.053	0.151	0.258	NR
TS14x10x 5/16	0.31	0.053	0.151	0.258	NR
TS16x8x 5/16	0.31	0.053	0.151	0.258	NR
TS18x6x 5/16	0.31	0.053	0.151	0.258	NR
TS20x4x 5/16	0.31	0.053	0.151	0.258	NR
TS14x14x 5/16	0.31	0.053	0.151	0.258	NR
TS16x12x 5/16	0.31	0.053	0.151	0.258	NR

TS20x8x 5/16	0.31	0.053	0.151	0.258	NR
TS18x12x 5/16	0.31	0.053	0.151	0.258	NR
TS16x16x 5/16	0.31	0.053	0.151	0.258	NR
TS20x12x 5/16	0.31	0.053	0.151	0.258	NR
TS20x16x 5/16	0.31	0.053	0.151	0.258	NR
TS20x18x 5/16	0.31	0.053	0.151	0.258	NR
TS4x4x 3/8	0.34	0.047	0.128	0.224	NR
TS4.5x4.5x 3/8	0.35	0.047	0.128	0.224	NR
TS5x4x 3/8	0.35	0.047	0.128	0.224	NR
TS5x5x 3/8	0.35	0.047	0.128	0.224	NR
TS6x4x 3/8	0.35	0.047	0.128	0.224	NR
TS5.5x5.5x 3/8	0.35	0.047	0.128	0.224	NR
TS6x5x 3/8	0.35	0.047	0.128	0.224	NR
TS7x4x 3/8	0.35	0.047	0.128	0.224	NR
TS6x6x 3/8	0.36	0.046	0.123	0.217	NR
TS7x5x 3/8	0.36	0.046	0.123	0.217	NR
TS8x4x 3/8	0.36	0.046	0.123	0.217	NR
TS7x7x 3/8	0.36	0.046	0.123	0.217	NR
TS8x6x 3/8	0.36	0.046	0.123	0.217	NR
TS9x5x 3/8	0.36	0.046	0.123	0.217	NR
TS10x4x 3/8	0.36	0.046	0.123	0.217	NR
TS10x5x 3/8	0.36	0.046	0.123	0.217	NR
TS8x8x 3/8	0.36	0.046	0.123	0.217	NR
TS9x7x 3/8	0.36	0.046	0.123	0.217	NR
TS10x6x 3/8	0.36	0.046	0.123	0.217	NR
TS12x4x 3/8	0.36	0.046	0.123	0.217	NR
TS9x9x 3/8	0.36	0.046	0.123	0.217	NR
TS10x8x 3/8	0.36	0.046	0.123	0.217	NR
TS12x6x 3/8	0.36	0.046	0.123	0.217	NR
TS14x4x 3/8	0.36	0.046	0.123	0.217	NR
TS10x10x 3/8	0.36	0.046	0.123	0.217	NR

TS12x8x 3/8	0.36	0.046	0.123	0.217	NR
TS14x6x 3/8	0.36	0.046	0.123	0.217	NR
TS16x4x 3/8	0.36	0.046	0.123	0.217	NR
TS12x10x 3/8	0.36	0.046	0.123	0.217	NR
TS12x12x 3/8	0.37	0.045	0.119	0.211	NR
TS14x10x 3/8	0.37	0.045	0.119	0.211	NR
TS16x8x 3/8	0.37	0.045	0.119	0.211	NR
TS18x6x 3/8	0.37	0.045	0.119	0.211	NR
TS20x4x 3/8	0.37	0.045	0.119	0.211	NR
TS14x12x 3/8	0.37	0.045	0.119	0.211	NR
TS14x14x 3/8	0.37	0.045	0.119	0.211	NR
TS16x12x 3/8	0.37	0.045	0.119	0.211	NR
TS20x8x 3/8	0.37	0.045	0.119	0.211	NR
TS18x12x 3/8	0.37	0.045	0.119	0.211	NR
TS16x16x 3/8	0.37	0.045	0.119	0.211	NR
TS20x12x 3/8	0.37	0.045	0.119	0.211	NR
TS18x16x 3/8	0.37	0.045	0.119	0.211	NR
TS18x18x 3/8	0.37	0.045	0.119	0.211	NR
TS20x16x 3/8	0.37	0.045	0.119	0.211	NR
TS20x18x 3/8	0.37	0.045	0.119	0.211	NR
TS20x20x 3/8	0.37	0.045	0.119	0.211	NR
TS4x4x 1/2	0.45	0.038	0.097	0.175	0.319
TS4.5x4.5x 1/2	0.45	0.038	0.097	0.175	0.319
TS5x4x 1/2	0.45	0.038	0.097	0.175	0.319
TS5x5x 1/2	0.46	0.037	0.094	0.172	0.319
TS6x4x 1/2	0.46	0.037	0.094	0.172	0.319
TS6x5x 1/2	0.46	0.037	0.094	0.172	0.319
TS7x4x 1/2	0.46	0.037	0.094	0.172	0.319
TS6x6x 1/2	0.46	0.037	0.094	0.172	0.319
TS7x5x 1/2	0.46	0.037	0.094	0.172	0.319
TS8x4x 1/2	0.46	0.037	0.094	0.172	0.319

TS7x7x 1/2	0.47	0.037	0.092	0.168	0.319
TS8x6x 1/2	0.47	0.037	0.092	0.168	0.319
TS9x5x 1/2	0.47	0.037	0.092	0.168	0.319
TS10x4x 1/2	0.47	0.037	0.092	0.168	0.319
TS8x8x 1/2	0.47	0.037	0.092	0.168	0.319
TS9x7x 1/2	0.47	0.037	0.092	0.168	0.319
TS10x6x 1/2	0.47	0.037	0.092	0.168	0.319
TS12x4x 1/2	0.47	0.037	0.092	0.168	0.319
TS9x9x 1/2	0.48	0.036	0.091	0.166	0.319
TS10x8x 1/2	0.48	0.036	0.091	0.166	0.319
TS12x6x 1/2	0.48	0.036	0.091	0.166	0.319
TS14x4x 1/2	0.48	0.036	0.091	0.166	0.319
TS10x10x 1/2	0.48	0.036	0.091	0.166	0.319
TS12x8x 1/2	0.48	0.036	0.091	0.166	0.319
TS14x6x 1/2	0.48	0.036	0.091	0.166	0.319
TS16x4x 1/2	0.48	0.036	0.091	0.166	0.319
TS12x10x 1/2	0.48	0.036	0.091	0.166	0.319
TS12x12x 1/2	0.48	0.036	0.091	0.166	0.319
TS14x10x 1/2	0.48	0.036	0.091	0.166	0.319
TS16x8x 1/2	0.48	0.036	0.091	0.166	0.319
TS18x6x 1/2	0.48	0.036	0.091	0.166	0.319
TS20x4x 1/2	0.48	0.036	0.091	0.166	0.319
TS14x12x 1/2	0.48	0.036	0.091	0.166	0.319
TS14x14x 1/2	0.49	0.036	0.089	0.164	0.319
TS16x12x 1/2	0.49	0.036	0.089	0.164	0.319
TS20x8x 1/2	0.49	0.036	0.089	0.164	0.319
TS18x12x 1/2	0.49	0.036	0.089	0.164	0.319
TS16x16x 1/2	0.49	0.036	0.089	0.164	0.319
TS20x12x 1/2	0.49	0.036	0.089	0.164	0.319
TS18x16x 1/2	0.49	0.036	0.089	0.164	0.319
TS18x18x 1/2	0.49	0.036	0.089	0.164	0.319

TS20x16x 1/2	0.49	0.036	0.089	0.164	0.319
TS20x18x 1/2	0.49	0.036	0.089	0.164	0.319
TS20x20x 1/2	0.49	0.036	0.089	0.164	0.319
TS6x6x 5/8	0.57	0.033	0.078	0.146	0.319
TS7x5x 5/8	0.57	0.033	0.078	0.146	0.319
TS8x4x 5/8	0.57	0.033	0.078	0.146	0.319
TS7x7x 5/8	0.58	0.032	0.078	0.145	0.319
TS9x5x 5/8	0.58	0.032	0.078	0.145	0.319
TS10x4x 5/8	0.58	0.032	0.078	0.145	0.319
TS8x8x 5/8	0.58	0.032	0.078	0.145	0.319
TS9x7x 5/8	0.58	0.032	0.078	0.145	0.319
TS10x6x 5/8	0.58	0.032	0.078	0.145	0.319
TS12x4x 5/8	0.58	0.032	0.078	0.145	0.319
TS9x9x 5/8	0.59	0.032	0.076	0.143	0.319
TS10x8x 5/8	0.59	0.032	0.076	0.143	0.319
TS12x6x 5/8	0.59	0.032	0.076	0.143	0.319
TS14x4x 5/8	0.59	0.032	0.076	0.143	0.319
TS10x10x 5/8	0.59	0.032	0.076	0.143	0.319
TS12x8x 5/8	0.59	0.032	0.076	0.143	0.319
TS14x6x 5/8	0.59	0.032	0.076	0.143	0.319
TS12x12x 5/8	0.60	0.032	0.076	0.141	0.319
TS14x10x 5/8	0.60	0.032	0.076	0.141	0.319
TS16x8x 5/8	0.60	0.032	0.076	0.141	0.319
TS18x6x 5/8	0.60	0.032	0.076	0.141	0.319
TS14x14x 5/8	0.60	0.032	0.076	0.141	0.319
TS16x12x 5/8	0.60	0.032	0.076	0.141	0.319
TS20x8x 5/8	0.60	0.032	0.076	0.141	0.319
TS18x12x 5/8	0.60	0.032	0.076	0.141	0.319
TS16x16x 5/8	0.61	0.031	0.075	0.140	0.319
TS20x12x 5/8	0.61	0.031	0.075	0.140	0.319
TS18x16x 5/8	0.61	0.031	0.075	0.140	0.319



TS18x18x 5/8	0.61	0.031	0.075	0.140	0.319
TS20x16x 5/8	0.61	0.031	0.075	0.140	0.319
TS20x18x 5/8	0.61	0.031	0.075	0.140	0.319
TS20x20x 5/8	0.61	0.031	0.075	0.140	0.319
TS12x6x 3/4	0.70	0.029	0.068	0.129	0.319
TS16x16x 1	0.95	0.026	0.058	0.112	0.319
TS16x16x 1.5	1.38	0.023	0.050	0.099	0.319

**CARBOLINE CO** — TYPE THERMO-SORB, THERMO-SORB VOC. Investigated for Interior Conditioned Space and Interior General Purpose.

4. **Carbon Fiber Mesh** — (Optional, Not Shown) For three hour rating. Nom. 3/16 in. by 3/16 in. 3.50 oz/sq yd carbon fiber mesh to cover the entire surface. The depth at which the reinforcing mesh is placed shall be approximately 0.120 inches from the steel substrate.

5. **Top Coat** — (Not Shown) - No topcoat required for Interior Conditioned Space. Finishing topcoat for Interior General Purpose, Types Carboguard 893 SG or Santile 655 applied at 0.006 in. dry film thickness or Carbocrylic 3350 or Carbocoat 30R applied at 0.003 in. dry film thickness.

**\* 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 2013-12-11

### Design/System/Construction/Assembly Usage Disclaimer

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- 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.
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