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June 28, 2010

Ms Teresa Cruz
Peck, Smiley, Ettlin Architects
4412 Southwest Corbett
Portland, OR 97239

Subj Portland Fire and Rescue Station 1

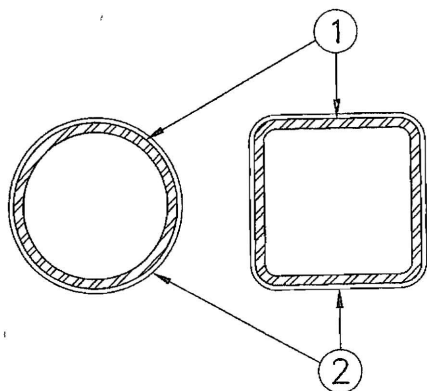
Dear Teresa

It is our engineering opinion that our Albi Clad TF, applied at 119 mils dry film thickness to your project specific steel size 4x4x 1/2 hollow square sections will provide a one hour fire resistance. Our material thickness recommendation is based on our UL Design X638.

Cordially,

Joseph Shaskus
Chief Engineer, Safety Director
StanChem, Inc

978 FIRE RESISTANCE RATINGS - ANSI/UL 263 (BXUV)

Design No X650
 Ratings-1, 1-1/2, 2 and 3 Hr (See Item 2)


- Steel Column** — Steel tube (ST) or steel pipe (SP) with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Columns shall be primed with a phenolic modified alkyd resin primer.
- Mastic and Intumescent Coatings*** — Coating spray, brush or trowel applied directly from containers to desired thickness. See table below for appropriate final dry thickness and applicable rating.

FOR STEEL PIPE

Steel Size	A/P	Hp/A	1 Hr		1 1/2 Hr		2 Hr	
			in	mm	in	mm	in	mm
SP 4 5 x 0.313	0.29	135	0.117	2.99	—	—	—	—
SP 8 x 0.875	0.79	49	0.097	2.46	0.097	2.46	0.120	3.05
SP 8 625 x 0.5	0.47	85	0.097	2.46	0.138	3.50	0.202	5.14

FOR SQUARE AND RECTANGULAR STEEL TUBE

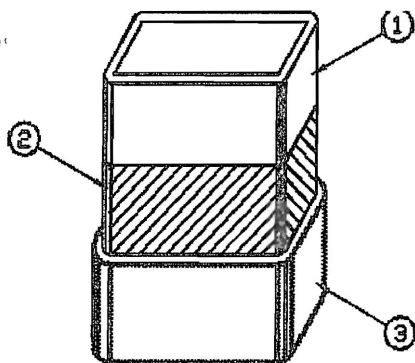
Steel Size	A/P	Hp/A	1 Hr		1 1/2 Hr		2 Hr		3 Hr	
			in	mm	in	mm	in	mm	in	mm
ST3 5x3 5x3/16	0.18	224	0.197	5.00	—	—	—	—	—	—
ST5x3x1/4	0.23	169	0.124	3.16	—	—	—	—	—	—
ST5x3x5/16	0.29	135	0.106	2.70	0.218	5.54	0.353	8.96	—	—
ST8x6x3/8	0.35	114	0.097	2.47	0.173	4.40	0.280	7.12	—	—
ST8x6x7/16	0.41	100	0.097	2.47	0.151	3.84	0.244	6.21	—	—
ST8x8x1/2	0.47	85	0.097	2.47	0.132	3.36	0.164	4.17	0.327	8.31

ISOLATEK INTERNATIONAL — Type SprayFilm-WB 3, Investigated for Interior General Purpose. Type SprayFilm-WB 4, Investigated for Interior General Purpose. Type SprayFilm-WB 4, Investigated for Exterior Use with top coat as described in Item 3.

- Top Coat** — Type SprayFilm — TOPSEAL required for Exterior Use, applied at a minimum dry thickness of 14 mils (0.34 mm) over the intumescent material. See Classification information in the Mastic Coating (CDWZ) category, Isolatek International, for mixing requirements.

Investigated for Interior General Purpose

*Bearing the UL Classification Mark

Design No X651
 Rating — 3 Hr (See Item 3)


- Steel Tube Column** — Hollow structural steel column with the minimum sizes shown in the tables below. Column shall be free of dirt, loose scale and oil.
- Primer Coating** — 0.003 in. dry film thickness of a two component polyamide epoxy.
- Mastic & Intumescent Coating*** — Coating spray or brush applied in accordance with the manufacturer's instructions at the minimum dry

FIRE RESISTANCE RATINGS - ANSI/UL 263 (BXUV)

thickness shown in the table below. The thickness shown does not include primer thickness.

Rating Hr

Min Thkns Inch

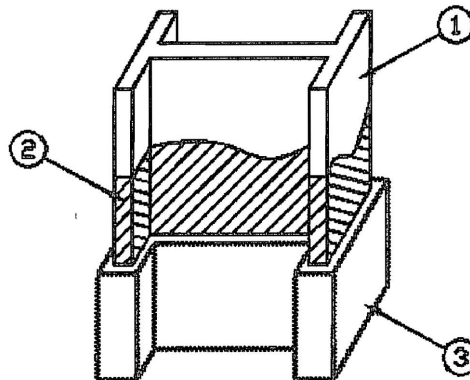
3

ST 12x12x1
0.364

PPG INDUSTRIES INC — Type Pitt-Char XP Intumescent Coating Investigated for Exterior Use

- Glass Fiber Mesh** — (Not Shown) — 3/8 in. glass fiber mesh weighing 4.5 oz./yd² to cover the entire surface. Reinforcing mesh placed approximately 0.120 in. from the steel substrate. Min. 2 inch overlap at mesh joints.

*Bearing the UL Classification Mark

Design No X652
 Ratings—1 and 1-1/2 Hr (See Item 3)


- Steel Column** — Wide flange steel columns with the minimum sizes shown in the tables below. Columns shall be free of dirt, loose scale and oil.
- Primer Coating** — 0.003 in. thickness modified alkyd primer.
- Mastic & Intumescent Coating*** — Coating spray or brush applied in accordance with the manufacturer's instructions at the minimum dry thickness shown in the table below. The thickness shown does not include primer thickness.

SIZE	W/D	1 HR inch	1-1/2 HR inch
W10x33	0.66	0.107	0.206
W8x31	0.66	0.107	0.206
W21x44	0.67	0.104	0.199
W16x40	0.68	0.101	0.193
W18x40	0.68	0.101	0.193
W8x28	0.68	0.101	0.191
W6x25	0.69	0.098	0.187
W10x30	0.70	0.095	0.181
W12x35	0.70	0.095	0.181
W14x38	0.70	0.095	0.181
W12x40	0.74	0.086	0.168
W8x35	0.74	0.086	0.164
W14x43	0.75	0.085	0.161
W24x55	0.75	0.085	0.161
W16x45	0.76	0.083	0.159
W21x50	0.76	0.083	0.159
W18x50	0.77	0.081	0.155
W10x39	0.78	0.080	0.152
W18x46	0.78	0.080	0.152
W12x45	0.82	0.075	0.144
W14x48	0.83	0.074	0.142
W24x68	0.83	0.074	0.142
W10x49	0.84	0.073	0.140
W16x50	0.84	0.073	0.140
W24x62	0.84	0.073	0.140
W8x40	0.84	0.073	0.140
W12x53	0.85	0.072	0.139
W18x55	0.85	0.072	0.139
W21x57	0.85	0.072	0.139
W21x62	0.85	0.072	0.139
W10x45	0.89	0.069	0.134
W12x50	0.91	0.068	0.131
W14x53	0.91	0.068	0.131
W10x54	0.92	0.067	0.129
W12x65	0.92	0.067	0.129
W14x61	0.92	0.067	0.129
W18x60	0.92	0.067	0.129
W21x68	0.92	0.067	0.129
W27x84	0.92	0.067	0.129

X650
Structural Steel Square Tube Columns
CAFCO SprayFilm WB 3 and WB 4

ASTM Desig	Wall Thk	A/P	Metric Desig	M/D	Hp/A	1-Hour	1-1/2 Hour	2-Hour	3-Hour
6 x 6	1/2	0 46	152 x 152 x 12 7	86 6	89 9	0 074	0 127	0 207	NR
	3/8	0 35	x 9 5	67 6	115 2	0 074	0 173	0 280	NR
	5/16	0 30	x 7 9	57 4	135 7	0 084	0 218	0 353	NR
	1/4	0 24	x 6 4	46	169 3	0 104	0 252	0 400	NR
	3/16	0 18	x 4 8	35 7	218 2	0 165	0 307	0 536	NR
5 x 5	1/2	0 45	127 x 127 x 12 7	83 9	92 8	0 074	0 127	0 207	NR
	3/8	0 35	x 9 5	66	118 0	0 074	0 173	0 280	NR
	5/16	0 29	x 7 9	56 3	138 3	0 084	0 218	0 353	NR
	1/4	0 24	x 6 4	46 1	168 9	0 104	0 252	0 400	NR
	3/16	0 18	x 4 8	35 3	220 6	0 165	0 307	0 536	NR
4 x 4	1/2	0 44	102 x 102 x 12 7	79 8	97 6	0 074	0 127	0 207	NR
	3/8	0 34	x 9 5	63 7	122 3	0 084	0 218	0 353	NR
	5/16	0 29	x 7 9	54 7	142 4	0 084	0 218	0 353	NR
	1/4	0 23	x 6 4	45	173 1	0 104	0 252	0 400	NR
	3/16	0 18	x 4 8	35	222 5	0 165	0 307	0 536	NR

Note A/P Ratio based on Design Formula

Note All thicknesses are expressed in inches To convert to Mils multiply by 1000 To convert to mm multiply by 25 4

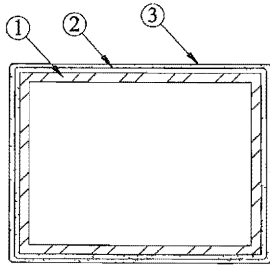
X650
**Structural Steel Square Tube Columns
CAFCO SprayFilm WB 3 and WB 4**

ASTM Desig	Wall Thk	A/P	Metric Desig	M/D	Hp/A	1-Hour	1-1/2 Hour	2-Hour	3-Hour
30 x 30	5/8	0 61	762 x 762 x 15 9	121 2	64 3	0 074	0 114	0 182	0 327
28 x 28	5/8	0 61	711 x 711 x 15 9	120 9	64 4	0 074	0 114	0 182	0 327
26 x 26	5/8	0 61	660 x 660 x 15 9	120 5	64 6	0 074	0 114	0 182	0 327
24 x 24	5/8	0 61	610 x 610 x 15 9	120 1	64 8	0 074	0 114	0 182	0 327
	1/2	0 49	x 12 7	96 9	80 4	0 074	0 114	0 182	0 327
	3/8	0 37	x 9 5	73 4	106 1	0 074	0 173	0 280	NR
22 x 22	5/8	0 61	559 x 559 x 15 9	119 6	65 1	0 074	0 114	0 182	0 327
	1/2	0 49	x 12 7	96 6	80 6	0 074	0 114	0 182	0 327
	3/8	0 37	x 9 5	73 2	106 4	0 074	0 173	0 280	NR
20 x 20	5/8	0 61	508 x 508 x 15 9	119	65 4	0 074	0 114	0 182	0 327
	1/2	0 49	x 12 7	96 3	80 9	0 074	0 114	0 182	0 327
	3/8	0 37	x 9 5	73	106 7	0 074	0 173	0 280	NR
18 x 18	5/8	0 60	457 x 457 x 15 9	118 3	65 8	0 074	0 114	0 182	0 327
	1/2	0 49	x 12 7	95 8	81 3	0 074	0 114	0 182	0 327
	3/8	0 37	x 9 5	72 7	107 1	0 074	0 173	0 280	NR
16 x 16	5/8	0 60	406 x 406 x 15 9	117 4	66 3	0 074	0 114	0 182	0 327
	1/2	0 48	x 12 7	95 2	81 8	0 074	0 114	0 182	0 327
	3/8	0 37	x 9 5	72 4	107 6	0 074	0 173	0 280	NR
	5/16	0 31	x 7 9	60 7	128 3	0 084	0 218	0 353	NR
14 x 14	5/8	0 60	356 x 356 x 15 9	116 3	67 0	0 074	0 114	0 182	0 327
	1/2	0 48	x 12 7	94 5	82 4	0 074	0 114	0 182	0 327
	3/8	0 36	x 9 5	72	108 2	0 074	0 173	0 280	NR
	5/16	0 31	x 7 9	60 4	128 9	0 084	0 218	0 353	NR
12 x 12	5/8	0 59	305 x 305 x 15 9	114 7	67 9	0 074	0 114	0 182	0 327
	1/2	0 48	x 12 7	93	83 7	0 074	0 114	0 182	0 327
	3/8	0 36	x 9 5	71 4	109 1	0 074	0 173	0 280	NR
	5/16	0 30	x 7 9	60 1	129 6	0 084	0 218	0 353	NR
	1/4	0 24	x 6 4	48 8	159 6	0 104	0 252	0 400	NR
10 x 10	5/8	0 59	254 x 254 x 15 9	112 6	69 2	0 074	0 114	0 182	0 327
	1/2	0 48	x 12 7	92 1	84 6	0 074	0 114	0 182	0 327
	3/8	0 36	x 9 5	70	111 3	0 074	0 173	0 280	NR
	5/16	0 30	x 7 9	59 5	130 9	0 084	0 218	0 353	NR
	1/4	0 24	x 6 4	48 1	161 9	0 104	0 252	0 400	NR
	3/16	0 18	x 4 8	36 5	213 4	0 165	0 307	0 536	NR
8 x 8	5/8	0 58	203 x 203 x 15 9	108	72 1	0 074	0 114	0 182	0 327
	1/2	0 47	x 12 7	89	87 5	0 074	0 114	0 182	0 327
	3/8	0 36	x 9 5	69 5	112 1	0 074	0 173	0 280	NR
	5/16	0 30	x 7 9	58 7	132 7	0 084	0 218	0 353	NR
	1/4	0 24	x 6 4	47	165 7	0 104	0 252	0 400	NR
	3/16	0 18	x 4 8	36 2	215 1	0 165	0 307	0 536	NR
7 x 7	1/2	0 46	178 x 178 x 12 7	88 6	87 9	0 074	0 127	0 207	NR
	3/8	0 35	x 9 5	68 7	113 4	0 074	0 173	0 280	NR
	5/16	0 30	x 7 9	58 1	134 0	0 084	0 218	0 353	NR
	1/4	0 24	x 6 4	47 2	165 0	0 104	0 252	0 400	NR
	3/16	0 18	x 4 8	36	216 3	0 165	0 307	0 536	NR

Note A/P Ratio based on Design Formula

Note All thicknesses are expressed in inches To convert to Mils multiply by 1000 To convert to mm multiply by 25 4

Design No X638
Rating-1 and 2 Hr



- Steel Column** — Steel tube columns with the minimum sizes shown in the tables below. Columns shall be free of dirt, loose scale and oil and primed with a red oxide primer.
- Reinforcing Mesh** — When total coating thickness exceeds 0.130 in. Glass fiber mesh, 3/16 by 3/16 in. square pattern weighing 147 g per sq m. Glass fiber mesh to be applied at mid depth of the coating.
- Mastic coating** — Coating spray applied directly from containers to desired thickness. See table below for appropriate final dry thickness. After each coat, the surface shall be lightly rolled with a paint roller.

Hourly Rating - 1 HR

Size	A/P	Thickness Required
8x8x3/8	0.36	0.119
10x10x5/8	0.6	0.065
16x16x1/2	0.48	0.065
16x16x5/8	0.6	0.065

Hourly Rating - 2 HR

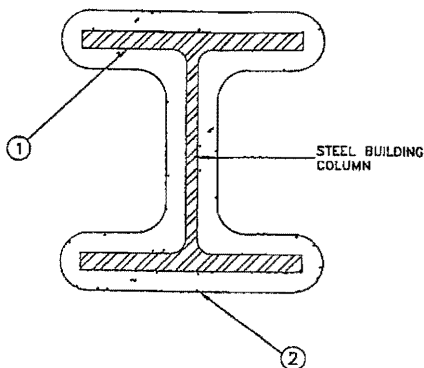
Size	A/P	Thickness Required
4x4x3/8	0.34	0.431
8x8x1/2	0.47	0.334
10x10x5/8	0.6	0.265
16x16x1/2	0.48	0.334
16x16x5/8	0.6	0.265

ALBI MFG, DIV OF

STANCHEM INC — Types ACTF, CITEX TF Investigated for Interior General Purpose only

*Bearing the UL Classification Mark

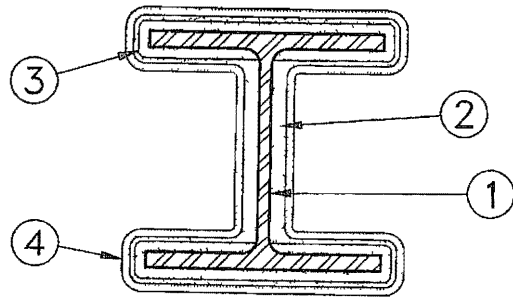
Design No X639
Rating - 3 Hr



- Steel Column** — Minimum size column W12 x 170 with W/D ≥ 26. The column surfaces shall be free of dirt, loose scale and oil.
- Mastic Coating*** — Coating applied in accordance with manufacturer's instructions to the minimum dry film thickness of 0.130 in.
- Top Coat** — (Not Shown) — Finishing topcoat, Type "A/D COLOR-COAT", silicone alkyd paint applied at an approximate 0.002 in. dry film thickness.

*Bearing the UL Classification Mark

Design No X640
Ratings - 2 and 3 Hr (See Item 3)



- Steel Column** — Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil.
- Mastic Coating*** — Coating applied as a mastic basecoat in accordance with manufacturer's instructions to the minimum dry film thickness shown below.
- Glass Fiber Mesh** — (for 3 hr rating only) — Self adhesive, alkali resistant glass fiber mesh, weighing 4.5 oz per sq yd (152 g/m²) applied over second to last coat of "A/D BASECOAT" around the column flanges.
- Mastic Coating*** — Coating applied over "A/D BASECOAT" in accordance with manufacturer's instructions to the minimum dry film thickness shown below.

A/D FIRE PROTECTION SYSTEMS INC — Type "A/D BASECOAT"

Rating, hr	Steel Column Size	Column W/D	Required Min 'A/D BASECOAT' Thickness, in	Required Min 'A/D FIREFILM II' Thickness in
2	W10x68	1.14	0.311	0.105
3	W10x77	1.28	0.300@	0.120

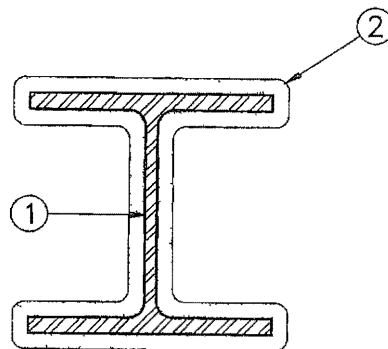
(@) Thickness includes glass fiber mesh

A/D FIRE PROTECTION SYSTEMS INC — Type "A/D FIRE-FILM II" Investigated for Interior General Purpose

- Top Coat** — (Not shown) — Finishing topcoat, Type "A/D COLOR-COAT", silicone alkyd paint applied at an approximate 0.002 in. dry film thickness.

*Bearing the UL Classification Mark

Design No X641
Ratings - 3/4, 1, 2 and 3 Hr (See Item 2)



- Steel Column** — Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil.
- Mastic Coating*** — Coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below.

Rating, hr	Steel Column Size	W Shaped only Min Columns, W/D	Required Min Film Thickness, in
3/4	W6x15	0.43	0.076
3/4	W14x38	0.70	0.050