FIBERGLASS ODOR CONTROL COVERS FOR WATER, WASTEWATER, & INDUSTRIAL APPLICATIONS

Glass·Steel, Inc.
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Glass-Steel, Inc. custom designs and fabricates odor control covers for collection of noxious emissions in numerous water and wastewater applications. All covers have integral access doors custom sized to fit the requirements of each particular application.

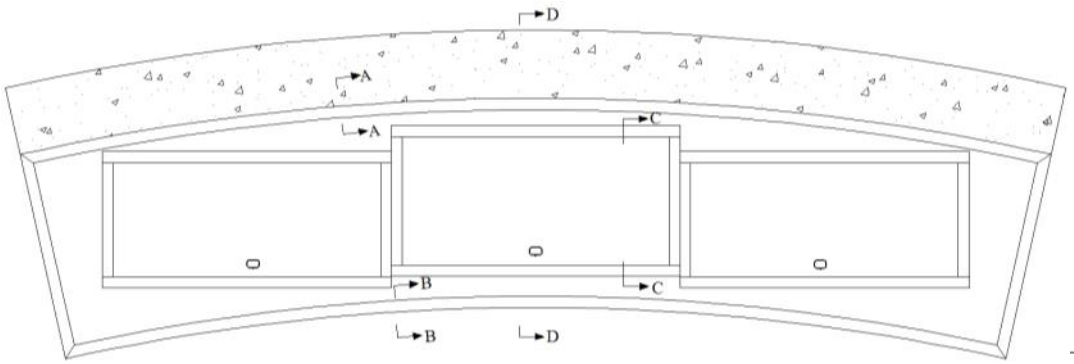
The fiberglass composite materials used for each application vary to suit the particular design parameters desired by our client. Covers can be built to clear spans up to 20' when depth of cover area is not an issue. With the use of fiberglass structural members virtually any size area can be covered and sealed against escaping emissions. Covers can be designed to cover an entire open area such as aeration tanks or can be designed to cover only the trough areas on the clarifiers, circular or rectangular. Clarifier partial covers generally have integral scum baffles, which are partially submerged to seal off the trough area.

Requirements which affect the material we utilize are:

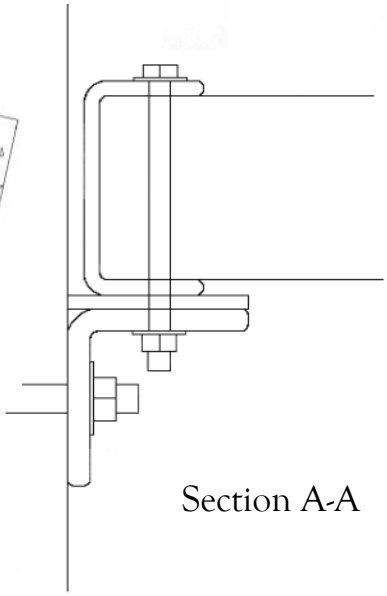
1. Load requirements and how load will be applied
2. Chemical resistance requirements
3. Fire retardence requirements (if applicable)
4. Smoke generation requirements (if applicable)
5. Weight Restriction requirements
6. USDA, FDA, or NSF requirements
7. Insulation requirements
8. Water absorption requirements
9. Limitations of secondary supports
10. Budget restrictions

Fully opening covers we designed for the San Jacinto RWRF

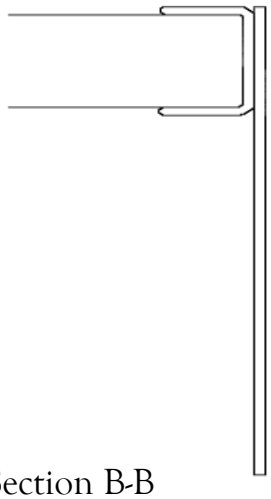
All load requirements and features being equal, Glass-Steel, Inc. fiberglass odor control covers should be lower cost than comparable aluminum covers. Most of our covers utilize a combination of Composolite Panels as the main member. Extren Structural Shapes as a support system, and trim Durashield Panels as door panels when doors are required, and all hardware is SST316. The following are a few details of optional components. We also furnish similar systems in non-sealed applications. ■



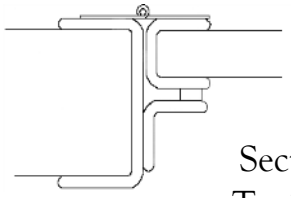
Typical circular cover for Clarifier Launder



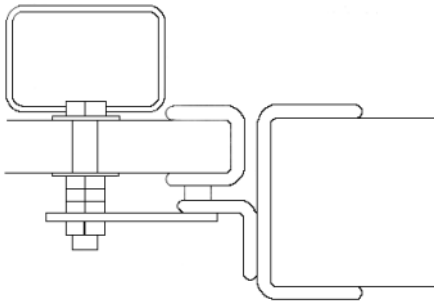
Section A-A

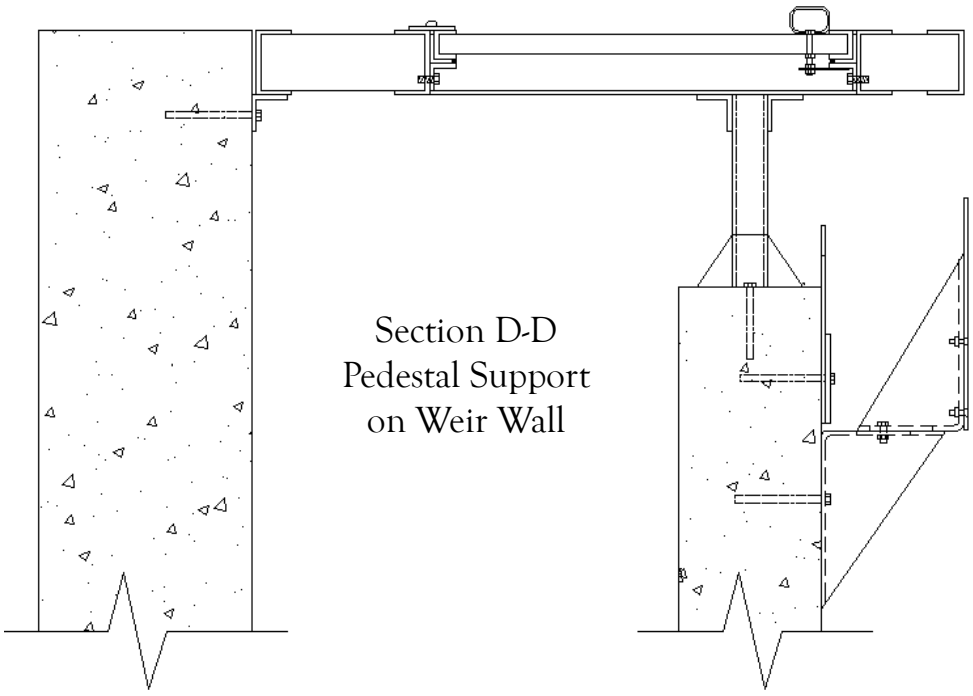


Section B-B

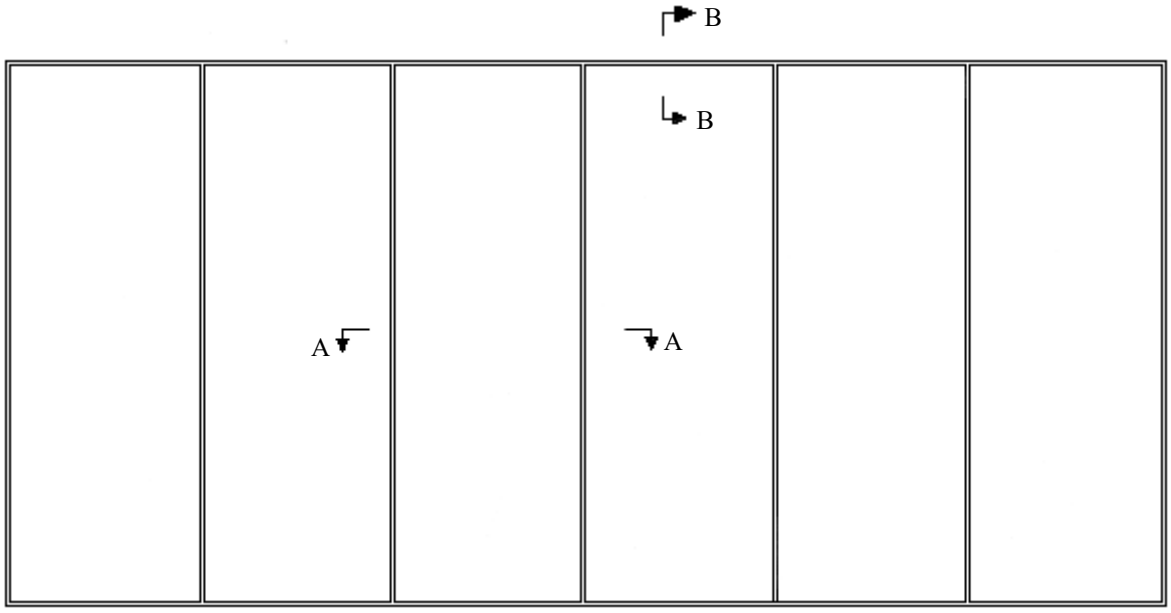


Section C-C
Typical Door

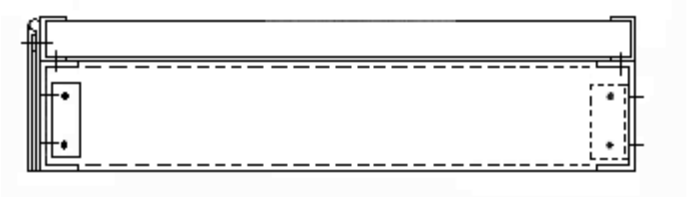




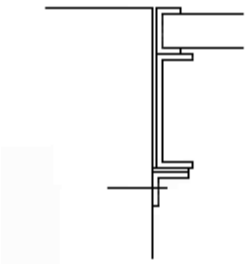
Section D-D
Pedestal Support
on Weir Wall



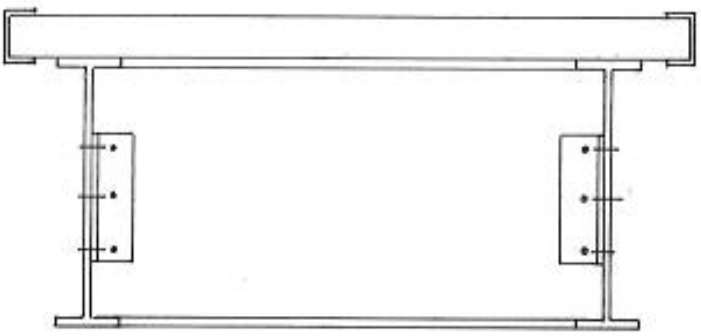
Typical Flat Full Cover Arrangement



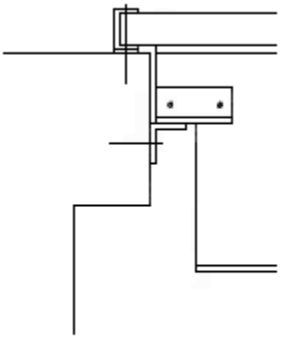
Section A-A
Section Flush Cover



Section B-B
Wall Mount Flush Cover

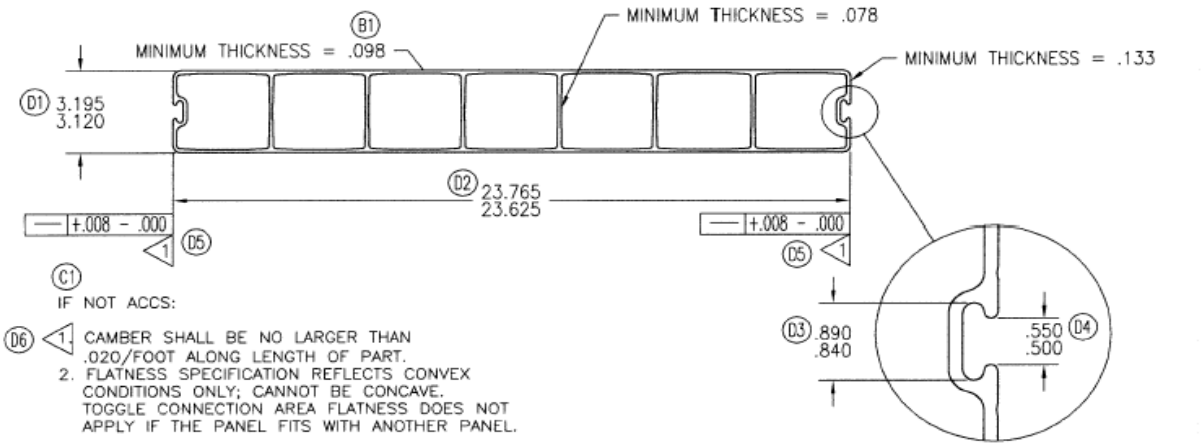


Section A-A Alt.
Section Surface Mount Cover



Section B-B Alt.
End & Wall Mount Surface Mount Cover

LTR	REVISIONS	DR'N.	DATE	CKD	DATE	APV'D.	DATE	REF ECO NO.
A	1.; WAS 90.5/90.0	WHITE	02-14-02			CBS	02-14-02	NONE
B	1. WAS .118 (IN ERROR)	WHITE	07-08-02			CBS	07-09-02	NONE
C	1. ADDED NOTES	WHITE	07-25-02			CBS	07-26-02	NONE
–	1. WAS 3.148; 2. WAS 23.700; 3. WAS .870; 4. WAS .530	–	–	–	–	–	–	–
D	5. REMOVED ANGLE TOLERANCE; 6. SPECIFIED CAMBER, FLATNESS AND STRAIGHTNESS.	WHITE	11-08-02					NONE



CAD/CAM INFORMATION:
CAD SYSTEM: AUTOCAD
CAD FILE: T:\TM1676\00104A01
CAM SYSTEM:
CAM FILE: NONE

PROPRIETARY INFORMATION
DISCLOSURE OR REPRODUCTION OF THIS DOCUMENT OR INFORMATION IS PROHIBITED.
UNLESS NOTED DIMENSIONS ARE IN INCHES AND TOLERANCES ARE:
FRACTIONAL = ±1/64"
.X = ±.1
.XX = ±.03
.XXX = ±.010
ANGULAR = ±1°
REV DAT OR OBSOLETE REF

ORIGINAL AUTHORIZATION

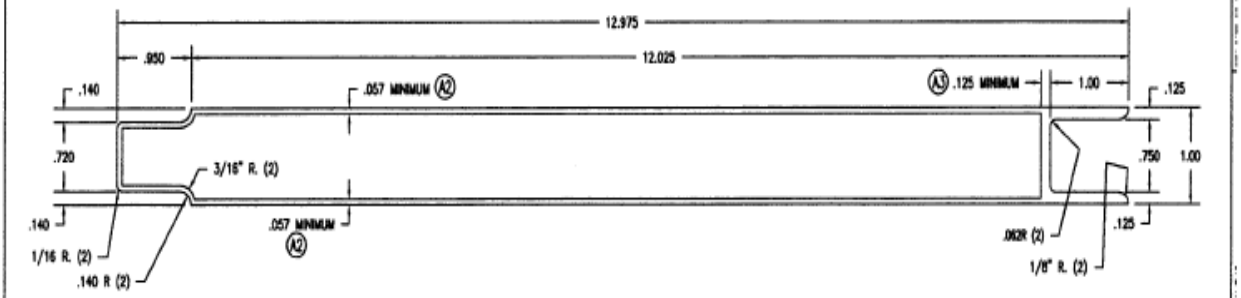
DR'N	WHITE	DATE	01-11-02
CKD	WHITE	DATE	01-11-02
ENG.	N/A	DATE	N/A
ENG MGR	CBS	REL. DATE	01-11-02
APV'D	N/A	DATE	N/A

REVISION FLAG

STRONGWELL
BRISTOL DIVISION
400 Commonwealth Ave. / Box 580
Bristol, VA 24203-0580 USA
Phone: 276-645-8000
Fax: 276-645-8132

TITLE: PART, INSPECTION DOCUMENT
COMPOSOLITE PLANK
SIZE
NO: TM1676-00104
REVISION: D
SCALE: 1/4
SHEET NO.: 1 OF 1
CONTROL STAMP

LTR	REVISIONS	DR'N.	DATE	CKD	DATE	APV'D.	DATE	REF ECO NO.
A	1. REDRAWN ON CAD, 2. WAS ±.010 -.025, 3. ADDED MINIMUM, 4. ADDED NOTE	WHITE	11-08-07					18-438



NOTES:
A4 1. UNLESS OTHERWISE SPECIFIED, EXTREN TOLERANCES APPLY

ITEM NUMBER	NAME	STOCK SIZE	MATERIAL
REQUIREMENTS PER ASSY.	BILL OF MATERIALS		

CAD/CAM INFORMATION:
CAD SYSTEM: AUTOCAD
CAD FILE: T:\TM0947\00101B01
CAM SYSTEM:
CAM FILE: NONE
A1

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FRACTIONAL = ±1/64"
.X = ±.1
.XX = ±.03
.XXX = ±.010
ANGULAR = ±1°

ORIGINAL AUTHORIZATION

DR'N	W.T.	DATE	12-04-07
CKD	N/A	DATE	N/A
ENG.	N/A	DATE	N/A
ENG MGR	N/A	REL. DATE	N/A
APV'D	N/A	DATE	N/A

STRONGWELL
BRISTOL DIVISION
400 Commonwealth Ave. / Box 580
Bristol, VA 24203-0580 USA
Phone: 540-645-8000
Fax: 540-645-8132

TITLE: PART
12 X 1 FOAM PANEL
SIZE: B
NO: TM0947-00101
REVISION: A
SCALE: 1/2
SHEET NO.: 1 of 1

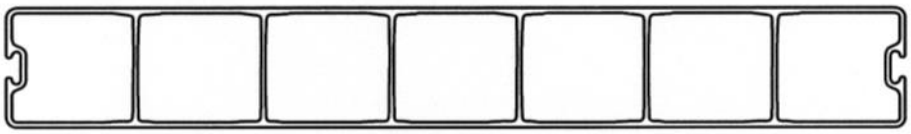
TEST DATA: DEFLECTION VS. LOAD FULL SECTION

SPAN (ft.)	LOAD① (lbs.)	DEFLECTION		EI x 10^6	E x 10^6
		SMAPLE #1	SAMPLE #2		
20	900	4.571	4.627	56.0 56.7	3.523 3.567
18	1000	3.764	3.787	55.8 55.4	3.509 3.484
16	1125	3.010	2.984	55.1 55.6	3.465 3.497
14	1285	2.310	2.331	54.9 54.5	3.453 3.428
12	1500	1.748	1.743	53.4 53.5	3.358 3.365
10	1800	1.263	1.239	51.3 52.3	3.226 3.289
9	2000	1.022	1.069	51.36 49.1	3.23 3.088
8	2250	0.863	0.846	48.1 49.0	3.025 3.082
6	3000	0.550	0.540	42.4 43.2	2.667 2.717

① Load calculated to maintain the bending stress at 9ft. constant throughout the trial.

COMPOSOLITE FIBERGLASS BUILDING PANEL SYSTEM

Components



Panel (3" x 24" nominal size - 80mm x 604.7mm actual)
7.49 lb/ft

3-Way Connector 1.65 lbs/ft

Toggle Connector .34 lbs/ft

Hanger 1.55 lbs/ft

45° Connector 1.65 lbs/ft

End Cap .57 lbs/ft

COMPOSOLITE® ALLOWABLE UNIFORM LOAD TABLE (PSF)

SPAN (ft.)	@Δ=span/60			@Δ=span/120			@Δ=span/180		
	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing
4	.8	*778	*774	.4	*778	*774	.27	*778	*774
5	1.0	*624	*620	.5	*624	*620	.33	490	486
6	1.2	*520	*516	.6	449	445	.40	299	295
7	1.4	*466	*462	.7	303	299	.47	204	200
8	1.6	*390	*386	.8	214	210	.53	142	138
9	1.8	311	308	.9	156	152	.60	104	100
10	2.0	233	229	1.0	116	112	.67	78	74
11	2.2	176	172	1.1	88	84	.73	59	55
12	2.4	140	136	1.2	70	64	.80	47	43
13	2.6	110	106	1.3	56	52	.87	37	33
14	2.8	90	86	1.4	48	44	.93	30	26
15	3.0	74	70	1.5	37	33	1.00	25	21
16	3.2	61	57	1.6	30	26	1.09	21	17
17	3.4	51	47	1.7	25	21	1.13	17	13
18	3.6	43	39	1.8	22	18	1.20	14	10
19	3.8	36	32	1.9	18	14	1.27	12	8
20	4.0	32	28	2.0	15	11	1.33	11	7

**Controlled by strength with a factor of safety of 2.50 for flexural or 3.0 for shear. NOTE: All values are typical.*

MECHANICAL PROPERTIES *(minimum)*

Properties	*ASTM Test Method*	*Value*
Flexural Strength, LW	D790	24.5 ksi
Flexural Strength, CW	D790	8.2 ksi
Flexural Modulus , LW	D790	885 ksi
Flexural Modulus, CW	D790	646 ksi
Tensile Strength	D638	31.1 ksi
Tensile Modulus	D638	2,486 ksi
Short Beam Shear	D2344	3.19 ksi

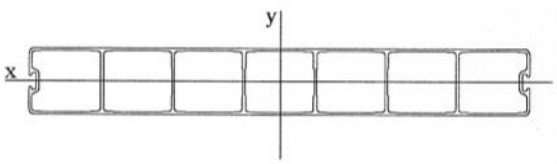
STRONGWELL

COMPOSOLITE® Building Panel System

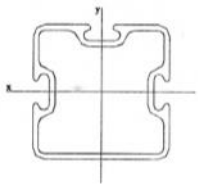
Span (ft.)														Ea I ① (106 lbs./in.²)	Maximum② Load/Deflection (lbs.)
6	c	300	600	900	1000	1250	1500	1750	2000	2250	2500	2750	3000	--	3000
	Δc	.06"	.11"	.17"	.19"	.23"	.28"	.32"	.37"	.42"	.46"	.51"	.55"	42.7	.55"
	u	50	100	150	167	208	250	292	333	375	417	458	500	--	500
	Δu	.03"	.07"	.10"	.11"	.14"	.17"	.20"	.23"	.26"	.28"	.31"	.34"	42.7	.34"
7	c	300	600	900	1000	1250	1500	1750	2000	2250	2500			--	2571
	Δc	.08"	.15"	.23"	.26"	.32"	.38"	.45"	.51"	.58"	.64"			48.2	.66"
	u	43	86	128	143	178	214	250	285	321	357			--	367
	Δu	.05"	.10"	.14"	.16"	.20"	.24"	.28"	.32"	.36"	.40"			48.2	.41"
8	c	300	600	900	1000	1250	1500	1750	2000	2250				--	2250
	Δc	.15"	.23"	.34"	.38"	.48"	.58"	.67"	.77"	.86"				48.6	.86"
	u	38	75	112	125	156	188	219	250	281				--	281
	Δu	.07"	.14"	.21"	.24"	.30"	.36"	.41"	.47"	.53"				48.6	.53"
9	c	300	600	900	1000	1250	1500	1750	2000					--	2000
	Δc	.16"	.32"	.47"	.53"	66"	.79"	.92"	1.050"					50.2	1.05"
	u	33	67	100	111	139	167	194	222					--	222
	Δu	.10"	.20"	.29"	.33"	.41"	.49"	.57"	.65"					50.2	.65"
10	c	300	600	900	1000	1250	1500	1750						--	1800
	Δc	.21"	.42"	.63"	.70"	.87"	1.05"	1.22"						51.8	1.25"
	u	30	60	90	100	125	150	175						--	180
	Δu	.13"	.26"	.39"	.44"	.54"	.65"	.76"						51.8	.78"
11	c	300	600	900	1000	1250	1500	1750						--	1785
	Δc	.27"	.55"	.82"	.92"	1.14"	1.4"	1.6"						52.4	1.63"
	u	27	55	82	91	114	136	159						--	160
	Δu	.13"	.27"	.40"	.54"	.55"	.66"	.77"						52.4	.78"
12	c	300	600	900	1000	1250	1500							--	1500
	Δc	.35"	.70"	1.05"	1.17"	1.46"	1.75"							53.5	1.75"
	u	25	50	75	83	104	125							--	125
	Δu	.22"	.44"	.65"	.72"	.91"	1.09"							53.5	1.09"
13	c	300	600	900	1000	1250								--	1385
	Δc	.44"	.88"	1.31"	1.46"	1.82"								54.4	2.02"
	u	23	46	69	77	96								--	105
	Δu	.28"	.57"	.85"	.95"	1.18"								54.4	1.29"
14	c	300	600	900	1000	1250								--	1285
	Δc	.54"	1.08"	1.63"	1.81"	2.26"								54.7	2.32"
	u	21	43	64	71	89								--	920
	Δu	.34"	.68"	1.02"	1.13"	1.41"								54.7	1.43"
15	c	300	600	900	1000									--	1200
	Δc	.66"	1.33"	1.99"	2.21"									55.1	2.65
	u	20	40	60	67									--	80
	Δu	.41"	.82"	1.24"	1.38"									55.1	1.65"
16	c	300	600	900	1000									--	1125
	Δc	.80"	1.60"	2.39"	2.66"									55.4	3.00"
	u	19	37	56	62									--	70
	Δu	.51"	1.00"	1.5"	1.66"									55.4	1.87"
17	c	300	600	900	1000									--	1055
	Δc	.96"	1.91"	2.87"	3.19"									55.5	3.36"
	u	18	35	53	59									--	62
	Δu	.61"	1.19"	1.8"	2.0"									55.5	2.10"
18	c	300	600	900	100									--	1000
	Δc	1.13"	2.27"	3.40"	3.78"									55.6	3.78"
	u	17	33	50	56									--	56
	Δu	.70"	1.41"	2.11"	2.36"									55.6	2.36"
19	c	300	600	900										--	947
	Δc	1.3"	2.7"	4"										56.0	4.21"
	u	16	32	47										--	50
	Δu	.84"	1.69"	2.48"										56.0	2.64"
20	c	300	600	900										--	900
	Δc	1.54"	3.07"	4.60"										56.4	4.6"
	u	15	30	45										--	45
	Δu	.96"	1.91"	2.87"										56.4	2.87"

① - Ea I is the typical apparent stiffness based on deflection testing; the load tables developed based on this stiffness are typical values.
② - The maximum load is determined by using a maximum moment of 216,000 in./lbs.; no distortion was observed in the panel.
U = Uniform load (lbs.) spread across the full panel width.
C = Concentrated load (strip load) across the full panel width.

Section Properties



$I_x = 15.9\ in.^4$
$S_x = 10.2\ in.^3$
$r_x = 1.33\ in.$
$I_y = 422\ in.^4$
$S_y = 105\ in.^3$
$r_y = 6.88\ in.$
$A = 8.89\ in.^2$
$Aw_x = 2.78\ in.^2$
$Aw_y = 6.11\ in.^2$



$I_{xx} = 2.73\ in.^4$
$I_{yy} = 2.69\ in.^4$
$S_{xx} = 1.80\ in.^3$
$S_{yy} = 1.71\ in.^3$
$A = 2.01\ in.^2$
$r_x = 1.17\ in.$
$r_y = 1.17\ in.$

DURASHIELD® Foam Core Building Panels

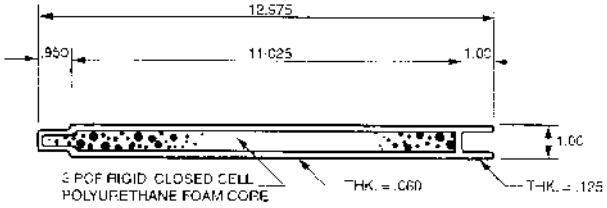
STRONGWELL

PROPERTIES AND DIMENSIONS

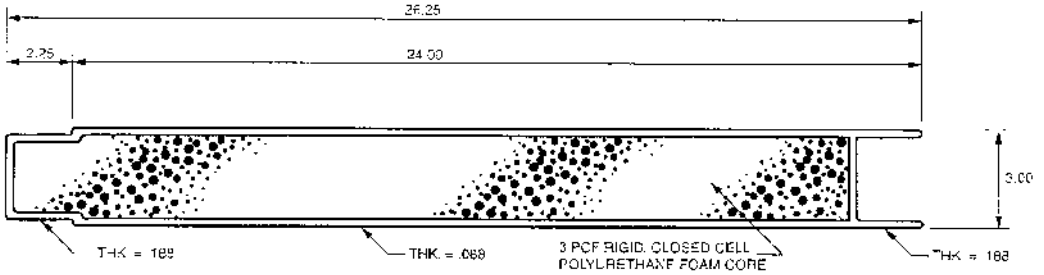
PHYSICAL PROPERTIES (NOMINAL)		
PROPERTY	**1" PANEL**	**3" PANEL**
Weight (lbs/linear ft.)	1.99	7.85
Panel Width (in.)	12	24
'R' Factor	7	21
Foam Density (lbs/cu. ft.)	3	3
Min. thickness FRP composite skin (in.)	.060	.088
Flame Spread Rating		
• Fiberglass Composite skin	MAX 25	MAX 25
• Foam	MAX 25	MAX 25
Water Absorption	<3% if properly sealed	<.3% if properly sealed
UL94	VO	VO

MECHANICAL PROPERTIES (NOMINAL)		
PROPERTY	**1" PANEL**	**3" PANEL**
Flexural Strength (psi)	1,750	869
Flexural Modulus (10^6 psi)	.2	.17
Short Beam Shear (psi)	113	90
Coefficient of Thermal Exp. 10^{-6} in/in/°F	5.2	5.2
Pullout Test (pull through) (lbs.)		
• Std. washer (1" dia. with 3/8" hole)	650	730
• Fender washer (2" dia. with 1/2" hole)	1,300	1,620
Crush Test (6" x 6" load plate) (lbs.)	5,600	6,750
Crush Test (full width) (lbs.)		
• 1" dia. bar	5,200	
• 2-1/2" dia. bar		18,800

NOMINAL DIMENSIONS



1" x 12" DURASHIELD®



3" x 24" DURASHIELD®

ROOFING AND SIDING LOAD TABLES

1" PANEL ALLOWABLE UNIFORM LOAD (psf) **

SPAN (ft.)	@Δ = span/60			@Δ = span/120			@Δ = span/180		
	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing
4	.8	*138	*136	.4	*138	*136	.27	90	88
5	1.0	*88	*86	.5	72	70	.33	40	38
6	1.2	*61	*59	.6	38	36	.40	20	18
7	1.4	45	43	.7	22	20	.47	12	10
8	1.6	32	30	.8	14	12	.53	8	6
9	1.8	22	20	.9	8	6	.60	4	2
10	2.0	14	12	1.0	6	4	–	–	–
11	2.2	10	8	1.1	4	2	–	–	–
12	2.4	8	6	–	–	–	–	–	–

3" PANEL ALLOWABLE UNIFORM LOAD (psf) **

SPAN (ft.)	@Δ = span/60			@Δ = span/120			@Δ = span/180		
	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing	Δ (IN.)	Siding	Roofing
6	1.2	*340	*336	.6	289	285	.4	190	186
7	1.4	*246	*242	.7	188	184	.47	124	120
8	1.6	*189	*185	.8	129	125	.53	85	81
9	1.8	*150	*146	.9	93	89	.60	61	57
10	2.0	*121	*117	1.0	69	65	.67	45	41
11	2.2	100	96	1.1	53	49	.73	35	31
12	2.4	84	80	1.2	41	37	.80	27	23
13	2.6	67	63	1.3	33	29	.87	22	18
14	2.8	55	51	1.4	27	23	.93	18	14
15	3.0	45	41	1.5	22	18	1.00	15	11
16	3.2	38	34	1.6	18	14	1.07	12	8
17	3.4	32	28	1.7	16	12	1.13	10	6
18	3.6	27	23	1.8	13	9	1.20	9	5
19	3.8	23	19	1.9	11	7	1.27	8	4
20	4.0	20	16	2.0	10	6	1.33	7	3

*Controlled by stress with a factor of safety of 1.50.
**Values are typical.

PERFORMANCE: These tables are offered as a guide only. The effects of sustained impact or dynamic loads, the particular corrosive environment and/or elevated temperatures have not been factored into these tables.

Hyperion Screw Pump Covers-Playa Del Rey, CA

Lake Heron WTP-Clarifier Covers-Ft. Gratiot, MI

4-Piece flat walkable odor control cover over Aeration Carrousel with Integral Access Hatch. Marianna, FL

Two 5-Piece flat walkable odor control covers over Aeration Carrousel with Integral Access Hatch. Marianna, FL

Fiberglass Structural Support framing for full tank odor control cover at Wolf Creek WWTP Abington, VA.

Fiberglass Cover panels being installed for above

HL Mooney Launder Covers Woodbridge, VA (Algae Covers-Un Sealed). Covers are walkable with non-skid and integral hatches

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Full Odor Control Cover over Thickeners at Parkesburg, WV WWTP with Integral Access Hatches to all of the primary maintenance areas.

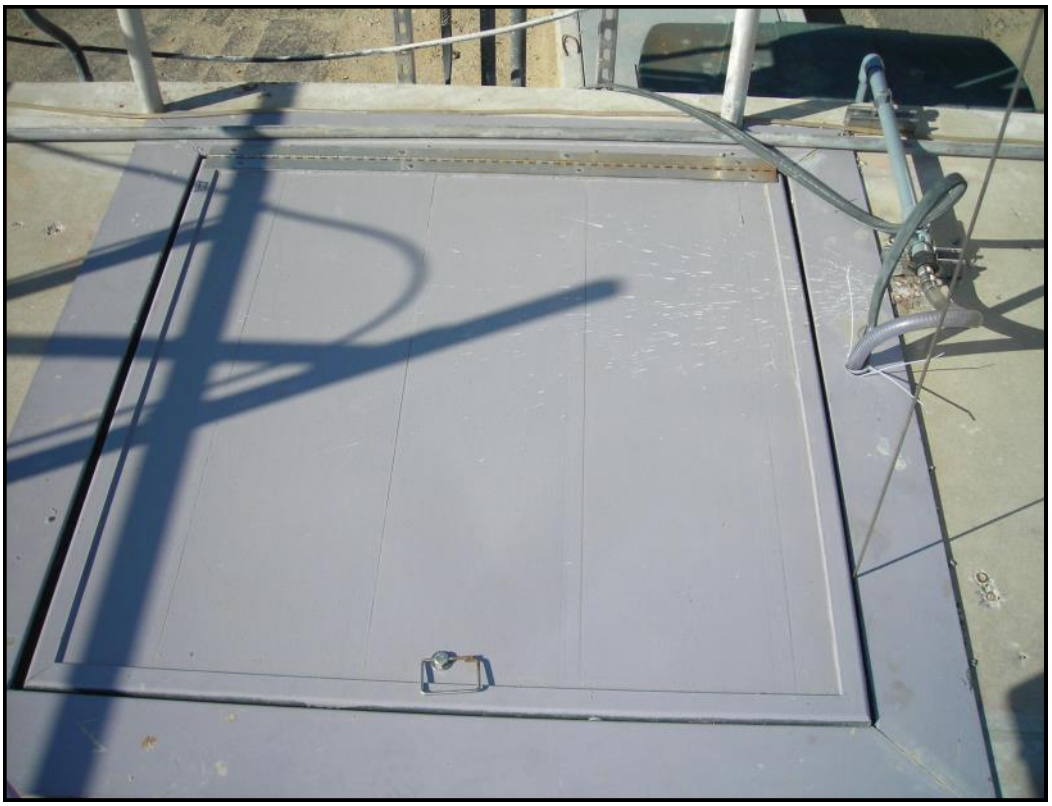
A raised support system had to be installed around the inside of the thickener to raise the bottom of the cover to sit level with the bottom flange of the center walkway beams. Each cover has an integral structural support system built into the underside of the cover to allow the cover to span up to 18'. When the covers are removed the supports being part of the cover are also removed to allow total access to the tank.

Odor Control Covers over Launders in Secondary Clarifiers at Parkersburg, WV WWTP. Covers have Integral Access Doors for maintenance.

Shown is Flat Covers over Effluent Trough with Integral Doors to access weirs for maintenance. At one end of this Control Cover the wall angle edge. The opposite end of the cover is supported by fiberglass plate columns and also can work as a seal surface.

Here shows a Launder Cover opening above an Odor Control Cover. Depicted as a sealed application with Fiberglass plates installed to accommodate wall opening also provides hanger supports for cover.

Above is a raised equipment drop-in access door assembly for Ontario, CA. This fabricated door assembly can be provided with sealed or non-sealed applications. Raised doors are used to protect equipment that protrudes above the concrete deck. Both halves are hinged for total access.



This flat drop in floor access door is also installed in Ontario, CA. The flange around the opening is 6" x 6" x 1/4", and can be recessed if a form out is done prior to installation or it can be set in as is without creating a tripping hazard. This door was installed in an existing structure. This door also can be provided sealed or not sealed.