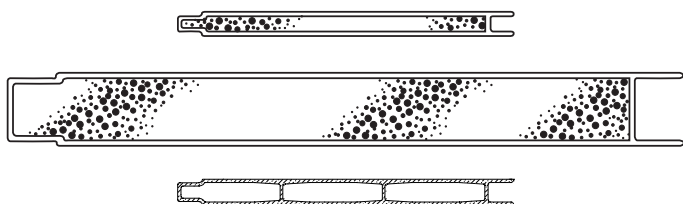


DURASHIELD® & DURASHIELD HC®

FIBERGLASS FOAM CORE/HOLLOW CORE BUILDING PANELS



DURASHIELD® Fiberglass Foam Core Building Panels



DURASHIELD® panels are used as plant roofs and chemical tank covers in corrosive environments, such as the covers (16,800 sq. ft.) (1,560 m²) over anaerobic digester units pictured above.



Airtight enclosure for Dow Chemical protects workers in adjacent areas against accidental escape of phosgene gas.



Compaq Computer chose a foam core panel building to assure RFI/EMI compliance for attenuation.



DURASHIELD® panels were used to help Roth-Käse, an award-winning cheese manufacturer, comply with USDA sanitation standards. 3" (76.2mm) and 1" (25.4mm) DURASHIELD® panels were used to create interior walls, a ceiling, and exterior walls because they are lightweight and can easily be removed for cleaning and moving equipment within the factory. The panels were also quick and easy to install, eliminating the need for insulation, paneling, or painting.

Features

DURASHIELD® is a tongue-and-groove fiberglass pultruded panel comprised of a pultruded skin over a foam core. The exclusively made in the U.S.A. panel provides these features:

- Integral Insulation
- Corrosion Resistant
- High Strength
- Transparent to Electromagnetic Emissions
- Lightweight
- Low in Conductivity
- Flame Retardant

Sizes

DURASHIELD® panels are available in 1" thick x 12" wide (25.4mm x 304.8mm) and 3" thick x 24" wide (76.2mm x 609.6mm) sizes. Panels can be produced in any practical length.

Materials of Construction

The pultruded fiberglass skin of DURASHIELD® is available in either a premium polyester or a vinyl ester resin. Both resin systems provide flame retardance (UL 94 V-0). Vinyl ester is utilized in extreme corrosive applications. A synthetic surfacing veil is incorporated into the skin to improve weathering, corrosion resistance, and resistance to degradation from ultraviolet rays. Resistance to weathering can be further enhanced by the application of a polyurethane paint.

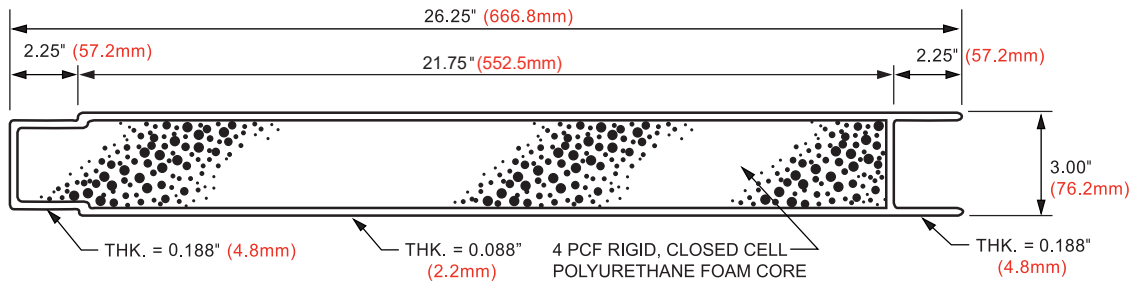
The core material, which provides the insulation value of DURASHIELD®, is a rigid closed-cell urethane foam. The ends of the panels must be encapsulated or coated with a resin similar to the skin resin to maintain the corrosion and weather resistant qualities of the total panel.

Applications

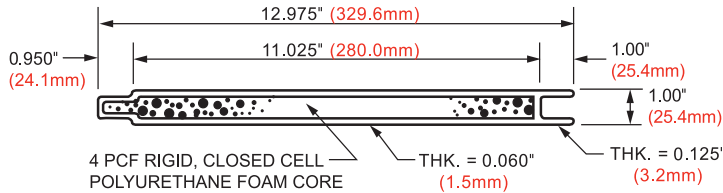
DURASHIELD® panels are designed to be used as walls, roofs, and covers. Typical applications are:

- Radar, Microwave, Radio, and TV Antenna Enclosures
- Enclosures for Electrical Equipment
- Enclosures of Chemical Processing Operations
- Buildings for EMI Testing (Computer Testing)
- Chemical Pit Covers
- Roofs on Wet-End Pulp and Paper Manufacturing
- Modular Buildings
- Walls/Flooring for Food Processing Operations

DURASHIELD® Properties (Nominal)



3" x 24" Foam Core Panel
3.00" x 26.25" (76.2mm x 666.8mm) actual size



1" x 12" Foam Core Panel
1.00" x 12.975" (25.4mm x 329.6mm) actual size



PHYSICAL	1" (25.4mm) PANEL	3" (76.2mm) PANEL
Weight (lbs/linear ft) (kg/m)	2.2 (3.27)	7.85 (11.71)
Panel Width (in) (mm)	12 (304.8)	24 (609.6)
R-value ((hr ft² °F)/BTU) RSI value ((m²K)/W)	5 (0.88)	17 (2.99)
Foam Density (lbs/cu. ft) (kg/m³)	4 (64.1)	4 (64.1)
Min. thickness FRP composite skin (in) (mm)	0.060 (1.524)	0.088 (2.235)
Coefficient of Thermal Exp. (10 ⁻⁶ in/in/°F) (10 ⁻⁶ mm/mm/°C)	5.2 (9.36)	5.2 (9.36)
Flame Spread Rating (ASTM E-84): • Fiberglass Composite Skin • Foam	MAX 25 MAX 25	MAX 25 MAX 25
Water Absorption	<0.3% if properly sealed	<0.3% if properly sealed
UL 94	V-0	V-0
MECHANICAL		
LW Flexural Strength (psi) (N/mm²) (ASTM D790)	1,750 (12.07)	869 (6)
LW Flexural Modulus (10 ⁶ psi) (10 ⁹ N/mm²) (ASTM D790)	0.2 (1.38)	0.17 (1.17)
LW Short Beam Shear (psi) (N/mm²) (ASTM D2344)	113 (0.78)	90 (0.62)
Pullout Test (pull through) (lbs) (N) • Std. washer (1" (25.4mm) dia. with 3/8" (9.525mm) hole) • Fender washer (2" (50.8mm) dia. with 1/2" (12.7mm) hole)	650 (2,890) 1,300 (5,785)	730 (3,245) 1,620 (7,209)
Crush Test (6" x 6" (152.4mm x 152.4mm) load plate) (lbs) (N)	5,600 (24,920)	6,750 (30,037)
Crush Test (full width) (lbs) (N) • 1" (25.4mm) dia. bar • 2-1/2" (63.5mm) dia. bar	5,200 (23,140) —	— 18,800 (83,660)

Electrical power companies use DURASHIELD® in non-conductive battery enclosures. Several containers were placed in the mountain ranges of Chile where power lines cannot run. This particular enclosure holds approximately 72 batteries, prevents battery acid leakage, and meets NEMA 3R standards.



DURASHIELD® 3" (76.2mm) foam core panels and DURASHIELD HC® 1" (25.4mm) hollow core panels were used as cladding on this drilling rig which was assembled and moved to a barge before being installed on land in Alaska.



DURASHIELD® Foam Core Panel Roofing & Siding Load Tables (Imperial)

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	0.8	*138	*136	0.4	*138	*136	0.27	90	88
5	1.0	*88	*86	0.5	72	70	0.33	40	38
6	1.2	*61	*59	0.6	38	36	0.40	20	18
7	1.4	45	43	0.7	22	20	0.47	12	10
8	1.6	32	30	0.8	14	12	0.53	8	6
9	1.8	22	20	0.9	8	6	0.60	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	0.6	289	285	0.40	190	186
7	1.4	*246	*242	0.7	188	184	0.47	124	120
8	1.6	*189	*185	0.8	129	125	0.53	85	81
9	1.8	*150	*146	0.9	93	89	0.60	61	57
10	2.0	*121	*117	1.0	69	65	0.67	45	41
11	2.2	100	96	1.1	53	49	0.73	35	31
12	2.4	84	80	1.2	41	37	0.80	27	23
13	2.6	67	63	1.3	33	29	0.87	22	18
14	2.8	55	51	1.4	27	23	0.93	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.

DURASHIELD® Foam Core Panel Roofing & Siding Load Tables (Metric)

25.4mm PANEL ALLOWABLE UNIFORM LOAD (N/m²)**

SPAN (m)	@Δ = span/60			@Δ = span/120			@Δ = span/180		
	Δ (mm)	Siding	Roofing	Δ (mm)	Siding	Roofing	Δ (mm)	Siding	Roofing
1.00	16.667	*7500	*7300	8.333	*7400	*7000	5.556	5700	5500
1.25	20.833	*6250	*6100	10.417	*6000	*5800	6.944	4050	3900
1.50	25.000	*4350	*4200	12.500	3500	3350	8.333	1900	1750
1.75	29.167	3150	3000	14.583	2100	1950	9.722	1100	950
2.00	33.333	2450	2300	16.667	1300	1150	11.111	700	550
2.25	37.500	1850	1700	18.750	850	700	12.500	480	380
2.50	41.667	1400	1300	20.833	550	450	13.889	320	220
2.75	45.833	1050	900	22.917	350	250	15.278	180	80
3.00	50.000	700	550	25.000	300	200	–	–	–
3.25	54.167	500	350	27.083	200	100	–	–	–
3.50	58.333	420	300	–	–	–	–	–	–

76.2mm PANEL ALLOWABLE UNIFORM LOAD (N/m²)**

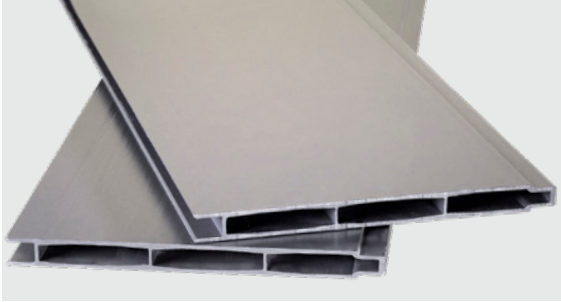
SPAN (m)	@Δ = span/60			@Δ = span/120			@Δ = span/180		
	Δ (mm)	Siding	Roofing	Δ (mm)	Siding	Roofing	Δ (mm)	Siding	Roofing
2.00	33.333	*13200	*13000	16.667	10600	10400	11.111	6800	6600
2.25	37.500	*10200	*10000	18.750	7400	7200	12.500	5000	4800
2.50	41.667	*8450	*8200	20.833	5600	5400	13.889	3650	3450
2.75	45.833	*7000	*6800	22.917	4300	4100	15.278	2900	2700
3.00	50.000	*5900	*5700	25.000	3400	3300	16.667	2250	2100
3.25	54.167	5000	4800	27.083	2750	2550	18.056	1800	1600
3.50	58.333	4300	4100	29.167	2200	2000	19.444	1400	1200
3.75	62.500	3700	3500	31.250	1800	1600	20.833	1200	1000
4.00	66.667	3200	3000	33.333	1500	1300	22.222	1050	850
4.25	70.833	2600	2400	35.417	1300	1100	23.611	850	650
4.50	75.000	2200	2000	37.500	1050	850	25.000	720	520
4.75	79.167	1900	1700	39.583	900	700	26.389	620	420
5.00	83.333	1700	1500	41.667	800	600	27.778	500	320
5.25	87.500	1400	1200	43.750	720	520	29.167	450	250
5.50	91.667	1250	1050	45.833	600	400	30.556	410	210
5.75	95.833	1100	800	47.917	500	300	31.944	380	190
6.00	100.000	950	750	50.000	450	280	33.333	300	150

*Controlled by stress with a factor of safety of 1.50.

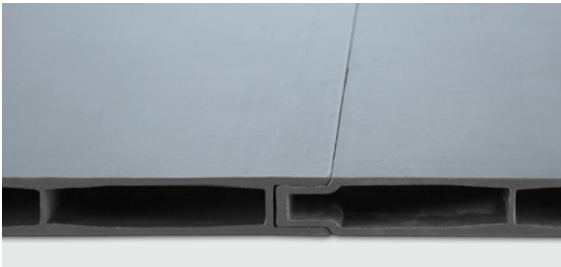
**Values are typical.

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.

DURASHIELD HC® Fiberglass Hollow Core Building Panels



DURASHIELD HC® panels can be used in many of the same applications as DURASHIELD® when projects do not require insulation. The intermediate ribs also provide extra stiffness.



DURASHIELD HC® panels are assembled using the simple tongue-and-groove connection. The panels are easy to install, withstand corrosive environments, and can even be ordered in various colors.



DURASHIELD HC® panels are commonly used in the construction of cooling tower interior partition walls.

Features

DURASHIELD HC® is a non-insulated alternative to standard DURASHIELD®. The hollow core panel is a sensible choice for any type of roofing, flooring, enclosures, or screening that does not require insulation. As a tongue-and-groove building panel, it offers quick assembly and easy installation in various applications. Made exclusively in the U.S.A., DURASHIELD HC® panel provides these features:

- Lightweight
- Easy to Install
- Rot, Rust, and Mildew Resistant
- Low in Conductivity
- High Strength
- Flame Retardant
- Low in Maintenance

The pultruded panel's unique hollow core and intermediate ribs provide extra stiffness for uses such as decking, cladding, or tank covers. The panels can be bonded together with standard adhesives and attached to structural shapes with bolts or screw fasteners. Panels will not rot, rust, or mildew, which makes them ideal for high moisture environments including saltwater.

Sizes

DURASHIELD HC® is available as a 1" thick x 12" wide (25.4mm x 304.8mm) panel. The panels can be produced in any practical length.

Materials of Construction

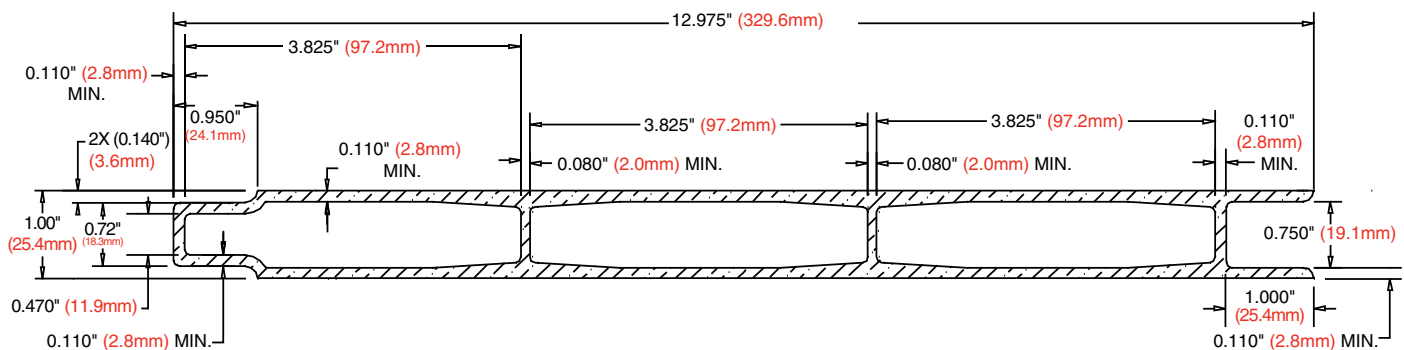
A synthetic veil is incorporated into the surface to improve weathering, corrosion, and UV resistance. The standard resin system of DURASHIELD HC® is polyester; however, it can be custom ordered with a vinyl ester resin for highly corrosive applications. Both resin systems include flame retardants and meet the requirements of a Class 1 flame spread per ASTM E-84 and the self-extinguishing requirements of ASTM D635.

Applications

DURASHIELD HC® panels are designed to be used as walls, roofs, and covers. Typical applications are:

- Cladding
- Decking
- Cellular Enclosures and Screening
- Tank Covers
- Cooling Tower Partition Walls
- Buildings and Enclosures when Insulation is Not Required

DURASHIELD HC® Dimensions (Nominal)



DURASHIELD HC[®] Properties (Nominal)



PHYSICAL		1" (25.4mm) PANEL
Depth (in) (mm)		1 (25.4)
Panel Width (in) (mm)		12 (304.8)
Weight (lbs/linear ft) (kg/linear m)		3.27 (4.87)
Area (in ²) (mm ²)		3.914 (2,525)
Section Modulus (SX) (in ³ /ft of width) (mm ³ /m of width)		1.312 (70,357)
Moment of Inertia (IX) (in ⁴ /ft of width) (mm ⁴ /m of width)		0.656 (895,826)
Coefficient of Thermal Exp. (10 ⁻⁶ in/in/°F) (10 ⁻⁵ mm/mm/°C)		7.0 (1.2)
Flame Spread Rating (ASTM E-84):		MAX 25
Water Absorption		<0.6%
UL 94		V-0

MECHANICAL			1" (25.4mm) PANEL
LW Compressive Strength (psi) (N/mm ²)	ASTM D695		50,000 (344.8)
LW Compressive Modulus (10 ⁶ psi) (10 ⁶ N/mm ²)	ASTM D695		3.5 (24,141)
LW Tensile Strength (psi) (N/mm ²)	ASTM D638		58,000 (400)
LW Tensile Modulus (10 ⁶ psi) (10 ⁶ N/mm ²)	ASTM D638		3.5 (24,141)
LW Short Beam Shear (psi) (N/mm ²)	ASTM D2344		4,500 (31)

DURASHIELD HC[®] Roofing & Siding Load Tables

1" PANEL ALLOWABLE UNIFORM LOAD (PSF)**

SPAN (ft)	@Δ = span/60		@Δ = span/120		@Δ = span/180		@Δ = span/240		@Δ = span/300		@Δ = span/360	
	LOAD (lbs/ft ²)	Δ (in)	LOAD (lbs/ft ²)	Δ (in)	LOAD (lbs/ft ²)	Δ (in)	LOAD (lbs/ft ²)	Δ (in)	LOAD (lbs/ft ²)	Δ (in)	LOAD (lbs/ft ²)	Δ (in)
2.0	1727	0.40	863	0.20	576	0.13	432	0.10	345	0.08	288	0.07
2.5	1045	0.50	523	0.25	348	0.17	261	0.13	209	0.10	174	0.08
3.0	671	0.60	335	0.30	224	0.20	168	0.15	134	0.12	112	0.10
3.5	451	0.70	225	0.35	150	0.23	113	0.18	90	0.14	75	0.12
4.0	315	0.80	157	0.40	105	0.27	79	0.20	63	0.16	52	0.13
4.5	226	0.90	113	0.45	75	0.30	57	0.23	45	0.18	38	0.15
5.0	168	1.00	84	0.50	56	0.33	42	0.25	34	0.20	28	0.17
5.5	127	1.10	64	0.55	42	0.37	32	0.28	25	0.22	21	0.18
6.0	99	1.20	49	0.60	33	0.40	25	0.30	20	0.24	16	0.20
6.5	78	1.30	39	0.65	26	0.43	20	0.33	16	0.26	13	0.22
7.0	63	1.40	31	0.70	21	0.47	16	0.35	13	0.28	10	0.23
7.5	51	1.50	26	0.75	17	0.50	13	0.38	10	0.30	9	0.25
8.0	43	1.60	21	0.80	14	0.53	11	0.40	9	0.32	7	0.27

25.4mm PANEL ALLOWABLE UNIFORM LOAD (N/m²)**

SPAN (m)	@Δ = span/60		@Δ = span/120		@Δ = span/180		@Δ = span/240		@Δ = span/300		@Δ = span/360	
	LOAD (N/m ²)	Δ (mm)	LOAD (N/m ²)	Δ (mm)	LOAD (N/m ²)	Δ (mm)	LOAD (N/m ²)	Δ (mm)	LOAD (N/m ²)	Δ (mm)	LOAD (N/m ²)	Δ (mm)
0.50	88000	8.333	48000	4.167	32000	2.778	25000	2.083	19000	1.667	15000	1.389
0.75	51000	12.500	25000	6.250	17000	4.167	12800	3.125	10000	2.500	8300	2.083
1.00	22000	16.667	11200	8.333	7400	5.556	5600	4.167	4400	3.333	3700	2.778
1.25	14000	20.833	6500	10.417	4800	6.944	3700	5.208	2500	4.167	1900	3.472
1.50	8200	25.000	4000	12.500	2600	8.333	2000	6.250	1600	5.000	1500	4.167
1.75	5200	29.167	2600	14.583	1900	9.722	1200	7.292	1000	5.833	800	4.861
2.00	3500	33.333	1700	16.667	1100	11.111	900	8.333	700	6.667	600	5.556
2.25	2500	37.500	1200	18.750	800	12.500	700	9.375	400	7.500	430	6.250
2.50	1200	41.667	950	20.833	500	13.889	250	10.417	300	8.333	280	6.944

**Values are typical.

NOTE: Controlled by stress with a factor of safety of 1.50. **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.

Supporting Fiberglass Structural Shapes

DURASHIELD® and DURASHIELD HC® panels are made for use with Strongwell's EXTREN® line of structural shapes. EXTREN® is available in more than 100 standard shapes. Common additional supporting shapes are listed below.

USE	1" (25.4mm) PANEL SUPPORTING SHAPES		3" (76.2mm) PANEL SUPPORTING SHAPES	
	SHAPE DESCRIPTION		SHAPE DESCRIPTION	
SECTION/BASE	Standard EXTREN® Angle		Standard EXTREN® Angle	
CORNER POST	Standard EXTREN® Angles Inside & Outside		Standard EXTREN® Angles Inside & Outside	
ROOF JOINER	90° Custom Angle		90° Custom Angle	
DOOR FRAMING	EXTREN® Channel	1-1/2" x 1-1/2" x 1/4" (38.1mm x 38.1mm x 6.35mm)	EXTREN® Channel	3-1/2" x 2" x 7/32" (88.9mm x 50.8mm x 5.56mm)
WINDOW LOUVERS	EXTREN® Channel	1-1/2" x 1-1/2" x 1/4" (38.1mm x 38.1mm x 6.35mm)	EXTREN® Channel	3-1/2" x 2" x 7/32" (88.9mm x 50.8mm x 5.56mm)
FASTENERS	3/8" (9.53mm) dia. FIBREBOLT® Stud & Nut Stainless Steel (optional)		1/2" (12.7mm) dia. FIBREBOLT® Stud & Nut Stainless Steel (optional)	



ISO 9001 Quality Certified Manufacturing Plants

BRISTOL LOCATION

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