



BUILDING PRODUCTS
TUFFSPAN™

TuffSpan Insulated Composite Panel

NOW SHOP ASSEMBLED!!!

With a proven history of outstanding product performance, TuffSpan FRP roofing and siding is the market leader providing safe, weathertight, long-term building solutions in the most chemically aggressive and harsh environments. The TuffSpan technology utilizes premium raw materials and constructability designed to achieve the highest performance.



TuffSpan ICP

New Shop Fabricated Insulated Panel!

Introducing Enduro's next generation non-metallic insulated panel system, TuffSpan ICP (insulated composite panel) utilizes insulation board sandwiched between premium TuffSpan fiberglass exterior and interior panels. Now shop fabricated, the ICP panels significantly reduce total installed time and cost while providing excellent corrosion resistance and superior UV protection, extending a building's service life in the most chemically aggressive and harsh environments.

REDUCED INSTALLED COST

- Shop Fabricated • Modular Design • Lightweight

The shop fabricated TuffSpan ICP panel's enhanced modular design provides a more efficient installation method, greatly reducing installation time and costs. In addition to the installation cost savings from reduced manhours, reducing the construction time onsite positions the facility to begin operations sooner. Utilizing fiberglass panels for both exterior and interior panels provides a lightweight insulated panel with better maneuverability and ease of installation.

EXCELLENT CORROSION RESISTANCE

- Long Service Life • Maintenance Free

Enduro's ICP panels utilize TuffSpan for the exterior and interior panels, which do not corrode in facilities with continuous wet or tough chemical exposure. Its premium, isophthalic polyester, aliphatic, or vinyl ester resin system ensures long, maintenance free service life and dramatically improves work conditions.

SUPERIOR UV PROTECTION

- Extended Color Retention • Greater Aesthetics

TuffSpan panels utilize an acrylic polymer coating and UV stabilized resin system resulting in extended UV protection and retention of its aesthetic properties. The premium resin options offer the best weathering and color retention properties for structural, corrosion resistant cladding panels.



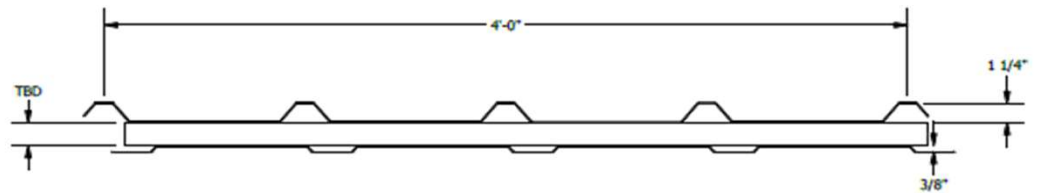
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TuffSpan ICP



Roofing Positive Load

L/D = 60

Moment FOS = 2.5

Uniform Load, PSF	20			30			40			50			60		
Span	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
ICP 450	6.08	8.16	7.50	5.25	7.08	6.50	4.83	6.41	5.91	4.41	5.83	5.50	4.16	5.33	5.16

Roofing Negative Load

L/D = 60

Moment FOS = 1.88

Pullover FOS = 1.88

Uniform Load, PSF	20			30			40			50			60		
Span	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
ICP 450	6.08	8.16	7.50	5.25	7.08	6.50	4.83	6.41	5.83	4.41	6.00	5.50	4.16	5.58	5.16

Siding Wind & Liner Load

L/D = 30

Moment FOS = 1.88

Pullover FOS = 1.88

Uniform Load, PSF	20			30			40			50			60		
Span	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
ICP 450	7.66	10.25	9.41	6.66	8.75	8.25	6.08	7.58	7.50	5.58	6.75	6.91	5.25	6.17	6.50

Maximum spans are shown in lineal feet and based on panel fasteners, w/.729" diameter washers, located 6" on center. Span limits and structural properties are determined from large-scale tests that consider bending moment at failure, flexural stiffness, and pullover force per fastener.

Span conditions shown apply to all insulation thicknesses.

MATERIAL CHARACTERISTICS & TEST CERTIFICATIONS:

Exterior and Interior Panels	TuffSpan fiberglass		
Panel Resin	AHR (Aliphatic Hybrid), PFR (Iso-polyester), VFR (Vinyl Ester)		
Insulation*	Polyisocyanurate Rigid Board (2" = R-value of 13; 3" R-value of 20)		
Panel Lengths	12 Ft	14 Ft	16 Ft
Panel Weights**	107 lbs (2"); 115 lbs (3")	125 lbs (2"); 135 lbs (3")	143 lbs (2"); 155 lbs (3")
Standard Colors	Gray, White, Beige, Stone-white-R (Contact Enduro for others)		
Flame Spread Rating, ASTM E84	Class 1, 25 or less		

* Polyisocyanurate board insulation in 2" and 3" thicknesses are standard insulation type and thicknesses for TuffSpan ICP.

For other type and thickness, please contact Enduro.

** Panel weights are nominal. For comparison, ICP panels are 48" coverage width vs industry standard 36" coverage width.

SPECIFICATION:

2.01 - Manufacturers

The standard for design, characteristics, and performance shall be TuffSpan ICP as manufactured by Enduro Composites, Inc.

2.02 - Materials

A. Insulated roofing and siding panel system shall conform to the following:

1. Insulated panel system shall be shop fabricated and delivered to jobsite with exterior panel, interior panel and insulation pre-assembled.
2. Profiles shall be 12 X 1.5C for exterior and 12 X 0.375C for interior.
3. Exterior and interior panels shall be made of TuffSpan fiberglass reinforced polymer (FRP) or approved FRP equal.
4. Resin type shall be premium grade, Isophthalic Polyester resin, UV stabilized, with neopentyl glycol and acrylic monomer.
5. Glass fiber reinforcements of FRP panels shall be straight, continuous bi-directional along the length and width.
6. Foam insulating core shall be 2" (R13) or 3" (R20) thick, polyisocyanurate board insulation.
7. Materials shall be fire retardant with UL Class 1 flame spread rating of 25 or less per ASTM E-84 test.
8. Exterior panel shall be protected from UV rays by the following, at minimum:
 - UV acrylic polymer exterior coating, factory applied, with minimum 0.4 mil dry film thickness
 - Surfacing veil
 - Embossed resin rich surface
9. Finish shall be embossed top/smooth bottom (exterior) and smooth/smooth (interior).
10. Color shall be Enduro standard or as selected by owner.

