

enduro

Tuff Span
FRP Building Products



World-Leading
Structural FRP Building Panels

www.endurocomposites.com

Series

FR 150 - 8 oz/sf
FR 200 - 9 oz/sf
FR 250 - 10.5 oz/sf
FR 300 - 12 oz/sf
FR 400 - 14 oz/sf
FR 450 - 16 oz/sf
FM 10 - 10.5 oz/sf
FM 13 - 13.5 oz/sf
FM 16 - 16.5 oz/sf

Colors

Opaque

gray, white, beige,
stone white, shale

Translucent

gray, white, beige,
stone white, shale,
clear, green, blue,
gray mist

Enduro has the ability to produce colors matched to existing structures.

More colors available, contact us.

Applications

Roofing & Siding
Daylighting Panels
Roof & Form Deck
Insulated Panel Systems
Cooling Tower Casing
Lagging Panels



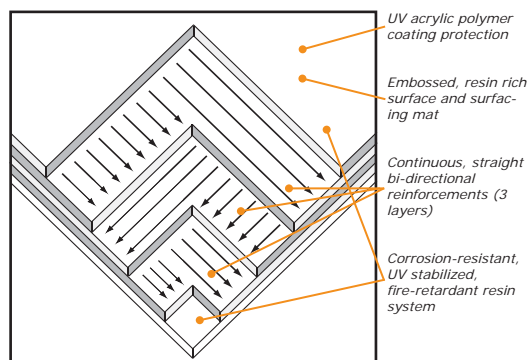
Tuff Span Building Panels

World-Leading Industrial Building Panels

For demanding structural and environmental conditions, Tuff Span FRP building panels from Enduro deliver unsurpassed performance as industrial roofing and siding.

Strength

In FRP materials, strength and stiffness is determined by the alignment and amount of its glass fiber reinforcements.



Higher content of glass fiber reinforcements in straight & continuous bidirectional alignment makes Tuff Span the strongest profiled FRP building panel.

For effective reaction and transfer of loads, Tuff Span is constructed with high reinforcing content placed in straight and continuous, bi-directional alignment. As a result, Tuff Span has higher strength and stiffness of any profiled FRP building panel and history of standing up to hurricane winds where aged metal, cementitious, and other materials have failed. Providing personnel safety, Tuff Span Series 450 is the standard for walkable, FRP roofing.

Corrosion Resistance

To resist attack from aggressive chemical exposure, Tuff Span is formulated with premium resin systems, Iso-Polyester or Vinyl Ester.

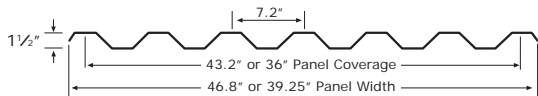
UV Protection

Extended and superior UV protection is provided by an exterior acrylic coating, UV stabilized resin, embossed resin-rich surface, and interior mat or veil.

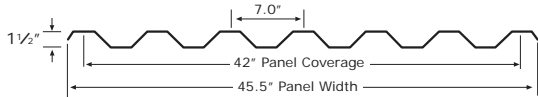
Standard Profiles

Roofing & Siding

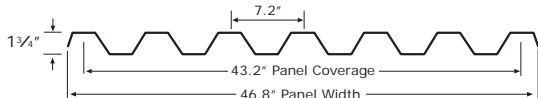
7.2 x 1.5 Rib



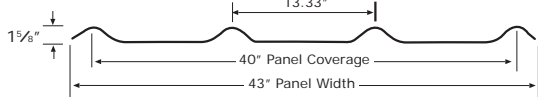
7.0 x 1.5 Rib



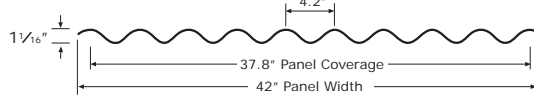
7.2D x 1.75 Rib



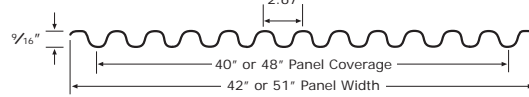
Trafford Tile



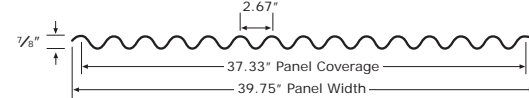
4.2 x 1.06 Corrugated



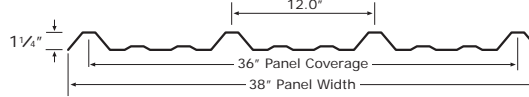
2 1/2 x 1/2 Corrugated



2.67 x 7/8 Corrugated



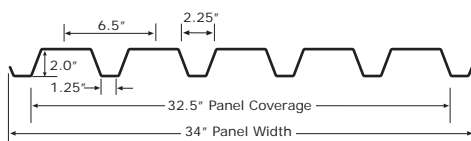
12.0 x 1 1/4 R-Panel



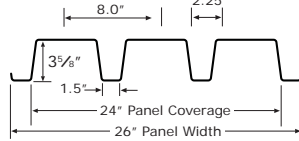
More profiles available, contact us

Roof Deck

6.5 x 2 Series 500



8.0 x 3.5 Series 700



Technical Data

Tuff Span Materials	PFR/VFR						FM		
	150	200	250	300	400	450	10	13	16
Nominal Weight, Oz/SF	8	9	10.5	12	14	16	10.5	13.5	16.5
Nominal Glass Content	48% by Wt.						30% by Wt.		
Flame Spread Rating, ASTM E-84	25 or less (Class 1)						15 (Class 1)		
FM Standard 4880	Not Applicable						Approved		
Fire Test for Roof Coverings, ASTM E-108	Class C: 3/12 max slope						Class B: 3/12 max slope		

PFR = Iso-Polyester Fire Retardant; VFR = Vinyl Ester Fire Retardant; FM = FM Approved Iso-Polyester

Standard Colors	Light Transmission
Gray, White, Beige, Shale, Stone White	Opaque
Translucent Clear	Up to 80%
Translucent White	Up to 50%
Translucent Gray, Beige, Shale, Stone White	Up to 40%

Translucent color only available in Polyester resin, FR series

Case Histories



Pulp & Paper

Tuff Span FM approved siding and louvers that replaced deteriorated metal units for this 210' tall recovery boiler. Challenging conditions include high load and corrosive elements from both the internal process and coastal location.



Metal Processing

Installed over its HCL pickling line, Tuff Span roofing, siding, and beams provide outstanding performance and cost savings for this steel plant. Natural light transmitting through the translucent roofing improves work conditions and lowers utility bills.



Mining

Tuff Span roofing, siding, and ridge vents installed in 1997 have maintained a high level of performance for this Copper Refinery in Mexico.

Power and Fertilizer Plant Case Histories

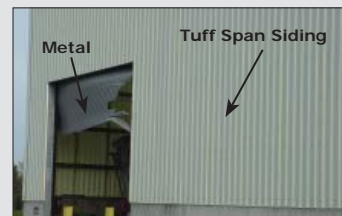
Tuff Span FRP roofing and siding panels from Enduro are installed on buildings around the world including coastal, hurricane zones. In 2004, a waste-to-energy facility located along the Florida Gulf Coast suffered direct hits from Hurricane Charley's 145 mph winds. Metal siding panels on the plant's side wall, weakened by corrosion, were completely blown off or severely damaged. Enduro's Tuff Span panels installed on the facility's roof and end wall, however, withstood the extreme conditions and were not at all damaged.

Hurricane Charley's fierce winds also hit a nearby fertilizer plant with Tuff Span roofing and siding installed. While the facility's steel roll-up doors were extremely damaged, the adjacent Tuff Span panels withstood the destructive winds. The facility's manager noted, "Almost every building in the area was damaged except the Tuff Span FRP panels, which survived the storm intact."



Above: Metal siding at waste-to-energy plant was completely blown off or damaged while the adjacent Tuff Span siding and roofing withstood the extreme winds.

Right: Steel roll-up door at fertilizer plant was destroyed while adjacent Tuff Span siding was not damaged.



More Tuff Span Products

Enduro offers a complete system of FRP building products designed specifically for challenging structural and environmental conditions.

Beams

Channel

Louvers

Angle

Ridge Vents

Tube

Gutter Systems

Flat Plate

Building Structures



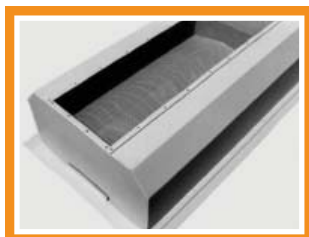
Enduro FRP structural members at a water treatment plant



Enduro FRP louvers on an offshore platform off the Gulf Coast



Enduro FRP primary & secondary beams



Enduro FRP Ridge Vent

About Enduro

Founded in 1975, Enduro is a leader in innovative, engineered FRP products and systems. In addition to Tuff Span building products, Enduro manufactures a number of other FRP products including cable tray, tank covers, baffle wall, piping and vessels. We create value for our clients by working closely with them to understand their needs, then designing solutions that provide unparalleled functionality and value.



For more information about Enduro Tuff Span building panels and our other FRP products, call toll free **(800)-231-7271** or **(713)-358-4000**. Please visit us at our website at **www.endurocomposites.com**.

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