Cooling Tower Structures: FRP vs. Steel

Unlike steel which will rust when exposed to weathering and chemicals, fiberglass structural shapes are highly corrosion resistant. Features of both pultrusions and steel structural shapes are compared on a point-for-point basis below.

Concern	 **FRP**	 **Steel**
CORROSION RESISTANCE	Pultrusions are available in either polyester or vinyl ester resin for resistance to a broad range of chemicals. Painting required only when exposed to direct sunlight.	Subject to oxidation and corrosion. Requires painting or galvanizing for many applications.
WEIGHT	Lightweight - weighs 75% less than steel. 1/2" thick plate = 4.7 lbs./sq. ft.	Could require lifting equipment to move and place. 1/2" thick plate = 20.4 lbs.
CONDUCTIVITY	Does not conduct electricity. Low Thermal Conductivity 4 (BTU/SF/HR/IN).	Conducts electricity. Grounding potential. Thermal Conductivity 260-460 (BTU/SF/HR/IN).
STRENGTH	Pultrusions have a high strength-to-weight ratio, and pound-for-pound are stronger than steel in the lengthwise direction. Ultimate flexural strength (Fu) LW = 30 ksi CW = 10 ksi	Homogeneous material. Yield strength (Fy) 36 ksi
FLEXIBILITY	Modulus of elasticity: Will not permanently deform under working load. LW = 2.5 x psi CW = .8 x psi	Modulus of elasticity 29 x psi
FINISHING AND COLOR	Pigments added to the resin provide color throughout the part. Special colors available.	Must be painted for color. To maintain color and corrosion resistance, repainting may be required.
COST	Lower installation and maintenance costs in industrial applications often equal lower lifecycle costs.	Lower initial material cost.
FIELD FABRICATION	Pultruded fiberglass can be field fabricated using simple carpenter tools with carbon or diamond tip blades. Lightweight for easier erection and installation.	Often requires welding and cutting torches. Heavier material requires special handling equipment to erect and install.

References: Pultrusion Industry Council

ICST – International Cooling Solutions (Thailand) Co., Ltd.
9th Floor Serm-Mit Tower, 159 Sukhumvit 21, Asoke Road, North Klongtoey, Wattana, Bangkok 10110, Thailand
Tel. +662-661-7723 · icsthailand.co.th