

## GFRC : PHYSICAL CHARACTERISTICS:

**Shell Thickness:** 1/2" Nominal Standard (+1/8", -1/16" / Unit)

**Glass Fiber Content:** PCI Guidelines 5% (by Weight)

**Weight:** +/- (lbs/ft<sup>2</sup>) (varies with embedment reinforcement, piece shape)

### **Strength:**

Flexural:	Modulus of Rupture (MOR)	2500-4000 (PSI)
	Limit of Proportionality (LOP)	900-1500 (PSI)
	Flexural Modulus of Elasticity	1.5-2.9 x 10 <sup>6</sup> (PSI)
Tensile:	Ultimate Tensile (UTS)	1000-1600 (PSI)
	Yield – Bend-Over Point (BOP)	700-1000 (PSI)
	Strain to Failure	0.6-1.2%
Compressive Strength:		7000-12000 (PSI)
Charpy Impact Strength:		55-140 (in-lb/in <sup>2</sup> )
Poisson's Ratio:		0.3

**Heat:** Thermal Conductivity 3.5-7.2 (BTU/in/hr/ft<sup>2</sup>/°F)  
 Thermal Expansion Coefficient 6-9 (10<sup>-6</sup> in/in/°F)

**Fire:** Incombustible Material, ASTM E84-80 (UBC Class 1) Flame = 5 Fuel = 5 Smoke = 5

**Moisture:** Water Absorption by Weight 3-5%

**Density:** (Dry) 120-140 (PCF)

**Tolerances:** Fabrication: Dimensional – all directions +/- 1/8"

## **Typical Range of GFRC Properties\***

Property	28-day, (E)	Aged**, (A)
Density (dry)	120-140 (PSF)	120-140 (PCF)
Impact strength (Charpy)	55-140 (in. lb/in <sup>2</sup> )	20-28 (in. lb/in <sup>2</sup> )
Compressive strength (edgewise)	7000-12000 (PSI)	10000-12000 (PSI)
Flexural:	Yield (FY)	900-1500 (PSI)
	Ultimate strength (FU)	2500-4000 (PSI)
	Modulus of elasticity	1.5 x 10 <sup>6</sup> - 2.9 x 10 <sup>6</sup> (PSI)
Direct tension:	Yield (TY)	700-1100 (PSI)
	Ultimate strength (TU)	1000-1600 (PSI)
	Strain to failure	0.6-1.2 %
Shear:	Interlaminar	400-800 (PSI)
	In-plane	1000-1600 (PSI)
Coefficient of thermal expansion (77-115F)	6-9 x 10 <sup>-6</sup> (in/in/ °F)	6-9 x 10 <sup>-6</sup> (in/in/ °F)
Thermal conductivity	3.5-7.0 (BTU/in/hr/ft <sup>2</sup> / °F)	3.5-7.0 (BTU/in/hr/ft <sup>2</sup> / °F)

\* These are typical values and are not to be used for design control purposes. Each manufacturer must test production composites to establish physical properties for design. The values achieved in practice will be dependent on mix design, quality control of materials, fabrication process and curing.

\*\* Developed from accelerated testing programs on GFRC specimens immersed in 50 to 80 deg C water. On the basis of comparisons between behavior in real weather and accelerated tests, predictions can be made of properties for 50+ years in different climates.

## **IN ARCHITECTURE, IN BUILDING & IN ENGINEERING:**

GFRC presents architects and engineers with a material from which the most ambitious designs can be created. It can be molded to form modern futuristic designs or to replicate traditional historic features. GRC can be painted, faced with fine aggregates, coloured or simply left with a natural white or grey, smooth or textured finish.

GFRC provides the designer with a complete technology that few other materials can match for versatility.

GFRC is environmentally friendly.

GFRC products reduce loadings on buildings leading to significant savings in superstructure and foundations. GFRC is excellent for reproduction and renovation.

Hard Topix lightweight concrete (GFRC) design weighs 8lb/ft<sup>2</sup> per 3/4" thick.

\* Poravor recycled expanded glass beads cannot be used to lighten mix by 30% for weight of 5.4 lbs/ft<sup>2</sup> per 3/4" thick.

### **Support:**

Span between support varies, dependent on concrete thickness.

Standard 1 3/4" thick GFRC concrete countertop - span every 3 ft.

Any overhang exceeding 12" require additional support.



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