# GFRP vs Steel Rebar

**Traditional building materials have their place. But for harsh, corrosive environments, GFRP is a smart choice. Here's how GFRP compares to several traditional options.**

| | Aslan 100 GFRP Rebar | Steel A615 Grade 60 |
|---|---|---|
| **Corrosion Resistance** | Resists a broad range of chemicals and is unaffected by moisture or immersion in water. | Subject to oxidation and corrosion. Requires some form of protection in corrosive environments. |
| **Strength** | Tensile strengths vary by size and range from 80 ksi to 130 ksi. GFRP bars remain linear and elastic up to failure. | Homogeneous material. Yield strength ($F_y$) = 60 ksi, with permanent deformation above this stress. |
| **Weight** | Weighs 75% less than steel. | Could require lifting equipment to move and place. |
| **Electrical Conductivity** | No electrical conduction and is an excellent insulator. | Conducts electricity. |
| **Thermal Properties** | Excellent insulator with no thermal conductivity. Thermal conductivity = 3.5 BTU in. / (hr. $ft^2$ °F) Longitudinal Coefficient of Thermal Expansion = 5-6 (in./in./°F) $10^{-6}$ | Conducts heat. Thermal conductivity = 416 BTU in/ (hr. ft2°F) Coefficient of Thermal Expansion = 7 (in./in./°F) $10^{-6}$ |
| **Modulus of Elasticity** | 6.7 x $10^6$ psi | 29 x $10^6$ psi |
| **Cost** | Lower installation costs, less maintenance and longer product life allow for a lower lifecycle cost. | Lower initial material cost. |
| **EMI/RFI Transparency** | Transparent to radio waves and EMI/RFI transmissions. Used for radar and antennae enclosures and supports, and MRI rooms. | Can interfere with EMI/RFI transmissions. |
| **Fabrication** | Can be field cut using simple carpenter's tools with carbon or diamond tip blades. No torches or welding required. Light weight allows easier transport and installation. | Often requires welding and cutting torches. |

## Compare the numbers ...

| Property | FRP Composites - Pultruded GFRP | Steel - A615 Grade 60 |
|---|---|---|
| Density (lb/$ft.^3$) | 120 | 490 |
| Tensile Strength (ksi) | 80-130 | 60 |
| Tensile Modulus (x $10^6$ psi) | 6.7 | 29 |
| Thermal Conductivity BTU in. /(hr $ft^2$ °F) | 3.5 | 416 |
| Thermal Expansion (x $10^{-6}$ in./in./°F) | 5 to 6 | 7 |

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