

Advantex® Glass FRP Outperforms Stainless Steel in Acidic Environments

Corrosion is a major economic and environmental issue facing many industries today. Every year, trillions of dollars are spent in repair and replacement of failed assets as a result of corrosion-related damage. New best practices are emerging in corrosion prevention with the development of superior performing materials for structures in corrosive applications.

Unique attributes of Owens Corning Advantex® glass — Advances in the development of material solutions include fiberglass-reinforced polymer (FRP). FRP materials made with Owens Corning Advantex® glass – a patented boron-free E-CR glass – offer unique attributes that can replace more expensive traditional materials like carbon and stainless steel and high-cost metal alloys used to design industrial applications facing corrosive environments. “Glass fibers are the reinforcements in the composite that provide the structural strength to the composite part,” said Dr. Amol Vaidya, senior engineer at Owens Corning. “The advantages include lower material, fabrication, and maintenance costs and proven greater long-term durability,” said Vaidya.

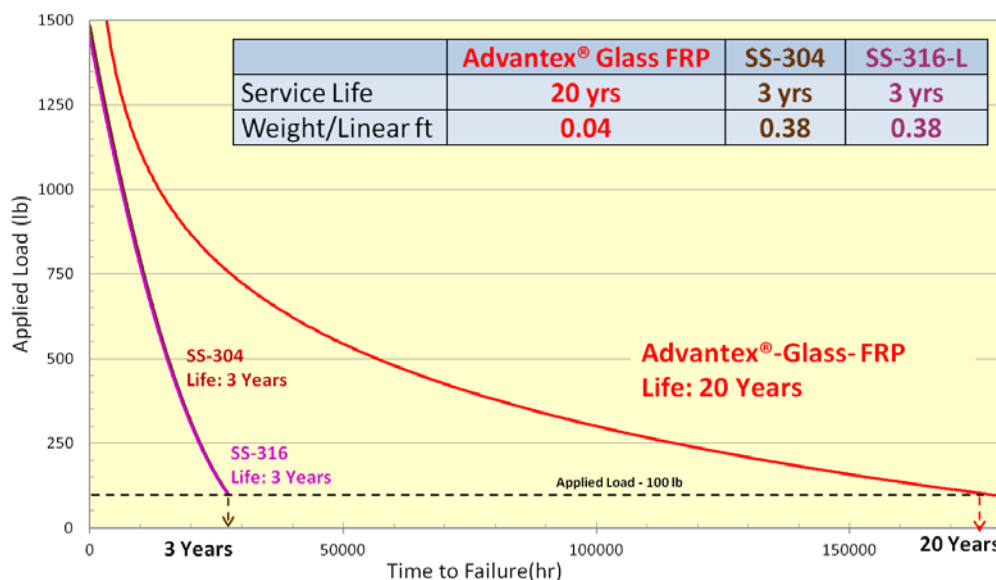


Figure 1 Analysis of SS-304, SS-316-L and Advantex® glass FRP for acidic environments under stress corrosion cracking

When analyzed under stress corrosion cracking, Advantex® glass FRP offers exceptional corrosion resistance over stainless steel as shown in Figure 1. The design life offered by Advantex® glass FRP is significantly longer than SS-304 and SS-316-L, and the FRP materials consistently outperform stainless steel in the same environment. The design of applications facing corrosive environments is a crucial link to performance. Selecting Advantex® glass reinforced FRP materials ensures durability and, therefore, longevity of the FRP structures (tanks, pipes, ducting, etc.).

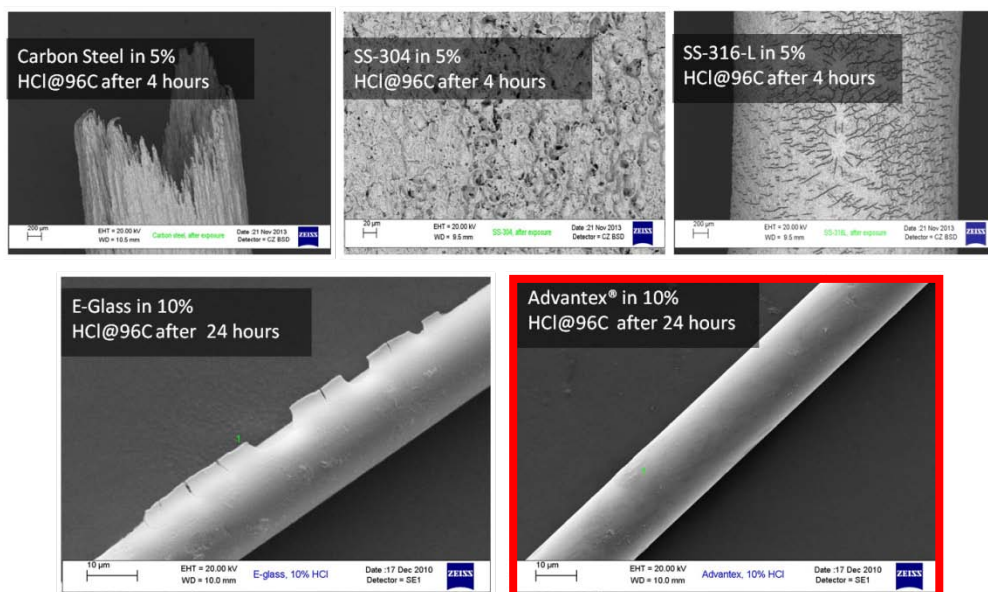


Figure 2 Performance of CS, SS-304, SS-316-L, E-Glass, and Advantex® glass after exposure to hydrochloric acid

The effect of corrosion on Advantex® glass and other materials — Results of a study performed by Owens Corning capturing the effect of corrosion on Advantex® glass reinforcements and other related materials are shown in Figure 2. In this study, reinforcements were tested in an acid solution to measure the effects of corrosion. After only four hours, the carbon steel, SS-304, SS-316-L, and E-glass reinforcements exhibited severe damage. Advantex® glass, however, showed no signs of corrosion damage after four hours at even higher acid concentrations, clearly outperforming the other reinforcements.



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Industry estimates indicate that 25% to 30% of the annual cost of all corrosion-related damage can be avoided if corrosion management practices include using Advantex® glass reinforced FRP materials for industrial applications. “We work with fabricators and end-users globally specifying the correct material for their applications,” said Matt Lieser, Owens Corning specifications manager. “By choosing Advantex® glass reinforced materials, our customers have significantly reduced their corrosion-related costs compared with those incurred using expensive alloys and E-glass-based FRP composites. Helping end-users specify the proper FRP materials for various chemical environments provides consistent FRP assets that will deliver a dependable performance throughout their enterprise,” said Lieser.

Despite the corrosion industry’s propensity for using high-cost metal alloys with various coating technologies to extend the life of metallic structures in highly corrosive environments, Advantex® glass reinforced FRP materials serve as a higher performing alternative to expensive metal alloys. These Advantex® glass FRP materials provide lightweight (seven times lighter than CS), superior corrosion performance (of years to days/weeks with E-Glass-FRP/metals), and design flexibility for producing both large- and small- scale structures (figure 3). And, unlike structures made with metal alloys, those made with FRP materials with Advantex® glass do not require coating or painting resulting in savings in the overall project cost (direct and indirect costs).



Figure 3 Large-diameter Advantex® Glass FRP tanks used for storing hydrochloric acid provides superior corrosion resistance

Take Risk Out...Put Advantex® Glass In. For more information call: (614) 777-1384

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