



FRP Fans
Blow Away the
Competition
in Corrosive
Applications

Corrosion can be exhausting.



Air handling is a critical component within corrosive applications in many industries including chemical process, food processing, pulp and paper, metal processing and refining, semi-conductor manufacturing, pharmaceuticals, mining, rubber and plastics, and wastewater treatment. While the corrosive environments in these applications garner the most attention, there are other factors that must be evaluated in order to achieve lower cost and higher operational reliability. Designed to exhaust corrosive air, fiberglass reinforced plastic (FRP) fans deliver the ideal combination of rugged durability, operational reliability, and lower cost.

What is FRP for Air Handling?

Fans manufactured from FRP are part of a specialized market of air handling equipment for corrosive applications that also includes fans constructed using aluminum, coated metal, stainless steel, and exotic alloy materials.

Generally speaking, FRP was specifically developed and has been refined for corrosion resistance. In 1969, the FRP industry, along with suppliers and end users, developed a standard for fabricating fiberglass products. This standard defines the minimum requirements for assuring maximum corrosion resistance and structural integrity. More recently, the American Society for Testing and Materials (ASTM) has adopted standards for FRP fabrication using fiberglass as a material of construction, while developing general and structural standards for FRP fans. ASTM

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Standards D-4167 and C-582 are compatible and clearly define what customers need to know and apply when specifying FRP fans.

The key components to corrosion resistance lie in the materials of construction and how they are applied. Verantis includes as standard materials of construction: premium vinyl ester and chemical resistant glass surface veil commonly referred to as C-Veil.

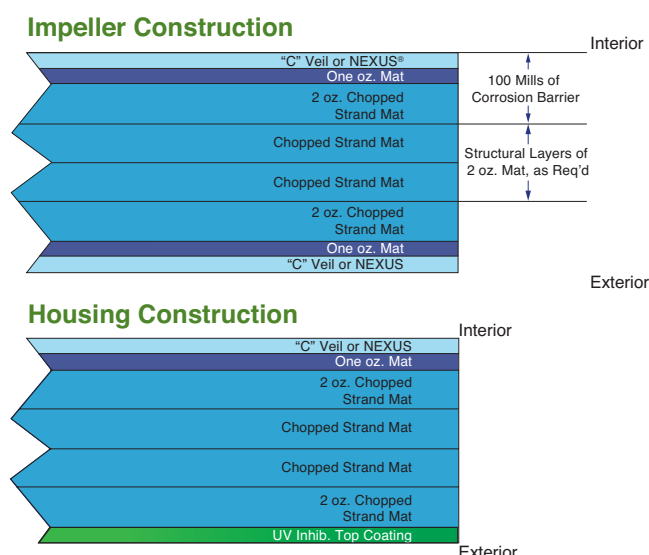
Per ASTM standards, these materials are applied as follows:

- An **inner corrosion resistant surface** which is exposed to the corrosive air stream that is resin-rich to a depth of 0.010 to 0.020 inch and reinforced with chemical resistant glass or a polymeric fiber surfacing mat. The surface shall be free of exposed reinforcing fibers. The composition of this layer shall be

90 weight percent resin and 10 weight percent of fiber.

- An **interior structural layer** consisting of the next 0.10 inch minimum thickness of laminate, adjacent to the resin-rich surface and reinforced with not less than 20 weight percent nor more than 30 weight percent of non-continuous, randomly oriented glass fibers.

These layers can be represented as follows:



WHY FRP?

When considering corrosive air moving applications including digesters, roasters, precipitators, scrubbers, odor control, etc., a number of factors come into play including corrosion, static dissipation, service life, capital investment, and operating costs. Verantis' industry-leading FRP fans are designed and constructed with these factors in mind.

Corrosion Resistance:

Chemical processing and odor control applications have corrosive air streams that can quickly deteriorate metal air handling surfaces such as coated and uncoated carbon and stainless steel. FRP fans are manufactured utilizing corrosion resistant materials in their construction for extended service life in extreme environments. Verantis has focused on strengthening the corrosion barrier on its FRP fan line through the use of additional protective coatings and layers. The Verantis line of rugged, lightweight fans features housings and impellers constructed of premium grade vinyl ester resin using C-Veil or optional NEXUS veil for all surfaces in the gas stream for maximum resistance to corrosive

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fumes, gases, and mists. Fan flanges conform to PS 15-69 FRP construction standards. This includes veil on all internal FRP surfaces and premium grade resins. Internal metal parts within the gas stream such as the shaft and bolts are encapsulated in FRP, thus providing superior corrosion protection. In addition, all internal FRP surfaces are top-coated with a resin rich layer to eliminate exposed glass fibers – so corrosion and wicking cannot start at protruding glass fibers. As a result of these precautions, corrosion resistance is enhanced and service life is greatly extended when compared with equivalent metal or coated fans.

Spark Resistance & Static Dissipation:

FRP impeller and FRP housing offer superior spark resistance when compared with metal fans due to their non-metallic construction. Verantis also offers graphite impregnated conductive coating and grounding to dissipate static buildup for combustible air stream applications.

Lower Cost of Ownership:

Since their inception, FRP fans offer the optimal balance of low cost and long service life, making them the ideal choice for corrosive and caustic

FRP fans offer better corrosion resistance than stainless steel and are less expensive.

applications. Verantis fan housings and impellers are constructed of solid FRP made from resins having a flame spread of 25 or less that are formulated for maximum resistance to corrosive fumes, gases, and mists. Verantis uses steel hubs in impeller construction which offers superior fatigue resistance and greater strength when compared with aluminum. The steel hubs are fully encapsulated within FRP material for exceptional corrosion resistance and service life. The outside diameter of the FRP shaft sleeve is machined to allow for a tighter fitting shaft seal as standard. Longer life shaft seal options also allow for even less leakage. Our oversized shafts operate below critical speed on sealed pillow block bearings. Verantis FRP fans are designed to run at lower speeds than similarly constructed competitor fans. These lower speeds reduce wear on the impeller, bearings, and mechanical drive components – resulting in improved operational reliability and minimal downtime. The fans are also statically and dynamically balanced to run smoother, thereby eliminating vibration and enhancing the service life of the fan and its components. In addition to these design features, the exterior of every Verantis fan is coated with a resin layer enhanced with UV-VIS protection against the harmful effects of exposure to sunlight. The combination of these barriers results in fans that not only operate reliably, but also hold up aesthetically for years of dependable service even in the most demanding applications.

Alternative Solutions:

In addition to FRP, air handling in corrosive applications can be met by materials including carbon steel (coated or uncoated), stainless steel, and exotic metals. While carbon steel offers the

lowest purchase price alternative, it falters in applications requiring corrosion resistance, thereby decreasing its service life. Coated carbon steel may be a slightly better alternative, with moderately better corrosion resistance than carbon steel, but at an increased price. Coated metal impellers are vulnerable to chipping and metal corrosion resulting in impeller imbalance, which can significantly impair a system's performance and service life. Stainless steel construction offers superior corrosion resistance in some applications, when compared with carbon steel; however, FRP fans offer better corrosion resistance than stainless steel and are generally less expensive. Exotic metals such as titanium or nickel-based alloys like inconel are generally the most resistant to corrosive effects, but are extremely costly and have very long lead-times for new and/or replacement parts. As a result, these types of metals are not often considered a viable option for most air handling applications.

THE COMPREHENSIVE CORROSION SOLUTION

- Premium vinyl ester resin, C-Veil, and NEXUS FRP Materials
- Flame retardant FRP fan housings with UV-VIS protection
- Fully encapsulated steel hubs and components in corrosive air stream
- Heavy duty steel bases for higher stiffness and reduced vibration levels
- Oversized fan shafts and bearings
- FRP belt and shaft guards and weather canopies for increased longevity



Contact Verantis

Contact Verantis for more information about FRP fans that can effectively and efficiently exhaust air in corrosive applications.



Please visit us at **www.verantis.com** or email **sales@verantis.com**