

Chemical Market

Fiberglass Reinforced Plastic (FRP) Products

35+ Years in Chemical Industry

Significant Features & Benefits

Flooring Solutions

Stair Solutions

Platform Solutions

Premium Grade Resin Systems

Industry Proven Success

Fibergrate
Composite Structures

High Performance Composite Solutions



Fibergrate in the Chemical Industry



Fibergrate Composite Structures Inc. is a global manufacturer of fiberglass reinforced plastic (FRP) products for industrial use. Fibergrate sets the standard for high performance composite products with such proven brands as Fibergrate® and Chemgrate® molded grating, Safe-T-Span® pultruded grating, Rigidex® Moltruded® grating, Dynarail® handrail and ladder systems, and Dynaform® structural shapes. Fibergrate also offers turnkey design, fabrication and installation services.

When Fibergrate originated FRP molded grating nearly four decades ago, it was initially in response to the harsh demands of the chemical industry. Compared to traditional metal products, Fibergrate's products continue to provide better solutions structurally and economically for chemical applications. Since its inception, Fibergrate has continued to meet the challenging conditions found in the chemical market through development of a wide range of FRP products. With key product benefits such as increased safety, slip resistance and low maintenance, Fibergrate's products are ideal for use throughout chemical facilities and around all types of chemical processes.

Fibergrate has more panel sizes, configurations, resin systems and approvals than any other FRP grating company to meet the ever-changing corrosive and environmental needs of the chemical industry. Fibergrate's innovative products for use in chemical facilities include HLC molded grating for truck loads (up to H-20), HF molded grating for hydrofluoric acid applications and more than 30 Super Vi-Corr® specialty resins for use in specific chemical environments. Fibergrate has even sought and received Association of American Railroads (AAR) approval for use of molded grating on railroad tank cars. This product specialization and years of service has allowed Fibergrate to become the leader in offering *proven* solutions to the chemical industry.

Fibergrate FRP products have solved problems in a variety of chemical facilities producing ammonia, nitrates, acids, alkalis, polymers, petroleum derivatives, solvents and many others. Fibergrate systems have also been utilized in facilities that use harsh chemicals as raw materials or additives in their own manufacturing processes including companies that make fertilizers, electronics, batteries and specialty chemicals or who do electroplating or pickling.

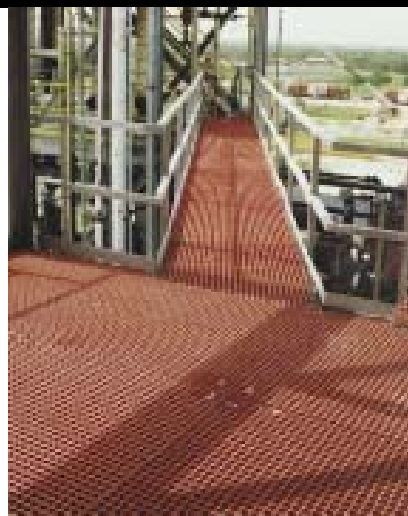
Applications

- *Elevated Walkways in Tank Farms*
- *Access Platforms for Process Vessels and Tanks*
- *Stair Tread Covers Over Existing Stairs*
- *Platforms Over Piping and Equipment*
- *Molded Grating Around Mixing Tanks and Pumps*
- *Chemical Loading/Unloading Platforms*
- *Walkways, Skids and Platforms for Chemical Storage Areas*
- *Access Systems for Hazardous Waste Areas*
- *Grating, Handrail and Ladders for Walkways In and Around Cooling Towers and Waste Processing Areas*
- *Trench Covers*



Features and Benefits of Fibergrate

- **Corrosion Resistance** - more than 15 premium resin systems to provide the corrosion resistance required to meet specific needs in varying chemical processes. This unmatched protection is ensured by the manufacturing process in which fiberglass is thoroughly wetted providing continued structural integrity in tough environments (*See page 6 for resin system information*)
- **Slip Resistance** - with safety becoming an increasing concern for the chemical industry, Fibergrate has developed grating, floor plate, stairtreads and stairtread covers with slip-resistant surfaces. These surfaces provide long lasting, superior traction even in wet and oily areas
- **Low Maintenance** - due to their corrosion-resistant properties, Fibergrate products rarely require any maintenance other than occasional cleaning unlike metals which require constant scraping, coating and painting
- **Fire Retardant** - most of Fibergrate's products are engineered to have a flame spread rating of 25 or less per ASTM E-84 and meet the self-extinguishing requirements of ASTM D-635. XFR, ELS and Phenolic have been specially designed to meet more stringent fire retardant and smoke density requirements (*See page 6 for resin system information*)
- **High Strength-to-Weight Ratio** - one-third the weight of steel grating allowing easy installation with no heavy equipment and less manpower. Contributes less weight to multistory process structures. Use of FRP can result in more allowable weight for process equipment, smaller structures and reduced lifting requirements during installation
- **Electrically and Thermally Nonconductive** - all-FRP construction provides additional worker safety (*Conductive and electrostatic dissipative coatings are available when required - contact Fibergrate for more information*)
- **Impact Resistance** - molded grating can withstand major impacts without structural failure and normally only cosmetic damage
- **Easily Fabricated** - can be cut using standard circular or reciprocating saws with abrasive blades
- **Electronically Transparent** - does not affect electromagnetic or radio wave frequencies



FRP vs. Steel

$$\text{VALUE} = \frac{\text{PRICE}}{\text{SERVICE LIFE}}$$

When comparing the price of Fibergrate fiberglass reinforced plastic (FRP) products to metallic products, consider:

Cost Factor	Traditional Metallic Materials	THE FIBERGRATE® ADVANTAGE
Safety Cost	Slips and falls are the second leading cause of industrial accidents and one of the leading causes of deaths. Each lost workday can cost \$50,000 to \$100,000.	Fibergrate's slip-resistant surfaces dramatically reduce accidental slips making it the most cost-effective solution for minimizing worker accidents and lost workdays.
Initial Installation Cost	Up front, metallic components appear to be the most economical based on material cost alone. However, metallic materials require heavy lifting equipment, added labor for cutting, welding and painting and grating must be "edge-banded".	Although initial material investment may appear higher, don't be fooled! FRP products require no heavy lifting equipment, minimal labor, is easily fabricated with hand tools, does not need painting and grating requires no edge-banding
Maintenance and Replacement Cost	In highly corrosive chemical processing installations, metallic products require intensive maintenance and often deteriorate in a few years or less requiring numerous replacements within the facility life.	Fibergrate FRP products will last much longer and require little maintenance. Fibergrate systems pay for themselves after one maintenance cycle. Many Fibergrate chemical installations have been in service for more than 35 years.

FRP Solutions for Chemical

Grating and Flooring Solutions



Fibergrate® and Chemgrate® Molded Grating

- Maximum Corrosion Resistance
- Bidirectional Strength (Facilitates Field Cuts and Penetrations)
- Maximum Impact Resistance
- Superior Slip Resistance (with meniscus or grit top)
- More than 20 Mesh and Panel Configurations
- More than 10 Standard Resin Systems



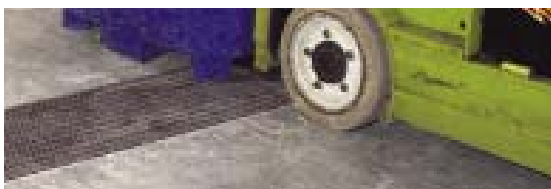
Safe-T-Span® Pultruded Flooring

- Superior Corrosion Resistance Compared to Metal Gratings
- High Unidirectional Strength and Stiffness for Longer Spans
- Excellent Slip Resistance (with grit top)
- Electrically and Thermally Nonconductive
- Can be Manufactured to Specific Widths and Lengths for Optimal Design Efficiency



Fiberplate® and Chemplate® Floor Plate

- Molded in Thicknesses from 1/8" - 3/4"
- Maximum Corrosion Resistance
- Often Installed Over Traditional Surfaces for Slip Resistance (Gritted Plate)
- Non-gritted Plates Available for Non-walking Applications



Molded High Load Capacity (HLC) Grating

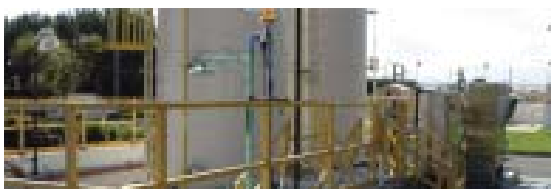
- Maximum Corrosion Resistance
- Unique One-piece Construction Withstands Vehicular Turning Loads
- Available in 1-1/2" and 2" Depths



Pultruded High Load Capacity (HLC) Grating

- Superior Corrosion Resistance to Metal Gratings
- High Unidirectional Strength
- Engineered to Withstand Forklift and Tractor Trailer Loads
- Available in 1-1/2", 2", 2-1/2" and 3" Depths

Dynarail® Handrail and Ladder Solutions



- Maximum Corrosion Resistance
- Nonconductive and Fire Retardant
- Shipped Ready-to-Install
- Long, Low Maintenance Life
- Meets OSHA, BOCA & Other Building Code Requirements

FRP Solutions for Chemical

Stair Solutions



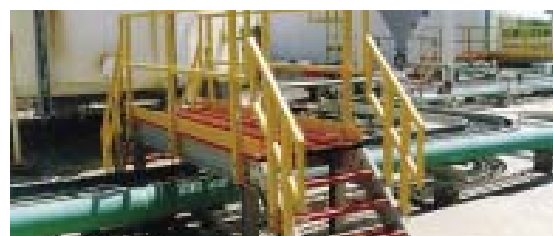
Stair Treads

- Available in Molded or Pultruded Configuration
- Available in Open Mesh or Solid Top
- Available in a Variety of Corrosion-Resistant Resin Formulations
- Slip Resistant and Nonconductive



Stair Tread Covers

- Provides Slip Resistance to Existing Stair Treads
- Installs Over Existing Treads
- Available With Phosphorescent Nosing (Emits Light When Light Source Is Removed)



Stairway and Crossover Systems

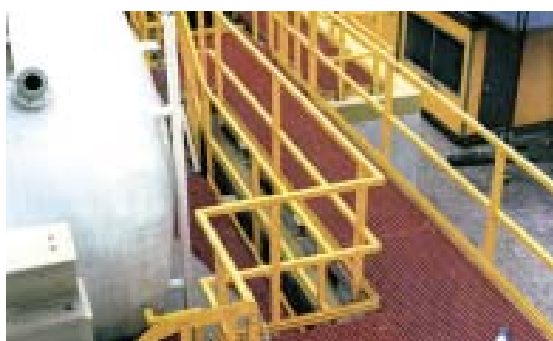
- All-FRP Construction
- One-third the Weight of Steel
- Engineered to Meet Your Specific Requirements
- Designed with Dynarail® Handrail Systems and Dynaform® Structural Shapes

Platform Solutions



RapiDeck™ Platforms

- Standard Sizes
- Adjustable Support Pedestal Construction
- Quick and Easy to Install
- No Welding Needed
- Can Support up to 400 lb/ft²
- Effortlessly Make Field Cuts and Penetrations
- Available with Dynarail® Handrail System



Custom Platform Systems

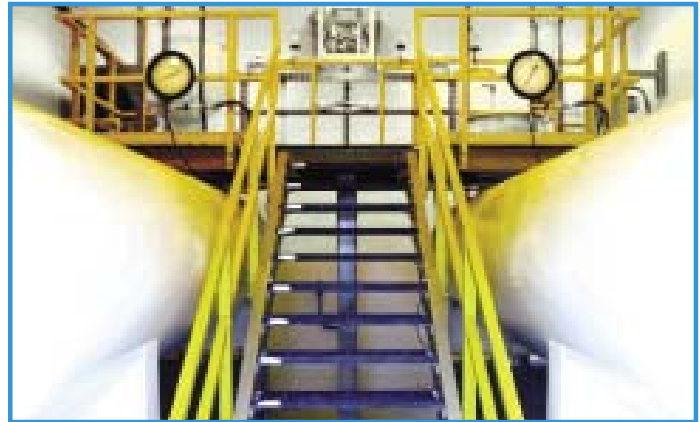
- All-FRP Structure
- Designed, Engineered and Fabricated In-House to Meet Your Specific Needs
- Shipped Ready-to-Assemble
- Effortlessly Make Field Cuts and Penetrations (with Molded Grating)
- Designed with Dynarail® Handrail Systems and Dynaform® Structural Shapes

Resin Systems

Corrosion in chemical processing facilities negatively impacts the bottom line. Each year, chemical plant executives eliminate expensive corrosion-related maintenance problems by switching to Fibergrate products. Fibergrate can provide a corrosion-resistant solution in chemical applications from acids to alkalis or polymers to solvents. Here are some of Fibergrate's more than fifteen premium grade resin systems (the most in the industry).

Fibergrate® Resins

- **Vi-Corr®** - A superior vinyl ester resin developed for reliable performance in the toughest environments. It offers outstanding resistance to a wide range of highly corrosive situations, ranging from caustic to acidic. In fact, no other standard resin system can match Vi-Corr's performance in highly acidic environments.
Flame spread: ASTM E-84 rating of 25 or less.
- **IFR** - This isophthalic polyester fire-retardant resin formulation designed for chemical processing applications where corrosion resistance is important. **Flame Spread:** ASTM E-84 rating of 25 or less.
- **CORVEX®** - An economy polyester grating, Corvex outperforms a number of competitive fiberglass and metal products and meets the requirements for corrosion resistance found in light industrial applications.
Flame Spread: ASTM E-84 rating of 25 or less.
- **XFR** - This extra fire-retardant vinyl ester resin is recommended for use where the fire potential is high.
Flame Spread: ASTM E-84 rating of 10 or less, a level exceeded by no other resin system.
- **ELS** - This Extremely Low Smoke resin is an acrylic-modified polyester system that is ideal for tunnel, offshore, mass transit and other confined space applications. **Flame Spread:** ASTM E-84 rating of 25, a smoke density index of 100 and Fuel Contribution of 0.
- **Super Vi-Corr®** - This family of resin systems with more than 30 custom formulas engineered for corrosion resistance in applications that are too severe for conventional FRP and other building materials. Each Super Vi-Corr resin was engineered for best performance in specific chemical and temperature environments. These systems exist for aggressive chemical service in reagents like solvents, acidic oxidizers, chlorine dioxide, sodium hypochlorite and liquid desiccants. Certain formulas are also for temperature applications up to 400° F.
Flame Spread: non fire retardant, unless specified.



Chemgrate® Resins

- **VE-25** - A premium vinyl ester resin system formulated to resist highly corrosive acids and caustics found in the harshest chemical environments.
Flame spread: ASTM E-84 rating of 25 or less.
- **CP-84** - A chemical-grade premium polyester resin, CP-84 offers excellent corrosion resistance in highly acidic conditions.
Flame Spread: non fire retardant.
- **FS-25** - This polyester resin system is designed for applications where there is moderate exposure to corrosive elements. Yellow and green.
Flame Spread: ASTM E-84 rating of 25 or less.

Safe-T-Span®, Dynaform® and Dynarail® Resins

- **ISOFR** - isophthalic polyester resin formulation designed for applications where there is moderate exposure to corrosive elements.
Flame spread: ASTM E-84 rating of 25 or less.
- **VEFR** - vinyl ester resin system for dependable resistance to both acidic and alkaline environments.
Flame spread: ASTM E-84 rating of 25 or less. and a smoke density index of 45 or less.

HF Molded Grating - Fibergrate has combined a premium-grade vinyl ester resin and exotic reinforcements to make the only molded grating system suitable for service in harsh hydrofluoric acid applications. This molded grating is 30% lighter and 40% stiffer than Fibergrate's standard molded gratings. HF Molded Grating, a non-fire retardant system, can see service in applications that would cause premature failure in most traditional molded grating systems.

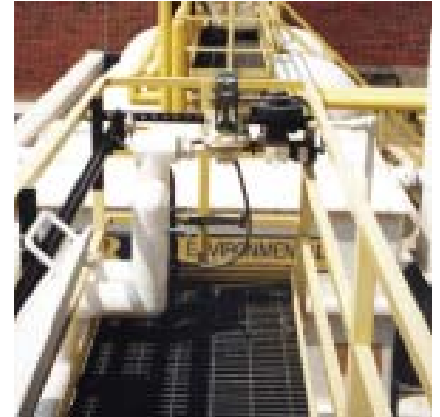
Applications

Applications



Access to Tanks and Process Vessels

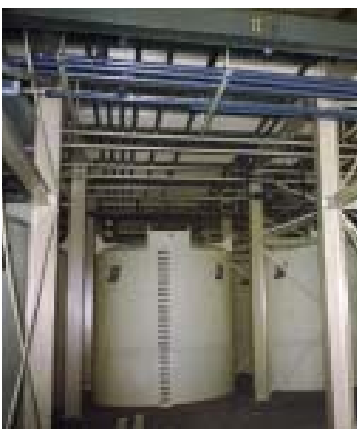
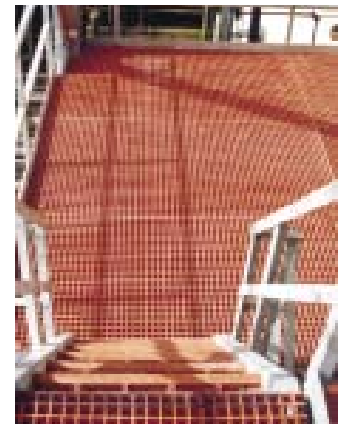
Fibergrate offers all the elements needed for safe and rapid access to equipment for inspection or maintenance. Our FRP structural elements, stair treads and grating can be engineered to offer a solution that will be easy to install and corrosion resistant. The use of lightweight products requires less structural support and makes installation faster and easier. Fibergrate's features facilitate fabrication for tight or odd-shaped spaces.



Multistory Process Structures

The most corrosive processes typically include separators, hydrocrackers, distillers and other tall equipment which require structural support. The structure, including grating, handrail, stairs and structural shapes are typically exposed to ultraviolet rays, chemical spillages, corrosive fumes and impact during maintenance and upgrades. Fibergrate's FRP systems are ideal for these challenges. The FRP products are corrosion and UV resistant and can be formulated for increased resistance. Due to its lighter weight, utilizing FRP dramatically reduces the load the structure has to bear

when compared with metal grating. Safety is increased with slip-resistant flooring and stair treads as well as with nonconductive handrail and ladders. Fiber grate products can reduce construction and maintenance costs dramatically.

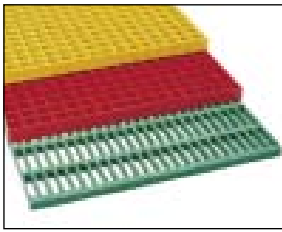


Walkways and Support Structures

Chemical processes such as electroplating, battery manufacturing and pickling utilize tanks, vats and cells containing highly corrosive acids at varying concentrations and pH levels. Fibergrate can assist customers or engineering firms in designing long-lasting, low-maintenance structures to support walkways, tanks and platforms. The use of FRP products eliminates maintenance (structure recoating or replacement). Metal grating and structures are a serious hazard in areas where high voltage or high current are part of the process, but FRP elements are nonconductive and provide increased safety.



Fibergrate Products & Services

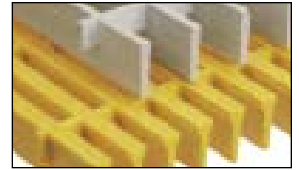


Fibergrate® Molded Grating

Fibergrate molded gratings are designed to provide the ultimate in reliable performance, even in the most demanding conditions. Fibergrate offers the widest selection in the market with more than ten resins including Chemgrate CP-84 and more than twenty grating configurations available in many panel sizes and surfaces.

RIGIDEX® Moltruded® Grating

RIGIDEX Moltruded gratings are the first fiber glass gratings to combine the corrosion resistance of molded grating with the longer span capacity of pultruded grating, all at the low cost of metal gratings.

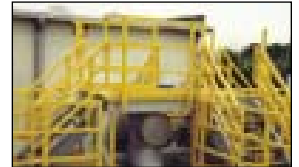


Safe-T-Span® Pultruded Industrial and Pedestrian Gratings

Combining corrosion resistance, long-life and low-maintenance designs, Safe-T-Span provides unidirectional strength for industrial and pedestrian pultruded grating

Dynarail® Handrail

Easily assembled from durable prefabricated components or engineered to your specifications, Dynarail handrail meets or exceeds OSHA and strict building code requirements for safety and design.



Dynarail® Safety Ladder System

Easily assembled on site, Dynarail safety ladder systems meet or exceed OSHA requirements. Though less costly than prefabricated ladder systems, these safety ladders provide a custom fit to the supporting structure.

Dynaform® Structural Shapes

Fibergrate offers a wide range of pultruded structural components for industrial use, including bars, rods, tubes, beams, channels, leg angles and plates.

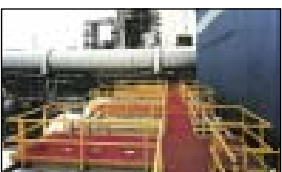


Stair Solutions

Fibergrate offers a wide range of slip-resistant products to meet your stair safety needs. These durable products which include treads, tread covers and covered stair treads are a long-term, cost-efficient solution for your facility.

Grating Pedestals

Uniquely designed adjustable single and quad head pedestals for square mesh molded grating are manufactured to provide safe and economical support for elevated flooring.



Fabrication Services

Combining engineering expertise with an understanding of fiber glass applications, Fibergrate provides turnkey design and fabrication of fiber glass structures, including platforms, catwalks, stairways and test racks.