



# Fibergrate

Composite Structures

*Building the World to Last<sup>®</sup>*

HIGH PERFORMANCE COMPOSITE SOLUTIONS



Together, we will make your vision a *reality*.

# Fibergrate in Oil & Gas

## Introduction

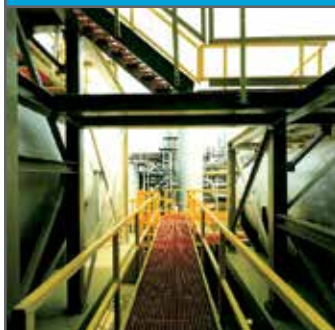
Fibergrate Composite Structures Inc. is a global manufacturer of fiberglass reinforced plastic (FRP) products for industrial and commercial use. Fibergrate sets the standard for high performance composite products with such proven brands as Fibergrate® molded grating, Safe-T-Span® pultruded grating,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



Within the oil and gas industry, corrosion resistance, safety and maintenance requirements are critical considerations. For nearly five decades, Fibergrate has met the challenges of the harsh environmental conditions found in the oil and gas industry with its wide selection of FRP products. Key product features, such as corrosion resistance, slip resistance, flame retardancy, non conductivity, impact absorption and low maintenance, make these products ideal for use in all types of oil and gas facilities.

Fibergrate's FRP products offer superior resistance to corrosive saltwater, drilling fluids, acids, alkalis and other chemical compounds. The result is minimal maintenance requirements, a long service life, significantly improved safety and a lower life cycle cost than ferrous metals and aluminum. Today, Fibergrate products can be found on offshore platforms, floating facilities, processing skid packages, land-based and offshore drilling rigs, marine terminals, storage facilities, gas processing plants, subsea manifolds and refineries.

## Applications



- Boat Landings, Splash Zones
- Stairways, Decking, Bridges, Catwalks
- Chemical Injection Skids
- Walkways over Mud Pits/Tanks
- Communications/Radar Platforms
- Air Intake and Personnel Protection Screens
- Access Platforms for Metering Stations, Valve Operations and Other Areas
- Drilling Derrick (Crown, Belly Boards, Racking Boards)
- Coverings, Support, Protection for Subsea Components
- Ship's Ladders

# Why Choose Fibergrate?



**Corrosion Resistant:** Multiple premium grade resin systems are available to combat the corrosive conditions found in the offshore oil and gas market. This unmatched protection provides continued structural integrity in tough environments.



**Slip Resistant:** The meniscus and integrally applied grit surfaces of Fibergrate grating and stair products have unmatched slip resistance for improved worker safety.



**Low Maintenance:** The corrosion resistant properties of Fibergrate's grating and other products reduce or eliminate the need for sandblasting, scraping and painting. Products are also easily cleaned with a high pressure washer.



**Impact Resistant:** FRP can withstand major impacts with negligible damage. Gratings are available to satisfy even the most stringent impact requirements.



**Electrically & Thermally Non Conductive:** Fiberglass is electrically non conductive for safety and has low thermal conductivity which results in a more comfortable product when physical contact occurs.



**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. Specially formulated resins have also been designed to meet rigorous fire retardant requirements.



**UV Resistant:** Fibergrate's FRP products are formulated for maximum UV resistance and a special coating is available for increased UV resistance on Dynarail® handrail, guardrail and ladder systems.



**High Strength to Weight Ratio:** Fibergrate products are less than one-half the weight of steel grating which allows easy removal for access below floor level and installation with no heavy equipment and less manpower.

**Easily Fabricated:** Most materials can be cut using circular or reciprocating saws with abrasive blades.

**Engineering and Drafting:** Oil & Gas projects require sealed drawing and calculations. Utilizing Fibergrate's 50+ years experience and engineering directed by a Professional Engineer can save time and money from concept to completion.



**Heavy Metal Safe:** The EPA, OSHA and other regulatory agencies created to protect our lives and our natural resources have increased legislation to control heavy metals such as lead, chrome, cadmium and other metals in all products where exposure is a health threat. Fibergrate Composite Structures Inc. supports this strengthened legislation and has, for more than 20 years, voluntarily tested for heavy metals in our products and minimized or eliminated heavy metals from our products.

**FRP vs. Steel:** When comparing the price of Fibergrate fiberglass reinforced plastic (FRP) to metallics, consider:  $\text{Value} = \text{Price} / \text{Service Life}$

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 death. Each lost work day can lead to significant costs.	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. Metallic grating must also be "edge-banded".	Although initial material investment may appear higher, don't be fooled! FRP products require no heavy lifting equipment and minimal labor, are easily fabricated with hand tools, and do not need painting. Fibergrate grating requires no edge-banding.
Maintenance & Replacement Cost	In highly corrosive oil and gas installations, metallic products often 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 oil and gas installations have been in service for 30+ years.



# Fibergrate Solutions

See how Fibergrate products can provide solutions for any oil & gas application -

Dynarail® railing and Fibergrate® grating can be used around loading zones for added safety and to create slip resistant walkways. Fibergrate products can also be used in multiple areas on large shipping vessels.

Corrosion and slip resistant Fibergrate® products including stair treads, handrail, grating, and structural profiles provide access platforms to processing tanks located on the shoreline.

Safe-T-Span® pultruded grating with phenolic resin is used in numerous areas on offshore oil & gas rigs, due to its US Coast Guard Approval.

Fibergrate molded grating can be used to protect whole manifold areas or subsea trees, with its corrosion and impact resistant properties.

Fibergrate® molded products and Safe-T-Span® pultruded products are used for walkways, platforms, catwalks and stairways on semi-submersible platforms due to their corrosion resistant and lightweight properties.

# Product Solutions

## Product Resin Systems

Various applications present different requirements, so Fibergate offers numerous standard resin systems to address multiple needs. Some of these standard resins for molded and pultruded grating offer a lower flame spread index or are extra fire retardant when compared to flame spread of 25 or less which all Fibergate products meet.

**PHENOLIC:** A Coast Guard approved flame-resistant phenolic resin with an extremely low flame spread of 10 and a smoke index of 400 (unpainted); flame spread of 15 and a smoke index of 450 (painted, UV coating) - designed primarily for the offshore industry. (Coast Guard approved for Level 2 & 3 performance criteria - Approval Number: 164.040/2/2; DNV Type Approval Certificate No. F-16856; ABS Product Type Approval Level 2 & 3 Certificate No. 01-HS34733-X)

**XFR:** This eXtra Fire Retardant vinyl ester resin is recommended for use where the fire potential is high. Color: dark gray. Flame Spread: ASTM E84 rating of 10 or less, a level exceeded by no other resin system. Certifications: DNV Type Approval No. F-16856; meets the USCG requirements for general fire rating\*.

**ELS:** This Extremely Low Smoke resin is a modified-acrylic polyester system that is ideal for tunnel, offshore, mass transit and other confined space applications. ELS exhibits low ignitability, low smoke generation and extremely low smoke toxicity. Color: light gray. Flame Spread: ASTM E84: flame spread index of 25 or less, a smoke developed index of 100 or less and Fuel Contribution of 0. Certifications: DNV Type Approval No. F-16856; meets the USCG requirements for general fire rating\*.

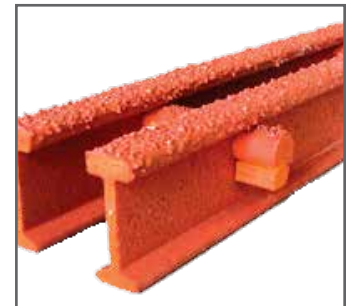
**SPECIALTY:** Fibergate also offers specialty resins custom designed to meet your specific needs. These special formulations are developed to address unique and demanding services and applications, as well as niche market needs (Super Vi-Corr family of resins).

We can engineer resin systems to address temperature, flame, smoke and toxicity requirements. Our HSUV resin system was developed to address the intense UV effects found in offshore applications. Fibergate's custom formulations with low smoke/toxicity properties were engineered with the United States Navy for below-deck marine service.

**\*For specific requirements and questions, please contact technical services.**

## Regulatory Information

Fibergate's products and manufacturing facilities are designed to comply with the regulations of many internally recognized safety organizations. These products have undergone extensive independent testing and received numerous certifications, approvals and authorizations including the following:



ABS Type Approval



United States Coast Guard (USCG)



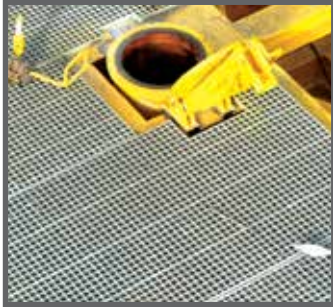
ISO 9001:2015 Certified Facilities



DNV Type Approval

# Product Solutions

## Fibergrate® Molded Grating



- Maximum corrosion and impact resistance
- Does not require edge/end-banding when cut
- Exceptional slip resistance with 2 non-slip surface options
- Variety of depths and panel sizes

## Safe-T-Span® Pultruded Grating



- High unidirectional strength and stiffness for longer spans
- Used for non-slip walkways and flooring
- Superior corrosion resistance compared to metal grating

## Fiberplate® Floor Plate



- Installs on traditional surfaces for slip resistance
- Solid composite panel; can also be adhered to molded grating for a covered grating option
- Nonporous surface allows for easy cleaning

## Dynaform® Structural Shapes



- High strength and durability; can withstand corrosive applications
- Thermal & electric non conductivity
- Includes channel, angle, wide flange beam, i-beam, round/square tube, & more
- Custom shapes available

## High Load Capacity Molded (HLC) and Pultruded (HI) Grating



- Engineered to withstand forklift & tractor trailer loads
- HLC Molded: 1-1/2" and 2" depths available
- HI Pultruded: available in 1", 1-1/2", 2", 2-1/2" & 3" depths
- Used for flooring, trench covers, ramps & loading zones

## Dynarail® Guardrail, Handrail and Ladder Systems



- Superior corrosion resistance compared to metal ladders and railings
- Thermally non conductive
- Lightweight, making installation easy & cost effective
- Can be coated for maximum UV resistance

## Stair Treads, Stair Tread Covers and Stairway Systems



- Treads available in molded or pultruded configuration
- Superior slip resistance compared to metal stairs, especially in wet conditions
- Tread covers install easily over existing treads providing slip resistance

## Custom Platform Systems and Pre-Engineered Crossovers



- All FRP structure; shipped ready-to-assemble
- Can be designed and engineered in-house to meet specific needs
- Utilizes Fibergrate grating and stair treads, Dynarail guardrail/handrail, and Dynaform structural shapes



# Case Studies

## Tension Leg Platform



### **i** Project Info

- Phenolic I6015 Pultruded Grating
- Clips and Accessories

This exploration and production rig is located 130 miles south of New Orleans in the Gulf of Mexico. It is a tension leg platform that extends below 3,000 feet of water to the Gulf floor and is over 300 feet high above the water. A competitor's phenolic grating was initially installed on the platform, but the applied grit on the grating started to come off of the product leading to potentially unsafe conditions. Over a two year period, Fibergrate's I6015 phenolic pultruded grating had replaced all initially installed competitor's phenolic grating, amounting to around 20,000 square feet! Due to the high quality of Fibergrate products and service, including on time deliveries, Fibergrate has become this customer's vendor of choice for all future retrofit and new construction projects.

## Oil/Petroleum Tanks



### **i** Project Info

- Safe-T-Span® I6015 Pultruded Grating, ISOFR
- Dynarail® VEFR Railings and Ladders
- Dynaform® VEFR Structural Shapes

Artificial islands off of the coast were initially built to transfer oil/ petroleum from offshore production platforms and rigs into vessels located onshore, next to the water. These vessels then pump the oil into nearby processing tanks. The primary goal of the project was to allow operators to access the tops of the tanks. This project was unique because it required platforms to run across the tops of horizontal tanks. Safe-T-Span pultruded grating, along with Dynarail railings and Dynaform structural shapes were used to construct these platforms. Crossovers were also created between the tank platforms to provide access to all tanks from the central platforms, thus making it more convenient for workers. Additionally, the light weight properties of FRP and the ability to easily fabricate the products allowed for easy removal of grating over tank holes that are often accessed by workers.

## Offshore Oil Rig



### **i** Project Info

- Fibergrate® Molded Grating
- Fibertred® Stair Treads
- Stair Tread Covers

Fibergrate has done extensive work in the Gulf of Mexico on various offshore rig modules. Fibergrate square mesh molded grating was used for walkways on numerous levels of this large rig. The concave surface of Fibergrate's meniscus top grating provides superior slip resistance, especially in wet and oily conditions which will protect workers from slips and falls when working on the platform. Fibertred molded stair treads and grating were also used to create small access platforms to storage areas. Molded tread covers were ordered to adhere over existing steel treads. These tread covers are able to provide solid, slip resistant footing for existing treads that are still structurally sound. The aluminum oxide gritted surface and highly visible yellow nosing also created a safer environment, as did Fibergrate's other products.

# 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 multiple resins and more than twenty grating configurations available in many panel sizes and surfaces.



## Safe-T-Span® Pultruded Industrial & Pedestrian Gratings

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



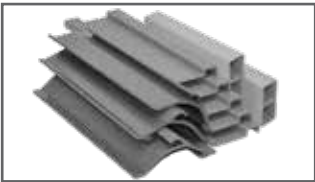
## Dynaform® Structural Shapes

Fibergrate offers a wide range of standard Dynaform® pultruded structural profiles for industrial and commercial use, including I-beams, wide flange beams, round and square tubes, bars, rods, channels, leg angles and plate.



## Dynarail® & DynaRound™ Guardrail, Handrail & Ladder

Easily assembled from durable components or engineered and prefabricated to your specifications, Dynarail® square tube and DynaRound™ round tube railing systems and Dynarail® safety ladder systems meet or exceed OSHA and strict building code requirements for safety and design.



## Custom Composite Solutions

Combining Fibergrate's design, manufacturing and fabrication services allows Fibergrate to offer custom composite solutions to meet our client's specific requirements. Either through unique pultruded profiles or custom open molding, Fibergrate can help bring your vision to reality.



## Design & Fabrication Services

Combining engineering expertise with an understanding of fiberglass applications, Fibergrate provides turnkey design and fabrication of fiberglass structures, including platforms, catwalks, stairways, railings and equipment support structures.



## Worldwide Sales & Distribution Network

Whether a customer requires a platform in a mine in South Africa to grating on an oil rig in the North Sea, or walkways in a Wisconsin cheese plant to railings at a water treatment facility in Brazil; Fibergrate has sales and service locations throughout the world to meet the needs and exceed the expectations of any customer.

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