

FRP Solutions for the Oil and Gas Market



30+ Years in Oil & Gas

Significant Features & Benefits

Flooring Solutions

Stair Solutions

Platform Solutions

USCG, DNV & ABS Approved Products

Wave Zone Solutions

Onshore & Offshore Applications

Fibergrate
Composite Structures

High Performance Composite Solutions



Fibergrate in the Oil & Gas Industry



Fibergrate Composite Structures Inc. is a global manufacturer of fiberglass reinforced plastic (FRP) products for industrial and recreational 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, manufacturing, fabrication and installation services.

Within the oil and gas industry; corrosion resistance, safety and maintenance requirements are critical considerations. For nearly four decades, Fibergrate has met the challenge 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, nonconductivity, impact absorbtion 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 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 Zone Areas*
- *Stairways, Decking, Bridges, Catwalks*
- *Chemical Injection Skids (Access Platforms)*
- *Walkways over Mud Pits/Mud Tanks*
- *Access Platforms for Metering Stations, Valve Operations and Other Areas*
- *Communications/Radar Platforms*
- *Coverings, Support, Protection for Subsea Components*
- *Windwalls*
- *Drilling Derrick (Crown, Belly Boards, Racking Boards)*
- *Air Intake and Personnel Protection Screens*
- *Ship's Ladders*



Features and Benefits of Fibergrate

- **Corrosion Resistance** - more than 15 premium grade resin systems available to meet your specific needs. This unmatched protection is ensured by the manufacturing process in which fiberglass is thoroughly wetted providing continued structural integrity in tough environments
- **Slip Resistance** - a meniscus top or permanent grit on Fibergrate's flooring products provides a safe, slip-resistant walking surface
- **Low Maintenance** - corrosion resistant and requires no scraping, sandblasting or repainting
- **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. Three resins have been specially designed to meet stringent fire retardant requirements. XFR molded (Extra Fire Retardant) has a flame spread of 10 or less. ELS molded (Extremely Low Smoke) has a Smoke Density Index of 100 and a Fuel Contribution of 0. Phenolic pultruded has a flame spread of 5 or less and a smoke index of 45 or less. (See page 6 for DNV, USCG and ABS certifications)
- **High Strength-to-Weight Ratio** - one-third the weight of steel grating allowing easy installation with no heavy equipment and less manpower and effortless removal for access below floor level. The lighter weight of FRP grating and structural members offer substantial savings for floating offshore facilities. 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** - can withstand major impacts with negligible damage. Gratings are available to satisfy even the stringent impact requirements of NORSOK U-001 "Subsea Production Systems".
- **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

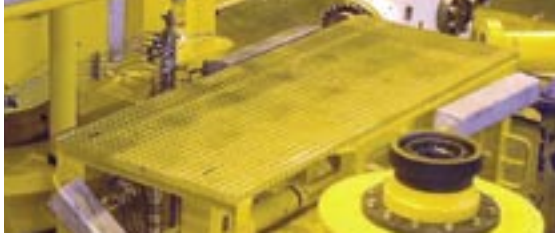
$$\text{VALUE} = \frac{\text{PRICE}}{\text{SERVICE LIFE}}$$

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 costs \$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 oil and gas 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 oil and gas installations have been in service for more than twenty years.

FRP Solutions for Oil & Gas

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



Safe-T-Span® Pultruded Flooring

- Superior Corrosion Resistance Compared to Metal Gratings
- High Unidirectional Strength and Stiffness for Longer Spans
- Superior Slip Resistance (with grit top)
- Available in 3 Resin Systems
- Phenolic Pultruded Grating is USCG Approved (Level 2 and 3)
- 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

Rigidex® Moltruded® Grating



- Unique Molded Unidirectional Grating
- Combines Maximum Corrosion Resistance With Longer Span Capabilities
- Available in 1-1/2" and 2" Depths

- Rigidex I (Walkway Applications) Competitively Priced Compared to Metallic
- Rigidex II (Industrial Applications) Passes 15 mm ball test

High Load Capacity (HLC) Grating



Molded

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



Pultruded

- 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

FRP Solutions for Oil & Gas

Stair Solutions



Stair Treads

- Available in Molded or Pultruded Configuration
- Available in Open Mesh or Solid Top
- Pultruded Treads Available in USCG Level 2 and 3 Approved Phenolic



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 Systems

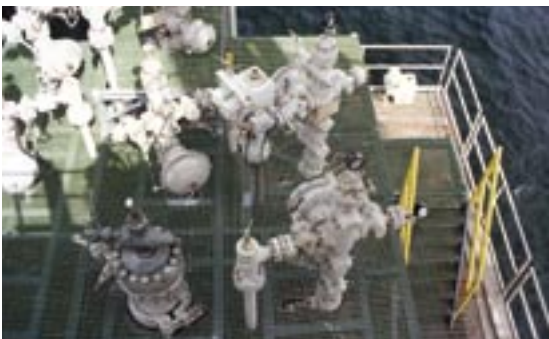
- All-FRP Construction
- One-third the Weight of Steel
- Engineered to Meet Your Specific Requirements
- Designed with Dynarail® Handrail Systems and Dynaform® Structural Shapes

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

Certifications

Regulatory Information

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

U.S. Coast Guard (USCG)

- **Pultruded Grating - Phenolic Resin** -
USCG PFM 2-98, Level 2 & 3
USCG Approval No. 164.040/3/0
- **Molded Grating** - Authorized for use where Fire Integrity is not a concern yet requires a flame spread index of less than or equal to 25 (ASTM E84) (Marine Safety Manual, Volume II, Paragraph 5.C.6.d(2))



ISO 9001:200 Certified Facilities

- Certificate No: CERT-05835-2003-AQ-HOU-RAB

ABS Type Approval

- **Pultruded Grating, Phenolic Resin** - Level 2 & 3 - Certificate Number: 01-HS34733-X
- **Molded Grating** - ASTM E84 less than or equal to 25 - Certificate Number: 01-HS34733-X

DNV Type Approval

- **FRP Grating** - Certificate Number: F-16856

NORSOK U-001 "Subsea Production System" Rev 3, 2002

- **Molded Grating, Vi-Corr Resin** - has been tested to be compliant

OSHA and BOCA Compliant

- **Dynarail® Handrail and Ladder Systems**
- **Fibergrate Molded and Pultruded Stair Treads and Molded Stair Tread Covers**

15 MM Ball Test

- **Rigidex® II Moltruded® Grating**
- **Pultruded Grating** - I5015 and I4015

Wave Zone Solutions

For decades, Fibergrate's square mesh molded grating has been the standard for wave zone applications due to its bidirectional strength, unparalleled impact strength and superior resistance to wave action. These gratings have traditionally been attached via an expensive, labor-intensive steel capture angle along the sides. Although this hold down system has served the industry well, it more than **DOUBLES** the installed price of the grating. Teaming up with Hilti®, the world leader in anchoring and fastener systems, an extensive testing program in Hilti's Tulsa, Oklahoma facility was undertaken utilizing the powder-actuated X-FCM Grating fastening disk system. The results with the Fibergrate/Hilti Zone System are dramatic over traditional systems!

Material Savings → up to 50%!

Labor Savings → up to 700%!

With no welding, sandblasting or repainting required, the fastening system is the perfect solution for both new fab yard projects and offshore refurb. For refurb, the labor savings are even more dramatic!



Washout Warranty Information

Fibergrate Composite Structures Inc., a leader in design, engineering, manufacture and fabrication of fiberglass composites for nearly four decades, is so confident of our wave zone solution that we offer a Limited Three-Year Incremental and Renewable Washout Warranty with every system! There are some specific details, however, so ask for your copy of the Fibergrate Commitment today!

Applications

Applications

Floating Facilities

Floating facilities often require large amounts of lightweight, and slip-resistant molded and pultruded grating which can withstand the environment's corrosive elements and UV rays. Choosing Fibergrate's USCG-approved phenolic resin pultruded Safe-T-Span grating reduces platform dead load allowing for more processing equipment and lighter lifting loads. With the added capability to withstand long-term exposure to the aggressive offshore environment, FRP products by Fibergrate provide the perfect solution.



Subsea Applications

Subsea trees, manifolds, manifold protection structures and other subsea



applications require stringent impact resistance that can only be supplied by Fibergrate molded products. Fibergrate molded gratings have been tested to 15 kJ of impact. Whether your requirement is to protect a whole manifold area or a subsea tree, molded gratings will survive and provide many years of low-maintenance service.



Platform Applications

Fibergrate's gratings have been used offshore for more than 30 years on applications from workboats to boat landings, from sub-cellar to topside perimeter walkways, and main deck gratings to stair towers. Molded square mesh gratings offer the least resistance to wave action - the highest level of impact resistance - and the longest service life in the industry . . . time tested and proven.



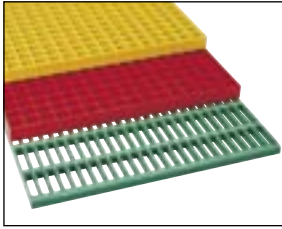
Land and Offshore Drilling Applications

Hinged catwalks, handrail, removable access platforms and portable walkways for land-based drilling and workover units offer a lightweight alternative to heavy steel, minimizing worker injuries during mobilization/demobilization, plus all the other benefits of FRP! Fibergrate products are easily installed and require no welding. Fibergrate systems include handrail,



ladders and gratings for many different applications within drilling operations.

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 fiberglass 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 applications.

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.

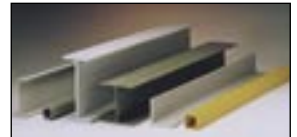


Dynarail® Safety Ladder System

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 fiberglass applications, Fibergrate provides turnkey design and fabrication of fiberglass structures, including platforms, catwalks, stairways and test racks.