

FIBERGLASS STRUCTURES

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GLASS·STEEL- AN INTRODUCTION

Founded in January of 1979, Glass-Steel, as the name implies, originally intended to be a fabricator of both fiberglass and steel structures. This concept was short-lived. The almost immediate success of the company with fiberglass structures coupled with the knowledge that fiberglass was making significant inroads into structural applications traditionally reserved for steel, aluminum, or wood convinced Glass-Steel management early on that the niche for Glass-Steel was in fiberglass.

A secondary reason for the selection of the name of the company was to suggest the phrase, "Glass was the strength of steel." For that reason the name "Glass-Steel" remains very appropriate today.

In the relatively few years since its beginning, Glass-Steel has rapidly achieved a reputation of being able to produce and deliver top quality fiberglass structures on schedule and at a reasonable price. This reputation has been achieved with industrial customers as well as municipalities and major architect-engineers. From standard handrail and ladder systems to multi-million dollar projects with complex customer structures. Glass-Steel has the capabilities and the facilities to meet the challenge.■

MATERIALS *extren* Fiberglass Structural Shapes

EXTREN fiberglass structural shapes are available in over 100 standard sizes and shapes. EXTREN is produced in three series designed for different environments and applications.

EXTREN 500 An all-purpose line utilizing a polyester resin system.

EXTREN 525 An all-purpose line utilizing a fire retardant polyester resin system.

EXTREN 625 A premium line of fiberglass structural shapes - both fire retardant and highly corrosion resistant, utilizing a vinyl ester resin system.

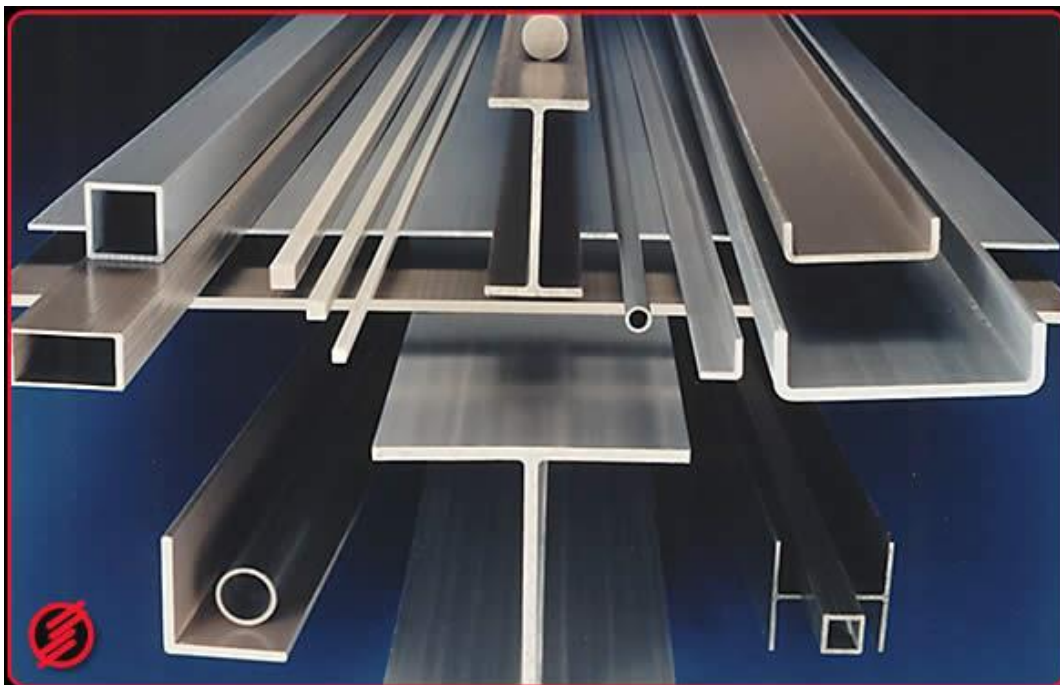
All EXTREN Shapes have a surfacing veil to protect against "fiberblooming", increase corrosion resistance, and aid in UV resistance.

The following features of EXTREN which are readily translated into user benefits are shared by fiberglass gratings used in Glass-Steel fabrications.

- **Corrosion Resistant** - EXTREN will not rot and is impervious to a broad range of corrosive environments.

- **Non-Conductive** - An excellent insulator, EXTREN is thermally and electrically non-conductive.
- **Non-Magnetic** - EXTREN is the obvious choice for structural applications where non-metallic non-magnetic properties are required.
- **High Strength** - EXTREN is stronger than structural steel on a pound-for-pound basis.
- **Lightweight** - Weighing 80% less than steel and 30% less than aluminum, EXTREN structural shapes are easily transported, handled and assembled.
- **Dimensional Stability** - Property designed, EXTREN will not creep or sag under fatigue loading or as a result of prolonged deformation. Its coefficient of thermal expansion is slightly less than steel and significantly less than aluminum and wood.

Additional information on EXTREN, including a product brochure with properties data, a corrosion resistance guide, and a size availability list, is available from Glass-Steel. ■



LADDERS

Glass-Steel fiberglass ladders and ladder-cages are in use today in a variety of severe environments. Typical applications include:

- **Water / Wastewater** - Numerous Glass-Steel Wet Well Ladders and Handrail Systems are in use in wastewater treatment plants in the southwestern United States.
- **Pulp and Paper** - The pulp and paper industry utilizes Glass-Steel ladders in caustic chemical areas.
- **Oil Production** - Glass-Steel ladders and ladder-cages have been utilized for years in Texas oil fields on the sides of sour crude storage tanks.

Glass-Steel ladders meet the requirements of OSHA 1910.27. For more information on OSHA requirements regarding ladders and ladder-cages contact Glass-Steel. ■

Note to Specifiers - Typical details and other information needed to specify Glass-Steel handrail systems or ladders are available from Glass-Steel.



Fiberglass handrail and guardrail systems fabricated by Glass-Steel are strong, durable and maintenance free for long-lasting service corrosive situations. The following are typical applications:

HANDRAIL SYSTEMS



- **Chemical** - Two miles of Glass-Steel handrail has provided maintenance free service since 1981 in four chlorine plants for a large chemical company.
- **Mining** - Glass-Steel handrail is ideal for use in mining operations where corrosive acids and electrolysis are present in the separation process.
- **Pulp and Paper** - Glass-Steel handrail is installed in a pulpwood bleaching operation where chlorine and other caustic fumes are present.
- **Offshore** - Resistant to saltwater and sea air. Glass-Steel handrail systems are used on offshore platforms and on saltwater cooling towers.

The Glass-Steel handrail systems meet the requirements of OSHA standard 1910.23. For more information on OSHA requirements regarding handrails and guardrails contact Glass-Steel. ■

CABLETRAY

Customers rely on Glass-Steel fiberglass cabletray because it will not deteriorate from chemical attack or weathering, is non-conductive, nonmagnetic has a low coefficient of thermal expansion, excellent dimensional stability, is lightweight and requires no maintenance. Glass-Steel tray is manufactured in four load sizes (25, 50, 75 & 100 pounds per linear foot). **All standard Glass-Steel cabletray is manufactured to a 2:1 safety factor.** All fittings are shipped fully assembled, including FRP splice plates. Custom cabletray can be designed and built to meet any loading requirement or special condition.

Glass-Steel cabletray installations are found in chemical processing plants, petrochemical operations, water and wastewater treatment facilities and on offshore platforms.

Glass-Steel cabletray meets the requirements of NEMA Standard FG1. For more information on NEMA requirements regarding cabletray contact Glass-Steel. ■

Completed cabletray section prior to shipment to chemical processing plant.



Glass-Steel cabletray and channel tray systems located on offshore platforms in the Pacific Ocean have survived severe storms and salt air and have given trouble-free service.



PLATFORMS

Glass-Steel walkway and platform systems are designed to be strong, durable and easily installed at the work site. When size permits, systems are fabricated and shipped preassembled to the customer. Typical environments include chemical, wastewater treatment, offshore, electrical, and plating operations. In many cases Glass-Steel fiberglass platforms cost less than equivalent steel platforms on an initial cost as-installed basis. Additional cost savings are realized through the elimination of maintenance costs over the life of the platform.

The Glass-Steel walkway and platform systems meet the requirements of OSHA Standard 1910.23 for handrail and 1910.24 for stairways. For more information on OSHA requirements regarding platform stairways systems contact Glass-Steel. ■

Four preassembled platform systems ranging in size from 3' wide x 21' long x 9' high to 11 1/2" wide x 58' long x 9 1/2" high were installed in the chlorine manufacturing area at Dow Chemical in Freeport, TX.





This circular platform surrounds an air stack at a major chemical plant and provides access for EPA workers to take air samples of emissions.



This Glass-Steel all fiberglass railroad tank loading platform features a cantilevered section that rotates upward automatically when not in use (shown locked in down position).

This 10' x 250' operating aisle platform is one of four such structures prefabricated by Glass-Steel and shipped to a \$3.6 billion petrochemical project in Saudi Arabia.

WATER / WASTEWATER

The chemicals present in water/wastewater plants are often largely unknown; therefore, Glass-Steel fiberglass structures are ideal for these operations because EXTREN is impervious to a wide range of chemicals. Glass-Steel products for water/wastewater are described below.

- **Troughs -**

Fiberglass troughs, custom made to any size and design, have strong integral stiffening and excellent beam strength. Troughs are available with fixed or adjustable flanged ends, or through-the-wall mounting. Troughs are supplied with or without adjustable weir plates and scum baffles.



Fiberglass circular troughs with fiberglass weirs, scum baffles, and mounting brackets were installed in three 140' diameter clarifiers at the Laredo, TX Municipal Treatment Plant.

- **Weir Plates and Baffle Plates -**

Pultruded fiberglass weir plates and scum baffles fabricated from fiberglass sheet are custom produced by Glass-Steel. The pultruded weir and baffle plates are maintenance free and have a higher glass content than molded plates. Match-metal die molded plates are also stocked by Glass-Steel (custom notching available) as well as FRP mounting brackets and concrete anchors.

- **Clarifier Bridges -**

Utilizing fiberglass structural shapes and standard Glass-Steel systems, long spans with minimal deflection have been installed at costs lower than comparable concrete and steel bridges.

- **Trash Racks -**

Custom fabricated racks of any size can be provided preassembled to the customer.



- **Walkway & Handrail Systems -**

Glass-Steel fiberglass handrail and walkway systems are used widely in water/wastewater plants.

2500 feet of Glass-Steel handrail was installed in 1984 at the Fort Kamehameha Wastewater Treatment Facility, Pearl Harbor Naval Base in Hawaii.

OFFSHORE

The use of fiberglass structures on offshore drilling rigs and production platforms is rapidly expanding. Benefits of fiberglass include resistance to saltwater corrosion and significant weight reduction. For existing platforms where congestion is typical, structures of high-strength fiberglass are much easier to retrofit because of the relative light weight of fiberglass (80% less than steel). An additional benefit of fiberglass is the elimination of cutting torches and or welding to make field modifications thereby saving the cost of shutting the wells in.

Examples of fiberglass structures and systems for offshore use include the following:

- Electrical and Pneumatic Cabletray
- Generator Covers for Louvers
- FRP Analyzer Buildings
- Handrail for Upper Levels and Special Handrail for Boat Landings
- Identification Signs for Platforms
- Well Bay Platforms
- Sump Tanks
- Electrical Panels and Cabinets
- Battery Boxes
- Heliport System with Non-Skid Surfacing
- Work Platforms on Main Deck
- Stairways
- Ladders
- Drain Pipe and Drain Systems
- Subsea Identification Signs



Preassembly of well bay platform of Glass-Steel plant.



Grating with well holes are added to preassembly.



Final assembly of platform in progress on Southpass 62.

Glass-Steel is experienced in the design of fiberglass structures and systems and is ready to design structures for you or assist you in your design. Glass-Steel's extensive experience in fabrication procedures, joint design, and stress analysis of composite assemblies coupled with the use of MMFG EXTREN results in fiberglass structures of superior, cost-effective design and structural integrity.

Design and analysis at Glass-Steel is supplemented by physical testing to ASTM standards in MMFG's Bristol, Virginia laboratory. Lab testing is used on each lot of material to assure published minimum values are met. In special circumstances actual loads may be simulated in the lab to verify designs.

Detailing is an extension of the engineering function at Glass-Steel. Clear, straightforward drawings are completed and the necessary approvals obtained before fabrication begins. Field assembly drawings are provided as necessary. ■



GLASS·STEEL, INC. PRODUCT LINES

STANDARD PRODUCTS

Cabletrays
Handrail Systems
Ladders
Ladder Cages
Walkway & Platform Systems
Raised Floor Supports
Weirs
Baffles & Brackets
Troughs
Slide Guides & Gates
Emergency Boarding Ladders
Underwater Antifouling Signs & Sheathing

TYPICAL CUSTOM PRODUCTS

Work Platforms
Single Piece Monopile Platforms (Offshore)
Personnel Walkways
Mezzanine Towers (CPI)
Clarifier Bridges (Wastewater)
Sluice Gates (Wastewater)
Dome Housing Platform (RR)
Trusses
Buildings
Enclosures
Electrical Housings & Barriers
Battery Boxes & Battery Racks
Tank Loading Platforms
Trash Racks
Equipment Skids
Pipe Racks & Pipe Supports & Walkway Stiles
Signs
Rolling Platforms
Tradeshow Exhibits
EMI/FRI Transparent Structures
Fume Hoods
Ductwork
Intake Gates & Screens
Floor Systems
Offshore Structures (see List in Offshore Section)

TYPICAL MARKETS SERVED BY GLASS·STEEL, INC.

Aquaculture
Chemical Processing
Cooling Towers
Exhibit Designers
Fertilizer
Food & Beverage
Marine
Metal Processing Plating Lines
Micro Chip Plating Lines
Mining & Ore Leaching
Municipal Waste Treatment
Municipal Water / Water Purification
Offshore Drilling & Production
Pharmaceutical
Petrochemical
Power Plants
Pulp & Paper
Radar Installations
Raised Computer Floors
Transportation

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