TATA STEEL
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TATA

CREATING A NEW TOMORROW FOR INDUSTRY

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Tata Steel's New Materials Business

A SPRINGBOARD INTO THE EXCITING WORLD OF ADVANCED MATERIALS

Tata Steel has recently initiated a new business vertical, '**New Materials Business**' in the domain of composites. A springboard into the exciting world of advanced materials, this new business division aims to take advantage of the increasing potential of new and emerging materials in many areas. This includes light weighting, energy storage, water and infrastructure, health and wellness, railways, automotive, and smart cities.

A Fibre Reinforced Composite (FRP) comprises a polymer matrix reinforced with carbon, glass, aramid or natural fibres. Fibres heighten properties such as stiffness, strength, creep and fatigue resistance while enhancing value. The choice of polymer and fibres depends on desired physical and chemical properties. A wide range of matrix and reinforcement combinations are possible, offering a specific mix of properties to suit many applications areas.

Composites offer a range of benefits:

- High strength
- Corrosion resistance
- Lighter weight
- Smooth finish
- Low maintenance
- Design freedom
- Cost efficiency

A number of technology and manufacturing partnerships, understanding of customers' requirements, backed by in-depth technical specialisation are helping Tata Steel develop engineered composites tailored for specific applications. Giving New Materials Business a leading edge.

WHY ARE FIBRE REINFORCED PLASTICS (FRP) ADVANTAGEOUS?

FRP has a quarter of the bulk of steel, which means that in several cases it is possible to handle equipment manually rather than hiring a crane.

FRP is easy to repair and does not require arc welding in risky zones. Its dielectric properties mean that it can be used in places where electrical conductivity is untenable.

FRP's anisotropic nature (different physical properties in different directions) means that engineers are able to line up the reinforcing fibres with the main area of tension, thus making the equipment stronger and lighter than an equivalent steel fabrication would be.

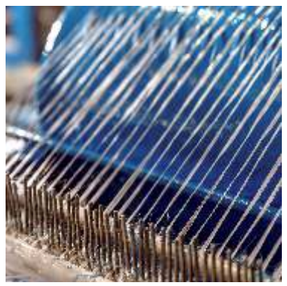
FRP PRESSURE VESSELS

High-performance FRP pressure vessels are used mainly in the water filtration industry. With the growing demand for safe and cheap drinking water, the demand for lightweight, corrosion resistant pressure vessels is on the rise.

Ideal for

- Water filtration
- Effluent treatment

World-class Filament Winding Process



Tata Steel's New Material Business Division has invested in the latest equipment & technology systems to manufacture pressure vessels that meet the most demanding needs of industry. The manufacturing process for these pressure vessels is the filament winding process. Filament winding is an automated PLC controlled open moulding process that uses a rotating mould made of FRP.

The mould configuration produces

- A finished inner surface
- A laminated surface on the outside diameter of the product.

Filament winding results in a high degree of fibre loading, providing high tensile strength in the manufacture of hollow, generally cylindrical products such as pressure vessels and chemical storage tanks.

Automated process makes high strength- to-weight ratio laminates and provides a high degree of control over uniformity and fibre orientation.

FRP TANKS & CHEMICAL EQUIPMENT

Tata Steel offers a range of FRP tanks and chemical equipment for process industries.

These include FRP acid storage tanks, stacks and hoods. Lightweight and with excellent corrosion resistance and superior mechanical properties, FRP tanks offer a long maintenance-free service life of more than 20 years. With optimum choice of resins, FRP walls of tanks and chemical equipment have anti-ageing, seepage-proof and heat insulation properties. The tanks are used to handle acids, alkalis and other corrosive liquids.

Industries using FRP tanks

- Chemicals
- Food & beverages
- Paper and textile sectors
- Steel

100 KL tank for Tinplate

CHEMICAL PIPING SYSTEMS

GRP pipes offer tailored solutions to challenging applications. FRP being orthotropic in nature, mechanical properties such as hoop and axial tensile strengths can be controlled to meet design pressure and stiffness ratings. Being lightweight, laying and transportation are easy and cost-effective.

Moreover, pipes can be manufactured in longer lengths up to 12 metres, which minimises the number of joints in a pipeline, thus reducing chances of angular deflection and leakage. Having a high C value or Hazen William co-efficient, GRP pipes offer a smooth slime-free inner surface which increases pumping efficiency and reduces operational costs.

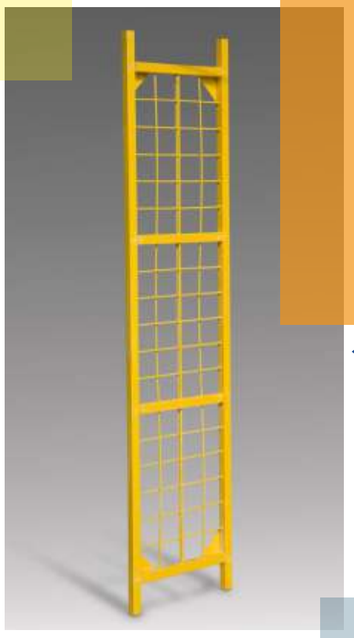
Pipes are suitable for

- Carrying potable water
- Sewage
- Chemicals with a wide range of pH values
- Aggressive soil conditions.

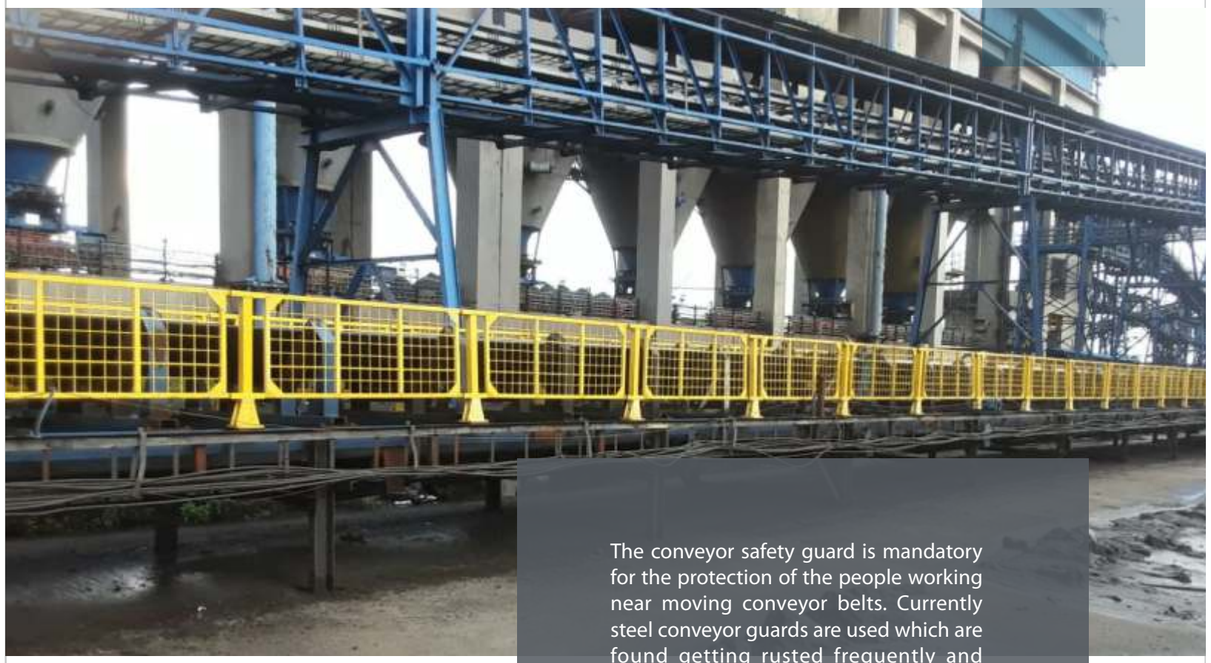
FRP Air-receiver units

FRP SOLUTIONS FOR PROCESS INDUSTRIES

Tata Steel's **New Materials Business** worked closely with many process industries to introduce innovative solutions in FRP leveraging their unique mix of properties to address issues in line maintenance, corrosion and cost. Tailored to suit application needs, the products were developed through a range of composite manufacturing technologies such as hand layup, filament winding and pultrusion. These products, some of which are groundbreaking in India, have proved to be low cost and lightweight solutions with a long maintenance free life.



Safety equipment



FRP CONVEYOR GUARD

The conveyor safety guard is mandatory for the protection of the people working near moving conveyor belts. Currently steel conveyor guards are used which are found getting rusted frequently and needs high maintenance

Advantages:

- FRP conveyor guards are corrosion resistant, maintenance free strong, durable and has a longer shelf life
- Cost and time of erection is low due to its modular structure
- No electrical or gas cutting hazard

FRP Conveyor Guards

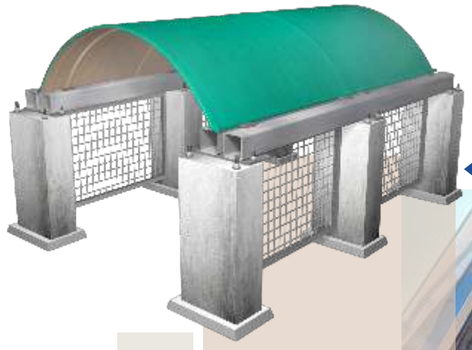
FRP Conveyor Safety Guards

FRP CONVEYOR HOOD

Conveyor hoods are needed to cover iron ore fines, or coal from rain and to reduce the fugitive dust missions in the plant. FRP Conveyor hoods can be engineered to suit the specific dimensions of the conveyor belt.

Advantages:

- FRP conveyor hoods can be used in open type conveyors of material handling systems of any process plant



FRP Conveyor Hoods

FRP DRIP POTS

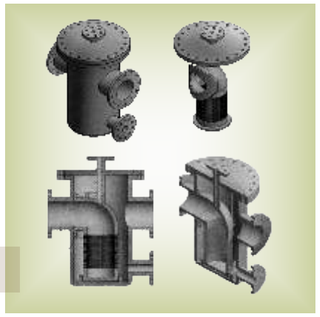
Drip pots are used in coke oven gas lines, blast furnace gas lines, LD gas lines and mixed gas lines. Use to remove the condensate generated in the pipeline due to condensation of vapor mixed in the coke oven gas

Benefits:

- FRP Drip pots are lightweight, corrosion resistant, easy to handle and customized to meet the process requirements as per size and details received from customer
- FRP drip pots have a longer shelf life than their steel counterparts

FRP Drip Pots

FRP Acid Strainers



FRP ACID STRAINER

The pickling process generates impurities like chloride crystals, rubber particles and carbon particles and silica dust which is precipitated in the pickling solution. These particles in turn are deposited on the filter elements of the strainer chamber causing clogging of the strainer, resulting in line stoppage and cleaning. The solution here is usage of FRP acid strainers

Benefits:

- The strainer can be backwashed within 5 to 10 minutes without opening the flange, compared to 2 hours shutdown needed for other type of strainer
- Quality problem due to poor pickling or rinsing can be eliminated by increasing the cleaning frequency without line stoppage.

GRATINGS

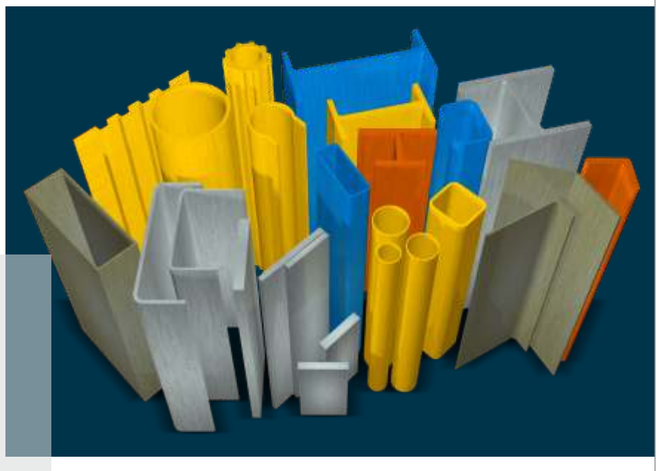
FRP gratings offer corrosion free and light weight solutions for industrial flooring applications.

Flexible manufacturing process

- Gratings can be produced in any size
- Any geometry
- In all possible colours
- UV-resistant properties to ensure longer life in exteriors

Tata Steel can manufacture state-of-the-art gratings to suit industrial, urban and marine applications.

PULTRUDED PRODUCTS



Pultrusion is a continuous process used in the production of composite profiles with constant cross sections and material properties.

Tata Steel offers a range of FRP pultruded sections that are the ideal cost efficient replacement for traditional materials such as concrete, steel and wood.

Usage

- Handrails
- Ladders
- Staircases
- Crossovers
- Platforms
- Pedestrian bridges
- Steps
- Walkways
- Construction of cooling towers

FRP MANHOLE COVER

FRP Manhole Covers are made using thermoset material for long term durability. The material comprises of cross-linked polyesters combined with Fibreglass reinforced materials to sustain against wear-n-tear for heavy load vehicular traffic. It is 40% lighter than their steel counterpart

Advantages:

- Free from theft easy to handle and no risk of due to light weight.
- Does not rust due to chemical / sewage / rain water.
- High service life as it does not corrode and has high impact resistance.
- High on aesthetics. The covers are self pigmented and do not require periodical painting for maintenance.
- The pigment arebuild in the material and UV stabilized. Hence there is no peeling / fading of the colors due to sunlight.

FRP CABLE TRAYS

Tata Steel Ltd. has ventured into Fibre Reinforced Plastic (FRP) Cable Tray manufacturing to bring in the best in class quality for unmet needs of the industry and aspire to be the most trusted partner. The mission is to support the industry with the customised solutions that comes with world class quality and unmatched performance at an affordable cost.

Types of Cable Trays offered:

- Ladder Type Cable Trays.
- Perforated Type Cable Trays
- Trough Type Cable Trays