

# GFS TANKS

*Glass-Fused-to-Steel Tanks*

*Durable & Corrosion-Resistant Storage Solutions.*

*Engineered for Longevity, Designed for Performance.*



Ministry of MSME, Govt. of India



**Glass-Fused Steel Tanks**  
Engineered by **STREAMINDUS**



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## Introduction

At **Streamindus Engineering Services Pvt. Ltd.**, we specialize in providing innovative engineering solutions, and our Glass-Fused-to-Steel (GFS) tanks are a testament to our expertise. These tanks are created by fusing two robust materials – glass and steel – at high temperatures, resulting in a durable and corrosion-resistant storage solution. With our advanced engineering design and manufacturing capabilities, we deliver GFS tanks that offer superior protection against harsh environmental conditions, making them ideal for various industrial and municipal applications.



### **Key Benefits of GFS Tanks:**

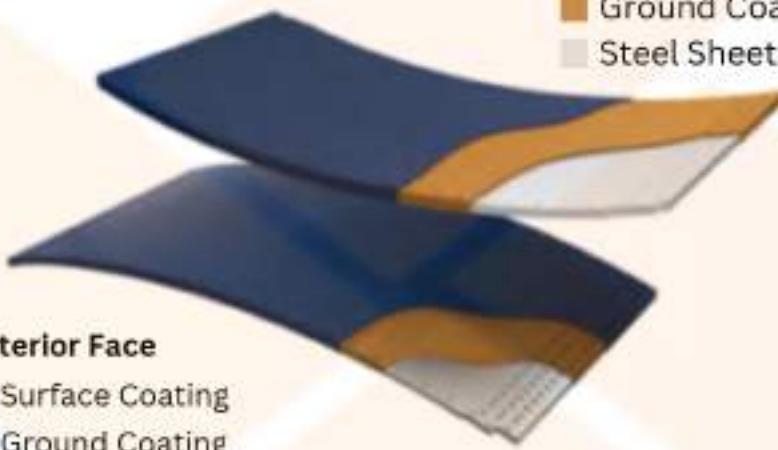
- Corrosion resistance due to fused glass coating.
- High mechanical strength of steel structure.
- Low maintenance and long lifespan.
- Resistant to harsh weather and extreme pH levels.
- Easy transportation and modular installation.
- Suitable for water, wastewater, and chemical storage.

## WHAT IS GFS TANKS?

After firing at **820 °C-930 °C** high temperature, the molten **glass reacts with the steel plate surface to form an inert and inorganic bond**, which combines the strength & flexibility of steel and outstanding corrosion resistance of glass, therefore GFS tanks can provide many advantages over standard epoxy or welded painted storage tanks.

### Interior Face

- Surface Coating
- Ground Coating
- Steel Sheet



### Exterior Face

- Surface Coating
- Ground Coating
- Steel Sheet

Glass-Fused-to-Steel technology is the premium coating technology in the storage tanks market, and GFS tanks are widely used in bio-energy, municipal sewage, landfill leachate, industrial, wastewater treatment and other applications.

### COATING PROPERTIES

**Coating Thickness:** 0.25-0.40 mm

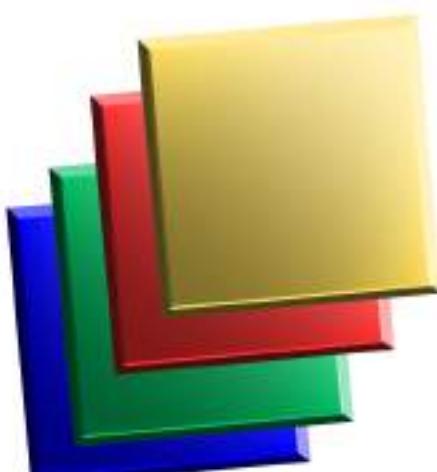
**Double Coating:** 2 layer each side

**Adhesive Power:** 3,450 N/ cm

**Coating Elasticity:** 500kN/mm

**Hardness:** 6.0 (Moh's hardness)

**Service life:** > 30 years



## GFS TANKS TECHNICAL SPECIFICATION

Parameter	Details
Material	Glass-Fused-to-Steel (GFS) - Steel coated with a layer of glass
Diameter	3 meters to 30 meters (customizable based on requirements)
Height	3 meters to 20 meters (customizable based on tank capacity)
Thickness	Glass coating thickness: 0.3 mm to 0.5 mm, Steel thickness: 2 mm to 10 mm
Coating/Finish	Glass coating fused to steel at high temperatures (corrosion-resistant)
Types	Bolted GFS tanks (modular, easy to assemble and transport)
Temperature Resistance	0°C to 100°C (can be designed for higher temperatures based on application)
Design Life	30 to 50 years, with low maintenance and high durability due to the corrosion resistance of the glass coating
Accessories	Inlet/outlet pipes, Manhole, Level Indicator, Overflow valve, Drain valve, Vent valve
Applications	Used for potable water, wastewater treatment, chemical storage, and other industrial liquid storage needs

Capacity	Details
Minimum Capacity	20,000 liters (20 m³)
Maximum Capacity	10,000,000 liters (10,000 m³)

## APPLICATION OF GFS TANKS

### POWER & ENERGY



Biogas	Fly ash Silo	Boiler Feedwater
Biomass Energy	DI water	Reverse Osmosis water
Process Water	Coal Storage	Fermentation Tank

### WASTE WATER TREATMENT



Buffer pool	Aerobic reactor	Biological filter
Regulation tank	Anaerobic reactor	Leachate storage
Water purifying tank	Sedimentation container	Sludge tank
Effluent treatment	Irrigation water	Animal wastes

### WATER SUPPLY AND TREATMENT



Potable water	Bitter-brackish water	Biological filter
Water purifying tank	Disinfecting water	Sedimentation container
RO water	Sea water desalination	Raw/fresh water
Fire-fighting water	Irrigation water	Clarification pool
Lime silo	Saline /brine water	Aeration tank

### INDUSTRIAL DRY BULK STORAGE



Mineral	Wood product	Stone / clay / glass
Chemicals	Petrochemicals	Mining Industry
Foods	Plasthetics	Grain / seeds

## GFS Tanks Color Options



Grey Olive



Black Blue



White



Forest Green



Red



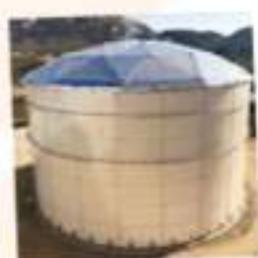
Sky Blue



Evening Haze



Cobalt Blue



Desert Tan



Mist Green

## GFS Tanks Roof Options



### Glass-Fused-to-Steel Roof

- Air-tightness, often utilized for pressurized structures and provide a suitable option for odour control
- Cone shape roof with external / internal beams
- Viable solution for demanding applications



### Aluminum Alloy Trough Deck Roof

- Economical option for potable water, waste water, and fire water storage etc.
- Keep out rain and wind, odour control
- Without air-tightness

## Accessories

### Roof Handrails

*Full perimeter / partial roof handrails can be constructed on tanks according to related safety regulation. Material Options: HDG Carbon Steel / SS304 / SS316*



### Access Ladders

*HDG / SS ladder with step off platform is available, all the design conform to OSHA and other international safety specification.*

*Types: Vertical / Spiral / Rotatory*



### Manways and Nozzles

*GLS tanks include manways and nozzles, which provide access for man / liquid to enter or get out of the tanks.*

*Material Options: HDG carbon steel / SS304 / SS316 / FRP / Epoxy*



### Three-Phase Separator (GLSS)

*UASB reactors are commonly equipped with Three-Phase Separator (GLSS) to separate gas, liquid and solid, the structure materials can be PP, Stainless Steel, GRP, PVC and Carbon Steel.*



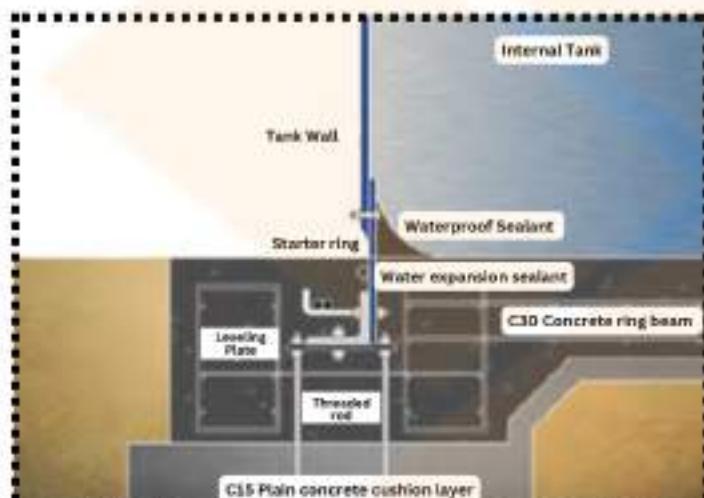
## Accessories

### Mixing System and Other Systems

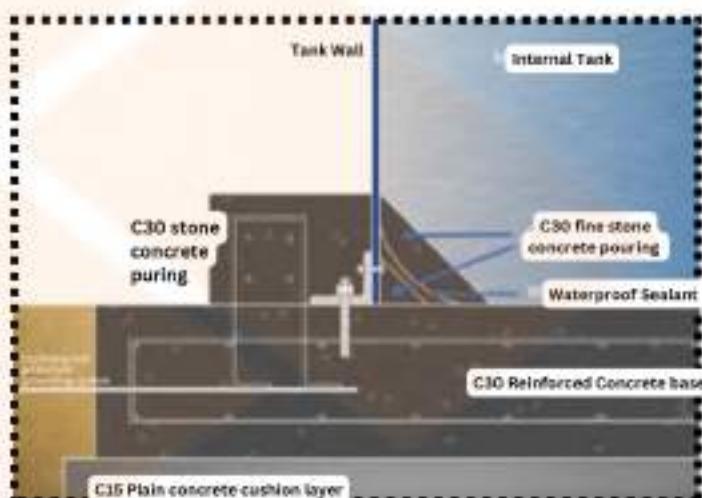
CSTR / AD tanks are generally equipped with mixing system like mechanical agitator or hydraulic agitator. Furthermore, Pumping System, Insulation System, Cathodic Protection, Heating System, Biogas Purification System and other equipment can be provided as requested.



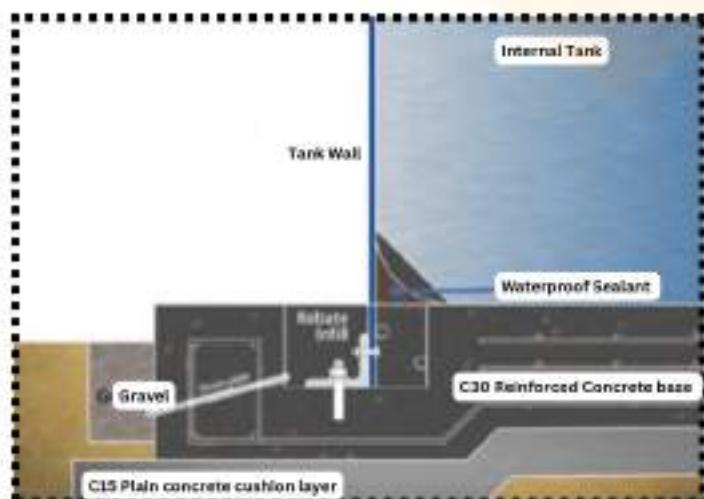
## Tank Foundations



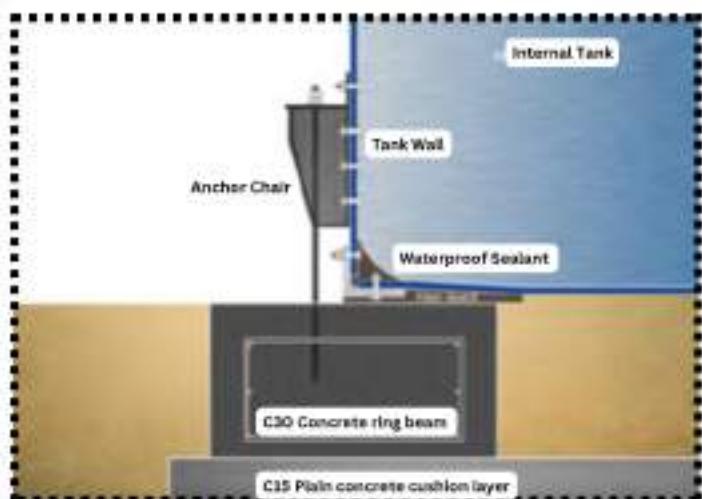
**Starter Ring Foundation**



**Above Floor Foundation**



**Embedded Foundation**



**Enamel Floor Foundation**

# Technical References

## Conversion Factor

Measurement/Conversion	Formula/Value
1 Cubic Meter (m <sup>3</sup> )	1000 Liters (1 KL)
1 Gallon (US)	3.785 Liters
1 Inch	25.4 mm
1 kN/m <sup>2</sup>	0.102 Ton/m <sup>2</sup>

## Density Of Material

Material	Density (kg/m <sup>3</sup> )
Mild Steel (MS)	7,850
Stainless Steel	7,900
Zincalume Steel	7,100
FRP (Fiberglass Reinforced Plastic)	1,800 - 2,000

## Tank Formula

Aspect	Formula	Description
Volume of a Cylindrical Tank	$V = \pi r^2 h$	Used to calculate the liquid storage capacity of cylindrical tanks.
Volume of a Spherical Tank	$V = (4/3)\pi r^3$	Used for spherical tanks.
Volume of a Rectangular Tank	$V = l \times w \times h$	Used for cuboidal tanks.
Surface Area of a Cylindrical Tank	$A = 2\pi rh + 2\pi r^2$	Calculates the external surface area of the tank.
Surface Area of a Spherical Tank	$A = 4\pi r^2$	Calculates the total surface area of a spherical tank.
Surface Area of a Rectangular Tank	$A = 2(lw + lh + wh)$	Determines the total external area.

Figure	Formula
Cube	$a^3$
Rectangular prism	$l \times w \times h$
Cylinder	$\pi \times r^2 \times h$
Cone	$\frac{1}{3} \times \pi \times r^2 \times h$
Sphere	$\frac{4}{3} \times \pi \times r^3$

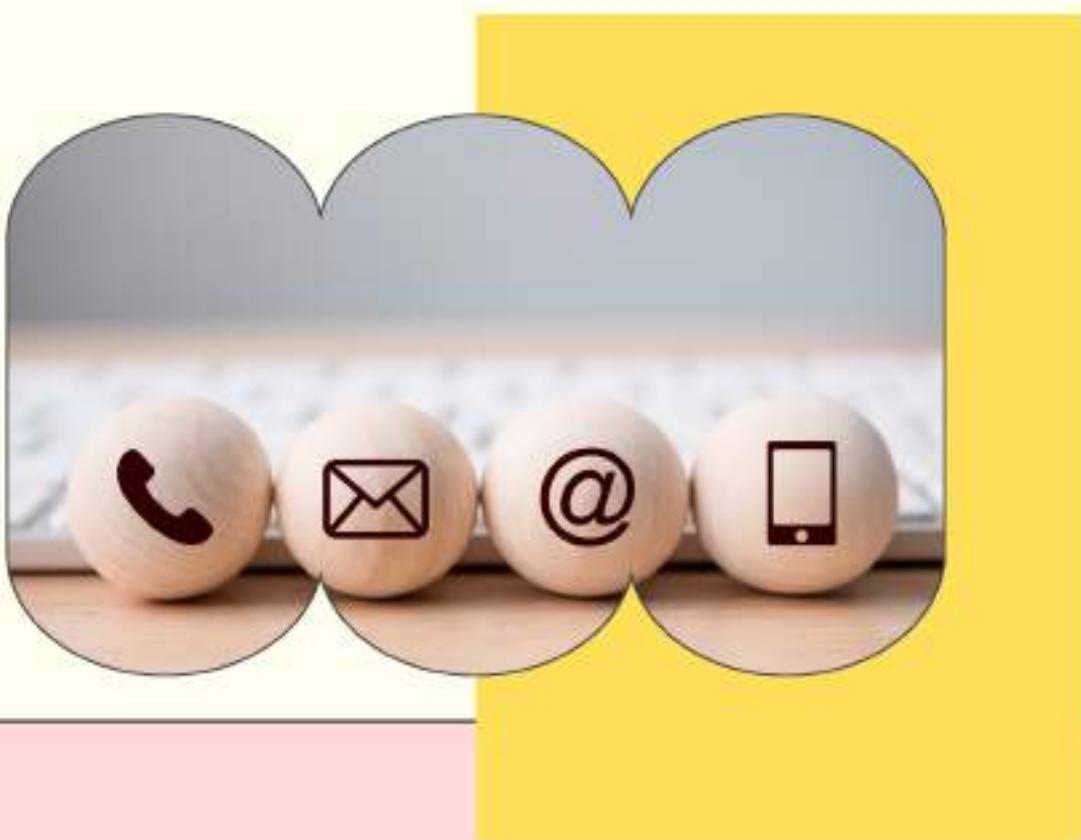
## Sesmic Zone Of India

Formula	$F = Ah \times W$
Zone	Zone Factor (Z)
Zone 2 (Low Risk)	0.10
Zone 3 (Moderate Risk)	0.16
Zone 4 (High Risk)	0.24
Zone 5 (Very High Risk)	0.36

## Soil Bearing Capacity

Soil Type	Bearing Capacity
Soft Clay	50-100 kN/m <sup>2</sup>
Dense Sand	150-300 kN/m <sup>2</sup>
Hard Rock	300+ kN/m <sup>2</sup>

# Keep In Touch



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