www.crimar.com www.sbcco-china.com

Large Tank Fabrication & Installation

Crimar Industrial has been designing, fabricating and installing large diameter fiberglass tanks for the global customers for over 30+ years. Our regular customer base includes companies such as FLSmidth, Glencore, M3 Engineering, Technip, Hatch Engineering, Biorem, CODELCO, Freeport-McMoRan, WesTech, SNC Lavalin and many others, providing equipment and services for projects in North and South America, Africa, China, Australia, the Philippines and Eastern Europe.

In general, because of transportation limit, the tanks larger than DN4500mm can choose two fabrication methods:

Option 1. Shop fabricated, then oblated and shipped to site for field assembly.

Option 2. Fabricate at customer's project site with field winder.

The process of oblating fiberglass tanks for shipping to site for on-site assembly began in in North America in the 1960's and became common practice in the 1970's.

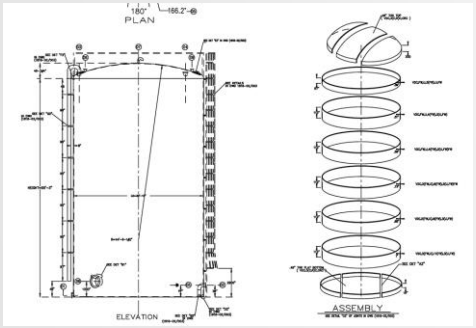
The oblated tanks has the following advantages:

- fabrication is done in a controlled shop environment which provides higher quality - wind, rain and direct sunlight cause problems for on-site winding
- on-site winding often requires large temporary structures to protect the tank fabrication from rain and wind during production
- on-site labor time is considerably reduced
- on-site labor costs are higher than shop rates, especially on a unionized job site
- labor time lost due to weather conditions is minimized
- on-site winding often requires environmental control permits due to the styrene emissions
- project scheduling is simplified

Field winding of large tanks has the following advantages:

- lower shipping costs
- Less joints for tank body（if the height is within 12m, tank body can be one section without joint）
- For the demanding of batching fiberglass tanks of same diameter, the delivery can be realized quicker than oblated tanks.

Fabrication of Oblated Tank



Design

Mold

Winding

Heads fabrication and cutting

Load to frame after oblated and ship to site

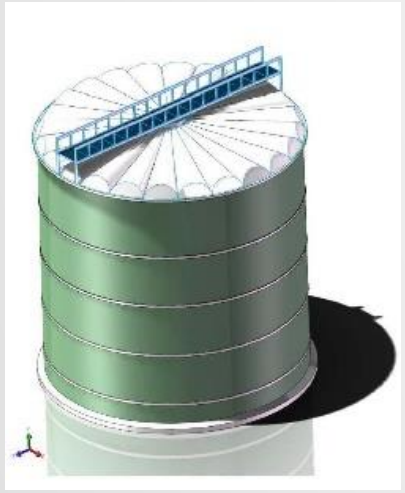
Oblated Tank's Installation

Unload

Field assembly

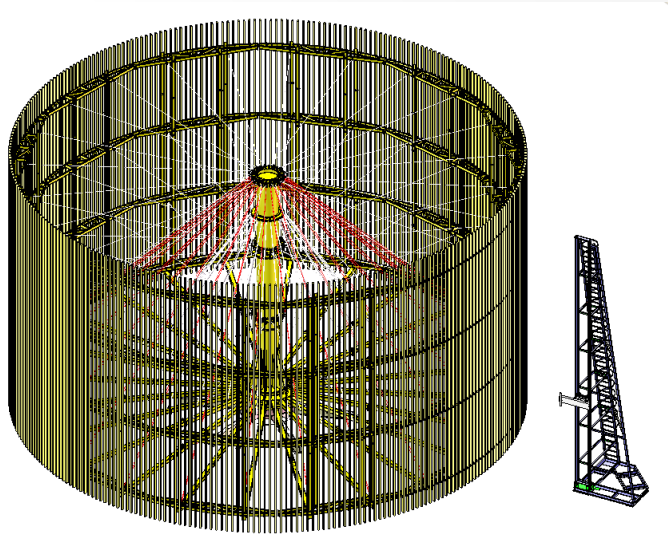
Come into service after hydrostatic test

Fabrication and Installation of Field Winding Tank



Design

Construction team



Winder and Mold installation

Fabrication and Installation of Field Winding Tank

Make Corrosion Barrier

Wind the structural layer

Demolding after curing

Fabrication and Installation of Field Winding Tank

Make tank bottom on the concrete foundation

Demold the tank body and move it to the concrete foundation

Bond the tank body and heads

Come into service after hydrostatic test

Manufacturing Site Requirement

1, Flat and hard ground for winder placing;

2, We plan to use 2 sets of winders, among them：

2.1 one for Dia.10 to 15m tanks: ground required should be L 25m X W 18m；

2.2 one for tanks less than Dia.10m: ground required should be L 20m X W 13m

3, Some containers for storage of raw materials, accessories, etc., please see below:

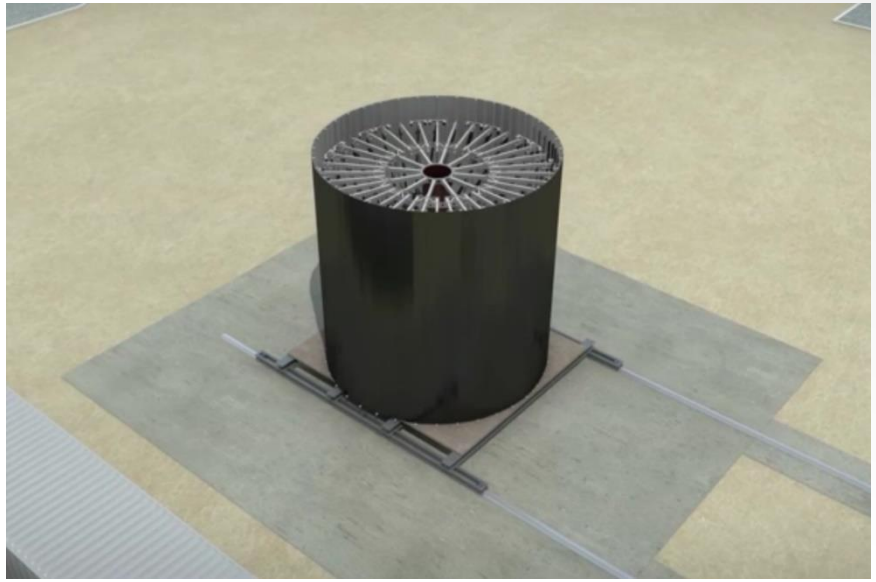
3.1 10X40’ containers for resin storage, air conditioners shall be equipped;

3.2 4X40’ containers for construction team, as temporary office and tearoom, air conditioners shall be equipped;

3.3 10X40’ containers for fiberglass storage, no special requirement;

3.4 6X40’ containers for accessories, no special requirement.

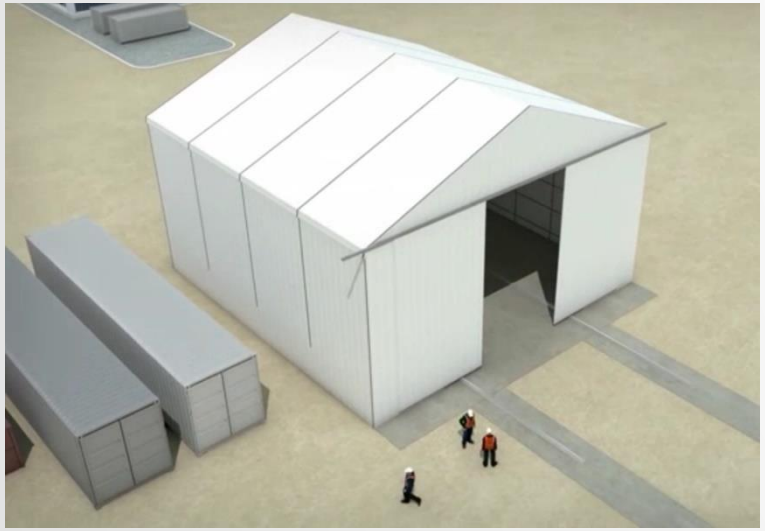
4, Containers are Customer’s scope



1, Track devices shall be equipped under the winder so that the finished product can move to outside of temporary workshop to be demolded.

2, The winders and track devices are Vendor’s scope

Manufacturing Site Requirement



1, We shall build temporary workshops with steel frame ;

2, Two workshops are 12m and 9m high respectively (wall height) ;

3, Temporary workshops are Vendor’s scope.

Demolding view

Installation view

Fiberglass Standards

ASME & ASTM :

ASME RTP-1 Reinforced Thermoset Plastic Corrosion-Resistant Equipment

ASTM D 3299 Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks

ASTM D 4097 Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks

ASTM D 2996 Filament-Wound “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe

ASTM D 2310 Machine-Made “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe

ASTM D 5421 Contact Molded “Fiberglass” (Glass-Fiber-Reinforced Thermosetting Resin) Flanges

BS EN :

EN 13121 GRP tanks and vessels for use above ground

EN 4994 Design and construction of vessels and tanks in reinforced plastics

EN 5480 Glass reinforced plastics (GRP) pipes, joints and fittings for use for water supply or sewerage

Fabrication Materials

Corrosion resistant resins and fiberglass materials are selected based on the operating environment of the tanks

Epoxy Vinyl Ester:

Options: High temperature
Fire retardant
Flexible
High corrosion resistance

Polyester:

Options: Fire retardant
High temperature

Fabrication Materials

GLASS REINFORCEMENT:

- Roving
- Mat
- Woven roving
- Surfacing veils

ADDITIVES:

- Antimony trioxide
- Silica carbide
- Ultraviolet ray inhibitors

Nexus

Area Weight:

37g/ ㎡

1.1 oz/yd²

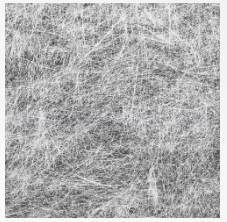
Superior corrosion and stress corrosion resistance, used in the external corrosion barrier of FRP

C-veil

Area Weight:

30g/ ㎡

0.9 oz/yd²



Provides a smooth surface and quick resin soaked, mainly used on the surface layers of FRP.

Chopped Strand Mat

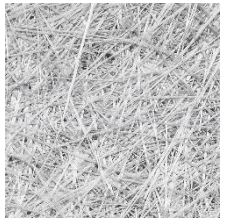
Area Weight:

300g/ ㎡

1 oz/ft²

450g/ ㎡

1.5 oz/ft²



Quick wetting and rapid air release, ease of handling and ability for complex molds, used in combination with woven roving to make up the structural cage of FRP..

Woven Roving

Area Weight:

600g/ ㎡

18 oz/yd²

800g/ ㎡

24 oz/yd²

To increase the flexural and impact strength of laminates, good drapeability, wet out and cost effective, used in the structural cage of FRP.

Continuous Roving

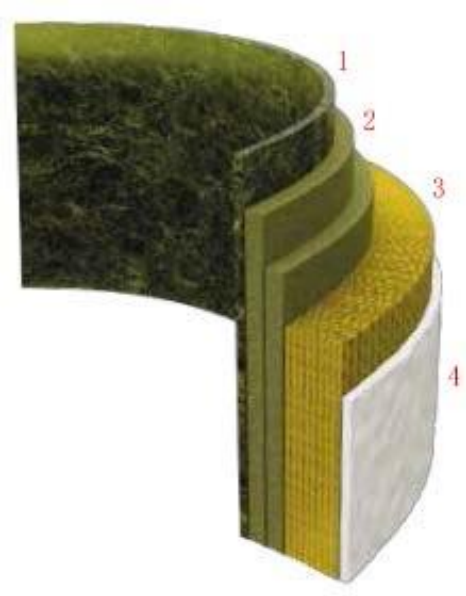
Standard:

1200 tex

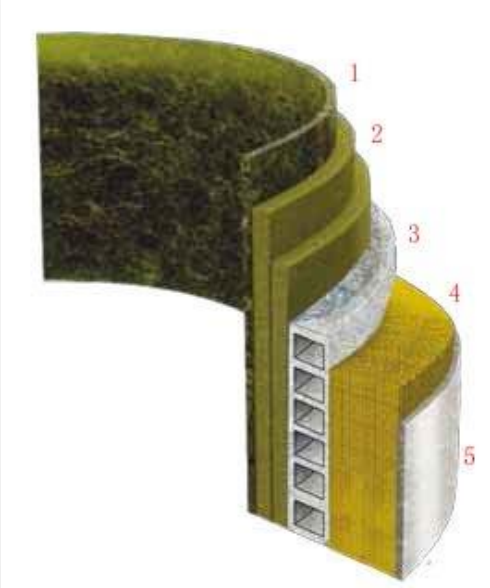
2400 tex

4800 tex

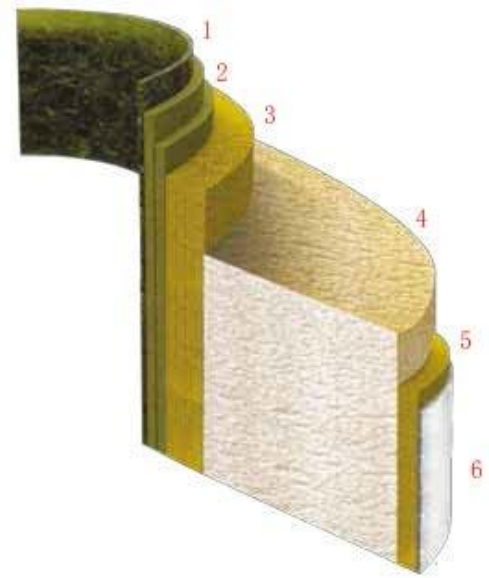
Sketches Of Different Laminates



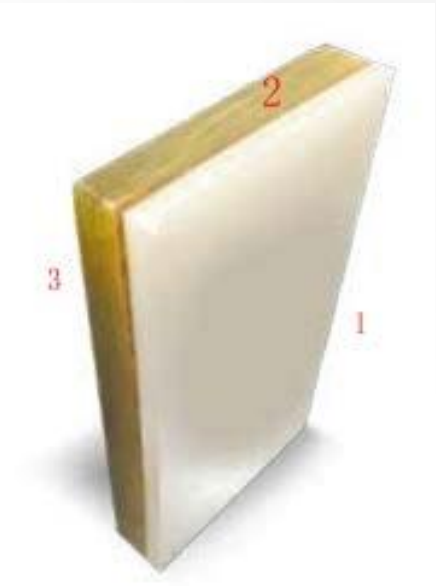
1 Inner Surface
2 Interior Layer
3 Structural Layer
4 Outer Surface



1 Inner Surface
2 Interior Layer
3 Sandwich Layer
4 Structural Layer
5 Outer Surface



1 Inner Surface
2 Interior Layer
3 Structural Layer
4 Insulation Layer
5 Structural Layer
6 Outer Surface



Dual Laminate
1 PVC / PP / PVDF / ECTFE
2 Structural Layer
3 Outer Surface