FIBERGLASS UNDERGROUND WATER STORAGE TANKS

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ARCSA CONFERENCE
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• History of Fiberglass Tanks
• Benefits of Fiberglass
• Manufacturing Process
• Standards & Associations
• Stormwater
• Stormwater Containing Oil
• Other Water Storage Applications
• Accessories
HISTORY OF FIBERGLASS TANKS
Steel Tanks Installed Underground Due to Fears of Fire Hazards

Leaking Steel Tanks Caused Environmental Problems

API Searched for a Rustproof Solution

Owens Corning Fiberglas® Tank Division Was Formed
1965
First Single-Wall Tank Produced

1988
EPA UST Federal Regulations Enacted

1995
Containment Solutions Purchased Tank Division From Owens Corning

Flowtite® Water Tanks Introduced to the Market
Benefits of Fiberglass Tanks

What is Fiberglass Reinforced Plastic?

Glass Fiber Reinforcement

Thermosetting Resins

Resistant to Hydrogen Sulfide Corrosion
Resistant to Microbial Induced Corrosion (MIC)
Structural Integrity Designed to Meet H20 Traffic Load Conditions
Nonporous to Combat Bacteria Accumulation
Easier to Install Fabrication & Installation
Lightweight One Piece Design
Diameters 4' to 12'
Tank Capacities Sizes 600 to 50,000 Gallons
Resistant to Acids, Caustics & High Temps

What are Thermosetting Polyester Resins?
Reacts When Cured w/Catalyst

What is Fiberglass Reinforced Plastic?
Glass Fiber Reinforcement

Thermosetting Resins
Computer Controlled Process

Automated Carriage Arm Meters Raw Material onto Mold

Tank Checked for Surface Thickness with a Fischerscope
Tank Design Standards & Associations

- American Water Works Association
- NFPA 22
- NSF 61
- American Rainwater Catchment Systems Association
- U.S. Green Building Council Member (LEEDS® Credits)
- International Association of Plumbing and Mechanical Officials
- Uniform Plumbing Code
- International Plumbing Code
STORMWATER
Typical Applications

- Stormwater Runoff Collection
- Gray Water Reuse
- Irrigation Systems
- Chilled Water Storage
A. Fiberglass Tank
B. Fiberglass Access Collar
C. Watertight Fiberglass Riser
D. Fiberglass Drop Out Box
E. Deadmen Anchors
F. Fiberglass Anchor Straps
G. Flanged Nozzle – Inlet
H. Flanged Nozzle – Outlet
I. Tank Vent
Stormwater Collection

- Capture Stormwater from Impervious Surfaces
- Stormwater is Filterable for Indoor & Outdoor Applications
- Comply with Local Retention & Detention Regulations

Stormwater Collection
STORMWATER CONTAINING OIL
Interceptor (API Type I)

- Available in Single, Double, and Triple Basin Models
- Reduce Sand, Settleable Materials, & Oil/Grease from Water
- Useable as a Stand-alone Unit
- Combine with Separator for Most Effective System
- Available in Single, Double and Triple Basin Models

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**Diagram Details:**
- Tangentially Mounted Inlet
- 4” Tank Vent
- Access Manway
- Tangentially Mounted Outlet
- Sludge Baffle
Oil Water Separator (API Type II)

Top View

Inclined Corrugated Parallel Plate Separator

Plates Stacked at 45° Angle

Oil Coalesces on Underside of Plate and Rises

Known Effluent Quality

FLOW

Inlet

Outlet

Coalescer Plate Packs
Design Basics
A. Hydrostatic Double-Wall FRP Tank
B. Removable Coalescer Packs
C. Flanged Manway
D. Hydrostatic Reservoir
E. FRP Anchoring Straps
F. Turnbuckles
G. Concrete Deadman Anchors
H. FRP Drop Out Box
I. Inlet Piping
J. Shut-off Valve
K. Manway Extension
L. Watertight Tank Sump
M. Dual-Float Interface Sensor
N. Slotted Oil Suction Pipe
O. Hydrostatic Sensor
P. Oil Stop Valve
Q. Valve Float Cable
R. Outlet Piping
S. Shut-off Valve
T. Concrete Slab
Storm Water Runoff Sizing

- Determine discharge requirements (ppm)
- Calculate rainfall (in/hr)
- Calculate flow source area (ft$^2$)
- Calculate treatment rate (GPM)

\[(\text{GPM}) = \text{Area(}ft^2\text{)} \times \text{Rainfall (}in/hr/ft^2\text{)} \times 0.0104 \ (\text{GPM/in/hr})\]
Storm Water Sizing Example

- 42,000 Sq. Ft.
- Lawrence, KS (2 in/hr.)
- Conversion Factor – 0.0104
- $42,000 \times 2 \times 0.0104 = 885.25$ gallons per minute

9,000 gallon OWS (900 gpm)
Other Water Storage Applications

- Fire Protection
- Potable Water
- Rainwater
- Onsite Septic
- Grease Interceptor
FIRE PROTECTION
Typical Applications

- Surge Tanks for Fire Sprinkler Systems
- Horizontal Suction Pump Tanks
- Vertical Suction Pump System
- Dry Hydrant Tanks
A. Fiberglass Tank
B. Fiberglass Access Collar
C. Watertight Fiberglass Riser
D. Deadmen Anchors
E. Fiberglass Anchor Straps
F. Flanged Nozzles
G. Vertical Pump Vault
H. Turbine Pump w/ Discharge Head
I. Vent/Level Indicator
J. Dual NST Fill Point
Fire Protection Tanks

NFPA 22 Standard

Water Storage Tanks for Fire Protection Systems
POTABLE WATER
Typical Applications

- Rural Properties
- Commercial Business Complexes
- Emergency Water Supplies (Hospitals)
- Large Private Resorts
A. Fiberglass Tank
B. Fiberglass Flanged Manway
C. Fiberglass Manway Extension
D. Deadmen Anchors
E. Fiberglass Anchor Straps
F. Flanged Nozzle – Inlet
G. Flanged Nozzle – Outlet
H. NSF-61 Fiberglass Ladder
I. Auxiliary Fill Gauge
J. Tank Vent
Potable Water

- NSF 61 Approved Resin
- No PVC Below Water
- Manways Only
Typical Applications

Commercial & Residential Rainwater Harvesting
Grey Water Reuse
Irrigation Systems
Cooling Tower Recharge
A. Fiberglass Tank
B. Fiberglass Access Collar
C. Watertight Fiberglass Riser
D. Deadmen Anchors
E. Fiberglass Anchor Straps
F. Roof Drain
G. First Flush Filter
H. Smoothing Inlet Diverter
I. Pump Control Float Switch
J. Floating Filter
K. Overflow Device
L. Suction Pump
ONSITE SEPTIC
Typical Applications

- Resorts & Spas
- Suburban & Rural Developments
- Rest Areas & Truck Stops
- Municipalities
A. Fiberglass Tank
B. Fiberglass Access Collar
C. Watertight Fiberglass Riser
D. Fiberglass Baffle
E. Deadmen Anchors
F. Fiberglass Anchor Straps
G. PVC Inlet Piping
H. Effluent Filter
I. Effluent Pump with Filter
J. Effluent Discharge
Onsite Septic

- Custom OEM Fabrication
- Watertight & Corrosion Resistant
- Aerobic & Anaerobic Applications
GREASE INTERCEPTOR
Typical Applications

- Restaurants
- Convenience Stores
- Food Service Kitchens
- Schools & Universities
- Hotels & Resorts
A. Fiberglass Tank
B. Fiberglass Access Collar
C. Watertight Fiberglass Riser
D. Fiberglass Baffle
E. Deadmen Anchors
F. Fiberglass Anchor Straps
G. PVC Transfer Piping
H. Grease Clean-Out Riser
I. PVC Inlet Piping
J. PVC Outlet Piping
K. Tank Vent
Grease Interceptor

- Natural Separation of Fats, Oils, & Grease (F.O.G.)
- Prevents F.O.G. from Entering Sewage Systems
- Temporary Storage of F.O.G.
ACCESSORIES
Flanged Nozzles

Flexible Connectors

Differential Movement Between Tank & Piping
Access Risers Are Available in Fiberglass or PVC (24”, 30”, 36” Dia.)

Adhesive Kit Provides Watertight Permanent Bond Between Access Collar and Riser

Protects Access Opening from Infiltration and Exfiltration Contamination
Engineered Deadmen Anchor Systems

- Pre-fabricated Deadmen Anchors
- FRP One-piece Straps or Split Straps
- Turnbuckles
Containment Solutions Manufactures:

Petroleum Storage Tanks
Urea DEF Storage Tanks
Automotive Oil & Lubricant Storage Tanks
Oil / Water Separators & Interceptors
Flowtite® Water Tanks
Chemical Storage Tanks
Fiberglass Manholes & Wetwells

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