



# Advantages of FRP (Fiberglass Reinforced Plastic) Wet Well and Pumping Station Chambers

*RM of West St. Paul  
Presentation  
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*Lister Rapids*

*Rivercrest & River Springs*

# FRP Pump Stations

- A better approach for small to medium sized pump stations and chambers.
- Longer lasting, lower maintenance & cleaner alternative to precast or cast-in-place concrete chambers.
- Diameters from 1219mm (4ft) to 3660mm (12ft). Depth limited only by trucking regulations (>15m/50ft)



# FRP Pump Stations

## Why FRP?

- Structurally engineered specifically for lift stations
- Corrosion-resistant material outlasts alternatives, even concrete. Ideal for sewage, industrial waste or leachate.
- Easy-to-clean smooth gel coat finish so solids don't stick.
- Engineered benching directs effluent to pump inlet minimizing clogging, residence time & odours.
- Sealed, leak proof design – excellent in high water table or environmentally sensitive areas (no seams to leak).
- Prefabricated, factory built & packaged. Allows custom shapes and minimizes on-site work and installation time.

**TANK WEIGHTS AND CENTER OF GRAVITY**

ITEM	WEIGHT (LBS)	CG (IN)
1. TANK (EMPTY)	11,000	110.0
2. TANK (FULL)	11,000	110.0
3. TANK (FULL) + PAYLOAD	11,000	110.0
4. TANK (FULL) + PAYLOAD + SERVICE MODULE	11,000	110.0
5. TANK (FULL) + PAYLOAD + SERVICE MODULE + ORBITER	11,000	110.0

**TANK DIMENSIONS**

ITEM	WEIGHT (LBS)	CG (IN)
1. TANK (EMPTY)	11,000	110.0
2. TANK (FULL)	11,000	110.0
3. TANK (FULL) + PAYLOAD	11,000	110.0
4. TANK (FULL) + PAYLOAD + SERVICE MODULE	11,000	110.0
5. TANK (FULL) + PAYLOAD + SERVICE MODULE + ORBITER	11,000	110.0

**TOLERANCES (UNITS)**

ITEM	WEIGHT (LBS)	CG (IN)
1. TANK (EMPTY)	11,000	110.0
2. TANK (FULL)	11,000	110.0
3. TANK (FULL) + PAYLOAD	11,000	110.0
4. TANK (FULL) + PAYLOAD + SERVICE MODULE	11,000	110.0
5. TANK (FULL) + PAYLOAD + SERVICE MODULE + ORBITER	11,000	110.0

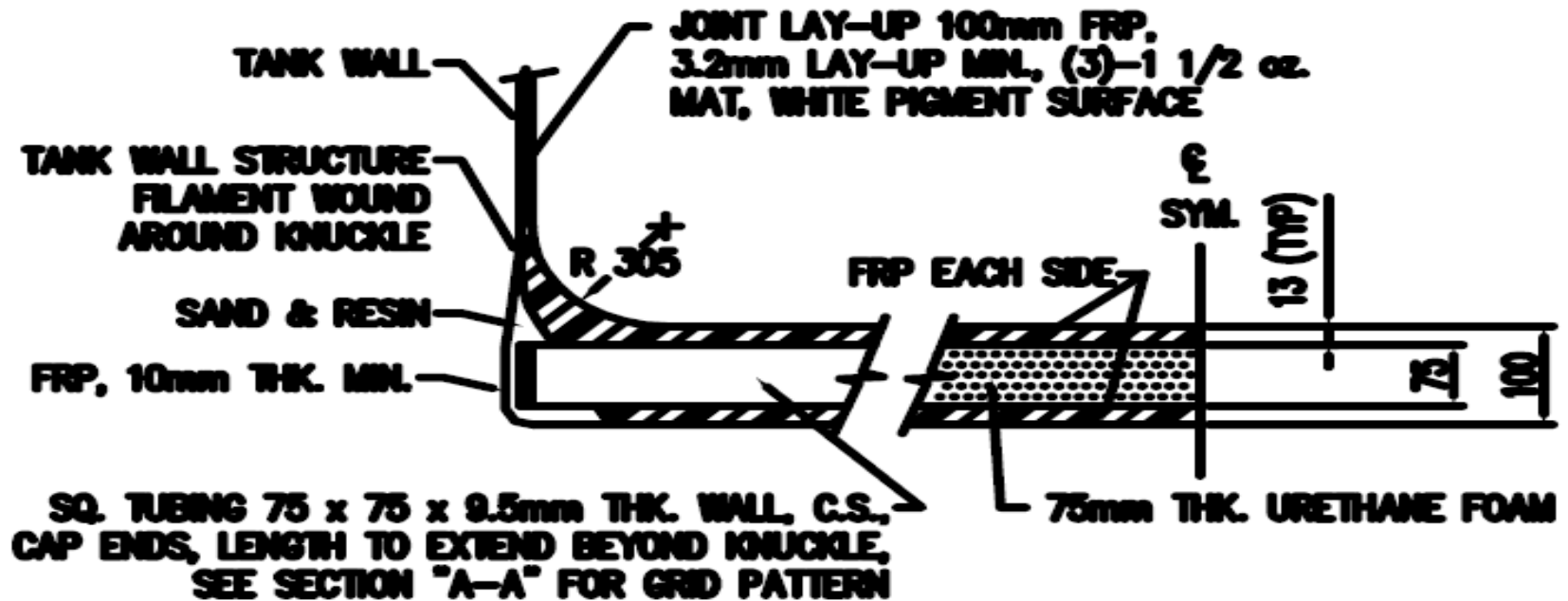
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- Integrated design and assembly: everything fits right the first time
- Tanks filament wound with 60-70% glass content to assure a strong vessel.
- Smooth gel coat interior
- Wall thickness to 21 mm as required by depth
- Steel reinforced station floors: foam filled and encapsulated with FRP 100-200 mm thick.

# Station Floor



## LAYUP SEQUENCE:

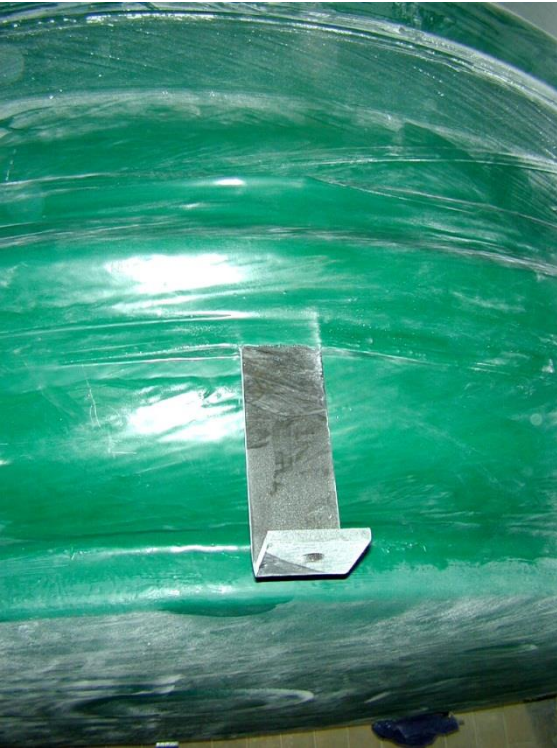
**LINER, (5) ROVING; 75mm THK. FOAM/75mm THK. STEEL SQ. TUBING; (5) ROVING**

**DETAIL "3" - BOTTOM BASE**  
**N.T.S.**

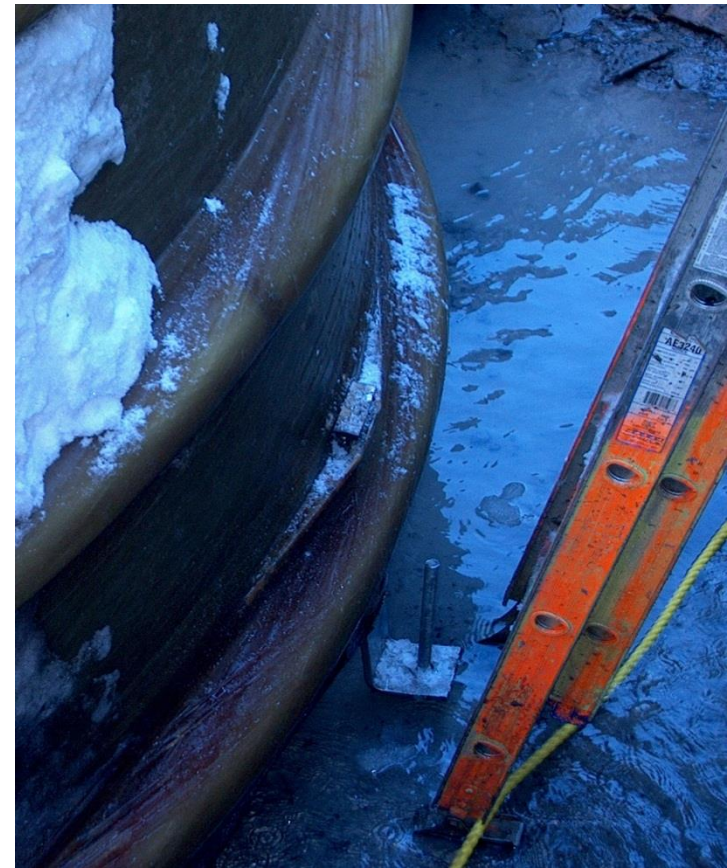




# FRP Station Base



- External brackets are moulded into the structure and used to bolt the tank to a pre-poured concrete slab.
- Once fastened in place an extra pour is used to ballast the tank.







# FRP Pump Station Base

- 2<sup>nd</sup> pour of concrete



# Tank structure and floatation

- Tank design includes strengthening ribs added during the filament winding process. Tanks are engineered to withstand full submergence pressure even when empty.
- Strengthening ribs are captured in the 2<sup>nd</sup> pour of concrete to withstand upward forces. Tanks will not lift regardless of water table.
- Internals all pre-built. No on-site fabrication, allows shorter dewatering time.
- No seams in structure to leak effluent into the environment or ground water into the sump.
- “As built” matches design: a true engineered system vs. on-site “adaptations” common in site-assembled stations.



## Engineered tank bottom (optional)

- Based on the Flygt hydraulics laboratory design
- “T.O.P.” (**T**echnically **O**ptimized **P**ump sump)





# Moulded “T.O.P.” sump

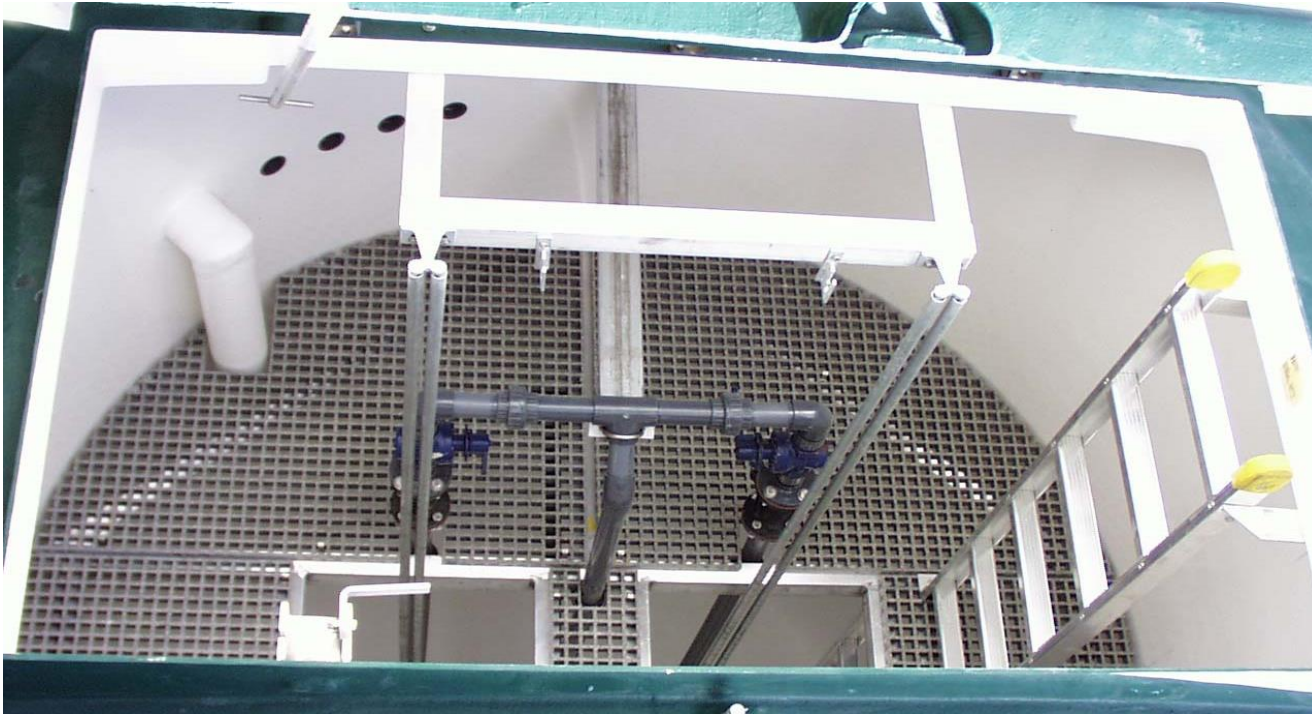
The design allows highest efficiency solids removal *and* minimizes residual volume

Can also be used in concrete wells



# Safety platforms

- Standard intermediate platform is FRP grating with aluminum supports and stainless fasteners
- Aluminum or stainless grating optional



# Piping

- FRP, PVC, Stainless or Ductile piping available
- FRP piping adds benefit of *structural* tank penetrations





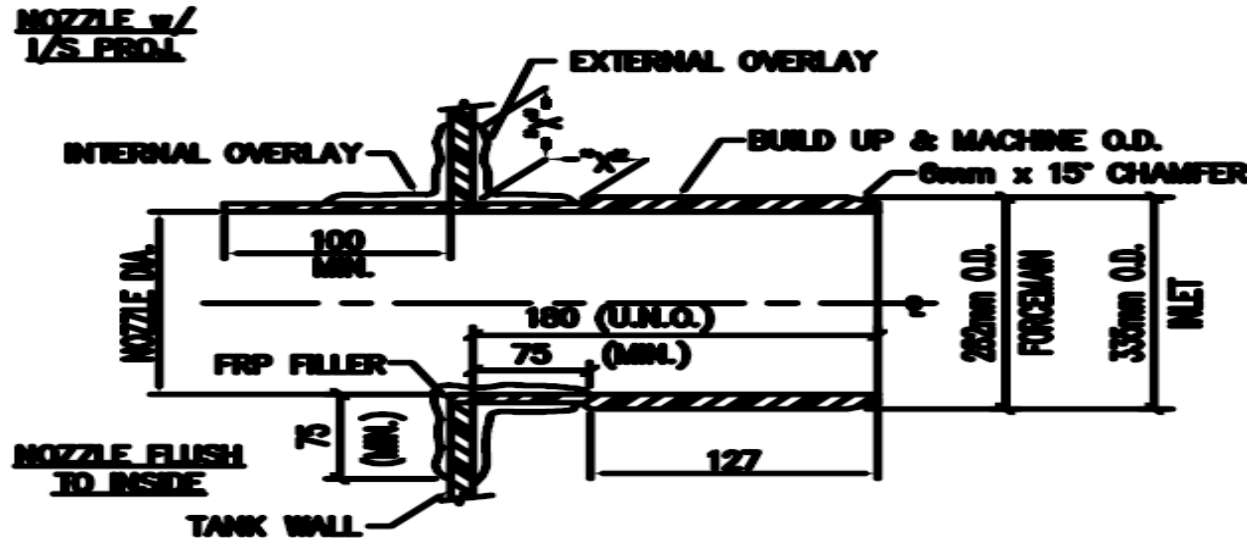
# Station piping

- Exterior nozzles are reinforced and machined for use with standard underground pipe couplers (typically Robar)
- Penetrations are moulded into tank: no sealing required, no dissimilar materials





# FRP Pumping Stations Piping



## NOZZLE NOTES

FOR

A MINIMUM OF 2 LAYERS OF WOVEN ROVING IS REQUIRED FOR NOZZLE PORTION OF OVERLAY. TANK PORTION OF OVERLAY SHALL BE SAME THICKNESS AS TANK WALL. DIMENSION "X" SHALL BE GREATER THAN ONE HALF THE NOZZLE DIAMETER. INTERNAL OVERLAY TO HAVE A MINIMUM OF 2 LAYERS MATT. FRP REINFORCING MATERIAL TO BE CUT TO A SHAPE TO ENSURE A SMOOTH LAMINATE.

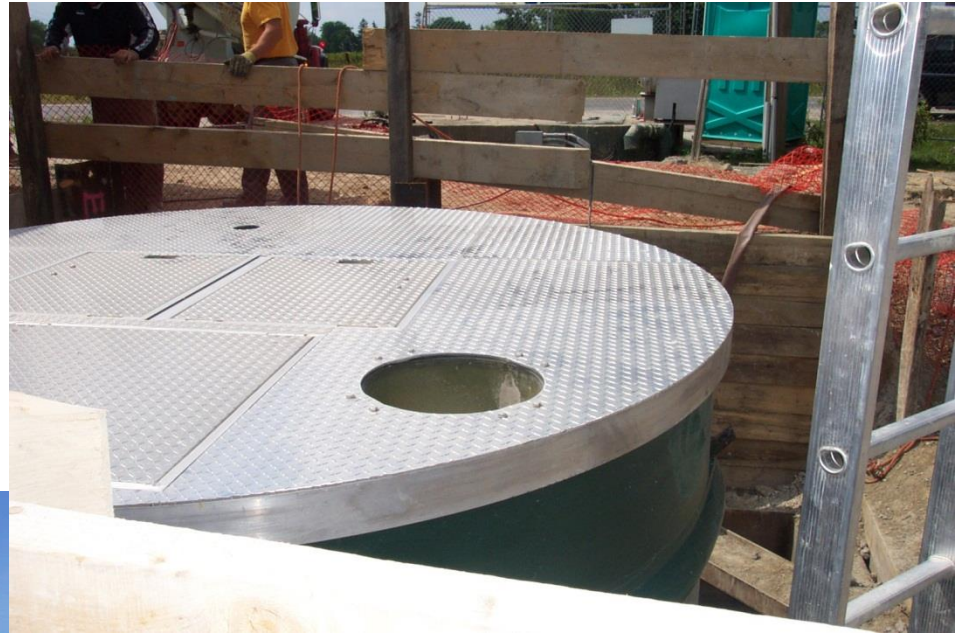
O.D.'s REPRESENT THICKNESSES REQUIRED FOR ADEQUATE NOZZLE STRENGTH. TO BE CONNECTED TO EXTERIOR PIPING WITH A ROBAR TRANSITION COUPLER OR EQUAL.

# Surface covers and access hatches

- Laminated core FRP to withstand pedestrian traffic
- UV protective coating on exposed areas
- Hatch covers can be FRP or aluminum, and standard or Flygt “Safe Hatch” design
- H2O loading (20 ton truck) possible with concrete cover



# Station covers and access hatches



# FRP Retrofits in space restricted areas

- Retrofit in a concrete structure







## FRP station summary

- Xylem FRP tanks are a fully engineered system, factory built and delivered ready for installation on-site.
- Xylem has >25 years experience w/ FRP pump stations, with more than 1000 installations
- Corrosion proof structure outlasts alternatives
- Less potential for leaks/infiltration (environmental issues/additional pumping)
- Format allows wide range of designs to optimize pumping, reduce odour, eliminate confined space entry... etc.
- Short installation time ideal for remote sites, high water tables etc.
- Design and specification assistance at Engineering stage



# Lister Rapids Wastewater Lift Station





# Rivercrest River Springs Wastewater Lift Station





# FRP Pumping Stations

- Questions?

Thank You!