



INDUSTRIAL TANK ENGINEERING GUIDE

Engineered for Industrial Performance

CHOOSING THE RIGHT TANK FOR DEMANDING SERVICE

Industrial environments demand tank systems that deliver long-term reliability under chemical, thermal, and mechanical stress. Tank failures are not caused by capacity errors alone. They are caused by using a tank style or material that was not truly engineered for the chemistry, load case, thermal exposure, or duty cycle it sees in the field.

Houston PolyTank designs and manufactures PP and HDPE large volume industrial tanks using extrusion-wound construction to create rigid, corrosion-resistant structures built for demanding industrial service. Formed in 2010, the company built the first and only extrusion-wound manufacturing facility in the U.S., located in Hopkins, MO.

Extrusion-wound construction winds heated thermoplastic in overlapping layers to build the tank wall, creating a heavy-wall structure tailored to each application. Instead of relying on a generic molded shell, these tanks are engineered for the specific process, installation conditions, and long-term performance demands they will see in service.

This guide outlines key design considerations, material options, and configuration choices for industrial tank applications involving aggressive chemicals, high-specific-gravity materials, and continuous-duty service.

HOUSTON POLYTANK KEY ADVANTAGES

- Custom engineering around chemistry, temperature, structural loads, and site conditions.
- Rigid thermoplastic construction designed to resist bulging and maintain dimensional stability.
- Engineered wall thickness (up to 2.5 in) for high-stress and high-specific-gravity applications.
- Strong corrosion resistance in harsh chemical environments.
- Broad configuration flexibility across tanks, reactors, ductwork, pipe systems, and manhole products.
- Support from a U.S. manufacturer focused on made-to-order thermoplastic structures.

Cylindrical Extrusion-Wound Tanks

Cylindrical tanks provide structural efficiency and uniform load distribution. Their extrusion-wound walls improve hoop strength and reduce weak points common in lower-grade designs.

Engineering advantages

- Uniform wall thickness
- High hoop strength
- No panel joints or laminated layers
- Excellent chemical and corrosion resistance
- Suitable for vertical or horizontal configurations

Typical applications

- Chemical processing
- Wastewater treatment
- High-specific-gravity materials
- Industrial storage

Rectangular Storage Tanks

Rectangular tanks maximize usable volume and footprint efficiency. Houston PolyTank designs these tanks to support self-supporting systems in many applications without external steel frames.

Engineering advantages

- Space-efficient geometry
- Adaptable for modular systems
- Suitable for skids, trailers, or containers
- Reinforced for long-term stability

Typical applications

- Oil and gas
- Renewable energy
- Food processing
- Water treatment

Reactor Tanks

Reactor tanks are built for applications that require agitation, thermal control, and stability under dynamic loads. Cone-bottom options and mixer bridge support make them suitable for process-intensive environments.

Engineering advantages

- Tank Structure resists stress cracking
- Cone bottoms support efficient cleanout
- Mixer bridges are engineered to support torque and weight
- PP options are available for high-temperature reactions

Typical applications

- Continuous stirred tank reactors (CSTRs)
- Batch reactors
- High-temperature processes

MATERIAL PERFORMANCE

Houston PolyTank tanks use two core polymers selected for chemical resistance, temperature tolerance, and long-term durability.

Property	PP	HDPE
Temperature range	180–200°F	Up to 120°F
Chemical resistance	Outstanding resistance to high-temperature corrosives	Excellent resistance across pH 0–14
Best suited for	High-temperature chemical processes, hot caustics, elevated-temperature wastewater, industrial reactors	Acids, alkalis, salts, high-specific-gravity materials, ambient-temperature corrosive environments
Construction approach	Extrusion-wound	Extrusion-wound

WHY EXTRUSION-WOUND CONSTRUCTION MATTERS

- Corrosion-resistant construction
- Reduced structural weak points
- Uniform stress distribution
- Superior long-term structural stability

HARSH CHEMICAL SAFETY

Industrial chemical environments create stresses that standard tank designs often cannot withstand. Houston PolyTank tanks are engineered for corrosive exposure, high-specific-gravity materials, thermal cycling, and continuous-duty service.

- Stress cracking environments: extrusion-wound construction eliminate weld-line failures and seam-related weak points.
- Corrosive chemical exposure: PP and HDPE resist many acids, alkalis, oxidizers, and solvents.
- High-specific-gravity service: thick wall construction helps maintain structural rigidity under load.
- Thermal cycling: extrusion-wound construction supports dimensional stability through fluctuating temperatures.
- Continuous-duty operation: engineered for 24/7 industrial systems with minimal maintenance.

INDUSTRIAL APPLICATIONS

- Chemical processing
- Industrial wastewater
- Mining and minerals
- Food and beverage
- Energy and power generation
- Municipal systems
- High-temperature process systems
- High-specific-gravity material storage

TANK CONFIGURATIONS

Category	Options
Cylindrical configurations	Vertical cylindrical tanks; horizontal cylindrical tanks
Top options	Flat top; open top; cone top; recessed top
Bottom options	Flat bottom; sloped bottom; cone bottom

Vertical cylindrical tanks are a standard choice for chemical and wastewater systems, while horizontal cylindrical tanks are well suited to height-restricted areas, skid systems, and mobile equipment.

WHY HOUSTON POLYTANK OUTPERFORMS

Tank Type	Common Limitations
Steel tanks	Corrode in acidic and alkaline environments; require coatings and maintenance; susceptible to rust and pitting
Fiberglass tanks	Laminated layers create weak points; prone to delamination and cracking; limited chemical compatibility
Rotomolded tanks	Inconsistent wall thickness; lower structural strength; not ideal for industrial duty
Houston PolyTank extrusion-wound tanks	Engineered wall construction; strong chemical resistance; long-term structural stability; built for demanding industrial environments

ENGINEERING SUPPORT

Houston PolyTank stands behind every structure it builds with documented warranty protection, responsive factory support, and an engineering-led approach designed for long-term service.

For engineering support or specification assistance, contact our team at 660.301.2015.