PETROLEUM & CHEMICAL STORAGE TANKS

Motor & Aviation Fuels
Heating & Lube Oils
Chemicals
Biofuels
Propane

Stoystown, PA
One Highland Road
Stoystown, PA 15563-0338
T: 814-893-5701
F: 814-893-6126

Manheim, PA
4656 Elizabethtown Road
Manheim, PA 17545-9410
T: 717-664-0600
F: 717-664-0617

Watervliet, NY
958 19th Street
Watervliet, NY 12189-1752
T: 518-273-0801
F: 518-273-1365

Greensboro, NC
2700 Patterson Street
Greensboro, NC 27407-2317
T: 336-218-0801
F: 336-218-1292

Lebanon, PA
2225 Chestnut Street
Lebanon, PA 17042-2504
T: 717-864-0602
F: 717-664-0631

Friedens, PA
1510 Stoystown Road
Friedens, PA 15541-7402
T: 814-443-6800
F: 814-444-9652

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www.highlandtank.com
tanks@highlandtank.com

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Our mission

Highland Tank’s mission is to engineer and manufacture quality products while providing innovative solutions through relationships founded upon integrity and excellence in customer service.
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Highland Tank Sets the Standard 8
Working Together for a Cleaner Environment 11
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Experience
Since 1946, Highland Tank has been upholding a tradition of uncompromising craftsmanship and a commitment to providing solutions to even the most challenging storage tank projects making Highland Tank the leader in the steel tank industry. Engineering depth, state-of-the-art equipment and skilled craftsmen with pride and traditional American work ethic have given us the tools needed to maintain our dedication to quality production.

Capability, Capacity, Commitment
Highland Tank has facilities strategically located to serve our core markets in the United States. Our team works with the proper tools and latest technology to help build the highly customized products required in today’s world. Steps are constantly being taken to keep Highland Tank on the cutting edge. Even in economic times when many companies are cutting back and downsizing, Highland Tank is committed to our clients. A new facility, which will allow us to build larger, heavier tanks and vessels that are in demand, is set to open in 2013. This new facility is just one more reason why Highland Tank remains the leader in steel tank manufacturing.

Quality Assurance
All of our products are backed by our helpful support staff to ensure quality throughout every phase of your project. Highland’s team of professionals in design, engineering, fabrication, sales, delivery and service provide you with outstanding solutions for your liquid storage challenges. Our goods undergo strict quality control processes and are readily available from our national distribution network and six manufacturing facilities.

Manufacturing area:
296,000 ft² at six locations

Maximum Physical Fabrication Size:
- Horizontal tanks: 70,000 gallons
- Vertical tanks: 57,500 gallons
- ASME pressure vessels: 60,000 gallons
- Maximum diameter: 14’
- Maximum length: 90’
- Steel rolling: up to 1.25” thick

Product Transportation:
Highland Tank takes product delivery seriously. We have our own fleet of trucks and team of experienced drivers. Your product will be in the hands of people who transport over-sized loads every day, taking pride in timely delivery and providing Highland’s signature service.
Steel: The Material of Choice

Superior Structural Strength

The Steel Advantage
Steel is the material of choice at Highland Tank because of its many advantages, and it should be yours too. As a construction material, steel is strong, affordable, reliable and environmentally friendly. Steel’s unique combination of properties and characteristics enable it to achieve performance levels required in today’s storage tanks. Because of its product compatibility, steel is the best choice for your liquid storage needs, including motor fuels, biofuels, heating oils, aviation fuels, lube oils and chemicals.

Specified for Strength
We buy steel according to our own strict guidelines and rigid ASTM specifications. All of our mild carbon steel is fine grain with superior toughness and surface quality that offers both weldability and improved corrosion resistance. The time-tested strength and performance of steel remains unparalleled.

Steel’s structural integrity can withstand even extreme weather conditions or natural disasters. State-of-the-art fabrication technology, welding, interior linings and exterior coatings reinforce the durability of Highland’s mild carbon and stainless steel products.

Environmental Benefits
Steel has the highest recycling rate of any durable material in the United States. Unlike concrete or plastic storage tanks, or even those reinforced with fiberglass, recycled steel storage tanks ultimately keep a valuable commodity out of the nation’s landfills. In addition, the latest recycling processes drastically reduce industrial emissions by over 70% to air and water, accompanied by a reduction of approximately 30% in the amount of energy required to produce new steel.

Recycled steel products are important to projects striving to achieve LEED certification. Highland Tank can help companies earn valuable Materials and Resources credits.
**Stainless Steel Construction**

Highland Tank has a long and successful record of manufacturing stainless steel storage tanks for our commercial and industrial customers. Our tanks are manufactured from 304, 304L, 316 or 316L stainless steel for compatibility with many chemicals and corrosive environments.

Contemporary steel-making technology enables stainless steel to be welded and fabricated as readily as conventional steels. Additionally, stainless steel has many unique properties that may make it the best choice for your special storage tank requirements.

**Advantages**
The bright, easily maintained surface of stainless steel provides a clean, contemporary appearance. Stainless steel is corrosion-resistant to a large number of liquids. Stainless steel is used when carbon steel or internal linings are not compatible with the product to be stored.

**Customized for Your Needs**
Because every application is unique, Highland stainless steel tanks are “made-to-order” so you never have to adapt your facility’s operations to our products.

When specifying or ordering custom stainless steel tanks from Highland, our experienced staff will assist you in selecting just the right grade and combination of features to meet your specific needs.
Highland Tank Sets the Standard

Few names in the field of storage tank manufacturing are as widely recognized as Highland Tank. Our products are available in a vast range of sizes, all types of construction and a variety of options.

**Design Standards**
Highland Tank fabricates tanks and vessels to a wide range of specifications and standards.

- Underwriters Laboratories, Inc. 
  UL-58, UL-80, UL-142®, UL-1746, UL-208
- National Fire Protection Association 
  NFPA 22, NFPA 30-30A, NFPA 58
- American Petroleum Institute 
  API-650, API-12F
- American Water Works Association 
  AWWA D100
- Occupational and Safety Health Administration OSHA
- Southwest Research Institute 
  SWRI 97-04

We can supply a full range of equipment packages, and we excel in custom fabrication for those unique situations.

**Material Selection**
The fabrication process begins with the rolling of steel that meets ASTM specifications. Steel plates from 7 gauge to 1.25” are rolled to form the rigid shell.

Steel plates are formed, fitted and lap-welded to provide superior “ribbed” strength. Flat-flanged heads are standard, as are continuous exterior welds on all joints. Impervious bulkheads are added to create compartments for multiple fluid storage options.

Fittings of various sizes and styles enable connections to external piping systems. Emergency vent fittings are standard on all aboveground fuel storage tanks 24” diameter, or larger. Cylindrical or large rectangular manways allow for convenient access for inspection and maintenance.

**100% Secondary Containment**
Double-wall tanks are constructed by wrapping an impervious secondary wall completely around the primary tank.

The space between the two walls, known as the interstice, assures a rapid fluid migration rate not less than one centimeter per second, vastly superior to the allowable rate. The interstitial space can be electronically monitored to immediately detect a leak; any breach in the wall of the tank that results in a leak can be immediately addressed without impacting the environment.

Emergency vent fittings are standard on both the inner and outer tanks of double-wall aboveground fuel storage tanks, per fire codes.
The Ultimate Protection (DW UL-2085)
Fireguard® fire-protected tanks are cylindrical or rectangular double-wall aboveground tanks. The exterior steel wall provides superior weatherability and low-cost maintenance. The interstice, a minimum of 3" around the inner tank, is filled with a lightweight material which provides thermal insulation for a 2-hour minimum fire rating.

Both inner and outer tanks can be tightness tested and are equipped with emergency vent fittings. Our Fireguard® tanks meet or exceed required standards for protected, insulated, fire-rated storage tanks.

Unique Secondary Containment (DW UL-1746)
The inner tank is constructed similarly to a UL-58 single-wall steel tank, but the outer thermoplastic tank is made from a high molecular weight polymer creating a tough, economical double-wall tank. The interstice design assures fluid migration to the monitoring system. This innovative tank technology is Highland Tank’s own TITAN®.

Factory Testing
A 5 PSI factory air test and seam inspection is conducted on every storage tank. All underground double-wall storage tanks are shipped with a vacuum on the interstice for continuous testing to guarantee integrity of both the primary and secondary tanks.

Performance Coatings
Proper surface preparation is an important factor in any successful coating or lining. Quality assurance is maintained through Highland’s complete in-house grit blast cleaning, finishing and curing facilities. Our facilities are temperature-controlled for year-round application. Only qualified and experienced personnel, working under stringent guidelines, spray applied high-performance formulations, including epoxies and high-build polyurethanes. Exterior coatings and interior linings are selected to meet specific site conditions and service requirements.

Highland Tank and Steel Tank Institute specifications are followed to assure complete internal and external corrosion protection.
Working Together for a Cleaner Environment

Environmental protection is one of our highest priorities. How we impact the environment is important to us, and environmental considerations are an integral part of Highland Tank’s business practices. The steps we take today to preserve our planet will ultimately affect the health and well-being of our children. From the earliest stages of product design through manufacturing, recycling and usage, we take care to keep our activities and our products environmentally sound. Our progressive thinking, inventive policies and pioneering spirit are helping to make the world a greener, cleaner place for our children.

Product Design
It all begins with the design and manufacturing of tank products specifically required to safely store some of the most hazardous materials. Our company produces the industry’s most robust tank products for the safe storage of petroleum, chemicals and other hazardous materials to ensure compliance with all applicable regulatory requirements. As a result, our tank products are the number one choice among industry professionals.

Responsible Manufacturing
Reducing the environmental impact of our products starts with the product design phase. Design dictates the quantity and type of raw materials used, recyclability of materials and energy consumption required for manufacturing.

Today, environmental issues are important criteria for material selection. All of our steel tank products are 100% recyclable after use. Although recycling is important, we don’t stop there. Highland Tank works hard to gather and recycle our waste steel at all of our factories during and after production.

Also, our decision to reduce the use of VOC-laden paints and completely eliminate the use of solvent-rich fiberglass reinforced polyester makes our product line much more environmentally friendly than our counterparts. Highland Tank helps to safeguard the environment — as well as consumers’ safety — by restricting the use of these environmentally harmful compounds in our materials and manufacturing processes.
Innovations in Steel Tank Design and Technology

Highland Tank’s aboveground tanks are of the highest quality to ensure compliance with the U.S. EPA's regulations for aboveground tanks for the storage of petroleum and chemicals. Primarily designed for safe storage of flammable and combustible liquids, our aboveground tanks are available in a variety of industry-proven cylindrical, rectangular, single-wall, double-wall and fire rated designs.

**Construction and Compliance**
Aboveground horizontal and vertical tanks are constructed, tested and labeled in strict accordance with Underwriters Laboratories, Inc. UL-142® Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids. Additionally, aboveground tanks can be constructed to American Petroleum Institute Standard 650 (Appendix J) Welded Steel Tanks for oil storage.

**Standard Tank Features**
- Horizontal capacity: 70,000 gallons
- Vertical capacity: 57,500 gallons
- Steel thickness from 7 gauge to 1.25’
- Exterior full fillet lap joints for added “ribbed” strength
- Flat flanged heads
- Seam inspection and 5 psi factory air test
- Manways required for tanks over 5,000 gallons
- Connections for normal and emergency venting, gauging, filling and product piping
- Lifting lugs
- Primer paint

**Options**
- Double-wall construction with electronic leak detection
- Secondary containment dikes of 120% or 150% capacities
- Single or double bulkheads for compartment tanks
- Flanged and dished heads with 30 to 50 psi hydro-test for service in New York City
- 24", 30" or 36" diameter manways
- Fittings in a variety of sizes and styles
- Interior and exterior coating systems
- Overfill protection containment chambers
- A variety of tank support and hold-down systems
- OSHA compliant external ladders, stairs, platforms and walkways with handrails

We have an experienced team that offers quality engineering and support to help you customize your tank to your specific application. Our tanks are produced according to the highest standards for the commercial, industrial, public and private sectors.

Highland Tank's aboveground tanks are the cornerstone of a petroleum or industrial facility's Spill Prevention Control and Countermeasure (SPCC) plan and are compatible with the full range of petroleum products in use today, including biofuels with high ethanol or biodiesel contents.
Fireguard® tanks are thermally protected, double-wall steel cylindrical or rectangular aboveground tanks. Fireguard® is an alternative for the safe storage of motor fuels and other flammable and combustible liquids above ground. They are used where a fire-protected tank is needed because of setback limitations or regulatory requirements. These tanks are Underwriters Laboratories, Inc. labeled and meet or exceed the requirements of UL-2085 including:

- Two-Hour Full Scale Pool Fire Test
- Hose Stream Test
- Ballistics/Projectile Test
- Vehicle Impact Test
- Interstitial Communication Test

Blast Effect Analysis proved Fireguard® resists, with limited damage to the primary steel tank, the effects of a 50 lb man-portable, a 500 lb vehicle-born improvised explosive device, and a 10 psig vapor cloud explosion.

Fireguard® tanks are approved and labeled for service in New York City with the addition of flanged and dished heads and a 15 to 50 psi hydro-test on the inner tank.

Fireguard® Features
Each tank is constructed with a minimum 3” interstice around the inner tank. The interstice is completely filled with a lightweight, monolithic material. This high efficiency insulation protects the inner tank in the unlikely event of a fire or extreme heat. It is porous to allow fluid migration through the interstice to the monitoring point.

Unlike concrete encased tanks, Fireguard® tanks’ steel outer wall protects the insulation, eliminating the problem of cracking and spalling concrete. Because of its unique construction, each tank is pressure-testable in the factory and at the jobsite. With Fireguard®, there is no question of compliance with fire codes; the tank is shipped with factory-installed emergency vents on both the primary and the secondary containment tanks for protection if exposed to fire or excessive pressure.

Fireguard® Advantages
- Carries UL-2085 listing as Insulated Secondary Containment for Flammable Liquids
- Lightweight – insulation 75% lighter than concrete – costing less to ship and install
- Reduces tank setback and separation distance requirements by up to 50%
- Fireguard’s® secondary containment can be tightness-tested on-site
- Steel outer wall protects insulation
- Available in rectangular or cylindrical design
- Wide range of tank capacities: 300-60,000 gallons
- Subject to strict, three-tier independent third-party quality assurance program
- STI® standard 30-year limited warranty
Dramatic developments in tank design during the past decade have seen the emergence of fire-rated, insulated, aboveground storage tanks for the safe storage and dispensing of motor fuels and other flammable and combustible liquids.
Fireguard® Design Options

Highland Tank offers a wide range of accessories and options to configure your tank for your specific application including:

Diesel or Biodiesel Blend

Top Fill and Top Mounted Pump (Suction System)
This configuration is popular in many small diesel or biodiesel vehicle fueling applications.

Boiler or Emergency Diesel-Electric Generator

Top Fill with Supply and Return Lines (Suction System)
This is a typical Fireguard® layout for fuel oil applications or supplying stationary combustion engines used for auxiliary power and emergency generators at first responder or mission critical facilities.
Gasoline or E85 Ethanol

Remote Fill and Remote Pump (Suction System)
This arrangement is common at many fleet vehicle maintenance facilities for diesel, biodiesel, gasoline or E85 fuel ethanol dispensing.

Aviation Refueling

Fireguard® Tank as part of a Modular System with Pump and Filtration Module
This set-up would include an additional module(s) for Direct-to-Plane, Truck Load or Remote Dispensing. A specific application at a military or commercial installation would dictate engineered fueling systems.
## Fireguard® Sizing Chart

### Rectangular

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<th>Volume (Gallons)</th>
<th>Width</th>
<th>Height</th>
<th>Length</th>
<th>Width</th>
<th>Overall Height</th>
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### Cylindrical

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Engineered Aviation Fueling Systems
Self-contained Aviation Fuel Equipment

Aviation refueling is a challenging task due to many critical safety concerns. Highland Tank now offers Self-contained Aviation Fuel Equipment (SAFE) systems. Our team of professionals has the expertise to offer precision-engineered, modular fueling systems to accompany our tanks on military and commercial installations.

These module configurations simplify specification, procurement, maintenance and spare parts support. Each module is precision engineered with rugged, field-proven components to provide years of trouble-free service. The flexible, modular design of the SAFE systems allow for system expansion as needs change by simply adding modules. Highland Tank now offers a truly scalable aviation fueling system solution.

Our SAFE systems product line features several modules that can be combined to provide a solution for a wide variety of aviation fueling scenarios. Included in the line is a Pump and Filtration module (PFT), which is critical for assuring clean fuel from the delivery truck to storage to dispensing.

A Direct-to-Plane module (DTP) allows for fueling at many private or executive airfields where planes are fueled at the storage tank. The DTP Module can be designed for overwing and/or underwing refueling. Highland also offers a Truck Loading Module (TLO), which is typically needed at larger aviation facilities where planes must be fueled on the tarmac by a refuel truck.

We also offer a Remote Dispensing Module (RDS). This unit is commonly used when refueling activities are located remotely from the fuel storage tank. Rooftop helicopter refueling at hospitals, offshore drilling rigs and airborne law enforcement agencies often entail the supply of a remote RDS Module in addition to a PFT Module back at the storage tank.

Highland’s Aviation Fueling Systems are typically paired with a Fireguard® or Flameshield tank depending on setback, regulations and other site-specific requirements. Highland Tank and its team of Aviation Fueling Specialists will work with you to provide a turnkey solution.
Aboveground storage tanks are designed and engineered to meet the demanding needs of many industries. They provide a sensible and safe solution for the storage of petroleum products and chemicals at bulk plants, transportation facilities, industrial sites, military bases and airports. They are manufactured to UL-142® specifications in single-wall or double-wall configurations. Horizontal and vertical tanks are available with an array of options that provide solutions for many applications. Standard tanks are fabricated using carbon steel. Stainless steel construction is also available.

**Standard Tank Features**
- UL-142® label
- Flat flanged heads capacity:
  - Horizontal: 185-72,500 gallons
  - Vertical: 185-57,500 gallons
- Diameter: 3'-2" to 14'-0"
- Maximum length (Horizontal): 72 feet for UL labeled tanks
- Maximum height (Vertical): 50 feet for UL labeled tanks
- Carbon steel thickness from 10 gauge to 1.25" latchs
- Exterior full fillet lap joints for added "ribbed" strength
- Seam inspection and 5 psi factory air test
- Manways required for tanks over 5,000 gallons
- Connections for normal and emergency venting, gauging, filling and product piping
- Lifting lugs
- Primer paint

**Options to Equip UL-142® Tanks for Specific Applications**
- Interior coatings for storage of aviation fuel, chemicals or other liquids
- VOC Compliant exterior coatings
- Overflow Protection Chamber (OP)
- Flanged and dished heads for NYC service
- Dike Tanks
- Areo Dike Tanks
- Flameshield® Design
- Lube Tanks
- Bulk Storage Drums
- Hopper Tanks

A wide variety of accessories for UL-142® tanks are available to meet your specification. Supports, saddles or skids can be fitted to horizontal tanks to customize your installation. Any necessary access or structural steelwork, such as ladders, stairs, platforms or walkways can be supplied. Other custom structural accommodations can be factory-fitted to facilitate field installation of special accessories.
Barrel Tanks

Highland Tank barrel tanks are the ideal solution for storage of a wide variety of production liquids while using the least amount of valuable real estate. They are fabricated under Highland’s strict quality control procedures to industry standards for the safe storage of produced water, crude oil and other liquids commonly handled and stored by natural gas exploration and production companies.

Highland Tank also offers a premium Gas & Oil Field Tank design that takes the barrel tank to a whole new level. Our stronger lap-weld construction and heavy-duty polyurethane coatings inside and out result in a stronger, longer-lasting tank. Couple that with a custom L-shaped skid, and you’ve got the “ultimate” barrel tank – a more robust tank that allows for the mobility and flexibility required in the tough natural gas drilling industry.

With our reputation for unmatched quality and service, Highland Tank makes sure these barrel tanks are worker safe. Our OSHA-compliant fixed ladder and cable-climbing system includes all of the necessary components for fall protection when accessing the rooftop vents, manways and hatches for periodic inspection and maintenance. And with our optional 100% double-wall construction, Highland Tank helps the drilling industry comply with environmental regulations, which are often more stringent in unconventional gas regions such as the Marcellus and Utica Shale areas.

**Standard Tank Features**
- Mild carbon steel construction
- UL-142® label
- Capacity from 90-500 barrels
- Exterior-full fillet lap joints for added “ribbed” strength
- Seam inspection and 5 psi factory air test
- Nozzle fittings per schedule
- Cleanout manway with cover
- Pressure vacuum vent (thief hatch)
- Lifting lugs
- Primer paint
The OP Tank is equipped with a patented overfill protection system and integral overfill chamber designed to capture and store overfills resulting from mistakes or failures during filling operations. Unlike other forms of secondary containment, the OP keeps the product in the storage tank where it can be easily recovered and used.

**Overfill Protection From:**
- Malfunctioning overfill limiter
- Unattended delivery truck
- Malfunctioning vents
- Distracted delivery attendant
- Malfunctioning gauge
- Incorrect inventory record
- Malfunctioning alarm

**OP Tank Features**
In the unlikely event of an overfill, the patented Overfill Protector chute directs the spill into the Containment Chamber. The chamber is large enough to contain a spill of at least 20% of the tank’s storage volume. The collected product can be recovered by pumping it back to the primary tank, or to another storage tank, through the pump-out fitting located on the top of the tank. Since the entire OP Tank is UL listed for flammable and combustible liquid storage, the Overfill Protector and Containment Chamber do not need to be cleaned or freed from vapors after pump-out.

**OP Tank Options**
The OP Tank is available as a UL-2085 Fireguard® tank or as a standard single or double-wall UL-142® horizontal tank. In addition to our standard features and options, we can also supply a larger (above 20%) Containment Chamber if greater spill containment is required.

Consult Highland Tank if a larger (above 20%) spill containment capability is required.

U.S. Patent No. 5,381,923
Dike Tanks

Standard and AREO

Dike tanks are a versatile aboveground secondary containment alternative. The impervious steel dike contains spills from the tank, piping and associated equipment, and it prevents their release into the environment. The entire unit meets UL-142® and NFPA 30 specifications for primary and secondary containment. In addition to our standard features and options, we can also supply rain shields or gabled, shed or rolled-top canopies to keep out rain, snow and debris.

AREO Dike tanks were the first of their kind to obtain an UL label for the entire secondary containment system, not just the primary tank. The unique rain shield system prevents water and debris accumulation in the containment dike while making provisions for visual monitoring.

AREO Dike Tank Features
- The integral spill-containment chamber around the fill connection provides an overflow pipe to divert any spilled product into the containment dike
- A large overflow chute ensures that any overfill will be diverted from the emergency vent directly into the dike
- Removable rain shields minimize rain, snow and debris accumulation in the containment area while allowing for easy visual inspection and access for maintenance
- Available with the safety of UL-2085® Fireguard®, it is listed for “Insulated Secondary Containment Protected Type” AST

U.S. Patent Nos. 4,895,272 and 5,346,093

Flameshield®

The Flameshield® design meets the demand for fuel storage where fire resistance, environmental safety and possible future relocation are primary concerns. The double-wall design provides for integral secondary containment with interstitial monitoring without the external diking. The secondary containment can be tightness-tested on-site using standard testing procedures.

- Meets National Fire Protection Association (NFPA) 30/30A criteria for fire-resistant AST
- Tested by Southwest Research Institute to SwRI 97-04, for 2 hours at 2000°F
- Built with strict independent third-party quality control
- Local codes supersede National Consensus codes. Please check with AHJ before purchasing equipment.
Selecting & Specifying Horizontal, Dike, AREO and OP Tanks

To select a Highland Horizontal Aboveground Steel Storage Tank, follow these easy steps:

- Select desired tank volume
- Specify single-wall or type of double-wall construction
- Select desired secondary containment system
- Select desired internal and external protective coatings
- Determine type, size, location and number of fittings and manways
- Select desired options listed in accessories section of this brochure

A drawing showing the storage tank size, along with the type, size and location of the fittings and manways as well as accessories required, is helpful when requesting a quote or placing an order. All Highland storage tank drawings are available for viewing or downloading in PDF or AutoCAD.DXF Format at www.highlandtank.com.

Please refer to the adjacent diagrams for the standard tank features and accessories available.

A. **Tank Diameter**
   Ranging from 3’-2” to 13’-0”

B. **Tank Length**
   Ranging from 3’-4” to 72’-0”

C. **Compartment Bulkheads**
   Single or Double

D. **Interior Coating**
   Specify Seal Welding, SSPC Cleaning Standard and type of Interior Coating

E. **Manway**
   Diameters from 24” to 36”

F. **Interior Ladder**
   2" x 1/4" sides – 3/4" rungs on 12" centers (OSHA requires a 36" diameter Manway for Interior Ladders)

G. **Standard Threaded Fittings**
   Specify size, number, location

H. **Flanged Fittings**
   150 # A.S.A. Specify size, number, location

I. **Fuel Oil Preheater**

J. **110% Containment Dike**
   (150% capacity also available)

K. **Rain Shields**

L. **Gabled, Shed or Rolled-Top Canopies**

M. **Leak Detection System**
   Specify Single or Multi-Channel system configuration

N. **Pump Platform**
   (Inside or outside dike, or on skids)

O. **Exterior Ladder**
   (Outside of dike and/or tank with or without a platform)

P. **Stairs (45°)/Ships Ladder (60°)**

Q. **Platform/Walkway**

R. **Exterior Coating**

S. **UL Style Saddle (2 per tank)**

T. **Supports (up to 4,000 gal.)**

U. **Skids (up to 12,000 gal.)**

V. **Interior Seal Welding**

W. **Hold-Down Straps**
   (for flood plains)

X. **Fireguard® Thermal Insulation or Other External Insulation System**

Y. **Tank-Top Spill Container**

Z. **Emergency Vent**
   Primary and Secondary Tank
### Horizontal, Dike, AREO and OP Tanks Sizing Guide

<table>
<thead>
<tr>
<th>Volume Gallons</th>
<th>Horizontal Tank Dimensions</th>
<th>Standard/AREO Dike Dimensions</th>
<th>OP Tanks</th>
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**Note:** Consult Highland Tank for NYC Tank Sizing Guide as flanged and dished heads will add to length. Dike sizes and capacities are for 100% containment. 150% containment dikes are also available. Custom sizing with a variety of configurations is available upon request.
Selecting and Specifying Vertical Aboveground Tanks

To select a Highland Vertical Aboveground Steel Storage Tank, follow these easy steps:

- Select desired tank volume
- Specify single-wall, double bottom or double-wall construction
- Select desired secondary containment system
- Select desired internal and external protective coatings
- Determine type, size, location and number of fittings and manways
- Refer to accessories section of this brochure for desired options

A drawing showing the storage tank size, along with the type, size and location of the fittings and manways and accessories required is helpful when requesting a quote or placing an order.

Please refer to the adjacent diagrams of some of the standard tank features and accessories available.

A. Tank Diameter
   Ranging from 3'-2" to 14'-0"

B. Tank Height
   Ranging from 3'-4" to 50'-0"

C. Manway
   Diameters from 24" to 36"

D. Interior Coating
   Specify Seal Welding, SSPC Cleaning Standard and type of Interior Coating

E. Interior Ladder
   2" x 1/4" sides – 3/4" rungs on 12" centers (OSHA requires a 36" diameter Manway for Interior Ladders)

F. Standard Threaded Fittings
   Specify size, number, location

G. Flanged Fittings
   150 # A.S.A. Specify size, number, location

H. Fuel Oil Preheater

I. Leak Detection System
   Specify Single or Multi-Channel system configuration

J. Support Legs

K. Support Skirt

L. Cone Bottom

M. Dished Bottom

N. Double Bottom

O. Double-Wall

P. Exterior Ladder
   (Outside of tank, with or without a platform)

Q. Ladder & Cage

R. Railing

S. Exterior Coating

T. Platform/Walkway

U. Thermal Insulation System

V. Emergency Vent

W. Double-Wall Emergency Vent
### Vertical Tank Sizing Guide

#### Dimensions

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<tr>
<th>Volume Gallons</th>
<th>Diameter</th>
<th>Shell Height</th>
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</table>

Consult Highland Tank for NYC Tank Sizing Guide as flanged and dished heads will add to height.

Custom Sizing with a variety of configurations is available upon request.
Lube Tanks

Dependable Storage for Lube Oils

Lube Tanks provide safe and dependable bulk storage for all types of motor oils. Their superior steel-welded construction makes them tougher than plastic tanks and they are more resistant to potential impacts and punctures common to vehicle maintenance facility operations. Lube Tanks are manufactured in a wide range of styles and capacities to meet all your replacement or new construction requirements.

Applications
- Fast lube service centers
- Car dealerships
- Vehicle maintenance and repair facilities
- Waste oil storage facilities
- Industrial facilities

Construction and Compliance
Lube Tanks are constructed, tested and labeled in strict accordance with UL-142® specifications in single-wall or double-wall configurations. The tanks meet or exceed the NFPA’s regulations for aboveground storage tanks for lubrication products and are compatible with new or used petroleum based or synthetic motor oils. Standard tanks are fabricated using hot-rolled carbon steel. Stainless steel construction is also available.

New York City approved
Lube Tanks are available.

Standard Tank Features
- UL-142® label
- Capacity: 120-20,000 gallons
- Carbon steel thickness from 12 gauge to 1/2”
- Exterior full fillet lap joints for added “ribbed” strength
- Seam inspection and 5 psi factory air test
- Connections for normal and emergency venting, gauging, filling and product piping
- Lifting lugs
- Structural supports underneath for easy installation
- Primer paint

Highland Tank builds lube tanks in several styles. Rectangular double-wall Lube Tanks are the most popular. Bench Top tanks are another common Lube Tank. These sturdy tanks are designed for use where space is at a premium by providing a convenient workbench on the top of the tank. Our Lube Tank product line also includes Catwalk and Under Catwalk designs. These units are designed to optimize space at fast lube service centers or vehicle maintenance facilities.

We have a wide variety of options and accessories to customize your Lube Tanks. The tanks can be equipped with bulkheads to create smaller compartments within a larger tank. Pump mounts, spill boxes and an assortment of equipment packages are also available to the tank to customize your installation. Any necessary access or structural steelwork can be fabricated to your specifications.
# Lube Tanks Sizing Guide

## Single-Wall and Double-Wall

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<thead>
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<th>Model</th>
<th>Volume Gallons</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
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<td>280</td>
<td>5'-0&quot;</td>
<td>2'-4&quot;</td>
<td>3'-3&quot;</td>
</tr>
<tr>
<td>LT-350</td>
<td>350</td>
<td>5'-0&quot;</td>
<td>3'-6&quot;</td>
<td>2'-8&quot;</td>
</tr>
<tr>
<td>LT-500</td>
<td>500</td>
<td>5'-0&quot;</td>
<td>2'-8&quot;</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>LT-500-S</td>
<td>500</td>
<td>6'-0&quot;</td>
<td>4'-2&quot;</td>
<td>2'-8&quot;</td>
</tr>
<tr>
<td>LT-750</td>
<td>750</td>
<td>7'-8&quot;</td>
<td>2'-8&quot;</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>LT-1000</td>
<td>1,000</td>
<td>10'-0&quot;</td>
<td>2'-8&quot;</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>LT-1000-S</td>
<td>1,000</td>
<td>6'-10&quot;</td>
<td>4'-0&quot;</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>LT-1500</td>
<td>1,500</td>
<td>15'-0&quot;</td>
<td>2'-8&quot;</td>
<td>5'-0&quot;</td>
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<tr>
<td>LT-1500-S</td>
<td>1,500</td>
<td>8'-0&quot;</td>
<td>5'-0&quot;</td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td>LT-2000</td>
<td>2,000</td>
<td>17'-3&quot;</td>
<td>2'-8&quot;</td>
<td>5'-10&quot;</td>
</tr>
<tr>
<td>LT-2000-S</td>
<td>2,000</td>
<td>8'-11&quot;</td>
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<tr>
<td>LT-3000</td>
<td>3,000</td>
<td>13'-9&quot;</td>
<td>5'-5&quot;</td>
<td>5'-5&quot;</td>
</tr>
<tr>
<td>LT-4000</td>
<td>4,000</td>
<td>18'-3&quot;</td>
<td>5'-5&quot;</td>
<td>5'-5&quot;</td>
</tr>
<tr>
<td>LT-5000</td>
<td>5,000</td>
<td>22'-10&quot;</td>
<td>5'-5&quot;</td>
<td>5'-5&quot;</td>
</tr>
<tr>
<td>LT-6000</td>
<td>6,000</td>
<td>13'-8&quot;</td>
<td>10'-10&quot;</td>
<td>5'-5&quot;</td>
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<tr>
<td>LT-6000-S</td>
<td>6,000</td>
<td>27'-4&quot;</td>
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<td>10,000</td>
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<td>10'-10&quot;</td>
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</tr>
<tr>
<td>LT-12000</td>
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<td>27'-4&quot;</td>
<td>10'-10&quot;</td>
<td>5'-5&quot;</td>
</tr>
<tr>
<td>LT-15000</td>
<td>15,000</td>
<td>34'-2&quot;</td>
<td>10'-10&quot;</td>
<td>5'-5&quot;</td>
</tr>
<tr>
<td>LT-20000</td>
<td>20,000</td>
<td>46'-3&quot;</td>
<td>10'-10&quot;</td>
<td>5'-5&quot;</td>
</tr>
</tbody>
</table>

Note: Add 2” (height of tank supports) to depth to determine overall height.
Hopper Tanks

Hoppers are low profile, secondarily contained, aboveground storage tanks. They are suitable for the storage of all types of motor fuels, biofuels, new and used oils, waste solvents and antifreeze. The Hopper consists of an inner tank placed in a second tub-like steel container, which provides a minimum of 110% secondary containment. Hoppers are manufactured to UL-142® specifications; UL-2085 for Fire-Hoppers. A limited number of options, such as pump mounts, pump and tank accessories and finish paints are available.

Standard Hopper Features
- UL-142® label;
  UL-2085 label for Fire-Hopper
- Flat flanged heads
- Capacities: 120-3,000 gallons
- Seam inspection and 5 psi factory air test on primary tank
- Connections for normal and emergency venting, gauging, filling and product piping 2" x 8" Vent pipe with mushroom (normal) vent
- 4" or 6" Emergency vent
- 2" Interstitial monitoring tube
- Elevation support
- Lifting lug
- Primer paint
Hopper Tanks Sizing and Specifications

**Hopper Models**
- **Fuel-Hopper** – Designed for storing fuel oil or diesel for emergency generators
- **Petro-Hopper** – Suitable for storing kerosene or gasoline/diesel for vehicle fueling applications
- **Fire-Hopper** – Specified in applications where a fire-protected tank is needed because of setback limitations and/or regulatory insistence (This low profile, vertical Fireguard® tank is available with the STI standard 30-year limited warranty)
- **Haz-Hopper** – Engineered for the storage of waste oil or solvents

**Fire-Hopper Tanks**

<table>
<thead>
<tr>
<th>Volume Gallons</th>
<th>Diameter</th>
<th>Depth</th>
<th>Diameter</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>*48&quot;</td>
<td>24&quot;</td>
<td>60&quot;</td>
<td>46&quot;</td>
</tr>
<tr>
<td>285</td>
<td>54&quot;</td>
<td>29&quot;</td>
<td>60&quot;</td>
<td>46&quot;</td>
</tr>
<tr>
<td>500</td>
<td>72&quot;</td>
<td>29&quot;</td>
<td>78&quot;</td>
<td>47&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>120&quot;</td>
<td>21&quot;</td>
<td>126&quot;</td>
<td>41&quot;</td>
</tr>
<tr>
<td>1,500</td>
<td>138&quot;</td>
<td>24&quot;</td>
<td>144&quot;</td>
<td>52&quot;</td>
</tr>
<tr>
<td>2,000</td>
<td>138&quot;</td>
<td>31&quot;</td>
<td>144&quot;</td>
<td>59&quot;</td>
</tr>
<tr>
<td>2,500</td>
<td>138&quot;</td>
<td>39&quot;</td>
<td>144&quot;</td>
<td>67&quot;</td>
</tr>
<tr>
<td>3,000</td>
<td>138&quot;</td>
<td>46&quot;</td>
<td>144&quot;</td>
<td>52&quot;</td>
</tr>
</tbody>
</table>

*6" interstice on this size only, all others have a 3" interstice

**Hopper Tanks**

<table>
<thead>
<tr>
<th>Volume Gallons</th>
<th>Diameter</th>
<th>Depth</th>
<th>Diameter</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>30&quot;</td>
<td>40&quot;</td>
<td>36&quot;</td>
<td>46&quot;</td>
</tr>
<tr>
<td>185</td>
<td>38&quot;</td>
<td>40&quot;</td>
<td>44&quot;</td>
<td>47&quot;</td>
</tr>
<tr>
<td>285</td>
<td>46&quot;</td>
<td>40&quot;</td>
<td>52&quot;</td>
<td>51&quot;</td>
</tr>
<tr>
<td>500</td>
<td>62&quot;</td>
<td>40&quot;</td>
<td>68&quot;</td>
<td>53&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>84&quot;</td>
<td>42&quot;</td>
<td>92&quot;</td>
<td>54&quot;</td>
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<tr>
<td>1,500</td>
<td>96&quot;</td>
<td>48&quot;</td>
<td>108&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
<td>2,000</td>
<td>108&quot;</td>
<td>51&quot;</td>
<td>120&quot;</td>
<td>63&quot;</td>
</tr>
<tr>
<td>2,500</td>
<td>108&quot;</td>
<td>62&quot;</td>
<td>120&quot;</td>
<td>75&quot;</td>
</tr>
<tr>
<td>3,000</td>
<td>108&quot;</td>
<td>76&quot;</td>
<td>120&quot;</td>
<td>91&quot;</td>
</tr>
</tbody>
</table>

Hopper Tanks, equipped with optional pump and equipment packages, are an economical way to save on your small fueling applications. With their lower profile and smaller footprint, Hoppers cost less to install, are easier to fill and operate, and they permit fuel to be dispensed from both sides of the tank.
Typical Uses

- Heating Oil
- Lubricants
- Motor Fuel
- Waste Oils

Bulk storage drums are both practical and economical. They can conveniently store more product in less space than 55-gallon drums, and they are perfect for bulk fuel purchasing when the prices are low.

The horizontal BDH tanks are functional when there is a height constraint, and the vertical BDV tanks are useful when floor space is at a premium. The BDV includes supports suitable for forklift entry ensuring safe and easy handling. Both models are built to UL-142® standards, are 100% product compatible and are available in single or double-wall construction.

Standard Features

- Superior lap-welded steel construction
- Heavy-duty forged fittings (with plugs for shipping)
- Lifting lug(s)
- Integral structural supports
- Primer paint

Options

- Saddle or skid supports
- Secondary containment dikes
- Platform or tank mounted pumps
- 110 V-AC Pump / Dispenser
- 12 V-DC Pump / Dispenser
- Manual Pump / Dispenser
- Complete Pump Systems:
  - GPIM-3120-AL Pump with MD-130 Meter, Auto Nozzle and 3/4" x 12' Hose
  - RP 10 Rotary Pump with Nozzle Hanger, Nozzle, 8' of 3/4" Hose and handle locking cable

<table>
<thead>
<tr>
<th>Horizontal Model</th>
<th>Volume Gallons</th>
<th>Dimensions*</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDH - 240</td>
<td>240</td>
<td>3'-2&quot; 4'-0&quot;</td>
</tr>
<tr>
<td>BDH - 300</td>
<td>300</td>
<td>3'-2&quot; 5'-0&quot;</td>
</tr>
<tr>
<td>BDH - 500</td>
<td>500</td>
<td>4'-0&quot; 5'-5&quot;</td>
</tr>
<tr>
<td>BDH - 1000</td>
<td>1,000</td>
<td>4'-0&quot; 10'-9&quot;</td>
</tr>
<tr>
<td>BDH - 1500</td>
<td>1,500</td>
<td>5'-4&quot; 9'-0&quot;</td>
</tr>
<tr>
<td>BDH - 2000</td>
<td>2,000</td>
<td>5'-4&quot; 12'-0&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vertical Model</th>
<th>Volume Gallons</th>
<th>Dimensions*</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDV - 240</td>
<td>240</td>
<td>3'-2&quot; 4'-4&quot;</td>
</tr>
<tr>
<td>BDV - 300</td>
<td>300</td>
<td>3'-2&quot; 5'-4&quot;</td>
</tr>
<tr>
<td>BDV - 500</td>
<td>500</td>
<td>4'-0&quot; 5'-9&quot;</td>
</tr>
</tbody>
</table>

Consult factory for double-wall capacities dimensions, and weights.

*Nominal dimensions, measured from inside tank.
The TOUGHTANK is the strongest small volume storage tank available in the industry. Fabricated of durable, lap-welded steel, the TOUGHTANK is engineered to withstand any unexpected internal pressure and minimize the chance of rupture due to improper filling, faulty equipment or clogged vents. In tests, the TOUGHTANK withstood pressures in excess of 25 psi without leaking.

The TOUGHTANK is an economical way to store lube or heating oil without compromising on quality or strength. 275 and 330 gallon models are available in double-wall construction for added security.

Construction – UL-80 construction of durable 12 gauge carbon steel for indoor or outdoor use in accordance with NFPA 31. Heavy-duty UL-142® steel construction is also available for long-term durability.

### Vertical Model

<table>
<thead>
<tr>
<th>Volume Galls</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>137</td>
<td>30&quot;</td>
<td>27.25&quot;</td>
<td>44.25&quot;</td>
</tr>
<tr>
<td>230</td>
<td>60&quot;</td>
<td>22.25&quot;</td>
<td>44.25&quot;</td>
</tr>
<tr>
<td>275</td>
<td>60&quot;</td>
<td>27.25&quot;</td>
<td>44.25&quot;</td>
</tr>
<tr>
<td>330</td>
<td>72&quot;</td>
<td>27.25&quot;</td>
<td>44.25&quot;</td>
</tr>
<tr>
<td>DW275</td>
<td>66&quot;</td>
<td>27.25&quot;</td>
<td>44.25&quot;</td>
</tr>
<tr>
<td>DW330</td>
<td>80&quot;</td>
<td>27.25&quot;</td>
<td>44.25&quot;</td>
</tr>
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</table>

### Horizontal Model

<table>
<thead>
<tr>
<th>Volume Galls</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>137</td>
<td>30&quot;</td>
<td>44.25&quot;</td>
<td>27.25&quot;</td>
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<tr>
<td>230</td>
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<td>44.25&quot;</td>
<td>22.25&quot;</td>
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<tr>
<td>275</td>
<td>60&quot;</td>
<td>44.25&quot;</td>
<td>27.25&quot;</td>
</tr>
<tr>
<td>330</td>
<td>72&quot;</td>
<td>44.25&quot;</td>
<td>27.25&quot;</td>
</tr>
</tbody>
</table>

### Upright Model

<table>
<thead>
<tr>
<th>Volume Galls</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>275</td>
<td>44.25&quot;</td>
<td>27.25&quot;</td>
<td>60&quot;</td>
</tr>
<tr>
<td>330</td>
<td>44.25&quot;</td>
<td>27.25&quot;</td>
<td>72&quot;</td>
</tr>
</tbody>
</table>

Note: Add 6” to overall height for tank supports. All double-wall lube tanks include a secondary emergency vent fitting and a 1/2” button sight glass in the outer tank for interstitial monitoring.

*3/4” Supply fitting in North Carolina market
All Highland Tank LPG Vessels are made in America.
LPG Vessels

Custom Quality in Every Detail

Highland Tank is the leader in the steel tank industry and has been building ASME pressure vessels for decades. Years of experience enable Highland Tank to provide solutions to the most challenging tank needs. A team of professionals in design, engineering, fabrication and service bring many features and tactics from other steel tank fields to the LPG market. These innovative techniques improve overall quality and life of the vessel while simplifying tank installation and everyday use. The flexibility to build custom vessels sets Highland Tank apart from the competition.

Large LPG Vessels provide fuel for a wide range of industrial, commercial and agricultural equipment including:

- Commercial and residential heating fuel
- Fleet vehicle fueling by school districts, government agencies and public transit companies
- Agricultural: crop drying, vehicle fuel and weed control
- Redundant fuel source for hospitals and other institutional, commercial and industrial properties
- Standby electric generators
- Distribution for consumers
- Autogas
LPG Vessels

Standard Vessel Features

- Volume: 3,900-60,000 USWG
- ASME “U” Stamp
- 2:1 Elliptical heads – utilizes less space on property
- National Board Registration
- Test Pressure 325 psi (250 psi WP at 125° F)
- RT3 X-Ray Inspection
- Flanged manway
- SA516-70 high strength carbon steel
- Grounding connectors
- Grit blasted/coated with white urethane topcoat (aboveground)
- Grit blasted/coated with 75 mils of HighGuard coating (underground)
- External connections and outlets (valves or fittings not included)
- Lift Lugs
- Cofferdam work chamber for easy access (underground)

LPG Vessels are designed and constructed to ASME, Section VIII, Division I and NFPA 58 “Liquefied Petroleum Gas Code” for stationary use vessels. Standard vessel sizes for industrial and commercial bulk uses range from 3,900 to 60,000 gallons.

Standard LPG vessels are constructed using SA516 Grade 70 steel, employing full-penetration butt welds on all seams. Normal operating pressure is 250 psi at 125° F.
## LPG Vessels Sizing Guide

<table>
<thead>
<tr>
<th>Volume USWG</th>
<th>Diameter</th>
<th>Straight Shell Length</th>
<th>Overall Length</th>
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</thead>
<tbody>
<tr>
<td>3,900</td>
<td>7'-0&quot;</td>
<td>12'-4&quot;</td>
<td>15'-2&quot;</td>
</tr>
<tr>
<td>6,565</td>
<td>7'-0&quot;</td>
<td>21'-17&quot;</td>
<td>25'-5&quot;</td>
</tr>
<tr>
<td>12,000</td>
<td>7'-0&quot;</td>
<td>40'-6&quot;</td>
<td>44'-4&quot;</td>
</tr>
<tr>
<td>18,000</td>
<td>9'-1&quot;</td>
<td>35'-6&quot;</td>
<td>40'-5&quot;</td>
</tr>
<tr>
<td>30,000</td>
<td>9'-1&quot;</td>
<td>60'-3&quot;</td>
<td>65'-2&quot;</td>
</tr>
<tr>
<td>30,000</td>
<td>11'-0&quot;</td>
<td>40'-4&quot;</td>
<td>46'-2&quot;</td>
</tr>
<tr>
<td>50,000</td>
<td>11'-0&quot;</td>
<td>68'-5&quot;</td>
<td>74'-3&quot;</td>
</tr>
<tr>
<td>60,000</td>
<td>11'-0&quot;</td>
<td>80'-6&quot;</td>
<td>88'-10&quot;</td>
</tr>
</tbody>
</table>

Standard openings are shown. Additional openings are available. Aboveground vessels available.

www.highlandtank.com • 39
Highland Tank underground steel tanks provide superior structural strength, product compatibility and durability. They are designed to withstand the rigors of the underground environment and are serviceable for storage of a wide range of petroleum products and other hazardous liquids. All of our tanks meet or exceed the United States Environmental Protection Agency’s regulations for underground storage of petroleum and chemical products.

**Construction and Compliance**
Each tank is constructed with advanced technology utilizing a skilled work force and stringent quality control procedures. The tanks are tested and labeled in strict accordance with Underwriters Laboratories, Inc. Standards:

- UL-58, Standard for Safety Steel Underground Tanks for Flammable and Combustible liquids
- UL-1746, External Corrosion Protection Systems for Steel Underground Tanks

Additionally, tank dimensions and thicknesses are calculated in strict compliance with Roark's Formulas for Stress and Strain as presented in UL-58.

**Standard Tank Features**
- Capacities from 240-60,000 gallons
- Exterior full fillet lap joints give tanks added "ribbed" strength
- Striker plates under every opening, protecting the internal tank surface
- Seam inspection and 5 psi factory air test
- Underground double-wall tanks are shipped with a full vacuum on the interstice, eliminating the need for on-site leak testing

In addition, you have the flexibility of customizing tank fittings, manways, dimensions and compartments to suit your requirements. We offer a variety of industry-proven corrosion protection systems, specifically our high performance, high-build polyurethanes. They are so tough that our tanks can be installed using a variety of backfill materials.

We ship our tanks with easy-to-use installation instructions, backed up by a trained staff of professionals, to assist you during installation and start-up. Maintenance instructions can always be found at www.highlandtank.com.

Steel storage tanks have been shown to be satisfactory for storing 100% ethanol and E-blend gasoline. Steel tanks have been used to store alcohols for more than 50 years without documented compatibility problems.
The HighGuard features a strong dielectric coating of high solids polyurethane for protection even under the most difficult conditions. HighGuard resists surface damage due to impact or abrasion that may occur during transportation, rigging and installation.

In fact, HighGuard underground storage tanks are so tough they require no cathodic protection or expensive corrosion monitoring. They out-perform fiberglass-reinforced polyester (FRP) clad tanks and require absolutely no artificial reinforcement.

HighGuard is superior in strength and rugged in appearance. After manufacturing and rigorous testing, the tank’s exterior surfaces are commercially blasted with steel grit in preparation for coating.

The HighGuard protective coating is a dense, solvent-free, tar-free, two component polyurethane coating system with high impact properties and tensile strength. The coating is spray-applied with special equipment that ensures an even application of 75 mils over the entire surface of the tank. The finished tank is quality checked by a 15,000-volt spark test to ensure coating integrity and effective corrosion protection that can be measured in decades, rather than years.

**HighGuard Features**
- UL-58 and UL-1746 compliant
- Provides 75 mils dielectric polyurethane protection
- Cured films are free of pores
- Must pass a 15,000 volt spark test before shipment
- Strong, flexible and resistant to impact, abrasion and corrosion
- No cathodic protection monitoring required
- Highland standard 10-year limited warranty
- Highland 30-year limited warranty is available

**Flexible Designs**
- Volumes from 240-50,000 gallons
- Custom sizes
- Multi-product storage compartments

**Product Compatible**
- Alternate fuel compatible without the additional cost of internal linings
- Safe storage for all motor fuels and biofuels, including biodiesel and ethanol blends

**Environmentally Friendly**
- Most environmentally-friendly coating on the market
- Uses no hazardous materials in production
- Can be disposed of as a non-hazardous material – steel tanks are 100% recyclable

**Cost Effective**
- On a total installed-cost basis, HighGuard’s cost is less than any other unmonitored tank configuration on the market today
- No job site spark or air test required
- Lightweight construction for lower shipping and handling costs
Double-Wall Jacketed Tank

Innovative Secondary Containment

The TITAN® is the most technologically advanced double-wall underground storage tank available in the industry. Our patented “fusion bond” technology bonds a high molecular weight (HMW) polymer outer tank to a steel inner tank at every tank opening. The process utilizes high heat and pressure to create a virtually leak and damage-proof outer thermoplastic tank. TITAN® is so tough, it surpasses the performance standards of Underwriters Laboratories, Inc. UL-1746.

The Ultimate in Secondary Containment
TITAN® assures 100% secondary containment with its 100 mil thick HMW polymer outer tank. Thorough UL-1746 interstitial communication performance testing assures that each TITAN® tank can alert its owner of a problem in as little as 5 minutes.

TITAN® Features
- UL-58 and UL-1746 compliant
- 100% secondary containment
- Superior strength – virtually damage-proof exterior
- Low installation costs
- No cathodic protection monitoring required
- Highland standard 10-year limited warranty

Flexible Designs
- Volumes from 500-29,800 gallons
- Multi-product storage compartments

Product Compatible
- Alternate fuel compatible without the additional cost of internal linings
- Both primary and secondary tank walls are compatible with all motor fuels and biofuels, including biodiesel and ethanol blends

Advantages
- Dielectric HMW polymer outer tank totally encapsulates the heavy-duty UL-58 steel tank
- Factory-activated vacuum tightness test assures inner and outer tank integrity at delivery, eliminating job site tightness test by installers
- Flat head construction reduces installation costs. At 19% shorter than domed-end tanks, the TITAN® requires less excavation and backfill
- Installation is easy with a choice of proven backfill materials
- Single and double bulkhead compartments can further reduce installation, insurance, monitoring and maintenance costs
- TITAN® tanks are fabricated at multiple locations, making them available for quick delivery to meet your tight installation schedule
The HotShot is the most innovative heated product storage tank system in the industry. The HotShot is designed specifically for the safe storage of heavy residual fuel oils (RFO), such as No. 6 fuel oil. Since No. 6 fuel oil is so thick and viscous, users heat the oil to over 150 degrees Fahrenheit before burning it. Due to the complexity of storing the heated fuel, RFO users must be on constant guard against the environmental hazards brought about by faulty storage tanks.

The HotShot design and construction is multi-layered for optimum performance and safety. We begin with a steel storage tank designed and constructed in accordance with UL-58 standards and certifications, as well as to customer specified design criteria. The tank surfaces are protected against corrosion with a firmly bonded, damage resistant coating. An industrial high-temperature, two-part catalyzed interior coating is applied over a grit blast for maximum interior surface protection. Additionally, a high temperature resistive exterior coating, coupled with a pre-engineered cathodic protection system, creates a dependable dielectric barrier between the tank and the underground environment.

**Standard Features**
- Capacities: 3,000-50,000 gallons
- OSHA compliant 36” diameter access manway(s)
- Flanged fittings
- Shrouded heating coil
- Exterior corrosion protection system featuring:
  - High-temperature dielectric coating
  - Electrical isolation
  - Cathodic protection employing sacrificial anodes
- Interior high-temperature, two-part catalyzed coating
- Highland 5-year limited warranty

**Options**
- Electric heating elements
- Double-wall construction
- Level & leak detection system
- 2" injected foam insulation between tank walls

HotShot tanks have proven themselves in many applications and under the most extreme RFO storage conditions:
- Large institutional facilities
- Schools, universities, hospitals and prisons
- Electric power plants
- Large apartment and commercial buildings
- Industries that maintain open-hearth furnaces, steam boilers and kilns
STI® Technologies

Long before the government became concerned with underground storage of petroleum and hazardous materials, Highland Tank addressed this issue with our quality Steel Tank Institute approved corrosion protection systems. Highland Tank offers several STI approved systems with or without sacrificial anodes.
ACT-100-U® polyurethane coating technology meets or surpasses all current UL standards. The ACT-100-U® is as rugged as the STI-P3® tank but does not require cathodic protection with anodes or monitoring. Performance tests prove that the 70 mil thick ACT-100-U® coating is far superior to Fiberglass Reinforced Polyester (FRP) coatings and much more resistant to incidental damage.

**ACT-100-U® Features**
- UL-58 and UL-1746 compliant
- Must pass a 15,000 volt spark test before shipment
- No cathodic protection monitoring required
- Available in single or double-wall
- STI® standard 10-year limited warranty
- 30-year limited warranty is available

STI-P3® tanks, first issued in 1969, feature a pre-engineered corrosion protection system that has withstood the test of time.

The “P3” is the most successful underground tank technology ever developed. It combines the strength of steel with a three-way protection system:

- 100% solids polyurethane dielectric coating
- Electrical isolation
- Factory-installed cathodic protection system using sacrificial anodes

STI-P3® tanks are available with a long-life buried reference cell and continuous monitoring system.

**STI-P3® Features**
- UL-58 and UL-1746 compliant
- Available in single or double-wall
- Maximum 120° F temperature use rating
- High temperature designs are available
- STI® standard 10-year limited warranty. NOTE: STI tanks are not warranted when storing No. 6 heating oil
- 30-year limited warranty is available
Multi-Compartment Option

Compartment Tanks are designed to store multiple grades of product, or different types of products, in the same tank. This safe, economical alternative allows you to create multiple fuel storage compartments without having to install separate tanks for each product.

Features:
- Available with single or double bulkheads
- Ideal for storing multiple grades of gasoline
- Diesel and biodiesel blend can be stored in the same tank

Advantages:
- Easier installation
- Requires less space
- Reduces costs of shipping, excavation and insurance
NYC Underground Steel Storage Tanks

NYC Heating Oil Tanks meet the city’s Building Code Regulations and are used for storage of commercial grade heating oils. NYC Motor Fuel Storage Tanks meet the city’s fire department regulations and are installed when safe storage of gasoline and diesel motor fuels, including the ethanol and biodiesel blends, is required. The New York City Fire Department limits motor fuel storage to a maximum of 12,000 gallons per tank. NYC storage tanks are approved and labeled for service in New York City.

NYC Tanks are fabricated in strict accordance with UL-58 double-wall construction, using flanged and dished heads.

The interstice can be monitored with a New York City approved electronic leak detection equipment. Seal welded striker plates under all openings are standard and all tanks are factory tested.

The primary tank is hydrostatically tested at 30-50 psi while the interstice is air pressure tested at 5-10 psi.

NYC Tanks are available with either the Steel Tank Institute’s ACT-100-U® or STI-P3® corrosion protection system with STI standard 10-year limited warranty.

A variety of optional equipment and accessories is available for tailoring NYC Tanks to meet your specified design criteria.

NYC Tanks with their thicker steel, dished heads, double-wall construction and advanced corrosion protection systems conform to the requirements of the New York City Administrative Code, New York State DEC and United States EPA regulations.
To select a Highland Underground Steel Storage Tank, follow these easy steps:

- Select desired tank volume
- Specify single-wall or type of double-wall construction
- Select desired corrosion protection system or internal and external protective coatings
- Determine type, size, location and number of fittings and manways
- Refer to accessories section of this brochure for desired options

A drawing showing the storage tank size, type, size and location of the fittings, manways and accessories required is helpful when requesting a quote or placing an order. For quick and easy reference, please refer to the adjacent diagrams of some standard tank features and accessories available.

A. Tank Diameter
   Ranging from 3'-2" to 12'-0"

B. Tank Length
   Ranging from 4'-0" to 59'-6"

C. Manway
   Diameters from 24" to 36"

D. Manway Extensions
   Customized per installation

E. Tank-Top Sump

F. Interior Coating
   Specify SSPC standard and type of Interior Coating

G. Interior Ladder
   2" x 3/8" sides – 3/4" rungs on 12" centers (OSHA requires a 36" diameter Manway for Interior Ladders)

H. Polyester Hold-Down Straps
   Refer to pp. 55-57 for details on Hold-Down Straps

I. Compartment Bulkheads
   Single or Double

J. Sacrificial Anodes
   Standard on STI-P3® and HotShot Tanks

K. Standard Threaded Fittings
   Specify size, number and location

L. Double Ring Manway
   Used to mount Tank-Top Sumps

M. Flanged Fittings
   150 # A.S.A. with isolated, threaded companion flange – specify size, number and location

N. Flanged Fitting Isolation Spool
   Specify size, number and location (standard on STI-P3® and HotShot Tanks)

O. Fuel Oil Preheater (Shrouded on HotShot Tank)

P. Leak Detection System
   Specify Single or Multi-Channel system configuration

Q. Lug and Wiring for Protection Prover – PP2

R. Interior Seal Welding
   Required on all tanks with additional bulkheads and/or interior linings
HighGuard, TITAN®, ACT-100-U®, STI-P3®, and HotShot Sizing Guide

Standard Tank Fittings
All standard underground tanks are fabricated with predetermined quantities, sizes and location of threaded/NPT fittings. (See p. 68 for details). Flanged fittings are furnished upon request.

Highland can supply a furnished tank with tank fittings located to the customer’s requirements. A tank drawing will be done for the customer’s approval to confirm proper location of the fittings.

Note:
1. Standard fitting arrangement for Highguard, ACT-100-U®, STI-P3®, and HotShot shown. TITAN® may have an additional fitting.
2. All threaded fittings shall be consistent with requirements of the Underwriter’s Laboratories Inc. All fittings shall be protected using threaded plugs or suitable closure gaps.

All Highland storage tank drawings are available for viewing or downloading in PDF or AutoCAD.DXF Format at www.highlandtank.com.

<table>
<thead>
<tr>
<th>Volume Gallons</th>
<th>Diameter</th>
<th>Length</th>
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<tbody>
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<td>12'-0&quot;</td>
<td>59'-6&quot;</td>
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</table>

Tank shell thickness is calculated using the Roark equation as defined by UL-58.
Consult Highland Tank for NYC Tank Sizing Guide as flanged and dished heads will add to length.
Custom sizing is available upon request.
* Maximum volume available for TITAN® Tanks.
Highland Tank’s accessory line is designed to augment our wide selection of Petroleum and Chemical Liquid Storage Tanks, making it easy to quickly and efficiently turn any of our tanks into a complete operating system. Take the guesswork out of your installation with the use of one of our comprehensive master installation kits.

1. **Hold-Down Straps**
   Designed to secure tanks in areas where high water levels may result in flotation. Hold-Down Straps are available in four different designs to accommodate specific installation requirements: Standard Steel, Safety, Deadmen and Polyester. (See pp. 56-59 for details).

2. **Concrete Deadmen Anchors**
   Deadmen help anchor underground tanks in installations in which there is potential for high water. They are used with our standard underground storage tanks from 500 to 50,000 gallons. (See p. 56 for details).

3. **Tank Support Systems**
   These systems are designed to support the tank, keep it stationary and elevate the tank to minimize corrosion concerns and allow for easy visual inspection. Tank Support Systems are available in three different designs to accommodate specific installation requirements: UL Saddles, Supports and Skids. (See pp. 60-63 for details).

4. **Ladders, Stairs, Platforms and Walkways**
   Internal and external ladders, stairs, platforms and walkways are designed to comply with strict OSHA specifications. Mounting brackets and other structural accommodations can be factory-fitted to facilitate field installation. (See pp. 64-65 for details).

5. **Manways, Extensions and Tank-Top Sumps with Double Ring Manways**
   Manways provide access to the tank and include a bolted cover and gasket. The cover provides a convenient location for fittings. Extensions and Tank-Top Sumps with Double Ring Manways are project specific. (See p. 66 for details).

6. **Grade Level Manways (GLM)**
   Designed to AASHTO H20 requirements. Each manway is constructed of A36 steel plate from 10 gauge to .25” thick, with lids of .375” reinforced checkered steel plate. Round GLMs are available in sizes ranging from 12”-48” diameter. Rectangular GLMs are available in widths from 48”-72” and lengths from 48”-150”. (See p. 67 for details).

7. **Insulation Systems**
   Selection includes external batt with metal jacket, external spray-on insulation or injected insulation.

8. **Electric, Steam or Hot Water Thermal Fluid Heaters**
   These provide temperature control for heat sensitive fluids.

9. **Complete Pump System Packages**
   These packages can be either platform or tank mounted.

10. **Overfill Containment Chamber**
    Overfill protection containment chambers with or without locking lids are available. A small hand pump is also available for returning any spilled product to the tank.

11. **Alarm and Control Panels**
    These provide a comprehensive panel selection for leak and level alarm.

12. **Leak and Level Sensors**
    Leaks are prevented by a wide variety of sensors used to detect leaks or liquid levels.
Deadmen Anchoring System

Highland Tank’s Deadmen Anchoring Systems are designed to secure tanks or vessels at installations. Polyester hold-down straps and concrete beams are used to anchor the tank or vessel and counteract its natural buoyant forces.

Polyester Hold-Down Straps
Polyester hold-down straps are intended for underground use only. They are made from 3” wide 100% polyester webbing. These straps have a large reinforced loop at each end for connecting to the Concrete Deadmen Anchor hardware. A length of .50” diameter wire rope and six cable clamps are included with each strap for connecting the strap to one side of the concrete anchoring. A hook-to-hook turnbuckle is used for attaching the strap to the anchoring on the other side.

Standard Features
- No strap liners are required because there are no metallic components in the strap system that can make contact with the tank
- Available without the cable, clamps and turnbuckles, for use with Concrete Deadmen Anchors
- Available for tank diameters 3’-2” to 12’-0”

![Image of Deadmen Anchoring System](image-url)
Deadmen Anchors are beams of reinforced concrete placed alongside the tank in the bottom of the excavation. The weight of the backfill on the Deadmen Anchors provides additional resistance to buoyancy forces acting on the tank. Properly installed Deadmen Anchors, when used exclusively with Polyester Hold-Down Straps and the supplied hardware, prevent tank flotation and cost less than a concrete bottom hold-down pad. Best of all, there is no delivery charge for Concrete Deadmen Anchors when they are shipped on the same truck along with a Highland storage tank.

**Standard Features**
- Designed to work with standard underground storage tanks from 500 to 50,000 gallons
- Utilize a 4,000 psi concrete mix reinforced with #4 rebar
- **Dimensions:**
  - CDA-15: 120” L, 18” W, 12” H
  - CDA-45: 120” L, 36” W, 18” H
- **Volume:**
  - CDA-15: 15 cubic feet (approx.)
  - CDA-45: 30 cubic feet (approx.)
- **Weight:**
  - CDA-15: 2,200 pounds (approx.)
  - CDA-45: 6,500 pounds (approx.)

**Note:**
1. Above recommendations assume that tanks are buried at least 36” deep, have at least one tank-top Sump and are installed exclusively with Highland Polyester Hold-Down Straps.
2. To be effective, Deadmen Anchors must be placed outside the tank diameter and extend the full length of the tank.
3. A limited number of Deadmen Anchors require the installation of supplemental methods of restraint, such as 8” grade-level reinforced concrete pads (as recommended by PEI RP100-11).

<table>
<thead>
<tr>
<th>Tank Volume Gallons</th>
<th>Tank Dimensions</th>
<th>Required Deadmen</th>
<th>Required Straps</th>
</tr>
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<tbody>
<tr>
<td>500</td>
<td>4'-0&quot; 5'-5&quot;</td>
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*Model CDA-45 required.
Steel Hold-Down Straps

This guide provides information about Steel hold-down straps manufactured specifically by Highland Tank. The guide references dimensions of standard underground tanks. Also referenced are hold-down strap specifications, recommended quantity, spacing and anchor bolt requirements. Contractor-supplied anchor bolt sizes must be in accordance with this guide for proper fit and system performance.

This guide is intended only as an aid to professional engineers. Highland Tank recommends that underground storage tank anchorage systems be designed by a licensed professional engineer.

A. Steel Hold-Down Straps
Steel hold-down straps are manufactured from mild-carbon steel with an adjustable turnbuckle and angle clip on each end for securing tanks in place. Neoprene rubber liners are supplied for electrical isolation and coating protection. Standard straps are sized so that when the turnbuckles are completely closed, there will be six (6") inches between the anchor pad and the tank bottom. Turnbuckles can be opened to allow up to twelve (12") inches of clearance.

B. Safety Hold-Down Straps
Safety hold-down straps are designed to avoid having installation personnel in the excavation during tank placement. They are manufactured in two pieces and shipped connected with a threaded tie rod at top center. These straps are designed to be installed before placing the tank in the excavation. By loosening the tie rod, the two pieces are separated and each rotated 90° to 180° away from their original position. After the tank is positioned, the strap’s sides are rotated back toward each other and tightened over the tank with the tie rod and nuts.

*Contractor Supplied Items
Due to shipping restraints, safety straps are required for tanks with a diameter of 10’ or greater.
### Steel Hold-Down Straps Sizing Guide

<table>
<thead>
<tr>
<th>Tank Volume Gallons</th>
<th>Tank Dimensions</th>
<th>Hold-Down Strap</th>
<th>Anchor Bolt</th>
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<tbody>
<tr>
<td></td>
<td>Diameter</td>
<td>Length</td>
<td>Required Quantity</td>
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<td>5</td>
</tr>
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<td>10'-0&quot;</td>
<td>25'-6&quot;</td>
<td>3</td>
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<td>60,000</td>
<td>13'-0&quot;</td>
<td>60'-6&quot;</td>
<td>12</td>
</tr>
</tbody>
</table>

**Note:**
- This information is provided as a service to our customers to assist with budgetary estimates.
- Underground storage tank anchorage systems should be designed by a licensed professional engineer for the particular geographic location, soil conditions and installation requirements of the specific jobsite. Highland Tank assumes no liability for errors or omissions in this information or for any consequent damages incurred by use or misuse of this guide.
- Additionally, supplemental methods of restraint, such as grade-level reinforced concrete pads, should be designed in accordance with PEI/RIP-100-05.
- Refer to appropriate Highland Tank and Steel Tank Institute installation instructions for additional information.
- Tanks with diameter of 10’ or greater require safety straps.
Tank Support Systems

Tank Support Systems are designed to support the tank, maintain stability and keep it stationary. They elevate the tank to minimize corrosion concerns and allow for easy visual inspection of the tank’s underside.

Tank Support Systems are designed to support the full load of the tank and its contents and facilitate a safer, quicker and trouble-free tank installation. In many cases, they must be designed to securely support and anchor the tank during severe storms, floods and earthquakes.

Skids
- Used to provide portability for empty horizontal tanks
- Stabilize and maintain a fixed elevation if being moved by towing
- High under-tank clearance for visual inspection of tank’s underside
- Does not require extensive site preparation
- Two style skids:
  - Small skids for tanks up to 1,500 gallons with runners fabricated from steel angle
  - Large skids with runners made from steel pipe

Supports
- Structural steel supports maintain the tank’s position and elevation
- Provide clearance for visual inspection of tank’s underside
- Standard supports provide 6” of clearance and are available on horizontal tanks up to 4,000 gallons, 5’4” diameter
Tank Saddles

UL Saddles
UL Saddles are designed for a specific diameter horizontal storage tank and fabricated to the latest UL-142® design standards. They can be welded directly to the tank or shipped loose.

Saddle Features
- Heavy-duty UL-142® steel construction for long-term durability
- Standard saddles provide 6" of clearance and are available up to 12" high (Saddles higher than 12" must be protected with a fire resistant material with a two-hour fire rating)
- Only two properly positioned saddles per tank required
- Four 1-1/8" diameter bolt holes are provided to secure the saddles to the concrete pad or piers
- Saddles are painted to the same specifications as the tank

Secure Fluid Storage
Our tank saddles are used to provide longitudinal support, maintain the tank's position and elevation and help minimize corrosion. They also provide clearance for complete visual inspection of the underside of the tanks.

Highland’s integral seal-welded tank saddles are constructed in accordance with Underwriter’s Laboratories, Inc. and designed to support the full load of tank and contents. Our new two saddle system is easy to install and service. Additionally, the tank saddles can be anchored to a concrete pad to help protect the tank from movement or flotation.

Tank Saddles allow for visual inspection of the entire storage tank in accordance to the requirements of the EPA’s SPCC rule.
The storage tank and saddles must be designed to accommodate loads resulting from the weight of the tank and its contents, external equipment and environmental conditions. In areas subject to damaging wind, water or earthquakes, the design of the supporting structure and connections for the storage tank shall require special engineering consideration.

The design and construction of tank supports and foundations is critical and should only be undertaken and supervised by competent professionals.

Note:
1. Do not rely on tack or seal-welded saddles as a means for securing a tank in flood-prone areas. A hold-down system, connected to an adequately sized anchor pad, is recommended.
2. A properly designed hold-down strap system with adequately sized reinforced concrete hold-down pad is recommended to secure a tank in flood-prone areas.
<table>
<thead>
<tr>
<th>Nominal Capacity</th>
<th>Tank Dimensions</th>
<th>Saddle Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallons</td>
<td>Diameter Length</td>
<td>(SS)</td>
</tr>
<tr>
<td>185</td>
<td>3'-2&quot; 3'-4&quot;</td>
<td>11&quot;</td>
</tr>
<tr>
<td>240</td>
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</tr>
<tr>
<td>300</td>
<td>3'-2&quot; 5'-0&quot;</td>
<td>1'-9&quot;</td>
</tr>
<tr>
<td>500</td>
<td>4'-0&quot; 5'-5&quot;</td>
<td>1'-9&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>4'-0&quot; 10'-9&quot;</td>
<td>4'-5&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>5'-4&quot; 6'-0&quot;</td>
<td>1'-8&quot;</td>
</tr>
<tr>
<td>1,500</td>
<td>5'-4&quot; 9'-0&quot;</td>
<td>3'-2&quot;</td>
</tr>
<tr>
<td>2,000</td>
<td>5'-4&quot; 12'-0&quot;</td>
<td>4'-8&quot;</td>
</tr>
<tr>
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<td>5'-4&quot; 18'-0&quot;</td>
<td>7'-8&quot;</td>
</tr>
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<td>10'-8&quot;</td>
</tr>
<tr>
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<td>6'-0&quot; 19'-0&quot;</td>
<td>8'-0&quot;</td>
</tr>
<tr>
<td>4,000</td>
<td>8'-0&quot; 10'-8&quot;</td>
<td>3'-3&quot;</td>
</tr>
<tr>
<td>5,000</td>
<td>6'-0&quot; 23'-10&quot;</td>
<td>10'-5&quot;</td>
</tr>
<tr>
<td>5,000</td>
<td>8'-0&quot; 13'-4&quot;</td>
<td>4'-8&quot;</td>
</tr>
<tr>
<td>6,000</td>
<td>6'-0&quot; 28'-8&quot;</td>
<td>12'-10&quot;</td>
</tr>
<tr>
<td>6,000</td>
<td>8'-0&quot; 16'-0&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>8,000</td>
<td>8'-0&quot; 21'-4&quot;</td>
<td>8'-8&quot;</td>
</tr>
<tr>
<td>8,000</td>
<td>10'-0&quot; 14'-0&quot;</td>
<td>4'-6&quot;</td>
</tr>
<tr>
<td>10,000</td>
<td>8'-0&quot; 26'-8&quot;</td>
<td>11'-4&quot;</td>
</tr>
<tr>
<td>10,000</td>
<td>10'-0&quot; 17'-0&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>12,000</td>
<td>8'-0&quot; 32'-0&quot;</td>
<td>14'-0&quot;</td>
</tr>
<tr>
<td>12,000</td>
<td>10'-0&quot; 20'-6&quot;</td>
<td>7'-9&quot;</td>
</tr>
<tr>
<td>15,000</td>
<td>8'-0&quot; 40'-0&quot;</td>
<td>18'-0&quot;</td>
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<tr>
<td>15,000</td>
<td>10'-0&quot; 25'-6&quot;</td>
<td>10'-3&quot;</td>
</tr>
<tr>
<td>20,000</td>
<td>10'-0&quot; 34'-0&quot;</td>
<td>14'-6&quot;</td>
</tr>
<tr>
<td>20,000</td>
<td>10'-6&quot; 31'-0&quot;</td>
<td>12'-11&quot;</td>
</tr>
<tr>
<td>25,000</td>
<td>10'-6&quot; 38'-9&quot;</td>
<td>16'-9&quot;</td>
</tr>
<tr>
<td>30,000</td>
<td>10'-6&quot; 46'-6&quot;</td>
<td>20'-8&quot;</td>
</tr>
<tr>
<td>40,000</td>
<td>12'-0&quot; 47'-6&quot;</td>
<td>20'-9&quot;</td>
</tr>
<tr>
<td>50,000</td>
<td>12'-0&quot; 59'-6&quot;</td>
<td>26'-9&quot;</td>
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<tr>
<td>50,000</td>
<td>12'-6&quot; 54'-6&quot;</td>
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<tr>
<td>60,000</td>
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<td>33'-0&quot;</td>
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<td>12'-6&quot; 65'-6&quot;</td>
<td>30'-6&quot;</td>
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<tr>
<td>60,000</td>
<td>13'-0&quot; 60'-6&quot;</td>
<td>27'-0&quot;</td>
</tr>
<tr>
<td>70,000</td>
<td>13'-0&quot; 72'-0&quot;</td>
<td>32'-9&quot;</td>
</tr>
</tbody>
</table>
Ladders, platforms and walkways are designed to comply with strict OSHA regulations. Carbon steel fabrication with a painted finish is standard. Stainless steel or galvanized finish is available upon request. Mounting brackets and other structural accommodations can be factory-fitted to facilitate field installation. Interior access ladders require a properly sized access manway for safety clearance. Standard or caged external access ladders are designed for access to the tank top, fill port, manways or tank appurtenances. Handrails and provisions for anchoring to a support pad are also included.

Note: OSHA-compliant internal ladders measure 16" wide and external ladders measure 24" wide.
Stairways and Ships Ladders

Highland Tank fabricates standard and custom stairs to facilitate access to tank fill ports and manways. OSHA standard design stairways provide access to the top of the tank from a platform attached to one end of the tank and include non-skid fiberglass grating on the stair treads and platforms. Handrails and provisions for anchoring stairway to a support pad are also included. In addition, we can manufacture Ships Ladders for job sites with limited space and can custom fabricate ladders, platforms and walkways to suit your site-specific needs.

### Stairways and Ships Ladders

<table>
<thead>
<tr>
<th>Model S or SL</th>
<th>Tank Diameter</th>
<th>Nominal Length Stairs</th>
<th>Nominal Length Ships Ladders</th>
<th>Platform Height From Support Pad</th>
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<tbody>
<tr>
<td>30</td>
<td>4'-0&quot;</td>
<td>29.6875&quot;</td>
<td>17&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>47</td>
<td>5'-4&quot; &amp; 6'-0&quot;</td>
<td>47.25&quot;</td>
<td>26&quot;</td>
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<td>72</td>
<td>8'-0&quot;</td>
<td>72.625&quot;</td>
<td>41&quot;</td>
<td>72&quot;</td>
</tr>
<tr>
<td>88</td>
<td>10'-0&quot;</td>
<td>88.8125&quot;</td>
<td>50&quot;</td>
<td>88&quot;</td>
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<td>108</td>
<td>12'-0&quot;</td>
<td>108.625&quot;</td>
<td>62&quot;</td>
<td>108&quot;</td>
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</table>

**Stairways**

- **Length**: 30"
- **Height**: 34"
- **Support Legs When Required**: 39-45°
- **Support Legs When Required**: 9-11"
- **Anchor**: 24" 28"

**Ships Ladders**

- **Length**: 30"
- **Height**: 34"
- **Top of Tank Access Perpendicular to Tank Head**: 60°
- **Top of Tank Access Parallel to Tank Head**: 0°
Manways and Manway Extensions

Manways are manufactured and protected against corrosion using the same methods and quality control procedures as the storage tank. The welding and fabrication specifications are in strict accordance with Underwriters Laboratories, Inc. and OSHA. By manufacturing our own manways, covers and extensions, we assure our customers of the same high quality as in our tanks.

Manways are available in standard 18", 20", 24", 30", 36", 42" and 48" diameters. Larger diameter cylindrical and custom rectangular manways are also available. Manway assemblies include the bolted cover and gasket. The cover provides a convenient location for fittings. 4" diameter NPT heavy-duty forged fittings are standard.

When ordering, specify manway cover fitting arrangement. Manway extensions lengths can vary and are made to order.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>ID</th>
<th>OD</th>
<th>Thickness/Lid</th>
<th>Bolt Size</th>
<th>Number</th>
<th>Bolt Circle</th>
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</thead>
<tbody>
<tr>
<td>18&quot;</td>
<td>24&quot;</td>
<td>.25&quot;-.25&quot;</td>
<td>.50&quot;</td>
<td>18</td>
<td>21&quot;</td>
<td></td>
</tr>
<tr>
<td>20&quot;</td>
<td>26&quot;</td>
<td>.25&quot;-.375&quot;</td>
<td>.50&quot;</td>
<td>24</td>
<td>23&quot;</td>
<td></td>
</tr>
<tr>
<td>24&quot;</td>
<td>30&quot;</td>
<td>.25&quot;-.375&quot;</td>
<td>.50&quot;</td>
<td>24</td>
<td>27&quot;</td>
<td></td>
</tr>
<tr>
<td>30&quot;</td>
<td>36&quot;</td>
<td>.25&quot;-.375&quot;</td>
<td>.50&quot;</td>
<td>42</td>
<td>34&quot;</td>
<td></td>
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<tr>
<td>36&quot;</td>
<td>42&quot;</td>
<td>.375&quot;-.375&quot;</td>
<td>.50&quot;</td>
<td>42</td>
<td>40&quot;</td>
<td></td>
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<tr>
<td>42&quot;</td>
<td>48&quot;</td>
<td>.375&quot;-.375&quot;</td>
<td>.50&quot;</td>
<td>52</td>
<td>45&quot;</td>
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</tr>
<tr>
<td>48&quot;</td>
<td>54&quot;</td>
<td>.375&quot;-.375&quot;</td>
<td>.50&quot;</td>
<td>60</td>
<td>51&quot;</td>
<td></td>
</tr>
</tbody>
</table>
Grade Level Manways

Grade Level Manways (GLM) are designed to AASHTO H20 requirements. Round GLMs are available in sizes ranging from 12" to 48" diameter. Rectangular GLMs are available in lengths from 48" to 150" and widths from 48" to 72".

Each manway is constructed using A36 steel plate from 10 gauge to .25" thick. Standard manways are fabricated with a 12" skirt depth and fitted with 1.5" x 2" x 3" steel concrete anchors seal welded to the manway skirt to ensure a secure installation. Standard manway lids are constructed of .375" reinforced checkered steel plate. Optional .375" checkered plate reinforced aluminum lids are available. Steel components receive a brush blast and are coated with black enamel paint. Optional polyurethane or epoxy coatings are available.

Rectangular manways are custom-fabricated to site-specific requirements. Custom diameters and depths are available upon request.

### Round

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Manway Skirt I.D. Inches</th>
<th>Manway Lid Collar I.D. Inches</th>
<th>Manway Lid O.D. Inches</th>
<th>Skirt Thickness</th>
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</thead>
<tbody>
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<td>GLM-12</td>
<td>12&quot;</td>
<td>14.5&quot;</td>
<td>14&quot;</td>
<td>10ga</td>
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<td>GLM-18</td>
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<td>20.5&quot;</td>
<td>20&quot;</td>
<td>7ga</td>
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<td>26&quot;</td>
<td>7ga</td>
</tr>
<tr>
<td>GLM-30</td>
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<td>32.5&quot;</td>
<td>32&quot;</td>
<td>7ga</td>
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<tr>
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<td>34.5&quot;</td>
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<td>7ga</td>
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<tr>
<td>GLM-42</td>
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<td>44&quot;</td>
<td>.25&quot;</td>
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<td>GLM-48</td>
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<td>50.5&quot;</td>
<td>50&quot;</td>
<td>.25&quot;</td>
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</table>

### Rectangular

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Number of Doors</th>
<th>Maximum Overall Length</th>
<th>Skirt Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-GLM-48</td>
<td>1</td>
<td>48</td>
<td>.25&quot;</td>
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<tr>
<td>R-GLM-60</td>
<td>2</td>
<td>60</td>
<td>.25&quot;</td>
</tr>
<tr>
<td>R-GLM-90</td>
<td>3</td>
<td>90</td>
<td>.25&quot;</td>
</tr>
<tr>
<td>R-GLM-120</td>
<td>4</td>
<td>120</td>
<td>.25&quot;</td>
</tr>
<tr>
<td>R-GLM-150</td>
<td>5</td>
<td>150</td>
<td>.25&quot;</td>
</tr>
</tbody>
</table>
Storage Tank Connections

Note:
Flanged fittings also available in other configurations
* Available in all standard steel pipe sizes
** Available as extras in standard steel pipe sizes from .125" to 6" nominal

Please contact Highland Tank for all other fitting requirements

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**Half Coupling**

**Full Coupling**

150 Pound Screwed Flange Fitting

Slip-on Welding Flange 150 Pound

*Flanged Nozzle

150 Pound Welding Neck Flange

---

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>Bolt No.</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
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<td>3.5&quot;</td>
<td>.4375&quot;</td>
<td>1.38&quot;</td>
<td>2.375&quot;</td>
<td>.625&quot;</td>
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<tr>
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<td>3.875&quot;</td>
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<td>1.6875&quot;</td>
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<td>2.5&quot;</td>
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ASME Semi-elliptical Heads

These superior heads are designed, engineered, and manufactured to individual customers’ application and specifications for pressure conditions. Tolerances comply with ASME requirements. These heads have a 2:1 diameter to depth ratio and are butt-welded to the tank shell.

Highland Storage Tank and ASME Pressure Vessel heads are of superior quality, value, and craftsmanship. Our heads are fabricated of either A36 and SA516 Grade 70 carbon steel and 304, 304L, 316, or 316L stainless steel. Thicknesses range from 14 gauge to 1-1/4”.

Three styles of tank heads are available in diameters from 2'-0" to 14'-0":

**Standard Flat-flanged Heads**

These cost effective heads are commonly used in applications where the tank will be operated at atmospheric pressure. The head’s flange fits precisely inside the tank shell to form a strong lap-welded joint.

**Standard Flanged & Dished Heads**

When applications require slightly higher operating pressures, our non-ASME flanged & dished design gives the tank the most strength without adding thickness. The lap-welded joint between the inner head flange and the outer tank shell provides superior “ribbed” strength.

**ASME Semi-elliptical Heads**

These superior heads are designed, engineered, and manufactured to individual customers’ application and specifications for pressure conditions. Tolerances comply with ASME requirements. These heads have a 2:1 diameter to depth ratio and are butt-welded to the tank shell.

### Standard Tank Head Design

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<th>Tank Head Diameter</th>
<th>Capacity of Shell, Gal. per ft.</th>
<th>Capacity of Shell, Gal. per in.</th>
<th>Capacity of Head, Gal.</th>
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</table>

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Our Commitment to You

Highland Tank is committed to building successful, long-standing relationships with our customers. We are dedicated to providing storage tanks of the highest craftsmanship and performance. Within a business of ever-changing technology, we are constantly striving to exceed all your expectations.

Our family-owned and managed business formed a humble philosophy many years ago that continues to hold true: manufacture a solid product at a competitive price and stand behind it with unparalleled service. Our hard work and dedication has helped to develop the high quality, dependability and craftsmanship put into every product we manufacture.

Engineering depth, state-of-the-art equipment and skilled craftsmen with old-fashioned pride and the traditional American work ethic have given us the tools needed to maintain our dedication to quality production.

An American Manufacturer Proven to Stand Behind its Products
PETROLEUM & CHEMICAL STORAGE TANKS

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Heating & Lube Oils
Chemicals
Biofuels
Propane

Stoystown, PA
One Highland Road
Stoystown, PA 15563-0338
T: 814-893-5701
F: 814-893-6126

Manheim, PA
4635 Elizabethtown Road
Manheim, PA 17545-9410
T: 717-664-0600
F: 717-664-0617

Watervliet, NY
958 19th Street
Watervliet, NY 12189-1752
T: 518-273-0801
F: 518-273-1365

Greensboro, NC
2700 Patterson Street
Greensboro, NC 27407-2317
T: 336-218-0801
F: 336-218-1202

Lebanon, PA
2225 Chestnut Street
Lebanon, PA 17042-2504
T: 717-664-0602
F: 717-664-0631

Friedens, PA
1510 Stoystown Road
Friedens, PA 15541-7402
T: 814-443-6800
F: 814-444-8602

www.highlandtank.com
tanks@highlandtank.com

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