

## General Industries

### ACT-100U Single Wall Quick Specification

#### PART 1 - GENERAL

##### 1.0 SCOPE OF SECTION

- A. This section describes requirements for providing the equipment, labor and materials necessary to furnish and install petroleum storage tank system(s) utilizing underground ACT-100 single-wall tank(s).
- B. Requirements include furnishing and installing all equipment and accessories necessary to make complete systems for the storage and dispensing of [List].
- C. The following components shall be provided by the Owner and installed by the Contractor. [List if applicable]
- D. The following components shall be provided by the Contractor, but not be installed as a part of this contract. [List if applicable]

##### 1.1 GENERAL REQUIREMENTS

- A. Unless otherwise specified, equipment furnished under this section shall be fabricated and installed in compliance with the instructions of the manufacturer.
- B. The Contractor shall ensure that all equipment, accessories and installation materials comply with the specification and that adequate provision is made in the tank design and fabrication for mounting the specified system equipment and accessories.
- C. The Contractor is solely responsible for construction means, methods, techniques, sequences and procedures and for safety precautions and programs.
- D. All electrical work shall conform with the national electric code NFPA 70, 1993.
- E. The contractor shall provide all labor, equipment and material required to provide a complete and functional system.
- F. To avoid delays in construction, the Contractor shall ensure that all components of the system are available at the time of installation.
- G. The Contractor shall coordinate his work with other work being performed at the construction site and to minimize interference with the Owner's normal activities which may continue during construction.
- H. The Contractor shall obtain necessary permits, arrange for inspections and obtain approval of the appropriate authority having jurisdiction over the work described.

##### 1.2 STANDARDS

- A. Work shall be performed in accordance with applicable federal, state and local fire protection, environmental and safety codes and regulations and the latest version of the following industry standards:
  - 1. Recommended Practices for Installation of Underground Liquid Storage Systems, PEI/RP100; Recommended Practices for Installation and Testing of Vapor Recovery Systems at Vehicle Fueling Sites, PEI/RP300; Petroleum Equipment Institute, P.O. Box 2380, Tulsa, OK 74101.
  - 2. Installation of Underground Petroleum Storage Systems, API/1615, Cathodic Protection of Underground Petroleum Storage Tank and Piping Systems, API 1632, American Petroleum Institute, 1220 L Street, Washington, D.C. 20005.
  - 3. Flammable and Combustible Liquid Code, NFPA/30, Automotive and Marine Service Station Code, NFPA/30A, National Electrical Code, NFPA/70, and Underground Leakage of Flammable and Combustible Liquids, NFPA/329, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9904.
  - 4. Article 79-Flammable and Combustible Liquids, Uniform Fire Code, 1994 Edition, International Fire Code Institute, 5360 Workman Mill Rd, Whittier, CA 90601, (310) 699-0124.
  - 5. Hazardous Waste Operations and Emergency Response and Excavating, OSHA/29 CFR 1910.120 & 29 CFR 1926 Subpart P., Occupational Safety and Health Administration, U.S. Department of Labor, Region V, 230 S. Dearborn Street, Room 3244, Chicago, IL 60604.
  - 6. Occupational Safety and Health Standards, Flammable and Combustible Liquids, 29CFR 1910.106,

Personal Protective Equipment 29CFR 1910 Subpart I, Excavations 29CFR 1926.650 Subpart P, U. S. Department of Labor, Occupational Safety and Health Administration (OSHA), Washington, D.C.

7. Control of External Corrosion of Metallic Buried, Partially Buried, and Submerged Liquid Storage Systems, NACE Recommended Practice RP0285-95; Control of External Corrosion on Submerged Metallic Piping Systems, NACE Recommended Practice RP0169-92; National Association of Corrosion Engineers, P.O. Box 218340, Houston, TX 77213.

8. Installation Instructions, ACT-100, R913; Steel Tank Institute Recommended Practices for Corrosion Protection of Underground Piping Networks Associated with Liquid Storage and Dispensing Systems, R892; Steel Tank Institute Standard for Dual Wall Underground Steel Storage Tanks, F841; Steel Tank Institute, 570 Oakwood Road, Lake Zurich, IL 60047 (847) 438-8265

9. UL Standard 58, "Steel Underground Tanks for Flammable and Combustible Liquids", 1996, "Control Equipment for Use With Flammable Liquid Dispensing Devices, UL1238, "Pipe Connectors for Flammable and Combustible Liquids and LP-Gas", UL567, "Pipe Unions for Flammable and Combustible Liquids and LP-Gas", UL567, "Powered-operated Dispensing Devices for Petroleum Products", UL87, "Valves for Flammable Fluids", UL842, "Corrosion Protection for Underground Storage Tanks" UL1746, "UL Listed Non-Metal Pipe", UL971, Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, Illinois 60062. (847) 272-8800.

10. Underground Storage Tanks; Technical Requirements and State Program Approval; Final Rules, 40 CFR Parts 280 and 281, Part II, Federal Register, Friday, September 23, 1988, Musts for USTs: A Summary of the New Regulations for Underground Storage Tank Systems, and Hazardous Waste Management Standards, Federal Register July 14, 1986. U.S. Environmental Protection Agency, Office of Underground Storage Tanks, 401 M. Street, S.W., Washington, D.C. 20460.

B. Where differences exist between standards, the Contractor shall use the most conservative. If in doubt, describe differences in writing to the Owner for his approval before performing the work.

C. The codes and standards listed are the latest as of this publication. Codes and standards are continuously updated. The Contractor shall confirm the construction standard edition enforced by the authority having jurisdiction

### 1.3 SUBMITTALS

A. The Contractor shall provide three (3) sets of shop drawings of the following system components for approval before commencing construction.

1. Shop drawings of the tank(s) by the tank manufacturer.
2. Assembly and installation drawings.
3. Other [List]

B. The Contractor shall provide product data sheets and descriptive material for major components to be provided.

1. Tank(s).
2. Pumps, valves and fittings.
3. Piping, leak detection equipment, and overfill prevention equipment.
4. Other system accessories [List]

C. Submittals shall be delivered to the Engineer within [10 days] of notice to proceed. The Engineer shall review the drawings and return them to the Contractor approved, or with appropriate comments, within [14 days] of receipt.

### 1.4 GUARANTEES, WARRANTIES AND INSURANCE

A. The Contractor shall provide the following insurance [List type and limits].

B. The Contractor shall provide the following guarantees/warranties [List requirements].

C. The Tank Manufacturer shall provide a Steel Tank Institute Third Party 30 year Warranty. Manufacturer's Warranty is not acceptable

### 1.5 DOCUMENTATION

A. The Contractor shall provide three (3) sets of the following installation instructions with the submittal of shop drawings.

1. Tank(s)
2. Pumps, valves, pipe and fittings

3. Monitoring system
4. Other [List]

## PART 2 - PRODUCTS

### 2.0 UNDERGROUND STORAGE TANK(S) (Tank 1)

A. Provide single-wall ACT-100U underground storage tank(s) for the storage of [petroleum products] at near atmospheric pressure. Number and size(s) of tank(s) shall be as follows (exact dimensions vary between manufacturers; verify dimensions with manufacturer):

(1) \_\_\_\_\_ gals. capacity (nominal) tank for [List] storage. Dimensions to be (\_\_\_\_\_ diameter, \_\_\_\_\_ length)

1. The steel tank(s) shall be manufactured in accordance with UL standard 58 requirements.
2. The tank exterior shall be 360 degree coated with a minimum 70 mil thick polyurethane coating. Polyurethane coating shall be applied by the manufacturer in accordance with Steel Tank Institute ACT-100U Specification for External Corrosion Protection of Polyurethane Steel Underground Storage Tanks.
3. Metal thickness shall be [5/16][1/4] inch walls and heads. Steel shall be equal to ASTM A-36, or better, for chemistry and weldability quality.
4. Manufacturing dimensional tolerances for primary tank shall be -0%/+5%.
5. All exposed metal surfaces shall be sealed and coated to ensure protection from corrosion.
6. Tank Testing by the Tank manufacturer at the factory:
  - a. The tank shall be Underwriters Laboratories listed and tested under UL 58.
  - b. The tank shall be pressure tested at 3-5 psig and all surfaces soaped and carefully inspected for leaks.
7. Field corrections, repairs and testing shall be performed in accordance with manufacturer instructions by factory trained personnel.

#### B. Tank Requirements

1. The number, sizes and locations of tank openings are shown in the drawings.
2. Provide 1/4 inch thick steel striker plates beneath all openings.
3. Number, type and placement of lifting lugs shall be determined by the manufacturer.
4. A legible placard with the UL label, installation instructions, tank weight and handling instructions shall be laminated to tank.
5. Tanks shall be compatible with ethanol and methanol fuels.
6. Provide holddown straps, turnbuckles, and insulating cushioning material to protect the tanks from damage from the straps.
7. Provide deadmen anchors and turnbuckles as required.
8. Exterior tank bottoms shall be protected from physical damage during shipping and storage with protective padding.
9. Acceptable tank manufacturers are [list]:

C. The Contractor or the Owner shall register each tank and serial number with Steel Tank Institute in accordance with instructions provided by the manufacturer with the tank.

D. Provide a [30] [36] [42] [48] diameter piping containment sump and integral collar with each tank.

1. Riser for [height] burial depth
2. [Polyurethane-coated,] continuously welded, [3/16] -inch steel riser
3. The 6-inch high piping sump collar shall be continuously welded to the primary steel tank, and the pipe sump riser shall be continuously [welded] [bonded] to the collar to make a liquid tight seal. All surfaces exposed to the soil shall be cleaned, well-coated with Polyurethane compatible with the tank.
4. Pipe and conduit penetrations fittings shall be liquid tight
5. Brackets for electrical junction boxes and sensors
6. [24] [30]-inch gasketed, liquid tight manway cover and ring with [threaded stud and wing-nut fasteners] [tie downs] [friction fit] lid

E. Accepted Manufacturers: General Industries or equal, all other Manufacturers must have Engineer's approval 30 days prior to bid.

### 2.1 Fuel Dispensing Equipment

A. Provide [Qty] [single-hose] [dual-hose], [single-product] [two-product], suction pump(s)

- B. Hoses, nozzles, swivels, breakaway valves, [hose retrievers] and accessories [list]:
- C. Acceptable Manufacturers are: [list]

## 2.2 Pump Controls

- A. Provide an interface between the liquid sensing system and the pump power which will interrupt power to the suction pump if the high level liquid sensor located in the containment sump senses the presence of liquid.
  - 1. The system is designed to force recognition of an unacceptably high level of water or released product in contained spaces and to prevent unauthorized restoration of power to the pumps in the event of a shut down.
  - 2. The relays shall be located in the [location].
- B. Provide electrical disconnection of all conductors to the suction pump in accordance with NFPA Codes 30, 30A and 70.
  - 1. Locate the emergency shut-off in an accessible area, at least 20 feet but not more than 100 feet from the dispenser. Confirm the final location with the Owner prior to installation.
  - 2. Provide a palm type switch button that will shut off electrical power to the pump.
  - 3. The emergency shut-off shall be clearly identified with signage.
  - 4. Emergency shut-off shall have a manual reset.

## 2.3 Primary Piping

- A. Provide [diameter] inch diameter Schedule [40] [80] steel product, and vent piping.
  - 1. Pipe shall be wrapped/coated black steel pipe.
  - 2. Provide extra-heavy 250/300# malleable iron [threaded] [welded] fittings.
  - 3. Provide flexibility through the use of flexible connectors at tank, vent and dispenser connection. The use of "swing-joints" is unacceptable.
- B. Provide cathodic protection for all buried metallic piping in contact with the soil.
  - 1. Electrically insulate piping from tank(s) and dispenser(s).
  - 2. Metallic piping shall be cathodically protected through a [Cathodic Protection System] [Impressed Current Protection System] [Secondary Containment in nonmetallic piping] [list]
- C. Provide the following riser piping for:
  - 1. [3] [4]-inch galvanized tank fill pipe. Do not coat fill riser with dielectric material. Contact with the soil is essential to dissipate static electricity.
  - 2. [3] [4]-inch Schedule 40 vent [Stage I vapor recovery] riser.
  - 3. 4-inch tank gauge probe.
  - 4. 2-inch interstitial monitor.
  - 5. 2-inch Schedule 40 galvanized vent riser aboveground.

## 2.4 Monitoring and Gauging System

- A. Provide an integrated electronic tank gauging and monitoring system with the following features: [list]
- B. Provide liquid sensors in the containment sump(s), programmed to audibly alarm at the low preset level and to interrupt electrical power to the pumps at a high preset level. Acceptable manufacturers are: [list]
- C. Provide [magnetostrictive] [mass] [sonic] [infrared] electronic in tank probe(s) capable of detecting a [0.1] [0.2] gallon per hour leak. Provide riser with liquid tight snap mounting ring cap kit. Acceptable manufacturers are: [list]

## 2.5 Manholes

As per Engineer's Specifications

## 2.6 Containment Sump

- A. Provide liquid-tight containment sump beneath each pump to prevent the release of product into the environment.
- B. Sump shall be constructed for use underground and shall be sufficiently reinforced to prevent distortion from the weight of soil, concrete or ground water.
- C. The containment sump shall be constructed of [steel] [fiberglass] [high density polyethylene] and provided

with the following features and accessories:

1. One-inch lip above concrete inside pump perimeter to prevent infiltration of wind-driven rainwater.
2. Internal bracketing for liquid monitoring sensor to eliminate drilling chamber walls.

D. Provide liquid-tight bulkhead fittings for piping and conduit penetrations of the containment sump and gauge containment manhole.

E. Acceptable manufacturers and products are:

1. Containment sumps: [list]
2. Penetration fittings: [list]

## 2.7 [Steel] [Plastic] Island Forms

A. Provide [size (length x width)] -inch high island form with integral pump box designed for the suction pump and incorporating the following features and accessories:

1. [12-gauge steel] [plastic] island forms.
2. [Factory primed. Painted after completion of paving.] [Brushed Stainless Steel]
3. Features to ensure proper alignment.

B. Integral dispenser boxes.

1. Provision for anchoring suction pump and piping.
2. Provision for securing junction box and conduit.

## 2.8 Valves, Fittings, Flexible Connectors and Other Equipment

A. Provide tight, lockable, fill cap and adapter for each tank. Model [list]

B. Provide a [fire impact valve] [shear section] on product pipe beneath each suction pump. Model [list]

C. Provide all-steel flexible connectors at all tank, pump and vent riser connections as shown in the drawings.

[Flexible connectors may not be required for system with flexible piping systems]

1. Provide all-steel construction with a UL-listing for use aboveground (UL567). Do not use connectors with low melting point materials.

[2. Flexible connectors for suction piping shall be rated for full vacuum service at 760mm Hg (mercury) vacuum.]

3. Flexible connectors shall have one swivel end and one female pipe thread end. Units shall be clearly marked with a lay line to minimize chances of twisting during installation.

4. Flexible connectors installed with a 90 degree bend shall be not less than [24] [30]-inches long.

5. Acceptable manufacturers are: [list]

D. Provide corrosion control using cathodic protection or isolation boots for each flexible connector in contact with the soil.

1. Isolation boots shall completely isolate the metallic flexible connectors from the soil.

2. A liquid-tight seal which can be tested at not less than 10 psig.

3. Seal to FRP piping with at least two stainless steel hose clamps per end. Coat buried clamps with dielectric material after installation.

4. Acceptable manufacturers are: [list]

E. Provide extractable fittings at tank connections as shown on the drawings.

1. Provide each extractable fitting with a liquid tight extractor pipe cap, coated and wrapped Schedule 40 riser pipe.

2. Acceptable manufacturers and models are: [list]

3. Provide brass test plugs for each extractor fitting and an extractor wrench. Acceptable manufacturers and models are: [list]

4. Provide foot valve extractor for each suction pipe riser. Model [list]

F. Provide [size] -inch up-flow [atmospheric] [pressure/vacuum] vent caps. [Pressure vacuum vent caps shall open with [8] ounces of pressure and [one-half] ounce of vacuum.] Acceptable manufacturers and models are: [list]

G. Provide overfill valves and [coaxial] [standard] drop tube assemblies for each tank fillpipe. Acceptable manufacturers and models are: [list]

H. Provide portable Class ABC [20 pound] [40 pound] fire extinguisher(s) and weather proof cabinet(s) at dispenser island(s) and [other locations] in accordance with applicable fire codes.

I. Provide [quantity] [size] diameter ["U" shaped steel pipe guards] [bollards] to be placed at the ends of the pump island, primed and painted.

## PART 3 - EXECUTION

### 3.0 General

#### A. Familiarity with the Site.

1. Contractor shall familiarize himself with the location of all public utility facilities and structures that may be found in the vicinity of the construction.
2. The Contractor shall conduct his operation to avoid damage to the utilities or structures. Should any damage occur due to the Contractor's operations, repairs shall be made at the Contractor's expense in a manner acceptable to the Owner.
3. The Contractor is responsible for meeting all the requirements established by the agencies for utility work, as well as work affecting utilities and other government agencies.

### 3.1 Excavating and Trenching

#### A. Excavated materials.

1. Contractor shall remove necessary paving by saw cutting and excavating as required to accomplish the work described on the drawings.
2. Contractor shall temporarily stockpile excavated spoil on-site. Contractor shall dispose of clean spoil [on-site][off-site].
3. Spoil shall not be considered acceptable as backfill.

### 3.2 Backfilling and Compaction

A. Contractor shall provide clean, pea gravel, compacted sand or crushed stone backfill for the tank and product piping excavations. All backfill material shall conform with ASTM standard C-33 paragraph 9.1.

1. Pea gravel consisting of naturally-rounded particles with a minimum diameter of 1/8 inch and a maximum of 3/4 inch as backfill material.
2. Washed crushed stone may be used if it is acceptable to the tank and pipe manufacturers. Crushed stone mix of angular particles with minimum size of 1/8 inch and maximum size of 1/2 inch.
3. Sand shall be clean, well-granulated, free flowing, non-corrosive and inert.
4. Provide laboratory analysis (sieve analysis) with pre-construction submittals. All materials must be approved in writing by the Engineer prior to placement.

#### B. Contractor shall carefully place and compact the backfill around the tank, containment sumps, and piping.

1. Take particular care to fully support lower quadrant and sides of tank as well as around the other equipment to prevent future settlement.
2. Sand backfill shall be placed and compacted in 12-inch lifts.

C. If dissimilar materials are used as backfill, or if the surrounding soil is unstable, separate the pea gravel or crushed stone backfill from the surrounding soil through use of geotextile filter fabric.

1. Fabric strips must overlap by at least 18-inches, minimum thickness of 4 ounces per square yard.
2. Acceptable filter fabric materials are [list].

### 3.3 Tank Handling and Storage

A. Tanks shall be handled, lifted, stored and secured in accordance with the manufacturer's instructions.

B. Unload with equipment having sufficient lifting capacity to avoid damage to the tank. Securely store the tank at the job site.

### 3.4 Equipment Installation

A. Contractor shall install tank(s), dispensers(s), piping and equipment in accordance with the manufacturers' installation instructions, industry standard recommended practices and federal, state and local regulations.

B. Calibration and start-up of equipment shall be performed by factory-trained and qualified personnel.

C. Pipe installation.

1. Maintain at least 1/8 inch slope in all pipe back to the tanks to prevent traps as prescribed in the standards.
2. Provide at least two secondary pipe diameter clearance between parallel piping runs. Separate crossed

pipng by at least four-inches.

D. The Contractor shall provide sufficient tank burial depth to ensure proper piping slope.

1. Tank burial depth shall be a minimum [3'-0"] [3'-6"] from finished grade, field verify.
2. Field changes or modifications must be approved by Owner beforehand.
3. Confirm the tank burial depth with the Engineer before excavating.

E. Set island form level at 6-inches above general grade. Confirm the placement before placing concrete in the forms.

F. Containment sump

1. Install containment sump in strict accordance with the instructions of the manufacturer.
2. Support sump securely until it is evenly backfilled.
3. Carefully install penetration fittings for piping and conduit as prescribed by the sump and fitting manufacturers.
4. Sumps which are distorted or not liquid tight after installation shall be replaced at the contractors expense.

### 3.5 Electrical

As per Engineer's Specifications

### 3.6 Concrete

As per Engineer's Specifications

### 3.7 Asphaltic Paving

As per Engineer's Specifications

### 3.8 Painting

As per Engineer's Specifications

### 3.9 Testing

A. The Contractor is responsible for testing all installed systems for liquid tightness and proper operation, including:

1. Pre-installation inspection of all materials.
2. Pre-installation tank tightness testing.
3. Product, containment and vent piping during construction.
4. Tank risers before backfilling (with inert gas).
5. Containment sump integrity.
6. System tightness test after all work, including paving, is completed and before the system is placed in service.

7. Post installation inspection and testing eleven months after substantial completion of all work and approval of the Owner.

B. Testing shall be witnessed by the Owner.

1. The Owner shall witness tank delivery and setting in place, anchoring, backfilling, piping tests, final precision testing and system start-up.

2. The Owner shall indicate approval of all testing witnessed in writing.

C. Tests shall be performed in conformance with the manufacturers' instructions, state laws and the quoted industry standards, particularly PEI/RP100.

1. If a conflict exists between the test protocols, the most stringent test shall be performed.
2. Any conflict which affects manufacturers' warranties must be resolved before beginning construction.
3. The Contractor shall document all tests in writing, signed by the individuals who performed and witnessed the test.

the test.

D. The Contractor shall demonstrate the operation of all systems to the Owner at the time of the final start-up test.

1. Provide one day of instruction on the proper operation and maintenance of all components.

2. Demonstrations shall include, but are not limited to, pump operation, monitoring and gauging systems, fuel filter replacement and leak detection.

3.10 Testing Product and Vent Piping in accordance with manufacturer's instructions and quoted industry standards, particularly PEI/RP-100.

A. Maintain minimum 10 psig pressure on all piping during backfilling and paving operations.

3.11 Testing Containment Sumps

A. After piping and backfilling are completed, the Contractor shall perform a hydrostatic test on the containment sumps and manholes as follows:

1. Fill the containment sump with water to a level near the top of the sump and above the penetration fittings. Mark liquid level on the sump wall.

2. The test duration shall be at least 24 hours. Verify that the liquid level has not changed.

B. If the water level changes, find and repair the leaks and repeat the test.

C. After the test, remove all liquids, clean and dry the sumps.

D. Monitor the sumps for liquid infiltration throughout completion of the remaining construction.

3.12 Test Documentation and Reporting

A. The Contractor shall document all testing and provide copies to the Owner and authorities having jurisdiction. Test records shall include:

1. Date and time of test.

2. Name of tester.

3. Names of any inspectors present.

4. Test procedure followed.

5. Test results.

B. Provide documentation for all testing with contract close-out documentation to the Owner.

C. The Contractor shall ensure that future testing is not impaired. The Contractor may be requested to demonstrate the tests as a part of the final approval process.

1. Inspection of tank interstices.

2. Periodic hydrostatic testing of containment sump. Caution: Piping which has contained flammable or combustible liquids may not be air tested under any circumstances. (NFPA 30)

END OF SECTION