SECTION 33 16 00

STORAGE TANKS

Display hidden notes to specifier. (Don't know how? [Click Here](https://www.arcat.com/sd/display_hidden_notes.shtml))

*Copyright 2015 - 2024 ARCAT, Inc. - All rights reserved*

\*\* NOTE TO SPECIFIER \*\* Xerxes Corporation; fiberglass storage tanks and separators.  
This section is based on the products of Xerxes Corporation, which is located at:6907 36 St. N.W.Edmonton, AB, Canada T6B 2Z6Toll Free Tel: 800-661-8265Email: [request info (michael.kernaghan@shawcor.com)](https://arcat.com/rfi?action=email&company=Xerxes%252BCorporation&message=RE%253A%2520Spec%2520Question%2520(13200xer)%253A%2520&coid=36629&spec=13200xer&rep=&fax=)  
Web: <https://www.xerxes.com>   
 [ [Click Here](https://arcat.com/company/xerxes-corporation-36629) ] for additional information.  
Xerxes is a product line of Shawcor Ltd. Headquartered in Toronto, Canada, Shawcor is a leading global company specializing in products, services and solutions for the water, energy, infrastructure and transportation markets. We continually pursue sustainable solutions that protect the environment, conserve resources and extend asset life.  
With six manufacturing facilities in North America, no matter where customers need fiberglass tanks and accessories shipped, a Xerxes manufacturing facility is not far away. No other tank producer offers this kind of manufacturing capability in North America.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete tank type below not required for project.

* + 1. Underground Water Tanks:
       1. Tank installations in the following locations:

\*\* NOTE TO SPECIFIER \*\* Delete locale not required.

* + - * 1. United States.
        2. Canada.
      1. For the following applications:

\*\* NOTE TO SPECIFIER \*\* Delete applications not required.

* + - * 1. Rainwater Harvesting / Stormwater Detention.
        2. Fire Protection Standby Water Storage.
        3. Potable Water Storage.
        4. Onsite Wastewater Storage.
        5. Grease Interceptors.
        6. Oil /Water Separators.
        7. Industrial Wastewater and Chemical Storage.
    1. Underground Petroleum Tanks:
       1. Tank installations in the following locations:

\*\* NOTE TO SPECIFIER \*\* Delete locale not required.

* + - * 1. United States.
        2. Canada.
      1. For the following applications:

\*\* NOTE TO SPECIFIER \*\* Delete applications not required.

* + - * 1. Fuel Storage.
        2. Diesel Exhaust Fluid (DEF) Storage.
        3. Oil/Water Separators.
        4. Pipeline Sump Tanks.
    1. Aboveground Tanks:
       1. Tank installations in the following locations:

\*\* NOTE TO SPECIFIER \*\* Delete locale not required.

* + - * 1. United States.
        2. Canada.
      1. For the following applications:

\*\* NOTE TO SPECIFIER \*\* Delete applications not required.

* + - * 1. Rainwater Harvesting / Stormwater Detention.
        2. Fire Protection Standby Water Storage.
        3. Potable Water Storage.
        4. Onsite Wastewater Storage.
        5. Grease Interceptors.
        6. Oil /Water Separators.
        7. Industrial Wastewater and Chemical Storage.
        8. Diesel Exhaust Fluid (DEF) Storage.
  1. RELATED SECTIONS
     1. Section 02 20 00 - Assessment.
     2. Section 03 30 00 - Cast-in-Place Concrete.
  2. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references by tank type not required.

* + 1. Aboveground Tanks in the United States:
       1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
       2. NFPA 22: Standard for Water Tanks for Private Fire Protection.
       3. NFPA 1142: Standard for Water Supplies for Suburban and Rural Fire Fighting.
       4. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects.
       5. Underwriters Laboratories (UL) Subject 2215 - Outline of Investigation for Oil/Water Separators.
       6. ISO 22241-1: Diesel engines -- NOx reduction agent AUS 32 -- Part 1: Quality requirements.
       7. Tank manufacturer shall be recognized by Underwriters Laboratories as a manufacturer of tanks listed to the UL 1316 standard.
    2. Aboveground Tanks in Canada:
       1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
       2. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects.
       3. ISO 22241-1: Diesel engines -- NOx reduction agent AUS 32 -- Part 1: Quality requirements.
       4. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
    3. Underground Water Tanks in the United States:
       1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
       2. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
       3. IAPMO/ANSI Z1000 - Prefabricated Septic Tanks.
       4. IAPMO/ANSI Z1001 - Prefabricated Gravity Grease Interceptors.
       5. NFPA 22: Standard for Water Tanks for Private Fire Protection.
       6. NFPA 1142: Standard for Water Supplies for Suburban and Rural Fire Fighting.
       7. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects.
       8. Underwriters Laboratories (UL) Subject 2215 - Outline of Investigation for Oil/Water Separators.
       9. Tank manufacturer shall be recognized by Underwriters Laboratories as a manufacturer of tanks listed to the UL 1316 standard.
    4. Underground Water Tanks in Canada:
       1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
       2. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
       3. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects.
       4. National Fire Code of Canada.
       5. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
       6. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.
    5. Underground Petroleum Tanks in the United States:
       1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
       2. NFPA 30: Flammable and Combustible Liquids Code.
       3. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
       4. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
       5. City of New York Department of Buildings M.E.A.
       6. Underwriters Laboratories (UL) Subject 2215 - Outline of Investigation for Oil/Water Separators.
       7. Underwriters Laboratories (UL) Standard for Safety 1316 Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.
       8. ISO 22241-1: Diesel engines -- NOx reduction agent AUS 32 -- Part 1: Quality requirements.
       9. U.S. Coast Guard Test Method 46 CFR 162.050.
    6. Underground Petroleum Tanks in Canada:
       1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
       2. CCCME PN1326, Canadian Council of Ministers of the Environment - Environmental Code of Practice for Aboveground and Underground Storage Systems Containing Petroleum and Allied Petroleum Products.
       3. ULC S615 - Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids.
       4. National Fire Code of Canada.
       5. ISO 22241-1: Diesel engines -- NOx reduction agent AUS 32 -- Part 1: Quality requirements.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Submit manufacturer's data sheets on each product to be used, including, but not limited to, the following:
        1. Preparation instructions and recommendations.
        2. Storage and handling requirements and recommendations.
        3. Installation manual and operating guidelines.
     3. Shop drawings: Tank manufacturer shall submit the following for review and approval prior to fabrication of the tanks:
        1. Detailed shop drawings of each tank complete with all accessories supplied by the manufacturer.
        2. Detailed shipping, handling and installation instructions.
  2. QUALITY ASSURANCE

\*\* NOTE TO SPECIFIER \*\* Delete locale not required.

* + 1. Tank installations in the United States:
       1. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction.
    2. Tank installations in Canada:
       1. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, provincial and municipal construction, health, safety and environmental codes, and local authorities having jurisdiction.
  1. DELIVERY, STORAGE, AND HANDLING
     1. General: Comply with tank manufacturer's Installation and Operating Guidelines recommendations for delivery, storage, and tank handling.
  2. WARRANTY
     1. Warranty: Provide manufacturer's standard limited warranty.

1. PRODUCTS
   1. MANUFACTURERS:

\*\* NOTE TO SPECIFIER \*\* Delete locale not required.

* + 1. Tank installations in the United States:
       1. Acceptable Manufacturer: Xerxes Corporation, which is located at:6907 36 St. N.W.Edmonton, AB, Canada T6B 2Z6Toll Free Tel: 800-661-8265Email: [request info (michael.kernaghan@shawcor.com)](https://arcat.com/rfi?action=email&company=Xerxes%252BCorporation&message=RE%253A%2520Spec%2520Question%2520(13200xer)%253A%2520&coid=36629&spec=13200xer&rep=&fax=);Web: <https://www.xerxes.com>
    2. Tank installations in Canada:
       1. Acceptable Manufacturer: Xerxes Corporation, which is located at:6907 36 St. N.W.Edmonton, AB, Canada T6B 2Z6Toll Free Tel: 800-661-8265Email: [request info (michael.kernaghan@shawcor.com)](https://arcat.com/rfi?action=email&company=Xerxes%252BCorporation&message=RE%253A%2520Spec%2520Question%2520(13200xer)%253A%2520&coid=36629&spec=13200xer&rep=&fax=);Web: <https://www.xerxes.com>
    3. Substitutions: Not permitted.
    4. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. UNDERGROUND WATER TANKS
     1. Tank Design - Fiberglass reinforced plastic (FRP) tanks:
        1. The tank size, fittings and accessories shall be as shown on the drawings.
        2. Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
        3. Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
        4. Tank shall be vented to atmospheric pressure.
        5. Tank shall be capable of handling liquids with specific gravity up to 1.1
        6. Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.
     2. Loading Conditions - Tank shall meet the following design criteria:
        1. Internal Load Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor.
        2. Surface Loads Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
        3. External Hydrostatic Pressure Tank shall be designed for 7 feet (2.1 m) of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Rainwater Harvesting / Stormwater Detention Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if the project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
      1. Tank Design: Single-Wall vessel as specified and shown on the drawings.
      2. Tank Accessories - Rainwater Harvesting / Stormwater Detention Applications:
         1. Tank Anchoring:

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the tank manufacturer.

Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Access Openings:

All access openings shall have a diameter of 24 inches or 30 inches (610 mm or 762 mm), complete with riser, lid and necessary hardware.

* + - * 1. Attached Access Risers:

Attached access risers shall be PVC or FRP as supplied by tank manufacturer.

Attached access risers shall be 24 inches or 30 inches (610 mm or 762 mm) diameter

Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.

* + - * 1. Piping and Fittings:

Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.

PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

* + - * 1. Manway Openings:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.

* + - * 1. Ladders: Ladders shall be the standard FRP ladder as supplied by tank manufacturer.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Fire Protection Standby Water Storage Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. NFPA 22: Standard for Water Tanks for Private Fire Protection.
        2. NFPA 1142: Standard for Water Supplies for Suburban and Rural Fire Fighting.
        3. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete the following two standards if the project is not in Canada.

* + - * 1. National Fire Code of Canada.
        2. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
      1. Tank Design: Single-Wall vessel as specified and shown on the drawings.
      2. Tank Accessories - Fire Protection Standby Water Storage Applications:
         1. Tank Anchoring

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the tank manufacturer.

Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Access Openings:

All access openings shall have a diameter of 24 inches or 30 inches, complete with riser, lid and necessary hardware.

* + - * 1. Attached Access Risers:

Attached access risers shall be PVC or FRP as supplied by tank manufacturer.

Attached access risers shall be 24-inch or 30-inch-diameter

Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.

* + - * 1. Piping and Fittings:

Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.

PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

* + - * 1. Manway Openings:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.

* + - * 1. Ladders:

Ladders shall be the standard FRP ladder as supplied by tank manufacturer.

* + - * 1. Pump Platforms:

FRP pump platforms shall be supplied by tank manufacturer.

* + - * 1. Internal Piping

All internal piping shall be supplied by tank manufacturer.

All FRP nozzles for fire pump supply shall have an anti-vortex plate factory installed.

* + - * 1. Suction/Fill tubes:

Vertical draft/fill tubes shall be a minimum of PVC SCH 40 or FRP.

Vertical draft /fill tubes shall be factory installed.

Vertical draft /fill tubes shall terminate 4 inches (102 mm) above the bottom of tank.

Vertical draft tubes shall have anti-vortex plate factory installed.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Potable Water Storage Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
          3. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects. Tank shall be NSF/ANSI Standard 61 listed and labeled.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if the project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Single-Wall vessel as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Double-Wall vessel as specified and shown on the drawings.
         1. Interstitial Space (Double-Wall tanks only):

The interstitial space between the primary and secondary walls shall be constructed with a glass reinforcement material such as Parabeam, which provides a structural bond between the two tank walls, while creating a defined interstice that allows for free flow of liquid.

A tank top fitting shall be provided to allow for a monitoring sensor to be installed at the bottom of the interstice.

The interstice of the tank shall be designed to withstand 20-psig (138 kPa) pressure.

* + - 1. Tank Accessories - Potable Water Storage Applications:
         1. Tank Anchoring:

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the tank manufacturer.

Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Manway Openings:

Potable water tank shall have at least one manway opening.

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.

Manway extensions shall be FRP and shall be supplied by tank manufacturer.

* + - * 1. Piping and Fittings:

Tank shall be equipped with internal factory-installed piping that meets NSF/ANSI Standard 61.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

* + - * 1. Suction/Fill Tubes:

Suction/fill tubes shall be manufactured with materials listed under NSF/ANSI Standard 61 and factory installed.

Suction/fill tubes shall terminate 4 inches (102 mm) above the bottom of the tank.

* + - * 1. Ladders:

Ladders shall be the standard FRP ladder listed under NSF/ANSI Standard 61 as supplied by tank manufacturer.

* + - * 1. Pump Platforms:

Pump platforms shall be the pump platform listed under NSF/ANSI Standard 61 as supplied by tank manufacturer.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Onsite Wastewater Storage Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. IAPMO/ANSI Z1000 - Prefabricated Septic Tanks. Tank shall be IAPMO/ANSI Z1000 listed and labeled.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete the following two standards if the project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
        2. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to CSA B-66 Prefabricated Septic and Sewage Holding Tanks.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Single-Wall vessel as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Double-Wall vessel as specified and shown on the drawings.
         1. Interstitial Space (Double-Wall tanks only):

The interstitial space between the primary and secondary walls shall be constructed with a glass reinforcement material such as Parabeam, which provides a structural bond between the two tank walls, while creating a defined interstice that allows for free flow of liquid.

A tank top fitting shall be provided to allow for a monitoring sensor to be installed at the bottom of the interstice.

The interstice of the tank shall be designed to withstand 20-psig (138 kPa) pressure.

* + - 1. Tank Accessories - Onsite Wastewater Storage Applications:
         1. Tank Anchoring:

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the tank manufacturer.

Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Access Openings:

All access openings shall have a diameter of 24 inches or 30 inches (610 mm or 762 mm), complete with riser, lid and necessary hardware.

* + - * 1. Attached Access Risers:

Attached access risers shall be PVC or FRP as supplied by tank manufacturer.

Attached access risers shall be a 24 inches or 30 inches (610 mm or 762 mm) diameter.

Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.

* + - * 1. Piping and Fittings:

Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.

PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

* + - * 1. Manway Openings:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.

* + - * 1. Ladders:

Ladders shall be the standard FRP ladder as supplied by tank manufacturer.

* + - * 1. Baffles and Partitions:

Baffles and Partitions shall be capable of withstanding hydrostatic loads occurring when one compartment is empty and the remaining compartment(s) is full.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Grease Interceptor Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. IAPMO/ANSI Z1001 - Prefabricated Gravity Grease Interceptors. Tank shall be IAPMO/ANSI Z1001 listed and labeled.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if the project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Single-Wall vessel as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Double-Wall vessel as specified and shown on the drawings.
         1. Interstitial Space (Double-Wall Tanks only):

The interstitial space between the primary and secondary walls shall be constructed with a glass reinforcement material such as Parabeam, which provides a structural bond between the two tank walls, while creating a defined interstice that allows for free flow of liquid.

A tank top fitting shall be provided to allow for a monitoring sensor to be installed at the bottom of the interstice.

The interstice of the tank shall be designed to withstand 20-psig (138 kPa) pressure.

* + - 1. Accessories - Grease Interceptor Applications:
         1. Interceptor Anchoring

Anchor straps shall be as supplied by interceptor manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the interceptor manufacturer.

Prefabricated concrete anchors shall be supplied by the interceptor manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Access Openings:

All access openings shall have a diameter of 24 inches or 30 inches (610 mm or 762 mm), complete with riser, lid and necessary hardware.

* + - * 1. Attached Access Risers:

Attached access risers shall be PVC or FRP as supplied by interceptor manufacturer.

Attached access risers shall be 24 inches or 30 inches (610 mm or 762 mm) diameter.

Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the interceptor manufacturer.

* + - * 1. Piping and Fittings:

Interceptor shall be equipped with factory-installed threaded fittings, or pipe stubs.

PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

* + - * 1. Manway Openings:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.

* + - * 1. Ladders:

Ladders shall be the standard FRP ladder as supplied by interceptor manufacturer.

* + - * 1. Baffles and Partitions:

Baffles and Partitions shall be capable of withstanding hydrostatic loads occurring when one compartment is empty and the remaining compartment(s) is full.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Oil /Water Separator Applications:
       1. Governing Standards, as applicable:
          1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete the following six standards if project is not in the U.S.

* + - * 1. NFPA 30: Flammable and Combustible Liquids Code.
        2. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
        3. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
        4. U.S. Coast Guard Test Method 46 CFR 162.050
        5. Underwriters Laboratories (UL) Subject 2215 - Outline of Investigation for Oil/Water Separators. Tank shall be Underwriters Laboratories (UL) Subject 2215 listed and labeled.
        6. Underwriters Laboratories (UL) Standard for Safety 1316 Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.

\*\* NOTE TO SPECIFIER \*\* Delete the following two standards if the project is not in Canada.

* + - * 1. ULC S615 - Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids.
        2. National Fire Code of Canada.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Single-Wall vessel as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Double-Wall vessel as specified and shown on the drawings.
         1. Interstitial Space (Double-Wall tanks only):

The interstitial space between the primary and secondary walls shall be constructed with a glass reinforcement material such as Parabeam, which provides a structural bond between the two tank walls, while creating a defined interstice that allows for free flow of liquid.

A tank top fitting shall be provided to allow for a monitoring sensor to be installed at the bottom of the interstice.

The interstice of the tank shall be designed to withstand 20-psig (138 kPa) pressure.

* + - 1. Tank Accessories - Oil /Water Separator Applications:
         1. Separator Anchoring

Anchor straps shall be as supplied by the manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the manufacturer.

Prefabricated concrete anchors shall be supplied by the manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Manways:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

* + - * 1. Threaded Fittings:

All threaded fittings shall be NPT half or full couplings, in 2 inches, 4 inches or 6 inches (51 mm, 102 mm, 152 mm) diameters.

Fittings shall be installed on the separator-top centerline or in the cover of the manway.

Duplex fittings shall be located on each side of the separator's centerline.

* + - * 1. Containment Collars and Sumps:

The separator shall have factory installed 42 inches or 48 inches (1067 mm or 1219 mm) diameter containment collars.

Containment sumps in 42 inches or 48 inches (1067 mm or 1219 mm) diameter shall be provided by the separator manufacturer and designed for mounting on the containment collars.

Adhesive shall be provided by the tank manufacturer with each containment collar and sump.

Containment collars and sumps shall be designed and supplied as a containment system. Only sumps provided by the manufacturer shall be allowed.

* + - * 1. Flanged Fiberglass Nozzles for Separators:

All separators shall be equipped with one FRP, factory-installed, flanged inlet nozzle.

All separators shall be equipped with one FRP, factory-installed, flanged outlet nozzle and clean-water collector.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

* + - * 1. Sludge Baffle:

All separators shall have a FRP grate on which the coalescer packs will be placed to keep sludge build-up from interfering with the coalescer media.

* + - * 1. Electronic Liquid-Level Monitoring System:

General:

All UL-listed separators shall have an electronic liquid-level monitoring system, including a controller and a sensor.

The liquid-level monitoring system shall be included in the OWS design and shipped with the separator from the manufacturing facility. Only Omntec model LU2-OWP shall be used.

Materials:

The controller shall be UL-listed and shall have a NEMA 4X, weatherproof, corrosion-resistant enclosure.

Requirements:

The controller shall have an audio-visual alarm activated by a float sensor.

The controller shall provide for automatic pump-out capability.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Industrial Wastewater and Chemical Storage Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if the project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.
      1. Tank Design: The tank shall be designed as a Double-Wall vessel as specified and shown on the drawings.
         1. Interstitial Space:

The interstitial space between the primary and secondary walls shall be constructed with a glass reinforcement material such as Parabeam, which provides a structural bond between the two tank walls, while creating a defined interstice that allows for free flow of liquid.

A tank top fitting shall be provided to allow for a monitoring sensor to be installed at the bottom of the interstice.

The interstice of the tank shall be designed to withstand 20-psig (138 kPa) pressure.

* + - 1. Tank Accessories - Industrial Wastewater and Chemical Storage Applications:
         1. Tank Anchoring:

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the tank manufacturer.

Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Access Openings:

All access openings shall have a diameter of 24 inches or 30 inches (610 mm or 762 mm), complete with riser, lid and necessary hardware.

* + - * 1. Attached Access Risers:

Attached access risers shall be PVC or FRP as supplied by tank manufacturer.

Attached access risers shall be 24 inches or 30 inches (610 mm or 762 mm) diameter.

Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.

* + - * 1. Piping and Fittings:

Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.

PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

* + - * 1. Manway Openings:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

Manway openings shall be designed to withstand 5-psig (35 kPa) test pressure with a 5:1 safety factor.

* + - * 1. Containment Collars and Sumps:

The tank shall have factory installed 42 inches or 48 inches (1067 mm or 1219 mm)-diameter containment collars.

Containment sumps in 42 inches or 48 inches (1067 mm or 1219 mm) diameter shall be provided by the tank manufacturer and designed for mounting on the containment collars.

Adhesive shall be provided by the tank manufacturer with each containment collar and sump.

Containment collars and sumps shall be designed and supplied as a containment system. Only sumps provided by the manufacturer shall be allowed.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. UNDERGROUND PETROLEUM TANKS
     1. Tank Design - Fiberglass reinforced plastic (FRP) tanks:

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Double wall vessel as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Triple wall vessel as specified and shown on the drawings.
      2. The tank size, fittings and accessories shall be as shown on the drawings.
      3. Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
      4. Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
      5. Tank shall be vented to atmospheric pressure.
      6. Tank shall be capable of handling liquids with specific gravity up to 1.1
      7. Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.
    1. Loading Conditions - Tank shall meet the following design criteria:
       1. Internal Load Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test with a 5:1 safety factor.
       2. Surface Loads Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
       3. External Hydrostatic Pressure for Underground Water Tank Tank shall be designed for 7 feet of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.
    2. Interstitial Space:
       1. The interstitial space between the primary and secondary walls shall be constructed with a glass reinforcement material such as Parabeam, which provides a structural bond between the two tank walls, while creating a defined interstice that allows for free flow of liquid.
       2. A tank top fitting shall be provided to allow for a monitoring sensor to be installed at the bottom of the interstice.
       3. The interstice of the tank shall be designed to withstand 20-psig (138 kPa) pressure.
    3. Tank Monitoring System:
       1. General:
          1. Tank shall be continuously monitored with TRUCHEK hydrostatic leak monitoring system.
          2. The continuous monitoring system shall include monitoring fluid factory-installed in the interstitial space and within a fiberglass tank-top mounted reservoir.
          3. The monitoring system shall be recognized by the National Work Group on Leak Detection Evaluations (NWGLDE) as continuous leak detection and as a precision tank test.
          4. The monitoring system shall be independently tested by a qualified third-party and verified to be capable of detecting leaks as small as .05 per hour when proper tank tightness test procedures are followed.
       2. Design:
          1. The continuous monitoring system shall be designed to detect a leak in either the primary or secondary wall at all times, regardless of the water table conditions at the installation site.
          2. The interstice of the tank shall be designed for a 5:1 safety factor beyond normal hydrostatic operating pressure to ensure structural integrity and to prevent false leak alarms.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Fuel Storage Applications:
       1. Governing Standards, as applicable:
          1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete the following four standards if project is not in the U.S.

* + - * 1. NFPA 30: Flammable and Combustible Liquids Code.
        2. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
        3. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
        4. Underwriters Laboratories (UL) Standard for Safety 1316 Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. City of New York Department of Buildings M.E.A.

\*\* NOTE TO SPECIFIER \*\* Delete the following three standards if the project is not in Canada.

* + - * 1. ULC S615 - Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids.
        2. National Fire Code of Canada.
        3. CCCME PN1326, Canadian Council of Ministers of the Environment - Environmental Code of Practice for Aboveground and Underground Storage Systems Containing Petroleum and Allied Petroleum Products.
      1. Tank Accessories - Fuel Storage Applications:
         1. Tank Anchoring:

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the tank manufacturer.

Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Manways:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

* + - * 1. Threaded Fittings:

All threaded fittings shall be NPT half or full couplings, in 2 inches (51 mm), 4 inches (102 mm) and 6 inches (152 mm) diameters.

Fittings shall be installed on the tank-top centerline or in the cover of the manway.

* + - * 1. Containment Collars and Sumps:

The tank shall have factory installed 42 inches or 48 inches (1067 mm or 1219 mm)-diameter containment collars.

Containment sumps in 42 inches or 48 inches (1067 mm or 1219 mm) diameter shall be provided by the tank manufacturer and designed for mounting on the containment collars.

Adhesive shall be provided by the tank manufacturer with each containment collar and sump.

Containment collars and sumps shall be designed and supplied as a containment system. Only sumps provided by the manufacturer shall be allowed.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Diesel Exhaust Fluid (DEF) Applications:
       1. Governing Standards, as applicable:
          1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
          2. ISO 22241-1: Diesel engines -- NOx reduction agent AUS 32 -- Part 1: Quality requirements.

\*\* NOTE TO SPECIFIER \*\* Delete the following three standards if project is not in the U.S.

* + - * 1. NFPA 30: Flammable and Combustible Liquids Code.
        2. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
        3. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
        4. Underwriters Laboratories (UL) Standard for Safety 1316 Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. City of New York Department of Buildings M.E.A.

\*\* NOTE TO SPECIFIER \*\* Delete the following two standards if the project is not in Canada.

* + - * 1. ULC S615 - Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids.
        2. National Fire Code of Canada.
      1. Tank Accessories - Diesel Exhaust Fluid (DEF) Applications:
         1. Tank Anchoring

Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the tank manufacturer.

Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Containment Collars and Sumps:

The tank shall have factory installed 42 inches or 48 inches (1067 mm or 1219 mm)-diameter containment collars.

Containment sumps in 42 inches or 48 inches (1067 mm or 1219 mm) diameter shall be provided by the tank manufacturer and designed for mounting on the containment collars.

Adhesive shall be provided by the tank manufacturer with each containment collar and sump.

Containment collars and sumps shall be designed and supplied as a containment system. Only sumps provided by the manufacturer shall be allowed.

* + - * 1. Manways:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and include a stainless steel cover.

* + - * 1. Threaded Fittings:

All threaded tank wall fittings shall be stainless steel NPT half or full couplings, in 2 inches (51 mm), 4 inches (102 mm) and 6 inches (152 mm) diameters.

Fittings shall be installed on the tank-top centerline or in the cover of the manway.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Oil /Water Separator Applications:
       1. Governing Standards, as applicable:
          1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete the following five standards if project is not in the U.S.

* + - * 1. NFPA 30: Flammable and Combustible Liquids Code.
        2. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
        3. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
        4. U.S. Coast Guard Test Method 46 CFR 162.050
        5. Underwriters Laboratories (UL) Subject 2215 - Outline of Investigation for Oil/Water Separators. Tank shall be Underwriters Laboratories (UL) Subject 2215 listed and labeled.
        6. Underwriters Laboratories (UL) Standard for Safety 1316 Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.

\*\* NOTE TO SPECIFIER \*\* Delete the following three standards if the project is not in Canada.

* + - * 1. ULC S615 - Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids.
        2. National Fire Code of Canada.
        3. CCCME PN1326, Canadian Council of Ministers of the Environment - Environmental Code of Practice for Aboveground and Underground Storage Systems Containing Petroleum and Allied Petroleum Products.
      1. Tank Accessories - Oil /Water Separator Applications:
         1. Separator Anchoring:

Anchor straps shall be as supplied by the manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the manufacturer.

Prefabricated concrete anchors shall be supplied by the manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Manways:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

* + - * 1. Threaded Fittings:

All threaded fittings shall be NPT half or full couplings, in 2 inches (51 mm), 4 inches (102 mm) and 6 inches (152 mm) diameters.

Fittings shall be installed on the separator-top centerline or in the cover of the manway.

Duplex fittings shall be located on each side of the separator's centerline.

* + - * 1. Containment Collars and Sumps:

The separator shall have factory installed 42 inches or 48 inches (1067 mm or 1219 mm) diameter containment collars.

Containment sumps in 42 inches or 48 inches (1067 mm or 1219 mm) diameter shall be provided by the separator manufacturer and designed for mounting on the containment collars.

Adhesive shall be provided by the tank manufacturer with each containment collar and sump.

Containment collars and sumps shall be designed and supplied as a containment system. Only sumps provided by the manufacturer shall be allowed.

* + - * 1. Electronic Liquid-Level Monitoring System:

General:

All UL-listed separators shall have an electronic liquid-level monitoring system, including a controller and a sensor.

The liquid-level monitoring system shall be included in the OWS design and shipped with the separator from the manufacturing facility. Only Omntec model LU2-OWP shall be used.

Materials:

The controller shall be UL-listed and shall have a NEMA 4X, weatherproof, corrosion-resistant enclosure.

Requirements:

The controller shall have an audio-visual alarm activated by a float sensor.

The controller shall provide for automatic pump-out capability.

* + - * 1. Flanged Fiberglass Nozzles for Separators:

All separators shall be equipped with one FRP, factory-installed, flanged inlet nozzle.

All separators shall be equipped with one FRP, factory-installed, flanged outlet nozzle and clean-water collector.

All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

* + - * 1. Sludge Baffle:

All separators shall have a FRP grate on which the coalescer packs will be placed to keep sludge build-up from interfering with the coalescer media.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Pipeline Sump Tank Applications:
       1. Governing Standards, as applicable:
          1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

\*\* NOTE TO SPECIFIER \*\* Delete the following four standards if project is not in the U.S.

* + - * 1. NFPA 30: Flammable and Combustible Liquids Code.
        2. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
        3. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
        4. Underwriters Laboratories (UL) Standard for Safety 1316 Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. City of New York Department of Buildings M.E.A.

\*\* NOTE TO SPECIFIER \*\* Delete the following three standards if the project is not in Canada.

* + - * 1. ULC S615 - Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids.
        2. National Fire Code of Canada.
        3. CCCME PN1326, Canadian Council of Ministers of the Environment - Environmental Code of Practice for Aboveground and Underground Storage Systems Containing Petroleum and Allied Petroleum Products.
      1. Tank Accessories - Pipeline Sump Tanks Applications:
         1. Tank Anchoring:

Anchor straps shall be as supplied by the manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

Galvanized turnbuckles shall be supplied by the manufacturer.

Prefabricated concrete anchors shall be supplied by the manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

* + - * 1. Manways:

The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

* + - * 1. Manway Extensions:

The standard fiberglass manway extension shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.

The top 3 feet (914 mm) minimum of extension shall be provided with white gel coat exterior finish.

* + - * 1. Threaded Fittings:

All threaded fittings shall be NPT half or full couplings, in 2 inches (51 mm), 4 inches (102 mm) and 6 inches (152 mm) diameters.

Fittings shall be installed on the tank-top centerline or in the cover of the manway.

* + - * 1. Flanged Fiberglass Nozzles:

Flanged fiberglass nozzles shall be flat faced and conform dimensionally to ASME B16.5 "Pipe Flanges and Flanged Fittings", Latest edition.

Maximum bolt torque on FRP flanges is 25 lb-ft (34 NM), unless otherwise noted.

Standard nozzle sizes to be 2 inches (51 mm), 4 inches (102 mm), 6 inches (152 mm), or 8 inches (203 mm) diameters.

All nozzles are to be gusseted. (Gussets shall not interfere with hold down strap locations or flange bolt holes.)

* + - * 1. Nozzle Extensions:

Fiberglass nozzle extensions shall be 2 inches (51 mm), 4 inches (102 mm), 6 inches (152 mm), or 8 inches (203 mm) diameters FRP pipe with standard 2 inches (51 mm), 4 inches (102 mm), 6 inches (152 mm), or 8 inches (203 mm) flanges on both ends. Nozzle extensions shall be shipped loose with installation hardware.

Steel nozzle extensions shall be 2 inches (51 mm), 4 inches (102 mm), 6 inches (152 mm), or 8 inches (203 mm) diameters size pipe meeting ASTM A53, type F, grade A or B, with flanges meeting ASME B 16.5, 150# bolting pattern, on both ends. Nozzle extensions shall be shipped loose with installation hardware.

Nozzle Extensions shall be to length and type.

* + - * 1. Mounting Hardware:

Flange nozzle bolts and nuts shall be provided for the nozzle blind flange, nozzle extension, manway, manway extension, sump and sump extensions. Bolts shall be ASTM A193, Grade B7, and nuts shall be ASTM A-194, Grade 2H.

Gaskets shall be fluorocarbon type FKM, meeting ASTM D1418 standards, and shall be new and shipped loose.

* + - * 1. Containment Collars and Sumps:

The tank shall have factory installed 42 inches or 48 inches (1067 mm or 1219 mm)-diameter containment collars.

Containment sumps in 42 inches or 48 inches (1067 mm or 1219 mm) diameter shall be provided by the tank manufacturer and designed for mounting on the containment collars, shall be supplied.

Adhesive shall be provided by the tank manufacturer with each containment collar and sump.

Containment collars and sumps shall be designed and supplied as a containment system. Only sumps provided by the manufacturer shall be allowed.

* + - * 1. Stinger Piping:

Stingers shall be constructed of FRP pipe matching the diameter of the flange nozzle and cut at 45 degree angle 12 inches (305 mm) off tank bottom.

Stainless steel stingers shall be a 6 inches (152 mm) flange x 3 inches (76 mm) pipe, Schedule 40, Type 316 and cut at 45 degree angle 12 inches (305 mm) off tank bottom.

Stingers shall be to length and type.

* + - * 1. Vents:

Vent shall be BAYCO 3 inches (76 mm) Station Vent #49 or approved equal.

* + - * 1. Gauge Hatch:

Hatch shall be a 4 inches (102 mm) or 8 inches (203 mm) VAREC Gauge Hatch or approved equal.

* + - * 1. Tank Upload Connection:

Tank upload connection shall be a Dixon 3 inches (76 mm) Stainless Steel quick Coupling with a 3 inches (76 mm) Dust Plug or approved equal.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. ABOVEGROUND TANKS
     1. Tank Design - Fiberglass reinforced plastic (FRP) tanks:

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Single-Wall vessel as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Design: Double-Wall vessel as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Configuration: Aboveground Storage Tank Horizontal (AST-H) configurations shall be as specified and shown on the drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Tank Configuration: Aboveground Storage Tank Vertical (AST-V) configurations shall be as specified and shown on the drawings.
      2. The tank size, fittings and accessories shall be as shown on the drawings.
      3. Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.
      4. Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
      5. Tank shall be vented to atmospheric pressure.
      6. Tank shall be capable of handling liquids with specific gravity up to 1.1
      7. Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.
    1. Loading Conditions - Tank shall meet the following design criteria:

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Internal Load - AST-H Tank shall be designed to withstand a 5-psig (35 kPa) air-pressure test short term and only for testing with a 5:1 safety factor.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Internal Load - AST-V tanks shall be designed to withstand a full hydrostatic load with a 2:1 safety factor.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Saddle Design - AST-H:
       1. Saddles shall be constructed of fiberglass or steel with epoxy coating.
       2. Steel saddles shall be a cradle design to support the tank and shall be shipped separate from the tank.
       3. Fiberglass saddles shall be factory mounted to tank.
       4. Number of saddles and saddle material determined by manufacturer as shown on submittal drawings.

\*\* NOTE TO SPECIFIER \*\* Delete if Double-Wall tanks not required.

* + 1. Interstitial Space (Double-Wall tanks only):
       1. The interstitial space between the primary and secondary walls shall be constructed with a glass reinforcement material such as Parabeam, which provides a structural bond between the two tank walls, while creating a defined interstice that allows for free flow of liquid.
       2. A tank top fitting shall be provided to allow for a monitoring sensor to be installed at the bottom of the interstice.
       3. The interstice of the tank shall be designed to withstand 20-psig (138 kPa) pressure.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Accessories - Aboveground Tank Applications:
       1. Piping and Fittings

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. AST-V tanks shall be equipped with factory-installed threaded fittings, or fiberglass nozzles.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. AST-H tanks shall be equipped with factory-installed threaded fittings, or fiberglass nozzles.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. PVC piping (AST-H) shall at a minimum meet the requirements of ANSI Schedule 40.
        2. All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.
        3. Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.
      1. Manway Openings:
         1. The standard manway shall be flanged, 22 inches (559 mm) I.D. and complete with gaskets, bolts and cover.
      2. Ladders:
         1. Ladders shall be the standard FRP, aluminum or NSF-61 approved ladder as supplied by tank manufacturer.
      3. Tank Anchoring:
         1. Number and location of tie-down lugs to be standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Rainwater Harvesting / Stormwater Detention Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Fire Protection Standby Water Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

\*\* NOTE TO SPECIFIER \*\* Delete the following three standards if project is not in the U.S.

* + - * 1. NFPA 22: Standard for Water Tanks for Private Fire Protection.
        2. NFPA 1142: Standard for Water Supplies for Suburban and Rural Fire Fighting.
        3. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Potable Water Storage Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects. Tank shall be NSF/ANSI Standard 61 listed and labeled.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Onsite Wastewater Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. IAPMO/ANSI Z1000 - Prefabricated Septic Tanks. Tank shall be IAPMO/ANSI Z1000 listed and labeled.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Grease Interceptors Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. IAPMO/ANSI Z1001 - Prefabricated Gravity Grease Interceptors. Tank shall be IAPMO/ANSI Z1001 listed and labeled.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Oil /Water Separators Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

\*\* NOTE TO SPECIFIER \*\* Delete the following two standards if project is not in the U.S.

* + - * 1. Underwriters Laboratories (UL) Subject 2215 - Outline of Investigation for Oil/Water Separators.
        2. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Industrial Wastewater and Chemical Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Diesel Exhaust Fluid (DEF) Applications:
       1. Governing Standards, as applicable:
          1. ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.
          2. ISO 22241-1: Diesel engines -- NOx reduction agent AUS 32 -- Part 1: Quality requirements.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in the U.S.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories (UL) as a manufacturer of tanks listed to the UL 1316 standard.

\*\* NOTE TO SPECIFIER \*\* Delete if project is not in Canada.

* + - * 1. Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

1. EXECUTION
   1. TESTING
      1. Tank shall be tested according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.
   2. INSTALLATION
      1. Tank shall be installed according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

END OF SECTION