SECTION 221363 - FACILITY GRAY-WATER STORAGE TANKS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
   * + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      1. SUMMARY
         1. Section Includes:

Steel, pressure, water storage tank.

Steel, nonpressure, water storage tank.

Insulated, steel, water storage tanks.

Plastic, pressure, water storage tank.

Plastic, nonpressure, water storage tanks.

* + - 1. SUBMITTALS

Do not ask for manufacturer's specifications, material safety data sheets, installation instructions, and similar items that may conflict with specification requirements or needlessly involve Architect in Contractor's means and methods of construction.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        2. Manufacturer’s installation instructions shall be provided along with product data.
        3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
        4. Product Data: For each type of product.

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for gray-water storage tanks.

Include rated capacities, operating characteristics, [**electrical characteristics,**]and furnished specialties and accessories.

Include Shop Drawings only for work that involves custom fabrication or if Shop Drawings are typically prepared to assist in the performance of the work involved.

* + - * 1. Shop Drawings:

Include plans, elevations, sections, and [**mounting**] [**attachment**] details.

Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Detail fabrication and assembly of <**Insert portion of Work**>.

Include diagrams for power, signal, and control wiring.

Retain "Delegated-Design Submittal" paragraph below if design services have been delegated to Contractor.

* + - * 1. Delegated-Design Submittal: For facility gray-water storage tanks.

Include design calculations for selecting vibration isolators[**and seismic restraints**] and for designing vibration isolation bases.

Retain "Seismic Qualification Certificates" paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment." See ASCE/SEI 7 for certification requirements for equipment and components.

* + - * 1. Seismic Qualification Certificates: For gray-water storage tanks, accessories, and components, from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

Retain "Welding certificates" paragraph below if retaining "Welding Qualifications" paragraph in "Quality Assurance" Article.

* + - * 1. Welding certificates.
      1. CLOSEOUT SUBMITTALS
         1. Maintenance Data: For gray-water storage tanks to include in maintenance manuals.
      2. QUALITY ASSURANCE
         1. Fabricator Qualifications: Employ a qualified structural Director’s Representative to prepare calculations, Shop Drawings, and other structural data for fabrication and erection of surface water-storage tanks.

Engineering Responsibility: Preparation of data for surface water-storage tanks, accessories, specified appurtenances, and concrete supports and foundations, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

Retain "Welding Qualifications" paragraph below if shop or field welding is required. If retaining, also retain "Welding certificates" paragraph in "Informational Submittals" Article.

* + - * 1. Welding Qualifications: Qualify procedures and personnel according to the following:

AWS D1.1, "Structural Welding Code - Steel."

AWS D1.3, "Structural Welding Code - Sheet Steel."

AWS D1.4, "Structural Welding Code - Reinforced Steel."

* + - * 1. Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. PERFORMANCE REQUIREMENTS

Retain "Delegated Design" paragraph below if Contractor is required to assume responsibility for design.

* + - * 1. Delegated Design: Engage a qualified professional Director’s Representative to design facility gray-water storage tanks.

Revise wind load in "Structural Performance" paragraph below to suit local conditions.

* + - * 1. Structural Performance: Surface water-storage tank, including structural reinforcement and foundation, shall be capable of withstanding the effects of dead and live gravity loads and winds of [**100 mph**] <**Insert value**>.

Retain "Seismic Performance" paragraph below with "Seismic Qualification Certificates" paragraph in "Informational Submittals" Article for projects requiring seismic design. Delete paragraph if performance requirements are indicated on Drawings. Model building codes and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions. Coordinate requirements with structural engineer.

* + - * 1. Seismic Performance: Surface water-storage tank, including structural reinforcement and foundation, withstand the effects of earthquake motions determined according to [**ASCE/SEI 7**] <**Insert requirement**>.

Retain subparagraph below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Last option is used for essential facilities where equipment must operate immediately after an earthquake.

The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

For life-safety components required to function after an earthquake (such as fire-sprinkler systems, components that contain hazardous content, and storage racks in structures open to the public), the Component Importance Factor is 1.5. For other components, the Component Importance Factor is 1.0 unless the structure is in Seismic Use Group III and component is necessary for continued operation of facility or failure of component could impair continued operation of facility, in which case the Component Importance Factor is 1.5.

Component Importance Factor: [**1.5**] [**1.0**].

* + - * 1. Thermal Movements: Surface water-storage tank, including structural reinforcement and foundation, shall allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

Differential values in "Temperature Change" Subparagraph below (for aluminum in particular) are suitable for most of the U.S.

Temperature Change: [**120 deg F, ambient; 180 deg F, material surfaces**] <**Insert temperature change**>.

Retain one or more of five paragraphs below for surface water-storage tanks.

Retain first paragraph below only for welded-steel, surface water-storage tanks.

* + - * 1. Comply with AWWA D100, "Welded Steel Tanks for Water Storage," and with AWWA M42, "Steel Water-Storage Tanks."

Retain first paragraph below only for concrete, surface water-storage tanks with steel diaphragm.

* + - * 1. Comply with AWWA D110, "Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks."

Retain first paragraph below only for cast-in-place-concrete, surface water-storage tanks with vertical prestressed reinforcement.

* + - * 1. Comply with AWWA D110, "Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks."

Retain first paragraph below only for concrete, surface water-storage tanks with circumferential tendons.

* + - * 1. Comply with AWWA D115, "Tendon-Prestressed Concrete Water Tanks."
        2. Comply with AWWA D120, "Thermosetting Fiberglass-Reinforced Plastic Tanks."
      1. STEEL, PRESSURE, WATER STORAGE TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11340) Subject to compliance with requirements, [**provide products by the following**] [**provide products by one of the following**] [**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

[A. O. Smith Corporation](http://www.specagent.com/Lookup?uid=123457132518).

[Adamson Global Technology](http://www.specagent.com/Lookup?uid=123457132505).

[Aldrich Company, Inc. (The)](http://www.specagent.com/Lookup?uid=123457132506).

[Bradford White Corporation](http://www.specagent.com/Lookup?uid=123457132507).

[Cemline Corporation](http://www.specagent.com/Lookup?uid=123457132508).

[Flo Fab Inc](http://www.specagent.com/Lookup?uid=123457132509).

[GSW Water Heating](http://www.specagent.com/Lookup?uid=123457132510).

[Green Boiler Technologies](http://www.specagent.com/Lookup?uid=123457132524).

[HESCO Bastion Ltd](http://www.specagent.com/Lookup?uid=123457132511).

[Lochinvar, LLC](http://www.specagent.com/Lookup?uid=123457132512).

[PVI; A WATTS Brand](http://www.specagent.com/Lookup?uid=123457132514).

[Precision Boilers](http://www.specagent.com/Lookup?uid=123457132513).

[RBI](http://www.specagent.com/Lookup?uid=123457132516).

[RECO USA](http://www.specagent.com/Lookup?uid=123457132517).

[State Industries](http://www.specagent.com/Lookup?uid=123457132519).

[Weben-Jarco, Inc](http://www.specagent.com/Lookup?uid=123457132520).

[Wendland Manufacturing Corp](http://www.specagent.com/Lookup?uid=123457132521).

[Wessels Company](http://www.specagent.com/Lookup?uid=123457132522).

[Wood, John Co](http://www.specagent.com/Lookup?uid=123457132523).

Approved equivalent.

* + - * 1. Description: Steel, [**horizontal**] [**vertical**], pressure-rated tank with cylindrical sidewalls.

Retain first paragraph below for projects in seismic areas.

* + - * 1. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
        2. Construction: [**ASME code, steel**] [**Steel**], constructed with nontoxic welded joints, for [**125-psig**] [**150-psig**] <**Insert value**> working pressure.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter; same pressure rating as tank.

Retain second option in "Tappings" paragraph below if ASME label is required.

* + - * 1. Tappings: Factory-fabricated[**stainless**] steel, welded to tank[**before testing and labeling**].

NPS 2 and Smaller: ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, with female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Retain specialties in subparagraphs below to suit Project.

Pressure relief valve.

Pressure gage.

Thermometer.

Air-charging connection.

Gage glass, brass fittings, compression stops, and gage-glass guard.

Retain "Horizontal Tank Supports" paragraph below or specify cast-in-place concrete saddles and indicate on Drawings. Retain option if ASME label is required.

* + - * 1. Horizontal Tank Supports: Factory-fabricated steel saddles, welded to tank[**before testing and labeling**].

Retain option in "Vertical Tank Supports" paragraph below if ASME label is required.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or steel skirt, welded to tank[**before testing and labeling**].

Retain "Exterior Coating" paragraph below to require tanks to have exterior coating.

* + - * 1. Exterior Coating: [**Galvanized**] [**Manufacturer's standard enamel paint**] [**Primer paint**] <**Insert coating**>.
      1. STEEL, NONPRESSURE, WATER STORAGE TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11341) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Adamson Global Technology](http://www.specagent.com/Lookup?uid=123457132525).

[Highland Tank & Manufacturing Company, Inc](http://www.specagent.com/Lookup?uid=123457132526).

[RECO USA](http://www.specagent.com/Lookup?uid=123457132527).

[Steel Tank and Fabricating Corporation (STAFCO)](http://www.specagent.com/Lookup?uid=123457132528).

[Wood, John Co](http://www.specagent.com/Lookup?uid=123457132529).

Approved equivalent.

* + - * 1. Description: Steel, [**horizontal**] [**vertical**], nonpressure-rated tank with cylindrical sidewalls.

Retain first paragraph below for projects in seismic areas.

* + - * 1. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
        2. Construction: Steel, constructed with nontoxic welded joints.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter.
        2. Cover for Open Tank: [**Plastic**] [**Steel, with lining same as or similar to tank lining and**] with shape that encloses top of tank.
        3. Tappings: Factory-fabricated[**stainless**] steel, welded to tank.

NPS 2 and Smaller: ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, with female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Retain specialties in subparagraphs below to suit Project.

Vacuum relief valve.

Free air vent with insect screen.

Thermometer.

Gage glass, brass fittings, compression stops, and gage-glass guard.

Retain "Horizontal Tank Supports" paragraph below or specify cast-in-place concrete saddles and indicate on Drawings. Retain option if ASME label is required.

* + - * 1. Horizontal Tank Supports: Factory-fabricated steel saddles, welded to tank[**before testing and labeling**].

Retain option in "Vertical Tank Supports" paragraph below if ASME label is required.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or steel skirt, welded to tank[**before testing and labeling**].

Retain "Exterior Coating" paragraph below to require tanks to have exterior coating.

* + - * 1. Exterior Coating: [**Galvanized**] [**Manufacturer's standard enamel paint**] [**Primer paint**] <**Insert coating**>.
      1. INSULATED, STEEL, WATER STORAGE TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11342) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[A. O. Smith Corporation](http://www.specagent.com/Lookup?uid=123457132538).

[GSW Water Heating](http://www.specagent.com/Lookup?uid=123457132530).

[HESCO Bastion Ltd](http://www.specagent.com/Lookup?uid=123457132531).

[Laars Heating Systems Company; a subsidiary of Bradford White Corporation](http://www.specagent.com/Lookup?uid=123457132532).

[Lochinvar, LLC](http://www.specagent.com/Lookup?uid=123457132533).

[PVI; A WATTS Brand](http://www.specagent.com/Lookup?uid=123457132535).

[Precision Boilers](http://www.specagent.com/Lookup?uid=123457132534).

[RBI](http://www.specagent.com/Lookup?uid=123457132536).

[State Industries](http://www.specagent.com/Lookup?uid=123457132539).

[Vaughn Thermal Corporation](http://www.specagent.com/Lookup?uid=123457132540).

[Wessels Company](http://www.specagent.com/Lookup?uid=123457132541).

Approved equivalent.

* + - * 1. Description: Steel, vertical, pressure-rated tank with cylindrical sidewalls.

Retain first paragraph below for projects in seismic areas.

* + - * 1. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
        2. Construction: [**ASME code, steel**] [**Steel**], constructed with nontoxic welded joints, for [**125-psig**] [**150-psig**] <**Insert value**> working pressure.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter; same pressure rating as tank.

Retain second option in "Tappings" paragraph below if ASME label is required.

* + - * 1. Tappings: Factory-fabricated[**stainless**] steel, welded to tank[**before testing and labeling**].

NPS 2 and Smaller: ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, with female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Retain specialties in subparagraphs below to suit Project.

Pressure relief valve.

Pressure gage.

Thermometer.

Air-charging connection.

Gage glass, brass fittings, compression stops, and gage-glass guard.

Retain option in "Vertical Tank Supports" paragraph below if ASME label is required.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or steel skirt, welded to tank[**before testing and labeling**].
        2. Insulation: Factory-installed fiberglass or polyurethane foam; surrounding entire tank except connections and other openings; suitable for tank operating temperature; and complying with ASHRAE/IES 90.1 “Energy Standard for Buildings Except Low-Rise Residential Buildings”.
        3. Jacket: Steel, with manufacturer's standard finish unless otherwise indicated.
      1. PLASTIC, PRESSURE, WATER STORAGE TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11343) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Pentair, Inc](http://www.specagent.com/Lookup?uid=123457132542).

[Tankinetics, Inc](http://www.specagent.com/Lookup?uid=123457132543).

Approved equivalent.

* + - * 1. Description: FRP, vertical, pressure-rated tank with cylindrical sidewalls.
        2. Construction: [**ASME code, composite FRP**] [**Composite FRP**], [**contact-molded**] [**or**] [**filament-wound**], thermosetting-resin tank for [**100-psig**] [**125-psig**] [**150-psig**] <**Insert value**> working pressure.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter; same pressure rating as tank.
        2. Tappings: Factory-fabricated, FRP flanged-end nozzle.

NPS 2 and Smaller: Include plastic-to-steel transition fitting from tank nozzle flange to ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Retain specialties in subparagraphs below to suit Project.

Pressure relief valve.

Pressure gage.

Thermometer.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or FRP skirt attached by FRP brackets to tank sidewall.
      1. PLASTIC, NONPRESSURE, WATER STORAGE TANKS

Retain one of first two paragraphs below. Retain first paragraph for tanks fabricated of FRP and second paragraph for tanks fabricated of PE.

* + - * 1. FRP Water Storage Tanks:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=11344) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Amprotec, Inc](http://www.specagent.com/Lookup?uid=123457132545).

[Belding Tank Technologies, Inc](http://www.specagent.com/Lookup?uid=123457132546).

[L. F. Manufacturing, Inc](http://www.specagent.com/Lookup?uid=123457132547).

[Palmer Manufacturing and Tank Company](http://www.specagent.com/Lookup?uid=123457132548).

Approved equivalent.

Description: FRP, vertical, nonpressure-rated water tank.

Construction: [**ASTM D3299 “Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks”, filament-wound**] [**or**] [**ASTM D4097 “Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks”, contact-molded**] FRP.

Tappings: Factory-fabricated, FRP flanged-end nozzle.

NPS 2 and Smaller: Include plastic-to-steel transition fitting from tank nozzle flange to ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, female thread.

[**Exception: Tappings may be threaded FRP coupling integral with nozzle for connections for plastic piping.**]

NPS 2-1/2 and Larger: Flanged.

Retain "Vertical Tank Support" Subparagraph below only if a stand is required.

Vertical Tank Support: Separate factory-fabricated steel stand capable of supporting tank.

* + - * 1. PE Water Storage Tanks:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=11345) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Amprotec, Inc](http://www.specagent.com/Lookup?uid=123457132549).

[Assmann Corporation of America](http://www.specagent.com/Lookup?uid=123457132550).

[Chem-Tainer Industries](http://www.specagent.com/Lookup?uid=123457132551).

[Poly Processing Company](http://www.specagent.com/Lookup?uid=123457132552).

[Premier Plastics Inc](http://www.specagent.com/Lookup?uid=123457132553).

[Snyder Industries, Inc](http://www.specagent.com/Lookup?uid=123457132554).

[Steel Tank and Fabricating Corporation (STAFCO)](http://www.specagent.com/Lookup?uid=123457132555).

[TolPlast Company, Inc](http://www.specagent.com/Lookup?uid=123457132556).

Approved equivalent.

Description: PE, vertical, flat-bottom, nonpressure-rated water tank.

Construction: ASTM D1998 “Standard Specification for Polyethylene Upright Storage Tanks”, molded PE.

Tappings: Factory-fabricated bulkhead fittings attached to tank.

NPS 2 and Smaller: With female thread.

NPS 2-1/2 and Larger: Flanged.

Retain "Vertical Tank Support" Subparagraph below only if a stand is required. Tanks are specified as flat-bottom shape and may be installed directly on a base.

Vertical Tank Support: Separate factory-fabricated steel stand capable of supporting entire bottom of tank.

Retain remaining paragraphs with either tank material retained above.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter.
        2. Cover for Open Tank: Plastic, same as or similar to tank material and with shape that encloses top of tank.
        3. Specialties and Accessories: Include tappings in tank and the following:

Retain specialties in subparagraphs below to suit Project.

Vacuum relief valve.

Free air vent with insect screen.

Thermometer.

Gage glass, brass fittings, compression stops, and gage-glass guard.

* + - 1. PAINT MATERIALS
         1. Paint: Comply with AWWA D102 “Standard for Coating Steel Water-Storage Tanks”.
         2. Primer: Tank fabricator's standard epoxy-polyamide paint.
         3. Tank Shell Exterior Intermediate Paint: Tank fabricator's standard, two-component epoxy paint compatible with prime and finish paint. Intermediate coat shall have a slight color contrast with finish coat.
         4. Tank Shell Exterior Finish Paint: Tank fabricator's standard urethane paint.

Color: [**As selected by Director’s Representative from tank manufacturer's paint chart**] <**Insert color**>.

* + - 1. SHOP PAINTING
         1. Tank Shell Exterior Finish Coat: Factory coating according to AWWA D103 “Standard for Factory-coated Bolted Carbon Steel Tanks for Water Storage”.

1. EXECUTION
   * + 1. INSTALLATION
          1. Install water storage tanks on concrete bases, level and plumb, firmly anchored. Arrange so devices needing servicing are accessible.

Install horizontal tanks on [**concrete piers and factory-fabricated**] [**fabricated steel supports and**] saddles.

* + - * 1. Vertical Water Storage Tanks:

Retain first subparagraph below to require storage tanks to be installed on cast-in-place concrete equipment bases.

Install on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

Retain subparagraph below for projects in seismic areas.

Comply with requirements for vibration isolation and seismic control devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

* + - * 1. Anchor tank supports and tanks to substrate.

Use steel or FRP straps over or around plastic tanks.

Retain first paragraph below if required. Insert special requirements or indicate on Drawings.

* + - * 1. Install tank seismic restraints.
        2. Install thermometers and pressure gages on water storage tanks and piping if indicated. Thermometers and pressure gages are specified in Section 220519 "Meters and Gages for Plumbing Piping."
        3. Install the following devices on tanks:

Pressure relief valves.

Temperature and pressure relief valves.

Vacuum relief valves.

Tank vents on nonpressure tanks.

Connections to accessories.

* + - * 1. After installing tanks with factory finish, inspect finishes and repair damages to finishes.
      1. FIELD QUALITY CONTROL

Retain "Perform the following tests and inspections" paragraph below to require Contractor to perform tests and inspections.

* + - * 1. Perform the following tests and inspections[**with the assistance of a Company Field Advisor per OGS Spec Section 014216**]:

Retain subparagraphs below for welded-steel, surface water-storage tanks.

Tank Weld Test: Use radiographic method according to AWWA D100 “Standard for Welded Carbon Steel Tanks for Water”. Repair failures and retest.

Leak Test: Comply with AWWA D100 “Standard for Welded Carbon Steel Tanks for Water” [**and NFPA 22 “**Standard for Water Tanks for Private Fire Protection**”**]. Fill tanks with water and test for leaks after installation. Repair leaks and retest until no leaks exist.

Water will be furnished by Director’s Representative.

Retain "Leak Test" Subparagraph below for concrete, surface water-storage tanks.

Leak Test: Comply with [AWWA D110 “Standard for Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks”] [AWWA D115 “Standard for Tendon-Prestressed Concrete Water Tanks”] [and NFPA 22 “Standard for Water Tanks for Private Fire Protection”]. Fill tanks with water and test for leaks after installation. Repair leaks and retest until no leaks exist.

Water will be furnished by Director’s Representative.

Retain subparagraph below for all surface water-storage tanks.

Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

* + - * 1. Water storage tanks will be considered defective if they do not pass test and inspections.
        2. Prepare test and inspection reports.

END OF SECTION 221363