SECTION 467319 - DIGESTER APPURTENANCES

Note that this section has only been edited for NYSOGS standardization and has not been technically edited. The designer shall make all technical edits specific to the project for this section.

This Section includes common work requirements for anaerobic digesters used in stabilization processes for wastewater residuals.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Piping.

Valves.

Piping specialties.

Electrical appurtenances.

Waste gas burner.

Flame traps/arrestors.

Sediment traps.

Drip traps.

Gas meters.

Pressure indicating gages.

Gas storage tanks.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section as well as Sections required to describe complete system or assembly requirements.

Section 262419 - Motor-Control Centers: Motor-control centers for electrical appurtenances.

Section 262923 - Variable-Frequency Motor Controllers: Motor-control requirements for electrical appurtenances.

Section 400506 - Couplings, Adapters, and Specials for Process Piping: Expansion joints.

Section 400519 - Ductile Iron Process Pipe: Gas and sludge piping.

Section 400524 - Steel Process Pipe: Other piping as required by this Section.

Section 400561 - Gate Valves: Gate valves as required by this Section.

Section 400562 - Plug Valves: Plug valves as required by this Section.

Section 400565.23 - Swing Check Valves: Check valves as required by this Section.

Section 400567.39 - Pressure-Relief Valves: Pressure relief valves as required by this Section.

Section 400593 - Common Motor Requirements for Process Equipment: Motor requirements for electrical appurtenances.

* + - 1. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

* + - * 1. American Welding Society:

AWS D1.1 - Structural Welding Code - Steel.

* + - * 1. ASME International:

ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.

ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.

ASME Boiler and Pressure Vessel Code (BPVC) Section IV - Heating Boilers.

ASME Boiler and Pressure Vessel Code (BPVC) Section VIII - Pressure Vessels.

ASME Boiler and Pressure Vessel Code (BPVC) Section IX - Welding, Brazing, and Fusing Qualifications.

* + - * 1. ASTM International:

ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.

* + - * 1. CSA Group:

CSA ANSI Z21.15 - Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves.

* + - * 1. FM Global:

Product Certification and Testing.

* + - * 1. Manufacturers Standardization Society of the Valve and Fittings Industry:

MSS SP-78 - Gray Iron Plug Valves Flanged and Threaded Ends.

* + - * 1. UL:

UL - Listing and Classification Marks.

* + - 1. PREINSTALLATION MEETINGS
         1. Convene minimum [**one week**] <**\_\_\_\_\_\_\_\_**> [**weeks**] prior to commencing Work of this Section.
      2. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 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: Submit manufacturer information describing materials of construction, fabrication, and protective coatings.
        5. Shop Drawings: Indicate materials and equipment, including wiring and control diagrams, performance charts and curves, installation and anchoring requirements, fasteners, and other details.
        6. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
        7. Welder Certificates: Certify welders and welding procedures employed on Work, verifying [**ASME**] [**AWS**] <**\_\_\_\_\_\_\_\_**> qualification within previous 12 months.

Include separate Paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions:

Submit detailed instructions on installation requirements, including storage and handling procedures, anchoring, and layout.

Submit installation, selection, and hookup configuration, with pipe and accessory elevations.

Submit hanging and support requirements and recommendations.

* + - * 1. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
        2. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.
        3. Qualifications Statements:

Coordinate following Subparagraphs with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer and installer.

Submit manufacturer's approval of installer.

* + - 1. CLOSEOUT SUBMITTALS
         1. Project Record Documents: Record actual locations and final orientation of equipment and accessories.
      2. QUALITY ASSURANCE

Include this Article to specify compliance with overall reference standards affecting products and installation included in this Section.

In following Paragraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Perform Work according to <**\_\_\_\_\_\_\_\_**> standards.

Include following Paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
      1. QUALIFICATIONS

Coordinate following Paragraphs with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
        2. Installer: Company specializing in performing Work of this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience [**and approved by manufacturer**].
        3. Welders: [**AWS**] [**ASME**] qualified within previous 12 months for employed weld types.
      1. DELIVERY, STORAGE, AND HANDLING
         1. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
         2. Store materials according to manufacturer instructions.
         3. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
         1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

* + - 1. WARRANTY

This Article extends warranty period beyond one year. Extended warranties may increase construction costs and Owner enforcement responsibilities. Specify warranties with caution.

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for digester appurtenances.

1. PRODUCTS
   * + 1. PIPING
          1. Gas:

As specified in Section 400519 - Ductile Iron Process Pipe.

End Connections: Flanged, Class [**125**] <**\_\_\_\_\_\_\_\_**>.

Bolts and Nuts: Comply with ASTM A307, Grade B.

* + - * 1. Sludge:

As specified in Section 400519 - Ductile Iron Process Pipe.

Pipe 4 Inches and Smaller: Thickness Class 51.

Pipe 6 Inches through 24 Inches: Thickness Class 50.

Pipe 30 Inches and Larger: Thickness Class 51.

End Connections: Flanged, Class [**125**] <**\_\_\_\_\_\_\_\_**>.

Bolts and Nuts: Comply with ASTM A307, Grade B.

* + - * 1. All Other Piping:

General service piping as specified in Section 400524 - Steel Process Pipe.

Pipe Smaller than 4 Inches:

End Connections: Screwed.

Fittings: Malleable iron; ASME B16.3.

Pipe 4 Inches and Larger:

End Connections: Flanged, Class 150.

Fittings: Comply with ASME B16.5.

* + - 1. VALVES
         1. Angle:

[**Minimum**] Working Pressure: [**\_\_\_\_\_\_\_\_ psig**] [**As indicated on valve schedule**].

Size: [**\_\_\_\_\_\_\_\_ inches**] [**As indicated in valve schedule**] [**As indicated on Drawings**].

Trim Type:

[**Balanced**] [**Unbalanced**].

Number of Stages: [**As required by service conditions**] <**\_\_\_\_\_\_\_\_**>.

Flow Characteristics: [**Modified**] [**Linear**] [**Equal percentage**].

Operation: [**Spring diaphragm**] [**Piston**] [**Electric motor**] [**Pneumatic**] [**Hydraulic**] actuator.

* + - * 1. Check:

As specified in Section 400565.23 - Swing Check Valves.

Designed to accommodate slurries.

* + - * 1. Gate: As specified in Section 400561 - Gate Valves.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Knife Gate:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=12742&mf=04&src=wd):

DESIGNER TO PROVIDE TWO MANUFACTURERS AND APPROVED EQUIVALENT FOR ALL LISTED PRODUCTS.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Description:

[**Minimum**] Working Pressure: [**\_\_\_\_\_\_\_\_ psig at \_\_\_\_\_\_\_\_ deg. F**] [**As indicated on valve schedule**].

Maximum Fluid Temperature: [**\_\_\_\_\_\_\_\_ deg. F**] [**As indicated on valve schedule**].

Design: Double seated.

Opening: Full port.

End Connections: [**ASME B16.1, B16.5, and B16.42, flanged**] [**Bell and spigot**] [**Mechanical joint**] <**\_\_\_\_\_\_\_\_**>.

Gear Actuator: [**Handwheel**] <**\_\_\_\_\_\_\_\_**>.

Materials:

Sleeve: [**Buna-N**] [**Neoprene**] [**EPDM**] <**\_\_\_\_\_\_\_\_**>.

Body: [**Ductile iron**] [**Steel**] <**\_\_\_\_\_\_\_\_**>.

Gate: [**Type 316 stainless steel**] <**\_\_\_\_\_\_\_\_**>.

Lining: [**Elastomer suitable for process fluid**] <**\_\_\_\_\_\_\_\_**>.

Connecting Hardware: [**Type 316 stainless steel**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Plug:

As specified in Section 400562 - Plug Valves.

Comply with MSS SP-78.

* + - * 1. Gas Shutoff Valves:

Comply with CSA ANSI Z21.15.

Valves 2 Inches and Smaller:

Type: Plug-cock.

Material: Brass.

Valves 2-1/2 Inches and Larger:

Material: [**Cast iron, brass mounted**] [**Brass**].

Type: Plug-cock.

* + - * 1. Pressure Relief Valves:

Type: Spring-loaded diaphragm.

As specified in Section 400567.39 - Pressure-Relief Valves.

* + - 1. PIPING SPECIALTIES
         1. Expansion Joints: As specified in Section 400506 - Couplings, Adapters, and Specials for Process Piping.
      2. ELECTRICAL APPURTENANCES
         1. Motors: As specified in Section 400593 - Common Motor Requirements for Process Equipment.
         2. Motor Controls: As specified in [**Section 262923 - Variable-Frequency Motor Controllers**].
         3. Motor-Control Centers: As specified in Section 262419 - Motor-Control Centers.
      3. GAS HANDLING SYSTEM
         1. Performance and Design Criteria:

Digester Gas:

Coordinate heating value requirements with Section 467341, boiler burning equipment.

Approximate Heating Value: [**600**] <**\_\_\_\_\_\_\_\_**> Btu/ cu. ft

Maximum Pressure: <**\_\_\_\_\_\_\_\_**> inches wc

* + - * 1. Waste Gas Burner:

Description: Furnish pilot light, air inlet and mixing chamber, burner bowl, and flanged base with anchor bolts.

Capacity: <**\_\_\_\_\_\_\_\_**> cu. ft. gas per hour at minimum pressure loss of <**\_\_\_\_\_\_\_\_**> inch wc

Inlet:

Size: <**\_\_\_\_\_\_\_\_**> inch

Type: Screwed.

Pilot Gas Line: Furnish shutoff valve.

* + - * 1. Flame Traps/Arrestors:

Description:

Type: Horizontal.

FM-approved and listed by UL.

Locations:

In gas piping system between each source of ignition and digester.

Maximum Distance from Source of Ignition: [**25**] <**\_\_\_\_\_\_\_\_**> feet

Minimum Flow Rate: <**\_\_\_\_\_\_\_\_**> scfh at maximum pressure loss of <**\_\_\_\_\_\_\_\_**> inch wc

Connections: [**Flanged**] [**Screwed**].

Grids:

Minimum Net Free Area: [**Four**] <**\_\_\_\_\_\_\_\_**> times pipe cross-sectional area.

Arranged for individual removal.

Thermal Shutoff Valve:

Type: Spring actuated.

Fusible Element: Automatic closure based on burning mixtures.

Materials:

Housing: Cast-aluminum end sections and cast-iron side and cover plates.

Bank Assembly: Aluminum.

* + - * 1. Sediment Traps:

Description:

Operation: Centrifugal force at high gas velocities; gravity at low gas velocities.

Configuration: Baffled.

Furnish liquid level measurement without need to close gas supply line.

Locations: [**In gas piping system prior to equipment**] [**As indicated on Drawings**].

Capacities:

Minimum Volume: <**\_\_\_\_\_\_\_\_**> gal

Minimum Flow Rate: <**\_\_\_\_\_\_\_\_**> scfh at maximum pressure loss of <**\_\_\_\_\_\_\_\_**> inch wc

Material: [**Cast iron**] [**, ductile iron**] [**, or**] [**galvanized steel**].

Connections:

Blowout.

Drip trap, plumbed to drain.

Sight glass.

End Connections: [**Flanged**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Drip Traps:

Description:

Type: Ball float with needle valve.

Drain: Manual with plug.

Locations: [**At low points in gas piping system and on upstream side of each gas meter**] [**As indicated on Drawings**].

Minimum Volume: <**\_\_\_\_\_\_\_\_**> gal

Materials:

Cover and Bowl: [**Cast iron**] [**, ductile iron**] [**, aluminum**] [**, or**] [**galvanized steel**].

Float, Needle Valve, and Seat: Stainless steel.

Connections:

Inlet and outlet.

End Connections: [**Flanged**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Gas Meters:

Description:

Measure gas production of each digester.

Measure volume of gas delivered to waste gas burner and sludge heating system.

Furnish valved bypass around each gas meter [**as indicated on Drawings**].

Minimum Flow Rate: <**\_\_\_\_\_\_\_\_**> scfh at maximum pressure loss of <**\_\_\_\_\_\_\_\_**> inch wc

Capacity: Twice rated flow rate.

Materials: [**As recommended by manufacturer to be resistant to corrosive effects of digester gas**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Pressure Indicating Gages:

Type: Direct reading.

Units: Inches wc

Mounting: [**Wall**] [**Pipe**].

Furnish isolation cocks.

* + - * 1. Gas Storage Tanks:

Description:

Type: [**Ground level**] <**\_\_\_\_\_\_\_\_**>.

Construction: Welded steel.

Comply with ASME Section VIII and furnish ASME "U" stamp.

Furnish steel support saddles[**, taps for accessories, threaded connections, and access way**] [**and appurtenances as indicated on Drawings**].

Configuration: [**Vertical**] [**Horizontal**].

Overall Length: <**\_\_\_\_\_\_\_\_**> feet

Diameter: <**\_\_\_\_\_\_\_\_**> feet

Nominal Capacity: <**\_\_\_\_\_\_\_\_**> cu. ft

Performance and Design Criteria:

Minimum Working Pressure: <**\_\_\_\_\_\_\_\_**> psig

Snow Loading: Minimum <**\_\_\_\_\_\_\_\_**> psf

Wind Load Requirements: <**\_\_\_\_\_\_\_\_**> mph

Earthquake Design Factor: <**\_\_\_\_\_\_\_\_**> percent for Zone <**\_\_\_\_\_\_\_\_**>.

Tank Saddles:

Quantity: [**Two**] <**\_\_\_\_\_\_\_\_**>.

Size: Minimum 4 inches) wide by 1/4 inch thick.

Mounting: 2-inch -diameter pipe stand with minimum four cross-braced legs.

Furnish sheet PTFE isolation strip between tank and saddle and dielectric unions between tank and piping.

1. EXECUTION
   * + 1. EXAMINATION
          1. Verify layout and orientation of equipment, accessories, and piping connections.
       2. INSTALLATION
          1. According to manufacturer instructions and as indicated on Drawings.
          2. Locate waste gas burner minimum of [**50**] <**\_\_\_\_\_\_\_\_**> feet from [**gas storage tank**] [**and**] [**digester**].
          3. Pressure Relief Valves: Comply with ASME Section IV.
          4. Ensure that connections with or protrusions through digester cover or walls are gastight.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Paragraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Installation Standards: Install Work according to <**\_\_\_\_\_\_\_\_**> standards.
      1. FIELD QUALITY CONTROL
         1. Testing:

Test for proper operation.

Control System: Start by energizing system equipment and testing operation of hardware and process control logic under supervision of manufacturer's representative and in presence of [**Director’s Representative**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than <**\_\_\_\_\_\_\_\_**> days on Site for installation, inspection, startup, field testing, and instructing Director’s Representative in operation and maintenance of equipment.
        2. Equipment Acceptance:

Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.

Make final adjustments to equipment under direction of manufacturer's representative.

* + - * 1. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.
      1. DEMONSTRATION
         1. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Director’s Representative.

END OF SECTION 467319