

## SECTION 2

### GRINDER VAULT SPEC

#### **PART 1 - GENERAL**

##### 1.01 SECTION INCLUDES

- A. Plant assembled and tested precast wastewater utility grinder stations, including:
  - 1. Precast concrete vault.
  - 2. Grinder and mountings.
  - 3. Control panels.
  - 4. Piping integral to grinder station.
  - 5. Grinder station design services.

##### 1.02 ACTION SUBMITTALS

- A. Product Data: Provide manufacturer's technical data including station capacities and operating characteristics.
- B. Grinder Performance Criteria.
- C. Shop Drawings: Show fabrication and installation details.

##### 1.03 INFORMATIONAL SUBMITTALS

- A. Certificate: Signed by manufacturer, verifying grinder station performance testing.

##### 1.04 CLOSEOUT SUBMITTALS

- A. Field Reports: Provide quality-control test reports documenting station operation performance.
- B. Warranty: Signed copy of manufacturer's warranty.
- C. Operation and Maintenance Manual: Include approved submittals and schedule for maintenance requirements.

##### 1.05 SUBSTITUTIONS

- A. Substitutions will be considered per Substitution Procedures Section 012500.

##### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: NPCA-certified plant, with experience and demonstrated capability to produce work specified in this Section.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

##### 1.07 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of grinder stations that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including precast concrete structures, hatches, and other accessories.

- b. Faulty operation of grinders, controls, and accessories.
  - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
- 2. Warranty Period for Precast Concrete Structures: One year from date of Substantial Completion.
- 3. Warranty Period for Grinders, Control Panels, and Valves made by Yeomans: Subject to the terms and conditions hereof, the Seller warrants until one year after commissioning (written notification to Seller by Buyer required) of the Product or until 18 months after delivery of such Product to Buyer, whichever is earlier, that each Product will be free of defects in material and workmanship.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURER**

- A. Basis of Design: Provide plant assembled precast wastewater utility grinder station, including specified controls, grinders, valves, internal piping, and precast concrete vault from a reliable and certified concrete precaster.

### **2.02 PRECAST GRINDER STATIONS DESIGN CRITERIA**

- A. Description: Plant assembled and tested precast wastewater utility grinder station including controls, grinders, valves, internal piping, precast concrete vault.
  - 1. Grinder Station Peak Design Flow: 660gpm.
  - 2. Sewer Main: New, as shown on Drawings.
    - a. Inlet Pipe Size: 12" NPS.
    - b. Discharge Pipe Size: 12"NPS.
    - c. Pipe Type: Ductile iron.
  - 3. Design Elevations: As indicated.
    - a. Inlet Piping Invert: See Civil drawings
    - b. Vault Finished Grade: See Civil drawings
    - c. Vault Rim: See Civil drawings
    - d. Vault Discharge Piping Invert: See Civil drawings
  - 4. Vault: Precast concrete.
    - a. Capacities and Characteristics: Provide base, risers, and flat top precast sections as follows to correspond to height of precast structures indicated:
      - i. Inside Dimensions: 8' x 14'
      - ii. Height: 9 feet.

### **2.03 PRECAST CONCRETE STRUCTURES**

- A. General: Size indicated, with provision for sealant at joints, meeting ASTM C 913, designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy traffic, structural loading.
- B. Rectangular Precast Concrete Vaults: ASTM C 478, precast, reinforced concrete.
  - 1. Flat Top: 12-inch minimum thickness.
  - 2. Base Section: 10-inch minimum thickness floor slab.

3. Walls: 11-inch minimum thickness.
4. Joints: Bell and spigot, ASTM C 443.
5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
6. Flexible Resilient Pipe Connectors: ASTM C 923:

C. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

## 2.04 PRECAST CONCRETE MATERIALS AND MIX DESIGN

- A. General: Precast concrete according to ACI 318.
- B. Concrete Design Mix: 4,000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

## 2.05 ACCESS DOORS AND FRAMES

A. Watertight Access Door: Double-leaf opening. Galvanized gutter frame with NPS 1-1/2 drainage coupling and diamond-pattern tread plate door of thickness required for loading requirements.

1. Loading Capacity: Support AASHTO H20 concentrated wheel load, without impact.
2. Door Hardware: Equip door with adjustable counterbalancing springs, heavy-duty hold-open arm that automatically locks door open at 90 degrees, release handle and removable lift handle.
  - a. Hinges: Heavy-duty butt hinges.
  - b. Latch: Slam latch.
  - c. Lock: Snap lock with fixed handle on underside of hatch.
  - d. Hardware Material: Stainless steel, including latch and lifting mechanism assemblies, hold-open arms, and all brackets, hinges, pins, and fasteners.

B. Safety Accessories: None

C. Materials:

1. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
2. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
3. Frame Anchors: Same type as door face.
4. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

## 2.06 GRINDER

A. Wastewater Grinder: Grinder unit shall include grinder, motor, speed reducer, and grinder controller. In-line installation shall include flanged hopper. Grinder shall be capable of processing sludge or solids (normally found in wastewater flow) continuously either wet or dry.

1. Basis of Design Product: Provide Yeomans Sewer Chewer, Model SC-12, or a comparable product approved by Engineer prior to bid.
2. Grinder System Characteristics: As required to meet performance requirements.
  - a. Number of Grinders: Two.
  - b. At Flow Rate: 660 gpm
    - i. Torque 2569 in lb

- ii. Speed 1750 rpm
  - c. Motor Size: 5 hp.
- B. Grinder station Electrical Characteristics:
- 1. Electrical Service:
    - a. Volts: 480 V.
    - b. Phases: Three.
    - c. Frequency: 60Hz.

2.07 GRINDER STATION CONTROLS

- A. Control Sequence of Operation & Motor Controls: Normal operation is continuous forward rotation. When an impediment condition is detected, the controller shall instantaneously stop the rotation, pause, and momentarily reverse the grinder rotation to clear the obstruction. When the jam is cleared, the controller will return to standard forward operation. If the obstruction persists, the controller shall repeat the reversal cycle for a total of three (3) times within a 30 second window. If the grinder attempts a fourth reversal, it will shut down, an overload warning light is energized on the control panel and sounds the horn once every 10 seconds until the alarm is reset. Additionally, on the fourth reversal, an electric actuated plug valve located on the bypass line will be opened by a signal sent by the control panel. Provide a dry contact to send a trouble signal to the BMS control panel.
- B. Install labels to identify switches and controls.
- C. Control Panel: Complying with UL 508A, with weatherproof enclosure, covered compartments sized to accommodate controllers, circuit breakers, transformers, alternators, and programmable logic controller.
- 1. Basis of Design Product: Provide a PLC or a comparable product approved by Engineer prior to bid.
  - 2. Provide duplex convenience receptacle
  - 3. PIPING
- D. Ductile-Iron Flanged Pipe and Fittings:
- 1. Ductile-Iron Pipe: AWWA C151/A21.51, with flanged ends unless indicated otherwise.
    - a. Provide flanged ends within vault unless indicated otherwise.
  - 2. Ductile-Iron Fittings: AWWA C110/A21.10, flanged, ductile- or gray-iron standard pattern or AWWA C153/A21.53, ductile-iron compact pattern.
  - 3. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel nuts and bolts.
- E. Isolation Valves: Flanged eccentric plug valves with worm gear actuator.

2.08 FABRICATION

- A. Precast Concrete Structures:
- 1. ASTM C 478 for precast vaults.
  - 2. Fabricate structures with continuous joints to provide watertight construction.
  - 3. Prepare grinder vault with factory installed piping, valves, and other devices required.
- B. Piping: Manufacturer's standard piping layout including spools, fittings, and valves.

## **PART 3 - EXECUTION**

### **3.01 EARTHWORK**

A. Refer to Division 31 Section "Earth Moving" for general and trench excavation and backfilling.

### **3.02 FIELD QUALITY CONTROL**

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a grinder station manufacturer's authorized service representative to assist in testing and startup.

B. Tests and Inspections:

1. Test completed piping systems according to requirements of authorities having jurisdiction. Submit reports.
2. After installing wastewater grinder station and after electrical circuitry has been energized, test grinder and controls for compliance with requirements.
3. After electrical circuitry has been energized, start units to confirm the station can run at pre-specified design parameters.
4. Test piping for leaks and defects.
5. Test and adjust controls and safeties.

C. Remove and replace components of the wastewater grinder station that do not pass tests and inspections and retest as specified above.

**END OF SECTION 2**

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