

Section 11337

STATIC MIXERS AND APPURTENANCES

PART 1 GENERAL

1.01 SUMMARY

This Section includes the furnishing and installation of chlorine leak detectors as shown on Plans and specified herein.

1.02 MEASUREMENT AND PAYMENT

No separate payment will be made for chlorine gas leak detectors under this Section. Include payment in price for Work of which this is a component part.

1.03 REFERENCES

This specification references the following publications in their current editions. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

- A. National Sanitation Foundation International (NSF): NSF/ANSI 61 - Standards for Drinking Water Systems Components
- B. Texas Commission on Environmental Quality (TCEQ) Guidelines

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01330 – “Submittal Procedures” and Section 01782 – “Operations and Maintenance Data.”
- B. Submit the following shop drawings:
 - 1. Data regarding static mixers characteristics and performance:
 - a. Prior to fabrication and testing, provide guaranteed performance curves based on actual shop tests of duplicate mixers, showing they meet indicated and specified requirements for capacity, and pressure drop.
 - b. Curve of flow vs pressure drop
 - c. Results of shop performance tests as specified
 - d. Submit curves for guaranteed performance, and shop performance tests on 8-1/2-inch by 11-inch (A4) sheets, one curve per sheet.
 - 2. Shop drawing data for accessory items

3. Manufacturer's literature as needed to supplement certified data
4. Operating and maintenance instructions and parts lists
5. Certified results of hydrostatic testing
6. Shop and field inspection reports
7. Special tools (if applicable)
8. Material Certification:
 - a. Provide certification from the equipment manufacturer that the materials of construction specified are recommended and suitable for the service conditions specified and indicated.
 - b. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.

1.05 RELATED REQUIREMENTS

- A. Drawings show general arrangement, location, and basic dimensions. Related work as called for on Drawings or specified in this or other Specification Sections.
- B. Section 01330 – “Submittal Procedures”
- C. Section 01610 – “Basic Product Requirements”
- D. Section 01782 – “Operations and Maintenance Data”
- E. Section 15130 - " Pressure Gauges, Transmitters and Elements"

1.06 QUALITY ASSURANCE

- A. Static mixers shall be the product of one manufacturer
- B. Static mixers shall be manufacturer’s standard cataloged product and modified to provide compliance with the drawings, specifications and the service conditions specified and indicated
- C. Shop tests as specified
- D. Provide services of factory-trained Service Technician, specifically trained on type of equipment specified
- E. Service Technician must be present on site during installation.

1.07 SYSTEM DESCRIPTION

Static mixer capacities and operating data are indicated in the ATTACHMENT.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials and equipment to jobsite with sufficient protection to ensure arrival in undamaged condition.
- B. All equipment is to be stored so as to be completely protected from damage and exposure to the elements until installation
- C. Handle all components in accordance with manufacturer's instructions to prevent damage.

1.09-1.12 (NOT USED)

1.13 WARRANTY

The Manufacturer shall warrant the static mixers and appurtenances to be free of defects in material and workmanship for a period of two years from date of shipment, provided the static mixers and appurtenances are installed and used in accordance with all applicable instructions.

PART 2 PRODUCTS

2.01 MANUFACTURER(S)

- A. Subject to compliance with the requirements of this Section, provide equipment from the following manufacturers.
- B. Static Mixers
 - 1. Westfall
 - 2. Or Approved Equal
- C. Injectors / Diffusers
 - 1. SAF-T-FLO
 - 2. Or Approved Equal

2.02 MATERIALS AND/OR EQUIPMENT

- A. Static Mixer Construction:
 - 1. The static mixer shall be of a compact ring body design for mounting between two standard 150# pipe flanges.

2. The ring body shall be a minimum thickness of 3.00 inches and shall be fabricated from PVC.
3. Provide the mixer with an open structure guaranteeing reliable operation without the danger of clogging.
4. Ring type NSF-61 approved EPDM gaskets shall be furnished and adhered to both sides of the mixer body.
5. The mixer plate shall be computer designed to provide a geometric shape which will create the mixing vortices to effectively mix the injected fluid(s) with the main process fluid.
6. The average variation in the process stream of the injected fluid shall be within 5% of the mean value at 10 pipe diameters downstream of the mixer.
7. The mixer plate shall be no less than .500 inches thick and shall be formed from PVC.
8. The mixer plate shall be mounted in a machined cavity on the upstream side of the ring body.
9. The mixer body shall include two (2) - 1" injection ports that will be fitted with 1" Saf-T-Flo brass corp stops. See Paragraph 2.02.C for details on Saf-T-Flo diffuser.
10. The mixer body, mixing plate and injector materials shall be suitable for handling the process and injection fluids.
11. The entire mixer must be NSF-61 certified and provided with documentation during the submittal process acknowledging this certification is available for each of the specified size(s) of static mixers. In addition, NSF 61 certification paperwork will be supplied with the shipped static mixer attesting to NSF61 certification for the static mixer. Submittals or any other form of paperwork certifying that the static mixer is made from individual NSF61 certified materials shall be considered a deviation from this specification.

B. Gauges:

1. Provide pressure gauges upstream and downstream of each static mixer
2. Provide pressure gauges as specified in Technical Specification Section 15130 - "Pressure Gauge".
3. Gauge Range: 0 to 15 psi (0 to 100 kPa).
4. Mixer manufacturer to provide recommender the field testing as specified herein.

C. Solution Diffuser:

1. Assembly shall be Saf-T-Flo Diffuser or Approved Equal
2. Diffuser configuration shall provide a single feed point into the water pipe. Materials of construction shall be Stainless Steel, Hastelloy C-276 or Alloy20 and compatible with chemical solution and be capable of withstanding maximum pump discharge line pressure and velocity, as well as water main pressure. Insertion depth shall be ½ diameter of the water pipe or as called for by the mixer manufacturer.
3. Chemical Diffuser shall be capable of installation and operation in a submerged environment external of the pipe where the injection point is located.
4. Water Main Connection:

Connection shall include a brass corporation stop valve. Threaded connection shall be male NPT inlet and capable of withstanding maximum water main pressure. Corporation Stop must include an acceptable safety device to prevent accidental release of solution tube while under maximum water main pressure and/or surge conditions.
5. Solution Tube:
 - a. Solution tube shall be sized to match pump discharge line or injection flow rate.
 - b. Materials of construction shall be Stainless Steel, Hastelloy C-276 or Alloy20 and compatible with chemical solution and be capable of withstanding maximum pump discharge line pressure and velocity, as well as water main pressure.
 - c. An acceptable locking device must be included to prevent accidental release of the solution tube from the water main while under pressure.
 - d. A ball check valve shall be included to prevent backpressure from the main from entering chemical feed system.
 - e. A stainless steel safety chain shall be included to prevent withdrawal of solution tube past corporation stop. Safety chain length shall be preset by manufacturer for closure of the corporation stop before withdrawal of solution tube.
6. Operator shall be able to withdraw or insert solution tube into water main while under pressure and without having to shut down the main.

2.03 SHOP TESTING

- A. Provide certified performance test data confirming the uniformity and pressure drop.
- B. In the event that specified tests indicate that the static mixer will not meet the specified requirements, repeat tests until specified results are obtained
- C. Correct or replace promptly all defects or defective equipment revealed by or noted during tests at no additional cost to the Owner.

PART 3 EXECUTION

3.01-3.02 (NOT USED)

3.01 INSTALLATION AND CONSTRUCTION

Materials and equipment to be installed in accordance with accepted shop drawings, manufacturer's written instructions and applicable codes and ordinances.

3.02 REPAIR/RESTORATION (NOT USED)

3.03 FIELD QUALITY CONTROL

- A. Manufacturer's Service Technician to assist Contractor in testing all equipment to ensure that it functions properly
- B. Upon satisfactory completion of testing, the Manufacturer's Service Technician will assist the Contractor in installation and placing system in operation.
- C. Manufacturer's Service Technician to assist Contractor in instructing the OWNER's personnel in operation and maintenance of equipment.

3.04 FIELD TESTING

- A. Test piping connections to prove the chemical function nozzles are installed with the pipe in a free supported state and without need to apply vertical or horizontal pressure to align piping with static mixer connections nozzles. This must be performed and the piping acceptable prior to any field performance testing.
- B. Field testing will not be conducted without an accepted procedure, calibration certificates for all testing equipment, gauges and flow meters and a completed and signed pretesting check list.
- C. After installation of static mixers, and after inspection, operation, testing and adjustment have been completed by the manufacturer's field service technician, conduct running test for each static mixer in presence of the OWNER/Engineer to determine its ability to operate within the vibration and temperature limits specified, and to deliver its rated capacity under specified conditions.
 - 1. During tests, observe and record, capacity and pressure drop.

2. Immediately correct or replace all defects or defective equipment revealed by or noted during tests at no additional cost to the Owner.
 3. Repeat tests until specified results are obtained.
 4. Contractor is to provide all water labor, piping, testing equipment, equipment, flow meters and test gauges for conducting tests.
 - a. Contractor shall provide calibrated test gauges for all permanently installed gauges and portable calibrated flow meters.
 - b. All calibrations must be within 30 days of the field testing.
 - c. The testing will not be started and will not be accepted until the calibrated testing equipment stated above is operational and all certifications have been submitted.
- D. Make all adjustments necessary to place equipment in specified working order at time of above tests.

3.05-3.06 (NOT USED)

3.07 FIELD TOUCH-UP PAINTING

After installation and accepted testing by OWNER/Engineer, apply touch-up paint to all scratched, abraded and damaged shop painted surfaces. Coating type and color shall match shop painting.

3.08-3.10 (NOT USED)