



HOLTZ CONSULTING ENGINEERS, INC

December 5, 2022

Mr. Greg Alfsen, P.E.
Project Manager
Drinking Water State Revolving Fund & Water Supply Restoration Funding
Division of Water Restoration Assistance
Florida Department of Environmental Protection
3900 Commonwealth Blvd MS3505
Tallahassee, FL 32399

RE: SRF Project: DW430450 – City of Stuart Water Treatment Plant Reverse Osmosis Treatment Facility

Subject: AIS Availability Waiver Request for Reduced Pressure Zone (RPZ) Backflow Preventers

Dear Ms. Speas-Frost:

On behalf of the City of Stuart, we are respectfully requesting a waiver from the American Iron and Steel (AIS) provisions required by the Drinking Water State Revolving Fund loan program for the 4" diameter backflow preventers specified for the City of Stuart Water Treatment Plant Reverse Osmosis Treatment Facility Project. These RPZ backflow preventers are not currently produced within the United States in sufficient and reasonably available quantities. Correspondence from the leading supplier of these items (Core and Main) has confirmed that there are no AIS compliant products available (Exhibit A).

This project includes constructing a new potable water service, which contains a 4" Reduced Pressure Zone (RPZ) Backflow preventer. The Contractor, PC Construction's documentation includes documentation showing the RPZ is scheduled to be installed in December 2022 (Exhibit A).

The items listed in the EPA's Information Checklist for Waiver Request form are addressed below.

1. General Description:

- a. Reduced Pressure Zone Backflow Preventers. See the specifications (Exhibit B) and the attached Locations of RPZ (Exhibit C).

2. Unit of Measure/Quantity/Pricing:

- a. Incorporated into unit price for service water piping. Price for RPZ is [REDACTED] plus tax and shipping.



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3. Time of Delivery or Availability:

- a. 2-week delivery
- b. Attached Submittal for Equipment (Exhibit D).

4. Location of Construction Project:

- a. The project is located at the City of Stuart Water Treatment Plant, 1000 SE Palm Beach Rd, Stuart, FL 34994

5. Name and Address of Proposed Supplier:

- a. A large black rectangular redaction box covers the address information for the proposed supplier.

6. Supporting documentation, including that the Contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers.

- a. See attached Exhibit A.

7. Supplier information or pricing information from the leading domestic supplier indicating availability/delivery date for construction materials:

- a. See attached Exhibit A

8. Contractor and/or supplier to provide a statement confirming the non- availability of the domestic construction material which is sought:

- a. See attached Exhibit A.

9. Has the State received other waiver requests for the materials described in the request for comparable projects?

- a. Based upon the information published on the EPA website, there are approved waivers for backflow preventers for projects located in California, Oregon, Virginia, Idaho, and New Jersey.



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10. Project Schedule:

- a. See Exhibit A for when the Contractor intends to perform this work.

11. Engineering Reduced Pressure Zone Backflow Preventers

- a. Reduced Pressure Zone (RPZ) backflow preventers shall consist of isolation valves, two (2) independent check valves, and differential relief valve. The assembly shall automatically reduce the pressure in the zone between the check valves. In the event that a reduced pressure is not maintained, the differential relief valve shall open, maintaining proper zone differential. RPZ backflow preventers shall comply with AWWA C511 and ASSE Standard 1013 requirements and shall be suitable for horizontal installation. Backflow preventers shall comply with the requirements of ANSI/NSF 61, Annex G for low lead and shall be provided with a relief valve air gap drain fitting. This is a highly specialized item and based on the advice and research by the project specified leading manufacturer and supplier there does not appear to be an AIS compliant manufacturer.

Sincerely,

Christine Miranda, PE
Principal Engineer

Cc: Marc Rogolino, City of Stuart
Rick Herndon, FRWA/FDEP SRF Program
Andrea Carpenter, Kimley-Horn

This waiver request was submitted to the EPA by the state of Florida. All supporting correspondence and/ or documentation from contractors, suppliers or manufacturers included as a part of this waiver request was done so by the recipient to provide an appropriate level of detail and context for the submission. There may be documents with project diagrams, schedules, and supplier correspondence in formats that do not meet the Federal accessibility requirements for publication on the Agency's website. Hence, these exhibits have been omitted from this waiver publication. They are available upon request by emailing DWSRFWaiver@epa.gov.

SECTION 15100

PIPING AND VALVES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install all piping, fittings, and valves as shown on the drawings and specified herein. This section does not piping and fittings for yard piping. Reference Division 2 for all piping, valves, fittings and appurtenances. In general, include all piping from tie-ins to and from equipment as shown on the drawings, including all piping appurtenances for a complete, operating piping system as specified herein.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Section 01300 – Submittals
- B. Section 01720 – Project Record Drawings
- C. Section 01730 – Operating and Maintenance Manuals
- D. Section 02670 – Flushing, Testing, and Disinfection
- E. Section 05500 – Miscellaneous Metals
- F. Section 09900 – Painting
- G. Section 11280 - Control Valves

1.03 REFERENCES

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
- B. ANSI/ASTM D2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- C. ANSI/AWWA C104 – Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- D. ANSI/AWWA C105 – Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems

- E. ANSI/AWWA C110 – Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. for Water and Other Liquids.
- F. ANSI/AWWA C111 – Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- G. ANSI/AWWA C115 – Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray Iron Threaded Flanges.
- H. ANSI/AWWA C150 – Standard for the Thickness Design of Ductile-Iron Pipe.
- I. ANSI/AWWA C151 – Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
- J. ANSI/AWWA C153 – Standard for Ductile-Iron Compact Fittings, 3 In. Through 24 In. and 54 In. Through 64 In. for Water Service.
- K. AWWA C210 – Standard for Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
- L. AWWA C220 – Standard for Stainless-Steel Pipe, 4 In. and Larger.
- M. AWWA C504 – Standard for Rubber-Seated Butterfly Valves.
- N. AWWA C508 – Standard for Swing-Check Valves for Waterworks Service, 2 In. Through 24 In.
- O. AWWA C509 – Standard for Resilient-Seated Gate Valves for Water Supply Service.
- P. AWWA C511 – Standard for Reduced-Pressure Principle Backflow-Prevention Assembly.
- Q. AWWA C512 – Standard for Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
- R. AWWA C600 – Standards for Installation of Ductile-Iron Water Mains and Their Appurtenances.
- S. AWWA C605 – Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
- T. AWWA C606 – Standard for Grooved and Shouldered Joints.
- U. AWWA C900 – Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. for Water Distribution.

- V. AWWA C901 – Standard for Polyethylene (PE) Pressure Pipe and Tubing, ½ In. Through 3 In. for Water Services.
- W. ASTM D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- X. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- Y. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- Z. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
- AA. ASTM F437-82 - Threaded Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80.
- AB. ASTM F439-87 - Standard Specification for Socket - Type Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe Fittings, Schedule 80.
- AC. ASTM 493-85 - Solvent Cements for Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe and Fittings.
- AD. ASME/ANSI B16.5 –1996 – Pipe Flanges and Flanged Fittings.
- AE. ASME/ANSI B 31.3 – 1996 – ASME Code for Pressure Piping.
- AF. ASME/ANSI B 16.9 – Pipe Fittings.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on pipe fittings, valves, and accessories.
- C. Manufacturer's Certificate: Certify that pipe, fittings, and valves meet or exceed respective ANSI, AWWA, and/or NSF Standards.

1.05 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of piping mains, valves, connections, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with City of Stuart Water & Wastewater Specifications, where applicable.
- B. Fabricated piping shall meet all ASME code requirements as specified herein.
- C. Valves: Manufacturer's name and pressure rating marked on valve body.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.

1.08 AMERICAN IRON AND STEEL REQUIREMENT

- A. **All applicable iron and steel products to be installed under this contract must be in compliance with the Federal American Steel Provision and current Amendments.**

PART 2 PRODUCTS

2.01 GENERAL

Although they may not be specifically shown on the drawings or called for elsewhere in the Technical Provisions, the Contractor shall include the cost of all fittings, piping supports, and miscellaneous appurtenances needed to provide a secure, workable pipe and valve system. Equipment suction and discharge piping and other exposed piping shall be supported by reinforced concrete pedestals, piers, adjustable pipe supports, thrust restraints, hangers, and tie rods as necessary to insure a stable installation. Adjustable pipe supports or piers shall be arranged to relieve attached equipment of all strain due to the weight of the pipe, fittings, valves, and the contents of the pipe.

2.02 PRODUCT LIST

All products shall conform to the Approval Product List, City of Stuart Water & Wastewater Specifications, latest edition, unless specifically specified herein.

2.03 PIPE SCHEDULE – SEE TABLE 15100-1

2.04 STAINLESS STEEL PIPE, SCHEDULE 10S, 10, 40

- A. Stainless Steel Pipe: ANSI/ASTM A312, Schedule 10S, 10, 40
 - 1. Stainless steel pipe shall conform to ASTM A312, Austenitic steel pipe, welded, seamed, grade TP 316L.

2. Size shall be nominal pipe size (NPS) designation as shown with Schedule 10S, 10, or 40-wall thickness as indicated on the drawings or specified herein.
3. Pipe flanges and fittings to meet ASME B16.5-1996.
4. Flanges to be Class 150 or class 300, depending on service, raised face, serrated finish, forged A182 Grade F316L, slip on type. Dimensions shall meet ANSI/ASME B16.5-1996.
5. Flange bolts and nuts shall be ASTM A193 and ASTM A194, Type 316, respectively. Never Seize shall be used on all stainless steel threaded fasteners. Flange gaskets shall be full faced, elastomeric type rubber (neoprene or EPDM), and meet the requirements of ANSI/AWWA C207.

B. Victaulic Joints, Fittings, Valves and Couplings

1. All fabricated fittings shall be A403WP type, with dimensions meeting ANSI B 16.9.
2. All victaulic style joints shall be grooved in accordance with ANSI/AWWA C606. All steel joints for schedule 10 pipe shall be roll grooved, whereas steel joints for schedule 40 pipe may be roll or cut grooved. All stainless steel pipe with Victaulic couplings shall have sch 40, cut groove nipples, 6" long, welded to sch 10 ss pipes, for all pipe sizes 8" and above.
3. Gaskets shall be suitable for their intended service. For potable water service, gaskets shall be EPDM, Grade E, UL listed in accordance with NSF61. Gaskets shall be clearly marked with colored striping to indicate material compound.
4. Bolts shall be 316 SS stainless steel on all Victaulic couplings.
5. RO train header shall be designed per pressure class, have all side ports installed off of header using the pull-tee method and be counter-bored, sch 40 nipples. All nipples 1" and smaller shall be 3000# rated FNPT, threidolet type.
6. All nipples 1½" and smaller shall be seamless.

2.05 PVC PIPE

A. AWWA C900 and C-905

1. All PVC pipe shall meet AWWA C-900 and AWWA C-905 Standards and NSF requirements for potable water application. PVC pipe 4" through 12" shall be class 150, DR 18 pipe conforming to AWWA C900. Pipe greater than 12" shall conform to AWWA C905, DR 18 or better.
2. Fittings used in conjunction with the C900 PVC pipe shall be ductile iron, or PVC push-joint pressure rated fittings (SDR-35 min) as detailed on pipe schedule, mechanical joint.
3. PVC for potable water mains shall be blue in color. Raw water and wastelines shall white in color.
4. Markings on pipe shall be in accordance with Martin County Standards.

B. Schedule 80 PVC Pipe

1. Rigid PVC (polyvinyl chloride) compound used in the manufacturer of schedule 80 pipe shall be Type I, grade 1 as identified in ASTM D1784. The pipe shall be NSF rated for potable water.
2. PVC schedule 80 shall meet the requirements of ASTM standard D1785 for physical dimensions and tolerances.
3. The marking on PVC Schedule 80 pipe shall meet the requirements of ASTM D1785 and state the material designation code, nominal pipe size, schedule of pipe, pressure rating in psi for water at 73° F., the ASTM designation number D1785 and the NSF seal for potable water.
4. Fittings used shall be PVC Schedule 80 and solvent welded in accordance with ASTM D1785.
5. Small Diameter PVC Pipe: PVC pipe smaller than 4-inch shall be schedule 80 PVC plastic pipe with solvent weld fittings in accordance with ASTM D-1785.
6. PVC Drain Pipe: PVC drain pipe shall be PVC sewer pipe and fittings, ASTM D-2729.

2.06 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

A. High Density Polyethylene Pipe and Fittings - HDPE pipe.

1. This specification covers requirements for DRISCOPELEX™ 4100 high-density polyethylene pipe and fittings for potable water distribution and transmission mains as manufactured by Performance Pipe, a division of Chevron Phillips Chemical Company LP, or equal. All pipe shall be ductile.

2. Materials used for the manufacture of polyethylene pipe and fittings shall PE 3408, Class B high density polyethylene meeting cell classification 345464C per ASTMD 3350 and material classification Type III, Category 5 per ASTM D-12485. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements. Resin shall be NSF approved.
3. Polyethylene pipe shall be manufactured and tested in accordance with AWWA C906 and shall be so marked.
4. Polyethylene fittings and custom fabrications shall be molded or fabricated by the approved pipe manufacturer. Butt fusion outlets shall be made to the same outside diameter, wall thickness and tolerances as the mating pipe. All fittings and custom fabrications shall be pressure rated for the same internal pressure rating as the mating pipe. Reduced pressure-rated (de-rated) fabricated fittings are prohibited.
5. Molded fittings shall be manufactured and tested in accordance with ASTM D3261 and shall be so marked. Molded fittings shall be tested in accordance with AWWA C906.
6. The manufacturer must certify that samples of the manufacturer's production pipe have been tested, in accordance with ASTMS D-2837, and validated in accordance with the latest revisions of PPI-TR-3.

2.07 BUTTERFLY VALVES

- A. Butterfly valves in stainless steel or PVC process pipelines which are rated for 150 psi or less shall be lug style with "O" ring shaft seal. Valve body inner lining and shaft seals shall be EPDM. Disc, shaft and bearings shall be 316 stainless steel. Valve body shall be epoxy coated (Rilsan coated) ductile iron. Valve shall be manufactured by Keystone or Durco, Inc.
- B. Butterfly valves in stainless steel piping which are rated for greater than 150 psi shall be stainless steel body conforming to ANSI B16.34. Valve body inner lining shall be TFE, seat shall be Viton. Disc, shaft and bearings shall be 316 stainless steel. Valve shall be lug style, unless otherwise indicated on drawings.
- C. Butterfly valves in PVC piping systems, including membrane cleaning and supply piping system, scrubber system, etc., shall be wafer style for ANSI flanges. Valve body and disc shall be PVC. Seats and seals shall be EPDM. The disc shaft be stainless steel and have full engagement with the disc so as to be a non-wetted part isolated from the media by double "O" ring seals on top and bottom tru-unions of disc. The valve shall be capable of providing bubble-tight seating. The valve shall have a geared operator capable of providing adequate opening torque at the design

150 psi pressure rating. Valve shall be manufactured by ASAHI/America or approved equal.

- D. Actuators:
 - 1. Valves 6" and below not used for throttling - notched plate and handle.
 - 2. Valves larger than 6" on for throttling - gear unit with handwheel.
- E. Valves shall be manufactured by Keystone, Durco, ASAHI/America or equal.

2.08 PLASTIC BALL VALVES

- A. Ball valves 1/2 " through 2" shall be double true union type, CPVC, or PVC (same material as pipe) fitted for intended service. Valves shall be solvent welded to piping system unless otherwise noted. Valves shall be Nibco Chemtrol, style TU.
- B. Multiport ball valves shall be Chemtrol MP type, with line unions and threaded branch.
- C. Ball check valves - Chemtrol BC series, double true union.

2.09 STAINLESS STEEL VALVES (less than 2" size)

- A. Regulating valves for throttling service for air, ammonia, and other gases Whitey Forged body regulating and shutoff valve, 316 stainless steel.
- B. Ball valves for gas services, Whitey Series 60, swing out style, 316 stainless steel body and ball, viton fitted cadmium plated handle.
- C. Shut off cocks for seal water, gages, instruments, etc. Nupro plug valve, 316 stainless.
- D. Check valves - ammonia service - spring loaded in-line check valve, similar to Nupro 16C series, 316 stainless steel

2.10 CHECK VALVES

- A. Feedwater Pumps, Well Pumps, RO Trains

Check valve shall be dual-door, Class 300# or 150# rated for intended service, wafer style with 316 stainless steel body and valve plates. Valve shaft, shaft support and accessories to be 316 stainless steel. Springs shall be Inconel (ASTM B166). Valve seal shall be EPDM. Valve must be installed with shaft in vertical position for horizontal flow application. Valve to be Technocheck, Duo-Chek, or equal.

B. Transfer Pumps

Check valves shall be flanged, globe style, silent check valves. The valve shall be cast-iron body, bronze seat, bronze disc and stainless steel spring and screws. Valve seat shall be Viton. The silent check valve shall be fully automatic, spring loaded and double guided. The valve shall be class 125, Model GC101 manufactured by Multiplex Manufacturing Crispin Valve Div.

C. Swing Check Valves (3-inches and larger)

General: Swing check valves for water, sewage, sludge, and general service shall be of the outside lever and spring or weight type, in accordance with AWWA C 508 - Swing-Check Valves for Waterworks Service, 2-in. through 24-in. NPS, unless otherwise indicated, with full-opening passages, designed for a water-working pressure of 150 psi. Units shall have a flanged cover piece to provide access to the disc. Where indicated, swing check valves shall be provided with position indicators.

Body: The valve body and cover shall be of cast iron conforming to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings, with flanged ends conforming to ASME B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800, or be mechanical joint ends, as indicated. Protective coating shall be as specified in Section 09900.

Disc: The valve disc shall be of cast iron, ductile iron, or bronze conforming to ASTM B 62 – Specification for Composition Bronze or Ounce Metal Castings.

Seat and Rings: The valve seat and rings shall be of bronze conforming to ASTM B 62 or B 148 - Aluminum-Bronze Castings or of Buna-N.

Hinge Pin: The hinge pin shall be of bronze or stainless steel.

Manufacturers shall be APCO or Val-Matic.

2.11 AIR RELEASE VALVE

- A. Air release valves shall be the type to automatically exhaust large quantities of air during filling and allow air to re-enter when draining or subject to a negative pressure.
- B. Valve shall be 2" with N.P.T. threaded inlet and outlet. The valve body shall be cast iron. The float, internal float guides and trim shall be 316 stainless steel. The seat shall be BUNA-N.
- C. Valve shall be manufactured by Crispin, Valmatic or approved equal.

2.12 PRESSURE/VACUUM RELEASE VALVE

- A. Pressure/Vacuum Release Valves shall be the type to automatically exhaust large quantities of air during filling and allow air to re-enter when draining or subject to a negative pressure.
- B. Valve shall be 2" with N.P.T. threaded inlet and outlet. The valve body shall be cast iron. The float, internal float guides and trim shall be 316 stainless steel. The seat shall be EPDM.
- C. Valve shall be manufactured by Crispin, Valmatic or approved equal.

2.13 PIPE COUPLINGS

- A. Couplings shall be EPDM gasketed, sleeve-type, with diameter to fit existing pipe. Coupling shall include a steel middle ring, follower rings, wedge-section gaskets and truck head type steel bolts. Couplings shall be manufactured by Dresser, or equal.

2.14 CORPORATION STOPS

- A. Units shall be brass, equipped with connections compatible with the connecting service pipe-type; must have pack joint type connections for polyethylene tubing with locking collars and stainless steel inserts.

2.15 HOSE BIBBS

- A. Hose bibbs for potable water shall be $\frac{3}{4}$ " hose thread, NIBCO (or equal), with screw on backflow or vacuum breaker device.

2.16 REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER

- A. Furnish and install as shown on the drawings. The valves should be constructed of 316 Stainless Steel with stainless steel springs, fabricated assembly, have two independently operated, spring loaded cam-check valves with hydraulically operated differential pressure release valve located between and below the cam-checks. The valve shall be ASSE 1013 approved as a backflow preventer and comply with AWWA C511-92. Rated working pressure shall be 175 psi, hydrostatic 350 psi. Valves shall be designed for high hazard cross connection control environments. The valves shall be Model 4000ss, as manufactured by Ames Fluid Control Systems Co.

2.17 RUPTURE DISKS AND FLOW SWITCH

- A. Rupture disk shall be impervious graphite type disk which mates between class 150 ANSI flanges. Disk shall be rated for 40 psi pressure rating and shall be steel armored Teflon coated disk with armor ring. Disks shall be TD type as manufactured by Zook and shall conform to ASME Section VIII code.
- B. Flow indication as a result of rupture disk failure shall be provided using a flow switch or sensor integrally mounted with disk. Flow switch shall be mounted to pipe with welded boss, be 24VDC, low flow type as manufactured by GEMS, Inc. or equal. Flow sensor strip shall be SVT01A type as manufactured by OXECO compatible with rupture disk assembly.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that building service connection and municipal utility water main size, location and invert are as indicated.

3.02 PREPARATION

- A. Where applicable, ream pipe and tube ends and remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.03 BEDDING

- A. Excavate trench and install pipe bedding as specified in Section 2200, Earthwork.

3.04 SURFACE CONDITIONS

- A. Inspection
 - 1. Prior to all Work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this work may properly commence.
 - 2. Verify that all equipment may be installed in accordance with all pertinent codes and regulations, the original design, shop drawings, and the reference standards.
- B. Discrepancies
 - 1. In the event of discrepancy, immediately notify the Engineer.

2. Do not proceed with installation in area of discrepancy until all such discrepancies have been fully resolved.

3.04 STEEL PIPE FABRICATION

- A. Stainless steel pipe shall be fabricated by Aerex Industries, Fort Pierce, Florida, or equal, which shall be the minimum standard of fabrication quality for this project. The shop shall carry ASME certifications for performing pipe fabrication and be able to provide pickling of all piping systems.

- B. Field Joints

Flanged joints shall be provided at all connections to valves, equipment, and specialties, and at the locations indicated on the Drawings. To facilitate installation, additional field welded joints may be provided. Additional field joints shall be kept to a minimum and their location shall be acceptable to the Engineer.

- C. Flanged Joints

The diameter and drilling of flanges furnished in the piping shall be coordinated with the flanges for the valves and other equipment to be installed in the piping and conform to the standards specified herein. Blind flanges shall conform in diameter, drilling, and thickness to the flanges to which they attach and shall be reinforced as required to produce an airtight joint.

- D. Threaded joints

Pipe threads shall conform to ANSI/ASME B1.20.1, NPT, and shall be full and cleanly cut with sharp dies. Not more than three threads at each pipe connection shall remain exposed after installation. Ends of pipe shall be reamed, after threading and before assembly, to remove all burrs.

Threaded joints shall be made up with Teflon threaded tape applied to all male threads.

- E. Welded joints

All welds shall be sound and free from embedded scale or slag, shall have tensile strength across the weld not less than that of the thinner of the connected sections, and shall be airtight. Butt welds shall be used for all welded joints in line pipe assemblies.

All welding shall be in accordance with the Process Piping Code", ANSI B31.3-1996.

Welders for all piping shall be qualified per ASME Code Section IX for welding carbon steel and stainless steel piping, positions 2G and 5G. All welders will be required to present current qualification papers.

The Engineer shall have the right to perform any additional inspection of shop or field welds, at not additional cost to the Contractors, provided the welds pass the inspection. The Contractor shall repair all welds that fail inspection and burden the cost of retesting of any failed welds.

F. Pickling

After shop fabrication, all stainless steel pipe, fittings, and appurtenances shall be completely immersed for a minimum of 15 minutes in a pickling solution of 6 percent nitric acid and 3 percent hydrofluoric acid at 140 F. Parts shall be free from iron particles or other foreign material. A complete neutralizing operation, by immersion in a continuous fresh water bath, shall be required after the pickling operation. Passivate to uniform finish free of defects and scratches or pipe will be rejected. Electropolishing is not required.

G. Inspection and Testing

Inspection and testing by an independent laboratory will not be required at the fabricating or coating shop; however, the pipe manufacturer shall furnish an affidavit of compliance certifying that all materials used and work performed comply with the specified requirements. Affidavits shall be furnished in accordance with the submittal section.

H. Cleaning

All pipelines shall be clean and free of dirt, rocks, debris, or other foreign material of any kind when placed in service.

The interior of all pipe and fittings shall be thoroughly cleaned of all foreign matter, grease, oil, or other hydrocarbons before being installed and shall be kept clean until the work has been accepted.

I. Drawings and Data

Drawings, specifications, and other data showing complete details of the fabrication, construction, verification that pickling will be performed, weld locations, and installation of pipe, fittings, specials, and connections, together with complete data covering all materials proposed for use, shall be submitted in accordance with the submittals section.

3.06 PIPE INSTALLATION - GENERAL

- A. Take all precautions necessary to insure that pipe, valves, fittings, and other accessories are not damaged in unloading, handling, and installation. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.
- B. Exercise care to keep foreign material and dirt from entering pipe during storage handling and installation. Close ends of in-place at the end of any work period to preclude the entry of animals and foreign material.
- C. Use only those tools specifically intended for cutting the size and material and type pipe involved. Make cut to prevent damage to pipe or lining and to leave a smooth end at right angles to the axis of the pipe.

3.09 PIPE PENETRATIONS

- A. Use sleeves where pipes, valve stem extensions, or equipment parts pass through poured in place concrete or masonry walls or slabs. Sleeves shall be either cast iron or fabricated steel wall pipe with intermediate flange seep ring of sufficient size to allow sealing around pipe and clearance for valve stems or equipment. Extend vertical sleeves through slabs 1-inch above top surface.
- B. Provide "Link Seal" pipe to wall closures manufactured by Thunderline Corporation, Wayne, Michigan, where shown on drawings or otherwise required. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to fill annular space between pipe and wall opening.
- C. Where new pipe must penetrate existing concrete walls of water bearing structures or into the top slab of potable water bearing structures, core drill to smooth inside finish and install with Link Seal. Seal any rebar exposure.
- D. Where new pipe must penetrate concrete wall on non-water bearing concrete structures, drill penetration in neat, workmanlike manner, install pipe, grout in place with non-shrink grout, and refinish surface to match adjacent.

3.11 PRESSURE TESTING AND DISINFECTION

- A. Flush, test, and disinfect system in accordance with Section 02670.

3.12 FIELD QUALITY CONTROL

- A. If tests indicate Work does not meet specified requirements, remove work, replace, and retest at no cost to Owner.
- B. Frequency of Tests: Minimum of one test per pipe branch.