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CITY OF MANCHESTER
Department of Public Works
Environmental Protection Division

October 7, 2021

Mr. Andrew Morrill, PE
Wastewater Engineering Bureau
Department of Environmental Services
29 Hazen Drive/P.O Box 95,
Concord, 03302-0095

NOTE:

This waiver submission may include references to proprietary items and brand name products. These references have been retained in order to provide context for the waiver submission. EPA does not evaluate a waiver based on a proprietary item but reviews the performance-based specifications for the project/products. As such, any references to brand or proprietary items are reviewed on an "or equal" basis by EPA.

Items and pages may have been intentionally redacted or excluded by the EPA. Contact CWSRFWaiver@epa.gov for more information if necessary.

**Subject: Manchester, NH Wastewater Treatment Facility Solids Train Upgrade
AIS Availability Waiver Request for Stainless Steel Press Fittings**

Dear Mr. Morrill,

The City of Manchester, NH requests a waiver from the American Iron and Steel requirements for the CWSRF funded Solids Train Upgrade project for small (≤ 2 -inch) diameter stainless steel pipe press fittings for equipment water, flushing water, and plant water applications. These press fittings are not produced in the US in sufficient and reasonably available quantities and of the quality to comply with the project design specifications. EPA has the authority to issue such requested waivers in accordance with section 1452(a) (4) (C) (ii) of the Safe Drinking Water Act.

Manchester's Wastewater Treatment Facility Solids Train Upgrade Project will provide continuous sludge wasting, thickening, mixing, dewatering, and dewatered cake storage to comply with newly issued NPDES total phosphorus discharge effluent limits. This upgrade includes installation of equipment water, flushing water, and plant water piping for various uses. As this piping is part of a retrofit where the engineer has determined field welding is not desired and is a corrosive environment, stainless steel piping and fittings with grooved or press joints have been specified. The project is scheduled to be substantially complete by January 25, 2023, and substantial completion of the project is subject to a deadline by an EPA Clean Water Act consent decree. Please refer to the attached project schedule, indicating plant water piping is planned to be installed beginning in early 2022.

Refer to the attached statement from PC Construction, the general contractor, regarding the extensive efforts to source an AIS compliant product and have contacted the following suppliers and vendors:

1. Ferguson (Numerous manufacturers)
2. Victaulic
3. Viega
4. Apollo
5. Anvil

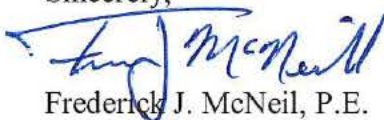
This good faith effort has not identified a single domestic manufacturer capable of providing a product conforming to the product specifications. Several readily available foreign manufactured products have been identified by the prime contractor's supplier, Ferguson Waterworks. A summary of the available foreign produced product is provided in Table 1. This alternative has been submitted by the Contractor and is acceptable to the Engineer of Record.

TABLE 1. SUMMARY OF MATERIALS REQUESTED FOR WAIVER OF AIS REQUIREMENTS

Description	Stainless Steel Piping Press Fittings
Unit of Measure	Each
Quantity	Varies - Refer to attachment
Price	
Lead Time	Immediately available – 2 week delivery
Location of Project	Manchester, NH WWTF 300 Winston St Manchester, NH 03103
Justification	Availability. Refer to attached supplier submittal, project drawings, and specifications.

Thank you for your review of this waiver is request for small (≤ 2 -inch) diameter stainless steel pipe press fittings. If you have any questions, please feel free to contact us at your convenience.

Sincerely,



Frederick J. McNeil, P.E.
Chief Engineer

Enclosures

- 1. Contractor Statement – Memo: Victaulic Pro-Press Stainless Steel Pipe Fittings Waiver for De Minimis*
- 2. Manchester, New Hampshire Wastewater Treatment Facility Solids Train Upgrade Conformed Specifications 15050 Pipe and Pipe Fittings – General, 15064B Stainless Steel Piping and Fittings*
- 3. 14045 Wastewater Treatment Facility Solids Train Upgrade Conformed Drawings PR-3 - PR-6A*
- 4. Submittal #15064B-03.0 15064B – Stainless Steel Piping and Fittings (Special) Vic-Press PW Piping for 1 1/2" to 2"*
- 5. Supplier Provided Fitting Quantities & Pricing*
- 6. Project Schedule*

cc: Beth L. Malcom, NH DES,
John A. Kelly, PC Construction
Bryanna Denis, PE, Wright Pierce

Kathleen Bourret, NH DES
Jeff Pinnette, PE, Wright Pierce
Matt Kackley, PE, Wright Pierce

Attachment 1
Contractor Statement
Memo: Victaulic Pro-Press Stainless Steel Pipe
Fittings Waiver for De Minimis





BUILDING STRONGER, TOGETHER

670 N. Commercial Street
Manchester, NH 03101
802.658.4100
pcconstruction.com

100% EMPLOYEE OWNED

September 16, 2021

Andrew Morrill, PE
Construction Management Engineer
Wastewater Engineering Bureau – Water Division – NHDES
29 Hazen Drive, P.O. Box 95
Concord, NH 03302

Memo: Victaulic Pro-Press Stainless Steel Pipe Fittings Waiver for De Minimis

Dear Mr. Morrill,

PC Construction was informed that the Victaulic Pro-Press stainless steel pipe fittings were unable to be added to the De Minimis list due to not being considered 'incidental'. These crimped stainless-steel fittings are specified for use on plant water, equipment water, and flushing water for piping above 3/4" in diameter. Victaulic is the sole named manufacturer for these fittings in the contract documents. Upon further investigation, no other manufacturer known to Ferguson Waterworks, PC's piping supplier, can furnish crimped stainless-steel fittings that are AIS compliant.

Viega was the only other manufacture besides Victaulic that makes a SSTL Compression System, which is called Viega Pro Press. Viega meets Buy American, but do not meet AIS. Apollo Makes a System called Apollo Power Press, but this is only available in Carbon Steel ZnNi Coated. This Press System is also not available in AIS. Nibco makes a system called Bench Press, but this is only available in Carbon Steel. This Press System is also not available in AIS.

PC requests a waiver be granted to PC to use import Victaulic Pro-Press crimped stainless-steel fittings for the Manchester Wastewater Treatment Facility Solids Train Upgrade Project's plant water piping modifications. Ferguson has sourced enough of these pro-press fittings to furnish this project's scope complete. Keeping in mind that this project is consent decree and lead times for another piping system are potentially extended durations, PC feels allowing these fittings for use with AIS compliant piping is the best option to provide the owner with the engineered system specified on time. The value of these fittings total [REDACTED]. The total cost of materials used in and incorporated into this project is \$10,636,303.00 making the 5% limit \$531,815.15, and indivial items are limited to 1%, or \$106,363.03.

Feel free to reach out to PC with any questions or concerns.

Thank you for your consideration,

John A. Kelly
Project Director

Attachment 2
Manchester, NH Wastewater Treatment Facility
Solids Train Upgrade Conformed Specifications
15050 Pipe and Pipe Fittings – General
15064B Stainless Steel Piping and Fittings



SECTION 15050

PIPE & PIPE FITTINGS – GENERAL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Furnish, install, support, and test pipe and pipe fittings of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.
- B. Related Work Specified Elsewhere (When Applicable):
 - 1. Excavation and backfill are specified in Division 2.
 - 2. Concrete cradles, arches, and encasements are specified in Division 3.
 - 3. Painting and Pipe Identification are specified in Section 09900.
 - 4. Surface Preparation and Shop Coatings are specified in Section 09905.
 - 5. Valves, gates, pipe hangers, pipe supports, pipe and equipment insulation, heating, and plumbing are specified in the appropriate Sections in Division 15.
 - 6. Pipe materials are specified in the appropriate sections of Division 2 and/or Division 15.
- C. Other Trades: Cooperate with all other trades whose work is to be coordinated with piping work.

1.2 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. ANSI B31.1 – Power Piping
 - 2. ANSI B31.3 – Process Piping
 - 3. ANSI B31.4 – Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohol.
 - 4. ANSI B31.5 – Refrigeration Piping
 - 5. ANSI B31.9 – Building Services Piping
 - 6. ANSI B31.8 – Gas Transmission and Distribution Piping Systems

1.3 SUBMITTALS

- A. Submit shop drawings in accordance with Section 01340 and the General Conditions of the Construction Contract.
- B. Submit manufacturer's "Certification of Conformance" that pipe and fittings and other piping appurtenances meet or exceed the requirements of these Specifications.
- C. Submit other documents as specified in the appropriate Sections of this Division.
- D. Submit complete pipe support system design stamped by a Professional Engineer registered in the State of New Hampshire with at least 5 years of experience in the analysis and design of similar system within the last 5 years.
- E. Computerized calculations with supporting and backup documentation will be acceptable.
- F. The design of the pipe support system shall include analyzing the system piping and service conditions to develop a detailed support system, specific to the piping material, pipe joints, valves and piping appurtenances.
- G. The support system design shall include the criteria for each piping system.

- H. The piping system analysis and design shall conform to ANSI B31.
- I. The support system shall be designed for dead weight and dynamic analysis, including system thermal effects, pressure thrusts and seismic forces. Refer to paragraph 1.4 Seismic Control for seismic requirements.
- J. Each piping system shall be presented in an isometric graphic and shall show the resolved and resultant force and moment systems as well as all recommended hangers, supports, anchors, restraints and expansion/flexible joints.
- K. Submit complete layouts, schedules, and location plans for all piping systems.
- L. Submit complete piping drawings for each piping submittal indicating type of hanger and/or support, location, magnitude of load transmitted to the structure and type of anchor, guide and other pipe supporting appurtenances including structural fasteners.
- M. Submittal shall include catalog cut for each different type of pipe hanger or support indicating the materials of construction, dimensions and range of pipe sizes for which that hanger is suitable. Where standard hangers and/or supports are not suitable, submit detailed drawings showing materials and details of construction for each type of special anchor and/or support.
- N. Summary of Contractor selected related components including joints, class, valves, appurtenances, etc., and commercial supports and piping materials.
- O. Coordinate piping support arrangements to eliminate interference with similar systems to be installed under HVAC, Plumbing, Fire Protection and Electrical; to account for structural expansion joints and to maintain access for both personnel and for removal of equipment.
- P. After the work is installed, but before it is filled for start-up and testing, the support system design engineer shall inspect the work and certify its complete adequacy. Each system shall be inspected and certified in the same way. Submit a report, including all field modifications and all certificates.

1.4 ~~SEISMIC CONTROL~~

- A. ~~Refer to specification section 13081 for general project and equipment specific seismic requirements.~~

1.4 DELIVERY, STORAGE AND HANDLING

- A. Exercise care during loading, transporting, unloading, and handling to prevent damage of any nature to interior and exterior surfaces of pipe and fittings.
- B. Do not drop pipe and fittings.
- C. Store materials on the project site in enclosures or under protective coverings in accordance with manufacturer's recommendations and as required by the Engineer.
- D. Assure that materials are kept clean and dry.
- E. Do not store materials directly on the ground.
- F. Follow manufacturer's specific instructions, recommendations and requirements.
- G. Store in a manner to protect items with epoxy shop coatings from exposure to UV light which can cause chalking of the epoxy. Length of acceptable exposure prior to providing UV protective measures shall be in accordance with coating manufacturer's recommendations. This includes protection from UV light after installation while awaiting covering or filling of tanks, or prior to field painting for items scheduled to be top coated as specified in Section 09900.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials are specified in the following Sections in this Division.

2.2 SURFACE PREPARATION AND SHOP COATINGS

A. Provide surface preparation and shop coatings in accordance with Specification Section 09905.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets, and other materials.
- B. Carefully inspect all materials at the time of delivery and just prior to installation.
- C. Carefully inspect all pipe and fittings for:
 - 1. Defects and damage.
 - 2. Deviations beyond allowable tolerances for joint dimensions.
 - 3. Removal of debris and foreign matter.
- D. Examine areas and structures to receive piping for:
 - 1. Defects, such as weak structural components that adversely affect the execution and quality of work.
 - 2. Deviations beyond allowable tolerances for pipe clearances.
- E. All materials and methods not meeting the requirements of this Contract will be rejected.
- F. Immediately remove all rejected materials from the project site.
- G. Start work only when conditions are corrected to the satisfaction of the Engineer.

3.2 INSTALLATION

- A. General:
 - 1. Install all pipe and fittings in strict accordance with the manufacturer's instructions and recommendations and as specified herein.
 - 2. Install all pipes and fittings in accordance with the lines and grades shown on the Drawings and as required for a complete installation.
 - 3. Install adapters, acceptable to the Engineer, when connecting pipes constructed from different materials.
 - 4. Support all piping not being installed in trenches in accordance with the "Pipe Hangers & Supports" Section in Division 15.
- B. Installation in Trenches:
 - 1. Firmly support the pipe and fittings on bedding material as shown on the Drawings and as specified in the appropriate Sections of these Specifications.
 - 2. Do not permanently support the pipe or fittings on saddles, blocking stones, or any material which does not provide firm and uniform bearing along the outside length of the pipe.
 - 3. Thoroughly compact the material under the pipe to obtain a substantial unyielding bed shaped to fully support the pipe.

4. Excavate suitable holes for the joints so that only the barrel of the pipe receives bearing pressure from the supporting material after placement.
 5. Lay each pipe length so it forms a close joint with the adjoining length and bring the inverts to the required grade.
 6. Set the pipe true to line and grade.
 7. Do not drive the pipe down to grade by striking it with a shovel handle, timber, rammer, or any other unyielding object.
 8. Immediately after making a joint, fill the holes for the joints with bedding material, and compact.
 9. When each pipe length has been properly set, place and compact enough of the bedding material between the pipe and the sides of the trench to hold the pipe in correct alignment.
 10. After filling the sides of the trench, place and lightly tamp bedding material to complete the bedding as shown on the Drawings.
 11. Take all necessary precautions to prevent floatation of the pipe in the trench.
 12. Bedding and backfill for all pipe materials shall be as specified in Section 02200, Earthwork, and as shown on the Drawings.
- C. Temporary Plugs:
1. When pipe installation work in trenches is not in progress, close the open ends of the pipe with temporary watertight plugs.
 2. If water is in the trench when work is resumed, do not remove plugs until all danger of water entering the pipe is eliminated.
 3. Do not use the pipelines as conductors for trench drainage during construction.

3.3 CLEANING AND TESTING

- A. Cleaning & Testing Piping - General:
1. Thoroughly clean all piping prior to testing. Remove all dirt, dust, oil, grease and other foreign material. Exercise care while cleaning to avoid damage to linings and coatings.
 2. When the installation is complete, test all pipelines in the presence of the Engineer and the plumbing or building inspector in accordance with the requirements of the local and state plumbing codes and the appropriate Sections of these Specifications, at no additional cost to the Owner. When requested by the Engineer or local plumbing inspector, building gravity drains shall be tested prior to backfilling or concealing. All other piping must be tested after backfilling.
 3. Equipment: Supply all labor, equipment, materials, taps, gauges, and pumps required to conduct the tests.
 4. Retesting: Perform all retesting required by the Engineer at no additional cost to the Owner.
- B. Outside Potable Water Piping:
1. Pressure Test (CLASS I):
 - a. CLASS I Pressure Testing shall be performed in accordance with Section 4 of AWWA Standard C600.
 - b. Pressure and leakage tests are required and will be conducted concurrently.

- c. Hydrant branch gate valves shall remain open during this test.
- d. The hydrostatic pressure shall be at the test pressures noted on the Drawings based on the elevation of the lowest point in the Section under test. If no test pressure is indicated, perform pressure and leakage test at 1-1/2 times the maximum system pressure or 150 psi, whichever is greater (based on the elevation of the lowest point of the section under test and corrected to gauge location). Test duration shall be two (2) hours.
- e. Leakage, if any, shall be equal to or less than the amounts as determined by Section 4.2 of AWWA C 600.

$$L = SD \sqrt{P}$$

148,000

L = allowable leakage in gallons per hour
 S = length of pipe tested, in feet
 D = nominal diameter of pipe, in inches
 P = average test pressure, in pounds per square inch

- f. The Contractor shall furnish and install corporation stops, taps and lengths of line as required to conduct the testing.

2.

Disinfection of Pipelines:

- a. Chlorinate all new potable water lines in accordance with the procedure outlined in AWWA C651. (Section 5.1 deleted)
- b. Review locations of chlorination and sampling points with the Engineer prior to beginning disinfection.
- c. Use a dosage which will produce an initial minimum concentration of 25 mg/l and not less than 10 mg/l chlorine residual after a contact period of 24 hours.
- d. During the chlorination period, exercise care to prevent the contamination of water in the existing water main.
- e. After chlorination, flush the piping with clean potable water until the residual is that prevailing in the existing system or less than 0.5 mg/l.
- f. The Contractor shall furnish and install corporation stops, taps, lengths of pipe as required to conduct testing.
- g. Dispose of chlorinated water as per AWWA C651, Appendix B.

3.

Bacteriological Testing:

- a. Test all new potable water lines for total coliform bacteria at no additional cost to the Owner.
- b. The length of pipe to be tested and the time of the test itself shall be as approved in advance by the Engineer.
- c. The Engineer will observe the taking of samples.
- d. Have all samples tested by a laboratory certified by the State and submit test results to the Engineer.
- e. Any segment of a potable water line shall be considered unsuitable for service if a coliform bacteria count is obtained from that sample or if results show a high non-specific bacteria level.
- f. Re-disinfect all segments of piping considered unsuitable and retest. Continue to disinfect and test until satisfactory results are obtained.

- whichever is greater (based on the elevation of the lowest point of the section under test and corrected to the gauge location).
- e. While maintaining this pressure, the Contractor shall make a leakage test by metering the flow of water into the pipe. If the average leakage during a two-hour period on buried pipelines exceeds a rate calculated by the equation in paragraph 3.3, B, 1, e of this Specification Section, the section shall be considered as having failed the test. All pipes within structures and chambers and all flanged joints shall have no visible leakage.
 - f. If the section fails to pass the pressure and leakage test, the Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work. Additional tests and repairs shall be made until the section passes the specified test.
2. Connection to Work by Others.
 - a. If work involves connection of pipelines to pipes or structures provided by others, pressure test pipeline prior to making the connection.
 - b. After successfully passing the pipeline pressure test, make the necessary connections to the work by others, and pressure test the connection.
 - c. The connection shall be pressurized to the pipeline test pressure, for a minimum of 4 hours. The connection shall have no visible leakage.
 - d. Correct any leakage at no cost to the Owner and retest until connection passes.
 3. Cleaning: Perform all specialized cleaning as specified or required by system.

3.4 PIPE SCHEDULE

TAG	DESCRIPTION	LOCATION (1)	SIZE	MATERIAL (2)	JOINT SYSTEM	PRESSUR E TEST CLASS (3)	DELEGATED PE DESIGN OF PIPE SUPPORTS (4)	DELTA OPER. PRESS. (PSI)	DELTA OPER. TEMP. (degF)
PIPE SCHEDULE PART 1:									
PART 1 OF THIS PIPE SCHEDULE APPLIES TO ALL PIPING EXCEPT FOR PLUMBING AND MECHANICAL PIPING. REFER TO PART 2 AT THE END OF THIS TABLE FOR PLUMBING/MECHANICAL PIPING SCHEDULE.									
AC	COMPRESSED AIR	EXPOSED	ALL	RIGID AL GRADE 5042	SEE SPEC 15075	CLASS IV	NO		
CEN	CENTRATE	BURIED	ALL	CLASS 52 D.I. ⁵	PUSH-ON	CLASS IV	N/A	-	-
		EXPOSED	ALL	CLASS 53 D.I. ⁵	FLANGED				
CSC	CONCENTRATE D SCUM	EXPOSED	ALL	SCH 40 STEEL	WELDED	CLASS IV	YES		
					GROOVED				
DPOL	DILUTED POLYMER	EXPOSED	ALL	SCH 80 PVC	SOLVENT WELD OR THREADED	CLASS IV	NO	-	-
		EXPOSED CONTAIN. PIPE	ALL	SCH 80 PVC ELECT. CONDUIT W/LONG RAD. SWEEPS	SOLVENT WELD		NO	-	-
		EXPOSED CHEMICAL PIPE	ALL	160 PSI PE TUBING	INSERT FITTINGS		NO	-	-
D/ DR/ DW	DRAIN/ DEWATERING	BURIED	≥4"	CLASS 51 D.I. ⁵	MJ OR PUSH-ON	CLASS V	N/A	-	-
			<4"	SCH 40 PVC	SOLVENT WELD		N/A	-	-
		EXPOSED	SEE SPEC SECTION 15401					NO	-
DSL	DEWATERED SLUDGE PIPE / CAKE PIPING	EXPOSED	ALL	SCH 40, ASTM A- 53, GR-B CARBON STEEL	GROOVED OR WELDED	CLASS V	YES	-	-
EW/	EQUIPMENT	EXPOSED	≥ 1.5"	SCH 40 304 SS	GROOVED OR	CLASS IV	NO	-	-

PIPE & PIPE FITTINGS – GENERAL
 SPECIFICATION UPDATED VIA ADDENDUM 1, 2 & 3

TAG	DESCRIPTION	LOCATION (1)	SIZE	MATERIAL (2)	JOINT SYSTEM	PRESSUR E TEST CLASS (3)	DELEGATED PE DESIGN OF PIPE SUPPORTS (4)	DELTA OPER. PRESS. (PSI)	DELTA OPER. TEMP. (degF)
FW/PW EW/FW /PW ⁶	WATER/FLUSHING WATER/PLANT WATER		< 1.5"		CRIMP		NO	-	-
				SCH 10 304 SS	GROOVED OR CRIMP				
				TYPE L COPPER	SOLDERED				
FIL	FILTRATE	BURIED	ALL	CLASS 52 D.I. ⁵	PUSH-ON	CLASS IV	N/A	-	-
		EXPOSED	ALL	CLASS 53 D.I. ⁵	FLANGED		NO	-	-
FW	FLUSHING WATER	SEE EW							
GT	GRIT	EXPOSED	ALL	CLASS 53 D.I. ⁵	FLANGED	CLASS IV	NO	-	-
			TRAN- SITION	10S STAINLESS STEEL	FLANGED		NO	-	-
GTE	GRAVITY THICKENER EFFLUENT	BURIED	ALL	CLASS 52 D.I. ⁵	PUSH-ON	CLASS V	N/A	-	-
		EXPOSED	ALL	CLASS 53 D.I. ⁵	FLANGED		YES	-	-
		IN AERATION TANKS	ALL	SCH 40 304L SS	FLANGED		YES	-	-
		THROUGH TUNNEL/TANK WALL	ALL	SCH 40 316 SS	FLANGED		NO	-	-
HPHOR/ HPHOS	HYDRAULIC OIL RETURN AND SUPPLY ⁶	EXPOSED	ALL	STEEL TUBE	TBD	CLASS IV	NO		
				RUBBER HOSE	TBD				
MPOL	MANNICH POLYMER	EXPOSED	ALL	SCH 10 STAINLESS STEEL (304L)	WELDED	CLASS IV	YES		
LW	LUBE WATER	SEE OCS							

PIPE & PIPE FITTINGS – GENERAL
 SPECIFICATION UPDATED VIA ADDENDUM 1, 2 & 3

TAG	DESCRIPTION	LOCATION (1)	SIZE	MATERIAL (2)	JOINT SYSTEM	PRESSUR E TEST CLASS (3)	DELEGATED PE DESIGN OF PIPE SUPPORTS (4)	DELTA OPER. PRESS. (PSI)	DELTA OPER. TEMP. (degF)
ODOR/ OCD	ODOR CONTROL DUCT	EXTERIOR		FRP (SEE SPECIFICATION SECTION 15841)			YES	-	-
		EXPOSED	≥6"	FRP (SECTION 15841)	BUTT WELD OR FLANGE	SPEC 15841 AND 15907			
		EXPOSED	<6"	SCH 40 PVC	SOLVENT WELD	SECTION 15907	NO	-	-
OFL	OVER FLOW ⁷	EXPOSED	OFL	CLASS 53 D.I. ⁵	FLANGED	CLASS IV	NO		
OCS / LW	ODOR CONTROL MIST SPRAY / LUBE WATER	EXPOSED	3/8" & 1/2"	304 SS TUBE (SECTION 11231B)	COMPRESSION TYPE	CLASS IV	NO	-	-
POL	POLYMER (EMULSION POLYMER)	EXPOSED	ALL	SCH 80 PVC	SOLVENT WELD OR THREADED	CLASS IV	NO	-	-
PS/ TPS/ TCS	PRIMARY SLUDGE/ THICKENED PRIMARY SLUDGE/ THICKENED COMBINED SLUDGE	EXPOSED	ALL	CLASS 53 D.I. ⁵	FLANGED	CLASS IV	YES		
PW	PLANT WATER	SEE EW							
S	SEWER	BURIED	≥30"	CLASS 52 D.I. ⁵	PUSH-ON	CLASS II	N/A	-	-
				SDR 35 PVC	PUSH-ON		N/A	-	-
				RCP CLASS III/IV	BELL & SPIGOT		N/A	-	-
			<30"	SDR 35 PVC	PUSH-ON		N/A	-	-
				RCP CLASS III/IV	BELL & SPIGOT		N/A	-	-
				EXPOSED	≥4"		CLASS 51 D.I. ⁵	PUSH-ON	SEE SPEC
		<4"	SDR 40 PVC	SOLVENT WELD	15400-3	NO	-	-	
SAM	SAMPLE LINE	EXPOSED	ALL	SCH 40 304 SS	GROOVED OR CRIMP	CLASS IV	NO	-	-

PIPE & PIPE FITTINGS – GENERAL
 SPECIFICATION UPDATED VIA ADDENDUM 1, 2 & 3

TAG	DESCRIPTION	LOCATION (1)	SIZE	MATERIAL (2)	JOINT SYSTEM	PRESSUR E TEST CLASS (3)	DELEGATED PE DESIGN OF PIPE SUPPORTS (4)	DELTA OPER. PRESS. (PSI)	DELTA OPER. TEMP. (degF)	
SC/ SCO	SCUM/ SCUM DECANT	BURIED		CLASS 52 D.I. ⁵	PUSH-ON	CLASS IV	N/A	-	-	
		EXPOSED	≤ 8"	CLASS 53 D.I. ⁵	FLANGED		NO	-	-	
SD	STORM DRAIN	BURIED	≥30"	RCP CLASS III	BELL & SPIGOT	NR	N/A	-	-	
			<30"	RCP CLASS III	BELL & SPIGOT		NR	N/A	-	-
				SDR 35 PVC	PUSH-ON			N/A	-	-
				CPE	PUSH-ON			N/A	-	-
		EXPOSED	SEE SPEC SECTION 15401				NO	-	-	
TCS / TPS	THICKENED COMBINED SLUDGE/ THICKENED PRIMARY SLUDGE	SEE PS								
TWAS / WAS	THICKENED WASTE SLUDGE/ WASTE SLUDGE	BURIED	ALL	CLASS 52 D.I. ⁵	PUSH-ON	CLASS IV	YES	-	-	
		EXPOSED	≥6"	CLASS 53 D.I. ⁵	FLANGED					
			<6"	CLASS 53 D.I. ⁵	FLANGED					
SW	SEAL WATER	EXPOSED	ALL	TYPE L COPPER	SOLDERED	CLASS IV	NO	-	-	
UD	UNDER DRAIN	BURIED	ALL	SDR 35 (PERF)/ ABS (PERF)/ CPE (SLOTTED)	PUSH-ON	NR	N/A	-	-	
W / CW	WATER / CITY WATER	BURIED	≥4"	CLASS 52 D.I. ⁵	PUSH-ON	CLASS I	N/A	-	-	
			< 4"	SCH 80 PVC	SOLVENT WELD		N/A	-	-	
				160 PSI PE	INSERT FITTING		N/A	-	-	
		EXPOSED	≥4" , SEE SPECIFICATION 15401				CLASS IV			
	<4" , SEE SPECIFICATION 15401				CLASS IV					
WAS	WASTE SLUDGE	SEE TWAS								

PIPE & PIPE FITTINGS – GENERAL
SPECIFICATION UPDATED VIA ADDENDUM 1, 2 & 3

TAG	DESCRIPTION	LOCATION (1)	SIZE	MATERIAL (2)	JOINT SYSTEM	PRESSUR E TEST CLASS (3)	DELEGATED PE DESIGN OF PIPE SUPPORTS (4)	DELTA OPER. PRESS. (PSI)	DELTA OPER. TEMP. (degF)	
PIPE SCHEDULE PART 2: PART 2 OF THIS PIPE SCHEDULE APPLIES TO PIPING SHOWN ON PLUMBING, MECHANICAL, AND CIVIL DRAWINGS. FOR PROCESS PIPING, REFER TO PART 1 OF THIS TABLE.										
NOTE 1: "X" AT THE END OF THE TAG DENOTES PIPE IS BELOW A CONCRETE SLAB OR BELOW GRADE. NOTE 2: WASTE PIPING (W) CHANGES TO SANITARY PIPING (S) DOWNSTREAM OF WHERE A TOILET CONNECTS.										
CD	CONDENSATE DRAIN	EXPOSED	< 4"	SCH 80 PVC OR TYPE L COPPER	SOLVENT WELD OR SOLDERED	N/A	NO	-	-	
		EXTERIOR		TYPE L COPPER	SOLDERED					
CW/ CWX	DOMESTIC COLD WATER	ALL	ALL	SEE SPEC SECTION 15401			NO	-	-	
G / GX	NATURAL GAS	ALL	ALL	SEE SPEC SECTION 15401 AND 15444			NO	-	-	
HW/ HWX/ HWRX	DOMESTIC HOT WATER	ALL	ALL	SEE SPEC SECTION 15401			NO	-	-	
HWS / HWR	HEATING HOT WATER	ALL	ALL	SEE SPEC SECTION 15601			NO	-	-	
S/SX	SANITARY	ALL	ALL	SEE SPEC SECTION 15401			NO	-	-	
SPD	SUMP PUMP DISCHARGE	SEE PART 1 OF THIS TABLE								
TW/ TWX	DOMESTIC TEPID WATER	ALL	ALL	SEE SPEC SECTION 15401			NO	-	-	
V/VX	SANITARY VENT	ALL	ALL	SEE SPEC SECTION 15401			NO	-	-	
W/WX	WASTE	ALL	ALL	SEE SPEC SECTION 15401			NO	-	-	

- (1) PIPE CONTAINED WITHIN TANKAGE SHALL BE CONSIDERED “EXPOSED” OR “INTERIOR” PIPING FOR THE PURPOSES OF THE PIPE SCHEDULE (UNLESS OTHERWISE SPECIFICALLY DESIGNATED).
- (2) TYPE L COPPER MAY BE USED IN LIEU OF D.I. FOR <3" DUCTILE IRON PIPE.
- (3) IF A SPECIFIC PRESSURE IS NOT INDICATED IN PARENTHESES AFTER THE PRESSURE TESTING CLASS, USE THE TEST PRESSURE INDICATED IN THE SPECIFICATION WRITE UP FOR THAT GENERAL PIPE PRESSURE TESTING CLASS.
- (4) REFER TO SECTION 15094 FOR PIPE SUPPORT REQUIREMENTS AND SUBMITTALS. ALL EXPOSED PIPES REQUIRE SUPPORTS; SOME PIPES REQUIRE PIPE SUPPORTS, BRACING OR RESTRAINTS DESIGNED BY A PROFESSIONAL ENGINEER.
- (5) ALL NEW REPLACEMENT CENTRATE, DRAIN, GRIT, PRIMARY SLUDGE, OVERFLOW, THICKENED PRIMARY SLUDGE, THICKENED WASTE ACTIVATED SLUDGE, THICKENED COMBINED SLUDGE PIPING SHALL BE GLASS LINED DUCTILE IRON, ALL OTHER DUCTILE IRON LINES SHALL BE DOUBLE CEMENT LINED.
- (6) *FOR BURIED PW PIPING, REFER TO “W / CW, WATER / CITY WATER” LINE ITEM IN PIPE SCHEDULE.*
- (7) *OFL/OVER FLOW PIPE ON MANNICH POLYMER PUMPING SYSTEM SHALL BE MPOL PIPE TYPE (SCH 10 SS) LISTED IN PIPE SCHEDULE. ALL OTHER OFL / OVER FLOW SHALL BE CL 53 DI FLG PIPE AS SPECIFIED.*

END OF SECTION

SECTION 15064BSTAINLESS STEEL PIPING AND FITTINGS (SPECIAL)PART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Furnish, install and test complete stainless steel piping systems, including stainless steel pipe, fittings, couplings, supports and appurtenances, as shown on the Drawings and as specified herein, and in accordance with piping manufacturer recommendations.
1. Plant water flushing piping for Gravity Thickeners (GT-1, -2, and -3).
 2. Plant water flushing piping for WAS Thickeners (TCEN-1, -2, and -3).
 3. Equipment water for Emulsion Polymer Dilution System (PBU-1 and -2).
 4. Equipment water for cooling WAS Thickeners (TCEN-1, -2, and -3).
 5. The stainless steel piping system shall be shop fabricated to the maximum extent practicable and shall have shop prepared joints to facilitate shipping to the job site as well as to facilitate field assembly by the Contractor. Field welding shall be kept to a minimum and shall be used to correct misalignment.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Pipe and Pipe Fittings - General is specified in Section 15050.
- B. Couplings and Connectors is specified in Section 15088.
- C. Pipe Hangers and Supports is specified in Section 15094.
- D. Valves and Specialties is specified in Section 15100.

1.3 QUALITY ASSURANCE

- A. General:
1. Manufacturer's Qualifications:
 - a. All shop fabricated stainless steel pipe and fittings shall be furnished by a single manufacturer who is experienced, reputable, qualified and regularly engaged for the last 5 years in the manufacture and fabrication of stainless steel piping systems, and shall show evidence of satisfactory service in at least 5 installations.
 - b. Stainless steel pipe shall be manufactured in the United States.
 2. Acceptable Manufacturers:
 - a. Douglas Brothers, Portland, Maine
 - b. Felker Bros. Corp., Marshfield, Wisconsin
 - c. Or approved equal.
- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ASTM A 240, Specifications for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.
 2. ASTM A 312, Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.

3. ASTM A 774, As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.
 4. ASTM A 778, Welded, Unannealed Austenitic Stainless Steel Tubular Products.
 5. ASTM D 6585-00, Standard Specification for Unsintered Polytetrafluoroethylene (PTFE) Extruded Film or Tape.
 6. ASTM D 3294-97, Standard Specification for PTFE Resin Molded Sheet and Molded Basic Shapes.
 7. ASTM F 36, Standard Test Method for Compressibility and Recovery of Gasket Materials.
 8. ASTM F 38, Standard Test Methods for Creep Relaxation of a Gasket Material.
 9. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
 10. ANSI B16.9, Factory Made Wrought Steel Butt Welding Fittings.
 11. ANSI B36.19, Stainless Steel Pipe.
 12. ANSI B31.1/AWWA C206, Standard for Field Welding.
 13. ANSI/ AWWA C-220, Standard for Stainless Steel Pipe, 4 in. and Larger.
 14. AWWA M-11, Steel Pipe – A Guide for Design and Installation.
 15. ANSI/AWS D1.1, Structural Welding Code Steel.
- C. Shop Welding:
1. Shop welding shall be performed by welders certified per ASME Section IX, in accordance with ANSI B31.1.
- D. Field Welding:
1. Field welding shall be done with prior approval of the Engineer and shall be performed by welders certified per ASME Section IX, in accordance with ANSI B31.1. Field welds shall be equal to shop welds in all respects.

1.4 SUBMITTALS

- A. Submit shop drawings, manufacturer's literature, catalog cuts, piping layouts in accordance with Section 01340 and Section 15050. Specific information which shall be submitted is identified below.
1. Name of manufacturer of pipe, fittings and appurtenances and a list of material(s) to be provided by each manufacturer.
 2. Piping layouts and schedules to include: dimensions; location(s) and type(s) of joints, fittings, equipment, valves, supports and appurtenances; coordination with all other work and existing conditions, and all other pertinent technical specifications for the piping systems to be furnished. Piping layouts shall also indicate intended field welding locations.
 3. Shop fabrication drawings showing alloys, diameters, pipe wall thicknesses, flanges and other joint preparation details, dimensions, fittings, and other appurtenances to be supplied.
 4. Proposed cleaning methods, including pre-cleaning, passivation and final cleaning.
 5. Certifications for proposed shop and field welders per ASME Section IX. Certifications shall document conformance with ASME B31.1.
 6. Shop fabrication inspection report documenting a Certified Welding Inspection (CWI) of shop welds. CWI shall be performed on **20%** of the total number of shop welds. Shop fabrication inspection report, including qualifications of shop

- Certified Welding Inspector, shall be submitted prior to shipment of materials. Welds identified as insufficient shall be repaired or replaced prior to shipment.
7. The Contractor shall submit a sample of the pipe fittings and the installation manual from the manufacturer.

PART 2 - PRODUCTS

2.1 PIPE

- A. Pipe 1.5 inches and greater in diameter shall be manufactured ASTM-A240 annealed and pickled sheets and plates in accordance with ASTM A778 in Type 304L stainless steel as specified herein and on the Drawings. Pipe under 1.25 inches in diameter shall be Type L copper as specified herein, in Specification 15063 and on the Drawings.
- B. Pipe shall be manufactured to nominal pipe sizes as listed in ANSI B36.19, Table 2.
- C. Pipe wall thickness shall be specified herein or by Schedule or Gauge / Wall thickness in Section 15050 "Pipe and Pipe Fittings – General" in the Pipe Schedule. Pipe material shall be specified herein or by
- D. Piping shall be shop prepared for pipe grooved or crimp compression couplings where shown on the Drawings and specified herein.

2.2 FITTINGS:

- A. Groove type or crimp compression type fittings shall be shop prepared as specified herein and shown on the Drawings:
 1. Fittings shall be manufactured in type 304L SS, conforming to pipe per ASTM A 312:
 - a. 90° and 45° Elbows
 - b. Tees and Reducing Tees
 - c. Laterals, True Wyes, Crosses
 - d. Adapter nipples
 - e. Concentric Reducers
 - f. Eccentric Reducers
 - g. Caps
 2. Maximum working pressure shall be equivalent to the pressure ratings of the pipe and couplings used for installation. Pressure ratings shall be dependent on pipe wall thickness.
 3. Gaskets shall be full-faced neoprene or rubber ring gaskets, conforming to grooved coupling housing .
 - a. 12 inch diameter or less shall be 1/16-inch thick.
 - b. Larger than 12 inch diameter shall be 3/32-inch thick.
 - c. Gaskets shall be suitable for use at temperatures to 250°F.
 4. Bolts, nuts and washers shall be stainless steel, ASTM F593/F594, Alloy Group 2, AISI 316 stainless steel with minimum yield strength of 65,000 psi. Bolt grade identification marking "F593G". For high temperature service, use A193 Grade B8M Class 1 AISI 316 stainless steel. Bolt grade identification marking "B8M".
 5. Field fabricated fittings are not acceptable.

6. Acceptable manufacturers:
 - a. Victaulic Company of America,
 - b. Star Pipe Products,
 - c. Or equal.

2.3 JOINTS:

- A. Grooved or crimped compression pipe adapters shall be provided as a minimum at all flanged valves, meters, and other equipment.
 1. Grooved Couplings:
 - a. Split Type:
 - i. Constructed from Type 304L.
 - ii. For use with grooved or shouldered end pipe.
 - iii. Acceptable Manufacturers:
 - (1) Victaulic Company of America,
 - (2) Star Pipe Products,
 - (3) Or equal.
- B. Pipe and fitting spools shall be shop fabricated to the fullest extent possible in 40'0" maximum lengths with 7'6" maximum widths for efficient commercial transport to the project site. Spools with fittings may exceed 40'0" so long as length allows commercial transport. Smaller pipe spools shall be provided with joints as shown on the Drawings for special handling, installation, and/or disassembly requirements.

PART 3 - EXECUTION

3.1 FABRICATION AND INSTALLATION

- A. All stainless steel pipe and fittings shall be pickled by immersion in an air agitated tank containing an ambient 25% solution of nitric and hydrofluoric acids for 15 to 20 minutes at 125 degrees F. A clean water rinse shall follow the acid pickle.
- B. Spools shall be fabricated to the "Pipe Fabrication Institute" fabricating tolerances ES-3 (1981).
- C. All fabricated piping shall have openings plugged and flanges secured for storage and/or transport after fabrication. All fabricated piping shall be piece marked with identifying numbers or codes which correspond to the Contractor's layout and installation drawings. The marks will be located on the spools at opposite ends and 180 degrees apart.
- D. Handling and Installation:
 1. The piping supplier during manufacturing, fabrication and handling stages, and the Contractor during handling and installation stages, shall use extreme care to avoid the contact of any ferrous materials with the stainless steel piping.
 2. All saws, drills, files, wire brushes, etc. shall be used for stainless steel piping only.
 3. Pipe storage and fabrication racks shall be non-ferrous or stainless steel or rubber lined.
 4. Nylon slings or straps shall be used for handling stainless steel piping. Contact with ferrous items may cause rusting of iron particles embedded in the piping walls.

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5. After installation, the Contractor shall wash and rinse all foreign matter from the piping surface. If rusting of embedded iron occurs, the Contractor shall pickle the affected surface with Oakite Deoxidizer SS or equal, scrub with stainless steel brushes and rinse clean.
- E. Maintenance:
1. The Contractor shall be responsible for supplying and installing the stainless steel piping with a consistently clean surface. Identifying spool piece marks shall be removed with paint thinner or solvents and the entire stainless steel surface shall be washed with detergent and hot water and rinsed clean.
 2. Final marking of the pipeline will be in accordance with Section 09900.
- F. After installation, the piping system shall be tested by the Contractor according to Section 15050.

Table 1 on the following two pages includes the nominal pipe size (NPS) the outside diameter of the pipe, wall thickness and weight per foot of the acceptable piping.

TABLE 1
DIMENSIONS OF WELDED AND SEAMLESS STAINLESS STEEL PIPE
ANSI/ ASTM/ ASME B36.19M-1985
ASTM A778

Nominal Pipe Size (NPS)	Outside Diameter (OD)	GAUGE / WALL THICKNESS								
		16 GA. 0.062"	14 GA. 0.078"	12 GA. 0.109"	11 GA. 0.125"	10 GA. 0.140"	8 GA. 0.172"	3/16" 0.188"	1/4" 0.250"	3/8" 0.375"
		Weight of pipe pounds per foot								
3	3.500	2.6	3.1	4.1	4.5	--	--	--	--	--
4	4.500	3.4	4.1	5.3	5.8	--	--	--	--	--
5	5.563	4.0	4.8	6.5	7.5	8.2	--	--	--	--
6	6.625	5.0	5.7	7.8	8.9	9.6	--	--	--	--
8	8.625	6.2	7.4	10.2	11.7	13.8	--	--	--	--
10	10.750	7.8	9.3	12.5	14.6	15.6	19.2	23.7	28.8	--
12	12.750	9.2	11.0	14.9	17.4	19.5	21.7	25.0	34.3	50.9
14	14.000	10.1	12.1	16.9	19.1	21.4	23.6	28.4	37.7	56.0
16	16.000	11.6	13.8	19.3	21.8	24.5	28.5	32.5	43.2	64.3
18	18.000	13.0	15.6	21.7	24.6	27.6	32.1	36.6	48.7	72.5
20	20.000	14.5	17.3	24.1	27.3	30.7	38.0	40.9	54.2	80.8
24	24.000	17.4	20.8	29.0	32.8	36.9	45.7	49.1	65.3	97.3
30	30.000	21.7	26.0	36.2	41.1	46.1	57.2	61.6	81.7	122.0
36	36.000	26.1	31.2	43.5	49.3	55.4	68.7	74.0	98.2	146.7

TABLE 2
DIMENSIONS OF WELDED AND SEAMLESS STAINLESS STEEL PIPE
ANSI/ ASTM/ ASME B36.19M-1985
ASTM A-312 0.5" THROUGH 2.5" AND ASTM A778 3" THROUGH 36"

		SCH 5S		SCH 10S		SCH 40S	
Nominal Pipe Size (NPS)	Outside Diameter (OD)	Wall Thickness (T)	LBS/FT	Wall Thickness (T)	LBS/FT	Wall Thickness (T)	LBS/FT
0.5	0.840	0.065	0.54	0.083	0.68	0.109	1.1
0.75	1.050	0.065	0.69	0.083	0.87	0.113	1.7
1	1.315	0.065	0.88	0.109	1.4	0.133	2.3
1.25	1.660	0.065	1.1	0.109	1.8	0.14	2.7
1.5	1.900	0.065	1.3	0.109	2.1	0.145	3.7
2	2.375	0.065	1.6	0.109	2.7	0.154	5.9
2.5	2.875	0.083	2.5	0.12	3.6	0.203	7.7
3	3.500	0.083	3.1	0.12	4.5	0.216	10.9
4	4.500	0.083	4.1	0.12	5.8	0.237	14.8
5	5.563	0.109	6.5	0.134	8.2	0.358	19.2
6	6.625	0.109	7.8	0.134	9.06	0.28	28.9
8	8.625	0.109	10.2	0.148	13.8	0.322	40.9
10	10.750	0.134	15.6	0.165	19.2	0.365	50.1
12	12.750	0.156	21.7	0.18	25	0.375	
14	14.000	0.165	23.3	0.188	28.4		
16	16.000	0.165	28.5	0.188	32.5		
18	18.000	0.165	32.1	0.188	36.6		
20	20.000	0.188	40.9	0.218	47.4		
24	24.000	0.218	57	0.25	65.3		
30	30.000	0.250	81.7	0.312	101.8		
36	36.000	0.250	98.2	0.312	122.3		

END OF SECTION