South Fork Water Board
15962 Hunter Avenue
Oregon City, Oregon 97045

ADDENDUM NO. 2 to Contract Documents for
WATER QUALITY SYSTEMS BUILDING
PROJECT NO. CIP-01

DATE: AUGUST 20, 2026

SUBJECT: ADDENDUM 2 - CHANGES TO THE CONTRACT DOCUMENTS

DOCUMENTS TO: PROSPECTIVE BIDDERS AND PLANHOLDERS

The Contract Documents for the above project are not modified in any way by this A*ddendum No. 2 except as provided below.*

ITEM NO. 1 – DIVISION 0 FRONT END SPECIFICATIONS, SECTION 00 11 13 ADVERTISEMENT TO BID

A. Section 00 11 13 Advertisement for Bid, Subsection General Notice, the first sentence of the paragraph that begins with the words "Sealed Bids for the construction of the Project …" is REPLACED with the following:

    a. "Sealed Bids for the construction of the Project will be received electronically via a link at sfwbor.gov/bids-and-rpfs, until Tuesday, September 1, 2026 at 2 PM local time."

B. Revision to bid form to revise measurement unit for Bid Item 50. DELETE Specification Section 00 41 13, and REPLACE in its entirety with the attached revised section included as Attachment A.

C. Revisions to Bid Items 5 and 11.
    a. DELETE specification section 00 41 13 and REPLACE it in its entirety with version included as Attachment A.

ITEM NO. 2 – DIVISION 01 GENERAL REQUIRMENTS, SECTION 01 20 20, MEASUREMENT AND PAYMENT

A. Specification Section 01 20 20, DELETE bid item 50, and REPLACE in its entirety with the following:

    a. Metering Pump Assemblies: Measurement and payment for furnishing and installing metering pump assemblies will be on a lump sum basis. The price presented in the bid proposal will include installation cost of the metering pump assemblies, complete, including flow meter and metering pumps for all chemicals, and coordination with the supplier and start-up and testing by the contractor.

ITEM NO. 3 - DIVISION 46 WATER AND WASTEWATER EQUIPMENT, SECTION 46 33 13 ONSITE HYPOCHLORITE GENERATION SYSTEM

A. Specification Section 46 33 13, DELETE paragraph 1.6 Operating Cost Information in its entirety.

B. Specification Section 46 33 13, DELETE paragraph 2.3 Sodium Hypochlorite Generator, Item E and REPLACE with the following:

    a. "E. The electrolytic cell shall consume a maximum of 2.4 AC kilowatt-hours of electricity per pound of chlorine equivalent output."

C. Specification Section 46 33 13, DELETE paragraph 2.3 Sodium Hypochlorite Generator, Item F and REPLACE with the following:

    a. "F. The electrolytic cell shall consume a maximum of 17 gallons of water per pound of chlorine equivalent output."

ITEM NO. 4 - DIVISION 46 WATER AND WASTEWATER EQUIPMENT, SECTION 46 36 33 SODA ASH BULK BAG UNLOADER SYSTEM

A. Specification Section 46 36 33 Soda Ash Bulk Bag Unloader System, DELETE paragraph 2.1.B and REPLACE with the following:

    a. "B. The soda ash system shall be able to feed soda ash into the WQSB at a rate of 1,746 dry pounds per 12-hour day."

ITEM NO. 5 - DIVISION 43 PROCESS GAS AND LIQUID HANDLING, SECTION 43 41 43 POLYETHYLENE TANKS

A. Specification 43 41 43 was duplicated in its original form. DELETE both versions of Specification 43 41 43 in their entirety, and REPLACE with the Specification 43 41 43 included as Attachment A.

ITEM NO. 6 – DRAWINGS

A. DELETE Sheet M-505 of the Contract Drawings and REPLACE with the sheet M-505 in Attachment B.

B. DELETE Sheet I-601 of the Contract Drawings and REPLACE with the Sheet I-601 in Attachment B.

C. DELETE Sheet G-006 of the Contract Drawings and REPLACE with the Sheet G-006 in Attachment B.

South Fork Water Board
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D. Reference Sheet GE-2, Luminaire Schedule A

   a. For luminaire TYPE F under CATALOG NO./VOLTAGE column, DELETE catalog number "22FPX-21-EL14W-L840-HCD" and REPLACE it in its entirety with "22FPX-21-L840-HCD".

_____ _____

Bidder's Signature Date

_____

Company Name

South Fork Water Board
15962 Hunter Avenue
Oregon City, Oregon 97045

ATTACHMENT A – SPECIFICATIONS

SECTION 00 41 13 - BID FORM

ARTICLE 1 - OWNER AND BIDDER

1.1 This Bid is submitted to: South Fork Water Board, 15962 Hunter Ave., Oregon City, Oregon 97045.

1.2 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - ATTACHMENTS TO THIS BID

2.1 The following documents are submitted with and made a condition of this Bid:

A. Section 00 41 13, Bid Form

B. Section 00 43 13, Bid Bond;

C. Section 00 45 13.01, Responsibility Determination Form

D. Section 00 45 17, First-Tier Subcontractors Disclosure Form;

E. Section 00 45 19, Non-Collusion Affidavit

ARTICLE 3 - BASIS OF BID UNIT PRICES

3.1 Unit Price Bids

A. Bidder will perform the following Work at the indicated unit prices:

B. Note: This project is subject to AIS requirements and Davis-Bacon Wage Rates.

Item	Description	Unit	Quantity	Unit Price	Bid Amount
1	Mobilization, bonds, insurance, and demobilization	LS	1		$
2	Traffic control	LS	1		$
3	Erosion control	LS	1		$
4	Construction survey and staking	LS	1		$
5	Extra work as authorized	LS	1	$100,000.00	$100,000.00
6	Demolition of Existing Facilities	LS	1		$
7	Shop drawings and approvals	LS	1		$
8	Tree protection and removal, clearing, and grubbing	LS	1		$
9	Dewatering	LS	1		$
10	Clearing and Grubbing	LS	1		$

Item	Description	Unit	Quantity	Unit Price	Bid Amount
11	Backfill with imported material	CY	1100		$
12	Excavation	LS	1		$
13	Sawcutting	LF	630		$
14	Subgrade Stabilization	SY	120		$
15	Cold Plane Pavement Removal, 2 inches	SY	400		$
16	Asphalt Concrete Paving (ACP) - Swan Avenue				$
	a. Level 2, 1/2-Inch ACP, 4-inch depth	TON	100		
	b. Grind and Inlay, 2-Inch ACP	SY	400		
	c. Crushed Aggregate 3/4-Inch (leveling course) - Swan Avenue Roadway	CY	25		
	d. Crushed Aggregate 1/2-Inch (base) - Swan Avenue Roadway	CY	125		
	e. Geotextile Fabric, Woven	SY	450		
17	Concrete Curb and Gutter - Swan Avenue				$
	a. Concrete Curb and Gutter - Swan Avenue	LF	380		
	b. Crushed Aggregate 3/4-Inch - Swan Avenue Curb and Gutter	CY	30		
18	Concrete Sidewalk - Swan Avenue				$
	a. Concrete Sidewalk - Swan Avenue	SF	2320		
	b. Crushed Aggregate 3/4-Inch - Concrete Sidewalk - Swan Avenue	CY	20		
	c. Extra for Curb Ramps	EA	6		
19	Concrete Driveway - Swan Avenue				$
	a. Concrete Driveway - Swan Avenue	SF	600		
	b. Crushed Aggregate 3/4-Inch - Concrete Driveway - Swan Avenue	CY	10		
20	Asphalt Concrete Paving (ACP) - On Site				$
	a. Level 2, 1/2-Inch ACP, 4-inch depth	TON	400		
	b. Crushed Aggregate 3/4-Inch - Access Road and Parking	CY	590		
	c. Geotextile Fabric, Woven	SY	1770		
21	Concrete Curb - On Site				$
	a. Concrete Curb - On Site	LF	750		
	b. Crushed Aggregate 3/4-Inch - On Site	CY	50		
22	Concrete Sidewalk - On Site				$
	a. Concrete Sidewalk - On Site	SF	2090		
	b. Crushed Aggregate 3/4-Inch - Concrete Sidewalk - On Site	CY	20		
23	Chemical Containment Pad - On Site				$
	a. Concrete Driveway - On Site	SF	300		
	b. Crushed Aggregate 3/4-Inch - Concrete Driveway - On Site	CY	10		

Item	Description	Unit	Quantity	Unit Price	Bid Amount
24	Furnish and Install 7-foot chain link gate and fence, complete				$
	a. 7-foot Chain Link Fencing with Barbed Wire	LF	360		
	c. Motorized Chainlink Access Gate, 20'-wide, Swing	LS	1		
25	Furnish and install DI pipe with Class B (imported granular material) Trench Backfill				$
	a. 10" DI Stormwater Pipe, non-restrained	LF	260		
	b. 12" DI Stormwater Pipe, non-restrained	LF	70		
26	Furnish and install 4" PVC Stormwater Pipe	LF	250		$
27	Furnish and install 8" PVC Stormwater Pipe	LF	70		$
28	Furnish and install 10" PVC Stormwater Pipe	LF	20		$
29	Furnish and install 18" Concrete Storm Culvert, Class V, complete	LS	1		$
30	Site Stormwater system testing and start-up	LS	1		$
31	Furnish and install NW Rain Garden, Complete	LS	1		$
32	Furnish and install NE Rain Garden, Complete	LS	1		$
33	Furnish and install Swan Avenue Stormwater Planter, Complete	LS	1		$
34	Furnish and install 2' Wide Roadway Drainage Ditch, Complete	LS	1		$
35	Furnish and install manholes				$
	a. 48" Stormwater Manhole	EA	8		
	b. 60" Stormwater Manhole	EA	1		
	c. 72" Stormwater Manhole	EA	1		
36	Furnish and install stormwater inlets				$
	a. Ditch Inlet	EA	1		
	b. Curb Inlet	EA	1		
	c. Catch Basin, Type 3	EA	2		
37	Furnish and install Polydrain PDX H-20, Complete	LF	20		$
38	Existing Ditch Connection	LS	1		$
39	Furnish and Install 24-inch Class 52 Ductile Iron Pipe with Class B Trench Backfill	LF	108		$
40	Common Utility Trench, complete	LS	1		$
41	Hydrostatic testing, flushing, and disinfection of water mains	LS	1		$

Item	Description	Unit	Quantity	Unit Price	Bid Amount
42	Furnish and Install Fire Hydrant Assembly	EA	1		$
43	All work required to constructing landscape items, complete, including all incidental work as specified and necessary	LS	1		$
44	Alum Bulk Tank, HDPE, (6,000 gal)	EA	2		$
45	Coagulant Polymer Aid Bulk Tank, HDPE (6,000 gal)	EA	1		$
46	Brine Tank, FRP (7,100 gal)	EA	1		$
47	Sodium Hypochlorite Tank, FRP (10,000 gal)	EA	2		$
48	Sodium hypochlorite Generator, (2) 900 PPD units & Accessories	LS	1		$
49	Soda Ash Batching System	EA	1		$
50	Metering Pump Assemblies	LS	1		$
51	Air Compressor	EA	1		$
52	Chemical Feed Piping				$
	a. 1/2-Inch, PVC	LF	20		
	b. 1-Inch, PVC	LF	220		
	c. 2-Inch, PVC	LF	190		
	e. 3-Inch, PVC	LF	300		
	f. 4-Inch, PVC	LF	90		
	g. 8-Inch, PVC	LF	30		
	h. 3/8-Inch, Poly-Braided Tubing	LF	160		
	i. 1/4-Inch, Poly-Braided Tubing	LF	150		
	j. 1-Inch, Poly-Braided Tubing	LF	250		
	k. 1-1/2-Inch, Poly-Braided Tubing	LF	250		
53	Ball Valves				$
	a. Valves 1/2-inch	EA	9		
	b. Valves, 3/4 inch	EA	4		
	c. Valves 1-1/2-inch	EA	3		
	d. Valves, 2-inch	EA	18		
	e. Valves 3-inch	EA	8		
54	Utility Water Twin Booster Pumps & Accessories	LS	1		$
55	Hydropneumatic Tanks	EA	2		$
56	All work and materials required to construct the architectural facilities for water quality systems building, complete, including all incidental work as specified and necessary:				$
	a. CMU Wall Systems, Complete	LS	1		
	b. Doors and Fenestration, Complete	LS	1		
	c. Architectural Roof System, Complete	LS	1		

Item	Description	Unit	Quantity	Unit Price	Bid Amount
	d. Finishings, Coatings, and Paint, Complete	LS	1		
	e. Furniture and Devices, Complete	LS	1		
57	All work and materials required to construct the structural facilities for water quality systems building, complete, including all incidental work as specified and necessary:				$
	a. Concrete Foundations and Slab-On-Grade, Complete	LS	1		
	b. Structural Roof Support and steel, Complete	LS	1		
58	All work and materials required to construct the HVAC facilities for water quality systems building, complete, including all incidental work as specified and necessary:				$
	a. VRF Packaged Heat Pump System, Complete	LS	1		
	b. Makeup Air Handling Unit, Complete	LS	1		
	c. Ducting and Conveyance Systems, Complete	LS	1		
59	All work and materials required to construct the plumbing facilities for water quality systems building, complete, including all incidental work as specified and necessary:				$
	a. Water Service Piping and Fixtures, Complete	LS	1		
	b. Sewer Collection System, Complete	LS	1		
	c. Emergency Shower and Eyewash Systems, Complete	LS	1		
60	All work required to construct the electrical facilities for the water quality systems building, complete, including all incidental work as specified and necessary				$
	a. Service & Distribution	LS	1		
	b. Controls / PLC / SCADA / Comms	LS	1		
	c. Lighting & Devices	LS	1		
	d. Equipment Connections	LS	1		
	e. Raceway / Wire / Installation	LS	1		
	f. Coordination with Owner's SCADA Integrator	LS	1		
Total of All Unit Price Bid Items					$

C. Bidder acknowledges that:

1. Each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and

2. Estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 4 - TIME OF COMPLETION

4.1 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment on or before the dates or within the number of calendar days indicated in the Contract.

4.2 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 5 - BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.1 Bid Acceptance Period

A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.2 Instructions to Bidders

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.3 Receipt of Addenda

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 6 - BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.1 Bidder's Representations

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.

2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.

4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.2 Bidder's Certifications

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.

2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.

4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this contract:

    a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.

    b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

    c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.

    d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

B. Bidder acknowledges of all funding agency requirements for the Contract. The Owner will be utilizing WIFIA funds for this project, which have requirements pertaining to the use of American Iron and Steel (AIS) products, federal Davis-Bacon wage requirements, the requirement that the Bidder and all subcontractors are not subject to debarment and suspension with SAM, certification that any property acquisition complies with the URA 'Uniform Relocation Assistance' requirements, prohibition on certain telecommunication and video surveillance services or equipment, Disadvantaged Business Enterprises (DBE) good faith efforts and reporting, among other requirements. Bidder acknowledges that they have familiarized themselves with all WIFIA funding requirements (described in Section 00 73 45), and have accounted for all required compliance while placing their bid.

BIDDER hereby submits this Bid as set forth above:

Bidder:

_____

(typed or printed name of organization)

By: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

Address for giving notices:

_____

_____

Bidder's Contact:

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Phone: _____

Email: _____

Address:

_____

_____

_____

Bidder's Contractor License No.: (if applicable) _____

END OF SECTION

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SECTION 43 41 43 –POLYETHYLENE TANKS

PART 1 GENERAL

1.1 SUMMARY

A. Work under this Section includes single- and double-wall liquid storage tanks made from high density cross-linked polyethylene, and accessories, for storage of water treatment chemicals.

1.2 REFERENCE STANDARDS

A. American Society of Testing Materials (ASTM).

1. D1998, Standard Specification for Polyethylene Upright Storage Tanks.

B. ANSI Standards:

1. B-16.5, Pipe Flanges and Flanged Fittings

C. Building Code: International Building Code

1. IBC, 2021

D. NSF/ANSI Standard 61

1.3 SUBMITTALS

A. Drawings: drawings shall be approved by the Owner prior to the manufacturing the tanks. Submit the following as a single, complete initial submittal.

1. Location and orientation of openings, fittings, accessories, restraints and supports, demonstrating compliance with the locations shown on the Drawings.

2. Details of manways, flexible connections, and vents.

B. Product Data: Sufficient data to show that the product conforms to the requirements of this specification and the Drawing. Provide the following additional information:

1. Tank and Fitting Material

a. Resin Manufacturer Data Sheet
b. Fitting Material
c. Gasket style and material
d. Bolt material
e. Details of level indication gages
f. Details of the seismic restraint system

2. Calculations shall be stamped and signed by a Structural Engineer registered in the State of Oregon.

a. Tank restraint system. Show seismic criteria.

1) Tank pad dimensions shall be verified by the Contractor and manufacturer to confirm sufficient edge distance for seismic restraints and tie downs. Dimensions less than 4 inches from the outside of bolt to edge of concrete shall be brought to the attention of the Engineer.

b. Wall thickness. Hoop stress shall be calculated in accordance with ASTM D1998. In no case shall the tank thickness be less than design requirements per ASTM D1998. Tanks shall be designed using a hoop stress no greater than 600 psi and the Barlow formula.

C. Manufacturer's warranty.

D. Manufacturer's shipping, storage and protection, and handling procedures.

E. Manufacturer's unloading procedure.

F. Manufacturer's installation instructions.

G. Supporting information on Manufacturer's Quality Management System.

H. Supporting documentation of Manufacturer's certification to NSF/ANSI Standard 61.

I. Manufacturer's Qualifications: Submit to Engineer a list of 5 installations with tanks in the same service as proof of Manufacturer's qualifications.

J. Electrical heat tracing and foam insulation data sheets, as required.

K. Factory Test Report

1. Wall thickness verification.
2. Fitting placement verification.
3. Visual inspection
4. Impact test
5. Gel test
6. Hydrostatic test

1.4 QUALITY ASSURANCE

A. The Contractor shall supply tanks of high-density, cross-linked polyethylene. Tanks furnished under this Section shall be supplied by a manufacturer who has been regularly engaged in the design and manufacture of chemical storage tanks for a minimum of 5 years.

B. Tanks shall be manufactured from virgin materials.

C. Tanks shall be manufactured from materials certified to NSF/ANSI Standard 61 for chemical storage and submit form from NSF supporting chemical certification.

1.5 WARRANTY

A. The Supplier shall provide the Manufacturer's 5-year, full replacement limited warranty for the specific service application. Prorated warranties are not acceptable.

PART 2 PRODUCTS

2.1 GENERAL

A. Tanks shall be rotationally molded, high density cross-linked polyethylene, single-wall tanks.

B. Tanks shall be rotationally molded, one piece and of seamless construction.

C. Tanks shall be designed for above-ground, vertical installation and shall be designed to store the specified chemicals at atmospheric pressures.

D. Tanks shall be adequately vented.

E. The ancillary mechanical fittings and accessories specified herein shall be provided by the Tank Manufacturer.

F. Tanks shall be marked to identify the Manufacturer and date of manufacture. The serial number for each tank shall be permanently embossed into the tank.

2.2 POLYETHYLENE STORAGE TANKS

A. Service: Chemical storage tanks shall be suited for the following operating conditions:

1. Specific gravity: See HDPE Tank Schedule at the end of this Section.

2. Interior locations:

a. Temperature range: 40 degrees Fahrenheit to 105 degrees Fahrenheit.

3. Mechanical fill and Pneumatic fill.

B. High Density Cross-linked Polyethylene resin used in the tank manufacture shall contain ultraviolet stabilizer as recommended by the Resin Manufacturer. Tank colors shall be natural, un-pigmented polyethylene, unless indicated otherwise.

C. The polyethylene shall be virgin material. Any use of regrind, recycled, or reprocessed materials or combinations of such materials shall not rely upon the performance data of their original constituents, but must meet the requirements of this standard in its own right.

D. Wall thickness for a given hoop stress shall be calculated in accordance with ASTM D1998. Under no conditions shall the tank thickness be less than design requirements of ASTM D1998.

1. The wall thickness of any cylindrical portion at any fluid level shall be determined by the following equation:

$T = P \times OD/2SD$ or $0.433 \times SG \times H \times OD/2SD$

Where: T = wall thickness; in
P = pressure; psi
SG = specific gravity; grams/cubic centimeter
H = fluid head; ft
OD = outside diameter; ft
SD = hydrostatic design stress

a. The minimum wall thickness shall be sufficient to support its own weight in an upright position without external support but shall not be less than 0.187" thick.

b. The hydrostatic design stress shall be derated for service above 100 degrees Fahrenheit and for mechanical loading of the tank.

c. The minimum design specific gravity shall be 1.9.

2. On closed top tanks, the top head shall be integrally molded with the cylindrical wall. The minimum top head thickness shall be equal to the thickness of the top of the straight sidewall. Flat areas shall be provided for attachment of large fittings on the dome of the tank, as shown in the Drawings.

3. The bottom head shall be integrally molded with the cylindrical wall. Knuckle radius shall be a minimum of 1-inch for tank diameters less than or equal to 6 feet and 1.5-inches for tank diameters greater than 6 feet.

4. Lifting lugs shall be provided for tanks of greater than 3,000 gallons and the lugs shall be designed for lifting the tank when empty.

5. Unless otherwise indicated in the Drawings, for indoor pneumatic fill, manways shall be 24-in diameter or greater and equipped with an emergency pressure relief device with pressure relief at 6-inches water column to prevent over-pressurization. The manway shall be chemically compatible with the chemical being stored. Gaskets shall be closed cell, cross-linked polyethylene foam, Viton, or EPDM materials.

6. Tank Vents: Each tank shall be vented for the material and for the anticipated flow and withdrawal rates.

a. Tanks shall be vented to allow for performance at atmospheric pressure, in accordance with the following matrix:

Venting Requirements For Polyethylene Tanks

Mechanical Pump Fill	**Pneumatic Fill**								
IF ≤ 1000 gallons	**IF** Vent length ≤ 3 feet			**IF** Vent length > 3 and ≤ 30'			**IF** Scrubber Application		
Vent size should equal size of largest fill or discharge fitting	**AND - Vent** screen mesh size ≥ 1/4" or no screen used			**AND** 3 or less 90° elbows with no other restrictions or reduction in pipe size			**Vent pipe size throughout scrubber system CANNOT be reduced!** Centerline of dispersion pipe not to be submersed > 6 inches		
IF > 1000 gallons	**Emergency Pressure Relief Cover Required**			**Emergency Pressure Relief Cover Required**			Perforated dispersion pipe must be same diameter or larger as vent. Sum of perforations ≥ cross sectional area of pipe		
Vent size should exceed the largest fill or discharge fitting by 1 inch	Tanker Discharge	Inlet/Fitting Size	Minimum Vent Size	Tanker Discharge	Inlet/Fitting Size	Minimum Vent Size	Tanker Discharge	Inlet/Fitting Size	Minimum Vent Size
	2"	2"	4"	2"	2"	6"	2"	2"	6"
	3"	2"	6"	3"	2"	8"	3"	2"	8"
	3"	3"	6"	3"	3"	8"	3"	3"	10"

(2) 2 inch vents **DO NOT EQUAL** 4 inch venting capacity

rev Nov 2009

For detailed venting guidelines, please visit our Technical Resources at www.polyprocess.com

2.3 MANUFACTURER

A. Poly Processing Company.
B. Norwesco.
C. Snyder.
D. Or equal.

2.4 TANK ACCESSORIES

A. Restraint System:

1. Metal components shall be stainless steel, edge softeners, and tension ring with stainless steel cables and clamps.

2. Tank restraint system shall be supplied by the Tank Manufacturer.

3. Seismic restraint shall be designed by a Structural Engineer registered in the State of Oregon. Design shall conform to the most recent edition of the IBC code for seismic load.

4. Anchor bolts as required by the calculations shall be supplied by the Tank Manufacturer.

B. Fittings: Each tank shall have the following fittings if they are shown on the Drawings. Fitting locations and size shall be as shown in the Drawings.

1. Fill connection with interior drop pipe.

2. Connection for vent pipe.

3. Bolted, one-piece sidewall fitting on the interior tank wall with siphon leg inside the main tank to fully utilize tank storage volume and bellows style transitional fitting on exterior tank wall for secondary containment of chemical, if required.

4. Bulkhead fitting on a vertical face for overflow pipe.

5. Universal ball dome bulkhead fitting on the top face or slope for vertical installation of a non-contacting level sensor.

C. Level Indication

1. As shown on the Drawings.

2.5 TANKS

A. Tank Schedule as shown in the Drawings and as further specified herein.

B. Note that approximate overall height is measured along the straight cylindrical portion of the tank. Maximum height is from the outside base of the tank to the dome top or the threaded cap on the dome, whichever is higher.

C. Fittings

1. Threaded fittings shall use American Standard Pipe Threads.

2. Bolted flange fittings shall be constructed of one 150 lb. flange with ANSI bolt pattern, one flange gasket and stud bolts with gaskets. Stud bolts shall have chemical resistant polyethylene injection molded heads and gaskets to provide a sealing surface between the bolt head and the interior tank wall. Stud bolt heads shall be color coded, according to the following schedule, for ease of visual identification.

a. Green for 316 Stainless Steel,

b. Black for Titanium,
c. Red for Alloy C-276
d. Blue for Monel.

3. All materials shall be compatible with chemical service and as indicated in the fitting schedule above. For NSF/ANSI 61 certification, EPDM or Viton GF gaskets shall be supplied.

4. For sodium hypochlorite and sulfuric acid storage, Bolted One-Piece Sure Seal (B.O.S.S.), double flange fittings constructed of virgin polyethylene shall be supplied. Bolts shall be welded to a common backing ring and encapsulated with polyethylene to prevent fluid contact with the metal material. Flanges will have one full face gasket to provide a sealing surface against inside tank wall. All materials shall be compatible with chemical service and as indicated in the fitting schedule above. For NSF/ANSI 61 certification, EPDM or Viton GF gaskets shall be supplied.

5. Down Pipes and Fill Pipes: Down pipes and fill pipes shall be supported at intervals of no more than 6-feet. Down pipes and fill pipes shall be PVC or other material compatible with the chemical stored.

6. Expansion joints shall meet the following minimum performance requirements:

a. Axial Compression ≥ 0.67”
b. Axial Extension ≥ 0.67”
c. Lateral Deflection ≥ 0.51”
d. Angular Deflection ≥ 14º
e. Torsional Rotation ≥ 4º

2.6 FACTORY TESTING

A. Material Testing

1. Perform gel and low temperature impact tests in accordance with ASTM D1998 on condition samples cut from each polyethylene chemical storage tank.

2. Degree of Crosslinking. Use Method C of ASTM D1998- Section 11.4 to determine the ortho-xylene insoluble fraction of cross-linked polyethylene gel test. Samples shall test at no less than 60 percent.

B. Tank Testing

1. Dimensions: Take exterior dimensions with the tank empty, in the vertical position. Outside diameter tolerance, including out-of-roundness, shall be per ASTM D1998. Fitting placement tolerance shall be +/- 1/2-in vertical and +/- 1 degree radial.

2. Visual: Inspect for foreign inclusions, air bubbles, pimples, crazing, cracking, and delamination.

3. Hydrostatic test: Following fabrication, the bottom tanks, including inlet and outlet fittings, shall be hydraulically tested with water by filling to the top sidewall for a minimum of 1 hour and inspected for leaks. Following successful testing, the tank shall be emptied and cleaned prior to shipment.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. The tank shall be shipped upright or lying down on their sides with blocks and slings to keep them from moving. Sharp objects on trailers shall be avoided.

B. All fittings shall be installed at the factory to confirm proper installation. All fittings that the Manufacturer recommends be shipped separately shall be removed for shipping. Manufacturer's instructions for reinstallation of removed fittings shall be provided with the tanks and accessories.

3.2 INSTALLATION

A. Manufacturer shall provide detailed instructions for tank installation.

B. Manufacturer shall provide a check list for review of the installed tanks by Owner and Contractor prior to Manufacturer's review of the installed tank systems.

C. After the Contractor has installed the tanks, Manufacturer shall inspect installed tanks to verify proper installation of flexible outlet and drain connections, venting pipe connections, fill pipe connections, overflow, reverse level gauge and other fittings.

D. Manufacturer shall provide a minimum 1-hour training session to instruct Owner's operators on servicing and maintaining the tank system. Included in the training session will be three complete sets of training manuals.

E. Manufacturer's trained, certified technician shall conduct an onsite inspection of the completed installation. Inspection will verify chemical application, plumbing connections, venting, and applicable ancillary equipment such restraints. Manufacturer shall supply Owner with a certificate verifying proper installation when equipment has passed the installation checklist.

F. Tank manuals will consist of installation check lists, record tank drawings, fitting drawings referencing nozzle schedule on tank drawing, materials of construction, and recommended maintenance program.

3.3 ANCHORING

A. Furnish and install equipment anchoring as specified in Section 01 33 17, Structural Design, Support and Anchorage and the recommendations of the equipment manufacturer's literature and calculations, including anchoring methods and leveling criteria.

3.4 FIELD TESTING

A. All tanks shall be hydrotested for 24 hours prior to commissioning.

3.5 SUPPLEMENTS

A. The supplements listed below, following "End of Section", are part of this Section.

1. HDPE Tank Schedule.

END OF SECTION

HDPE TANK SCHEDULE		
Name of Tank	Alum Tank (Typ of 2)	Polymer Tank
Equipment Number(s)	72TNK-1-70 72TNK-2-70	74TNK-1-70
Filament-wound or Contact-molded	Contact-molded	Contact-molded
Maximum Capacity Measured to High Solution Level (gallons)	6,000	6,000
Installation (Vertical/Horizontal)	Vertical	Vertical
Diameter (feet)	8.5	8.5
Support (saddles, flat pad, legs)	Flat pad	Flat pad
Type of Bottom Head	Flanged only	Flanged only
Type of Top Head	Flanged only	Flanged only
Ladder Required (Yes/No)	No	No
Tank Location (indoor/outdoor)	Indoor	Indoor
Ambient Temperature Range (F)	55-75	55-75
Exterior Loading (psf):		
Personnel Roof Loads	20	20
Pipe Supports and Appurtenances	As required	
Operating Contents:		
Temperature (degrees F, not to exceed 180)	55-75	55-75
Chemical Composition	$Al_2(SO_4)_3 \cdot 14H_2O$	N/A
Specific Gravity	1.35	1.14
Concentration	25%	50%
pH Range	1.2-2.5	5-9
Insulation/Heat Tracing (Yes/No)	No	No

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ATTACHMENT B - DRAWINGS