

Roane County is inviting sealed bids for the good(s) and/or service(s) listed below, subject to the terms and conditions of the Invitation to Bid (ITB), the accompanying specifications, and the Roane County Purchasing Manual.

At the appointed time bids will be publicly opened in the office of the Roane County Purchasing Agent at the above address. Bids arriving in the Purchasing Department past the appointed date and time will be considered late and will not be opened.

Deliver Bids To:

ROANE COUNTY PURCHASING DEPARTMENT
200 EAST RACE STREET, SUITE #3
KINGSTON, TENNESSEE 37763

Bid Number: 2021-06-128
VERTICAL DOUBLE WALL POLYETHYLENE STORAGE TANK

Open Date & Time: SEPTEMBER 24, 2020 at 2:00 p.m. (Eastern Time Zone)

The Bid Envelope must show the Bid Number, Name & Opening Date.

PURCHASING CONTACT INFORMATION

Lynn Farnham, CPPO, CPPB
Purchasing Agent
Phone: 865-376-4317
Fax: 865-376-4318
Email: lynn.farnham@roanecountytn.gov

GENERAL TERMS & CONDITIONS

1. Attached are instructions and conditions for submitting a bid for Roane County Government. The objective of this bid is to select suppliers in such a manner as to provide for open and free competition and comparability.
2. Vendors are to provide one original and one copy of the bid being submitted. Any costs associated with the preparation or delivery of the bid is at the Vendor's cost with no cost to Roane County.

BID PREPARATION & SUBMISSION

1. Bidders are expected to examine any drawings, specifications, terms and conditions, general or special conditions, schedules and all instructions for the purpose of this bid. Failure to do so will be at the bidder's risk.
2. The total bottom line cost will be determined by multiplying each item bid price times the quantity requested and adding the extended dollar figures.
3. All bids shall be in accordance with the instructions to bidders and specifications included in this ITB. Specifications are intended to be open and non-restrictive.
4. All columns of the bid document must be completed in ink or typewritten. The bottom line total (sum of extended prices) must also be printed in ink or typewritten on the proposal form. No erasures shall be permitted. Errors may be crossed out and corrections printed in ink or typewritten and must be initialed in ink by the person signing the bid.
5. All bids must meet or exceed the enclosed specifications. Bidder must indicate the manufacturer's name and model number offered. If bidder fails to provide this information, and an award is made, then the bidder shall supply the item(s) as specified. All items supplied by the successful bidder shall be new and unused and meet all OSHA standards. Items delivered not meeting these requirements shall be subject to return and replaced at no additional

cost to Roane County. Any exceptions to the specifications must be clearly noted, documented and have prior approval to be submitted as an approved alternate.

6. The use of the name of a manufacturer, brand, model or make used in describing an item does not restrict the bidder to that manufacturer. Others will be considered if they meet or exceed the items specified. When an alternate manufacturer, brand, model or make will be bid, five (5) days prior to the bid the bidder must submit documents to the Purchasing Agent, for evaluation of the product. Roane County will determine if the item does meet or exceed the item as specified.
7. It shall be the sole responsibility of the bidder to make certain that all bids in proper form are submitted to the Purchasing Department as described below.
8. Delivery charges are to be prepaid and included in the bid pricing.
9. All original forms must be signed by a person with authority to bind the bid. The bid must be sealed in an envelope that is labeled according to the directions stated below.
10. On the outside of the envelope/package mark the bid as follows:
 - Vendor Name & Address
 - Bid Number
 - Bid Date & Time
11. The bid must then be in a sealed envelope/package mailed or delivered to the following address:

Roane County Purchasing Department
200 East Race Street, Suite #3
Kingston, Tennessee 37763

Please note that Roane County does not receive a guaranteed delivery time for express mail and/or packages. Please mail accordingly.

12. Sealed written bids will be received at the time and place specified on the Invitation to Bid. Postmark on the Bid by this date will not suffice. Bid must be received on or before the date and time stated. Faxed bid documents will not be accepted.

LATE RECEIPT OF THE BID

1. The bid and modifications or withdrawals thereof received after the time set for opening will not be considered, unless they are received before the award is made and it is determined by Roane County that failure to arrive on time was due solely to a delay in delivery for which the bidder has no responsibility. Roane County does not receive a guaranteed delivery time for express mail and/or packages. Please mail accordingly.
2. Bids must be in the Purchasing Department prior to or at 2:00 p.m. sharp on the appointed date. No bids will be accepted past 2:00 p.m. (02:00:01 is considered late) Time will be determined by the official NIST US time.

BID PERIOD

1. Unless otherwise noted in the bid specifications, the contract will be awarded for the period of one (1) year from the date of bid opening. Roane County reserves the right to purchase additional items against this bid on an "as needed" basis if pricing remains the same. This does not apply to bids with options of renewal.

RESTRICTIVE OR AMBIGUOUS SPECIFICATIONS

1. It is the responsibility of the bidder to review the entire Invitation to Bid document and to notify the Purchasing Agent if the Invitation to Bid is formulated in a manner that would unnecessarily restrict competition or if it is ambiguous in what is being requested.
2. Pursuant to TCA §12-4-126, questions regarding the specifications or bid procedures must be received by the Purchasing Agent and/or designer no less than ninety-six (96) hours before the bid opening date. No addenda will be issued within less than forty-eight (48) hours of the bid opening day, excluding weekends and legal holidays designated in §15-1-101 unless the bid opening is extended for a reasonable time as determined by the purchasing agent, which shall not be less than forty-eight (48) hours excluding weekends and legal holidays designated in §15-1-

101, to allow for any necessary changes to the Invitation to Bid documents and to allow responders to resubmit their responses accordingly.

3. Any questions concerning this Invitation to Bid are to be faxed to the Purchasing Department. Questions will be answered via addenda. Information obtained from any office other than the Purchasing Office is not to be considered binding.

BID OPENING & AWARD

1. Only the bottom-line figure will be read at the bid opening. Bids will also be examined for compliance with specification and conditions outlined in the bid document.
2. Consideration will be given to all bids properly submitted. Bids will receive appropriate confidentiality before awarding. Upon award, bid documents and tabulations will be available for review. Errors discovered after public opening may not be corrected, and the bidder may be bound to honor bid as submitted. After investigation of the nature of the mistake, the Purchasing Agent may allow the bid to be withdrawn.
3. The contract will be awarded in writing to the most responsive bidder whose bid conforms best to the Invitation to Bid will be most advantageous to Roane County. It is the intent of Roane County to involve and utilize the best product/services at the best prices and provide small and minority firms, women's business enterprises and labor surplus area firms with increased opportunity to do business with the county. However, currently there are no set asides for small or minority firms.
4. Roane County reserves the right to accept or reject any or all bids and to waive informalities and minor irregularities in the bids received.
5. Roane County reserves the right to award the bid in its entirety or to divide the award in any way that will be more advantageous to the county.
6. Bid results will be posted on the County's website along with the bid tabulation.

PROTEST PROCEDURE

1. If a prospective vendor does not agree with the bid award, they have the right to protest. Disputes arising from the award of this bid must be submitted in writing to the Roane County Purchasing Department no later than seven (7) days from date of bid award. The steps for dispute resolution may include:
 - A meeting with the Purchasing Agent, the requisitioning department's manager and representatives from the disputing party to discuss and resolve the complaint.
 - Information from the aforementioned meeting will be forwarded to the County Attorney for review.
 - A written decision letter stating the reasons for the decision will be prepared by the Purchasing Agent and submitted in writing to the protestor and all parties involved.
 - Purchases will not be allowed under this procurement until a final decision is rendered.
 - In the event that purchases must be made before a final decision is rendered, the emergency purchase procedures will be used.

FUTURE PURCHASES – BID RENEWAL

1. Unless otherwise noted, Roane County reserves the right to purchase goods or services for one year from the date of the award of the contract at the same price and terms and conditions. Further, Roane County reserves the right to renew all aspects of the bid one (1) year at a time for and additional one (1) year based on the same price and terms and conditions unless otherwise noted. There is no guarantee that that this contract will be considered for renewal.

APPROPRIATION

1. In the event no funds are appropriated by Roane County for the goods or services in any fiscal year or insufficient funds exist to purchase the goods or services, then the contract shall expire upon the expenditure of previously appropriated funds or the end of the current fiscal year, whichever occurs first, with no further obligations owed to or by either party.

VENDOR QUALIFICATION

1. Potential bidders must meet the following criteria:
 - Be able to provide a quality product as specified
 - Offer reasonable pricing
 - Provide dependable delivery of items ordered
 - Meet specifications and bid conditions
 - Demonstrate successful past performance
2. A potential bidder may be rejected for one or more of the following reason:
 - Inadequate or unacceptable product lines
 - Bidding remanufactured or reconditioned items
 - Bidding alternate to approved item without notice prior to bid opening
 - Documented unacceptable product

INSURANCE

1. The contractor will maintain, at their expense adequate insurance coverage to protect them from claims arising under the Worker's Compensation Act, from claims for damages resulting from bodily injuries and damage to their property, for Bodily Injury and Property Damage Liability in the amount of no less than \$1,000,000, for Products and Completed Operations Liability of no less than \$1,000,000 and from claims for damage to any Roane County property. Additional insurance requirements may be listed any Special Terms & Conditions or in the Bid Specifications. This insurance company shall have a Best's rating of A or better. Any deviations from the above requirements must be disclosed in the bid submission.
2. The successful bidder shall furnish a Certificate of Insurance issued by their insurance company showing that Roane County as an additional insured. Carrier will assume full common liability of all shipments.

COMPLIANCE WITH ALL LAWS

1. Contractor is assumed to be familiar with and agrees to observe and comply with all federal, state, and local laws, statutes, ordinances, and regulations in any manner affecting the provision of goods and/or services, and all instructions and prohibitive orders issued regarding this work and shall obtain all necessary permits.

GOVERNING LAW

1. This contract shall be governed by the laws of the State of Tennessee, and all obligations of the parties are performable in Roane County, Tennessee. The Courts in Roane County shall have exclusive and concurrent jurisdiction of any disputes which arise hereunder.

BUSINESS LICENSES

1. Bidders located in Tennessee are required to have a current business license issued by the State of Tennessee at the time the bids are submitted. Vendors located outside Tennessee are required to obtain a business license issued by the State of Tennessee in Roane County if the project is over \$50,000.

INDEMNIFICATION/HOLD HARMLESS

1. Contractor shall indemnify, defend, save and hold harmless all departments of Roane County Government and/or the Roane County Board of Education, its officers, agents and employees from all suits, claims, actions or damages of any nature brought because of, arising out of, or due to breach of the agreement by Contractor, its subcontractors, supplier, agents or employees or due to any negligent act or occurrence or any omission or commission of the contractor, its subcontractors, suppliers, agents or employees until the contract terminates.

VENDOR PERFORMANCE

1. If the contractor fails in full or part to perform or comply with any provision of this Contract or the terms or conditions of any documents referenced and made a part hereof, Roane County may terminate this contract, in whole or in part, and may consider such failure or noncompliance a Breach of Contract. Contractors with poor performance will be notified at the time of such performance and be given opportunity to correct the problems. Documentation will be kept on file. Any contractor with continued poor performance will be removed from the potential vendor list for one year.
2. Roane County expressly retains all its rights and remedies provided by law in case of such breach, and no action by Roane County shall constitute a waiver of any such rights or remedies. In the event of termination for default, Roane County reserves the right to purchase its requirements elsewhere, with or without competitive bid.
3. Failure to deliver within the time specified or within a reasonable amount of time, or failure to make replacements of a rejected item immediately will constitute authority to purchase on the open market so as to replace the item(s) rejected and/or not received. On all such purchases, the Vendor agrees to promptly reimburse the county for excess costs incurred by such a purchase.
4. Reasons for product rejection may be any one of the following:
 - Quality
 - Price
 - Serviceability of item (damage)
 - Product does not meet bid specifications

BREACH OF CONTRACT

1. A party shall be deemed to have breached the contract if any of the following occurs:
 - Failure to provide products or services that conform to contract requirements.
 - Failure to maintain/submit any report required hereunder.
 - Failure to perform in full or in part any of the other conditions of the contract.
 - Violation of any warranty.

CONTRACT TERMINATION FOR CAUSE

1. If the contractor fails to properly perform its obligations under this contract in a timely or proper manner, or if the contractor violates any terms of this contract, the county shall have the right to terminate the contract and withhold payments in excess of fair compensation for completed services.
2. In the event the contract is terminated for due cause by the county, the county shall have the option of awarding the contract to the next lowest bidder or bidding again.

CONTRACT TERMINATION FOR CONVENIENCE

1. The county may, by written notice to the contractor, terminate this contract without cause for any reason. Said termination shall not be deemed a Breach of Contract by the county. The county must give notice of termination to the vendor at least thirty (30) days prior to the effective date of termination. The contractor shall be entitled to receive compensation for satisfactory, authorized service completed as of the termination date, but in no event shall the county be liable to the contractor for compensation for any service which has not been rendered. Upon such termination, the vendor shall have no right to any actual general, special, incidental, consequential, or any other damages whatsoever of any description or amount.

BOOKS AND RECORDS

1. The contractor shall maintain all books, documents, accounting records and other evidence pertaining to the goods and services provided under this contract and make such materials available at its offices at all reasonable times during the contract period and for three (3) years from the date of the final payment under this agreement for inspection by county or by any other governmental entity or agency participating in the funding of this agreement, or any authorized agents thereof; copies of said records to be furnished if requested. Such records shall include those books, documents and accounting records that represent the vendor's costs of manufacturing, acquiring or delivering the products and services governed by this agreement.

DELIVERY

1. All items included in this Invitation to Bid is to be delivered with no evidence of damage. The successful bidder agrees to be responsible for damaged packaging and to replace any damaged components or equipment at no charge.
2. Roane County shall retain the right to reject any or all of a delivery that does not meet product specifications. Rejected items are to be picked up at the supplier's expense.

INSPECTION AND ACCEPTANCE

1. Warranty periods shall not commence until Roane County inspects and formally accepts the goods and/or services. The terms, conditions and timing of acceptance shall be determined by Roane County. Roane County reserves the right to reject any or all items or services not in conformance with applicable specifications, and contractor assumes the costs associated with such nonconformance. Acceptance of goods or services does not constitute a waiver of latent or hidden defects or defects not readily detectable by a reasonable person under the circumstances.

INVOICES AND PAYMENTS

1. Payment will be made within 30 days after receipt of invoice and/or delivery of items included in this Invitation to Bid, whichever is later.
2. Roane County Government is not subject to taxation. A tax exemption certificate will be provided upon request.

NONDISCRIMINATION AND NON-CONFLICT STATEMENT

1. Contractor agrees that no person on the grounds of handicap, age, race, color, religion, sex or national origin, shall be excluded from participation in, or be denied benefits of, or be otherwise subjected to discrimination in the performance of this agreement, or in the employment practices of vendor. Contractor shall upon request show proof of such non-discrimination and shall post in conspicuous places available to all employees and applicants notices of non-discrimination. Contractor covenants that it complies with the Fair Wage and Hour Laws, the National Labor Relations Act, and other federal and state employment laws as applicable. Contractor covenants that it does not engage in any illegal employment practices.
2. Contractor covenants that it has no public or private interest and shall not acquire directly or indirectly any interest; that would conflict in any manner with the provision of its goods or performance of its services. The contractor warrants that no part of the total contract amount provided herein shall be paid directly or indirectly to any officer or employee of Roane County as wages, compensation, or gifts in exchange for acting as officer, agent, employee, subcontractor or consultant to contractor in connection with any goods provided or work contemplated or performed relative to the agreement.
3. No employee or member of the Roane County's governing bodies shall participate in the selection or award of a contract if a conflict of interest, real or apparent, would be involved.
4. Officers, employees or officials of the Roane County Government shall neither solicit nor accept gratuities, favors or anything of more than nominal monetary value from vendors or parties to subcontracts.

IRAN DIVESTMENT ACT

1. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to Tennessee Code Annotated § 12-12-106.

**2021-06-128 – VERTICAL DOUBLE WALL POLYETHYLENE STORAGE TANK
VENDOR INFORMATION SHEET**

(Please fill out completely)

By completing and signing this form you certify that you are an authorized representative of the company for which you are submitting a bid/proposal and that you have the authority to legally bind your company. Further, by completing and signing this form you certify that you agree to all the terms and conditions of this bid/proposal.

1. Vendor Name _____

2. Address _____

City _____ State _____ Zip Code _____

3. Contact Person (Please Print) _____

4. Telephone Number _____ Fax Number _____

5. Vendor's e-mail address _____

6. Authorizing Signature _____

7. Title of Person Signing Bid _____

8. If addenda were issued, please acknowledge the receipt of: (please write "yes" if you received one)
Addendum 1 _____ Addendum 2 _____ Addendum 3 _____ Addendum 4 _____

9. If applicable, please indicate below if discounts will be allowed for prompt payment or if there is not discount offered:
_____ % Net 10 Days; _____ % Net 20 Days; _____ % Net 30 Days; _____ No Discount

COOPERATIVE PURCHASING - Vendors are to indicate if it is permissible for other governmental agencies in the State of Tennessee to purchase these items or services at the same price. Freight charges may be adjusted to reflect differences in delivery costs to other locations. Please indicate the approval of Cooperative Purchasing.

_____ Yes _____ No

SCHOOL CONTRACTS ONLY

CRIMINAL HISTORY RECORDS CHECK – Do you agree to comply with Public Chapter 587 of 2007 which requires all contractors to facilitate a criminal history check, including fingerprinting, conducted by the Tennessee Bureau of Investigation and the Federal Bureau of Investigation for each employee or subcontractor personnel before permitting the employee or subcontractor personnel to have contact with students or enter school grounds?

_____ Yes _____ No

THIS FORM MUST BE COMPLETELY FILLED OUT, SIGNED, & RETURNED IN YOUR BID.

**2021-06-128 – VERTICAL DOUBLE WALL POLYETHYLENE STORAGE TANK
NON –COLLUSION, INDEPENDENT PRICE DETERMINATION,
NON-DISCRIMINATION, NON-DEBARMENT & LOBBYING AFFIDAVIT**

I do hereby certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same materials, supplies, or equipment, and is in all respects fair and without collusion or fraud.

I understand that collusive pricing is a violation of State and Federal law and can result in fines, prison sentences, and civil damage awards and that no collusion with another firm was used in preparation of this bid.

I also certify that this firm does not discriminate against any employee or applicant for employment on the grounds of race, color, national origin or sex; and does not and will not maintain or provide for his employees any segregated facilities at any of its establishments, and further, that the firm does not and will not permit their employees to perform their services at any location under this contract where segregated facilities are maintained.

By submission of this bid, the bidder certifies that neither it or its principals is presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any Federal or State department or agency.

I further certify that during the Invitation to Bid solicitation and/or during the performance of this contract that neither it nor its principals will participate in lobbying activities in conjunction with this project.

I agree to abide by all terms and conditions of this Invitation to Bid and certify that I am authorized to sign this affidavit for the vendor.

Please indicate which of the following apply to your company. This information is requested for information purposes only. Roane County currently has no policy that allows for set asides or preferences for woman owned or minority owned businesses.

_____ African American Owned
_____ Caucasian Owned
_____ Native American Owned
_____ Other Owned

_____ Asian Owned
_____ Hispanic Owned
_____ Woman Owned

Vendor Name

Signature

Title

THIS FORM MUST BE COMPLETELY FILLED OUT, SIGNED, & RETURNED IN YOUR BID.

**2021-06-128 – VERTICAL DOUBLE WALL POLYETHYLENE STORAGE TANK
IRAN DIVESTMENT ACT COMPLIANCE**

The Iran Divestment Act of 2016, effective on July 1, 2016, is codified in Tennessee Code Annotated §12-12-101 *et seq.* The Iran Divestment Act, with certain exceptions, prohibits local governments from entering into contracts with persons or entities engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in Tennessee Code Annotated §12-12-105, a person engages in investment activities in the energy sector of Iran if:

- 1) The person provides goods or services of twenty million dollars (\$20,000,000) or more in the energy sector of Iran, including a person that provides oil or liquified natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or
- 2) The person is a financial institution that extends twenty million dollars (\$20,000,000) or more in credit to another person, for forty-five (45) days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list, created pursuant to §12-12-106, as a person engaging in investment activities in Iran as described in this section.

This Act requires the State of Tennessee’s chief procurement officer to publish on the State’s website a list of persons it determines engaged in investments activities in Iran (the “Prohibited Entities List”).

Any BIDDER that is on the Prohibited Entities List will be ineligible to contract with the COUNTY.

Pursuant to the Act, any BIDDER that attempts to contract with the COUNTY must certify, at the time the bid is submitted, that the BIDDER is not identified on the Prohibited Entities List. A bid shall not be considered for award, nor shall any award be made where the BIDDER fails to submit a signed and verified compliance certification form.

**CERTIFICATION OF COMPLIANCE
IRAN DIVESTMENT ACT**

The undersigned states that he/she has legal authority to swear this on behalf of _____

(Vendor); and that the Vendor is not in any manner in violation of *Tennessee Code Annotated §12-12-101 to §12-12-106.*

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury that to the best of its knowledge and belief that each bidder is not on the list created pursuant to the Iran Divestment Act, Tennessee Code Annotated §12-12-106.

By: _____

Title: _____

Sworn to and subscribed before me, a Notary Public, this _____ day of _____ 20____.

Notary _____ My Commission Expires _____

Vendor Name _____

THIS FORM MUST BE COMPLETELY FILLED OUT, SIGNED & NOTARIZED, & RETURNED IN YOUR BID.

**2021-06-128 – VERTICAL DOUBLE WALL POLYETHYLENE STORAGE TANK
SPECIFICATIONS**

Roane County is inviting bids for one (1) new Vertical Double Wall Polyethylene Storage Tank as per the enclosed specifications.

This tank is being purchased as part of a grant for upgrades to the leachate system at the closed Roane County Landfill. This tank is being purchased with county funds and will be installed by the Roane County Waste Water Department.

The grant deadline to have the project completed is December 31, 2020. Due to this stringent schedule, delivery time will be a factor in the award of the bid in addition to price.

Bid price is to include shipping to 215 White Pine Road, Harriman, Tennessee 37748.

BID FORM

Quantity	Description	Lump Sum Price
1 each	Vertical Double Wall Polyethylene Storage Tank as Specified	
	Delivery Date After Receipt of Order	
	Warranty Period on Tank	

SECTION 11112R

VERTICAL DOUBLE WALL POLYETHYLENE STORAGE TANK

PART 1 – GENERAL

1.01 Scope

- A. This specification covers upright, cylindrical, flat bottom, double wall tanks. The assembly shall consist of one primary inner tank and one outer secondary tank. Each tank shall be molded in one piece seamless construction by rotational molding. The tanks shall be designed for above-ground, vertical installation and be capable of containing chemicals at atmospheric pressure. The assembly shall be designed to prevent rainwater from entering the containment tank. The containment tank shall be designed to hold a minimum of 115% of the normal fill capacity of the primary tank. Included in this specification are requirements for material properties, design, construction, dimensions, tolerances, workmanship, and appearance. The tank capacity shall be a minimum of 12,500 gallons.
- B. Contractor shall supply and install all materials, equipment, appurtenances, specialty items, and services required to provide an upright, double wall, flat bottom, closed top, polyethylene storage tank for storage of **Landfill Leachate**. Each tank is to be molded in one-piece seamless construction according to ASTM D 1998 and will be capable of storing the leachate at atmospheric pressure.

1.02 Manufacturer

- A. Tanks shall be manufactured by Snyder Industries Inc. or approved alternate.

1.03 Applicable Documents

- A. ASTM (American Society for Testing and Materials) Standards:
 - 1. D618 Conditioning Plastics and Electrical Insulating Materials for Testing
 - 2. D638 Tensile Properties of Plastics
 - 3. D790 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - 4. D883 Definitions of Terms Relating to Plastics
 - 5. D1505 Density of Plastics by the Density-Gradient Technique
 - 6. D1525 Test Method for Vicat Softening Temperature of Plastics
 - 7. D1693 Test Method for Environmental Stress-Cracking of Ethylene Plastics
 - 8. D1998 Standard Specification for Polyethylene Upright Storage Tanks
 - 9. D2765 Degree of Crosslinking in Crosslinked Ethylene Plastics as Determined by Solvent Extraction
 - 10. D2837 Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
 - 11. D3892 Practice for Packaging/Packing of Plastics
 - 12. F412 Definitions of Terms Relating to Plastic Piping Systems
- B. ARM (Association of Rotational Molders) Standards: Low Temperature Impact Resistance (Falling Dart Test Procedure)
- C. ANSI Standards: B-16.5 Pipe Flanges and Flanged Fittings

1.04 Submittals

- A. Drawings and Data: The manufacturer's shop drawings shall be approved by the engineer and contractor prior to the manufacturing of the tank(s). Data and specifications for the equipment shall include, but shall not be limited to, the following submittals.
- B. Contractor shall submit for review sufficient literature, detailed specifications, and drawings to show dimensions, materials used, design features, internal construction, weights and any other information required by the ENGINEER for review of storage tanks and accessories.
- C. Information to be included with submittals are specified below:
 - 1. Shop drawings for the tanks shall include as a minimum the following:
 - a. Service Conditions: Chemical environment and temperature.
 - b. Statement that fabrication shall be in accordance with ASTM D 1998, where applicable.
 - c. Sizing and description of the fittings and accessories for each tank that are to be supplied by the tank manufacturer.
 - d. Layouts and assembly schedules for each tank identifying the location and elevation from the bottom of the tank for all inlet, outlet and other integrally molded connections and appurtenances supplied by the tank manufacturer.
 - e. Certification that the tank is capable of storing landfill leachate (municipal waste) with no deleterious affects on the tank materials or construction.
 - 2. Resin - A copy of the resin data sheet from the resin manufacturer for the tank is to be supplied and the tank manufacturer is to certify that it will be the resin used in the manufacture of the tank.
 - 3. Wall thickness - Prior to the manufacture of the tank the designed wall thickness audit is to be supplied based upon ASTM D1998 @ 100 degrees F
 - 4. Tank restraint – If supplied, the drawings and calculations for the system are to be supplied.
 - 5. Supporting information on fittings and accessories to be supplied.
 - 6 Technical Manuals: The tank manufacturers Guideline for Use & Installation is to be submitted for review.
 - 7. Manufacturer's warranty.
 - 8. Manufacturer Qualifications: The manufacturer is to have rotationally molded tanks based upon ASTM D 1998 utilizing Type I and Type II resins for the last 10 years.
 - 9. Installation certificate: Once installed the installer is to certify that the tank system has been installed according to the tank manufacturer's Guidelines for Use & Installation.

10. Factory Test Report: Upon completion of the tank the manufacturer's inspection report is to be supplied for each tank.
 - a. Hydrostatic test (See 1.09 F.)
 - b. Verification of fitting placement (See 1.09 B.)
 - c. Visual inspection (See 1.09 G.)
 - d. Verification of materials
 - e. Verification of wall thickness

1.05 Chemical Compatibility

A. Chemical compatibility shall be according to the following chemical resistance guides:

Compass Publications -

Pruett, Kenneth M., "Chemical Resistance Guide for Plastics"

Pruett, Kenneth M., "Chemical Resistance Guide for Metals and Alloys"

Pruett, Kenneth M., "Chemical Resistance Guide for Elastomers III"

B. These references shall be considered as general guidelines only. In many cases, combinations of these chemicals are used in such a way that only the customer (by testing molded product samples) can make a determination in regards to acceptability.

Chemical	Concentration	Tank Resin	Tank Design Info	Fitting Material	Gasket Material	Bolt Material
Acetic Acid	60	HDLPE & XLPE	1.5/AST M	PP/PVC	EPDM	316SS/Hastelloy/Titan.
Acetic Acid	80	HDLPE	1.9/AST M	PP	EPDM	316SS/Hastelloy/Titan.
Acrylic Emulsions	50	XLPE	1.9/AST M	PVC	EPDM	316SS
Aluminum Sulfate	50	HDLPE & XLPE	1.5/AST M	PVC	EPDM	316SS**/Hastelloy/Titan.
Ammonium Sulfate	40	HDLPE & XLPE	1.5/AST M	PVC	EPDM	316SS**/Hastelloy/Titan.
Calcium Carbonate	Saturated	HDLPE & XLPE	1.9/AST M	PVC	EPDM	316SS
Calcium Chloride	40	HDLPE & XLPE	1.5/AST M	PVC	EPDM	316SS**/Hastelloy/Titan.
Citric Acid	Saturated	HDLPE	1.9/AST M	PVC/PP	EPDM	316SS
DEF (Diesel Exhaust Fluid)	32.5	HDLPE & XLPE	1.35/AST M	316 SS	EPDM	316SS
Deionized Water	Up to 18.3 mΩ	HDLPE & XLPE	1.5/AST M	PVC	EPDM	316SS
Ethylene Glycol	100	HDLPE & XLPE	1.9/AST M	PVC	EPDM	316SS
Ferric Chloride	50	HDLPE & XLPE	1.9/AST M	PVC	EPDM	Hastelloy/Titan.

Ferric Sulfate	60	HDLPE & XLPE	1.9/AST M	PVC	EPD M	316SS**/Hastelloy/Titan.
Ferrous Chloride	Saturated	HDLPE & XLPE	1.9/AST M	PVC	EPD M	Hastelloy/Titan.
Ferrous Sulfate	20	HDLPE & XLPE	1.5/AST M	PVC	EPD M	Hastelloy
Hydrochloric Acid	37	HDLPE	1.9/AST M	PVC	Viton	Hastelloy
Hydrofluoric Acid	48	HDLPE	1.9/AST M	PP/PVC	Viton	Hastelloy
Hydrofluosilicic Acid	26	HDLPE/XLPE*	1.9/AST M	PP/PVC	Viton	Hastelloy
Hydrogen Peroxide	50	HDLPE	1.9/AST M	PVC	Viton	316SS/Hastelloy/Titan.
Magnesium Chloride	30	HDLPE & XLPE	1.5/AST M	PVC	EPD M	316SS**/Hastelloy/Titan.
Motor Oil	100	HDLPE & XLPE	1.9/AST M	316SS	Viton	316SS
Peracetic Acid	30	HDLPE	1.9/AST M	316SS	Aflas	316SS
Phosphoric Acid	85	HDLPE	1.9/AST M	PVC	Viton	316SS
Polyaluminum Chloride		HDLPE & XLPE	1.9/AST M	PVC	EPD M	Hastelloy.
Polymers (Deposition)		XLPE	1.5/AST M	PVC	EPD M	316SS
Potable Water		HDLPE	1.5/AST M	PVC	EPD M	316SS
Potassium Carbonate	50	HDLPE & XLPE	1.9/AST M	PVC	EPD M	316SS
Potassium Hydroxide	Saturated	HDLPE & XLPE	1.9/AST M	PVC	EPD M	316SS
Propylene Glycol		HDLPE & XLPE	1.9/AST M	PP/316SS	EPD M	316SS
Sodium Bisulfate		HDLPE	1.9/AST M	PVC/P	EPD M	316SS
Sodium Bisulfite		HDLPE	1.9/AST M	PVC/P	EPD M	316SS
Sodium Carbonate	30	HDLPE & XLPE	1.5/AST M	PVC	EPD M	316SS**/Hastelloy/Titan.
Sodium Carbonate	Saturated	HDLPE & XLPE	1.9/AST M	PVC	EPD M	316SS**/Hastelloy/Titan.
Sodium Hydroxide	50	HDLPE & XLPE	1.9/AST M	PVC	EPD M	316SS
Sodium Hypochlorite-in (Non-UV)	<16.5	HDLPE	1.9/AST M	PVC	Viton	Titanium
Sodium Hypochlorite-out (UV)	<16.5	HDLPE #880059	1.9/AST M	PVC	Viton	Titanium
Sodium Hypochlorite-out (UV)	<16.5	HDLPE Insulated	1.9/AST M	PVC	Viton	Titanium
Sodium Thiosulfate	40	HDLPE &	1.9/AST	PVC	EPD	316SS

		XLPE	M		M	
Sulfuric Acid	98	HDLPE #880046*	1.9/AST M	CPVC	Viton	Hastelloy
Sulfuric Acid	93	HDLPE #880046*	1.9/AST M	CPVC	Viton	Hastelloy
Surfactants		XLPE	1.5/AST M	PVC	EPD M	316SS
Urea Solution	50	HDLPE & XLPE	1.35/AS TM	PP/PV C	EPD M	316SS
Water w/Ozone up to 10 PPM		HDLPE & XLPE	1.5/AST M	PVC	EPD M	316SS
Zinc Orthophosphate		HDLPE	1.9/AST M	PP/316 SS	EPD M	316SS

*Chemical may cause tank material to discolor.

** 316SS may pit upon drying. Not recommended for SUMOs.

For chemicals or chemical blends not listed on the above chart, please contact Snyder Industries

1.07 Materials – Resin Classification

- A. Tanks shall be molded from Type II linear polyethylene resin (not cross-linkable resin).
- B. The material used shall be virgin polyethylene resin as compounded and certified by the manufacturer. Type II tanks shall be made from high density linear polyethylene (HDLPE) resin as manufactured by ExxonMobil Chemical, or resin of equal physical and chemical properties.
- C. All polyethylene resin material shall contain a minimum of a U.V. 8 -15 stabilizer as compounded by the resin manufacturer. Pigments may be added at the purchaser's request, but shall not exceed 0.25% (dry blended) of the total weight.
- D. Mechanical Properties of Type II tank material: High density Linear (HDLPE)

<u>PROPERTY</u>	<u>ASTM</u>	<u>VALUE</u>
Density (Resin)	D1505	0.941-0.950 g/cc
Tensile (Yield Stress 2"/min)	D638	2800 - 3500 PSI
Elongation at Break (2"/min.)	D638	>1000%
ESCR (100% Igepal, Cond. A, F50)	D1693	>500 hours
ESCR (10% Igepal, Cond. A, F50)	D1693	40 - 48 hours
Flexural Modulus 1% Secant	D790B	130,000 – 145,000 PSI

1.08 Design Requirements

- A. The minimum required wall thickness of the cylindrical shell at any fluid level shall be determined by the following equation, but shall not be less than 0.187 in. thick.

$$T = P \times O.D./2 SD = 0.433 \times S.G. \times H \times O.D./2 SD$$

- T = wall thickness
- SD = hydrostatic design stress, PSI
- P = pressure (.433 x S.G. x H), PSI
- H = fluid head, ft.
- S.G. = specific gravity, g/cm³
- O.D. = outside diameter, in.

1. The hydrostatic design stress shall be determined by multiplying the hydrostatic design basis, determined by ASTM D2837 using rotationally molded samples, with a service factor selected for the application. The hydrostatic design stress would be ≤ 660 PSI at 73 degrees Fahrenheit for Type I and Type II materials based the resin density. In accordance with the formula in 1.08 A., the tank shall have a stratiform (tapered wall thickness) wall. In no case shall the wall thickness be less than the minimum allowed per calculation of ASTM D1998.
 2. The hydrostatic design stress shall be derated for service above 100 degrees Fahrenheit and for mechanical loading of the tank.
 3. The standard design specific gravity shall be 1.5 or 1.9.
- B. The minimum required wall thickness for the cylinder straight shell must be sufficient to support its own weight in an upright position without any external support. Secondary containment tanks shall be designed per manufacturer’s standard containment thickness requirements. The primary and secondary tanks shall be shipped as one piece.
- C. The top head must be integrally molded with the cylinder shell. The minimum thickness of the top head shall be equal to the top of the straight wall. The top head of tanks with 2000 or more gallons of capacity shall be designed to provide a minimum of 1300 square inches of flat area for fitting locations. The primary and secondary tanks shall be keyed to prevent rotation between the two tanks.
- D. Tanks with 2000 or more gallons of capacity shall have a minimum of 3 lifting lugs integrally molded into the top head. The lifting lugs shall be designed to allow erection of empty primary and secondary tanks as a single unit.
- E. The tank shall be designed to provide a minimum of 4 tie-down lugs integrally molded into the top head. The tie-down lugs shall be designed to allow tank retention in wind and seismic loading. Refer to section 2.02 H. for tank tie-down accessories.

Table II – Tank Schedule

Tank Reference #	
Quantity	1
Capacity - Side Wall	12,500 GAL
Diameter (maximum)	16 ft
Height max liquid level	8.5 ft
Type II HDLPE	X
Color	OPAQUE
Fitting Material	SST
Bolt Material	SST

1.09 Quality Assurance & Test Methods

- A. The tanks of the same material furnished under this Section shall be supplied by a manufacturer who has been regularly engaged in the design and manufacturing of rotationally molded chemical storage tanks using cross-linked and high density linear polyethylene tanks for over ten years.
- B. Dimensions and Tolerances
1. All dimensions will be taken with the tank in the vertical position, unfilled. Tank dimensions will represent the exterior measurements.
 2. The tolerance for the outside diameter, including out of roundness, shall be per ASTM D1998.
 3. The tolerance for fitting placements shall be +/- 0.5 in. in elevation and 2 degrees radial at ambient temperature.
- C. Ultrasonic Tank Thickness Test
1. All tanks 2000 gallons or larger shall be measured for tank wall thickness at 6", 1ft., 2ft. and 3ft. on the tank sidewall height at 0° and 180° around the tank circumference with 0° being the tank manway and going counter-clockwise per ANSI standard drafting specifications. A copy of this test report shall be provided prior to tank shipment. All tanks shall meet design thickness requirements and tolerances.
- D. Hydrostatic Water Test
1. The hydrostatic water test shall consist of filling the tank to brim full capacity for a minimum of four hours and conducting a visual inspection for leaks.
- E. Workmanship
1. The finished tank wall shall be free, as commercially practicable, of visual defects such as foreign inclusions, air bubbles, pinholes, pimples, crazing, cracking and delaminations that will impair the serviceability of the vessel. Fine bubbles are acceptable with Type II tanks to the degree in which they do not interfere with proper fusion of the resin melt.
 2. All cut edges where openings are cut into the tanks shall be trimmed smooth.

Table III – Fitting and Accessory Schedule

Tank Number	
Description	Quantity / Size
Inlet /Fill	1-4"/2-2"
Outlet	2 – 3"
Drain	N/A
Overflow	4"
Vent	2 – 4"
Manway	18" Dia
Ladder FRP or Galv. Steel	N/A
Lifting Lugs	YES

Tie-down Lugs	YES
Seismic/Wind Tie-down	NO
Sight Glass Assembly	NO
Ultrasonic Level Indicator	NO
Reverse Float Level Indicator	NO

PART 2 – FITTINGS & ACCESSORIES

2.01 Tank Fittings

A. Fittings - Bolted Double 150 lb. Flange Fittings

1. Bolted double flange fittings are required for below liquid level installation for sizes above 2 in. Fittings must be placed away from tank knuckle radius' and flange lines. Allowable fittings sizes based on tank diameter for curved surfaces are shown below.

<u>Tank Diameter</u>	<u>Maximum Bolted Fitting Size Allowable</u>
48 in. - 86 in.	3 in.
90 in. - 102 in.	6 in.
120 in. and larger	8 in.

The bolted double flange fittings shall allow tank wall thickness up to 2 1/2 in.

2. The bolted double flange fitting shall be constructed with 2 ea. 150 lb. flanges, 2 ea. 150 lb. flange gaskets, and the correct number and size of all-thread bolts for the flange specified by the flange manufacturer. The flanges shall be constructed of PVC Type I, Grade I, or other specified material. Gaskets shall be a minimum of 1/4" thickness and constructed of 40-50 durometer EPDM, 60-70 durometer Viton[®]. There shall be a minimum of 4 ea. full thread bolts. The bolts diameter is to meet ANSI standards based upon the flange size. The bolts may have gasketed flanged metal heads or bolt heads encapsulated in Type II polyethylene material. The encapsulated bolt shall be designed to prevent metal exposure to the liquid in the tank and prevent bolt rotation during installation. The polyethylene encapsulation shall fully encapsulate the bolt head. The polyethylene shall be color coded to distinguish bolt material (white - 316 S.S.). Each encapsulated bolt shall have a gasket to provide a sealing surface against the inner flange.
3. Standard orientation of bolted double flange fittings shall have bolt holes straddling the principal centerline of the tank in accordance with ANSI/ASME B-16.5 unless otherwise specified.

B. Vents

1. Each tank must be properly vented for the type of material and flow rates expected. Vents must comply with OSHA 1910.106 (f) (2) (iii) or other accepted standard. All tanks must be vented for atmospheric pressure as well as any pressure created by filling and emptying the tank. A minimum of 2 U-Vents with SST mesh screening shall be provided.
2. All U-vents shall be constructed of PVC or other specified materials.

I. Flexible Connections

1. All tank fitting attachments shall be equipped with flexible couplers or other movement provisions. The tank will deflect based upon tank loading, chemical temperature and storage time duration. Tank piping flexible couplers shall be designed to allow 4% tank design movement. Movement shall be considered to occur both outward in tank radius and downward in fitting elevation from the neutral tank fitting placement.
2. The flexible connection is to be manufactured of the same material as the tank or a compatible material approved by the Engineer. If an elastomer flexible connection is used control bolts are required if recommended by the manufacturer. The flexible connection is to be designed for a minimum of 4% tank movement. The flexible connection is to be designed with 150# flange connections to allow for attachment to the tank and the piping system. The flexible connection is to be attached as close as possible to the tank to reduce stress.

2.02 Tank Accessories

A. Bolted Sealed Top Manway

1. Provide a sealed manway of 18-inches minimum clear opening.
2. The sealed manway shall be constructed of polyethylene material. The bolts shall be 316 stainless steel. The gaskets shall be closed cell, crosslinked polyethylene foam and Viton[®] o-rings to seal the bolts.

B. Down Pipes and Fill Pipes

1. Fill pipes shall be prepared per the customer approved drawings and specifications. All down pipes and fill pipes shall be supported at 5 ft. maximum intervals with support structures. Standard support structure design shall utilize bulkhead fitting tank attachments or welded attachments on Type II tanks. All designs shall be done in accordance with the drawings.
2. All down pipes and fill pipes shall be constructed of PVC or other specified materials.

C. Tie Down Systems

1. The tie down system shall be designed to withstand 150 MPH wind loads. Tie down systems are based on requirements for nonbuilding structures and must meet seismic requirements per IBC 2015 / CBC 2016 code with seismic loads $\leq .445g$ (Seismic Design Category "D" - $F_a=1.0$, $F_v=1.5$, $S_s=1.4$, $S_1=0.5$). Anchor bolts shall be provided by the contractor per the calculations and the base plates for the system.
2. The tie down system shall be of 316 stainless steel.

2.03 Warranty

- A. The tank shall be warranted for three years in regards to defects in materials and workmanship. The warranty on fittings and accessories supplied by the tank manufacturer will be for one year. The warranty will begin at time the tank is put into service.

2.04 Marking, Packing and Packaging

- A. The tank shall be marked to identify the product, date (month and year) of manufacture, capacity, and serial number. The tank shall be shipped with a 3 of 9, HRI bar code label containing tank description, manufacturing order number, part number, serial number, manufacturer, and date.
- B. All fittings that do not interfere with tank shipment shall be installed unless otherwise specified. Fittings and accessories that interfere with tank shipment or could be broken during shipment are shipped separately.
- G. Permanent Labels:
 - 1. Provide one (1) engraved stainless steel identification plate.

PART 3 – EXECUTION

3.01 Shipping, Delivery & Storage

- A. Since there are variations in methods of shipping, the manufacturer's instructions shall be followed in all cases.
- B. Transportation, handling, storage of the tanks, and installation shall be in accordance with the manufacturer's printed instructions.
- C. Consult the manufacturer's "Guideline for Use and Installation" booklet included with the tank for unloading instructions on specific tanks.
- D. Upon receipt of the tank and accessories the contractor shall be responsible for inspection for damage and to verify that the system is complete. If damage has occurred, the manufacturer should be notified prior to the tank being put into service. All fittings and accessories must be installed and adjusted in the field according to the manufacturer's Guidelines for Use & Installation.
- E. If tank shall be stored for over one month before being put into service, it should be stored in an upright vertical position. If outdoors it shall be secured to prevent movement or overturn during high wind situations.

3.02 Installation & Field Testing

- A. Install the tanks in strict accordance with the manufacturer's guidelines and installation and shop drawings.
- B. The tank shall be hydro-tested (water test) for 24 hours before introduction of leachate. Once completed, remove all test water.
- C. All tank fitting attachments shall be equipped with flexible couplers or other movement provisions provided by the tank manufacturer or the Contractor. The tank will deflect based upon tank loading, liquid temperature and storage time duration. Tank piping flexible couplers shall be designed to allow 4 percent tank design movement. Movement shall be considered to occur both outward in tank radius and downward in fitting elevation from the neutral tank fitting placement.

- D. The installer is to certify in writing that the tank system has been installed according to the tank manufacturer's Guidelines for Use & Installation.

END OF SECTION