



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
 DNR209032

PAGE
 1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
 FRANK WHITTAKER
 804-558-2316

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE

SHIP TO

DIVISION OF NATURAL RESOURCES
 ELKINS OFFICE
 RANDOLPH CENTER - SUITE 222
 1200 HARRISON AVENUE
 ELKINS, WV
 26241

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
10/10/2008				

BID OPENING DATE: 10/28/2008 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 1		
				THIS ADDENDUM IS ISSUED TO:		
				1.) ANSWER ALL QUESTIONS GENERATED FROM THE PRE-BID MEETING AND THOSE RECEIVED PRIOR TO THE OCTOBER 7, 2008 DEADLINE FOR TECHNICAL QUESTIONS,		
				2.) ADD SECTION 13155 (SWIMMING POOL LINER) WHICH WAS INADVERTENTLY OMITTED FROM THE ORIGINAL SPECIFICATION, AND		
				3.) INCLUDE A COPY OF THE MANDTORY PRE-BID ATTENDEE LIST		
				BID OPENING DATE REMAINS: OCTOBER 28, 2008		
				BID OPENING TIME REMAINS: 1:30 PM		
				***** END ADDENDUM NO. 1 *****		
0001	1	LS		968-42		
				GENERAL CONSTRUCTION		

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. All quotations are governed by the *West Virginia Code* and the *Legislative Rules* of the Purchasing Division.
4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
5. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods, this Purchase Order/Contract becomes void and of no effect after June 30.
6. Payment may only be made after the delivery and acceptance of goods or services.
7. Interest may be paid for late payment in accordance with the *West Virginia Code*.
8. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
11. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.
12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
13. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, this Contract may be deemed null and void, and terminated without further order.
14. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (<http://www.state.wv.us/admin/purchase/vrc/hipaa.htm>) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
15. **WEST VIRGINIA ALCOHOL & DRUG-FREE WORKPLACE ACT:** If this Contract constitutes a public improvement construction contract as set forth in Article 1D, Chapter 21 of the West Virginia Code ("The West Virginia Alcohol and Drug-Free Workplace Act"), then the following language shall hereby become part of this Contract: "The contractor and its subcontractors shall implement and maintain a written drug-free workplace policy in compliance with the West Virginia Alcohol and Drug-Free Workplace Act, as set forth in Article 1D, Chapter 21 of the West Virginia Code. The contractor and its subcontractors shall provide a sworn statement in writing, under the penalties of perjury, that they maintain a valid drug-free work place policy in compliance with the West Virginia and Drug-Free Workplace Act. It is understood and agreed that this Contract shall be cancelled by the awarding authority if the Contractor: 1) Fails to implement its drug-free workplace policy; 2) Fails to provide information regarding implementation of the contractor's drug-free workplace policy at the request of the public authority; or 3) Provides to the public authority false information regarding the contractor's drug-free workplace policy."

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division.
2. **SPECIFICATIONS:** Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Complete all sections of the quotation form.
4. Unit prices shall prevail in case of discrepancy.
5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
6. **BID SUBMISSION:** All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130

MEETING MINUTES
Tomlinson Run SP Pool Renovation
Pre-Bid Meeting, 1 Oct 2008 11AM

CALL TO ORDER:

Meeting called to order by Don Smith of WVDNR.

INTRODUCTIONS:

Introduced the Owner's Personnel and Agents in attendance including:

Don Smith PE – Engineer, WVDNR

Jim Harvey – Superintendent Tomlinson Run State Park (TRSP)

Sam Morris – Asst. Superintendent, TRSP

Craig Miller PE – President, Miller Engineering, Inc (MEI) - Consultant

BIDDING / ADMINISTRATIVE:

Contractors reminded that the pre-bid was mandatory and they are required to sign in to be eligible to submit a bid. Bids are due as indicated in the Request for Bids.

Don Smith reviewed the bidding procedures including the use of the provided bid forms, bid bond, contract time period, and liquidated damages, progress payments, and acknowledge of addenda. Failure to acknowledge any addenda will result in the bid not being accepted.

The project is a prevailing wage project and there is a project requirement to maintain certified payroll.

Don cautioned that all verbal comments made related to the project are subject to verification in writing through meeting minutes and addenda. The written minutes and addenda will be the basis of bidding.

All questions are to be in writing and directed to Frank Whittaker as indicated in the Invitation to Bid. Responses to questions are by written addendum only distributed to all bidders by WV Purchasing. The last day for questions is October 7, 2008.

The following Question was asked concerning project administration:

1. Question: How often will progress meeting be required?

Answer: Progress meeting will occur approximately one per month when work is in progress.

TECHNICAL OVERVIEW:

MEI presented a general review of the project scope.

The project is the renovation of the existing pool by selective demolition and construction of new interior walls attached to the existing, reconfigured as show, to permit the installation of a perimeter combination supply tube/ gutter system and a membrane liner system. The scope includes the piping between the pool, surge tank, and filter room, "gut out" of the filter room including installation of a pump well, and electric upgrade. The existing filtration system and piping will be replaced as indicated.

The diving well will be made shallower as shown on the drawings with a new concrete floor with new main drain boxes installed prior to installation of the liner. The two existing diving stands will be removed. One will be delivered to the Owner for storage, the other will be reinstalled, centered on the diving well, with a new pedestal and foundation to the lower height called for on the drawings.

The wading pool will be selectively demolished and reconstructed as indicated with a separate filtration system located in the filter room.

The existing water slide pump will be relocated as shown into a below grade pump well with protective railings and a gate.

No work is to be performed in the bathhouse as part of this project.

TECHNICAL QUESTIONS:

The following Technical Questions were asked at the pre-bid:

2. Question: Who is responsible for initially filling the pool and establishing the chemical balance to a swimming condition, the Owner or the Contractor?
 Answer: The contractor is responsible for both.
 Also, in the event of an installation problem resulting in the need to lower or empty the pool to affect any repairs during the construction period through final acceptance, the contractor would be responsible for lowering or emptying the pool and refilling and re-establishing the chemicals as part of the repair.
 Additionally, in the event of warranty problem resulting in the need to lower or empty the pool to affect any warranty repairs during the warranty period, the contractor would be responsible for lowering or emptying the pool and refilling and re-establishing the chemicals as part of the warranty repair.
3. Question: There was a reference to Alternates in the specifications, please clarify?
 Answer: There are no Bid Alternates in the bidding of this project.
 Comment: Subsequent to meeting, MEI reviewed the specification and could not locate the reference to Alternates. If there is still a concern or questions, please identify the reference to Alternates by specification section and page/ paragraph

in a question and a clarification can be issued.

4. Question: Will a notice to pour concrete be required?
Answer: Yes, at least 72 hours notice will be required for pre-pour review of the work.
5. Question: Will the existing wall penetration be required to be sealed?
Answer: Yes, the existing wall penetrations will all be sealed using Dow-Corning Dymeric 240 FC or Sonneborn NP-1.
6. Question: Does the design include hydrostatic relief valves?
Answer: Yes, 2- 2" hydrostatic relief valves are required in each main drain box.
7. Question: Are the main drain covers to bear an ANSI stamp per the new federal anti entrapment standards?
Answer: MEI will review and advise.
Comment: Subsequent to the prebid, MEI has determined that all main drain boxes and gratings will be required to bear an ANSI stamp regardless of size. Neptune-Benson (basis of design for this project) informs MEI they are in the process of securing the required ANSI certification for their boxes and already have a certified grating available.

End of Technical Questions

An Attendance log is attached to these minutes for reference.

ACKNOWLEDGEMENT:

The above minutes are a true and accurate reflection of the meeting content to the best of our knowledge. Please contact Frank Whittaker at WV Purchasing with any concerns regarding these minutes by the cutoff date and time for bidding questions.

The minutes, questions, answers and comments detailed herein are part of the project documents for this project and are to be acknowledged as ADDENDUM #1.

Submitted this 2nd day of October, 2008 for distribution by WVDNR & WV Purchasing.

Craig Miller PE
President
Miller Engineering, Inc

Cc: Project file

**TOMLINSON RUN STATE PARK
SWIMMING POOL RENOVATION
RFQ DNR209032
ADDENDUM NO.1
OCTOBER 2, 2008**

TO ALL BIDDERS:

1.0 GENERAL NOTES

- .01 This addendum is part of the Contract Documents for the project.
- .02 Acknowledge receipt of this addendum on the Form of Proposal in the space provided. Failure to do so may be cause for rejection of the bid.
- .03 A Mandatory Pre-Bid Meeting was held on October 1, 2008. Copies of the Pre-Bid Meeting Minutes and attendance Sign - In Sheet are appended to this Addendum.

2.0 CORRECTIONS/ADDITIONS TO THE PROJECT MANUAL

- .01 Add Section 13155 - SWIMMING POOL PVC MEMBRANE SYSTEM, attached.

SECTION 13155 – SWIMMING POOL PVC MEMBRANE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provision of the Notice to Bidders, Instructions to Bidders, Proposals, General Conditions, Supplementary Conditions, General Requirements, related Sections and other Divisions of these documents if used as part of this project are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. It is the intent of this specification to describe the installation of a complete reinforced PVC membrane lining system specifically designed and formulated for use in swimming pools. The system shall consist of two layers of flexible PVC totally encapsulating a polyester inner reinforcement in combination with required accessory items to complete the installation. The sections of material shall be fuse bonded together at the site to form a watertight continuous membrane lining. The system shall be installed in accordance with the configuration as detailed on the drawings, including all necessary equipment within this specification. Individual rolls of reinforced PVC membrane shall be custom fitted and welded together at the job site using hot air welding techniques. Upon completion, the system shall provide a waterproof, yet flexible membrane, complete with all necessary fittings, attachments, flange transitions and markings.
- B. The performance characteristics and installation qualifications as established herein reflect the representative minimum requirements for membrane systems to be considered for this project. Systems manufacturers requesting a substitution not meeting the minimum requirements established for this project, as determined by the Owner and Project Engineer, will not be accepted.
- C. This specification includes, but is not limited to, the following components:
 - 1. Flexible PVC membrane
 - 2. Slip-resistant reinforced PVC membrane
 - 3. Separator fleece
 - 4. PVC steel edging & sheets
 - 5. Galvanized and/or steel edging & sheets
 - 6. Sanitizing agents
 - 7. Transition flanges
 - 8. Edge sealants
 - 9. Adhesives
- D. Refer to Section 01600, Product Requirements for alternates that may affect the Work of this Section.
- E. This Specification describes Natatec® PVC Membrane Lining System as the basis of design

1.3 SCOPE OF WORK:

- A. Work Included: The work specified herein and as indicated on the drawings includes, but is not necessarily limited to, furnishing all the labor, materials, equipment, appliances, services and drayage to all the operations related to the fabrication and installation of the PVC Membrane System, including all necessary surface preparation. The Work shall be as herein specified and as denoted on any accompanying drawings.

1. The Contractor shall be responsible for obtaining any and all Building permits, governmental or othr necessary approvals, the cost of which shall be paid by the Owner.
 2. The Contractor installing the PVC Membrane System shall be duly licensed as required by the governing entity in the State and jurisdiction where the System is installed and licensed in the State of West Virginia.
- B. Related Work and Responsibilities Assigned to Others: The membrane system contracvtor shall coordinate all activities with the appropriate party. The contractor will advise the owner's representative in writing if proper conditions are not maintained or if responsibilities of others are not properly completed and will detail any conditions creating impairment to the installation of the membrane and which contractor they believe holds responsibility for the impairment. The Membrane contractor shall make a site visit 2 to 4 weeks prior to the installation and create a punch list of outstanding issue or impairments to the membrane installation. Said punch list shall be delivered in writing to the Project Engineer via the GC.
- C. Related work responsibilities of the General contractor and membrane contractor to be coordinated prior to bidding generally include, but are not limited to the following:
1. Provide and maintain appropriate and suitable environmental conditions, including temporary heat shelter and weather protection for the completion of the work.
 2. Surface preparation beyond the scope of normal surface patching of concrete, surface repair or cleaning of the existing interior surfaces prior to system installation.
 3. Perimeter sealant, caulking, or other sealing except sealants that are integral to the PVC Membrane System, unless otherwise indicated herein.
 4. Removal and reinstallation of deck and accessory equipment beyond the removal of ladders, stanchion posts or other items intended for regular removal.
 5. Provide means for storage and disposal of scrap material, coating debris, and other material in close proximity to pool area.
 6. Electrical work, including grounding of the pool, installation of underwater lights or other components, or any related electrical work.
 7. Temporary facilities, including electrical power close to the installation site.
 8. Provide temporary water at fifty (50) psi (to gallons per minute) minimum for cleaning, rinsing, and test purposes, as well as facilities for draining pool and maintaining workable conditions within the pool area.
 9. Final cleaning of pool area outside of the PVC Membrane System installation area.
 10. Provide and maintain all necessary barricades, signs, lights, flares, and other security as required protecting workmen and the public.
 11. Drain pool, coordinate with contractor to ensure proper hydrostatic relief is maintained. Closely monitor water table around pool to minimize hydrostatic damage to pool shell.
 12. Immediately after installation, protect pool from damage, contamination, spatter, and spillage caused by construction work of other trades. This shall include covering of pool with protective materials when necessary, and responsibility for prompt repair or corrective measures in the event of damage.
- D. Where items of the architectural, mechanical, or electrical general conditions, special conditions, and specifications are repeated in this Section of the Specifications or Project Documents, it is intended to call particular attention or qualify these items or to indicate that the requirements of this Section. The membrane contractor shall indicate any such

conflicts in writing to the Project Engineer prior to bidding. It is not intended that any other parts of the documents shall be assumed to be omitted if not repeated herein. Should the requirements of any other Section of the project documents contradict this section, the contradiction shall be communicated to the project Engineer for resolution.

1.4 DEFINITIONS

- A. References Standards: Certain applicable reference standards are incorporated herein to the extent such references are relevant, with the latest revision applicable including, but not limited to:
1. Fabrication standards:
 - a. ASTM - American Society for Testing Materials
 - b. ANSI - American National Standards Institute
 - c. NSF - National Sanitation Foundation
 2. The following are utilized as applicable:
 - a. NCAA - National Collegiate Athletic Association
 - b. FINA - Federation Internationale de Natation Amateur
 - c. USS - United States Swimming Incorporated
- B. The intent of these specifications is not to establish specific quantities, amounts, or dimensions. Thus, the reference to "one", "each", "an", "a", or like wording is for semantic purposes only. Unless specifically stipulated otherwise, provide materials, equipment, and items as detailed on the drawings or as reasonably required for complete, operational PVC Membrane System installation(s). The membrane contractor shall provide a complete membrane system as specified to provide complete system for the facility.

1.5 SUBSTITUTIONS

- A. The PVC Membrane System has been the subject of a detailed investigation, and the design and operation of adjoining equipment and systems is based upon the specified membrane system. All base bids shall include only that equipment and systems listed herein or systems subsequently approved by addendum to these projects specifications.

1.6 TRADE NAMES

- A. When a particular manufacturer's product, system or brand name is designated in the project documents, either in the drawings, specifications or addenda thereto, only such designated products or systems by the named manufacturer may be provided.
1. When reference is made in the project documents to trade names, brand names or the products of a particular manufacturer, such references are made solely to indicate what products or systems may be furnished under the base bid and are not intended to restrict competition. Should any bidder desire to use products, systems or trade or brand names that are different from those mentioned in the project documents, a detailed substitution request is to be submitted by the cutoff date for bidding questions. Review the requirements of Section 1600 Product Substitutions for details on substitution requests.
 2. The request for substitution must be accompanied with adequate and sufficient technical data, drawings and details to clearly and convincingly establish that the proposed product or system meets or exceeds all express requirements of the project documents.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate all work activities and installation of the PVC Membrane System with other building components and the work activities of other trades

1.8 DRAWINGS:

- A. Any and all the drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement. The drawings are intended for contractors having experience, skill and discretion in the execution of the work implied by the drawings.
- B. If directed by the Consultant or required for the successful completion of the project, the contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work. The membrane contractor shall provide a complete membrane system as specified for the facility as indicated on the project drawings without request for further compensation or deduction for material quantities or labor unless the Owner or Engineer issues revision drawings showing a net change in facility gross size greater than 2 percent.

1.9 SUBMITTALS

- A. Upon notice to proceed under this Contract, installation details and submittal documents shall be provided, fully illustrating the materials and procedures to be utilized. These details and submittal documents, once accepted by the Owner or Owner's Representative, shall be the basis for the fabrication, installation and inspection.
- B. Product Data: Submit manufacturer's technical information and product data including basic materials and installation instructions for the PVC Membrane System including the following:
 - 1. List each material finished and application and cross-reference to the shop drawing(s).
 - 2. Provide dimensional shop drawings showing all pertinent dimensions.
- C. Program and Procedures: Prepare and submit a summary of the installation program which involves scheduling, preparation and installation procedures, quality control and project close-out. Submit to architect for approval.
- D. Submit comprehensive operations and maintenance manuals. Include recommendations for corrective action of typical situations that may be encountered.
 - 1. Submit recommended and required values for swimming pool water chemistry and other operational aspects of maintaining the swimming pool facilities.
 - 2. Maintenance Instructions and Maintenance Program: Provide complete descriptive information detailing proper care, maintenance and cleaning of the system.

1.10 QUALITY ASSURANCE

- A. This is a performance specification. The complete and functional reinforced PVC membrane system, as specified herein and shown on the drawings, is to be the basis for receiving bids. While it is not the intent of these specifications to, in any way, limit competition or restrict the bidder in the preparation of their bid, the bidder shall offer products and materials in literal compliance with these specifications.
- B. The PVC Membrane System shall be the product of a firm having at least ten (10) years experience in the design, manufacture and installation of PVC Membrane Systems used in swimming pool, aquatic or water feature applications. The firm also must have at least ten (10) installations of similar projects currently in satisfactory operation for no less than three (3) years. The installing contractor must as a minimum have completed at least ten

(10) installations of PVC swimming pool membranes of similar size and scope with the proposed membrane system, which have been in satisfactory operation for at least three (3) years. All systems shall be in compliance with the code requirements that govern in the State of the installation.

1. Listing or subsequent approval of a particular manufacturer as an approved manufacturer does not constitute acceptance of the manufacturer's standard configuration, materials, or equipment, except as they specifically meet or can be made to conform to the requirements defined in this specification. Any bid shall be assumed to include any and all costs to change, modify or otherwise comply fully with the requirements of this specification. Claims for additional compensation to comply with these specifications after bid for any reason whatsoever will not be considered. Only materials, equipment, or systems that absolutely comply with these specifications in all regards will be accepted. Any substitute systems from alternate manufacturers shall be in compliance with all requirements of these specifications.

C. Warranty: The PVC Membrane System shall be guaranteed for workmanship, materials and performance for a period of ten (10) years. This warranty shall not include or cover abusive or improper treatment to the PVC Membrane System by others either during construction or when operational.

D. A sample copy of the warranty statement in accordance with these specifications must be provided prior to approval and as part of the project warranty submission.

1.11 DELIVERY, STORAGE AND HANDLING:

A. The PVC Membrane System components shall be delivered to the job site adequately packaged to prevent damage. Unloading and storage shall be executed by the Contractor. The materials shall not be stacked or stored in any manner which could cause damage or deformity. Site assembly or fabrication of any part of the PVC Membrane System without the complete coordination and supervision of the manufacturer or his representative is strictly prohibited.

1.12 PROJECT SITE CONDITIONS:

A. The project site shall be in accordance with the Manufacturers' technical bulletins. Access for the installation of the PVC Membrane System will be provided by others.

B. All surface preparation necessary to produce a reasonably smooth, firm, clean and dry surface shall be completed prior to the onset of installation. The surface must be free of angular materials, bubbles, voids and large cracks. These irregularities shall be filled with suitable patching material or covered with galvanized or stainless steel sheet as detailed on the drawings. Tar, oil, or petrochemical compounds must be removed or isolated. Surface preparation is part of this contract.

1.13 COORDINATION:

A. The manufacturer shall provide complete descriptive information detailing the design, construction and installation. The contractor shall include all costs for visits to the project site to coordinate various aspects of design, construction, installation and commissioning of the lining system. Coordination shall include the cost for aspects of the installation and to coordinate manufacturing, testing and commissioning programs with the main contractor(s), and other suppliers. Such visits shall take place immediately upon notice to proceed to enable all contractors to be briefed, and a complete production and installation program to be established.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. **Manufacturer:** All bids shall include only PVC Membrane Lining Systems from a manufacturer who can demonstrate absolute compliance with the criteria established herein..
- B. If alternate systems are approved prior to bidding, all contractors will be notified by addendum.
- C. **Source Limitations:** Provide all PVC Membrane System components through one source from a single manufacturer.

2.2 MATERIALS

- A. Ensure that all materials used are compatible with the swimming pool environment, and that these materials are supplied as a system.
- B. The membrane contractor and manufacture will provide the necessary materials pool markings as indicated on the project drawings and require by current standards. All marking are to be indicated on the shop drawings for review and approval by the Engineer. Should the contractor or manufacturer believe markings are missing, they are to inform the Owner and show such marks as "pending approval" on the shop drawings for approval.

2.3 COMPONENTS AND EQUIPMENT

- A. **Flexible Reinforced PVC Membrane:** The flexible PVC membrane shall be installed to the dimensions detailed on the drawings and as required. The membrane shall consist of two (2) layers of PVC fuse, bonded to a polyester mesh substrate. The membrane shall be no less than 60.0 mil in thickness (.060-inch/1.5 mm), and shall conform strictly with the following chemical and physical properties as listed herein. Only those membranes specifically formulated for swimming pool use shall be considered. Roofing membranes, general waterproofing membranes, and vinyl liners shall not be acceptable. Additionally, only those swimming pool membranes meeting or exceeding the following ASTM test values, substantiated by independent documentation from a certified testing laboratory, shall be acceptable. This certification will be required as part of a substitution request. The membrane shall be furnished in a color scheme as detailed by the drawings or in a standard color as selected by the owner.

- B. ***Chemical and Physical Properties:**

Thickness:	60 mil	ASTM D374C
Specific gravity:	1.22 g/cc	ASTM D792/method A
Yield tension:	MD166 lbs/in - XD284 lbs/in	ASTM D638
Yield elongation:	MD 110% - XD 104%	ASTM D638
Break tension:	MD 51 lbs/in - XD 70 lbs/in	ASTM D638
Break elongation:	MD 181% - XD 132%	ASTM D638
Secant modulus	MD 1352 psi - XD 1125	ASTM D5323 (100%):
Tear resistance:	MD 18.2 lb. - XD 24.7 lb.	ASTM D1004- Die C
Low temp. brittleness	-50°C - Pass	ASTM D1790

Water absorption:	0.78%	ASTM D570
Puncture Resistance:	125 lbs	ASTM D4833
Ply Adhesion	24 in/2 in.	ASTM D413
UV Resistance:	% change	ASTM D4355
Tensile Strength @ Yield	MD -12% - XD -16%	
Fungal & Bacteria Resistance	No growth, staining or discoloration	ASTM G21-96
Resistance to Chemicals (Cyanuric Acid, Sodium Dichloroisocyanurate, Trichloroisocyanuric acid, Calcium Hypochlorite, Sodium Hypochlorite with 12 PPM solution)	Excellent resistance	ASTM D543 Procedure I (73.4 F) for 7 days

MD = machine direction; XD = cross machine direction *Average values plus or minus 10%

- C. Slip Resistant Flexible Reinforced PVC Membrane: A slip resistant reinforced PVC membrane, 67.0 mil in thickness (.067-inch/1.7 mm),, and identical in chemical and physical properties to the flexible reinforced PVC membrane described above, which includes a specifically designed embossed surface suitable for high traffic areas, shall be installed as detailed on the drawings. The slip-resistant surface shall be certified by independent ASTM Laboratory testing to comply with the requirements of ASTM C1028. Furnish in the color scheme as detailed by the drawings or as selected by the owner.
- D. Separator Fleece: The interior surfaces of the swimming pool shall be covered with an engineered polyester fleece separator, a minimum of 150.0 mil in thickness (.150-inch/3.81 mm),, weighing at least 10.5 ounces per square yard. The fleece separator must be resistant to freeze, thaw, moisture, soil-chemical abrasion, or ultraviolet deterioration and shall conform strictly to the following chemical and physical properties. All fleece separators shall be certified and guaranteed to be free of foreign materials, which could potentially be damaging to the liner.
- E. Chemical and Physical Properties (Property Unit Value Test)

Weight:	10.5 oz/sq.yd.	ASTM D-3776
Thickness:	150 mils	ASTM D-1777
Grab strength:	390/330 lb.	ASTM D-4632
Grab elongation:	75/85%	ASTM D-4632
Trapezoid tear strength:	135/120 lb.	ASTM D-4533
Puncture resistance:	155 lb.	ASTM D-3787
Mullen burst strength;	550 psi	ASTM D-3786
Water flow rate:	100 gpm/ft	
Permeability:	0.52 cm/sec	
- F. PVC Steel Edging: An PVC-coated stainless steel sheet, at least 20 gauge with PVC laminated on one side shall be used to form edges, angles, corners, or other transitions where a firm surface is necessary to weld the PVC membrane.
- G. Galvanized Steel Sheet: At least 20-gauge heavily galvanized or stainless steel sheet shall be used as required for reinforcement, shaping, or separation as required. It shall be installed over expansion joints when sealants or caulking has been installed.
- H. Sanitizing Agents: Sanitizing agents, formulated from a mixture of halogenated organic compounds, and specifically designed for this purpose, shall be applied to the pool surface, beneath the pool liner, to prevent the growth of microbes or fungus.

systems, a 12 gauge T-304 stainless steel compression skirt shall be continuously welded to the stainless steel gutter system.

- F. The compression skirt shall be fabricated as detailed on the drawings and shall provide a smooth, uninterrupted surface onto which the membrane shall be compressed. The PVC membrane shall be compressed between a rigid PVC profile and the compression skirt through the installation of 1/4"-20 stainless steel screws, located no greater than 3" O.C. A semi rigid interlocking cap strip shall be installed over the PVC profile to finish the installation. Due to the critical nature of insuring a positive, permanent and enduring watertight seal between the PVC membrane and the stainless steel gutter system, only those systems incorporating a fully welded, stainless steel membrane compression skirt will be allowed.
- G. One method of meeting these requirements is furnished by Natare Corporation of Indianapolis, Indiana and is available under license for use by any contractor installing a PVC Membrane System in a swimming pool facility. This process is the subject of US Patent No. 4, 991,294, and additional patents pending or issued.
 - 1. The PVC membrane contractor is responsible for pressure testing the existing stainless steel gutter supply tube and hydrostatic testing of the return trough prior to installing the compression skirt to ensure that the gutter system is watertight.

3.4 SEQUENCE OF WORK

- A. Attach the fleece to the pool wall and/or the bottom with the appropriate adhesives in the amounts adequate to secure the fleece. Isolate deteriorated surfaces of voids, cracks, or any other areas with moisture proof composition board or galvanized sheet (20-gauge) as required.
- B. The flexible reinforced PVC membrane shall be securely welded to PVC coated steel, which has been attached to the pool surface with aluminum drive rivets approximately four (4) inches on center.
- C. Install PVC coated steel or shaped galvanized sheet as necessary to form angles, edges, corners, or other transitions.
- D. Weld the flexible reinforced PVC membrane in accordance with the procedures established by the manufacturer. The joints shall be hot air welded with a minimum of two (2) inches of overlap. Probe all seams with a hand-held lance or air lance to ensure complete welding. Completely close the seam edge using a PVC edge sealing compound.
- E. All seams in the membrane shall be one-piece, single overlap seams. Patching and overlaying of multiple layers of the membrane material is not acceptable. All material sections are to be applied in full roll widths and lengths except where pool conditions dictate otherwise. No scrap or short-roll material is to be utilized in the membrane installation. To minimize visible seams, the membrane is to be applied to the pool walls in horizontally oriented sheets. Applying the membrane to the pool walls in vertically oriented sheets is not acceptable. Any areas of the membrane which are damaged during installation are to be completely removed and replaced with new material. There are to be no visible patches on the completed membrane.
- F. Apply special markings, targets, lines, etc., as indicated on the drawings or as specified. The owner's representative is to provide detailed instructions as to necessary markings.
- G. After installation of the PVC membrane, apply an appropriate elastomeric sealant to all transitions between construction materials, utilizing only sealants suitable for submerged application, and compatible with the flexible reinforced PVC membrane.

- H. All inlets, outlets, drains, underwater lights, skimmers, stanchion posts, and other required membrane penetrations shall be fitted with rigid PVC compression flanges securely anchored to the pool structure to ensure a watertight seal. The "wrapping and clamping" of the membrane material around stanchion posts, ladder rails, and other protrusions through the membrane will not be considered acceptable. Only rigid compression flanges shall be utilized for all membrane penetrations.
- I. The PVC membrane shall be continuous throughout recessed steps and any other recessed areas in the pool wall. Compression flanging around recessed steps will not be considered acceptable.

3.5 ADJUSTING & CLEANING

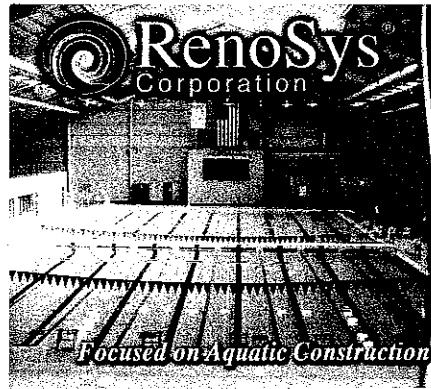
- A. After installation is complete, "broom" clean all surfaces. Remove all scraps, debris, or construction material and dispose of properly

3.6 FIELD QUALITY CONTROL

- A. Limit access to the project site to minimize possibility of damage to the membrane. Materials and equipment shall not be dragged across the surface of the liner or allowed to slide down the slopes. All parties working on the liner shall wear soft soled shoes. Immediately following installation, verify completion and testing of all seams. Retesting may be necessary to ensure complete sealing.
- B. Upon completion of installation and testing, the completed PVC Membrane System shall be hydrostatically tested by filling the pool or water feature to the typical operating level and operating all systems for a period of 6 hours without evidence of leakage.

3.7 DEMONSTRATION AND COMMISSIONING

- A. Provide at least three full sets of bound operation and maintenance manuals which fully detail the proper system operation and maintenance techniques.
- B. In the company of the Owner's representative, inspect the completed installation, make final adjustments, place the system in operation and give operating instructions relative to its care and use.
- C. Prepare a complete "Project Completion Report and Warranty Application," documenting the proper completion of the project, training of Owner's personnel, and application for warranty. Provide to Owner's representative for review and signature prior to turning over project to Owner.
- D. The contractor and manufacturer shall provide senior experienced personnel for one full day set aside for training the Owners personnel on maintenance, cleaning, operation, and repair of the membrane system. If the pool is filled, the training shall be delayed until the pool is empty and repair techniques for every membrane system component can be demonstrated in detail throughout the pool.



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