

TERAL INC.
Sales and Installation
Cheshire, Oregon

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SPECIFICATIONS for
Polishing Pond and Aeration Pond
Bremerton W.W.T.F

PORT OF BREMERTON

A. PVC Liner

1. Manufactured by American Plastics Membrane Linings.
2. PVC Polyvinyl Chloride Liner shall be manufactured from domestic virgin Polyvinyl Chloride resin and specifically compounded for use in hydraulic facilities.
3. Color shall be black or charcoal grey.

B. Factory Fabrication

1. Individual widths of PVC materials shall be fabricated into large sections by PVC bonding by Dielectric welding, into a single piece, or into the minimum number of pieces, up to 50' wide, as required to fit the facility.
2. Lap joints with the minimum joint width of 1/2" shall be used.
3. All corners shall be contoured with no folds, excessively loose liner shall not be permitted. The corners shall be factory contoured or, at the manufacture's option, may be field constructed.
4. All manufacturing shall be approved by the Engineer.
5. After fabrication, the lining shall be accordion folded in both directions and packaged for minimum handling in the field. Shipping boxes shall be used for all linings

C. Excavation/Embankment Construction

1. Embankments shall be constructed to the lines, grade, and shape as shown on the plans and as staked in the field by the Engineer.
2. Embankment slopes shall be smooth and uniform.
3. Excess excavation shall be spread on the outside slopes or stockpiled near the Ponds as directed by the Engineer.

D. Liner Base

After the subgrade has been rolled smooth, compacted and approved by the Engineer, the Contractor shall place 3" in compacted depth of approved liner base material as specified under all surfaces to receive the PVC Liner.

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E. Placing PVC Liner

1. The liner shall not be placed until the Engineer approves all advanced construction/preperation as necessary.
2. The PVC Liner shall be installed in accordance with the manufacturer's recommended procedures using the specified liner.
3. The Contractor shall provide a manufacturers technical representative at his own expense.
4. The manufacture and manufacturer's representative shall have a minimum of 5 years experience in the satisfactory installation of PVC Liners.
5. The manufacturer's representative shall be present during Liner installation to instruct the Contractor, observe the work, report any unsatisfactory conditions, and make recommendations for the improvement in installations instructions.
6. The Contractor shall give the Engineer a minimum of 24 hours notice prior to begining installation of the Liner.
7. The installer shall not do any Liner installation unless the Engineer and manufacturer's representative are present to inspect the installation.
8. The Liner shall be completely sealed at all seams at the factory or in the field. Corners shall be countored smooth, no overlaps of the material permitted.
9. Lap joints of the same kind as used in the factory shall be used to seal factory-fabricated pieces of PVC together in the field. Lap joints shall be formed by lapping the edges of pieces together a minimum of 3 inches.
10. The contact surfaces of the pieces shall be wiped clean to remove all dirt, rust, moisture, or other foreign materials; use cleaner where necessary.
11. Sufficiant American Plastics Bonding Solution shall be applied to both contact surfaces in the joint area, and the two surfaces pressed together immediately, then roll.
12. Any wrinkles shall be smoothed out. Any air bubbles removed per manufacturer's recommendations.
13. All joints, on completion of the work, shall be tightly bonded.
14. Any lining surface showing injury due to scuffing, penetration by foreign objects, and distress from rough subgrade shall, as directed by the Engineer, be replaced or covered and sealed with an additional smooth layer of PVC of the proper size.

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15. Prior to placing cover fill the Engineer, Contractor, and Manufacturer's representative shall inspect the lining for leaks, damage, and proper installation. Bubbles in the seams shall be cut and sealed with adhesive.
16. All patches and repairs shall be covered completely with a new sheet of lining bonded with bonding solution; smooth out wrinkles.
17. Any damage to lining during installation or other subsequent operations shall be repaired as directed by the Engineer and/or the manufacturer's representative.
18. Manufacturer's recommended weather and temperature limitations shall be strictly adhered to for all phases of installation of Lining.

F. Testing of Liner

1. Air Lance Test
 - a. All field seams and patches shall be checked by the Contractor initially by a metal probe (such as an ice pick with it's point slightly rounded).
 - b. In addition to a visual inspection, all seams shall be checked using an air nozzle directed on the seams upper edge and surface to detect loose edges indicating unbonded areas within the seam, or other undesirable seam conditions.
 - c. Use a minimum of 50 psi apply through a maximum 3/16-inch nozzle held not more than 6" from the seam and performed at least 30 hours after the seam has been made.
 - d. All Air Lance tests shall be performed in the field by the Contractor in the presence of the Engineer during daylight hours only.
 - e. Any leak paths or suspicious areas revealed through these inspections shall be marked and repaired.

G. Earth Cover Material

1. Immediately following installation of the lining, the PVC shall be covered with 3" layer of earthen cover materials.
2. This cover material should be good sand saved from the excavation contain NO sharp stones, or any material that might puncture the lining.
3. This material shall be placed on the liner using rubber tired or track vehicles. Vehicles shall not drive directly on the liner, but may operate on previously laid cover material.

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4. Care should be taken to eliminate traffic which may cause damage to the lining material. The excavation Contractor will be responsible for any damage to the lining material during covering operations.

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STORAGE

Receiving & Storage of Liner Materials

Panles will weigh approximately 2000 lbs. each. The liner is typically packed in a white covering to reflect the sun's heat and can usually be stored outside at the site for one to three weeks before starting installation with no harm to the materials. If the job is delayed for an extended period of time (more than three weeks), materials must be stored inside or in open shade. All factory panels will have identifying marking indicating proper direction of unfolding to facilitate layout and positioning in the field. Liner panels will be on pallet skids and stored in one central place until installation has begun.

REPAIRS TO LINING

Any necessary repairs to the lining shall be made with the lining materials itself and the use of manufacturer supplied splicing materials. The splicing materials shall be applied to the contact surfaces of the patch and the piece to be repaired and the two joined immediately. All wrinkles shall be smoothed out. All patches shall be round or have corners rounded to 1.5 inch minimum radius. The minimum patch shall be six inches in diameter. The bonded area of the patch shall extend a minimum of 3 inches in all directions from the boundary of the distressed area.

FIELD SEAMS

Lap joints shall be used to seal factory fabricated pieces of the lining together in the field. The lap joints shall be formed by lapping and bonding the edges of pieces 3 inches minimum. Contact surfaces of the pieces shall be cleaned to remove all dirt, dust, moisture, and other materials. The solvent supplied by the manufacturer shall be applied to both contact surfaces and the two surfaces joined in accordance with the manufacturer's recommendations. The field seams may require additional heat from industrial type hot air guns. A rigid, flat surface shall be placed under the portion of the seam being sealed.

PIPE SLEEVES

All pipe sleeves for pipe penetration will be factory fabricated using PVC liner materials respectively.

The design and construction of the pipe sleeves will be such that 6 inches of bonded material will be attached to the floor liner. Stainless steel band couplings will be used as specified in the specifications.

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AIR LANCE TESTING

All Factory seams, field seams, and patches shall be air lance tested. All air lance tests shall be performed in the field by the Contractor in the presence of the Engineer during daylight hours only. Any leak paths or suspicious area revealed through these inspections shall be marked and repaired.

The air lance shall be created with 3/16 inch diameter orifice at a pressure of 50 psi. The jet of air shall be directed at the edge of seams and patched areas to result in lifting the unbound edges. The air lancing shall be done in such a manner as to allow the Engineer sufficient time to record any leaks or suspicious areas.

SITE ACCEPTANCE

An authorized representative will certify in writing upon completion of the grading and compaction that the surface on which the lining shall be placed is acceptable. The acceptance of sub-grade will be done at the time of installation and should be accepted cell by cell as lining is installed.

SOLVENTS

Solvents for cleaning will be M.E.K.. The adhesive to be used is PVC sealent.

SERVICE

A repair kit will be supplied with any materials necessary for minor repairs.

SEAMS

Factory seams are 1/2", heat weld method, with no loose edges on top.

ANCHOR TRENCH

Anchor trench should be constructed as the lining is going in.

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PROCEDURE

Upon completion of sufficient dike we will then certify the dike walls as specified. Panels will be individually palletized. Each pallet shall be placed on a movable flat surface, this could be a small tractor with a bucket or a forklift, making sure the new liner is sitting level on the pallet and caution taken not to put any rips in liner. Next the unit is backed the full length of the dike, while 3 people are unaccordion folding new liner off the pallet. Once new liner is unfolded off the pallet on top of dike, unit is then removed from dike. Liner is then unaccordianed width wise positioned to make all necessary field seams or anchoring as noted per individual panel. After panel is installed we will proceed with air lance testing on all factory and field seams. NOTE: Field seams will occur a minimum of 24 hours before air lance test. After air lance test and final approval by the factory rep. and engineer, they may proceed with back fill.