



MILLER ENVIRONMENTAL

PVC: Polyvinyl Chloride Flexible Membrane Liners for Concrete Precast Products

The Universal Liner™, designed by Miller Environmental Products, Inc., is a single-ply construction fabricated primarily of polyvinyl chloride (PVC), a polymer compound proven to be chemically resistant. Our Universal Liner™ is shaped and joined with radio frequency-bonded seams and can be easily handled and field welded using simple, proven construction methods with chemical fusion. Our liner can be cut, molded, and R-F welded to accommodate any size, shape or configuration.

Our PVC material has been tested and proven for over 40 years. Typical applications include, but are not limited to*, landfills, sewage lagoons, industrial waste ponds, primary and secondary containment, reservoirs, canals, and farm ponds. Our product is also available for many types of precast products such as lining septic tanks to ensure longer life and water tightness.

The Miller Environmental Universal Liner System™ is an effective and economical solution to repairing and preventing precasted concrete leakage. The Universal Liner™ is guaranteed to add years of life to your product and make it both watertight and environmentally safe.

I. General

Our PVC flexible membrane product is a multi-purpose, long-lasting lining that can be customized to fit any size, shape or configuration. This lining can be easily adapted for use in* septic tanks, landfills, industrial waste ponds, secondary containments, D-boxes, and other such installation sites.

** Precast concrete products, catch basins, clarifiers, manholes and septic tanks.*

II. Product Description

The Universal Liner™ is a single-ply construction fabricated primarily of poly-vinyl chloride (PVC). Our patent pending polymer material and process has been developed and specially formulated to be flexible

and chemically resistant. It has been tested and proven to provide a long-lasting barrier to water, raw sewage, and liquid waste. Other materials are available for required resistance to meet the requirements of your particular project.

Miller Environmental Products, Inc. has a patent pending method for attaching the Universal Liner™ to the interior of your precasted concrete product as part of the manufacturing process. Using this cast-in-place method, our liner is fabricated to fit the precaster's mold core and is secured to the mold interior with our patented attachments. After the liner is in place, the concrete is poured into the mold according to normal procedure. Once the tank, vault or other concrete product has been cured and removed from the mold, it is completely lined with our PVC liner. Our cast-in-place method not only creates a watertight seal but also prevents deterioration of the product's concrete material.

The Universal Liner™ can also be retrofitted into an existing tank or vault through the access cover. Our flexible PVC liner can fit through an 18" diameter manhole cover allowing an installer to attach the liner to the inside perimeter of the tank or vault (completely lining the interior). If high groundwater is an issue, the liner can also be attached to the exterior of the tank or vault to prevent outside water penetration. Our interior and exterior retrofitting methods guarantee a watertight tank or vault.

III. Intended Uses

Our patent pending PVC liner is available in a variety of thicknesses and can be formulated to be resistant to virtually any chemical, liquid, or gas that your product may contain. The intended uses of the Universal Liner™ include, but are not limited to, the following:

- Septic tanks
- Catch basins
- Holding tanks
- Rural area fire department holding tanks
- Drinking water tanks
- Above-ground or in-ground secondary fuel containment
- Breakout barriers
- Primary & secondary fuel containment
- Lift stations
- Utility vaults
- Clarifiers
- Distribution boxes
- **Any precast product !**

IV. Typical Precast Concrete Installation

The Universal Liner™ is fabricated to the specifications of the one-piece monolithic or two or more mold core. Once the liner has been placed inside the core, the manufacturer pours the concrete into the mold according to normal procedure. The liner is made with exterior anchors that embed themselves in the poured concrete to ensure a tight, smooth bond. This bond is further strengthened by the close adhesion of the concrete to the liner's slightly embossed surface. Extra material is folded to allow the liner to be continuously attached as the precast product is stacked or joined. The finished, lined, precast concrete

product is watertight and impenetrable by liquid and air-bound chemicals and gases. In this application, there are two methods to insure quick watertight inlet and outlet connections: pre-attach boots or proper cut and slide, quickly and easily making them both water tight.

V. Typical Retrofit Installation

In order to perform a retrofit installation of the Universal Liner™, the tank or vault's access covers must be fully exposed. The tank or vault is then pumped, power washed, and aerated, with OSHA-approved equipment, in accordance with OSHA confined space entry procedures. Once a visual inspection of the interior of the tank or vault has been performed, the equipment, hand tools, and liner, which is folded, shipped, and handled in a small container, are passed through the access cover. The liner is installed using a variety of fasteners and boots to accommodate inlet and outlet pipes. All materials are resistant to the types of chemicals and/or corrosion typical to the particular application. Due to the flexibility of our fabrication procedures, the Universal Liner™ can be used in virtually any tank size, shape, or configuration in single or multi pieces.

VI. Exterior Applications

In high groundwater and other highly sensitive areas, the Universal Liner™ can be used on the exterior of the tank or vault to prevent hydrostatic penetration or to provide extra leakage protection. The Universal Liner™ can also be used as a breakout barrier in areas where one is required, or simply to line and water proof underground breakout barrier walls.

VII. Product Adaptability

In cases that require the use of two or more pieces of PVC liner, our material can be sealed together using a chemical fusion agent. The liner surfaces are cleaned of dirt and liquid and overlapped onto one another. The chemical fusion agent is brushed onto the overlapped areas with a brush or squeeze bottle and the liners are pressed firmly together. All seams are then visually inspected. This makes one, continuous liner for multi-connected precast products. Please refer to the material data sheet for information on the particular chemical fusion agent used in this process.

VIII. On-Site Product Repairs

Liner damage is repaired on-site with additional pieces of PVC material and chemical fusion agents or adhesives. A liner tear is covered with a rounded-corner patch extending six inches beyond the damaged area on all sides.

PVC: Polyvinyl Chloride Flexible Membrane Liners for Concrete Precast Products

Typical Physical Property Values of our Chemical Resistant Liner Film

Gauge: 30 mil Hand: 5S Form#: -98004.0 Operating Temperature Range: 0F to 140F

Property	Unit	Test Method	Required	Value
Durometer	Shore A	ASTM D-1240		77
Specific Gravity	g/cc	ASTM D-792		1.27
Tensile Strength	PSI	ASTM D-882		MD 2150 TD 1840
Elongation	%	ASTM D-882		MD 280 TD 310
Elmendorf Tear	g/mil			MD over 300 TD over 300
Cold Impact	°F	ASTM D-1790		passed at -20
Hydrostatic Resistance (lbs/sq in)		ASTM D-751	100 min.	115
Resistance to Soil Burial		ASTM D-3083	Breaking Factor +/- 5%	Pass
			Elongation at Break +/- 20%	Pass
			Modulus at 100% +/- 20% Elongation	Pass
Shrinkage		ASTM D-1204	Less than 5% MD	-1.5

30 mil Sample

(Also Available 3 mil - 120 mil)