

Introduction to the Poly-Triplex® Liner System

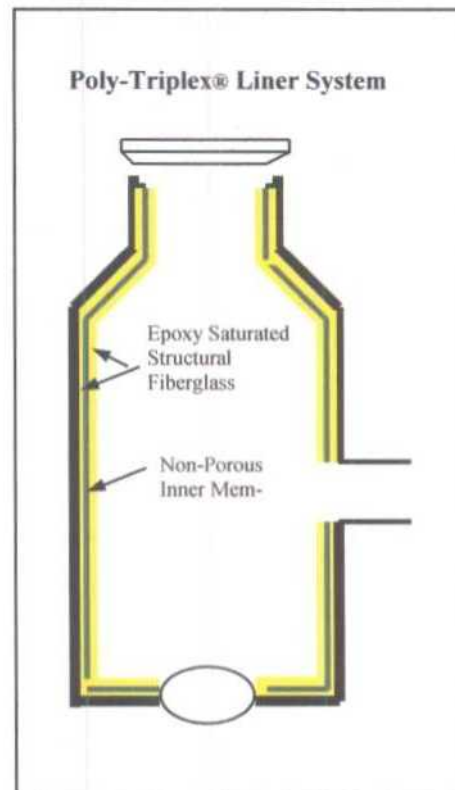
The PolyTriplex® Liner System was developed to permanently stop infiltration and halt further deterioration in manholes and sewage pump-stations. Successful installations have taken place for over ten years.

The Poly-Triplex® Liner System bonds a non-porous inner membrane between structural fiberglass layers, saturated with epoxy resin that is designed to bond to wet or dry surfaces. The existing structure serves as a mold, and we install the liner using "No-Dig" technology. Manholes can be completely rehabilitated in 4 to 6 hours with this very tough, multi-layered laminate material that is bonded to the existing structure.

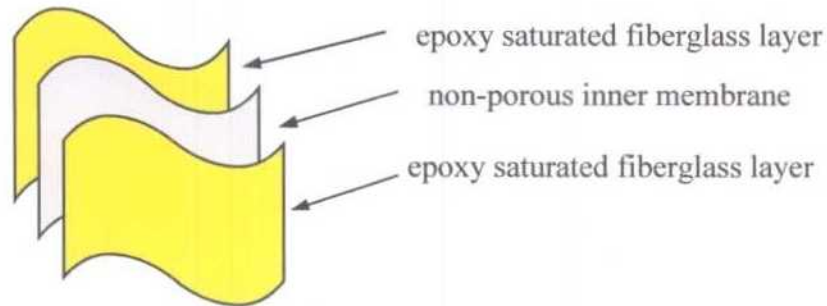
Poly-Triplex Technologies currently offer three Poly-Triplex® Liner Systems. Each system is designed to address varying rehabilitation requirements. The PTL-6800 is designed to address serious structural rehabilitation for high infiltration and/or gas deteriorated structures. The PTL-5600 is designed where less serious problems exist because of infiltration or gas deterioration, but where rehab is definitely needed. The PTL-4400 is primarily for preventive maintenance and minor rehabilitation requirements

We designed these three systems to allow the utility to choose the appropriate method of rehabilitation to solve rehab problems with the most economical and lasting method.

The Poly-Triplex® Liner System is designed to last 50 - 100 years or more and has over thirteen years of field testing. It continues to meet and exceed product expectations.



Poly-Triplex® Liner System



A) Poly-Triplex® Liner System-6800: Custom fabricated liner composed of 20-ounce non-porous inner membrane with two (2) 24-ounce layers of structural fiberglass, epoxy saturated, cured in place with air pressure and steam heat injection; provides a monolithic, non porous liner from the manhole ring and cover seat to the invert channel and/or covering the entire interior surface area of pump stations, wet wells or vaults. Ten Year Material and Five Year Labor Warranty, to stop infiltration and deterioration. PTL-6800 is designed for serious structural rehabilitation where severe infiltration or gas deterioration is present.

B) Poly-Triplex® Liner System-5600: Custom fabricated liner composed of 20-ounce non-porous inner membrane with two (2) 18-ounce layers of structural fiberglass, epoxy saturated, cured in place with air pressure and steam heat injection; Provides a monolithic, non-porous liner from the manhole ring and cover seat to the invert channel and/or covering the entire interior surface of pump stations, wet wells or vaults. Ten Year Materials and Five Year Labor Warranty, to stop infiltration and deterioration. PTL-5600 is designed for rehabilitation where less serious problems exist from infiltration or gas deterioration, but where rehabilitation is definitely needed.

C) Poly-Triplex® Liner System-4400: Custom fabricated liner composed of 20-ounce non-porous inner membrane with two (2) 12-ounce layers of structural fiberglass, epoxy saturated, cured in place with air pressure and steam heat injection; provides a monolithic liner from the manhole ring and cover seat to the invert channel and/or covering the entire interior surface area of pump stations, wet wells and vaults. Ten Year Materials and Five Year Labor Warranty, to prevent infiltration and deterioration. PTL-4400 is designed for preventive maintenance and minor rehabilitation requirements.

* All liners are cured the same way using steam, air pressure and an inflation bladder.

In addition to having a thorough knowledge of the Poly-Triplex® Liner System, a good working knowledge of the other products in the industry is also necessary, There are various other types of products and brand names and because the industry is still emerging, so are the products.

The following article will give better insight into this market and the way rehabilitation needs should be met.

The Evolution of the Cured-In-Place Liner System

Manhole and sewage pump station rehabilitation has been a series of rather futile processes during the past several decades. A system needed to be developed that was both effective, quick to install, and economical. There is now such a value filled process.

Compared to pre-cast fiberglass inserts, inside-the-structure forming for concrete, or replacement of existing structures, cured-in-place synthetic liners were certainly the light at the end of the tunnel for manhole rehabilitation, Some of these liners have been completed using fiberglass or felt fabrics, saturated with either epoxy or polyester resin. The fiberglass with epoxy resin liners have certainly been the better combination because of strength, bonding ability, non-shrinkage, non-toxic characteristics of the resin, and no noxious fumes,

The cured-in-place epoxy/fiberglass liner became a structural composite, as it bonded with the remaining strength of the existing structure, This provided a significant increase to the structural integrity of the manhole, and was a no-dig solution, requiring less time than other solutions to install.

Two Primary Drawbacks Remained:

"A" You had to stop all infiltration prior to installing the product - sometimes a monumental problem, In an old brick manhole (for example) with mortar joints partially gone due to deterioration, and with infiltration coming through the walls in some areas, there was a problem of pinholes through the cured liner. This was caused by collected infiltration in the mortar joints and hydrostatic head pressure during the curing process penetrating the liner's warm, liquid resin to the surface of its inflation bladder, Once the liner's resin cured, the pinholes (by the hundreds) were formed, This allowed for continued infiltration problems during wet times, and caused further sewer gas deterioration to the old structure during dry times,

THE SOLUTION: The solution to "A " was invented by Ronald A, McNeil, (US Patent No, 5,265, 981) by the use (of a non-porous membrane bonded during the curing process between the layers of structural fiberglass. With this Poly- Triplex® Liner System (a registered trademarked product), the first layer of structural fiberglass

bonds to the existing surfaces of the structure; the non-porous membrane then stops the flow of the infiltration water to the inflation bladder during the curing process: and the inside layer of fiberglass adds additional structural strength to the liner system and forms a permanent barrier to keep anything from harming the non-porous membrane in the future. This system works without having to stop infiltration prior to installing the liner - a significant savings in time and costs. Now a manhole with serious infiltration problems is as easy to rehabilitate as one with no infiltration.

"B" was another significant annoyance - consistently curing all surfaces of the liner uniformly throughout the structure. All dry type heating systems, whether by electric heaters hung inside the structure, or blown in heat from above the ground systems had the same problems with curing the resin. Take the same brick manhole as described above. Infiltration water traveling behind the liner in the mortar joints made cold spots on the liner, and therefore, made the resin in those areas cure very slowly compared to the rest of the structure. When the installer thought his liner was cured, he stopped the inflation pressurization, removed the inflation canister, and removed the inflation bladder. He often found out (a little too late) that in the lower areas where infiltration was present the liner had pushed away from the structure - it was not completely cured in those spot locations. Now, he had a timely and costly repair to the liner to be accomplished

THE SOLUTION: The solution to this problem was also invented by Ronald A. McNeil. (US Patent No.5,490,744) who created a turbulent, convection steam oven atmosphere inside the inflation bladder of the liner. Inflation air from a blower system that provided column of hot, turbulent air pressurizing the inside of the liner's inflation bladder was made extremely hot and moist by adding the injection of 300 degree steam into that column of fast moving air. The result is a quick and equal cure of the liner resin throughout the structure - overpowering the cool spot areas where inflation waters existed behind the liner.

This patented Poly-Triplex® Liner System is accomplished with state of the art equipment retrofitted into a 24-ft. box body installation truck. The process is quick to install, economical, and permanent. It carries up to a 10-year warranty to stop infiltration and future deterioration. It has a life expectancy in a sewer environment of 50-100 years. When this monolithic, laminated liner system is bonded to the existing structure, there is significant enhancement of the structural strength of the manhole or sewage pump station,

An easy way to understand the additional strength of this composite, laminated liner system would be a comparison of completely bonding a sheet of re-bar type material the same thickness of the Poly-Triplex® liner to the existing structure, and then making that re-bar material completely resistant towards ever deteriorating inside the sewer environment. The strength of the Poly-Triplex® Liner compared to re-bar material is almost exactly the same.

The Poly-Triplex® Liner System, invented by McNeil, and manufactured by Poly-Triplex Technologies, Inc., is the most economical system to permanently rehabilitate manholes and sewage pump stations that has been developed.

McNeil has been in the environmental field for 14 years. He has been inducted into "Who's Who of American Inventors," and into "Who's Who of Inventors International." His in-the-field research and development took several years to complete.

Poly-Triplex® liners have been installed in numerous areas of the US and in Canada. The product has tremendous freeze-thaw properties, having significantly more flexibility, elongation, and bonding properties to protect against freeze-thaw problems in the upper portions of manholes than any other system.