

# Easy-Liner slipliner

segmental sliplining pipe  
24", 27", 30" and 36" diameters

**A trenchless technology for  
rehabilitation of live sewers,  
storm sewers and culverts.  
A great carrier pipe for new  
casings.**

## Easy-Liner Exceeds All Rehabilitation Objectives

**Increased hydraulic capacity  
with diameter reductions**

**Full strength restoration**

**Low installed cost**



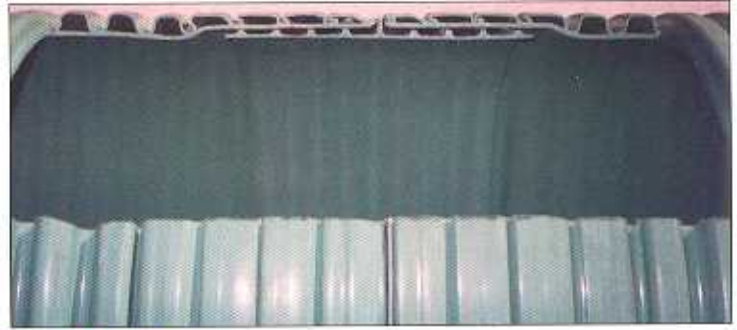
**PWEagle**

# Easy-Liner slipliner



Uponor is one of the world's leading suppliers of pipe systems with sales well over one billion dollars. Uponor operates in 24 countries and its products are sold in 100 countries around the globe.

Easy-Liner is made from Ultra-Corr, a proven direct bury product with a long-term history of success. Ultra-Corr offers the user a pipe that has a seamless uniform cross-sectional wall, radial corrugations that are perpendicular to the axis of the pipe, and a smooth interior for excellent flow characteristics.



## Easy-Liner Slipliner

- Easy to assemble in sewer flow
- Constant O.D. and I.D.
- Gasket system is provided to assure zero leakage
- Restrained with cable
- 5 degree articulation
- Easily restrained during assembly
- 20,000 lbs. of pushing force

*It's Just That  
Easy*

## Easy-Liner in Casing Pipes

Casing pipes can be reduced in diameter when low profile Easy-Liner is used as a carrier pipe. Direct bury projects that have jack and bore casing sections under railroads, interstates, or other structures can use Ultra-Corr direct bury and Easy-Liner slipliner on the same job because both interface well. Casing spacers can be used to center Easy-Liner in the casing pipe.



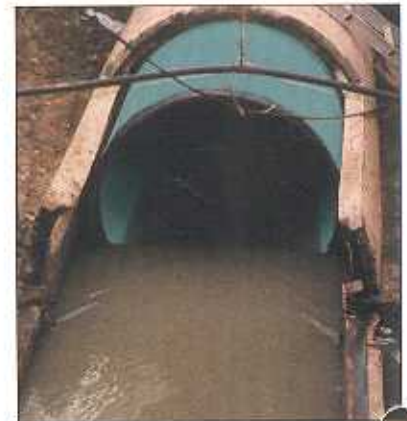
## Culvert Sliplining

The light weight design and easy joint assembly make Easy-Liner an ideal pipe for culvert rehab. A come-along for pipe assembly and a small backhoe for moving and pushing pipe is normally all that is needed. The Easy-Liner should be braced for alignment prior to joint assembly and during installation. Most short pushes can be pushed by hand. Grouting is recommended to stabilize and strength the system. When doing multiple culverts, use the piece of pipe leftover from cutting the pipe to fit on the first culvert as a starter piece for the next culvert and so on. This procedure will eliminate ordering special lengths for each culvert.

## Hydraulic Improvement

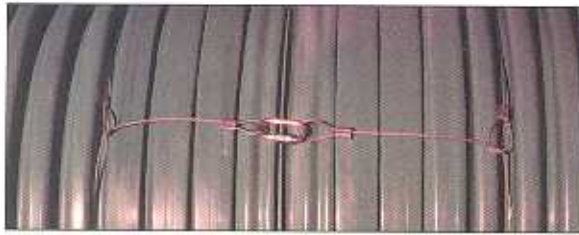
Easy-liner's ultra-smooth, glossy interior with a Manning's "n" = .009 provides a significant hydraulic improvement when sliplining concrete or clay pipes. A deteriorated concrete host pipe ( RCP ) will have a Manning's " n " = .015 to .018, and corrugated metal pipe ( CMP ) has a Manning's " n " = .018.

Host Pipe Nominal ID (in.)	Easy-Liner Nominal ID n=.009 (in.)	Percent Improved RCP n=.015	Percent Improved CMP n=.018
27	24	114%	138%
30	27	119%	144%
36	30	103%	118%
42	36	111%	128%



Formula used to calculate improved flow:

$$\% \text{ of Improved Flow} = \frac{M \text{ Host Pipe}}{M \text{ Easy-Liner}} \left[ \frac{\text{ID Easy-Liner}}{\text{ID Host Pipe}} \right]^{8/3}$$



## Restrained Joint

A 1/8" steel cable ( 2,000 lb. test ) is attached to each end of Easy-Liner at the factory. After the field joint assembly, the two cable loops from both sides of the joint are joined together with a Quick Link snap hook. The resulting restrained joint will articulate 5 degrees.

## Host Pipe Preparation and Easy-Liner Installation

Prior to ordering sliplining materials the contractor should measure the inside diameter of the host pipe and TV the line. The host pipe should be cleared of obstructions, solids, offset joints, protruding taps, collapsed pipe, and the line should look straight. **THIS IS NOT AN OPTION!** Pit locations are often considered based on this data. Insertion pits should be located considering conditions of the existing pipe, directional changes, surface conditions, or pushing distances. The number of insertion pits may be reduced by sliplining in both directions from a single insertion point. The insertion pit should be long enough to accommodate a complete length of sliplining pipe plus five feet. The width of the insertion pit should be sufficient to allow workers enough room to remove the crown of the existing pipe and install the sliplining pipe (usually a minimum of two to three feet on each side of the existing pipe). A trench box or sheeting is used to provide a safe working environment. A steel can slightly larger than the outside diameter of the Easy-Liner sliplining pipe (1/4") and approximately six feet long shall be pulled through the host pipe prior to any insertion attempts. If there are sags, depressions or slight bends in the line, a longer steel can shall be pulled through the line to verify that Easy-Liner will fit. A baffle can be placed in the middle of the steel can to catch any material left over from the original cleaning. Bypass pumping is not required for the installation of Easy-Liner sliplining pipe. The bell end of the lead pipe should be removed at the first whole profile thus creating a natural bevel to ride over small imperfections in the host pipe. This piece should be inserted into the host pipe with enough pipe exposed to be restrained. A horseshoe cut from a piece of 1/4" steel plate or 1/4" plywood can be slipped between the exposed profiles and pressed against the vertical edge of the cut top half of the host pipe or a chain can be wrapped around the profile and anchored to the trench box. The bell and spigot is then lubed (use a sub aqueous lubricant when water is present) and the next piece of Easy-Liner is inserted, spigot into bell. The horseshoe or chain is removed and force is applied (using a wide thick board) across the bell end of Easy-Liner to slide the slipliner in place. If large forces are needed, a push ring should be used which will press against the PVC uniformly to prevent damage. This procedure is repeated until the entire line is sliplined. Easy-Liner is neutrally buoyant when the host pipe is half full of water, thus long pushing distances can be obtained without friction, when the host pipe is straight and clean.

## Reinstating Lateral Connections

Service laterals should be restored using tapping saddles or Fowler Inserta Tees by point excavation Before Grouting.

## Bulkheads

Bulkheads shall be constructed in sequence from upstream to downstream allowing sewage trapped in the annulus to escape. If annular grouting is to be performed, grout tubes, ventilation tubes, and drainage tubes shall be constructed into the bulkheads.

## Grouting

The annulus between the Easy-Liner and the host pipe may require grouting. Always grout the annulus if the host pipe is fully deteriorated. Grout will stabilize and add strength to the system. The grout should consist of Portland cement, pozzolanic fly ash and/or foaming agents and water. Cellular grout should weigh 55 pcf. The grout should have between 100 and 300 psi. compressive strength after 28 days. It should pass through a flow cone in less than 20 seconds for good viscosity. No aggregates or sand should be used in the grout mix. With annular spaces of more than three inches, flotation of the liner should be taken into consideration. For very large annular spaces heat of hydration should also be considered. Do not exceed 5 psi grout pressure during installation.

## Encasement

At points where Easy-Liner is exposed (service connections, insertion pits, etc.), the liner pipe can be back filled using the same procedures as any high stiffness flexible direct bury pipe. Particular care should be taken to insure compaction beneath lateral connections in order to prevent stress at the connections. PVC couplings and gaskets are available for closures at pit locations.





## Dimensions & Weights

Nominal Diameter (inches)	Outside Diameter (inches)	Inside Diameter (inches)	Weight (lbs./ft.)
24	25.580	23.469	19.0
27	28.860	26.440	21.0
30	32.150	29.469	27.0
36	38.740	35.475	38.0

## Short Form Specifications Reference Specifications

This specification references American Society of Testing and Materials (ASTM) standard specifications, which are made a part hereof by such reference and shall be the latest edition and revision thereof.

- ASTM F 949** Standard Specification for Polyvinyl Chloride (PVC) Corrugated Sewer Pipe with a smooth interior and Fittings
- ASTM F 794** Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- ASTM D 1784** Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
- ASTM D 2412** Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading. Pipe Stiffness of 50 psi.
- ASTM D 3212** Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
- ASTM F 477** Elastomeric Seals (Gaskets) for Joining Plastic Pipe

## Materials

Pipe shall be manufactured from a PVC compound having a minimum cell classification of 12454 as defined in ASTM D1784. Gasket shall meet the requirements of ASTM F 477.

## Manufacturing

Pipe shall be corrugated PVC, ASTM F 794 or ASTM F 949 for 24" - 36" diameters. The joint is designed to provide a constant inside/outside diameter. A gasket system on each coupling end is provided to assure zero leakage. The joint shall meet the requirements of ASTM D 3212. Easy-Liner shall have a minimum pipe stiffness of 50 psi when tested in accordance with ASTM D 2412. Easy-Liner shall have a seamless uniform cross-sectional wall, radial corrugations that are perpendicular to the axis of the pipe, and a smooth interior for excellent flow characteristics.

### Customer Service Centers:

- Oregon: 800-347-0200  
Missouri: 800-341-0053  
West Virginia: 800-624-3111

**PW**Pipe and ETI, Inc. have merged  
and the new name is:

**PWEagle**

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800-347-0200