

National Liner —

A CIPP technology that literally breathes new life into worn-out, damaged mains and laterals by creating an all-in-one process to rehabilitate and extend the life of sewer systems.

**National Liner's Lateral Lining System—
A unified, sealed system, and an end to
inflow and infiltration.**

Old pipes that have outlived their useful service life develop a variety of structural problems—cracks, offset joints, root and subsidence damage and more. These integrity troubles permit inflow and infiltration of groundwater and foreign material that compound structural problems by increasing the hydraulic load. Continued I&I can lead to more serious problems, such as roadway subsidence and contamination of soil and groundwater. Our national infrastructure is rife with these kinds of situations, requiring urgent renewal as efficiently and economically as possible.

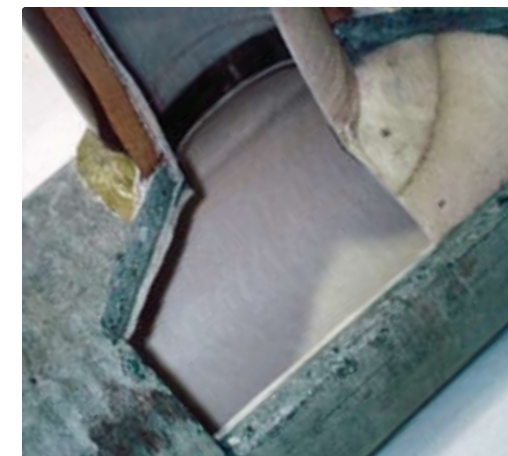
National Liner's Lateral Lining System is a flexible, no-dig pipe rehabilitation technology that can be applied to a wide variety of lateral systems. While designed to be installed prior to the CIPP lining of the mainline, our Lateral Lining System can also be installed after mainline rehabilitation. Since it is installed from the mainline, our Lateral Lining System does not require a clean-out.

The technology behind the National Liner Lateral Lining System, when installed prior to CIPP lining of the main, is the S COLLAR. This stainless steel collar is designed to protect our lateral liner against damage at the lateral joint that could be caused by the robotic cutter during reinstatement of the service connection. This is just one of the many quality assurance measures and attributes that have earned this technology approval by the WRc in 1999.

Among the trenchless lateral lining systems available in today's marketplace, the National Liner Lateral Lining system offers superior durability, hydraulic integrity, low energy consumption in the installation process, extended life to existing lateral lines, overall lower cost to dig and replace, and an end to I&I problems.



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**A unified CIPP lining system
for mainlines and laterals**

Creating a Totally Unified Lining: Lateral Pipes

How lateral and mainline pipes are joined

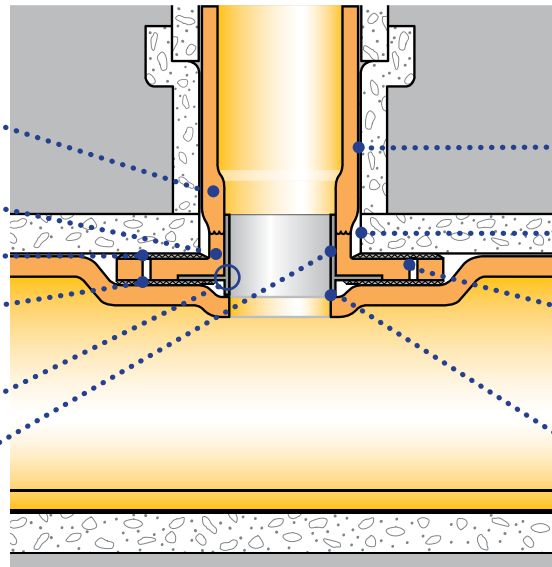
The joint end of the lateral liner is thicker, providing extra strength.

The collar is manufactured in a tee or wye configuration that aids in positioning the lateral liner at the opening to the host pipe.

Fabric affixed to the surface of the collar enhances strength of joint.

This segment is sealed with coating film.

The S Collar (stainless steel collar¹) protects the main liner from the cutter.



This surface is sealed with coating film.

Excess resin squeezed out of the main-line pipe liner strengthens the joint.

Collar slits are filled with resin extruded from the main liner to function as anchor plugs and help strengthen the joint.

Protrusion of the edge of the S Collar from the lining after curing enables easy identification of lateral entrances to be opened.

Installation features

1 The joint area is designed to provide additional strength to the lateral/mainline joint while unifying the lateral and mainline liners.

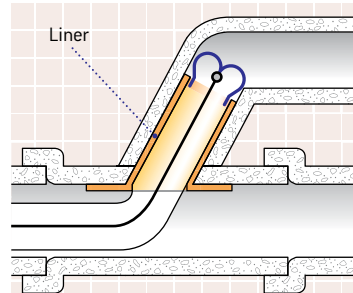
*Please refer to the above diagram for details.

2 Lateral entrances are protected by S Collars (stainless collars¹) to aid in the reopening process.



The S collar protects lateral pipe entrances

3 Laterals without a clean-out can be lined from the mainline pipe¹.



National Liner Lateral Liner System: standard installation process

1 Inspection

Lateral pipes are inspected using the National Liner robot with CCTV cameras to determine liner specifications.

2 Pipe closure

Shutoff plugs are installed in laterals, and bypass pipes are fitted as required.

3 Pre-lining works

Any obstructions noted during inspection are removed.

4 Pre-lining positioning

A pressure bag containing the liner for lateral pipes is mounted on a robot. The robot is introduced into the mainline pipe and moved into position to attach the end of the lateral liner to the opening of the lateral pipe.

5 Inversion insertion

The lateral liner is inverted and inserted using either water or air pressure.

6 Curing with steam or hot air

When inversion is completed, steam or hot air is then introduced into the liner to start the curing process. After the lateral liner is hardened, the pressure bag is torn cleanly away.

7 Finishing

The newly installed liner is examined using the National Liner robot and CCTV cameras.

The S Collar marks the position for cutting lateral opening



Lateral pipes are inspected using the National Liner robot with CCTV cameras to determine liner specifications.

¹ Patented Technology

