

## Technology Spotlight

### What is your technology?

Rigid Seal Technology ([www.RigidSeal.com](http://www.RigidSeal.com)) is a trenchless pipe lining system that seals and strengthens failing water lines, sewer lines, storm sewers and process water lines. The family of lining products can be matched to the most challenging lining conditions.

Rigid Seal was developed by a team of sewer/water rehabilitation industry experts that, together, have decades of experience in all type of trenchless water/sewer rehabilitation. This experience has allowed Rigid Seal to address the most vexing challenges facing the industry. The result is a family of products that can address all types of challenges facing rehabilitation contractors. In the near term, Rigid Seal has focused on lining pipes between 6" and 24" diameters but these limitations are only the result of the design constraints of our existing installation equipment.

- Rigid Seal offers various levels of service:
- Complete installation services for municipal and industrial customers.
- Installation Equipment to underground contractors (under a Rigid Seal license).
- Project specific liners, grout, and ancillary products.
- Technical support for contractors during start-up and/or during installation.

Rigid Seal has been certified to NSF/ANSI 61 standards by NSF for use in potable water systems (C0314125-01).

### What are the benefits to implementing your technology?

**Easy to Install:** Rigid Seal is easily installed through a standard manhole or access point and becomes a rigid, cohesively bonded composite unit made up of the host pipe, a cured/rigid grout compound, and a robust Thermoplastic Polyurethane (TPU liner). The liner provides Shore-D hardness properties comparable to that of a standard hard hat while the moisture activated grout has sufficient mineral fillers to achieve an even harder structure. Together they are designed to reinforce even the most compromised pipe system.

The Rigid Seal process also offers installation equipment that is designed, manufactured, and tested by RecycaPipe to deliver consistent performance in the difficult conditions expected in restoring water, sewer, and storm drain systems. The liner, grout, and installation equipment are easily delivered to the site without the need for pre-installation grouting, boilers, UV light sources, or refrigerated transport vehicles, thereby substantially reducing the cost of repair.



Figure 1. Rigid Seal can line all types of pipes and virtually any diameter.



Figure 2. TPU liner threaded through funnel prior to adding grout.



Figure 3. Grout added to funnel and fed into liner grooves which prevents grout from "scraping off" during insertion.

**Easy to Reconnect:** Because the fully cured liner is translucent, locating and reestablishing service connections is simplified.



Figure 4. Poorly fitted connection is sealed by expanding grout.



Figure 5. Connection can be viewed through translucent liner for easy reconnection after curing.

**Seals even the most severely damaged lines:** The moisture activated, expanding grout seals the voids between the liner and aging host pipe. It expands to fill gaps and cracks stabilizing and strengthening the existing pipes.

**Provides the Strength Needed for Decades of Use:** The fully cured grout bonds to the TPU liner, adheres to the host pipe, and hardens to form pipe system that exceeds the original hoop strength of the host pipe.

**Maintains and/or Improves Hydraulic Capacity:** The unique design of liner provides a very low profile coupled with the smooth, jointless surface and flow guiding indentations which results in better flow dynamics and increased flow capacity.

#### Advantages:

- Seals pipes to eliminate leakage and infiltration.
- Strengthens original pipe by filling cracks and voids with expanding grout.
- Easily installed through a manhole.
- Applicable to pipes of all sizes and shapes.
- Little or no loss of hydraulic capacity.
- Installed product designed for 50-year life.
- Translucent liner allows precise, water-tight reinstatement of laterals.
- No Volatile Organic Compounds (including Styrene).
- Smaller crews than alternative solutions.
- NSF International Certified for use in water mains (NSF/ANSI 61).
- WEF/AWWA/WRF – Lift Program participant.
- Minimal capital investment required for installation.
- Patented liner profile both chemical and mechanically locks grout in place.

#### Has the technology been tested, demonstrated, or implemented anywhere to date?

Rigid Seal has performed dozens of full-scale installations through a wide variety of weather conditions on privately held abandoned industrial sites and their pipe farm (also on private property). The pipe farm allows Rigid Seal to install several hundred feet of liner at a time, allow it to cure, and then excavate the lined pipe for further testing and analysis. The pipe farm has also allowed the Rigid Seal development team to further improve and refine the installation process and equipment.

The first installations on publicly owner sewer systems is expected to be performed Southeast Michigan in August 2019 and in Florida the following winter.

#### What are some of the next steps needed to advance the technology?

The installations to date have verified our ability to seal and structurally reinforce failing water/sewer lines. These early installations have also allowed the Rigid Seal developers to refine and improve the installation equipment.

The base Rigid Seal Product is fixed, but the developers continue to work with TPU specifications and grout formulation to provide increased strength and improved resistance to extremely aggressive chemicals (for industrial applications).

#### How has LIFT helped, or how can LIFT help?

LIFT has been helpful in providing direction in how best to address the technical challenges facing the product. LIFT has introduced the Rigid Seal development team to industry experts and large-scale users who have provided written critiques and proposed specific technical questions for our consideration and response.

We also look forward to LIFT's help in identifying and introducing municipal leaders that show additional interest in the process. Rigid Seal will work with LIFT to invite those interested parties to observe an installation at our pipe farm, at a local municipal installation, or at the interested party's location.

**For more information, please contact:**

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