Pipe Lining Systems (PLS)
Technical Committee Meeting Minutes
Working Session # 5
Tuesday, June 10th, 2025 10:00am – 11:15am

1) **Call to Order and Introductions**

2) **Review of Current Technical Committee Members**

3) **Summary of the Technical Committee Purpose and Goals**
   -Powerpoint presentation on TC and TC history shared remotely

4) **Program Status**
   -User Guide update is forthcoming
   -Action Item – Janae: structural testing for products needs to be pulled

5) **Discuss Recommendations for Improving Participation from DOT's and Vendors**
   -Participation from DOT (more DOT requiring program) for PLS to be successful
   -In Ohio, an enrollment requirement date of January 2025; AASHTO PLS material testing result required by January 2027

6) **Testing Lab Concerns/Updates**
   -No one from test lab attending
   -Question from Sika: Is this open enrollment? Answer: Yes, rolling

submission cycle
-Question: Is there a list of states who adopted this? Answer: Louisiana, Tennessee, Ohio, North Carolina, Colorado, Montana (this list includes those who require and allow in lieu of something else)

7) **Industry Concerns/Updates**
-Concern brought up that data written in fields and specs that are viewable without a login is incorrect
-Active manual review of DataMine is needed

8) **State DOT Concerns/Updates**
-Reasoning why PLS has not been made required in the states?
-One DOT said they use a APL/QPL and test for a Mannings coefficient (1 test per product lifetime)
-LA is bolstering their internal specifications and is looking into adoption; need to know how to pre-qualify products, will touch base soon
-NC requires participation in this program to get on APL/QPL; installation and specific contractor makes the biggest difference; open to sharing how to do this

9) **CIPP Design Methods Overview and NCHRP Research**
-ASTM F-1216: simple equation and has been around for a very long time with minor revisions, was state of practice for CIPP design
-More recently, ASCE MOP-145 is for close fit liners (CIPP and fold and form PVC for any host pipe shape); more complex equation, for any shape, limitations on deflections **[**append CIPP design methods slide]**

10) **SAPL ASTM F-3706**

11) **Open Discussion/Questions**
-Data quality checks in DataMine

PVC Fold and Form
-Any states who have interest in adding PVC fold and form products? This type of pipe may be very popular
-Ohio had a pilot project of PVC fold and form rehabbed pipes on a specific site, and has put it in their specs as a competition to

cured-in-place pipes
-Kentucky is also using this
-If it was put into PLS program, it would become part of Ohio's spec, for example
-NC, TN, GA, LA, MO are all interested in adopting PVC

-Consensus to move forward in adding PVC fold and form

Action Item – Jeff: Ask NASCO contact Sheila Joy and other industry for a list

– Look in to seeing if there is this needs approval before proceeding

-Coordinate with Industry for PVC fold and form

NCHRP 24-53 (Development of a Load and Resistance Factor Design (LFRD) Culvert and Storm Drain Rehabilitation Guide)

-Upcoming project for FY 2026, looking for Panel Members, apply through NCHRP

-Generic spec information for any of these products is available at NASCO

Other:

-Wisconsin DOT mentioned they use slip lining and they require Manning's n hydraulic testing; Maybe we survey the other States to see if this would be of value to the PLS workplan?

-There was an ASTM test D6992 "Step Isothermal Method" that may be able to determine the CIPP creep in about two weeks. This is something to investigate and maybe bring up with the CIPP vendors to see if they have ever used this or are familiar with this.

Pipe Lining Systems (PLS)

Working Session #5
Tuesday, June 10, 2025
10:00am-11:15am

Pipe Lining Systems (PLS) Technical Committee

- Provide uniform and consistent material physical testing of PLS products used for gravity flow stormwater conduits
- Vendors and State DOT's develop and maintain the workplan
- Current workplan includes Spray Applied Liners (SAPL) and Cured In Place Pipe (CIPP)

PLS Goals

- Meet the needs of State DOT's construction specifications for PLS used in storm water conveyance conduits
- Reduce variability of testing methods for PLS products at each State DOT
- Provide platform for Vendors to share material testing results directly with State DOT's. Common set of testing results performed one time for the entirety of the State DOT's.

Spray Applied Liner (SAPL)

- Cementitious or Geopolymeric
- Resinous

Cured in Place Pipe (CIPP)

- Resin-impregnated felt tube
- Resin-impregnated Glass Reinforced Plastic (GRP) tube
- Cured in the host conduit with: Hot water, Steam, or UV light

Cementitious Spray Applied Pipe Liner (SAPL)

Resin Spray Applied Pipe Liner (SAPL)

Cured In Place Pipe (CIPP)

Home
Annual Meeting
Membership
Technical Committees
Asphalt Binder Suppliers (ABS)
Asphalt Mixture Additives (AMA)
Asphalt Release Agents (ARA)
Composite Concrete Reinforcements (CCR)
Concrete Admixtures & Concrete Curing Compounds (CADD/CCC)
Corrugated Metal Pipe (CMP)
Detectable Warning Systems (DWS)
Elastomeric Bridge Bearings (EBB)
Epoxy Resin Based Adhesive Bonding Systems (ERB)
Erosion Control Products (ECP)

AASHTO Product Evaluation & Audit Solutions

Home / Technical Committees / Pipe Lining Systems (PLS)

Pipe Lining Systems (PLS)

This committee oversees the work plan that covers the evaluation of pipe lining systems for stormwater conveyance conduits. This work plan utilizes laboratory testing to evaluate material used for Glass Reinforced Plastic Cured-In-Place (CIPP), Felt Liner CIPP, cementitious Spray Applied Pipe Liner (SAPL), and resin based SAPL. Different laboratory material testing is required for the resin-based liner versus the cementitious liner. An optional structural test is included in the work plan.

This work plan (located under Documents on the above menu) is intended to determine the material, durability, application properties, composition properties, and structural capacity of each liner. Acceptability of each material, based upon the data generated as a result of the testing and evaluation in this practice, is the responsibility of the user. Structural design methodologies of liners are not covered under this work plan.

Designated Lab:

- SGS TEC Services

DataMine Pipe Lining Systems (PLS) Module: https://datamine.transportation.org/PLS/Products

Meeting Minutes +

Documents +

Testing Service Fee +

AASHTO Product Evaluation & Audit Solutions Committee Work Plan for

Evaluation of Pipe Lining Systems for Storm Water Conveyance

AASHTO Product Evaluation & Audit Solutions
Designation: PLS-22-01

AASHTO Product Evaluation & Audit Solutions
555 12th Street NW, Suite 1000
Washington, D.C. 20004

NTPEP
AASHTO | NATIONAL TRANSPORTATION PRODUCT EVALUATION PROGRAM

User Guide for the Spray Applied Pipe Liners Technical Committee

(Published 11/18/19)

Introduction:
A Spray Applied Pipe Liner (SAPL) is a trenchless technology utilized to rehabilitate storm water conveyance conduits of many shapes and sizes. The liner may be applied manually or via a remote device depending on the span and rise of the host conduit.

The SAPL technical committee oversees the work plan that covers the evaluation of cementitious and resin based spray applied liner materials for storm water conveyance conduits. This work plan utilizes laboratory testing to evaluate material used for the SAPL. Different laboratory material testing is required for the resin based liner versus the cementitious liner.

Key Aspects of the Program:
The SAPL work plan contains physical material testing, freeze thaw testing, and optional structural testing. The physical material testing is performed every four (4) years by each Vendor or is required if the material formulation changes.

The optional structural testing contains two available tests that may be requested by vendors, which will be performed once per product unless the material formula changes. Structural testing includes: Method A andMethod B. Method A is intended for materials that behave in a rigid fashion and Method B is for materials that behave in a flexible fashion.

Terminology:
The SAPL material may be resinous, cementitious, or geopolymeric. Geopolymer materials are treated as cementitious for the purpose of the evaluations.

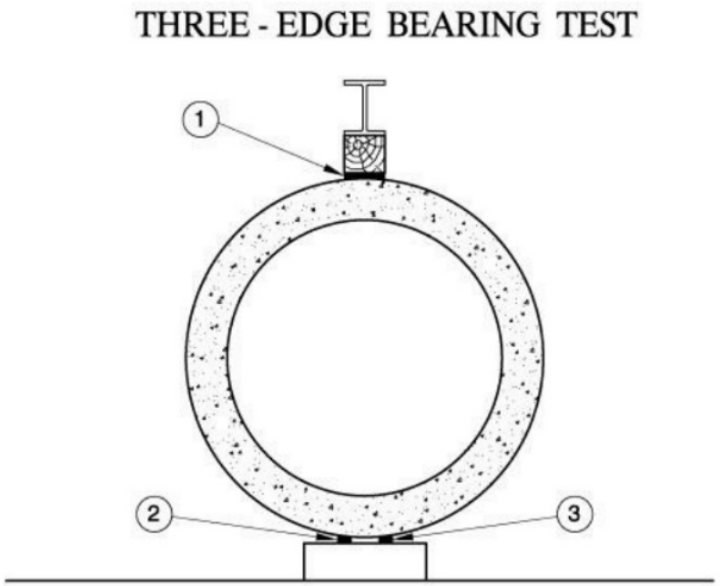
PLS Summary

- Workplan testing is performed by SGS TEC Services
- Includes material testing and two optional structural tests
  - Some material tests are optional as identified in the workplan

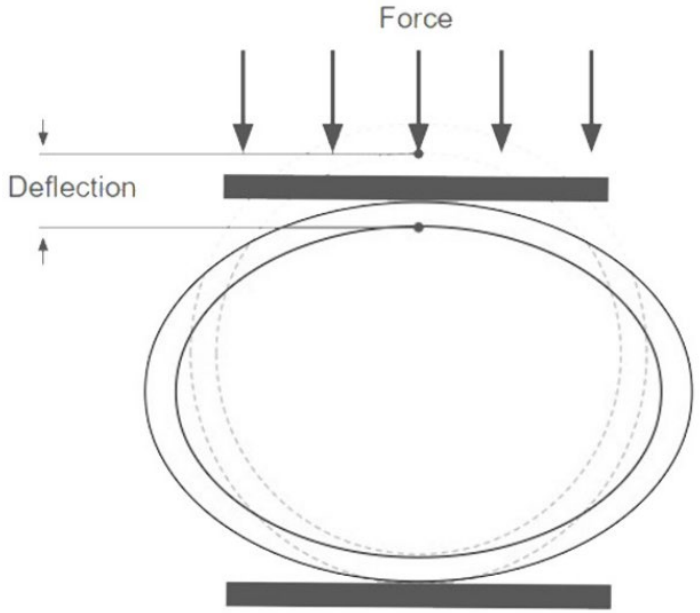
PLS Summary

- Structural tests (performed once per product) are either:
  - Lining of cracked concrete pipe and subsequent loading via D-load testing
  - Lining of removable forms or forms that lack stiffness and subsequent parallel plate testing

PLS Summary



ASASHTO T-280



ASTM D-2412

PLS Testing Fees-Paid by Vendor

Spray Applied Pipe Liners

Testing Service Fees for EACH product submitted:

RESIN LABORATORY TESTING **$2,783.00 per product**

"Laboratory Testing" fee is inclusive of all laboratory testing, report preparation and program management services by the host testing state. A portion of this fee is assigned for administrative management of the Spray Applied Pipe Liner Program.

CEMENTITIOUS LABORATORY TESTING **$6,794.00 per product**

"Laboratory Testing" fee is inclusive of all laboratory testing, report preparation and program management services by the host testing state. A portion of this fee is assigned for administrative management of the Spray Applied Pipe Liner Program.

THREE EDGE BEARING TEST (D-LOAD) **$13,385.00 per product**

The fee includes the cost of the concerte pipe.

PARALLEL PLATE TEST **$2,206.00 per product**

The fee includes the cost of the Sonotube.

Accurate Invoice for the total number of products submitted will be provided upon the acceptance of your online submission.

Cured-In-Place Pipe

Testing Service Fees for EACH product submitted:

Method	Property	Cost per Product
D638	Tensile Properties	$449
D790	Flexural Properties	$449
D2990	Long Term Creep - 10,000 hrs	$5,610
T280*	D-Loading of Concrete Pipe	$21,318
D2412	Parallel Plate Testing	$1,683

Accurate Invoice for the total number of products submitted will be provided upon the acceptance of your online submission.

SAPL Vendors and Status

- Quadex-In Test
- Henkel - Complete
- Action Products – In Test
- Sprayroq-In Test
- Nukote –Good through December 2026

SAPL Vendors with older testing have been archived due to expired testing data and non-participation with renewed testing.

- The Strong Company
- A.W. Cook Cement Products
- Instacote
- HydraTech

CIPP Vendors and Status

- SAERTEX- In Test
- Inliner Solutions- Enrolled
- Reline America-Enrolled

- **Requesting DOT's to incorporate AASHTO PLS material testing into Specifications**
  - Require enrollment in PLS by a set date
  - Require AASHTO PLS material testing result after vendors complete testing

- **Example - Ohio DOT**

  - CIPP vendors notified August of 2024 that enrollment in the PLS will be required by January 2025

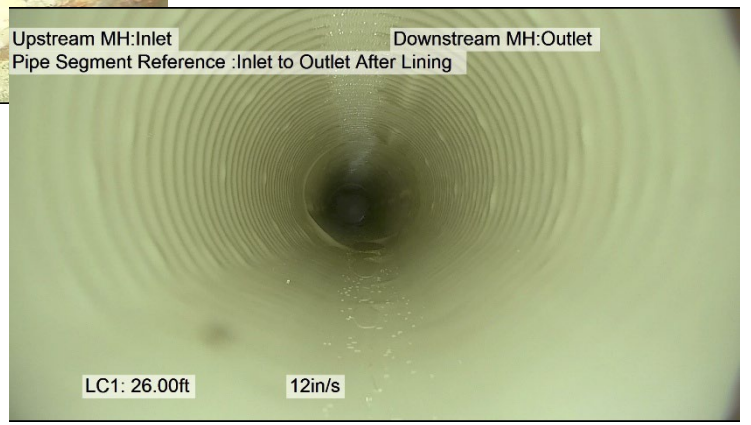
  - AASHTO PLS material testing result will be required by January 2027

Testing Lab Concerns?

Industry Concerns?

State DOT Concerns?

- Any interest in adding PVC fold and form products?



CIPP Design Methods

- ASTM F-1216- Appendix
  - Round host pipes- less than 10% ovality with no imperfections
    - Partially deteriorated-Groundwater load only or
    - Fully deteriorated-Live, Dead, and Ground Water Load
  - Simple equation

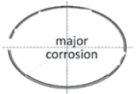
CIPP Design Methods

- ASCE MOP-145
  - Close fit liners including CIPP and Fold and Form PVC for any host pipe shape
  - Considers host pipe material type and condition using three design states:

Rigid Host Pipe

Design State	Criteria			
State I		AND/OR Minor surface corrosion		AND/OR Minor abrasion
State II		AND/OR Minor surface corrosion		AND/OR Minor abrasion
State III		AND/OR Steel reinforcement corrosion	AND/OR Major surface corrosion	AND/OR Major abrasion

Flexible Host Pipe

Design State	Criteria		
State I		AND/OR Minor surface corrosion	AND/OR Minor abrasion
State III		AND/OR 	AND/OR 

NCHRP 18-20(01)-LRFD Design, Installation, and Standard Practice of Testing for Cured In-Place Pipe Liners

- Completion of previous 18-20 research, which was canceled
- Goal is to provide a LRFD themed CIPP design guide that AASHTO can publish
- Proposals are currently under review by Research Panel

SAPL

- ASTM F-3706-Standard Practice for Cementitious SAPL
  - New specification that covers the procedures to structurally or non-structurally reconstruct, seal, and protect conduits
    - Includes structural design information in the Appendix
    - Similar Design States as MOP-145
    - Does not provide a design equation

- Structural design method proposed by Royer 2022
  - “Exploration of Engineering Design Methods for Cementitious Spray Applied Liners Systems”-NASTT 2022 No-Dig North Show

North American Society for Trenchless Technology (NASTT)
NASTT's 2022 No-Dig North Show

Toronto, ON
October 17-19, 2022

WA-T4-01

Exploration of Engineering Design Methods for Cementitious Spray Applied Liners Systems

Joe Royer, PhD, GeoTree Solutions, Spartanburg, SC.
John C. Matthews, PhD, Trenchless Technology Center (TTC), Louisiana Tech University, Ruston, LA

Any other Research Efforts underway involving Pipe Lining Systems?

Questions?

Pipe Lining Systems (PLS)

Technical Committee

Attendance

June 10, 2025

First Name	Last Name	Employer
Joe	Royer	Henkel
Justin	Morris	LA DOTD
David	Young	Tennessee Department of Transportation
Martin	Dassi	TxDOT
Willie	Johnson	MODOT
Mario	Paredes	TRI Environmental Inc.
Todd	Whittington	NCDOT
Alexander	Lewis	FDOT
Kelly	Easley	Timewell
William	Real	W L Real consulting
Merrill	Zwanka	SCDOT
Ryan	Buck	FDOT
Kean	Ashurst	KTC
Steve	Esposito	New Jersey Turnpike Authority
George	Koustis	Sherwin
Eli	Ulmer	NDDOT
Daniel	Huggins	Ladotd
Hemantkumar	Shah	New Jersey Department of Transportation
Michael	Dickey	WisDOT
George	Koustis	Sherwin
Yong	Zeng	NJDOT
Connie	Coleman	GDOT
Jake	Jenson	AASHTO
Rodney	Klopp	PennDOT
David	Malburg	MDOT-SHA
Joseph	Stilwell	MaineDOT
Matt	Schulz	Vt Agency of Transportation
Aamer	Syed	Sika
Allen	Gallistel	MnDOT
Cabell	Garbee	Ncdot

Scott	Bickford	Mainedot
Carla	Principe	WisDOT
Dan	Currence	PPI
Randy	Boysen	Montana DOT
Ayrton	Hernandez	Tododren
Hector	Anaya	WMC
Paul	Bushnell	MT DOT
Scott	Nussbaum	Utah Department of Transportation
Emiliano	Hernandez	WMC
Sara	Stone	Crossroads Engineering Services