

## **SECTION 431 PIPE LINER**

### **431-1 Description.**

Rehabilitate drainage pipe by installing a pipe liner in accordance with the requirements of this Section. The Plans will indicate the location of the pipe to be rehabilitated, the material composition and the alternate liner types that may be used to rehabilitate the pipe, and the method of liner installation.

### **431-2 Materials.**

Meet the requirements of Section 948.

### **431-3 Pre-installation Requirements.**

Prior to installing the pipe liner, inspect the host pipe and ensure that it is clean, dry and stable. Inspect the host pipe by means of closed circuit television. The closed circuit television inspection may be augmented by a visual inspection in which persons enter a host pipe to inspect it, at no additional cost to the Department. Obtain written approval from the Engineer prior to allowing persons to enter a host pipe. Furnish all equipment necessary to inspect, remove silt and other debris, and dewater the host pipe to the satisfaction of the Engineer. Seal cracks and joints using an approved chemical grout of either acrylamide base gel, acrylic base gel, urethane base gel, or urethane base foam. Place flowable fill as directed by the Engineer to maintain the stability of the host pipe.

### **431-4 Installation Methods.**

**431-4.1 General:** Install the liner using one of, or a combination of, the following methods: sliplining, inverting, pulling/pushing, spiral winding, paneling, coating, or bursting. Seal or grout the annular space between the interior of the host pipe and the exterior of the liner according to the liner manufacturer's written instructions.

**431-4.2 Sliplining:** Use either polyethylene, high density polyethylene, polyvinyl chloride, fiberglass, steel or aluminum pipe liner. Install the liner by joining discrete lengths, panels or segments of the pipe liner in a manhole or other access point and inserting the liner into the host pipe.

**431-4.2.1 Polyethylene:** Install polyethylene pipe liner in accordance with ASTM F-585. The manufacturer's written instructions may be substituted for ASTM F-585 with written permission from the Engineer.

**431-4.2.2 High density polyethylene:** Install high density polyethylene pipe liner in accordance with ASTM F-585. The manufacturer's written instructions may be substituted for ASTM F-585 with written permission from the Engineer.

**431-4.2.3 Polyvinyl chloride:** Install polyvinyl chloride pipe liner in accordance with ASTM F-1698.

**431-4.2.4 Fiberglass, steel or aluminum:** Install fiberglass, steel or aluminum pipe liner in accordance with the manufacturer's written instructions.

**431-4.2.5 Steel Reinforced Polyethylene Ribbed Pipe:** Install reinforced pipe liner in accordance with ASTM F-585. The manufacturer's written instructions may be substituted for ASTM F-585 with written permission from the Engineer.

**431-4.3 Inverting:** Install a resin impregnated felt tube pipe liner into the host pipe, and cure in place, in accordance with ASTM F-1216.

**431-4.4 Pulling/Pushing:** Install the liner in accordance with the manufacturer's written instructions. Protect the pipe liner end using a device that uniformly distributes the applied load around the perimeter of the liner. Continuously monitor the applied load, and do not stretch the liner by more than 1% of its original length. For liner lengths of 100 feet or less, the end protection device may be omitted, with written permission from the Engineer. Do not seal the liner ends or begin grouting prior to 24 hours after liner installation.

**431-4.5 Spiral Winding:** Install the pipe liner in accordance with ASTM F-1698 or ASTM F-1741.

**431-4.6 Paneling:** Install the pipe liner in accordance with the manufacturer's written instructions. Limit paneling to host pipes having 90 inch or greater internal diameters. Do not place panels where a liner joint will lie along or near the crown of the host pipe.

**431-4.7 Coating:** Use materials and install the pipe liner in accordance with the manufacturer's written instructions.

**431-4.8 Bursting:** Install the pipe liner in accordance with the manufacturer's written instructions. Limit bursting to vitrified clay or concrete crossdrain or sidedrain pipe having no lateral connections or risers. Further limit bursting to locations where no part of the host pipe passes within 5 feet of any buried utility or pavement base material.

#### **431-5 Acceptance.**

Inspect the complete rehabilitation by means of closed circuit television. Obtain written approval from the Engineer prior to allowing persons to enter a host pipe. Provide the Engineer videos of all preliminary and final inspections.

#### **431-6 Method of Measurement.**

The quantity of pipe liner to be paid for will be the length, per foot, of pipe liner installed and accepted, measured along the centerline of the pipe, from end to end.

The quantity of flowable fill to be paid for will be in accordance with Section 121.

The quantity of desilting pipe to be paid for will be in accordance with Section 430.

#### **431-7 Basis of Payment.**

Price and payment for pipe liner will be full compensation for furnishing and installing the pipe liner in accordance with the requirements of this Section, including all materials, labor and incidentals required for sealing cracks and joints in the existing pipe, and sealing and grouting the annular space between the liner and interior of the host pipe.

Price and payment for pipe liner will also be full compensation for all equipment, materials and labor required for inspections, and for furnishing videos of the inspections to the Engineer.

Price and payment for flowable fill will be in accordance with Section 121.

Price and payment for desilting pipe will be in accordance with Section 430.

Payment will be made under:

Item No. 431- 1- Pipe Liner - per foot.