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## **Problem: Infiltration Issues between Liner and Host Pipe**

### **Solution: Seal Annulus Between Liner and Host Pipe Using Avanti AV-333 Injectaflex Grout**

**Methodology:** The application places the AV-333 Injectaflex on the cleaned interior wall of the host pipe prior to either fold-and-form or CIP\* liner pipe insertion.

**Results:** A gasket is formed between a host pipe and a liner pipe at the manhole. The gasket shall fill the annulus†.

**Application:** The pipe should be thoroughly cleaned by water blasting the pipe interior prior to spraying the cleaned area with AV-333. AV-333 shall be sprayed on the interior wall of the host pipe at the manhole easily assessable to the applicator. If the AV-333 resin fails to bond to the pipe, the pipe shall be re-cleaned until resin adhesion is achieved. In some cases a solvent wipe may be required to completely de-grease the area to be spray/coated with AV-333.

**Notes:** It is essential that all water, either flowing or standing be removed from the invert of the pipe area‡ to be sprayed/coated with AV-333. After the AV-333 urethane resin has foamed, returning water in the invert will not harm the gasketing properties.

The following table is suggested as a guideline for the area on the interior wall of the host pipe to be cleaned and sprayed by AV-333 resin.

Pipe Diameter	Interior area: Clean/Spray
8" to 15"	2 ft. wide
18" to 30"	3 ft. wide
36" to 48"	4 ft. wide
54" to 72"	5 ft. wide
72" and over	Call Avanti International

**Equipment:** The chemical grout pump shall be equal to a Nordson #397 – 1:4 pressure ratio pump§, dolly mounted, 3/8" x 25 ft. grout hose, siphon kit for 5 gallon pails of AV-333 polyurethane resin grout, air controls, spray gun with a 32" extension and a GHD spray tip.

The Nordson #397 will produce a spray of 1.5 gpm @ 30 cycles per minute using AV-333 with a viscosity of 300 to 600 cps\*\*. The chemical grout shall be **AV-333 Injectaflex††**.

\* CIP - Cured In Place

† Annulus - void area between host pipe and liner

‡ Invert of pipe area – Bottom of host pipe

§ Pump requires 100 psi (in) vs. 400 psi (out) to atomize AV-333 polyurethane resin grout

If, after the liner is in place, water seepage occurs; it will be necessary to drill a small hole in the liner and pump AV-333 into the annulus until all leakage ceases and the Engineer approves.

**Procedure:** The applicator may enter the manhole wearing the proper respirator and garments to insure safety for confined spaces. The compressor, pump and grout shall remain outside of the manhole. The operator will require that only the gun/wand with spray head attached be taken “down hole”, into the manhole.

**Clean-up:** Immediately after use, AV-333 shall be removed from the hoses, pump, spray gun, wand and spray head with AV-208 acetone or AV-284 Pump Wash. Failure to properly clean the equipment after use will result in moisture contamination.

**AV-333 Injectaflex** – a single component hydrophilic<sup>††</sup> polyurethane resin that reacts rapidly with water to form a flexible, impermeable foam with excellent adhesion to the interior wall of water blasted, clean host pipe.

### AV-333 PROPERTIES

#### UNCURED

Appearance	Light amber
Solids content	85% (ASTM D-1259)
Viscosity	300 – 600 cps @ 70° F (ASTM D-1638)
Flash Point	> 25° F (ASTM D-93)
Corrosiveness	Non-corrosive
Reaction time	40 seconds @ 70° F

#### CURED

Tensile strength	100 – 120 psi
Elongation	750 – 850% (ASTM D-3574)
Shrinkage	< 2% after cure
Toxicity	non-toxic

#### Links:

Tech Data Sheet – AV-208 Acetone  
 Tech Data Sheet – AV-284 Pump Wash  
 Tech Data Sheet – AV-333 Injectaflex  
 MSDS Sheet for AV-208  
 MSDS Sheet for AV-284  
 MSDS Sheet for AV-333  
 Testing of AV-333 as Urethane Elastomer

\*\* Cps – centipoise, a unit of measurement for viscosity in the centimeter-gram-second system that is equal to one hundredth of a poise

†† See AV-333 Injectaflex properties on next page

‡‡ Hydrophilic – dissolving in, absorbing, or mixing easily with water