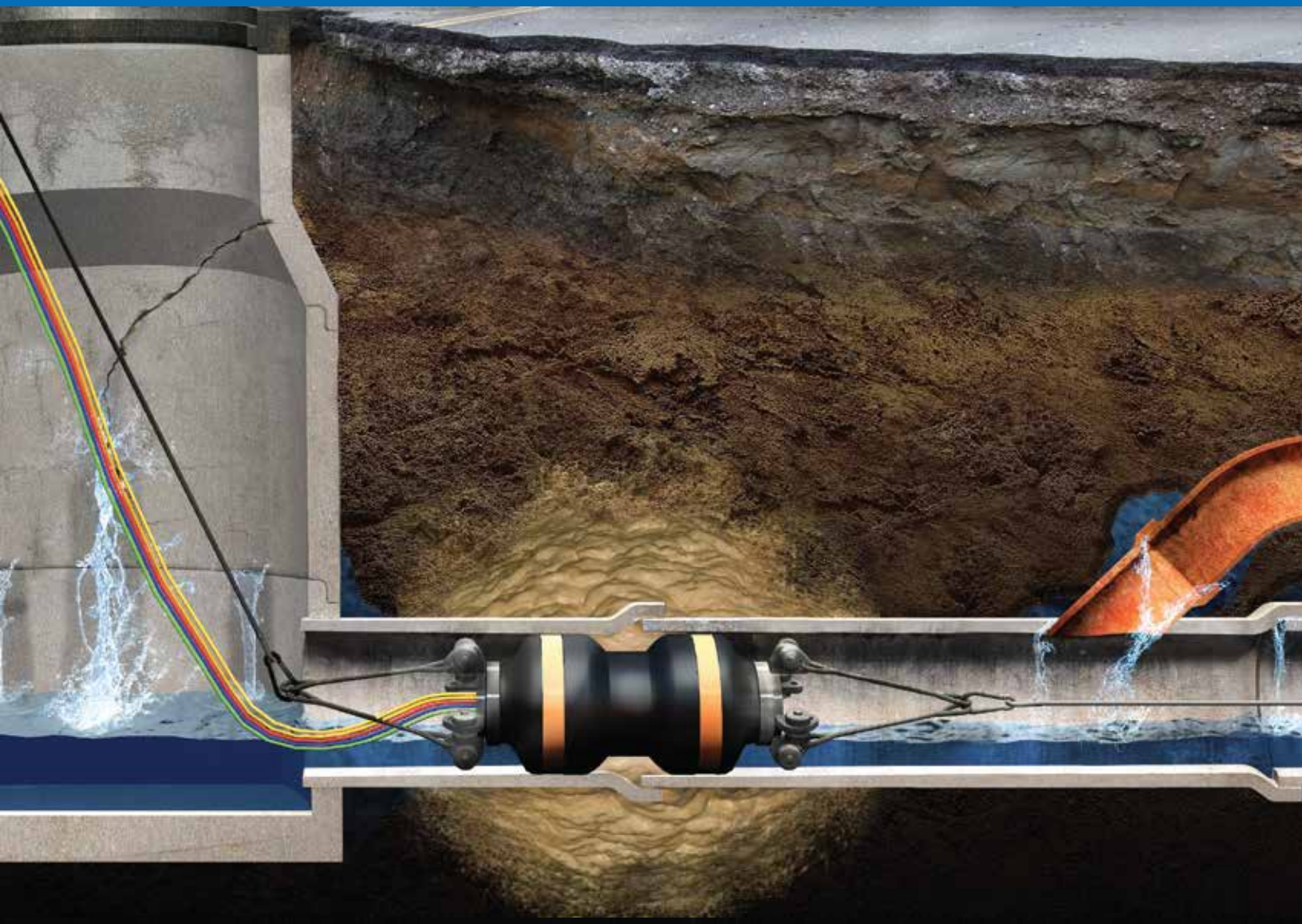
Sewer Grouting

Mainlines • Laterals • Lateral Connections



AVANTI

What is Injection Grouting?

Injection grouting technology was first developed in 1955 as a soil stabilization technique. Since that time, it has been used to stop active leaks in sewers, manholes, tanks, vaults, subways, mines, tunnels, and many other underground structures all over the world. Recent studies combined with over 60 years of experience prove that America's first trenchless technology is still the best, most cost-effective, long-term defense against infiltration of groundwater into structurally sound sewer systems.

Injection grout does not stop sewer leaks simply by filling joints and cracks. Instead, grout is forced under pressure through joints and cracks into the surrounding soil. The grout gels - or cures - with the soil to form a waterproof mass which cannot be pushed back into the sewer system. Most infiltration enters structurally sound sewer systems through defects in mainline joints, manholes, service connections, and service laterals. **The best and most economical way to stop these leaks is with injection grout.**

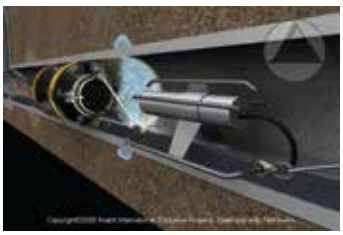
In most mainline and lateral grouting, Avanti's AV-100® Chemical Grout - acrylamide - is used. AV-100 is a chemically reactive gel with ultra-low viscosity (1-2 cP); as a result, it can penetrate wherever water can reach. It offers the advantage of customizable curing times, which can vary from mere seconds to several hours. Once cured, this crosslinked polyacrylamide grout not only forms a long-lasting water barrier but also enhances soil stability, ensuring the structural integrity of the treated area. AV-100 has a half-life of 362 years determined by the Department of Energy (at 20% concentration), and is available as NSF/ANSI/CAN 61 - Drinking Water System Components certified.

An important characteristic of AV-100 is it requires moisture to thrive, and will shrink when dehydrated, potentially losing sealing capabilities if humidity levels drop below a specified amount. A new White Paper titled "Zero Shrinkage of AV-100 Chemical Grout Due to Consistent Relative Humidity in Soils" proves AV-100 will not experience significant shrinkage under high relative humidity (RH) conditions, and that AV-100 injected below the shallow soil surface layer will not shrink from desiccation. **For more information about AV-100 visit avantigrout.com/acrylamide.**

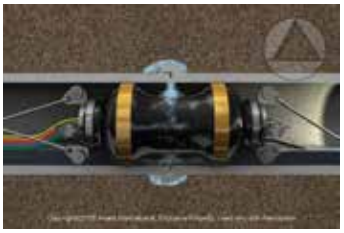
Mainline Grouting

Mainline grouting is executed using a grout truck, inflatable mainline packer, and AV-100. From the grout truck, an operator controls all aspects of the project. Closed-circuit television (CCTV) is utilized inside the pipe to locate the joint or crack to be tested or injected, and strategically positions the packer in place. It is important to air test all joints because joints that were not visibly leaking during inspection may leak in the future after sealing surrounding joints. Joints that fail the air pressure test can immediately be injected and sealed with grout. Grout is forced under pressure through the defect into the surrounding soils forming a waterproof mass which cannot be permeated. The operator will pump until grout is no longer being accepted through the defect. After the defect is sealed, a post-air pressure test is administered. If the defect does not leak air, it will not leak water. Once the joint is documented, the packer is then deflated and moves to the next defect in the pipe to repeat this process. Residual cured grout left behind in the pipe will breakdown as it cycles through the system.

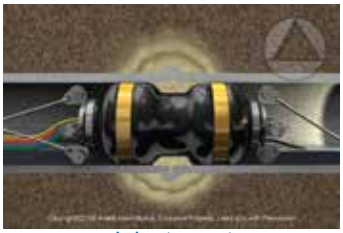
Injection grouting is often utilized before or after cured-in-place-pipe (CIPP) lining of mainline pipes. By eliminating infiltration before lining pipes, maximum performance is achieved by creating an infiltration-free environment for the lining process. After lining, AV-100 is used to seal the annulus space between host pipe and liner. If this space is not grouted, infiltration will continue to enter the system at the next point of entry.



Locate the leak via CCTV



Center packer over joint or defect and inflate



Inject grout through defect into soil

Air test the seal and deflate

Lateral Grouting

Service laterals and lateral connections are often a source of significant infiltration. According to the EPA, as much as 60% of overflow comes from leaking service connections. Studies have shown that most infiltration into service lines occurs within a few feet of the mainline. There are two primary reasons for this; lateral lines are usually above the water table with the exception of the last few feet, and groundwater flows easily in the backfill of a mainline trench because of the French drain effect.

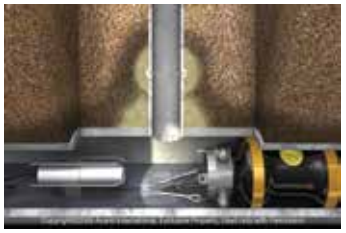
Lateral grouting is completed much like mainline grouting, except the packer has an inflatable plug that extends up the lateral connection from the mainline. Once the lateral plug is fully inverted, the mainline bladders are inflated. The top, ribbed portion of the lateral plug expands against the pipe wall, while the bottom expands enough to create a thin annulus for the grout to travel. Grout is forced under pressure through the defects into the surrounding soil creating an impermeable barrier in the soil. After sealing is complete, the mainline bladders are deflated, the lateral plug is reinverted into the assembly, and the packer is moved to the next lateral in need of rehabilitation. Residual cured grout left behind in the pipe will breakdown as it cycles through the system.

After CIPP lining of laterals and lateral connections, AV-100 is used at the lateral reinstatement, sealing the connection – a primary source of infiltration.

Locate the lateral via CCTV

Center packer over lateral and inflate

Inject grout through defect into soil



Air test and deflate

Rule of Thumb

MAINLINE JOINTS: An estimate for volume of grout needed for sealing a mainline joint is .50 gallons of grout per inch diameter pipe. Ex. if the mainline pipe is 8”, a fair estimate of grout per joint is 4 gallons*.

LATERALS: An estimate for volume of grout needed for sealing a lateral is .33 gallons of grout per inch diameter pipe plus an additional gallon per foot of lateral. Ex. if sealing 3-feet up the lateral, a fair estimate for an 8“ pipe is 2.6 gallons plus 3 (feet up lateral) for 5.6 gallons per lateral*.

Grouting By the Numbers...

Suppose you have a 300-foot section of 8-inch pipe with joints every 3-feet, and 20% of the joints are leaking one-gallon per minute:

1 GPM x 60 min. x 24 hrs. x 365 days x 20 joints = 10,512,000 gallons per year

Using a conservative cost estimate of $4 USD per 1,000 gallons to treat the water, y**ou are spending approximately $115.20 per day - over $42,000 annually - to treat infiltration on this single 300-foot section.**

The industry average cost for grouting is $8-$12 per foot*. By grouting this single section at a cost of $10 per foot, **your grouting expense will total $3,000**.

In just over 25 days, you will have recouped your initial investment of $3,000, and **saved over $39,000 in unnecessary treatment costs** at the end of the first year.

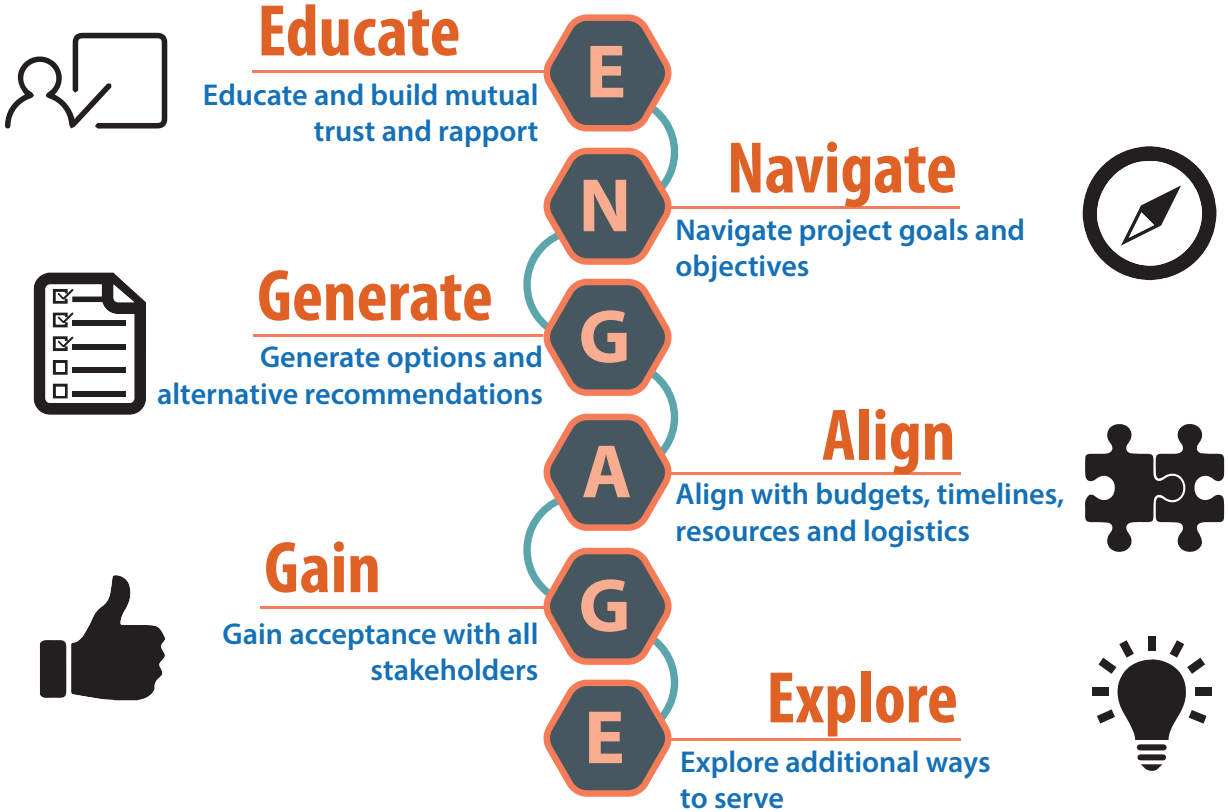
*Cost and amount of grout varies per project and by region

THE AVANTI PHILOSOPHY

Since 1978, Avanti has remained an American owned and operated, experienced producer of high-quality injection grouts. Avanti began with only one product - AV-100® Chemical Grout - used primarily to seal leaking collection systems. Avanti now offers over 25+ injection grouts including acrylics, polyurethanes, epoxies, and cements used world-wide in municipal, industrial, commercial, and geotechnical applications to stop water infiltration, stabilize soil and rock, and control groundwater - permanently.

We have specific core values that we abide by each day: to provide sustainable solutions for safer work environments, stronger infrastructure, and healthier communities everywhere. Restoring public safety and confidence in our aging infrastructure drives us to educate and train public and private property owners, lead the charge of proactive vs. reactive repair and maintenance, and grow the use of injection grouts around the world.

ENGAGE with AVANTI



AVANTI
Stop leaks. Stabilize soil.
Control groundwater. Permanently.

45 yr. INJECTION GROUT AUTHORITY

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