

**TECH  
TIPS**

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## QC SAMPLING FOR LATERAL LINING INSTALLATIONS

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**The installed properties of mainline CIPP are affected by the installation process. This phenomenon has been referred to as natural parameter variation.** To ensure the installed CIPP exhibits the necessary physical properties after curing is completed, field samples are prepared during installation and then sent to a testing laboratory for testing flexural modulus, strength and wall thickness. The practice of sampling and testing mainline sewer CIPP installations has been well established for at least 30 years.

Lateral CIPP systems use many similar materials and processes as mainline CIPP, so it is not unexpected that the installed properties of lateral liners are just as affected by the installation process. Indeed, lateral CIPP systems can be at risk of a much wider spectrum of variables than mainline CIPP since much of the preparation of lateral liners (measuring and mixing resins and saturating the tube) occurs in the field as opposed to mainline CIPP where liner preparation is typically performed at a wet-out facility.

Until recently, measuring the mechanical properties from lateral installations has been considered challenging because of the necessity to obtain physical samples. Given the accumulating knowledge of natural variation in CIPP physical properties in mainline sewers, owners, utilities and contractors are starting to look for ways to efficiently sample and test their lateral installations for the same reason they do for mainline sewer rehabilitation – to ensure they achieve the marketed life extension and infiltration reduction for these critical lateral assets.

Two basic types of samples are in current use for mainline installations, and each is tailored to accommodate the constraints imposed by the different types of installations. These samples are called restrained and plate. Both types of samples are made from the installed material and are cured along with the installation. The goal is to obtain a sample of cured CIPP which is as representative of the installed CIPP as possible.

**Restrained Lateral Field Sample**

Restrained samples are formed by passing the saturated tube through a cylindrical form, typically a short section of pipe of the same diameter as the installation, which is then pressurized and cured along with the CIPP installation. Restrained samples are the preferred sample type because the CIPP sample which is produced experiences generally the same conditions as the rest of the installation.

**Lateral Plate Sample**

Plate samples are used for installations where space constraints prevent a restrained sample from being made. Plate samples consist of a section of saturated tube which is sandwiched between two metal plates held apart by spacers. This sandwich is then placed within a separate curing environment and is cured using a simulation of the installation. The physical constraints of a lateral installation site as well as the method of installation of the liner will dictate which sample type, restrained or plate, should be used to prepare a lateral QC sample.

The simplest lateral installation to sample is one where the liner is being installed right up to the opening from where it is being launched, either from a cleanout or from a pit where the lateral pipe extends into a pit. In both cases the pipe sample restraint segment will just butt-up against the pipe or cleanout opening and the liner will be installed through the restraint and cured together with the installation and then trimmed flush with the cleanout or pipe opening. In those cases where the liner does not extend all the way back

to the opening, a separate liner segment should be placed at the appropriate location along the installation train so that when the installation train is fully extended in the lateral, this additional segment will be aligned with the pipe restraint segment which is butted up against the pipe opening.

Some installation methods do not lend themselves to preparation of a restrained sample, for example systems which launch the liner from the main sewer. In these cases, it is not possible to position a pipe segment restraint anywhere for the liner to pass through, so a plate sample is an available option. The liner sample (resin and felt or fiber reinforcement from the installation) should be sandwiched between the two metal plates.

It is important that the sample be exposed, as closely as possible, to the curing conditions of the installation. For ambient cured installations, a good correlation of ground temperature is near the bottom of the nearest manhole. Plate samples for steam or hot water cures can be placed within a separate pressure vessel through which the heating media is passed through during the curing process preferably sourced from the downstream side of the installation where the media will be at it's coolest.

Both the restrained and plate sampling methods are preferable to destructively testing the actual CIPP installation. With a little bit of planning, the quality of lateral installations can be assured just we do today for mainline installations.

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