The Pipe Liner Newsletter

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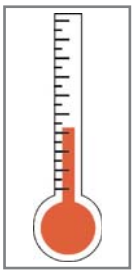
www.pipeliningsupply.com

Resin Control

An issue that we hear over and over again is the length of time the resin takes to cure varies so much, we just can't figure out how much time we have to work the product and how long we have to wait before we can pull the calibration tube to be sure it's "done". here are two factors that play into the length of working time and cure time that you need to know.

UV Light - Sunlight (UV Rays) will begin the cure process and will speed up the amount of working time you have to install the liner. If you lay your "wetted out" tube in the sun, and it hardens before you get it into the pipe, you may have seen the direct results of the effects of UV rays. When working with resin, keep it shaded and away from UV light sources. A tent, tarp or working under any cover will prevent the direct sunlight from making your resin cured before you want it to.



Cold Weather has been the biggest problem of late. Keep the resin above 50 degrees. Starting out with cold resin will give you a longer cure time. If your resin is cold, allow extra time for curing.

Temperature will have the biggest effect on your working times and your curing times. You will notice on Quick - Pox TM, and other manufacturers products labels telling you how long the working times and cure times are for each type of hardener you are using. If you have a resin, for example, that has a 15 minute working time at 72 degrees, the working time at 100 degrees gets much shorter. If your resin indicates that the curing time will be 3 hours at 70 degrees, and your ground temperature is 55 degrees, your curing time will be substantially longer.

We are all in business to do good work, at our lowest possible costs for our customers, with the best products we can provide them. If you are on site curing a liner in the ground when the ground is only 50 degrees, your labor costs increase. If you are mixing two batches of resin because one "kicked off" early, your materials costs go up. So with this knowledge, you have the potential to change the outcome by controlling the resin and the environment you put it in. If it's a hot day, and you are headed to a job with 15 minute resin at 72 degrees, a simple inexpensive way to make sure you have 15 minutes or more to work with the resin is to chill it. Put it in a cooler with ice and get it colder. The colder it is, the longer you have to work with it. If you get it to 45 degrees, you have a much longer window to work with the resin before it will cure. If it's rained and the ground temperature has cooled the lateral to 50 degrees, you may want to see how you can increase the temperature inside your liner to cure it faster. Time is money and if you can get in and out in less time, you make more money.

One of the easiest ways to increase the temperature of the resin inside the pipe, after it's in the ground, is to introduce hot water to the inside of the bladder. There is a specially designed boiler that has been made for the lateral lining business. For more information, call us for specific applications.

The following is a chart for the working time and cure time of the Q u i k- Pox TM resin.

Q u i k- Pox TM **Epoxy Resin Pot Life time (approx.) in Minutes**

The following chart gives the working time of mixed base & different hardeners. It is calculated on the temp. of the resin - not air temp.

Q u i k- Pox Base Resin - (4 parts) with:	50 deg. F	63 deg. F	77 deg. F	80 deg. F
Q u i k- Pox 60 Hardener (1 part)	180 Min.	100 Min.	60 Min.	30 Min.
Q u i k- Pox 30 Hardener (1 part)	120 Min.	50 Min.	30 Min.	20 Min.
Q u i k- Pox 15 Hardener (1 part)	35 Min.	20 Min.	15 Min.	10 Min.

Q u i k- Pox TM **Epoxy Resin Initial Curing time (approx.)**

The following chart gives the approximate curing time of resin combination. It is calculated on the ground temp. - not air temp.

Q u i k- Pox Base Resin - (4 parts) with:	58 deg. F	63 deg. F	77 deg. F	80 deg. F	96 deg. F	125 deg.F
Q u i k- Pox 60 Hardener (1part)	11 Hrs.	6 Hrs.	5 Hrs.	4.5 Hrs.	135 Min.	60 Min.
Q u i k- Pox 30 Hardener (1part)	7 Hrs.	4 Hrs.	3 Hrs.	2.5 Hrs.	85 Min.	45 Min.
Q u i k- Pox 15 Hardener (1part)	5 Hrs.	3 Hrs.	2 Hrs.	1.5 Hrs.	50 Min.	30 Min.

Helpful Tool

Everyone that is doing lateral lining should have a digital probe type thermometer. Take out the guess work for less than $30.00! "What is the ground temperature?" These inexpensive thermometers can measure the *ground temp next to the pipe as soon as you expose the pipe. They can be purchased at your local Grainger. Look for product # 5WX81.

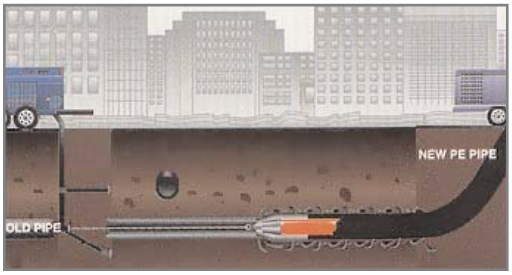
*Note: Ground temperature can vary if pipe depth changes drastically

Cleaning the Pipe before you line it is like cleaning a wall before you paint it. We get caught up to often in trying to get in and out as quickly as we can, we minimize how dirty or root infested the pipe is before lining.

If you run your camera in the line and see debris, and roots, get rid of them before you line. If you don't the liner will show every bump and particle of sin you tried to cover up. If the line has roots, make sure you have the right tools to get the line clean. Most lines can be cleaned with a good blade on your cable machine followed by flushing the line out with water. Bigger roots may require a root saw to remove the larger roots, followed by a jetter to get rid of the smaller ones. Once you've cleaned the line, check it again with the camera. There are a few people who make jetter nozzles that will allow you to clean from the clean-out out to the main, flushing debris toward the main. If you use this method, it may save you from trying to retrieve debris from the upstream end. If some of the pipe is missing, care should be exercised in the cleaning process to make sure you don't collapse the ground into the pipe zone. If you can clean the pipe enough for lining, you may consider a pre-liner to make sure your liner pipe goes where you want it to go and not into some void left from the missing section of pipe.

Pipebursting Pitfalls When you've determined that pipebursting may be a better option than lining, here are some tips that may save you grief. Pre-site check of equipment is vital and will save you a trip back to the shop to get parts or repairs because something didn't work right. Frayed winch cable, wrong size head, forgotten fusion tools, or mis-sized pipe swivels may get you started late or not at all. If you do a dry run at the shop before going to the field, you'll cut down on those trips back for something forgotten.

Check your staging areas and the area you have to make the bends necessary to get the pipe into the existing alignment. Your replacement pipe isn't as pliable as string, and has limits as far as its' bending radius is concerned. If your insertion pit is 2 feet from the house, and the alignment runs perpendicular to the house, you won't be able to get the pipe in behind the bursting head.



Measure the pipe you are replacing. Make sure of your tie in pipe size and have the right connecting fittings to finish the tie in. Eyeballing a pipe from 10 feet above, gets more people in trouble showing up with the wrong size to make the connections. If will only take a minute to get to the pipe to measure it. If you can't get to the pipe to verify the size before showing up, make sure you have a variety of fittings for all possible sizes as well as reducing couplings, to eliminate the cussing that will ensue when your ready to go and don't have the right stuff. Camera the line before you burst it. There's been more than once when a side connection came into a line that didn't get reconnected, followed by a sewage backup. While it may not be or have been good plumbing practice, it's amazing what you find when working with old sewers.

Finally, call your local utility location company before beginning the job. You are going to dig and the costs you incur by hitting an unmarked line that's been called in for location versus the cost for hitting a line that wasn't called in is considerable as well as

potentially dangerous. While gas lines, electric lines, etc. are supposed to have utility separation, sometimes they don't, and while you may be in the right if you hit a gas line that was touching a sewer line you are bursting and it blows up and kills you, you're still dead. Right, but dead!

Resin / Tube Thickness We've been asked by several people why resin/tube thickness has to be a certain dimension. Without going into the boring details of showing the calculation used by ASTM F 1216 in determining the thickness

An American National Standard
www.astm.org

calculation for each type of resin used, and the thickness the composite has to be to resist the long term effects of creep, (buckling) let's look at the practical explanation. My best descriptive of buckling can be visualized by taking a soda straw, and putting your key ring over one end while holding the other end in your hand. Eventually the weight of the keys will cause the straw to bend and the keys will fall off the end. This is buckling. When a plastic pipe is placed in the ground, pressure is exerted on the pipe, similar to the example I gave with the straw. In good pipe design, the pipe is designed to resist this pressure for a period of 50 years by taking into account its' strength (flexural modulus), thickness, and strength after 50 years of load being placed on it.
Many of you are using carpet rollers to spread the resin in the tube around evenly, but in doing so, you have no assurance that you are maintaining a composite thickness that will meet or exceed the thickness needed to resist buckling, based on the calculations dictated by ASTM F-1216.

If any of you reading this letter have had a liner that developed a lift in the bottom of the pipe similar to this, (Figure 1) you've experience a buckling failure. This failure was a direct result caused by the strength of the composite being less than the surrounding conditions. Factors affecting this are live load and dead load.

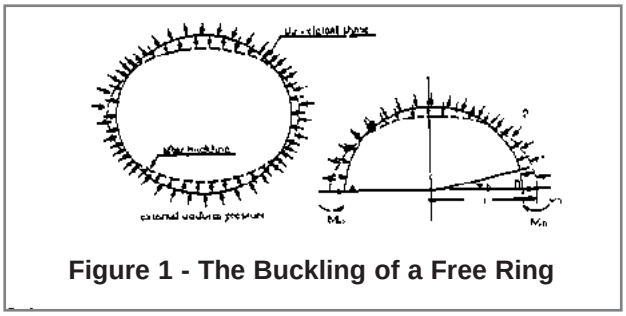


Figure 1 - The Buckling of a Free Ring

Live load includes traffic over the pipe zone, while dead load includes soils and water weight over the pipe zone. If those loads are greater than the actual load the material can support, it will fail, just like my example with the straw.

One final concern of squeezing out too much of the resin is the possibility of roots growing back through the composite due to lack of resin in the material. For those of you wanting to avoid failure, make sure that the finished product is thick enough and that the resins long term resistance to creep is enough to overcome live and dead loading. ***The resin gives strength - the tube is the holder!***

Diameter & Thickness	Lbs. of Resin Req. Per Foot of Liner
4” x 3 mm	.7
4” x 4.5 mm	.8
6” x 4.5 mm	1.4
6” x 5 mm	1.5

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