

PREVENT LEAD LEACHING IN WATER WITH EPOXY COATINGS

By Amanda Strouse for Pipe Restoration Technologies, LLC



Lead, found in common items from paint to lipstick to batteries to toys, is a well-known toxic metal which can cause a wide range of health problems when it's absorbed into the body, especially for children and seniors. Studies have shown that even low levels of exposure to lead can cause a significant reduction in a child's IQ. We would not apply lead paint to the walls of a newly constructed day care centre, so then why would we overlook a day care centre's lead water pipes?

It is estimated that 40 per cent of properties in the United Kingdom receive domestic water through lead pipes. Although domestic water is thoroughly cleaned at a treatment facility, when that treated water is carried through lead pipes, the lead can dissolve into the water and be consumed, posing health risks. (Boiling the water will not remove the lead.)

People have used lead for thousands of years, because it is found all over the world and it is easy to smelt and refine into other products. Until the 1980s, lead pipes were commonly used for a property's internal plumbing and its connection to a water supply main. The inclusion of lead-based solder was also sometimes used to join sections of copper pipes. Lead pipes were installed throughout the world, due to lead's strength, ductile nature and resistance to corrosion.

After research and scientific studies displayed strong evidence of bodily harm due to lead in drinking water, the European Communities first established a new standard in 1988 that permitted up to 50 µg/L of lead in water at the tap. Since then, the parametric values were lowered to 25 µg/L in 2007 and eventually 10 µg/L at the end of 2013.

The water authorities have to abide by this regulation, but the responsibility to ensure that a building or home's clean water has minimal levels of lead also lies with property owners. They must be vigilant and proactive. Most water companies will perform lead tests at no cost, and they will also know if the property is in an area known to have lead pipes. The option to pay to test a property's water at a private laboratory is also available.

Although lead pipes are not installed any more, it is estimated that tens of millions of homes and buildings throughout the UK still have lead pipes. These lead pipes contaminate clean water going to homes, schools, hospitals and senior facilities.

The United Kingdom faces a dilemma: How do we rid this country of all the lead pipes in the least disruptive, inexpensive, environmentally friendly manner and, thereafter, effectively provide the taps with lead-free water?

A very popular notion is to replace all of the lead pipes with non-toxic pipes. But this strategy, called repiping, will cost tens of billions of pounds for the government, as well as property owners and homeowners. As any engineer could imagine, digging up and replacing pipes throughout the UK could take decades, and many people will be medically affected by the lead pipes in the meantime. Replacing pipes is also a very destructive and disruptive process – to homes, streets and business operations alike.

The alternative to replacing pipes is an innovative method called pipe lining. Using an epoxy coating to line the interior of water pipes is a very effective restoration and preservation strategy that has been used throughout the world for decades, and it has been gaining well-deserved popularity with UK water authorities, homeowners and property managers.

Epoxy coatings are installed using in-place technology, which includes the use of the pipe system's existing access points and clean, compressed air. This compressed air is blown into the pipe system at these access points to clean the pipes, prep them for the epoxy coating and to coat the interior of the pipes with the epoxy. Compared with a traditional repipe, this process's many benefits include eliminated destruction and disruption, as well as a much longer project turnaround time and cost.

The process to apply an epoxy coating for the restoration of water pipes is generally the same for all pipe lining companies, with different companies having their own benefits or drawbacks to their particular epoxy or installation method. The ordinary application approach includes these steps:

- 1 A full pipe system evaluation and diagnosis
- 2 Planning the pipe lining process, mapping the pipes and setting up the equipment
- 3 Draining the water pipes and drying them using compressed air
- 4 Applying an abrasive agent to the pipe system (a process called sanding)
- 5 Applying the epoxy to the interior of the pipe system using compressed air and letting it cure
- 6 An evaluation of the work performed, pipe system re-assembly and testing of the pipes.

The strong, epoxy barrier coating on the inside surface of pipes prevents water from coming into contact with the lead, preventing lead and other metals from leaching into the water. Thanks to thorough studies, epoxy coatings have been named as a suitable and desirable method to prevent lead leaching in pipes (as well as preventing copper leaching, pinhole leaks, corrosion and other common failures found in pressurised pipe systems).

This isn't new technology. UK utilities have been utilising pipe lining technologies for years. More than 50 million feet of UK water mains have had epoxy lining installed in them, and more water authorities utilise pipe lining techniques each year.

Now that UK water authorities have recognised the importance of pipe lining, it is up to individual property owners, managers and engineers to restore and improve their properties' pipes, thereby ridding their buildings of contaminated, harmful water.

One example of a UK utility company working with a business owner to reduce lead leaching and improve their water, is when Severn Trent Water (STW) assisted with a pipe lining project for a children's nursery. STW, a major water authority that supplies approximately 3.7 million homes and businesses in its service area, proactively conducts random lead tests as a part of ongoing water quality

testing. A children's nursery facility owned by the charity Children First Derby (a 40-year-old charity that provides day care and support facilities to underprivileged families) was found to have a lead water service line on the customer's side, so STW helped the facility to resolve the lead contamination issue.

The building's domestic water pipe, with a 15mm diameter, runs from the curb stop, under the building's foundation, into the building's walls and to the building's water shut off valve in the basement. There are only three options to 'cure' a property like this of its toxic lead service pipe: dig up and cut out the lead pipes and then replace them with non-lead pipes, reroute the pipe line by installing a brand new service pipe in a different location or use an epoxy coating to line the interior of the pipes.

If the children's nursery had chosen a repipe or reroute, the building would have been closed for several days, at the least. Since this service line is located under foundation and through walls, a repipe or reroute process would have been extremely difficult and could have jeopardised the integrity of the building. In addition, these traditional repair methods would have been very expensive and would have caused major disruptions for the facility and its customers, resulting in a loss of revenue for the nursery.

STW informed the facility about Pipe Restoration Services' ePIPE epoxy coating technology and recommended they use this innovative pipe lining method to rehabilitate the lead service line with minimal intrusion and business downtime. The patented ePIPE process is STW's only approved lining solution for lead pipes, as well as the only pipe lining solution within the UK regulations capable of coating pipes on both public works and private works.

The children's nursery chose the ePIPE technology over a traditional repair by looking at the simple pros and cons: A two-hour cure time for the ePIPE epoxy coating, versus business closure for multiple days for a repipe.

Pipe Restoration Services' pipe lining team arrived at the nursery facility in the morning of the scheduled project date and the lining process was completed by the early afternoon. The children's nursery was only closed during the morning for the work, and then the facility was back to normal by the afternoon, as if nothing happened.

The original lead levels, when tested at the tap before the ePIPE process, measured 24.5 µg/l parts per billion (ppb), which is nearly 2.5 times over the current maximum limit of 10 µg/l. After the ePIPE epoxy coating was installed in the service line, the lead levels measured at the tap dropped to 0.5µg/l (ppb), well below the maximum limit. The operators of the children's nursery were extremely pleased and impressed with the ePIPE technology, as well as Pipe Restoration Services' professionalism during the brief project.

More and more water authorities are utilising the ePIPE technology, but it's the responsibility of property owners to proactively make sure that their property's domestic water pipes are protected from contaminants leaching into their drinking water.

We know there are lead pipes. We know that lead pipes are toxic. And we have an effective solution.

Epoxy coatings are the future for restoring existing pipe infrastructure and ensuring clean, metal-free water at the tap. The best way to prevent lead and other contaminants from leaching into water is to protect the water from touching the pipes. The ePIPE technology's epoxy coating process is the time-proven, saving grace that the world's engineers and property owners have been searching for.

● Further information from Pipe Restoration Services.
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