

FREQUENTLY ASKED QUESTIONS

October 2014

1) What is AQUA-PIPE®'s installation history?

Over 1000km of AQUA-PIPE® with 60,000 service connections have been installed over the past two decades throughout 500 towns and cities in North America and Australasia.

2) In what size diameters is AQUA-PIPE® available?

Any pipe internal diameter from 100 - 630mm.

3) Can AQUA-PIPE® be used for other applications?

AQUA-PIPE® is specifically designed for water distribution systems but other pressure pipe systems such as force mains can also be rehabilitated using AQUA-PIPE®.

4) Is AQUA-PIPE® safe for potable water?

Yes, AQUA-PIPE® is certified by Underwriters laboratory (UL) and by NSF to NSF/ANSI Standard 61 and also meets WRAS BS6920 and NQ 3660-90/2003 requirements.

5) Are there problems with solvents in the water after the CIPP process?

No, the AQUA-PIPE® epoxy is made of 100% solids. No VOCs or styrene is present.

6) How do you make sure the epoxy is not in contact with the water?

The watertight membrane fused to the inner jacket prevents the epoxy from being in contact with the water inside the pipe.

7) Is AQUA-PIPE® an environmentally friendly technology?

AQUA-PIPE® is a trenchless technology and therefore greatly reduces the carbon footprint of the project. AQUA-PIPE®'s GHG emissions have been quantified according to international standards. It has been determined that for each mile of renewed pipe, AQUA-PIPE® reduces GHG emissions by 378 tons or 84% compared to traditional open cut replacement. These quantities do not include GHG savings due to other impacts such as traffic detours and increased vehicle idling that are commonly observed using the traditional open-cut replacement.

8) How should fittings, line valves, hydrant branches, etc. be handled when setting up an AQUA-PIPE® project?

In general, existing fittings, such as bends can be lined. Valves can also be replaced at their original location (requiring an access pit at that location) or relocated into another access pit to reduce costs. Hydrants and their branch lines can be replaced if requested by the owner or, if they are to be maintained, the tee is excavated and the location is used as an access pit.

9) Do valves have to be excavated?

Gate valves and hydrants can be lined through, with the bonnets removed and throat sections cut back. Butterfly type valves have to be excavated.

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10) Do you re-instate tees and hydrants from inside the pipe?

This can be done but it is not recommended. When reopening lined tees, the opening is not complete due to the curvature of the tee. Also, when tees remain in the section to be lined, it allows the epoxy to escape and accumulate in a puddle at the bottom of the pipe which may hinder the use of the shutoff valve on the branch line. Finally, at these locations some infiltration between the liner and the host pipe may sometimes occur.

11) Can service connections be damaged inside the pipe during the cleaning or lining process?

Yes, the service connection may be damaged during cleaning when using nonrecommended equipment or procedures. The use of high pressure nozzles and reamers (rotating chains) is recommended to clean the pipe as opposed to rack bore or winch-pulled scrappers. The lining procedure will not cause any damage to the service connections.

12) Can the structural CIPP liner be used on asbestos cement pipe?

Yes, AQUA-PIPE® has been successfully used to rehabilitate asbestos cement pipe.

13) Prior to installing AQUA-PIPE® in a previously cement lined water main, is it necessary to remove the lining during the cleaning process?

During the cleaning process, it is necessary to remove the cement lining which may be loose. The cement remaining in place will not hinder the lining process. However, special care must be taken to scrape or chip away the cement layer at the extremities of each cut away section of pipe. This will assure that the liner will properly adhere to the host pipe and create a proper seal.

14) How does Sanexen assure the quality of work performed by its licensed installers?

An AQUA-PIPE® installer is trained and certified by Sanexen and is provided with continuous technical support. The fact that Sanexen is also an installer reassures both Water Utilities and Installers of the high quality of training and support provided. Sanexen is present during the licensed installer's first installation project and provides ongoing support with regards to product and process standards.

Having its own installation crews since 2000, has allowed Sanexen to develop and continually improve its products, tooling and procedures.

15) How long is the installation warranted?

Installation is typically guaranteed 1 year from the date of installation.

16) Can AQUA-PIPE® support diameter changes along the host pipe?

Yes, within reason. AQUA-PIPE® is designed to be slightly larger than the interior of the host pipe to compensate for such variations. When the pipe diameter is smaller than that of the liner, a longitudinal fold or wrinkle will be visible. This is completely normal and assures and indicates contact with the host pipe. For large diameter changes, for example 150mm to 200mm, the reducer shall be excavated and the excavation shall be used as an access pit to line two diameters in each direction.

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17) How much of a difference in diameter is acceptable between 2 sections of pipe for an AQUA-PIPE® installation?

(Ex. a section of PVC pipe which was used to make a break repair on cast iron pipe)

The AQUA-PIPE® product was designed oversized so that the liner can compensate for changes in internal diameter. The allowed diameters are specified by the minimum and maximum allowable diameter for a specific pipe (ex. a 200mm liner will be suitable for pipes ranging from 197mm to 213mm internal diameter).

18) Up to what pressure can AQUA-PIPE® be designed?

AQUA-PIPE® can easily be designed for operating pressures of up to 20 bar. Specialist designs can be done for greater pressures.

19) What is Aqua-Pipe's burst pressure?

Aqua-Pipe's maximum burst pressure is greater than 50 bar.

20) Does AQUA-PIPE® resist vacuum?

Yes, AQUA-PIPE® will resist a full vacuum. This has been verified by third party testing performed by the City of Toronto and the University of Waterloo.

21) Can CIPP be used in areas where the operating pressure is higher than 20 bar?

A standard AQUA-PIPE® liner thickness will withstand operating pressures up to 20 bar depending on all site specific requirements. Some diameters may withstand greater pressures and are treated on a case by case basis. Specialist designs can be done for higher pressures.

22) Can AQUA-PIPE® negotiate bends?

AQUA-PIPE® can negotiate bends of 11.25° to 90° either vertically or horizontally. The number of bends that can be negotiated in one section will depend on the length and diameter of the section. This can only be answered on a case by case basis.

23) How many feet / day can be lined using AQUA-PIPE®?

Technically, up to 600m/day (2 liners). However, access pits may be strategically located at street intersections, valves, fire hydrants, or changes of direction and therefore will dictate the actual length of each liner to be installed on a given day. Statistically, 180m/day is typical.

24) What is the pot life of the epoxy resin?

Two AQUA-PIPE® resins are available. One with a 2 hour at 20°C pot life and a second, when specific conditions are required, with a 4 hour at 20°C pot life. The curing process starts when the resin and hardener are mixed on site. The process is slowed by working in a refrigerated environment.

25) How does the fold affect the flow or hydraulic properties of AQUA-PIPE®?

The longitudinal fold does not affect the flow properties of the rehabilitated pipe. It is well known that the flow in water mains is of the laminar type and is therefore not affected by the location of the fold.

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26) What is the shear resistance of AQUA-PIPE®?

The structural liner can resist and survive extreme ring fracture conditions to help it withstand soil movements, settlement and beam conditions. This is attested by ring fracture testing results carried out by the Trenchless Technology Center of Louisiana Tech University.

27) How does the liner react when the host pipe breaks after many years following rehabilitation?

If the host pipe of a rehabilitated section breaks for whatever reason, the AQUA-PIPE® liner will resist and remain water tight, given that the failure does not occur at the extremities or at the service connections. The oldest AQUA-PIPE® liner was installed in 2000 and has not experienced any breaks.

28) Is there a procedure to repair a damaged rehabilitated pipe?

Yes, the damaged section (host pipe and liner) must first be removed; once the new extremities are verified and repaired (if necessary), a new section of pipe is then installed using standard pipe and fittings.

29) Is it possible to carry out a hydrostatic pressure test after the service connections have been reinstated?

Yes, this type of test is performed, upon request, by certain clients. It is important that the client also considers carrying out a comparison test prior to the work before cleaning the pipe so as to demonstrate the overall performance of the rehabilitation of the host pipe. Note that rehabilitating the host pipe does not repair any leaks already present in the service connection lines and will, more often than not, show leaks in the system (service connections) that are very small and difficult to locate using conventional detection methods.

It is therefore important when testing the system after the reinstatement of the service connections, to determine the proper test pressure for the pipe so as to not damage the service lines and curb stops.

30) What are AQUA-PIPE®'s bonding characteristics with the host pipe?

The material characteristics of the epoxy allow the AQUA-PIPE® liner to bond to the host pipe. This bonding is not necessary for the liner to be structural; however it assures a watertight seal at the extremities of the lined section and at the service connection locations after reinstatement using robotic equipment. Bonding also prevents the free flow of water in between the liner and the host pipe.

31) Does AQUA-PIPE® require end seals?

No, end seals are not required.

32) Is it possible to pressure tap a new service on a rehabilitated pipe?

Yes, the new lining can be dry or pressure tapped. The only precaution would be to make sure that the utility workers use a saddle or tapping sleeve and a sharp shell cutter, and to make sure that they have cut through the walls of both the existing pipe and the liner. The use of the appropriate procedure and equipment is recommended.

Ref: [Procedure No. APSOP-4.03 \(2nd revision\)](#)



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33) Are temporary mains required?

Yes, they are generally required to maintain fire protection and water to the residents.

34) How are service connections to residences handled with the CIPP system?

They are reinstated from within the pipe.

35) Is there any special treatment around the service connections before lining to ensure a good water tight seal?

Preparation of the pipe is the key factor in this case. The pipe and service connection must be properly cleaned in order to ensure a good seal. The service connection will be plugged before lining to avoid resin migration up the service line and ensure the presence of epoxy, which fills all voids, around the threads of the service connection. This presence of epoxy maintains water tightness.

36) Does the robot damage the service connection during reinstatement?

No, the robot is designed to minimize contact with the inside of the corporation stop.

37) What is the maximum diameter service connection that can be reinstated from within?

50mm maximum.

38) What is the service reinstatement success rate after rehabilitation?

Between 90 and 100%

39) How are (invisible) non – protruding service connections located after rehabilitation?

They are located using special void locating equipment which provides the technician with the precise location of the service connection. The service connection is then reinstated from within using the robotic equipment.

40) Does AQUA-PIPE® need any specific end fittings and how do you reconnect the pipe?

No special fittings are required. Regular pipe and fittings are used to reconnect the 2 ends of lined pipe in the access pit.

41) How do you disinfect the pipe?

The pipe is disinfected as per city, state or AWWA standards. Identical to new installations.

