

WATER AND SEWER TREATMENT PLANT PIPING



Concrete Pressure Pipe with flanged reducer is attached to cross using a joint harness assembly.

Concrete Pressure Pipe has a wide range of applications beyond water distribution and transmission mains and sewer mains. Concrete Pressure Pipe is regularly installed in pumping stations, filter plants, and sewage treatment plants.

Treatment plants employed in water and sewage systems are designed to treat a broad spectrum of water in-flows. These may include natural waters, sanitary sewage, and a wide range of industrial waste materials. Concrete Pressure Pipe, with its dense concrete core, is particularly well suited for use in these installations. In sewage treatment plants, chances are that the in-flow will already have been carried by a concrete pipe before it reaches the treatment plant.

Concrete Pressure Pipe is commonly used to convey partially treated water and sewage in treatment plant piping systems, as well as fully treated water discharging from the plant. The rigid nature of Concrete Pressure Pipe eliminates the need for elaborate lateral support in backfilling operations, a critical consideration in developing the load-carrying ability of flexible piping materials. Substantial economies will be realized through the use of conventional bedding and backfilling procedures normally specified for the installation of Concrete Pressure Pipe. The ring stiffness of Concrete Pressure Pipe provides excellent resistance to localized deflections and buckling, which may occur when flexible piping materials are used.



Concrete Pressure Pipe connects to treatment plant reservoir with flexible restrained joints.

PRESTRESSED CONCRETE CYLINDER PIPE

Manufacturing standards for Prestressed Concrete Cylinder Pipe (PCCP) are furnished under AWWA Standard C301. Recommended specifications for PCCP and all other types of Concrete Pressure Pipe are available on the ACPPA website at <http://acppa.org/technical-resources/specifications/>. Two general types of PCCP are manufactured: lined-cylinder pipe, comprising a steel cylinder lined with a concrete core; and embedded-cylinder pipe, comprising a steel cylinder embedded in a concrete core. Both types are wrapped with high-strength steel prestressing wire to develop a predetermined residual compression in the concrete and steel core. The entire pipe is then coated with a cement-rich mortar for protection of the prestressing wire.

BAR-WRAPPED CONCRETE CYLINDER PIPE

Manufacturing standards for Bar-Wrapped Concrete Cylinder Pipe (Bar Wrap Pipe, or in some regions, CCP) are furnished under AWWA Standard C303. Bar Wrap Pipe contains a fabricated steel cylinder with joint rings attached. It is lined with concrete or mortar, wrapped with a mild steel bar and then coated with a cement-rich mortar.

REINFORCED CONCRETE CYLINDER PIPE

Manufacturing standards for Reinforced Concrete Cylinder Pipe (RCCP) are furnished under AWWA C300. Manufacture starts with a steel cylinder with joint rings attached, followed by placement of the cylinder and the steel reinforcement into a form. Concrete is then cast within the form to create the pipe.

DELIVERING VERSATILITY

Functional requirements, economics, and space limitations associated with modern water and sewage treatment plants also dictate extreme versatility of standard and special fittings for the piping material used. Concrete Pressure Pipe is particularly well suited for installation in the distribution headers and piping galleries of both types of plants. With a wide range of tees, wyes, elbows, and reducer sections available, the ability to easily customize Concrete Pressure Pipe provides owners and their engineers with a product that will meet their most exacting requirements.

The humid environments of many plant piping galleries can induce atmospheric corrosion of ferrous piping materials. However, the humid environment is well suited to Concrete Pressure Pipe, because concrete actually increases in strength with this type of exposure. The use of Concrete Pressure Pipe may also eliminate the expense of dehumidifying equipment.



Concrete Pressure Pipe fittings provide nearly unlimited pipeline design flexibility to address treatment plant piping needs.



Concrete Pressure Pipe discharge header from high pressure pump station.

The corrosion inhibiting properties of mortar-coated Concrete Pressure Pipe are well known in the waterworks field. The cement-rich mortar coating and concrete places the steel components of the pipe into a passive state, protecting it from corrosion. The alkaline environment provided by the coating yields a corrosion inhibiting pH value of approximately 12.5 around the steel. This built-in corrosion protection allows concrete pipe to not require painting, so owners can also save on the painting and maintenance costs associated with metallic piping systems.

The standard joint used with Concrete Pressure Pipe is the steel bell and spigot ring with a confined O-ring rubber gasket. This self-centering joint provides ample flexibility for normal settlement experienced in yard piping installations around treatment plants.

When thrust restraint is required, a variety of welded or mechanically restrained joints are available to

transfer axial thrust forces. Mechanically restrained joints such as Snap Rings® and harness clamps provide flexibility for treatment plant installations. Concrete Pressure Pipe is readily adaptable to the mechanical couplings frequently used to join valves and pumping equipment in treatment plants.

SIMPLIFIED TESTING

No pipe job is complete without testing joints for leaks. Competitive pipe materials require filling the line with water and applying a pressure to test for leaks. Typically, that is accomplished after a considerable amount of pipeline has been installed and backfilled. Should a leak occur, finding it is a major problem, and correcting can be an even larger one. With Concrete Pressure Pipe, the double O-ring testable joint alternative gives the piping contractor the assurance of water-tight joints, even before backfilling the pipe, and it takes only minutes to perform.

SUMMARY

Concrete Pressure Pipe has a proven track record in treatment plant installations in both the United States and Canada. Its structural strength provides an inherent margin of safety against installation, backfill, and live loads. Its excellent long-term hydraulic characteristics and corrosion resistance combine to provide extremely low maintenance and operation costs.

Whether the requirement is for 10 inch (254 mm) or 144 inch (6400 mm) diameter pipe or larger, one or more types of Concrete Pressure Pipe are readily available to match the design requirements. These pipes will handle pressures from full vacuum to over 400 psi (2760 kPa). A full range of standard and special fittings are available for solving even the most complex piping problems.

LEARN MORE

For further information regarding the application of this amazingly versatile piping product in your treatment plant projects, speak with your Concrete Pressure Pipe supplier, or contact the American Concrete Pressure Pipe Association at **714.801.0298** or **www.acppa.org**.



ACPPA Headquarters
T 714.801.0298
email: support@acppa.org
www.acppa.org