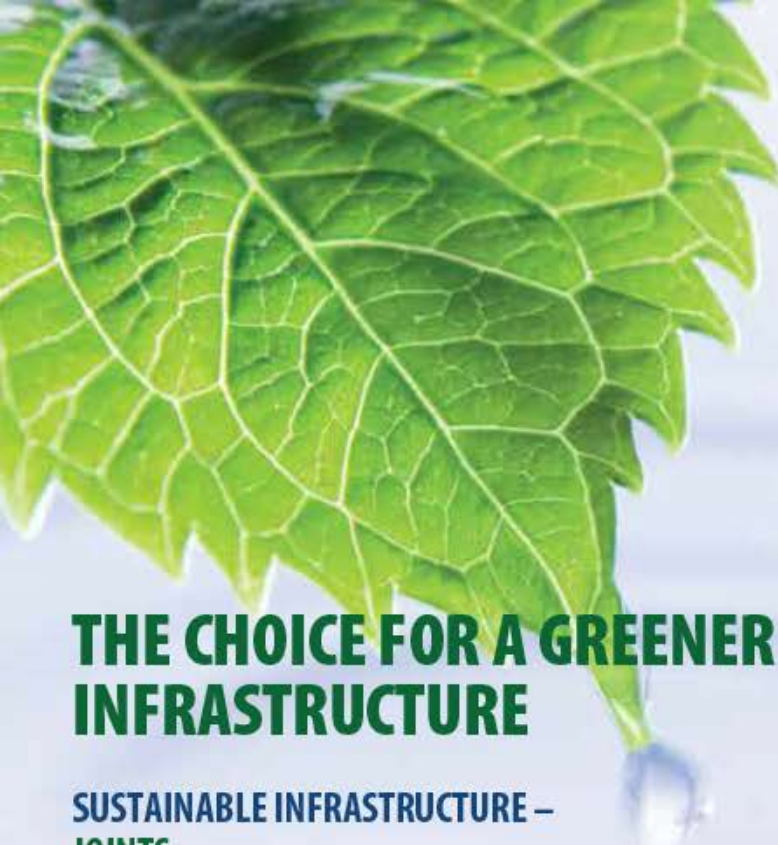


A GREENER INFRASTRUCTURE



THE VOICE OF AN INDUSTRY



THE CHOICE FOR A GREENER INFRASTRUCTURE

SUSTAINABLE INFRASTRUCTURE – JOINTS

Every pipe line is as strong as its weakest link – the joint. For water and sewer systems, a traditional bell-and-spigot system joins 10 or 20-foot lengths of pipe and creates an opportunity for leaks at every joint. Today's installation standards allow new pipelines to leak thousands of gallons of water each year by design. A survey of 46 jurisdictions, including 43 states, found an average of 16 percent "unaccounted for" water leakage with some leakage exceeding 50 percent.

PE pressure pipe systems have a zero-leak rate due to the heat fusion process that produces a monolithic pipe system. This means precious natural resources are saved and the energy to treat, store and distribute water is reduced while your savings are increased.

In municipal storm sewer systems, improvements in joint design have delivered measurable increased benefits. Today's corrugated PE pipe comes with a factory installed premium rubber gasket providing an exceptional soil-tight joint. For increased performance the pipe bells and gaskets can be easily modified to deliver water-tight performance – to the same level required for sanitary sewer systems. And with pipe lengths of 20 feet, PE storm water pipe systems have only one-third the number of joints as compared to pipe systems using concrete. Therefore a decrease in leak potential is significant.

SUSTAINABLE INFRASTRUCTURE – MANUFACTURING

Polyethylene, as its name suggests, is made from the polymerization of ethylene – a component derived from either crude oil or natural gas. The energy needed to extract and deliver the feedstocks for PE pipe is far different when compared to the cost of extracting and shipping iron ore.

With its melting point of 275 degrees Fahrenheit, PE resin can be formed into pipe at one-tenth the temperature needed to melt iron. Similarly, conditions of higher energy costs to produce pipe exist for reinforced concrete pipe. In fact, the manufacture of plastic pressure pipe used in the building, construction, and transportation industries required 56,500 trillion fewer BTUs than iron in concrete/aggregate alternatives.

SUSTAINABLE INFRASTRUCTURE – TRANSPORTATION

With its lighter weight to accomplish needed performance, PE pipe demonstrates significant cost savings when shipping from the factory to the job site. A nominal 8-inch PE pipe used for a water main weighs 8 lbs. per foot as compared to 8-inch iron pipe weighing 33 lbs per foot. That means for the same amount of feet per truckload, the amount of fuel required and wear on the roadway is significantly less. For storm water pipe, the difference is even more significant. A standard 20-foot length of corrugated PE pipe weighs just over 600 lbs, whereas the same 20-foot of 48-inch reinforced concrete pipe weighs over 22,500 lbs. In practical terms a 3-axle, 40-foot long trailer for most states has a maximum load of 72,000 lbs, or 64 feet of concrete pipe per load. For corrugated PE pipe, the volume, not the weight of the pipe maximizes the load. Yet each load has nearly twice as much footage (120 feet) resulting in half as many loads, and a total load weight of 3700 lbs – requiring far less fuel and destructive weight pounding the roadways. Furthermore, by "telescoping" or "nesting" smaller diameter corrugated PE pipe inside larger diameter pipe, even more lengths can be delivered per load without breaching the weight limitations.

SUSTAINABLE INFRASTRUCTURE – LOWER INSTALLATION COSTS

Once again, lighter weight, longer lengths and flexibility all add up to lower costs for installing PE pipe systems. In traditional open trench installations, PE pipe's lighter weight means less heavy equipment to lift and install each section of pipe. With lengths twice as long as iron pipe, and nearly three times longer than concrete pipe, more utility pipe footage can be installed per day, with smaller construction crews and with less joints to worry about.

PE pipe's flexibility makes it a natural for trenchless installations including the horizontal directional drilling, slip lining and pipe bursting. All three of these processes require significantly less disruption to the ground – and to the citizens of a community. With less land or roadways torn up, that translates into fewer roads shut down, fewer detours and traffic disruption, and less patching and repaving after the work is completed. For slip lining and pipe bursting, since the original pipe provides the pathway for the new pipe, the installation is not only less disruptive but dramatically faster – and typically less expensive. All of this equals a much "greener" approach with significant cost, time and energy savings.

SUSTAINABLE INFRASTRUCTURE – SERVICE LIFE

According to the American Water Works Association (AWWA) industry database, there are approximately 876,000 miles of municipal water piping throughout the United States. Americans consume approximately 145 gallons of drinking water per person per day, for a total annual quantity of over 15 trillion gallons. Due to the inherent nature of cast iron or ductile iron pipe systems, these pipes are subject to internal and external corrosion, resulting in pipe leaks and water main breaks – nearly 700 each day.

The total annual direct cost of corrosion for the nation's drinking water and sewer systems is estimated to be \$36.0 billion. This amount includes an extensive list of costs in the form of repairing and replacing aging infrastructure, unaccounted-for water through leaks, corrosion inhibitors, internal mortar linings, external coatings and cathodic protection.

PE water pipe is not subjected to galvanic corrosion and is resistant to tuberculation of dissolved minerals. That means it doesn't rust, the water won't be discolored and it doesn't lose its long-term hydraulic effect due to internal pipe wall buildup. And with a leak-free joint, water leakage is a thing of the past.

Storm water systems are also subjected to harsh chemicals and aggressive flow conditions. Corrugated PE pipe is unaffected by roadway salts, brackish water, roadway pollutants, corrosive flows or "hot" soils. With its ability to handle the widest utility pH range between 1.5 and 14, PE pipe is commonly used in aggressive environments where concrete and metal pipe cannot consistently perform. A superior joint limits infiltration and exfiltration that can prematurely end a system's design life. And lastly, with the best resistance to abrasion when compared to concrete or metal, PE storm water pipe can deliver an exceptional unmatched service life.

PE PIPE – THE CHOICE FOR UNDERGROUND INFRASTRUCTURE

Beginning in the 1960's PE pipe found a natural home in the gas distribution industry. With its flexibility and leak-free joints, PE pipe is now used in 95% of all gas distribution systems throughout North America. Over that time, three billion feet of PE pipe and more than 39 million gas services have been installed, proving a leak-free pressure pipe system can be built and effectively serve the community.

Today, with our nation having to deal with deteriorating underground assets, specifiers need to compare every alternative. As a nation, we are also becoming more aware of environmental stewardship and why it needs to be an important part of our decision making. We need to be "greener."

Exceptional resistance to corrosion and abrasion; leak-free or watertight joints; greater durability and flexibility; high energy efficiency; it's no wonder why PE pipe serves every underground utility today and is becoming the choice for a greener infrastructure.

The Problem

Every day 2.5 billion gallons of water are being lost due to crumbling pipes and over 250,000 water main breaks per year. The EPA states that the top two problems with America's water and sewer utilities are corrosion and leakage requiring, within the next 20 years, over \$540 billion to replace unreliable water and sewer systems.

Our nation's streets and roads are deteriorating, often due to poorly performing storm and wastewater systems that allow important soil support to be eroded away. This compromises the roadbed creating depressions, sink holes, and catastrophic collapses. In just the next two years, over \$64 billion will be necessary to rehabilitate the country's streets and roadways. In order to protect that investment the underground utilities must remain intact.

Local municipalities have to fund the repair and replacement of an aging underground infrastructure that has outlived its service life – sometimes prematurely. With the federal government only supporting a fraction of the costs, the financial burden is laid at the feet of the local citizens in higher taxes or higher service fees. Making the right decision on what type of pipe to use will extend utility life and save local citizens future costs.

The Green Solution

Polyethylene (PE) pipe provides a sustainable solution whose performance has been validated for over 50 years. Starting with a leak-free joint for pressure systems, or watertight joint in gravity flow applications, PE pipe is the greenest choice for municipal water, sewer and storm water applications. A lower environmental carbon footprint is the hallmark for PE pipe, starting with its low energy requirements for manufacturing. Continuing through transportation and installation, the energy needed to completely install a PE pipe system pales in comparison to the economic and environmental costs of pipe made from various metals or concrete. PE pipe's resistance to corrosion and abrasion will also create a longer utility life for generations to come. This translates into direct consumer savings and strong enhancement of our environment.



The smartest investment you can make.

SUSTAINABILITY STATEMENT

Plastic piping systems are a sustainable and environmentally responsible choice that will serve generations to come. They are energy efficient during manufacturing and provide peak protection from contamination during service. Strong, durable, lightweight and flexible, these piping systems require significantly less energy to fabricate, transport and install than metal or concrete alternatives. With superior resistance to corrosion and abrasion, plastic piping systems also supply long service life, excellent joint performance and offer leak-free protection - all adding up to an exceptional value.



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