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GEORG FISCHER
PIPING SYSTEMS

CONNECTRA simply fusion

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FACT SHEET

Facts About the Polyethylene Pipe Industry and Heat Fusion Technology

ABOUT POLYETHYLENE (PE) PIPE

- PE pipes are not a new technology: they have been used in piping applications for more than 50 years.
- PE pipes have a far greater life expectancy than traditional piping materials like concrete, iron and steel. The PE pipe industry conservatively estimates the lifespan of PE pipe to be 50-100 years. However, in a ground-breaking new study released by Drexel University on the lifespan of, in particular, corrugated PE pipe, researchers predict that with variances to the deflection (PSI material stress in the wall), that particular type of PE pipe could last anywhere from 572 to 2800 years!
- PE pipe provides many advantages over pipes of other materials:
    - it is virtually leak-free
    - it can maintain optimum flow rates
    - it is resistant to biological build-up
    - its flexibility allows it to withstand surges and soil shifting
    - its comparatively light weight (approximately 1/8 the weight of steel pipe) and reduces the need for heavy lifting equipment
    - its high strain allowance virtually eliminates breakage due to freezing
- Installation costs for PE pipe vary according to the conditions, but can be much less costly in overall life-cycle costs, including significantly lower rates of maintenance as compared to pipes made from other materials.
- The increased demand for PE pipe can be attributed to stricter waste management laws, ongoing construction and the rehabilitation of aging or obsolete municipal pipe systems (i.e. drainage, sewer, drinking water).
- The Plastics Pipe Institute (PPI) estimates that more than 90% of the new natural gas pipe distribution systems being installed currently in the U.S. are polyethylene, which accounts for more than 500,000 miles of pipe.
- America's aging water-supply infrastructure needs to be updated in the next 20 years. The estimated cost of rehabilitating/upgrading more than 700,000 miles of water piping has been estimated at $150 billion dollars.

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  - Currently, the U.S. spends $36 billion every year to replace defective pipes and broken water mains.
  - According to the PPI, public water systems in the US lose an average of 11% of the water they transport due to leaks and breaks—a number which is even greater in water systems that serve 1 million + people. The primary cause of pipe leakage is corrosion, which is the most difficult type of leak to detect.

- PE pipe is not subject to corrosion. Corrosion is an electrolytic process that requires electrically-conductive materials, and polyethylene is a non-conductor.
- PE pipe is flexible in how it can be installed: it can be trench-laid, sliplined or directionally drilled. This flexibility makes PE pipe extremely well-suited for installation in a wide range of environments: from densely populated urban areas where major excavation is difficult, to rough, rugged countryside with very small easements. These trenchless methods are estimated to be up to 30% more cost effective than dig-and-replace installations, primarily because they avoid soil removal and resurfacing costs.
- In the 1994 San Francisco earthquake, the industry was astonished at how well the PE pipe and joints withstood the stress created by the tremors; far outperforming other piping products. In a recent study by the PPI, PE pipes were also shown to have performed very well in past earthquakes in California, Thailand, Kobe, Armenia and Columbia.

ABOUT HEAT FUSION

- Heat fusion is by no means a new technology. In fact, it's been used in the U.S. for over 30 years in natural gas distribution systems, and in Europe for over 50 years in water transmission.
- Heat fusion and welding are two completely different processes. Unlike welding, fusion is virtually hazard-free.
- Butt fusion provides a super-strong, liquid-tight connection that becomes an integral part of the pipe. In fact, the fused joints actually become stronger than the pipe itself.
- In destruction testing, pipe breaks have occurred 100% of the time in areas *other* than the fused joint.
- Butt fusion is not "rocket science." It is a relatively simple procedure that requires a portable heat fusing machine to clamp the two end sections of PE pipe together. The machine heats the pipes to a temperature where the polyethylene melts and the molecules from both pipe ends mix together. The machine then uses fusion force to keep the two ends together until the joint has totally fused and cooled, creating a seamless expanse of pipe.

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- In more detail, there are six steps to fusing pipe:
    - **securing and cleaning** the pipe,
    - **"facing"** the pipe ends (this is the procedure of evenly cutting off pipe ends so that they are perfectly parallel to each other and clean of contaminants. Connectra equipment performs this facing as part of the fusion process),
    - **aligning the pipes** so that they are perpendicular to the centerline of each pipe,
    - **melting the pipe ends** by placing an electric plate between the faced ends that reaches an appropriate temperature to make the plastic pliable, and then quickly removing the heating plate,
    - **joining** the molten pipe ends together, and
    - **holding under pressure** until the pipe cools. Only when completely cooled is the pipe removed from the fusion machine.
- The fusion industry is dominated by players offering costly, high-tech machines with lots of "bells and whistles" which involve high training and maintenance commitments. By contrast, Connectra produces comparatively inexpensive and simple machines that are sturdy, easy to operate, and effective at producing proper joint fusion.
- Heat fusion is reliable and safe. In fact, for over 30 years, the natural gas industry has used visual inspection to verify fused joints—a simple procedure which has yielded an extremely high record in both safety and efficiency.