PE PIPING USES IN BUILDING AND CONSTRUCTION

As stated earlier, more than 2.0 billion pounds of polyethylene are used in various extrusion applications. Some of the main uses and some uniquely applicable uses are described in the following text.

Municipal water piping – Research has established that water leaks lead to an average unbilled rate of 16% for North America's water pipelines. On this scale, millions of gallons of water are lost every day, resulting in environmental forfeit, in addition to the expensive maintenance of such defects. Polyethylene piping's excellent corrosion and chemical resistance combined with strength and flexibility makes it an outstanding choice for leak-free transport of potable water to world populations. PE is also highly resistant to freeze breakage that is a great problem to rigid metallic piping materials in cold climates.

Geothermal climate control -- GEO systems use special heat pumps coupled with polyethylene piping as a ground source heat exchanger to efficiently draw and discharge heat from earth's natural heat sink. This innovative heating and cooling method provides the same comfort as conventional heat pump and forced air systems but uses 25% to 50% less consumption of electricity. Polyethylene's durability, flexibility and thermal conductivity were main reasons for its choice as the ideal material for this energy saving concept.

Drip Irrigation – Professionally designed irrigation systems utilizing polyethylene pipe and small plastic emitters save water by providing precisely measured distribution of water to trees, shrubs, gardens and certain crops.

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Polyethylene (PE) – An EnvironmentallySound Piping Material

POLYETHYLENE HISTORY

Polyethylene was developed and gained widespread use in the 1930's as a replacement for natural rubber in wire, cable, and other applications. During wartime, as natural rubber became scarce, engineers and scientists began using polyethylene as one of the first synthetic rubbers. Due to its flexibility, chemical resistance and low cost, the use of polyethylene quickly spread to oil field applications where it was used as the connection between well heads and central collection facilities.

In the late 1950's, utilities began using metal pipe wrapped or coated with polyethylene for low pressure gas distribution applications in heavily populated areas. This new piping product had superior leak and corrosion resistance when compared to non-coated metal pipes, thus sparking PE's initial growth into the gas distribution industry. As polyethylene gained acceptance as a suitable material, pressure rated polyethylene resins were invented, and solid-walled polyethylene pipe began to displace coated steel and cast iron pipe. Quite simply, the pressure-rated solid-wall polyethylene pipe provided a lower cost solution than metal pipes in most gas distribution applications. For natural gas distribution in large cities where a piping failure could have catastrophic consequences, polyethylene pipe was the answer.

In the 1960's and 70's, due to the success and acceptance in the gas distribution application, polyethylene piping began to make inroads into potable water distribution, oil and gas collection, and mining applications. PE pipe is one of the few commercial piping products available today that can be butt-welded to ensure a continuous leak-free system. In addition to the traditional butt weld, advances in mechanical fittings

technology for PE pipe provides greater flexibility for the design engineer and installer. Finally, due to PE pipe's excellent coilability and ductility, it can be installed with many of the newer trenchless and directional drilling technologies. Compared to concrete and iron, the ability to install PE pipe under or around obstructions adds to the flexibility of the overall system design.

Given these many design and cost advantages along with the fact that PE pipe is now available in sizes ranging from ½" to 63" in diameter, over 2.0 billion pounds per year of PE are sold for various extrusion applications which contains both pressure and non-pressure pipe production.

Energy Efficient

In manufacturing…

Energy saving polyethylene (PE) is an economical and highly cost effective construction piping material. Production of PE requires less energy to produce than equivalent metal piping products.

In transportation…

Energy savings are possible due to lower transportation costs owing to the light weight of plastic piping products vs. metallic piping. Additionally, PE piping is manufactured from sites normally located within 500 miles of their markets, thus reducing transportation costs even more.

ENVIRONMENTAL CREDENTIALS

In installation…

PE piping is lightweight, flexible and easy to handle, thus providing energy saving for the manpower and resources required to install it. PE is easier to take to the jobsite and put into place. Being flexible, fewer fittings are required in installation, yielding significant cost and energy savings.

Durable

Polyethylene plastic pipe is designed to withstand corrosion, extreme weather conditions and surge events. Its flexibility, durability and ease of use characteristics make it an effective solution in a wide range of municipal, marine, mining, landfill, duct and agricultural applications, and a valuable piping material for effective natural resource management and long-term, quality water transportation.

Polyethylene pipe has established a tremendous performance record over the past 70 years. Not much of that pipe has been recycled yet, simply because the vast majority of all of the polyethylene pipe ever produced is still in service and still performing.

Health and Safety

All polyethylene plastic pipe for potable water is made to strict standards [American Society for Testing & Materials (ASTM), American Water Works Association (AWWA), Canadian Standards Association (CSA)] and tested by nationally certified agencies NSF International (NSF), Underwriters Laboratories, Inc. (UL) for performance and health effects. Its light weight and flexibility give PE inherent occupational safety advantages over heavy, rigid metallic piping materials. It installs without machine oils or torches which might pose safety or health concerns.

Recyclable

Polyethylene plastic piping material is compatible with recycling. All PE should be recyclable at the end of its long projected service life. Some new polyethylene pipe products are made with plastic raw materials that include significant quantities of recycled polyethylene.

At the present time, all polyethylene piping materials, even those for the most demanding applications such as pressure pipe for gas and water distribution, can include polyethylene recycled material obtained from the pipe manufacturer's own operation. That is, clean trim and scrap from extrusion and fabrication operations can be (and typically are) collected and recycled within the production facility. Manufacturers have established sound procedures for incorporating this rework material back into the manufacturing process with no negative effects on product quality. The performance of these products is not compromised in any measurable way by including these recycled material streams in the manufacturing operation. Because of this, the typical polyethylene pipe producer disposes of virtually no polyethylene.

When buildings and systems incorporating polyethylene pipe are eventually retired and dismantled, the recovered polyethylene pipe will be in-demand for recycling into new polyethylene products.

Some segments of the polyethylene pipe industry actually use polyethylene recycled from other industries to make top-quality new pipe for agricultural and construction applications. Corrugated polyethylene pipe for gravity-flow applications is available with more than 50% recycle content, with performance similar to pipe made with all-virgin polyethylene. One corrugated polyethylene pipe manufacturer alone tests, blends, and uses hundreds of thousands of pounds of recycled PE from other industries every year. These products will provide many decades of service; when they eventually need to be replaced, they are themselves recyclable.