



HDPE (High Density Polyethylene) Pipe

HDPE pipe is a primary alternative to PVC (polyvinyl chloride) pipe for all piping applications and is rapidly gaining market share for potable water, sewer, conduit and ducting, DWV (drain, waste and vent,) agriculture, and ground drainage uses. Used since the 1950's, HDPE has demonstrated its effectiveness through its durability, leak-free performance, corrosion resistance, and ductility. Its greater resilience and flexibility make it less susceptible than PVC to surges, damage from digging, and shifting soils during earthquakes.

HDPE is also preferable to PVC as it is chlorine-free, requires fewer additives in its manufacture, and has a much higher recycling rate than PVC. Commonly referred to as vinyl, PVC is a common plastic used in a wide variety of products such as piping, flooring, wallpaper, window frames, siding, office equipment, children's toys, and catheters. About 50% of all PVC is used for piping applications. The worst plastic from an environmental and human health perspective, PVC introduces myriad hazards throughout its lifecycle. The manufacturing of PVC creates dioxin, the most potent carcinogen known, as well as ethylene dichloride and vinyl chloride. These toxins can cause severe health problems including cancer, endocrine disruption, neurological damage, birth defects, and reproductive and immune system damage.

To learn more about the issues with PVC, see www.buildinggreen.com/features/pvc/pvc.cfm.

PRODUCT COMPARISONS

HDPE Pipe

Chlorine-free
No dioxin produced in manufacture
High abrasion and chemical resistance
Less susceptible to surge shocks
Seamless joint connections
Flexible

PVC Pipe

Contains chlorine
Dioxin produced in manufacture
Moderate abrasion and chemical resistance
More susceptible to surge shocks
Joint seams can leak
Rigid

For a general comparison of various piping materials, see the following EPA factsheet:
www.epa.gov/owmitnet/mtb/pipe_construction.pdf.

LEED CREDITS

Using this material potentially contributes to obtaining these credits in the US Green Building Council's LEED certification program:

Materials & Resources

MR Credit 4.1 Recycled Content

MR Credit 4.2 Recycled Content

LEED stands for Leadership in Energy and Environmental Design. To find out more about it, visit www.leadbuilding.org



ENVIRONMENTAL ATTRIBUTES

Energy Performance

Using recycled HDPE pipe saves energy in the manufacturing process, using less energy than the creation of virgin plastic. Recycling plastic saves significant energy over the creation of new plastic.

Resource Impacts

HDPE pipe has a service life of 100 years and can then theoretically be recycled. Recycled HDPE has minimal impact on the environment since it keeps material out of the waste stream. An estimated 12% of the U.S. solid waste stream is plastic, and 19% of that is HDPE. The resin can be more easily recycled than almost any other plastic. While most recycled plastic markets are specifically tailored to post-consumer bottles, a pipe manufacturer or large end user should be able to find a recycling facility that will accept their HDPE pipe.

Recycling post-consumer PVC is difficult because of its wide range of additives and formulations. It also complicates the recycling of other plastics.

Health Considerations

Although PVC is more resistant to combustion, it smolders at a lower temperature than HDPE and releases toxic hydrochloric gases before combustion. Dioxin is an unavoidable byproduct of PVC manufacture and is a bioaccumulative toxin, building up in fat tissues of living things, and becoming more concentrated as it moves up the food chain. Americans are exposed to high levels of dioxin, enough for a calculated risk of cancer greater than 1 in 1,000 - thousands of times greater than the usual standard for acceptable risk.

PVC pipe generally requires toxic solvent glues to join sections, whereas HDPE pipe sections are simply melted together. PVC also requires the addition of toxic heavy metal stabilizer organotins (carbon and metal compounds), which have problems with leaching.

For a comprehensive summary on the health and environmental impacts of PVC, read a briefing paper from the Healthy Building Network at:

www.healthybuilding.net/pvc/ThorntonPVCsummary.html

FUNCTIONAL CONSIDERATIONS

Cost

Material prices are comparable to PVC. However, material costs may not be the determining factor in pipe selection. Contractors who have never used HDPE may be resistant to working with an unfamiliar material. HDPE is gaining market share and acceptance through its demonstrated effectiveness in the field. For example, a study conducted by engineers with the Oklahoma Water District found that HDPE would cost less than PVC when considering projected leaks, breaks, joint failure, and associated water lost over a 15-year period. Also, trenchless installations can dramatically reduce both cost and environmental impact of some underground pipe projects.

Installation

Because HDPE pipe can be delivered in longer lengths, thus requiring a smaller number of joints, it has better leak resistance than PVC pipe. Also, butt fusion joint welding provides stronger,



tighter, more leak proof joints than the bell and spigot or solvent glue joints used for PVC. The longer lengths of HDPE can require that longer trenches are open at one time, although its length and flexibility may allow trenchless installations.

Fusion welding requires a fusion machine for larger diameter pipe, which could be problematic in tight spaces. A handheld device can be used for smaller diameter pipes. Mechanical couplings are available for HDPE, though these couplings are sometimes made of PVC.

Because HDPE has a higher coefficient of thermal expansion than other pipe plastics, aboveground applications will warrant extra care in anchor and support design if the pipe will be subject to significant temperature swings.

Maintenance

HDPE is very durable and should require little maintenance if used in appropriate applications and installed correctly.

RESOURCES

Endot Industries, Inc.

(water pipe, gas pipe, telecommunications conduit, electrical conduit)

60 Green Pond Road
Rockaway, NJ 07866
(800) 44-ENDOT (443-6368)
www.endot.com

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