

# The Facts about PVC

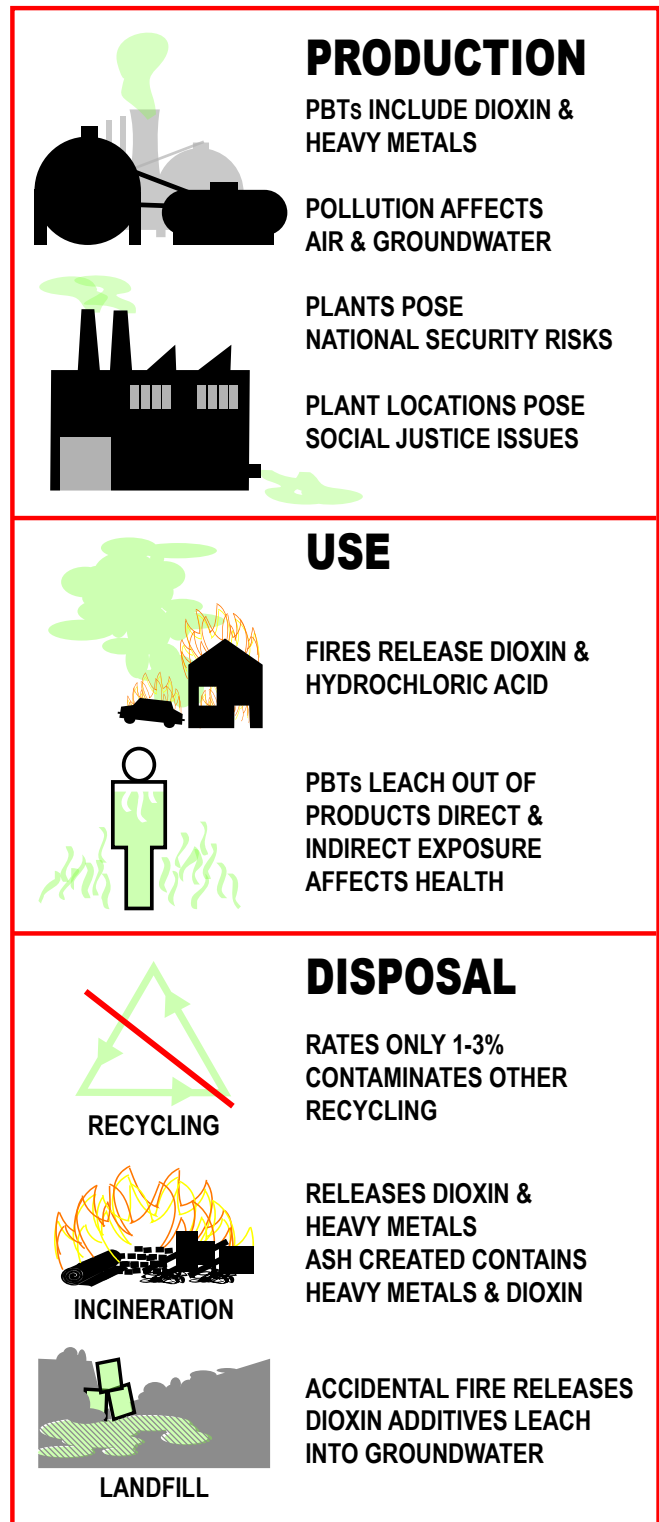
Polyvinyl chloride (PVC) is everywhere. Many consumer products, electronics and medical products contain PVC, but nowhere is it more prevalent than in building products. More than 70% of plastic used in buildings contains some form of PVC. It is widely used because there are many additives that allow it to take on different physical properties and work in a wide range of applications. There's really only one major problem with it – it's toxic.

PVC poses a huge and growing environmental problem. It is poisonous to humans and the environment throughout production, use and disposal. During each phase, it produces dioxin and releases heavy metals and other persistent and bioaccumulative toxins (PBTs) into the environment.

Dioxin refers to a group of chemicals that are created by the combustion of chlorine, the chemical that is the primary ingredient in PVC. Dioxin is the most carcinogenic chemical known and for which there is no safe dose. Dioxin, along with phthalates found in plasticizers, has contributed to a 25-60% rise in many different types of cancers over the last forty years.

Plasticizers are used to make plastics that are naturally stiff, like PVC, flexible. All flexible PVC products contain plasticizers, and some stiff ones do as well. Plasticizers are dangerous because they contain phthalates, which are endocrine disruptors. Endocrine disrupting phthalates cause serious reproductive problems including fertility problems, early puberty, birth defects, sperm damage, decreased testis size and decreased sperm counts. They are also the reason that studies show a direct link between the use of flooring and wallcoverings that contain vinyl and asthma in adults and children.

Figure 1 - PVC is harmful throughout its life cycle.



PVC production, use and disposal also contribute to the release of heavy metals into the environment. Mercury is often used during the production of chlorine, the primary ingredient in PVC. Many studies estimate that nearly half the mercury used in production is lost into the environment. The chlorine production industry is the largest user of mercury and the PVC industry is the largest user of chlorine. Other heavy metals, including lead and cadmium, are used as stabilizers in PVC and leach out of products during use and disposal. Heavy metals are known to cause neurological damage in humans.

One of the most significant issues related to PVC is disposal. The many additives in PVC render it nearly impossible to recycle. It contaminates other recyclables and toxic additives make it unattractive to recyclers. These factors contribute to a pathetic 1-3% recycling rate. Municipal incineration and backyard burning have decreased significantly, helping to reduce the dioxin levels in the environment, leaving landfills as the primary disposal method. Heavy metals and plasticizers leach out of products in landfills. Accidental fires, which are very common even in well maintained landfills, release dioxin and other toxins into the air.

So, if PVC is so bad, why do manufacturers use it? It's simple. PVC is cheap and easy to use. Thousands of readily available additives allow manufacturers to define performance characteristics and order up a polymer compound that meets their requirements. Using other types of polymers requires time, research, development and extensive testing. Switching to something better also requires investments in expensive new machinery and tooling.

Another issue is that many alternatives to PVC do not provide a significant improvement in terms of

toxicity. Greenpeace rates plastics on a scale of one to five. **Figure 2** provides a graphic interpretation of that scale, with the most toxic materials on the red end of the scale. All PVC, including unplasticized PVC (UPVC) and any materials containing halogenated fire retardants are classified as the most toxic. Acrylonitrile butadiene Styrene (ABS) and polycarbonate (PC) are also highly toxic. Petroleum based products are slightly better, but increase our reliance on petroleum.

Developments in biobased materials can provide a more environmentally friendly alternative to both toxic chemicals and petroleum products for some applications. Biobased materials including polylactic acid (PLA) are made from rapidly renewable materials including corn. Some biobased materials, including deTerra™ biobased polymer, are non-toxic and also outperform PVC in terms of fire-resistance and some mechanical performance tests. DeTerra biobased polymer, developed by Interfacial Solutions IP, LLC, is 90% biobased and rapidly renewable and does not contain any known toxic materials like halogenated fire-retardants.

### Learn More

Links to sources used for this fact sheet can be found at [www.alpararch.com](http://www.alpararch.com) under *Resources: Green Building References*.



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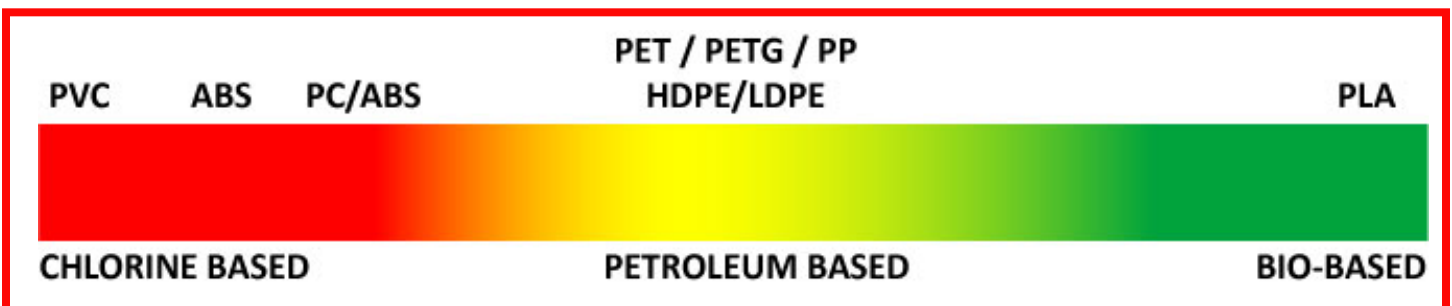


Figure 2 – Biobased polymers are the least toxic plastics available.