

PVC: Overview of Hazards and Alternatives



Polyvinyl chloride, commonly known as “PVC” or “vinyl,” is one of the most common synthetic materials. PVC is a versatile resin and appears in thousands of different formulations and configurations. Among plastics, PVC is second in quantity used only to polyethylene. Approximately 75% of all PVC manufactured is used in construction materials.

PVC: A major environmental health disaster

PVC is the worst plastic from an environmental health perspective, posing major hazards in its manufacture, product life and disposal.

Toxic Manufacturing By-products: Dioxin (the most potent carcinogen known to science), hydrochloric acid and vinyl chloride are unavoidably created in production of PVC and can cause severe health problems to workers, fence-line communities and ultimately to us all.

- Cancer
- Endometriosis
- Neurological damage
- Immune system damage
- Respiratory problems
- Liver and kidney failure
- Birth defects

In the U.S. PVC is manufactured predominately near low-income communities in Texas and Louisiana. The toxic impact of pollution from these factories on these communities has made them front line struggles in the environmental justice movement.

Lethal additives: PVC is useless without the addition of a plethora of toxic chemical stabilizers - such as lead and cadmium - and phthalate plasticizers. These leach, flake or outgas from the PVC over time raising risks from asthma to lead poisoning to cancer.



Global impact: Dioxin's impact doesn't stop there. As a persistent bioaccumulative toxin (PBT), it does not breakdown rapidly and travels around the globe, accumulating in fatty tissue and concentrating as it goes up the



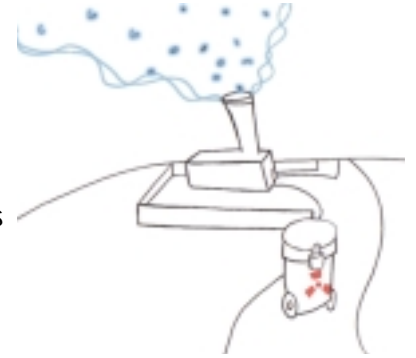
food chain. Dioxins from Louisiana manufacturing plants migrate on the winds and concentrate in Great Lakes fish. Dioxins are even found in hazardous concentrations in the tissues of whales and arctic polar bears. The dioxin exposure of the average American already poses a calculated risk of somewhere between 1 in 100 to 1 in 1,000 - thousands of times greater than the usual standard for acceptable risk. Most poignantly, dioxins concentrate in breast milk to the point that human infants now receive high doses, orders of magnitude greater than those of the average adult. **Deadly Fire Hazard:** PVC poses a great risk in waste incineration and building fires, as it releases deadly gases such as hydrogen chloride long before it ignites. As it burns, it leaves behind toxic dioxin waste.

Can't be readily recycled: The multitudes of additives required to make PVC useful make recycling on any significant scale nearly impossible and interfere with the recycling of other plastics, leading the Association of Post Consumer Plastics Recyclers to declare it a contaminant in 1998.

The many problems associated with PVC far outweigh the minimal benefits. Fortunately, there are safer, cost-effective alternatives to PVC in all applications in construction.

PVC is widespread in the construction industry

While the many problems associated with PVC throughout its lifecycle far outweigh the minimal benefits, the construction industry has been unaware of its true cost and long considered it a cheap wonder material. Piping, vinyl siding, and vinyl flooring are the largest and most familiar uses of PVC. Roof membranes are another growing area. It also shows up in electrical wire, conduit, junction boxes, wall coverings, carpet fibers and backing, sealants adhesives, windows, door frames, shades and blinds, shower curtains, furniture, gutters, down spouts, waterstops, weatherstrip, moldings and elsewhere. Fortunately for each of these uses, there exist a wide range of cost effective alternative materials that pose less of a health hazard than PVC.



All images from original animation by Emily Hubley and Jeremiah Dickey

The alternatives are ready

Many cost-effective alternatives have been long available that avoid the health hazards of PVC to both workers and the larger community. Listed below are some of the places vinyl appears in buildings and examples of commercially available alternative materials

Piping

Cast iron, vitrified clay, and plastics such as HDPE (High Density Polyethylene).

Siding

Fiber-cement board, stucco, recycled or reclaimed or FSC certified sustainably harvested wood, polypropylene and acrylic.

Roofing Membranes

TPO (Thermoplastic polyolefin) and EPDM (ethylene propylene diene monomer) membranes, low-slope metal roofing.

Flooring & Carpet

Natural linoleum, bamboo, ceramic tile, carpeting with natural fiber backing, recycled, reclaimed or FSC certified sustainable harvested wood, cork, rubber, concrete, Stratica and other nonchlorinat-

ed plastics.

Wall Coverings & Furniture

Natural fibers (wood, wool, etc), polyethylene, polyester, paint.

Electrical Insulation and Sheathing

Halogen free, linear low-density polyethylene (LLDPE), thermoset crosslinked polyethylene (XLPE)

Windows & Doors

Recycled, reclaimed or FSC certified sustainable harvested wood, fiberglass, and aluminum.

...and even for the average consumer, shower curtains do not have to be made of vinyl!

Join the move away from PVC

Architectural firms, governments and major corporations all over the world are dropping PVC. A wide range of major corporations ranging from Nike, Mattel and Lego to GM, VW and Honda have begun the switch to

alternative materials. NY State has banned PVC pipe. An increasing number of major projects from the UK-French Tunnel to the U.S. EPA headquarters in DC to the 2000 Olympic village in Sydney, Australia vastly reduced or completely eliminated use of PVC and more are following from the US Navy to NASA to NY Subway system.

Replacing PVC in your projects is easier than you may think. A number of resource guides are available to help you find green construction materials. Beware: some construction materials labeled "green" actually contain recycled PVC/vinyl. The Healthy Building Network web site (see below) includes charts of PVC free building materials, plus links to some of the best of the web's other green building resources.

For more information:

- Healthy Building Network: Charts of PVC free building materials and more information on the hazards of PVC, including a review of the science
www.healthybuilding.net
- Environmental Building News: Article discussing issues around a phase out of PVC
www.buildinggreen.com/features/pvc/pvc.html
- HDR Architecture: White paper on why HDR avoids PVC
www.hdrinc.com/architecture/sustain
- Center for Health & Environmental Justice: Information on Health Care Without Harm and related efforts to eliminate PVC and other dioxin sources
www.chej.org/techassist.html



602 South Fifth Avenue
Wilmington NC 28401
910 342-9000
www.workingfilms.org



2425 18th St NW,
Washington DC 20009
www.healthybuilding.net
info@healthybuilding.net