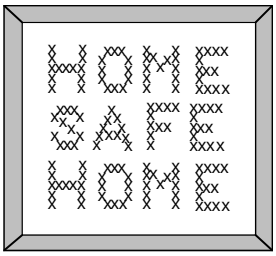
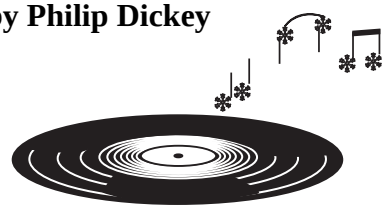
Alternatives
A Washington Toxics Coalition Fact Sheet



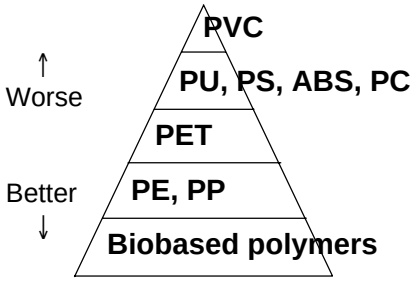
Vinyl Exam: Eliminating PVC in your Home

by Philip Dickey



Why is it called vinyl?
The term "vinyl" doesn't follow the standard system for naming chemicals; it should have been called ethenyl. The word "vinyl" comes from the Latin "vinum" for wine, because of the close connection between ethylene (from which vinyl is made) and ethyl alcohol, the alcohol in wine. The term vinyl had been in common use since 1863 and so was allowed to continue as an alternate name for ethenyl. Good thing, too, because "spinning some ethenyl" just doesn't have the same ring to it.

Plastics Pyramid



Key to the Polys:
PVC = polyvinyl chloride
PU = polyurethane
PS = polystyrene
ABS = acrylonitrile butadiene styrene
PC = polycarbonate
PET = polyethylene terephthalate
PE = polyethylene
PP = polypropylene

What do you think of when you hear the word "vinyl?" Perhaps it's vinyl siding or that orange chair you had in the 1970s. To many of us, the term "vinyl" is synonymous with the long-playing record, introduced in 1948. The 45- and 33-RPM disks were made of polyvinyl chloride (PVC), a type of plastic invented by accident in 1926. Although records have been replaced by CDs and DVDs, which are not made of PVC, the vinyl industry produces more than 30 billion pounds of PVC plastic each year worldwide.

Polyvinyl chloride (PVC or just "vinyl") is the second most widely used plastic in the world. More than half of the world's production goes into construction materials. It is relatively cheap to produce (ignoring cost to health and the environment) and can be made into either rigid or flexible products. From shower curtains to garden hoses to children's toys, the use of PVC is so pervasive in today's society that most of us use PVC products every day without a second thought. Even the credit card that you use to buy your PVC products is made from PVC!

The Healthy Building Network, a coalition of green-building professionals and others interested in sustainable building materials and practices, has called PVC an environmental-health disaster. Its production involves the use and release of extremely toxic chemicals. Flexible PVC products contain toxic plasticizers that leach out of the material and can be a health hazard for users. PVC plastic is not widely recyclable and when burned releases dangerous hydrogen chloride gas and dioxin, one of the most toxic chemicals known.

This fact sheet is designed to help you identify PVC products in your home and make better choices when you buy products or remodel your house.

What's the Problem with PVC?

All plastics have environmental problems, but PVC is by far the worst. Greenpeace has developed the "plastics pyramid" to illustrate the relative environmental and health burdens of various plastics (www.greenpeaceusa.org/toxics/house.htm). As you can see in the pyramid at the left, PVC scores the worst, while bio-based plastics score best. Polyethylene and polypropylene score next to best. No petroleum-based plastic is made from sustainable resources.

PVC's production begins with chlorine and lots of energy. Something like 40% of the chlorine that is produced worldwide goes into making PVC plastic. This chlorine is combined with ethylene from petroleum to form ethylene dichloride, which in turn is reacted to make vinyl chloride monomer, the building blocks for the plastic resin. Depending on the final use, various toxic additives such as plasticizers or heavy metals are used to soften or stabilize the material.

Dioxins are produced at many points in the making of PVC, including the production of the chlorine from salt, making the plastic itself, and incineration of production wastes. Additional dioxins are produced if the PVC itself burns, either during garbage incineration or in the event of a structure or automobile fire. EPA studies have shown that incineration of garbage and medical waste are two of the largest sources of dioxins. PVC and other chlorine-containing materials are the largest source of the

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chlorine that forms those dioxins.

Dioxins pose a serious public health threat. They are known to cause cancer in humans and are among the most powerful carcinogens known. They also cause a whole range of other health effects on the reproductive, endocrine, and immune systems. EPA estimates that most people in this country have dioxin exposures 200 times above calculated safe levels. Highly exposed populations, such as those that eat a lot of fish, meat, or dairy products, are at higher risk.

Workers involved in making PVC or its basic ingredients are exposed to vinyl chloride, a known human carcinogen. Chemicals from PVC production have contaminated groundwater near several plants, and many residents have had to be relocated. Vinyl chloride is also released into the air in large quantities at plants where PVC is made, posing a health risk for the communities, which are typically low income.

Although the vinyl industry says that PVC is recyclable, most of the recycling done today is production scrap rather than finished PVC items, which mostly end up in the trash. PVC bottles and other items with the number 3 recycling symbol are theoretically recyclable, but because of the various additives in PVC and the fact that it easily contaminates other plastics, most recycling programs cannot accept PVC and aren't likely to do so any time soon. One PVC bottle can render a batch of 50,000 PET bottles unrecyclable. Most of the millions of pounds of PVC waste generated every year, from food wrap to water pipes, go straight to the dump or, worse, to the incinerator. Eliminating dioxin emissions means removal of the chlorine sources rather than trying to control thousands of combustion sources all over the world. You can do your part by avoiding the products containing PVC.

Identifying Products Made from PVC

Many things in the home can be made from PVC, as you can see from the list on the opposite page, but not all items in a category contain it. Look for the word "vinyl" in a product name or description or the number 3 recycling code on the product. Many PVC items, especially flexible ones, have a strong odor when new. The smell of a new plastic shower curtain is a sign that it is probably made from PVC. According to the U.S. government's National Toxicology Program, one of the largest potential exposures to vinyl chloride for the general population is from inhaling the so-called "new car smell" that comes from the offgassing of dashboards, door panels, and other PVC parts.

Alternatives to PVC

There are alternatives for most uses of PVC. Some cost more at the counter, but if you add in the health and environmental costs of producing PVC, it becomes the most expensive choice. Prices of alternatives will come down as demand increases.

It may seem overwhelming to try to avoid every use of PVC in your life, and in some cases you have little choice. Begin by focusing on products with large amounts of PVC (construction materials), those that present the greatest health risk (toys, plastic wrap), or those that are easy to replace (shower curtains).

The rest of this section gives some examples of alternative materials that can be substituted for PVC. Much more detail on specific brands of products available can be found on the Healthy Building Network web site at www.healthybuilding.net/PVC/pindex.html.

Windows and Doors: The preferred choice is wood, especially from certified sustainable sources. For low maintenance, wood windows clad with aluminum on the outside are available. All-metal doors are also available, especially as screen or storm doors.

When we added a second story to our home several years ago, we decided against the very popular PVC windows, which are marketed for their energy efficiency, durability, light weight, and low price. Although we spent more money, we chose wood windows. Because the windows were on the second floor, where repainting is more difficult, we decided on the aluminum-clad exteriors. Our windows are just as energy

PVC Bad Actors

Vinyl chloride. The building block from which PVC is made. As a gas or compressed liquid, vinyl chloride can escape from places where the chemical is used, endangering workers and people living nearby. Vinyl chloride is known to cause cancer in humans. It also can cause nerve damage, immune reactions, and other serious health effects in high enough doses.

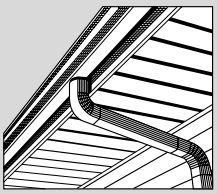
Dioxins. A group of chemicals among the most toxic in the world. Dioxins are a byproduct of the manufacturing and incineration of chemicals containing chlorine, such as PVC. Dioxins are known to cause cancer, as well as reproductive and immune system effects. They are slow to break down in the environment and have contaminated the food chain, especially foods with animal fat, including mothers' milk.

Phthalates. A group of chemicals added to PVC to make it flexible. Phthalates can leach out of products when sucked on by a child, when in contact with food, or when used in medical equipment. In animal studies, most phthalates cause birth defects or reproductive problems. Recent studies show that virtually all of us have phthalates in our bodies.

Organotins are a group of compounds of the metal tin. They are highly toxic and persistent in the environment. Organotins are most likely to be found in rigid PVC products, but have also been found in wallpaper and flooring.

Lead is a highly toxic metal that has been removed from consumer paints and gasoline because of its devastating impacts on children's nervous systems. Lead is still used as an additive in some PVC products, particularly wire insulation.

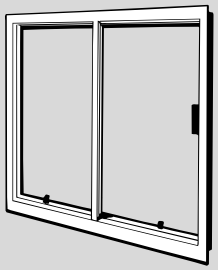
The Many Uses of PVC



Siding & gutters

Plumbing

Toys



Window & door frames

Children's swimming pools

Food wrap
Coatings
Automotive seats (also dashboards, door panels, upholstery)
Credit cards
Flooring
Upholstery
Medical instruments
Bottles
Garden Hose
Apparel (aprons, shoes, boots, bags, luggage, raincoats)
Shower curtains
Wall covering
Wire/Cable insulation
Molding
Appliance housing (TV, video, stereo, circuit cards, white goods)
Flooring
Packaging
Shutters and blinds
Furniture (outdoor, inflatable, imitation leather, furniture film)
Office supplies (ring binders, clipboards, tape, organizers)
Mattress covers
Diaper covers
Bibs
Car seats and strollers for children
Dish and clothes racks
Tarps
Greenhouse and cold frames
Pond liners
Drinking straws

efficient as vinyl and much more attractive and durable. We chose Marvin windows, but there are many choices available in wood windows.

Pipe and Garden Hose: Choices will be different for water supply and sewer pipes, and for natural gas or perimeter drain lines. Specific materials may be required by building codes. High quality water supply lines in the home are usually copper, but polyethylene pipe may also be available. Sewer lines can be cast iron, vitrified clay, high-density polyethylene, or acrylonitrile-butadiene-styrene (ABS). There have been numerous cases of failure with ABS. If you're in the market for garden hose, spring for the rubber hose. It's higher quality, lasts longer, and won't kink as easily. Look for hoses made from post-consumer, recycled rubber.

Flooring: There are many interesting choices for flooring in areas where vinyl might otherwise be used. Linoleum, made from natural bio-based materials, is an excellent choice, but has some initial odor. Ceramic tiles are particularly good in a kitchen or bathroom, but check to be sure the floor can take the additional weight. Wood or cork floors are very attractive and practical but will require a durable, waterproof finish. Low toxicity finishes are available. For more information on PVC-free resilient flooring and carpets containing recycled materials, go to the Healthy Building Network website at www.healthybuilding.net/PVC/pindix.htm.

Electrical Wire: When building, remodeling, or rewiring a home, the type of wire is specified by building codes, which in turn are specified by fire codes. The most widely used wire in home construction today, Romex, has PVC insulation and sheathing. Although PVC-free (or, more generally, halogen-free) wire exists and is available in Europe, it is currently very difficult to find any replacement in this country for residential use. Permitted wiring materials are dictated by electrical codes, which thus far have not been met by halogen-free products. Southwire, makers of Romex, have developed PVC-free wire that could eventually replace Romex in household applications. Their technical report states that the PVC-free wire is less likely to burn, but if it does burn emits less smoke, less-dense smoke, and less-toxic smoke than PVC-insulated wire. Another manufacturer describes the applications for halogen-free wire in the following way: "halogen-free cable and wire should be used where there is an increased need for safety to protect human life and/or valuable materials."

Packaging: It's worth taking packaging into account when purchasing household products. Avoid the #3 recycling symbol on bottles and other packaging. Post-consumer PVC is not recyclable to any great extent because each type of PVC has different additives and once mixed together is hardly useful for anything.

Wall Coverings: Traditional wall coverings include paint, tiles, paper-based wallpaper, and wood paneling. The choice you make is likely to be dictated by the style of your home, which room is being decorated, and your budget. For more information, visit www.healthybuilding.net/PVC/pindex/htm.

Siding: In terms of volume, vinyl siding makes up one of the largest potential uses in a home, so avoiding vinyl for this purpose is a priority. If your goal is to cover existing clapboard wood siding with a lower maintenance alternative, several companies make a polypropylene siding that is comparable in appearance and performance. Aluminum siding is still available as well. Another option is a non-flammable cement-fiber composite commonly called Hardi Plank. It looks like lap siding and comes pre-primed and ready to paint. For new construction, other obvious choices include traditional brick, masonry, stucco, stone, metal, and concrete, in addition to wood and various fiber-cement composites.

Fencing and Decking: The traditional wood fence or deck are still good choices, but wood preservatives bring a host of problems of their own. Choose naturally rot-resistant woods, preferably grown and harvested in a sustainable manner. For availability of

certified wood, contact the Environmental Home Center (see Resources at right). Paint or stain to provide weather protection if you like. Metal is also a possible choice for fencing, though often not as attractive. Plastic wood materials make sense in the outdoor environment, and there is a host of chlorine-free products made from recycled plastic or a blend of wood and plastic. Finally, for a deck or patio, don't rule out ceramic tile, stone, or molded paving blocks, in addition to the newer recycled plastic-wood composites.

Gutters: The most popular gutter material in use today is continuous aluminum gutters and downspouts. Unless damaged by a ladder or falling tree branch, aluminum gutters will outlast vinyl (which would be damaged by the same events). Vinyl is inherently unstable and not the most long-lasting material.

Shutters and Blinds: A wide range of window treatments now supplement the traditional shutters, blinds, and draperies. Shutters can be wood, aluminum, or chlorine-free plastic. Many blinds are fabric but may have plastic spacers, pulleys, or other parts that could contain PVC.

Furniture: Avoiding vinyl in indoor furniture is easy because there are so many other choices, including wood, textiles, and leather. For outdoor furniture, consider wood, metal, or chlorine-free plastics. Ask the salesperson for assistance in determining the type of plastics that may be used in items they carry. Look for items made from recycled rather than virgin plastic whenever possible.

Shower Curtains: Choose a cotton shower curtain with a polyester or nylon liner. Cotton is more expensive than vinyl but can be laundered. The liners are much less expensive than the curtains and can be replaced when needed. Periodic washing will make them last longer. Non-vinyl curtains are available at many stores, including IKEA and Bed, Bath, and Beyond.

Office Supplies: A host of office and hobby supplies are made from vinyl. For sheet protectors, photo albums, notebooks, report covers and the like, look for indications of "archival quality," "acid free," or "non-stick" that indicate non-vinyl materials such as polyethylene. See also Better Office Products under Resources at right.

Toys and Food Containers: The uses of PVC most likely to impact your health include plastic in contact with food, such as plastic wrap and containers for leftovers, and children's toys, especially those likely to be sucked on. Remember that children will put most anything in their mouth, not just items intended for that purpose. If you have young children, make it a high priority to look for products that don't contain PVC. If necessary ask your retailer or contact the manufacturer for more information. Fortunately, large multi-national toymakers like Early Start, Little Tikes, Lego, Prime Time Playthings, Sassy, and Tiny Love have pledged to stop using PVC. Some shoemakers, such as Nike, Adidas, Asics, and Puma have also agreed to phase out PVC in their products.

If you use plastic wrap or food bags, look for those made from polyethylene, such as GLAD™ bags and plastic wrap. For food storage, use glass containers or plastic containers marked with recycling symbols other than 3. If you like to reuse plastic produce bags from the grocery store, look for the recycling symbol there as well. If you think plastic wrap or food containers may be vinyl, don't put them in the microwave.

The Rest: We don't have space to list alternatives for every vinyl use. To find out about alternatives for other uses, ask your retailer about substitutes for vinyl products. Doing this helps to let industry know that customers don't want vinyl. Also, consult the resources section on this page for more information. ■

Resources

Greenpeace PVC Alternatives Database:
www.greenpeace.org/~toxics/pvcdatabase/
Searchable database on alternatives worldwide. Products may not be available in the U.S.

Healthy Building Network:
www.healthybuilding.net/
A wealth of information on PVC alternatives as well as on arsenic wood preservatives and sustainable lumber.

Environmental Home Center:
800-281-9785;
www.environmentalhomecenter.com
A wide range of environmentally preferable products for building and furnishing. Shop online, in person at the Seattle store, or by phone.

Forest Stewardship Council:
www.fscoax.org/principal.htm
Explanation of how sustainably produced wood is labeled.

Better Office Products: 800-631-7673; www.betteroffice.com
A complete line of PVC-free polyethylene office supplies.

The Washington Toxics Coalition is a non-profit organization dedicated to protecting public health and the environment by identifying and promoting alternatives to toxic chemicals. Please write or phone for information: WTC, 4649 Sunnyside Ave N, Suite 540, Seattle, WA 98103. Phone: 206-632-1545. Visit our Internet Web site at www.watoxics.org.

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