



## Alternatives to Vinyl (PVC) Products

Alternatives to PVC exist for all design and construction applications. While there are environmental considerations with every material, none of the listed alternatives cause the highly carcinogenic dioxin emissions that result from PVC. All of the alternates described below are currently commercially available. The specific products and manufacturers listed here are examples, not a comprehensive listing and listing here does not imply an endorsement.

- **PVC Piping**

Alternative pipe materials include cast iron, vitrified clay and plastics such as cross-linked Polyethylene and HDPE (High Density Polyethylene). **Cast-iron** pipes have a much lower thermal expansion coefficient than PVC pipes, which makes them preferable where temperature fluctuations are common. Iron pipes are just as durable as PVC, although they can corrode over time and are heavier. **Vitrified clay** pipes have the lowest thermal expansion coefficient of all pipe materials, and are more durable than PVC pipes, especially resisting deterioration due to chemical reactions. Like iron, clay pipes are heavier. **Polyethylene** is the least expensive plastic material for pipes and is very light and flexible. It does have a high thermal expansion coefficient that must be accommodated when used in environments with large temperature fluctuations. **ABS** is another PVC-free plastic. It is less desirable, however, due to higher cost, a much larger thermal expansion coefficient and a number of other environmental problems.

- **Vinyl Siding**

Alternative siding materials include wood, fiber-cement board, polypropylene and acrylic siding. Vinyl siding can yellow, fade, and become brittle over time, whereas wood is more durable. **Wood** however, is more expensive and has to be painted or stained. **Fiber-cement** board siding and shingles (e.g., James Hardie Building Products)

are both durable and affordable, although heavier. Recently other durable non-chlorinated plastic siding options have been introduced as well, most notably, **acrylic** (e.g., ICI Acrylics) and **polypropylene** (e.g., Alcoa).

- **Electrical Wiring**

Alternative wire sheathing and insulation plastics include halogen-free, low-smoke **polyethylene** and linear, low-density polyethylene (**LLDPE**). Importers of halogen-free (non-PVC) cables include Siemens PLC and Multi-Contact USA. Some of the California manufacturers of halogen-free wiring include Bay Associates, Inc. (Menlo Park), Calmont Wire and Cable, Inc. (Santa Ana), Barcel Wire and Cable Corporation (Irvine), and JIC Industrial Company, Inc. (Milpitas).

- **Vinyl Roofing Membranes**

For flat roofing systems, cost effective alternative halogen-free membrane materials include thermoplastic **polyolefins** (e.g. Firestone's UltraPly TPO) and **EPDM** (Ethylene Propylene Diene Monomer) membranes (e.g., Stevens Roofing Systems). Alternative flat roofing systems include **low slope metal roofing**. **Pitched** roofs have environmental advantages over flat roof systems since they are generally more durable, and there is more potential for reuse and recycling of materials such as slate or tiles.

- **Vinyl Flooring & carpet**

Alternative flooring materials include linoleum, bamboo, ceramic tile, carpeting with natural fiber backing, wood, cork, and slab flooring. **Natural linoleum** provides the closest natural replacement for vinyl, sharing its water resistant properties while being made of more environmentally sound materials than any of the plastic options. Natural linoleum is now distributed by both Armstrong (DLW Linoleum) and Forbo.

Several manufacturers are making chlorine free **polymer** flooring products (e.g., Ethylene Styrene Interpolymer from Dow Chemical and polyethylene Stratica from Amtico), which do not crack as easily as vinyl for corner applications.

**Ceramic** tile is more durable than vinyl flooring, is readily available, and can be manufactured from natural clays or from recycled materials. **Bamboo** and **wood** flooring are also good alternatives to PVC if care is taken to prevent water damage. Bamboo flooring comes in standard planks that are harder and more durable than standard red oak and many other hardwood products. Suppliers of bamboo flooring include EcoTimber, Smith & Fong (Plyboo), Bamboo Accents, and Bamboo Hardwoods.

**Carpeting** often comes with PVC backing as well as a host of other indoor air quality problems of its own. There is a wide range of natural fiber alternatives to vinyl carpet backing. For example, Naturlich Flooring supplies a wide range of natural fiber carpets with jute and other natural fiber backing.

- **Vinyl Wall Coverings**

Alternative wall covering materials include **natural fiber**, **non PVC plastics** and a variety of **blends**. An example of a polyethylene wall covering that has similar properties to vinyl is Xorel, a product by Carnegie. Fabric and natural fiber alternatives include sisal, cotton, rayon, linen, polyester, grass cloth, jute, hemp, burlap, straw, and yarn. Innovations In Wall Coverings, Inc. has just released a wood fiber/polyester blend called Allegory. Other alternative materials used for wall coverings are **wood** and wood veneers, clay coated **paper**, and **marble**. Some of the suppliers of wall coverings made from these varied materials include Design Materials, Inc. (KS), Blumenthal (CT), Knoll Textile (NY), Maya Romanoff (IL), Larson (IL), Hirshfields, Inc. (MN), Grass Cloth Imports (IL), Sloan Davis, Inc. (IL), Seabrooke Wallcoverings (TN), and Thybony Wallcoverings (IL).

- **Vinyl Windows & Doors**

Alternative window & door materials include wood, fiberglass and aluminum windows. Vinyl windows have a higher thermal expansion coefficient that can lead to water leaks and other maintenance problems. They can become brittle, yellow, and can develop cracks over time with exposure to sunlight. They are also more prone to impact damage than timber and more difficult to repair. **Wood** windows require maintenance; however, they are more tolerant of poor fitting or abuse. An example of a supplier of sustainable wood windows and doors is EcoTimber (Berkeley, CA). **Aluminum** windows can be more expensive than vinyl; however, they do not require painting like wood windows. They can carry a heavy energy penalty unless using a thermal barrier. Another alternative is **fiberglass** window frames and doors which are also maintenance-free and more energy-efficient than aluminum.

- **Resources**

Many of these materials and others are described further with contact information for manufacturers or distributors in the following:

- **Architectural Resource Guide**  
\$35 in CD or book form from  
**Northern California ADPSR**  
P.O. Box 9126, Berkeley, CA 94709  
(510) 273-2428  
<http://www.adpsr-norcal.org/>
- **Environmental Building News**  
28 Birge St., Brattleboro, VT 05301  
(802) 257-7300  
<http://www.ebuild.com/>
- **Interior Concerns Resource Guide**  
P.O. Box 238, Mill Valley, CA 94942  
(415)389.8049  
<http://www.interiorconcerns.org>

Sample green building materials and more references may be found at the:

- **Green Resource Center**  
2000 Center St. #120, Berkeley, CA 94704  
(510) 845-0472

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