

Screening the Toxics out of Building Materials

Polyvinyl chloride (PVC)

Polyvinyl chloride, or vinyl, has been singled out for elimination because of its uniquely wide and potent range of chemical emissions throughout its life cycle including many of the target chemicals listed below. It is virtually the only material that requires phthalate plasticizers, frequently includes heavy metals and emits large numbers of VOCs. In addition during manufacture it is responsible for the production of a large number of highly toxic chemicals including dioxins (the most potent carcinogens measured by man), vinyl chloride, ethylene dichloride, PCBs and more. Plus when burned at the end of life, whether in an incinerator, structural fire or landfill fire, it releases hydrochloric acid and more dioxins. *Avoid products made with PVC.* For more info on PVC, see <http://www.healthybuilding.net/pvc>

Volatile organic compounds (VOCs)

VOCs are actually a category of thousands of different chemicals, such as formaldehyde and benzene, which evaporate readily into the air. They are most immediately noticed causing dizziness, headaches, eye, nose, and throat irritation or asthma, but some can also cause cancer, provoke longer term damage to the liver, kidney and nervous system, and stimulate higher sensitivity to other chemicals.

- **Wet products (adhesives, paints and other coatings):** *Seek no or low VOC products.* Look for Green Seal certified paints or paints with *less than 20 g/l VOCs*. Look for the SCAQMD (South Coast Air Quality Management District) compliant adhesives and coatings.
- **Flooring and carpet, wall covering, ceiling tiles, furniture:** *Seek CA 01350 compliant products.* A variety of programs utilize the CA 01350 testing protocol to measure the actual levels of individual VOCs emitted from the material and compare it to allowable levels set by the state of California. These include CHPS, CRI's Green Label Plus, SCS's Indoor Advantage, RFCI's FloorScore and GreenGuard's Schools & Children. Also avoid flooring that requires waxing and stripping which will release more VOCs than the original material. For more info on CA 01350, see www.healthybuilding.net/healthcare/CHPS_1350_summary.pdf
- **Composite wood products and insulation:** *Look for no added formaldehyde.* The CA 01350 program sets limits on formaldehyde emissions but for these products there are options with no formaldehyde added at all.

Phthalates

DEHP and other phthalates have received most notice for their use in PVC medical products and in toys and concerns about their impact on development of young children. Phthalates are, however, also used widely in flexible PVC building materials and have been linked to bronchial irritation and asthma. *Seek products with no phthalates – this primarily means avoid PVC* (see above).

Heavy metals

Many metals you may have thought were banned long ago continue to be used for stabilizers or other additives in building materials. Lead, mercury and organotins are all potent neurotoxins, particularly damaging to the brains of fetuses and growing children. Cadmium is a carcinogen and can cause a variety of kidney, lung and other damage. *Seek products with no heavy metals.*

Halogenated Flame Retardants (HFRs)

Flame retardants used in fabrics, foams and various other plastics have certainly saved many lives. The halogenated ones (including PBDEs & other brominated flame retardants (BFRs), however, disrupt thyroid and estrogen hormones, which can cause developmental effects, such as permanent changes to the brain and to reproductive systems (including reduced sperm count in males and changes to ovarian cell structure in females). Being persistent and bioaccumulative they are rapidly accumulating to dangerous levels in humans and the subject of an increasing number of bans and phase-outs. *Avoid products using any halogenated flame retardants.*

Perfluorocarbons (PFC)

Many treatments for fabric and various building materials have been based on PFCs that - like the HFRs – are highly persistent bioaccumulative and hence concentrating at alarming levels in humans. PFOA, a major component of treatments such as Teflon, Scotchguard, Stainmaster, Gore-Tex, and Zonyl has been linked to a range of developmental and other adverse effects. *Avoid any product treated with a PFC based material.*

Resources for Finding Healthy Building Materials

No single building materials list or certification yet covers all of the important health and environmental issues. For example, the various programs listed below that certify products to meet the CA 01350 VOC emissions standards don't also screen for phthalates and flame retardants and you will find many PVC/vinyl products on those lists. Note also some 01350 VOC programs are managed by trade associations. It is recommended to always ask for the actual lab certification of 01350 VOC emissions when first screening a material and ask about PVC/vinyl, heavy metals, HFRs and PFCs.

**** PVC ****

HBN PVC Alternatives Database is a CSI based listing of PVC free alternatives for a wide range of building materials. www.healthybuilding.net/pvc/alternatives.html

Healthy materials checklist:

- **No PVC** (polyvinyl chloride, vinyl)
- **Low or no VOC** (volatile organic compounds)
 - CA 01350 compliant
 - No added formaldehyde
- **No phthalates or heavy metals** (lead, mercury, cadmium, organotins)
- **No HFRs** (PBDEs, BFRs & other halogenated flame retardants)
- **No PFCs** (perfluorocarbons, PFOA, Teflon & other treatments)

**** VOCs (Volatile organic compounds - Low VOC & 01350 based programs) ****



Green Seal Certified Products: **Paints & coatings** are listed that meet the GreenSeal VOC (volatile organic compounds) content standards, do not contain certain excluded chemicals and meet certain performance requirements. www.greenseal.org/certproducts.htm#paints



CHPS Low-Emitting Materials: (Collaborative for High Performance Schools). CHPS maintains a table listing products that have been certified by the manufacturer and an independent laboratory to meet the CHPS Low-Emitting Materials criteria-Section 01350-for use in a typical classroom, including **Adhesives, Sealants, Concrete Sealers, Acoustical Ceilings, Wall Panels, Wood Flooring, Composite Wood Boards, Resilient Flooring (Includes Rubber) and Carpet.**

Note: This list also includes paint listings, but CA 01350 is not yet a replacement for low VOC screening. www.chps.net/manual/lem_table.htm



GreenLabel Plus: Carpet & Rug Institute (a trade association) certifies that **carpets and adhesives** meet CA 01350 VOC requirements. www.carpet-rug.com/News/040614_GLP.cfm



FloorScore: Scientific Certification Systems certifies for the Resilient Floor Covering Institute (a trade association) that **resilient flooring** meets CA 01350 VOC requirements. www.scs-certified.com/iaq/floorscore_1.html



GreenGuard for Children & Schools: Air Quality Sciences certifies for GreenGuard that **furniture & indoor finishes** meet lower of CA 01350 VOC or 1/100 of TLV. www.greenguard.org

**** Formaldehyde **** Formaldehyde emissions are restricted by the CA 01350 VOC programs. For **composite wood & insulation**, however, specify "no added formaldehyde". **ASK YOUR PRODUCT REPS**

****Phthalates & heavy metals (lead, mercury, cadmium, organotins) **** Phthalates are almost exclusively used in PVC and PVC is a major user of all of these heavy metals. But heavy metals like lead are still also used in **solder, roofing** and some other products **ASK YOUR PRODUCT REPS**

**** BFRs/ HFRs (Brominated Flame Retardants/Halogenated Flame Retardants)**

& PFCs (perfluorochemicals)** No listings are yet screened for these emerging problem chemicals. The flame retardants are added to plastics, particularly **fabrics and foams**. PBDEs are the most widely used. All halogen based flame retardants, however, are likely problematic. The PFCs frequently show up as fabric treatments such as Teflon, Scotchguard, Stainmaster, Gore-Tex, and Zonyl **ASK YOUR PRODUCT REPS**

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