



CABINETS

Introduction

Most new homes come with site-built or pre-fabricated cabinets, countertops, closet organizers, shelving, wainscoting, and trim that use engineered wood products such as plywood, particleboard (PB) or medium density fiberboard (MDF). Unfortunately, most of these materials are made with binders, glues and finishes that contain high levels of volatile organic compounds (VOCs) including formaldehyde. People with chemical sensitivities and children are more susceptible to experiencing side effects from these odorous fumes such as headaches, nasal congestion, and other more severe reactions to the emissions of these harmful VOCs. The good news is that there are healthier alternatives.

Green cabinets are distinct from standard cabinets in one or both of two ways:

- Less-toxic options include materials with reduced VOCs and formaldehyde (i.e., solid wood, metal, reduced formaldehyde MDF, or straw-based MDF), materials with low-VOC finishes, or materials that try to lock in the VOCs with applied sealers.
- Sustainable options include FSC-certified wood, agricultural waste products (straw, rice, sugar cane, soybeans, sunflower hulls, etc.), recycled materials, or locally sourced and produced products.

Green Building Benefits

Indoor Environmental Quality

Indoor environmental quality problems come from the offgassing of VOCs, such as formaldehyde, from the glues used to bind the wood veneers or particles together to make engineered boards such as plywood, particleboard (PB) or medium density fiberboard (MDF). A homeowner can reduce these emissions by:

- using MDF that uses glues that contain no formaldehyde (typically an MDI resin). There is

one company that has this product available in wood, and about four companies that have it available in straw;

- using exterior grade plywood (which typically uses phenol formaldehyde-based glue) rather than interior grade (which typically uses urea formaldehyde-based glue), as the exterior glues offgas roughly 90% less formaldehyde than interior glues;
- using metal cabinetry;
- sealing every side (all six including backs, insides, and edges) of all engineered materials with at least two coats of a low-permeance sealer or paint
- using low-VOC finishes (paints and sealers under 150 grams per liter VOCs) for all surface coverage.

Resource Efficiency

The most common cabinet materials are plywood, PB and MDF. The manufacture of plywood requires large, old growth trees in order to be able to acquire large expanses of strong, thin veneers (ply's). These types of trees are severely dwindling if not very endangered in the U.S. and are putting severe pressure on the health of forests in the rest of the world from which we import them as well. By choosing a product other than plywood, you are conserving these large trees and ancient forests. Consumers can additionally help ensure the longevity of U.S. and foreign forests by purchasing wood that has been certified and labeled by the Forest Stewardship Council (FSC). This international organization has developed strict guidelines for the economic, ecological, and social health of the forest, local region, workers, and company.

PB and MDF are made from finely ground wood that is sourced from either small, fast growth trees or from the waste from lumber mills (sometimes considered post-industrial waste). This is generally a more environmentally responsible process than the making of plywood. Consumers can additionally improve environmental performance by requesting high rates of recycled content as well as FSC certification as mentioned above.

In the last few years, a number of manufacturers have produced high quality MDF with agricultural waste products such as wheat straw, sugar cane bagasse,

soybeans, sunflower hulls, and kenaf, all made with formaldehyde-free MDI resins. Purchase of these products uses annually renewable waste products, provides additional revenues for farmers and reduces our use of trees.

Using recycled or salvaged materials for cabinetry also reduces the need to cut new lumber or produce new materials.

Promote the Local Economy

Cabinet materials can be sourced, fabricated and assembled either by persons and firms locally or far away. Each time you make purchases of local products and services, you keep money circulating locally, which benefits the local tax base, job creation and other local businesses.

Affordability

Cabinet materials made from formaldehyde-free MDF, agricultural bio-composites, salvaged materials, and steel must typically be special ordered, and thus may increase costs, but certain cabinetmakers order them more routinely and achieve no difference in production time. Overall, these materials do cost more than standard materials, but the cost of materials is small compared to the labor involved in making and installing cabinets (typically 10%), so even a significant increase in material costs is very small for the overall budget. Sealing all six sides is not a typical practice, so doing this will cost a small amount extra.

Installation

Extra time may be required to special order healthier and more resource efficient cabinets, so be sure to make accommodations for this possible time lag in finding materials or cabinetmakers. Local cabinetmakers can, but may simply not want to, accommodate your material choices fairly easily, since green cabinets are fabricated and installed and use the same finishing techniques as standard cabinetry materials. In fact, many cabinetmakers prefer MDF to plywood, since its thickness tends to be more exact.

No matter what materials your cabinets use, use paints and clear finishes with low VOCs (<150 gms/ltr) for the boxes and the frames. Request that the sealing be done as much as possible off site to reduce the fumes entering your home.

If your budget or process will not allow for one of the green or healthy cabinet options or you have an

existing home, it is possible to prevent much of the offgassing of VOCs and formaldehyde by using at least two coats of a paint or sealer on every face and edge (all six sides of every piece) of all of the cabinet materials.

Operation and Maintenance

Care and maintenance of your green and healthy cabinets is no different than with standard cabinets. As with all cabinets, keep moisture away from materials to avoid damage.

Green vs. Conventional

Green Product	Conventional Product
Few to no harmful VOC and formaldehyde emissions	Typically constructed with binders/glues/resins high in urea-formaldehyde and sealers high in VOCs
Uses recycled materials	Uses virgin materials
Uses local materials	Uses materials from all over the world
Wood comes from FSC-certified sustainably harvested forests and is tracked throughout its production and delivery process	Wood comes large diameter, old-growth trees from non-certified sustainable forests
As durable as or more than standard cabinetry	
Installation cost is the same. Fabrication cost is the same unless extra sealing is required. Material cost may be the same or more, depending on the materials and finishes.	Installation cost is the same.
O&M cost is the same	O&M cost is the same

Bay Area Suppliers

- Search the **Materials Database** from Bay Area Build It Green to find local suppliers and services: www.build-green.org
- **Dow BioProducts**, “Woodstalk” straw MDF (www.dow-bioproducts.com)
- **Goldboard** straw MDF (www.goldboard.com)
- **Meadowood Industries**, “Meadowboard” ryegrass MDF (www.meadowoodindustries.com/)
- **Phenix Biocomposites**, “Microstrand” straw MDF (www.phenixbiocomposites.com/)
- **Sierra Pine**, “Meditate II” and “Medex” MDF with no added formaldehyde (www.sierrapine.com/products/mdf.htm)

For More Information

- **Green Seal:** (www.greenseal.org/cgrs/CGR_PB&MDF.pdf) has a good fact sheet on particleboard and medium density fiberboard.
- **EPA Indoor Air Quality Program:** (<http://www.epa.gov/iaq/>) has good information on all types of indoor air quality issues
- **Canada Mortgage and Housing Corporation:** (www.cmhc-schl.gc.ca/en/index.cfm) has excellent resources on all aspects of home ownership including indoor air quality and building materials.
- **Forest Stewardship Council:** (www.fsc.org) for an explanation of sustainable forestry practices and list of companies supplying FSC-certified wood products
- **The Healthy House Institute:** (www.hhinst.com) information and tools to improve and protect indoor environmental quality
- For more information about Green Building, visit our website at: www.greenaffordablehousing.org or call Bruce Mast at 510-271-4785.

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