

Northwest Particleboard: An environmental workhorse

The pervasive emphasis on green products and environmental concern in the office furniture industry has undoubtedly led to improvements in furniture designs and manufacturing processes. Yet the constant quest for new materials can blind us to the environmental value of some old standards that were originally developed for other reasons.

Particleboard for work surface, storage component, and other substrates is an excellent example. This material originated in the 1950s as a low-cost replacement for virgin wood. Today, however, after 50 years of development and utilization, we have a highly efficient, cost effective product with a surprising sustainability upside.

Though the term “sustainable” has been broadly applied in the industry, the true meaning of the word is far more than a marketing mantra. At Activewerks, we take a deeper approach to this loaded term. In our view, sustainability encompasses more than the potential environmental impact of materials. We believe it also involves numerous other elements, including economic viability issues and impacts on local communities.

For example, many so-called advances that at first glance appear to be “perfect solutions” actually disguise hidden environmental or economic issues and concerns. In procuring materials for manufacturing, it’s important to keep the bigger picture in sight and seek a more complete understanding of environmental value. At Activewerks, we work to understand true environmental impacts and have always been more committed to “doing good” than “feeling good.”

The information in this paper reflects this approach. Our company has a proven environmental track record and has been recognized in numerous local and regional programs, including EnviroStars certification and the Washington State Governor’s Award for Pollution Prevention & Sustainable Practices. But while we like to receive awards, the keys for us are making a real difference and being a responsible member of our community.

Which board is greener?

We believe Northwest-produced particleboard is the soundest environmental core material available. This may be surprising, but consider the following:

Wood Particleboard

- **100% post-industrial by-product:** Particleboard is made with sawdust and shavings left over from various industrial processes, including the production of lumber and even solid wood furniture.
- **Reuse vs. landfill or burning:** Industry associations report that literally millions of tons of residual wood are diverted from landfills to make particleboard each year [The US & Canadian particleboard industries reportedly save an average of about 9 million tons of residual wood from landfills each year (*National Particleboard Association & Canadian Particleboard Association 1996*)].
- **Natural, sustainable collection and manufacturing process:** Our suppliers conduct their initial harvest of timber using a selective process and by following Sustainable Forestry Initiative (SFI) guidelines. Most of the material in particleboard originates from timber waste in the form of sawdust or shavings. Refinement of these particles does not require the use of any chemicals; the shavings are simply milled to render the fibers uniform in size. When the shavings are devoid of all moisture, they are shaped into mats and compressed using an adhesive resin.

*Please see note below on urea formaldehyde (UF).

- **Managed forests:** Companies manufacturing forest products have learned that responsible forestry management is a necessity in order to maintain high production levels. Recognizing the value for future generations, many Northwest suppliers have concentrated their efforts toward sustainable harvest & reforestation. We encourage all of our suppliers to employ sustainable practices and continually seek those who are committed to responsibility in their timber collection processes.
- **Wildlife habitat:** Responsible forest management has a positive impact on local wildlife populations. With targeted harvesting and the elimination of clearcutting, many animal species have been able to re-establish their numbers in well-managed timber forests.
- **Produced and delivered locally (no long-haul shipping):** Activewerks has chosen responsible suppliers with local operations in the Northwest. We recognize the emissions associated with interstate transport and try to minimize our impact by using local suppliers. We also value the importance of conducting business in our local economy. The environmental merit of incorporating local suppliers is confirmed by the US Green Building Council, which includes a LEED credit in its certification criteria for specifying Local/Regional Materials. (MRc 5.1-5.2 under LEED-NC, MRc 2.1-2.5 under LEED-EB)

Alternative Materials

Agri-Based Wheat or Straw Board

In comparison to wood particleboard, agri-based straw board and similar materials have a very different background. Though straw board is certainly preferable to virgin timber, the facts indicate that this material isn't as green as many people think. Among the flaws:

- **Product of monocultural farming process:** Straw board is comprised of ground wheat stalk or other cereal crop straw particles collected during or after agricultural food harvests. Diverse ecosystems transformed into monocultural cropland suffer significant losses in genetic diversity.
- **Produced using fossil fuel intensive farm equipment:** Emissions from plows, tractors, & combines are not regulated by the EPA. Planting, tending, harvesting, and shipping these products requires the burning of enormous quantities of fossil fuels.
- **Erosion and nitrate run-off:** Because the production of straw board means harvesting all of the stalks, the topsoil loses its vegetative cover and stability. Strong wind and rain can erode the topsoil, creating a barren, nutrient-deficient soil structure.
- **Pesticides, herbicides, and chemical fertilizers:** The production of wheat and other cereal crops requires a high chemical input in order to produce high yields. Because the soil structure is often depleted with the harvesting of straw, greater chemical inputs may need to be introduced in order to counteract nutrient deficiency. Negative impacts on local ecosystems from high quantities of synthetic chemicals have been well documented.
- **Harsh chemical "de-waxing" required:** The process of refining straw particles for use in furniture substrates requires partial removal or degradation of the wax layer in order to improve bondability. This chemically intensive process requires arduous mechanical refinement and pre-conditioning.
- **Problems with MDI adhesive:** The adhesive resin used in straw board is methyldiisocyanate (MDI) polymer. Scientists have found that the MDI glue can actually create a significant health risk to production workers.

**Please see note below on methyldiisocyanate (MDI).

Clearly, the "feel good" factor is in play here. Many people operate under the assumption that straw board is one of the most sustainable products, but the facts suggest otherwise.

Asian Bamboo

Another example of a perceived *green* core material is Asian bamboo. Though it is valued for its fast regeneration rates, Asian bamboo raises other environmental concerns.

- **Bamboo grown and processed in Asia:** Immediately, the problem of local production and extraction becomes evident. Instead of supporting local businesses and suppliers, manufacturers import an exotic species into the area. Very little information is available regarding the production process of the bamboo, leaving no guarantee as to how it was grown and harvested, etc.
- **Diesel transport - thousands of miles to United States:** Bamboo is delivered via ocean vessels across the Pacific. The amount of diesel fuel burned to transport the bamboo to the U.S. negates some of the potential benefit of using a rapidly regenerating material.
- **Excessive waste:** Bamboo boards are currently supplied only in dimensions that are extremely inefficient for most furniture manufacturing. Standard bamboo board only comes in 4'x8' sheets, but optimum size board for most furniture manufacturers is in 5'x12' sheets. Using *nesting* techniques, Activewerks is typically able to fit two desks on one 5'x12' sheet. Because two bamboo sheets would be necessary to complete the same job, this makes bamboo both economically impractical and raises major questions about sustainability due to excessive amounts of waste/falldown in the manufacturing process.

The net result: Another material that appears green but conceals undesirable elements.

Conclusion

"Wood is the most renewable, most environmentally friendly building material we have."

-- Patrick Moore, PhD, former director of Greenpeace International

Northwest-produced particleboard is the most sustainable and responsible choice for a substrate material. Not only is particleboard manufactured entirely of waste material, it is also the most cost effective and efficient product available. It is important to remember that part of sustainability is cost viability. The price of standard particleboard for furniture is about \$.67 per square foot, compared with \$1.02+ for wheat board (where available), and \$4.78 for bamboo. Add in the fact that NW particleboard is produced and used locally, and it stands alone as the best selection.

Activewerks stands firmly behind its decision to continue using particleboard as its primary substrate material. We believe it is the best *green* product available. Though it may not look as green as other substrates, particleboard has a hidden story that has been ignored for too long.

*A note on formaldehyde

We contend that particleboard furniture presents absolutely no health risk in office environments. While the use of urea formaldehyde (UF) in the production process is a concern in some circles, the fact is that emission levels are very low - even immediately after the boards are produced. That level diminishes dramatically before the boards leave the mill, and is almost completely eliminated during the lamination and furniture production process.

Through an independent testing laboratory, we found that our finished particleboard desktop yielded only 0.02 ppm (parts per million) in a large chamber test for formaldehyde emissions - 60% below the GreenGuard standard of 0.05 ppm, and 15 times below the Federal HUD & ANSI standard of 0.30 ppm. [Pittsburgh Testing Laboratory Division, using ASTM E1333 (Determining Formaldehyde Levels using a Large Chamber Test Method)]. This also meets the indoor environmental quality standard for LEED EQc 4.5 under the LEED-CI rating system.

****A note on MDI**

Beyond the potential health risks of MDI (methyldiisocyanate), some economic concerns are worth examining as well. Industry sources state that MDI has only 40% of the strength and stability of UF glues. The resin also typically costs about 4 times as much as UF resins, driving up the cost of production. Additional costs of MDI are related to the release agents required to avoid sticking of panels to press plates. Because MDI is also in comparatively short supply, the availability of straw board has been somewhat erratic over the last several years.

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