

Is Wood a Health-Compatible Building Material?

By

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Wood is a classic building material that has proven its worth since ancient times. One of its properties is that it contains volatile organic compounds (VOCs). For the most part, these are monoterpenes such as α - and β -pinenes, higher aldehydes such as pentanal and hexanal, and acetic acid. These substances escape into the ambient air and are responsible for the typical odour of wood.

In connection with the issue of indoor air being contaminated with VOCs from building materials and furnishings, in recent years many consumers have also been concerned about whether these emissions from wood and wood-based building materials might also be harmful to their health. Although the long history of wood use has provided no evidence that wood-specific VOCs pose hazards, in connection with either construction or furnishings, until relatively recently no relevant scientific studies had been carried out.

Between 2005 and 2009, the Department of Environmental Health Sciences of the University of Freiburg and the Fraunhofer Institute for Wood Research (WKI) in Braunschweig therefore conducted a study to clarify these

issues. Voluntary test subjects were exposed to significantly increased concentrations of wood emissions to determine whether they are harmful or harmless.

Beforehand, the planned study was submitted to an ethics committee for approval. The materials studied were freshly dried pinewood and freshly produced OSB made from pinewood chips. Both had been identified in preliminary trials as emitting particularly copious amounts of VOCs.

Both materials were used to fill a large test chamber with VOC concentrations that were significantly greater than both the recommended levels and the normally measured concentrations of wood VOCs. In 10 test series involving up to 25 persons, no evidence was found to suggest that exposure to VOCs from wood and OSB has any detrimental effects on health. The monitored health parameters and symptoms included lung function, inflammatory responses, irritation of the mucous membranes of the eyes and throat, headaches, malaise, nausea and dizziness.

The test subjects themselves only noticed the intensive wood smell, but overwhelmingly perceived it as pleasant. The study findings have been published in international journals and can also be read on the website of the institute in Freiburg. Parallel to it, tests were carried out on human lung cell cultures with much higher concentrations, e.g. up to 1.8 grams of α -pinenes per cubic metre of air. These tests also failed to produce any evidence that realistic indoor concentrations can affect health.

The study findings may be summarised as follows:

The study has furnished robust data on the effects of emissions from wood and wood-based products. The data, which were captured from healthy adults without violating the ethical principles established in scientific practice, also permit conclusions to be drawn for sensitive groups such as chil-

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dren and diseased individuals by applying acknowledged uncertainty factors. In the light of these study findings, the concentrations of VOCs specific to wood and wood-based materials that can be measured in actual rooms pose no recognisable risks to their occupants, especially considering that when these materials are properly installed the concentrations of specific VOCs are considerably lower than in the study and in most cases quickly fade and disappear.

This probably makes wood the first building material for which there exist scientifically verified data on its toxicity to humans. Although this does not prove that wood is healthy or promotes health, it does demonstrate that, when properly used, wood and wood-based products are highly unlikely to pose indoor health risks.

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