Formaldehyde From Flooring: Comparison of Emission Testing and Indoor Air Testing

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With the recent headlines and heightened awareness of formaldehyde off-gassing from wood flooring, it is useful to understand the differences between "emissions" testing of samples of flooring and "air testing" of the general indoor area where the flooring is located.

CARB-2 testing is required for emissions testing of flooring materials in California. CARB-2 is short for Phase 2 of the California Air Resources Board (CARB) airborne toxic control measure to reduce formaldehyde emissions from wood products and specifies chamber testing (e.g., ASTM E1333-96(2002)) for formaldehyde emissions. The conditions specified by these methods, e.g., time, ventilation rate, temperature, humidity, etc., are critical factors in the resultant emissions data. Typical acceptable amounts of formaldehyde emission from various materials range from 50 ppb (hardwood/plywood veneer core) to 130 ppb (thin medium density fiberboard (MDF)).

It is important to recognize that formaldehyde detected in large chamber tests are solely from the material being tested. It is also important to recognize that once the material is installed in a home or business, the formaldehyde from these materials is diluted by air volume and the amount of formaldehyde detected in the general indoor area is impacted by humidity levels, ventilation, temperature, size of the room, and the presence of other sources of formaldehyde. An additional factor is the amount of time since installation of the flooring, since formaladehyde emission levels from the flooring will dissipate over time. Therefore, indoor air testing is more representative of what occupants in the area are exposed to.

Indoor air testing involves collecting a sample from the area being tested and determining the formaldehyde levels by an acceptable analytical method. Ultimately, the level of formaldehyde determined using the indoor air testing method is an accurate assessment of "snapshot" exposure to formaldehyde from multiple sources under conditions typical for that location.

One must consider that a flooring material that yields an elevated CARB-2 test result may yield a low indoor air test result based on the physical criteria listed above. Likewise, in a tightly sealed room with low ventilation and high humidity conditions, a flooring material that passes the CARB-2 test may yield an elevated indoor air testing result. All of this information must be considered before determining the next course of action, especially regarding removal of the flooring. Further information about CARB guidelines related to composite wood products can be found at the CARB website (http://www.arb.ca.gov/toxics/compwood/compwood.htm).