

Public Health Implications of Chinese-manufactured Drywall



The Agency for Toxic Substances and Disease Registry (ATSDR) has examined whether breathing sulfur compounds released into the air from problem drywall posed a health hazard. This factsheet explains how ATSDR conducted this evaluation, what we found, and what steps you can take if you experience symptoms that you believe are associated with problem drywall.

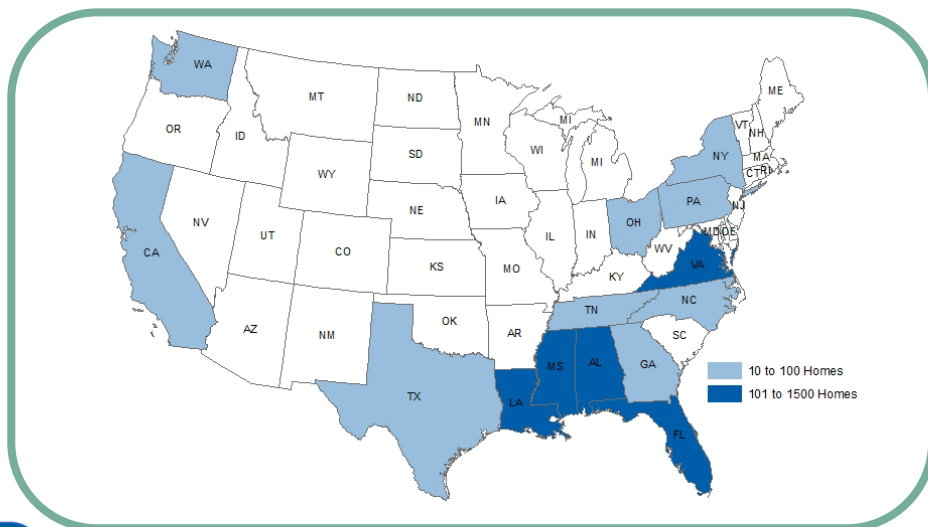
Background

Drywall from China was imported into the U.S. from 2006 to 2008 to address the shortage of construction materials created by the 2004 and 2005 hurricane seasons and the national demand for new home construction. Beginning about 2008, people living in homes built between 2001 and 2008 began reporting health issues. People also reported corrosion of certain metal components in their homes. The U.S. Consumer Product Safety Commission (CPSC), the lead federal agency for problem drywall, began investigating the problem in 2009 with ATSDR and other agencies. In 2011, ATSDR and CPSC agreed that more could be done to estimate exposures to sulfur compounds emitted from problem drywall and identify possible health risks from those exposures.

What is Problem Drywall?

Residents in homes with problem drywall report having health issues like respiratory irritation, and other problems such as copper corrosion and sulfur odors.

People can figure out whether their drywall meets the Consumer Product Safety Commission (CPSC) case definition by following the [guidance for identifying problem drywall](#).

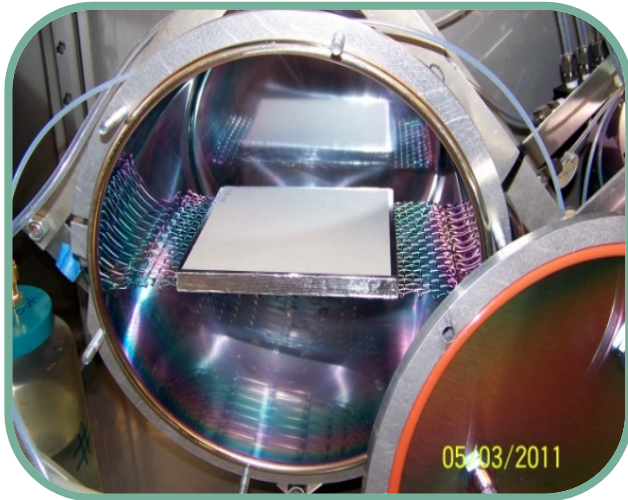


States where problem drywall has been reported to CPSC (as of April 2014)



Measuring Sulfur Compound Emissions from Drywall

In 2009, the Lawrence Berkeley National Laboratory (LBNL) measured sulfur compound emissions from 30 drywall samples using funding from CPSC. These drywall samples were manufactured in China during 2005, 2006, and 2009 and in North America during 2009. LBNL measured several sulfur compounds emitted from drywall, including: hydrogen sulfide, methyl and ethyl mercaptans, carbonyl sulfide, dimethyl sulfide, and sulfur dioxide.



Test chamber used by the Lawrence Berkeley National Laboratory to measure emissions from drywall samples

To measure emissions, LBNL placed a drywall sample into a sealed stainless steel chamber and measured the sulfur gasses coming out of the drywall. They used this information to calculate an emission rate for each sulfur gas they measured.

LBNL measured sulfur compound emissions on all 30 samples in 2009. In 2010, LBNL retested emissions from four of the

samples manufactured in China and one of the samples manufactured in North America.

Estimating Health Risk from Sulfur Compounds in Indoor Air

ATSDR contracted with the Georgia Institute of Technology (Georgia Tech) to estimate the levels of sulfur compounds that might be found in the air of a home built using the drywall samples tested by LBNL. Georgia Tech took the emissions rates measured by LBNL and used mathematical models to estimate what the indoor air concentrations of sulfur compounds might be in a square box (to simulate a room) where the sides and top were made with the drywall samples.

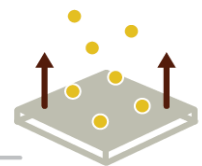
ATSDR then compared these estimated indoor air concentrations to health-based comparison values and scientific studies to determine whether people's health would be at risk from breathing indoor air in a home built with the drywall samples. (Comparison values are health guidelines set well below levels that are known or anticipated to result in adverse health effects.)

Findings

People who were exposed to sulfur compounds emitted by some drywall manufactured in China may have experienced health effects.

Emission Rate

How fast sulfur compounds come out of a piece of drywall

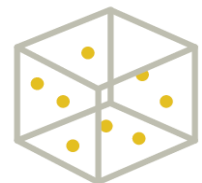


Measured by Lawrence Berkeley National Laboratory



Indoor Air Concentration

The amount of sulfur compounds in the air of a room made with that drywall

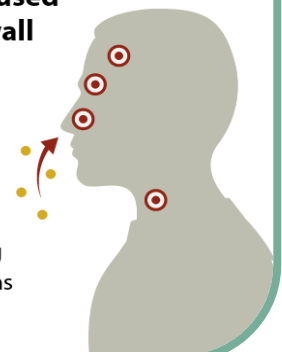


Modeled by Georgia Institute of Technology



Health Effects Caused by Problem Drywall

- Headaches
- Irritation of the eyes, nose, and throat
- Feeling tired
- Problems controlling respiratory conditions (like asthma)



The estimated concentrations of sulfur compounds in indoor air emitted from drywall samples manufactured in China in 2005 and 2006 were a public health concern at the time of testing (2009 and 2010). These levels are consistent with metal corrosion observed in homes with problem drywall. Sulfur compound emission rates increased with both temperature and humidity.

Sulfur compound emissions from drywall samples decreased between the 2009 and 2010 testing. This suggests that emissions likely were higher when the drywall was first manufactured in 2005 and 2006. Exposures may have been higher when the drywall was newly manufactured and installed.

The available data cannot be used to determine if people are still being exposed to sulfur compounds at levels that could cause health effects.

The drywall samples selected by CPSC for the emissions tests that were manufactured in North America in 2009 do not appear to emit sulfur compounds at levels of health concern.

ATSDR's findings and conclusions cannot be generalized to all drywall manufactured during the period of concern. The laboratory results used for this report are based on a small number of drywall samples.

Health risks associated with exposures to sulfur compounds

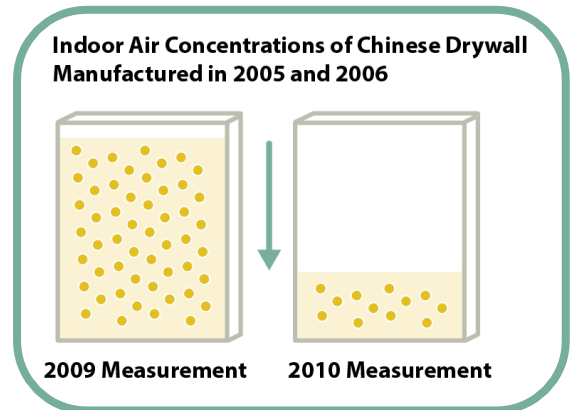
Exposures to sulfur compounds at the levels estimated from Chinese drywall manufactured in 2005 and 2006 may be associated with such effects as:

- Headaches,
- Irritation of eyes, nose, and throat,
- Feeling tired, and
- Problems controlling respiratory conditions (like asthma).

Odors associated with sulfur compounds emitted by problem drywall could disrupt daily activities and cause stress.

Recommendations

- If residents are concerned, the first thing they should do is look at their drywall and see if it meets the CPSC [problem drywall case definition](#).
- If residents have problem drywall, they should follow CPSC/HUD's [remediation guidance](#). This guidance calls for replacement of all problem drywall, smoke and carbon monoxide alarms, and most electrical distribution components and sprinkler heads.
- If people have had or currently have health symptoms or health effects they feel are associated with living in a home with problem drywall, they should provide the ATSDR health consultation report to their health care provider.



More information on the hazards and removal of problem drywall

ATSDR's Drywall Website
www.atsdr.cdc.gov/drywall

Consumer Product Safety Commission's Drywall Information Center
<http://www.cpsc.gov/en/safety-education/safety-education-centers/drywall-information-center/>