



Chinese Drywall: Facts, Science and Outlook

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Introduction

Over the past nine months, a new mass tort has developed related to imported Chinese drywall. This article outlines the facts related to this new mass tort; addresses the science that is rapidly developing and offers some perspectives on this problem. Given the rapidity with which this mass tort has developed, this article draws on the most current information available published online by scientific and legal practitioners.

Background & Timeline

New home construction surged in the first part of this decade. Domestic producers of drywall had great difficulty meeting demand. This problem grew dramatically worse in the aftermath of Hurricane Katrina and soon, there was a shortage of domestically produced dry wall. During the shortage, builders and contractors purchased and installed drywall manufactured in China from a variety of manufacturers. Starting in Florida in June 2008, homeowners started to complain to state authorities of a “rotten egg” or sulfur-like smell emanating from their homes.¹ Complaints soon spread around the country. Now, as many as 18 states have noted owner complaints of “rotten egg” smell, corrosion of air conditioning and electrical equipment, and a variety of health ailments.²

The problem has drawn Congressional attention. This spring, Senators Bill Nelson (D-Fla.) and Mary Landrieu (D-La.) sponsored legislation to stop future Chinese drywall installation and recall existing Chinese drywall. The Senators also requested that the Consumer Products Safety Commission (CPSC) conduct an investigation in conjunction with the National Institute for Standards and Technology and the Environmental Protection Agency (EPA) into the origin of the problem and the potential for human health effects from Chinese drywall.³

The Scope of the Problem

The EPA's initial analysis revealed sulfur, strontium, and iron found in Chinese drywall as potential contaminants.⁴ The report stresses that the analysis was conducted over a very small sample size and was, therefore, not necessarily representative of all drywall products.⁵ However, in comparing Chinese to domestic drywall, the EPA found:

Element	Chinese Drywall	Domestic Drywall
Sulfur	83 ppm/199 ppm	0 ppm
Strontium	2,750 ppm/ 2,760 ppm	244 ppm to 1,130 ppm
Iron	244 ppm to 1,130 ppm	841 ppm to 1,130 ppm

The EPA also found two organic compounds in the Chinese drywall associated with acrylic paints: two propanoic acids between at 50 ppm and 92 ppm. The EPA is conducting additional analysis on samples of dry wall for calcium sulfate, strontium sulfide, strontium sulfate, pyrites, and iron oxide, with results pending.

Human Health Effects and Exposure Limits

A number of persons claim personal injury from exposure to Chinese drywall. Their complaints include coughing, irritated eyes, sneezing, sinus problems, sore throat, asthma, difficulty breathing, runny nose, bloody nose, fatigue, headaches, dizziness and nausea. As of May 2009, no government or private agency has identified a definitive causal link between exposure to Chinese drywall and identifiable health effects.

The focus of human health effects is on two sulfurous gases. Initial analysis indicates that Chinese drywall emits sufficient amounts of sulfurous gas to be detected by the human nose, but not to cause physical harm. Most complaints have related a faint or strong smell of sulfur. For reference, the sense-of-smell recognition threshold for one of the two sulfurous gases, hydrogen sulfide (H₂S), is **0.00047 ppm**.⁶

The OSHA Permissible Exposure Limit for hydrogen sulfide is 20 ppm Time Weighted Average; peak exposures no more than 50 ppm. The American Conference of Governmental Industrial Hygienists (“ACGIH”) Threshold Limit Value for hydrogen sulfide is 10 ppm, 14 mg/m³ Time Weighted Average and 15 ppm, 21 mg/m³ Single Time Exposure Limit. The NIOSH Recommended Exposure Limit (REL) is 10 ppm, 15 mg/m³ ceiling for 10 Minutes, and its Immediate Danger Life and Health rating is 100 ppm.⁷

The second sulfurous gas at the center of the research is sulfur oxide. The OSHA permissible exposure limit (PEL) for sulfur dioxide is 5 ppm, 13 mg/m³ (general industry) using a Time Weighted Average.⁸ The ACGIH Threshold Limit Value (TLV) for sulfur dioxide is 2 ppm, 5.2 mg/m³ Time Weighted Average; 5 ppm, 13 mg/m³ Single Time Exposure Limit. The ACGIH does not classify sulfur dioxide as a human carcinogen.⁹

The National Institute for Occupational Health and Safety (NIOSH) considers sulfur dioxide Immediately Dangerous to Life or health (IDLH) at 100 ppm. The FDA generally recognizes sulfur dioxide as safe when used in accordance with good manufacturing practices as a preservative of fruits or vegetables.

With sufficient exposure, both hydrogen sulfide and sulfur dioxide may harm the eyes, skin, and respiratory system. However, a human being would smell sulfur gas long before they reach the threshold for minor human health effects of sulfurous gas.

Property Damage Caused By Chinese Drywall

The primary problem associated with Chinese Drywall is property damage caused by sulfur corrosion of copper HVAC components and exposed copper wiring. Heat and moisture activate the chemical

reactions that release the sulfur gases. This is why these complaints have first arisen in warm, moist climates. According to an early study commissioned by the Florida Department of Health, strontium sulfide or iron sulfide in the drywall reacts with moisture in the air to produce hydrogen sulfide gas and sulfur oxide.¹⁰ Hydrogen sulfide is a known oxidizer.¹¹ Commonly used in electrical wiring and in HVAC piping, copper alloys possess limited resistance to sulfur environments, including moist hydrogen sulfide (H₂S) and sulfur oxide (SO₂).¹² Additionally, Chinese Drywall may not meet ASTM standards because it may continue to disintegrate as the chemical reactions continue over time and the high level of organic contaminants weaken the drywall.¹³ Private and governmental firms are conducting more research on the long-term property damage caused by Chinese drywall.

Origin of the Problem

Four different theories exist as to the causes of the sulfur gas emission:

1. sulfur-based fungicides used in transit to prevent mold causes release of sulfur gas;
2. The gypsum rock mined in China contains high sulfur content;
3. The gypsum open pit mines in China are contaminated with high sulfur run off from nearby farms; and
4. Fly ash from coal-fired power plants is used to create synthetic gypsum.¹⁴

The EPA and CPSC are currently studying the issue and have not released any definitive studies on the origin of the Drywall problem.

Remediation Options

The consensus among experts is that Chinese Drywall must be removed and replaced with domestic drywall. In South Florida, Lennar Corp. has aggressively moved to head off potential litigation by temporarily relocated home owners while replacing the Chinese drywall.¹⁵

Other options include sealing off drywall cavities from humidity or heat, or fogging material surfaces with an oxidizing agent, such as bleach or Oxine, which may eliminate sulfur dioxide to trace levels. This method has been used in the past for similar problems caused by green mold.¹⁶

Detection

Several firms have developed tests to determine if wall board contains Chinese Drywall:

	EMSL Analytical, Inc. (NJ)	Columbia Analytical Services, Inc. (WA) ¹⁷
Compounds Evaluated	iron disulfide (FeS ₂ pyrite), hydrogen sulfide (H ₂ S), carbonyl sulfide, sulfur dioxide (SO ₂), and carbon disulfide (CS ₂).	orthorhombic cyclooctasulfur (S ₈) (Columbia Analytical claims this sulfur allotrope is a unique and reliable marker only found in drywall imported from China.)

Methodology	X-ray Fluorescence (XRF) or Volatile Organic Compound analysis using an environmental chamber study by the EPA's "TO-15" method.	gas chromatography/mass spectrometry (GC/MS)
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Governmental agencies and private firms continue to research causation and detection behind the problem of Chinese drywall.

The Litigation Landscape

Litigation has been increasing exponentially with home owners seeking redress from builders directly, suing contractors, and making insurance claims. These plaintiffs are typically making claims for negligence, strict liability for defective products, breach of implied and express warranties, breach of contract, state-specific consumer protection acts, fraudulent concealment/misrepresentation, and private nuisance.¹⁸

Plaintiffs started by suing large builders like Lennar Corp. and South Kendall Construction Corp., but have begun suing smaller, more local builders as well. Two Plaintiffs filed a Motion with the Judicial Panel on Multidistrict Litigation to consolidate and centralize all currently-filed and potential future cases in the Southern District of Florida. The Motion was argued to the Panel on May 27, 2009 at Louisville, Kentucky.¹⁹

One major issue is whether the "pollution exclusion", common to commercial insurance policies, excludes Chinese drywall claims. A recent 5th Circuit decision illustrates the potential litigation over builder's insurance coverage of damages caused by the gas in Chinese drywall. In *Nautilus Ins. Co. v. Country Oaks Apts. Ltd*, the Court held that the plaintiff's claims stemming from carbon monoxide poisoning fell under the "pollutant" exclusion in the insurance policy. The exclusion covered "Bodily injury or property damage which would not have occurred in whole or in part but for the actual, alleged, or threatened discharge, dispersal, seepage, migration, release, or escape of pollutants at any time."²⁰ In construing the terms of the policy, the Court decided that the emission of carbon monoxide from a furnace into an apartment unambiguously satisfied the exclusion's requirement of a "discharge, dispersal, seepage, migration, release, or escape," and further ruled it was irrelevant that a reasonable insured might not expect this result.²¹

Approaches

Potential defendants may find guidance in prior mass tort claims based on exposure to silica, asbestos, and mold. The well-known defenses in those mass torts may be valuable in Chinese drywall litigation. First, general causation must be proven and, as yet, there is no clear causation established for either property damage or health effects. Correlation in time is not causation. Plaintiff's claimed health effects, in particular should be carefully examined. Sulfur dioxide and hydrogen sulfide are well known features of the industrial landscape. There is extensive research on the levels that cause injury and it is reasonably clear that such levels would be notable for strong sulfur smell. Few plaintiffs make such allegations.

Additionally, defendants need to manage the media interest in this litigation. Contrasting asbestos with silica, one sees that the asbestos defendants never established an industry explanation and story for the extensive use of asbestos and never directly challenged plaintiffs' attorneys for bringing baseless claims. Consequently, the litigation has progressed for more than 30 years and 67 American

corporations have been bankrupted by asbestos litigation. By contrast, when silica litigation began to explode, the defendants' attorneys (most, old asbestos hands) aggressively challenged the plaintiff's medicine and claims solicitation methods. As a result, a federal judge issued a scathing 249 page order and the litigation against silica defendants collapsed. Defendants in Chinese drywall case can draw lessons from what had happened in other mass torts.

Similarly, asbestos litigation provides the warning that settling smaller claims early will only lead to more claims as plaintiffs' attorneys use proceeds from early settlements to recruit plaintiffs otherwise hesitant to pursue legal claims. Lastly, defendants should not ignore the hybrid nature of these claims. By bringing property damages and health effect claims, plaintiffs' attorneys double their burden. Defendants need to make the plaintiffs prove up both cases.

Conclusion

By some estimates, 100,000 to 300,000 homes have Chinese drywall. The cost of remediating each home is tens of thousands of dollars, not including losses to personal property (*i.e.* flat screen TVs; air conditioning units etc). Human health claims will add to the potential exposure. The overall industry exposure is in the hundreds of millions of dollars.

Defendants would do well to address this litigation aggressively and early. Right now, the science and medicine are not fully developed. Defendants should immediately develop a strategy to resolve legitimate claims quickly while fighting weak or doubtful claims.

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