

Elements of Corrosive Drywall Damage

Chemistry

Climate

Confinement

Damage Engineering INSIGHTS

commercial • energy • infrastructure • manufacturing • habitational

Corrosive Drywall – “Chinese Drywall”

Florida’s Department of Health uses the term “corrosive drywall” to refer to Chinese drywall. Chemical reactions can damage exposed metal surfaces if the drywall *chemistry*, *climate* and *confinement* circumstances align.



Drywall delivery



Gypsum plant

Chemistry

The corrosive properties of this drywall come from its particular form of gypsum.

- Not all gypsum is the same because gypsum formed on the floor of ancient seas: the salts, minerals, chemicals and organic residue from sea life that lived eons ago. Seas differed then as they do now.
- Not all drywall coming out of China falls into the corrosive category.

The drywall in the corrosive category is reportedly from a mining complex in China’s Shandong province. Gypsum removed from this mining complex in China or at least from a vein in the mine has high levels of sulfur and inorganic compounds, which can off-gas in the temperature ranges that can be encountered in buildings, particularly in some climates.

The drywall was reportedly only manufactured in 1/2" thicknesses which greatly reduces the likelihood of encountering this problem at commercial and industrial sites where fire codes typically require 5/8" drywall.

Climate

Prevailing hot, humid conditions can facilitate corrosion because:

- High average temperatures drive up off-gassing and chemical reaction rates.
- The moisture from high levels of humidity can mix with some gaseous sulfur-containing compounds and form a sulfuric acid (H_2SO_4) mist or vapor.

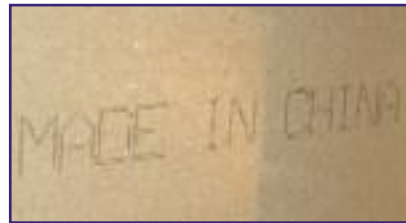
Thus a number of factors combined to make subtropical south Florida the prime location for public recognition of “Chinese drywall”: the long, hot and humid Floridian summers, massive rebuilding after the 2004 and 2005 hurricane seasons, and the global building boom which increased importation of drywall.

While Florida and Louisiana dominate the reported cases there is a scattering of cases throughout the United States.

Confinement

The off-gassing products even in sub-tropical conditions will typically be carried away by normal ventilation. It takes confinement such as wall cavities where the gases can accumulate to levels where they can significantly react with exposed metal surfaces forming:

- Black copper compounds (on copper surfaces).
- De-zincified galvanized components such as metal studs which can ultimately corrode through.



The metal surface needs to be truly exposed to react significantly. Insulation or even a price tag glued to the surface can be an effective barrier.

Links

The knowledge in the public domain is rapidly expanding. To keep up with it, you may find these links helpful.

- Florida Department of Health
www.doh.state.fl.us/environment/community/indoor-air/drywall.html
- Louisiana Department of Health & Hospitals
www.dhh.louisiana.gov/offices
(click on “Drywall Information”)
- University of Florida William W. “Bill” Hinkley Center for Solid and Hazardous Waste, College of Engineering symposium website host
www.drywallsymposium.com

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