



CHINESE DRYWALL ALERT 7-01-09

We continue to increase our knowledge in regard to types of Chinese drywall; properties of Chinese drywall; as well as appropriate test procedures for characterizing and identifying Chinese drywall.

In this report we: • Identify a different type of Knauf Chinese drywall • We publish new test data that shows the significant impact of humidity and temperature on Chinese drywall off gassing, and • We review the status of the Florida Department of Health Chinese drywall studies. Attached also is a timeline that provides a history of significant Chinese drywall events.

There is more than one Knauf-labeled problem Chinese drywall. The commonly found Knauf drywall (in South Florida) shown below has a dot matrix Knauf name (not logo) stamped on the back which is printed in dark blue; is stamped Knauf Tianjin; and has a blue and yellow edge tape that includes the Knauf logo. We call this Knauf Tianjin. CERTIFIED TO ISO 9001 means nothing. This is not the same as ISO 9001 CERTIFIED.



The less common Knauf drywall (in South Florida) has metric numbers on the back of the board that is stamped with solid (not dot matrix) light blue ink with Knauf logo; a date code of June 2006; a different color (blue, grey and white) edge tape and is called "Natural Gypsum." We call this product Knauf Natural. See pictures below.



From the Knauf web site, the official logo for Knauf is shown to the right which in style and color matches closely with the Knauf Natural drywall.



As shown elsewhere, the Knauf Tianjin sourced gypsum is heavily contaminated with organic material (which we have identified as invertebrate fecal pellets) giving it a dark color. Knauf Natural is a noticeably whiter color than the Knauf Tianjin. Knauf Natural appears to have a less of a detectable odor than the Knauf Tianjin when I put a piece to my nose.

Knauf Natural material did not substantially off gas when a 2"x2" piece was lab tested out of the zip lock bag the material was shipped in. However, using an improved procedure to better mimic conditions of the hot and humid Florida summer, Centek Labs retested at higher temperature and humidity. Under these conditions, gas emission was literally off the charts for both the Knauf Natural and Knauf Tianjin products.

Both products show a mix of elevated carbon disulfide, carbonyl sulfide and hydrogen sulfide that we have found to be characteristic of contaminated Chinese drywall.

See results below for Knauf Natural and Knauf Tianjin drywall.

Centek Laboratories, LLC

Date: 23-Jun-09

CLIENT:	Ceritified Mold & Allergen Free Corp	Client Sample ID:	Knauf (Natural)			
Lab Order:	C0906023	Tag Number:				
Project:	Headspace	Collection Date:	6/5/2009			
Lab ID:	C0906023-001A	Matrix:				
Analyses	Result	**Limit	Qual	Units	DF	Date Analyzed
LOW LEVEL SULFURS BY TO-15		TO-15				Analyst: LL
Carbon disulfide	11000	20	E	ppbV	4	6/17/2009 9:42:00 PM
Carbonyl sulfide	970	20		ppbV	4	6/17/2009 9:42:00 PM
Hydrogen Sulfide	690	20		ppbV	4	6/17/2009 9:42:00 PM
Surr: Bromofluorobenzene	96.8	70-130		%REC	1	6/17/2009 8:58:00 PM
NOTES:						
E - Estimated value. The amount exceeds the linear working range of the instrument.						

Centek Laboratories, LLC

Date: 23-Jun-09

CLIENT:	Ceritified Mold & Allergen Free Corp	Client Sample ID:	Knauf (Tianjin)			
Lab Order:	C0906023	Tag Number:				
Project:	Headspace	Collection Date:	6/5/2009			
Lab ID:	C0906023-002A	Matrix:	AIR			
Analyses	Result	**Limit	Qual	Units	DF	Date Analyzed
LOW LEVEL SULFURS BY TO-15		TO-15				Analyst: LL
Carbon disulfide	11000	20	E	ppbV	4	6/17/2009 11:11:00 PM
Carbonyl sulfide	690	20		ppbV	4	6/17/2009 11:11:00 PM
Hydrogen Sulfide	79	5.0		ppbV	1	6/17/2009 10:27:00 PM
Surr: Bromofluorobenzene	97.0	70-130		%REC	1	6/17/2009 10:27:00 PM
NOTES:						
E - Estimated value. The amount exceeds the linear working range of the instrument.						

The level of off gassing shown above is substantial. For carbon disulfide the levels exceed 11,000 parts per billion. These levels are not indicative of the levels to be found in homes. However they do show that the levels of sulfur compounds off gassed by Chinese drywall can be substantial when assessed under elevated humidity and temperature conditions such as found in many regions of the south in the summer.

Earlier studies by CTEH for Knauf and by ENVIRON for Lennar were performed during cooler / dryer months that significantly reduces drywall off gassing levels. Below we reproduce a statement from Lennar that was based on conclusions drawn from ENVIRON testing performed during the cool/dry season.

LENNAR STATEMENT IN RESPONSE TO MEDIA INQUIRIES

The following statement is by Lennar Division President Darin McMurray: December 22, 2008

Lennar hired ENVIRON International, a leading global environmental firm, to conduct extensive air sampling in more than 50 homes. The environmental scientists and toxicologists at ENVIRON have confirmed that the presence of sulfur compounds inside the homes is far lower than even the most stringent government health and safety standards. As a result, there is no indication that the substances pose any health risks to our homeowners.

It is true, that at this point in time there are no *proven health problems* as a result of living in a Chinese drywall home. But certainly there have been quite a few complaints of burning eyes, sore throats, etc. Whether the burning eyes and sores throats are from Chinese drywall or other factors such as hidden mold or dust mites still needs to be determined.

Even though there are no proven health problems from the Chinese drywall homes, given the high levels of sulfur gas emissions from Chinese drywall either measured directly from pieces of drywall at the lab or measured by us taking gas collection samples from homes (see our Chinese Drywall Alert 6-24-09) we do not believe that anyone should be making the statement that living in Chinese drywall homes poses no health risks to homeowners.

ENVIRON could not measure elevated sulfur gases relative to the outside in ANY homes even though homes were not habitable due to the smell of sulfur gases. Drawing conclusions of no health risks from such dubious test results makes no sense. Again we are not saying that in the long run that this may not turn out to be true – simply that the information available TODAY would seem to not support making such a strong conclusion that there are *no health risks to homeowners*.

COMMENTS AND SPECULATION:

Can Good Drywall Turn BAD? A number of homes have drywall from several sources. Due to the very high level of off gassing seen from lab testing Chinese drywall under elevated temperature and humidity, one would expect to find that non-problem drywall in close proximity to contaminated drywall could absorb a certain amount of odors emitted from the contaminated drywall.

This is also the assumption of builders who are removing all drywall from problem homes, both problem Chinese drywall and non-problem drywall due to claimed cross contamination. Further testing is warranted.

Test Results May Shed Light on Source of Contamination: Knauf announced that they had stopped using the Tianjin gypsum mine in 2006. Given the change in the way the drywall is stamped as well as the change in end wrap, gypsum color and detectable odor – one might speculate that the Knauf Natural drywall (made mid 2006) was from another source than Knauf Tianjin.

And yet Knauf Natural drywall is still off gassing similar sulfur compounds to Knauf Tianjin. It is very hard to believe that Knauf would move to another mine that had similar sulfur compound contamination as the Tianjin mine. It costs a great deal of money to change mines. Why change from one contaminated gypsum source to another contaminated source. And by coincidence the new mine results in off gassing a similar mix of sulfur gases! This I find to be too much of a coincidence to believe. If the Knauf Natural is not from the Tianjin mine but is also off gassing sulfur in a similar mix to Knauf Tianjin, then one possible explanation is that Knauf is adding sulfur compounds to the gypsum which is often done to prevent mold and bacterial growth on the drywall. Sulfur compounds have excellent antimicrobial properties and are being used world wide for both their anti-bacterial as well as anti-fungal properties.



Why add antimicrobials to drywall?

1. Very humid climate in many parts of China and no AC – conditions highly conducive to mold growth.
2. As we know, the Knauf drywall has a significant organic, dark colored, content that we have determined to be invertebrate fecal pellets (crab poop). There is actually such a high degree of this contaminant that the Knauf gypsum core is grey in color and not pure white like the US materials. This high level of fecal contaminant will make this product particularly susceptible to mold and bacteria

growth. Add to that a long ocean voyage transporting the material to the US in non-air conditioned, hot and humid ship storage hulls, and you have an excellent reason to be concerned about microbial growth. There is no doubt that the contaminated Chinese drywall is highly mold resistant. We have tested it.

It may be that Knauf added some but did not add as much sulfur to the drywall produced and labeled as Knauf Natural because there was less concern about mold and bacteria growth due to lower level of organic contaminants in this material than Knauf Tianjin.

Understand that major US drywall manufacturers add anti-microbial chemicals to certain lines of drywall to make them mold resistant. So this speculation that Knauf is adding sulfur compounds to their drywall to make it microbial resistant is not completely far fetched.

Another possibility may be that Knauf Natural still comes from the contaminated Tianjin mine but the mining process during 2006 had been improved to reduce the amount of organic contaminants in the gypsum and also reduce the level of sulfur contaminants. Hence the whiter color and lower level of odor but still being from Tianjin – Knauf Natural continues to off gas a mix of sulfur dioxide, carbonyl sulfide and hydrogen sulfide just like the earlier Knauf Tianjin.

And yet a third possibility in no way based on anything but a guess ... would be that the Knauf Tianjin was private labeled drywall produced for Knauf. This could possibly explain why the Knauf Tianjin board does not use a standard Knauf logo on markings stamped on the back of the board, nor does it use Knauf logo colors on the edge tape.

Update on State DOH Testing:

United Engineering Results:

There are no new test results published since March 17, 2009 by United Engineering where they found higher levels of sulfur gas release in USG drywall than in Knauf drywall. We have retested many times and find these results completely erroneous leading to confusion and more confusion. These erroneous results should be retracted.

State Attorney General's Office: The following alert was generated by the attorney general's office:

TALLAHASSEE, FL – Attorney General Bill McCollum today (April 23, 2009) issued a consumer advisory to Florida homeowners ...

The Attorney General noted that a homeowner can determine if defective drywall is present in his or her home by asking the homebuilder or a qualified air conditioner technician to conduct a professional visual inspection. The presence of defective imported drywall cannot be determined by "testing" the air in the home.

The attorney general recommends asking the builder or an AC contractor to determine if there is Chinese drywall in the home. Don't hire a firm like ours with a \$5M Professional Liability policy that covers drywall testing to test the air, better to just ask an AC contractor! Is the attorney general asking you to hire a state licensed AC contractor to perform services for which they have no training and no insurance? Sounds like it! Confusion leading to more confusion. This erroneous statement should be retracted.



Florida DOH Testing in Parkland:

June 10, 2009 The Florida Department of Health on Wednesday completed three days of air-quality sampling at a Parkland home built with defective Chinese drywall but results will take several months. *What takes several months? You can get 24 hour turn around on testing.*

The samples have been sent for analysis to private laboratories in Lakeland and Atlanta. *Do these labs have the equipment to test low levels of sulfur gases? Are the firms that are taking the samples qualified to take such samples? Do they have Errors & Omissions insurance coverage for such testing?*

The air-quality testing will cost the state between \$40,000 and \$50,000, Krause said. *Why so much money? 2 weeks ago we took air samples from a South Florida problem home, flew up to Centek in Syracuse that evening, and they ran the samples the next day while we waited. Total cost including air fare, hotel, and testing was under \$1K.*

What does all this mean? There is quite a bit of confusion and misinformation. One thing we do know is that it is best to remove the problem drywall from homes as quickly as possible to reduce any potential for home owner related complications.

Sincerely,



Gary Rosen, Ph.D.



TIMELINE OF SIGNIFICANT EVENTS RELATING TO IMPORTED DRYWALL

2004-2007

- As early as the end of 2004 problem Chinese drywall appears to have been imported into the US. However, in March 2006 the first very large ship full of Knauf Tianjin contaminated Chinese drywall enters the US. The picture on the right shows Chinese drywall being loaded onto a ship for transport to the U.S.
- Homeowners start to complain of "rotten egg" smell. By the end of 2006 major builders no longer allowed Chinese drywall to be used in home construction. But there was still inventory and problem drywall was slipped into stacks of regular drywall a few sheets at a time.
- Knauf says it stopped using the Tianjin mine in late 2006 after the issues arose.



November 2006

- CTEH (Center for Toxicology and Environmental Health) tested Chinese drywall for Knauf. CTEH conclusions: Nothing wrong with the material. They claim that the measured indoor levels are too low to cause any health problems.

June 2008

- Florida Department of Health receives its first call on sulfur odors in homes

August 2008

- Inquiries continued about sulfur odors and copper corrosion. Picture of copper corrosion shown on right.
- EPA considers gypsum as possible source, but not viewed as widespread



September 2008

- ENVIRON starts to investigate homes for Lennar.

October 2008

- ENVIRON Report: October 2, 2008 Meeting in Sarasota regarding sulfur compound emissions from imported gypsum board. According to the report: "ENVIRON presented the results of sampling for reduced sulfur gases in room air from over 30 homes in Southwest Florida. ... no public health concerns associated with the low parts per billion levels of sulfur-containing gas emissions found to date."

November 2008

- Consumer Product Safety Commission contacted

December 2008

- Lennar Division President Darin McMurray states: "The environmental scientists and toxicologists at ENVIRON have confirmed that the presence of sulfur compounds inside the homes is far lower than even the most stringent government health and safety standards. As a result, there is no indication that the substances pose any health risks to our homeowners." (*We believe that the ENVIRON testing was flawed and that this is too strong a statement to have been made.*)

January 2009

- Florida DOH inspects and samples 12 homes
- Lawsuit filed Jan. 30 by Lennar against Knauf Gips of Germany and its Chinese affiliate, Knauf Plasterboard Tianjin, and others.
- Lennar starts to remediate Chinese drywall homes by removing Chinese drywall and replacing with new.
- In January the only point that was generally agreed upon was that Chinese drywall tarnishes copper and corrodes AC coils

February 2009

FL state toxicologist presentation on drywall. With the following conclusions on health issues:

- Available data has not identified levels of corrosive gasses that exceed those recognized as posing a risk to health. (*No health problems.*)
- DOH continues to seek data from all parties regarding occupant exposures to chemicals and secondary hazards resulting from corroded building materials. (*Actually will not post test results from third parties such as ourselves.*)
- In Feb the state toxicologist continued to follow Lennar and ENVIRON's lead that sulfur gases are not detectable and therefore pose no health problems.

March 2009

- Florida DOH released the Unified Engineering study on Chinese drywall. Testing found that USG drywall that has no smell had greater sulfur gas release than Knauf Chinese drywall that smells so bad the homes have to be evacuated. (*This report should be retracted.*)
- ENVIRON informs the state that sulfur is at 20x higher in Chinese Drywall and is the likely cause of the elevated levels of corrosive gas that is corroding the AC copper coils.

- When Knauf was contacted by Time Magazine, the company referred to a statement by its subsidiary, Knauf Plasterboard Tianjin Ltd.: "Any low levels of sulfur compounds present in the air in homes are not a health risk ... The substances identified in testing are in no greater amounts than [in] the air found outside homes or in soil, marshes or the oceans." By TIM PADGETT / MIAMI Monday, Mar. 23, 2009 Time Magazine
- In March, ENVIRON continues to deny that there are elevated levels of sulfur gases in homes compared to the outside air although ENVIRON claims elevated levels of sulfur gases are corroding AC coils. (How is one possible without the other?)

April 2009

- Certified Mold & Allergen Free Corp finishes a comprehensive study comparing 4 different types of Chinese drywall to USG drywall. Inspection techniques were subsequently developed that allow the non-destructive testing of each sheet of drywall in a home to determine which sheets are defective Chinese drywall which are not.
- Certified Mold & Allergen Free Corp determines that the organic contamination in the Chinese drywall gypsum is invertebrate fecal pellets which is a commonly found in sedimentary rock that starts out at the bottom of an ocean. Invertebrate fecal pellets is crab poop.
- Certified Mold & Allergen Free Corp publishes the *Chinese Drywall Q&A* series summarizing what is known and not known about Chinese drywall. At this point in time, we knew that there were at least 4 types of Chinese drywall. 3 including Knauf from Tianjin China that off gas sulfur compounds and one (BNBM) from Beijing that does not smell.
- TALLAHASSEE, FL – Attorney General Bill McCollum today (April 23, 2009) issued a consumer advisory to Florida homeowners: "The Attorney General noted that a homeowner can determine if defective drywall is present in his or her home by asking the homebuilder or a qualified air conditioner technician to conduct a professional visual inspection. The presence of defective imported drywall cannot be determined by "testing" the air in the home." (*This should be retracted. Who is he to say that levels of sulfur gas cannot be determined by testing the indoor air? And why is the Attorney General recommending an AC contractor not trained in detecting Chinese drywall and without appropriate insurance to do home inspections. This is against FLA law!*)
- In April no one had at this point in time measured any elevated level of sulfur gas in any home. ENVIRON had tested over 100 homes that smelled of sulfur gas but did not detect elevated levels of gas in any home. And no one had yet measured high levels of gases being released by drywall pieces tested at the various labs.

May 2009

- EPA published their preliminary drywall sampling analysis. Conclusions: Sulfur contaminants found in Chinese drywall not found in US drywall. Higher levels of strontium found in Chinese drywall than US drywall. Several organic compounds found in Chinese drywall but not found in US drywall. They had no comments on sulfur gas levels in homes or on health issues of Chinese drywall.
- Lennar in a complaint filed in Miami-Dade County stated: ENVIRON provided written assurances to all of the affected homeowners that the conditions identified in their homes would not result in any adverse health effects.
- Certified Mold & Allergen Free Corp submitted samples of 4 different kinds of Chinese drywall and USG drywall to Assured-Bio for analysis. According to their analysis BNB Chinese drywall is equivalent to USG and equivalent to pure gypsum test samples. Knauf and the other two types of problems Chinese drywall contain contaminants that are readily detected using their technology.
- In May no one still had measured any detectable level of sulfur gas in any contaminated home. However, firms including Certified Mold & Allergen Free Corp had started to measure low but detectable sulfur gas release from pieces of drywall.

June 2009

- The Florida Department of Health, visiting a Chinese drywall home in Parkland, FL, started another round of drywall testing. Results are due in 2-3 months.
- Certified Mold & Allergen Free Corp had a busy month:
 - Released *Chinese Drywall Q&A 3.0 Health Alert* where it was disclosed that the plastic collection bags being used by ENVIRON do not work for the collection for sulfur gases. (See pix on right)
 - Visited Centek Labs in Syracuse, NY and documented the testing of Chinese drywall samples that show extensive release of carbon disulfide, carbonyl sulfide and hydrogen sulfide along with the release of a large number of organic (mainly benzene ring based) compounds when tested *under higher heat and humidity conditions typical of summer months in the Florida*. The pattern of gas release looks very similar to that of a land fill: High concentrations of sulfur gases and also high concentrations of organic gases. This is not surprising given that the contaminants include not only sulfur compounds but also enough invertebrate feces to turn the gypsum grey.
 - Released *Chinese Drywall Alert 6-24-09* which for the first time published test results that measured high levels of sulfur gas collected inside a problem Chinese drywall home. The collection and analysis procedure was published so that others could easily start measuring sulfur gas levels in problem homes.



July 2009

- Certified Mold & Allergen Free Corp releases *Chinese Drywall Alert 7-1-09* in which they identify a second type of Knauf Chinese drywall and show that it also off gases high levels of sulfur compounds under temperature and humidity levels similar to the S Florida summer climate.