

SUMMARY OF IDENTIFICATION GUIDANCE FOR HOMES WITH CORROSION
FROM PROBLEM DRYWALL AS OF MARCH 18, 2011

In its continuing effort to provide accurate and helpful information, the Federal Interagency Task Force¹ believes that it is appropriate to update Revision 1 to the Interim Guidance–Identification of Homes with Corrosion from Problem Drywall, August 27, 2010,² to reflect additional information uncovered by the Task Force concerning the installation dates of problem drywall imported from China. Specifically, the CPSC has found a number of homes where problem drywall previously imported from China was not installed in homes until calendar year 2009. Previously, the CPSC believed that all such problem drywall installations were completed by the end of calendar year 2008. In this updated Identification Guidance for Homes with Corrosion from Problem Drywall as of March 18, 2011, the years of installation are adjusted accordingly, to include calendar year 2009.

There are no other substantive changes in this updated Identification Guidance for Homes with Corrosion from Problem Drywall as of March 18, 2011.

¹ All references to the Federal Interagency Task Force in this document refer to the staff of the U.S. Consumer Product Safety Commission (CPSC) and the U.S. Department of Housing and Urban Development (HUD). This is a staff document, and has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission or the Department.

² <http://www.cpsc.gov/info/drywall/guidance0827.pdf>.

**Identification Guidance for Homes with Corrosion
from Problem Drywall as of March 18, 2011**³
**by the U.S. Consumer Product Safety Commission
and the U.S. Department of Housing and Urban Development**

March 18, 2011

Executive Summary

The identification guidance was first revised on August 27, 2010, to reflect a change in the understanding of the usefulness of strontium as a marker to confirm the presence of problem drywall. The August 2010 revision relied upon the draft report prepared by the CPSC's contractor, Environmental Health and Engineering (EH&E), on Identification of Problematic Drywall: Source Markers and Detection Methods, May 28, 2010, available at www.DrywallResponse.gov. The identification guidance is being updated further to reflect additional information uncovered by the Task Force concerning the installation dates of problem drywall imported from China. Specifically, the CPSC has found a number of homes where problem drywall from China was installed in homes during 2009.⁴ Previously, the CPSC believed that all such problem drywall installations were completed by the end of calendar year 2008. In this updated Identification Guidance for Homes with Corrosion from Problem Drywall as of March 18, 2011, the years of installation are adjusted accordingly, to include calendar year 2009. This guidance continues to represent what the Federal Interagency Task Force on Problem Drywall believes is the best approach based upon the information available today. This identification guidance is based primarily on the presence of metal corrosion in homes, as well as other indicators of problem drywall. This version supersedes prior versions of this Guidance. Additional work will continue to validate these methods, and the identification guidance will be modified as necessary.

Identification Method

The identification process requires two steps: (1) an initial or threshold inspection to find visual signs of metal corrosion and evidence of drywall installation during the relevant time period, and (2) the identification of corroborating evidence or characteristics.

Step 1: Threshold Inspection

Visual inspection⁵ must show:

- (a) Blackening of copper electrical wiring and/or air conditioning evaporator coils; and
- (b) The installation of new drywall (for new construction or renovations) between 2001 and 2009.

A positive result for the first step (including both criteria) is a prerequisite to any further consideration.

Step 2: Corroborating Evidence

Because it is possible that corrosion of metal in homes can occur for other reasons, it is important to obtain additional corroborating evidence of problem drywall. Homes with the characteristic metal corrosion problems must also have at least two of these corroborating conditions if the new drywall was

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⁴ Importantly, the drywall installed in 2009 had been previously imported during the years 2006-2007 and does not represent any new importation of problem drywall.

⁵ For example, the Florida Department of Health's Self-Assessment Guide on signs that a home may be affected by drywall-associated corrosion (<http://www.doh.state.fl.us/environment/community/indoor-air/inspections.html>) has questions that may be helpful; mention in this guidance of this or other references does not imply endorsement.

installed between 2005 and 2009. For installations between 2001 and 2004, at least four of the following conditions must be met:

- (a) Elemental sulfur levels in samples of drywall core found in the home exceeding 10 ppm;⁶
- (b) Corrosive conditions in the home, demonstrated by the formation of copper sulfide on copper coupons (test strips of metal) placed in the home for a period of two weeks to 30 days or confirmation of the presence of sulfur in the blackening of the grounding wires and/or air conditioning coils;
- (c) Confirmed markings of Chinese⁷ origin for drywall in the home;
- (d) Elevated levels of hydrogen sulfide, carbonyl sulfide, and/or carbon disulfide emitted from samples of drywall from the home when placed in test chambers using ASTM Standard Test Method D5504-08 or similar chamber or headspace testing;⁸ and
- (e) Corrosion of copper metal to form copper sulfide when copper is placed in test chambers with drywall samples taken from the home.

Collecting evidence of these corroborating conditions, in some cases, will require professional assessors and/or testing by analytical laboratories.

⁶ Note that a preliminary screening for strontium levels exceeding 1,200 parts per million may be useful to identify boards to test for elemental sulfur. The Task Force emphasizes, however, that such preliminary screening for strontium does not necessarily indicate the presence of problem drywall, rather, only that additional testing in those areas may be advised.

⁷ This does not imply that all Chinese drywall or that only Chinese drywall is associated with these problems, but that among homes with the characteristic corrosion, Chinese drywall is a corroborating marker for the characteristic problems.

⁸ ASTM International. Standard D5504-08: Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence. 2008. <http://www.astm.org/Standards/D5504.htm>. Subsequent revisions by ASTM of this standard will be considered to be “similar chamber or headspace testing” methods.

Detailed Description

March 18, 2011

Introduction

This updated identification guidance represents what the Federal Interagency Task Force on Problem Drywall believes is the best approach based upon the information available today. We recognize that important additional guidance is still needed to clarify qualifications for inspectors and test laboratories and to describe methods for making the measurements in the criteria defined in this report. This identification guidance is being released in recognition of the immediate need for homeowners to have this information. Consumers should exercise caution in contracting for testing and should be diligent in confirming the references, qualifications, and background of individuals and firms that offer such testing.⁹ Scientific investigations have moved as quickly as possible to understand the complex problems presented by Chinese¹⁰ drywall. The scientific work completed by the Federal Interagency Task Force, to date, has been essential to building the foundation for decision-making by homeowners and local, state, and federal authorities.¹¹ The investigation continues on several fronts to expand our understanding of this issue—but the Task Force believes that current information is sufficient to revise the guidance on how to identify homes with problems associated with this drywall.

Findings have shown a strong association between the presence of problem drywall and metal corrosion in homes. The results of investigations reported by the Federal Interagency Task Force provide criteria and indicators for identifying those homes. The Task Force updated the identification guidance based upon these findings.

This updated identification guidance is based primarily on the presence of metal corrosion in homes, as well as other indicators of problem drywall. It is possible to misclassify homes because of other possible sources of metal corrosion, such as volatile sulfur compounds from sewer gas, well water, and outdoor contaminants that may enter the home independent of the presence of problem drywall in the home. Homes may also be misclassified as having no drywall problem due to the absence of characteristics found to be typical in the limited testing to date. Given these limitations, additional work will continue to validate these methods, and the identification guidance will be modified as necessary.

Identification Method

The identification process will require two steps: (1) an initial or threshold inspection to find visual signs of metal corrosion and evidence of drywall installation in the relevant time period, and (2) the identification of corroborating evidence or characteristics.

Step 1: Threshold Inspection

A visual inspection will seek to identify blackening of copper electrical wiring and/or air conditioning evaporator coils (or documentation of replacement of evaporator coils due to blackened corrosion causing

⁹ FTC Consumer Alert, “Defective Imported Drywall: Don’t Get Nailed by Bogus Tests and Treatments,” <http://www.ftc.gov/bcp/edu/pubs/consumer/alerts/alt164.pdf>, December 2009.

¹⁰ The Interagency Task Force on Problem Drywall is conducting a broad investigation, and its studies have included Chinese and non-Chinese samples. While this work does reference “Chinese” drywall as a general term, we have not concluded that all Chinese-manufactured drywall presents corrosion or health issues or that drywall made elsewhere will never present these issues.

¹¹ Reports and information released regarding problem drywall can be found at: www.drywallresponse.gov.

failure), and the installation of new drywall (for new construction or renovations) between 2001 and 2009. Meeting both criteria for this step is a prerequisite to further consideration.

Rationale

A visual observation of corroded air conditioning evaporator coils and/or electrical wiring by trained inspectors is believed to be a prerequisite for consideration of a home as having problem drywall. The Florida Department of Health has long included such corrosion as part of its definition of problem drywall homes.^{12,13} It is appropriate to limit the dates of installation to the relevant time period because this corresponds to the majority of complaints received by the U.S. Consumer Product Safety Commission (CPSC). In addition, older homes with earlier dates of installation could exhibit corrosion due to different sources acting over longer periods of time.

A CPSC contractor completed a detailed study of 51 homes in Alabama, Florida, Louisiana, Mississippi, and Virginia. The report was issued on November 23, 2009, and is available on www.drywallresponse.gov. This investigation included inspections of each home for the presence and extent of corrosion. Copper and silver metal test strips, called “coupons,” were placed in each home for two weeks to test the corrosive environment. The copper and silver coupons showed significantly higher rates of corrosion in homes where complaints had been registered than in the control homes. The dominant types of corrosion on the coupons were copper sulfide and silver sulfide, respectively, as determined by additional laboratory tests. Copper sulfide and silver sulfide appear as a black coating on copper or silver metal. Visual inspection and evaluation of electrical (ground) wire corrosion also revealed statistically significant greater corrosion in complaint homes compared to the control homes.

Step 2: Corroborating Evidence

Because it is possible that corrosion of metal in homes can occur for other reasons, it is important to obtain additional corroborating evidence of problem drywall. Homes with the characteristic metal corrosion problems must also have at least two of these corroborating conditions if the new drywall was installed between 2005 and 2009. For installations between 2001 and 2004, at least four of the following conditions must be met:

- (a) Elemental sulfur levels in samples of drywall core found in the home exceeding 10 ppm¹⁴;
- (b) Corrosive conditions in the home, demonstrated by the formation of copper sulfide on copper coupons (test strips of metal) placed in the home for a period of two weeks to 30 days or confirmation of the presence of sulfur in the blackening of the grounding wires and/or air conditioning coils;
- (c) Confirmed markings of Chinese¹⁵ origin for drywall in the home;
- (d) Elevated levels of hydrogen sulfide, carbonyl sulfide, and/or carbon disulfide emitted from samples of drywall from the home when placed in test chambers using ASTM Standard Test Method D5504-08 or similar chamber or headspace testing¹⁶; and/or

¹² Case Definition (03-31-09) for Premature Copper Corrosion in Residences Possibly Associated with the Presence of Imported Drywall from China.

¹³ Case Definition (12-18-09) for Drywall Associated Corrosion in Residences.

(<http://www.doh.state.fl.us/ENVIRONMENT/COMMUNITY/indoor-air/casedefinition.html>.)

¹⁴ Note that a preliminary screening for strontium levels exceeding 1,200 parts per million may be useful to identify boards to test for elemental sulfur. The Task Force emphasizes, however, that such preliminary screening for strontium does not necessarily indicate the presence of problem drywall, rather, only that additional testing in those areas may be advised.

¹⁵ This does not imply that all Chinese drywall, or that only Chinese drywall, is associated with these problems, but that among homes with the characteristic corrosion, Chinese drywall is a corroborating marker for the characteristic problems.

¹⁶ ASTM International. Standard D5504-08: Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence, 2008.

(e) Corrosion of copper metal to form copper sulfide when copper is placed in test chambers with drywall samples taken from the home.

Collecting this corroborating evidence, in some cases, will require professional assessors and/or testing by analytical laboratories.

Rationale

The Federal Interagency Task Force's study of the elemental and chemical composition of 17 drywall samples shows higher concentrations of elemental sulfur and strontium in certain Chinese drywall than in non-Chinese drywall.¹⁷ Although, the 51-home study (41 homes with reported problems and 10 control homes) also found a correlation between elevated strontium levels and problem homes,¹⁸ additional testing conducted on a wide range of drywall samples found that the use of strontium as a marker resulted in false-positives where some non-problem drywall samples (based on chamber testing) were found to contain elevated strontium levels.¹⁹ The Task Force does not believe strontium has a causative role, and in light of the possibility for false-positives, we no longer consider elevated strontium levels to be valid corroborating evidence for problem drywall. However, in many cases, screening for strontium can be an effective tool in identifying what boards may warrant additional testing for elemental sulfur.^{17, 18, 19, 20} The additional testing in the contractor's draft report¹⁹ found that elemental sulfur (also known as orthorhombic sulfur) was highly correlated with problem drywall. Thus, the presence of elevated levels of elemental sulfur is believed to be corroborating evidence for homes with problem drywall.

The 51-home study and the preliminary corrosion reports^{18,21,22} also found that the type of corrosion present on copper coupons, copper electrical wire, and air conditioning evaporator coils was copper sulfide. Thus, the confirmation of copper sulfide or sulfur in the corrosion of the copper (and similarly silver sulfide or sulfur in the corrosion on silver coupons) is believed to be a corroborating marker.

Chinese drywall installed in the identified period has been associated with the types of corrosion problems reported. This does not imply that all Chinese drywall, or that only Chinese drywall, is associated with these problems, but that among homes with the characteristic corrosion, Chinese drywall is a corroborating marker. It is not absolutely necessary for the markings to be found because, in some cases, Chinese drywall does not have markings that identify the nation of origin of the drywall.

Additionally, the EH&E report on source markers (May 28, 2010), together with the Lawrence Berkeley National Laboratory Chamber Study Report (October 2010), indicate that higher emission factors for reactive sulfur gases, including hydrogen sulfide, show a connection between certain Chinese drywall and

<http://www.astm.org/Standards/D5504.htm>. Subsequent revisions by ASTM of this standard will be considered to be "similar chamber or headspace testing" methods.

¹⁷ Statistical Analysis of the Chemical Screening of a Small Sample of Unused Chinese and non-Chinese Drywall, October 30, 2009, <http://www.cpsc.gov/info/drywall/TabA.pdf>.

¹⁸ U.S. Consumer Product Safety Commission Staff Summary of Contractor's Indoor Air Quality Assessment of Homes Containing Chinese Drywall, November 23, 2009, <http://www.cpsc.gov/info/drywall/51homeStudy.pdf>.

¹⁹ Identification of Problematic Drywall: Source Markers and Detection Methods, May 28, 2010, <http://www.cpsc.gov/library/foia/foia10/os/EHESourceMarkers.pdf>.

²⁰ The Task Force emphasizes, however, that such identification of strontium does not necessarily indicate the presence of problem drywall, rather, only that additional testing in those areas is advised.

²¹ Status Report on the Preliminary Analysis of HVAC, Gas Distribution, and Fire Safety Equipment Installed in Homes with Chinese Drywall, November 23, 2009, <http://www.cpsc.gov/info/drywall/PrelimHVACGasDistFireSyst.pdf>.

²² Interim Report on the Status of the Analysis of Electrical Components Installed in Homes with Chinese Drywall, November 23, 2009, <http://www.cpsc.gov/info/drywall/prelimelectrical.pdf>.

corrosion in homes. In addition, the patterns of reactive sulfur compounds emitted from drywall samples show a clear distinction between certain Chinese drywall samples manufactured in 2005/2006, and other Chinese and non-Chinese drywall samples. Also, the 51-home study reported an association between hydrogen sulfide levels in homes and corrosion in those homes. Thus, it is believed that one of the possible corroborating tests that could be considered is emissions testing from suspect drywall from homes. Another similar corroborative test could be determining whether corrosion of copper metal to form copper sulfide occurs when copper is placed in test chambers at elevated humidity with drywall from the home. Chamber tests may be costly and time consuming options.

Continuing Development of this Guidance

We will incorporate future findings, as appropriate, to improve upon this guidance. More information on problem drywall is available at the federal Drywall Information Center website, www.drywallresponse.gov.