

**Remediation Guidance**  
**for Homes with Corrosion from Problem Drywall as of September 15, 2011**<sup>1</sup>

by the U.S. Consumer Product Safety Commission  
and the U.S. Department of Housing and Urban Development

**Introduction**

This Remediation Guidance summarizes what the U.S. Consumer Product Safety Commission (CPSC) and the U.S. Department of Housing and Urban Development (HUD) believe is an effective approach to address potential health and safety issues for the remediation of houses affected by problem drywall, given the information now available.<sup>2</sup> Initial studies found a strong association between the presence of problem drywall and corrosion of metal in homes. Based upon those findings, the CPSC and HUD have developed this Guidance, which focuses on the replacement of problem drywall and building components for which drywall-induced corrosion might cause a health or safety problem. This version supersedes prior versions of the Guidance.

The CPSC and HUD recognize that many homeowners want to begin the process of repairing their homes. This revised Guidance is designed to be a conservative, commonsense approach to assist homeowners in making some of the challenging decisions they face remediating their homes. Should additional scientific information become available, which suggests that less extensive or less costly remediation methods would work, the CPSC and HUD will consider the evidence, and we will update our protocol, as appropriate.

**Remediation Guidance**

This Remediation Guidance for homes with problem drywall calls for the replacement of all:

1. possible problem drywall;
2. smoke alarms and carbon monoxide alarms;
3. electrical distribution components (including receptacles, switches, and circuit breakers, but not necessarily wiring); and
4. fusible-type fire sprinkler heads.<sup>3</sup>

All testing and remediation work should be conducted in compliance with applicable building codes, occupational safety and health standards, and environmental regulations. Gas service piping should be inspected and pressure-tested to ensure that the materials comply with the relevant building code(s), in accordance with the International Fuel Gas Code and National Fire Protection Association (NFPA) Standard 54, *National Fuel Gas Code*.

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<sup>1</sup> This staff document has not been reviewed or approved by, and it may not necessarily reflect the views of, the Commission or the Department.

<sup>2</sup> This Remediation Guidance is not intended to address any non-health and safety remediation requirements; nor does it address what, if any, additional elements of a home may require remediation in order to accomplish the principles set forth here. The Task Force recognizes that additional considerations for repair of economic damages have been included in both court-ordered remediation plans and voluntary remediation plans agreed upon by various parties, including homeowners and those in the supply chain. This Remediation Guidance does not address such economic considerations that lie outside the scope of health and safety, but that are nonetheless of great importance to all parties involved.

<sup>3</sup> Glass bulb sprinkler heads should be tested or replaced in accordance with National Fire Protection Association (NFPA) Standard 25, *Standard for Testing and Inspection of Water-Based Fire Protection Systems*. For corrosive environments (which should be assumed for the purpose of the remediation), NFPA Standard 25 calls for testing at 5-year intervals. When remediation is completed, the environment should no longer be treated as corrosive, and the expected life span of the fire sprinkler heads—normally 20 years—should apply.

## Discussion

This Remediation Guidance addresses the emission of corrosive sulfur gases by problem drywall and the safety systems in the homes possibly affected by a corrosive environment by: (1) eliminating the source of the corrosion—the problem drywall, and (2) replacing certain building components for safety systems for which drywall-induced corrosion may affect performance, such as smoke and carbon monoxide alarms, electrical components, and fusible-type fire sprinkler heads, in addition to inspecting and testing gas service piping and glass bulb fire sprinkler heads.

As a threshold matter, before remediation, care should be taken to determine whether the home contains problem drywall. CPSC staff and HUD staff issued guidance<sup>4</sup> to assist in the identification of problem drywall.

Where a home has been identified as having problem drywall, the scientific and practical challenges of finding individual problem sheets of drywall remain. Until such challenges are overcome, this Remediation Guidance calls for the general replacement of all drywall in an identified home. If some of the drywall in a home can be identified reasonably not to be problem drywall—because it is known to have been installed prior to the relevant time period (*i.e.*, before 2001)—and if there are no other corroborating conditions (as provided in the CPSC and HUD guidance on identification), which indicates that the drywall is problem drywall, then one option would be to leave that drywall in place.

This Guidance includes replacement of the home safety systems at greatest risk of being affected by drywall-induced corrosion that may affect their performance: smoke alarms and carbon monoxide alarms; electrical components (but not necessarily the wiring); and fusible-type fire sprinkler heads. In addition, glass bulb fire sprinkler heads should be tested or replaced in accordance to NFPA Standard 25, and gas distribution piping should be inspected and pressure-tested, in accordance with NFPA Standard 54.

CPSC staff's assessment of the effect of problem drywall-related corrosion on electrical distribution components, gas service piping, fire sprinkler heads, and smoke alarms has not revealed any safety-related failures.<sup>5,6,7,8,9</sup>

Corrosion of exposed electrical contact surfaces was observed on electrical devices harvested from affected homes, as well as on new devices subjected to an accelerated corrosion regimen at Sandia National Laboratories to simulate 40 years of exposure. However, although no significant degradation of the electrical connections to the devices was noted, extensive corrosion was present and replacement of receptacles, switches, ground-fault circuit interrupters, and circuit breakers is recommended, out of an abundance of caution.

CPSC staff's assessment of the effect of problem drywall-related corrosion on electrical distribution wiring indicated that exposed copper wires were corroded.<sup>4</sup> However, the corrosion was superficial, and it did not reduce the overall cross-section of copper significantly. Thus, the corrosion did not decrease the wire's ability to carry its rated current. Removal or cleaning of the exposed ends of the wiring to reveal a clean/uncorroded surface is recommended. Removal/replacement of cable runs is not necessary, unless the

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<sup>4</sup> [www.cpsc.gov/info/drywall/IDguidance031811.pdf](http://www.cpsc.gov/info/drywall/IDguidance031811.pdf), March 18, 2011.

<sup>5</sup> [www.cpsc.gov/info/drywall/electrical031811.pdf](http://www.cpsc.gov/info/drywall/electrical031811.pdf), March 18, 2011.

<sup>6</sup> <http://www.cpsc.gov/info/drywall/NISTsmoke.pdf>, September 15, 2011.

<sup>7</sup> <http://www.cpsc.gov/info/drywall/NISTsprinkler.pdf>, September 15, 2011.

<sup>8</sup> <http://www.cpsc.gov/info/drywall/NISTgas.pdf>, September 15, 2011.

<sup>9</sup> One fusible-type sprinkler head out of the set of 18 tested failed to operate after being subjected to an accelerated corrosion regimen at Sandia National Laboratories to simulate 20 years of exposure to problem drywall. NIST analyzed but could not identify a definitive cause for the functional test failure of this sprinkler. Irrespective of this event, the Task Force recommends replacement of this type of sprinkler head, based on the changes that were observed.

remaining cable has been damaged during drywall removal. However, all repairs must comply with local codes, and final approval of the installation is at the discretion of the authority having jurisdiction.

The corrosion seen on gas service piping materials was found to be superficial and uniform without pin holing. No meaningful loss of thickness was observed, and there was no evidence that the ability to carry gas and hold pressure was compromised. Out of an abundance of caution, and considering the wide variety of environmental conditions that might exist in different homes, this guidance recommends inspecting and pressure-testing gas service piping according to all applicable standards. Any changes to gas service piping should be done in strict accordance with all codes and standards.

A small but significant difference in performance for certain types of fusible-type sprinkler heads was found after accelerated corrosion although these sprinklers continued to meet the appropriate performance standards. This Guidance recommends the replacement of all fusible-type sprinkler heads and either testing or replacement of glass bulb sprinkler heads out of an abundance of caution, based on the finding of a small difference in performance for certain sprinkler heads after accelerated corrosion, as well as recognition of the National Fire Protection Association (NFPA) Standard 25, requiring either testing or replacement of sprinkler heads in corrosive environments (which may be present prior to remediation) every 5 years.<sup>10</sup>

In the case of smoke alarms, there were small but significant changes to performance in some cases, although the alarms continued to meet applicable safety standards. The CPSC recommends replacement of smoke alarms every 10 years and carbon monoxide alarms after their limited lifespan, typically every 5–7 years. Therefore, as part of this Remediation Guidance, it is recommended that all smoke alarms and carbon monoxide alarms be replaced.

Staffs of the CPSC and HUD are aware that some remediation efforts have included the replacement of electrical wiring, water service plumbing, HVAC (heating, ventilation and air conditioning) evaporator coils, furnishings, and carpeting. Homeowners may seek to replace such items, but their replacement is not included in this Guidance because of the absence of a direct connection to safety.

Staffs of the CPSC and HUD continue to recognize that other remediation approaches ultimately could prove more cost-effective and/or less invasive; however, this Guidance is believed to be a conservative, commonsense approach and represents all applicable CPSC staff studies on corrosion effects from problem drywall.

Homeowners should recognize that homes can suffer from corrosion unrelated to drywall, and that such other corrosion problems may not be resolved by addressing the drywall.

#### *Other Building Materials and Contents:*

Underlying the CPSC staff and HUD staff's recommendations is the view that removal of the source material (*i.e.*, the problem drywall), will eliminate the cause of the corrosive environment. Staffs of CPSC and HUD do not have a scientific basis to believe that emissions from the problem drywall require replacement of non-problem drywall, wood studs, flooring, cabinetry, or other household components and fixtures that may have been exposed to the drywall emissions.

Staffs of the CPSC and HUD understand, however, that certain other building materials and contents could be affected or require replacement in the course of the practical construction or engineering steps required to

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undertake the remediation described in this Guidance. Staffs of the CPSC and HUD do not offer any view on the replacement of other affected metals, home electronics, or personal property.

*Drywall Dust Clean-Up:*

During the remediation, it is important to ensure that the home is cleaned to remove any visible drywall dust and debris that was created during the demolition, including material that is on and around framing material, prior to commencing reconstruction.

Staffs of the CPSC and HUD are aware that some parties who are remediating homes with problem drywall use HEPA (high efficiency particulate air) vacuums and wipe surfaces to remove drywall dust, and ventilate the home for a period between removal and replacement of drywall to insure that all reactive sulfur gases have dissipated. We do not have a scientific basis for recommending such steps, but homeowners may consider these options as they seek to make an informed decision in their particular situation.

*Additional Issues:*

Staffs of the CPSC and HUD are aware that some parties offer remediation approaches other than the replacement of problem drywall and affected metal components. We do not have a scientific basis to provide an opinion of such approaches.

Consumers should exercise caution in contracting for testing and remediation and should be diligent in confirming the references, qualifications, and backgrounds of individuals and firms that offer such services.<sup>11</sup> Consumers should request that individuals and firms that offer remediation strategies that differ significantly from this Guidance explain those strategies to the consumer's satisfaction before the consumer's purchase of those services or products.

**Conclusion**

Scientific investigations to understand the complex problems presented by the issue of problem drywall are wrapping up. The scientific work completed by the Federal Interagency Task Force has been essential to building the foundation for decision making by homeowners and local, state, and federal authorities.<sup>12</sup> The results of the Task Force studies conducted to date are sufficient to provide this Remediation Guidance for homes with corrosion from problem drywall.

More information on problem drywall is available at the Federal Drywall Information Center website, [www.drywallresponse.gov](http://www.drywallresponse.gov).

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<sup>11</sup> FTC Consumer Alert, "Defective Imported Drywall: Don't Get Nailed by Bogus Tests and Treatments," [www.ftc.gov/bcp/edu/pubs/consumer/alerts/alt164.pdf](http://www.ftc.gov/bcp/edu/pubs/consumer/alerts/alt164.pdf), December 2009.

<sup>12</sup> Reports and information regarding problem drywall can be found at [www.drywallresponse.gov](http://www.drywallresponse.gov).