U.S. Consumer Product Safety Commission Staff
Summary of Contractor's Report on Preliminary Microbiological Assessment of Chinese Drywall

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## Background

The U.S. Consumer Product Safety Commission (CPSC) staff contracted with Environmental Health & Engineering, Inc. (EH&E), an internationally known environmental testing firm based in Massachusetts, to characterize the indoor environment in representative homes reportedly constructed with imported Chinese drywall ("complaint homes"), compared to homes that did not reportedly contain Chinese drywall ("non-complaint homes"). This study was conducted as part of the CPSC staff forensic investigation of health effects and corrosion issues reported by consumers as being associated with the presence of Chinese made drywall in residences. In the EH&E 51-home study, hydrogen sulfide levels in complaint homes were low, but statistically significantly higher than in the non-complaint homes. Complaint homes had significantly greater rates of copper and silver corrosion than non-complaint homes and, hydrogen sulfide was associated with both copper and silver corrosion.

Various organizations have proposed that sulfur-reducing bacteria may be a source for sulfur emissions from problem drywall. The EH&E study summarized below was undertaken to determine whether sulfur-reducing bacteria are present in Chinese drywall.

## Methods

EH&E submitted ten drywall samples (4 Chinese, 6 U.S.) supplied by CPSC to EMLab P&K for evaluation for the presence of sulfur-reducing bacteria. These drywall samples were collected by CPSC staff from manufacturers, drywall suppliers and storage warehouses. U.S. samples were manufactured in 2009 while Chinese drywall samples were manufactured in 2006. These drywall samples were not obtained from individual homes and were unfinished (*i.e.*, no paint, plaster or other modification had been applied). Additional sub-samples of these same Chinese drywall samples were among those tested in emissions chambers by LBNL, including several which were among the highest hydrogen sulfide emitters in the LBNL testing.[2]

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[1] The EH&E report uses the term "Chinese drywall" and "problem drywall" interchangeably but CPSC staff cautions that until completion of its investigation it is premature to consider that all Chinese or imported drywall exhibits the reported health or corrosive characteristic; nor is it correct to assume that all domestic brands are entirely void of any reported health or corrosive characteristics. In this CPSC staff summary of the EH&E study, staff will also use the terms interchangeably for ease of reading, but the same caveats apply. These studies are staff level documents and have not yet been reviewed or approved by the agencies participating in this investigatory effort.

[2] CPSC Staff Preliminary Evaluation of Drywall Chamber Test Results, www.DrywallResponse.gov.

The paper covering both sides of each drywall sample was removed, prepared and cultured separately. The remaining drywall "core" was also prepared and cultured. A culture method, Most Probable Number (MPN, a modification of Method 9240 Iron and Sulfur Bacteria as published in the 20th Edition of *Standard Methods for the Examination of Water and Wastewaters*), was employed to determine whether viable sulfur-reducing bacteria were present in the Chinese drywall compared to the U.S. drywall samples.

**Results**

The paper and the gypsum core of each sample were evaluated separately for the presence of sulfur-reducing bacteria. No sulfur-reducing bacterial growth was observed in the twenty paper samples. Sulfur-reducing bacterial growth was detected in one of four Chinese gypsum core samples and one of six U.S. gypsum core samples. The MPN for the Chinese gypsum core sample was at the method detection limit of 0.31 colonies per sample while the U.S. sample was 3-fold higher than this method detection limit. Both positive samples fell below 1 colony forming unit per sample.

**Conclusions**

Based on a limited preliminary study of 10 drywall samples, there appears to be no difference in the presence or absence of sulfur-reducing bacteria between imported Chinese drywall and U.S. domestic drywall tested, including Chinese samples found by LBNL to have some of the highest reactive sulfur gas emissions in the chamber tests. One sample of Chinese drywall and one sample of U.S. drywall demonstrated very low levels of sulfur-reducing bacterial growth; the remaining samples showed no bacterial growth.

There are limitations to this study. The culture conditions selected for use are for known species of sulfur-reducing bacteria. However, this does not exclude the possibility that sulfur-reducing bacterial species that are not known to the scientific community may be present in the drywall. Furthermore, the low number of colony forming units that were found in the two core samples do not necessarily support the contention that sulfur-reducing bacteria were metabolically active in the problem drywall and causing the emission of sulfur gases, the reported health effects and the reported corrosion to metal components in homes.