RESEARCH in Progress

Coalition for Advanced Wood Structures
a university, industry, government partnership

Volatile Organic Compounds (VOCs) from Engineered Wood Products

The Forest Products Laboratory and APA–The Engineered Wood Association are undertaking a research project to assess types and amounts of volatile organic compounds (VOCs) that are emitted by engineered wood products used as structural elements of buildings. VOCs are characterized as carbon-containing organic compounds that exist in gaseous phase at ambient temperature. Engineered wood products such as structural plywood, oriented strandboard, structural composite lumber, I-joists, and glued-laminated timber are engineered for strength properties. Because they are required to be made with moisture-resistant adhesives, they are typically exempt from emission testing requirements such as the California Air Resources Board regulation for formaldehyde from wood composites. Therefore, data on types and amounts of VOCs that are emitted from engineered wood products are limited.

Background

The need for off-gassing data on various industrial and natural VOCs from building products is emerging. To date, these questions have been directed mainly at nonstructural wood products used in furniture and interior trim through various voluntary green labeling programs. Designers and specifiers will likely be seeking this type of information on glued structural wood products. A project to benchmark VOCs from structural wood products would be useful to answer questions from specifiers.

Objective

This study will determine types and amounts of VOCs that are emitted from common engineered wood products—useful data for users and producers of wood products.

Advanced Testing Services VOC Chambers and Analytical Equipment

VOC conditioning and sampling equipment are data logged 1 per minute for temperature and relative humidity during all operations. Mass flow control data is logged at 1 per second. All control is run through a dedicated PLC which is hooked to a PC for I/O and data logging/storage purposes.

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USDA Forest Service

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APA HEXION

Approach

Commercial engineered wood products typically used in construction will be sampled at producing mills following typical manufacturing processes. Relevant manufacturing details such as species, adhesive type, and processing variables (such as drying method and temperature, press temperature) will be determined. The products will be carefully sampled and wrapped to prevent contamination and exposure during shipping that may affect presence of naturally occurring VOCs.

The products will be shipped to Advanced Testing Services (ATS), an accredited testing laboratory, for evaluation of VOC emissions using a test protocol designed for commercial products. The test method will measure presence and quantitative amounts of at least 40 different VOCs.

ATS will apply the CDPH/EHLB/Standard Method V1.1 (February 2010), "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1." This method is within the ATS scope of accreditation. Results will list the Chemical Abstract Service Registry Number for individual VOCs and indicate which non-listed VOCs were quantified using surrogate compounds in lieu of pure compounds.

Expected Outcomes

Emission test results will provide useful data for demonstrating types and amounts of VOCs that are emitted from engineered wood products.

Timeline

The research program began in June 2015 and will be completed in February 2016.

Cooperators

APA–The Engineered Wood Association

USDA Forest Service, Forest Products Laboratory

Advanced Testing Services
(Accredited to ISO/IEC 17025 by IAS; TL #325)

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