

Building Materials with High Moisture Content Not Enclosed

Last Updated: 03/29/2016

Scope



Check the moisture content of wall materials to ensure materials are dry before enclosing walls with drywall and siding.

Do not install drywall if framing and/or insulation materials are damp.

- Inspect framing, sheathing, and insulation for dampness before installing drywall and other wall materials that would limit the framing and insulation's ability to dry out.
- Test the framing with a moisture meter to ensure the lumber moisture content is $\leq 18\%$, as recommended by [ENERGY STAR](#).
- If damp, allow materials to air dry or dry with fans before enclosing the walls.
- Follow the manufacturer's specifications when installing wet-applied insulation products to ensure an adequate amount of drying time.

See the [Compliance Tab](#) for related codes and standards requirements, and criteria to meet national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.

Description

If interior walls are enclosed (e.g., with drywall) when framing materials and insulation are wet, the trapped moisture can lead to problems for the home. Therefore, it is essential to do the following before enclosing the interior walls:

- Ensure lumber does not exceed 18% moisture content.
- Follow the manufacturer's drying specifications for wet-applied insulation products.



Figure 1 - Wet-Applied Insulation that is Still Drying. The dark spots on this wet-spray cellulose insulation indicate that it is not dry, and it must be allowed to dry completely before the wall is enclosed. [i](#)

Measuring Moisture Content of Framing Materials

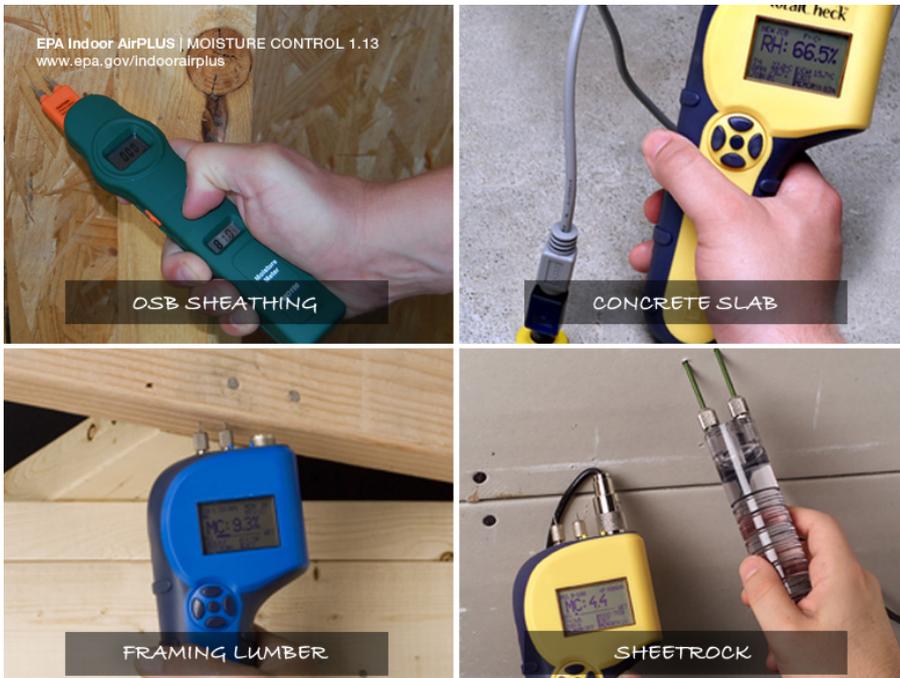
If framing materials appear wet, you must test them using a moisture meter. Moisture meters will give you a reliable benchmark to evaluate whether or not the materials can be safely installed in the home.

The most common wet building material is dimensional lumber used for framing. This material usually arrives early at the jobsite and will be exposed to the elements longer than most other building materials. To test the moisture content of wood, you can use a resistance meter.

A resistance moisture meter measures the moisture by sending a small electrical charge through two probes inserted into the lumber. If the wood is wet, the charge will pass easily between the probes; dry wood offers greater resistance and less charge will pass ([Curkeet 2011](#)). Some moisture meters have additional features that allow the units to be calibrated for different kinds of wood, but usually at a higher cost. In general you can expect to spend between \$500 and \$650 on a moisture meter that will be suitable for residential construction ([PNNL 2012](#)).

How to Use a Moisture Meter ([Curkeet 2011](#)):

1. Insert the probes at least 1/4 inch into the wood to get an accurate measurement.
2. Insert the probes parallel with the grain of the wood.
3. Do not try to test wood on the ends; this will not give an accurate measurement.
4. Test in multiple locations along the lumber to get an accurate assessment. The meter only measures the moisture content between the probes. Although moisture can saturate an entire piece of lumber, it also can only impact a small section; therefore, you should test multiple areas of the wood to ensure the entire piece is dry enough to install and enclose.
5. If the material has a high moisture content, allow it to dry until it is under the required moisture threshold. Use dehumidifiers, fans, and gentle heat to shorten the drying time and lessen the impact on the construction schedule ([EPA 2013](#)).



MEASURING MOISTURE IN VARIOUS BUILDING MATERIALS

Figure 2 - Meters for Measuring Moisture in Building Materials. It is important not to enclose the interior of a wall (e.g., with drywall) if a high moisture content is detected in either the framing members or the insulation products. ⓘ

Follow Manufacturer’s Specifications When Drying Wet-Applied Insulation Products

Some insulation products, such as fiberglass batts, are supposed to be dry at all times. However, other products, such as open cell and closed cell spray foam insulations, are wet applied. It is critical to ensure these wet-applied products are fully dried (and cured, if required) before enclosing them. Follow this overall guidance:

1. Apply insulation per manufacturer’s directions.
2. Allow insulation to dry and/or cure according to the manufacturer’s specifications. Although this will depend on the type of insulation used, in general allow as much access to airflow as possible for drying. If recommended, a fan can help speed drying times. However, this can impact any curing that may need to occur, so be sure to check with the manufacturer first.

Ensuring Success

It is critical to ensure the materials in the wall cavity are dry before being enclosed. When in doubt, use a moisture meter to determine exactly what percentage of moisture is in the material. Also, be sure that any wet-applied insulation is fully cured so you do not trap moisture in the wall assembly.

Climate

No climate-specific information applies.

Training

Right and Wrong Images



Display Image: [ES_WMSBC_4.4_4.5_PG60_134g_32311.jpg](#)

Reference: [Water Management System Builder Checklist Guide](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.

CAD

None Available

Compliance

The Compliance tab contains both program and code information. Exact code language is copyrighted and may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

[ENERGY STAR Certified Homes](#)

ENERGY STAR Certified Homes (Version 3/3.1, Revision 08), Water Management System Builder Requirements

4. Water-Managed Building Materials:

4.5 Framing members & insulation products having high moisture content not enclosed (e.g., with drywall).¹⁸

Footnotes:

(18) For wet-applied insulation, follow manufacturer's drying recommendations. EPA recommends that lumber moisture content be ? 18%.

Builders Responsibilities: It is the exclusive responsibility of builders to ensure that each certified home is constructed to meet these requirements. While builders are not required to maintain documentation demonstrating compliance for each individual certified home, builders are required to develop a process to ensure compliance for each certified home (e.g., incorporate these requirements into the Scope of Work for relevant sub-contractors, require the site supervisor to inspect each home for these requirements, and / or sub contract the verification of these requirements to a Rater). In the event that the EPA determines that a certified home was constructed without meeting these requirements, the home may be decertified.

ENERGY STAR Revision 08 requirements are required for homes permitted starting 07/01/2016.

[DOE Zero Energy Ready Home](#)

Exhibit 1: Mandatory Requirements. Certified under ENERGY STAR Qualified Homes Version 3.

More Info.

Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

Case Studies

1. [New Whole-House Solutions Case Study: New Traditions Homes, Landover Commons, Vancouver, WA](#)
(873 KB)
Author(s): PNNL
Organization(s): PNNL
Publication Date: April, 2012
Case study about energy efficient new home construction that also incorporated moisture management techniques for durability in the damp Northwest climate.

References and Resources*

1. [DOE Zero Energy Ready Home National Program Requirements](#)
Author(s): DOE
Organization(s): DOE
Publication Date: August, 2015
Standard requirements for DOE's Zero Energy Ready Home national program certification.
2. [ENERGY STAR Certified Homes, Version 3 \(Rev. 08\) National Program Requirements](#)
Author(s): EPA
Organization(s): EPA
Publication Date: September, 2015
Document outlining the program requirements for ENERGY STAR Certified Homes, Version 3 (Rev. 08).
3. [Technical Guidance to the Indoor airPLUS Specifications](#)
Author(s): EPA
Organization(s): EPA
Publication Date: October, 2015
Website providing technical guidance to help home builders and their subcontractors, architects, and other housing professionals understand the intent and implementation of the specification requirements of the IAQ labeling program.
4. [Water Management System Builder Checklist Guide](#)
Author(s): EPA
Organization(s): EPA
Publication Date: February, 2011
Guide describing details that serve as a visual reference for each of the line items in the Water Management System Builder Checklist.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide

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