



®

# BUILD A BETTER HOME

## CONTROLLING MOLD AND MILDEW

**M**old and mildew are often present in buildings where there is excessive moisture. Because mold and mildew infestation can be detrimental to the building and its inhabitants, it is important to understand how to prevent their growth in the first place.

The Build A Better Home program from APA – The Engineered Wood Association is designed to provide builders and homeowners with the construction guidelines they need to protect homes against moisture damage. Key elements in the building envelope are the roof, walls, and foundations.

This publication outlines the characteristics of mold and mildew, conditions in which they grow, effect of mold and mildew growth on wood products, and methods of prohibiting their growth.

## WHAT ARE MOLD AND MILDEW?

Mold and mildew are microscopic fungi, which are a low form of plant life that live off of organic matter rather than a photosynthetic process. They appear as woolly or powdery growths on numerous surfaces, including engineered wood.

Mold and mildew are terms commonly used interchangeably, although mold is often applied to black, blue, green, and red fungal growths, and mildew to whitish growths. The color depends on the infecting organism, the type of nutrient (wood, food, etc.), and moisture levels therein.

Mold is often mistaken for dirt. To test for mold or mildew, apply a few drops of a 5% solution of household bleach. When performing this test, it is important to use fresh bleach, since bleach deteriorates in potency when older than six months. Mold or mildew will usually bleach within one to two minutes, and substances that remain the same color are probably dirt.

## ENVIRONMENTS IN WHICH MOLD AND MILDEW GROW

Mold and mildew grow in conditions of moisture, darkness or low light, and stagnant air-flow. Found nearly everywhere, mold and mildew spread as airborne spores, and when they find suitable growing conditions, they will begin to flourish. For example, white mold is commonly found on water-saturated laboratory samples of wood stored overnight at room temperature.

### **Effect of Mold and Mildew Growth on Wood Components**

As an organic material, mold and mildew readily grow on wood if moisture is present. Mold grows on wood if exposed to water or prolonged humidity in excess of 70%.

Mold and mildew are of a different type of fungi than those that cause wood to rot. Unlike wood decay fungi, they do not cause significant loss of the strength of wood products. Nonetheless, mold and mildew on wood indicate high moisture. Prolonged periods of high moisture may also support the growth of wood decay fungi, which is why it is important to prohibit the growth of mold and mildew.

Mold and mildew need the following conditions to grow:

- **Nutrients:** Nearly any organic substance can provide the needed nutrients for mold and mildew, including wood, paper, plaster, cloth and dirt. Since even a thin film of dust will suffice, it will grow on nearly any surface, including plastics, metals and glass.
- **Moderate Temperatures:** Mold and mildew grow easily at a temperature range of 68° F and 86° F. Outside this range, growth slows and may become inactive. Growth can resume when the temperature moderates.
- **Oxygen:** Mold will not grow without oxygen.
- **Moisture:** Mold growth requires high moisture conditions and becomes inactive when relative humidity drops below 70%. Mold growth resumes in moist conditions.

### **CLEANING MOLD AND MILDEW**

Mold and mildew can be removed with commercial mold/mildew removers, following the manufacturer's directions, or with a solution of one part household bleach (5% sodium hypochlorite) mixed with three parts warm water. When using bleach, avoid breathing the vapors and contact with skin and eyes. Children and pets should be kept away from these products.

Floods represent an extremely high mold and mildew hazard. Mold often grows within 48 hours after floodwaters recede. Because of the unusually high moisture levels, flood-damaged structures present an extreme risk for mold. The following publications provide guidance on dealing with flood reclamation:

- American Red Cross Publication 4477, *Repairing Your Flooded Home*
- Institute of Inspection, Cleaning and Restoration Certification Standard S500-94, *Standard and Reference Guide for Professional Water Damage Restoration*.

### **CONTROL OF MOLD AND MILDEW IN WOOD STRUCTURES**

Moisture control is the only viable method of managing mold and mildew growth in buildings, since there are ample substances that allow them to flourish.

When mold or mildew grow on wood products during construction, it should be cleaned and then allowed to dry before being enclosed. Similarly, when mold or mildew grow on wood products surfaces in a standing structure, the products should be cleaned. Of equal importance, the source of moisture must be determined and rectified.

#### **Site layout, foundations and basements**

Foundations and basements can be major sources of moisture and subsequently a source of mold growth. A 2000 study of indoor mold concentration by the State of Wisconsin Department of Health and Human Services found that the humidity level of basements was linked to mold and mildew concentrations in the house. The following steps can reduce moisture in foundations and basements:

- Assure house site is positioned to provide drainage away from the structure.
- Provide proper ventilation of crawl spaces.

- Use a dehumidifier in damp basements. Be sure to drain and clean the dehumidifier frequently, since the drip pan can be a source of mold.
- Drain downspouts away from the foundation.
- Exhaust dryer and bathroom vents outside and not to the crawlspace or basement.

### Controlling moisture in walls

Walls are often subjected to moisture. Although moisture during construction eventually dries, the elevated moisture trapped in wall cavities promotes mold and mildew growth. After construction, walls are prone to leakage around windows, doors and other wall penetrations. In addition, air leakage into the wall cavity may condense on cooler wall surfaces and become trapped in the wall cavity. The following steps can reduce moisture in walls:

- Use wide overhangs to protect windows, doors and other wall penetrations from leaks.
- Install proper flashing around windows, doors and wall penetrations.
- Design walls to prevent condensation, with consideration for the local climate.

### Controlling moisture in roofs

Roofs are exposed to moisture from leaks and from condensation in the attic. The following steps can reduce moisture in the roof system:

- Ventilate roofs in accordance with local code requirements.
- Bathroom and dryer vents must not exhaust into the attic.
- Properly flash roof penetrations and roof-wall intersections to prevent leaks.

### Controlling moisture generated from occupancy

There are many sources of occupancy moisture that elevate interior humidity, causing mold and mildew to grow. Below is a short list of interior moisture loads:

- **Shower**                    0.5 pint per 5 minute shower
- **Clothes dryer**        4.7 to 6.2 pints per load if vented indoors
- **Cooking dinner**       1.2 pints (plus 1.6 pints if gas cooking) per family of four
- **Dishwashing**           0.7 pints per family of four
- **House plants**           0.9 pints per 6 plants

### RELATED PUBLICATIONS

Since mold and mildew require high moisture conditions, proper moisture design, construction and maintenance of structures are important to maintain moisture levels below the threshold for their growth. The literature listed below, which has been developed by APA, provides detailed provisions to assure proper moisture control.

- *Residential & Commercial Construction Guide* (Form E30)
- *Controlling Decay in Wood Construction* (Form R495)
- *Moisture Control in Low Slope Roofs* (Form EWS R525)
- *Condensation – Causes and Control* (Form X485)

### Health Issues with Mold and Mildew

Mold and mildew are potential health risks. The health aspects of mold and mildew are beyond the scope of this publication; however, the American Lung Association is an excellent source for information. They are located on the Internet at [www.lungusa.org](http://www.lungusa.org).

## ADDITIONAL INFORMATION

### About APA – The Engineered Wood Association

APA – The Engineered Wood Association is a nonprofit trade association whose member mills produce approximately 70 percent of the structural wood panel products manufactured in North America.

The Association's trademark appears only on products manufactured by member mills and is the manufacturer's assurance that the product conforms to the standard shown on the trademark. That standard may be an APA performance standard, the Voluntary Product Standard PS 1-95 for Construction and Industrial Plywood, or Voluntary Product Standard PS 2-92, *Performance Standards for Wood-Based Structural-Use*

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APA's services go far beyond quality testing and inspection. Research and promotion programs play important roles in developing and improving panel and engineered wood systems, and in helping users and specifiers better understand and apply products.

For additional information on wood construction systems, contact

APA – The Engineered Wood Association,  
P.O. Box 11700, Tacoma, Washington  
98411-0700.

#### More Information Online

Visit APA's web site at [apawood.org](http://apawood.org) for more information on engineered wood products, wood design and construction, and technical issues and answers.

Online publication ordering is also available through the web site.

We have field representatives in most major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying APA engineered wood products, contact us:

#### APA – THE ENGINEERED WOOD ASSOCIATION HEADQUARTERS

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#### PRODUCT SUPPORT HELP DESK

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Hamburg, Germany; Mexico City, Mexico;  
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*The product use recommendations in this publication are based on APA – The Engineered Wood Association's continuing programs of laboratory testing, product research, and comprehensive field experience. However, because the Association has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility for product performance or designs as actually constructed. Because engineered wood product performance requirements vary geographically, consult your local architect, engineer or design professional to assure compliance with code, construction, and performance requirements.*

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