mold™
& MOISTURE MANAGEMENT MAGAZINE
The Magazine for Moisture Prevention and Remediation
January-February 2006
Volume 3 | Issue 1

Free Subscription Form on Page 15

On-Site
Builders' Part in Mold Prevention

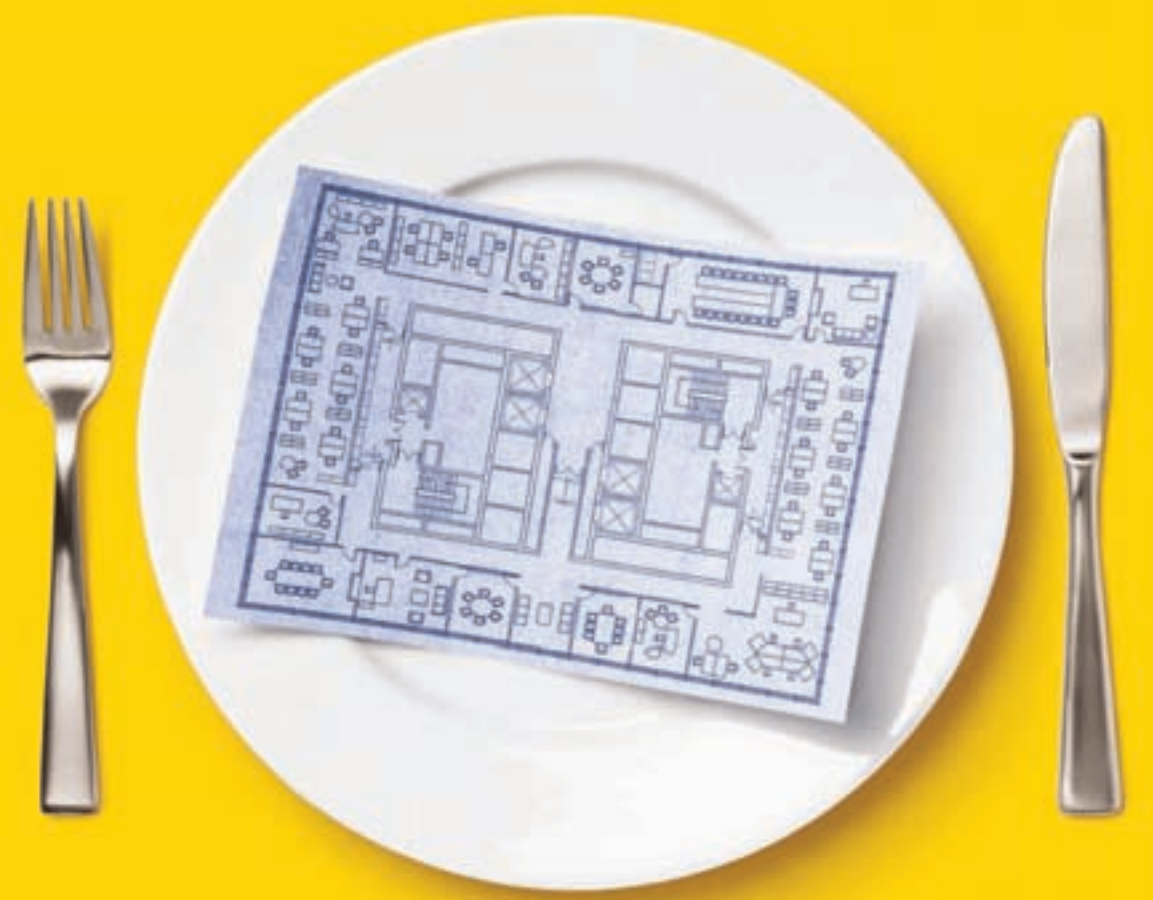
An Official Publication of
Environmental Education Foundation

Also inside: A Preview of the International Builders Show and AHR Expo

A Publication of Key Communications, Inc.

1. Most walls inside buildings are made of paper-faced drywall.

2. Mold eats paper.



3. If you eliminate the paper you reduce the chances for mold.

4. Georgia-Pacific introduces DensArmor® paperless drywall.

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On the cover

Photo provided by Protecto Wrap

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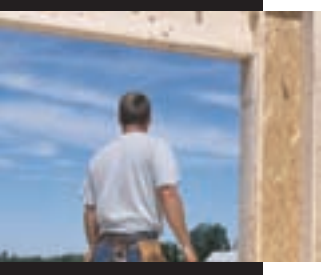

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Environmental Education Foundation

From the Back of the Refrigerator ...

to the Topic of the Day

It's been hard to believe, but a full year has passed since **Moldmag** made its debut at the 2005 International Builders' Show. In that time I've gotten quite an education. Mold for me is no longer just the stuff in the back of my refrigerator that the art department once joked about photographing for the magazine's layout.

In fact, there's no longer anybody in our office who groans when they hear a mention of mold in the news. Now they're more likely to leave a videotape or a local newspaper article on my desk, or sometimes just bring up the latest "local mold news" at the lunch table (a strangely popular place to discuss fungi).

So now I've shared all the news about the relocation troubles following the discovery of mold at my alma mater down the road with a coworker and fellow alum. I've heard about every design show on HGTV that featured a disgusting close-up of colorful fungus, dutifully noted by my coworkers. I even watched (and, I admit, laughed loudly through) an episode of the cartoon *King of the Hill* one coworker taped for me, in which Hank Hill struggles with his insurance company over a destructive mold remediation. And while most of these observations hadn't made it into the magazine (until now) they've been noted—and they've reminded me that this is a problem about which the public continues to grow in awareness.

It's also been a reminder of how great it is to have such a wide network of people involved in my search for information on mold. A wide knowledge base about mold is something we're hoping to make available to you as well through our new **Moldmag** Message Forum, available on our website at www.moldmag.com.

There are other fine online message forums that look at mold prevention or remediation, but we're trying to offer a place where individuals from either end of the spectrum—in prevention or remediation—from all types of industries, can find and compare information on mold and moisture management. That means that all of the builders I've overheard at meetings telling their peers that architects aren't designing properly for mold prevention, and all of the remediators who announce to co-workers that builders don't talk to homebuyers enough about their part of mold prevention and everyone else who thinks mold isn't their problem: you're all working on the same problem, so get talking!

We've set it up. It's yours to use. Send any suggestions for making the site a better and more useful resource—or tips on the latest cartoons covering mold—to mheadley@moldmag.com.

Megan Headley
Editor, **Moldmag**

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OSB vs. Plywood

Evaluation of Moisture-Related Risk Factors

By **Colin Murphy** and **Lonnie Haughton**. **Murphy** is a founder and managing partner of Exterior Research & Design LLC in Seattle. **Haughton** is a construction consultant for Richard Avelar & Associates in Oakland, Calif.

The commonly available exterior plywood and oriented strandboard (OSB) sheathing panels can be considered structurally equivalent for all of our standard construction purposes. Both engineered wood products meet or exceed national voluntary performance standards for strength and stiffness, dimensional stability and bond durability. A partial list of these performance tests include racking, uniform load, concentrated static load, impact resistance, direct fastener withdrawal, lateral fastener strength and linear expansion.

There is, however, only limited published testing of the comparative moisture exchange performance of plywood and OSB. In other words, when the two panels are exposed to excess moisture, which resists moisture infiltration better? More importantly, if the two panels become wet, which tends to dry faster?

Industry groups such as APA – The Engineered Wood Association and the Structural Board Association simply state that, when properly installed in conformance with code requirements and industry standards, neither type of panel should ever be exposed to long-term excess moisture.

However, we believe that readers of this column who have had real world experience with exterior plywood and OSB sheathing panels that have become wet will agree that wet plywood panels generally tend to provide better performance (i.e., a slower rate of loss of structural integrity and a somewhat greater resistance to severe proliferation of mold or decay fungi) than comparably wet OSB panels.

Quantification of these performance tendencies are provided in a report published by Achilles Karagiozis of the Oak Ridge National Laboratory, titled *Building Enclosure Hygrothermal Performance Study – Phase 1*[1]. The report provides two-dimensional simulations of the long-term hygrothermal performance of stucco-clad wall systems in Seattle.

The computer modeling of potential real-world conditions of building leakage demonstrates that, during periods of moisture increase within the stucco wall assembly, the moisture content of plywood panel sheathing tends to increase initially at a somewhat faster rate than the OSB panels. However, during periods of moisture decrease, the plywood more rapidly releases its moisture. This results in some extended periods (greater than three months) during which the moisture content of the OSB remains significantly greater than the plywood.

Dr. Karagiozis' report demonstrates that for OSB panels, unlike plywood, the rates for wetting and drying differ greatly and both the wetting and drying rates improve exponentially for the orthogonal 'y-direction' (i.e., laterally within the panel) when compared with the 'x-direction' (i.e., through the panel). In other words, unlike plywood, it is far easier for excess moisture simply to move laterally within an OSB panel than to exit through the panel. This results in an increased potential for conditions favorable to structural deterioration and fungal growth.

High-density gradients between the outer and inner layers of wood strands produced during hot-pressed manufacture of the panels and the addition of wax during the OSB manufacturing process explain this performance characteristic. Such observations are general, of course. Both plywood and OSB panel performance may be affected by many environmental and product variables, including the natural resistance to decay of the differing wood species used to manufacture the engineered wood products.

> "Unlike plywood, it is far easier for excess moisture simply to move laterally within an OSB panel than to exit through the panel. This results in an increased potential for conditions favorable to structural deterioration and fungal growth."

According to an August 1994 article by APA – The Engineered Wood Association, *Dimensional Stability*[2], "When exposed to direct wetting, the moisture content is influenced by wetting time and by panel variables such as veneer species of plywood and wax additives of OSB."

In addition, the modeling results reported by Dr. Karagiozis appear to be consistent with prior comparative research of moisture diffusivity of OSB and plywood carried out by Mostafa Nofal and Kumar Kumaran of the National Research Council of Canada, as reported in the April 2000 issue of *Professional Roofing* magazine and the October 2000 issue of The *Journal of Light Construction*. Dr. Nofal and Dr.

Kumaran demonstrated that an initial wetting-and-drying cycle significantly compromised OSB's ability to resist water infiltration during subsequent cycles:

"OSB's moisture-absorption capacity increased with each cycle, and the time required for reaching maximum moisture content was reduced drastically as cycles progressed."[3]

Increased Moisture Obstacles

A related performance difference between plywood and OSB panel sheathing is thickness swell resulting from increased moisture content. The testing reported by APA[4] reveals, in general terms, the potential for an approximately 30 percent maximum increase in thickness for water-saturated OSB compared to only an approximately 9 percent maximum increase for similarly saturated plywood.

It is reasonable to conclude that due solely to this thickness swell issue the use of OSB sheathing behind stucco cladding will lead to an increased risk for cracking of the attached hardcoat system. In response to this concern, the project architect may wish to provide increased provisions for control and expansion joints, or to call out plywood sheathing instead.

Evaluating the Risks

These observations should not be construed as a blanket condemnation of the use of standard OSB structural panels in roof, wall or floor assemblies, even in the wettest and most humid climates. OSB is a well-engineered product that provides significant economic and environmental benefits through the use of lower quality and more easily farmed trees. For many uses, OSB provides performance and/or service values that are superior to plywood; however, it is clear that on a project-specific basis, prudent designers, specifiers and contractors must evaluate known moisture-related risk factors to determine if OSB is a reasonable substitute for plywood.

Various risk factors (e.g., wintertime construction or high ambient humidity or a projected long lead time before the building is closed in) may lead the design team to: specify plywood instead of OSB; specify a different cladding or roof covering assembly over the OSB; or upgrade the specifications and details for installation of the weather-resistive barrier or felt underlayment and related flashing assemblies.

In addition, combining these risk factors might lead the builder to more closely supervise and coordinate the subcontractors' work or to upgrade the weather protection systems for the exposed construction.

In the event of subsequent building defects litigation, knowledgeable attorneys may require all parties involved in the design, specification and construction processes to defend their evaluation of this OSB vs. plywood issue. This discovery process may lead to claims that the extent and severity of the building's structural damage would have been lessened by proper consideration of known moisture-related risk factors. m

Designers, specifiers and contractors may want to evaluate on a project-specific basis whether moisture-related risks make it appropriate to use OSB or plywood.

[1] A.N. Karagiozis, *Building Enclosure Hygrothermal Performance Study – Phase 1*, Oak Ridge National Laboratory, ORNL/TM-2002-89. http://www.ornl.gov/~webworks/cppr/y2001/rpt/113799.pdf.

[2] *Dimensional Stability* (TT-028), APA – The Engineered Wood Association, Technical Services Division, August 1994. http://www.apawood.org/level_c.cfm?content=pub_tch_libmain.

[3] M. Nofal and K. Kumaran, "Moisture's effects on OSB," *Professional Roofing* magazine, April 2000.

[4] *Dimensional Stability* (TT-028), APA – The Engineered Wood Association, Technical Services Division, August 1994.

In the Field

Field Testing Can Identify Leaks Before They Happen

By **Dean Lewis**, the manager of product certification for the American Architectural Manufacturers Association (AAMA).

Water penetration through fenestration openings has been at the focal point of investigations ranging from mold infestation to hurricane damage. With extreme hurricane conditions, it is very likely that some water will penetrate the window. In addition, rain driven by high winds may enter the wall cavity of a home at any number of points, including soffit or wall penetrations. Running down the wall, the water may emerge around the rough opening at a window or door causing it to appear to be leaking.

It should also be noted that the water resistance performance of a door or window product is often affected by a variety of design parameters. To ensure that design goals are realized in the field, we believe windows should be installed according to InstallationMasters™ specifications. Based on ASTM E 2112 protocols, this is an independent program, originally developed by AAMA, that trains and certifies window installers in proper installation methods to minimize future field failures and callbacks.

Verifying Leak-Resistant Installation

If documented and tested installation methods (such as ASTM E 2112 or AAMA 504) aren't sufficient to ensure the effectiveness of installation methods, performance after installation can be checked according to installation test protocols, such as those set forth in AAMA 502-02, *Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.*

AAMA 502-02 establishes requirements for verifying air infiltration and water penetration resistance of newly installed products (it is not intended for use on existing older installations). Based on ASTM E 783 and ASTM E 1105, it describes two test methods (A and B), both of which require the use of a sealed test chamber applied to the interior side of the window or door and evacuated to establish a specified pressure differential across the product that simulates wind pressure. (The test chamber may be installed on the exterior and raised to a positive pressure.) Water is then sprayed against the outside surface of the window from a calibrated spray rack.

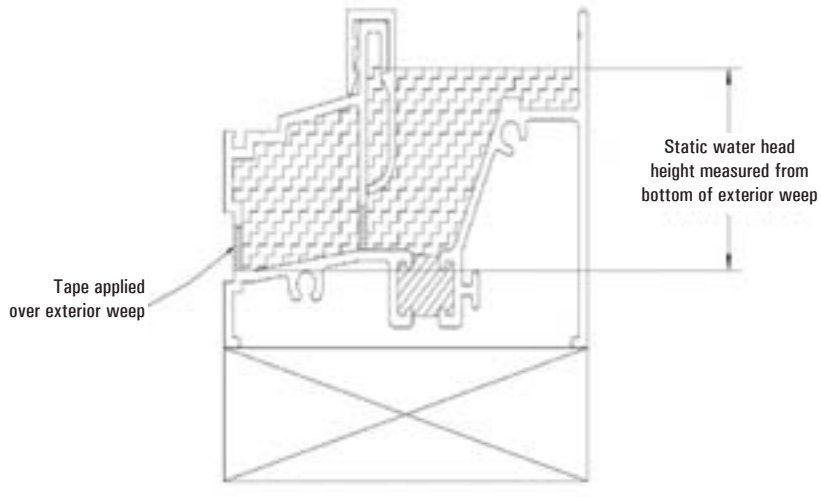
In Method A, only the window or patio door product is tested. Frame corner seals and perimeter members are excluded, although an optional sill dam test can be specified to test for leakage at lower corners. In this test, interior finishings around the bottom of the product's frame are removed and the weep holes are plugged, or an exterior dam can be built, to hold water within the sill frame/receptor system. Water is poured into the resulting vessel to a height such that the static water head (measured from the bottom of the exterior weep hole) is equal to the specified test pressure (calculated in inches as 0.192 x the specified test pressure in psf). To pass the test, there can be no water penetration through the perimeter frame.

Method B tests the complete installed assembly by using a larger test chamber that applies the differential pressure to the joint between the product and the rough opening. It ensures that the entire fenestration product is tested, including the frame, corners, panning, subframe/receptor system, etc. and the adjacent substrate.

AAMA 502-02 also includes a short-form model specification for specifying field testing of newly-installed windows.

Because the consequences of window leakage are potentially serious, investigate all steps of the installation for assurance that the window will perform as intended. m

Method A Testing of Water Penetration in Windows



Static water head (mm) = 0.102 x specified test pressure (Pa)
Static water head (inches) = 0.192 x specified test pressure (psf)

Tales from the Attic

Managing Attic Moisture During Cold Weather

By **Paul Scelsi**, who has been Air Vent Inc.'s Attic Ventilation: Ask the Expert™ seminar leader since 1998. For more information about Air Vent, or its seminars, visit www.airvent.com or call 800/AIR-VENT.

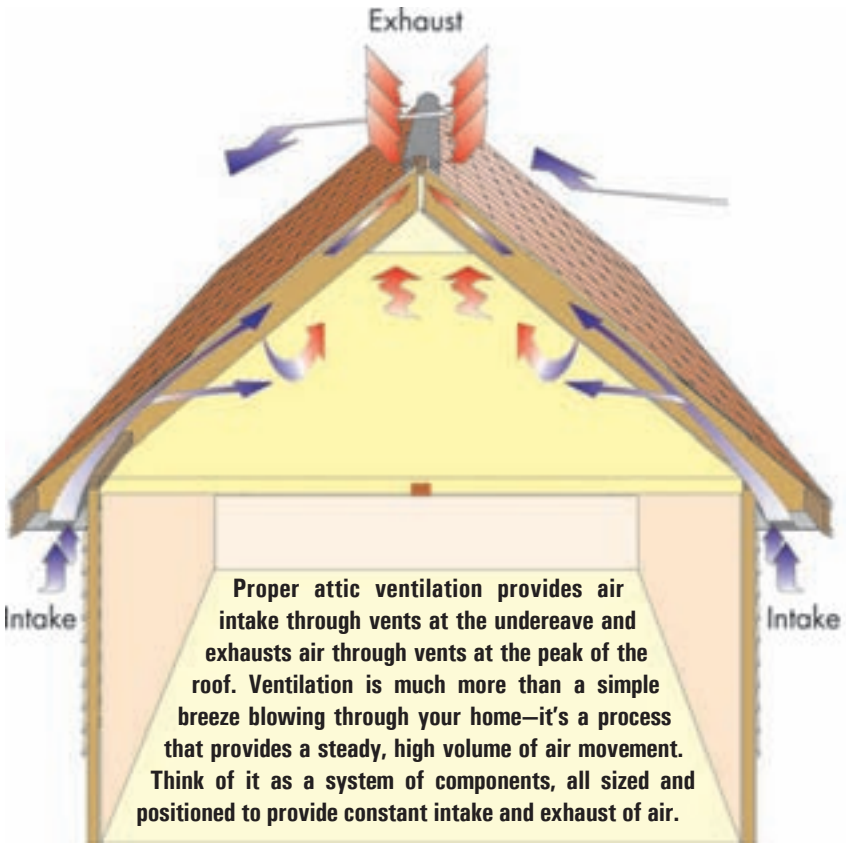
Proper attic ventilation can help prevent costly problems resulting from moisture build-up inside the attic, including mold, mildew, wood rot, dampened insulation and reduced indoor air quality.

A properly designed attic ventilation system not only removes hot air from the attic in the summer months, but will exchange warm, moist air with cooler, drier air in the winter months. This results in more comfortable living quarters, more efficient energy usage and longer-lasting building materials.

Designing a Ventilation System

Attic winter moisture and summer heat build-up have different causes, but they share one solution: a high-efficiency ventilation system that allows a uniform flow of air to sweep the underside of the roof sheathing.

- Determine the square footage of the attic.
- Most building codes require one square foot of vent area for each 150 square feet of attic floor space.



Proper attic ventilation provides air intake through vents at the undereave and exhausts air through vents at the peak of the roof. Ventilation is much more than a simple breeze blowing through your home—it's a process that provides a steady, high volume of air movement. Think of it as a system of components, all sized and positioned to provide constant intake and exhaust of air.

If there is a vapor retarder or the attic ventilation is balanced between the ridge and intake vents, the minimum is reduced to one square foot for every 300 square feet of attic floor space. I recommend the 1/150 ratio due to tighter construction of modern homes.

- Always balance the attic ventilation system with 50 percent of the required ventilation high on the roof for exhaust and 50 percent of the required ventilation low on the roof for intake. Balancing the system allows cool, dry air to enter at the soffit and push warm, moist air out the exhaust vents high on the roof.

By incorporating a high-efficiency attic ventilation system into the homes you build or service, you can help manage moisture during cold weather in addition to providing years of satisfaction, comfort, reduced maintenance and energy costs. It can help reduce callbacks, help build new business and customer loyalty and can lead to increased profits per job. m

What Happens When the Temperatures Drop

- The average family of four generates two to four gallons of moisture from everyday activities such as cooking, cleaning, showering and breathing. Some of this moisture eventually rises to a cooler, dryer place: the attic.
- If not properly ventilated out of the attic, the moisture can condense as frost or water droplets inside the attic when it hits the cooler rafters, trusses and roof sheathing, where it can lead to problems with building materials and the indoor air quality.
- Moisture build-up can have long-term effects. Not all the condensing moisture drips into insulation. The structural elements of the house also absorb some, which can lead to wood rot and the deterioration of roofing materials. Other moisture is likely to soak into the attic floor and eventually into ceiling materials, causing water stains and paint damage in the rooms below.

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INDUSTRY NEWS

NAHI Members Deploy to Gulf Coast

The National Association of Home Inspectors (NAHI) now has members working under the Federal Emergency Management Agency (FEMA) to perform habitability inspections in the Mississippi Gulf Coast areas damaged by Hurricane Katrina. The inspection reports are required as part of the FEMA claim process. In addition, NAHI members are also working with non-profit organizations in the relief and recovery efforts.

NAHI member Everett Rawlings was in D'iberville, Miss., as part of the relief effort and was shocked by the amount of damage he saw.

"D'iberville, which is near Biloxi, didn't have the high winds that other areas had," said Rawlings. "But it did have a storm surge of 25 to 30 feet, which flooded most of the homes in the area. The homes had extensive water damage as well as mud and debris in the flooded rooms."

NAHI member Claude McGavic was in Slidell, La., and saw that many of the homes had little that was salvageable.

"Many of the homes had both wind and water damage to the extent that they will have to be stripped to the studs before they can be rebuilt. It's a sad situation for both homeowners and businesses in the area," said McGavic.

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COMPANY NEWS

BluWood™ Expands into New Facilities

EnviroGard of the Southeast, of Conway, S.C., a company that treats framing lumber to resist mold and termites, is taking advantage of a local growth spurt and expanding to an empty factory in Georgetown County, S.C., according to an article in *The Sun News*.

The company plans to hire 25 people to run the manufacturing and distribution facility to start with and add more as sales increase.

EnviroGard, a private company, is licensed to use a process developed by Woodsmart Solutions of Boca Raton, Fla. Wood treated by WoodSmart's Perfect Barrier System, the technology behind the company's BluWood, is primarily sold to lumber dealers who in turn sell mainly to builders.

WoodSmart Solutions is in talks to have its mold-resistant BluWood available nationwide in 2006.

WoodSmart Solutions is continually opening new licensed treatment centers to produce BluWood. There are currently treatment facilities operating in Georgetown and Conway, S.C.; Asheville and Raleigh, N.C.; Winter Haven, Fla., and Dallas, Texas. Talks are ongoing to have the process available nationally by the end of 2006, according to information from the company.

"This year we'll have treatment centers across two-thirds of the United States and Canada," said Charles Morando, chief executive officer of WoodSmart in a telephone interview.

According to Morando, business is growing at the rate of 30 to 40 percent a month, and BluWood is "absolutely the hottest thing in the building industry."

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LITERATURE

Gypsum Association Releases Document on Water Damage

Due to the severe weather events in the Gulf Coast region that resulted in the flooding of many buildings, the Gypsum Association has released document GA-231 to address the assessment of water-damaged gypsum board.

The brief document provides information on determining whether gypsum board must be replaced after it is exposed to elevated levels of moisture. It also provides recommendations for drying conditions and additional sources of information on mold and water damage. According to the association, the guidelines were implemented for help following Hurricanes Katrina and Rita that flooded large areas of Louisiana, Mississippi, Alabama and Texas, but can be useful in the case of exposure to water from other sources, such as improper storage, water leaks and janitorial activities.

The document is available from the Gypsum Association's website.

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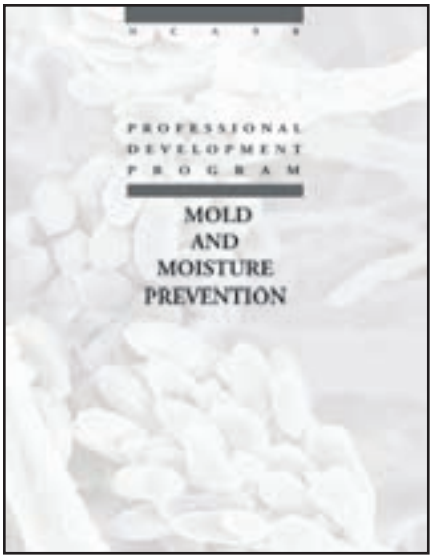
Forensic Mold and Moisture Manual Now Available

David Odom and George DuBose of Liberty Building Diagnostics Group recently co-authored a new manual, *Mold and Moisture Prevention*, for the National Council of Architectural Registration Board (NCARB).



A new manual aims to provide a standard of care for designing and constructing moisture-free buildings.

According to the authors, the 124-page manual provides a series of proven guidelines on specific ways to avoid moisture and mold problems. The document aims to establish a new standard of care for designing and constructing moisture-free buildings, providing the latest information for designers, contractors and building owners on key issues such as building envelope and rainwater intrusion solutions; HVAC and humidity control solutions; and moisture and mold remediation. It concentrates on integrating the designs of both the envelope and the HVAC systems.

Together Odom and DuBose have more than 35 years of experience in predicting, preventing, diagnosing and successfully remediating mold and moisture problems in more than 500 buildings. The authors' previous manual, in cooperation with Disney Develop-ment Co., has been used as a guide successfully in more than $2 billion in construction.

The manual is $215 and can be obtained online from LPDG's website.

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SPOTTED

IBA Selected to Waterproof New Trump Tower

IBA Consultants of Miami, a consulting firm that specializes in building envelopes, glass and waterproofing, has been selected for the new Trump Tower Tampa project developed by Donald J. Trump and SimDag-RoBEL LLC.

IBA will provide the project's architect with design development, construction document review, shop drawing/submittal review, site inspection and testing services for waterproofing, glass and roofing.

"With so much on the line for luxury buildings—money, time and reputation—no one wants the building to leak after construction," stated Mark Baker, president of IBA. "That's why more architects are getting us involved early in the design process to ensure the integrity of the building envelope is done right the first time. We are excited about being a partner on this prestigious project."

The $220 million, 52-story development will be located in the heart of Tampa's financial and cultural districts and feature 190 condominium and penthouse residences. When completed, it will be the tallest residential building on the Gulf of Mexico.

MERGERS AND ACQUISITIONS

Tremco Completes Acquisition of Illbruck Sealant Systems

Tremco Inc. of Beachwood, Ohio, a global supplier of products to control moisture intrusion, including sealants, weatherproofing and residential waterproofing, has completed the acquisition of privately-owned Illbruck Sealant Systems, located in Leverkusen, Germany, for approximately $137 million.

Illbruck, with sales of approximately $190 million, is a manufacturer of high-performance sealants and installation systems for pre-fabricated construction components and for window and door applications. Illbruck systems are highly specified throughout Europe and are sold primarily to professional window and door applicators. The company's product line includes joint sealing tapes, flashing tapes, cartridge sealants and adhesives, polyurethane foams, strips, foils and accessories.

"We are excited at the potential opportunities resulting from bringing Tremco and Illbruck together," said Randy Korach, president of Tremco's global sealants division. "We believe that the combination of these companies creates synergies that will enable us to better meet the needs of our customers throughout the world. Illbruck will not only extend Tremco's product offering with a complementary line of well respected brands but will add a talented workforce and a strong pan-European infrastructure to our existing operations."

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PIA Holds Insurance Industry Summit

The Professional Insurance Agents (PIA) Western Alliance, an association representing independent insurance agents in nine Western states, presented a summit on moisture management and mold control on January 12, 2006, at the Doubletree Suites Southcenter in Seattle. The goal of the summit was to build awareness within the insurance industry and among realtors, contractors and lenders that preventative steps can be taken to reduce their exposure to losses resulting from moisture damage. To teach insurers about the availability of tools to prevent mold growth, PIA is using the Mold Technologies Moisture Management System™. The system, from Mold Technologies Inc. of Salem, Ore., was built around MoldTech™ inspection software manufactured by Core Environmental Corp®.

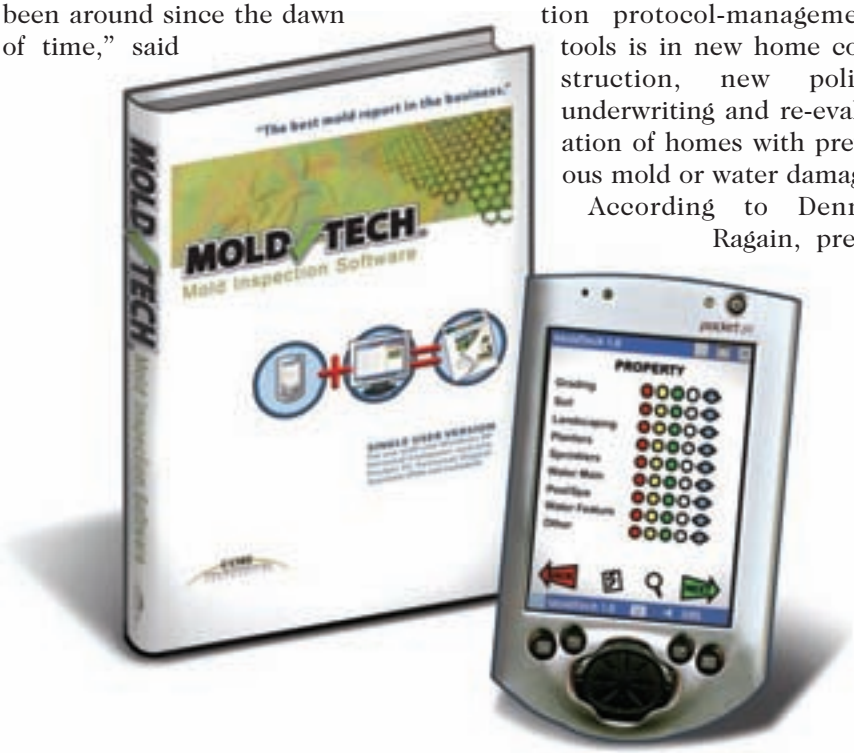
"We think that this is a 21st century solution to a problem that's been around since the dawn of time," said Gary Wolcott, director of communications for PIA, of the system.

The association has also announced its official endorsement of the system and formed a close working relationship with the software manufacturer, Core Environmental Corp.

The endorsement states in part: "The PIA Western Alliance believes MoldTech mold inspection software, the technology developed by Core Environmental Corp. and processes used by Mold Technologies™ are a major benefit to insurance companies and consumers and for this reason the PIA Western Alliance has endorsed this technology."

As part of its backing, the PIA is currently developing resources to make mold inspectors certified by Mold Technologies available to its members. Areas in which the PIA would like its members to utilize inspectors using the mold inspection protocol-management tools is in new home construction, new policy underwriting and re-evaluation of homes with previous mold or water damage.

According to Dennis Ragain, president of Mold Technologies, PIA's national office is currently looking into adopting the system.



Some High-End Homes to be Insured Against Floods

Several private-sector insurance groups, including American International Group Inc. (AIG), Chubb Corp., Fireman's Fund and Lloyd's, are introducing new coverage designed to protect high-end homeowners from water damage resulting from floods, according to a September article in *The Wall Street Journal.*

Standard homeowners' policies don't cover flood damage, and until now flood coverage could only be purchased through the National Flood Insurance Program (NFIP) run by the Federal Emergency Management Agency—but only for homes in designated flood areas.

One of the new options for high-end homeowners is to buy a separate "excess flood" insurance policy in addition to the standard NFIP flood coverage, according to the article. The excess flood insurance covers damage above the $250,000 federal limit.

According to the article, AIG's Private Client Group began including flood coverage last year, targeting homeowners who purchase policies of at least $1 million in coverage. Like the NFIP coverage, AIG's primary flood insurance covers up to $250,000 to rebuild structures and $100,000 to replace personal property. However, AIG's coverage adds insurance for things the federal plan typically does not, providing money for basement finishes and contents, as well as living expenses if the homeowners are displaced by a flood.

AIG's primary flood coverage, however, is currently available only in

Excess flood insurance policies, now available from some insurance companies, cover costs of flood damage above the federal policy's $250,000 cap.

California, Colorado, Connecticut, Illinois and Massachusetts, and does not cover homeowners in high-risk flood zones.

Anyone who resides in a city or county that participates in the federal program is eligible to buy flood insurance. A list of participating areas is available on the NFIP Web site, www.floodsmart.gov.

Working From the Outside In

High Rise Residents Look Out on Mold Remediation

By **Peter Sierck**, an industrial hygienist and the director of Environmental Testing & Technology Inc. He participated in the development of the IICRC standards S500 for professional water restoration and the S520 for professional mold remediation. Peter can be reached by e-mail at PSierck@IAQsurveys.com.

The mild climate in Southern California invites retirees from all over the United States and Canada to spend their golden years under the warm and ever-present sunshine of the Pacific coast. Upscale retirement communities can be found embracing their own golf course or as high rise condominiums with an ocean view.

This particular high-end, 21-story condominium had chronic water intrusions, which triggered a lawsuit with an extensive discovery phase. The investigation identified water intrusions through the exterior wall assembly, windows, sliding doors and decks. The building envelope consisted of an exterior insulation and finish system (EIFS). An EIFS is made up of sheets of polystyrene foam (styrofoam) glued to exterior drywall sheeting and then sealed with co-polymer coating on the outside. No building paper or interior drainage plane is present in this type of assembly.

Once a monetary settlement was reached, the repair process began. The remediation plan required the removal and replacement of the entire building envelope, all windows and glass sliding doors, the deck membranes and flashings. However, the relocation costs for the residents were estimated at about $9 million. To save the cost of relocation, an innovative approach to allow the residents to stay in the units while work was developed. We termed this process "working from the outside in."

Containing the Building

The work plan consisted of building an exterior containment around the structure that was negative pressurized in relationship to the interior residential units. This allowed removal of the exterior sheeting and the inspection of interior drywall from the outside (exterior containment). Local interior containments were built where interior drywall needed to be removed. The containment was tested upon completion of the local remediation. However, a number of engineering challenges had to be solved.

To save the cost of relocating residents, the remediation crew created a negative-pressurized containment around the exterior of this condo.

The project was divided into seven phases with three floors per phase beginning at the penthouse level. "Trigger points" as to when interior materials need to be removed and what constituted successful post remediation verification were determined.

First, the structurally-engineered scaffold system around the building was erected. Steel beams and columns were installed to transfer the structural loads through administrative offices and two levels of park-

ing garages down to the bottom slab.

The scaffolding was shrink-wrapped and 24 HEPA-filtered negative air machines were put in the exterior containment under negative pressure, creating between 30 and 40 air exchanges per hour. This assured a managed airflow from inside the residential condominiums to the exterior containment and dilution ventilation for the exterior containment.

Workers then started to cut and remove the EIFS paneling 450 feet above ground level. Initially, a pressure differential of minus 12 to 18 Pascal was achieved. However, once large sections of exterior sheeting were removed, the negative pressure dropped significantly. The negative pressure was monitored 24/7 and recorded with a digital manometer with an alarm feature that announced any critical pressure drop below 5 Pascal.

The remediation of this condo offered several challenges, including construction of an exterior containment system upon 21 story scaffolding.

After initial debris clean-up, the interior drywall was inspected for visible mold growth. Astonishingly, very little damage was detected on the interior drywall. That was good news because unique built-in bookshelves, hand-milled baseboards and expensive wallpaper complicated remediation of the interior.

Up and Out

The new doors and windows arrived next and were installed on the penthouse level. The units were inspected and water tested—and we found that they did not fit properly and were leaking. They went back to the manufacturer for design changes. Meanwhile, the mold remediation work continued into the next phases, making its way down the high-rise.

Scaffoldings were constructed to bear a specific load. The top of the scaffold was scheduled to be dismantled upon completion of the installation of the windows and reconstruction of the exterior building envelope. However, at phase 4, the scaffolding reached its maximum approved load capacity and the entire mold remediation project came to a full stop.

By then it was late summer, with the winter and the possibility of rain storms was fast approaching. The recently-remediated elevations of the building that did not have a repaired exterior wall assembly and were protected by the shrink-wrapped scaffold only would be very vulnerable to further water intrusions. Everybody was waiting for the arrival of the new refitted windows. Two month went by before they finally arrived.

Modifying the System

Engineers concluded that an EIFS cladding system needed to be reinstalled, as a stucco system would exceed the structural load capacity of the structure. To prevent future mold growth, a modified drainage plane EIFS system was designed. This new "waterproof" assembly consisted of:

- use of exterior glass-mat gypsum sheeting to eliminate the mold growth-supporting cellulose nutrient source (paper);
- application of a primer to provide an adhesive coating for the bitumen membrane;
- application of a self-adhering bitumen membrane to provide a drainage plane;
- installation of an expanded metal lath system to provide drainage channels; and
- foam board, taping, a base coat and color finish coat.

Finally, the scaffolding was removed from the top levels and hope rose that the project would conclude before the year's end. Three months later, eighteen months after the project began, the last interior containment was cleared and in early spring, all repairs were completed.

Overall, only relatively small amounts of mold damaged interior drywall were detected and removed. The project cost stayed within its $11 million budget using the innovative exterior containment concept. The new modified drainage plane EIFS building envelope is now a very reliable cladding and rain water management system. m

COMPANY NEWS

RestorAid Disaster Services Honored with Torch Award

RestorAid Disaster Services of Woodlawn, Ohio, has been awarded the Cincinnati Better Business Bureau's (BBB) Torch Award for Marketplace Ethics.

According to a news release from RestorAid, the company received the award for demonstrating high ethical standards and integrity toward customers, suppliers, shareholders, employees and communities in which they do business.

The Torch Award was presented to RestorAid Disaster Services president Keith Desserich (center) at a gala event on October 20, 2005.

"The Torch Award encompasses the spirit and tradition of the BBB unlike anything else," said BBB president Jocile Ehrlich. "It recognizes and honors businesses and organizations that fully commit themselves to ethical practices in all aspects of their business dealings."

The Cincinnati BBB is one of the largest in the nation, and this award holds special significance. This marked the first time it has ever been awarded to a restoration company in this area and one of the few times that it has ever been awarded to a company on the first nomination. It is a lifetime award that the company cannot receive again, although RestorAid is now eligible for the international 2006 BBB Torch Award.

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PDG Environmental Announces Acquisition of Lange America

Pittsburgh-based PDG Environmental Inc. (PDGE), a national specialty contractor, announced that is has acquired certain assets, backlog and operations of Lange America Inc., a Los Angeles-based mold and asbestos remediation company. The acquisition was finalized November 18, 2005. Terms of the acquisition have not been disclosed.

John Regan, chairperson and chief executive officer of PDG Environmental, commented, "PDGE is very pleased to have been able to take advantage of this opportunity. Lange's customer base will significantly improve our already extensive contact and customer list in the Southern California market. There is very little overlap between our current customer base and Lange's. Lange's annual revenues are approximately $3.5 to $4 million and PDGE will be assuming Lange's $2 to $2.5 million backlog. Existing Lange management will join PDGE and operations will be consolidated at PDGE's operations center in Fullerton (a Los Angeles suburb)."

Regan added, "PDGE continues to explore both opportunistic and strategic acquisitions where appropriate, and Lange met our criteria."

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MARCOR Announces Expansion into Midwest

MARCOR Remediation Inc. of Hunt Valley, Md., a provider of environmental contracting services, is expanding its reach into the Midwest market, according to David A. Jungers, president and chief operating officer. The first step of this expansion is the opening of a new office in the Pittsburgh, Pa., area.

"We have a very strong presence on the East, West and South. With this new office, we are building our foundation to better serve our Midwest clients," Jungers said. "We have always served the Midwest region of the country, but we now feel we can greatly improve our service by opening a regional office."

The initial geographic focus of the Pittsburgh office will be western Pennsylvania, Ohio, Kentucky, Michigan, Minnesota, Wisconsin, Illinois and Indiana. The new office, under the direction of general manager Jim Bliss, is based in Cranberry Township, Pa.

Heading up the major expansion into the Midwest is Tony Skenzich, regional manager.

In the South Central region of the country, the company is opening a new office in the New Orleans area.

"We established this new office to provide environmental and demolition services to help cleanup and

rebuild the region hit hard by Hurricanes Katrina and Rita," said Jungers. The office is based in Saint Rose, La. Mike Burke will manage the office.

The two new offices mark the opening of the company's 15th and 16th offices.

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Mold Consulting Firm Nationally Recognized a Second Time

For the second year in a row, DiversityBusiness.com, a multicultural business-to-business online portal that links large organizational buyers to multicultural product and service businesses, has named Pure Air Control Services of Clearwater, Fla., as one of the top 100 diversity-owned businesses in Florida.

Pure Air Control Services, in business for over 20 years, is the largest indoor environmental consulting company in Florida, with an in-house AIHA-accredited environmental microbiology laboratory. The IAQ consulting firm was also recently awarded a GSA contract, providing diagnostic and remediation services directly to federal government agencies.

Pure Air Control Services has been recognized as one of the top diversity-owned businesses in Florida.

"We are proud of our firm's efforts as a minority-owned business, and to be among this elite group of companies and individuals," said Alan Wozniak, president and chief executive officer of Pure Air Control Services.

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IN ACTION

Sabre Technical Services "Fumigates" New Orleans Landmark to Remove Mold

Pascal's Manale, the New Orleans landmark restaurant that created the world famous dish barbecue shrimp, was fumigated with chlorine dioxide gas in November 2005 by Albany, N.Y.-based Sabre Technical Services. The method is actually being used in New Orleans to combat the heavy mold and other biological contaminants resulting from the flooding following Hurricane Katrina.

BRIEFLY ...

EMLab™ has opened a new microlab in Baton Rouge, La. The new lab has a drop off location in New Orleans, 24 hours turnaround time on spore trap and direct exam analysis and 24/7 online access to reports and invoices. www.moldmag.com/infocenter ... The **Infrared Training Center** has announced its course schedule through May 2006. The courses, held at the ITC headquarters in Boston, offer infrared training programs including predictive maintenance, thermography, research and development and application courses in building science. In addition, the training center now has an infrared thermography primer, answering common questions about infrared thermography, available on its website. www.moldmag.com/infocenter ...

John Mason, president and chief executive officer of Sabre Technical Solutions said, "Sabre's method of mold treatment is the only EPA-registered product that uses a fumigant to decontaminate an entire structure."

He went on to explain that a structure fumigated with chlorine dioxide does not have to be stripped and gutted as is done with traditional mold remediation. Because the gas penetrates interior wall spaces and is effective on hard, porous and non-porous surfaces, it is not necessary to remove mold-affected areas of a structure. Moreover, the fumigation process is complete in one day, allowing for rapid recovery and rebuilding of these compromised structures. Chlorine dioxide fumigation removes mold from the rebuilding equation.

Mason added, "Sabre mobilized its equipment and personnel to New Orleans within days after the flooding. It is an honor to be working with key business owners and homeowners helping during these difficult times in Louisiana."

Chlorine dioxide is a micro-biocide that has been used for disinfection and sterilization in the food and drinking water industries for more than seventy years. It does not form toxic byproducts, is environmentally friendly and leaves no residual toxicity. Chlorine dioxide gas penetrates into all surfaces, including interior wall cavities, porous surfaces, carpets, ducting and insulation. The treatment eliminates the need for traditional "rip and replace" mold remediation and substantially reduces the cost and duration of renovation.

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DISINFECTANTS

Sporicidin International Offers EPA-Registered Disinfectant

Sporicidin International, based in Rockville, Md., is offering its Sporicidin disinfectant for mold remediation. The disinfectant is suitable for mold remediation, air duct cleaning, sewer backflow clean-up and carpet decontamination in residential and commercial buildings. It is also an active deodorant that kills the organisms that cause odors.

According to information provided by the company, a two-year study at the University of Maryland by Dr. George Bean, department of cell biology and molecular genetics, found that Sporicidin prevented mold growth (notably of stachybotrys and chaetomium) and provided "continuous residual fungistatic activity for four months after application." The study also showed the treatment to be useful on drywall before installation for preventing future mold contamination.

The product is EPA-registered to provide continuous residual bacteriostatic activity for up to six months. It is also FDA- and OSHA-compliant.

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Sensible Life Products EPA-Registered as Botanical Disinfectants

Sensible Life Products (SLP) of Flamborough, Ontario, is offering a botanical disinfectant with EPA certification. The EPA stamp of approval for Benefect® is added to official recognitions from Health Canada and the Environmental Choice Program.

The only disinfectant with food-grade, plant-based biodegradable ingredients, Benefect kills more than 99.99 percent of fungi, as well as bacteria, TB and HIV, according to a company news release. No mixing is required before applying the product, and once it is sprayed onto an area, there is no need for rinsing or wiping.

Although suitable for homeowners' use, company information says that the product can be used by contractors for hard surface disinfection on construction materials, such as frame lumber, concrete or drywall, as well as for mold abatement. It is also recommended for use in commercial and medical applications, including: food preparation and storage facilities; day cares

CLEANERS

Anabec Provides Mold Clean-Up

The Anabec Systems, from Anabec Inc. of Clarence, N.Y., are science-based product lines developed to reduce indoor allergens and remove strains of mold and bacteria in porous building materials such as wood, brick, block, concrete, ceiling tile, insulation and flooring.

The company's remediation systems clean and protect treated building surfaces with the reduction of colony-forming units and long-term protection. The Anabec Advanced Cleaning Solution is a patented detergent with high contact and penetrating ability. The cleaner removes the food source for the mold and bacteria, leaving a pristine surface behind. The microbial barrier Anabec X-70 and EPA-registered antimicrobial shield, AnaShield, provide durable bonding agents that inhibit the reoccurrence of microbial growth and provide long term protection.

All of the company's product systems average 1,000 square feet per gallon and when applied by a trained Anabec applicator come with written warranties for up to 30 years.

The systems have been used in schools, office buildings, homes and healthcare facilities across the country.

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and nurseries; hospitals; hotels and restaurants; schools; and other similar application sites where bacteria, mold and mildew or odors are a concern.

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Moldex™ Designed for Range of Uses

Moldex, from EnviroCare Corp. of Wilmington, Mass., is an EPA-registered disinfectant, sanitizer and cleaner. Useful for household cleaning, it is also suitable for use as an industrial cleaner for water damage restoration. According to information from the company, Moldex has also been approved for use as a hospital-grade disinfectant. Specifically formulated as a fungicide and mildewstat, it is based on a proven quaternary ammonium blend and packaged in a ready-to-use form.

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BioTech Medics Commences Selling SHBAN™ Biotech Disinfectant

BioTech Medics Inc. of Irving, Texas, has begun marketing and selling its SHBAN™ Biotech disinfectant and cleaning solution.

According to company information, the SHBAN BioTech Solution is an effective, odorless, non-chlorine-based, anti-mold, anti-fungal, cleaning solution that may be used safely as directed in a variety of ways. The disinfectant may be used on porous clothes and materials as well as hard surfaces. SHBAN is sold in 16-ounce, 32-ounce and 1-gallon containers.

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SOFTWARE

Leviticus Corp. Adds Modules for Inspector/Remediator Software

Leviticus Corp. of Traverse City, Mich., has released new add-on modules for its Leviticus PRO 2005 document compliance software for mold inspectors and remediators. The software allows users to integrate customer management, basic and advanced report generation—from mold inspections to remediation scopes and estimates—and financial information.

In addition to time-saving advances, the software has added flexible integration with QuickBook® accounting software and a graphical imaging module that allows users to manipulate digital images within the Leviticus software.

According to a company news release, the product is scalable from a single user to an entire enterprise. The software's "open-architecture" design allows Leviticus to expand as needed with a growing business.

The company says the new software is endorsed by the National Association of Mold Professionals (NAMP), Integrated Microbiological Services Laboratory LLC and recommended by the Environmental Education Foundation (EEF) as well as the National Indoor Air Quality Institute (NIAQI).

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METERS

New Fluke 971 Meter Measures Temperature, Humidity

Fluke Corp. of Everett, Wash., a manufacturer of handheld test and measurement products, has introduced the Fluke 971 temperature humidity meter. The rugged, pocket-sized test tool was designed for professionals in the heating, ventilation and air conditioning (HVAC), building maintenance and indoor air quality (IAQ) fields.

The Fluke 971 measures temperature, dew point or wet bulb from -4° Fahrenheit to 140° Fahrenheit (±1.0° Fahrenheit) and measures relative humidity from 5 percent to 95 percent (±2.5 percent RH). Its 99-point data storage capacity means users can take multiple readings and store them for later analysis.

The meter features a liquid crystal display with backlight and a low battery indicator. The unit operates on four AAA alkaline batteries. With its pocket-size convenience and durability, the Fluke 971 gives HVAC technicians and building managers an accurate, simple tool to ensure HVAC systems are operating within specification. Industrial hygienists will find it useful for identifying conditions that encourage biological growth, and verifying that measures to control humidity are working.

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Show Preview

Winter Wonderland

Two Industry Meetings Offer Learning Opportunities:

A Preview of the Builders Show and AHR Expo

What better way to prevent those winter blues than by throwing something a little unusual into your schedule? And while you're at it, why not pick up the information and products you need to do a better job? Why not accomplish both with a trip to a sunny Southern city or a flight into a Midwestern metropolis with something for everyone?

Good things come in pairs this January as two big shows—the International Builders' Show (IBS) and the International Air-Conditioning, Heating, Refrigerating Exposition (AHR Expo)—offer up hundreds of exhibitors, present unique events and in general make learning fun.

International Builders' Show

The holidays have drawn to a close but builders are just getting ready to gorge themselves upon the biggest educational treat of all. The annual International Builders Show, sponsored by the National Association of Home Builders (NAHB), will be held January 11-14. More than 200 educational sessions, more than 1,600 exhibitors and more attendees than ever before will fill the Orange County Convention Center in Orlando, Fla.

Another treat is the keynote speaker at the grand opening ceremonies.

"We are very honored to have Colin Powell as the keynote speaker for the 2006 International Builders' Show," said NAHB president Dave Wilson.

Now here's something special just for **Moldmag** readers: an early look at some of the products that will be featured at the show can be found in our special products section on page 24.

Be sure to visit **Moldmag** at booth W7000!

Colin Powell to Give IBS Keynote Address

A noted statesman, a highly respected soldier and the nation's 65th Secretary of State, General Colin L. Powell will be the keynote speaker at the grand opening ceremonies of the 2006 International Builders' Show in Orlando, Fla.

Gen. Powell served in the United States Army for 35 years, rising to the rank of Four-Star General and serving as chairman of the Joint Chiefs of Staff from 1989 to 1993. Before becoming Secretary of State, he served as an aide to the Secretary of Defense and as National Security Advisor to President Reagan.

The grand opening ceremony and keynote address begins at 10:30 a.m. on January 11. Limited general seating is available on a first-come, first-served basis.

IBS Hours:
Wednesday, January 11
9:30 a.m. – 5:00 p.m.
Thursday, January 12
9:30 a.m. – 5:00 p.m.
Friday, January 13
9:30 a.m. – 5:00 p.m.
Saturday, January 14
9:00 a.m. – 1:00 p.m.

AHR Expo

The largest HVAC&R event of the year—the International Air-Conditioning, Heating, Refrigerating Exposition (AHR Expo)—will take place January 23-25 at the McCormick Place in Chicago. The American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc. (ASHRAE), the Air-Conditioning and Refrigeration Institute (ARI) and the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI), all co-sponsors of the event, are expecting more than 35,000 visitors to see 1,800 exhibitors—including **Moldmag** in booth 1143.

Architects, engineers, builders and contractors looking to design and integrate HVAC systems more efficiently can meet with manufacturers and new suppliers, see live demonstrations of products in action, find the latest technology and network and learn from experts and peers.

If you're looking to spend a little more time in the Windy City and get a little more information, come in early for the educational opportunities found at the ASHRAE Winter Meeting, being held January 21-25 at the Palmer House Hilton Hotel.

But why wait? You can see some of the products from these exhibitors in our special products section starting on page 24.

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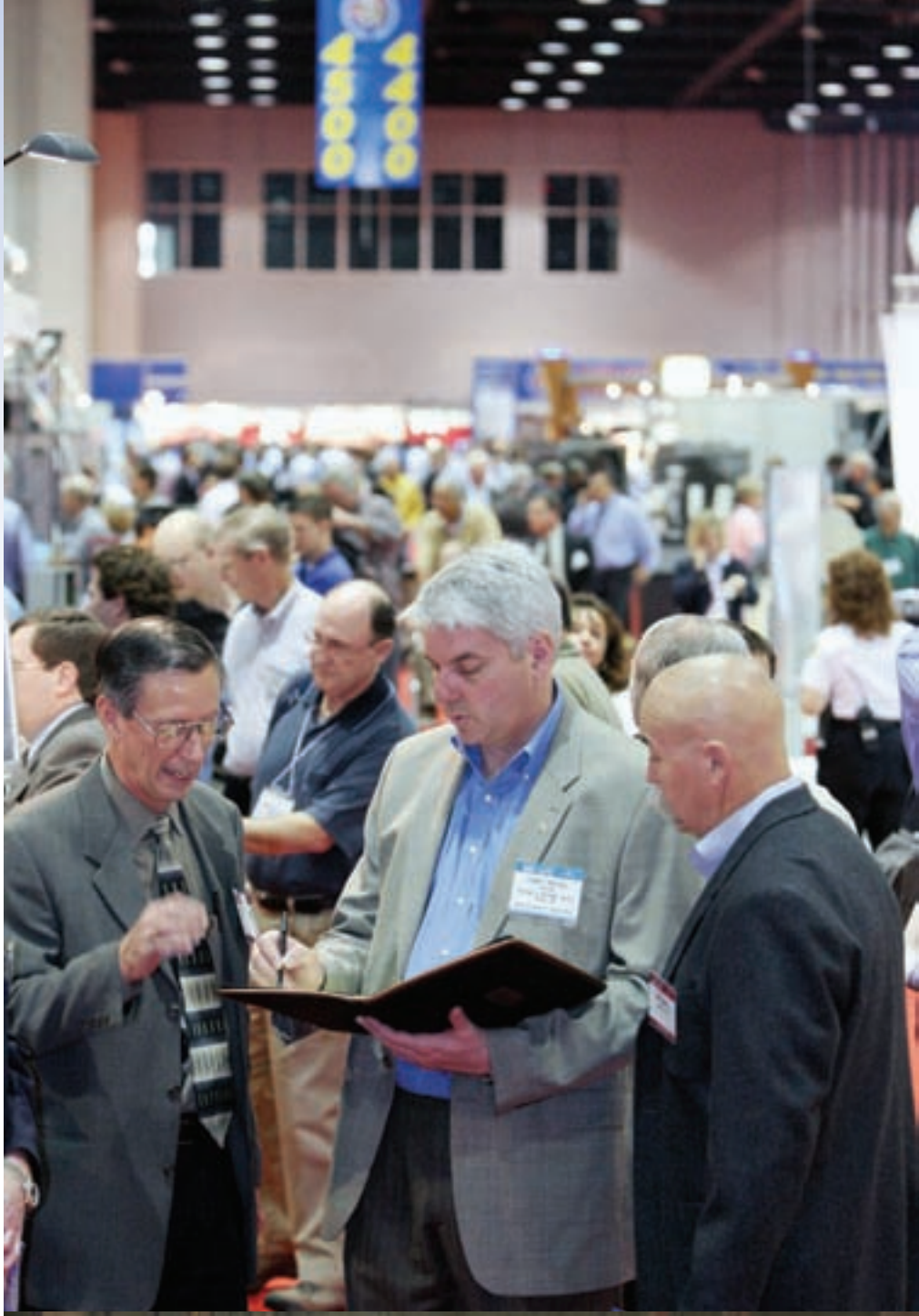
AHR Expo Hours

Monday, January 23
10 a.m. – 6 p.m.
Tuesday, January 24
10 a.m. – 6 p.m.
Wednesday, January 25
10 a.m. – 4 p.m.



A Product Preview of the Builders Show and AHR Expo

Whether you're looking to prioritize your mold prevention needs or looking to see what all the fuss is about, our preview of the International Builders Show and the International Air-Conditioning, Heating, Refrigerating Exposition will give you a glance into some of the prevention products to be featured at two big shows this January.

WALLBOARD

IBS Booth #W3159: Georgia-Pacific Stops Mold in Its Tracks with New Advertising Campaign

Atlanta-based G-P Gypsum Corp., a wholly-owned subsidiary of Georgia-Pacific Corp., has launched a new consumer-oriented "Stop Feeding Mold™" advertising campaign for the company's mold- and moisture-resistant DensArmor® Plus interior wallboard product line.

The campaign is intended to educate consumers about the company's paperless interior wallboard that can reduce the risk of mold growth in residential construction. DensArmor Plus specifically targets one of mold's food sources—the paper found on most interior wallboard products. The campaign spotlights how DensArmor Plus is the only interior wallboard available in North America featuring mold- and moisture-resistant glass mat facings, which replace the paper facings used in the manufacture of traditional drywall.

Traditionally, Georgia Pacific has marketed its building products almost exclusively to the building products industry. The "Stop Feeding Mold" consumer advertising for DenArmor Plus interior wallboard provides a new mechanism for helping pull through sales of products for the building and construction industries.

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WEATHER BARRIER

IBS Booth #S12385: Valéron Vortec Promotes Water Drainage

Valéron Strength Films of Houston is now offering its Vortec™ water-resistive barrier, a moisture management solution for the building and construction industries. The barrier is engineered with millions of non-directional drainage channels that allow moisture to drain fully.

Vortec is a thin, flexible plastic film micro-perforated and engineered with a pattern of dimples and bumps. The barrier is installed on the exterior of a home or commercial building during construction. The engineered surface facilitates water drainage by channeling any water that gets past the siding away from a structure's exterior wall surface, thereby reducing the chance of mold and mildew.

According to a company news release, the product is the company's first direct-to-user brand.

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SIDING

IBS Booth #W1559: LP® SmartSide® Meets Exterior Siding Standards

Moisture-resistant SmartSide siding products, from Louisiana-Pacific of Nashville, are treated with resin to provide protection from moisture and zinc borate to resist termites and fungal decay. In fact, the SmartSide products were jungle-tested in Hilo, Hawaii, one of the world's most-voluminous rainfall climates, where the volume of repetitive annual mois-

DESSICANTS

Silica Gel Used to Stop Moisture and Mold in Home Construction

Desiccants have been used for decades to control moisture-related problems such as mold and corrosion in nearly every industry. Dry-Stuff desiccant strips from Autumn River Inc. of Coon Rapids, Minn., have been sized for a typical 2-by-4 or 2-by-6 wall cavity built 8 feet tall and 16 inches on center. The desiccant blend encapsulated within the strip is capable of adsorbing up to 40 percent of its own weight in moisture.

By hanging one desiccant strip in each exterior wall cavity, enough drying capacity is introduced to ensure that framing lumber moisture content will quickly be dried to below 20 percent, the common threshold for

mold growth on lumber. This typically occurs within 48 hours of installing the desiccant strip and applying the vapor retarder. The desiccant technology is also applicable for water damage situations.

The dry-stuff desiccant strip is capable of regenerating itself and offers continuing protection. The product will quickly absorb excess moisture when the humidity and moisture-related damage potential is high, and will slowly release the stored moisture when humidity and moisture-related damage potential is very low.

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ture is more extreme than that of hurricanes, according to information from the company.

In addition, the siding products can be used in all wind zones, including U.S. coastal areas, and have been wind-tested to 130 mph. The products exceed the American Plywood Association standard for exterior siding, meet standards set forth in National Evaluation Report 124 from ICC-ES and have been approved by Florida's building code.

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FLASHING

IBS Booth #W5971: Pactiv Adds Greenguard® Flashing to Moisture Management System

Pactiv Corp. of Lake Forest, Ill., has introduced two self-adhering flashing membranes to its line of moisture management products: GreenGuard flashing and GreenGuard SuperStretch™ flashing. Both flashings are designed to deflect water that would otherwise enter around windows and doors, channeling it down the face of wall and directing it away from the structure.

GreenGuard flashing conforms to irregular surfaces caused by nails, uneven spots in wood sheathing and window flange edges or joints. The result eliminates gaps that could lead to the development of water canals. The membrane also demonstrates consistent initial adhesion across a broad range of installation temperatures. The membrane incorporates a split-release design, which allows for easy and fast application.

GreenGuard SuperStretch flashing is an extremely flexible, self-adhering flashing membrane that is highly conformable and stretches in any direction, making it an ideal choice for flashing curved and three-dimensional shapes.

A distinct composition allows each product to create airtight and watertight seals that fully adhere to wood, polystyrene sheathings and housewraps. Both flashing products are composed of high performance butyl-rubber formulations and contain no asphalt, volatile organic compounds or solvents.

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LITERATURE

IBS Booth #W2982: Southern Pine Council to Showcase Raised Floor Information

In the wake of the destructive 2005 hurricane season along the Gulf Coast, the Southern Pine Council (SPC), a source for wood information, is launching a campaign to educate builders to "Build Smart" when building, and rebuilding, throughout the country.

SPC is offering builders complete information on raised floor systems, mold prevention, blue-stain lumber and termite-resistant wood. Brochures, photos, case histories and expert analysis on the topics mentioned above are available.

New literature available includes the following titles: *Southern Pine Headers & Beams, Southern Pine Patterns,* and *Rediscover Raised Floor Systems*. All SPC literature titles are available on one new literature CD.

In addition, the Council has released a new FAQ brochure that provides key information about blue-stained Southern Pine lumber. *Facts about Blued Pine* explains that the stain found in reclaimed Southern pine timber is a natural but harmless discoloration that is not mold, does not pose any health risks and does not affect lumber strength. Complemented with full-color photos, the *Facts about Blued Pine* brochure is available from the Council's website.

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DECKING

IBS Booth #S11813: Deck Protector® Seals Out Water from Decks

Grace Construction Products of Cambridge, Mass., offers Grace Vycor Deck Protector® self-adhered flashing as a solution for extending the effective life of decks by protecting against corrosion and joist rot.

Water tends to accumulate and remain on the surface of deck joists and other structural elements for

extended periods of time with fastener holes and cracks providing direct access for water penetration. This water can cause even treated structures to rot prematurely, shortening the useful life of the entire deck. The Vycor Deck Protector self-adhered flashing membrane seals around the tops of deck joists to create an impervious barrier against water and moisture, reducing the likelihood of rot and extending the effective life of the deck.

The deck protector may be used under all decking materials, and its self-adhering membrane enables fast, easy installation. The product includes a skid-resistant coating and measurement markings on the membrane surface to simplify application.

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DOOR COMPONENTS

IBS Booth #S10751: FrameSaver Introduces Stain-Grade, Rot-Resistant Door Frames

FrameSaver of Nacogdoches, Texas, has announced the expansion of its FrameSaver® product line with its stain-grade door frames. Known for its rot-resistant, moisture-proof, wood door frames, the company now offers the same technology and money-back guarantee in a stain-grade option.

Built for entry and patio doors, the frames are offered in widths from 4 ⅛ inches to 7 ¼ inches, with lengths of 6 feet 8 inches and 8 feet. The initial stain-grade product offering is available in Radiata Pine.

The company is currently in the research and development phase of adding the stain-grade option for additional wood species.

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METERS

AHR Booth #3561: Shinyei Corp. of America Offers New Aerosol Monitor

Shinyei Corp. of America based in San Diego has introduced to the market its aerosol monitor, AES-1000, to monitor indoor airborne particulate level.

AES-1000 features an easy-to read display that shows current indoor air cleanliness levels by using a scale of one to ten LED lights. The monitor can detect airborne particles as small as 0.3 microns. The monitor can be linked to Ethernet system with the purpose of monitoring air cleanliness level using an existing LAN cable.

The particle sensor technology is now part of a system solution for users wanting to improve the cleanliness of indoor environments, particularly for commercial industries.

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AHR Booth #5677: New Humidity Alert Meter Available from Extech

Extech Instruments, a supplier of test and measurement equipment for the industrial marketplace, will showcase its new 445815 humidity alert meter at the AHR Expo. The new humidity alert meter features a user-settable alarm and will warn users, both audibly and visually, when adverse conditions occur.

The meter also has a remote probe that can either clip onto the meter or extend on an 18-inch cable, where the user can take measurements behind walls or other difficult-to-access areas. A large digit LCD screen allows for the simultaneous display of humidity, temperature and dew point. The meter measures humidity from 10 to 99 percent relative humidity (RH) and temperature from 14 to 140° Fahrenheit, with an accuracy of ±4 percent RH; ±1.8° Fahrenheit.

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MASONRY PRODUCTS

IBS Booth #W2589: Tamlyn Weep Hole Cover Manages Moisture

The patented Weep Hole Cover™ from Tamlyn & Sons Building Materials of Dallas, Texas, was designed to provide efficient management of moisture and air flow, preventing the growth of mold and damage caused by freeze/thaw cycles.

The cover breaks up mortar and prevents mortar damming for proper water flow and air circulation, while also helping to keep bugs out of the house. The uniquely shaped material permits air and water to move through the cover. The durable, non-reactive material is designed to last the life of the building. According to company information, it can also be installed over windows and doors.

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COATINGS

AHR Booth #4573: EPA-Registered Coating Prevents Mold on HVAC Components

Design Polymerics of Fountain Valley, Calif., has introduced its DP 2545 protective coating for preventing mold and mildew growth. The water-based coating is formulated with an EPA-registered preservative that prevents the growth of mold.

According to information from the company, DP 2545 forms a durable, flexible film over metal, fiberglass insulation and wood used in HVAC and general construction applications.

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COATINGS

IBS Booth #W2986: FrameGuard™ XP Coating Added to Arch Product Line

Arch Wood Protection of Smyrna, Ga., has announced the addition of FrameGuard XP coating to its line of products for lumber's effective resistance of mold, termites and fungal decay.

According to information from the company, extended exposure to running water will dilute and eventually deplete the solution's effect, but it is designed to provide resistance during the time that wood is stored at the jobsite and during construction.

The solution is a water-based, proprietary combination of patented and EPA-registered components that provide broad protection against mold and wood-destroying organisms. The coating is applied by spray or dip at an OEM plant, lumber mill or distribution yard where the quality of coverage can be precisely controlled. In addition to its use on lumber and plywood, the coating works on oriented strand board, parallel strand lumber, laminated veneer lumber and wood I-beams. Coated products are readily identified by the blue dye mixed in with active ingredients.

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On-Site Action

How Action During Construction Can Prevent Mold Growth in the Future

By **Megan Headley**, the editor of **Moldmag**.

John Dattilo, the owner of Cardinal Custom Homes in Huntsville, Ala., takes a proactive approach when it comes to mold prevention, since groundwater infiltration of the crawlspace is a common problem in the areas where he builds. However, he worries that his foresight isn't largely mirrored by the building industry.

"From the experience I've had," said Dattilo, "there's not enough concern [about mold] from our industry in general."

Clint Allen, a managing member of Allen Oyler LLC, a national distributor for the FortiCel coating, has found that many of the builders he speaks to are very skeptical about mold and the need for products to control it.

"Anytime we say we're trying to sell you something to keep you from being sued—we get a very negative reaction," said Allen.

Still, as awareness builds about the results of moisture intrusion in a home, builders are finding that there are actions that they can take to prevent future mold problems.

Charles Morando is a 40-year veteran of the building industry and the chief executive officer of WoodSmart Solutions of Boca Raton, Fla., a manufacturer of mold-prevention coatings for lumber. He feels that more builders are becoming aware of actions they can take to prevent mold.

"It has evolved into [an attitude of] 'I better do something about it,'" said Morando. "They're concerned about the liability."

Lawrence Shapiro, residential

Placing a waterproof roofing underlayment beneath shingles may provide protection from ice dams, wind-driven rain and other causes of leaks.

business director for Grace Specialty Building Materials, a part of Cambridge, Mass.-based Grace Construction, agrees that more builders are looking for information about mold prevention.

"It's no secret that mold issues are a potential source for major liability," says Shapiro. "For people who want to protect their business and their reputations … it's a big deal."

Morando says that public perception is also feeding builders concern about mold. He feels that concern skyrocketed after Hurricanes Katrina and Rita swept through the Gulf Coast and mold became a staple in the news from that area.

Public perception is part of what has made Dattilo become so involved in mold prevention in the homes he builds.

"If you don't [worry about mold] you're not reading the newspapers," said Dattilo.

Areas to Watch

What all of the experts agree on is that the prevention of moisture intrusion is a primary goal when it comes to mold prevention.

"The first step in preventing mold is preventing moisture accumulation," says Shapiro.

"You control the moisture and you've gone a long way to controlling the mold," adds Morando.

> "People can't prevent a lot of things that happen during construction—weather especially."
> —Charles Morando, chief executive officer of WoodSmart Solutions

But how to do that exactly can take a number of forms.

"First thing is to make sure you've got a watertight roof," Shapiro recommends.

Many experts also stress the importance of having a watertight roof up over an unfinished structure so that moisture does not continue to soak structural lumber long into the construction process.

Shapiro adds that a watertight roof will later provide protection from problems such as ice dams and wind-driven rain. In areas with heavy snow, ice dams prevent water from properly leaving the roof system. When an ice dam forms on the roof, water from melting snow has no place to drain. It backs up behind the ice, seeps under the shingles and enters through the wood on the roof deck. In windy areas, shingles can be raised slightly by the wind, allowing water to penetrate through the roof. A waterproofing underlayment beneath the shingles is Shapiro's solution.

"The second area builders need to know about is water infiltration around windows and doors," Shapiro says. "Flashing around windows and doors is absolutely critical."

Any penetrations in the wall, but especially those around doors and windows, are another prime place the experts agree where water can easily enter a structure. Correctly installed flashing materials around these penetrations can prevent water from finding an entrance.

"And of course you want to be very careful about where you build," Shapiro continues.

Building below the water table can lead to issues of groundwater wicking up into a home's crawlspace or basement.

"That's the biggest problem in our experience," says Datillo of groundwater intrusion. "Typically if we build a house in areas we think the water table is high we do an evaluation of the lot."

Taking the proactive approach,

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Common Culprits

One Window Expert Talks about Mold and Residential Building

By **Charles Cumpston,** a contributing editor of **Moldmag.**

Ted Hart, an industry consultant who serves as an expert witness in mold cases and has been in the glass and contract glazing industry for 50 years, says that the instances of mold are not increasing.

"The incidence of mold has not changed," he explained. "What has is the investigation to find it. In the cases where there is defect litigation, and there is water intrusion or penetration, lawyers and those associated with these cases are looking carefully to find mold. In my experience, they see the condensation and blackness you might find on the interior sill of an aluminum window say, 'Yes, that is mold.' But it's not mold in any more sense than what you would find in your shower."

Hart pointed out that many of the leaks stem from aluminum windows, which haven't been used in significant number in residential construction for the last ten years.

"Vinyl has taken over the market," he explains, "so we don't end up with the leaking corners we've known it in the past."

But mold can show up because of other building components, he points out, and there are lawyers who aggressively pursue this area.

"When they speak of failure of the window, they are talking about the entire area surrounding it," he said, "that runs from the sill of the window all the way to the floor."

Another component problem that can contribute to mold growth occurs in stuccoed structure. Hart explains, "When they staple on the building paper, they will miss the studs and drive a staple through the building paper. This breach is supposed to be covered up but it's not. So when water comes in against the stucco, it finds its way through the building paper to the wall cavity and over time that can generate a tremendous amount of mold.

"The same thing happens when they use wood trim around the window," Hart says. "Two conditions almost always show up in these cases. Usually the wood trim has not been back-primed. This means that it will absorb water because it has not been primed and it will warp more easily because it gets wet. The second is that no sealant is used in the joints between where the wood trim comes down on the jamb of the window and meets the sill. Over a period of years, if you don't have sealant in there and you don't have this painted and maintained, all these sections open up and collect water. It's like having 1/8-inch 'holes' that let water in. Mold then grows and eats through the paper and gets into the wall cavity."

Hart points out that 10 years from now "we won't be looking at these cases." Developers and contractors have learned what they need to do to make windows more secure. "They have hired people to come in and tell them how to keep away from these problems," he explains. "Also they now use the most expensive flashing paper available and make sure that everything connected with that window is done properly. Because they have been burnt so badly, they've wised up."

With windows more than 10 years old, there's no guarantee they were installed properly, Hart says. His advice: If there's any doubt, seal the corners of the windows from the inside. "It gives some insurance and is a maintenance upgrade. Sealants are not designed to work forever although they do a good job."

Properly installed flashings around doors and windows can protect these vulnerable wall penetrations from leaks.

Cardinal Custom Homes includes sumps in its building plan in those areas where groundwater is a concern.

"We use a company that puts in a drainage system underneath the house," Datillo says.

Taking a proactive approach is part of the reason Dattilo says he doesn't worry about lawsuits over mold. The company that installs the sumps also offers a guarantee that the mitigation will be successful, according to Dattilo.

Problem Materials

Mold prevention product suppliers want builders to know about some of the trouble areas where extra protection isn't a bad idea. But even suppliers are drawn into the courtroom now.

In an October 2005 court case, Crenshaw Lumber Co. Inc., based in Gardena, Calif., paid the lion's share of a $22.6 million settlement awarded to a family that claimed mold in their home caused their young child brain damage—and was the result of moldy lumber that had been improperly stored by the lumberyard (*see page 33*).

Improper storage of lumber and other materials on the jobsite frequently is cited as a cause of mold growth by experts, but builders should also be cautious about

checking incoming supplies for signs of a serious mold problem.

"Lumber contains moisture when you get it. It's hard to find a stick of lumber without mold on it. Typically it's exposed to the weather before it gets into the house," according to Morando. "Almost all of the lumber we receive at the plant has some mold on it."

Problem Solving Materials?

Proper storage of materials during construction and attention to installation is clearly crucial. After all, as Morando says, "People can't prevent a lot of things that happen during construction—weather especially."

But how much of mold prevention is the right product versus proper attention to installation?

According to Dattilo, it takes a combination of both.

Morando agrees that products are just one part of the solution. "It's a part of a comprehensive plan."

Allen also emphasizes the importance of the integration of products geared toward mold prevention in talking with builders. He adds, however, that the market exists—despite the reluctance of many builders to talk about the need for products that either assist in stopping water intrusion or remove a food source for mold. In fact, he says, manufacturers are "definitely seeing it growing, even in markets where we see a building downturn."

"Now the pressure-treated people are sending us their lumber because they want the mold protection. If they [builders] don't use it, they put themselves in a potentially negligent situation," Morando adds.

"You could address all of those issues very simply for very few dollars," says Shapiro.

Compared to the cost of litigation, he might just be right.

Improper storage of lumber and other materials on the jobsite is one frequently-cited cause of mold growth that builders can control.

California Family Wins Record Mold Settlement

According to a story from the Associated Press, a family that claimed mold in their home caused brain damage to their child has reached a $22.6 million settlement against a lumber company and 16 other defendants. The October 19, 2005, settlement is believed to be the largest in the country for a mold case involving a single-family home.

The case is considered unusual not only for the settlement amount but also because contractors, rather than suppliers, are generally held responsible for construction defects.

Gary and Dana Gorman of Los Angeles claimed that their son Kellen became sick because of mold on framing studs that had been improperly stored by Crenshaw Lumber Co. Inc. of Gardena, Calif. The studs were used in the custom-built Manhattan Beach home the family lived in for about two years beginning in 1999.

Crenshaw settled the day after Los Angeles Superior Court Judge Victoria G. Chaney barred the wood supplier from using 10 of its 17 experts, including a toxicologist and a microbiologist. According to the plaintiff's lawyer, Brian Witzer, the judge excluded the experts because a lawyer for the defense allegedly missed a deadline for designating witnesses and backdated a document to cover it up.

Larry Olson, who owns Crenshaw Lumber with his brother, Lindsay, said he felt bad for the family, but denied that his company was at fault. He noted that water, which could have caused the mold, leaked into the house after the family moved in. He said it would be comparable to suing the company if a house caught fire.

The Gormans said the blackened studs appeared irregular behind the house's walls, indicating that the wood was contaminated before it was installed.

The settlement came after six weeks of testimony. Neither Crenshaw nor any of the other defendants admitted liability.

The Building Blocks of Building Science

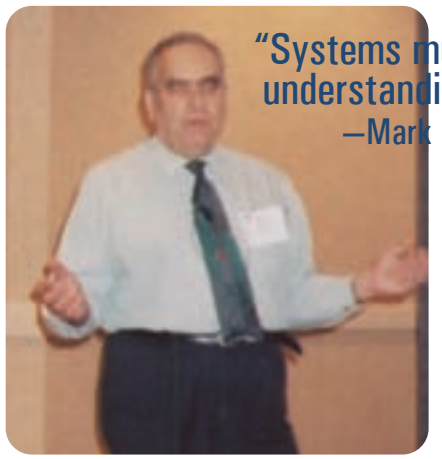
BETEC Forum Defines One Approach to Preventing Moisture Intrusion

By **Alan Goldberg**, a contributing writer for **Moldmag**.

Building science can be defined as a method of design, construction, inspection and testing that considers how all building components work together. By coordinating when and how components are installed, building science can be an important tool for preventing moisture intrusion.

Good Communication/ Good Design

Designed for architects, engineers and researchers, Building Science Forum 2005 offered a two-day introduction to the topic of building science and a discussion of design and construction issues. The symposium, which took place on October 6 and 7 in Chicago, was presented by the Building Enclosure Technology and Environment Council (BETEC) of the National Institute of Building Sciences (NIBS).



"Systems must be designed with an understanding of building science."
—Mark Bomberg, Syracuse University

Professor Mark Bomberg, Syracuse University, reviewed material characterization and benchmarking experiments.

Research professor Mark Bomberg of Syracuse University opened the forum with a question for the audience: why are there so many problems in construction when there is so much information available?

"There is no good communication between research and practice," Bomberg then answered. "Incomplete design or poor workmanship causes more damage during the life of a structure than entry of water."

Bomberg said that in 95 percent of water damage cases water entry is a result of poor design, while errors on the building site account for only 5 percent.

Bomberg explained during the course of his presentation, *Heat, Air and Moisture Transfers Are Inseparable*, that moisture is involved in many damaging processes. It causes rot and corrosion and affects building materials' physical dimension, stress/stain and heat loss or gain. In a later session, *Using Tools to Predict and Resolve Moisture and Mold Problems in the Building Envelope*, André Desjarlais from Oak Ridge National Laboratory noted that moisture can be responsible for energy inefficiency, mold, corrosion, wood rot, termites and stain-

"We investigate because we need to know how systems perform and how to build for durability."
—Donald Onysko, DMO Consultants

Don Onysko, DMO Consultants, described tests of cladding with drainage planes.

ing. Desjarlais noted that water damage is involved in some way in almost every type of building envelope. In a presentation on *Whole Building Mold Assessment*, Godfried Augenbroe, associate professor of the College of Architecture, Georgia Institute of Technology, added that the consequences of mold growth in buildings include deterioration to structures and property damage, adverse health effects, low occupant productivity and high-profile litigation.

The remedy for damage from moisture offered by these and other researchers is building science.

Bomberg listed 11 key items related to building science, among the most important being water vapor flow, rain penetration and air flow. What is needed, Bomberg concluded, is a broad understanding of materials, components and assemblies.

Know Your Materials

Bomberg noted during his presentation that many people believe the best strategy for preventing rain ingress is waterproofing the surface of the wall. However waterproofing a surface too tightly can mean that if water should enter it will be very difficult for the surface to dry.

"This theory proves a lack of building science know-how. Systems must be designed with an understanding of building science, which includes proper venting," he said.

Desjarlais also pointed out that using a polyethylene vapor retarder makes it impossible for moisture to dry on the interior wall. With no path for water to leave, the exterior remains wet as well.

In addition, Bomberg warned, all materials change in some way during construction.

Concrete is one particularly troublesome material that will change after construction.

Desjarlais said that because concrete holds moisture, there are many long-term damaging effects. One is visual degradation on the surface, or more specifically, staining, microbial growth, salt efflorescence, salt crystals (caused by elevated water levels) and damage due to insufficient frost-resistance.

Bomberg mentioned another material problem that can occur with stucco. Referring to the water absorption testing of a stucco structure done at the Technical University of Dresden, Bomberg explained that most of the water entered through cracks and terminations of the stucco. He said that using sealant instead of a two-stage joint means that stucco shrinkage will open cracks around the windows.

The Right Components

Donald Onysko of DMO Consultants spoke on *Testing Cladding with Drainage Planes*. The ability to accommodate water penetration is necessary, he said. There are specific practices for different material used in wall systems.

"We investigate because we need to know how systems perform and how to build for durability," said Onysko.

He mentioned that the Canada Mortgage and Housing Corp. (CMHC) did a study on drainage and drying that attempted to measure the water retained in each wall accurately. The study tested exterior insulation and finish system (EIFS) walls, vinyl siding, wood siding and hardboard siding. Each material was tested in several different ways. The intention was to maintain thermal conditions at 0° Celsius and 50-percent relative humidity for 48 hours after wetting

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About NIBS

The National Institute of Building Sciences (NIBS), a Washington, D.C.-based non-profit, non-governmental organization, was established by the U.S. Congress to enable findings on technical, building-related matters to be used effectively to improve government, commerce and industry.

According to information from the institute's website, its public interest mission is to improve the building regulatory environment; facilitate the introduction of new and existing products and technology into the building process; and disseminate nationally recognized technical and regulatory information.

The Building Enclosure Technology and Environment Council,a part of NIBS, focuses specifically on the performance and interaction of building envelope components and systems and their effect on the environment. The council offers annual symposiums on building topics and numerous publications.

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continued

and drainage. Sixteen relative humidity temperature sensors were used to monitor changes in the environment. For EIFS testing, wall systems were selected that represented the most and least amount of water retained.

It was learned that there can be considerable variation from EIFS walls. According to the results, retention did not take place on joints as expected with the EIFS wall.

"What we learned is to consider air flow characterization," Onysko said.

He concluded that testing alone will not provide all the answers. Modeling—using mathematical equations to simulate and predict real events and processes—could help provide the right information.

Anton TenWolde from Forest Products Laboratory, part of USDA Forest Services, described a new study in his presentation *Moisture Conditions in an Unvented Rain Screen Wall*. The study uses a 2,200-square-foot research house in Madison, Wis., to test moisture retention in various wall systems with vented rain screens.

Test walls, using standard construction in average conditions, were monitored for moisture. Moisture sensors were used on the OSB siding in ten locations. The use of cladding or lap siding on an open air space provided ventilation through that space so there was drain-off without moisture being forced into the structure. Redistribution of moisture then occurred. One of the conclusions, even though this test house is a work-in-progress, is that the air space provides a better distribution of air and water vapor.

Niklas Vigener, Simpson Gumpertz & Heger Inc., outlined a chapter of the new building enclosure design guide.

Anton TenWolde, Forest Products Laboratory, described test walls monitored for moisture.

The Right Model for Assessing Mold Risks

Desjarlais discussed the use of hygrothermal (heat and moisture) models to determine moisture, air and heat transfer. He indicated that there are nearly 40 different hygrothermal models being used in 14 countries. As useful as models may be, Desjarlais pointed out that every model has its limitations. The user must be aware of what it can and cannot do. A model looks at the most typ-

What's New for Envelope Design?

Paul Totten with Simpson Gumpertz & Heger Inc. described the wall chapter of the new building enclosure design guide.

During the Building Science Forum, Niklas Vigener, an associate with Simpson, Gumpertz & Heger (SGH) and Paul Totten, a senior staff engineer with SGH presented a general overview of the new *Envelope Design Guide* (EDG). The guidelines cover design suggestions for below-grade systems, wall systems, fenestration systems, roofing systems and atria systems. Moisture management is mentioned as an important consideration throughout.

Totten said that each of the six chapters is written by a different firm, in their area of expertise. NIBS developed the comprehensive guide for exterior envelope design and construction for institutional/office buildings under guidance from the federal envelope advisory committee. The guidelines are available for free as a virtual information source on the web within the *Whole Building Design Guide* provided by NIBS.

The Envelope Design Guide is continually being improved and updated through the Building Enclosure Councils. Any edits, revisions, updates or interest in adding new information can be directed to the EDG review committee via the web at www.wbdg.org/design/envelope.php.

ical problems and can not predict every situation that may occur.

One moisture design tool he described as creating effective models is the WUFI ORNL/IBP, which was developed for architects and engineers by Oak Ridge National Laboratory's Building Technology Center. From the information that the user provides, the software is able to indicate the possibilities of mold growth based on the conditions that are established.

André Desjarlais, Oak Ridge National Laboratory discussed tools to predict and resolve moisture and mold problems in building envelopes.

Desjarlais said this particular model is "very quick for inputting," although it requires a lot of information on material properties—density, porosity, heat capacity, thermal conductivity, sorption and suction moisture content, water vapor permeability, liquid diffusivity—in order to offer realistic simulations. The result is output screens that provide snapshots of conditions relating to temperature, water content and relative humidity. By varying conditions, such as reduced air space or a change of materials or conditions, the user can create an endless situations of "what if's" in order to see the types of results that will occur.

Desjarlais added that there is also a great availability of tools from the Department of Energy that can be used to address building envelope issues.

Augenbroe suggested another model in a presentation titled *Smart Double Facades*, but one with limited data for existing buildings. It is based on a performance indicator and information on mold germination characteristics such as surface temperature, surface relative humidity and exposure time from 200 cases. Another factor is mold-risky days based on when mold growth would have occurred in a troubled area.

The basis for the model is a mathematical formula, which serves as a simulation tool. From this model, different scenarios can be created as long as fixed parameters are used to determine what factors will influence heat, moisture and air flow.

The model now makes it possible to attain a quantified mold risk assessment offering a foundation of performance criteria.

However, Augenbroe cautioned that the study of mold is extremely case sensitive and must be done on a case by case basis. Even two similar buildings can have very different data, so there is no such thing as a generic study.

The Future of Building Science

Augenbroe explained that a lot of work has been done on mold through field investigation and remediation. The problem, he said, is that even after remediation there is no guarantee against the recurrence of mold. Currently, there are prescriptive standards and codes but the "ultimate goal is performance-based standards."

Desjarlais added that assessing moisture is no easy task.

While lab tests can provide a realistic picture, they can be expensive. Another drawback with lab tests is what he described as comparability. Climates vary and one set of tests can't adequately define every condition.

Godfried Augenbroe of the College of Architecture, George Institute of Technology talked about assessing mold risk.

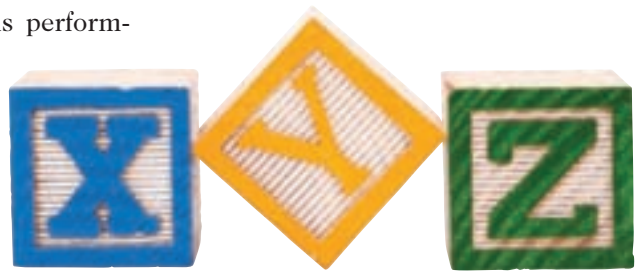
Thus, it is important that building and design professionals focus on preventing the problem in the first place.

According to the first day's closing session, there has been interest in establishing a network for the advancement of building science, to improve understanding of building science by architects and civil engineers. Bomberg said that he feels there are many issues to be resolved before formal discussions can take place—but it is simply a matter of time before a network is established. For now, the focus will continue on educating the tradespeople on the value of controlling heat, air and moisture. m

Resources:

For more information about the forum, visit www.nibs.org/betecregis2.html.

The WUFI ORNL/IBP model is available online at www.ornl.gov/btc/moisture.



Controlling Moisture More Efficiently

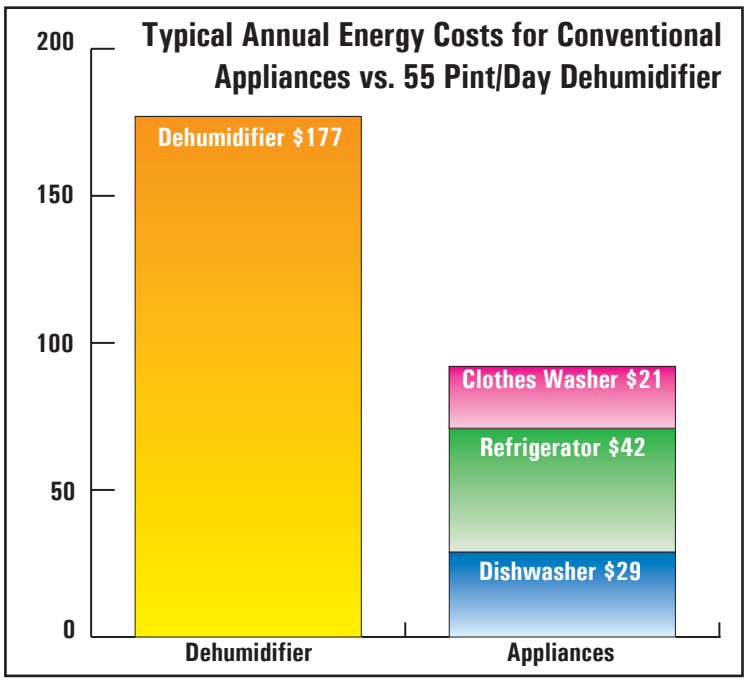
ENERGY STAR® Program Makes Moisture Control Energy-Efficient

By **David Shiller**, the product manager of ENERGY STAR for dehumidifiers. He can be reached at 202/343-9397 or shiller.david@epa.gov. Additional information, including a list of qualified models, is available at www.energystar.gov/products.

The arsenal of mold and moisture control measures available includes a number of electricity-consuming devices that can consume substantial amounts of energy individually and collectively. In a building battling moisture control and mold problems, the amount of energy used by these devices can easily exceed the total electric consumption for all other appliances. In fact, a single average size dehumidifier can consume more than $150 per year in electricity. It is no surprise that energy costs are a concern for many mold remediation consultants and contractors and their clients.

For Terry Brennan, president of Camroden Associates and one of the top building scientists in the country, "low energy use" is at the top of the list of desirable qualities for dehumidifiers that he recommends to clients. In this spirit, Brennan recommends models that have been ENERGY STAR-qualified.

The U.S. Environmental Protection Agency (EPA) established ENERGY STAR as a voluntary labeling program designed to help consumers quickly and easily identify energy-efficient products, starting with computers and monitors. These products deliver the same or better performance as conventional models while using less energy and saving money. They must meet strict energy efficiency guidelines set by EPA and the Department of Energy. The program has expanded since 1992 to include a wide variety of appliances and products, including those products used to combat mold.



Dehumidifiers: A Market Transformed

Dehumidifiers help control indoor moisture levels and reduce the potential for mold growth by removing water from the air. Their operation is generally unnoticed until it is time to dump out the water they have collected. However, their significant energy usage, and their energy-efficiency potential did not escape the EPA's attention. EPA's interest in an ENERGY STAR specification for dehumidifiers was based on three factors:

- significant per-unit energy consumption;
- variation in energy efficiency among product models; and
- potential for more energy-efficient design based on engineering analysis and test data.

The EPA ENERGY STAR program engaged manufacturers and retailers in a "market transformation" toward development of more energy-efficient dehumidifiers. Market transformation is an intervention in the marketplace that leads to an increase in the adoption of an energy-efficient product, service or practice. Over time, a successful market transformation initiative is expected to raise the average energy efficiency of products on the market, resulting in energy savings and environmental benefits.

Criteria for ENERGY STAR-Qualified Standard Capacity Dehumidifiers

Product Capacity (L/day)	Product Capacity (pints/day)	Energy Factor Under Test Conditions (L/kWh)
< 10	< 21	≥ 1.20
10 < 25	21 < 52	≥ 1.30
25 - 35	52 - 74	≥ 1.50
36 - 57	74 - 120	≥ 2.25

The EPA ENERGY STAR program is working toward a market transformation with the development of more energy-efficient dehumidifiers.

With the help of Whirlpool and other partners, EPA established criteria for efficient dehumidifiers and launched the product category. At the time that EPA first considered a specification, a Canadian mandatory efficiency standard (CAN/CSA-C749-94) was in place. Rather than reinvent the wheel, EPA adopted the framework upon which the Canadian standard was based. EPA adopted the Canadian standard's efficiency metric, which was simple to understand, relatively easy to measure and a direct measure of efficiency. The metric is termed energy factor (EF) and is expressed in liters per kilowatt-hour (L/kWh). The Canadian specification of 1.0 L/kWh was established as a minimum performance level for dehumidifiers sold in Canada. EPA's more stringent specification for the voluntary ENERGY STAR program was based on a review of energy performance data collected under the Canadian program. The ENERGY STAR specification went into affect on January 1, 2001.

Today's dehumidifiers use, on average, 13 percent less energy than units sold in 2001, but they can remove the same quantities of water from the air (*See chart above*). Market penetration for ENERGY STAR-qualified dehumidifiers has grown rapidly and now represents more than two-thirds of product shipments. The million or so dehumidifiers sold in 2004 will use about 2 billion fewer kilowatt-hours (kWh) of electricity over their lifetimes than they would have used if they had maintained the energy use of units sold prior to the EPA effort. Two billion kWh translates to more than $160 million in energy savings for consumers. Due to this reduced electricity demand from power plants—most of which burn fossil fuels—a reduction in greenhouse gas emissions of almost three billion pounds is expected. This is equivalent to removing 24,000 cars from the road.

Consultants and contractors who have recommended ENERGY STAR dehumidifiers to their clients in the past few years are part of this revolutionary trend that has saved money and combated global warming. For Terry Brennan, the addition of energy-efficient models in the low and medium capacity ranges was a welcome development. Prior to the EPA effort, the only energy-efficient dehumidifiers he could recommend to his clients were a few large capacity models.

Ventilation Fans: A Market On The Move

Ventilation fans have also gained EPA's attention. EPA established ENERGY STAR criteria for bathroom/utility and inline fans, as well as kitchen range hoods. Qualified bathroom vent fans with lighting will typically save a home or building 65 percent compared to conventional models. In addition to energy efficiency, another criteria is low noise level. This quality is ideal for situations where continuous, 24 hour-a-day ventilation is required.

ENERGY STAR: A Good Recommendation

To continue to promote energy savings, when a market transformation toward ENERGY STAR products such as dehumidifiers is achieved, EPA works with manufacturers and other partners to develop new, more challenging energy-efficiency criteria. Currently EPA is working to finalize a new specification for dehumidifiers that will provide even more energy savings over currently labeled products. Models meeting these new criteria should be available starting in the summer of 2006.

New Private Testing Shows High Mold Counts in New Orleans

According to information from the Natural Resources Defense Council (NRDC), air tests taken by the Council have shown that airborne mold levels in New Orleans could pose a serious health risk to residents and workers returning to the devastated city. NRDC is a not-for-profit environmental organization based in New York City.

NRDC collected air samples for mold spore analysis in 14 locations across the New Orleans area from October 17 to 19. Nine of the locations had significant flooding. The spore counts outdoors in most flooded neighborhoods tested by NRDC—including New Orleans East, the Lower 9th Ward, Chalmette, Uptown, Mid-City and the Garden District—topped out at 77,000 spores per cubic meter at one site in Chalmette, and 81,000 spores per cubic meter at another site in Uptown.

The Council reported that the National Allergy Bureau of the American Academy of Allergy and Immunology considers any outdoor mold spore level of greater than 50,000 spores per cubic meter to be "very high."

"The outdoor mold spore concentrations could easily trigger serious allergic or asthmatic reactions in sensitive people," said Dr. Gina Solomon, M.D., who led the NRDC research team. "The indoor air quality was even worse, rendering the homes we tested dangerously uninhabitable by any definition."

According to NDRC, the federal agencies, including the U.S. Environmental Protection Agency, Department of Health and Human Services and the Centers for Disease Control and Prevention, are not monitoring mold levels in flooded areas, and have not helped residents cope with the mold problem. While there are no U.S. regulatory standards for levels of mold spores, NRDC maintains that it is the government's responsibility to ensure the public is protected from the dangerous health risks.

The Council is urging the federal government to offer personal protective equipment—such as respirators, nitrile gloves, safety glasses and a Tyvek suit—and mold remediation assistance, especially to low-income and other disenfranchised communities that otherwise couldn't afford to rebuild.

Experts Sort Fact from Fiction on Mold

With the goal of distinguishing fact from fiction, health professionals gathered to discuss the most recent scientific evidence on the health effects of mold at the Annual Meeting of the American College of Allergy, Asthma and Immunology (ACAAI) in Anaheim, November 4-9, 2005. One of the topics discussed was toxic mold syndrome, or inhalational toxicity, which continues to cause public concern despite a lack of scientific evidence that supports its existence, according to Emil Bardana, Jr., M.D., Oregon Health & Science University in Portland, Ore.

International experts presented more than 100 scientific sessions on allergic diseases at the ACAAI Annual Meeting.

In a study published in September in the *Annals of Allergy, Asthma & Immunology*, the scientific journal of the ACAAI, investigators at the Oregon Health and Science University in a self-funded study conducted a retrospective review of 50 individuals who claimed compensation for toxic mold disease and in every case found alternative medical and/or psychiatric explanations for the claimed illness.

Investigators found only two of the 50 subjects had evidence of a mold-related allergic disease attributable to their home or workplace. Seventeen individuals complained of a nonspecific irritant symptoms complex that could not be linked to mold exposure.

"Based on our findings, no case definition is possible for so-called 'toxic mold syndrome,'" said Dr. Bardana, co-author of the report. "Because molds are encountered both indoors and outdoors, it is almost impossible to determine where the sensitivity arose."

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National Association of Home Builders.
Contact: Christopher Hood at 202/266-8684.

March 14-17, 2006
2006 ASCR Solutions Convention
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Contact: ASCR at larryj@ascr.org
or call 410/729-9900.

April 12-13, 2006
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May 13-18, 2006
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May 15-20, 2006
Affordable Comfort Conference 2006
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June 25-28, 2006
NEHA Annual Conference
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Contact: Toni Roland at 303/756-9090
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June 8-10, 2006
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June 20-23, 2006
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June 26-29, 2006
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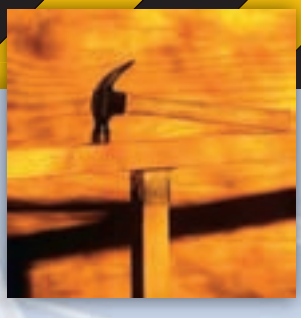

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Our emergency response teams are trained to take on some pretty diverse situations, but mold has proven to be a threat in the daily work of those to whom we look for protection, according to these articles from the consumer press:

Mold Found Stored with DNA Evidence

Less than a year after Fort Wayne's Indiana State Police expanded its lab to include DNA analysis, it was reported that mold found on stored biological evidence may have jeopardized at least five cases, according to an article in *The Journal Gazette*.

Upon further investigation of 20 evidence packages stored in the lab's refrigerator, it was decided that none of the evidence had been altered due to the exposure. The refrigerator was scrubbed following the discovery and the lab is freezing its evidence now to avoid future problems.

Forensic consultant Ed Blake told the *Gazette* that the situation called the competence of the lab into question. According to Blake, the first rule of storing biological evidence is to dry it, thereby preventing mold growth.

Public Safety Building Not Safe from Mold

According to an October article in Vero Beach, Fla.'s *Press Journal*, that county's public safety officers were will be working shorter shifts until the town can replace the mold-infested air-conditioning units in the public safety building.

High levels of mold spores were found in the upstairs barracks, where officers sleep, and in the kitchen.

The public safety officers, trained in fire rescue, emergency medical procedures and law enforcement, typically work 24-hour shifts. Shortening the shifts eliminated the need for officers to sleep upstairs and be in the kitchen preparing food until the problem is resolved.

The mold problem was first reported by the Police Benevolent Association union, which represents the town's 22 officers. Two officers filed workers' compensation claims for respiratory problems. Following the report, the town council authorized spending up to $35,000 on a new air-conditioning system, including ductwork. The current system is more than 25 years old.

Mold Disrupts Dispatch Center

Mold has infested the communications center in the New London, Conn., police department, according to an article in *The Day*. Spores were discovered in October while workers were tearing apart the center's walls to rebuild it as part of a planned update of the center. Work on the center has stopped, however, and the room that houses dispatchers can no longer be entered without wearing a respirator, according to the article.

Lt. Chip Segar, president of the police officers' union, told *The Day* that significant leaks existed from the top floor to the basement. According to Lt. Segar, the union had suspected sick building syndrome for some time.

Segar also said there have been many reports of allergies and sinus illnesses from dispatchers and officers who work in the room.

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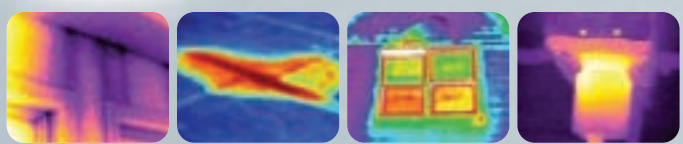

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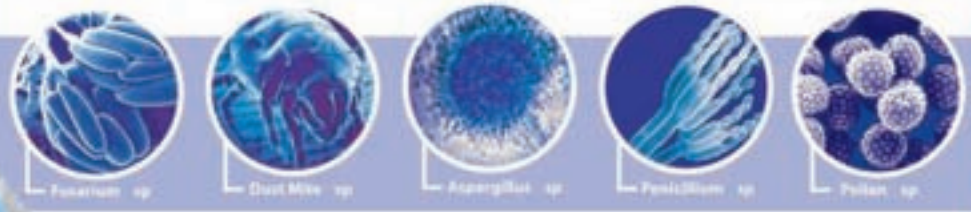

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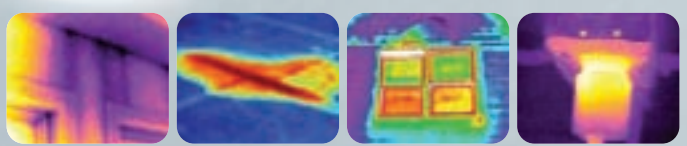

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