HT 7: REDUCE MOLD IN BATHROOMS

New York City Building Code
Proposal developed by the Materials & VOCs Committee

Summary

Issue:
Mold is common in moist areas of many buildings, such as showers. Exposure to mold can cause negative health effects, including allergic responses, asthma and other respiratory irritations.

Recommendation:
Require the use of mold-resistant gypsum board and cement board in water-sensitive locations.

Proposed Legislation, Rule or Study

Amendments to the New York City Building Code:

1. Amend section 2501.1.1 as follows:

2501.1.1 General. Provisions of this chapter shall govern the materials, design, construction and quality of gypsum board, lath, gypsum plaster, cement plaster and cement board.

2. Add a new definition to section 2502 as follows:

CEMENT BOARD. A fiberglass reinforced concrete sheet most commonly used under floors or as a tile backing board.

3. Add a new section 2506.3 as follows:

2506.3 Gypsum and cement board in showers, and water closets, and other areas likely to be subject to water or moisture damage.

2506.3.1 Cement board only. The walls of all shower and bath surrounds up to six feet above the finished floor shall be composed of cement board, fiber-cement or glass mat gypsum backers in compliance with ASTM C 1178, C 1288 or C 1325 and installed in accordance with manufacturer recommendations. Gypsum board shall not be permitted in such locations.

2506.3.2 Mold resistance. In any area where there will be direct exposure to water or that is subject to continuous high humidity, any gypsum board or cement board used on walls or ceilings shall be rated as mold resistant (rating of 10) in accordance with ASTM D3273-00 and water-resistant gypsum board (“greenboard”) shall not be permitted. Such areas shall include the following:

1. walls of basements and other below grade rooms;
2. walls of mechanical rooms and closets housing air conditioning equipment;
3. rear walls of fan coil/unit ventilator type HVAC unit chases;
4. ceilings beneath cold water pipes;
5. ceilings beneath air handlers in ceiling plenums;
6. ceilings of bathrooms;
7. walls of plumbing and electrical chases;
8. walls of laundry rooms;
9. walls beneath kitchen sinks and splash areas above sinks;
10. walls behind kitchen stoves; and,
11. walls of bathrooms other than walls specifically required to be cement board.

Supporting Information

Issue – Expanded
Molds can grow on almost any surface as long as moisture and oxygen are present. Molds can be allergens, irritants, and even produce toxic substances (mycotoxins). They can also trigger asthma attacks and other chronic conditions. In New York City, where the asthma hospitalization rate in some neighborhoods is four times as high as the national average, complaints of mold infestations are on the rise. In 2008, the City’s 311 service received 7,658 mold-related complaints of which 6,566 were from residential locations. As of July 2009, the City has received 5,779 mold-related complaints—almost a 32% increase over the same period in 2008.

While it is impossible to eliminate all mold and its spores in the indoor environment, mold growth can be controlled. To prevent the proliferation of mold—and address associated health impacts from mold exposure discussed below—this proposal requires the use of cement board in areas that are subject to constant moisture. Cement board has better long-term performance than paper-faced gypsum core and water-resistant products because it does not mold, mildew or physically break down in the continued presence of moisture or leaks.

Most manufacturers of drywall and water-resistant drywall (often referred to as “greenboard”) agree that in areas continually exposed to water such as showers and tubs, cement board is the best choice to prevent the formation of mold. Water and water vapor easily pass through ceramic tile grout and cause the paper facing of drywall to disintegrate. Water-resistant drywall is not recommended for areas that are subject to constant moisture such as bathrooms and laundry areas and should not be used as tile substrate.

This proposal also requires the use of mold-resistant drywall instead of regular drywall for other water-sensitive areas such as laundry rooms and basements. Mold resistant drywall is waterproof and can inhibit the growth of mold on the surface of the panel.

Environmental & Health Benefits
Enhanced safety and quality of life are expected with the reduction in exposure to biocontaminants such as mold. Mold results from moisture problems, poor maintenance, or inadequate ventilation and has been known to cause and exacerbate serious, sometimes life threatening respiratory diseases which themselves can lead to chronic respiratory conditions. Inhalation of fungal spores, fragments, or mycotoxins can lead to or exacerbate allergic reactions and cause infections, eye irritation, cough, congestion, headache, and fatigue. Severe illnesses such as Organic Dust Toxic Syndrome (ODTS) and pulmonary hemosiderosis have also been attributed to fungal exposures. Illnesses can result from both high level, short-term exposures and lower level, long-term exposures.

For these reasons, and because measurements of exposure are not standardized and biological markers of exposure to fungi are largely unknown, it is not possible to determine “safe” or “unsafe” levels of exposure for people in general. This proposal is a precautionary measure to address increasing citywide incidents of mold infestation.

This proposal was found to have a positive, indirect environmental impact.

This proposal was found to have a low positive health impact per building and to impact a large number of buildings. It was thus given a health score of 2.

Cost & Savings
As described in the Executive Summary, Bovis Lend Lease prepared cost estimates for each Task Force proposal in the context of well-defined construction projects in specific buildings. Where possible, members of the Technical Committees prepared savings estimates for some of these projects and buildings. These cost and savings estimates are presented in the February 1st draft version of Appendix A. The innate uncertainty in how construction and operation will vary from one building to another, the complexity of the Task Force proposals, and the wide range of applications in which the proposals may be realized mean these figures are truly estimates.

This proposal was estimated to increase first capital costs by 0.0% to 0.2%, depending on building type. It was thus categorized as incurring no to a medium capital cost increment.

Precedents
The 2006 International Residential Code (IRC) requires the use of cement, fiber-cement or glass mat gypsum backers for wall tile in tub and shower areas and wall panels in shower areas. It also prohibits the use of water-resistant gypsum backing board where there is direct exposure to water.

Similarly, the City of Palo Alto, CA, prohibits the use of gypsum products in steam showers and that the use of
greenboard in shower and tub compartments. The California Building Code strictly mandates the use of cement board as a base for wall tile in tub and shower areas and also in all wall and ceiling panels in shower areas. This proposal is less strict than California’s Building Code in that the requirement only applies to walls of all shower and bath surrounds up to six feet above the finished floor.

In addition, the design and construction guidelines and standards in some states prohibit the use of greenboard in bathroom and laundry areas. In the State of Massachusetts, for example, the Department of Housing and Community Development requires the use of cement backer boards in wet areas “such as tub surrounds, showers, janitor’s closets or for entry vestibules/stairwells subject to freezing temperatures” and specifically states that “moisture-resistant paper-faced drywall is not acceptable as a backer.”

**LEED**

There are no LEED credits directly affiliated with this proposal to utilize mold-resistant materials. However, the LEED ratings systems incorporate provisions under the Indoor Air Quality Divisions for air ventilation. Adequate ventilation will assist in protecting materials from moisture. Therefore, while the proposal will not assist in achieving LEED certification, it is in conformance with the intent of LEED.

LEED for Homes specifically addresses dehumidification systems in EQ cr. 3 Moisture Control.

**Implementation and Market Availability**

There are no known implementation issues for this proposal. Materials are readily available. Most U.S. gypsum board manufacturers have developed gypsum board products that are mold and mildew resistant and score highly on the ASTM D3273-00 mold resistance standard test method.
ENDNOTES:


2. ibid.


5. NYC Dept. of Health and Mental Hygiene, Guidelines on Assessment and Remediation of Fungi in Indoor Environments (2008), http://home2.nyc.gov/html/doh/html/epi/moldpt1.shtml#health (Human exposure indoors occurs via inhalation, through physical contact (dermal exposure), or ingestion. Whether or not symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the amount of exposure, and the susceptibility of exposed persons. Susceptibility varies with genetic predisposition to allergic reactions, age, state of health, and concurrent exposures. Exposure to mold through renovation work may also lead to initiation or exacerbation of allergic or respiratory symptoms.).


7. INTL. RES. CODE § R702.4.2 (2006) (The International Residential Code states that “cement, fiber-cement or glass mat gypsum backers in compliance with ASTM C1288, C1325 or C1178 and installed in accordance with manufacturers’ recommendations shall be used as backers for wall tile in tub and shower areas and wall panels in shower areas.”); and INTL. BUILDING. CODE § 2509.2 (2003) (In comparison, the International Building Code requires the use of water resistant gypsum backing board when gypsum board is used as a base for tile and wall panels in showers and tubs. Ideally, gypsum board should not be used at all in wet areas. The backing paper on gypsum board provides excellent food for mold to grow. Alternatives to gypsum board include concrete masonry, ceramic tile on cement backer board, or cement plaster, which perform well in high-moisture areas.).

8. INTL. RES. CODE § R702.3.8.1 (“Water-resistant gypsum backing board shall not be used where there will be direct exposure to water.”). (Additionally, section 2509.3 of the International Building Code (2003) contains a similar provision, prohibiting the use of gypsum board, including water-resistant gypsum backing board. over a vapor retarder in a shower or bathtub. Although water-resistant gypsum board is required when used as a base for tiles or wall panels in showers and tubs under, in extreme conditions, even water-resistant gypsum board will not provide an adequate level of moisture protection. Installing water-resistant gypsum board over a vapor retarder would create a waterproof membrane on both sides of the gypsum board. Moisture would become trapped in the gypsum board, causing it to fail. Ideally, gypsum board should not be used at all in wet areas.).

9. CAL. BLDG. CODE § 2508.2 & 2509.3 (2008)

10. OHIO BLDG. CODE 4101 § 2509, available at http://codes.ohio.gov/oac/4101:1-25 ("Cement, fiber-cement or glass mat gypsum backers in compliance with ASTM C 1178, C 1288 or C 1325 and installed in accordance with manufacturer recommendations shall be used as a base for wall tile in tub and shower areas and wall and ceiling panels in shower areas.").