

Waterproof Wall Panels: Expanded Knowledge Resource

Continuing Education Course Reading Supplemental

Design professionals must consider many factors when selecting building materials for architectural applications such as showers, bathtubs, laundry rooms, kitchens, and other spaces. Waterproof wall panels offer many advantages compared to other building materials for these applications. This reading supplemental will expand on topics discussed in the continuing education course so students have a comprehensive understanding of the material.

Water Damage

According to a [recent study](#), water damage resulted in insurance payouts of \$13 billion in 2017. The average claim was \$10,000. News headlines are full of stories about hurricanes, fires, and earthquakes damaging homes. However, little attention is given to the extensive damage by plumbing failures, water leaks, aging hardware, and issues related to mold and mildew. Condensation in shower areas, baths, and other moisture prone areas can be especially damaging.

[Condensation](#) can be defined as the change of the physical state of matter from the gas phase into the liquid phase and is the reverse of vaporization. In the construction industry, condensation is an unwanted phenomenon as it may cause mold, mildew, health issues, wood rot, corrosion, the weakening of masonry walls, and energy penalties due to increased heat transfer. It is critical that design professionals select materials in moisture prone areas to offset the negative impacts of condensation.

Bathrooms can be very humid environments. Moisture is released into the air by taking a shower, bath, or hot water use in a sink. As the moisture mixes with the air as water vapor, it eventually makes contact with a cold surface and forms as droplets on surfaces. The hotter the water vapor, the more moisture the air can hold, which is why condensation becomes a more significant issue in the bathroom, as there's lots of steam rising from the shower, sink, or bath. Waterproof panels provide a cost-effective, sustainable, low maintenance, and easy installed solution for these types of issues.

Mold and Mildew

According to the [Centers for Disease Control and Prevention \(CDC\)](#), molds are very common in buildings and homes. Mold will grow in places with a lot of moisture, such as around leaks in roofs, windows, or pipes, or where there has been flooding. Mold grows well on paper products, cardboard, ceiling tiles, and wood products. Mold can also grow in dust, paints, wallpaper, insulation, drywall, carpet, fabric, and upholstery.

The CDC has stated that exposure to damp and moldy environments may cause a variety of health effects, or none at all. Some people are sensitive to molds. For these people, exposure to molds can lead to symptoms such as stuffy nose, wheezing, and red or itchy eyes, or skin. Some people, such as those with allergies to molds or with asthma, may have more intense reactions. Severe reactions may occur among workers exposed to large amounts of molds in occupational

settings, such as farmers working around moldy hay. Severe reactions may include fever and shortness of breath. Waterproof wall panels can help combat mold and mildew issues since they are resistant to them.

Sustainability

According to the [USGBC](#), Buildings account for almost 40 percent of global energy-related CO2 and will play a major role in a sustainable transformation. Sustainably designed buildings, like those that are LEED certified, are a global solution for cities, communities and neighborhoods. The tangible benefits may not be easily recognizable to tenants or visitors, but through sustainable design, construction and operations green buildings are reducing carbon emissions, energy and waste; conserving water; prioritizing safer materials; and lowering our exposure to toxins.

The USGBC states that green buildings reduce day-to-day costs year-over-year. LEED buildings have reported almost 20 percent lower maintenance costs than typical commercial buildings, and green building retrofits typically decrease operation costs by almost 10 percent in just one year. Green buildings positively affect public health. Improving indoor air quality can reduce absenteeism and work hours affected by asthma, respiratory allergies, depression and stress and self-reported improvements in productivity. USGBC's own research reinforces that employees in LEED green buildings feel happier, healthier and more productive.

Waterproof Panels and LEED Credits

Waterproof panels can contribute to LEED projects in many ways. The LEED v4.1 Materials and Resources category offers many opportunities for panels to contribute to a project. The Materials and Resources (MR) credit category focuses on minimizing the embodied energy and other impacts associated with the extraction, processing, transport, maintenance, and disposal of building materials. The requirements are designed to support a life-cycle approach that improves performance and promotes resource efficiency. Each requirement identifies a specific action that fits into the larger context of a life-cycle approach to embodied impact reduction.

Through credits in the MR category, LEED has instigated market transformation of building products by creating a cycle of consumer demand and industry delivery of environmentally preferable products. LEED project teams have created demand for increasingly sustainable products, and suppliers, designers, and manufacturers are responding. From responsibly harvested wood to increased recycled content to bio-based materials, the increased supply of sustainable materials has been measurable over the history of LEED. Several MR credits reward use of products that perform well on specific criteria.

Life-cycle assessment (LCA) provides a more comprehensive picture of materials and products, enabling project teams to make more informed decisions that will have greater overall benefit for the environmental, human health, and communities, while encouraging manufacturers to improve their products through innovation. LCA is a "compilation and evaluation of the inputs and outputs and the potential environmental impacts

of a product system throughout its life cycle.”⁵ The entire life cycle of a product (or building) is examined, the processes and constituents identified, and their environmental effects assessed—both upstream, from the point of manufacture or raw materials extraction, and downstream, including transportation, use, maintenance, and end of life. This approach is sometimes called “cradle to grave.”

Health Product Declaration (HPD)

The [HPD Open Standard](#) is a standard specification – composed of a format and instructions – for the accurate, reliable and consistent reporting of product contents and associated health information, for products used in the built environment. The HPD Open Standard specification is harmonized with programs of International Living Future Institute, Cradle-to-Cradle Product Innovation Institute, Clean Production Action, BIFMA, LEED, WELL and a growing number of rating and certification standards in the building industry.

HPDs can contribute to [LEED v4.1 MR Credit- Building Product Disclosure and Optimization- Material Ingredients](#). The HPD defines how to report screening of a wall panel’s contents, using authoritative lists of hazards and other information that is valuable for further analysis and assessment of health-related questions. Design professionals working on schools, healthcare facilities, and other sensitive projects may want to minimize the use of products with specific hazards to minimize potential harm to vulnerable populations.

The occupants of an average office building, school, or warehouse have little knowledge of the components of the building that surrounds them every day. Often, not even project planners have enough information about construction materials on which to base their own selection criteria, given that disclosure data are hard to acquire. Despite the regulatory safeguards for some toxic chemicals, 96% of the roughly 85,000 chemicals on the U.S. market have never been screened for possible health effects.

The intent of the BPDO-Material Ingredients credit is, “ To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.”

Project teams must use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm). (10 different permanently installed products from at least three different manufacturers for CS and Warehouses & Distribution Centers). HPDs are one of the approved transparency documents to contribute to the credit.

Environmental Product Declarations (EPDs)

Project teams can contribute to LEED v4.1 projects by specifying waterproof wall panels with an EPD for the [LEED v4.1 MR credit: Building Product Disclosure and Optimization— Environmental Product Declarations](#). The intent of the credit is “to encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.”

What is the overall impact to our environment at the time of production and installation of water proof wall system? What happens to the waterproof wall panel at end of life when they are removed? What method of transportation is used to deliver wall panels to the jobsite? What is the wall panel’s carbon footprint? These are all questions design professionals should ask when thinking of life cycle analysis.

This credit recognizes the selection of products for which the environmental impacts are well known because of industry standard life-cycle information and reporting protocols. EPDs are a standardized way of communicating the environmental effects associated with a product or system’s raw material extraction, energy use, chemical makeup, waste generation, and emissions to air, soil, and water. Although a variety of EPD programs exist, the credit requires that EPDs come from program operators who follow the International Organization for Standardization (ISO) standards, the internationally recognized norm for EPDs.

Sourcing of Raw Materials

Waterproof wall panels can contribute to [LEED v4.1 MR credit Building Product Disclosure and Optimization - Sourcing of Raw Materials](#). Raw material extraction has a direct environmental impact on Earth’s ecosystems. For example, conventional logging is the largest source of deforestation in Latin America and subtropical Asia, accounting for more than 70% of resource depletion; mining operations clear another 18% of the world’s forests. Unmanaged extraction practices can cause not only deforestation but also degradation of water sources, habitat loss, threats to rare and endangered species, releases of toxic chemicals, and the infringement of indigenous peoples’ rights.

In addition to seeking the responsible sourcing of virgin materials, teams are also encouraged to reduce raw material usage by selecting reused and recycled materials. Teams may also follow leadership performance standards and certifications that encourage local sourcing. By increasing the demand for transparency in mining, quarrying, agriculture, forestry, and other industries, this credit rewards environmental impact reductions that go beyond the individual project and have positive effects on the sources of project materials.

The intent of this credit is “To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.”

LEED project teams can meet the requirements by using products sourced from at least three different manufacturers that meet at least one of the responsible sourcing and extraction criteria for at least 20%, by cost, of the total value of permanently installed building products in the project. Wood products must be certified by the Forest Stewardship Council or USGBC-approved equivalent such as the [Programme for the Endorsement of Forest Certification \(PEFC\)](#).

Waterproof wall panels made from PEFC wood can fulfill the LEED requirements and ensure a sustainably built project. In North America, most design professionals are familiar with FSC and SFI certified wood but perhaps are not familiar with PEFC. PEFC, is a leading global alliance of national forest certification systems. As an international non-profit, non-governmental organization, they are dedicated to promoting sustainable forest management through independent third-party certification. PEFC certified wood can contribute to LEED projects using the Alternative Compliance Path. The Path rewards building projects that use "wood products from certified sources as defined by ASTM D7612-10", which includes internationally recognized voluntary forest certification standards such as PEFC.

Conclusion

It is critical that design professionals select the best materials for the job. Performance, sustainable attributes, durability, aesthetic options, and occupant health are a few factors to consider for product specification. Waterproof wall panels offer design professionals many positive attributes for a project. Waterproof wall panels offer many advantages compared to other building materials for these applications. We wish you good luck on your next project!