Ceramic Tile Green Guide

By Bill Griese, Tile Council of North America, LEED AP BD+C

This months' Getting Green section is expanded to detail the green and sustainable aspects of tile – and what makes a tile or tile setting product genuinely green and what does not.

Through technical research and standardization, the Tile Council of North America (TCNA) is leading the effort to communicate sustainability performance criteria. When selecting ceramic tile for a green building project, it is important to consider a wide variety of sustainability concepts.

Multi-attribute product sustainability standard and certification

Over the past several years, the tile industry considered a host of sustainability criteria in creating a wide-ranging multi-attribute product sustainability standard and certification program. Titled Green Squared®, this standard and certification program establishes prerequisite and elective criteria for sustainable tiles and tile installation materials, including social and environmental criteria. It is the first product sustainability standard and certification program to encompass a full range of products within an industry and is a valuable tool for specifying sustainable tile systems.

When approved industry installation guidelines are followed and products which meet stringent industry standards are used, tiled surfaces can have a perpetual service life which is paramount to sustainability.

What sustainability attributes can be expected of tile products?

Durability: Product durability is one of the most important contributors to the sustainability of a tile installation. When considering the environmental, social, and economic sustainability of a product, all relevant impacts are repeated each time that product is replaced within a normalized timeframe (usually, the expected life of a building). Ideally, a product's expected service life is at least as long as the building in which it is installed, in which case its relative impacts are considered only once. Tiled surfaces can have a perpetual service life, especially if they meet or exceed industry durability criteria such as ANSI, ASTM, and/or ISO tile and installation material product standards. By following approved industry installation guidelines such as those outlined by the *TCNA Handbook for Ceramic, Glass, and Stone Tile Installation*, durable and ultimately sustainable tile installations can be achieved.

Recycled content: Tile and installation material manufacturers offer wide varieties of products with pre- and post-consumer recycled content. Recycled content in tile products can contribute to overall building recycled content and help achieve compliance with recycled-content criteria in various green building standards and rating systems. It is always a good idea to consult directly with manufacturers to ensure that products labeled as containing recycled content meet project-specific requirements. Additionally, high levels of responsibly-recovered waste, including dust,

In addition to pre- and post-consumer recycled content, high levels of responsibly-recovered waste including dust, powder, fired and unfired scrap, and water are commonly reincorporated into tile manufacturing processes which can result in true closed-loop manufacturing.

powder, unfired scrap, and water, are commonly reincorporated into tile and installation material manufacturing. Such materials, when reincorporated into the same processes that created them, are not typically considered pre-consumer recycled content by ISO and FTC definitions. However, waste reclamation in such processes is a vital component to minimizing waste and maximizing resources. In fact, many tile factories are so efficient at waste reclamation they are effectively closed-loop facilities. Reducing waste to zero and fully utilizing all inputs are paramount to sustainability and the "holy grail" in efficient manufacturing.

Indoor air quality: Building materials with few or no volatile organic compounds (VOCs) are necessary for good indoor air quality. Ceramic and porcelain tile products have zero VOCs (because they are manufactured at high temperatures) and easily meet the requirements of commonly-referenced emission specifications. In fact, tile and stone floor coverings with no organic-based coatings or sealants are exempted from VOC emissions testing in most green building standards and rating systems, including Leadership in Energy and Environmental Design (LEED).

While tile-setting materials are not exempted from VOC testing in LEED and other green building standards and rating systems, cementitious mortars (both with and without polymer additives) typically have low to no VOC content or emissions. Such products, as well as most mastics and reactive resins in the North American marketplace, have been tested and are in compliance with VOC content and emission criteria.

Since tile products are fired at very high temperatures, there are zero volatile organics in the finished product that can be released into the air we breathe.

Cleaning and maintenance: The use of tile generally eliminates the need for harsh cleaning chemicals and their impact on the environment. Tile and grout manufacturers should be contacted to provide cleaning and maintenance recommendations for products used in green buildings. When a sealer is used, it is important to consult with the manufacturer regarding its product's compliance with VOC content and emission criteria, especially for sealers being utilized on projects designed to green building standards and rating systems.

The use of tile requires very little maintenance and generally eliminates the need for harsh cleaning chemicals and their impact on the environment.

Cleanliness and sterility: Inherently, ceramic tile is inhospitable to dust mites, mold, germs and bacteria and is often a desirable surface covering for people with allergies or asthma. Additionally, several products today, including tiles and installation materials, have innovative coatings which inhibit microbial growth. TCNA routinely runs tests and performs research to evaluate the antibacterial activity on such products, and is also evaluating the durability of these coatings. Although antimicrobial tile products are fairly new to the tile industry, the use of such products is expected to grow. Preliminary research by TCNA on the effectiveness of these coatings is encouraging, and they are yet another feature to consider when choosing ceramic wall and floor coverings.

Regional availability: Tile products manufactured with indigenous raw materials and within close proximity to building sites can help reduce overall energy consumption and air emissions associated with transportation. For product contributions to projects designed to green building standards and rating systems, manufacturers can provide the necessary paperwork regarding product manufacturing locations, quantities of indigenous raw materials, and modes of product and raw material transportation.

Exterior contribution: Light-colored tiled surfaces for site hardscaping, as opposed to traditional paving materials, can lower a development's heat absorption, or heat island effect. Such use of tile can contribute toward compliance in green building standards and rating systems when tile products have a solar reflectance index (SRI) value of 29 or greater. For more information on such products, contact the tile manufacturer.

Energy reduction: There are a number of ways tiled finishes can contribute to the energy efficiency of a building. The use of tile can help lower a building's energy footprint, reduce operational costs, and serve as a valuable strategy in meeting energy consumption reduction targets specified by green building standards and rating systems. By their nature, tile products have exceptional thermal mass. The incorporation of heavy and dense ceramic and cement-based materials into floor, wall, and ceiling installations allows for their storing and slow release of heat. This means that in the summer, tiled surfaces capture and store heat from interior environments without significantly changing temperature, keeping interiors cool during the hottest parts of the day. During the winter, tiled surfaces are able to store heat and radiate it back to an interior environment in a comfortable and energy-efficient fashion. Also, there is an increasing popularity in the use of ventilated façade tiling systems. With such systems, there is a gap between a building's exterior wall and its tile cladding. The resulting ventilated space creates a "chimney" effect where hot air is evacuated in the summer and a building's insulation properties are improved in the winter. Some experts calculate the use of ventilated façades can result in energy savings of between 20% and 30%.

Finally, some ceramic and porcelain tile manufacturers are beginning to add photovoltaic cells onto the surfaces of some of their specialty products. Such technologies are becoming more sophisticated and could potentially introduce a new variety of renewable energy solutions for building exteriors.

Innovation: Manufacturers of tile and installation materials continue to create new products that lower energy usage, reduce material consumption, improve human health, and lower other environmental burdens. Consumers are encouraged to check with manufacturers regularly for details on new environmental technologies as the expectations of "green" products continue to evolve.

Tile products have exceptional thermal mass which allows for the storage and slow release of heat. This means cool surfaces in the summer and the option for energy-efficient radiant heating in the winter.