

Ceramic glazed masonry offers advantages in sustainable designs*

By Ceramic Glazed Masonry Institute

Paraphrasing a famous quote from architect Louis Kahn, “You ask masonry what it wants. Masonry answers, ‘I want to be an arch.’” This statement describes the most basic sustainability principle: use a material to its fullest potential. Ceramic glazed masonry used for its intrinsic structural, aesthetic, durability, fire-resistance, acoustic and thermal properties on a project is the definition of sustainability: *doing more with less.*

Sustainable building design

With sustainable processes utilized in manufacturing, the end use of glazed brick and glazed structural tile building structures is where designers can see the true advantage of ceramic glazed masonry. Several design standards and codes exist today for a project to consider sustainable design strategies. Of these, the design standard of the Leadership in Energy and Environmental Design, or LEED®, standard is most often used, due to its timely introduction to the design community and adoption by various state and federal agencies.

LEED is in its fourth version, LEED v4 (www.usgbc.org/leed/v4). Six categories have historically existed in LEED for new construction, where sustainable strategies can be considered in design and operation of the building. Of the main categories, use of ceramic glazed masonry fits

into four categories, depending on the scope and conditions of the project. These include: Sustainable Sites, Energy and Atmosphere, Materials and Resources and Innovation in Design.

LEED is project-driven, not material-driven, so a system of materials – such as ceramic glazed masonry – is a part of the strategies used to increase the sustainability of the project. LEED v4 will utilize these categories; how-

ever, impact of specific materials will be treated differently than before. In addition, LEED v4 mandates disclosure and transparency of products with lifecycle assessments (LCAs),



Ceramic glazed masonry will multi-task in a project's performance, acting as structure, enclosure, aesthetic finishing, acoustic insulation, thermal mass, fire barrier, and partition as in this Walnut Bend Elementary School project.

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environmental product declarations (EPDs), and health product declarations (HPDs) .

In LEED, points for various sustainable strategies can be adopted in design. Points accrue as more strategies are adopted and higher levels of sustainability are achieved. Total points are calculated and LEED certification is determined. Several levels of certification exist in LEED depending on the total number of points awarded for a project. There are 100 base points, 6 possible Innovation in Design and 4 Regional Priority points. The four LEED Certification levels are:

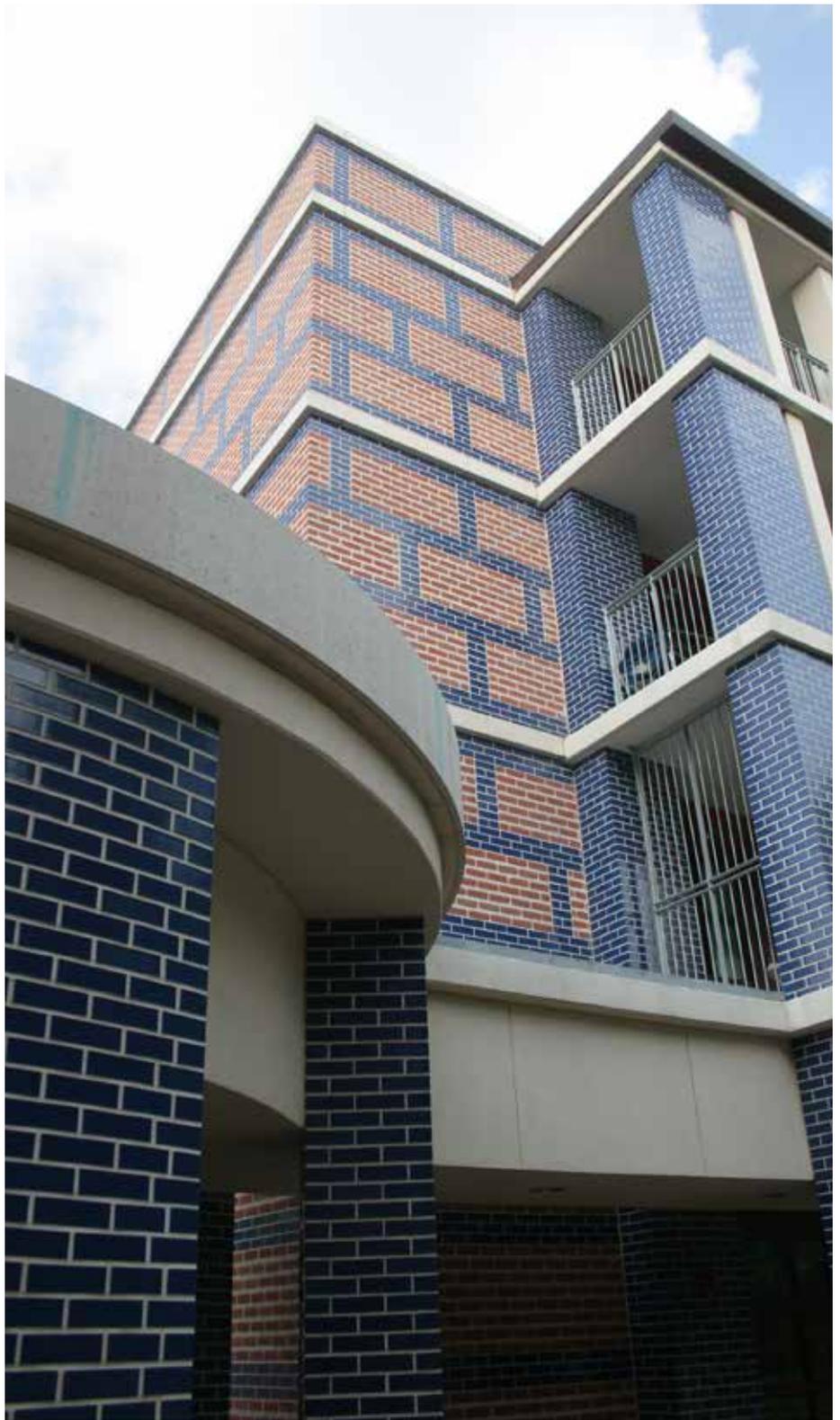
- Certified 40 – 49 points
- Silver 50 – 59 points
- Gold 60 – 79 points
- Platinum 80 points and above

Designers are encouraged to adopt as many strategies as possible to attain a higher-level certification. Many municipal, state, and federal agencies have set required LEED certification levels for their public buildings.

A sustainable choice

Ceramic glazed masonry offers the opportunity to add greatly to sustainability strategies on new construction projects. Depending on the project's scope and conditions, glazed brick and glazed structural tile can fit into the design and can assist in acquiring a significant number of credit points in the LEED certification system. Ceramic glazed masonry will multi-task in a project's performance, acting as structure, enclosure, aesthetic finishing, acoustic insulation, thermal mass, fire barrier and partition. When designed utilizing its properties to their fullest, it is a highly-sustainable choice.

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Houston's Rice University uses ceramic glazed masonry to best advantage. Of the main LEED Certification categories, use of ceramic glazed masonry fits into four categories: Sustainable Sites, Energy and Atmosphere, Materials and Resources and Innovation in Design.

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Structural tile and glazed brick: building green environments one brick at a time

Three giants of structural tile and glazed brick are Elgin Butler, Trikeenan Tileworks and McIntyre Tile. Here we take a peek at how these tile makers contribute to green-built environments, through their products and their policies.



Elgin Butler Company (www.elgin-butler.com) offers life-cycle performance-based masonry products that are ideal for environmentally-friendly projects. Its glazed brick and structural tile provide a powerhouse combination of quality, safety and affordability, making them perfect choices for sustainable construction and design.

Elgin Butler's products allows clients to build it once to last a lifetime.

Elgin Butler Company's ceramic glazed brick and structural tile can effectively contribute "points" to projects being constructed under the U.S. Green Building Council LEED certification rating system. Here's how:

Energy & Atmosphere

Optimize Energy Performance (2-10 points): Brick and structural glazed

tile have thermal lag, which allows for the high thermal mass of these products to lessen the effects of heat and cold, therefore reducing energy demands during peak-demand hours.

Materials & Resources

Construction Waste Management (1-2 points): Brick and structural glazed tile arrive on wooden pallets that are reused many times. The packaging is recycled paper that is



St. Cecilia Middle School
Houston, Texas
Jackson & Ryan Architects
Project Details: 4"x 12" in color
#7500 Ivory



St. Cecilia School in Houston, Texas, was built more than 50 years ago using ceramic glazed brick and structural glazed tile in the corridors. Through the years the school has required little to no maintenance on the ceramic glazed walls. Since the school facility was originally built, several additions became necessary to accommodate the rising student population. All additions specified the original ceramic glazed brick and structural glazed tile. Performance benefits were a factor in product selection for these additions, as well as the opportunity to create a seamless addition in the corridors. The ceramic glazed surface will never fade, flake and will look just as good as the day it was built. St. Cecilia School is an industry model for sustainable design.

landfill biodegradable and may be recycled. Product waste is <1% as most damaged pieces (max. 3% per load) can be reused as cut pieces on the project, or as filler in the core holes to meet fire resistance ratings.

Resource Reuse (1-2 points): There is a high demand for “used” clay masonry, which is one of the most widely reused wall/flooring materials for new construction. Clay brick and structural glazed tile can be 100% recycled after the life of the product (100+ years). These materials can be used in other projects, thereby reducing landfill waste.

Local/Regional Materials (1-2 points): Clay is considered an “unlimited resource” material and is our primary manufacturing ingredient. Elgin Butler’s clay is located at the manufacturing site; therefore, there is no input shipping distance, which offsets most output shipping distances.

Recycled Content (1-2 points): Elgin Butler operates a “no waste/no-discharge manufacturing” process – that is, clean-up water and manufacturing rejects are reused/recycled in manufacturing.

Innovation in Design

With the many benefits of ceramic glazed brick and structural tile, additional points are possible with Innovative Design (ID). Following are several areas where ceramic glazed brick and structural tile can contribute toward environmentally-friendly projects. Consider these additional benefits when totaling all potential points:

- Improves IAQ (Indoor Air Quality) with no off-gassing, hazardous chemicals, volatile organic compounds (VOC’s) or asbestos. (See case study Environmental Health Clinic, Halifax, Nova Scotia, at www.elginbutler.com).

The positive paradox of ceramic glazed masonry: *sustainable + durable*

*By Matthew Galvez,
president & CEO of Elgin Butler Company*

What do schools, jails, subway stations and public stadiums have in common? They all are heavily used by people who are not only indifferent to the interior and exterior environment around them, they are often hostile to it. These structures, and especially vertical walls, are faced with major issues such as graffiti, weather, constant contact with humans, as well as limited funding for maintenance and repair.

Ceramic glazed masonry can provide a sustainable solution that is durable and costs little to maintain, and has a long track record of success. There is a long history of schools, public spaces and other places that could be considered hostile environments for architectural products that have solved their design and functionality problems with ceramic glazed masonry.

Elgin Butler takes environmental initiative and responsibility seriously – because it is the right thing to do. Before 2008, recycling was not part of the manufacturing process at Elgin Butler. At that time, Elgin Butler used to send out clay to be pre-fired in a calcine kiln in order to create a body of proper size and density. Also, there was no provision in the Elgin Butler heavy-clay manufacturing process to add green ware that had been rejected back into the mix.

Elgin Butler management took the initiative, the risk, and made the financial investment (almost \$2 million) to change all of this. Elgin Butler invested in a crushing plant to crush rejected materials that were then re-ground to replace the calcine in the mix. It took almost a year to get it right because the sizing/shrinkage of this three-dimensional product changes every time a change was made to the body content. Once completed, it saved the energy of making calcine, transport energy and costs, mining for the clay used for calcine and the time and labor to make this ingredient that had been used in Butler Brick for close to 100 years.

Next, Elgin Butler began sorting, re-grinding and re-introducing green ware into the mix, eliminating a waste stream that originally comprised up to 15% of the material the company made. Again, this resulted in less mining, less consumption of things such as clay and various additives needed to make ceramic masonry.

The combination of the above efforts – replacing calcine with recycled post-industrial waste, and recycling green ware – created a 35% content of recycled materials in our products which continues today. Though none of those efforts qualify Elgin Butler for LEED points, it now sells its grog to select face brick manufacturers, which receive LEED points for incorporating the recycled grog into their body.

- Emits no toxic fumes, ozone-depleting substances or smoke, even when heated to 2000°F.
- Provides zero smoke density, zero fuel contribution and zero flame spread in a fire.
- Contains no organic material that can contribute to mold or bacteria growth; will not sustain insects.
- Requires zero maintenance (no fading, no painting).
- Graffiti is easily cleaned with environmentally-friendly detergent products, eliminating the need for harmful cleaning chemicals.
- Delivers high-quality clay masonry wall systems that are consistent and reliable, even in seismic zones.
- No refinishing or sealers necessary, thereby reducing harmful emissions into the atmosphere.
- Building life-cycle is 100+ years and when and if ever torn down, may be 100% recycled.
- 95% of the raw material used in manufacturing the brick is on site. No-input shipping distance offsets most output shipping distances.
- Rail shipping: 1/3 of the fuel usage compared to overland trucking;

therefore, 1,500 miles is equivalent.

- Clay is considered an “unlimited resource” material and primary manufacturing ingredient.

In addition, although not specifically designated for LEED credit, Elgin Butler’s manufacturing facility incorporates the following energy and waste reduction procedures to produce brick:

- Reuse of gray water for brick production
- Radiant kiln heat is recycled to pre-kiln storage and warm-up
- Ceramic glaze is recycled with less than 2% waste
- Approximately 30% of the body formula is batched from recycled or reworked glazed brick or structural glazed tile. 18.7%, by weight, is dried green ware rework and approximately 11.2%, by weight, is ground grog, or recycled fired-waste materials.
- Dust reclamation system
- 20% of the electrical energy used throughout – including manufacturing – comes from a renewable source (certificate on file)

- Currently working toward certification as an Environmentally Preferred Product by a third party source.



Green is more than just a color to Trikeenan (www.trikeenan.com); it is a way of life. Trikeenan Tileworks’ vision to create innovative ceramic tiles began more than 20 years ago, in 1989 – and the passion to inspire great designs with the beauty of hand-crafted ceramic tiles is now a reality. To this day, Trikeenan’s products are all manufactured in the USA, producing charming tiles while meeting strict U.S. environmental standards.

Ceramic tile and brick are some of the longest-lasting surfaces for floors and walls. Tile and brick are also made from naturally occurring, sustainable materials like clay and calcium carbonate. When sourced locally, they are products that have one of the lowest amounts of embodied energies and thus the smallest carbon footprint of any covering.



Tommy Hilfiger Flagship Store Los Angeles, Calif.

Tommy Hilfiger Interior Design Team

Project Details: Boneyard Brick – Custom “Tommy Blue”



Tommy Hilfiger recently celebrated the grand opening of its new 6,600-square-foot flagship store in Los Angeles, Calif. The façade features Trikeenan Tileworks’ Boneyard Brick in a custom developed “Tommy Blue” color. With a combination of utility field, corners and edge caps, and a custom half-closure size, the project design was simple, yet stunning. The sheen on the ceramic glaze creates a reflection from the natural sunlight and the deep color complements the Tommy Hilfiger signature logo and style. Trikeenan Tileworks products are made in the USA.

In addition, Trikeenan:

- Collects and reuses clay, glaze waste and wastewater in its factory.
- Uses water-based glazes that are 100% VOC-free. No VOCs escape during manufacturing nor for the life of project.
- Building sites within 500 miles of the Trikeenan factory are eligible for additional LEED points for the reduced amount of fossil fuels used in shipping.



Since 1972, McIntyre Tile (www.mcintyre-tile.com) has been employing the most environmentally-responsible manufacturing methods available. Initially, the company recycled an old wooden prune-drying building in Healdsburg, Calif., into a small factory. More than 40 years later, all McIntyre's tiles are made in the same facilities.

In general, materials that make up any ceramic product are inexpensive

clays and minerals that most people would refer to as dirt or rocks. To a potter these materials can be precious. McIntyre's manufacturing systems are continually being adjusted to ensure that those invaluable materials are used with utmost efficiency and conservation. When part of the Earth's crust is taken and fired into tile, something is made that has the potential to last as long as our planet. That is a humbling responsibility to McIntyre, which takes great pride in producing tiles of timeless beauty; tiles that upon closer examination are merely the ground we walk on recycled into a simple building material.

McIntyre recycles three ways: by formulating its clay bodies by utilizing post-industrial waste materials that it purchases; by processing internally-produced scrap materials back into

its clay bodies; and by finding special markets for tiles that do not meet the company's exacting specifications.

McIntyre uses ground brick and marble dust post-industrial waste materials, which can account for up to 50% of its clay body. Prior to being subjected to 2400 degrees Fahrenheit in the kilns, the materials that comprise the clays and glazes are blended with water. Clay manufactured but not used in tiles can be collected as scrap and recycled back into the production loop prior to firing. 99% of all scrap clay generated in the tile forming process is recycled back into new tile. 80% of all glaze over-spray is collected and recycled. When combining these factors, the resulting recycled content of any of McIntyre tile ranges between 50% and 85%.



Treasure Island Foods Market Chicago, Ill.

Project Details: 3x6 Porcelain Tiles in Amber, Dijon, Aegean & Juniper



The Treasure Island Foods Market in Chicago, Ill., features McIntyre's fine porcelain tiles in an array of bold colors. The 3" x 6" tiles in Amber, Dijon, Aegean and Juniper are installed throughout the market. Each section features a different color that radiates focus and warmth, such as Juniper in the fruit section or Dijon in the bakery. The beautiful ceramic glazed porcelain tiles are not only a stylish addition for the design, but offer sanitary benefits for food preparation areas. McIntyre Tile offers over 360 standard colors so the design possibilities are truly endless.