THE BRICK INDUSTRY ASSOCIATION

Brick Brief

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RECYCLED CONTENT IN GREEN BUILDING RATING SYSTEMS – CERTIFICATION AND CREDIT

Introduction

Most brick manufacturers have incorporated recycled materials into their brick production in one form or another for years. However, with the advent of various green building rating systems, determining the exact amount and type of recycled content material has become more crucial. This *Brick Brief* describes a third-party certification program to verify recycled content, clarifies how credits are awarded for recycled content by green building rating systems and gives an example of how to determine recycled content for a typical building project.

Materials used as recycled content can come from either post-consumer or pre-consumer (post-industrial) sources. Brick units may incorporate recycled materials such as overburden from mining, washings from aggregate processing, grog, sawdust and metallic oxides. These are typically considered pre-consumer recycled materials.

Certification

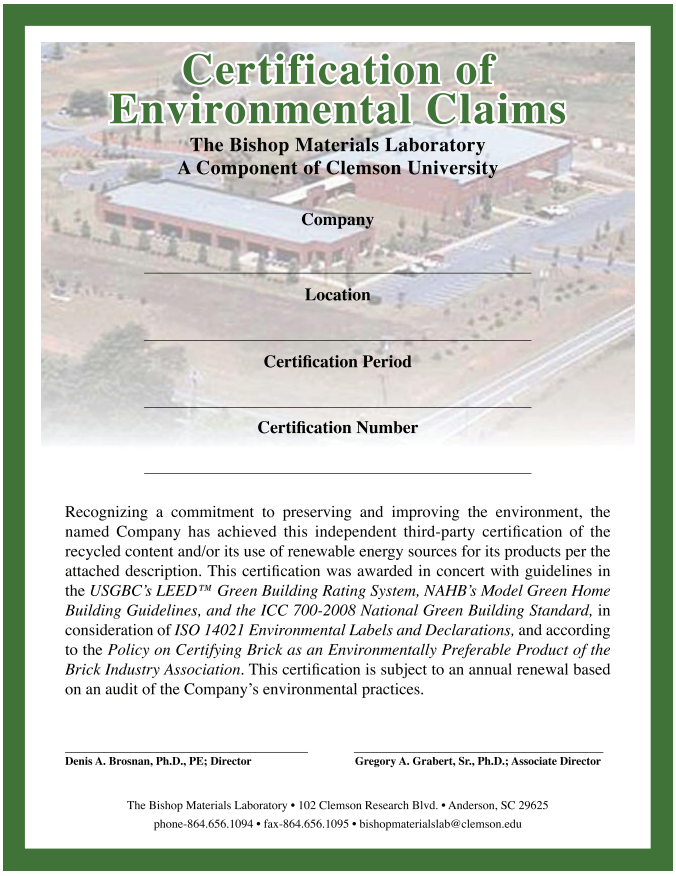
Designers and owners need assurance that the amount of recycled content in a brick claimed by its manufacturer is correct. However, not all manufacturers may assess a product's green claims in the same manner. For example, if two products made by the same process, using the same components and extracted from the same place are made by two manufacturers that do not interpret the green aspects in the same way, then the green claims for each product will be different. If the two products are exactly the same, then the green claims for each should also be the same.

In response to the need for assurance that the brick used in a project meet the environmental claims stated by the manufacturer, the Brick Industry Association and the National Brick Research Center (NBRC) have developed the Brick as an Environmentally Preferred Product Certification Program. The certification program provides clay brick manufacturers a means of verifying their "green" claims. It focuses on three primary areas:

- the amount of recycled content
- renewable energy source
- reduced resources

Each plant where a brick or brick blend is manufactured is reviewed separately. For brick certified to this policy, the certificate will list the extent to which the brick qualify for each environmental aspect or category as verified by qualified NBRC staff. The certification program requires a physical on-site plant audit, which is also administered by NBRC staff. This audit is reviewed annually to ensure continued compliance. The certificate template is shown in Figure 1.

One of the primary items verified by the Brick as an Environmentally Preferred Product Certification Program is the recycled content of the brick. The type and amount of recycled materials in brick are verified by qualified NBRC staff innately familiar with the brick manufacturing process and able to correctly interpret and quantify the amount of recycled content in a brick unit.



Certification of Environmental Claims

The Bishop Materials Laboratory
A Component of Clemson University

Company

Location

Certification Period

Certification Number

Recognizing a commitment to preserving and improving the environment, the named Company has achieved this independent third-party certification of the recycled content and/or its use of renewable energy sources for its products per the attached description. This certification was awarded in concert with guidelines in the *USGBC's LEED™ Green Building Rating System, NAHB's Model Green Home Building Guidelines, and the ICC 700-2008 National Green Building Standard,* in consideration of *ISO 14021 Environmental Labels and Declarations,* and according to the *Policy on Certifying Brick as an Environmentally Preferable Product of the Brick Industry Association*. This certification is subject to an annual renewal based on an audit of the Company's environmental practices.

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Figure 1: Template of Certificate for Recycled Content and Renewable Energy

Credit Basis and Clarification

The most prevalent green building rating system for new buildings in the United States is the Leadership in Energy and Environmental Design (LEED) for New Construction

from the U.S. Green Building Council. A new version of LEED-NC was released in April 2009 as a part of the LEED version 3 package and contained no substantive changes to the recycled content requirements (MR Credit 4 [formerly 4.1 and 4.2]).

The calculation of recycled content begins in LEED-NC with determining the recycled content value of each building material. This is the sum of the percentage of post-consumer recycled content by weight plus one-half of the percentage of pre-consumer recycled content by weight multiplied by the total cost of the material. Only permanently installed materials are included: the structure (steel, concrete, wood or masonry), the enclosure (windows, doors and exterior walls) the interior walls, the finish, and the ceilings (gypsum board, ceiling tiles, etc.). It is important to note that no labor or installation cost is included — only the cost of the building material itself. Mechanical equipment, plumbing, electrical and elevators are not included. In LEED, 1 point is earned if the percentage of recycled content is greater than 10 percent and less than 20 percent; 2 points are earned if the percentage of recycled content is 20 percent or more. An additional point can be earned under the Innovation in Design credit for exemplary performance when the percentage of recycled content is 30 percent or greater.

LEED requires the cost of all building materials on the project to be included when calculating the building's materials cost. The percentage of recycled content for the building is the *sum* of the recycled content value of the materials considered, divided by the total materials value. Once the minimum percentage of recycled content is achieved for the building to earn the points, then the recycled content of other materials do not to have to be considered.

There are several often misunderstood aspects of the recycled content credit found in most green building rating systems:

Myth #1: *Using one material or product that has a high recycled content guarantees that the credit will be awarded.*

This credit is based on *all* the building products used for a building. Simply using a single product that has a high recycled content will not necessarily result in meeting the requirements of the recycled content credit. Instead, consider the cost of all the products used in the building. For example, a product with 100 percent post-consumer recycled content that constitutes only 5 percent of all the materials costs on a project does not by itself meet a credit requiring that the sum of recycled content value constitute at least 10 percent of the total value of materials.

Myth #2: *Each material or product that counts toward the credit must contain the minimum amount of recycled content stipulated by the credit.*

Any recycled content in any material used in a building can be included in the building's recycled content total. A material is *not* required to contain a minimum amount of recycled content to be counted toward the recycled content credit. Some materials may have recycled content value above the minimum amount, while other materials may have an amount below the minimum or no recycled content at all.

Myth #3: *All materials and products in a building must have some recycled content for the credit to be awarded.*

There is no requirement that each material and product in the building must contain recycled content. For some materials, including recycled content may not be possible due to quality assurance, manufacturing or finish issues. Some manufacturers may not have access to recycled materials that can be consistently supplied in the quality and volume necessary to meet their quality and daily production demands.

On the other hand, some materials, such as metals, gypsum board and glass, can contain very high recycled content due to the inherent nature of their manufacturing processes and the availability of quality recycled materials in large enough quantities to satisfy their production needs. In recognition of these facts, no green building rating system requires that *every* material and product contain recycled content. Rather, they require that recycled content value be a portion of the sum of all materials and products. For example, a building that includes a material with no recycled content comprising 50 percent of the material costs in the building can still qualify for a 10 percent recycled content credit as long as the recycled content value of the remaining materials meets or exceeds 10 percent of the *sum* of materials costs in the building.

Myth #4: *Only the volume of the recycled content matters.*

Most recycled content credits consider the value or cost of the material in its calculations, *not* the volume. Rather, the percentage of recycled content is the value of the recycled content in the materials, divided by the value of all the materials in the building. This means that when considering two materials that each have the same volume of recycled content for the same application, the one that costs more will contribute more toward achieving the credit. While no one advocates spending more on materials for the sake of obtaining points, it certainly can be one of the factors considered by the designer or owner when contemplating materials for use in a building pursuing a sustainability certification.

For example, consider a building in which only one of the materials contains recycled content (50 percent) and all the other materials are valued at $400,000. If Material A with a recycled content value of 50 percent and a cost of $93,000 is selected, then the percentage of recycled content would be $46,500 / $493,000 = 9.4 percent. However, if Material B with a recycled content value of 50 percent and a cost of $100,000 is selected,

TABLE 1:
Calculating a Building's Recycled Content

Material	Recycled Content	Material Value	Recycled Content Value
Concrete foundation and floors	8% post-consumer; 2% pre-consumer	$ 140,000	$ 12,600
Steel columns, beams, studs	40% post-consumer	$ 525,000	$210,000
Gypsum board	50% post-consumer; 10% pre-consumer	$ 80,000	$ 44,000
Insulation	80% post-consumer	$ 10,000	$ 8,000
Brick	16% pre-consumer	$ 75,000	$ 6,000
Mortar	4% pre-consumer	$ 12,200	$ 244
Carpet	16% post-consumer; 60% pre-consumer	$ 49,500	$ 22,800
Fenestration and doors	10% post-consumer; 10% pre-consumer	$ 220,000	$ 33,000
Roofing	0%	$ 37,000	—
Ceiling	80% post-consumer	$ 8,000	$ 6,400
Total Materials Value		**$1,107,500**	

then the percentage of recycled content would be $50,000 / $500,000 = 10 percent.

Percentage of Recycled Content Calculation

This example illustrates how the percentage of recycled content is calculated and dispels some of the myths listed. Assume that a building contains 250,000 brick with a cost $300 per thousand. The brick have no post-consumer recycled content and 16% pre-consumer recycled content. The recycled content value of the brick is one-half of the pre-consumer recycled content (half of 16 percent) times the cost of all brick (250,000 brick times $300 per thousand).

Recycled Content Value of Brick =
(0.5 × 0.16 × 250 x 300) = $6,000

A similar calculation is made for each material in the building. The percentage of recycled content of the building is then calculated by adding the recycled content value of all the materials used and dividing it by the sum of all the materials costs (total materials value) and multiplying by 100 to determine the percentage.

Here's how the values would be calculated for the building in Table 1, above:

Taking just the materials with the three highest recycled content values (steel, gypsum board and fenestration and doors), the percentage of recycled content can be calculated as:

Percentage of Recycled Content =
(210,000 + 44,000 + 33,000) × 100 / 1,107,500 = 25.9%
(Points earned: 2)

Including the recycled value content of other materials will raise the percentage recycled content of the building. For this project, 2 points are earned from just these three materials. Brick does not have to be included when calculating percentage of recycled content.

An additional point can be awarded as an Exemplary Point in LEED v3.0 if the percentage of recycled content is 30 percent or more. Even if the Exemplary Point is sought in this instance, then the percentage of recycled content can reach 30 percent without including the brick and mortar, as follows:

Percentage of Recycled Content =
25.9 + (12,600 + 8,000 + 22,800 + 6,400)
× 100 / 1,107,500) = 30.4%

Conclusion

This analysis applies to LEED-NC for new construction, LEED-Schools and LEED-CS for core and shell.

This information is presented so that designers and owners understand the implications of choosing materials with recycled content. Although brick may contribute to points for recycled content, there are many instances when that contribution is not needed to achieve those points in a green building rating system. In those cases, the designer and owner are free to choose the brick without considering how much recycled content it contains.