THE BRICK INDUSTRY ASSOCIATION

# Brick Brief

August 2010

## REGIONAL MATERIALS IN GREEN BUILDING RATING SYSTEMS – CALCULATING CREDIT

### Introduction

This Brick Brief describes how points are accrued under LEED 2009 for New Construction for regional materials (MR Credit 5). With proper understanding of how this is done, the points can be earned with the selection of any brick desired for a project.

Brick plants are most often located near large deposits of raw materials used to make the brick. Since large areas of land will be mined during the life of the plant, these are most often not located near large cities. Regional materials are identified as those extracted and manufactured within 500 miles of the project site. Of the 50 largest metropolitan statistical areas (MSAs) in the United States, there are at least two brick plants within 500 miles of 49 of them. See Figure 1 for a map of brick plants in the United States. Remember, the mileage is based on a straight-line, "as the crow flies" distance, not road mileage. Search the Internet for "distance calculations" or go to Google Earth to obtain direct-line distances.

### Credit Basis and Clarification

The revised Leadership in Energy and Environmental Design (LEED) for New Construction was released in April 2009 as a part of the LEED version 3 package. No significant changes were made to the requirements for regional materials.

The points in this category are based on the percentage of the cost of materials that come from locations within 500 miles of the building site. One point is earned if this regional source percentage is greater than 10 percent and less than 20 percent; 2 points are earned if the regional source percentage is at least 20 percent. An additional point can be earned as an Innovation in Design credit for exemplary performance where the

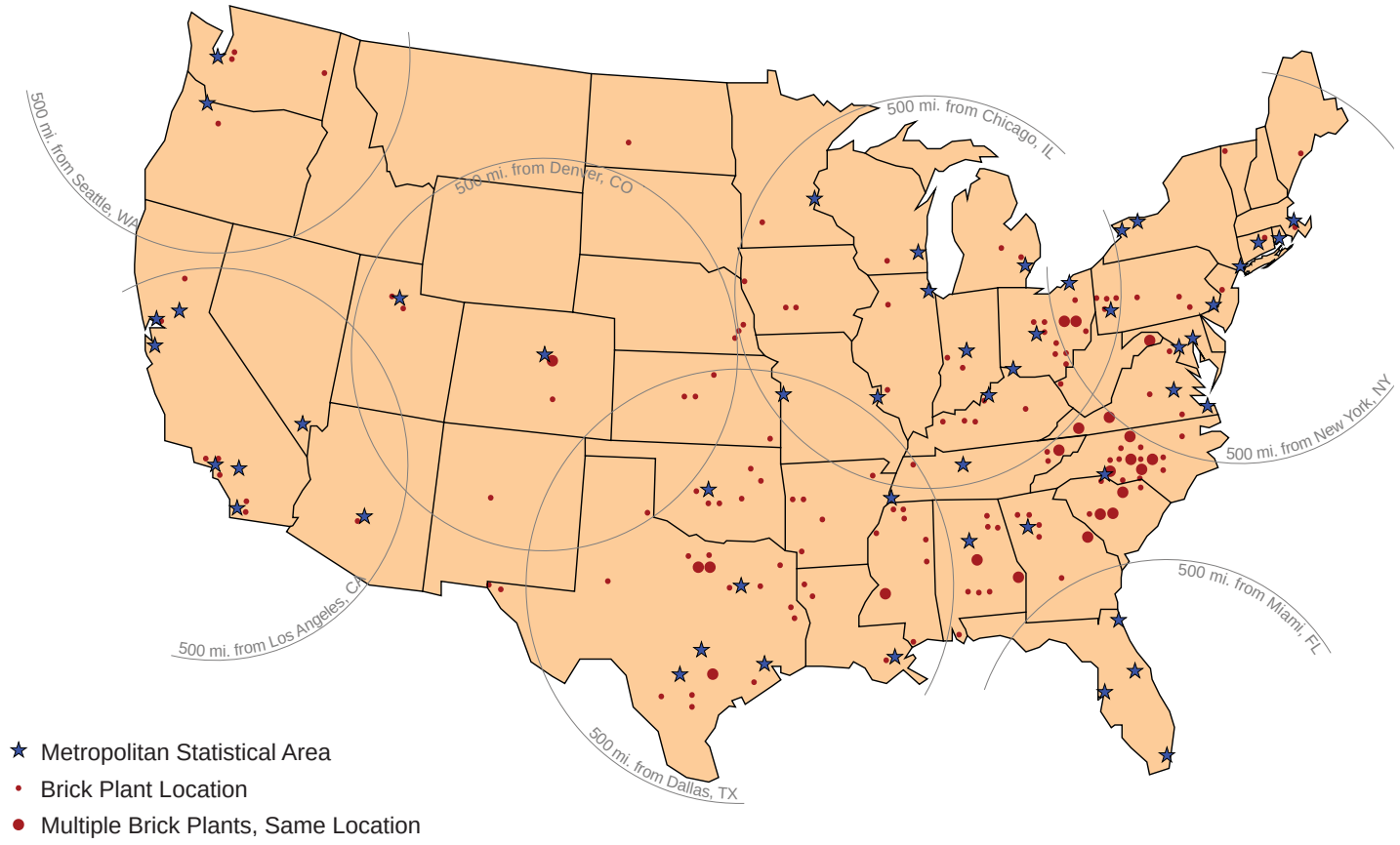


**Figure 1: Brick Plant Proximity to 50 Largest Metropolitan Statistical Areas**

regional source percentage is 30 percent or greater. Only permanently installed material are included: the structure (steel, concrete, wood or masonry), the enclosure (windows, doors and exterior walls), the interior walls and the finish and 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.

If only part of the product is extracted within 500 miles of the project, it is that percentage by weight that contributes to the product's regional value. Most raw materials used in brick manufacturing are mined (extracted) close to the plant. If the raw materials that make brick come from different locations, then just the percentage of regional materials in the brick can be included. This percentage of regional material is based on weight. See Table 1 for an example of how to calculate a material. A similar calculation is done for each building material.

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

These percentages of regional materials are then used along with the cost of the materials to determine the regional materials value for each product. A regional source percentage of the building is then calculated by dividing the sum of these regional materials values by the total materials cost and then multiplying by 100 to determine the percentage.

There are several often-misunderstood aspects of the regional materials credit found in most green building rating systems:

**Myth #1:** *Only the cost of the product matters.*

Cost is important when calculating a regional materials value, but it is not the only factor. Since a product can be made from materials that come from several locations, the distance of those source materials from the project site and their weight percentage in the product are also important. If some source materials come from more than 500 miles away, the regional material value is reduced by the weight percentage of those materials. For example, a curtain wall assembly is made up of aluminum framing, glass and gaskets. Assume that the glass makes up 75 percent of the weight of the assembly and that the glass is made more than 500 miles from the project site. Further, the other components are made within 500 miles of the site. Then the regional material value of the curtain wall assembly will be 25 percent of its materials cost.

**Myth #2:** *Using one material or product that qualifies as a regional material 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 qualifies as a regional material will not necessarily result in meeting the requirements of the regional materials credit. Instead, the cost of all the products used in the building must be considered before the credit can be met and points awarded. For example, a products whose materials are extracted and is produced within 500 miles of the project site and constitutes just 8 percent of the material cost on a project does *not* meet a credit requiring that the *sum* of regional materials value constitute at least 10 percent of the total value of the materials.

**Myth #3:** *All materials and products in a building must have been extracted and manufactured within 500 miles of the project site for the credit to be awarded.*

There is no requirement that *each* material in the building be extracted and manufactured within 500 miles of the project site. For some materials, such as aluminum and steel, extraction of a large percentage of the raw materials may come from mines or quarries far from the project site. In recognition of this fact, no green building rating system requires that every material comes from within 500 miles of the project site. Rather, they require that regional material value be a portion of the sum of all

**TABLE 1**
Calculating Percentage of Regional Material for a Building Material

| Brick Raw Material | Weight | Distance from Plant to Project Site | Distance from Extraction Site to Project Site | Weight Contribution to Regional Materials |
|---|---|---|---|---|
| Shale | 850 lbs. | 236 miles | 212 miles | 850 lbs. |
| Clay | 450 lbs. | 236 miles | 227 miles | 450 lbs. |
| Additives | 13 lbs. | 236 miles | 583 miles | — |
| Color additive and coating | 50 lbs. | 236 miles | 399 miles | 50 lbs. |
| **Totals** | **1,363 lbs.** | | | **1,350 lbs.** |
| **Percentage of regional material in brick:** (1350 lbs. / 1363 lbs.) × 100% = 99.0% | | | | |

**TABLE 2**
Calculating Percentage of Regional Materials Points

| Material | Percentage of Regional Material Content | Material Value | Regional Material Value |
|---|---|---|---|
| Concrete foundation and floors | 99% | $140,000 | $138,600 |
| Steel columns, beams | 0% | $325,000 | 0 |
| Gypsum board | 95% | $80,000 | $76,000 |
| Insulation | 0% | $10,000 | 0 |
| Brick | 99% | $77,000 | $76,230 |
| Concrete masonry | 98% | $60,000 | $58,800 |
| Mortar | 70% | $12,200 | $8,540 |
| Carpet | 0% | $49,500 | 0 |
| Fenestration and doors | 0% | $220,000 | 0 |
| Roofing | 0% | $37,000 | 0 |
| Ceiling | 0% | $8,000 | 0 |
| **Total material value** | | **$1,018,700** | **$358,170** |
| **Total percentage of regional material content: ($358,170 / $1,018,700) × 100% = 35%** | | | |
| **Points earned = 2** | | | |
| **Brick contribution to regional material content: ($76,230 / $358,170) × 100% = 21%** | | | |
| **Masonry contribution to regional material content: ($76,230 + $58,800 + $8,540) / $358,170 × 100% = 40%** | | | |

materials. For example, if a non-regional material makes up 50 percent of a buildings materials cost, the building can still qualify for a 10 percent regional materials credit as long as the regional material value of the remaining materials meets or exceeds 10 percent of the *sum* of material costs in the building.

## Example Calculation of Percentage of Regional Materials

As an example, assume that a building contains 350,000 brick with a cost $300 per thousand for a total brick cost of $77,000. The brick is composed of 99 percent regional materials, and the plant is 236 miles from the project site, as shown in Table 1. The regional material value of the brick is 99 percent times the cost of all brick:

**Regional Material Value of Brick =**
(0.99 × $77,000) = $76,230

A similar calculation is made for each material in the building. The percentage of regional materials of the building is then calculated by adding the recycled content value of the materials considered and dividing it by the sum of all the material costs (total materials value) and multiplying by 100 to determine the percentage, as shown in Table 2.

If the brick were from more than 500 miles away, then the total cost of regional materials would be reduced by the brick's regional material value to ($358,170 – $76,230) = $281,940. The percentage of regional materials calculation would then be:

**Percentage of Regional Materials =**
($281,940 / $1,018,700) × 100% = 28%

The project would still achieve 2 points and could even qualify for an additional point through an Innovation in Design credit for exemplary performance. For this project, brick does not have to be included when calculating percentage of regional materials.

## 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 from within 500 miles of the project. Although brick may contribute to points for regional materials, there are many instances in which that contribution is not needed to achieve the maximum points allowed by regional materials under current green building rating systems. In those cases, the designer and owner are free to choose the brick for the project without considering whether the brick plant is within 500 miles of the project site.