



INDUSTRY TECHNICAL NOTE COLD FORMED STEEL CONSTRUCTION

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LEED® Credits for Cold-Formed Steel Framing Manufacturers

INTRODUCTION

The US Green Building Council (USGBC), LEED® is one of the nationally accepted benchmarks for the improvement of sustainable design, environmental performance, and economic impact for commercial buildings. LEED stands for The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™. Steel framing is recognized for its important environmental attributes, particularly its consistent recycled content and reclamation rate. SSMA supports the increasing demand for sustainable green buildings through the use of innovative practices, standards, materials, and technologies.

SSMA presents the following sustainability concepts to meet your LEED-related, documentation requirements for submissions of cold-formed steel framing products.

LEED® CREDITS & CALCULATIONS

The following credit information comes from the U.S. Green Building Council's **New Construction & Major Renovation Reference Guide Version 2.2**, (Third Edition October 2007). The **Materials and Resources (MR)** chapter of the Reference Guide contains the credits discussed in this paper.

Credit MR 2.1/2.2 – Construction Waste Management

Credit Intent

“Divert construction and demolition debris from disposal in landfills and incinerators. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to the appropriate sites.”

Credit Requirements

Recycle or salvage at least 50% of non-hazardous construction and demolition materials (75% for Credit 2.2)

SSMA Opportunity

SSMA sections are manufactured from cold-formed steel framing. 100% of cold-formed steel framing members can be recycled. SSMA member companies may claim that their materials contribute to LEED® Credits MR 2.1 and MR 2.2. The specific contribution will vary by project and must be determined by the Contractor.

Calculations

Calculations are by weight or volume for total recycled and diverted waste over the total construction waste from a project. These calculations are generally performed and submitted by the Contractor.

Credit MR 4.1/4.2 - Recycled Content

Credit Intent

"Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials."

Credit Requirements

Use materials with recycled content such that the sum of post-consumer recycled content plus one-half the pre-consumer content constitutes at least 10% of the total value of materials on the project. (20% for Credit 2.2)

*An additional point is available under the **Innovation in Design** credit if the project has a total recycled content value greater than 30%.

Steel Recycled Content Value =
(Value of Steel Product) (Post-Consumer % +
½ Pre-Consumer %)

Definitions

Electric Arc Furnace (EAF) is a device used to heat iron ore and steel scrap to make steel. In an EAF an electric current is passed through the charged material, heating it to the required temperatures for steelmaking.

Basic Oxygen Furnace (BOF) is a furnace that heats iron ore and steel scrap by fueling the molten pig iron with pure oxygen. The increase in temperature reduces the carbon content of the resulting alloy and produces low-carbon steel.

Post-consumer material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purposes.

Pre-consumer material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in process and capable of being reclaimed within the same process that generated it.

Examples of pre-consumer material would be stud punch-outs sent to a recycler or mill by the stud manufacturer to be processed into new steel. Extra steel produced by the mills during the production of steel slabs that is reused does not contribute to recycled content because it comes from the same process.

SSMA Opportunity

SSMA sections are manufactured from cold-formed steel framing that has a high percentage of recycled content. Larger recycled content numbers from the SSMA sections contribute to the goal for the project, since cost of materials is multiplied by recycled content.

SSMA members should report recycled content by facility or by project (with documentation). Steel framing manufacturers may purchase sheet steel from a multiple sources to produce products for a single project it can be difficult to determine the exact recycled content. The Steel Recycling Institute (SRI) has simplified the process by providing recycled content data for the sheet steel products industry. The USGBC vetted the SRI data and the Basic Oxygen Furnace data can be applied to SSMA products. Based on the SRI the SSMA recycled content is 25.5% post-consumer and 6.8% pre-consumer.

If the manufacturer chooses to report recycled content values greater than the SRI default level, it may do so on a per project basis. In the case that a manufacturer wishes to report the higher values they must trace the end products back to the original sheet steel and steel producer.

Calculations

Calculations are based on the cost of materials to the Contractor multiplied by the recycled content of the material.

The recycled content for LEED® MR 4.1 & 4.2 and any ID credit is based on the equation listed under the Credit Requirements.

To calculate the recycled content the manufacturer should obtain written documentation from their supplier on the steel's recycled content and then derive the project's recycled content by taking a weighted average of

each of the products and its associated recycled content.

Example

A stud manufacturer produces the following SSMA products for a project and purchases from steel mills as indicated below:

Product	Weight	% Total	Steel Mill
362S125-18	30,000	30%	A
362T125-18	5,000	5%	A
362S125-30	10,000	10%	B
600S162-43	40,000	40%	C
600T125-43	10,000	10%	C
150U150-54	5,000	5%	A
Total	100,000	100%	

The stud manufacturer gathers the following data about the mills recycled content for the steel sheet coils purchased to manufacture the steel framing products:

Recycled Content Information		
Mill	Post-consumer	Pre-consumer
A	25%	6%
B	50%	8%
C	45%	9%

Stud Manufacturer Content Calculation

Pre-consumer Recycled Content =
Sum of (Purchase % x Pre-consumer %)

Products from

Mill	Purchase %	Pre-consumer %	
A	40%	x	6% = 0.024
B	10%	x	8% = 0.008
C	50%	x	9% = 0.045
Total			0.077

Pre-consumer Recycled Content = 7.7%

Post-consumer Recycled Content =
Sum of (Purchase % x Post-consumer %)

Mill	Purchase %	Post-consumer %	
A	40%	x	25% = 0.100
B	10%	x	50% = 0.05
C	50%	x	45% = 0.225
Total			0.375

Post-consumer Recycled Content = 37.5%

$$\begin{aligned}\text{Recycled Content \%} &= (\text{Post-Consumer \%} + \\ &\frac{1}{2} \times \text{Pre-Consumer \%}) \\ &= (37.5\% + \frac{1}{2} \times 7.7\%) = 41.4\%\end{aligned}$$

Project Recycled Content Calculation

Material	Cost	Recycled %	Credit
Concrete	\$200,000	10%	\$20,000
Steel Studs	\$100,000	41.4%	\$41,400
Wood Products	\$100,000	0%	\$ 0
Total		\$400,000	\$61,400

Project Recycled Content = \$61.4 / \$400 = 15.35%

This project qualifies for LEED® Credit MR 4.1 (10% level), but does not qualify for Credit MR 4.2 (20% level) or a possible ID credit (30% threshold).

**If a company can provide documentation that their steel for a specific project came from individual coils, they can report that specific percentage.

Credit MR 5.1/5.2 – Regional Materials

Credit Intent

“Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.”

Credit Requirements

10% of materials (based on cost) extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site. (20% for Credit MR 5.2)

SSMA Opportunity

SSMA sections are manufactured from cold-formed steel framing. SSMA member companies often purchase steel from mills within 500 miles of their facility and their plants are located within 500 miles of the project site. While steel may contain local materials and recycled content, not all of the steel content generally come from local sources. If an SSMA member company meets the following

provisions and can provide documentation to that effect, they can claim contribution to Credit MR 5.1/5.2¹:

1. The SSMA member can provide documentation from their steel provider that the content of the steel supplied was extracted and manufactured within 500 miles of the project site.
2. The SSMA member provides documentation that the steel used to produce SSMA sections for the specific project originated from the source in Item 1.

It is common that the iron ore and other raw materials may not have been extracted within 500 miles of the project, but the recycled steel was processed locally. The example in the calculation provides this example.

Calculations

Distances to Jobsite are determined by geographic great circle distance (as a crow flies). Several online tools can help determine this distance. This example is based on a Google tool located at:

<http://www.googleminiapps.com/tools/travel-distance-calculator-gadget/>

See Figure 1

Project Location: Cincinnati, OH
SSMA Member Location: Indianapolis, IN
Distance from Manufacturer to Jobsite: 100 mi.

SSMA Member's Suppliers		
Mill	Location	Distance to Project (miles)
A	Chicago, IL	250
B	Toledo, OH	179
C	Detroit, MI	231

Since all of these suppliers purchase extracted iron-ore from various suppliers more than 500 miles from the project, the only portion that may be claimed is the recycled content portion.

To claim the recycled content portion one must confirm that the recycling processor is within the

500 mile radius and sourced its feedstock from within a 500 mile radius.

Steel Mill Recycler Location

Mill	Location	Recycler Location
A	Chicago, IL	Fort Wayne, IN
B	Toledo, OH	Fort Wayne, IN
C	Detroit, MI	Fort Wayne, IN

From previous research it was determined that Fort Wayne, IN is 140 miles from Cincinnati therefore the recycled content of the SSMA members steel may be claimed for the calculation of regional materials.

Project Regional Material Calculation

Material	Cost	% Regional	Credit
Concrete	\$200,000	0%	\$ 0
Steel Studs	\$100,000	41.4%	\$41,400
Wood Products	\$100,000	30%	\$30,000
Total	\$400,000		\$71,400

Regional Material % = \$71.4/\$400 = 17.85%

This project would qualify for Credits MR 5.1 (10% Regional), but not for Credit MR 5.2 (20% Regional).

¹The above example is a simplified for the purposes of this document, and in reality the manufacturer will need to consider the source for each product on a project. If a single product cannot be directly traced to mill, recycling center, or raw material extraction site within the 500 miles, that product should be excluded from calculated percentages, and a weighted average should be taken, similar to the method shown in the example for Credits MR 4.1 & 4.2. All of the examples and statements contained in this document are based on the SSMA's understanding of the LEED®-NC Reference Guide Version 2.2 and "the Steel Recycling Institute's Steel Takes LEED® with Recycled Content" letter dated March 2009.

Figure 1

