

# TECHNICAL BULLETIN



## Recycled Content of Metal Roofing and Siding Panels

Metal roofing and siding panels are made with the highest recycled content from the most recyclable materials on earth, making them a great choice not only for today, but also for future generations to use. Your old car, soup can or washing machine may become part of your new roof or siding material! The federal government and most states are mandating energy-saving requirements for buildings or giving tax breaks for energy-efficient and energy-saving construction products. Because recycling decreases the amount of energy required to produce metal products, recycled content is also being recognized and rewarded, making recycling an economic as well as an environmental benefit.

California, New York, and Pennsylvania are leading the way in energy-saving initiatives, using the “Leadership in Energy and Environmental Design” (LEED) rating system to certify “green” buildings under the system created and promulgated by the U.S. Green Building Council (USGBC).

Energy savings comes from many efforts including design considerations such as landscaping that saves water or highly reflective metal roofs that reduce air conditioning load to save energy. The LEED 2009 rating system considers both the “pre-consumer” and “post-consumer” recycled content of building materials. Although recyclability is not a specific part of the LEED rating system, it is still a valuable asset that metal panels may be recycled when their useful life ends after many years of service and that they can contribute again to a future products’ recycled content.

### Steel Recycling

Steel is the world’s most recycled material. In the U.S. alone, nearly 86 million tons of steel were recycled in 2011. Every ton of steel recycled saves 2,500 pounds of iron ore, 1,400 pounds of coal and

120 pounds of limestone. New steel, made with recycled material, uses as little as 26% of the amount of energy that is required to make steel from raw materials extracted from nature.

Two different processes, the basic oxygen furnace (BOF) and the electric arc furnace (EAF), are used to produce steel. Both processes utilize recycled scrap steel to produce new steel.

According to the Steel Recycling Institute ([www.recycle-steel.org](http://www.recycle-steel.org)) the total recycled content from BOF production of 37,798,500 tons of steel in North America during 2011 was 13,957,000 tons or 36.93% total recycled content. The post-consumer recycled content was 19.8% and the pre-consumer recycled content was 14.4%.

The total recycled content from EAF production of 55,152,600 tons of steel in North America during 2011 was 49,575,000 tons or 89.89% total recycled content. The post-consumer recycled content is 69.0% and the pre-consumer recycled content is 19.5%. As you can see, the EAF process uses almost all scrap steel.

Care should be taken when making environmental comparisons between steel made by the BOF and EAF process. Both are part of a complementary steel-making system.<sup>1</sup>

### Aluminum Recycling

Aluminum is also recycled extensively from both pre-consumer and post-consumer sources and provides the most valuable component for most municipal recycling efforts. A survey in mid-2008 indicated that the recycled content of domestically produced, flat-rolled products for the building and construction market was approximately 85%. The survey of producers indicated that on average about 60% of the total product content is from post-consumer sources. In addition, at the end of a long,

useful life, aluminum roofing and siding panels can be repeatedly recycled back into similar products with no loss of quality.

Producing aluminum from recycled material requires only 5% of the energy required to produce aluminum from bauxite ore, and every ton of recycled aluminum saves four tons of bauxite. Additionally, using recycled aluminum instead of raw materials reduces air pollution generation such as CO<sub>2</sub>, SO<sub>x</sub>, and NO<sub>x</sub> by 95% and water pollution by 97%.<sup>2</sup>

## Copper Recycling

Copper also is routinely recycled with the highest scrap value of any building metal. Copper's high cost makes it a favored product for collection and sale to nonferrous-scrap recycling companies. The scrap is melted down and reformed into a new, appropriate product. This re-melting takes only about 15% of the total energy consumed in mining, milling, smelting, and refining copper from ore.

The average recycled content of all copper products is 44.6%. Copper wire is the biggest consumer of pure copper and, as a result, copper wire production uses little copper scrap. The remaining copper market, including copper roofing, contains 75% recycled product. Almost 50% of this is post-consumer recycled product.<sup>3</sup>

## Zinc Recycling

Over 30% of zinc used in all applications worldwide comes from recycling. That percentage is expected to increase.<sup>4,5</sup> In building applications, especially in Europe, more than 90% of old, rolled zinc products are recovered and generally recycled into other types of zinc products.

An estimated 13 Mt of refined zinc metal is produced annually. Of this, 12 Mt comes from ores and concentrates while the balance is supplied from old scrap that requires refinement before reuse. The

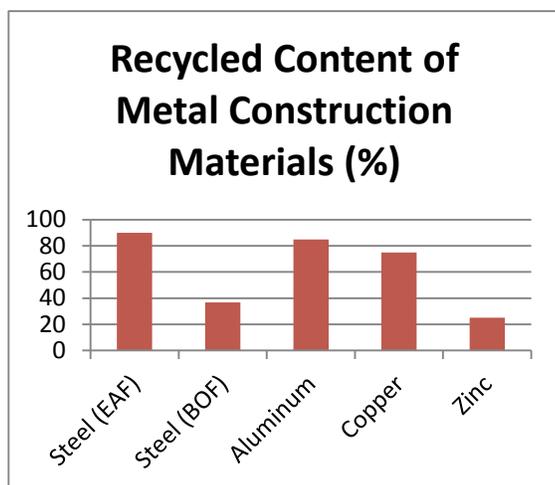
total amount of zinc consumed annually is approximately 16 Mt. The 3 million ton gap is supplied from secondary or recycled sources that do not require further refinement prior to reuse. This category is made up primarily of alloys (brass and die castings) and zinc sheet, which are simply re-melted.<sup>7</sup>

The average recycled content of zinc in building products, of refined metal, is estimated to be 15%.<sup>6</sup> However, the total recycled content of zinc, including all potential building applications (alloys and rolled zinc), is approximately 25%.

For zinc, the End of Life Recycling Rate is the preferred measure as it quantifies the amount of zinc actually recovered at the end of product life ("old scrap") and recycled into new zinc metal, and requires an understanding of historical production and consumption levels, product lifetimes and collection rates. It is estimated that 60% of available zinc at the end of life is recovered and actually recycled.<sup>6</sup>

## Conclusions

The high recycled content and recyclability of metals like steel, aluminum, copper, and zinc allow for metal construction products to be routinely included on listings for "green" or sustainable building materials.



The USGBC LEED green building rating program recognizes the importance of the weighted, total, and recycled content of a building project's materials. The use of recycled metal can help a LEED-registered building project acquire points in many credits within the program.

## References

- (1) Steel Recycling Institute ([www.recycle-steel.org](http://www.recycle-steel.org))
- (2) The Aluminum Association LEED Fact Sheet ([www.aluminum.org](http://www.aluminum.org))
- (3) Copper Development Association ([www.copper.org](http://www.copper.org))
- (4) International Zinc Association ([www.zincworld.org](http://www.zincworld.org))
- (5) "UM Recycling Workshop", Report of proceedings, Brussels, June 10, 1999.
- (6) "Zinc Recycling – Closing the Loop", International Zinc Association, 2011, [www.zinc.org](http://www.zinc.org)
- (7) "Le recyclage des métaux non ferreux" (Recycling non-ferrous metals), M.E.Henstock, Publication of the Conseil International des Métaux et de l'Environnement, May 1996

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- Technical guidance
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- Educational and awareness programs
- Advocating for the interests of our industry
- Recognition of industry-achievement awards
- Monitoring of industry issues, such as codes and standards
- Research to develop improved metal construction products
- Promotional and marketing support for the metal construction industry
- Publications to promote use of metal wall and roof products in construction

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