



Environmental Product Declarations

Steel Industry Issues First EPDs for Steel Joists and Steel Decks

By J. Kenneth Charles, III and Robert C. Paul, P.E.

Thinking green is not enough in today's construction environment. Any person or company can claim to be sensitive to the environment, but are their products and processes sustainable? With increased demand in the design arena for sustainable building practices and materials, architects, engineers, and other "buyers" can have a difficult time assessing the various parts and pieces that go into any construction project. They are confused by labels that are not standardized. There must be transparency and verifiability if these design professionals are to end up with truly sustainable projects that meet clients' demands.

In 2013, the Steel Joist Institute (SJI) was challenged, as members of the Steel Construction Sustainability Council, to consider the development of Environmental Product Declarations (EPDs) for steel joists and steel decks. The Steel Construction Sustainability Council is comprised of steel partner organizations that meet twice per year to review trends and challenges in sustainable building practices. It was founded by the Steel Market Development Institute, a business unit of the American Iron and Steel Institute (AISI).

The first task was to understand the various terms and definitions discussed by the Council. Steel is the most recycled material on the planet, but there are also other important considerations when determining a product's sustainability, such as:

- **Product Category Rule (PCR)** – Product Category Rules put in place the rules of the game for the development of Life Cycle Assessments (LCAs) and EPDs. The PCR defines how the EPD are created for a specific product, including how system boundaries are chosen, which impact categories should be included, and which methodologies should be used.
- **Life Cycle Assessment (LCA)** – This concept originally developed in the 1960s and 1970s. It assesses the inputs, outputs, and environmental impacts of a product or system over its entire lifespan, from extraction of raw materials to end-of-life disposal or recycling.

- **Life Cycle Inventory (LCI)** – This term refers to the data collection portion of the LCA. An LCI accounts for all inputs and outputs related to the system being studied.
- **Environmental Product Declaration (EPD)** – An EPD is defined by thinkstep, a prominent Life Cycle Assessment practitioner, as: "a verified (and registered) document that communicates transparent and comparable information about the life cycle environmental performance of a product." The EPD is the vehicle for reporting the results of the LCA studies.

Moving Toward Transparency

SJI and the Steel Deck Institute (SDI) share several member companies, so it made sense to move ahead as a team in the development of EPDs for these products. UL-Environment (UL-E) was selected as the Program Operator, and thinkstep was chosen as the Life Cycle Assessment Practitioner.

The first step in the process was determining which data should be collected from the steel joist and steel deck manufacturers, and which plants would supply the information based on processes that could be found at any SJI or SDI member plant. This was necessary for the resulting EPD to reflect an industry average.

Thinkstep collected the data and conducted the LCA study, which covers everything from materials and energy to paint, chemicals, and packaging. The results include quantities of waste and materials for recovery, emissions for air and water, ozone depletion potential effects, and potential global warming contributions. The collected data represents more than 85% of the products manufactured in North America by SJI and SDI member companies.

After the LCA study had been completed, an independent review was conducted. When the study had passed the review process, thinkstep created the EPDs, titled *Environmental Product Declaration: Open Web Steel Joists* and *Environmental Product Declaration: Steel Roof Deck and Steel Floor Deck*. The documents were sent to UL-E for third-party verification. The final step was registering the EPDs with UL-Environment.

The resulting EPDs for both steel joists and steel deck are available for free download. *Open Web Steel Joists* can be downloaded from the Steel Joist Institute website (www.steeljoist.org), and *Steel Roof Deck and Steel Floor Deck* can be downloaded from the Steel Deck Institute website (www.sdi.org). Both EPDs are also included on the UL website (www.ul.com). To download from the UL site, scroll down to the bottom of the page. In the Resources column, click on Sustainable Product Guide and then look for the Steel Deck Institute and the Steel Joist Institute under the Manufacturers/Brands tab. This new data is also included in thinkstep's GaBi databases (www.thinkstep.com) and the Tally database (<http://choosetally.com>).

Construction professionals interested in viewing and using steel industry EPDs and other transparency resources in their building projects can visit www.buildusingsteel.org for a list of steel product EPDs and updates on other sustainability resources.

LEED v4 Benefits for Building Construction Professionals

The EPDs enable engineers, architects, designers, specifiers, and other construction professionals to include steel joists and steel decks as separate products toward the achievement of one point in LEED v4, using the Materials and Resources credit titled *Building Product Disclosure and Optimization – Environmental Product Declarations*.

Open web steel joists, and steel floor and steel roof deck, have always been environmentally responsible products. With the development of Environmental Product Declarations voluntarily undertaken for these products, scientific data and results now exist to assist design professionals in the materials selection process. Through this process, the steel industry continues to demonstrate its commitment to transparency in sustainability reporting methods. ■

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