

STEEL CONDUIT TECH TALK

Technical Information About Steel Conduit and Electrical Metallic Tubing

HOW STEEL CONDUIT CONTRIBUTES TO SUSTAINABLE BUILDINGS

Green building practices aim to reduce the environmental impact of buildings throughout the entire life cycle of the building. While much of the attention has focused on energy efficiency, most green building rating systems and standards also include requirements for water efficiency, waste reduction, operations and maintenance optimization, indoor environmental quality enhancement, carbon dioxide emissions reduction, and for the reuse, recycled content and regional extraction and manufacturing of building materials.

Members of the Conduit Committee of the Steel Tube Institute manufacture rigid steel conduit, intermediate metal conduit, electrical metallic tubing, and associated elbows, couplings and nipples.

Unlike other materials, steel contains recycled material and is also fully recyclable. In fact, according to the Steel Recycling Institute (SRI), steel is the world's most recycled material.

The additional "green" aspect of our steel products is what the Steel Recycling Institute terms the "reclamation rate". Steel conduit is especially exceptional relative to "reclamation rate." Four major factors account for this:

The service life is very long. (There is steel rigid conduit still in use after more than sixty years.)

Conductors can be removed and new conductors installed.

Additional circuits can frequently be added in the same conduit.

When the conduit is finally discarded, it is virtually totally recyclable.

For more information on the sustainability of steel, please visit www.recycle-steel.org and www.sustainable-steel.org

LEED

LEED (Leadership in Energy and Environmental Design) is an internationally recognized green building certification system developed by the U.S. Green Building Council (USGBC). We are frequently asked to provide information for Material Resources (MR) Credit 4 – Recycled Content and for MR Credit 5 - Regional Materials.



CONDUIT COMMITTEE
www.steelconduit.org

It is explicitly stated in these sections of LEED that “mechanical, electrical and plumbing components and specialty items such as elevators and equipment **must not be included** in this calculation.”

Although steel conduit and EMT are electrical items and excluded at this time from contributing to points in MR Credit 4, we provide information on the recycled content of our products, based on average industry values provided by the steel industry.

There are two different technologies used to make steel – the basic oxygen furnace method (BOF) and the electric arc furnace (EAF). These technologies use differing amounts of old steel to make new steel but neither should be considered environmentally superior to the other.

According to the Steel Recycling Institute (www.recycle-steel.org), *total recycled content* of steel ranges from 32.7%- 93.3%. For *post consumer recycled content* the range is 25.5% - 56.9% and for *pre-consumer recycled content* the range is from 6.8% - 31.4%.

NEW LEED PILOT CREDITS FOR WIRING AND CONDUIT

The LEED Pilot Credit Library now contains Pilot Credit 2: PBT Source Reduction: Dioxins and Halogenated Organic Compounds. [Click here](#) for complete information. The intent of this credit is to “reduce the release of persistent bioaccumulative toxic chemicals (PBTs) associated with the life cycle of building materials.”

Steel conduit is specifically mentioned as a product that will contribute to this Pilot Credit.

ASHRAE STANDARD 189.1

In January 2010, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) announced the publication of the first green building standard “Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings”. ASHRAE developed the standard in conjunction with the Illuminating Engineering Society of North America (IES) and the U.S. Green Building Council (USGBC).

This standard covers the key topic areas typically included in green building rating systems, such as LEED and Green Globes. However, this standard is written in mandatory language while the ratings systems have been developed for implementation as a voluntary system. According to ASHRAE, Standard 189.1 is a “code-intended standard”, suitable for adoption by states and municipalities and for use by organizations with green building rating systems, developers, corporations and universities. The standard includes prescriptive requirements plus performance-based options.

ASHRAE 189.1 will be included as a jurisdictional requirement option in the new *International Green Construction Code* (IgCC) which is being published by the International Code Council.

Prescriptive Requirements

Section 9 “*The Building’s Impact on the Atmosphere, Materials, and Resources*” includes requirements for Reduced Impact

Materials in 9.4.1. This Section states:

“Components of mechanical, electrical, plumbing, fire safety systems and transportation devices shall not be included in the calculations except for piping, plumbing fixtures, ductwork, conduit, wiring, cabling and elevator and escalator framing. Calculations shall only include materials permanently installed in the project.”

Sub-section 9.4.1.1 Recycled content further states:

“The sum of post-consumer recycled content plus one-half of the pre-consumer recycled content shall constitute a minimum of 10%, based on cost, of the total materials in the building project. The recycled content of a materials shall be determined by weight. The recycled fraction of the material in an assembly shall then be multiplied by the cost of assembly to determine its contribution to the 10% requirement.”

Sub-section 9.4.1.1 also states that annual average industry values, by country of production, for the recycled content of steel products manufactured in basic oxygen furnaces and electrical arc furnaces are allowed to be used as the recycled content of the steel.

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Sub-section 9.4.1.2 Regional Materials contains requirements for building materials or products to be regionally extracted/harvested/recovered or manufactured within a radius of 500 miles of the project site. Please contact individual Conduit Committee members for the locations of their manufacturing facilities.

Performance Option – Life Cycle Assessment

As an option to the prescriptive requirements, ASHRAE 189.1 allows an LCA to be performed and submitted to the AHJ. As stated in 9.5.1.1 “the building alternative chosen for the project shall have a 5% improvement over the other building alternative assessed in the LCA in a minimum of two of the impact categories.

INTERNATIONAL GREEN CONSTRUCTION CODE (IgCC)

In August 2010 the ICC is holding hearings on its new Green Construction Code. Visit www.iccsafe.org for more information.

LIFE CYCLE ASSESSMENT

Life Cycle assessment (LCA) is a relatively recent concept developed in an attempt to examine the entire life cycle of a product or process in order to assess the burdens placed on the environment.

The Worldsteel Association (www.worldsteel.org) has published some position papers regarding LCA as well as a set of practical guidelines for undertaking or using LCA. While the association is committed to the concept of sustainable development, it recommends caution when using LCA: *“The present state of the art and the sensitivity of results to subjective assumptions demand extreme caution when using LCA to compare the impact on the environment of alternative materials.”*

The Global Development Research Center (www.gdrc.org) agrees. In the GDRC paper “Life cycle analysis and assessment”, they state: *“LCA is a potentially powerful tool which can assist regulators to formulate environmental legislation, help manufacturers analyze their processes and improve their products, and perhaps enable consumers to make more informed choices. Like most tools, it must be correctly used, however. A tendency for LCAs to be used to*

‘prove’ the superiority of one product over another has brought the concept into disrepute in some areas.” They also state that *“Reliable methods for aggregating figures generated by LCA, and using them to compare the life cycle impacts of different products, do not yet exist. However, a great deal of work is currently being conducted on this aspect of LCAs to arrive at a standardized method of interpreting the collected data.”*

In the meantime, when making product or system comparisons, it is important to focus on all of the attributes of the product or system that make it the correct choice for a particular application. Environmental considerations are one part of the equation. According to IEC 62430 *Environmentally Conscious Design for Electrical and Electronic Products*, *“The choice of a design solution should achieve a balance between the various environmental aspects and other relevant considerations, such as function, technical requirements, quality, performance, business risks and economic aspects.”*

Steel products such as steel conduit have a high recycled content rate, but more importantly, have a very high reclamation and re-usability rate in addition to several other benefits discussed on this website.



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