

**LEED stands for green building leadership.
LEED is transforming the way we think about how
buildings and communities are designed, constructed,
maintained and operated across the globe.**

-US Green Building Council

ICF Contribute Points to LEED Certification

Several green building standards have been created over the past several years to focus on reducing the environmental footprint that buildings have on local communities. Fortunately, Insulating Concrete Forms (ICFs) are a clear choice for building designers to maximize points in many of these ratings. A quick review of the 69 possible points available in the US Green Building Council Leadership in Energy and Environmental Design (LEED) for New Construction identifies energy savings as the most heavily weighted criteria, with up to 10 points achievable for buildings designed for energy savings over requirements set in code standards.

This strong focus on energy savings is appropriate considering the bulk of a building's environmental footprint is caused by the energy consumed in the heating and cooling of a structure over the course of its lifetime. The high performance thermal envelope of ICF construction can offer a significant contribution towards achieving all 10 of the **Energy & Atmosphere Credit 1** Optimize Energy Performance points for LEED projects.

"ICF construction provided us with a highperformance thermal envelope that contributed significantly to down-sizing the HVAC system and reducing energy consumption."

-John A. Boecker, AIA L. Robert Kimball & Associates Clearview Elementary Project.

Sustainable Sites Credit 5.1 calls for reducing the development footprint and limiting site disturbance in order to conserve existing natural areas. ICF construction can help reduce impact to a construction site, as the bracing is typically erected on the inside of the ICF wall, with limited construction activity around the perimeter. In the **Materials & Resource Credits**, ICFs contribute in three areas. **MR Credit**

2.1 and 2.2 seeks to reduce construction waste. By comparing the typical ICF waste factor of 2 – 5% with the normal waste factor of the alternative construction method, the architect can identify the quantities diverted.

The **Recycled Content Credit MR 4** is applicable for some ICF manufacturers who have incorporated recycled content in the plastic ties. The expanded polystyrene (EPS) used for the forms may also contain some post-industrial (i.e. factory regrind) waste, but generally not post-consumer waste, as the possible contamination jeopardizes the function as a safe concrete forming material.

The concrete mix used for ICFs can incorporate high percentages of fly-ash, which is 100% post-consumer recycled, and the reinforcing steel is generally 80% plus post consumer recycled. For LEED calculations, the recycled content is determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value. The values of all the materials used in the building are added for a combined percentage.

The intent of the **Regional Materials MR Credit 5** is to increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.

Depending on the manufacturer, the ICFs may fall within the 500 mile radius for manufacturing, and certainly the aggregate in the concrete is locally extracted. LEED-NC Vrs.2.2 and the LEED® Canada- NC 1.0 have been changed to require not only the manufacturing, but also the extraction of the material within the 500 miles. The aggregate for concrete certainly would qualify.

Canada has introduced a Materials and Resources Credit 8, Durable Building with the intent of minimizing construction waste due to premature failure of the building and its constituent components and assemblies. This credit was designed to address moisture and structural deterioration that causes the collapse of building envelopes. The Canadian Standards Association (CSA) Guidelines on Durability in Buildings, identifies concrete as a durable material, with resistance to mold and mildew. Indeed, the architecture of ancient Rome is time tested evidence of the endurance of concrete. Moreover, using ICFs, the concrete is protected by the layers of EPS foam, which is itself inorganic and not subject to deterioration. Durability lies at the core of sustainable architecture.

ICF structures can also achieve a high **Indoor Environmental Quality**. The insulation, combined with the reduced air infiltration of an ICF assembly, result in an interior air space that is "neutral." There are no convective currents caused by temperature fluctuation of the wall material. Nor are there any drafts caused by air leaks. And, the ambient temperatures throughout the space show little variance. With such a blank slate, the HVAC designer has a much easier task of achieving the intent of **Credit EQ2, Increased Ventilation Effectiveness**: air change effectiveness (v2.1), additional outdoor air ventilation (v2.2) and/or effective delivery and mixing of supply air (Canada v1). Likewise, using ICFs in the design of the building envelope can reduce temperature and humidity variables, and facilitate the maintenance of the comfort ranges specified for **Credit EQ7, Thermal Comfort** (Canada v.1 EQ7.1, provide a thermally comfortable environment.)

The **Environmental Quality Credits 3.2 and 4.1** are concerned with the reduction of pollutants. The EPS foam used in most ICF forms emits no VOCs or formaldehyde. They neither produce any CFCs or HCFCs during production, nor will they ever be the source of off-gassing, as the material is inorganic and inert. The adhesives and low expanding foams used in the ICF assembly are equally non-toxic, as is the concrete mass.

In addition to the points delimited by the USGBC LEED system, ICFs contribute to sustainable construction in many other ways. The sound dampening of the concrete and foam is ideal for protection from urban noise. The solid monolithic concrete wall withstands the worst of rain storms, fires, and high winds. It is also impenetrable to insects, including termites.

This is a product that will endure, as will the qualities and benefits that made ICFs clearly the right ecological choice in the first place. No matter what the criteria, ICFs are the best choice for today's construction.

This information provided by the Insulating Concrete Form Association (ICFA). The Insulating Concrete Form Association (ICFA) is the business association of the insulating concrete form industry, representing over 460 international firms through ICF promotion, codes and standards, research, partnering and education.

This document was originally published by the Insulating Concrete Forms Association in 2008.