

LEED™ Building Design & Construction Contribution NC v4.0 (April, 2017)



Fox Blocks is dedicated to contributing to sustainable building initiatives. We are a proud member of the USGBC and are driven to provide our products with the lowest carbon footprint possible to assist in the certification for a LEED™ - Silver/Gold/Platinum rating of your next project.

In the analytical review process for LEED credits, Fox Blocks Insulated Concrete Forms (ICF), as a high-performance building product for exterior and interior walls, can be classified into three categories for the application of credits:

Contributor – directly and significantly contribute toward credits within the specifics of the category.

Enabler – enable the application of design and operational credits by using the functional advantages and characteristics of Fox Blocks ICFs as an integral part of the overall building design and envelope.

Indirectly Enhance – utilizing the structural capabilities, resiliency and/or other characteristics of Fox Blocks ICFs, the installation and design may indirectly enhance or make feasible some aspect of the project design to apply for more credits.

Fox Blocks Insulated Concrete Walls specified for the exterior building envelope on sustainable projects will add directly, indirectly or enable credit contributions of LEED points in multiple credit categories.

Points available within each credit category in this report are identified in parenthesis. Total points available in USGBC LEED NC v4.0 are 110. Thresholds for certification are as follows:

LEED NC 4.0 Certified	40-49 Points
LEED NC 4.0 Silver	50-59 Points
LEED NC 4.0 Gold	60-79 Points
LEED NC 4.0 Platinum	80+ Points

FOX BLOCKS CONTRIBUTIONS TO USGBC LEED V4.0 CREDIT CATEGORIES

IP: Integrated Process (IP)

IP: Credit: Early Analysis Process (1 point)

- Fox Blocks is used in the analysis as a main component of the building envelope with the inter-relationships of building systems as basis of design in the construction documents to assist in thermal comfort and energy efficiency.

LT: Location and Transportation (LT)

- N/A

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SS: Sustainable Sites (SS)

- N/A

WE: Water Efficiency (WE)

- N/A

EA: Energy & Atmosphere (EA)

EA: Prerequisite: Minimum Energy Performance (required)

- Fox Blocks primary contribution to LEED point gains are in EA Energy and Atmosphere. The primary reduction of building energy consumption is to reduce the heating/cooling loads required. The most effective strategy to reduce heating cooling loads are through a combined enhancement of HVAC units and the building envelope. High performance walls, glazing, and roof systems will ensure protection against the exterior environment and reduce mechanical loads. The Prerequisite for this credit is to exceed national Energy Code baseline by a minimum of 5%. LEED strategy outlines improving the building envelope and thereby achieving subsequent reduction of HVAC equipment design loads.

EA: Credit: Optimize Energy Performance (1-18 points)

- Optimize Energy Performance 1 to 18 Points are available upon whole building performance exceeding successive percentage plateaus over national energy code. Note: This is the most heavily weighted LEED Credit Category, offering the most points available within LEED v4.0-(18)

	POINTS
6% New Buildings or 4% Existing Building Renovations	1
8% New Buildings or 6% Existing Building Renovations	2
10% New Buildings or 8% Existing Building Renovations	3
12% New Buildings or 10% Existing Building Renovations	4
14% New Buildings or 12% Existing Building Renovations	5
16% New Buildings or 14% Existing Building Renovations	6
18% New Buildings or 16% Existing Building Renovations	7
20% New Buildings or 18% Existing Building Renovations	8
22% New Buildings or 20% Existing Building Renovations	9
24% New Buildings or 22% Existing Building Renovations	10
26% New Buildings or 24% Existing Building Renovations	11
29% New Buildings or 27% Existing Building Renovations	12

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	POINTS
32% New Buildings or 30% Existing Building Renovations	13
35% New Buildings or 33% Existing Building Renovations	14
38% New Buildings or 36% Existing Building Renovations	15
42% New Buildings or 40% Existing Building Renovations	16
46% New Buildings or 44% Existing Building Renovations	17
50% New Buildings or 48% Existing Building Renovations	18

- Fox Blocks ICF delivers concrete walls (thermal mass) encapsulated with rigid continuous foam insulation both sides providing an airtight energy efficient building envelope. This assembly provides an effective airtight barrier (.01 Air Infiltration Rate), thermal mass wall, and a continuous insulation wall assembly with an R-23 value. A Fox Blocks specification will contribute in the Optimize Energy Performance criteria by improving the building energy efficiency and subsequent reduction of HVAC equipment design loads and consumption rates.
- Energy modeling software and analysis tools that incorporate thermal mass attributes and lowered air infiltration rates will identify percentage savings over minimum standards, providing increased point contributions as plateau levels are reached and exceeded.
- LEED EA required prerequisite of 5% increase over ASHRAE/IESNA Standard 90.1 is assured with an ICF specification - national comparative averages show insulated concrete form building envelopes offer 46% savings in energy consumption vs. light frame construction built to code standards.
- Fox Blocks will directly contribute to the overall building performance to maximize percentage increases over baseline. Fox Blocks can be a direct and major contributing component in an ultimate gain of the maximum 18 points / 50% efficiency increase over baseline.
- Fox Blocks ICF concrete walls will drive efficiencies due to a moderating mass effect, reducing peak loads and delaying peak loads to non-critical timing. Peak load reduction and delay will occur due to the extended thermal lag effect of insulated mass wall construction. This effect enhances the performance of related systems such as solar electric, wind generation electric, and ground source heating/cooling.

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MR: Materials & Resource (MR)

MR: Credit: Building Product Disclosure and Optimization – Environmental Product Declaration

Option 1. Environmental Product Declaration (EPD) (1 point)

- Fox Blocks can provide an EPD for our ICF products.

MR: Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials

Option 2. Leadership Extraction Practices (1 point)

- Fox Blocks contain 100% postindustrial Pre-Consumer recycled high density polypropylene webs as the structural skeleton of the form. The weight percentage of this portion of Fox Blocks varies across the product line. The EPS foam panels are not recycled content.
- Lowest contribution by weight of recycled content per Fox Block form unit is 37.3%, highest contribution is 64.1%.
- An 8" core commercial, institutional, industrial Fox Blocks project will average 55.2% recycled content by weight of Fox Blocks forms. Refer to the technical document 1.10.01 Fox Blocks Recycled Content, to determine exact recycled content by weight by specific project usage.
- Concrete* walls that include fly ash as recycled material will add to this credit category contribution.
- The specification of the rebar can include recycled content adding to the contribution to this credit category.
- Fox Blocks forms have multiple manufacturing locations, in the USA and Canada, and are pleased to offer product through the closest possible location that may meet the maximum 100 mile travel limit.
- ICF base product extraction must be shown to be within 100 miles of project site. Base products include the styrene bead manufacturing location, the polypropylene plastic manufacturing and/or recycling facility location.
- This credit is based on percentage of total cost of materials for entire project. The ICF cost portion of most projects is insignificant against the total cost and therefore offers minimal contribution to this credit.
- By weight 98% of Fox Blocks finished wall is concrete* and the cost elements of the structural concrete wall (aggregate, cement, water, fly ash, rebar, etc.) are typically sourced locally and thus are an exceptional contribution to this regional materials credit.

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MR: Credit: Construction and Demolition Waste Management

Option 1. Diversion (1-2 points)

- Fox Blocks offers 100% recyclable product; both the polypropylene plastic webs and the expanded polystyrene foam panels can be completely diverted from landfill.
- Fox Blocks forms are engineered with reversibility and strength to minimize waste and maximize product efficiencies. Fox Blocks ICF can provide a Construction Waste Management Recycling Plan to outline (upon confirmation of recycling locations near project site) a procedure to divert any Fox Blocks waste material from landfill contribution.
- Fox Blocks ICF will work closely with installing subcontractors to assure the direct contribution of Fox Blocks materials to 50% and 75% construction waste management diverted from landfill. Fox Blocks will assist in identifying recycling facilities and jobsite plan is in place as a recognized portion of the subcontractor's bid to General.

EQ: Indoor Environmental Quality (EQ)

EQ: Credit: Low-Emitting Materials (1-3 points)

- Fox Blocks ICF indirectly contributes in this category by eliminating and/or reducing wall assembly components that may include adhesives and sealants used to construct the building envelope.
- Fox Blocks ICF does not contain HCFC, CFC, Formaldehydes of any kind. Fox Blocks is stable and inert.

EQ: Credit: Thermal Comfort (1 point)

- Fox Blocks is a moderating thermal mass concrete* wall; enabling a wider range of control of temperature and set points. This allows reduction in design of the HVAC system to maintain these comfort ranges.
- Fox Blocks insulation and high mass produce stable interior temperature environments that allow for higher set points in cold conditions and lower set points in hot conditions.

EQ: Credit: Acoustic Performance (1-2 points)

- Fox Blocks ICF double insulated concrete walls contributes in this category by providing high sound transmission class (STC) ratings to reduce sound within the building for adjacent spaces and outdoor to indoor noises from road traffic, aircraft, railroads, and building service equipment.

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ID: Innovation (IN)

IN: Credit: Innovation (1-5)

- Fox Blocks ICF can contribute to the overall innovative design process as a unique component, minimizing wall assembly trades required to construct the building envelope. ICF construction technology is a unique alternative to mainstream construction practices.
- Fox Blocks has in-house staff LEED AP, Engineering, and retains LEED AP consulting services to aid LEED AP of Record in the substantiation and submittal process for LEED Credit Templates.

Regional Priority (RP)

- N/A

FOX BLOCKS ICF CONTRIBUTION SUMMARY

From the credit categories listed above per the USGBC LEED NC v4.0 Rating System, Fox Blocks ICF is a contributing factor in 5 of 9 areas. Fox Blocks can assist with both direct and indirect contribution towards a total of 9 to 34 points.

There are several indirect advantages provided by Fox blocks ICFs due to the natural characteristics of the product:

- A Fox Blocks exterior wall eliminates a number of associated products that are required on a conventional wall assembly i.e. air barrier membrane, vapor barrier membrane, sealants, tapes to provide energy efficient comparable wall assemblies.
- The structural capacity of the reinforced concrete walls within the Fox Blocks ICF may eliminate steel columns and miscellaneous steel for lintels and cross-ties.
- Structural capacity also enables the application of green roof system and may support a solar panel array.
- The fasten strips within the Fox Blocks ICF eliminate additional wood or metal strapping for finishes.

Fox Blocks has been involved in many LEED design projects, plus we are the only US based ICF manufacturer with complete vertical integration through our Omaha based manufacturing facility; delivering both plastic extrusion from in-house recycling and foam molding at the same location. This creates the highest efficiencies possible in the manufacturing process of insulated concrete forms.

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Reducing building loads over the life of the structure through Fox Blocks exterior wall specification provides a reduced carbon footprint advantage that is significant.

Fox Blocks have been in the ICF business for 15 years, and has always been centered on providing an environmentally and energy efficient manufacturing process** for a sustainable and resilient building envelope solution.

FOX BLOCKS LEED AWARDS

Refer to the Fox Blocks website to review the numerous projects that have been LEED certified.

- Schools
- Hospitals
- Government Buildings
- Residential – Homes and Multi-Story

**LEED and Ready Mixed Concrete*

- **Durability:** Concrete is a proven performer for long term durability. Compared to most other materials, concrete requires little maintenance or repair, and generally has long service life. This means that fewer additional resources are required over the life of the building and less disposal of materials – both positive environmental factors.
- **Structure:** In most cases concrete provides the structural capability for the building, which reduces the need for steel or masonry.
- **Mass Effect:** The performance of concrete walls, absorbing and releasing heat slowly, moderates interior temperatures, which has been demonstrated to provide a thermal lag effect to effectively reduce heating and cooling loads – and energy consumption.
- **Local Production:** Concrete products are typically manufactured within 100 miles of any project site. Aggregate is sourced locally, which reduces transportation requirements (and maximizes local employment).
- **Waste Management:** Ready-mixed concrete plants often incorporate recycling/reclaiming systems that produce aggregate for reuse and reclaim wash water. Returned plastic concrete is stripped and later ground, returned broken concrete is reground, both are recycled and become base and under-layments for road and new construction use.

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- **Recycled Content:** Fly ash, a waste product from coal burning plants, is frequently used as a partial replacement for the cement content in concrete products, in many cases enhancing the properties of the concrete.
- **Indoor Air Quality:** Concrete is an effective air barrier and reduces off-gassing of indoor air pollutants. The use of ICFs eliminates the need for form release oil and/or stripping agents which have been associated on concrete to produce levels of off gassing toxicity such as used with conventional concrete forms.

***Fox Blocks Manufacturing Process*

- Plastics bulk delivery via rail reduces transportation energy footprint
- In house plastics recycling with no transportation costs further reduce carbon footprint in Fox Blocks webs.
- Fox Blocks incorporates the highest % of recycled plastic by weight per form unit in the industry.
- Manufacturing machines are designed to use minimum energy to produce the EPS forms
- Effluent from the machine (steam and water) can be run through a heat exchanger to pre-heat boiler feed water, saves 30% in gas utilities.
- 80% of water used in the processing can be cleaned and re-used
- Expanded polystyrene does not use ozone depleting blowing agents (CFC or HCFCs) in the manufacturing process
- Fox Blocks ICF require minimal packaging and the packaging is recyclable.
- Fox Blocks ICF are lightweight and increase trucking efficiencies reducing fuel consumption.