What are ICFs?

Insulated Concrete Forms (ICFs) are hollow blocks that are used to build walls, foundations and roofs. An ICF consists of two pieces of foam board separated by plastic spacers. They are stacked like interlocking Lego blocks to build the outline of a wall. The space between the foam is filled with concrete, reinforced with steel rebar to provide extra strength. The rebar is set in place on the plastic ties before the concrete is poured. The foam board provides structure for the concrete to cure and then serves as insulation after concrete has set.

ICF Wall Cross-Section

ICF blocks come in several sizes, although a common size for walls is 16 inches high by 4 feet long. The concrete core also can vary in width, though it is typically 4-10 inches thick. Manufacturers also make corner blocks, typically reversible top-to-bottom so it can serve as a left or right corner. The
forms are versatile and can be used both for basement and above-grade walls (a concrete pump is needed to fill in tall walls). They can also be used for foundations, such as a frost-protected shallow foundation, or walls around a crawlspace.

ICF walls can be finished on the interior with drywall or a similar product. On the exterior, they can be finished with brick, stucco, vinyl or another siding. The interior and exterior finishes are attached to the flanges of the plastic ties.

With a variety of thicknesses and sizes, ICFs can be matched to the homeowner’s needs. Recycled materials are also available. The R-value depends on the thickness of the insulating foam board. Most ICFs are made of expanded polystyrene (EPS) foam, about R-4 per inch.

Of course, the total R-value of the wall can be raised by adding additional foam to the exterior of the ICF wall. The strength of the wall depends on the thickness of the concrete and the amount of steel rebar. In areas with high winds and hurricanes, the structural strength can be increased by adding more rebar and a thicker concrete layer.

The concrete core also means the walls are fire-resistant; however, ICF walls need a thermal barrier on the interior, such as gypsum drywall, similar to a wood-framed wall.

ICFs have some disadvantages. For one, they are more expensive to use than building a frame wall. They also allow for less on-site design changes because the forms are pre-ordered through a manufacturer. On the other hand, they can be a good choice for some residences. The blocks form an airtight building envelope because of the uninterrupted concrete layer, and ICF walls have high strength and sound attenuation.

If you are interested in learning more about ICFs, visit the website of the Insulating Concrete Form Association, which provides training and information on codes, standards, and other frequently asked questions: www.forms.org.