

FIRE & EARTHQUAKE-RESISTANT CONSTRUCTION

Insulated Concrete Form (ICF) Construction

Due to the rapid advance of climate change fires, tornados and hurricanes over the past decade, there now exists a growing demand for durable, energy-efficient concrete homes built using the system of pre-assembled, interlocking insulated concrete forms (ICF). Features include solidity, durability, and design flexibility which allows for the accommodation of unique footprints, angles, curves, and arches at competitive costs to traditional wood-framed construction pairing functionality and beauty.



What Gives ICFs Unique Design Flexibility?

Almost any house plan can be adapted to ICF construction. Comprised of two layers of insulating Expandable Polystyrene (EPS) enclosing cast-in-place concrete, ICF systems can be molded into a multitude of shapes. The forms can conform to slopes, curves or other design options so aesthetic appeal doesn't have to be sacrificed to achieve energy efficiency.

An ICF built house look similar to a house built with traditional materials since they can be finished with any traditional sidings such as wood, vinyl, natural stone, brick or stucco.



The many advantages of using ICF construction includes: energy-saving, dampen outside noises, and are fire resistant for up to 4 hours. Additionally, because EPS and concrete do not contain materials that promote organic growth, ICFs are resistant to mold and mildew growth and the resulting degradation that often occurs in wood frame structures. Independent third-party tests have verified EPS insulation used in ICF construction will not support mold growth (See "Moisture and ICFs: The Fact's).

But apart from that, ICFs allow for architectural designs in a wide range of styles, and can accommodate angles, curves and a large variation of opening options – just as with timber or conventional Concrete Masonry Units (CMU) aka cinder-block, construction.

For residential designs, the overall area of the structure is generally increased to make up for the thicker walls, door jambs, and windowsills. In this manner, when designing interior rooms with ICF, architects consider the design to accommodate the wall thickness while maintaining the interior space square footage. The roof size is equally designed to be slightly larger to support bigger dimensions.



In addition, because the bearing capacity of an ICF wall can accommodate flooring systems that span long distances, structures built with ICF may feature larger, clear span rooms, unobstructed by posts or other

vertical supports. As ICF gives a very sturdy and durable rendering, foundations made from ICF can, therefore, support bigger structures too.

Designing with ICFs in Mind



While it's not difficult to convert details for a wood frame structure to ICF, designing with ICF in mind also has its advantages. If the architect allows for the product's factory dimensions to contribute to the design, less waste will be produced on the job site from cutting the EPS blocks, which means less of an environmental impact. Additionally, ICF



construction generally uses less materials to accomplish what other construction methods require to achieve the same level of performance and protection. And fewer materials reduce the potential for interaction failures.

ICF ADU Structure

Rather than fireproof an existing upper-end home that is located in the Wildlife Urban Interface (WUI) a more cost effective or value-added alternative may be to build an ICF Additional Dwelling Unit (ADU) on the property. These units are normally around plus or minus 600sf and are used as in-law, guest, or entertainment structures. They are energy and communications self-contained.

