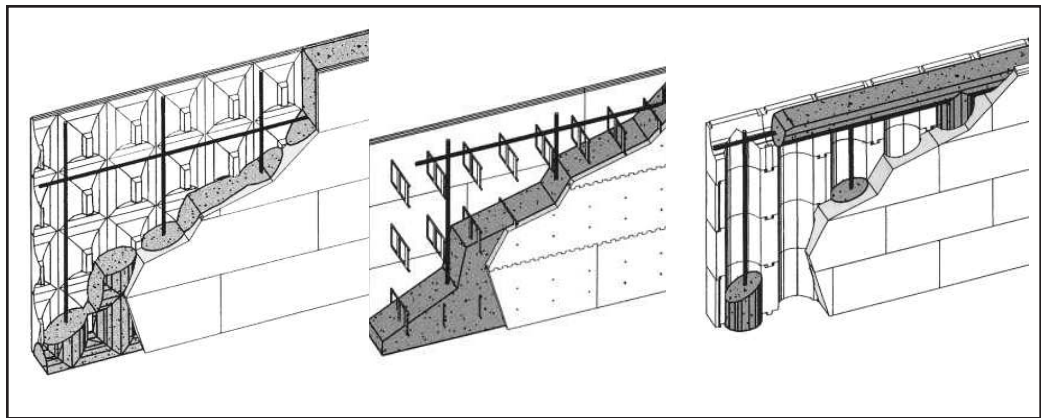


Building a Better House with Concrete

Concrete walls built with insulating concrete forms (ICFs) give a house superior comfort, solidity, durability, resistance to natural disasters, quietness, and energy efficiency. Use of ICFs is growing rapidly. They offer both home buyers and home builders a superior alternative to wood frame walls.

What are insulating concrete forms?

ICFs are hollow “blocks” or “panels” made of plastic foam that construction crews stack into the shape of the walls of a building. The workers then fill the center with reinforced concrete to create the structure.



How does the home owner benefit?

There are over 40 brands of ICFs in North America, each with some variations in design and materials.

ICF construction sandwiches a heavy, high-strength material (reinforced concrete) between two layers of a light, high-insulation one (foam). This combination creates a wall with an unusually good combination of desirable properties: air tightness, strength, sound attenuation, insulation, and mass.

Comfort. Houses built with ICF walls have a much more even temperature throughout the day and night. They have virtually no “cold spots”, and sharply fewer drafts.

Solidity. The rigidity of concrete construction reduces the flex in floors and cuts shifting and vibration from the force of the wind or the slamming of a door. Concrete houses survive high-force winds like hurricanes far better than wood homes. And when properly reinforced, they should also withstand earthquakes well.

Quietness. About one-sixth as much sound gets through an ICF wall compared with an ordinary frame wall. This sharply cuts the intrusion of noise from outside.

Energy efficiency. The superior insulation, air tightness, and mass of the walls cut the amount of energy needed for heating and cooling by 30-40%. This can save \$200-300 per year in a typical home. In addition, it allows the installation of smaller heating and cooling equipment. That can reduce the initial cost of a house by over a thousand dollars.

Design flexibility. ICF houses can be completed with almost any interior and exterior finishes and can take any shape as easily as wood frame. In fact, some interesting effects, such as curved walls and frequent corners, can be less expensive to build into an ICF home.

Building a Better House with Concrete**Don't the workers have trouble learning something new and different?**

Conventional homebuilding crews adapt easily to ICF construction. Stacking blocks is intuitive for most people, and the cutting and leveling involved draw on standard carpentry skills. Most carpentry crews will have to brush up on the use of concrete, and electricians need to learn how to cut channels in the surface of the foam to house their cable. But these are not complex tasks, and there is plenty of help available.



Photo Courtesy of Wind-Lock Corporation

Actually, ICF construction has big advantages for the workers. The foam is light, and power equipment moves the concrete. So crews stay fresh and sharp. In fact, the simplicity of assembly and the lightness of the work help keep labor costs below those of frame construction.

How much do ICF walls cost?

Because of low labor requirements, total construction cost is only slightly above the cost of wood frame despite the use of high-quality materials. When built by crews experienced with ICF construction, completed ICF houses cost about 0.5-4% more than they would if they had been built of frame.

Putting the numbers differently, building a house of ICFs adds approximately \$0.25-3.25 per square foot to the total cost. Simply building the walls adds about \$1.00-4.00. But then one can subtract off as much as \$.75 in savings from smaller heating and cooling equipment.

How can I build my next house of concrete and ICFs?

The companies that make ICFs provide extensive information. Home buyers can get names of experienced nearby contractors. Builders can get product specifications, instructions, and training. Contact the Insulating Concrete Form Association at 888.864.4232 or www.forms.org for the phone numbers of companies that serve your area.

Ask all the questions and see for yourself how concrete walls with ICFs provide a superior house for a modest price.

Additional related resources

The following publications are available from the Portland Cement Association. To order call PCA Publications at 1.800.868.6733.

CD026 *Thermal Mass Comparison of Wall Systems*

CD044 *HVAC Sizing for Concrete Homes* (version 3.0)

DVD500 *Building with Insulating Concrete Forms*

EB118 *"Prescriptive Method for Insulating Concrete Forms in Residential Construction, 2nd edition."*

LT282 VanderWerf, *"Insulating Concrete Forms Construction: Demand, Evaluation, and Technical Practice."*

SP208 VanderWerf, Lemay, *"Insulating Concrete Forms for Residential Design and Construction"*

SP405 VanderWerf, *"Concrete Systems for Homes and Low-Rise Construction."*