

An architectural cross-section of a house, showing the roof, walls, and foundation. The drawing is in a yellow and orange color scheme, with a green background on the right side. The drawing shows the interior of the house, including the roof structure, walls, and foundation. The drawing is a technical illustration of a house's structure.

A BUILDER'S GUIDE

Green from the Ground Up

**Sustainable, Healthy,
and Energy-Efficient
Home Construction**

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CASE STUDY

Hebel block is made from autoclaved aerated concrete (AAC), which is manufactured with entrained air to boost R-values. It's laid up much like ordinary concrete block but it has a number of green benefits.



ALTERNATIVES TO WOOD

Wood is still the predominant material for creating the shell of a house, but a number of builders have abandoned wood in favor of a variety of newer materials. Among them are North Carolina passive solar builders James Cameron and Kathleen Jardine (www.sungardenhouses.com), who have switched to blocks made from autoclaved aerated concrete (AAC).

AAC blocks take the place of a number of components used in a standard stick-frame—wood, insulation, house wrap, and drywall—all in a single product. The result, as these builders will tell you, is a house that's fire-proof, mold-proof, insect resistant,

hypoallergenic, sound-absorptive, and engineered to withstand hurricanes and earthquakes.

AAC is an interesting product. Aluminum powder added to a mix of sand, lime, water, and cement creates a five-fold increase in volume while trapping insulating air bubbles. It's hardened in a mold and then processed in an autoclave to produce blocks 8 in. or 12 in. thick, 8 in. high, and 24 in. long. Blocks can be cut on-site with a specialized handsaw or bandsaw and laid up somewhat like conventional concrete block.

Walls made with AAC block (Hebel is one trade name) have far less air infiltration than

conventional 2x4 constructions, the builders say, with insulating values for the 8-in. block as high as R-21 (less in colder climates). Although building with AAC is more expensive than standard 2x4 construction, the company offsets higher costs in other ways to remain competitive with wood-framed houses.

AAC blocks aren't the only alternative. Rastra is a type of insulated concrete form (ICF) made mostly of recycled polystyrene with some cement to form a material the company calls "Thastyron." It's made into hollow-core blocks that are relatively lightweight, can be cut with ordinary handsaws, and glued into place. Once stacked into walls, the blocks are reinforced with steel and filled with concrete to form finished walls. The company reports that

10-in.-thick walls have an R-value of 36.

Durisol is yet another option. These hollow-core blocks are made from mineralized wood shavings and portland cement, stacked into walls and then finished with reinforcing steel and concrete. The company says the material is noncombustible, sound absorptive, and dimensionally stable—and is made of 78 percent recycled content. It's also 100 percent recyclable.

Products like these share many green benefits and give builders interested in exploring new avenues considerable leeway. They are not as widely available as wood building products and may make the most sense in areas with local or regional suppliers. One more consideration: there is a learning curve in working with new materials. Converts will tell you it's well worth it.

Hebel block is lighter than a conventional CMU, making them somewhat easier to work with. They can be cut on-site.

