



THERMOMASS[®]
BUILDING INSULATION SYSTEMS
By Composite Technologies Corporation



If you could build a house that saved 66% or more
in energy costs, why wouldn't you?



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With THERMOMASS You Can

Homes constructed with the THERMOMASS Building System can produce a savings of 60%-80% of the cost of heating and air conditioning. The cost of building a home with the THERMOMASS Wall System is comparable to conventional frame construction.

Two recent studies conducted under the U.S. Department of Energy's Building America Program confirmed the energy savings. The D.O.E. studies compared the amount of energy required and the cost of maintaining comfortable interior temperatures in three different building systems: homes built with THERMOMASS Wall Systems; conventionally built frame homes; and a home constructed with Structural Insulated Panels. The studies were conducted in Las Vegas, NV, and Borrego Springs, CA.

Las Vegas Study

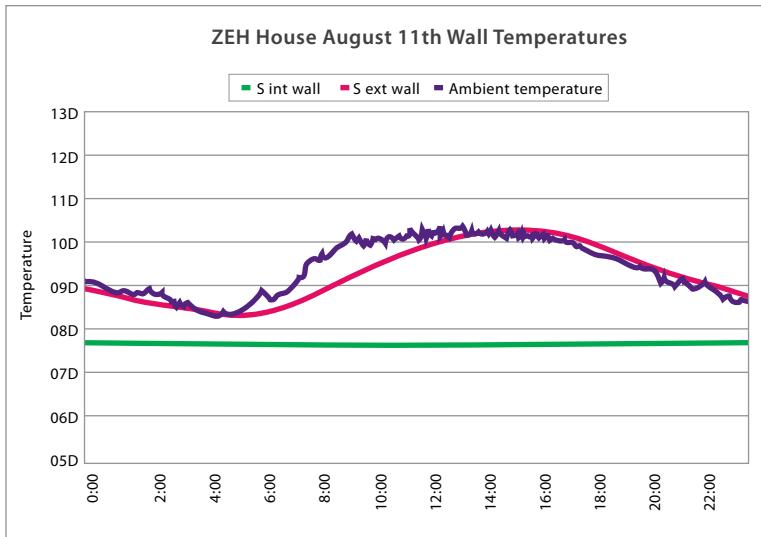


Researchers theorized that the greater mass of the THERMOMASS walls would act as a heat sink, preventing exterior heat or cold from penetrating the mass.

The Las Vegas Study compared the energy use and cost of two homes built side-by-side by Pinnacle Homes in its Vinings subdivision. One home was built with THERMOMASS featuring a 2-inch thick layer of Styrofoam® Insulation sandwiched between a 4-inch-thick interior layer of concrete and a 2-inch-thick exterior layer of concrete. The other home's walls

were constructed with conventional 2 x 4 wood framing with insulation between the wall studs. Each wall was designed to have an insulation value of R-12.

Researchers also wanted to determine whether the THERMOMASS walls could store a sufficient amount of cool air to allow the air conditioning system to be shut down during the peak hours of the day, to take advantage of a time-of-use rate plan. For that test, the THERMOMASS home's air conditioning was shut off from 1-7 p.m. The air conditioning was turned back on after 7 p.m. to cool the mass. The test was conducted during August 2006, when the temperature on the homes' south exterior walls exceeded 120 degrees.



The research yielded the following conclusions:

- The THERMOMASS walls reduced heat transfer to the inside of the home by 40%.
- Temperatures inside the THERMOMASS home maintained a near constant 78 degrees, regardless of time of day.
- The THERMOMASS home requires only 35% of the natural gas for space heating per year as the conventionally built home (109 Therms versus 308 Therms).

- The THERMOMASS home requires only 16% of the annual electric power for cooling as the conventionally built home (1,508 kilowatt hours versus 9,490 kilowatt hours).
- Based upon local utility rates, it would cost \$184.01 per year to heat and cool the THERMOMASS home, compared to a cost of \$937.98 to heat and cool the wood-frame home.

Borrego Springs, CA Study

The California study took place in two developments built by Clarum Homes in the desert community of Borrego Springs, about 90 miles northeast of San Diego. The researchers examined the energy efficiency and cost of two 1,920-square foot homes with advanced THERMOMASS Wall Systems with a benchmark established by the U.S. Department of Energy’s Building America Program. The benchmark estimates the energy use of a conventionally built home with 2 x 4 exterior wall framing and R-12 insulation and an identical orientation.

The study also compared changes in interior temperatures of a THERMOMASS home with two other prototypes, one with Structural Insulated Panels (SIP) featuring insulation sandwiched between layers of oriented strand board (OSB) and a 2 x 6 frame home with conventional insulation. All of the homes had an R-28 insulation equivalent.



The study found:

- The THERMOMASS homes used 44% to 66% less energy for heating and 66% to 68% less energy for cooling than the Building America benchmarks.
- The annual heating and cooling costs for THERMOMASS homes totaled \$675.75 and \$709.99, compared to \$1,965.01 and \$2,062.81 for the benchmark homes.

Comparison of Energy Use and Cost				
Benchmark House			THERMOMASS House #1	
	Energy Used	Cost	Energy Used	Cost
Space Heating	52 Therms	\$52.03	109 Therms	\$63.50
Space Cooling	14,715 kWh	\$1,912.98	5,973 kWh	\$646.49
Total space conditioning		\$1,965.01		\$709.99

Benchmark House			THERMOMASS House #2	
	Energy Used	Cost	Energy Used	Cost
Space Heating	53 Therms	\$53.38	30 Therms	\$30.14
Space Cooling	15,447 kWh	\$2,009.43	4,965 kWh	\$645.51
Total space conditioning		\$2,062.81		\$675.65

In addition to measuring overall energy use and cost, the study examined whether the effect of using nighttime cooling could recharge the mass of the THERMOMASS walls to prevent or minimize power consumption during peak hours. The experiment was conducted during August 2006 when maximum outdoor temperatures typically exceeded 105 degrees.

Researchers programmed one THERMOMASS home's HVAC system to cool the home to 72 degrees between Midnight and Noon then raised the set point to 85 degrees from Noon to Midnight. The interior temperature of the THERMOMASS home climbed only 3.5 degrees while the set point was set at 85 degrees, even though outdoor temperatures reached 105 degrees. The SIP house interior temperature climbed 8 degrees during the test. The 2 x 6 frame house reached the 85-degree set point in 4.5 hours and climbed 9 degrees during one test.

The THERMOMASS Building Insulation System can accommodate a wide variety of both exterior and interior finishes, including stucco, thin brick and lap or vertical siding. The system is also cost-competitive with conventional frame construction.

Because of its proven energy savings, the THERMOMASS homes in Borrego Springs brought a significantly higher sale price than the other homes that were studied.

For more information, contact THERMOMASS at (800) 232-1748, or visit www.thermomass.com.

