

BRICK, BLOCK & BEERS

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5 Things About Concrete Block and Energy Efficiency They Never Taught You In School

Part II - Energy Basics for Concrete Masonry Structures – Where, What and How

In Part I of this Masonry and Energy series I talked about five important things that we learned from the comprehensive Pacific Northwest National Labs energy study commissioned by the masonry and concrete industry. Just to review:

- 1- The study showed that massive amounts of insulation in your exterior walls could only save you a maximum of \$100/year and would take over 40 years to payback the investment.
- 2- Insulation of masonry walls beyond an R-8 is a real loser in Florida because the diminishing effectiveness of the extra insulation.
- 3- R-13 wood walls and R-4 masonry wall perform virtually equal across Florida.
- 4- Masonry walls with minimal R-4 added insulation provide good energy efficiency in North Florida.
- 5- Insulation belongs on the inside surface of a masonry home or building wall. You get only very minor savings from putting it on the outside of the wall. Your payback would be well over 100 years.

So, let's look at some of the most common and cost-effective ways to insulate masonry. We can use the truths learned from the PNNL study to help us in deciding how much and where to put the insulation. See Figure 1 for through wall U and R values.

Number One - the insulation is going on the interior side of the wall – period – end of story. No money to be saved in our lifetime by putting it on the exterior!

Number Two – If the inside of your block has to be exposed you are going to foam all cells which are not filled with grout. This creates about the same insulation value as the $\frac{3}{4}$ " reflective air space listed next.

Number Three – Basic insulation in the majority of masonry structures is a foil product on the inside of the furring strips under the drywall. This would be referred to as " $\frac{3}{4}$ " reflective insulation". It creates a reflective air space the thickness of the furring strips ($\frac{3}{4}$ "). It is cost effective and efficient insulation even up in Northern Florida.

Number Four – You can up your insulation level by going to a $1\frac{1}{2}$ " X $1\frac{1}{2}$ " furring strip and using a more robust foil product. This is commonly referred to as $1\frac{1}{2}$ " reflective insulation. Sometimes the extra thickness of the furring strip (and thus the extra thickness of the wall) is viewed as a negative factor because it reduces the Sq Ft of the home or apartment. You can get the same energy efficiency by going with a $\frac{3}{4}$ " reflective air space and foaming the cells.

Number Five – The top of the line insulation is $\frac{3}{4}$ " Polyisocyanurate Board directly applied to the masonry wall (normally with an adhesive and a couple of concrete nails if needed). The board comes with a foil face on one side and you turn that foil face to the interior. Your $\frac{3}{4}$ " thick furring strips go directly over your insulation board and your drywall goes over your furring strips as usual. This creates a $\frac{3}{4}$ " reflective air space in addition to the board insulation. The furring strips will hold your insulation onto the wall so you don't have to be too worried about the adhesive.

On the insulation level described in Five above you have slightly passed your point of diminishing returns. You might want to consider this insulation on a large exposed West facing wall only. Other than that, your minimum insulation (as we learned from the PNNL Study) will give you the best value for money anywhere in Florida.

Remember, there is no "minimum" level of wall insulation required in Florida. When your HVAC contractor runs the EnergyGauge software to determine the energy efficiency of your home the "base" or "model" home you are competing with has wall insulation of $U=1.7$ in Miami and $U=1.4$ over the remainder of the State. This is sometimes referred to as a "minimum" insulation value. IT IS NOT A MANDATED MINIMUM. It is simply a value in the computer program. Because the wall insulation does not make a big difference in the overall energy efficiency of your home, the program allows you to "trade" various insulation levels. It requires only a very minor tweak of some other component of your home envelope or equipment to make up for a change of, for example, $U=1.4$ (the value programmed into your Computer for walls in Orlando) to $U=1.74^*$ (the most common wall insulation actually used in Orlando).

BOTTOM LINE:

- Minimum insulation is a good idea and cost effective for masonry in Florida.
- Insulation up to $R\ 9.9^*$ is often used and saves some money, but doesn't give as good a payback - even in North Florida.
- Insulating masonry walls above $R\ 9.9^*$ is costly and a complete waste of money.

* See Values in Figure 1

Insulation Options for Masonry Walls (Figure 1)

Wall Insulation Description	'U' Value of Total Wall	'R' Value (1/U) of Total Wall
Plain Concrete Block Wall	0.770	1.3
Interior ¾" Reflective Insulation and Drywall	0.174	5.75
Foamed Cells w/ Exposed Interior	0.206	4.85
Foamed Cells w/ Interior ¾" Reflective Insulation and Drywall	0.120	8.33
Interior 1 ½" Interior insulation and Drywall	0.121	8.26
Interior ¾" Polyisocyanurate Board w/ ¾" Reflective Air Space and Drywall	0.101	9.90



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