

## Think You're in The Pink? This May Make You Blue

By James Quarello

Most everyone is familiar with the pink fiberglass insulation (Figure 1) found in many, many homes. Everyone knows the pink feline character that shows us how this stuff will keep our homes warm and our energy bills reasonable. If only he had an infrared camera, the things he'd see!

There has been controversy surrounding the effectiveness of fiberglass insulation for years mostly between the manufacturers and building science experts. The facts are strong that fiberglass is poor insulation that rarely performs as stated.

In the first infrared image (Figure 2) which was taken in the summer, this insulated ceiling doesn't look to be insulated at all in some areas. The hot attic air is moving around the insulation, or more accurately the vapor retarder, rendering it ineffective. Air also easily passes through fiberglass (they make filters out of this stuff). Exposed fiberglass attic insulation is subject to convective loops and studies have shown its performance diminishes dramatically as temperature difference increases (winter or summer).

The second infrared image (figure 3) shows a wall section where the studs are actually performing better than the insulation. Notice the wall is cooler (purple) than the studs (orange). This is a 2 x 6 wall with R-19 fiberglass batt insulation. Woods R value is about 1.5 per inch. Which means this R-19 wall is performing at less than R - 8!

Cellulose insulation (figure 4) on the other hand is not prone to these thermal or convective problems. First it does not require a paper vapor retarder. It can be sprayed or dense packed into wall and ceiling cavities leaving no voids around mechanical penetrations. Cutting and fitting batt fiberglass insulation around electrical boxes, plumbing and heating fixtures results in voids that create airways.

It has a slightly higher R value (3.8 / inch) than high density fiberglass (3.7 / inch). Best of all it is made from recycled materials (newspaper) and uses significantly less energy (750 Btu / lb.) to manufacture than fiberglass (12,000 Btu / lb.) or foam (33,000 – 48,000 Btu / lb.) insulations.

One potential problem with cellulose is in retrofit applications. As can be seen in the last infrared image (Figure 5) these wall cavities were incompletely filled by the installer. Older cellulose in some instances was prone to settling, usually due to a poor installation.



Figure 1: The Pink Stuff

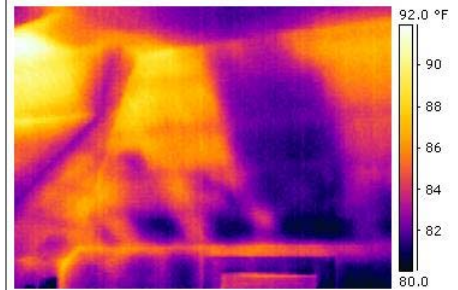


Figure 2

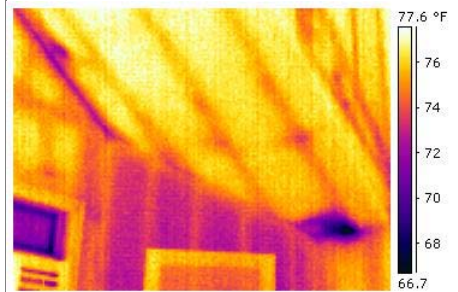


Figure 3



Figure 4: Cellulose

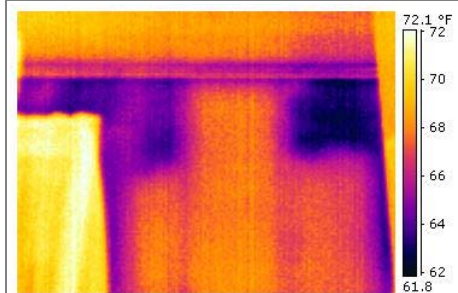


Figure 5

Cellulose today is manufactured to eliminate settling by making the material somewhat “springy”. Further by dense packing it in the wall cavity the material is under slight pressure and can not move. No more settling problems.

The benefits of this material over other insulations, most notably fiberglass, are considerable. Yet what usually decides what insulating material is used, *initial* cost, is where cellulose falls behind fiberglass. Cellulose costs about one and a half to two times that of fiberglass, but because it performs better the energy savings will undoubtedly offset the extra cost.

Continually seeing air leakage and poor performance through the infrared camera lens has made it apparent to me that using fiberglass insulation is a bad building practice. In the long run using higher performing insulation such as cellulose will help make our homes more comfortable and energy efficient.