



## NATIONAL FIBER CEL-PAK INSULATION

Professional Cellulose for Cellulose Professionals

### Using Cellulose to Meet the New ICC 2012 Blower Door Requirements

Weatherization programs across the country have historically used dense pack cellulose insulation to insulate and tighten existing buildings. High-energy efficiency Passive House and Net Zero buildings frequently use dense pack cellulose both as an effective insulation material and to enhance the airtightness of these 'next generation' buildings.

Dense pack cellulose refers to installing cellulose in an enclosed cavity at a density high enough to make the material self-supporting, typically 3.5lbs/cf. The most common application method uses either a flexible rubber or rigid tube that is run along the length of the framing cavity to achieve a consistent density from one end to the other. In building assemblies deeper than six inches, multiple passes are generally required to build this density evenly from front to back. Our Expanded Bag Coverage Chart aids the installer in calculating how many bags will be required for the cavity depth being insulated, and is also used to verify the correct installed density of the cellulose insulation by bag count.

As the cellulose is dense packed, the individual wood fibers lock together and provide resistance to air as it tries to move through the insulation. Oak Ridge National Laboratory (ORNL) released a study in 1993<sup>1</sup> regarding the air permeability of various insulation materials, including loose-fill cellulose and fiberglass, and fiberglass batts. The air permeability of loose fill cellulose at 2 lbs/cuft density in this ORNL study was found to be:

- 10 - 33 times better than blown fiberglass, depending upon the density of the fiberglass
- 3+ times better than standard fiberglass batts
- 2 times better than high density fiberglass batts

Dense pack cellulose at 3.5 lbs/cuft provides 2.3 times the air flow resistance as loose fill cellulose at 2 lbs/cuft, so in enclosed cavities, the difference between fiberglass and cellulose is enhanced even further. This translates into better blower door test results and tighter, more energy efficient buildings when insulated with cellulose insulation.

Frequent blower door testing by National Fiber on new construction has demonstrated that by using Cel-Pak cellulose insulation, the overall air leakage of a building is reduced by as much as 50%. We have found that achieving the ICC 2012 code mandated air tightness of 3.0 ach @ 50 Pa can be achieved by dense packing the exterior walls, comprehensively air sealing the wood to wood framing connections, and properly air sealing the attic penetrations. National Fiber's Cel-Pak cellulose insulation allows you to achieve this easier and less expensively than many alternatives.

If you have questions or would like to discuss this further, please contact our Technical Manager, Bill Hulstrunk at [technical@nationalfiber.com](mailto:technical@nationalfiber.com).

<sup>1</sup>Air-Flow Permeability of Attic Insulation Materials, Report ORNL/M-2646/September 1993