

Achieving Code Mandated Air Tightness Levels and Beyond with Cellulose Insulation

Weatherization programs across the country have been using dense pack cellulose to insulate and tighten up existing buildings for the past 30 years. Cellulose insulation is also featured in many of today's highest performing buildings including Passive House and Zero Net Energy construction. Changes beginning in the 2012 International Energy Conservation Code (ICC) require buildings to achieve a maximum air leakage of 3.0 air changes per hour (ach) when tested at a 50 pascal (Pa) pressure difference with a blower door. Dense pack or spray applied cellulose offer architects and builders an easier way of achieving these air tightness levels.

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 1993¹ 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

When dense packed, or spray applied, cellulose provides 2.3 times greater air flow resistance than loose fill cellulose, so for enclosed cavities the difference between fiberglass and cellulose is more than double the numbers stated above. This translates into better blower door test results and tighter more energy efficient buildings when insulated with cellulose insulation.

Blower door testing in new construction has proven that the 3.0 ach @ 50 Pa 2012 ICC air tightness levels can be achieved by dense packing or spray applying cellulose into the exterior walls. This along with comprehensively air sealing any wood to wood framing connections not containing the high density cellulose insulation (i.e. subfloor to bottom plate, between multiple studs, etc) and properly air sealing any attic penetrations, will assist in meeting your air sealing targets.

Air tightness levels below the 0.6 ach @ 50 Pa Passive House standards can be reliably achieved by air sealing the joints or seams of the building's exterior sheathing with the latest generation of high performance building tapes, or fluid applied air barriers. To achieve this level of performance it is important that the air barrier wrap around the corners of the building, into window and door openings and connect the foundation, walls and roof all together. NatureTech's ProFiber cellulose insulation makes it easier and less expensive for you to achieve the next generation of high performance buildings.

For further information, please contact our VP of Insulation Technology Bill Hulstrunk at bhulstrunk@nature-tech.com.

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