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RESIDENTIAL ENERGY CODE INFORMATION AND GUIDANCE FOR PASSING THE BLOWER DOOR TEST

Significant changes to building energy efficiency requirements were introduced into the 2015 Michigan Residential Code. The following represents key changes and areas of common questions or violations of the 2015 Michigan Residential Code. This is not intended to be inclusive but aid to the builder so as to alleviate problems in the field. The following guidance is taken from Chapter 11 - ENERGY EFFICIENCY of the 2015 Michigan Residential Code.

R 402.4.1.2 (p. 447-448) **TESTING.** The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 4 air changes per hour. Testing shall be conducted with a blower door...by a certified independent third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.

Passing the blower door test results in a building envelope that is "tight". Benefits often will include less dust, bugs and exterior noise entering the dwelling. Proper air exchange and indoor air quality is not compromised in a new code built home. Bath fans, range hoods, etc. are important features of new homes as are other forms of mechanical ventilation that are intentional and controllable. "Seal it tight and ventilated right" is a common way of describing energy efficient building shell or building envelope construction methods.

R 402.4 (p. 447). **AIR LEAKAGE.** The thermal building envelope shall be constructed to limit air leakage in accordance with the requirements of (the energy code). Sealing methods...shall allow for differential expansion and contraction.

The purpose of air sealing is to block or stop air leakage and to create an effective air barrier. An air barrier is anything that stops air movement through a building assembly such as a wall, ceiling, floor etc. Most insulation - except closed cell spray foam - is not an air barrier. Insulation needs an air barrier for it to work and achieve the listed R-value. Insulation is tested in a laboratory within a sealed box with no air leakage. The "thermal building envelope" shall be understood as any assembly that includes BOTH insulation and an air barrier.

R 402.4.1.1 The table in the code book titled **AIR BARRIER AND INSULATION INSTALLATION** provides details of many, if not most of the areas that require effective air sealing. A key concept is that the insulation and the air barrier are next to each other, or aligned. Insulation that is in contact with the surface of the wall, ceiling or floor is an example of “alignment”. Ideally, insulation will completely fill a cavity and be next to the sealed air barrier on both the interior and exterior side of a wall.

Siliconized latex caulk, flexible foam or rubber gaskets, one and two component spray foam or foam from a foam gun or can are some examples of effective sealing materials. Building components should be clean and dry prior to sealing. Tyvek or building wrap is a bulk water barrier that is made up of microscopic fibers that also allows for moisture vapor to pass through, but not bulk water. It is NOT an air barrier. In our Michigan climate the air barrier is on the warm side of the building. The drywall is typically the largest air barrier material in a building, but contains many openings that can allow air to pass through.

An air barrier prevents the flow of conditioned air into an unconditioned space, wall or floor cavity or to the outdoors. Areas that require a sealed air barrier - and often do not have a solid sheet of drywall - that are sometimes overlooked are as follows:
Exterior walls behind a shower or tub, walls and ceiling surrounding a fireplace or wood stove chase / shaft, exterior rim / band joists above foundation walls, insulated floor above a garage, attic access panel or drop down stair, recessed light fixtures, electrical, plumbing, duct and venting penetrations, and exterior walls with a staircase.

The air sealing is best done throughout the building process and before insulation is installed. Otherwise, the insulation has to be removed or disturbed, then reinstalled. Air sealing can be done after the fact but is more challenging, takes more time and is less effective. Blower door testing is commonly done after all finish work is completed, carpeting and painting are completed and the home is ready to be occupied.