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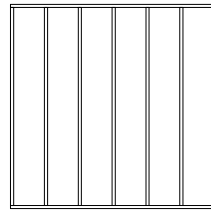
InsulStar® AND WALL STRENGTH

WHY SHOULD I WORRY ABOUT WALL STRENGTH?

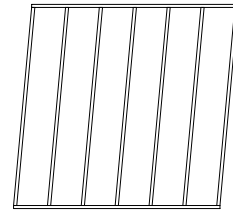
Your walls are the main structural component of your home. In wood frame construction, the weight of the roof and any snow on the roof push down on the walls with a compressive force. Strong winds and wind gusts impose lateral loads onto your house walls that tend to distort the walls with a shearing force. Building codes require that walls be designed to withstand these loads. However, when walls are built to minimum standards, while safe, you may sense wall creaking during high winds or shaking when doors are slammed or the kids are actively romping about.

WHAT IS A SHEARING FORCE?

A shearing force on a wall tends to distort the wall from its original shape as a rectangle into a parallelogram. To test a wall's resistance to the shear forces imposed by wind loading, engineers use a "racking test." An 8 ft. x 8 ft. model wall is built and placed in a large frame. The base of the wall is secured to the frame and a horizontal (lateral) force is applied at one upper corner. The force is increased in 400 lb. increments until the wall structure fails.



Stud wall as built.



Stud wall under shear load (exaggerated)

WHAT IS THE EFFECT OF **InsulStar** INSULATION ON WALL STRENGTH?

In a series of racking tests*, walls with and without spray-applied polyurethane foam insulation were compared. Two exterior facing materials were tested:

- (1) Vinyl siding over 15-lb. building paper; and
- (2) 5/8-inch textured plywood siding.

All wall panels were faced with 1/2-inch sheetrock on the interior side and used 16-inch 2x4 stud spacing. For the stud wall panels that were insulated with spray-applied polyurethane foam, the stud cavities were essentially completely filled with foam of 1.5 lb/ft³ density.

As the graph indicates, stud walls filled with spray-applied polyurethane foam add significant strength to home walls. Furthermore, for each load applied, the foam filled walls deformed less and offered greater resilience.

In a second series of racking tests** spray-applied polyurethane foam insulation was compared with conventional R-19 glass fiber batts. In one comparison, the wall panels were faced both sides with dry wall. In the other comparison, the wall panels were faced one side with OSB (oriented strand board) with dry wall on the opposite side. In both cases, the wall panels used 20-gauge, structural light-gauge steel framing spaced 24 inches on center and the average foam density was 2.26 lb/ft³.

Once again, the graph indicates the greater strength of the spray foam insulated wall system.

WHAT DOES THIS MEAN TO ME?

InsulStar insulation is sprayed into your stud walls and fully adheres to the exterior sheathing and studs, reinforcing both. With this added rigidity, there will be less wall movement due to shaking and vibration. Additionally your walls have greater than code required resistance to “racking events” such as hurricanes or other strong wind situations.

**With InsulStar, you get more than insulation . . .
You get strength and an air barrier too!**

*Test results are reported in “Testing and Adoption of Spray Polyurethane Foam for Wood Frame Building Construction” (May 25, 1992) prepared by NAHB Research Center for The Society of the Plastics Industry/Polyurethane Foam Contractors Division.

**Test results are reported in a letter from Bob Dewey, Mechanical Engineer, NAHB Research Center to Mason Knowles, The Society of the Plastics Industry/Spray Polyurethane Foam Division (November 18, 1996).

