

BLUEPRINTS™ services



CONTINUING EDUCATION FOR CODE OFFICIALS

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Fact or Fiction?

Industry PERSPECTIVES SCOTT YOUNG



Welcome to the inaugural issue of Blueprints, a quarterly publication that provides up-to-date perspectives

on code terminology, code changes and the idiosyncrasies of many residential building standards.

As an industry leader in the building and construction industry, Dow professionals have more than 60 years of experience in the science of building homes. We make it our priority to stay up-to-date on code requirements, and are well suited to share our insights and knowledge with you about Dow's differentiated product solutions to help address today's building challenges.

We hope you will take a few minutes to review Blueprints and for more information, visit our website, www.insulateyourhome.com or call us at 866-583-BLUE (2583). ■

Marketing Manager
Dow Building & Construction

Residential Wood Frame Wall Bracing Codes – Code Language and Enforcement

Today, one of the most difficult issues in the home building industry is the wide range of interpretations of how to define proper wood frame wall bracing.

Currently, the foam sheathing industry is seeking clarification of the code so that the full range of appropriate materials are covered by the printed standards.

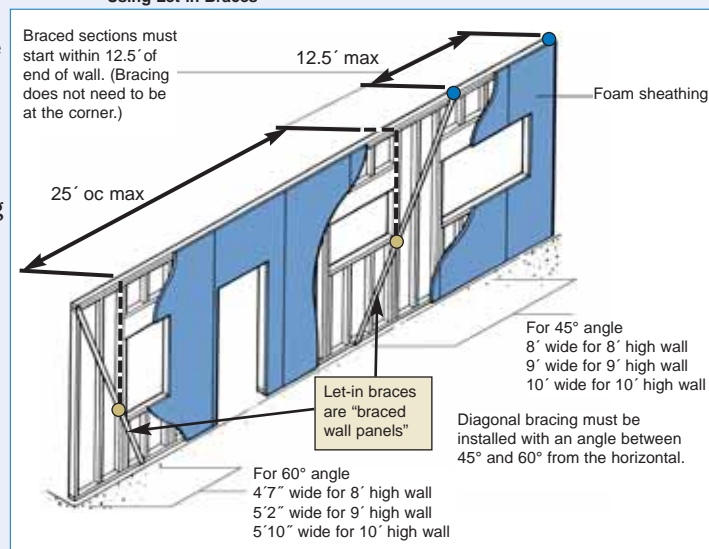
A History of the Code

Wall bracing is a critical part of any residential code. Historically, building codes from CABO, ICBO, BOCA and SBCCI have identified eight acceptable methods for properly bracing wood frame construction. The eight methods, when used as defined in the code, are equivalent in their function.

One of these methods, diagonal let-in wall bracing (International Residential Code (IRC) section R602.10.3 Method 1; see Figure 1) is a proven combination when used in conjunction with insulating foam sheathing. For over 30 years this method has given, and continues to give, the builder a code-approved avenue to building a structurally sound wall that incorporates the added benefits of energy efficiency and a weather-resistive barrier*.

*See Dow installation details on how to achieve a weather-resistive barrier using Dow's insulated foam sheathing products.

FIGURE 1 – Example of Braced Wall Panel Locations on an XPS Foam Sheathed Wall Using Let-in Braces



What Does the Code Say?

Wall bracing requirements are covered in Section R602.10 of the IRC. Section R602.10.3 outlines the

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Wall Bracing (continued from page 1)

eight code approved methods, and Section R602.10.1 details where and how those methods can be used. In addition, Section R602.10.5 and R602.10.6 cover alternative bracing methods when less than full braced wall panel widths are required.

If Section R602.10.5 is utilized due to a “narrow wall” detail on one or more walls, the new 2003 IRC code language requires that all exterior walls and interior walls be covered with wood structural panel sheathing.

However, Dow and other leading foam insulation manufacturers believe the rationale for requiring all walls to be fully sheathed with wood structural panels is flawed. For example, the existing body of technical data developed at the NAHB Research Center does not support this requirement. This “all wall” language was not present in the 2000 IRC, but was proposed and passed into code in the 2003 code change cycle.

The current requirement that all walls be fully sheathed with wood structural panels, when such bracing may only be needed on one wall, creates an exclusionary

use of wood structural panel sheathing. It unnecessarily prevents use of other approved bracing strategies that meet code requirements and which also meet historically-accepted practices. This limits a builder’s choice of materials and construction techniques without any technical basis supporting the new code language.

Many states that have adopted 2003 and more recent code language are in the process of removing the exclusionary “all wall” language and reverting back to the language as adopted in the 2000 IRC. Currently Georgia, Indiana, Ohio, Michigan and Virginia are in the process of updating their codes to reflect language similar to the 2000 IRC. In May 2006 Ohio began to enforce language similar to the 2000 IRC Section R602.10.

The code change process for the 2009 IRC model code has already begun. As noted in the April 3, 2006 Nation’s Building Newsletter, the NAHB is actively involved in “seeking to drop current ICC requirements for all walls to be fully sheathed with wood structural panels because they are inconsistent with IRC 2000 language and with the technical basis for IRC bracing provisions. Wall-bracing requirements are confusing to many builders, NAHB code experts note, and the new language is meant to clarify what needs to be done.” The entire article can be viewed at <http://www.nbnnews.com/NBN/issues/2006-04-03/Front+Page/4.html>.

Today, many builders are seeking ways to increase the energy efficiency of their homes without having to move to 2x6 framing to meet wall R-value requirements with cavity batt insulation. When walls are braced with diagonal metal braces, per Section 602.10 of the IRC, the entire wall surface can be covered with energy saving, cost saving rigid insulating foam sheathing. This allows for a maximum insulating approach since the thermal short through each wood stud is cut off due to the insulating layer envelope surrounding the house. ■



Wall sheathed with STYROFOAM™ insulation and let-in bracing.

Sheathing as a high performance barrier

Changes to several state building codes now require the installation of a weather-resistive barrier within all exterior wall assemblies in residential construction. Eventually, such code revisions will likely affect the entire United States.

Residential construction that includes an approved housewrap meets the weather barrier requirement. But housewrap isn’t the only solution. In fact, there are a number of options that can be used to meet code requirements while also creating more energy efficient homes.

Sheathing Provides a High Performing Barrier

Section R703.2 of the International Residential Code (IRC) discusses the requirements for a weather-resistive barrier. In recent tests, several extruded polystyrene and polyisocyanurate insulated sheathing products qualified as “weather-resistive barriers” for residential construction.

The testing was conducted by a certified, third-party laboratory accredited by the International Accreditation Service branch of the International Code Council (ICC). Among the products which passed all of the required tests in AC 71 are several sheathing materials from



Dow Building & Construction:

- STYROFOAM™ DURAMATE™ Plus
- STYROFOAM™ Residential Sheathing (RS)
- STYROFOAM™ Tongue & Groove (T&G)
- STYROFOAM™ Square Edge (SE)
- THERMAX™
- TUFF-R™
- Super TUFF-R™

Meeting AC 71 Standards

To classify a particular foam plastic product as a weather-resistive barrier, ICC-ES AC 71 requires the product to pass these tests:

- UV exposure test: Samples are exposed to UV for 210 hours (10 hours per day for 21 days) at 140°F+5°F.
- Heat cycling test: Samples are subjected to accelerated aging for 25 cycles by oven drying them at 120°F for three hours, then immersing them in water at room temperature for three hours.
- Hydrostatic water test: Test Method 127-1998 from American Association of Textile Chemists and Colorists (AATCC).

- Water Resistance: Hydro Static Pressure Test. In this test, samples were tested with a five hour duration using 22 inches of water head.
- ASTM E331: “Standard Test Method for Water Penetration of External Walls, Doors by Uniform Static Air Pressure Difference, American Society for Testing and Materials.” All water tests were done at 6.24 psf and were held for two hours.

Construction Tape Is an Essential Component

All tests were conducted using tape at joints, which satisfies the requirement – as outlined in AC 71. The tape used was WEATHERMATE™ Construction Tape, which is pliable, ensuring a tight seal even at extremely low temperatures. It also features a polypropylene backing formulated with a UV-treated film to help resist degradation from exposure to sunlight.

WEATHERMATE™ Construction Tape represents an important step forward in residential construction. It is the first and only joint sealing tape that can be used on all building materials, including insulating sheathings and housewraps. The product comes in two widths, 1 ½ inches and 2 ½ inches, and 165 feet in length. Taping should completely cover the seams and fastener penetrations.

With this new designation, local building code officials now have documentation that demonstrates several products qualify as weather-resistive barriers. And it means that a number of sheathing products may be used without housewrap – a benefit that recommends them over wood sheathings like OSB, plywood and fiberboard, all of which require the inclusion of housewrap. ■



reflective R-Values, fact or fiction?

Keeping It Real: Are Reflective Insulation R-Values Accurate?



Over the past several decades, the rising price of energy and the resulting ill effects of the economy have led to a variety of energy saving measures including the development and implementation of energy codes for buildings. The most recent energy code is the International Energy Conservation Code (IECC) published in 2006.

Among other things, the 2006 IECC specifies the insulation performance of the building envelope – in other words, the R-value of the roof, walls, and foundations. Acquiring accurate R-values for insulating materials is essential to meeting the IECC requirements. But if these measurements are not being stated accurately, it's possible that you could be falling short of applicable energy codes.

This issue of accurate R-values is particularly difficult when it comes to the claims of reflective insulating sheathing manufacturers.

Although a number of reflective sheathing products claim to provide a high R-value, in many cases the data doesn't support the manufacturer's claims.

For professionals with one primary question – “do my building materials help me meet the appropriate codes?” – the answer depends on accurate measures of an insulation's R-value.

What Are the Requirements for Calculating Reflective R-values?

The 2001 ASHRAE (American Society of Heating, Refrigeration, and Air-Conditioning Engineers) Fundamentals Handbook – Chapter 25 is an authoritative reference on understanding and calculating the effective R-value for systems and designing for reflective air spaces.

ASHRAE design recommendations point to certain features which must be in place to take advantage of low emittance-faced products in wall assemblies. To put it simply, reflective insulation values are not a property of the insulation, but of the air space next to the insulation. Additionally, this air space must meet certain requirements if it is to have a high R-value. Unfortunately, air spaces in most real world applications do not meet these stringent requirements.

Is R-20 for Real?

Some foil-faced product manufacturers have made startling claims about their products, claiming R-values as high as R-20 per inch. Are those numbers to be believed?

The Federal Trade Commission specifies that single-sheet reflective insulation manufacturers must use the R-value in the ASHRAE table for a mean test temperature of 75°F. The FTC requires that R-values be determined through R-value testing according to specific ASTM procedures.

When comparing insulation products, make sure that the R-values claimed by all products – from reflective sheathing to rigid foam insulation – are determined by reliable and approved methods. Unless the manufacturer has verified test results derived from the appropriate test methods, their R-values are not valid. ■

(Sources: Federal Trade Commission Trade Regulation Rule: Labeling and Advertising of Home Insulation, www.ftc.gov/os/1999/08/rvaluefr.htm; Home Energy Magazine Online March/April 1997, www.homeenergy.org/archive/hem.dis.anl.gov/eehem/97/970308.html).

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Building and/or construction practices unrelated to insulation or housewrap could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system. Published August 2006.

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