

TECHNICAL BULLETIN-ZIP SYSTEM® WALL SHEATHING ASSEMBLY AND ENERGY PERFORMANCE HUBER ENGINEERED WOODS

Rising energy prices, growing awareness of building performance and environmental sustainability, and changes in building codes have led to the development of new products and building practices. ZIP System® wall sheathing is specifically designed to address the growing need for home performance, comfort and energy efficiency, and is the optimal solution for structural sheathing, moisture management and superior air barrier performance, all-in-one.



ZIP System Wall Sheathing Can Contribute to Increased Energy Efficiency In A Home By:

- > Providing a continuous air barrier through simple installation,
- > Sealing panel joints and gaps, protecting the effective R-value of insulation, and
- > Eliminating rips, tears and fastener penetrations which degrade performance of housewraps.



EFFECTIVE AIR BARRIERS

An air barrier system is composed of materials that form and seal floors, walls and ceilings to prevent unwanted air movement. The system must be continuous (no holes, openings or penetrations) and resistant to air pressure differentials. ZIP System® wall sheathing panels and ZIP System™ tape can be used for the wall component of the air barrier system and have passed the air tightness requirements as set forth in the stringent air barrier assembly testing standard (ASTM E 2357) by the Air Barrier Association of America (ABAA).

“Air barriers help prevent air leakage in your home, which can account for 30% or more of a home’s heating and cooling costs.”¹



WHY IS AN AIR BARRIER IMPORTANT FOR ENERGY EFFICIENCY?

“Air sealing the building envelope is one of the most critical features of an energy efficient home.”² Proper sealing between wall assembly components prevents unwanted air movement in and out of conditioned air spaces. Such air movement washes through insulation and degrades the effective R-value. Without effectively sealing the building envelope, insulation cannot perform properly. A ZIP System wall sheathing assembly contributes to greater comfort and energy efficiency by sealing leak paths between panels and components.

TIGHT WALL ASSEMBLIES CAN CONTRIBUTE TO SUBSTANTIAL SAVINGS.³

ANNUAL ESTIMATED SAVINGS* IN HEATING AND COOLING, \$

LOCATION	ANNUAL SAVINGS
Duluth, MN	7 - 20%
Syracuse, NY	7 - 20%
Springfield, MO	7 - 21%
Atlanta, GA	8 - 23%

* RANGES BASED ON THE ASSUMPTION THAT WALLS CAN ACCOUNT FOR BETWEEN 18 AND 50 PERCENT OF TOTAL LEAKAGE OF THE BUILDING.⁴

1. “A CONSUMER’S GUIDE TO ENERGY EFFICIENCY AND RENEWABLE ENERGY.” U.S. DEPARTMENT OF ENERGY, [HTTP://APPS1.EERE.ENERGY.GOV/CONSUMER/YOUR_HOME /INSULATION_AIRSELIANG/INDEX.CFM](http://apps1.eere.energy.gov/consumer/your_home/insulation_airsealing/index.cfm).

2. “AIR SEALING-BUILDING ENVELOPE IMPROVEMENT; AIR AND RADIATION (6202J), EPA 430-F-97-028, DECEMBER 2000, PP.1&2, [HTTP://WWW.ENERGYSTAR.GOV/1A/NEW_HOMES/FEATURES/AIRSEALING1-17-01.PDF](http://www.energystar.gov/1a/new_homes/features/airsealing1-17-01.pdf).

3. CALCULATIONS ARE BASED ON MODELING RESULTS FROM ENERGY GAUGE USRCSB V.2.703 SOFTWARE FOR A 3,000 SQUARE FOOT HOME USING TOTAL NATURAL AIR LEAKAGE OF 0.55 ACH AS REPORTED BY SHERMAN AND MATSON, “AIR TIGHTNESS OF NEW U.S. HOUSES,” MARCH 2002. A SAVINGS RANGE WAS CALCULATED BASED ON WALL CONTRIBUTION TO TOTAL LEAKAGE (18-50%, ASHRAE HANDBOOK) ASSUMING THAT LEAKAGE THROUGH WALLS CAN BE REDUCED TO 0.5% (AS SUPPORTED BY 3RD PARTY AIR MOVEMENT TEST RESULTS). ACTUAL SAVINGS WILL VARY BASED ON VARIABLES SUCH AS HOME DESIGN, HEATING/COOLING SYSTEM, GEOGRAPHICAL LOCATION, CLIMATE, ENERGY COSTS, AND CONSTRUCTION METHODS.

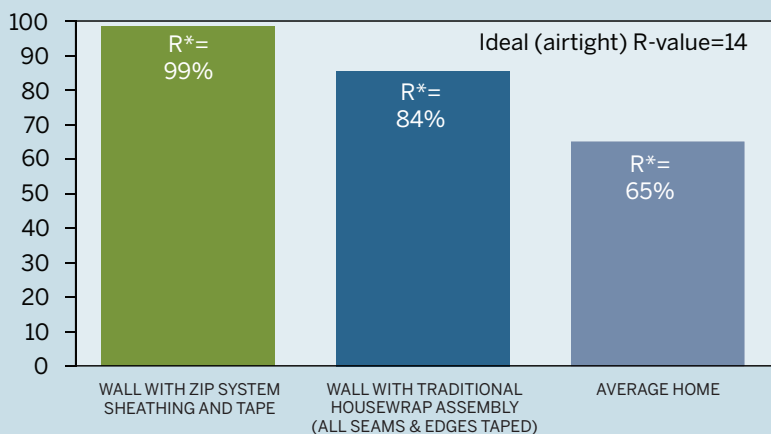
4. 2005 ASHRAE HANDBOOK – FUNDAMENTALS (SI), PP. 27.13-27.14.

TAPING SEAMS PROTECTS THE R-VALUE OF INSULATION

Insulation works by containing air within a sealed space, serving as a buffer between temperature differentials on each side of the wall. When conditioned air from the inside of the home or unconditioned air from the outside is allowed to move through the insulated cavity, the intended R-value of the insulation is degraded. Gaps, such as seams, must be sealed to prevent unwanted air movement through the wall system.

A WALL ASSEMBLY WITH ZIP SYSTEM WALL SHEATHING MAINTAINS 99% OF ITS INSTALLED R-VALUE

REDUCED AIR LEAKAGE = HIGHER EFFECTIVE R-VALUE



COMPARISON VALUES ARE CALCULATED FROM A BASELINE CHOSEN VALUE OF R-14. CALCULATIONS ASSUME A 3,000 SQUARE FOOT HOME WITH 35% OF ITS TOTAL LEAKAGE CONTRIBUTED TO THE WALLS (SEE FOOTNOTE 4) AND A TOTAL NATURAL AIR LEAKAGE RATE OF 0.55 ACH (SEE FOOTNOTE 3). THE ZIP SYSTEM AND HOUSEWRAP ASSEMBLIES AIR LEAKAGE DATA IS TAKEN FROM THE AIR MOVEMENT TEST RESULTS CHART IN THIS BULLETIN. EFFECTIVE R-VALUES ARE ESTIMATED WITH THE ASSUMPTION THAT HEAT LOSS ATTRIBUTABLE TO AIR LEAKAGE IS CONVERTED TO A DECREASE IN EFFECTIVE R-VALUE.

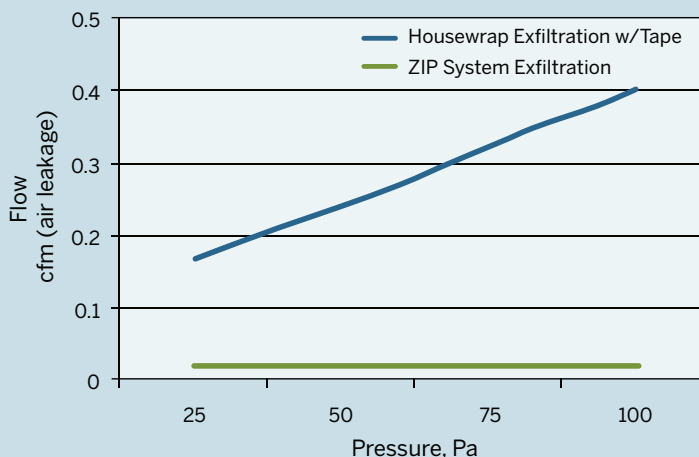
ZIP System® tape seals seams and gaps between panels eliminating these common leak paths in the wall assembly.

AIR MOVEMENT TESTING

In third party air leakage testing, a wall assembly constructed with ZIP System® wall sheathing and tape was compared to an assembly with traditional OSB sheathing and a common housewrap with tape. Both assemblies were identically constructed for a system-to-system performance comparison. In this lab test, the ZIP System wall sheathing assembly allowed significantly less air flow/leakage (as shown in the graph to the right) than the housewrap and tape system. Results indicate that a ZIP System wall assembly contributes to a tighter building envelope. ZIP System wall panels and tape seal panel seams and allow less air leakage, resulting in greater comfort and lower energy bills for the homeowner.

HOUSEWRAP MAY BE LEAKIER THAN YOU THINK.

TEST RESULTS SHOW VIRTUALLY NO AIR LEAKAGE IN A ZIP SYSTEM WALL ASSEMBLY



RESULTS FROM A 3RD PARTY AIR BARRIER LEAKAGE TESTING REPORT. TEST WAS PERFORMED ACCORDING TO ASTM E283. (SEE WWW.ZIPSYSTEM.COM FOR ADDITIONAL DETAIL ON TESTING METHODOLOGY.)



COMMON PROBLEMS WITH HOUSEWRAP INSTALLATION

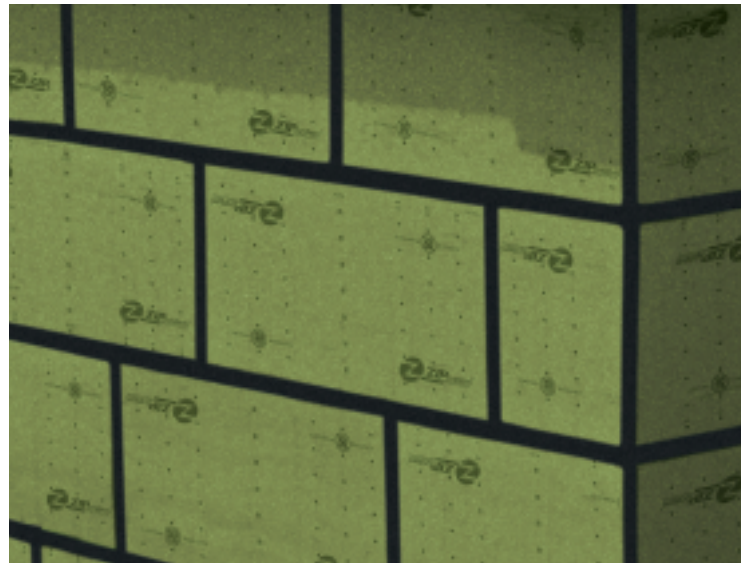
Housewrap that is installed according to the manufacturer's instructions can help to manage air movement; however, research demonstrates that incorrect installation procedures are widely evident in the field. Tears, holes and gaps are common in housewrap installations. Past research has indicated that 70 percent of builders fasten housewrap with staples, introducing holes in the housewrap allowing air to move through the barrier.⁵ These fastener holes can tear further as the housewrap balloons under normal pressures. In the same study, less than 10 percent of respondents taped or sealed overlapping sheets of housewrap, introducing gaps that allow air to move freely between panels in the wall assembly, degrading effective R-value of insulation and reducing energy efficiency. Top and bottom edges of the housewrap are also often neglected. Air is free to move behind the wrap system until it finds these gaps to move in or out.

HIGH PERFORMANCE BUILDING, AN UNDENIABLE TREND

Construction practices are moving toward providing greater energy efficiency and a tighter building envelope. These principles of high performance building are common in nearly all current green building standards and construction codes. Performance improvements in air sealing and air exchanges are specifically rewarded through programs such as ENERGY STAR®, LEED for Homes and the proposed National Green Building Standard™. The 2009 building code requires the use of an air barrier to prevent air leakage through the building envelope. (ICC Section 202)

ZIP SYSTEM® WALL SHEATHING – THE NEXT GENERATION OF WALLS®

A team of experts with over 100 years of combined building science experience developed ZIP System® products to provide an optimal solution incorporating structural support, moisture protection and energy savings all-in-one. Through standard installation, a ZIP System wall sheathing assembly can significantly contribute to the performance, comfort and efficiency of a home.



5. "THE USE OF HOUSEWRAP IN WALLS: INSTALLATION, PERFORMANCE AND IMPLICATIONS," BURNETT & BOSACK, PHRC REPORT A59, PENNSYLVANIA HOUSING RESEARCH CENTER, 1998, [HTTP://WWW.ENGR.PSU.EDU/PHRC/PUBS/REPORT_A59.HTM](http://www.engr.psu.edu/phrc/pubs/report_A59.htm).

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