



Comprehensive code changes need a comprehensive solution – Outsulation by Dryvit

Energy codes are changing and Dryvit has the solution.

Welcome to a new dawn for energy-efficient building in America.

What Are The New Energy Codes?

The Department of Energy (DOE) has mandated that by October 18, 2013, all states are required to certify compliance with the ASHRAE Standard 90.1-2010 as adopted by the 2012 International Energy Conservation Code (IECC). This will require increased use of continuous insulation in most commercial wall assemblies in nearly all climate zones in the U.S. [Learn More](#)

Why Are The Energy Codes Changing?

Buildings account for 39 percent of total energy use and 38 percent of carbon dioxide emissions in America, according to the DOE. Inefficient construction practices are a major contributor and the government has enacted stricter codes that will improve the performance of buildings. [Learn More](#)

How Do I Address The New Energy Codes?

Exterior continuous insulation and an air barrier are the most effective ways to meet the new energy code requirements. Exterior Insulation and Finish Systems (EIFS) are a proven methodology that integrates these elements into a design-flexible, cost-effective, single source solution that fully meets, and exceeds the new codes. [Learn More](#)



What Are The New Energy Codes?

Raising the Bar On Energy-Efficient Building.

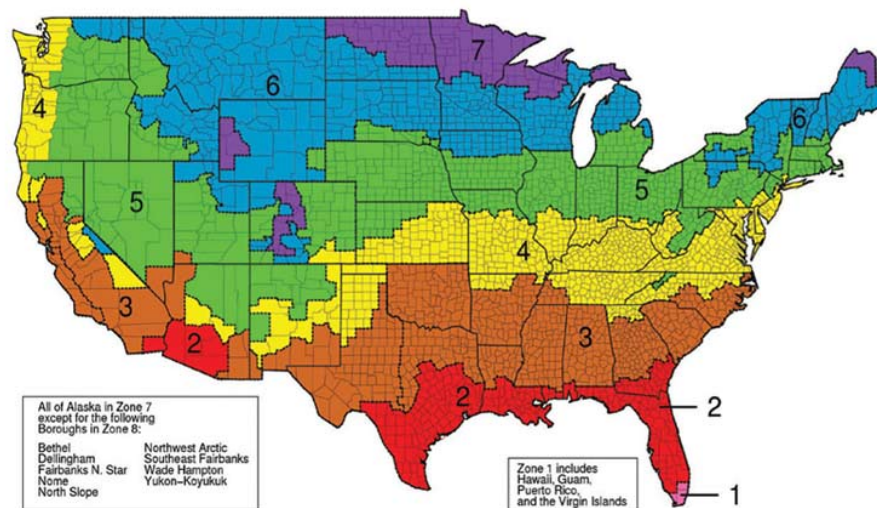
The federal government has been aggressively raising the bar on energy-efficient building standards, making this sustainable trend a requirement.

The DOE has mandated that by October 18, 2013, all states must certify that they will adopt a commercial building energy code that meets or exceeds ASHRAE Standard 90.1-2010. This updated standard triggers the need for a substantial change to the design of wall assemblies in new commercial construction.

IECC 2012

The 2012 International Energy Conservation Code (IECC), which adopts ASHRAE Standard 90.1-2010, has increased the minimum thickness required for continuous insulation for most commercial wall assemblies in climate zones 3 – 8, approximately 90 percent of the United States.

U.S. Climate Zones (per IECC)



Map of the US climate zones according to the IECC

Whereas previous codes have only alluded to general air sealing of the building envelope, the 2012 IECC now includes specific, mandatory provisions for Air Barriers in Climate Zones 4-8. These requirements may be met through the use of approved materials, approved assemblies, or whole building air leakage testing (ASTM E779). As more states adopt this code, these provisions will become mandatory for designers of commercial buildings in those jurisdictions.

Typically revised every three years, the IECC is part of the International Building Code (IBC) and is the governing commercial code section for building design and material requirements related to energy efficiency.

CODE REQUIREMENTS

The IECC divides the United States into eight climate zones, each with specific requirements for the type, placement and amount of insulating materials – both cavity and continuous – in the wall assembly. [Several versions of the IECC are currently in effect across the country](#), making it vital to be aware of which version is adopted by the state or local jurisdiction in which a project is located.

CONTINUOUS INSULATION

Each update of ASHRAE Standard 90.1 and IECC adoption has increased the amount of continuous insulation required in commercial buildings.

The latest ASHRAE Standard 189.1 (Standard for the Design of High Performance Green Buildings) adds the requirement for an air barrier as well as requiring and increasing the thickness of CI in ALL climate zones (1-8).

There is little doubt that future codes will be even more stringent when pertaining to energy efficiency.

Why Are The Energy Codes Changing?

Increasing R-Value and Eliminating Thermal Bridging.

Buildings are the primary user of energy use in the U.S., but modifications to traditional construction methods, particularly in exterior wall assemblies, have the ability to significantly reduce both consumption and resulting CO2 emissions.

THERMAL BRIDGING

Most exterior walls are built using stud framing with some form of insulation located between the studs. This method places the insulation into non-continuous cavities and allows energy to transfer – via the studs – between the interior and exterior of the building – a phenomenon known as "thermal bridging."

Thermal bridging occurs in both cold and hot climates, resulting in more energy used and higher energy bills, whether the building interior is being heated or cooled.

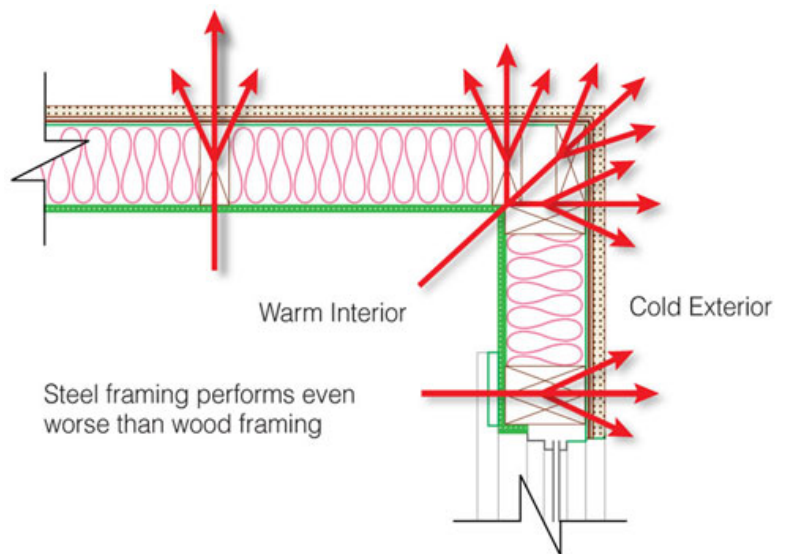


Diagram of thermal bridging when using CI

AIR LEAKAGE

Traditional cavity-insulated walls can suffer from air leakage, which occurs at joints, gaps and penetrations in the wall. The resulting airflow into or out of a building affects energy efficiency, indoor air quality, and heating, ventilating and air conditioning (HVAC) costs.

It is estimated that air leakage can result in a 25 – 40% increase in energy needed to heat or cool a typical structure.

Additionally, cavity insulation gets dirty and can absorb and retain moisture, which can lead to the premature degradation of the studs, sheathing and drywall exposed to the cavity.

R-VALUE

R-value is a number used to express a material's thermal efficiency, and the higher the number, the better.

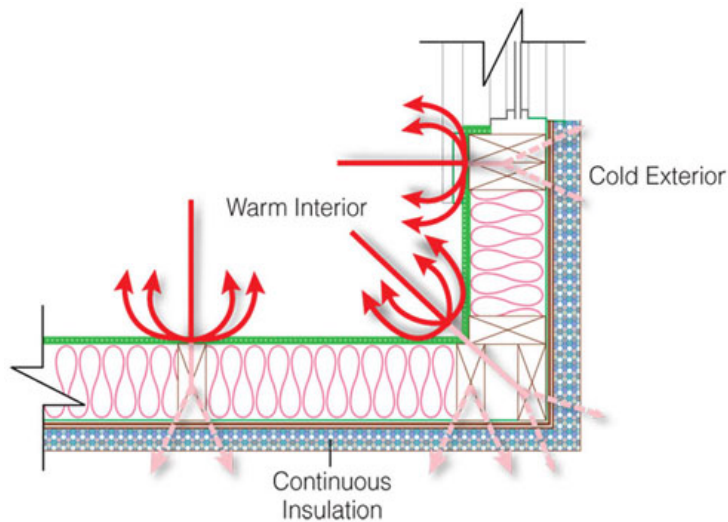


Diagram of no thermal bridging when using CI

However, this nominally takes into account the insulating value of the material itself. The whole wall can be compromised due to thermal bridging and air leakage, which can decrease the actual R-value by as much as 50 percent or more in steel-framed walls and 24 percent or more in wood-framed walls.

Adding thicker cavity insulation does little when trying to improve the thermal efficiency of the wall, as it does not mitigate thermal bridging or air leakage.

This is why an air barrier and continuous insulation are required to meet the energy code's effective R-value requirements, improving thermal efficiency of the full wall assembly, and accounting for all of its potential imperfections.

THE SOLUTION

The exterior placement of an air barrier and continuous insulation are the most effective ways to eliminate thermal bridging and air leakage issues associated with traditional stud framing and cavity insulation.



Two images showing heat loss with and without CI



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How Do I Address The New Energy Codes?

Exterior Continuous Insulation—The All-Around Solution.

Fully code compliant and tested for over 40 years, Outsulation by Dryvit is the ideal solution to meeting the new IECC requirements.

To determine how the code requirements will impact your next project, you must:

1. Identify the climate zone for the location of your next project
2. Determine what energy code is currently adopted for the state in which the project is located
3. Based on the type of construction and code requirement, determine the amount of continuous insulation (CI) required
4. Dryvit offers comprehensive engineering assistance to architects and construction professionals seeking further assistance in meeting these [new Code requirements](#).

Table 2: Prescriptive R-value Requirements – Commercial Framed Construction

Climate Zone	1	2	3	4 except Marine	5 and Marine 4	6	7	8
Commercial Construction								
Steel framed	R-13	R-13	R-13 + R-3.8 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI
Wood framed and other	R-13	R-13	R-13	R-13	R-13 + R-3.8 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-15.6 CI
Commercial Construction - Use Group R (Overnight Occupancies) Red values reflect increased CI requirements								
Steel framed	R-13	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-15.6 CI	R-13 + R-18.8 CI
Wood framed and other	R-13	R-13	R-13	R-13 + R-3.8 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-7.5 CI	R-13 + R-15.6 CI

Source: ASHRAE Standard 90.1-2010

Table 3: R-Value Prescriptive Requirements - Commercial Mass Wall Construction

Climate Zone	1	2	3	4 except Marine	5 and Marine 4	6	7	8
Commercial Construction								
Mass Wall R-Value	NR	R-5.7 CI	R-7.6 CI	R-9.5 CI	R-11.4 CI	R-13.3 CI	R-15.2 CI	R-25.0 CI

Source: ASHRAE Standard 90.1-2010

CI VERSUS CAVITY INSULATION

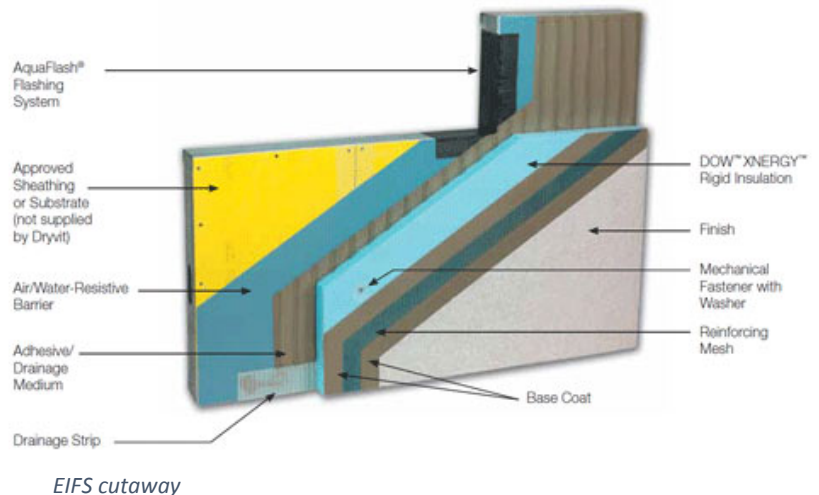
Exterior continuous insulation is much more efficient than the use of insulation in the wall cavity alone. Two inches of CI can have the effective R-value of 8 inches of cavity (batt type) insulation.

Eliminating the use of cavity insulation altogether can be considered by using the right amount of CI to meet a project’s total wall insulation goals. An empty wall cavity also improves airflow and can reduce the dirt and moisture retention associated with batt insulation.

EIFS

Exterior continuous insulation has been an integral component of Exterior Insulation and Finish Systems (EIFS) for decades.

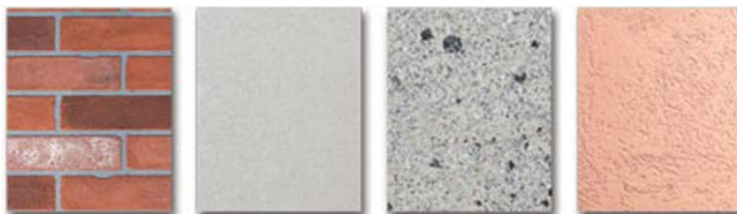
Engineered today to combine the use of an air barrier and continuous insulation, EIFS provide a design-flexible, durable, cost-effective, single-source solution that fully meets, and can exceed, the IECC code.



OUTSULATION BY DRYVIT

Outsulation by Dryvit is a superior EIF system that meets the need for both an air barrier and continuous insulation while offering unique design flexibility.

Outsulation systems are available in diverse finish options and architectural styles, including brick, granite and metal panels. Additionally, the rigid insulation used in Outsulation can be easily shaped into three-dimensional designs, which enhance the attractiveness of the building's exterior.



In 2002, the Department of Energy's Oak Ridge National Laboratory (ORNL) evaluated the effective R-value of several standard wall assembly types, including a Dryvit Outsulation system, brick, stucco, and wood siding.



The study evaluated the "whole" wall construction, which included both the effects of thermal bridging and material/framing discontinuities, such as transition details and typical wall-accessory penetrations.

The results speak for themselves—Outsulation Systems (with integral CI) are 84 percent more energy efficient than the next best cladding, brick veneer (without CI). Studies such as this undoubtedly contributed to the DOE's mandate to require CI in the newest energy codes.

In order to meet the CI requirements of the new energy codes, significant design changes must be incorporated when claddings such as brick, stucco and stone are desired, which can significantly increase costs

Unlike other materials such as brick, Outsulation by Dryvit integrates an [air barrier](#), continuous insulation and a [single source materials warranty](#).

In addition, Outsulation is lightweight, weighing just 1.0 – 2.0 pounds-per-square-foot, compared to the average masonry weight of 40 – 50 pounds-per-square-foot. This translates into a reduction of building structure and material transportation costs and a shortened construction cycle.

Difference Between Rated R-Value (R-11) and Effective R-Value



Source: Oak Ridge National Laboratory (ORNL), 2002

NFPA COMPLIANCE

Outsulation by Dryvit is also uniquely positioned to comply with all of the new requirements for NFPA 285 fire testing, saving a building owner on unanticipated testing costs and construction delays, which can greatly affect the project delivery schedule.

The air, vapor and water-resistive barriers of the Outsulation system meet all structural, durability as well as fire testing requirements of the current codes in place.

REAL WORLD SAVINGS

See how Outsulation by Dryvit saved the [Metro Career Academy](#) in Oklahoma City nearly 50 percent in construction costs and reduced construction time by two months compared to using masonry.



The Metro Career Academy building