



-Building Envelopes-

In Canada, when building houses, we need to think about how we can stay comfortable during the heatwaves as well as the frigid cold winter temperatures. How can a house stay comfortable while maintaining temperature and humidity levels inside while outside is forever changing. Well, we have two words for you, “Building Envelope” So what exactly is a building envelope and why should we care about it as a homeowner? Let’s dive into this essential element of home construction that is often not thought about.

What is a building envelope?

A building envelope refers to the physical barrier that separates the interior of the home from the outside environment. This includes walls, Roof, windows, doors, and foundation that form the boundary between indoors and outdoors. Essentially, it is the shell of your house or the part of the house that you can draw a line around that protects you from the elements while regulating temperature, humidity and air quality.

Why is a building envelope important?

Energy Efficiency

One of the primary reasons the building envelope is so important is its direct impact on a home’s energy efficiency. A proper envelope minimizes the amount of energy needed to heat or cool your home. Insulation, air sealing, and the quality of windows and doors all contribute to reducing heat loss in winter and keeping you home cool in the summer and warm in the winter.

Without a proper envelope, a significant amount of energy can escape through cracks, poorly insulated walls/attic, or drafty windows, this leads to higher heating and cooling costs, as well as an increased carbon footprint. By investing in a high-performance building envelope, homeowners can enjoy long-term savings and reduce their environmental impact.

Indoor Comfort

A well-constructed building envelope helps maintain a consistent indoor temperature. Without proper insulation, certain rooms in the house may be colder or hotter than others. This can make the home uncomfortable, especially during extreme weather conditions. A Good building envelopes prevents drafts, keeps moisture at bay, and maintains a balanced temperature, creating a more comfortable living environment year-round.

Moisture Control

Moisture management is a critical function of the building envelope. When water infiltrates the home – whether through leaks in the roof, windows, or walls-it can lead to mold growth, structural damage, and health issues. The building envelope works as a barrier to protect the interior from rain, snow, and humidity. Proper moisture barriers and ventilation systems within the envelope are essential in preventing these issues.

Structural Integrity and Durability

The building envelope also contributes to the overall longevity of your home. A well-designed envelope shields the structure from the harsh outdoor elements, including rain snow, wind, and temperature fluctuations. Over time, exposure to the elements can cause damage to the



exterior surfaces of a home, leading to costly repairs. A strong and well-maintained building envelope can help prevent deterioration and extend the life of your home.

Noise Reduction

When you live in a noisy neighborhood a good building envelope helps with sound proofing your home to prevent the outside noise from coming into your home. Good insulation and well-sealed windows and doors can significantly reduce the amount of external noise that enters your home. This results in a quieter, more peaceful living environment, which is particularly important for those who value privacy or work from home.

Sustainability and Eco-friendly design

A well-built building envelope also supports sustainability efforts by reducing the need for artificial heating and cooling systems. By minimizing energy consumption, a properly insulated home contributes to fewer emissions from the power plants and lowers the carbon footprint of the household. The material used in the building envelope, such as energy-efficient windows and ecofriendly insulation, further support an environmentally conscious lifestyle.

Key Elements of a High-Performance Building Envelope

To ensure your home is performing at its best, several factors must be considered in the design and construction of the building envelope:

Insulation: Proper insulation is crucial for thermal performance. It helps to keep your home warm in the winter and cool in the summer. Common materials include fiberglass, Polyurethane spray foam and cellulose.

Air sealing: Air Leaks can account for significant energy loss. Sealing gaps around windows, doors, and ducts is essential to preventing drafts and improving efficiency.

Windows and Doors: High-quality, energy-efficient windows and doors are crucial in reducing heat transfer. Double or triple glazing can significantly improve thermal performance.

Roofing and walls: A well-constructed roof and durable exterior walls protect against water penetration and temperature extremes.

Vapor Barriers and Ventilation: Preventing moisture buildup is critical for maintaining a healthy indoor environment and preventing mold growth. Proper ventilation systems and vapor barriers in the walls and roof keep humidity in check.

A building envelope is characterized by being either “tight” or “loose”.

A **“loose” building** allows for more natural air flow to occur which does improve air quality, but it also makes for a more drafty and uncomfortable home as well as higher heating and cooling bills as your furnace and other heating/cooling systems are working harder. A **“tight” building** allows for higher control over the air quality, temperature and humidity in other words your furnace/humidifiers in your home don’t need to work as hard. This will then lead to savings on heating and cooling bills as the building is less drafty and more comfortable.

There are many items that you may or may not be able to see in your house that work together to support an airtight home and tight building envelope. A few of those items are listed below:

- Attic insulation;
- Air sealing in the attic;
- Air sealing pot lights in attics;
- Proper venting in the attic;
- Properly installed and sealed windows;
- Sealing around your exterior doors;
- Proper wall insulation (R-Value up to code);
- vapor barrier;
- Proper roof ventilation;
- Proper washroom ventilation;
- Sealed dry vents (around them);
- Caulking;
- Adhesive tape; and
- Energy efficient windows

In Conclusion the building envelope may not always be the first things that may come to mind when planning your dream home, but it plays a fundamental role in performance, comfort, and sustainability of the entire structure. By ensuring that your building envelope is well designed, insulated, and properly sealed, you can improve energy efficiency, reduce long term maintenance costs and create a more comfortable living environment. Whether you're building a new home/cottage or renovating an existing one don't overlook the importance of a building envelope.



Roof + walls + Doors/windows + foundation = your homes building envelope

Insulation isn't sexy it's Smart