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# Reducing Global Warming Potential (GWP): A Comparison of Insulation Materials and Envelope Systems

Human activities, by their nature, consume energy and this results in an increase of greenhouse gas (GHG) emissions. These gasses collect in the atmosphere to create a type of greenhouse effect that reflects heat from the sun's rays back to the earth and "warms" the earth's temperature. The impact of these gasses on the earth is often referred to as global warming potential (GWP).

A large contributor to GHG, at almost 40% worldwide, is buildings and their construction. The majority derives from operational emissions (e.g. heating and cooling) while the remaining is from embodied carbon emissions associated with the actual construction processes and/or materials.<sup>1</sup>

GHG emissions from a building's operational energy use are addressed to some degree by building codes and other regulations. But how do you compare the environmental impact of the embodied carbon emissions produced to manufacture the materials? This is where Environmental Product Declarations (EPD's) can be helpful.

## Environmental Product Declarations (EPD's)

An Environmental Product Declaration (EPD's) is an independently verified and registered document that provides quantifiable environmental data to compare products that fulfill the same function.<sup>2</sup> In order to create **comparable** EPD's, they must follow the rules and guidelines called for in the associated Product Category Rule (PCR) that describes how the life-cycle assessment (LCA) should be conducted for a certain product type. This includes System boundaries (i.e. cradle to grave or cradle to crate), Declared/functional unit (for insulation 1m<sup>2</sup> with thickness to achieve thermal resistance of 1.0 RSI) and Impact Categories (i.e., what is measured like GWP, etc).

## Comparing the GWP of Insulation Materials

Plastic foams contain petrochemicals and a blowing agent that are responsible for the majority of the product's GWP; however, the GWP can vary greatly depending on the ingredients and the manufacturing process.

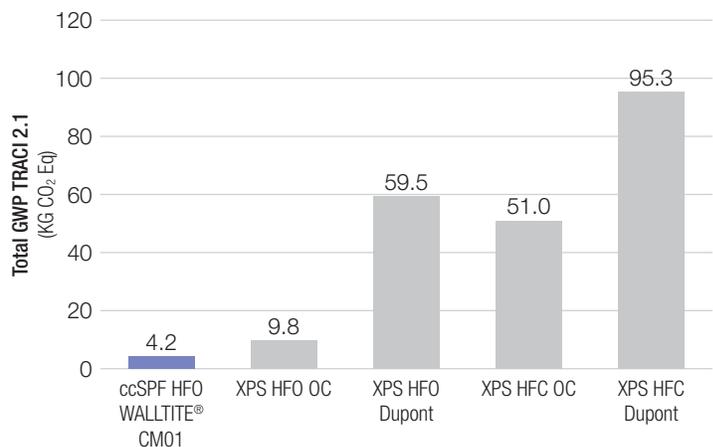
The Canadian Federal Regulation from 2016 requires the use of low GWP blowing agents (<150kgCO<sub>2</sub>eq) effective January 1, 2021.<sup>3</sup> Similar requirements are also being adopted by the US. These phaseouts result in a reduced environmental impact from closed-cell spray polyurethane foam (ccSPF).

Unfortunately, in Canada the federal government has permitted certain XPS manufacturers an extension to the date for compliance to December 2021 or December 2022.<sup>4</sup>

Here are some examples of the GWP of various insulation materials.

### Comparison of GWP of Insulation Materials

Functional Unit: 1m<sup>2</sup>@RSI 1.0



In this comparison, WALLTITE CM01 offers the best sustainable option, based on the lowest GWP, among the insulation materials.

## Comparing the GWP of Envelope Systems

WALLTITE CM01 provides high performance insulation with low GWP. In addition, WALLTITE CM01 can also eliminate other products, and their associated GWP, due to its ability to provide multiple functions in the envelope. WALLTITE CM01 has credentials as a vapour barrier, air barrier material, air barrier system, radon barrier, and water resistant barrier. It also adds racking and structural strength to stud wall assemblies allowing the deletion of full coverage membranes and/or wood sheathing.

### WALLTITE CM01 can provide multiple functions:

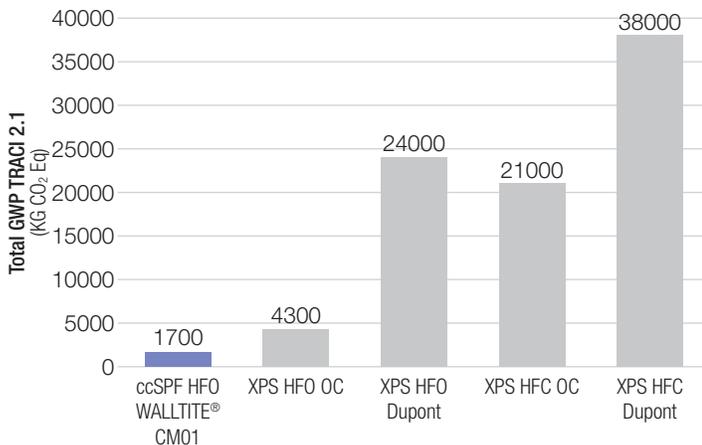
- vapour barrier
- air barrier material
- air barrier system
- radon barrier
- water resistant barrier

Here are some examples of the GWP of various wall systems.

Comparing WALLTITE with transition membranes only (10% coverage) with XPS with full air/vapour barrier (AVB).

### Comparison of GWP of Envelope Systems

Based on a Cavity Wall 100m<sup>2</sup>@RSI 4.0  
WALLTITE CM01 with 10% transition membrane  
All others with a 100% coverage air/vapour membrane



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## Conclusion

In this comparison WALLTITE CM01 offers the most sustainable solution, based on the lowest GWP, among the building systems.

By using WALLTITE CM01 in a project with 100m<sup>2</sup> of wall with an RSI of 4.0 the GWP is reduced by 2,598 kgCO<sub>2</sub>eq to 36,798 kgCO<sub>2</sub>eq.

To learn more about WALLTITE and how to include it in your next project, visit [www.walltite.com](http://www.walltite.com) or call us at 1-888-474-3538. Resources include technical data, details and guide specifications. Our architectural agents offer specification reviews and learning sessions customized to your interests.

## Notes

Source: Values are based on data sourced from publicly available environmental product declarations (EPDs) as of May 20, 2021.

ccSPF	SPFA (WALLTITE)	EPD-085	ASTM
XPS HFO	Owens Corning	4789639125.101.1	ULE
XPS HFO	Dupont	4786548101.101.1	ULE
XPS HFC	Owens Corning	4786548101.101.1	ULE
XPS HFC	Dupont	4789559274.102.1	ULE
AVB	Grace	EPD -074	ASTM

<sup>1</sup> <https://www.worldgbc.org/news-media/WorldGBC-embodied-carbon-report-published>

<sup>2</sup> <https://www.astm.org/CERTIFICATION/EpdAndPCRs.html>

<sup>3</sup> <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2016-137/>

<sup>4</sup> <https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/permits/authorizations-ozone-depleting-substances/companies-essential-purpose-permits-foam.html>

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