WALLTITE®

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Reducing Global Warming Potential: A Comparative of Insulation Materials and Building Systems

Introduction

Human activities, by their nature, consume energy and this results in an increase of green house 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.[1]

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) is an independently verified and registered document that provides quantifiable environmental data to compare products that fulfill the same function.[2] In order to create comparable EPD's, they must follow the rules and guidelines outlined 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^2 with thickness to achieve thermal resistance of 1.0 RSI) and Impact Categories (i.e., what is measured like GWP, etc.).

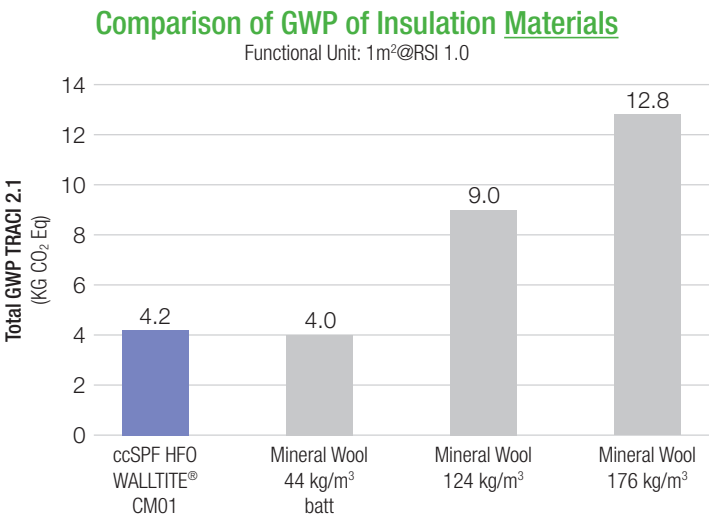
Comparing the GWP of Insulation Materials

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_2eq) effective January 1, 2021.[3] 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 on the date for compliance to December 2021 or December 2022.[4]

Another common insulation material is mineral wool. Mineral wool is manufactured by melting rock or slag at temperatures of approximately 1600°C. This requires the combustion of large amounts of petroleum which results in the significant production of greenhouse gasses. Higher density versions require even more combustion during manufacturing; resulting in an increase in the GWP.



In this comparison, WALLTITE CM01 has a total GWP close to mineral wool at a density of 44 kg/m^3. As density increases with the mineral wool batts, so does the GWP.

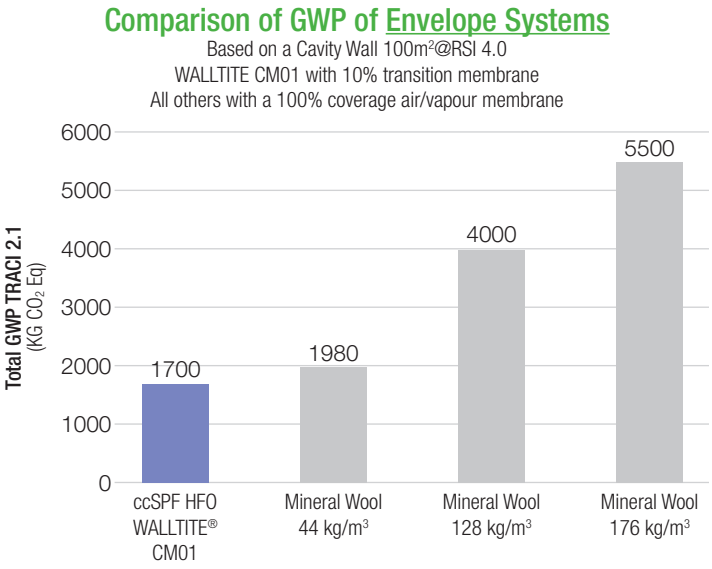
THE GWP of Building Systems

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 a 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 wall systems.



Conclusion

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

To learn more about WALLTITE and how to include it in your next project, visit 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
Mineral Fibre	NAIMA Assoc.	4788703029.101.1	ULE

NOTE: Published in the Rockwool website.

Comfort Board 80 has a density of 128 kg/m³ which is comparable to the 124kg/m³ in the EPD

Comfort Board 110 has a density of 176 kg/m³. The GWP value is prorated to account for the increased GWP for this higher density.

[1] https://www.worldgbc.org/news-media/WorldGBC-embodied-carbon-report-published

[2] https://www.astm.org/CERTIFICATION/EpdAndPCRs.html

[3] https://laws-lois.justice.gc.ca/eng/regulations/SOR-2016-137/

[4] 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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For more information on WALLTITE:
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