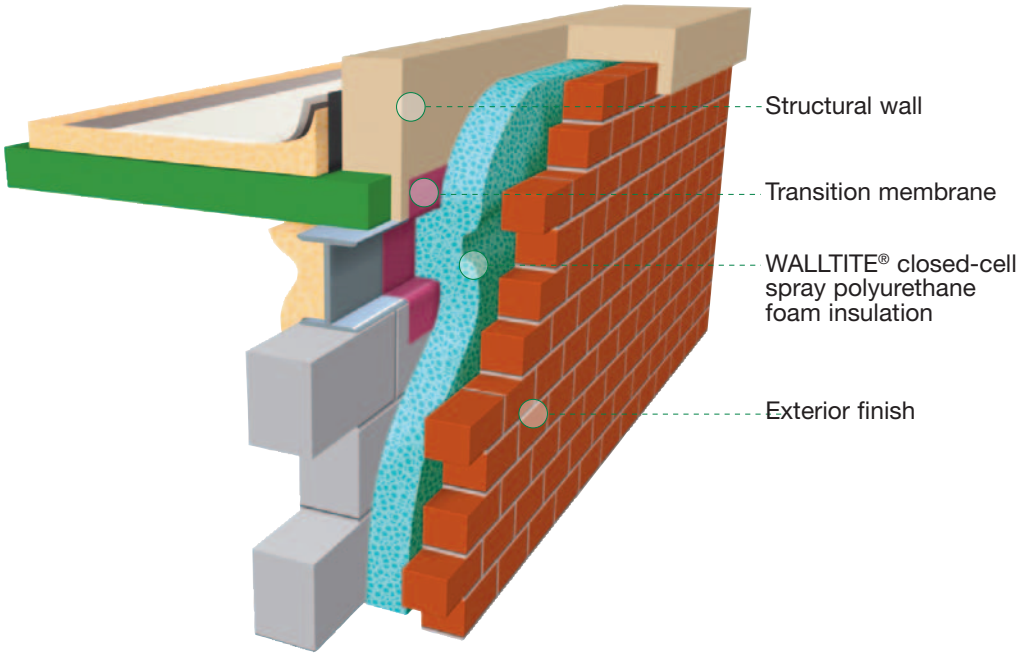


WALLTITE® Insulating Air Barrier System

The WALLTITE® insulating air barrier system from BASF outperforms traditional insulation and air barrier combinations in eco-efficiency, according to a study conducted by BASF's lifecycle assessment group. The system—consisting of spray-applied polyurethane foam (SPF) in combination with appropriate primers, transition membranes, other sealants and an optional vapor barrier—delivers a unique combination of properties to a highly functional building envelope.

The BASF Eco-Efficiency Analysis uses an award-winning methodology to measure the lifecycle performance[1], cost, ecological footprint (including energy and raw material consumption), health effect potential, risk potential, emissions, and evaluation of land use and transportation fuel usage for a set customer benefit (CB)[2] for WALLTITE technology compared with extruded polystyrene (XPS), expanded polystyrene (EPS), glass fiber board and mineral fiber board.

In 2005, the BASF Eco-Efficiency Analysis process won three major awards of interest to the building and construction industry: the Design for Sustainability Award (Society of Plastics Engineers), the Presidential Green Chemistry Challenge Award (U.S. Environmental Protection Agency), and the Best Sustainable Practice Award in the Sustainable Research, Development, Construction Process and Demonstration (Sustainable Buildings Industry Council).

The aim of the Eco-Efficiency Analysis is to compare similar products or processes. This involves carrying out an overall study of alternative solutions to include a total cost determination and the calculation of ecological impact over the entire lifecycle. Holding sustainability to be part of its global mission, BASF is committed to constant improvements in safety, protection of health and environmental conservation.

In addition to its eco-efficiency performance, the WALLTITE insulating air barrier system can help reduce air leakage by up to 80 percent, and improve energy efficiency by up to 40 percent for industrial, commercial and institutional buildings[3].

WALLTITE® Air Barrier

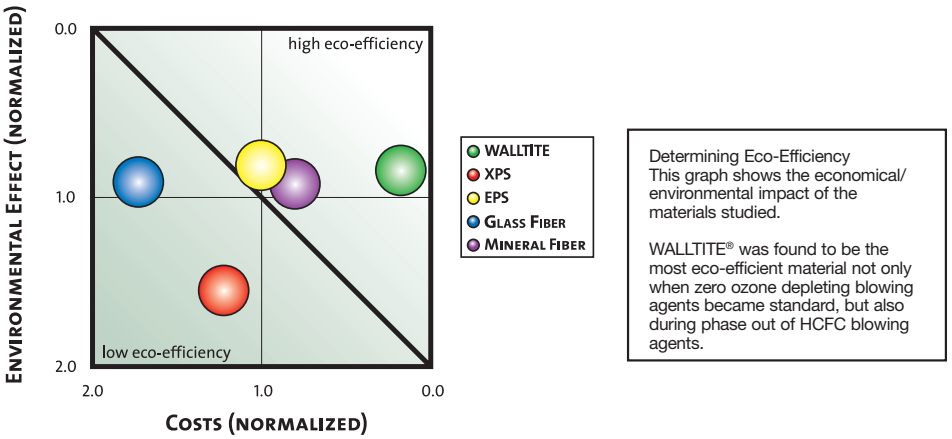
Scores High on Eco-Efficiency Analysis

BASF
The Chemical Company

Test Category	WALLTITE®	XPS	EPS	Glass Fiber	Mineral Fiber
Total Lifecycle Cost ($/CB)	**$230**	$540	$480	$690	$420
Total Material & Insulation Cost ($/CB)	**$235.68**	$536.37	$478.10	$687.51	$418.59
Total Landfill Costs ($/CB)	**$0.01**	$0.03	$0.02	$0.03	$0.04
Transportation Fuel Cost ($/CB)	**$0.48**	$0.99	$0.63	$1.07	$1.62
Energy Consumption (MJ/CB)	**2,000** High heat-transfer characteristics. Low density. Lowest membrane & primer requirements.	3,750 Uses most polystyrene. Requires full membrane & primer.	2,250 Requires full membrane & primer.	2,500 Requires full membrane & primer.	2,100 Requires full membrane & primer.
Raw Materials Consumption (kg*y/CB)	**820** Lowest oil & gas consumption among polymeric materials.	1,700 Polystyrene, membrane & primer use the most oil & gas.	1,000 Uses oil & gas primarily for insulation material.	900 Uses less oil, but gas & coal are significant contributors.	820 Uses less oil & gas than polymeric materials.
Health Effect Potential – Production (score)	**17** Less material to produce and transport.	31 Polystyrene production and diesel fuel use for transportation.	14 Relatively low quantities of material to produce and transport.	21 High quantity of material to produce and transport.	25 High quantity of material to produce and transport.
Health Effect Potential – Use (score)	**6.5** Least system material and transport use.	12.5 Diesel use has biggest impact during use phase.	8.5 Diesel use has biggest impact during use phase.	13.5 Diesel use has biggest impact during use phase.	20.5 Diesel use has biggest impact during use phase.
Risk Potential – Use (score)	**17** Requires less system material. Uses less flammable primer. Lower irritation potential.	23.5 Higher labor requirements. Higher material requirements.	21 Higher labor requirements.	29 Classified per IARC. Group 2b as a possible human carcinogen. High material requirements.	33.5 Classified per IARC. Group 2b as a possible human carcinogen. Listed as Hazardous Air Pollutant under Clean Air Act. High material requirements.
Risk Potential – Production (score)	**26.5** Storage accident risk is higher.	20 Transport accident risk slightly higher due to quantity.	17 Less material to transport.	23.5 Transport accident risk slightly higher due to quantity.	23.5 Transport accident risk slightly higher due to quantity.
Risk Potential – Disposal (score)	**10** Less material to transport.	14 Less material to transport than Glass Fiber or Mineral Fiber, more to transport than WALLTITE or EPS.	10 Less material to transport.	22 Transport accident risk higher due to quantity of material.	22 Transport accident risk higher due to quantity of material.
Evaluation of Land Use (weighted land use m2/CB/y)	**12** Less insulation material & primer required. Less solid waste to landfill.	25.5 Large quantity of material, membrane & primer required.	16 Large quantity of membrane & primer required.	19 Large quantity of material, membrane & primer required.	24.5 Large quantity of material, membrane & primer required.
Blowing Agent Weight %	HCFC-142b: **1%** HCFC-141b: **13.1%** HFC-245fa: **0%** Cyclopentane: **0%**	HCFC-142b: 9%	Pentane: 6%	Does not require a blowing agent.	Does not require a blowing agent.
Eco Portfolio Position (score) using HCFC	**0.80**	1.35	0.90	1.20	0.95
Eco Portfolio Position (score) Using HFC-245fa as WALLTITE Blowing Agent	**0.50**	1.45	1.00	1.40	0.90

Compare the performance attributes of the WALLTITE insulating air barrier system with traditional materials.

	WALLTITE®	Sheet goods: peel 'n' stick, torch-applied	Open-Cell Foam
R-value	6.7	0.0	3.5
Energy Savings and Comfort	Lower heating and cooling costs ■ High insulation value reduces heat loss ■ Air barrier stops costly air leakage ■ Improved occupant comfort	■ No insulation	■ Lower insulation value ■ Higher air and vapor transmission characteristics
Air Barrier Material Performance	Air leakage <0.001 L/s/m^2 @ 75 Pa at 1.5" thickness	Air barrier discontinuity allows leakage at poorly constructed joints	Air leakage 0.005 L/s/m^2 @ 75 Pa at 3.5" thickness
Air Barrier System*	Yes @ 1" thickness	No	No
Absorbs Water	<4% v/v	Yes	>40% v/v
Vapor Barrier Material	Yes	Some	No
Seamless Construction	Yes	Air barrier discontinuity allows leakage at poorly constructed joints	Yes
Structural Integrity	Self-supporting ■ Rigid ■ Fully self-adheres to wall system ■ Peak wind load resistance ■ Durable, long service life	■ Supported by wall system ■ Relies on adhesives	■ Self-adhering ■ Does not contribute to structural strength
Installation	Lower labor cost ■ Single operation ■ Conforms to irregular shapes ■ No fasteners ■ No gluing ■ No heat	■ Labor intensive ■ Multi-step	■ Single operation ■ Conforms to irregular shapes ■ No fasteners ■ No gluing ■ No heat



GRAPH A shows the Ecological Fingerprint of the systems studied for the Customer Benefit. 1.0 = worst position, better results ordered <1.

The U.S. Department of Energy reports that 40 percent of the energy cost of heating and cooling a building is wasted by uncontrolled air leakage, which also contributes to premature building deterioration, condensation, spalling, ice damming, poor indoor air quality (IAQ) and mold growth.
An effective air barrier system substantially reduces both air leakage and the passage of moisture through the building envelope.

The WALLTITE insulating air barrier system is approved by the Air Barrier Association of America (ABAA, www.airbarrier.org) and eliminates uncontrolled air leakage by providing seamless, monolithic construction, complete system continuity, superior effective insulation R-value and almost-zero air infiltration. Our closed-cell polyurethane technology is unique in the way that it allows design professionals and building owners to specify a material that is engineered to meet and exceed required performance criteria for every Code and climate.

These factors combine to increase building energy efficiency and significantly reduce operating cost, while improving occupant comfort, health and safety. The WALLTITE spray-applied system provides the design flexibility to address high-performance building envelope challenges in all types of buildings, including those with unusual shapes and contours.

* To learn more about the differences and performance requirements of air barrier materials and air barrier systems, please visit the Air Barrier Association of America website at www.airbarrier.org

[1] Lifecycle analysis calculations set up according to rules and principles of the ISO 14040 ff.

[2] Customer benefit = insulation of the exterior of 9 m^2 wall surface for a commercial building, with one 0.6 x 1.2 m window, and R-value of 20 ft^2*h*F/ (BTU*in) over a period of 25 years.

[3] *Investigation of the Impact of Commercial Building Envelope Airtightness on HVAC Energy Use*, Emmerich, McDowell and Anis. 2005, National Institute of Standards and Technology (NIST).

1-888-900-FOAM

BASF Corporation
1703 Crosspoint Avenue
Houston, TX 77054
Fax: 713-383-4592
www.spf.basf.com
spfinfo@basf.com

363-1084A