

BASF WALLTITE®

BENEFIT SUMMARY

WALLTITE® is a one step process that provides a gap free, air tight, monolithic envelope of low permeability closed cell moisture resistant insulation, that adheres tenaciously to virtually all surfaces, smooth or irregular.

WALLTITE® is an effective air barrier system approved by **CCMC # 12932-R**.

WALLTITE® is an effective insulation material approved by **CCMC # 12840-R**.

WALLTITE® eliminates convective air flow both through and around insulation.

WALLTITE® effectively controls moisture transfer and condensation.

WALLTITE® minimizes thermal bridging.

WALLTITE® is less costly than conventional 2 or 3 step systems.

WALLTITE® AS AN AIR BARRIER SYSTEM, CCMC # 12932-R

Resistance to Air Flow

WALLTITE® has been tested for air leakage. Test results show that WALLTITE® spray urethane foam insulation complies with **CCMC's Technical Guide "Air Barrier System,"** Masterformat Number 07273, dated 97-05-06. If used in accordance with the limitations and conditions stated in the CCMC report, **WALLTITE® insulation material provides a level of performance equivalent to that required in: National Building Code 5.4.1.2.(1) and Appendix A-9.25.3.2.**

The air leakage rate is 0.0054 L/(s.m²) at 75 Pa. This is lower than the requirements set out in the 1995 NBC [1].

Since WALLTITE® is sprayed-in-place, it provides wider latitude in construction of exterior envelopes. It can maintain continuity over the many imperfections and discontinuities, which are experienced with wall assemblies. These can include irregular walls, corners, gaps in masonry ties, equipment penetrations, etc. Termination points and locations of anticipated movement (roofs, windows, structural elements, etc) are completed with a transition membrane.

WALLTITE® AS THERMAL INSULATION, CCMC 12840-R

R-value

The long term design R value of Sprayed Polyurethane foam is 6 per inch (RSI 1.05 per 25mm thickness) as mandated by the **Canadian Construction Materials Center (CCMC)**.

WALLTITE® - CONVECTIVE AIR FLOW

Construction Specifications Canada state in their **Tek-Aid** on air barriers: “Thermal insulation must be in intimate contact with the air barrier system. In this way the insulation is not subject to local convection currents and the insulation can perform its intended function. Even a small space between the insulation and the air barrier substrate will drastically reduce the thermal efficiency. [2]

If insulation is applied to a wall in a way that allows air to circulate around it or behind it, convection currents will be set up that will reduce its insulating value. Laboratory measurements show that if this kind of convection is allowed to occur through a 1/8” (3mm) gap between an insulation board and its backup, it will, under severe conditions, reduce the value of the insulation by 40%. This work was originally done 32 years ago [3]. More recently (1991) it has been shown that a mere gap of between 1/32” and 3/64” (1mm) for walls is sufficient to initiate convective air flow around board insulation and reduce R-values. This study also showed that insulation gaps of 1/2% of total wall area will more than halve (reduce by 55%) its total R-value [4].

Maintaining intimate contact between insulation and the substrate in a gap-free manner can clearly be shown to be critical to the long term performance of any wall assembly. This can be challenging to achieve. Numerous construction details prevent intimate contact: Masonry walls are not flush or true line; the seams in sheet air barrier materials at masonry ties, joints and corners; extra mastic for sealing around masonry ties; The thickness of the masonry ties themselves. As a result, insulation boards may touch the backup wall in one place and be 10mm or more away in another.

WALLTITE® tenaciously adheres to backup walls and seals around masonry ties and corners. This provides a 100% gap free monolithic layer of insulation, totally eliminating and convective air flow and loss of R-value.

WALLTITE® AS VAPOR RETARDER

The effect of skins on vapor permeance has only just recently been understood. The vapor permeability of polyurethane foam has been traditionally measured on 25mm thick samples with the exterior skins removed, something that is not done on traditional board stock insulation. A typical value for vapor permeance when tested with skins removed would be 125 ng/Pa.s.m². The effect of the higher density skins, which have a lower permeability, that are formed on the contact and exterior surface of the foam on the overall in-situ vapor permeance is dramatic. When tested over concrete block with skins intact, for a typical 50mm cavity wall application, the in-situ vapor permeance was measured at 29.5 ng/Pa.s.m² [5]. We have also investigated the effects of traditional skins with the mass of polyurethane foam. Within a 50mm thickness of **WALLTITE®** would not be uncommon to find one and often two inter-laminar skins. Each additional skin effectively reduces vapor permeance. One test which we ran on a 50mm sample with one additional internal skins, with the outside skins removed, resulted in the vapor permeance being **halved!** [6]

While vapor retarders are an important element in moisture control, building scientists and code authorities have long recognized that air leakage can easily carry 50-100 times more moisture into the building than diffusion can [7].

Because **WALLTITE®** resists air leakage under all wind loads, has high structural strength, adheres to all surfaces, smooth or irregular, and bridges gaps, it controls moisture transfer by vapor diffusion and air leakage more effectively than sheet materials that might have a nominally higher resistance to vapor diffusion.

REFERENCES

- 1.) CMHC Report No. 38-11108 (1990), "The development of the Test Procedures and Methods to Evaluate Air Barrier membranes for Masonry Walls".
- 2.) CSC Tek-Aid (1990), "Digest 07195, Air Barrier", Alberta Building Envelope Council, Construction Specifications Canada.
- 3.) Lorentzen,G. and Nesje, R.S. (1962), "Experimental and Theoretical Investigation of the Influence of Natural Convection in Walls with Slab Type Insulation", Norwegian Institute of Technology, Trondheim, Norway.
- 4.) Trethowen, H.A. (1991), "Sensitivity of Insulation Wall and Ceiling Cavities to Workmanship", Journal of Thermal Insulation, Vol. 15.
- 5.) Bomberg, M.T. (1998), "Factors Affecting the Field Performance of Sprayed Polyurethane Foam, "Journal of Thermal Insulation and Building Envelopes, Vol. 21.
- 6.) ORTECH Report No. 97-J53-Mo228 (1998), "Water Vapor Permeance Evaluation of Polyurethane Foam Product".
- 7.) Brand, R. (1990), "Architectural Details for Insulated Buildings", Van Nostrand Reinhold.