

# Perlite is better...

than:

EPS INSERTS

EPS BEADS

AND VERMICULITE

## **CALCULATED TRANSMITTANCE VALUES ARE NOT THE ANSWER**

Concrete masonry walls with different types of core insulation are frequently compared by the relative ranking of published calculated U and R values. However, extensive Guarded Hot Box tests<sup>(1)</sup> of full scale wall systems at Dynatherm Engineering<sup>(2)</sup> have determined that thermal performance of insulated masonry walls is not solely proportional to thermal transmittance of the insulation but also depends on block geometry, concrete thermal conductivity and the degree to which the insulation fills the core spaces.

## **PERLITE IS THE SUPERIOR INSULATION**

Dynatherm Engineering's testing has shown conclusively that perlite masonry loose fill insulation is the superior concrete block insulation when compared to expanded polystyrene (EPS) inserts, expanded polystyrene (EPS) beads and vermiculite.

## **EFFECT OF DIMENSIONAL VARIATIONS**

Variations found in block dimensions and the effect of these variations lend further validity to the selection of masonry insulating material on the basis of actual tests of wall systems rather than on the use of published or calculated values based on nominal concrete block. In an analysis conducted by the Construction Technology Laboratories<sup>(4)</sup>, variations in block dimensions can cause thermal transmittance to vary from 19 to as much as 36% depending on face shell and web thickness. Accordingly, calculated and published values do not take these dimensional differences into account while tested wall systems do consider all variables.

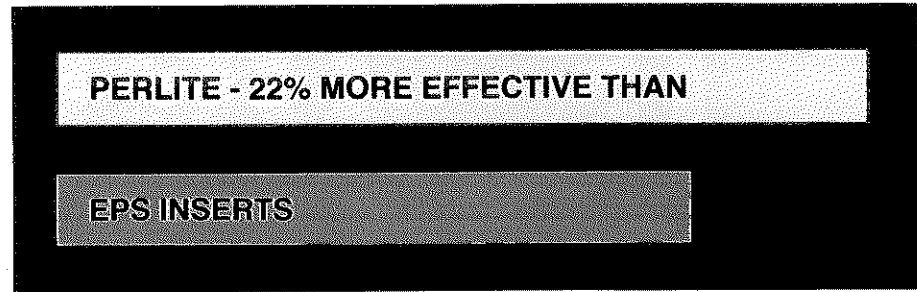
## **FREE-FLOWING PERLITE ASSURES SUPERIOR PERFORMANCE**

A key to perlite loose-fill insulation's excellent performance in masonry wall

(Continued Column 4)

**H**igh heating and cooling costs and the need for energy conservation have resulted in heightened awareness of the thermal performance of building envelopes. Contributing to the overall energy efficiency of the building envelope is the thermal performance of exterior walls. Selection of an optimal wall system is based on thermal performance as well as construction costs, structural requirements and aesthetics.

## **PERLITE VS EPS INSERTS**



The case for selecting insulation based on actual full scale wall measurements vs calculated values is clearly indicated in the perlite and EPS insert testing. Although calculated R values for EPS inserts appear more favorable, full scale laboratory wall testing reveals that silicone treated perlite masonry loose-fill insulation is actually 22% more effective<sup>(3)</sup> than EPS inserts.

A key to perlite's outstanding performance is the fact that all block cores, voids and mortar areas are completely filled with free flowing perlite. With perlite, convective loops within the block are filled, thus eliminating convective heat flow (chimney effect) and subsequent heat losses.

But perlite offers more. Perlite is non-combustible with a fusion point of approximately 2300°F (1260°C) and improves the fire rating of an 8 inch (20 cm) concrete block from 2 to 4 hours—a 100% improvement.



## **PERLITE VS EPS BEADS**

**PERLITE - 12% MORE EFFECTIVE THAN**

**EPS BEADS**

Wall tests conducted conclude that perlite is 12% more effective<sup>(3)</sup> than EPS beads. Perlite's superiority is related to its free-flowing characteristics. EPS beads are extremely light in weight making installation difficult. Furthermore, they suffer "static-cling" and tend to adhere to the walls of cores upon installation. As a result, voids can exist in masonry walls insulated with EPS beads. It is these unfilled voids that are largely responsible for the poorer performance of masonry walls insulated with EPS beads.

Perlite loose-fill masonry insulation assures a completely filled wall with no unfilled areas to drain away expensive heat. In addition, perlite has been fully tested and meets fire safety, thermal performance and quality assurance standards of federal and state agencies as well as international and local building code organizations.

## **PERLITE VS VERMICULITE**

**PERLITE - 6% MORE EFFECTIVE THAN**

**VERMICULITE**

Tests performed by Dynatherm Engineering reveal that perlite is 6% more effective<sup>(3)</sup> as a core fill insulation than vermiculite. Although the physical characteristics of the two materials are similar, the closed cell structure and lower thermal conductivity of perlite account for perlite's superiority.

Heat loss through the walls of a masonry building can be huge over the life of a building. The amount of heat saved by using perlite can very well more than offset the cost of the insulation.

systems is its free flowing characteristic. In a masonry wall system, granules of silicone treated perlite seek out and completely fill the smallest crevices, voids and mortar areas without bridging. This flowability of perlite loose-fill insulation assures a completely and efficiently insulated masonry wall and avoids the "chimney effect" or "static cling" effect characteristic of EPS products. Perlite's flowability also allows the masonry contractor to install several courses of block prior to the installation of insulation into core and ear holes.

Published and calculated thermal transmittance values do not consider the physical properties of insulation with regard to flowability, settling and the amount of the core that is actually filled.

Flowability of perlite combined with non-settling properties assures permanent thermal performance for the life of the structure.

## **PERLITE IS MORE THAN A SUPERIOR INSULATION**

In addition to its excellent thermal performance, perlite insulation offers a number of additional advantages to architects, engineers, contractors and building owners.

## **FOOLPROOF INSTALLATION**

Perlite is the one insulating material that ends up in the wall as specified. Installation is not dependent on the experience of the installer and its free-flowing properties will assure a completely insulated wall for the life of the structure.

## **PRICE COMPETITIVE**

Perlite loose-fill insulation is cost competitive with other masonry block insulations. When you consider that perlite insulation will reduce heat loss through masonry walls by more than 50%, it may be the best investment you've ever made!

## 100% IMPROVEMENT IN FIRE RATING

Independent studies show that the fire rating of concrete block is improved from 2 hours to 4 hours when the cores are filled with perlite loose-fill insulation.

## WHAT IS PERLITE LOOSE-FILL INSULATION?

Perlite loose-fill insulation is an inert volcanic glass expanded by heating to 1600° F (850° C) and treated with a non-flammable silicone to ensure against water retention. The resulting granular product is lightweight with countless tiny, sealed air cells which account for its excellent thermal performance. The characteristics of perlite loose-fill insulation provide many additional benefits including:

- Perlite loose-fill insulation is free-flowing and will uniformly and completely fill all cores and voids in masonry wall units.
- Perlite loose-fill insulation is inorganic and is rot, vermin and termite resistant.
- Perlite loose-fill insulation is non-combustible with a fusion point of approximately 2300° F (1260° C), while EPS products are combustible.
- Perlite loose-fill insulation improves the fire rating of an 8 inch concrete block from 2 hours to 4 hours — a 100% improvement!
- Perlite loose-fill insulation is non-settling and supports its own weight in masonry wall cavities and masonry block cores.
- Perlite loose-fill insulation may be easily installed without special training or equipment.

1 ASTM C236, Standard Test Method for Steady State Thermal Performance of Building Assemblies By Means of A Guarded Hot Box.

2 Dynatherm Engineering, Lino Lakes, Minnesota

3 Thermal effectiveness is based on a comparison of total R values corrected to ASHRAE winter design with 15 mph wind outside, still air inside and 8 inch (20 cm), 103 lb/ft<sup>3</sup> (1650 kg/m<sup>3</sup>) two-core blocks. The percent improvement will be greater if lighter weight (lower k value) blocks are used and less if higher weight (higher k value) blocks are used.

4 Construction Technology Laboratories, Skokie, Illinois.

## APPLICABLE STANDARDS, SPECIFICATIONS AND REFERENCES

ASTM Specification C549 - Perlite Loose Fill Insulation

ASTM Specification C520 - Density of Granular Loose Fill Insulation

ASTM Specification E84 - Test for Surface Burning Characteristics of Building Materials

Federal Specification HHI-574b - Thermal Insulation (Perlite)

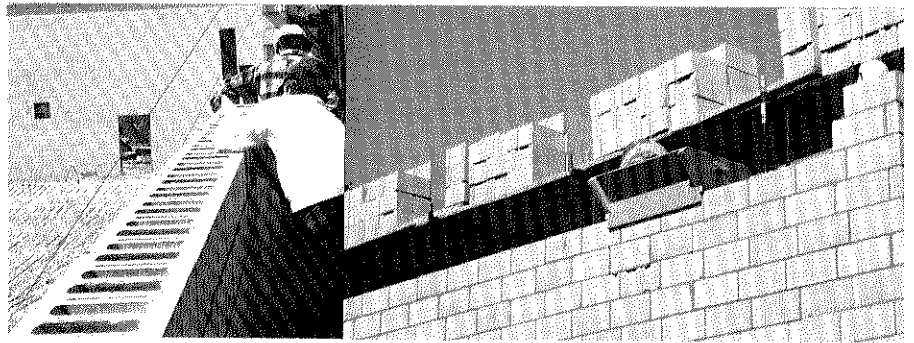
FHA Use of Materials Bulletin UM-37

GSA Commercial Item Description A-A-903. Insulation, Thermal (Expanded Perlite)

Brick Institute of America Technical Notes No. 21A

National Concrete Masonry Association Tek 101

Federal Specification HHI-515D for: Corrosion/Smoldering Combustion/Critical Radiant Flux/Moisture Absorption



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