

THE STORY FILE

Insulation Alert!

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Properly insulated masonry walls can make an excellent contribution to an energy-efficient building envelope. Insulation of masonry can be a simple and efficient process . . . however, if improperly selected, or installed, the insulation can be worse than no insulation at all.

The basic masonry wall types are single-wythe, composite and cavity walls. Single-wythe and composite walls can be insulated on their inside surface with rigid boards of styrene, urethane and isocyanurate, to name a few. Single-wythe and composite walls of hollow units can be insulated in their cores with loose fill or insert insulation. The loose fill is generally vermiculite, perlite or styrene pellets. Also frequently used in the cores of hollow walls, are urea-formaldehyde (U-F) foams.

Masonry cavity walls are generally insulated in the cavity. Board type, loose fill and foam insulations are used. Some cavity walls have additional insulation placed in the cores of their hollow inner wythe.

For insulation to be effective, it must first be a good insulator (R factor). Second and most importantly, insulation must be kept dry. Most closed cell rigid board insulations provide good moisture resistance; however, there are some board insulations that can take on moisture and, therefore, should not be used where they are likely to be exposed to moisture. Most commercially available loose fill insulations, such as vermiculite and perlite, are today treated so they do not absorb moisture.

As previously mentioned, U-F foam insulations have been used extensively in this area in hollow core and in cavity walls. We would strongly caution against using U-F foams in masonry walls subjected to either mild or severe moisture conditions. By that, we mean walls that will take on moisture through such external sources as wind-driven rain or below-grade moisture. Interior moisture such as condensation cannot be overlooked either, especially in cold climates like Michigan and Northern Ohio.

Designers and installers alike must take heed to the problems affecting the thermal performance of insulations. An excellent technical discussion of this subject is contained in

a 1978 publication by the American Society for Testing and Materials (ASTM), "Thermal Transmission Measurements of Insulation," STP 660, R.P. Tye, Dynatech R/D Company, editor. This publication is a summary of papers presented at a symposium on Heat Transmission Measurements held in Philadelphia, Pennsylvania, September 19-20, 1977, and sponsored by ASTM Committee C-16 on "Thermal and Cryogenic Insulation Materials."

Papers presented by M. Bomberg and C.J. Shirtliffe entitled, "Influence of Moisture and Moisture Gradients on Heat Transfer through Porous Building Materials," and one presented by F.J. Dechow and K.A. Epstein on "Laboratory and Field Investigations of Moisture Absorption and its Effect on Thermal Performance of Various Insulations," are of importance to this issue. Quoting from the second paper on moisture and thermal performance: "Since liquid water conducts 25 times more heat than the air it replaces, open celled or porous materials are affected to a much greater degree by moisture than closed cell materials in which any moisture is primarily in a vapor phase. If insulation is in a freezing environment, the ice trapped in the insulation will conduct over 100 times more heat than air would." One quickly sees the importance of keeping an insulation dry!

We have inspected a significant number of U-F insulated masonry walls in the last three or four years that contain moisture in the insulation. Most recently, a foam sample taken from single-wythe block walls was moist to touch after being in place for approximately eight months. Further testing revealed that this sample had a 75 per cent water absorption (by volume) capacity.

Since U-F foams contain as much as two pounds per cubic foot of water when placed, it is important to provide adequate time for foam insulations to dry out before paints, sealers or other barriers are applied to the walls. This becomes critical when single-wythe walls are to be sealed on the exterior. Serious paint peeling and some efflorescence has resulted in the case of the eight-month old

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Masonry Institute of Michigan

Detroit-area JATC sponsors training program in firebrick

Eighteen Detroit-area bricklayers recently attended a special eight-week program to upgrade their skills in firebrick work.

The class, which ran 48 hours, was sponsored by the Detroit Metropolitan Masonry Joint Apprenticeship and Training Committee.

"Because our area is heavily industrialized, we have a lot of firebrick work," explained Carlo Martina, business manager of Bricklayers Local No. 35, Wyandotte. "It's very intricate and much different than outside brick or block work. Our aim is to encourage more of our journeymen to become proficient in firebrick so that we can meet the manpower demands of our employers."

The class was taught by Ed Szatkowski, of Engineered Refractories, Pontiac, with help from apprentice coordinator Don LeMarbe. Materials and supplies were donated by Schad Boiler Setting Co., Detroit; Great Lakes Steel Division, National Steel Corp., Ecorse; and Michigan Boiler & Engineering Co., Detroit.

Current and choice . . .

Thermal Insulation of Concrete Masonry Walls. If you're serious about conserving energy in your next building project, you should have this timely TEK Note (No. 38-A) from the National Concrete Masonry Association. In concise fashion, it presents the industry's viewpoint on performance vs. prescriptive standards . . . on dynamic vs. steady-state analysis of thermal performance . . . on the cost effectiveness of added insulation . . . and on the actual thermal importance of walls in the overall building energy consumption picture.

Structural Backup Systems for Concrete Masonry Veneers. Here's another timely discussion of a very important subject being considered by most architects, structural engineers and design builders . . . how, when and if metal studs should be used with masonry veneers. TEK Note No. 114, just released by the National Concrete Masonry Association, covers the general design of concrete masonry backup, stiffness compatibility of veneer and block backup, and stiffness compatibility of veneer and flexible backup systems. You won't want to be without this important publication.

To order either the Revised TEK No. 38-A on "Thermal Insulation" and/or the new TEK No. 114 on "Structural Backup Systems," use the literature request form on the opposite page .

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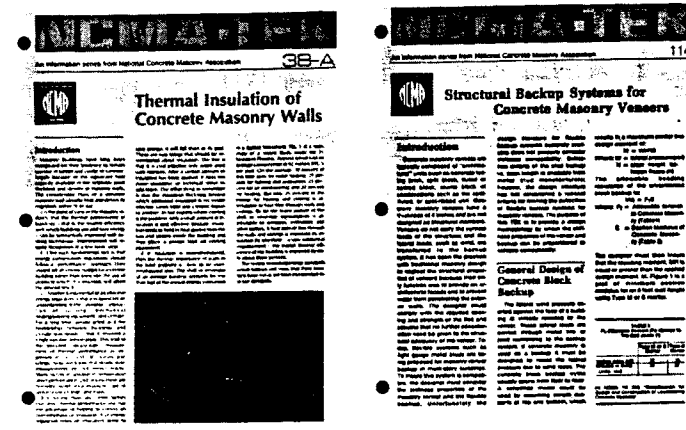
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single-wythe concrete masonry walls previously cited. Since these walls were painted within weeks of foaming, moisture was trapped . . . only to later develop *that driving force* that causes peeling.

Significant numbers of the masonry walls inspected for moisture and staining have had an oily stain on the masonry. The actual chemical composition of this stain is still unknown and under investigation; however, a correlation has developed between U-F foam core or cavity insulation and the problems.

Most of us are aware of the rapidly-changing technology for producing energy-efficient buildings. We do maintain that masonry walls with *properly* selected insulations continue to provide a premium solution to achieving that energy-efficient building envelope.