



STYROFOAM Brand Insulation & Masonry "They're Great Together"

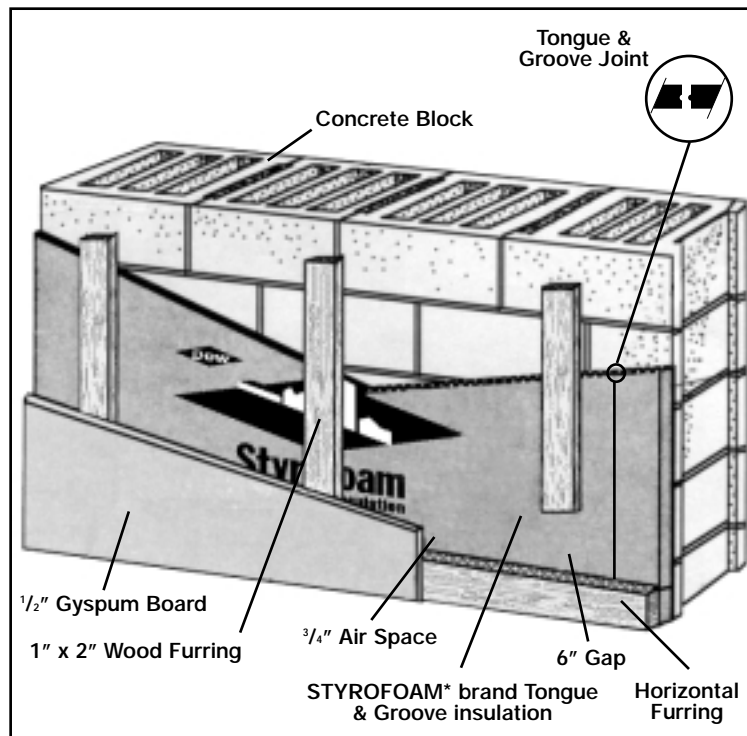
STYROFOAM* brand insulation for long-term insulation – Masonry for long-term strength

STYROFOAM Brand Insulation and Drywall on Masonry Walls

To insulate your masonry walls, STYROFOAM* brand Tongue & Groove insulation is truly your best solution. First of all, it is easy. Just stand the foam against the wall and nail the furring through it. You are done. Since STYROFOAM brand insulation is

inherently vapor resistant, it does not require the additional cost and bother of installing a layer of polyethylene film for vapor protection. And since the foam is behind the furring (instead of between), it saves the time to cut and fit it. Plus, the foam covers the wall totally, giving complete insulation coverage – rapidly. Just install the foam and furring. It is that simple.

¹ See 15-Year Limited Thermal Warranty certificate for details.



And it is effective, too. STYROFOAM brand residential sheathing starts out with high insulation value – and keeps it long-term. The insulation value is even warranted¹ to keep within 10% of its published value for a full fifteen years. This is particularly important in hot, humid climates, since it is well known that moisture in

insulation materials can reduce insulation values over the years.

Contractor Benefits

The contractor's benefits from using STYROFOAM brand insulation in a masonry wall system are numerous and valuable:

- Well-known Dow name: increases buyer awareness and acceptance
- 15-Year Limited Thermal Warranty: assures long-term customer satisfaction

- Excellent vapor resistance: eliminates cost of installing poly film
- Excellent water resistance: store outdoors or use below grade
- Clean, lightweight extruded polystyrene: is non-irritating; easy to cut and handle
- Tongue and groove edge design: increases joint efficiency



- Many foam thicknesses: to meet any energy code requirement
- Complete insulation coverage: increases system effectiveness
- Standard installation techniques: assure fast, easy installation

Insulation Values for Masonry Walls

.68	Inside Air Film
.45	Drywall
.94	Furring Space
3.80	.75" STYROFOAM
1.04	8" Concrete Block
.05	Stucco
<u>.17</u>	Outside Air Film
7.13	Total R-Value (Rt)
.140	U-Value (1/Rt)

Wall U-Value for Various Thickness of STYROFOAM Brand Tongue & Groove Insulation

Rt	U	Nom. Thickness of foam
7.13	0.140	.75"
8.33	0.120	1.00"
10.83	0.092	1.50
13.33	0.075	2.00"

Moisture Vapor Control

It is helpful to remember that the moisture vapor driving forces reverse every time the seasons reverse. In winter, moisture vapor is driven from inside to outside. In summer, the force reverses; and vapor is driven from outside to inside.

To prevent this moisture vapor from condensing in the wall, vapor retarders must be installed. They are usually installed behind the drywall because it is the right location for blocking wintertime vapor flow. However, it is the wrong location for blocking summertime flow, since in the summer the moisture vapor is coming in through the unprotected exterior side of the fibrous batts.

Fortunately, STYROFOAM brand Tongue & Groove insulation is inherently semi-permeable. As a result, it resists vapor flow from any direction, reduces vapor from inside the house in winter, and reduces vapor from outside the house in summer. Whatever the season, with STYROFOAM brand insulation the vapor protection is always on the right side.

This fact is clearly illustrated in the dew point models on page 3, which compare walls with fiberglass batts to walls with STYROFOAM brand Tongue & Groove insulation. The bold lines in these graphs indicate estimated temperatures in the wall; faint lines indicate estimated dew point temperatures. Intersection of the two lines shows potential condensation at that point.

Note in the wintertime model, the lines do not intersect on either graph to predict

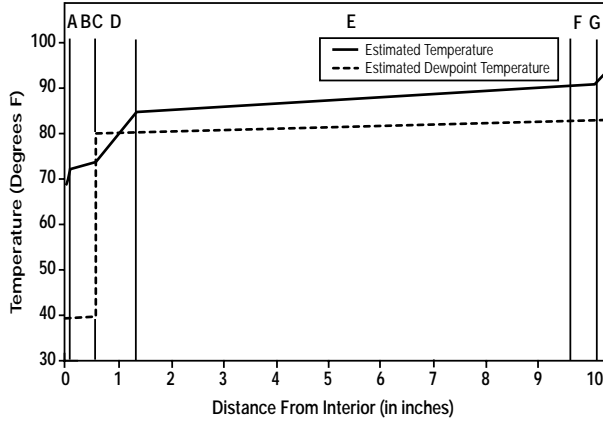
condensation with either insulation. No condensation is predicted because the polyethylene film vapor retarder against the fiberglass batts is in the right location to protect the batts from moisture flowing out of the house.

However, there is an intersection of the two lines in the summertime model for fiberglass. This indicates a potential problem. Since the vapor flow has reversed, the polyethylene film cannot protect the fiberglass against vapor driven in from the hot, humid out-of-doors.

On the other hand, the model with STYROFOAM brand Tongue & Groove insulation shows no condensation in either summer or winter. STYROFOAM brand sheathing protects itself from vapor flow, whatever the direction. Using STYROFOAM brand insulation means construction simplicity!

These dewpoint models are oversimplified because they do not include the effect of air infiltration. However, they are somewhat conservative as condensation is indicated where none may occur. But the conditions predicted by these dewpoint models have indeed been found in real life – in the block walls of actual research homes near Tampa, Florida. This research showed that condensation developed on the polyethylene film in August

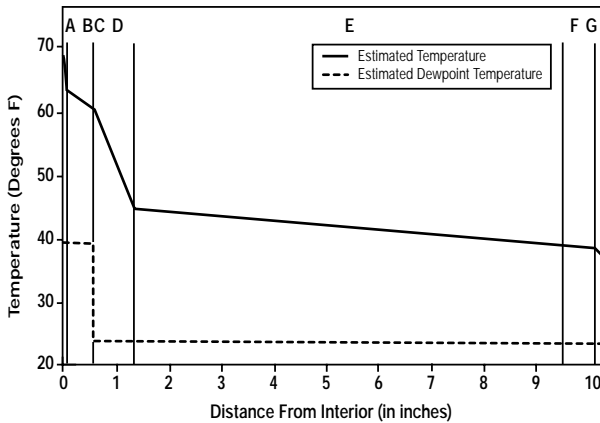
Estimation for Fiberglass Insulation Summer Conditions – Outside: 90°F, 75% RH



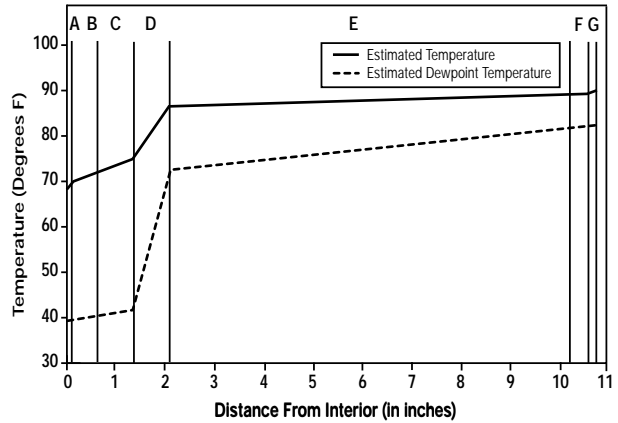
CONSTRUCTION COMPONENTS

- | | |
|-----------------------------|---------------------|
| A Inside Air Film | E 8" Concrete Block |
| B 1/2" Gypsum | F Stucco |
| C 2 mil Poly Vapor Retarder | G Outside Air Film |
| D 3/4" Fiberglass Batts | |

Estimation for Fiberglass Insulation Winter Conditions – Outside: 36°F, 55% RH



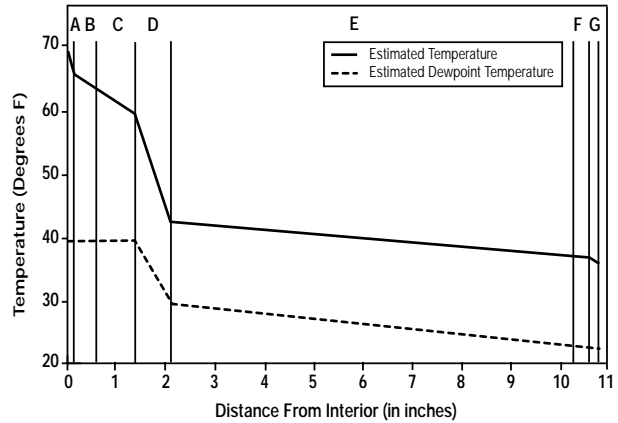
Estimation for STYROFOAM Brand Insulation Summer Conditions – Inside: 70°F, 40% RH



CONSTRUCTION COMPONENTS

- | | |
|-----------------------------|---------------------|
| A Inside Air Film | E 8" Concrete Block |
| B 1/2" Gypsum | F Stucco |
| C 2 mil Poly Vapor Retarder | G Outside Air Film |
| D 3/4" Fiberglass Batts | |

Estimation for STYROFOAM Brand Insulation Winter Conditions – Inside: 68°F, 35% RH



Note: Solid lines indicate estimated temperatures in the walls.
Dash lines indicate estimated dewpoint temperatures.
An intersection of lines indicates potential condensation.

Notice: This calculation is based on the theory of Water Vapor Migration presented in the ASHRAE 1993 Fundamentals Handbook. Actual performance may vary depending upon air infiltration, workmanship, and building materials.

at the very beginning of the testing. The film did not dry out again until the following November after the moisture vapor flow once again reversed from inside to outside. However, no condensation was ever registered on the moisture sensors in the block walls insulated with STYROFOAM brand insulation.

Typical Properties** of STYROFOAM Brand Insulation

Property	ASTM	Value
Compressive Strength psi, min.	D 1621	25
Water Absorption % by volume, max	C 272	0.1
Water Vapor Permeance perm	E 96	1.1
		Nom. Thickness
Thermal Resistance °F•ft ² •h/Btu, min. (R-value)	C 518	2.00"
		1.50"
		1.00"
		.75"
		.50"

**For more information, see Dow literature form no. 179-4256.

Installation Guidelines

1. Install horizontal furring strips at the top and bottom of the wall (see illustration) equal to the combined thicknesses of the foam and the vertical furring (to meet code as required).
2. Fit the STYROFOAM brand residential sheathing vertically against the masonry or concrete wall. The STYROFOAM brand insulation may be temporarily held in a place by utilizing small pieces of furring nailed into the block or by using a few nails or spots of a compatible adhesive.
3. Install vertical furring strips against the foam insulation 16" or 24" centers using the factory printed stud finders as a guide. (Note: The vertical furring may not need to be pressure treated since it does not touch the walls or floor. Check local code.)

4. Attach the furring permanently with suitable mechanical fasteners such as masonry nails or screws spaced 12" on center and long enough to penetrate the underlying masonry or concrete wall approximately one inch.
5. Install a minimum 1/2" gypsum wallboard over the furring in accordance with manufacturer's recommendations.

Alternate Installations

1. Optionally, STYROFOAM Score Board brand insulation may be used. Score Board is a 48" – wide unfaced product that is factory-scored for snapping into 24" or 16" wide boards. Thus, the foam board can easily be snapped-off at wall corners and window openings to line up with the edge of the block wall, reducing installation time and scrap loss.
2. Optionally, metal furring strips may be used instead of

wood furring strips. The T.G.I.F. Insulation Furring System is highly recommended. These galvanized, ribbed furring strips are available from Erico Tool & Fasteners, Inc. (1-800-248-2376). They are rapidly installed and since they are thin (only 1/8" x 1 5/8"), they take very little living space out of the room.

3. Optionally, the wood furring strips may be installed directly against the masonry wall. The foam and drywall are then installed over (not between) the furring for complete insulation coverage. (Check local code.)
4. Optionally, the foam may be installed on the exterior side of the masonry and finished with stucco. Following the stucco manufacturers' recommendations.
5. Optionally, The foam may be installed in the cavity of masonry cavity walls.

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For technical information, call 1-800-441-4369

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