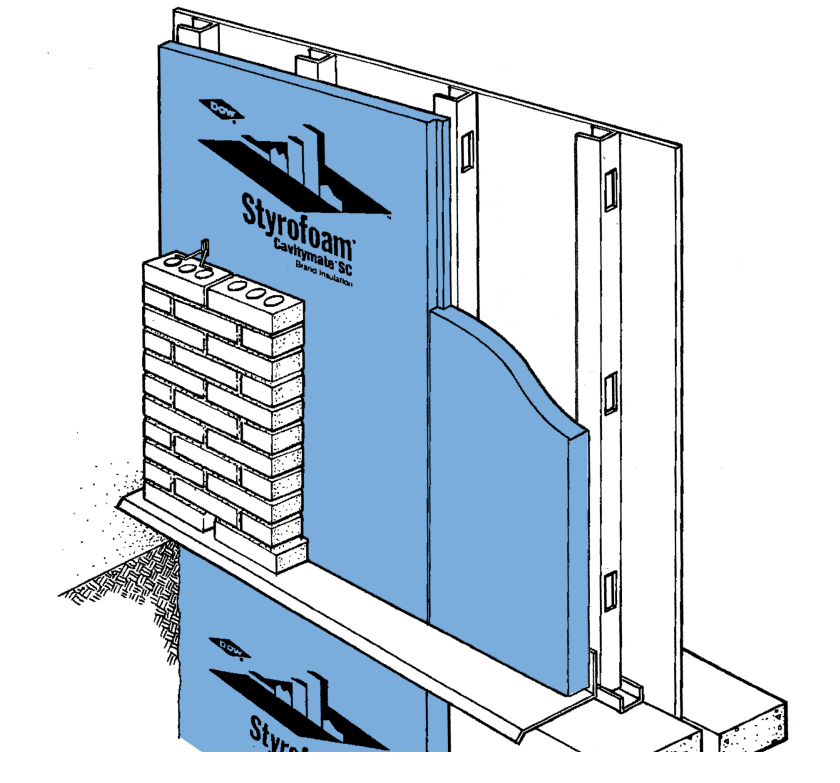


Why Insulate Steel Stud Cavity Walls in Hot Climates?

Steel stud construction contributes to an economical and versatile wall system in commercial and multistory residential construction. However, steel stud construction can also present unique challenges, including moisture accumulation and lowered R-value** of the wall system. Insulating with STYROFOAM* CAVITYMATE* SC extruded polystyrene insulation or THERMAX* Sheathing polyisocyanurate insulation from Dow Building Materials† helps you meet these challenges head-on.

Why Use Insulation Products From Dow?

Dow offers two proven products specially designed to solve the challenges of steel stud cavity wall construction. STYROFOAM CAVITYMATE SC insulation, an extruded polystyrene rigid foam insulation, has a shiplap edge that provides one of the most thermally efficient joints available. Its unique closed-cell structure gives STYROFOAM CAVITYMATE SC insulation superior moisture resistance and long-term R-value.



THERMAX Sheathing, a polyisocyanurate rigid foam insulation from Dow, offers unique strengths for steel stud cavity construction, as well. Because of its closed-cell structure, THERMAX Sheathing has a high R-value and is exceptionally resistant to the flow of heat. In addition, the aluminum foil facers laminated to each side of the core foam offer an effective moisture barrier.

Both STYROFOAM CAVITYMATE SC insulation and THERMAX Sheathing are lightweight, easy to install and cover large areas quickly.

The Anatomy of a Steel Stud Cavity Wall

One of the most common commercial steel stud wall assemblies consists of brick veneer with steel stud backup. The National Research Council (NRC) considers this an “open rain screen” design. This means the wall cavity is vented to the outside by openings in the outer layer (brick veneer) to allow rapid equalization of the cavity and external pressures caused by wind loads.

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**R means resistance to heat flow. The higher the R-value, the greater the insulating power.

TABLE 1

Effective R-Value Comparison: Cavity Insulation Alone vs. Cavity Insulation Plus STYROFOAM CAVITYMATE SC Insulation or THERMAX Sheathing					
Nominal Framing Depth and Spacing	Stud Cavity Insulation R-Value	Effective Wall R-Value ¹	Wall Thermal Efficiency	Effective Wall R-Value by Adding 1" of CAVITYMATE SC Insulation ¹	Effective Wall R-Value by Adding 1" of THERMAX Sheathing ² (HFC Blowing Agent)
4" @ 16" o.c.	0.9 (no fiberglass)	2.5	-	7.5	9.0
	11.0	7.5	58%	12.5	14.0
	13.0	8.0	53%	13.0	14.5
	15.0	8.4	49%	13.4	14.9
4" @ 24" o.c.	11.0	8.6	66%	13.6	15.1
	13.0	9.3	62%	14.3	15.8
	15.0	9.8	58%	14.8	16.3
6" @ 16" o.c.	19.0	9.1	43%	14.1	15.6
	21.0	9.4	41%	14.4	15.9
4" @ 24" o.c.	19.0	10.6	51%	15.6	17.1
	21.0	11.0	48%	16.0	17.5

¹Data Source: ASHRAE/EIS Standard 90.1-1989, User's Manual, November 1992, Page 8-65
²Values calculated from (1) substituting THERMAX Sheathing at an R-Value of 6.5/inch

In this type of design, some rainwater will pass through the brick veneer and run down the interior of the cavity. Also, moisture can enter the cavity through cracks that form in the brick joint work. As a result, the exterior surface of the sheathing behind the brick veneer is exposed to a moist environment. Since moisture can cause damage and compromise the R-value of the sheathing, the NRC recommends the addition of a water-resistant barrier on the outside of the stud wall.

STYROFOAM CAVITYMATE SC insulation is manufactured from an extruded polymer that is naturally moisture-resistant. In many cases, using STYROFOAM CAVITYMATE SC insulation eliminates the need for a protective covering, which saves money in the construction process.

The Advantages of Insulation From Dow

While steel studs offer superior strength and structural integrity, their thermal conductivity can present some challenges. STYROFOAM CAVITYMATE SC insulation and THERMAX Sheathing from Dow help solve these challenges.

R-Value and Thermal Efficiency. Steel studs transfer heat approximately 400 times faster than wood studs. This can lead to thermal bridging, where heat bypasses the cavity insulation and is transferred through the steel studs. Testing has shown that, depending on the specific design, thermal bridging can reduce the effectiveness of the wall insulation system by as much as 59 percent. (See Table 1.)

In hot climates, the steel studs can cool the exterior cladding where it is attached to the steel studs. This can cause dust and dirt to deposit at these cold spots, leading to poor exterior aesthetics and increased maintenance costs.

Adding STYROFOAM CAVITYMATE SC insulation or THERMAX Sheathing to the exterior wall makes steel stud construction systems more thermally efficient. (See Table 1.)

As shown in Table 1, adding just one inch of STYROFOAM CAVITYMATE SC insulation or THERMAX Sheathing greatly increases the effective R-value of the wall assembly. It will also increase the thermal efficiency of the wall system.

Moisture Control.

Moisture that enters the wall cavity can condense if it reaches a cold spot (below the dew point). A steel stud may provide that cold spot if the wall is not insulated properly.

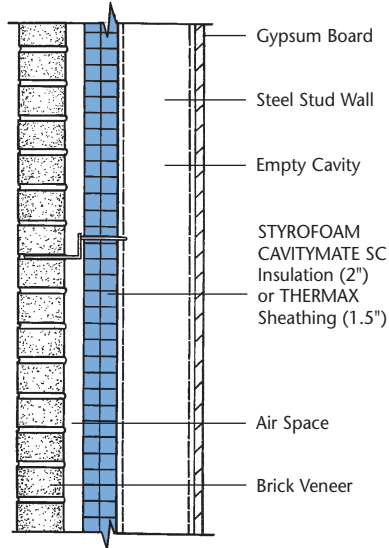
Condensation in walls can lead to corrosion of the steel studs, loss of R-value and moisture accumulation.

STYROFOAM CAVITYMATE SC insulation and THERMAX Sheathing help prevent condensation by reducing air infiltration and keeping the cavity temperature above the dew-point temperature.

Design Options

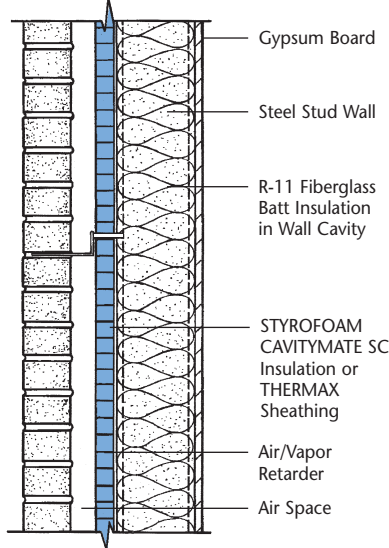
Figures 1, 2 and 3 represent three common designs for steel stud cavity wall construction. However, Figure 1 is the recommended assembly. During testing, this wall construction demonstrated excellent insulating performance with no dew point potential. In addition, STYROFOAM CAVITYMATE SC insulation and THERMAX Sheathing performed equally well to provide excellent thermal efficiency and moisture control. For more information about steel stud wall construction and insulation installation, contact your Dow representative.

FIGURE 1



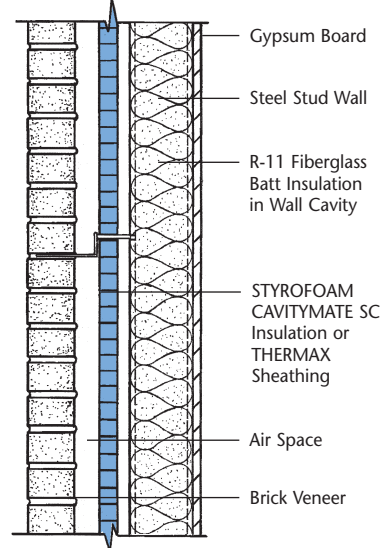
Recommended assembly. Steel stud cavity wall with interior gypsum, uninsulated stud cavity and no air/vapor retarder. The designer may want to consider sealing the external joints of the foam by taping or caulking.

FIGURE 2



Steel stud cavity wall with interior gypsum, insulated stud cavity and air/vapor retarder.

FIGURE 3



Steel stud cavity wall with interior gypsum, insulated stud cavity, and no air/vapor retarder. The designer may want to consider sealing the external joints of the foam by taping or caulking.

IN THE U.S.:

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WARNING: THERMAX insulation/finish boards do not constitute a working walkable surface or qualify as a fall protection product.



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