The Ideal Thermal Break Between Steel Stud Walls and Architectural Precast Concrete Wall Panels

Architectural Precast

Architects who specify architectural precast concrete panels have long sought ways to effectively control moisture penetration in the building envelope. Proper caulking of the exterior joints and the placement of rigid insulation such as STYROFOAM* brand Tongue & Groove insulation between the steel stud back up wall and the architectural precast cladding provide an effective and economical way to enhance the integrity of the building envelope and reduce the potential for problems.

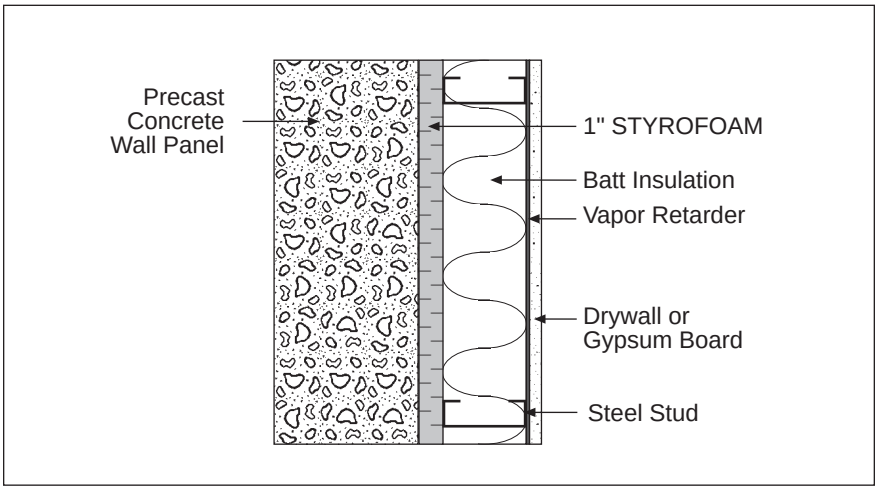
Interior Moisture

Moisture can enter wall assemblies from the interior. A vapor barrier, such as 6 mil poly, is often placed on the warm side of wall assembly to reduce this occurrence. However, often there are discontinuities around mechanical and electrical, allowing air laden with moisture to enter the wall assembly from the interior. Measures to minimize detrimental effects from this moisture must be taken. One means of doing this is by providing an air/moisture resistant insulation like STYROFOAM brand Tongue & Groove insulation on the interior surface of the architectural precast concrete panel behind the steel stud wall assembly.

Dew Point Outside The Wall

One-inch rigid insulation between the steel studs and the exterior precast wall cladding reduces the potential for condensation within the steel stud wall assembly. The addition of STYROFOAM brand Tongue & Groove insulation between the architectural precast concrete panel and the steel studs also reduces thermal bridging through the steel studs. Blanketing the studs keeps them warm within the wall assembly, which reduces the potential for condensation on cold steel. The batts and wall cavity are also kept warmer, which reduces the potential for condensation within the batt insulation itself. And the T&G edge treatment on STYROFOAM brand Tongue & Groove insulation acts as a secondary barrier against any air/moisture that makes its way past the exterior architectural precast cladding.

Figure 1. Plan view of wall assembly



Benefits of STYROFOAM Brand Insulation in Steel Stud Walls

- **Significantly increases effective R-value of steel stud wall assemblies.**

Steel studs are highly conductive to heat. In fact, thermal shorts through steel studs are so severe that they substantially lower the effective R-value of the entire steel stud wall assembly. In fact, the effective R-value of the fiberglass batt insulation between the steel studs can be reduced by as much as 50 to 60%. For example, ASHRAE Standard 90.1 allows effective R-values for insulation installed between metal framing, as shown in Table 1.

In the example in Table 1, one inch of STYROFOAM brand insulation (R-5) would almost double the effective insulation value of the wall.

Benefit = Lower energy cost.

Table 1.

Metal Framing Depth	Advertised Batt R-Value	Effective Batt R-Value
4" @ 16" o.c	R-11	R-5.5
4" @ 16" o.c.	R-13	R-6.0

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- **Reduces "ghosting" on interior wall surfaces.**

  During winter months, thermal shorts through highly conductive metal studs can cause the interior surfaces on gypsum board to be cooler at stud locations than the surrounding gypsum that covers the stud cavity. Air at the surface of the gypsum moves slower where the surface is cool. Over time, slow-moving air deposits dust at the cool stud locations, which then forms dirty lines on the wall. STYROFOAM brand insulation minimizes the thermal short, keeping metal studs warmer, which reduces ghosting.

  Benefit = Less cleaning and painting of interior walls and improved aesthetics.

- **Reduces potential for condensation in the wall.**

  Condensation occurs when warm, moist air comes in contact with cool surfaces. This can happen in the winter when heated air inside a building finds its way into a cold wall. Condensation in the wall can cause rust, mold, decay and odors and a deterioration of batt insulation R-value. STYROFOAM brand insulation installed between the exterior cladding and the steel studs helps keep the steel studs and the stud cavity warmer in winter, reducing the potential for condensation.

  Benefit = Reduced mold, decay and odors and maintained batt thermal performance.

- **Long term R-value.**

  STYROFOAM brand insulation is inherently resistant to moisture absorption. Exposure to wet conditions during construction and use does not adversely affect thermal performance.

  Benefit = Dependable, long term R-value keeps providing all the benefits above, year after year.

COMBUSTIBLE: Protect from flame and other high heat sources. For more information, consult MSDS and/or call Dow (1-800-441-4369). In an emergency, call (1-517-636-4400). Local building codes may require a protective or thermal barrier. Contact your local building inspector for more information.

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Styrofoam Brand Insulation

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