CavityComplete™
Wall Systems

How Wall Systemization

Is Revolutionizing Masonry Veneer Wall Specification and Construction

Overview

In this paper we'll explore the increasingly common practice of manufacturers marketing their products as wall systems rather than as individual components. We'll take a look at what defines a wall system, explore examples of masonry wall systems from several suppliers and examine the value these systems bring to the architect, the contractor and the building owner.

Until recently, it has been common practice for architects to design masonry veneer cavity walls with stud back-up by specifying each of the wall's individual components, what we might call a "pieces and parts" method. Using this method, architects have to research and specify the structural wall, sheathing, air and moisture barriers, insulation, brick ties and fasteners, flashing, mortar dropping collector, sealants, weep vents and brick or other masonry. They not only have to pick products from a huge array of possibilities, but they also have to be sure the components are compatible with each other and work together to effectively manage thermal transfer, and air and water leakage. While "pieces and parts" is a method that has been used for a long time, it is very time consuming and carries significant risk for the architect, contractor and building owner.

If even one component of the wall is specified incorrectly, heating and cooling costs may be much higher than projections indicated, the building may suffer water damage that compromises the building structure, safety and longevity and it may develop health hazards such as mold or insect infestations.

But since architects have been using the "pieces and parts" design method successfully for a long time, why change? The answer is multi-faceted, involving ever increasing performance demands that are most effectively met through "systemization". Buildings are becoming more and more sophisticated. Enhancements in energy efficiency, and fire and life safety standards, demand building science based improvements. Computer-based design tools like Building Information Modeling (BIM) and Computer-Aided Design (CAD) are enabling architects to create more complex structures. And as buildings become more complex and time-consuming to design, architects must look for ways to speed up the design process without compromising quality. Enter the wall system.

So what is a masonry veneer cavity with frame back-up wall system? It's an assembly of individual components that are tested and proven to be compatible, code compliant and warrantied* to produce a wall system.

Acceptable performance in a masonry cavity wall means it must provide thermal efficiency, which means at least stud cavity and continuous cavity insulation, and sometimes fire safing insulation. It must manage air and water movement using air and water resistive barriers. It must resist water permeation with vapor retarding layers, but when water does get in, it must ensure water gets out of the cavity, and that the cavity can dry quickly and thoroughly.

It must meet fire safety standards involving at least three different modes of fire resistance and containment. It must be structurally sound using components that will allow the wall to move with thermal changes and wind loads but not fatigue or break throughout the life of the building. And it must provide design options that allow the architect to realize their aesthetic vision.

Mastering effective masonry cavity wall design is becoming increasingly difficult, time-consuming and expensive for architects that continue to design using the traditional "pieces and parts" method. Designing and building with complete wall systems may save a huge amount of time for architects and help reduce the risk of wall failure. Wall systemization also makes it easier for the contractor to build a high-performance wall because all of the components are pre-tested to work together, and they help give the owner a building that delivers the performance they're paying for. However, not all wall systems are created equal, so let's take a look at several of them.

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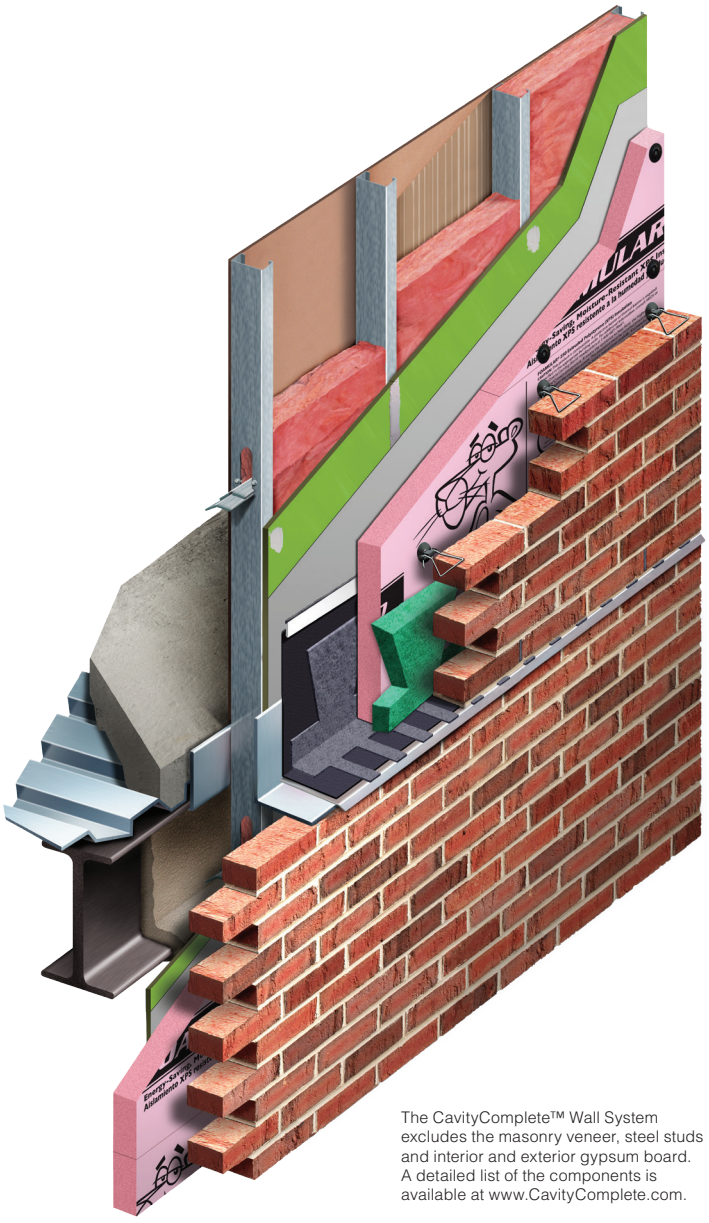
The newest systemized wall entry is the CavityComplete™ Wall System for Steel Stud with Masonry Veneer, which was introduced at the American Institute of Architects (AIA) National Convention in June, 2014. Unlike other systems, which are typically several products from one manufacturer, the CavityComplete™ Wall System was spearheaded by Owens Corning but features products from five industry-leading manufacturers. It is a complete system for masonry cavity walls with steel studs, and it encompasses every component between the inside of the brick and the exterior gypsum sheathing, plus insulation in the stud cavity and fire safing insulation. Only the steel studs, gypsum sheathing and masonry are not named and specified. Owens Corning™ EcoTouch® PINK® FIBERGLAS™ provides insulation in the stud cavity. To manage air and water movement, Tremco® Incorporated Dymonic® 100 Polyurethane sealant is used to seal the joints between the gypsum sheathing boards and to seal over screw heads. Tremco® ExoAir® 230 Vapor-Permeable Air & Weather Barrier, which is fully compatible with the Dymonic® 100 sealant, is either spray or roller applied to the sheathing.

The TotalFlash® Cavity Wall Drainage Solution from Mortar Net Solutions™, one of the multiple moisture management components of the system, is installed against the sheathing. TotalFlash® is a complete flashing solution that includes a Tremco® ExoAir® Thru-Wall Flashing (TWF) self-adhering membrane with a PVC termination bar, drainage mesh, mesh weep tabs and stainless steel drip edge factory-assembled to the membrane. Factory-assembly of the TotalFlash® solution improves the consistency of the flashing installation compared to field assembly. CompleteFlash™ pre-formed, one-piece 14" high corner boots and end dams plus MPE-1 sealant, also from Mortar Net Solutions™, complete the flashing component of the CavityComplete™ Wall System.

For continuous insulation, the CavityComplete™ Wall System specifies Owens Corning™ FOAMULAR® 250 extruded polystyrene (XPS) rigid foam insulation, both to reduce the amount of thermal bridging through the steel studs and to warm the stud cavity, making it more tolerant of vapor permeation. The continuous insulation is held in place with Grip-Deck™ Self-Drilling screws and Thermal-Grip® ci Prong washers from Rodenhouse, Inc. The 2" diameter washers pull the insulation tightly against the air barrier, forming an air and water-tight seal around the screw penetration.

A second part of the water management system is the MortarNet® mortar dropping collection device, which is installed in the air space between the rigid insulation and the brick veneer. It collects mortar droppings on two levels and prevents mortar droppings from reaching the flashing so the weep holes stay open and water can get out of the cavity. WeepVent™ mesh weep vents from Mortar Net Solutions™ are inserted in all of the weep holes to prevent insects and debris from getting into the cavity through the weeps.

To provide structural integrity, the system specifies Heckmann Building Products, Inc. Pos-I-Tie® masonry veneer anchoring system. They are screwed into the studs through the insulation and sealed with a Rodenhouse, Inc. Thermal-Grip® brick-tie washer specifically designed for the Pos-I-Tie® veneer anchors. Heckmann Building Product, Inc. wire ties are attached to the anchors through the ThermalClip,® which is made from a proprietary low conductivity composite material that creates a thermal break between the anchors and the ties.



The CavityComplete™ Wall System excludes the masonry veneer, steel studs and interior and exterior gypsum board. A detailed list of the components is available at www.CavityComplete.com.

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The CavityComplete™ Wall System addresses the issue of risk through extensive system performance testing as shown in the chart, rather than as individual parts.

	NFPA 285	ASTM E119	ASTM E331	ASTM E2307	ASTM E2357
Test Symbol					
Test Description	Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components	Standard Test Methods for Fire Tests of Building Construction and Materials (Timed Fire Resistance)	Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus	Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
CavityComplete™ Compliance Status					

The CavityComplete™ Wall System Warranty** is the only wall system in the industry that covers all the components of the system from multiple manufacturers, not just individual components. Even though the CavityComplete™ Wall System is provided by five different companies, the 10-year limited material and replacement warranty provides a single point of contact and the peace of mind no other warranty can offer.

Examples of other wall systems include the Ultra Barrier Wall System from Dow,® the Carlisle NVELOP™ System and the Firestone Enverge™ system. Those systems are comprised primarily of the major components made by each manufacturer, so none of them include all of the components of a complete cavity wall system. The Ultra Barrier system consists of STYROFOAM™ Brand Ultra SL Sheathing and WEATHERMATE™ Flashing tape to seal joints and openings, eliminating the need for an additional weather-resistant barrier. The system is cost efficient but lacks the redundancy of higher performance systems that back the water resistant insulation with a separate air and water resistive barrier. Through wall flashing, termination bar, drip edge, mortar dropping collection and weep vents are among the components not addressed with this system.[1]

The Carlisle NVELOP™ six-sided system is a suite of waterproofing, flashing, roofing and air and vapor barrier products that encompass all 6 sides of a building, from the roof to below grade. The system includes: thermoplastic polyolefin (TPO) and ethylene propylene diene monomer (EPDM) roofing systems and flashing accessories; air and water barrier systems for the walls consisting of fully adhered membranes, flashing and sheeting products; specialty products such as DryLight™ Skylights, pedestrian and vehicular deck coatings, roof garden assemblies and below-grade waterproofing systems. Insulation, mortar dropping collection and weep vents are not addressed with this system. The NVELOP™ warranty covers material quality and compatibility with other NVELOP™ components. An NVELOP™ Plus warranty covers material performance and installation and requires that a certified NVELOP™ building consultant be on the job to monitor installation of all NVELOP™ components.[2]

The Firestone Enverge™ Cavity Wall Products system provides continuous insulation, air and vapor barrier and thru-wall flashing. The insulation is the Enverge™ CI Exterior Wall Insulation formulated from a fire-resistant closed-cell polyisocyanurate foam core with either a glass or foil facer. It meets ASTM E84 test requirements. The Enverge™ Air and Vapor Barrier is an asphalt-based, self-sealing membrane with a release liner. Primer must be applied before it is installed. Enverge™ FlashGard™ Thru-Wall Flashing completes the system. It is a hi-performance, flexible EPDM membrane with strong resistance to UV and ozone that uses an adhesive and butyl tape to attach the membrane to the substrate. Termination bar, drip edge, mortar dropping collection and weep vents are not addressed with this system. Limited warranties cover the individual products.[3]

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Conclusion

Manufacturers are moving toward cooperative partnerships, combining their products to provide tested, warranted masonry cavity wall systems. Systemization makes their products more valuable by making the job of specifying and building modern, energy-efficient buildings easier and less risky for architects and contractors. Because of the value provided by system design, it's a virtual certainty that more manufacturers will be offering wall and other building systems during the next few years. The CavityComplete™ Wall System for Steel Stud with Masonry Veneer is the industry's best complete masonry cavity wall system created by industry leaders and their products, and is the only wall system that is warrantied to reduce liability and allow architects and specifiers to design and specify with confidence.

Owens Corning Complete Steel Stud/Masonry Veneer Wall Systems

Performance & Specifications AIA/CES Course Now Available

www.aecdaily.com/sponsor/owenscorning

*The CavityComplete™ Wall System components were successfully tested and found to be fully compatible with each other in the system.
**See actual limited warranty for complete details, requirements and limitations available at www.CavityComplete.com.
1 Source: Dow Building Solutions, http://building.dow.com/na/en/thermaxtws/, link contains info cited as of 8/20/14 and is currently active.
2 Source: Carlisle SynTec and Carlisle Coatings and Waterproofing, Inc., http://www.carlislenvelop.com/ link contains info cited as of 8/20/14 and is currently active.
3 Source: Firestone Building Products, http://firestonebpco.com/2013/11/20/firestone-building-products-launches-enverge-cavity-wall-products-for-maximum-building-envelope-design-and-performance/, Press release from source released on 11/20/13 and is currently active.

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