

# Rainscreen Backup Wall Types

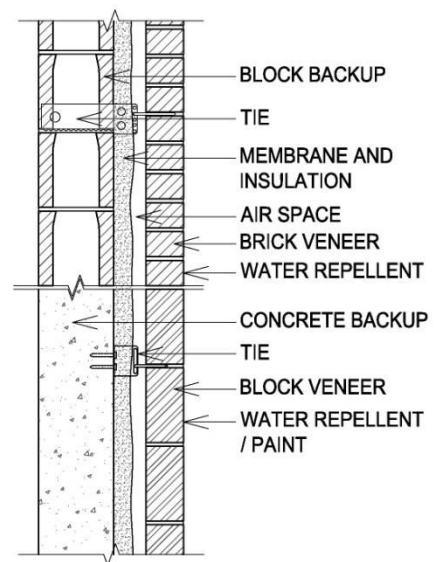
Section 1.1 of this manual noted that the oldest and most enduring buildings in the world are constructed of masonry. The serviceability of these masonry walls is attributed to the inherent robustness of masonry materials. That section reviewed the different kind of masonry walls, while the design of rainscreen veneer walls was described in Section 1.3.1. The different back-up walls are discussed below.

See Section 2.6 for a description of stainless steel versus hot-dipped galvanized ties. See Section 2.5 for a review of flashing materials.

## MASONRY OR CONCRETE BACKUP

A masonry veneer with masonry back-up can provide the most durable contemporary rain screen wall available. A concrete block or poured-in-place concrete back-up wall can accommodate higher levels of incidental wetness than a wood or steel stud back-up.

Buildings with a masonry back-up in a mild climate with moderate or controlled interior air conditions, may derive adequate air tightness from an uncoated concrete block back-up and require only a minimum of thermal insulation. Occasional wetting of masonry wall components by rain or condensation of moisture from outward air movement may be well within the tolerable capacity of the relatively massive and moisture resistant wall assembly.



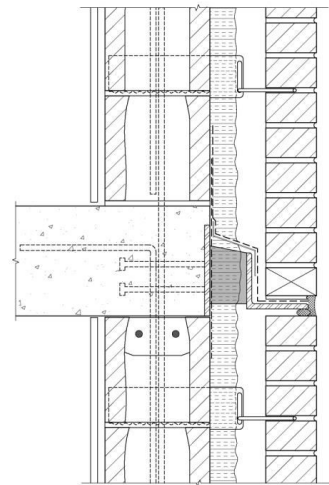
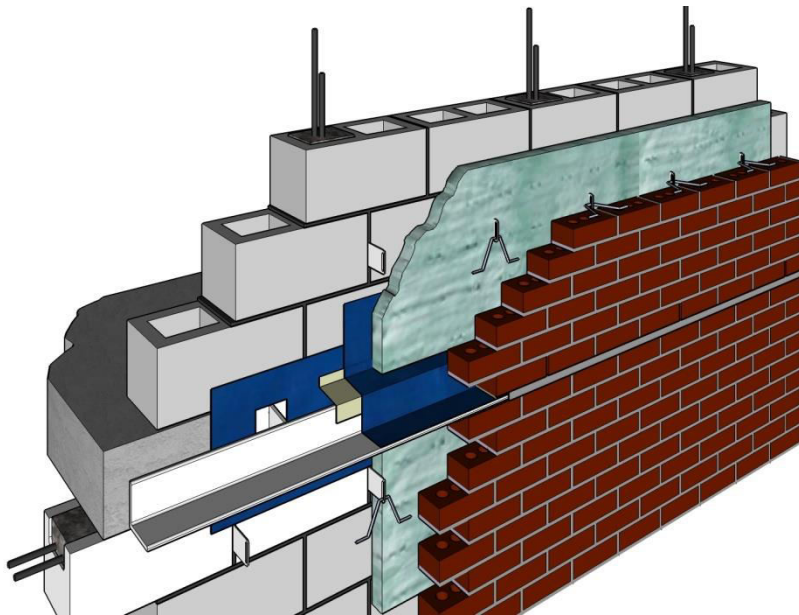
The often exceptional performance of the oldest buildings in the world suggests that the durability of masonry can be a positive factor in building design and construction.

Where more air tightness is required to contain humid interior environments, particularly in cold climates, increased air tightness and thermal insulation may be advisable. Increased air-tightness can be obtained as needed by applying paint or coatings on the exterior of a concrete block back-up, or by applying sprayed urethane foam insulation. An air barrier membrane at critical junctions between a concrete block or poured-in-place concrete back-up wall and other enclosure components and assemblies can provide the necessary air seals.



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More demanding interior or exterior environments may require higher levels of air-tightness or weather resistance of the building enclosure. It may be necessary or convenient to use a continuous membrane over all back-up surfaces to extend continuous waterproofing and air-tightness over all structural or structurally supported elements of the building envelope.



Typical rain screen wall assembly – block backup



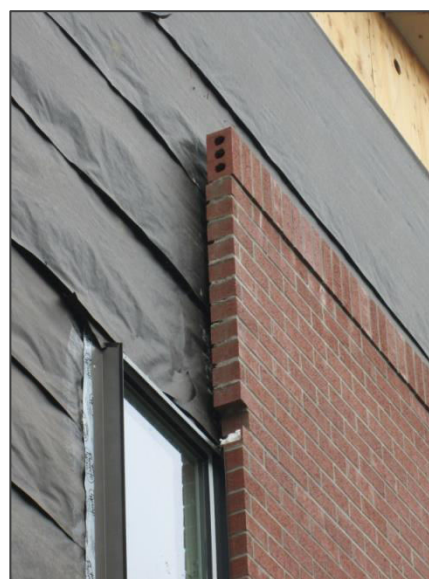
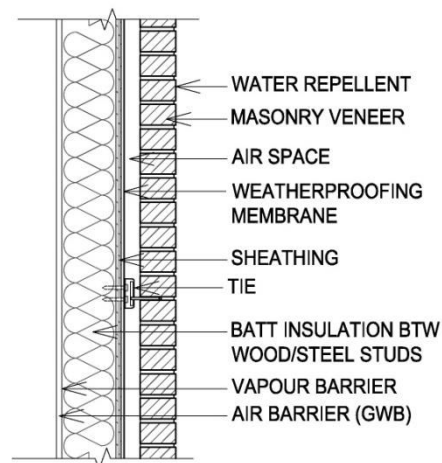
## **STUD BACKUP – UNINSULATED CAVITY**

Wood frame and steel stud infill walls with insulation within the stud space are familiar wall assemblies in a wide range of building types. The brick veneer/wood stud back-up wall is very commonly used for single family and low-rise residential construction in North America (see *Section 1.4*). Steel stud infill walls are often used in concrete structural frame buildings. Both of these materials are less moisture resistant than block or concrete back-ups, and must be carefully designed and constructed.

Because these systems employ insulation only in the space between the studs, thermal bridging must be considered, particularly for steel studs in colder climates. The effective combined R-value can be greatly reduced, and cold spots can cause condensation problems.

The principles of enclosure design (reviewed in *Section 1.3.1*) require air-tightness at the interior side of the insulation. Interior wall finishes should be rendered airtight where batt insulation fills stud spaces. The use of sealants or membranes may accomplish this objective while the continuity and strength of interior finishes becomes a design and construction consideration. This approach, which is often referred to as the airtight drywall approach (ADA), influences detailing and product selection at junctions and joints of interior finishes with all other building envelope components.

This approach can be advantageous for masonry-clad, concrete frame buildings with steel stud infill. With some ingenuity, it can also be useful in wood frame construction. An interior air barrier approach is generally not recommended for buildings using a structural steel frame.



**Uninsulated Cavity**

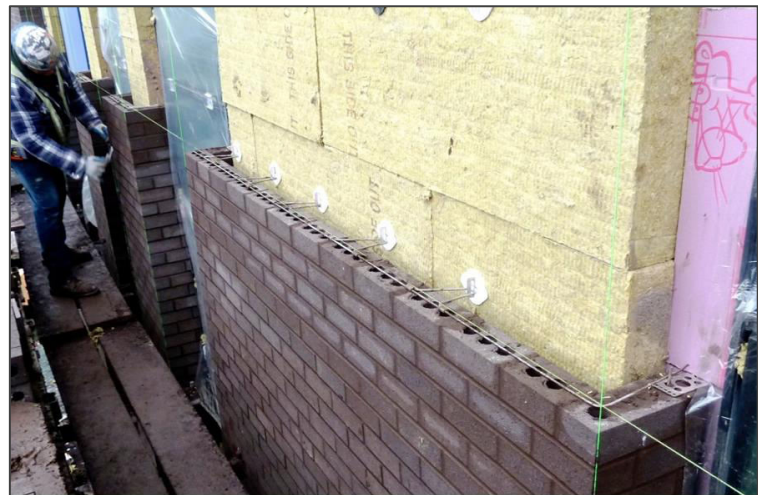
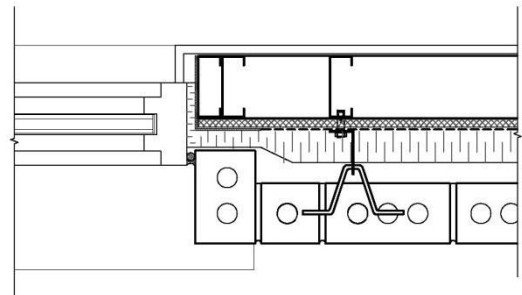
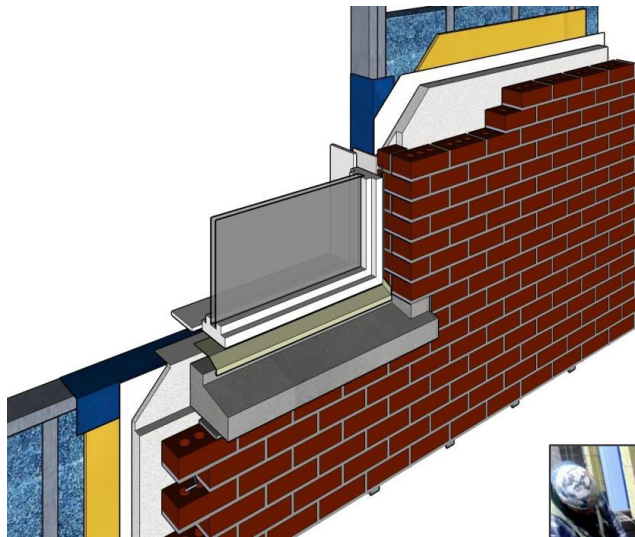
## **STUD BACKUP – INSULATED CAVITY**

This approach also uses wood or steel stud back-up wall materials, but incorporates some or all of the insulation in the cavity between the outside of the stud wall and the masonry cladding. This reduces thermal bridging and is compatible with the simpler air barrier membrane approach on the exterior of the stud back-up wall. An external membrane is simple to install over the sheathing and also provides a higher level of moisture protection to the wood or steel stud materials.

The cavity insulation can reduce condensation concerns for both thermal bridging and the external membrane. This system should not include vapour-tight interior finishes.

The additional wall thickness required for cavity insulation, the airspace and the masonry veneer may be offset by Floor Space Ratio relief under local jurisdiction bylaws.

*(See Masonry Report 5.8 – Changes to Floor Space Ratio Definitions Encourage Better Exterior Walls)*



Typical rain screen wall assembly – insulated cavity