



RAINSCREEN



The evolution of exterior wall systems progresses to an integrated rainscreen design

Delivers high-performance energy efficiency, sustainability and longevity

While the rainscreen principle has been time-tested throughout Europe for two centuries, the modern system was formalized in the early 1960s. The wider use of rainscreen systems in Europe and Canada accelerated several decades later in response to spikes in energy costs and a need to effectively manage moisture in buildings.

As a result, rainscreen design produced healthier, more energy-efficient and longer lasting walls. With the rainscreen principle, aesthetic considerations of a facade were finally liberated from the important functions of a weather barrier wall.

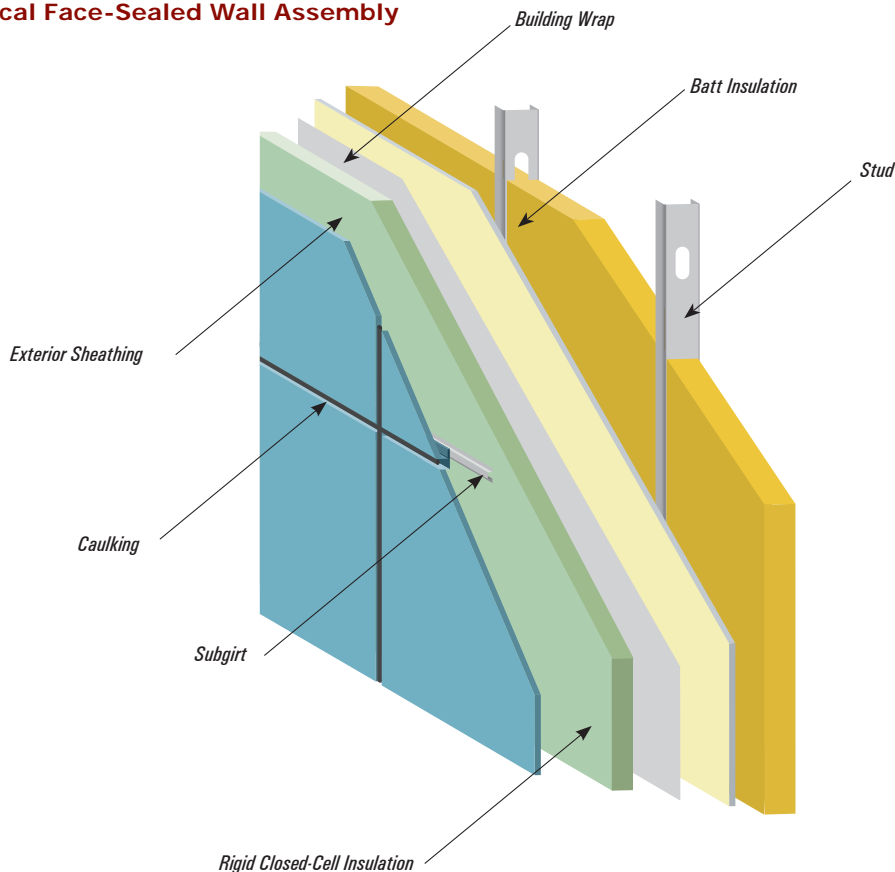
Despite the advances achieved, however, the rainscreen system retained certain shortcomings now eliminated by the new IMETCO IntelliScreen™ Rainscreen Wall System. Before considering this innovation, we first should examine typical face-sealed wall design concepts used extensively in the United States.

Problems associated with face-sealed wall design

With face-sealed wall construction, the outermost cladding material attempts to serve multiple functions, including aesthetics, air barrier, water barrier, thermal barrier, and/or wind barrier. These types of designs are problematic for a number of reasons, primarily because they are functionally overburdened and denied the benefit of a “belt and suspenders” approach offered by an integrated rainscreen system.

To begin with, traditional face-sealed design relies on the air and water tightness of hundreds of panel-to-panel joints and other panel transitions including jamb, head, and sill conditions, and interfaces

Typical Face-Sealed Wall Assembly



Think a small crack in the caulking can't do much harm?

The U.S. DOE says air movement accounts for more than 98 percent of all water vapor movement into the interior of wall assemblies. Vapor transfer by air currents is extremely fast: about several hundred cubic feet of air per minute. How does most of this water penetrate? Through sealants at the joints carried by the air flow. The air pushes itself in because of the difference in indoor and outdoor air density created by differences in temperature and moisture.



between various cladding materials. In many face-sealed wall systems, caulking is commonly used to create these seals, requiring perfect installation. In addition, no caulking is permanent. It degrades over time, usually as soon as five to ten years. Caulking can stain, collect dirt, and is costly because it necessitates close monitoring and maintenance.

When joints or other interfaces fail, large amounts of moisture will penetrate the wall. Moisture-laden air is drawn into any breach in the joint because of air pressure differences inside the wall vs. outside the wall. When liquid water is present in the wall cavity, traditional weather barrier wall design has no method of effectively draining or drying it. The infiltrating water damages insulation (rendering it much less effective), corrodes any metal components and creates a desirable condition for mold propagation. In the end, this type of wall design fails at all four of its original objectives: aesthetic, air barrier, water barrier, and thermal barrier.

■ Objections to the adoption of rainscreen wall design

As with any new building technology, there are certain predictable impediments to early adoption. First and foremost would be the issue of education: not enough architects and owners understand the many benefits of rainscreen design. On top of that, there are those who are reluctant to leave their comfort zone (the “this is the way we’ve always done it” mentality). The labor and material costs may present a perceived hurdle to those who are only familiar with the earlier versions of rainscreen wall systems: “it’s like building two walls, with an additional substructure required (horizontal and vertical subgirts).”

Finally, improper selection of insulation or other vapor-impermeable components can create a vapor barrier in locations where there should not be one, i.e. in mixed climates and cold climates. This last objection echoes the ongoing debate in building science about whether a vapor barrier is necessary at all.

■ Rainscreen Wall Construction

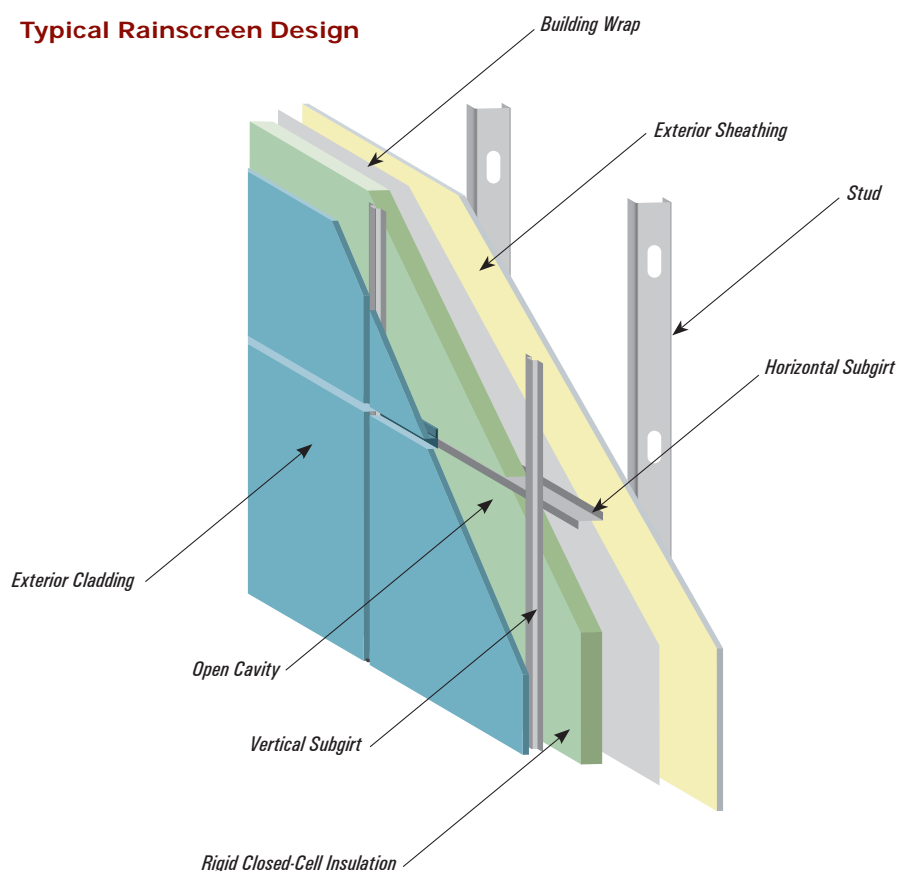
Rainscreen design acknowledges that face sealing exterior walls is an exercise in futility. With a rainscreen assembly, the burden of weather/climate management moves from the outer wall to the inner wall. The outer cladding’s only role, beyond aesthetics and long-term durability, is to serve as the initial defense against rain and, in some applications, to handle heavier wind load.

The inner wall now does the heavy lifting: it serves as a drainage plane/water barrier, as an air barrier, and as a thermal barrier.

The open cavity is essential to promote air flow via the chimney effect to rapidly dry out the cavity. The preferred practice is for an integrated ventilation system to be engineered into the wall assembly.

The air and thermal barriers are continuous and outboard of the framing studs to eliminate gaps and minimize thermal bridging via the floor slab or steel framing elements.

Typical Rainscreen Design



The IMETCO IntelliScreen Rainscreen Wall System:

Problems can be managed when they are anticipated

With its new rainscreen wall system, IMETCO has taken the position that preventing all vapor and water penetration is nearly impossible. IMETCO decided that a wall system should be designed with the **anticipation** that some water and vapor will penetrate the exterior cladding, and with a solution to **manage** it quickly and effectively.

The new IntelliScreen Rainscreen Wall System from IMETCO leaps over both traditional face-sealed walls (reliant on imperfect joints and seals) and air barrier systems that are vapor impermeable (providing no exit strategy for when, inevitably, vapor penetrates inside). In addition, IMETCO, because of its vast expertise, brings all best-in-class components together to create a unified system. This solves the problem of integrating the wall system with the metal roofing by creating an effective transitional interface that contributes to the building envelope's air barrier system.


IMETCO IntelliScreen Rainscreen System

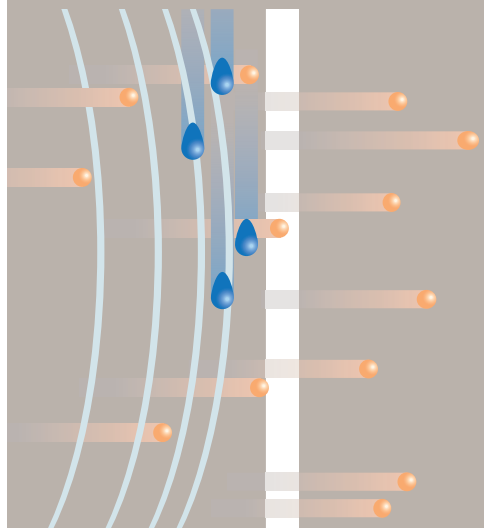


Three Key Terms

 **Air Barrier:** restricts the flow of air through the material.

 **Water Resistant:** does not allow the passage of liquid water.

 **Vapor Permeable:** controlled diffusion of water vapor through the material.



Materially effective exterior cladding

The engineering that went into the design of the IMETCO outer surface concentrated on three important priorities: shedding rain, material durability and design latitude. IMETCO offers a wide range of options for the metal façade, from solid zinc panels that will last more than 100 years to some of the best aluminum products on the market. The panel materials are customizable and can be shaped, textured or painted to fit any designer's aesthetic objectives.

Minimal thermal bridging

Next comes the one-inch air cavity and beyond that are the insulation, air barrier, sheathing and metal framing. The first characteristic that one notices in the IMETCO rainscreen design is its simplicity, primarily achieved by its perforated horizontal hat-shaped subgirt (patent-pending). The design eliminates the need for vertical subgirts (which would create vertical cavities) and requires only minimal fasteners to attach the subgirts to the studs, resulting in negligible thermal bridging to a loss of less than 5%.

R-value: Typical batt insulation may be labeled as providing for an R-value of 19 but delivers an "effective" R-value of only 7 due to thermal bridging.



■ Revolutionary Stone Wool Insulation

The IMETCO wall assembly will include one of the most impressive materials in the building market: insulation made from stone wool, a naturally occurring byproduct of volcanic activity first discovered on the islands of Hawaii. The insulation is a high-density board, *designed specifically for this wall system*.

Some of its advantages are:

- 4' x 8' boards lock tightly (no tape required) providing outstanding thermal insulation
- unaffected by water; makes an ideal drainage plane
- highly effective R-value per inch
- eliminates the need for cavity insulation and drastically reduces the potential for condensation
- unlike closed cell rigid foam board, this material (stone wool) is vapor permeable (and is completely non-combustible)
- critically important for any building, this material does not propagate mold or mildew



■ Simple and Sustainable

The beauty of this IMETCO wall system is that it is "rainscreen made simple." It is a single-supplier, all-in-one system, made of the highest quality materials available and backed by a single-source warranty. Its effectiveness does not rely exclusively on the craftsmanship of the installer and it requires virtually no maintenance, including to sealants and joints. When natural metals are used, the entire system will require little to zero maintenance, and will last a lifetime. The IMETCO wall assembly also gives contractors the option to use a single installer.

This new high-performance rainscreen system is a sustainable solution suitable for any building application, especially when an owner is concerned with life cycle costs and long-term, reliable energy efficiency (made possible, in part, by long material lifespans). In addition, all of the component materials are mold resistant. Furthermore, IMETCO provides engineering consultation and onsite project quality control for this rainscreen wall system.

The IMETCO wall system not only meets existing standards established by ASHRAE 90.1 and the IECC, but in some critical ways is ahead of these code organizations. IMETCO expects its new rainscreen system will entice these services to raise their standards.

*For more information regarding
this innovative building technology, visit*

www.imetco.com or call ***800-646-3826***



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