RAiNA Technical Bulletin: Defining Rainscreen Wall Performance

The term “rainscreen” is a widely applied—though sometimes confused term—used within the construction industry to describe cladding systems and/or exterior wall assemblies. The RAiNA definition: An assembly applied to an exterior wall that consists of, at minimum, an outer/inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor describes the basic components of a rainscreen. This bulletin further elaborates on these layers and the loads on the parts, and further describes the various wall performance attributes to distinguish between different types of rainscreen walls for all building types. A RAiNA glossary will follow as a separate bulletin. The figures and discussion following present the minimum defined rainscreen wall components (left side) ; however, additional wall components will typically be included within many rainscreen walls as discussed on the right. Steel framing is shown for backup in the example, though this does not preclude other construction materials including wood or concrete.

The Parts of and Loads on a Rainscreen Wall

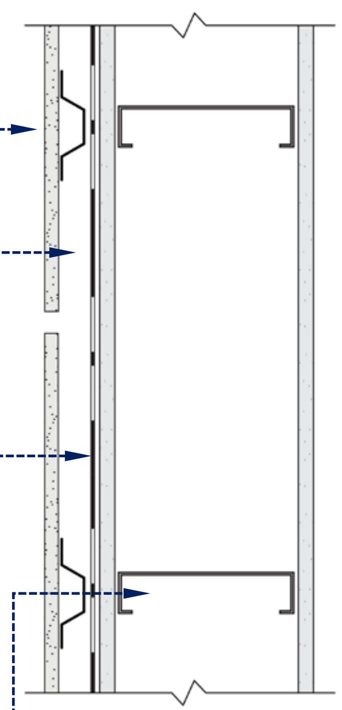
Basic Rainscreen Wall

Cladding Layer (various products) is the **outer layer** in the rainscreen definition above. It is any material that forms the external finish of the wall and is the primary water shedding element and unprotected from the environment. Typically, claddings are non-load bearing components of the building structure, though are subject to many loads as described below. The outer layer includes various interface and joint treatments (open/closed/baffled, etc.), flashings, trims and other accessories. It forms the first water control layer of the wall and defined as the water shedding surface (WSS). The degree of joint/interface/cladding openness impacts the amount of water penetration into the wall assembly and hence load on the materials inboard and on the WRB. The joint openness also has an impact on the fire performance of the cladding system.

Air Space/Gap (varying depth, located between the outer and inner layer) is the **cavity** in the rainscreen definition earlier providing a separation behind the cladding in a wall assembly intended to inhibit capillary action and moisture bridging, as well as to promote ventilation and drainage of moisture. The cavity depth is large enough for drainage by gravity and exchange of air for passive drying. The airflow response and compartmentalization of the cavity will impact pressure moderation/equalization and the structural loads on the cladding, cladding attachment, back-up structure, and air barrier (AB). The air gap depth and compartmentalization of cavity will also impact combustion and flame spread. Exterior insulation (optional) will increase the depth of separation between outer and inner layers, though the cavity is the remaining air space behind the cladding.

Water Resistive Barrier (WRB) (various materials and system approaches) is the **inner layer** in the rainscreen definition above and includes membranes, tapes, sealants, sheathings, and may include insulation boards/sprayfoam, etc. Position may vary by design but will always be inboard of drained (either vented/ventilated) air space. Is lapped and drained to the exterior through openings in the cladding and flashing at the bottom of the cavity. May or may not be combined with the AB and the materials used may have an effect on vertical flame spread over the wall assembly.

Back-up Wall Structure (various materials and approaches) provides the ultimate structural support for the cladding/cladding attachment system and substrate for the WRB and optionally the air barrier system (AB) and vapor control materials (see right). The back-up wall may also include insulation in lieu of or in addition to exterior insulation within the rainscreen assembly.



WALL PLAN VIEW

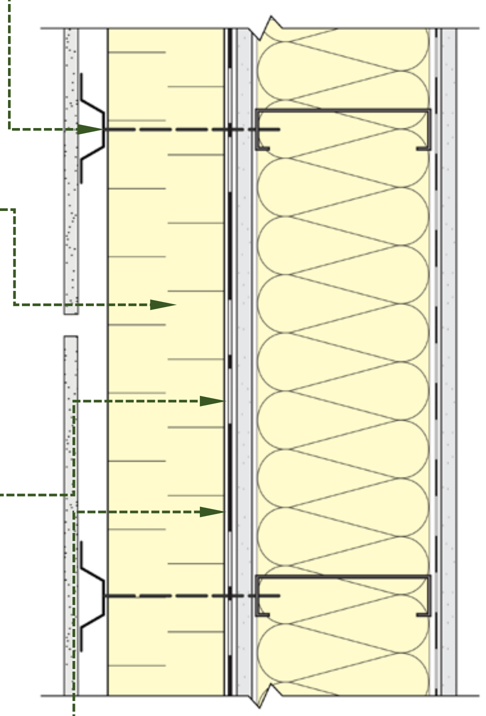
Additional Wall Components

Cladding Attachment/Structure (various systems) consists of the appropriate structural support system for the cladding, including girts/rails, attachment clips, fasteners etc. Where exterior thermal insulation is present, this is an important consideration for thermal efficiency. *Optional if cladding is directly fixed to the back-up wall structure through an air-space/gap (e.g. non-structural furring, spacers or polymeric rainscreen material, etc.) otherwise a basic part of any rainscreen cladding.*

Insulation (various products and thickness) provides thermal control for energy efficiency, condensation control. Exterior insulation increases the separation between outer and inner layers of the rainscreen which will impact water control. The water repellency, moisture sensitivity along with air and vapor permeability of the exterior insulation will impact the air and moisture control strategies for the wall. An additional air gap can also be created behind exterior insulation for additional drainage in some rainscreen wall designs, or in the case of rainscreen EIFS, be the only location for drainage. Insulation, depending on type may also provide fire protection to other combustible components.

Air Tightness Control: Air Barrier (AB) System (various materials and approaches) including membranes, tapes, sealants, sheathings, and may include insulation boards/sprayfoam, etc. Position may vary by design but will always be inboard of drained (and possibly vented/ventilated) airspace. AB materials are optional if rainscreen wall is exterior of the building enclosure (e.g. walls not separating indoor from outdoor space), though an air barrier system is still required within the wall where separating conditioned from unconditioned space as per building code requirements.

Vapor Diffusion Control: Vapor Retarder or Barrier (VR/VB) (various materials and locations) provides the control of water vapor transported by vapor diffusion. Need for vapor control material and position dictated by overall wall design, insulation placement, vapor permeance properties of all materials, and boundary conditions etc. Diffusion control is a balance of wetting versus drying for the whole assembly.



WALL PLAN VIEW

Loads on a Rainscreen Wall

Structural Loads: Gravity (weight of cladding, and cladding attachment system, insulation etc.), wind, seismic, creep, deflection, impact, blast, cyclic loading/fatigue, back-up structure movement

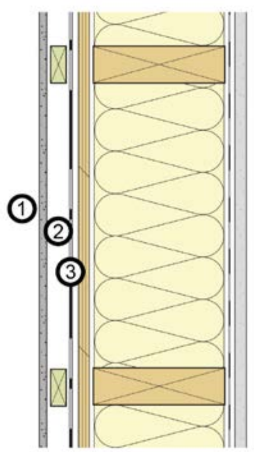
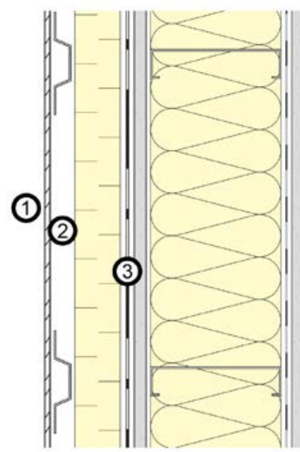
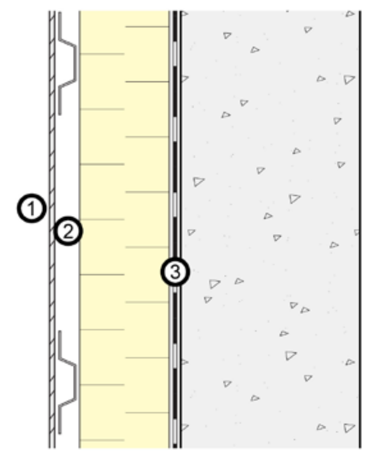
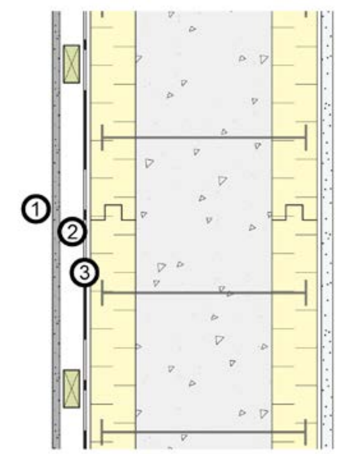
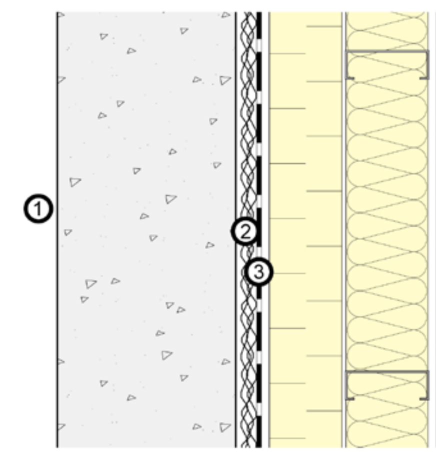
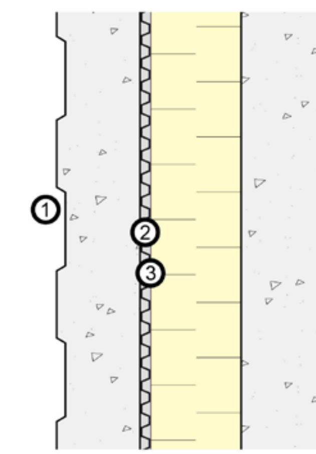
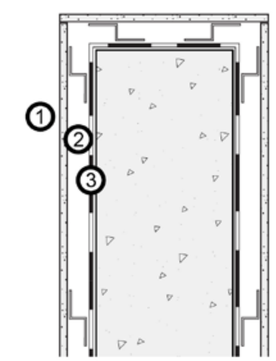
Environmental Loads: Driving rain, snow, ice, temperature, relative humidity, UV (in particular for open claddings with exposed membrane/insulation)

Combustion Loads: Flame spread, smoke, material toxicity, ignition, fuel loading, ignition, fuel loading

Rainscreen Wall Assembly Examples

The basic rainscreen components can be used on and adapted for many wall types regardless of their backup structure/configuration. The following table illustrates the application of the basic rainscreen components (outer layer, cavity and inner layer) on various typical wall assembly backups of different construction types. The first four assemblies (wood, steel, concrete/concrete block, ICF) are relatively common examples of rainscreen applications in residential and commercial applications with a range of possible claddings. The construction of cast in-place concrete and precast concrete rainscreen walls, examples 5 and 6 are less common in practice though examples of how a rainscreen rainwater management strategy could be incorporated if desired by design. Note that concrete walls are typically treated as a mass assembly for water control, potentially with rainscreen details at joints and interfaces. Finally, a rainscreen can also be applied to a building component outside of the conditioned building enclosure, such as a wing wall or other protrusions that are clad (7th example).

Table 1 Example rainscreen wall assemblies (see also Table 3 and Table 4)

						Outside of conditioned building enclosure example 
Rainscreen over wood-frame wall	**Rainscreen over steel-frame wall with exterior insulation**	**Rainscreen over concrete/CMU wall with exterior insulation**	**Rainscreen over insulating concrete form (ICF)**	**Cast-in place concrete rainscreen formed by intentional vented drainage layer**	**Precast concrete rainscreen assembly formed by intentional vented drainage layer**	**Rainscreen over unconditioned wall outside building enclosure**
1. *Outer Layer*: Cladding 2. *Cavity*: Created by vertical treated wood furring straps 3. *Inner Layer*: WRB attached to backup wall sheathing	1. *Outer Layer*: Cladding 2. *Cavity*: Created by vertical galvanized steel furring outboard of the insulation 3. *Inner Layer*: WRB adhered to backup wall sheathing	1. *Outer Layer*: Cladding 2. *Cavity*: Created by vertical galvanized steel furring outboard of the insulation 3. *Inner Layer*: WRB applied to concrete surface	1. *Outer Layer*: Cladding 2. *Cavity*: Created by vertical treated wood furring straps outboard of the WRB 3. *Inner Layer*: WRB attached to surface of ICF	1. *Outer Layer*: Cast-in place concrete 2. *Cavity*: Created by vented drainage medium drained and open to exterior, outboard of WRB 3. *Inner Layer*: WRB membrane at interior of vented drainage medium	1. *Outer Layer*: Pre-cast concrete 2. *Cavity*: Created by vented drainage medium drained and open to exterior, outboard of WRB 3. *Inner Layer*: Rigid insulation WRB inboard of vented drainage medium	1. *Outer Layer*: Cladding 2. *Cavity*: Created by vertical galvanized steel furring 3. *Inner Layer*: WRB

Performance Considerations for Rainscreen Wall Systems

Given the layers and materials that make up a rainscreen wall, there are many different aspects to consider when defining what is considered acceptable performance. The performance of each component must be assessed individually and then as part of the overall system. Consideration must also be given to the interactions between components. Performance moreover can be assessed on how the rainscreen components or assembly controls loads on the system, grouped by structure, fire, smoke, water, air, thermal and sound. These considerations, which may need to be addressed by the designer, are listed in Table 2 on the following page. Other performance considerations beyond loads and not included in this table may include material or assembly related properties for material sustainability, material life-cycle and embodied carbon etc.

Table 2 Rainscreen wall performance considerations

Environmental Load	Performance Considerations for Design	
Structural Loads *(Static, Dynamic, Cyclical)* *(wind, seismic, gravity, creep, deflection, thermal, moisture, impact, blast, back-up structure movement)*	• Project specific building code requirements for structural design • Claddings • Cladding perimeter systems • Cladding connectors/fasteners • Cladding attachment structure/sub-structure capacity (girts, furring, strapping, clips, fasteners, etc.) • Degree of pressure moderation and load sharing between cladding and backup structure (wall and primary structure)/AB	• Cyclical loading of all parts and long-term durability • Impact resistance • Thermal and potentially moisture related expansion/contraction of cladding components, cladding attachment sub-structure and back-up structure • Accommodation and impact of backup wall and building structure movement • Loads on exterior AB/WRB including sheet/adhered materials, fasteners, joints treatments including tapes and sealants • Material compatibility/galvanic corrosion potential of any connecting parts
Fire & Smoke	• Project specific fire/building code requirements that may include exterior wall flame spread, heat transfer resistance of the backup wall, cladding combustibility and thermal protection of exterior insulation including foam plastics. These considerations take into account: o Cladding flame spread/combustibility/fuel load/smoke development o Cladding attachment structure/sub-structure (girts, furring, strapping, clips, fasteners, etc.) flame spread/combustibility/fuel load/smoke development o Air gap depth	o Degree of cavity compartmentalization o Exterior insulation combustibility, flame and smoke development, thermal protection of wall components, thickness and type o AB/WRB flame spread/combustibility/fuel load/smoke development including facers, adhesives and membrane chemistry/thicknesses o Back-up wall flame spread/combustibility/fuel load/smoke development • In addition, the environmental attributes including toxicity of all potential combusting materials as part of rainscreen assembly and backup wall may be of concern
Water	• Driving rain exposure/loads • Slope. Will the assembly be exposed to roof loading or wall loading? • Cladding properties (water absorption, water storage, freeze-thaw resistance, solar properties, etc.) impacting temperature profile, moisture storage/weight and potentially leading to deterioration such as freeze-thaw, delamination that may impact fire and structural performance, as well as life-safety • Joints and degree of openness – air and water leakage of system o Cladding systems ability to manage bulk water penetration and allow water penetration into the air space/gap • Flashings and other cladding accessories • Moisture tolerance of and storage within wall assembly and exterior insulation materials, etc., by material selection, detailing, drainage provisions & capabilities	• Wetting and drying potential of exterior insulation by moisture within cavity including possible performance impacts • Buffering/sheltering characteristics of exterior insulation between outer and inner layer/WRB • Durability of components, corrosion resistance, fungal growth, decay, etc. • Water vapor diffusion control (vapor retarder/barrier), balance of wetting and drying potential • Water Resistive Barrier (WRB) system o Material/system characteristics o Water load reaching surface o Drainage on surface, provisions for prolonged storage or hydrostatic head o Perimeter seals and in-field joints/seams o Various penetrations through and sealing o Interfaces with fenestration and other transitions/terminations/flashing
Air *(both building airtightness & airflow within air space/air gap)*	• Cavity Venting or Ventilation o Air gap properties (depth, cavity dimensions, smoothness/roughness of surfaces, flow rates) o Cladding opening properties (type and position of vents/openings, blocking by screens, net free area, dimensions, etc.) o Resulting degree of pressure moderation/equalization o Resulting cavity air exchange, flow rates o Evaporation of and removal of water vapor o Impact of fire-stopping at floor line and/or code required locations	• Air Barrier (AB) system for whole building airtightness o Material/system characteristics o Air pressure load on AB components o Various penetrations through & sealing of interface details
Thermal *(insulation, thermal energy efficiency) & UV*	• Thermal insulation material properties • Thermal bridging through cladding attachments/sub-structure and fasteners • Airflow through/around/within exterior cavity insulations (e.g. wind washing and bypass) • Insulation material properties, long-term performance (LTTR), temperature-conductivity and moisture content-conductivity relationships • Placement and location of WRB, AB, and vapor control	• Impact of drainage behind exterior insulation at WRB (i.e. grooved foam, drainage mediums, textured sheathing membranes, etc.) • Impact of drainage and airflow behind exterior insulation in or part of rainscreen • Placement of insulation related to vapor control (i.e., use of exterior insulation) • Thermal degradation and behavior of materials • UV degradation of materials (cladding & finishes & behind cladding in open rainscreen claddings)
Acoustics	• Acoustic properties of claddings, exterior insulation, other wall components	

Defining Types of Rainscreen Walls

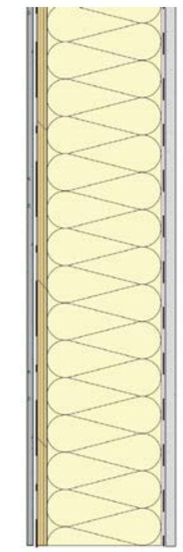
A rainscreen at its basic level is "an assembly applied to an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapor." The definition is intentionally more encompassing than the cladding itself to include the inner layer of water control and the cavity and its function. Drainage of liquid water and some amount of nominal air exchange to remove water vapor are an essential requirement to be considered for a rainscreen. Vapor diffusion through materials such as cladding or back-up structure alone is not sufficient to meet this definition. Subsequent specifics to distinguish between a loosely defined "drain screen," pressure equalized/moderated rainscreen, vented or ventilated rainscreen, rainscreen joints, etc., can be added to the definition.

The RAiNA definitions committee intends to continue to gain industry consensus on these and other rainscreen related definitions and will maintain an up-to-date glossary of terms on the RAiNA website.

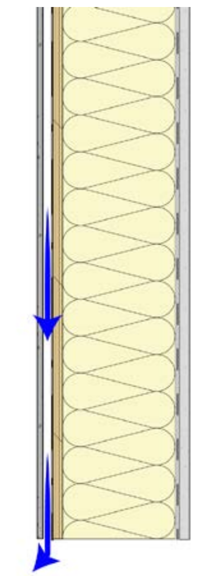
Within a rainscreen, it is accepted that some water may penetrate the cladding outer layer (which "screens" rain) into the cavity. Water may enter by gravity, direct momentum, air pressure or capillary suction. Water is subsequently removed passively in time by gravity drainage and air flow. How far the water is able to penetrate the cladding will dictate where drainage occurs, e.g., at the backside of the cladding versus on, within or behind exterior insulation (where present) and on the face of the water resistive barrier (WRB) the innermost layer of the rainscreen. The amount of water getting to and draining at each layer is dependent on a number of factors not covered here. The drainage effectiveness of rainscreen walls and layers can be measured in a laboratory setting. Theoretically the drainage effectiveness and a drainage rate could potentially be used to quantify and differentiate between different types of rainscreens or rainscreen parts. Further work is needed to develop industry accepted standards and gain consensus on procedures, metrics, and application in the field.

Water that is not removed by gravity drainage can be removed passively by evaporation and an air-exchange within the cavity, as well as vapor diffusion. The intent of a rainscreen design is that moisture is removed passively through this air space and not, for example, reliant on the vapor permeance of the cladding material. The rate of removal will depend on a number of factors not covered specifically here, though it includes the air exchange with the outdoor environment driven by thermal and moisture buoyancy from differences between the cavity and outdoor environment, as well as wind effects. The airflow within rainscreen walls can be calculated and measured. Numerical models can be used to predict drying rates and drying after wetting events can be measured. Moreover, with higher rates of ventilation and compartmentalization of the air cavity a structural phenomenon known as pressure moderation or in perfect state, pressure equalization can occur to further control water penetration past the cladding surface and structural loading. Theoretically, ventilation effectiveness and ventilation rates can be used to quantify and differentiate between types of rainscreens or rainscreen parts, as can the degree of pressure moderation of the system. Similar to challenges with the quantification of drainage above, the development of industry accepted standards, metrics and application in the field. This is of interest to RAiNA.

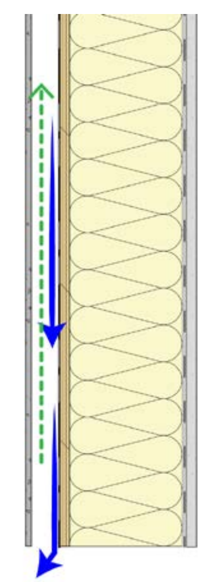
The depth of cavity is a critical performance aspect of a rainscreen. Firstly, the cavity width directly impacts capillary transfer of moisture and drainage. Research, testing and field experience have shown that even small gaps (1/16" to 1/8") between claddings and sheathing membranes in real-world applications are often sufficient for sufficient drainage. These small gaps do not however allow for an air exchange and therefore unable to remove trapped water vapor and therefore are precluded from the rainscreen definition. Moderate gaps (~1/2") allow for full drainage and decent airflow potential while large gaps (>3/4") allow for further increased airflow potential. Gap depth also influences fire propagation and it is beneficial to keep cavities less than 1" when combustible materials are present to limit cavity propagation. Gap depth also influences compartmentalization and pressure moderation. Providing greater clarity on rainscreen cavity depths on all aspects of performance is of interest to RAiNA.



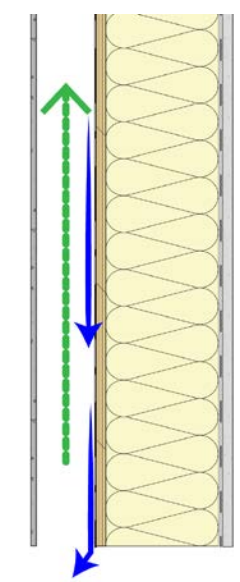
Cladding tight to WRB, no drainage or airflow possible



Small gap (1/16" to 1/8"), some drainage possible but minimal airflow potential



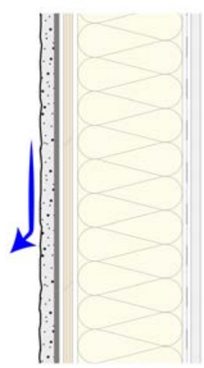
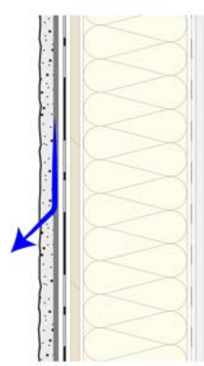
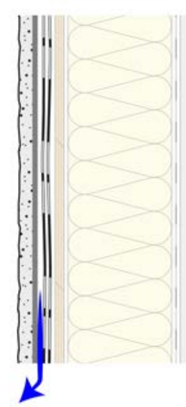
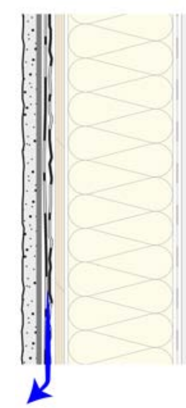
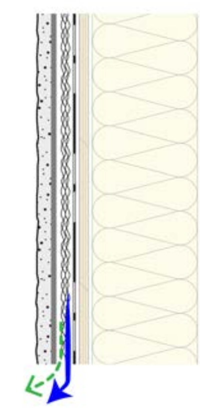
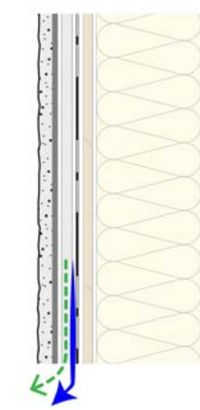
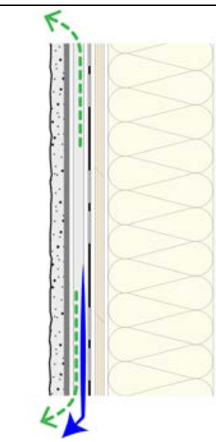
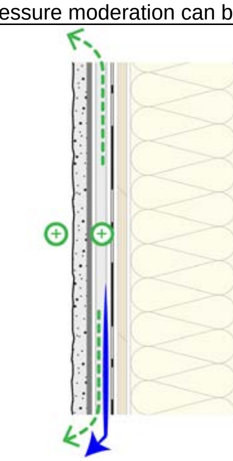
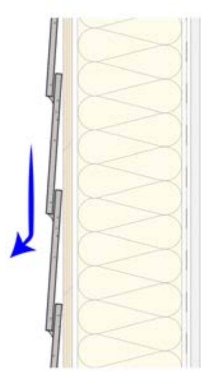
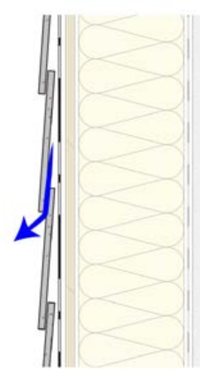
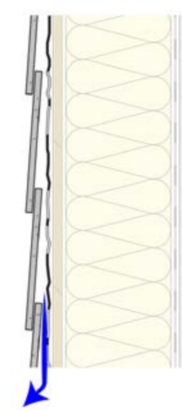
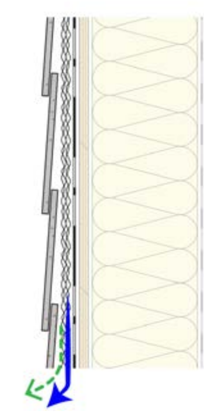
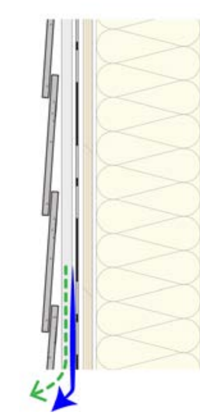
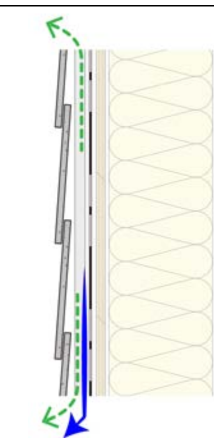
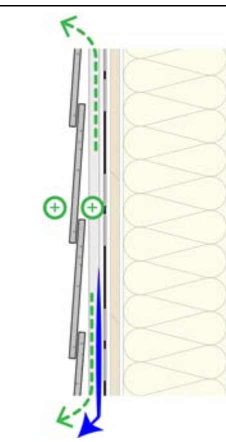
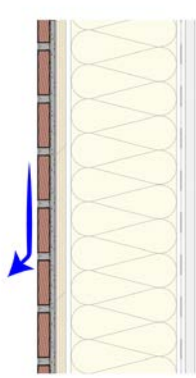
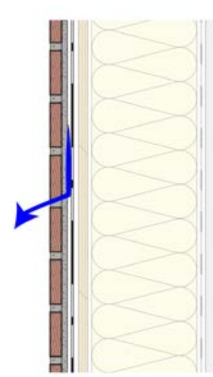
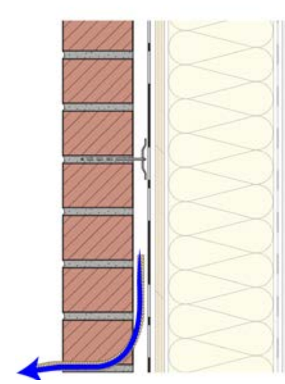
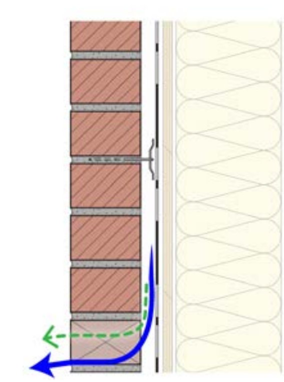
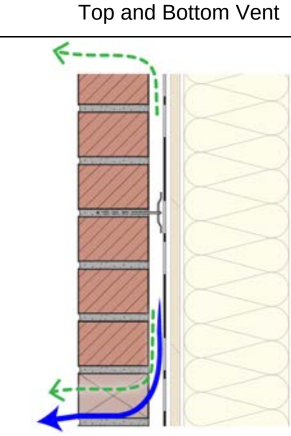
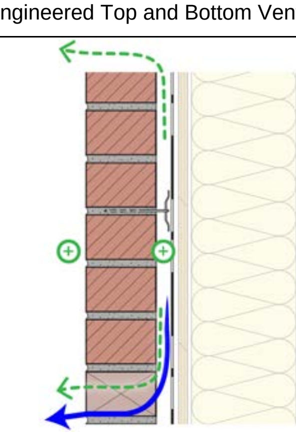
Moderate gap (~1/2"), full drainage and decent airflow potential



Large gap (>3/4"), full drainage and increased airflow potential

A continuum of frame wall assemblies is illustrated on the following page to better understand what is or is not a rainscreen wall, whether intentional by design or accidental by performance and the passive removal of both **liquid water** and **water vapor**. This categorization is based on either actual behavior or design intent, which needs to be declared. For the purposes of this classification system, the following rainscreen system definitions are proposed as included in Table 3 on the following page. (*Note that some of the wall assemblies, for example the face sealed assemblies would technically not be allowed to be constructed under current building codes, though are shown here as they may have been constructed in the past or could be constructed by accident.)*

Table 3 Wall Assembly Continuum – Non-Rainscreen to Rainscreen Conventional Frame walls (Vertical Wall Section View Shown, Blue Arrow Indicating Drainage and Green Dashed Arrow Indicating Air Flow, Black Dashed WRB)

	Not Rainscreen Walls				Rainscreen Walls			
	Face Seal	**Concealed Barrier**	**Drained**		**Drained and Vented**		**Drained and Ventilated**	**Pressure Equalized**
	No water control layer behind cladding	Water control behind cladding but no specific drainage or ventilation cavity	Specific detailing for drainage cavity to exterior. Drainage effectiveness can be measured per ASTM E2925-19A. Some small degree of venting can occur in some build-ups though is unintentional and is a differentiator between a drained only vs rainscreen wall		Specific detailing for cavity that allows drainage and venting or ventilation behind cladding. Larger capillary break and intentional airflow behind cladding. Degree of ventilation can be defined by an air exchange rate. Larger cavities and top and bottom vents (ventilation) provides greater air exchange than smaller cavities and bottom vents only (venting) which may be beneficial to some wall assemblies			Drained and ventilated cavity with specific provisions for the moderation of air cavity pressures using specific opening and cavity sizes and locations. Degree of pressure moderation can be defined
Panelized Cladding System	 Sealed Panel Cladding, No Building Paper	 One Layer Building Paper	 Two Layers Building Paper	 Building Paper on Textured Wrap	 Drainage Medium/Bottom Vent	 Bottom Vent	 Top and Bottom Vent	 Engineered Top and Bottom Vent & Cavity
Lap Siding	 Sealed Lapped Siding, No Building Paper	 One Layer Building Paper with No Detailing for Drainage	 One Layer Building Paper with Detailing for Drainage	 Textured Wrap	 Drainage Medium/Bottom Vent	 Bottom Vent	 Top and Bottom Vent	 Engineered Top and Bottom Vent & Cavity
Masonry Veneer/Thin-Brick	 Thin Adhered Masonry/Stone No Building Paper	 Thin Adhered Masonry/Stone over Building Paper	 Rope Weeps		 Bottom Vent		 Top and Bottom Vent	 Engineered Top and Bottom Vent & Cavity

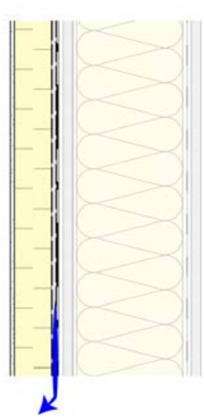
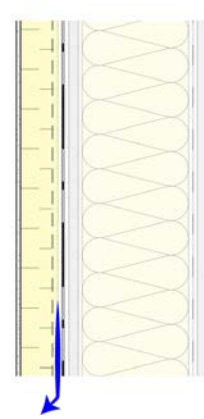
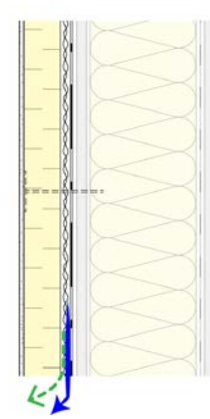
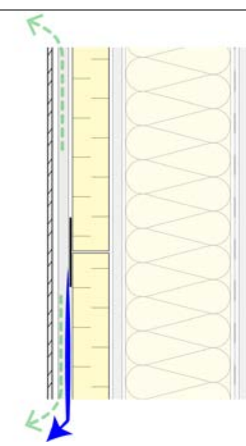
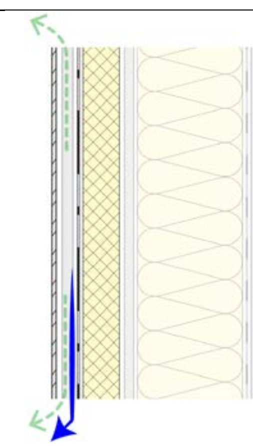
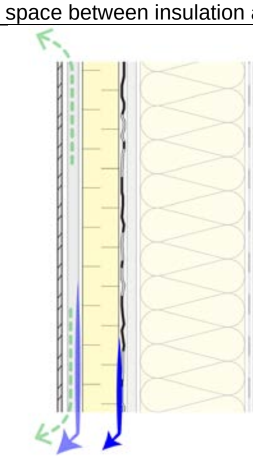
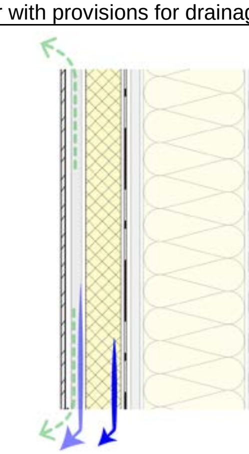
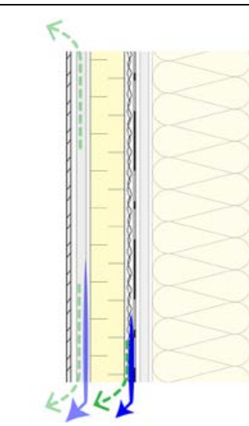
Rainscreen Walls with Exterior Insulation

The following table outlines the rainscreen wall components as it relates to the use of exterior continuous insulation, primarily related to water control. Fire and other aspects of exterior insulation will be covered elsewhere by RAiNA. The exterior insulation is considered a modifier to the baseline rainscreen assembly, with different considerations for different approaches.

Exterior Insulation Finish System (EIFS) and other systems with direct-applied cladding of exterior insulation over the substrate assembly may include a cavity for drainage and venting from behind the exterior insulation (at the WRB/inner layer). Vertically aligned gaps formed by adhesive or insulation grooves may be sufficient for drainage behind the insulation but may not represent a sufficient air cavity for venting and passive removal of moisture from the entire backup wall and therefore do meet the definition of a rainscreen. Sufficient air exchange by venting to meet the definition of a rainscreen can be achieved by open drainage mediums or specifically designed grooved insulation and specific details to provide for drainage and intentional venting behind the insulation. The degree or venting vs ventilation behind exterior insulation in EIFS walls must be carefully designed as to not reduce the effectiveness of the thermal insulation. Further work and industry consensus are needed to better define rainscreen vs. drainage EIF system.

With conventional claddings over exterior insulation, the rainscreen components for cladding and venting can be included in the attachment system through the exterior insulation and can provide for venting, ventilation, or pressure moderation/equalization. There are several approaches for the placement of the WRB/inner layer (with drainage) in relation to the exterior insulation. While the cavity of a rainscreen is defined as the space between the outer layer and inner layer, the exterior insulation takes up some of this physical space, leaving the functional cavity for drainage and the passive removal of moisture by airflow between the cladding and exterior of the insulation. That being said, drainage can occur through or behind exterior insulation and practically increases the physical separation between the primary and secondary plane of moisture control. Geometry alone reduces the amount of water that will ever be able to reach the WRB in addition to the baffling effect of foam plastic or fibrous cavity insulation. Venting behind the exterior insulation in addition to the cavity outboard is optional and must be carefully considered. Note that venting behind insulation is not intended to introduce large volumes of air in the same fashion as a rainscreen cavity, nor to meet the rainscreen definition (as the cavity is already provided outboard). Moreover, large amounts of ventilation and pressure moderation behind the exterior insulation can lead to short-circuiting of the insulation and reduction of the intended exterior insulation and whole wall effective R-value. Further research and industry consensus is needed to better define the potential benefits and limits of this approach.

Table 4 Exterior Insulation Rainscreen Wall Assemblies (Vertical Wall Section View Shown, Blue Arrow Indicating Drainage and Green Dashed Arrow Indicating Air Flow, Black Dashed WRB)

	Exterior Insulation Finish System (EIFS)			Rainscreen Walls with Conventional Claddings and Exterior Insulation (used with various cladding/venting approaches)				
	Cavity and Inner Layer for Venting/Draining Behind Insulation			Inner Layer Over Exterior Insulation		Inner Layer Drained from Behind/Within Insulation (Venting Optional Behind Insulation)		
	Specific detailing for drainage and venting between the insulation and the water resistive barrier (*inner layer*) is needed to maintain the rainscreen characteristics			Specific detailing for drainage in front of the insulation is used to achieve a typical rainscreen assembly. Rainscreen cavity is clearly the space between the outer layer and inner layer (WRB) on surface of exterior insulation. No drainage is provided behind the exterior insulation		Specific detailing for drainage between the insulation and the water resistive barrier (*inner layer*) is needed to maintain rainscreen characteristics, but capillary break and venting behind insulation is optional and design related to potential for water accumulation behind insulation. Primary drainage and venting/ventilation/pressure equalization still occurs at the face of the exterior insulation. Rainscreen cavity is the space between the outer layer and inner layer (WRB) behind exterior insulation which increases overall depth, however functional air gap for drainage and venting is seen as remaining space between insulation and outer layer with provisions for drainage within and behind insulation back to WRB		
Exterior-Insulated Walls								
	Vertical Adhesive Ribbons for Drainage Without Provision for Intentional Venting (Not Rainscreen)	Vertically Grooved Insulation for Drainage Without Provisions for Intentional Venting (Not Rainscreen)	Drainage Medium & Specific Detailing for Venting/Airflow to Remove Vapor (Rainscreen)	Sealed Foam Plastic Exterior Insulation with WRB in Front of, or as Surface of Insulation	Exterior Fibrous Insulation with WRB Membrane Added in Front of Insulation	Exterior Foam Plastic Insulation with Textured Wrap Behind Insulation for Supplemental Drainage Beyond Insulation Surface	Exterior Fibrous & Draining Insulation with WRB Behind Insulation for Supplemental Drainage Beyond Insulation Surface	Exterior Insulation with Drainage/Venting Medium Behind Insulation for Supplemental Drainage and Venting Beyond Insulation Surface