BEST6

AIA Definitions Project

Definitions for Building Performance

Presenters

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Purpose of AIA's Definitions Project

- CLARIFIES AMBIGUOUS BUILDING PERFORMANCE TERMS
- PROVIDES CONVENIENT TOOL TO EDUCATE ARCHITECTS TO IMPROVE BUILDING PERFORMANCE
- SUPPORTS AIA'S CLIMATE ACTION PLAN
- ESTABLISHES COMMON VOCABULARY FOR ARCHITECTS

Definitions Project: General Process

Create list of commonly misunderstood or loosely defined terms

Build consensus on terms to research and determine resources / bibliographies

Research each term and determine best definitions from bibliographies

Provide final team review of each definition and agree to issue to AIA website

Step 1: Create & Sort List of Misunderstood Terms

Phase 2: Fenestration

Please add your terms here.
Each committee member should categorize their terms as listed.

Brad Gellert		Drake Wauters		Greta Eckhardt		Will Babbington	
Fenestration	**Building Performance Strategies for Climate Action**	**Fenestration**	**Building Performance Strategies for Climate Action**	**Fenestration**	**Building Performance Strategies for Climate Action**	**Fenestration**	**Building Performance Strategies for Climate Action**
Type terms here.	Type terms here.	Type terms here.	Type terms here.	Type terms here.	Type terms here.	Type terms here.	Type terms here.
thermally improved	Embodied Carbon	weep	clarifying function - liquid water passage opening	curtain wall framing	durability	Thermally Improved	Embodied Carbon
vertical interstory movement	GWP - Global Warming Potential	vent	clarifying function - air passage opening	storefront framing	greenhouse gas emissions	Thermally Broken	Operational carbon emissions
shear block system	EPD - Environmental Product Declaration	two-stage seal	durability - rain screen function at seals	window	rising sea level	Warm Edge Spacer	Environmental Product Declarations
screw spline system	C02e	shadow box	durability - atmospherically vent/ weep to the exterior	sloped glazing	extreme weather events	Curtain Wall (v. Curtainwall)	Life cycle cost
unitary system	Life Cycle Assessment	chemical etching	durability - damage to	skylight	climate change	Curtain Wall	Life cycle assessment
center of glass	Eutrophication	baffled weep	clarifying function -	clear glass	return on investment	Veneer Curtain Wall	Whole Building Life Cycle
safety glazing	low carbon			heat-strengthened glass	renewable energy	Storefront	Life Cycle Inventory
				fully tempered glass	electrification	SSG	Global Warming Potential
				tinted glass	resilient	Butt-glazed	Embodied Carbon Stages A - Extraction, Fabrication, Installation
				low-e coating	adaptable	Visible Light Reflectance	Embodied Carbon Stages B - Use
				cladding	energy modeling	Unitized curtain wall	Embodied Carbon Stages C - End-of-Life
				operable sash	active systems	Ladder curtain wall	Global Warming Potential
				entrance	passive systems	Stick curtain wall	Acidification Potential
				thermal movement	commissioning	Window	Utrification
				deflection	energy use intensity (EUI)	Cable Wall (one-way, two-way)	Ozone depletion
				water penetration	lighting power density (LPD)	Point-Supported glazing	Non-renewable energy depletion
				air leakage	life cycle assessment	Skylights	Carbon equivalence
				condensation resistance	global warming potential	Outside glazed	The 2030 Challenge
				thermal transmittance		Inside glazed	SE 2050 Commitment
				shading coefficient	"material transparency"	Center glazed	Sustainable
				solar heat gain	"carbon neutral	Cassette system	Resilient

"Umbrella term"	Reviewer	Defined Term	Defined Sub-term	Synonym	Comments
Fenestration components	Will	framing	veneer framing	"add-on curtain wall framing"	
Fenestration components	Will	framing	non-thermal		
Fenestration components	Will	framing	thermally broken		
Fenestration components	Will	framing	thermally improved		
Fenestration components	Will	framing	pressure-equalized		rainscreen principle applied to framing profile
Fenestration components	Will	framing	screw-spline system		
Fenestration components	Will	framing	shear block system		
Fenestration components	Will	framing	"outside-glazed" and "inside-backpan		
Fenestration components	Brad	spandrel panel	insulated metal panel		should not be considered part of opaque wall!
Fenestration components	Brad	spandrel panel	shadow box		should not be considered part of opaque wall!
Fenestration components	Brad	spandrel panel			should not be considered part of opaque wall!
Fenestration performance	Greta	NFRC-tested performance value	daylight factor		how does this relate to "daylight opening"?
Fenestration performance	Greta	NFRC-tested performance value	U-factor	U-value	
Fenestration performance	Greta	NFRC-tested performance value	SHGC		
Fenestration performance	Greta		air leakage		
Fenestration performance	Greta		condensation resistance		
Fenestration performance	Greta		deflection		
Fenestration performance	Greta		CITC		measure of resistance to acoustic transmission
Fenestration performance	Greta		damage-weighted transmission??		did we really mean to include this?
Fenestration types	Dave	glazed aluminum storefront types	butt-glazed		
Fenestration types	Dave	glazed curtain wall types	Cable wall	spider wall	
Fenestration types	Dave	glazed curtain wall types	Cassette system		
Fenestration types	Dave	glazed curtain wall types	toggle system		
Fenestration types	Dave	glazed curtain wall types	ladder curtain wall		
Fenestration types	Dave	glazed curtain wall types	unitized curtain wall		
Fenestration types	Dave	glazed curtain wall types	stick-built curtain wall		
Fenestration types	Dave	glazed curtain wall types	structural sealant-glazed curtain wall		can be 2-sided or 4-sided
Fenestration types	Dave	glazed curtain wall types	structural glass curtain wall		glass fins
Fenestration types	Dave	glazed curtain wall types	fully captured curtain wall		is this the best term??
Fenestration types	hold	windows			refers to manufactured units, usually factory-
Glass types	Richard	dynamic glass types	electrochromic glazing	"smart glass"	
Glass types	Richard	dynamic glass types	themochromic glazing		
Glass types	Richard	dynamic glass types	photochromic glazing		
Glass types	Richard	Insulating glass unit types	double glazing		
Glass types	Richard	Insulating glass unit types	triple glazing		
Glass types	Richard	Insulating glass unit types	suspended thin film glazing		
Glass types	Richard	Insulating glass unit types	vacuum glazing		
Glass types	hold	laminated glass types?			
Glass types	Emily	monolithic glass types	Clear glass		
Glass types	Emily	monolithic glass types	Tinted glass		
Glass types	Emily	monolithic glass types	plate glass	flat glass	
Glass types	Emily	monolithic glass types	Float glass		flat glass produced by the float method
Glass types	Emily	monolithic glass types	heat-strengthened glass		
Glass types	Emily	monolithic glass types	fully-tempered glass		mention nickel-sulfide inclusions, heat-soak
Glass types	Emily	monolithic glass types	safety glazing		
Glass types	Emily	opaque glazing	opaque glazing		glass with solid ceramic frit or silicone coating
Glass types	Richard	translucent glazing	fiberglass panels		
Glass types	Richard	translucent glazing	??		"Solera", Okalux, others?
Glazing components	Cheryl	glass coatings	ceramic frit		
Glazing components	Cheryl	glass coatings	edge deletion		

Step 2: Build Consensus on Terms to Research

Phase 2: Fenestration

#	Fenestration components	Verdict	Reviewer's general comments
		A=keep; B=one-liner; D=omit	
1	veneer curtain wall	A	Curtain wall system where the air, thermal, and moisture control components and glazing attachment . It is meant to be attached to a mullion which could be steel, wood, concrete, or any other material meeting the system's structural requirements.
2	non-thermal	A	A metal fenestration frame system that is neither thermally improved nor thermally broken.
	thermally broken/thermally improved	B	Refer to NRFC 100 for a technical definition of each. Thermally broken fenestration performs better than thermally improved fenestration systems.
	thermally improved	Combined with thermally broken	
3	pressure-equalized/pressure-moderated	A	The industry is moving toward the use of the term pressure-moderated rather than previously used term pressure-equalized, recognizing the fact that the pressure behind the rains screen is never 100% equalized to the pressure on the exterior.
	screw-spline system	(D) A - we agree with Will's general comment.	Fenestration assembly and load transfer method where horizontal frame mullions are connected to vertical mullions with a screw going into a receiver or chase ("screw spline") which is extruded into the base horizontal mullion. The forces, are
	shear block system	(D) A	Horizontal mullions are connected, and their structural forces transferred, to vertical mullions by sleeving the horizontals over an aluminum block screwed into the vertical mullion. Load transfer is made from the horizontal. (Is this sentence complete?)
4	"outside-glazed" and "inside-glazed"	A - we agree with Will's general comment.	Refers to the side, exterior or interior (respectively), from which the glass panels would be installed during initial installation and reglazing. Outside-glazed systems typically perform better at resisting water and air infiltration.
	venting sash	D	No confusion - don't need to define?
	awning	D	No confusion - don't need to define?
	casement	D	No confusion - don't need to define?
	hung	D	No confusion - don't need to define?
5	backpan	A	WB: ASHRAE 90.1 has definition; DA: code considers all spandrel panels to be part of opaque wall in terms of prescriptive
	insulated metal panel	D	No confusion - don't need to define?
6	shadow box	A	DA: special type of backpan used behind transparent glazing, with opaque panel behind glass
	capillary tube, weep	D	No confusion - don't need to define?
	bite	D	No confusion - don't need to define?

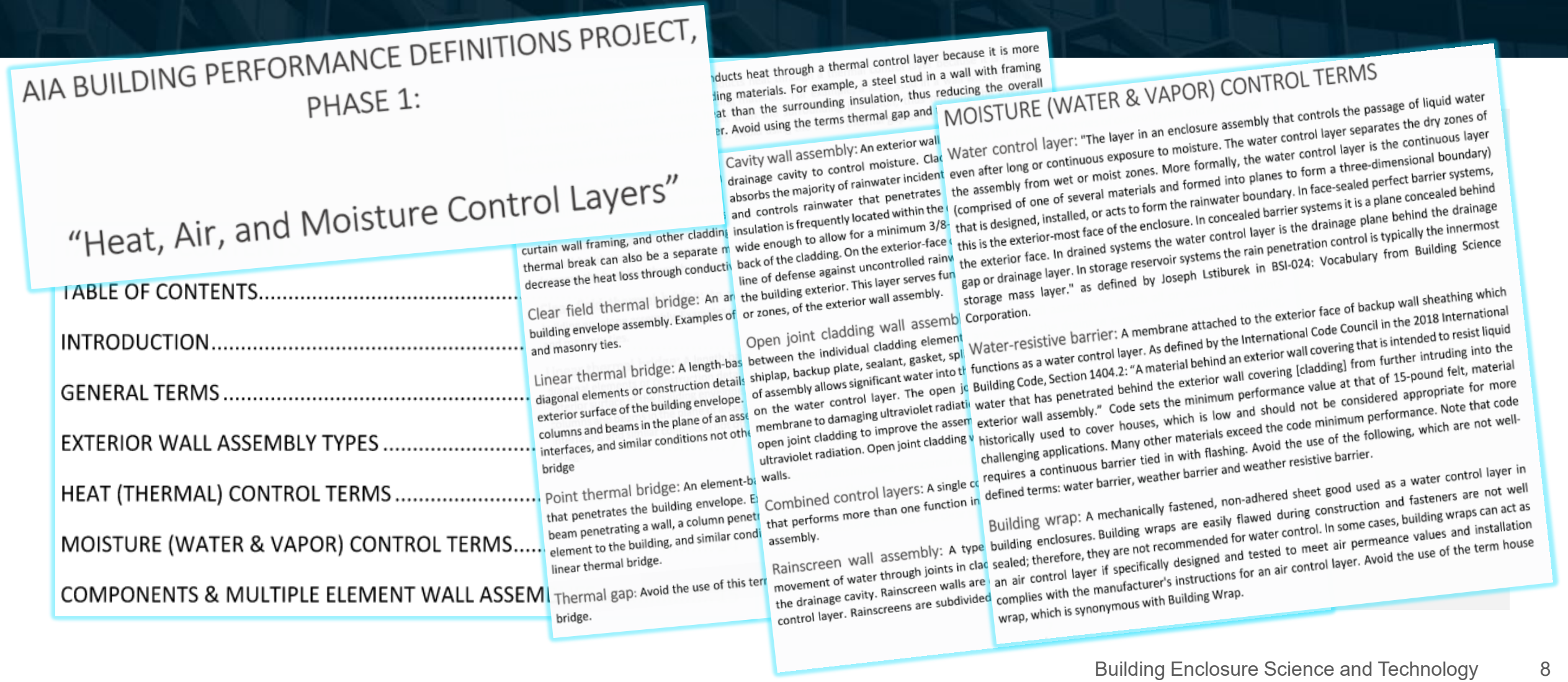
Step 3: Review Resources / Bibliography

Phase 2: Fenestration

No.	Terms	Verdict	Reviewer's general comments	IBC 2021	IECC 2021	NFRC	Whole Building Design Guide
4	"outside-glazed" and "inside-glazed"	A - we agree with Will's general comment.	Refers to the side, exterior or interior (respectively), from which the glass panels would be installed during initial installation and reglazing. Outside-glazed systems typically perform better at resisting water and air infiltration.	undefined	undefined	undefined	"Curtain Walls" section - https://www.wbdg.org/guides-specifications/building-envelope-design-guide/fenestration-systems/curtain-walls -no definition; only referenced -"For low rise construction with easy access to the building, outside glazing is typically specified. For high-rise construction interior glazing is sometimes used due to access and logistics of replacing glass from a swing stage." -(9) nine outside glazed examples are listed
5	backpan	A	WB: ASHRAE 90.1 has definition; DA: code considers all spandrel panels to be part of opaque wall in terms of prescriptive performance values as well as percentage glazing: ES: need continuous insulation across framing to achieve proper performance	undefined	undefined	undefined	Back pans are metal sheets, usually aluminum or galvanized steel, that are attached and sealed to the curtain wall framing around the perimeter behind opaque areas of a curtain wall.
6	shadow box	A	DA: special type of backpan used behind transparent glazing, with opaque panel behind glass	undefined	undefined	undefined	
7	U-factor	A	DA: U-factor for fenestration best defined by NFRC 100; fenestration should have NFRC label to indicate that appropriate testing has been done; GE: need to be clear....; WB: need to consider project-specific size impact on U-factor as specified in NFRC 100;	Not defined in Chapter 2 - DEFINITIONS; Chapter 13 - ENERGY EFFICIENCY refers to IECC	Chapter 2: U-FACTOR (THERMAL TRANSMITTANCE). The coefficient of heat transmission (air to air) through a building componenet or assembly, equal to the time rate of heat flow per unit area and unit temperature difference between the warm side and cold side air films ((Btu/h x ft2 x degrees F) [W/(m2 x K)] - *also need to mention later in IECC where NFRC is mentioned (C303.1.3)*	EM: quote from NFRC website "U-Factor measures how well a product can keep heat from escaping from the inside of a room. The lower the number, the better a product is at keeping heat in. Range: 0.20-1.20 Look for: Low numbers."	Windows and Glazing, Ander 2016: U-value indicates the rate of heat flow due to conduction, convection, and radiation through a window as a result of a temperature difference between the inside and outside. The higher the U-factor the more heat is transferred (lost) through the window in winter. The units of U-value are: Btus per hour per square foot per °F (Btu/hr · ft² · °F). U-factors usually range from a high of 1.3 (for a typical aluminum frame single glazed window) to a low of around 0.2 (for a multi-paned, high-performance window with low-emissivity coatings and insulated frames). A window with a U-factor of 0.6 will lose twice as much heat under the same conditions as one with a U-factor of 0.3. Total (or net) window U-factors can be considerably higher than the center-of-glass U-factors.
8	SHGC	A	same comments as for U-factor, using NFRC 200	Not defined in Chapter 2 - DEFINITIONS; Chapter 13 - ENERGY EFFICIENCY refers to IECC	SOLAR HEAT GAIN COEFFICIENT (SHGC)). The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat		Windows and Glazing, Ander 2016: SHGC indicates how much of the sun's energy striking the window is transmitted through the window as heat. As the SHGC increases, the solar gain potential through a given window increases. The SHGC is a ratio between 0 and 1. SHGC = 0 means none of the incident solar gain is transmitted through the window as heat and SHGC = 1 means all of the incident solar energy is transmitted through the window as heat. A window with a SHGC of 0.6 will admit twice as much solar heat gain as one with a SHGC of 0.3. Typically,

Step 4: Issue Final Terms with Acceptable Definitions

Phase 1: Heat, Air Moisture Control Layers



AIA BUILDING PERFORMANCE DEFINITIONS PROJECT, PHASE 1:

"Heat, Air, and Moisture Control Layers"

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COMPONENTS & MULTIPLE ELEMENT WALL ASSEM

MOISTURE (WATER & VAPOR) CONTROL TERMS

Water control layer: "The layer in an enclosure assembly that controls the passage of liquid water even after long or continuous exposure to moisture. The water control layer separates the dry zones of the assembly from wet or moist zones. More formally, the water control layer is the continuous layer (comprised of one of several materials and formed into planes to form a three-dimensional boundary) that is designed, installed, or acts to form the rainwater boundary. In face-sealed perfect barrier systems, this is the exterior-most face of the enclosure. In concealed barrier systems it is a plane concealed behind the exterior face. In drained systems the water control layer is the drainage plane behind the drainage gap or drainage layer. In storage reservoir systems the rain penetration control is typically the innermost storage mass layer." as defined by Joseph Lstiburek in BSI-024: Vocabulary from Building Science Corporation.

Water-resistive barrier: A membrane attached to the exterior face of backup wall sheathing which functions as a water control layer. As defined by the International Code Council in the 2018 International Building Code, Section 1404.2: "A material behind an exterior wall covering that is intended to resist liquid water that has penetrated behind the exterior wall covering [cladding] from further intruding into the exterior wall assembly." Code sets the minimum performance value at that of 15-pound felt, material historically used to cover houses, which is low and should not be considered appropriate for more challenging applications. Many other materials exceed the code minimum performance. Note that code requires a continuous barrier tied in with flashing. Avoid the use of the following, which are not well-defined terms: water barrier, weather barrier and weather resistive barrier.

Building wrap: A mechanically fastened, non-adhered sheet good used as a water control layer in building enclosures. Building wraps are easily flawed during construction and fasteners are not well sealed; therefore, they are not recommended for water control. In some cases, building wraps can act as an air control layer if specifically designed and tested to meet air permeance values and installation complies with the manufacturer's instructions for an air control layer. Avoid the use of the term house wrap, which is synonymous with Building Wrap.

Cavity wall assembly: An exterior wall drainage cavity to control moisture. Cla absorbs the majority of rainwater incident and controls rainwater that penetrates insulation is frequently located within the wide enough to allow for a minimum 3/8- back of the cladding. On the exterior-face line of defense against uncontrolled rainw the building exterior. This layer serves fun or zones, of the exterior wall assembly.

Open joint cladding wall assemb between the individual cladding element shiplap, backup plate, sealant, gasket, spl of assembly allows significant water into th on the water control layer. The open jo membrane to damaging ultraviolet radiati open joint cladding to improve the assem ultraviolet radiation. Open joint cladding v walls.

Combined control layers: A single co that performs more than one function in assembly.

Rainscreen wall assembly: A type movement of water through joints in clad the drainage cavity. Rainscreen walls are control layer. Rainscreens are subdivided

curtain wall framing, and other cladding thermal break can also be a separate m decrease the heat loss through conducti

Clear field thermal bridge: An ar building envelope assembly. Examples of and masonry ties.

Linear thermal bridge: A length-bas diagonal elements or construction details exterior surface of the building envelope. columns and beams in the plane of an asse interfaces, and similar conditions not othe bridge

Point thermal bridge: An element-ba that penetrates the building envelope. E beam penetrating a wall, a column penetr element to the building, and similar condi linear thermal bridge.

Thermal gap: Avoid the use of this term bridge.

ducts heat through a thermal control layer because it is more ding materials. For example, a steel stud in a wall with framing at than the surrounding insulation, thus reducing the overall er. Avoid using the terms thermal gap and

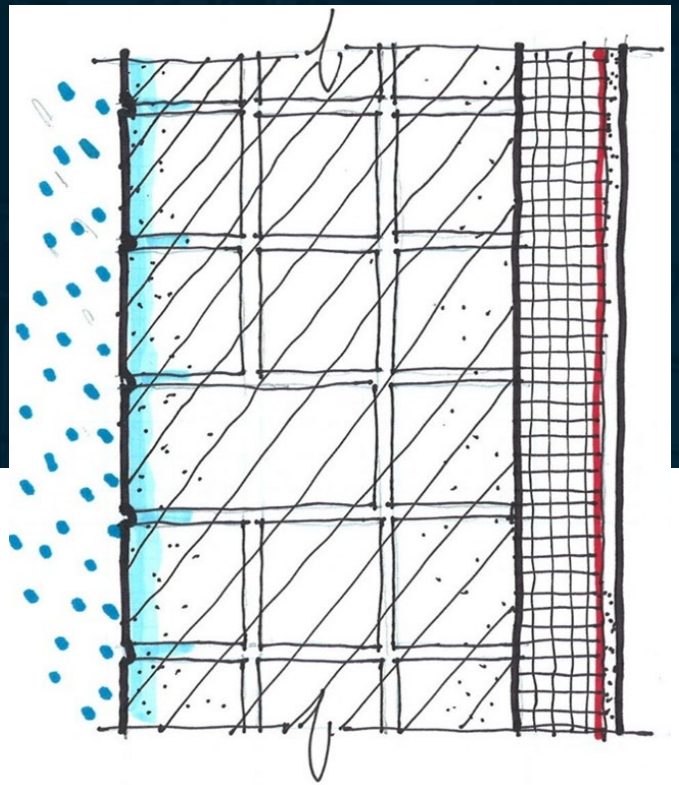
Examples of Terms

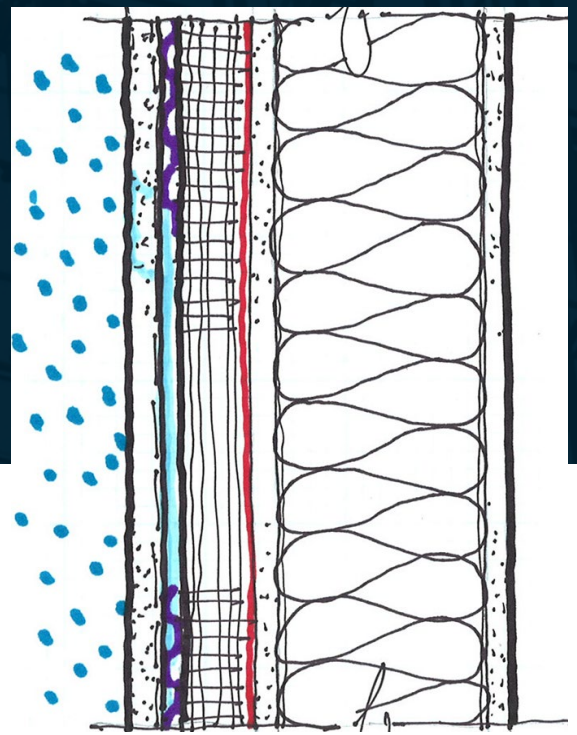
Control Layer

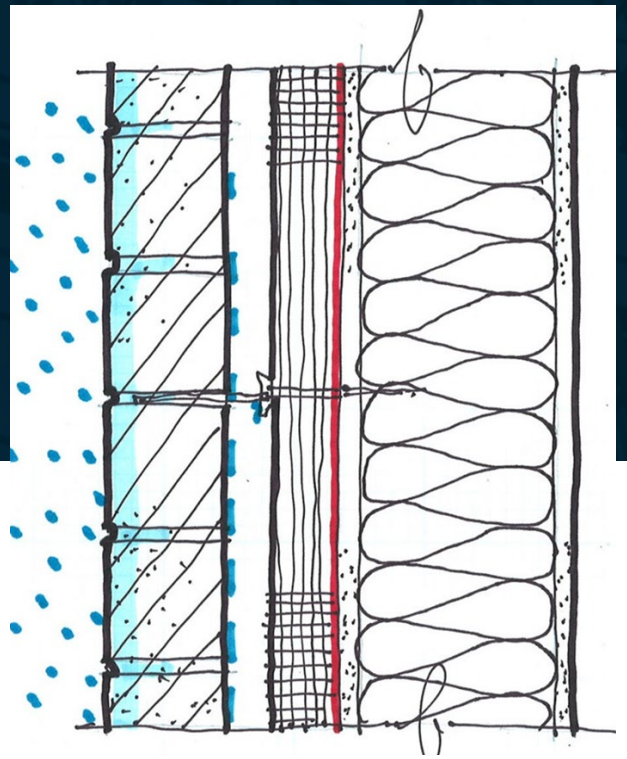
Control Layer: Materials or assemblies of materials that provide adequate control as defined below, of the passage of heat, air, and moisture. Control does not imply perfection but instead a level of performance adequate to suit the intended use, as such exact performance as determined through laboratory testing varies according to the building type, exposure, risk, and other factors. Adequate control is that level of performance necessary for the enclosure component to comply with the following: Applicable codes. Owner's requirements. Project specific expectations. Quantitative performance as indicated for the individual functions.

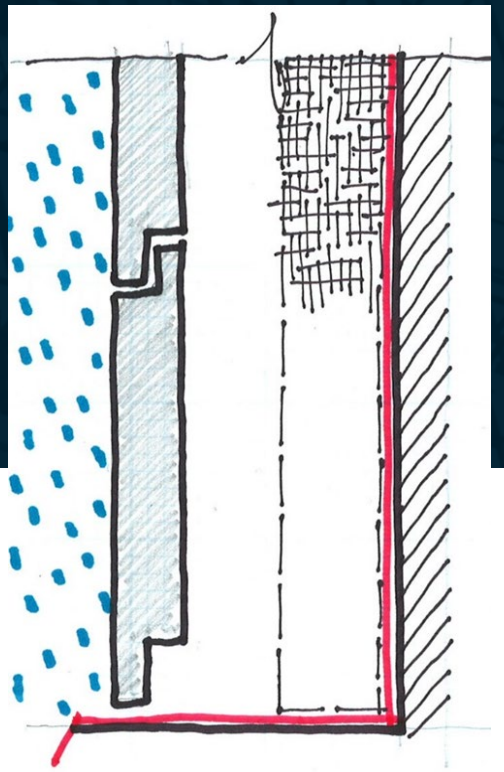
Enclosure Wall Assembly Types: barrier wall assembly, mass wall assembly, cavity wall assembly, open joint cladding wall assembly, and rainscreen wall assembly.

Enclosure Wall Assembly Types





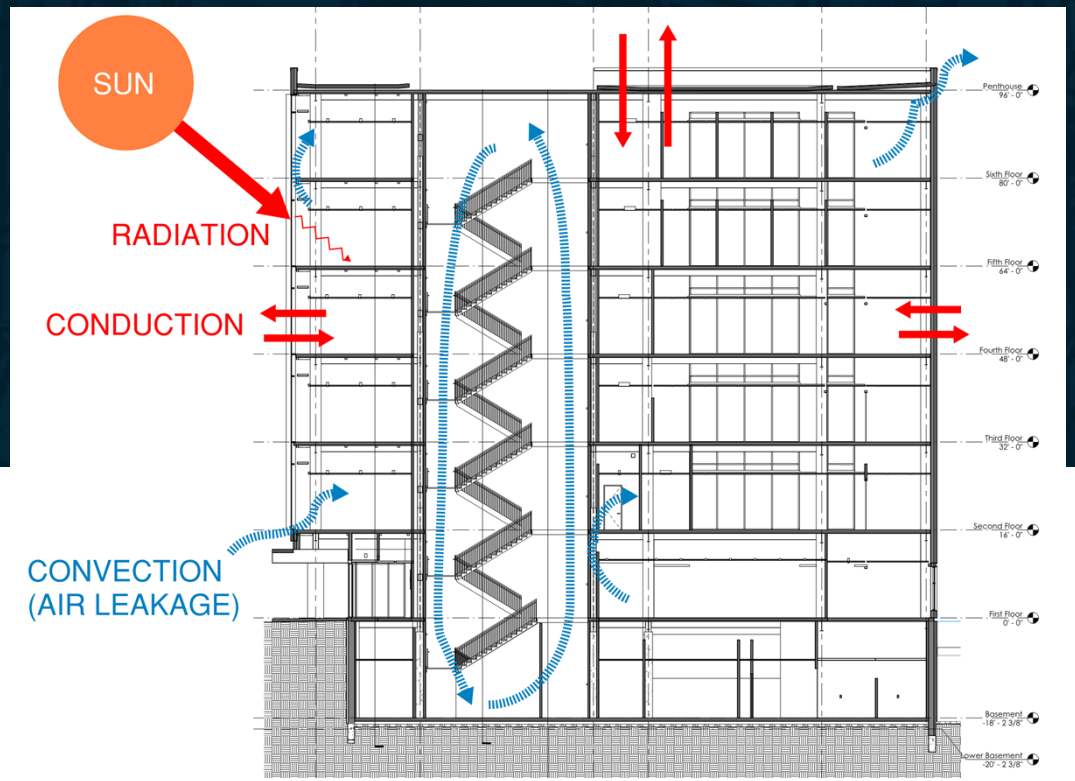




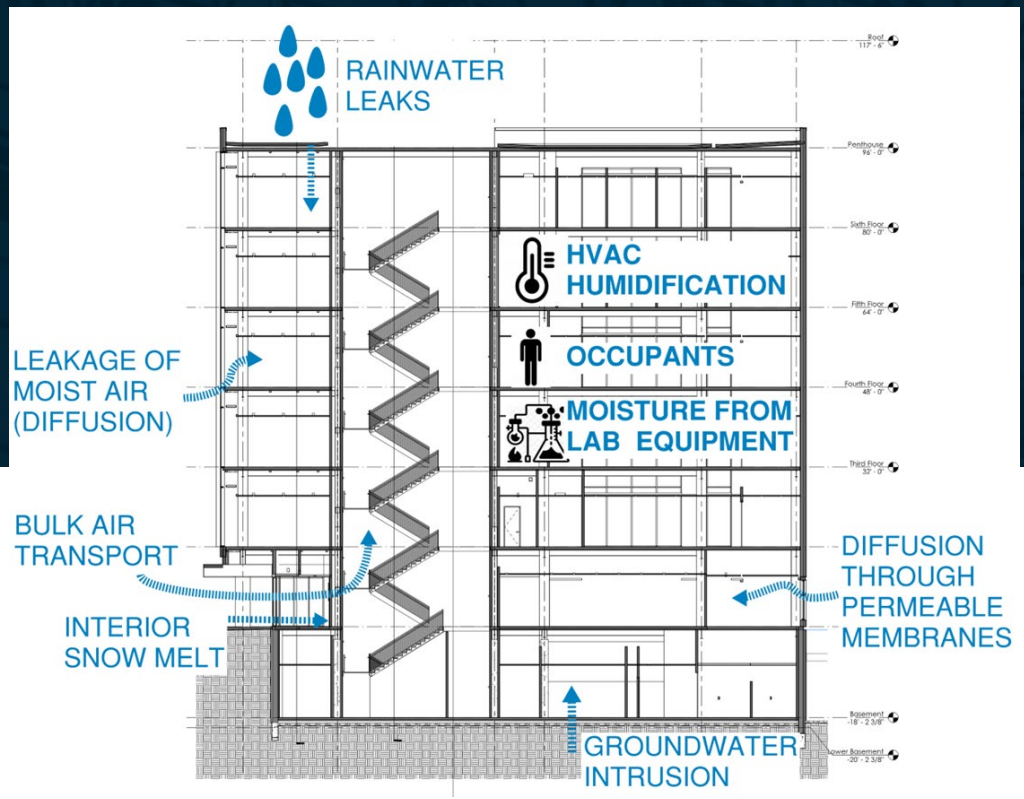
Credit sketches to Michael Lough, 2015 AIA Presentation

Thermal & Moisture Loads

Control of Heat



Control of Moisture



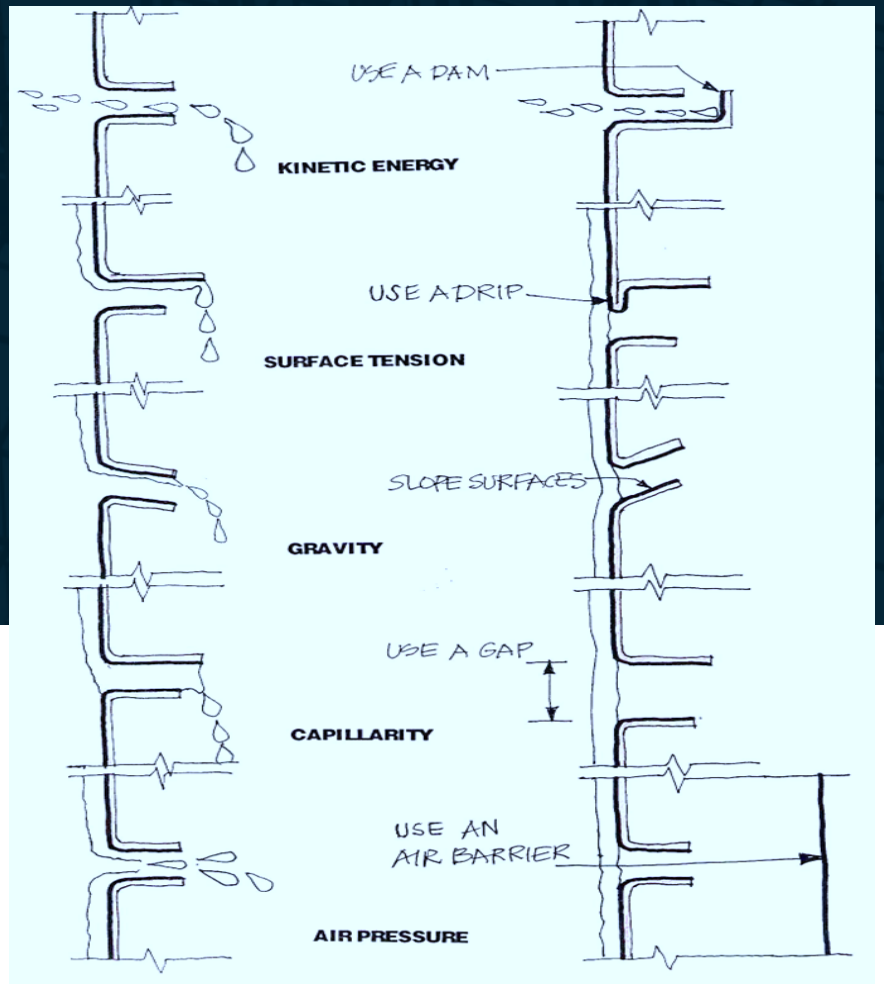
Examples of Terms

Rainscreen Wall Assembly

Rainscreen Wall Assembly: A type of cavity wall that is designed and detailed to reduce the movement of water through joints in cladding while promoting both drainage and air movement within the drainage cavity. Rainscreen walls are comprised of an exterior cladding, a cavity, and an inner water-control layer.

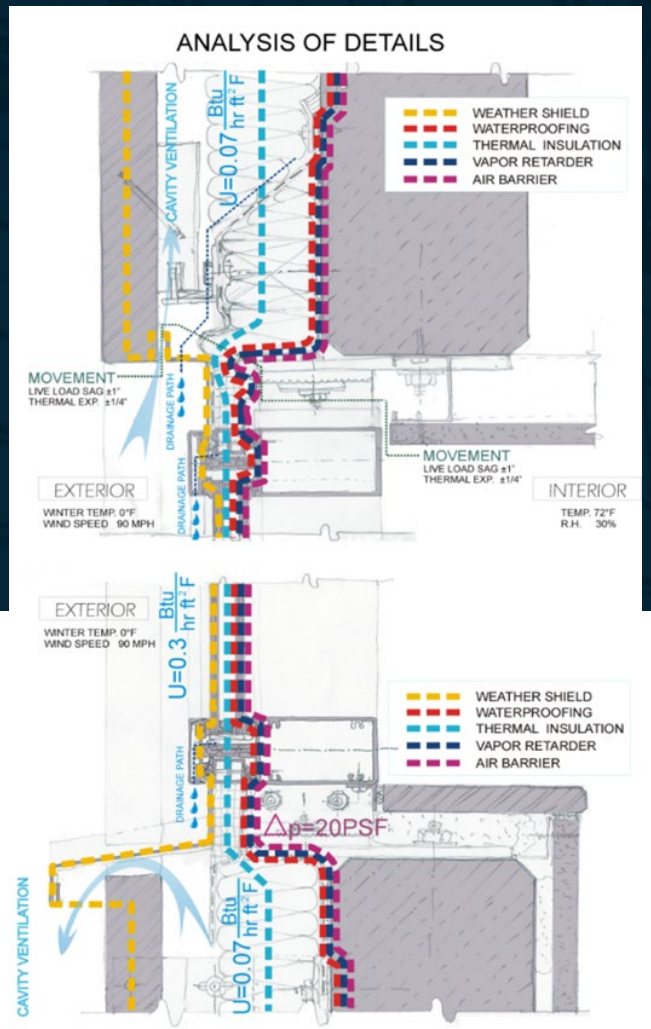
Rainscreens are subdivided into two distinct performance categories for control of water infiltration: Pressure-equalized rainscreen wall assembly (PER) and Drained and back ventilated cavity wall assembly (DBVC). Rainscreen walls are designed to control water at the outer cladding, but they still require a robust water-control layer behind them. There are a variety of methods to resist the penetration of rain and snow.

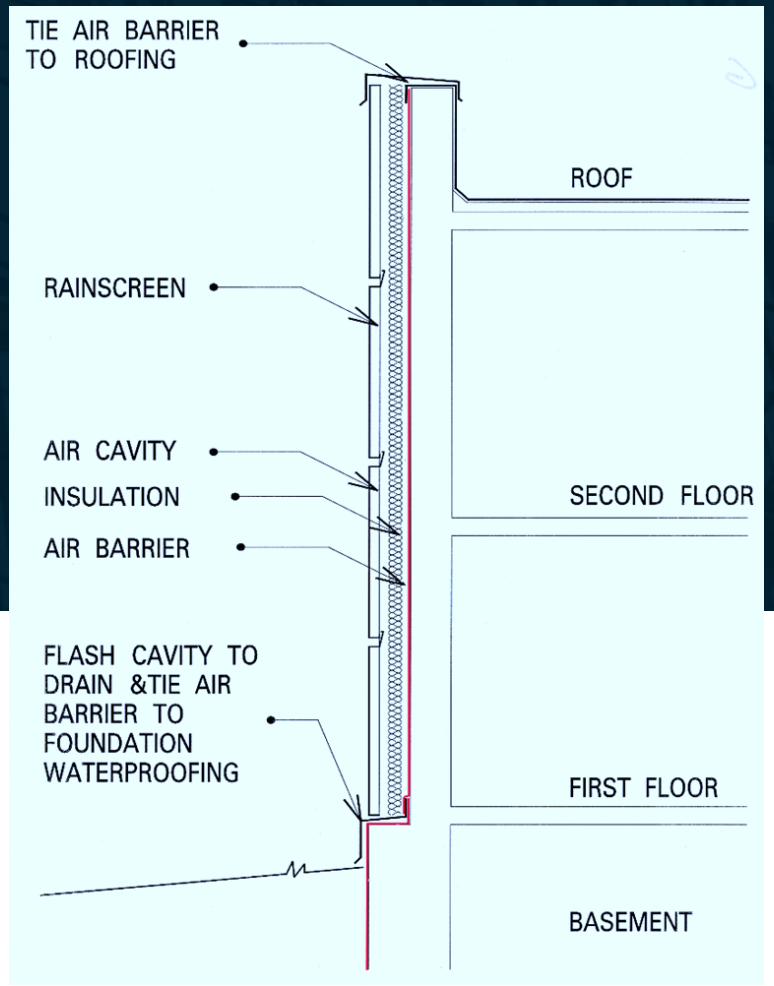
Forces Driving Water through a Gap



Credit sketches to Richard Keleher

Control of Air Movement





Examples of Terms

Thermal Bridge and Thermal Break

Thermal Bridge: A material that conducts heat through a thermal control layer because it is more thermally conductive than surrounding materials. For example, a steel stud in a wall with framing cavity insulation will conduct more heat than the surrounding insulation, thus reducing the overall performance of the thermal control layer.

Thermal Break: A rigid insulating material that is used to retard the flow of heat through an element that would otherwise act as a thermal bridge. Thermal break materials can be engineered as integral components of metal brackets, wall girts, attachments, structural framing members such as window and curtainwall framing, and other cladding support elements that penetrate the thermal control layer. A thermal break can also be a separate material installed in alignment with the thermal control layer to decrease the heat loss through conductive elements.

Thermal Bridges

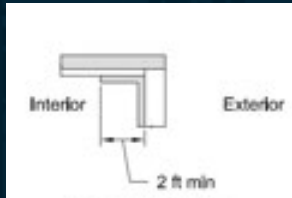


Figure 5.5.5.1.1c(i)
Mass Wall with
Interior Insulation

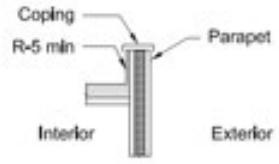


Figure 5.5.5.1.2b
Mass Wall with Integral Insulation

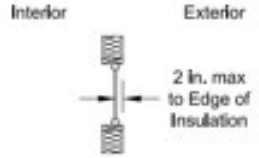


Figure 5.5.5.4b
Fenestration and
no Continuous Insulation

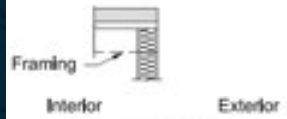


Figure 5.5.5.1.1b
Wall with Cavity Insulation

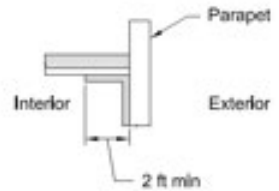


Figure 5.5.5.1.2c(i)
Mass Wall with Interior Insulation

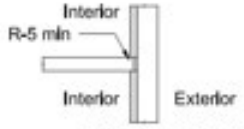


Figure 5.5.5.2.1d(i)
Mass Wall with
Interior Insulation

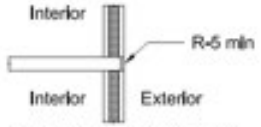


Figure 5.5.5.2.1c Exception
Mass Wall with
Integral Insulation

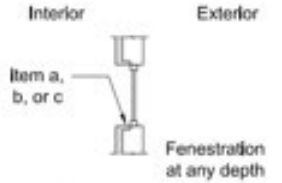


Figure 5.5.5.4a-b-c
Insulation between
Fenestration and Wall

Figure 5.5.5.1.1a
Wall with Exterior Continuous
Insulation

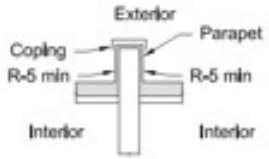


Figure 5.5.5.1.3
Parapet within Field of Roof

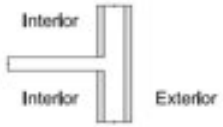


Figure 5.5.5.2.1d Exception
Mass Wall with Exterior
Continuous Insulation plus
Interior Insulation

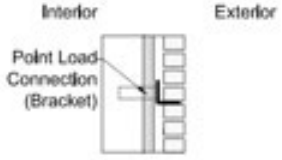


Figure 5.5.5.3
Shelf Angles Supporting
Exterior Cladding

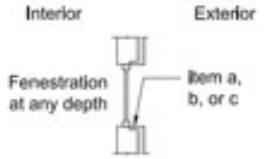
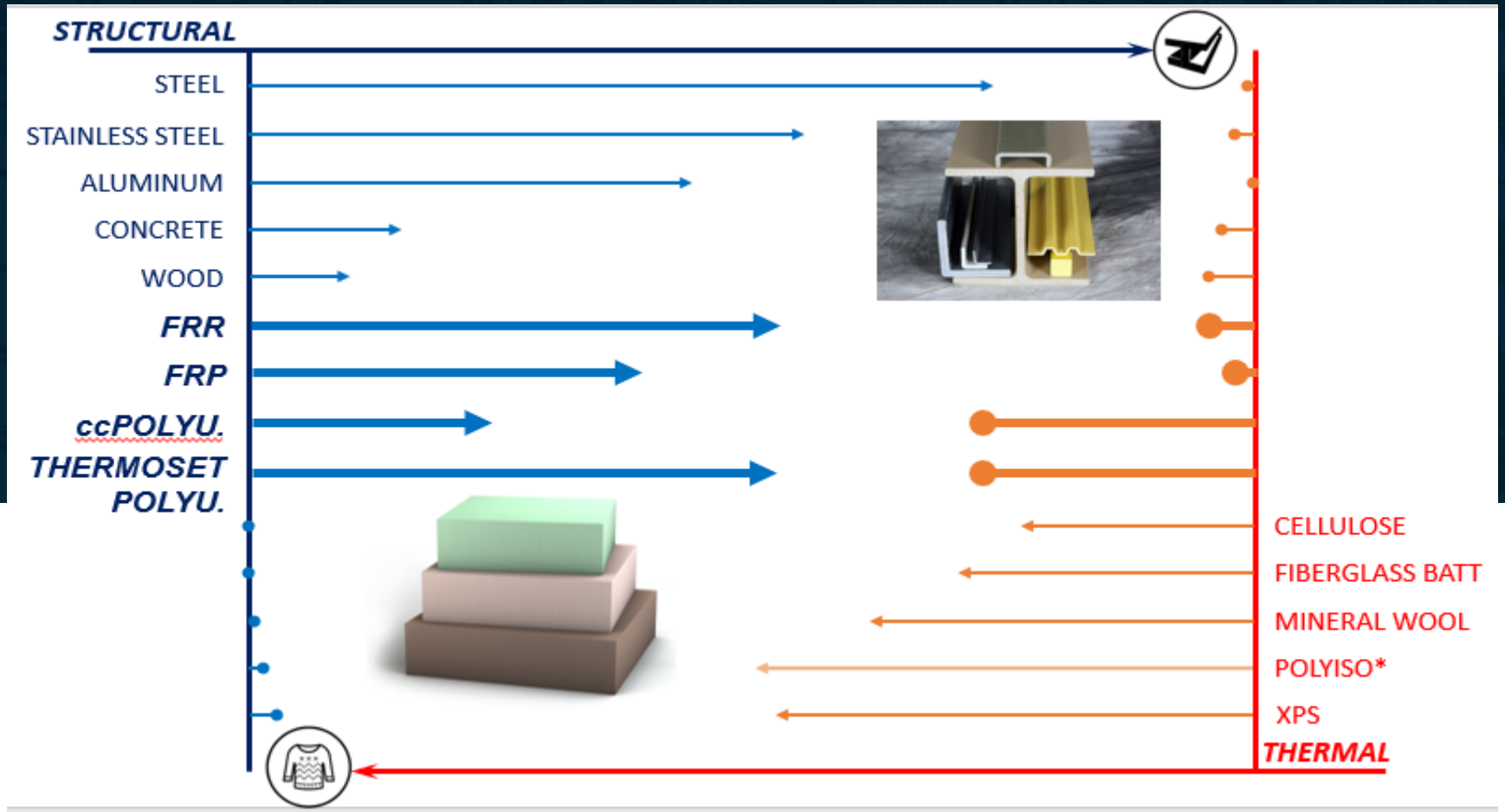


Figure 5.5.5.4a-b-c
Insulation between
Fenestration and Wall

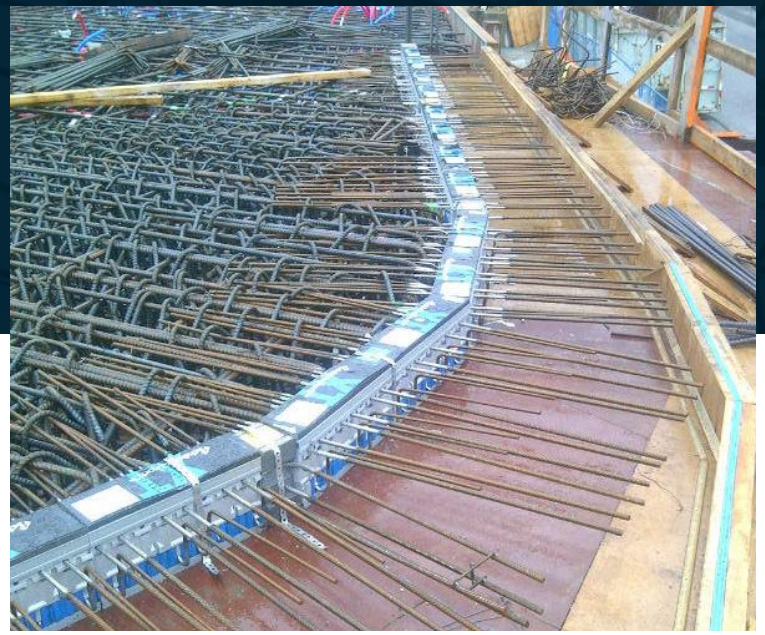
Structural / Thermal



Types of Thermal Bridges

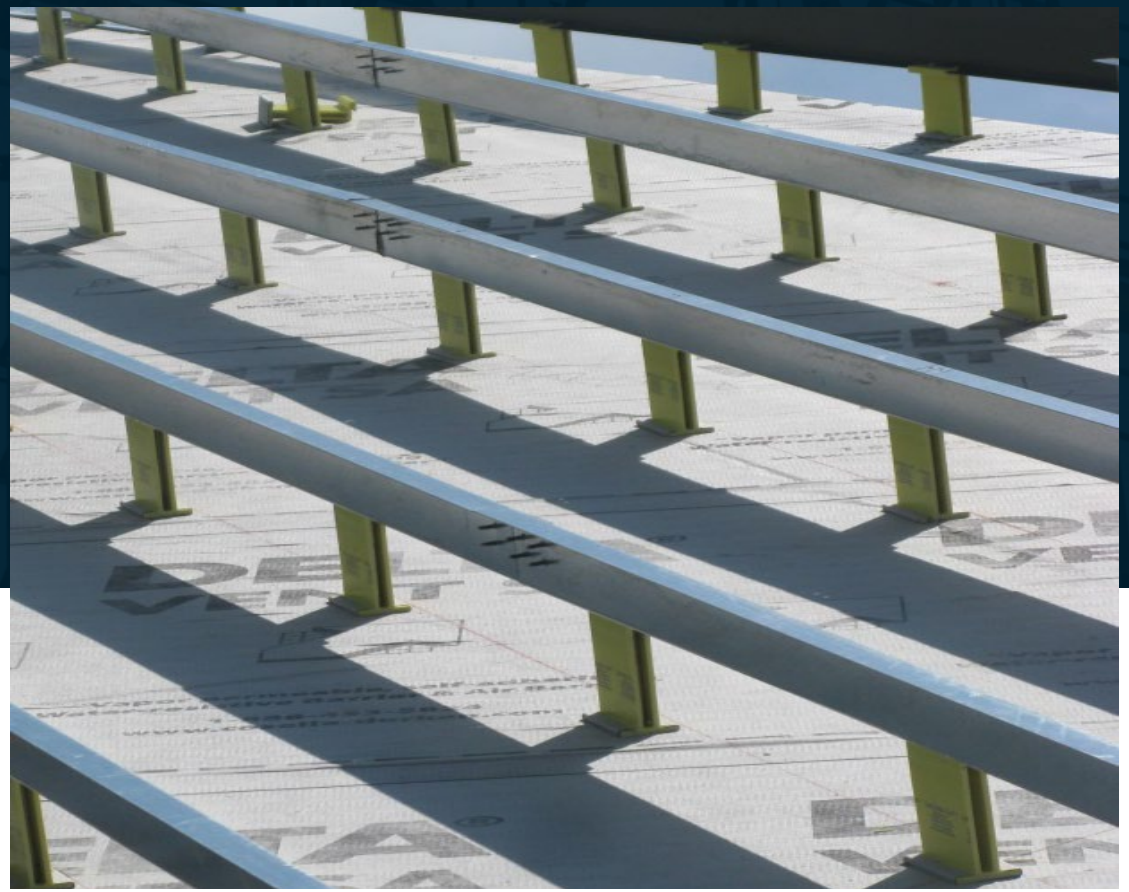
Clear Field

Linear



Point

Thermal Breaks



Examples of Terms

Area Weighted Averages

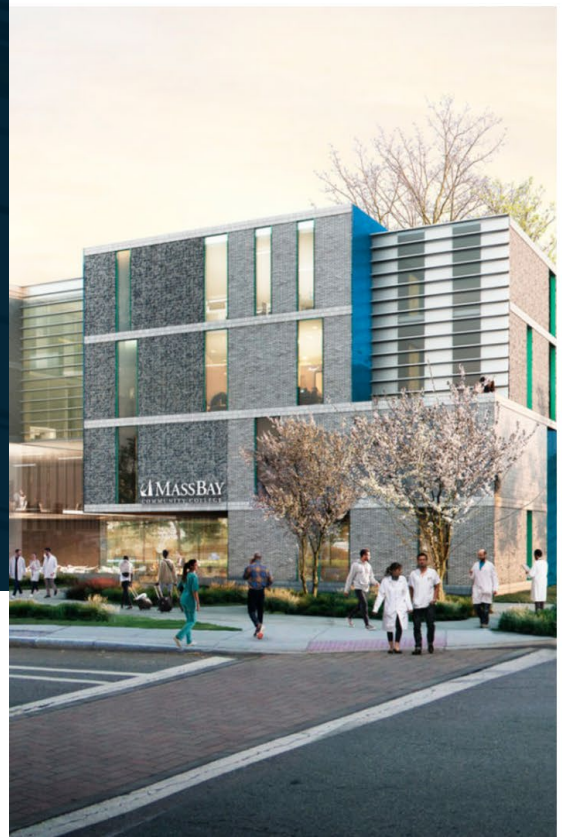
R-value: A measure of thermal resistance through one or more materials in a series. The use of the term R-value is regulated by several laws, codes and standards. R-values claimed by manufacturers for opaque thermal resistance should always be determined based on FTC 16 CFR Part 460, Labeling and Advertising of Home insulation Trade Regulations. R-value is the reciprocal of U-factor. Higher R-values mean better thermal resistance.

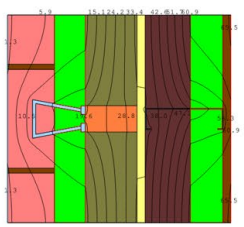
Thermal performance of fenestration is expressed as U-factor for the assembly.

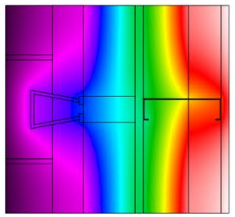
Rated R-value, Rated U-factors, Assembly U-factors, Overall U-factors, Effective R-values are terms found in ASHRAE 90.1 Normative Appendix A to assist in everyday determination of the thermal performance of the building enclosure, typically when insulation is interrupted by framing.

Area weighted U-factor: The thermal performance value for an assembly considering the relative areas ands U-factors of each material as determined per *ASHRAE Fundamentals*. Area-weighting can be used to estimate effect of thermal bridging.

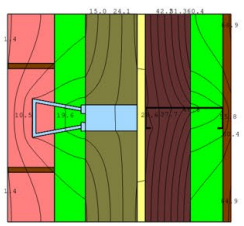
Area Weighted Averages

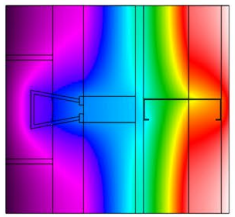




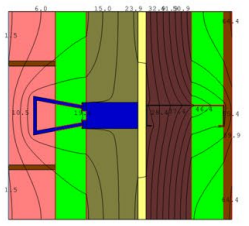


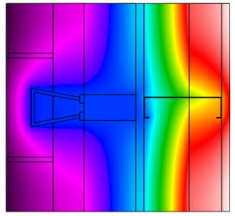
Option 1a: FRP & SS Brick Tie
4" ROCKwool Outboard + 3.5" BATT
Inboard Insulation
2" FRP & SS Brick Tie (16" OC)
R-Value = 7.9 h-ft2-F/BTU





Option 1b: SS Brick Tie
4" ROCKwool Outboard + 3.5" BATT
Inboard Insulation
2" SS Brick Tie (16" OC)
R-Value = 6.9 h-ft2-F/BTU



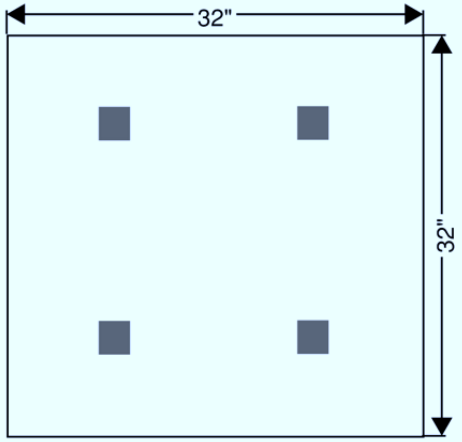


Option 1c: Aluminum Brick Tie
4" ROCKwool Outboard + 3.5" BATT
Inboard Insulation
2" Aluminum Brick Tie (16" OC)
R-Value = 6.2 h-ft2-F/BTU

Area Weighted Averages

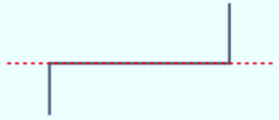
AREA WEIGHTED AVERAGES

The values provided are area weighted values where the area of 4 brick ties (2" wide) are accounted for in a 32" by 32" section. Areas are multiplied by their corresponding U-Factors, summed together, then divided by the total area (1024 in^2) to determine the recommended performance values. Refer to the Tie Section to see where the section cut is taken for all assemblies that model the ties/standoffs. These values are to aid the design process.



■ Area corresponds to the localized R-value for assemblies with ties.

□ Area corresponds to the localized R-value for assemblies without ties.

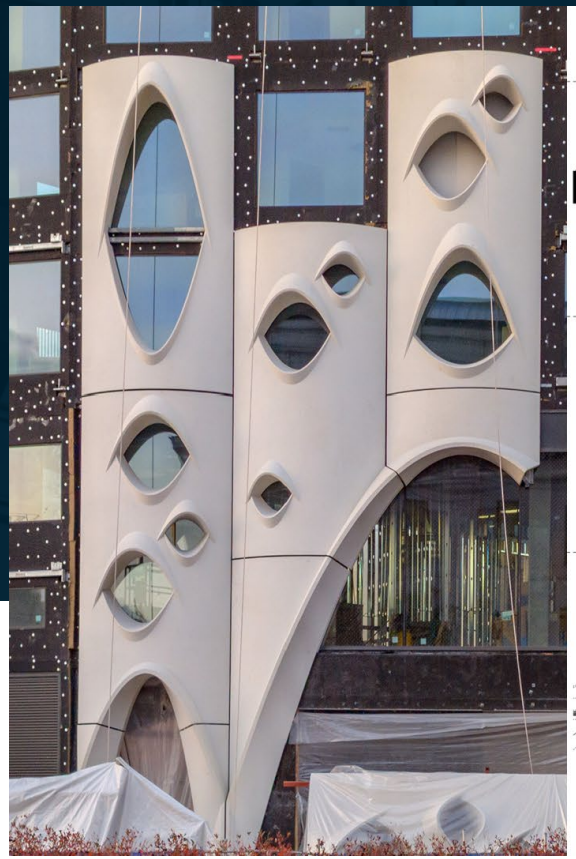


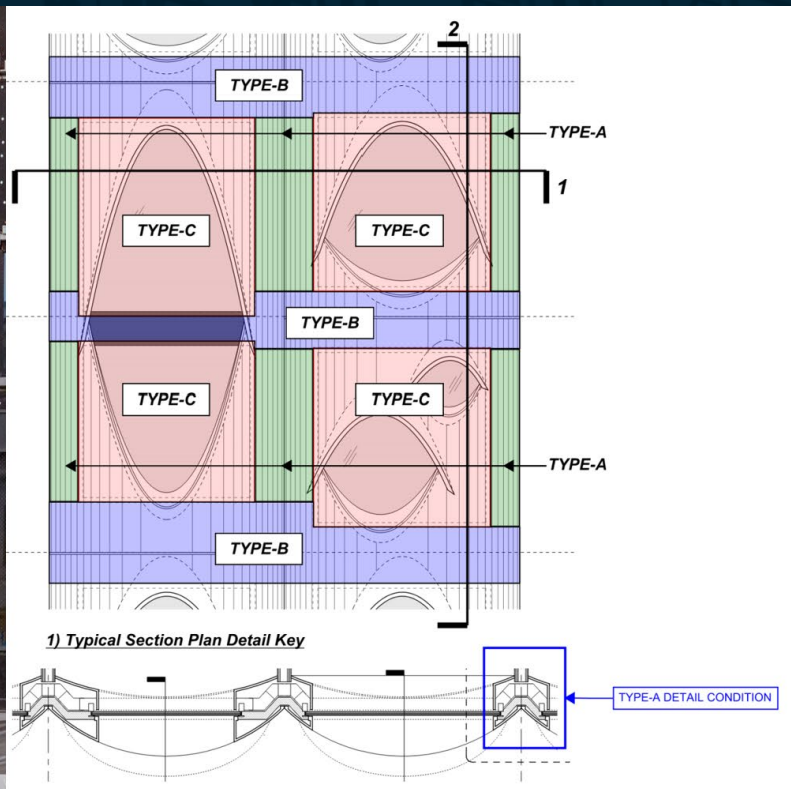
Tie Section

EWA-01 BRICK WALL W/ METAL STUD 16" OC

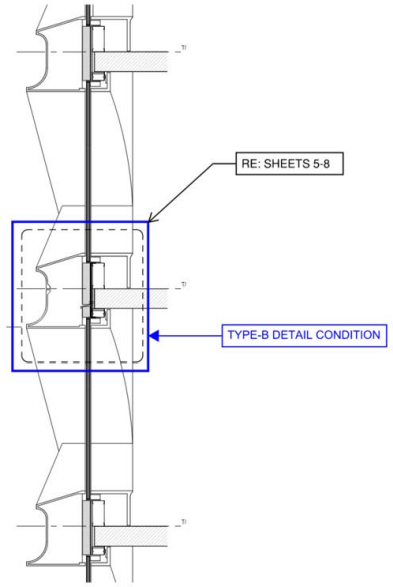
	R-VALUE	U-VALUE	AREA OF INFLUENCE (IN^2)	U-VALUE * AREA OF INFLUENCE
32" BY 32" WALL SECTION			1024	
OPTION 1: 4" ROCKwool Ci + 3.5" BATT Cavity				
Brick Wall w/o Brick Tie	24.4	0.041	992	40.7
Brick Wall w/ FRP & SS Tie	7.9	0.127	32	4.1
Brick Wall w/ SS Tie	6.9	0.145	32	4.6
Brick Wall w/ Aluminum Tie	6.2	0.161	32	5.2
OPTION 2: 4" XPS Ci + 3.5" BATT Cavity				
Brick Wall w/o Brick Tie	27.1	0.037	992	36.61
Brick Wall w/ FRP & SS Tie	7.9	0.127	32	4.1
Brick Wall w/ SS Tie	6.9	0.145	32	4.6
OPTION 3: 6" ROCKwool Ci + 3.5" BATT Cavity				
Brick Wall w/o Brick Tie	32	0.031	976	30.5
Brick Wall w/ FRP & SS Tie	7.4	0.135	48	6.5
Brick Wall w/ SS Tie	5.8	0.172	48	8.3
OPTION 4: 4" ROCKwool Ci + 6" BATT Inboard Insulation				
Brick Wall w/o Brick Tie	25.8	0.039	992	38.4
Brick Wall w/ FRP & SS Tie	10	0.100	32	3.2
Brick Wall w/ SS Tie	9	0.111	32	3.6
OPTION 5: 4" ROCKwool Ci + 1.5" Closed Cell Spray Foam Inboard				
Brick Wall w/o Brick Tie	23	0.043	992	43.1
Brick Wall w/ FRP & SS Tie	6	0.167	32	5.3
Brick Wall w/ SS Tie	4.9	0.204	32	6.5
OPTION 6: 4" ROCKwool Ci + 1.5" Open Cell Spray Foam Inboard				
Brick Wall w/o Brick Tie	21	0.048	992	47.2
Brick Wall w/ FRP & SS Tie	4.7	0.213	32	6.8
Brick Wall w/ SS Tie	3.6	0.278	32	8.9

Area Weighted Averages





1) Typical Section Plan Detail Key



2) Typical Section Detail Key

APPROXIMATE PANEL AREAS:

- OVERALL PANEL AREA: 435 SF
- TYPE A AREA: 68 SF (15.6%)
- TYPE B AREA: 147 SF (33.8%)
- TYPE C AREA: 220 SF (50.6%)

Next Steps & Future Phases

Phase 1:

“Heat, Air, and Moisture Control Layers” Issued 2020

Phase 2:

“Fenestration Terms”

Issue Summer 2024

Phase 3:

“Building Performance Strategies For Climate Action”

Thank You