STONE TYPE AND CURTAIN WALL VERTICAL MULLIONS

- JOSE L. CABRERA
- ARCH2431
- PROF. PAUL KING

THIN STONE WALL SYSTEMS

INTRODUCTION

• Thin stone wall systems used for exterior building envelopes typically consist of stone panels ranging in thickness from 3/4 inches to 2 inches. Most panels are fabricated from granite, while marble; limestone, travertine, and sandstone are also used to a lesser extent. A common panel thickness is 1-3/16 inch (3 cm). Overall panel dimensions can vary significantly for different buildings, depending on the strength of the stone used and architectural affect desired. However, maximum panel dimensions are usually approximately 3 to 4 feet and usually not more than approximately 6 feet. Typically each panel is independently supported to the building structure or back up system using an assemblage of metal components and anchors. Joints at the perimeter of each panel are usually 3/8 inch in width and are filled with sealant. A drainage cavity is typically located behind the stone panels to collect and divert to the exterior water that penetrates through the joints.

STONE TYPES

• Granite is the most commonly used stone type in thin stone wall systems. The commercial classification of granite usually refers to a stone that includes any visibly granular igneous rock consisting of mostly feldspar and quartz minerals. This commercial term encompasses a wide variety of geologic stone types rather than only the limited number that fall under the geologic classification of granite. Geologically, marble is a metamorphic rock resulting from the recrystallization of limestone. While less commonly used in this type of application today, marble is also sometimes used in thin stone wall systems. Commercially, the term marble refers to many rocks with a wide variety of geologic classifications. These can be true marbles of calcite and dolomite, as well as dense limestones which will polish, serpentine rocks, and travertine. Sedimentary rocks such as limestone and sandstone can also be used in thin stone wall systems. However, panels fabricated from these stone types are usually not less than 2 inches in thickness because of the lesser strengths of these stones relative to granite and marble. Commercially, limestone refers to rocks that are both limestone and dolomite. Sandstone belongs to the commercial "quartz-based" group which includes stones with high quartz and silica contents.

SUPPORT AND ANCHORAGE SYSTEMS

- There are two primary types of stone installation. The first is the "hand-set" method, in which each stone is individually attached to the building's primary structural frame or onto a secondary wall framing system. The second is the panelized installation method, in which the stone panel or multiple panels are preinstalled onto a frame or attached to a precast concrete panel. The frames or panels are transported to the building, where the entire assembly is attached to the building's structural frame or secondary structural members or framing system.
- In either installation system, anchors must be used to attach and support the stone panels to the building's primary or secondary framing system, or to the panelized system frame or element. Anchors that are in direct contact with stone are usually constructed of non-corroding metals such as Type 304 stainless steel or aluminum.

HAND-SET SYSTEMS

Panelized Systems

There are numerous types and styles of anchors used to support and anchor individual stone panels. Commonly used anchor types include:

- Kerf supported stone with stainless steel or aluminum angles
- Side supports, dowels, straps, and disks
- Undercut anchor
- Embedded Adhesive Pin Anchor

- Precast Systems
- Steel Truss Systems

JOINTS AND JOINT TREATMENTS

• Depending upon the overall design of the wall assembly and manner in which the stone is set, the appropriate use of these materials will vary from project to project. Joint mortar should be carefully evaluated relative to mix design and compressive strength, particularly with regard to load transfer (either intentional or inadvertent), bond intimacy (necessary for improved water penetration resistance) and the potential for moisture and/or thermally-induced degradation/spalling of the mortar and/or surrounding stone. Joint sealant should be carefully evaluated for elongation and movement capacity, adhesion, cohesion, and staining of stone substrates. Epoxies should be evaluated for adhesion and bond strength, as well as UV stability.

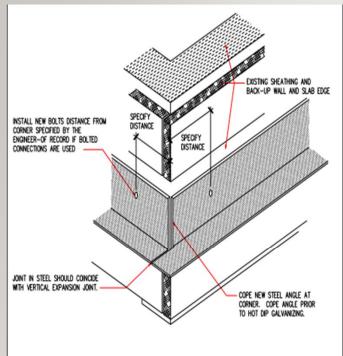
JOINTS AND JOINT TREATMENTS

• Joint profiles on exterior wall surfaces should also be designed with a positive slope to shed rainwater away from the building in a manner that will prevent "ponding" of water along the joint. When designing for joint sealant, overall joint widths should be designed to accommodate differential thermal movement between individual stone veneer panels without damage to the stone substrate or failure of the sealant. Joint configurations should also be designed to conform to the sealant manufacturer's guidelines and applicable industry standards for width-to-depth ratios, and minimum bond surfaces at joint substrates.

COMMON BACKUP WALL ELEMENTS

- Insulation
- Air and moisture barrier
- Metal stud framing
- CMU
- Flashing

DETAILS ILLUSTRATIONS



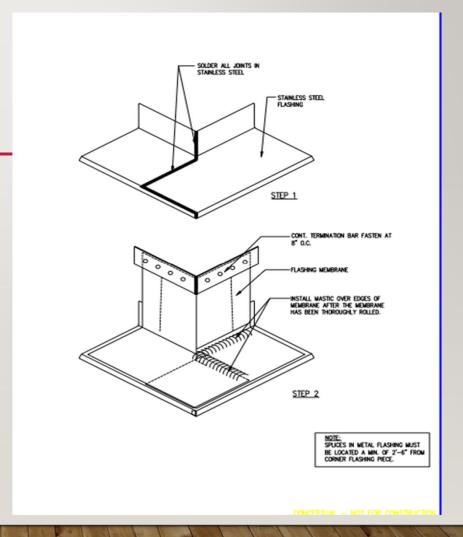
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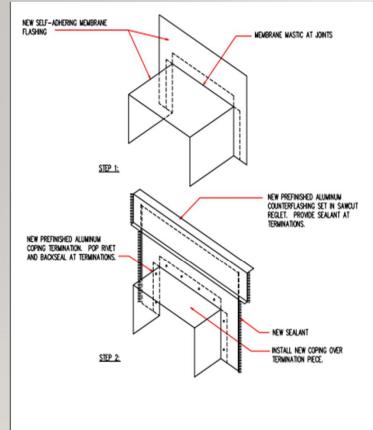
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MASONRY TYPICAL SHELF ANGLE OUTSIDE CORNER





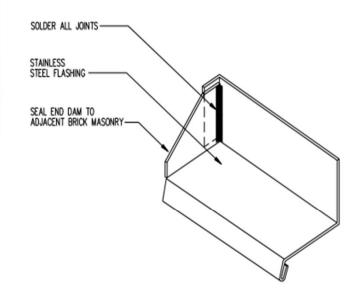
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> MASONRY TYPICAL COPING TERMINATION



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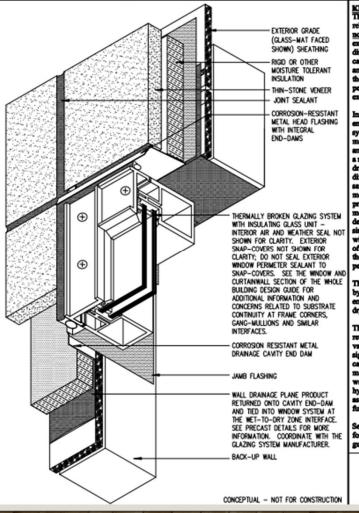
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> MASONRY TYPICAL END DAM -STAINLESS STEEL SHOWN

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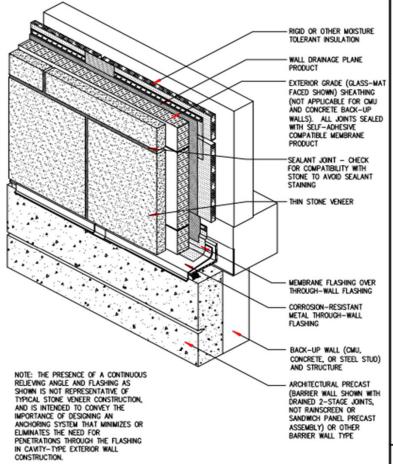
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> STONE VENEER HEAD AND JAMB FLASHING -OVERALL DETAIL



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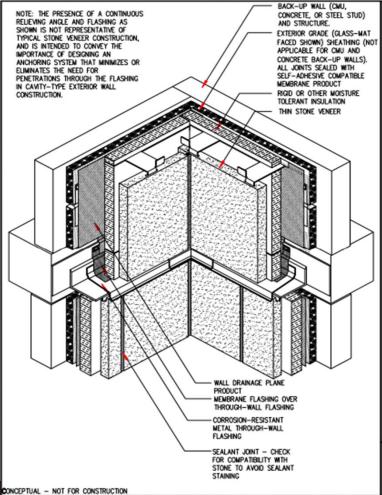
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STONE VENEER TO PRECAST HORIZONTAL INTERFACE -OVERALL DETAIL



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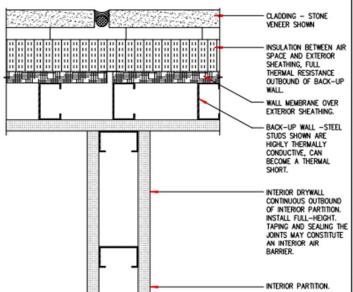
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> STONE VENEER INSIDE CORNER -OVERALL DETAIL



THE INTERIOR WALL NEEDS TO BE SEPARATED FROM EXTERIOR WALLS.

RUN THE INTERIOR DRYWALL CONTINUOUS AT EXTERIOR WALLS PRIOR TO INSTALLING PARTITION FRAMING.

INSTALL SEALANT AT TOP AND BOTTOM PLATES.

THE INTERIOR DRYWALL IS TO RUN CONTINUOUS FOR THE FULL HEIGHT (SLAB TOP TO SLAB SOFFIT (ABOVE))
BETWEEN FLOORS. IT SHOULD NOT STOP AT THE DROP CEILING OR ABOVE A RAISED ACCESS FLOOR. NOT
DOING SO MAY CREATE AN ACCIDENTAL PLENUM BETWEEN THE EXTERIOR WALL AND THE INTERIOR
PARTITION, RAISED ACCESS FLOOR AND/OR DROP CEILING.

ALL JOINT SEALANT IN CONTACT WITH NATURAL STONE CLADDING SHALL BE TESTED PRIOR TO CONSTRUCTION FOR ADHESION, MOVEMENT CAPACITY, AND STAIN RESPONSE IN ACCORDANCE WITH APPLICABLE ASTIM STANDARDS. COMPLETE FIELD PEL—ADHESION TESTING OF INSTALLED JOINT SEALANT BY A QUALIFIED TECHNICAL REPRESENTATIVE OF THE SEALANT MANUFACTURER.

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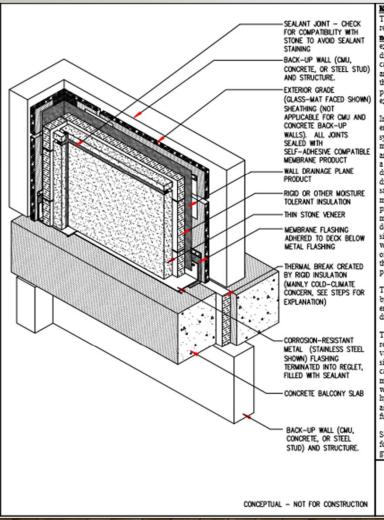
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INTERFACE BETWEEN INTERIOR AND EXTERIOR WALL



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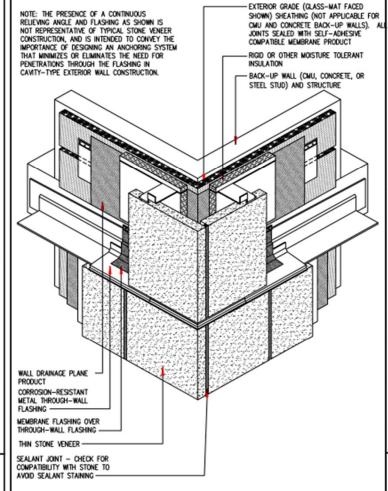
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> STONE VENEER INTERFACE WITH BALCONY -OVERALL DETAIL



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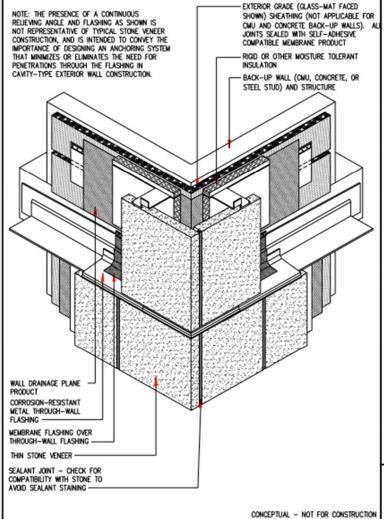
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STONE VENEER OUTSIDE CORNER -OVERALL DETAIL



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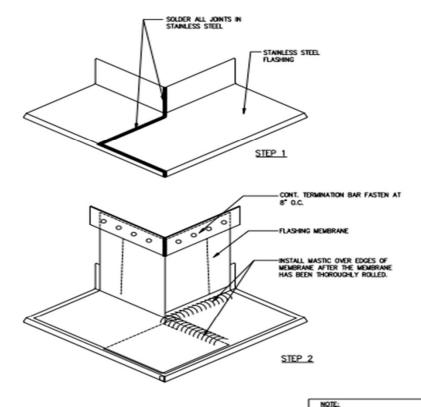
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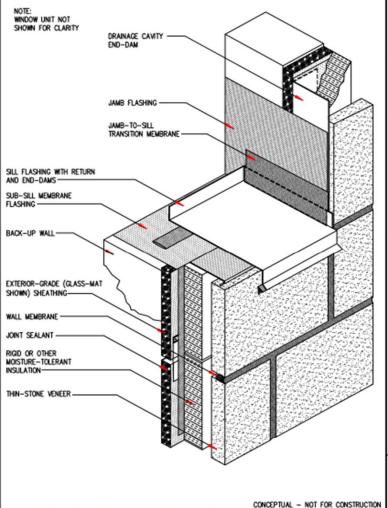
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NOTE: SPUCES IN METAL FLASHING MUST BE LOCATED A MIN. OF 2"-6" FROM CORNER FLASHING PIECE.



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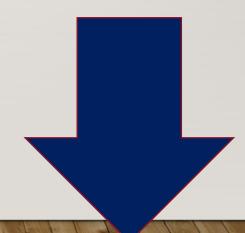
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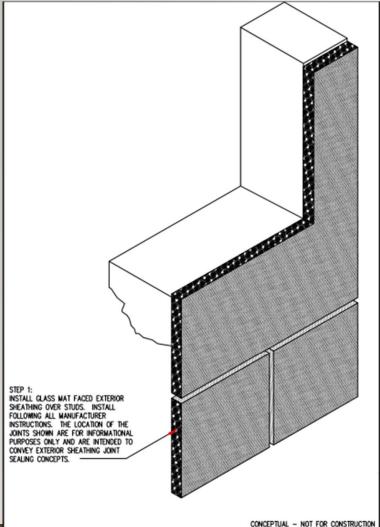
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STONE VENEER SILL AND JAMB FLASHING -OVERALL DETAIL

Stages of Details





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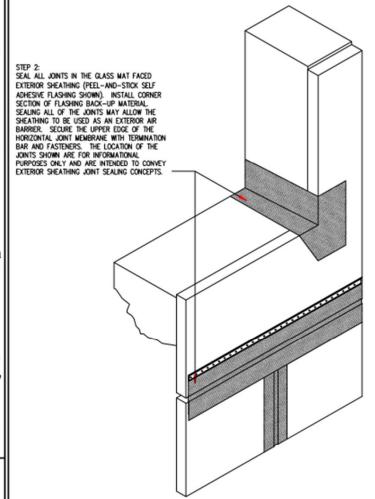
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> STONE VENEER SILL AND JAMB FLASHING -STEP 1



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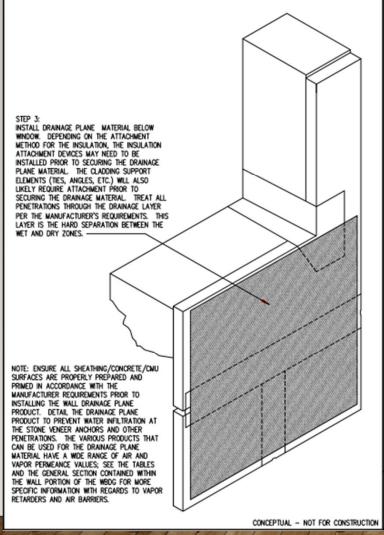
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> STONE VENEER SILL AND JAMB FLASHING -STEP 2



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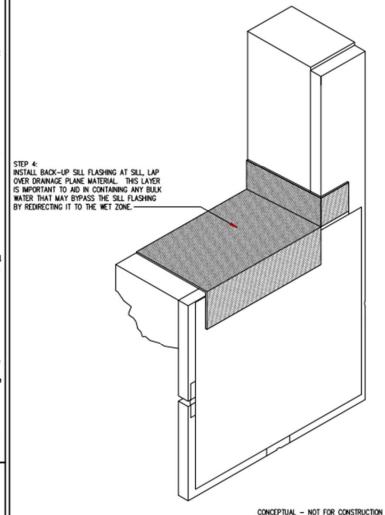
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> STONE VENEER SILL AND JAMB FLASHING -STEP 3



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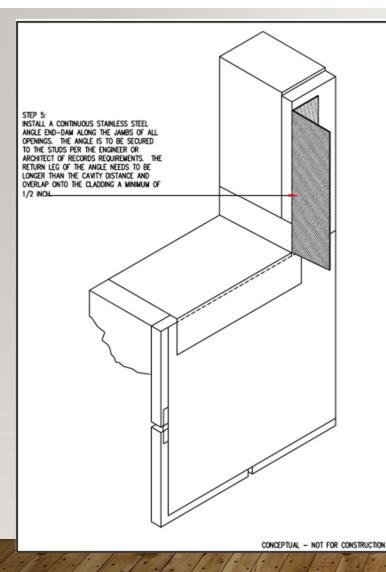
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STONE VENEER SILL AND JAMB FLASHING -STEP 4



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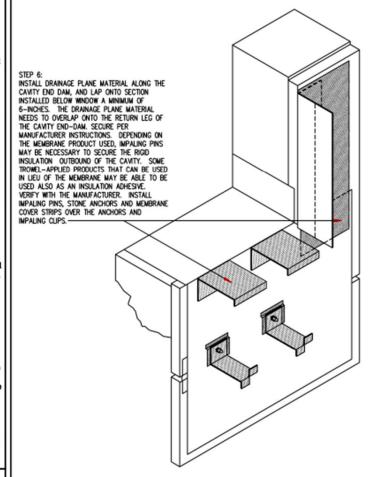
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> STONE VENEER SILL AND JAMB FLASHING -STEP 5



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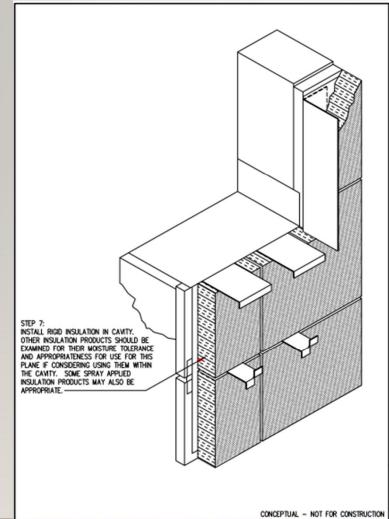
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> STONE VENEER SILL AND JAMB FLASHING -STEP 6



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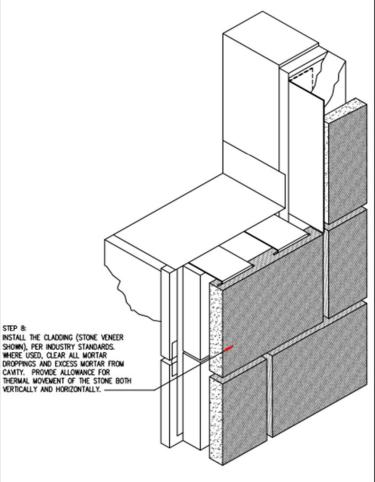
Interface conditions between building envelope materials, components and systems should be fully detailed in a manner that is both technically sound and serviceable. Detailing should, at a minimum, allow for coordination of drainage planes when two or more different wall types are used in the same faced; allow for thermal and moisture-induced changes in material properties and differential thermal movement; and allow for in-service deflection, shrinkage, creep and similar behavior considered to be within the allowable structural limits of the project without compromise to the weather-tight integrity and thermal performance of the building envelope.

The air barrier can either be formed by an exterior side air barrier or by employing the interior side airtight drywall approach.

The location of or need for a vapor retarder within wall assemblies will vary based upon climate, and can be significantly influenced by the storage capacity and vapor permeance of the materials selected for each layer of the wall system. A climate-specific, hygrothermal analysis for any wall assembly should be considered to further evaluate this concern.

See the General section of the WBDG for additional information and guidance.

> STONE VENEER SILL AND JAMB FLASHING -STEP 7



KEY CONCEPTS:

The dimensions and material relationships shown in this detail are not to scale and have been exaggerated for clarity. Actual dimensions will vary, and should be carefully coordinated with sequencing and construction tolerances to ensure the long-term durability and performance of this and similar exterior wall details.

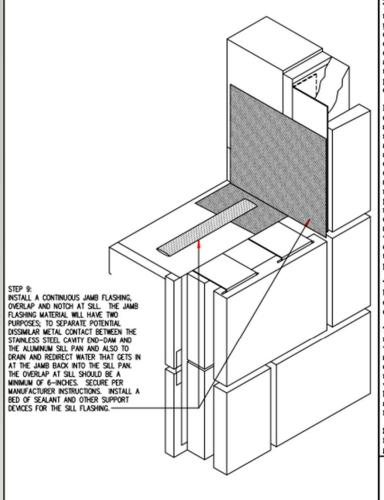
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> STONE VENEER SILL AND JAMB FLASHING -STEP 8



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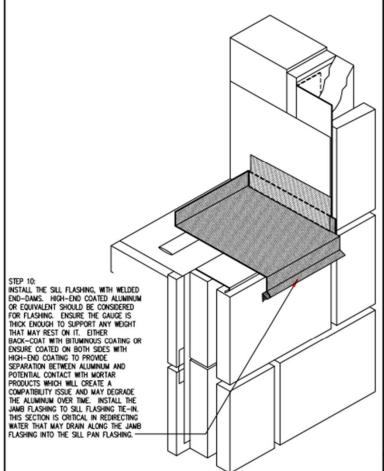
The air barrier can either be formed by an exterior side air barrier or by employing the interior side airtight drywall approach.

The location of or need for a vapor retarder within wall assemblies will vary based upon climate, and can be significantly influenced by the storage capacity and vapor permeance of the materials selected for each layer of the wall system. A climate-specific, hygrothermal analysis for any wall assembly should be considered to further evaluate this concern.

See the General section of the WBDG for additional information and guidance.

> STONE VENEER SILL AND JAMB FLASHING -STEP 9

CONCEPTUAL - NOT FOR CONSTRUCTION



KEY CONCEPTS:

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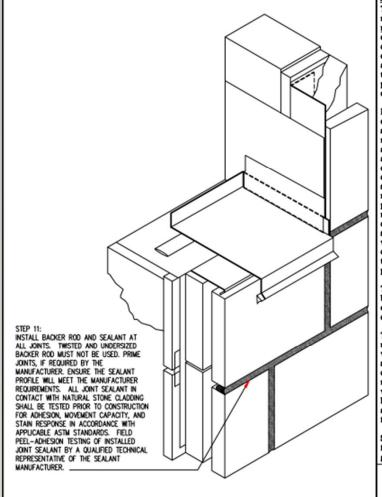
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> STONE VENEER SILL AND JAMB FLASHING -STEP 10



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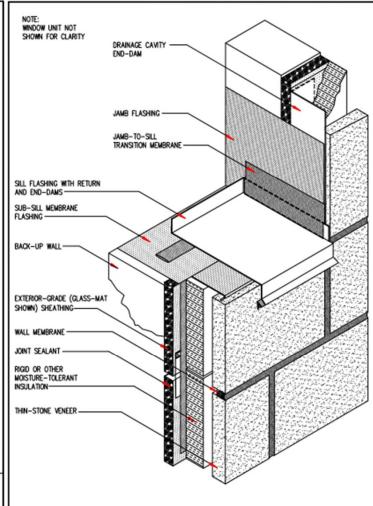
The air barrier can either be formed by an exterior side air barrier or by employing the interior side airtight drywall approach.

The location of or need for a vapor retarder within wall assemblies will vary based upon climate, and can be significantly influenced by the storage capacity and vapor permeance of the materials selected for each layer of the wall system. A climate-specific, hygrothermal analysis for any wall assembly should be considered to further evaluate this concern.

See the General section of the WBDG for additional information and guidance.

> STONE VENEER SILL AND JAMB FLASHING -STEP 11

CONCEPTUAL - NOT FOR CONSTRUCTION



KEY CONCEPTS:

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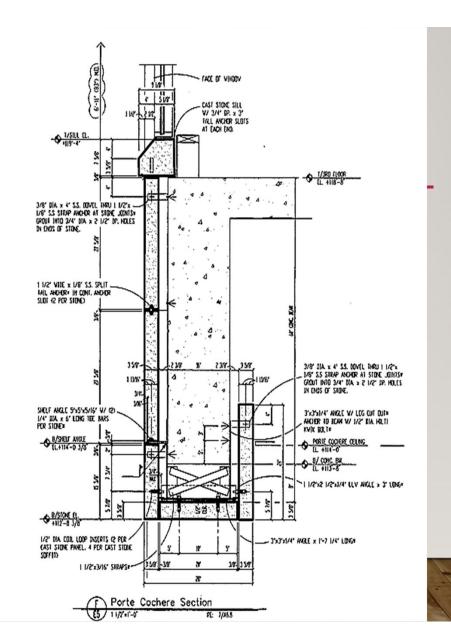
The location of or need for a vapor retarder within wall assemblies will vary based upon climate, and can be significantly influenced by the storage capacity and vapor permeance of the materials selected for each layer of the wall system. A climate-specific, hygrothermal analysis for any wall assembly should be considered to further evaluate this concern.

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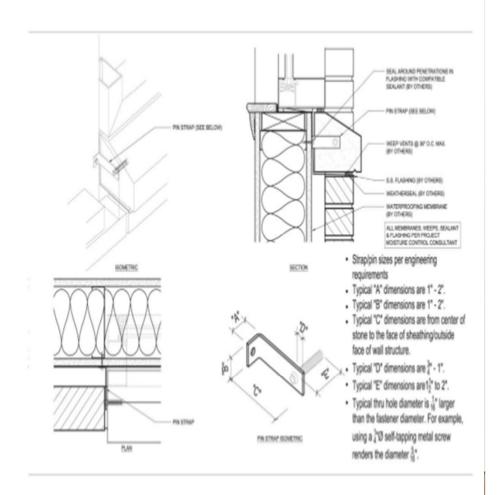
> STONE VENEER SILL AND JAMB FLASHING -OVERALL DETAIL

EACH ENTRY OF THE COMPLEX WAS MADE EYE-APPEALING BY THE EXCLUSIVE USE OF CAST STONE IS ATTACHED TO STEEL THROUGH THE USE OF STAINLESS STEEL COIL LOOP INSERTS, SPLIT TAIL ANCHORS, SHELF ANGLES AND STRAP ANCHORS. CAST STONE JOINTS ARE CLOSED BY USING BACKER ROD AND

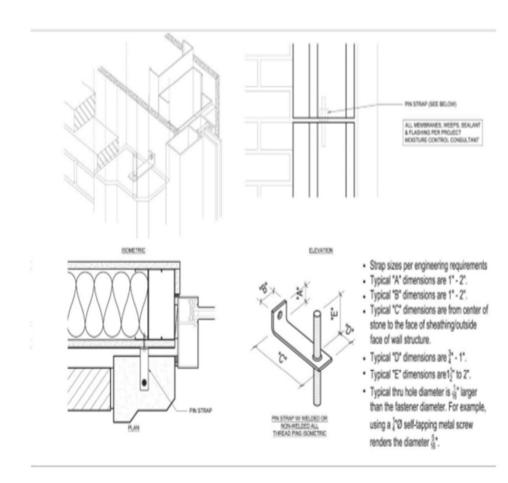
SEALANT.



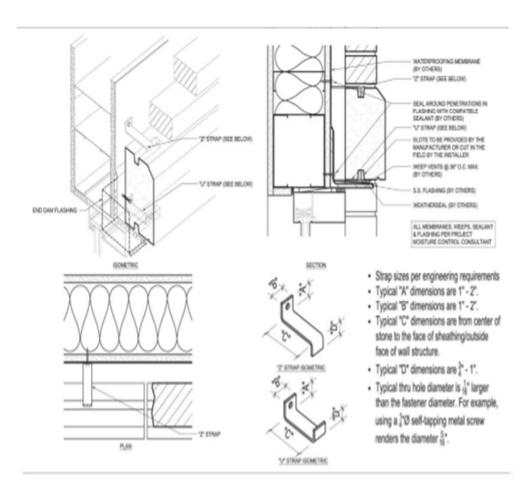
SILL - DETAIL #1



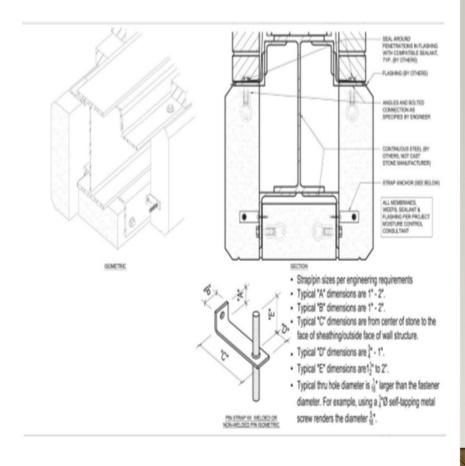
JAMB - DETAIL #1



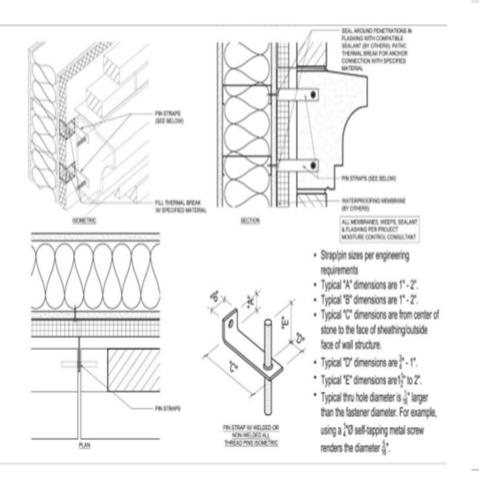
ANCHORING & FLASHING HEADER - DETAIL #1



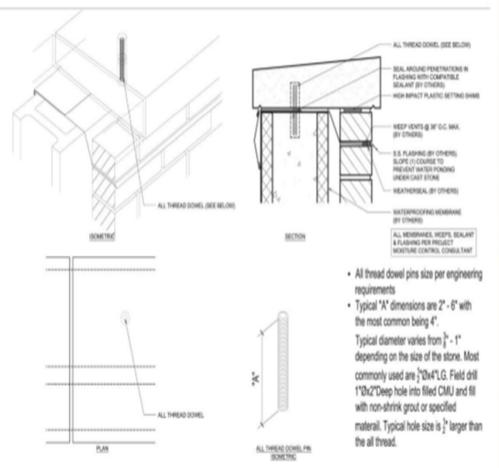
FASCIA/SOFFIT - DETAIL #1

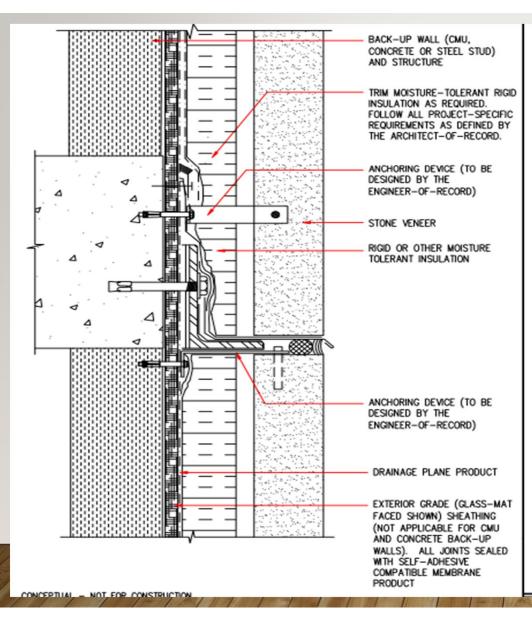


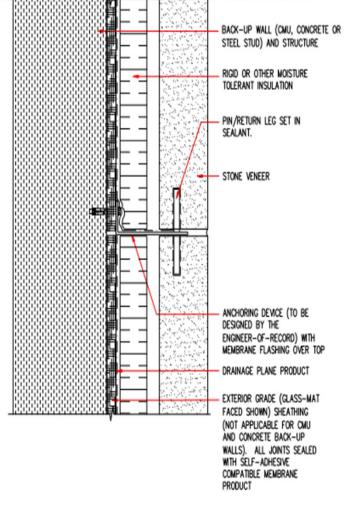
CORNICE - DETAIL #1



COPING - DETAIL #3







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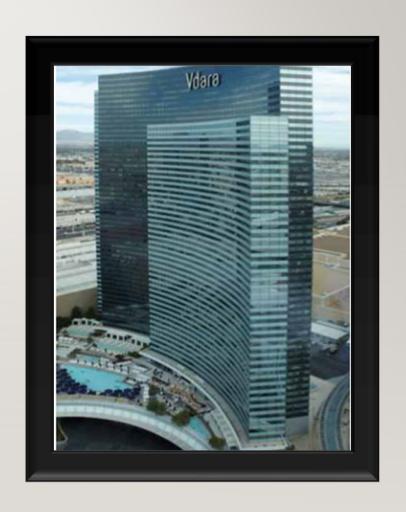
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STONE VENEER
DRAINAGE PLANE
CONTINUITY AT
ANCHORING DEVICE

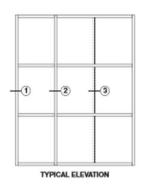
CURTAIN WALL VERTICAL MULLIONS



Typical Details

VERTICAL MULLIONS FOR 2" (51) TRIPLE GLAZING

NOTE: Part numbers shown are available in 24' (7.3 m) stock lengths. Visit usalum.com for more information.



High Performance Thermally Broken • Series HP3253

Series HP3253SG

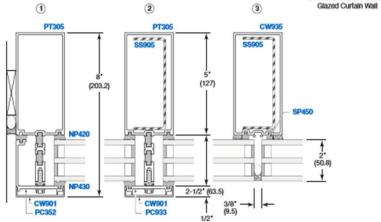
Patent No. 7,975,442



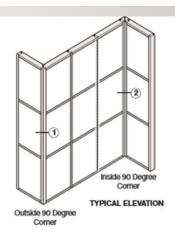
Captured Vertical Glazed Curtain Wall



SERIES HP3253SG Structural Silicone Vertical



NOTE: Part numbers shown are available in 24' (7.3 m) stock lengths. Visit usalum.com for more information.



· Jelies meszos Patent No. 7,975,442



Q sym.

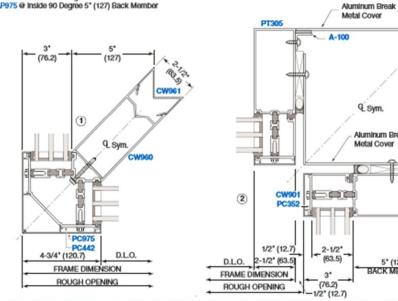
Aluminum Break

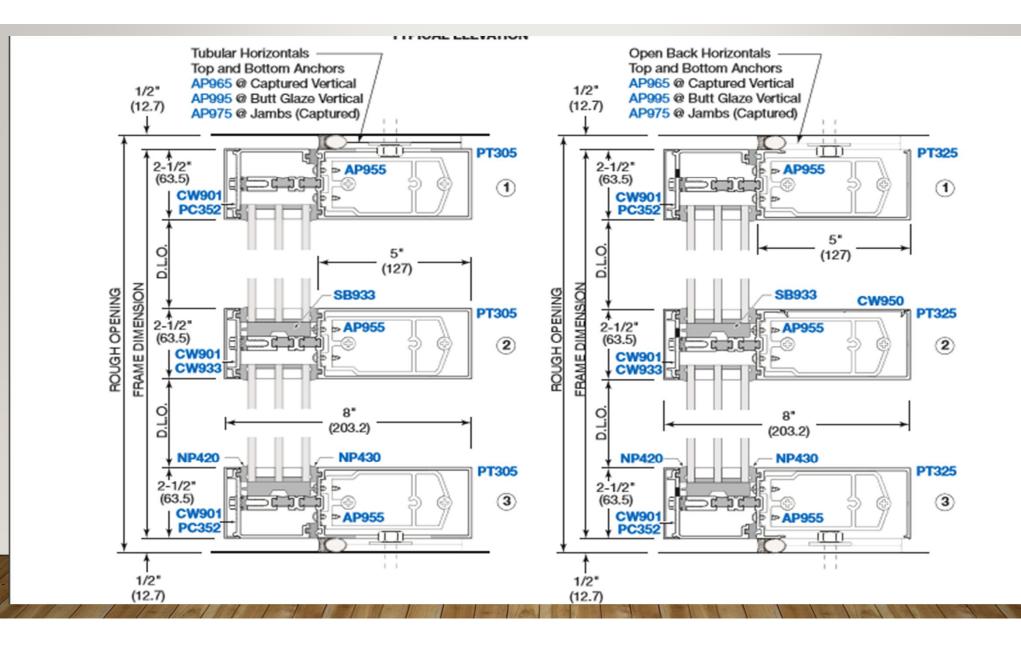
5" (127) BACK MEMBER

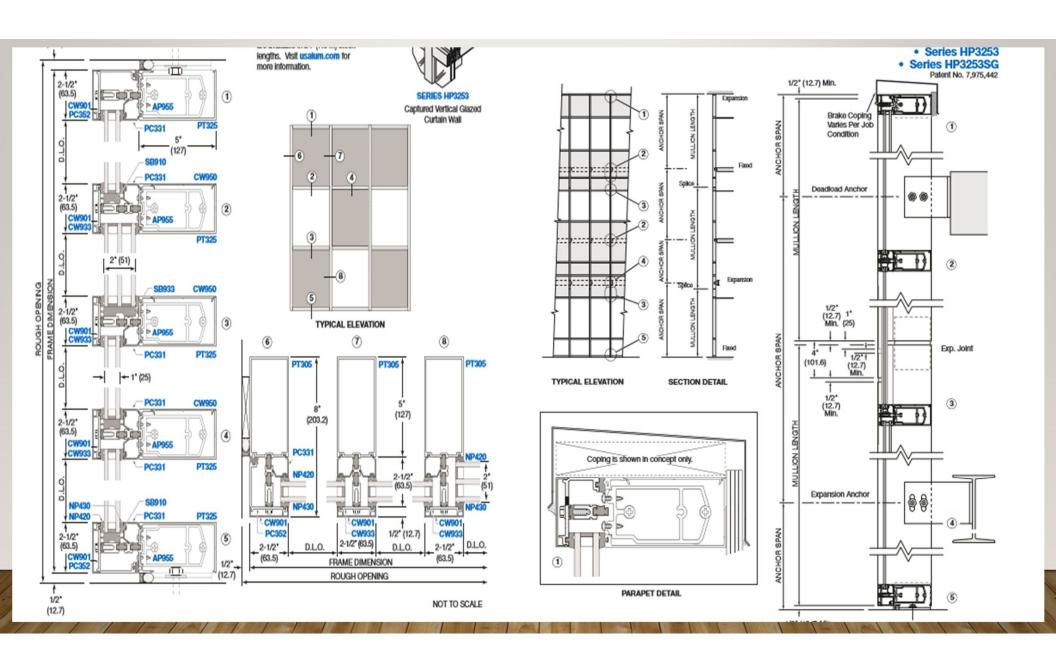
PT305

Metal Cover

Top and Bottom Anchors AP960 @ Outside 90 Degree
AP975 @ Inside 90 Degree 5* (127) Back Member



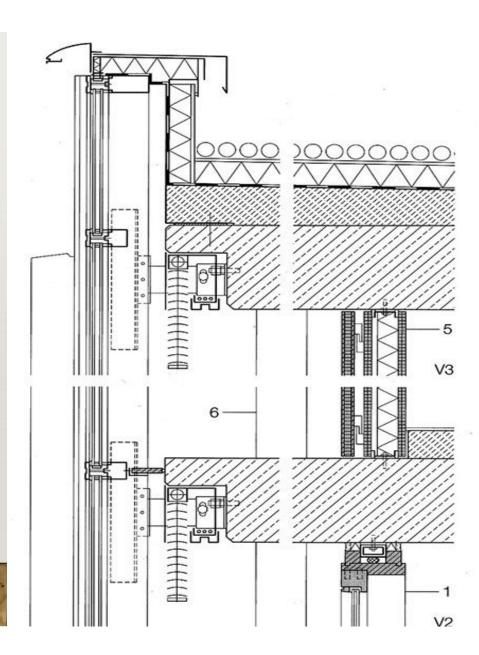


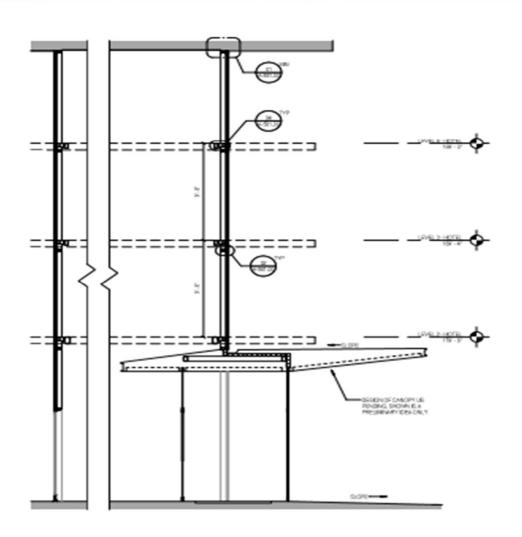


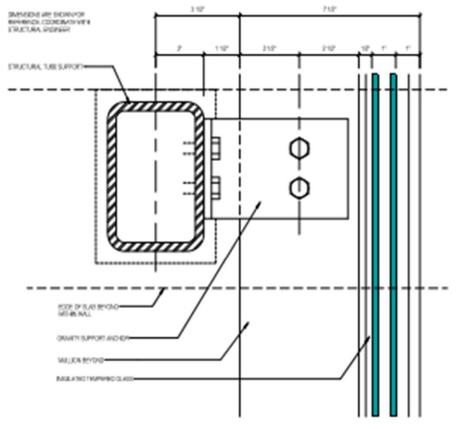
PART NO.	DETAIL	DESCRIPTION	PKG. QTY.
AP965	\Diamond	Intermediate Vertical Anchor at Head and Sill for PT605	12
AP995	\Rightarrow	Intermediate Vertical Anchor at Head and Sill for CW935	12
AP975		Wall Jamb Anchor at Head and Sill for PT605	6
AP960		Outside 90 Degree Corner Anchor at Head and Sill for CW960	12
SL945		Multion Splice Sleeve for PT605	12
SL935		Mullion Splice Sleeve for CW935	12
SL960		Outside 90 Degree Corner Multion Splice Sleeve for CW960	5
NP430		Exterior Gasket	250' Roll
NP420		Interior Gasket	250' Roll
SP450	0.5	Spacer Gasket for Butt Glaze	250' Roll
RG720		Temporary Glass Retainer for 2* (51) Butt Glaze. Patent No. D295,952	50
AW901		Edge Block 1-7/16" x 2-1/2" (36.5 x 63.5)	100
AW900		Edge Block 11/16" x 2-1/2" (17.5 x 63.5)	50

PART NO.	DETAIL	DESCRIPTION	PKG. QTY.
AP955	\$	Intermediate Shear Block for 5* (127) Back Members (Includes Screws)	20
AP926		Shear Block Inside and Outside Corners (Includes Screws)	20
HD885		End Dam for Captured Mullions For 2" (51) Glass	50
ED503		End Dam for Butt Glaze Mullions for 2" (51) Glass	50
CP885	€	Closure Plate for Captured Mullions	50
CP948	₹	Closure Plate for Vertical Multions	50
CP953	₹	Closure Plate for Outside Corner	10
CW368		Temporary Glass Retainer for Captured Mullions	50
WD961		Water Dam for Outside Corner	10
MS222		Screw for Pressure Bar 1/4*-20 x 1*(25) HWHCS with SRG5	200
SB933		Setting Block for 2* (51) Glass; 4* (101.6) Long	100
SB910		Transition Glazing Setting Block for 1" (25) Glass; 4" (101.6) Long	100
SB925		Transition Glazing Setting Block for 1/4" (6) Glass; 4" (101.6) Long	100

Online usalum.com By Phone (800) 262-5151 Ext. 5305
Online crlaurence.com By Phone (800) 421-6144 Ext. 5305

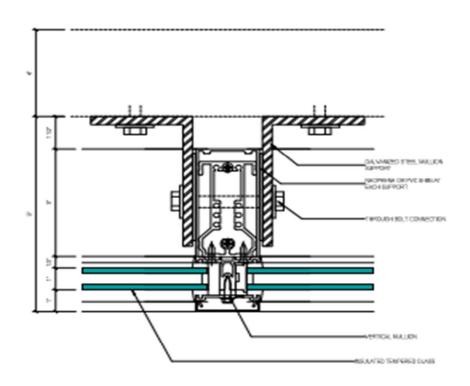


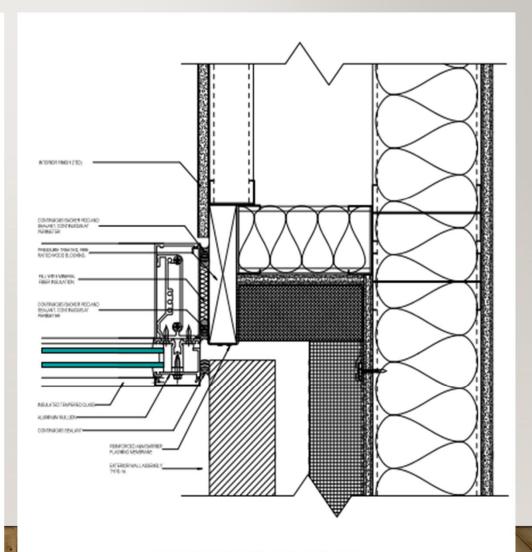




EXTERIOR CURTAIN WALL INTERMEDIATE MULLION DTL.

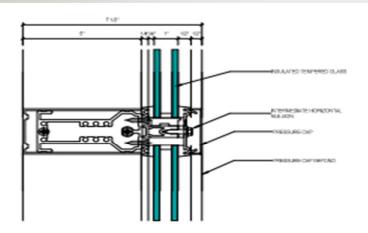
(04) AT SUPPORT



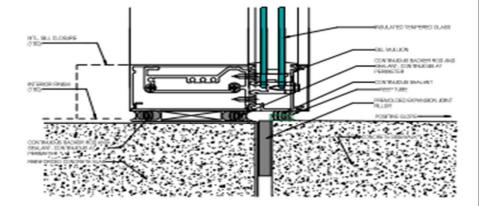


PLAN DETAIL AT INTERMEDIATE VERTICAL MULLION

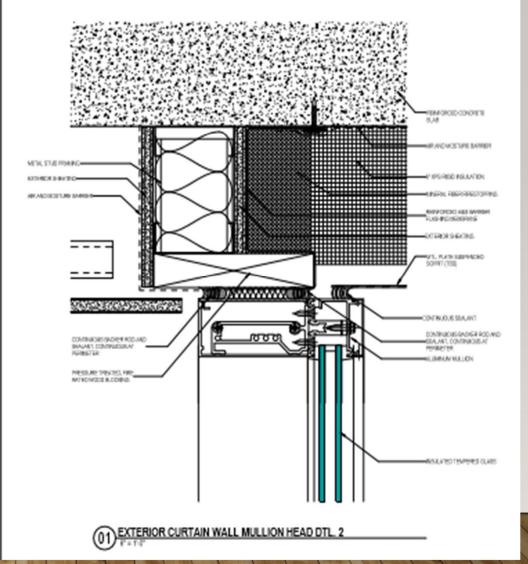
(05) EXTERIOR CURTAIN WALL DETAIL AT JAMB (TYP.)



(02) EXTERIOR CURTAIN WALL INTERMEDIATE MULLION DTL.



EXTERIOR SECTION DETAIL AT CURTAIN WALL SILL
(3) GROUND FLOOR HOTEL LOBBY



CITATIONS

- https://www.wbdg.org/guides-specifications/building-envelope-design-guide/wall-systems/thin-stone-wall-systems
- file:///E:/Class%2014%20Facades%20-%20Wall%20Sections%20and%20Details/Class%2014.15%20-%20CRL%20Curtain%20Wall%20DEtails.pdf