

WATERPROOFING PRE-CONSTRUCTION THRU CONSTRUCTION OBSERVATION

PROVIDER # 40119348

AIA COURSE # PEPPER-026

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Pepper Construction Company



2019 Spring Convention | April 8-10 | Jacksonville, Florida

Waterproofing
with **Aesthetics**
making it dry and appealing to the eye

WATERPROOFING PRE-CONSTRUCTION THRU CONSTRUCTION OBSERVATION



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This course is registered with AIA

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



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Course Description

Waterproofing installation can be complex and affect other trades. Making sure that expectations for installation are clear, is key to a successful project. This seminar will go over common waterproofing details, provide an understanding of what to review during the pre-installation meeting and what to look for during your construction observation review. Lessons learned from previous projects and pre-installation meetings will be reviewed and discussed throughout the meeting.

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Learning Objectives

1. Starting with the pre-installation meeting, understand how to set expectations early with the Waterproofing foreman and project team.
2. Review best practices regarding installation and understand what to look for during construction observation site reviews through job site photos.
3. Learn what waterproofing installation errors will affect other trades such as air vapor barrier, masonry flashing installation, and MEP installation.
4. Be able to apply what you have learned about waterproofing construction to the field during construction observation reviews.



Why do a
pre-installation
meeting?

NOW THAT A WATERPROOFING CONTRACTOR HAS BEEN CHOSEN...NOW WHAT?

- »»» Submittals
- »»» Two Coordination Meetings
 - »»» Building Envelope with all trades
 - »»» **WATERPROOFING PRE-INSTALLATION MEETING**
- »»» Mock-Up (Destructive) with building envelope trades
- »»» First Work in-place review
- »»» On-going job site review and verification (QC).



<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	REINFORCEMENT FABRIC	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	MEMBRANE	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	BLINDSIDE MEMBRANE	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	UNDERSIDE MEMBRANE	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	PROTECTION BOARD	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	DRAINAGE BOARD	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	COLD APPLIED MATERIAL	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	SEALANT	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	BACKER ROD	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	EXPANSION JOINT	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	TERMINATION BAR (Center of holes & how often fastened)	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	ROOT BARRIER	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	ELECTRONIC FIELD MAPPING DETECTION	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	ELECTRONIC FIELD MAPPING DETECTION – Pop-up point(s) and quantity of wires	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	INSULATION (type, thickness, etc)	



WHAT SUBMITTALS ARE REQUIRED...

- >>> Job Specific Quality Plan
- >>> Installation instructions
- >>> Data sheets of all components in the installation
- >>> Latest Manufacturer's Technical Bulletins (*project related*)
- >>> Hot or cold weather requirements (*as needed*)
- >>> Equipment to be used (*other than by hand*) to verify site logistics

Job Specific Details (*each location*)

- >>> Foundation Tie-in
- >>> Control Joints
- >>> Top of Foundation
- >>> Penetrations
- Openings
- Transition details
- Wall Expansion Joints
- Existing Tie-in



WHO IS NEEDED FOR A BUILDING ENVELOPE MEETING...

Design

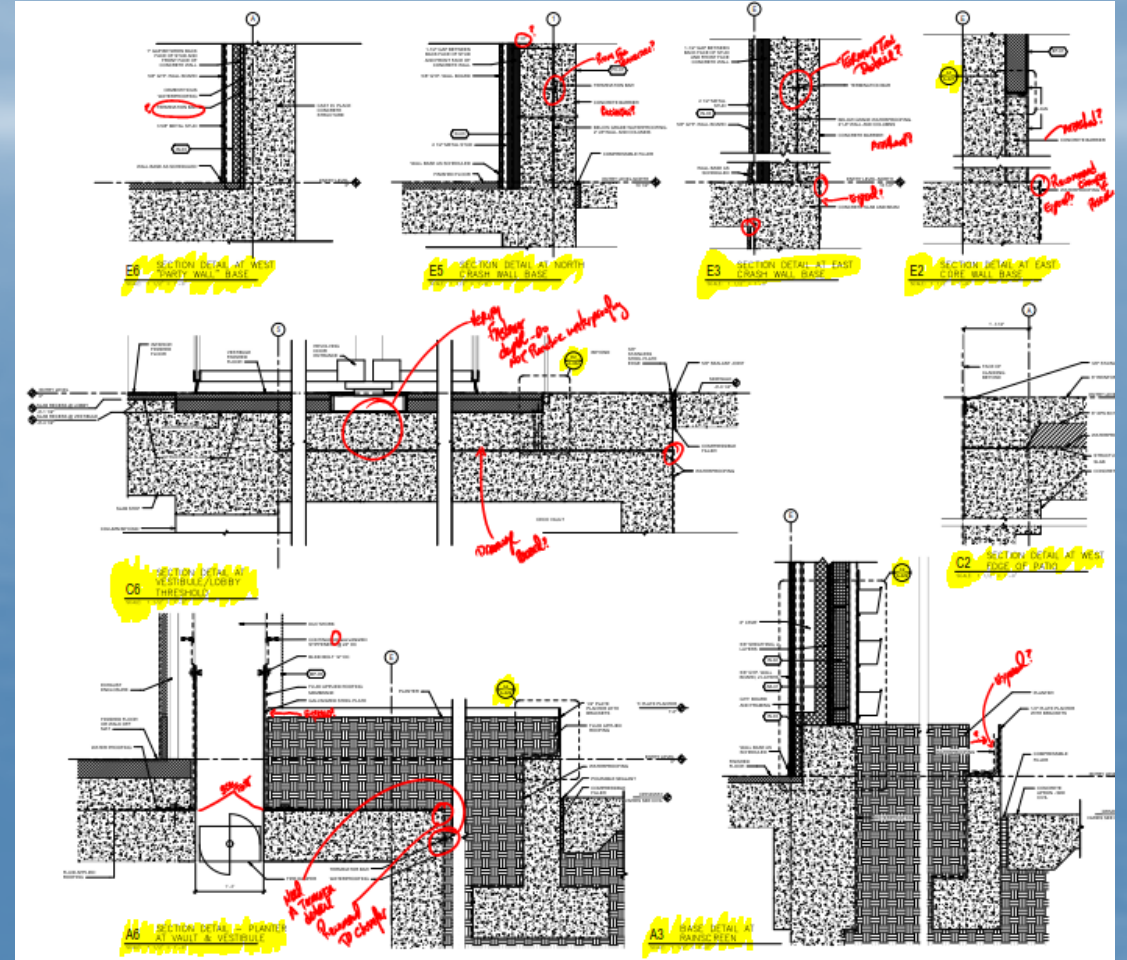
- Architect

Contractor

- General Contractor
- General Contractor Quality

Trades

- Concrete
- CFMF / Sheathing (if used)
- Masonry
- Air Barrier
- Exterior Skin Contractor (Metal Panel, EIFS, Etc.)
- Curtainwall / Window
- Roofing
- Wood Blocking / General Trades



WHO & WHAT IS NEEDED FOR A PRE-INSTALLATION MEETING...

- »»» Expectations
- »»» Specifications
- »»» Drawings
- »»» Building Envelope Meeting Minutes
- »»» Subcontractor Scope of Work
- »»» Submittals
- »»» Testing Criteria
- »»» Minimum time allotted 2-3 hours

Design

- Architect & Consultant
- Field observer

Contractor

- General Contractor
- General Contractor Quality
- Sub Contractor – **FOREMAN A MUST**
- Manufacturer(s)

Owner

- Owner
- Testing Agency

NO PRECONCEIVED IDEAS

The team must be open to understanding the requirements, sometimes new, for the exact product that is being installed or being installed adjacent too...



“YOU MUST UNLEARN WHAT YOU HAVE LEARNED”

TYPE OF WATERPROOFING BEING REVIEWED?

»»» **Below / Above Grade**

»»» **Positive side**

»»» **Negative side**

»»» **Blind Side**

»»» **Liquid**

»»» **Self-adhered sheet membrane**

»»» **Mechanically fastened sheet**

»»» **Bentonite**

»»» **Solider & Lagging**

»»» **Sheet Piles**

»»» **Whalers**

»»» **Secant Piles**

»»» **Foundation Wall**

»»» **Elevator**

»»» **Tunnel**

»»» **Plaza**

EACH PROJECT SHOULD HAVE A JOB SPECIFIC QUALITY PLAN



CONTRACTORS EXPERIENCE

Has your Team ever installed the specified product before? If so, when?

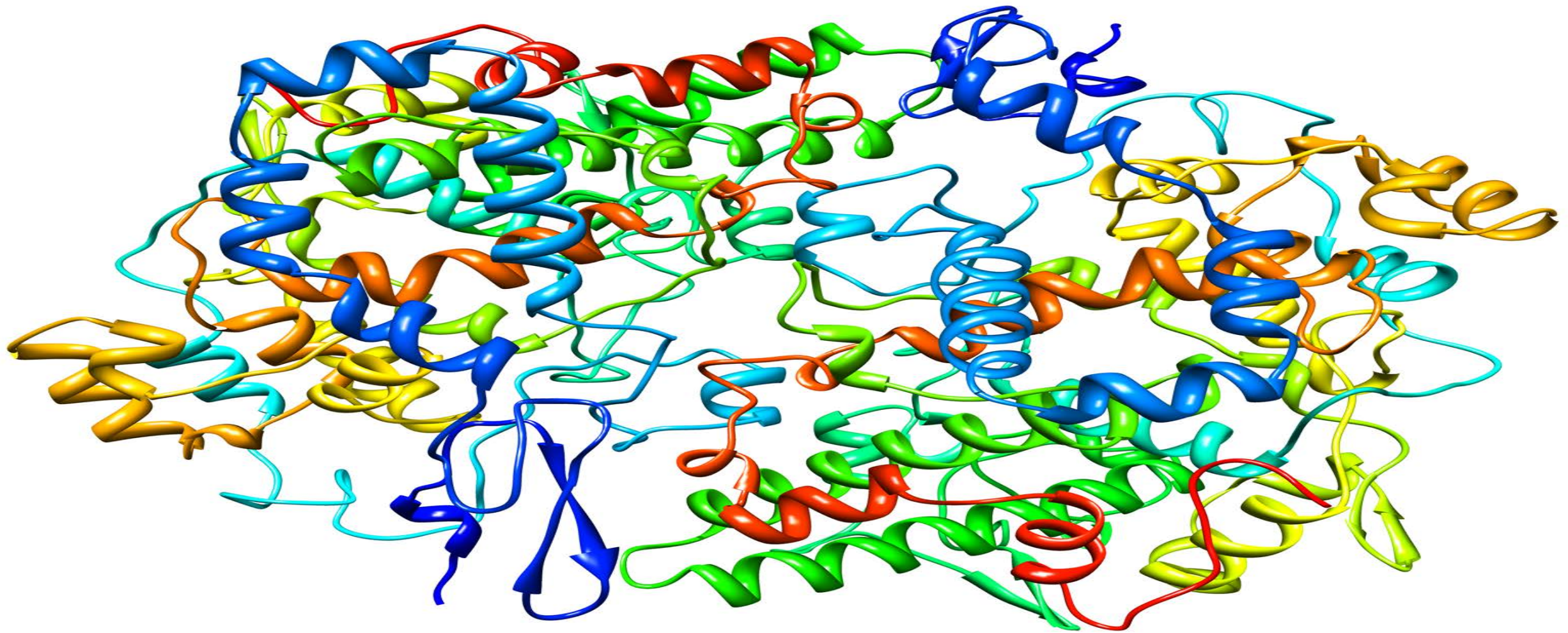
CONTRACTOR'S LESSONS LEARNED

What have you
LEARNED?

TOP 5

IDENTIFY TOP CONCERNS...

DISCUSS INITIAL COMPLEXITIES



Review clearances



At this point, there should be a running list of action items to follow up on...

ITEM #	ISSUE TO DISCUSS / NEED CLARIFICATION	DATE REQUIRED	Responsibility
01	Submit Quality Assurance Plans		Larson
02	Submit How Harmless for Lift USE To Review install		Larson
03	Submit All Products + Installation Instructions for VPO install		Larson
04	Window sub needs Sample + info on detail membrane for Sealant tests		Larson / PC
05	Review w/ Architect the detail of Existing Bldg & VPO → will it be SPF? 1, 2, & 4 / ASDI.3		

Make sure that **substitutions** are reviewed prior to submission and properly submitted...

Try not to change between manufacturers



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Review Testing Requirements

Have Testing company discuss their successes and procedures



<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	What are the minimum application temperatures?			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	Is there a low temperature product?	Y <input type="checkbox"/>	N <input checked="" type="checkbox"/>	Verify availability with distributor...
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	Are there special markings for low temperature material?			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	What are the temperature limitations?	Low Temp:		High Temp:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	What are the humidity/damp limitations?	Humidity:		Damp:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	What is the UV exposure and anticipated time?	UV exposure per manufacture:		Discuss actual time during construction:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	DO NOT INSTALL WHEN FOGGY			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	If UV will be an issue...discuss protection.			

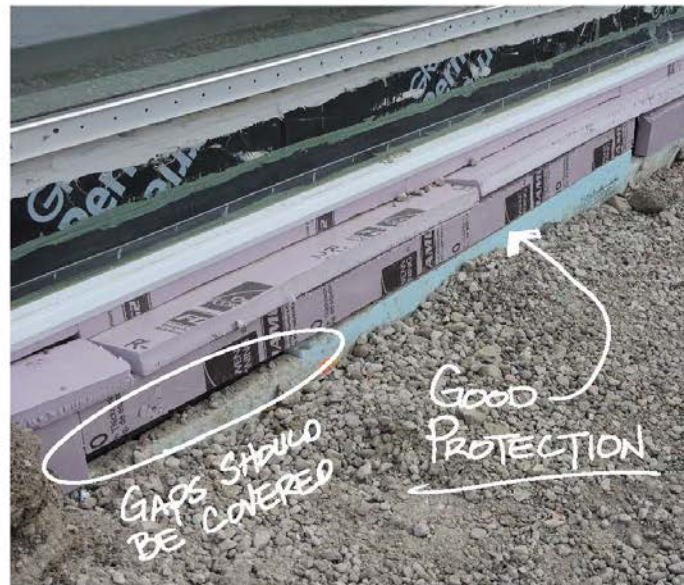


Review Compatibility of all products

<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	<p>Obtain compatibility letters from EACH manufacture of EACH product being installed in the cavity. Obtain sign-offs from both of the products that are adjacent to each other:</p>			
Notes:			Waterproofing & Flashing	<input checked="" type="checkbox"/>	Waterproofing & AVB	<input checked="" type="checkbox"/>
			Waterproofing & ETA	<input checked="" type="checkbox"/>	Waterproofing & AVB Joints	<input checked="" type="checkbox"/>
			Waterproofing & Sealant (window/curtainwall)	<input checked="" type="checkbox"/>	Waterproofing & Sealant (precast concrete)	<input checked="" type="checkbox"/>
			Waterproofing & Sealant (Other:)	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

**Discuss timing of
material
installation**

<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	Known Compatibility Concerns:	Bitumens & Polystyrene	Silicone Sealants & Other Sealants
				EPDM & Bituminous-based products	TPO & Bituminous-based products
				Silicone Sealants & Asphalt	Silicone Sealants & Butyl Rubber
				Silicone Sealants & Asphalt	
				Solvent-based sealants & polyethylene or polystyrene	
				urethane sealant & polyethylene sheet	urethane sealants & asphaltic materials
			urethane sealant & PVC or Vinyl	urethane sealants & XEPS or EPS	



Talk to your waterproofing & backfilling Contractors and determine the best long term way to protect the waterproofing during construction. *Place the cost to protect in your scope!*

Review how the waterproofing is being protected from UV or backfilling



SUBSTRATE BEING WATERPROOFED

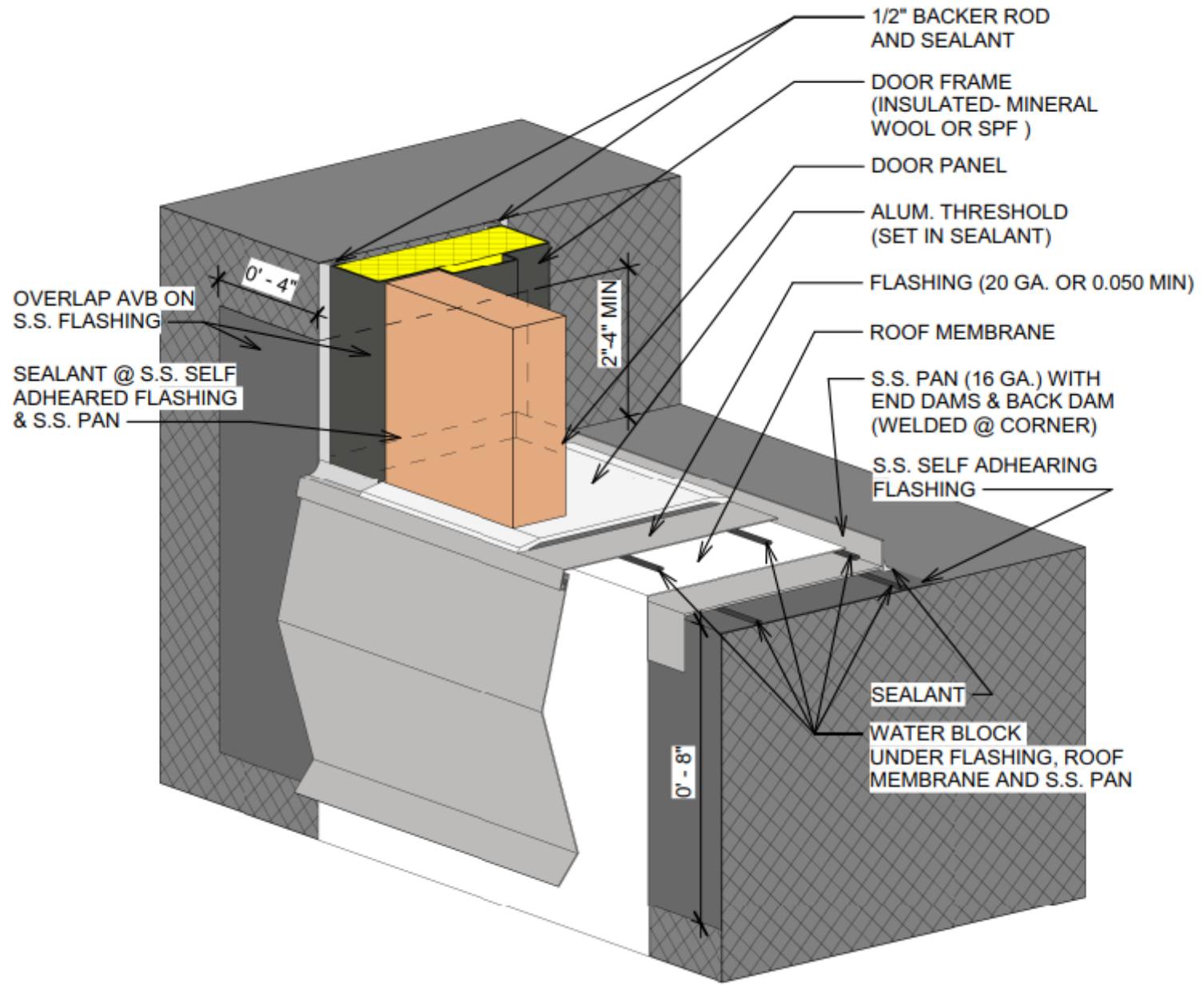
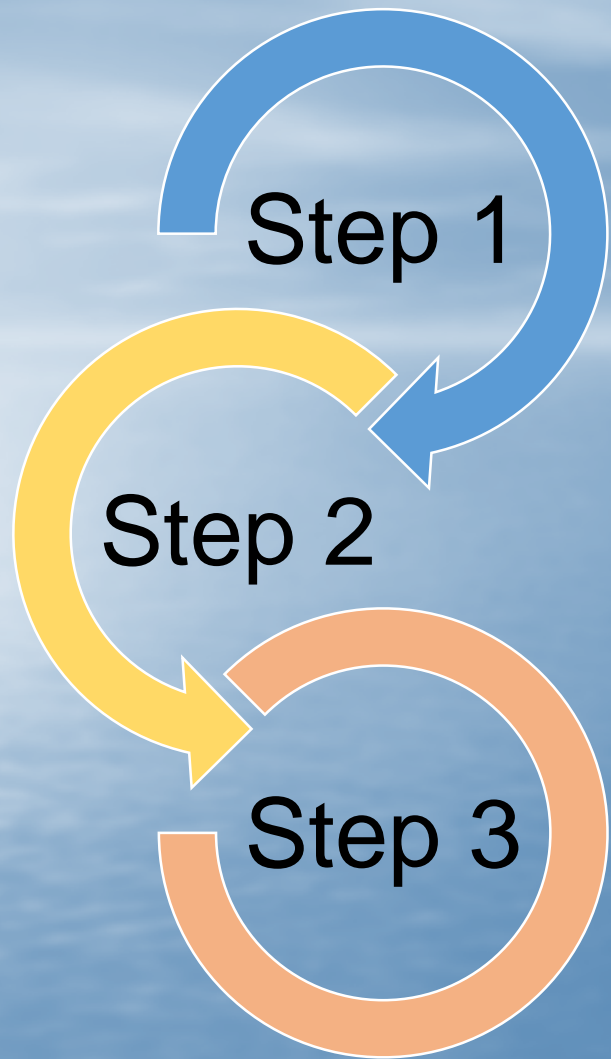
- »»» New Concrete
- »»» Existing Concrete
- »»» Shotcrete
- »»» Precast Concrete
- »»» Masonry / CMU
- »»» Stone / Rubble
- »»» Wood
- »»» Metal





"I'm here about the details."

*Review
the job
specific
details*





When membranes
are being used

And review
equipment
needed for
proper
installation



CSP 1
(acid etched)



CSP 2
(grinding)



CSP 3
(light shotblast)



CSP 4
(light scarification)



CSP 5
(medium shotblast)



CSP 6
(medium scarification)



CSP 7
(heavy abrasive blast)



CSP 8
(scabbled)



CSP 9
(heavy scarification)

ICRI #3732

Concrete surface profile

Coating to be applied	Concrete surface profile								
	CSP 1	CSP 2	CSP 3	CSP 4	CSP 5	CSP 6	CSP 7	CSP 8	CSP 9
Sealers 0 - 3 mils (0 - 75 μm)	█	█	█						
Thin-Film 4 - 10 mils (100 - 250 μm)	█	█	█						
High-Build 10 - 40 mils (250 - 1000 μm)			█	█	█				
Self-Leveling 50 mils - 1/8 inch (1250 μm - 3 mm)				█	█	█			
Polymer Overlay 1/8 - 1/4 inch (3 - 6 mm)					█	█	█	█	█
Preparation methods	CSP 1	CSP 2	CSP 3	CSP 4	CSP 5	CSP 6	CSP 7	CSP 8	CSP 9
Detergent scrubbing	█								
Low-pressure water cleaning	█								
Acid etching	█	█							
Grinding	█	█							
Abrasive (sand) blasting		█	█	█					
Steel shotblasting			█	█	█	█	█	█	█
Scarifying				█	█	█	█	█	█
Needle scaling					█	█	█	█	█
High/ultra high-pressure water jetting						█	█	█	█
Scabbling							█	█	█
Flame blasting								█	█
Milling/rotomilling									█

ALWAYS ASK ABOUT THE CONCRETE!

DOES IT HAVE FIBER

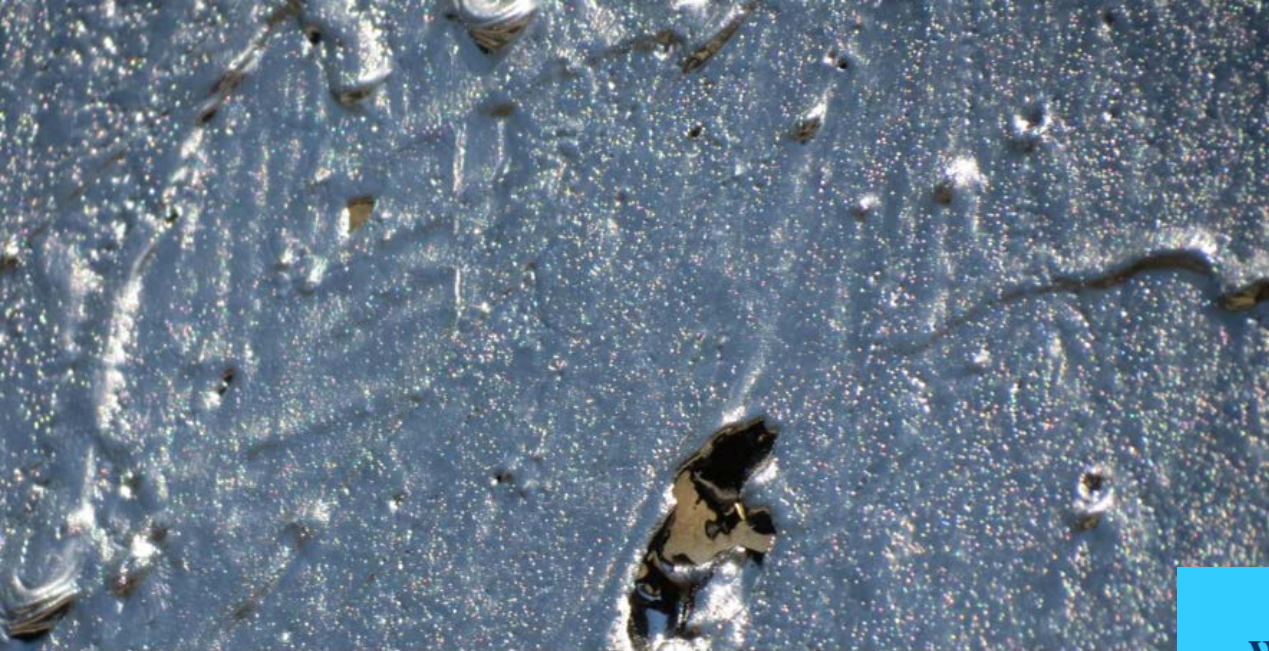
IS IT LIGHT WEIGHT – (MUST DISCUSS FINISHING)

HOW IS THE CONCRETE BEING CURED?

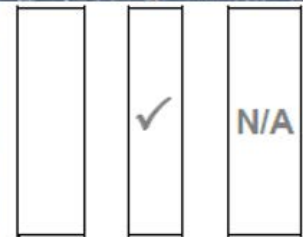
REVIEW SPECIAL ADDITIVES

CMU INSTALLATION

DISCUSS TYPE OF CMU BEING USED



Surface Finish - 3.0



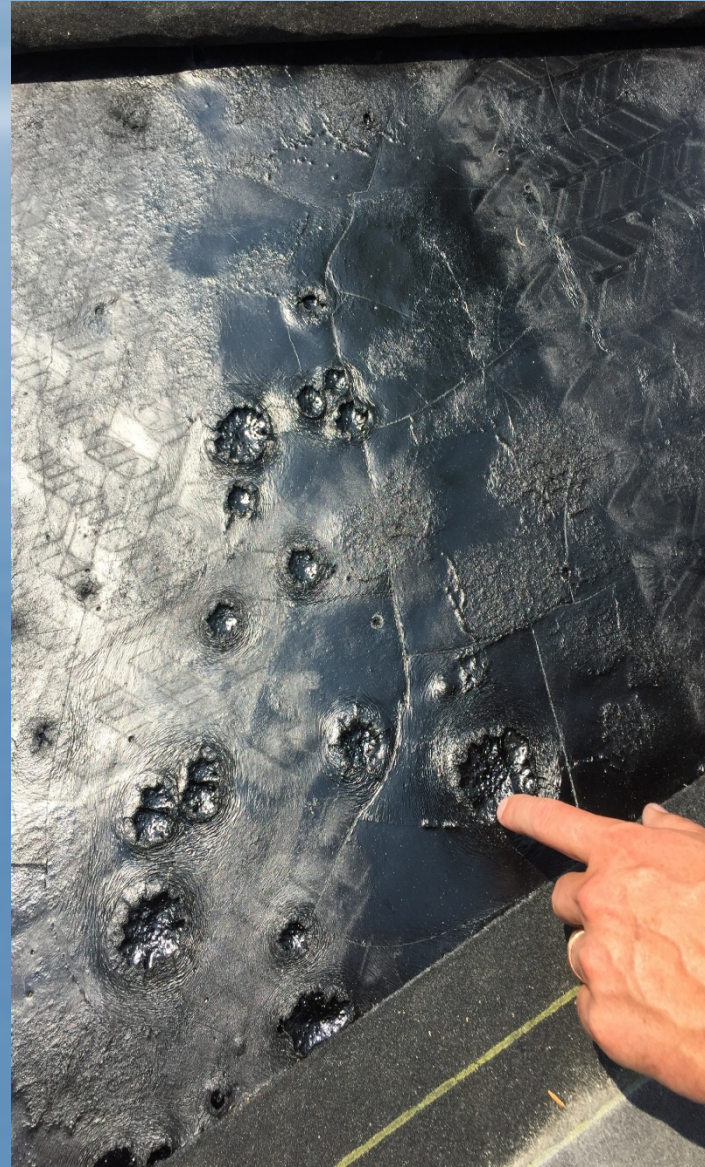
- Patch voids larger than 3/4" wide or 1/2" deep
- Remove projections greater than 1/8"
- Tie holes need to be patched
- Surface Tolerance Class A
- Mock-up required

DISCUSS CONCRETE SURFACE FINISH REQUIREMENTS

Weight Classification	Density (Ave of 3) (lb/ft ³)	Maximum Water Absorption (lb/ft ³)		Minimum Compressive Strength (psi)	
		Average of 3 Units	Individual Units	Average of 3 Units	Individual Units
Lightweight	Less than 105	18	20	1,900	1,700
Medium Weight	105 - 125	15	17	1,900	1,700
Normal Weight	Greater than 125	13	15	1,900	1,700

* Standard Specification for Loadbearing Concrete Masonry Units, ASTM C90-11b. ASTM International, 2011.

REVIEW TIMING / POSITION OF CONCRETE RELATED TO THE SUN POSITION



THICKNESS TESTING



**Thickness /
How many coats
Wet / Dry Mil thickness
Co-Spray?**

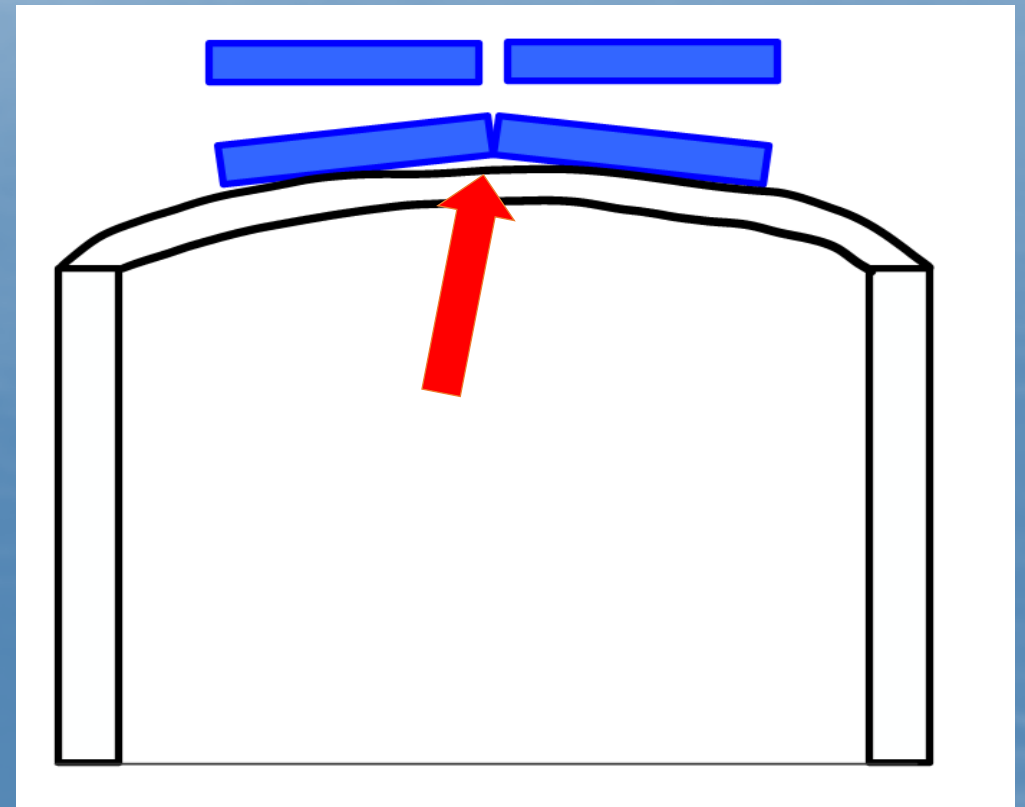
OUTSIDE CORNER DETAILING?



INSIDE CORNER DETAILING?



TYPE OF WATERPROOFING AND COMPACTION & SOIL VERIFICATION





DISCUSS RAILING INSTALLATION

- WHEN
- WHAT TYPE
- ATTACHMENT TYPE
- BOLT INSTALLATION
- POST RAILING INSTALL

CONCRETE MATERIAL CONCERNS



Railing setting material should not contain the following:

Calcium Sulfate
Anhydrite
Plaster

Gypsum
Calcium Sulfate Hemihydrate
Calcium Sulfate Dihydrate

**COORDINATE PENETRATIONS WITH THE MEP,
CONCRETE, AND WATERPROOFING TRADES.**

BEFORE / AFTER / SLEEVE / SPECIAL SLEEVE

LINK SEAL / LOCATION WITH-IN THE WALL



DO WE HAVE MULTIPLE PIPES?

**HOW FAR DO THEY NEED TO BE
FROM EACH OTHER?**

DISCUSS WITH THE ELECTRICIAN GROUNDING WIRE

(MUST BE SOLID SECTION OF WIRE @ WATERPROOFING)



Review grade condition and termination.

Grade should be above termination...expect grade to be lower than expected due to settlement and washout...

How does the termination turn?



DISCUSS JOINTS AND MAKE-UP OF THE JOINTS

END OF DAY SEALING



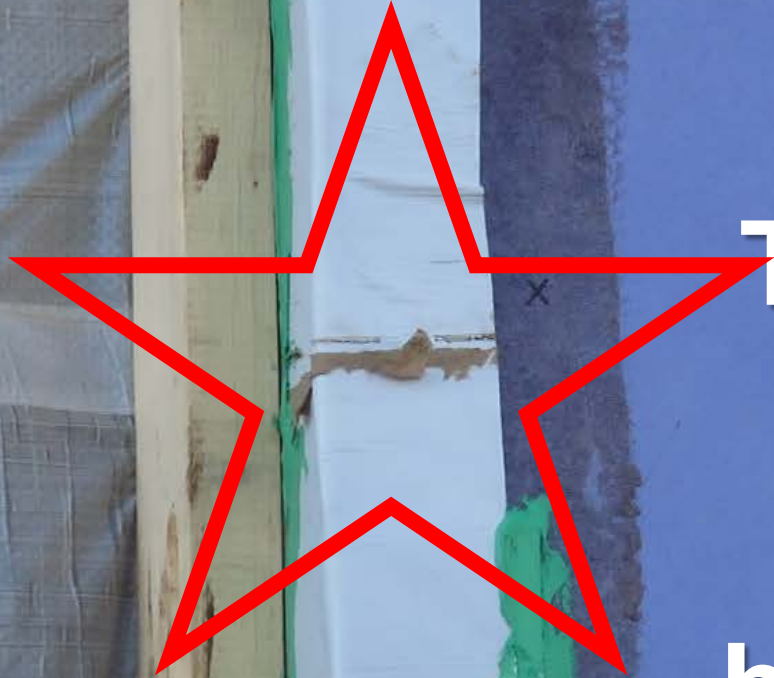


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**When membranes
are being used**

**The Little details
do mean the
difference
between success
& failure**



SOMETIMES YOU DON'T KNOW WHAT YOU WILL FIND!



SOMETIMES YOU DON'T KNOW WHAT YOU WILL FIND!



SOMETIMES YOU DON'T KNOW WHAT YOU WILL FIND!



SOMETIMES YOU DON'T KNOW WHAT YOU WILL FIND!





**Problems/
concerns might
initially appear
very large in the
beginning of the
conversation...**

**At the end of the
meeting, the
concerns are
typically small
and manageable**

**Its all about
perspective and
openness to
conversation...**



This concludes The American Institute of Architects
Continuing Education Systems Course



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