Craig Wetmore CSI, CDT

Craig Wetmore, President of York Flashings has over 25 years of experience in the building industry. He has a concentrated knowledge in through-wall flashings, moisture management and wall components.

Craig is active in building community where he is a member of CSI, RCI, USGBC, ASTM and the ABAA.

He serves as President for the Maine CSI Chapter, he is the chairperson of ABAA's Marketing & Outreach committee, and is Secretary of the ABAA board of directors.

Through-Wall Flashing Selection and Installation

Presented by: Craig Wetmore, CSI, CDT

AIA Course: YORK17
GBCI CMP Course: 0090005315

YORK Flashings™

Copyright Materials

YORK Flashings™

Air Barrier Association of America

-PRESENTATION CODE OF ETHICS-

The Representative, when speaking about Air Barrier technology and using language, information, presentations, logos, or any other communication means that could be reasonably likely to cause the recipient(s) of such information to believe that the communication represents an official ABAA technical viewpoint, shall:

- Hold themselves out to the public with professionalism and sound ethics by conducting themselves in a way which reflects positively on ABAA and the ABAA members
- Clearly state their affiliation
- Identify their relationship with ABAA
- Declare that they are presenting an official (unmodified) presentation prepared by ABAA
- Indicate whether the presentation is at the official request of ABAA
- This is an AIA Accredited Presentation
- This presentation will not highlight focus or reference to a specific product of manufacturer

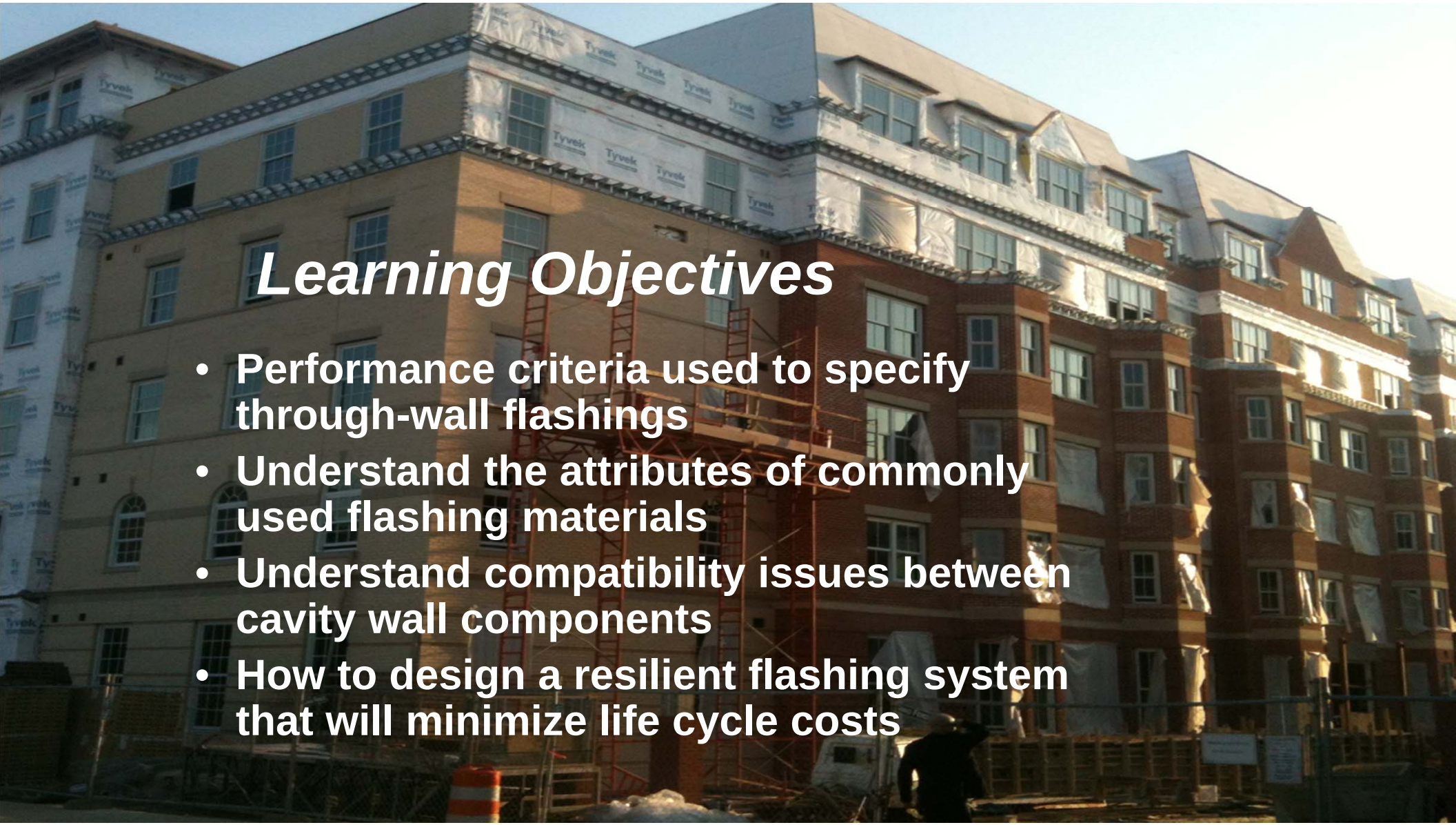
York Manufacturing is a registered Provider with the American Institute of Architects Continuing Education Systems. Credits earned on completion of this program will be reported to CES records for AIA members. Certificates of Completion for non-members are available upon request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing or dealing in any material or product. Questions related to specific materials, methods and services will be addressed at the conclusion of this presentation.

The U.S. Green Building Council (USGBC) has approved the technical and instructional quality of this course for one (1) GBCI CE Hours towards the LEED Credential Maintenance Program.”

York Manufacturing, Inc. is an USGBC Education Provider committed to enhancing the ongoing professional development of the building industry and LEED Professionals through high-quality education programs. As a USGBC Education Provider, York Manufacturing, Inc. has agreed to abide by USGBC established operational and educational criteria, and is subject to annual reviews and audits for quality assurance.”

Course #0090005315



Learning Objectives

- **Performance criteria used to specify through-wall flashings**
- **Understand the attributes of commonly used flashing materials**
- **Understand compatibility issues between cavity wall components**
- **How to design a resilient flashing system that will minimize life cycle costs**

Uncontrolled rainwater penetration and condensation are two of the most common threats to building enclosure performance. Together, they represent up to 80% of all construction-related claims in the United States.

Dan Lemieux from WJE in DC

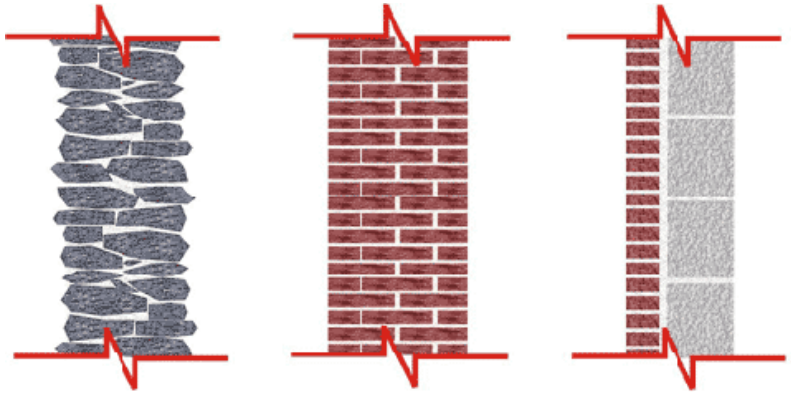
What we have to control and plan for in buildings:

1. **Water**
2. **Air**
3. **Vapor**
4. **Thermal**

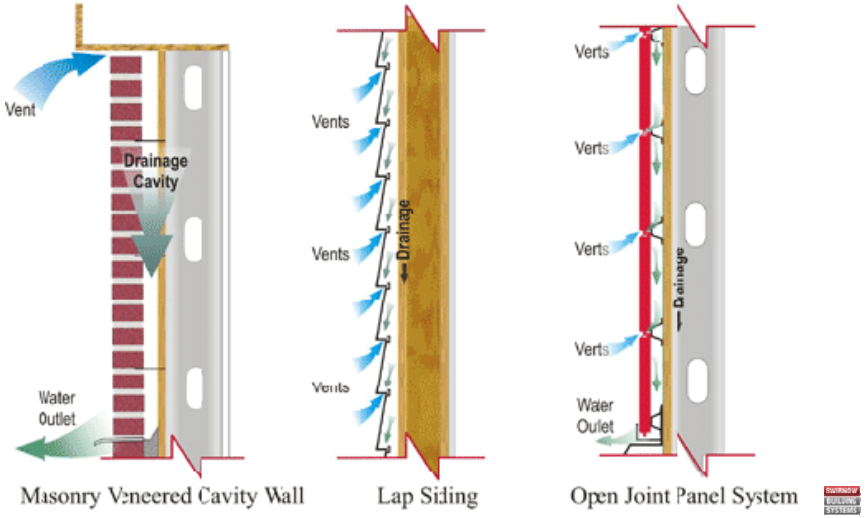
Dr. Joseph Lstiburek of Building Science Consulting

“Build it once, build it well”. Flashing is a concealed component that is expected to last and perform for the life of the structure (30, 50, 100+ years). The consequence of failed flashing causing leaky buildings is what every building owner wants to avoid.

Wall Types



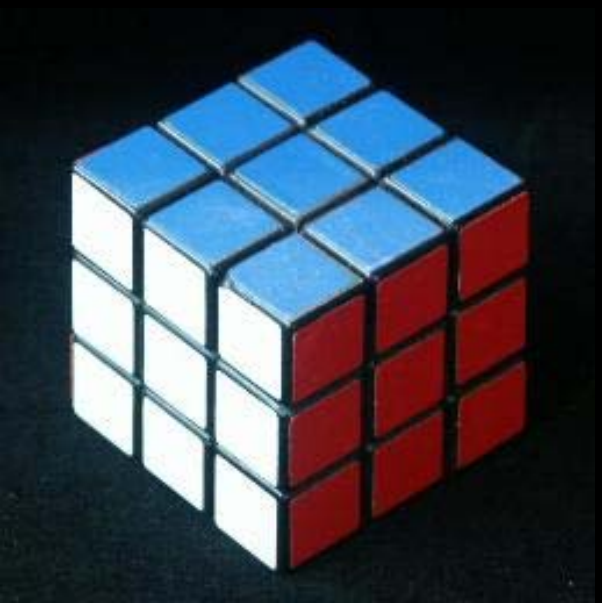
Mass Masonry Wall



Rain Screen Wall

Cavity Wall Components

- Air barriers
- Flashings
- Transition membranes
- Sealants
- Insulation



Cavity Wall Components

- Compatibility

Cavity Wall Components

Air Barriers:

- Required by:
  - ASHRAE 90.1-2010 (Sept. 2010)
    - LEED v.4
- Types
  - Liquid Applied: Asphalt, Acrylic, Silicone, etc…
  - Peel & Stick: Asphalt, Butyl
    - Primer compatibility
  - Spray Polyurethane Foam
  - Board stock
  - Building Wraps/Papers

Cavity Wall Components

Insulations:

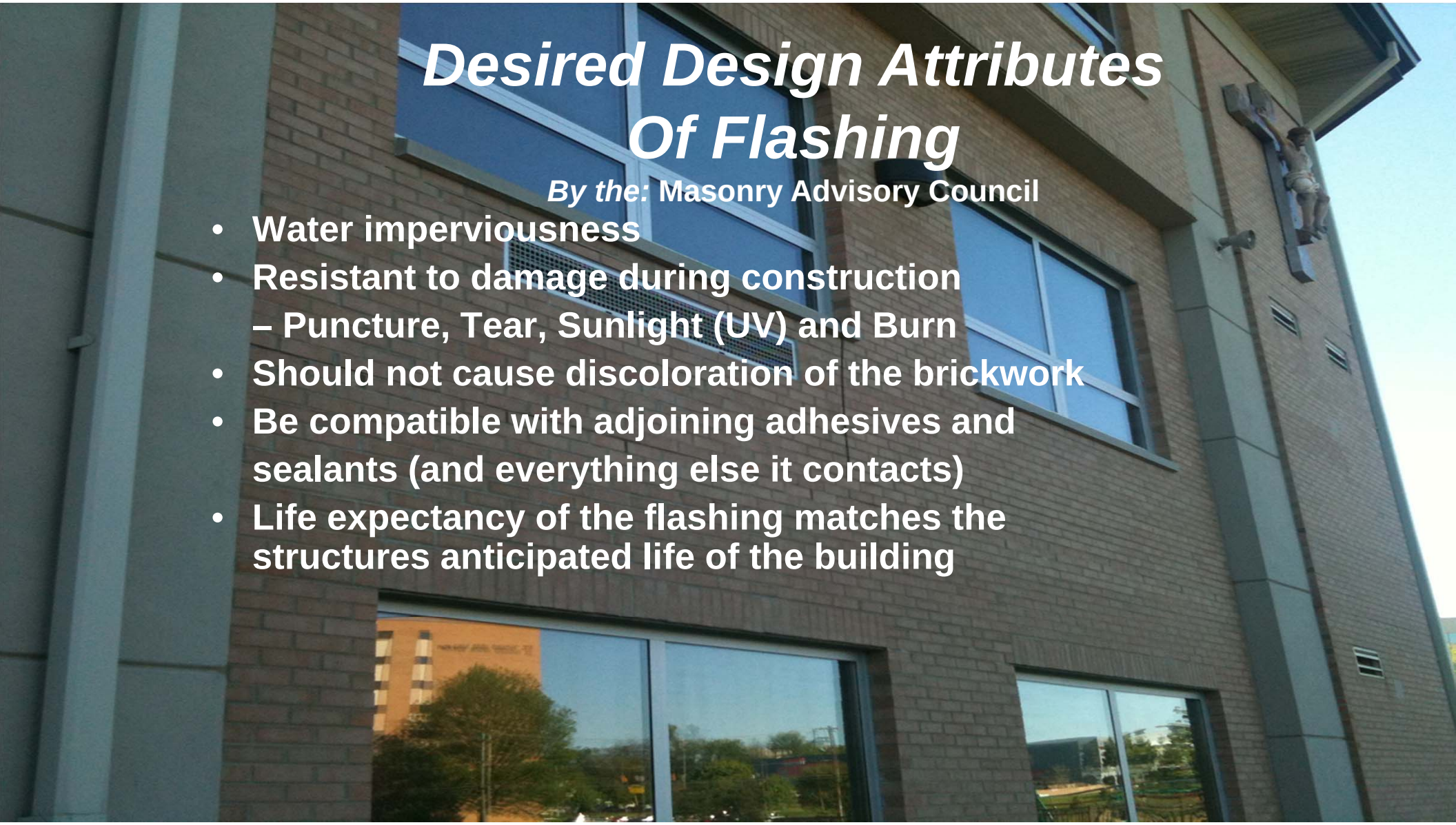
- Polystyrene, Polyisocyanurate, Spray Polyurethane Foam, Mineral Wool

Sealants:

- Mastic, Emulsion Mastic, Butyl, Polyether, Polyurethane, Silicones, etc…

Transition membranes:

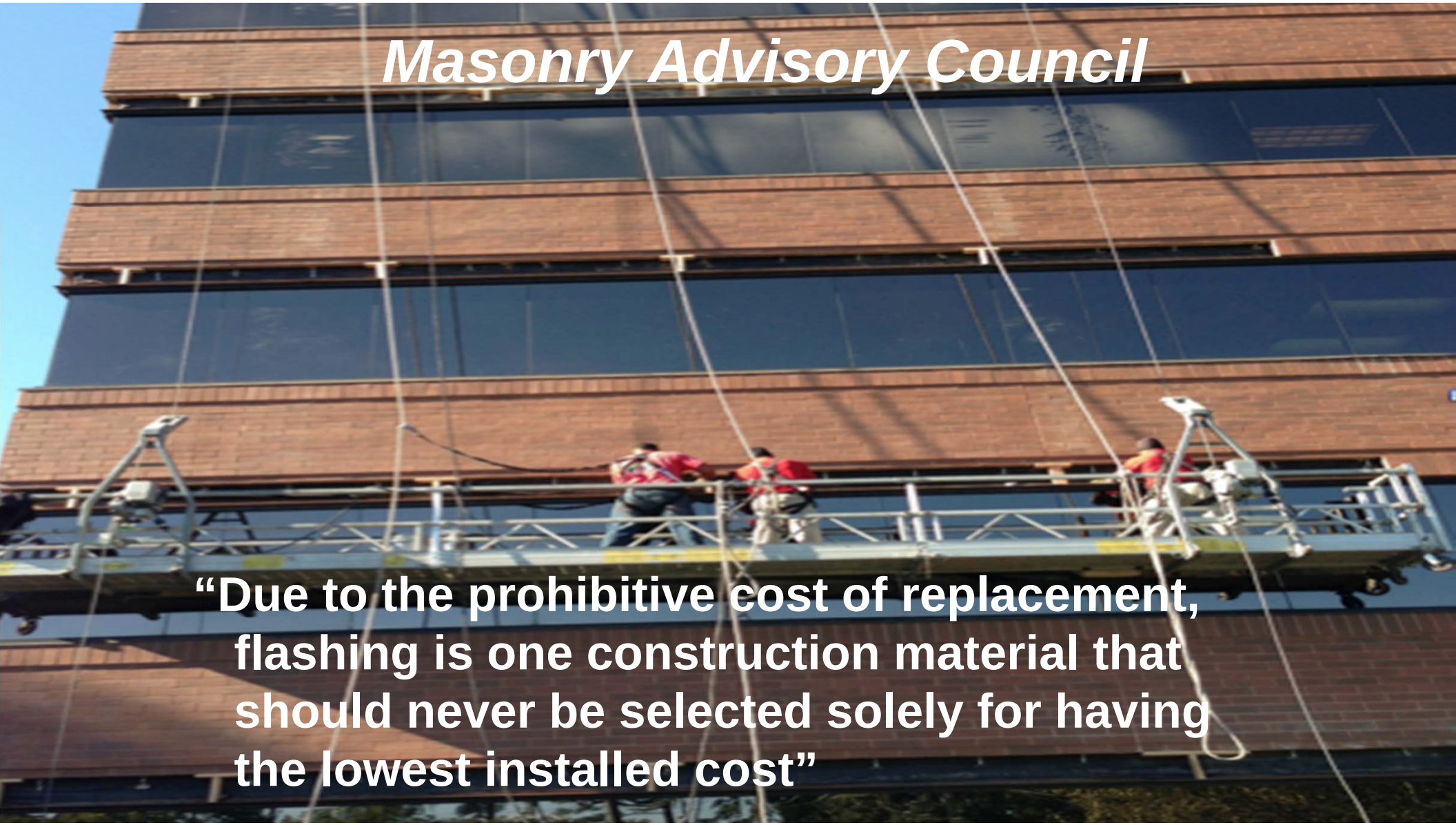
- Peel & Stick, Flexible Stainless Steel, Silicone Sheets

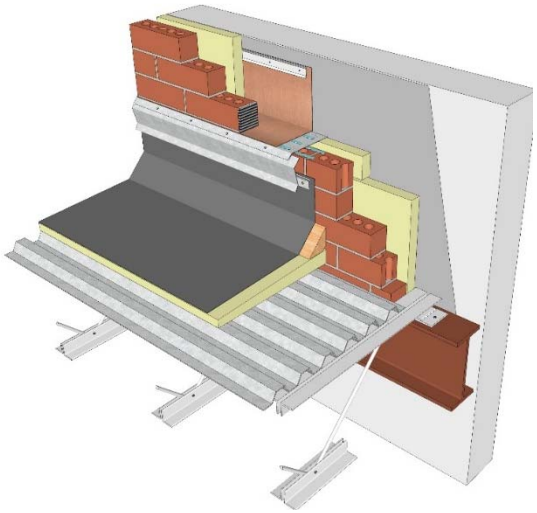


Desired Design Attributes Of Flashing

By the: **Masonry Advisory Council**

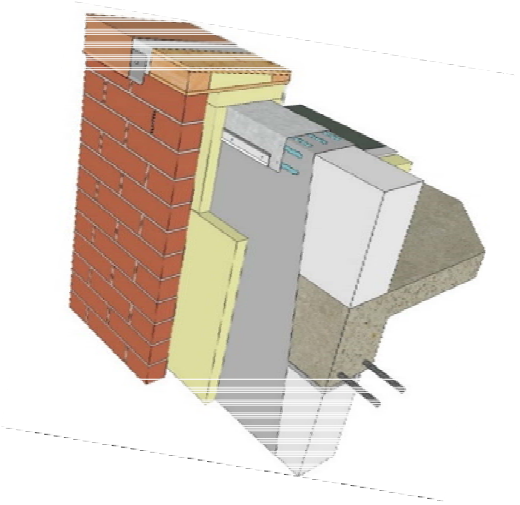
- **Water imperviousness**
- **Resistant to damage during construction – Puncture, Tear, Sunlight (UV) and Burn**
- **Should not cause discoloration of the brickwork**
- **Be compatible with adjoining adhesives and sealants (and everything else it contacts)**
- **Life expectancy of the flashing matches the structures anticipated life of the building**

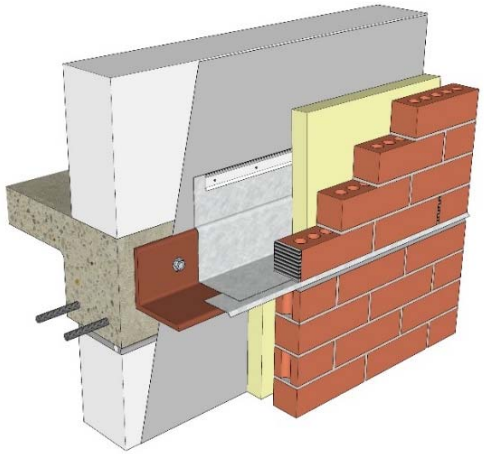

Masonry Advisory Council
“Due to the prohibitive cost of replacement, flashing is one construction material that should never be selected solely for having the lowest installed cost”

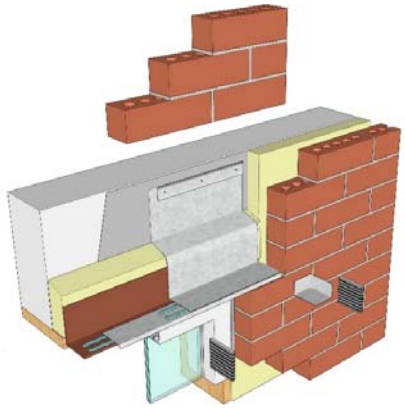


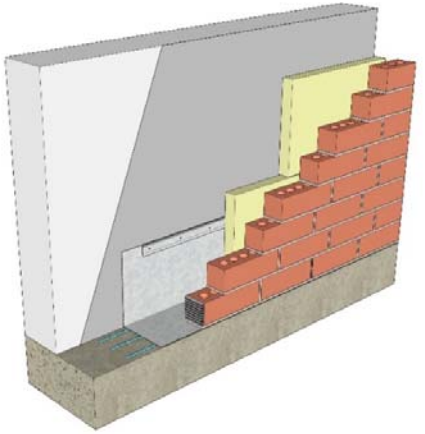
Locations for TWF

1. Base of wall
2. Sills
3. Over opening
4. Shelf angle
5. Veneer change
6. Top of wall
7. Roof to wall





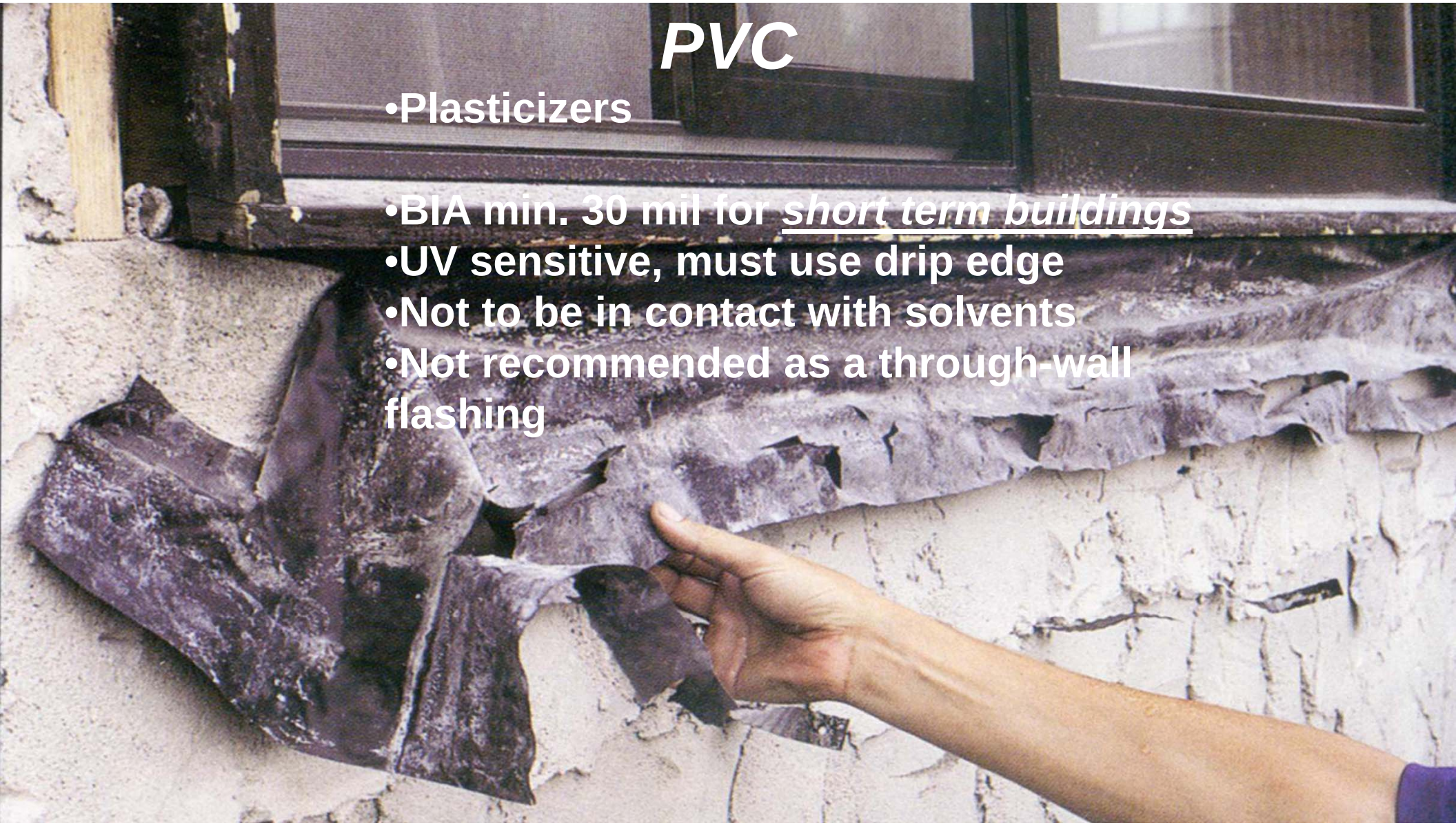




Through-Wall Flashings

- Plastics (PVC)
- Self-Adhesive Rubberized Asphalt (Peel & Stick)
- PVC KEE
- EPDM
- Flexible Metals
- Rigid Sheet Metals

PVC Flashings



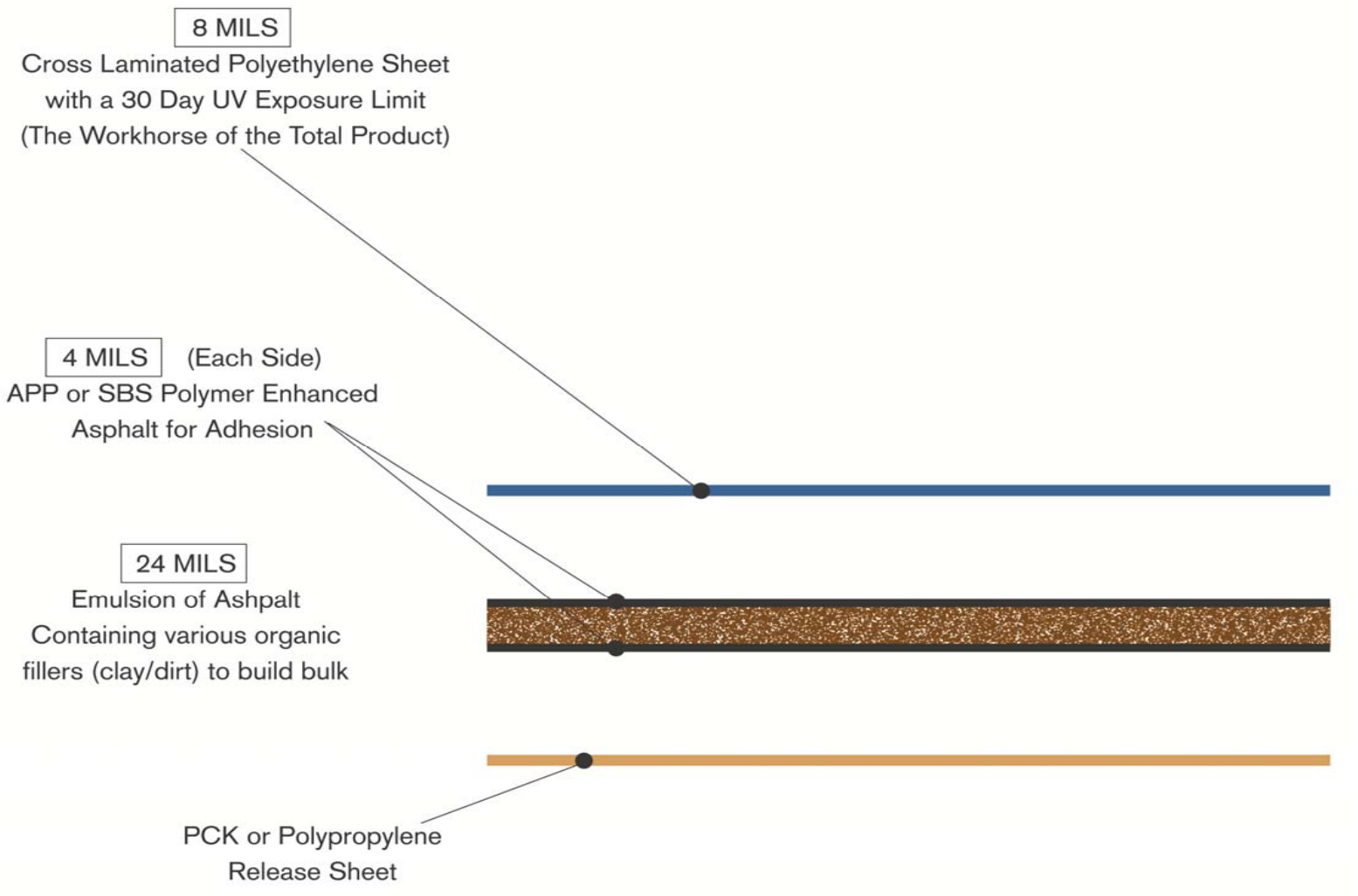
PVC

- Plasticizers

- BIA min. 30 mil for *short term buildings*
- UV sensitive, must use drip edge
- Not to be in contact with solvents
- Not recommended as a through-wall flashing

Peel & Stick Flashings

Peel & Stick


8 MILS
Cross Laminated Polyethylene Sheet
with a 30 Day UV Exposure Limit
(The Workhorse of the Total Product)
4 MILS (Each Side)
APP or SBS Polymer Enhanced
Asphalt for Adhesion
24 MILS
Emulsion of Ashpalt
Containing various organic
fillers (clay/dirt) to build bulk
PCK or Polypropylene
Release Sheet

Peel & Stick

- Spanning a gap
  - Cannot span a gap of 1/4”
  - Gaps must be reinforced
    - Max 2” / Min. 1” air cavity
- Puncture 80 psi
- Prime exterior surfaces
- Install termination bars
- UV Sensitive (30 day)
  - Drip edge required

BIA Tech Note #7

- **Select flashing that is waterproof, durable, UV resistant and compatible with adjacent materials**
- **Use a metal drip edge to extend flashings that degrade when exposed to UV light**

PVC KEE

Poly Vinyl Chloride Ketone Ethylene Ester

PVC KEE

- Thermoplastic
  - KEE polymer (type of solid plasticizer)
- Short history as a flashing
- Most roofing systems are heat welded at joints
- Types:
  - Self adhered: 25 mil sheet with 15 mil asphalt
  - Membrane: 40 mil sheet
- Cannot span a gap ¼”+
- LEED is not a fan of this

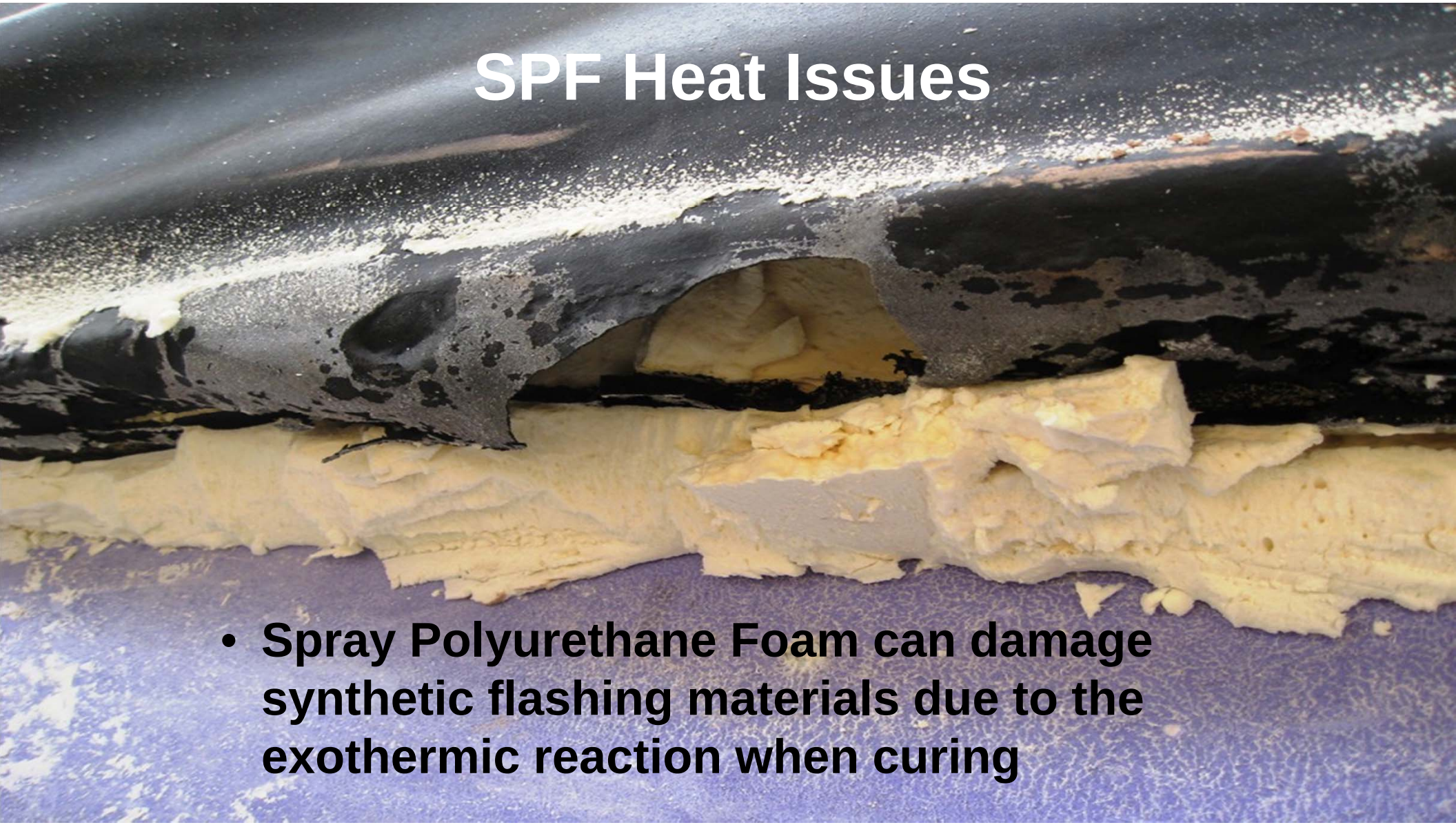
EPDM

ETHYLENE-PROPYLENE-DIENE MONOMER

EPDM

- Thermoset rubber
- Well known roof material
- Multiple component installation
- BIA Tech Note 7
  - Dimensional stability may be a concern
  - 2% shrink acceptable per ASTM D1204
- Cannot span a gap +¼”
- Compatibility issues
  - Asphalt (air barriers/damp proofing)
  - Oils/Solvents (mastics/spray foams)

SPF Heat Issues

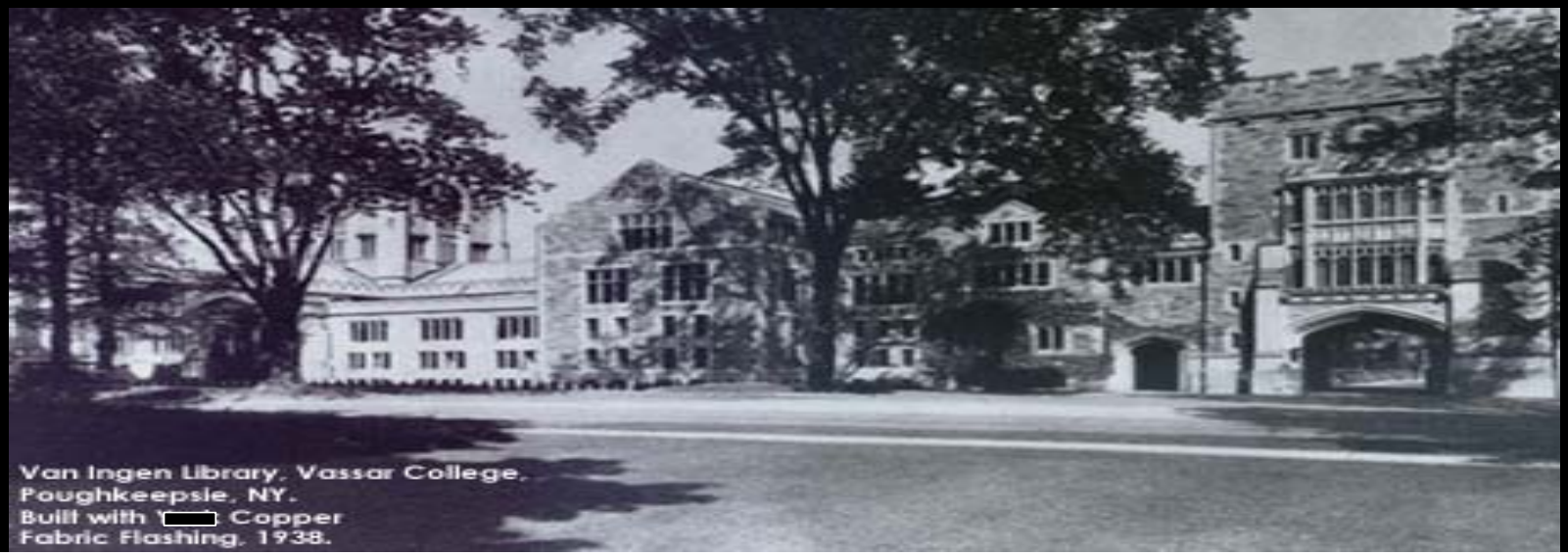


- **Spray Polyurethane Foam can damage synthetic flashing materials due to the exothermic reaction when curing**

Flexible Copper Flashings

Copper Fabric Flashing

- **Asphaltic coated copper covered in Mica Dust (a bond breaker), which is not compatible with:**
  - **Air barriers**
  - **Spray polyurethane foam**
  - **Polystyrene insulations**
    - **Mastic (20%-40% solvents)**



Copper Fabric Flashing

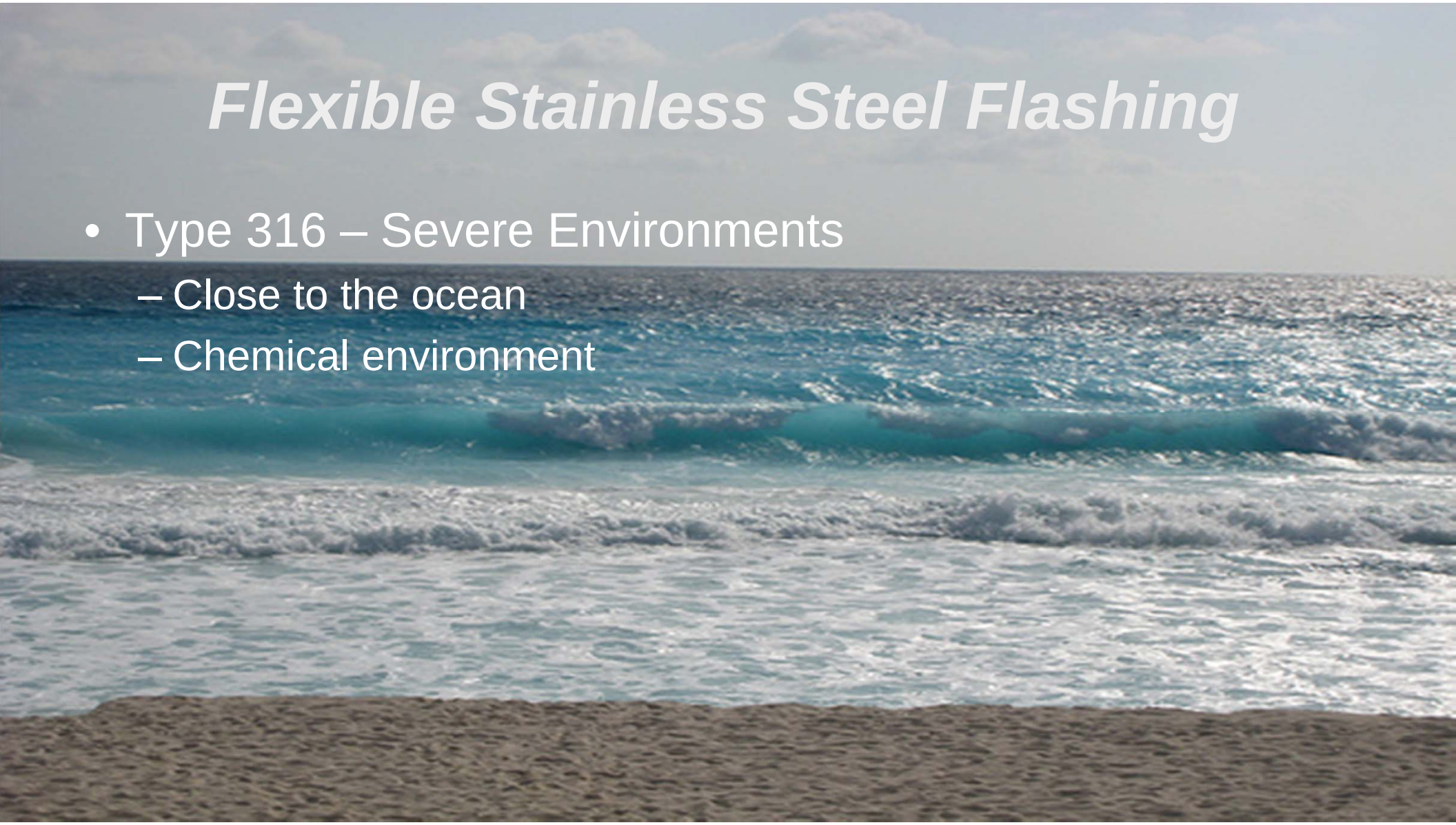
Non-Asphaltic copper flashing:

- Stronger than synthetic flashings
- Longer rolls for less laps
- Compatible with:
  - Air barriers
  - Sealants
  - Insulations
- Color coded
- Puncture 780 psi

Flexible Stainless Steel Flashings

Flexible Stainless Steel Flashing

- **Type 304 stainless steel (2 mil maximum)**
- **Compatible with sealants & air barriers**
- **Strongest flexible through-wall flashing**
- **Able to span the cavity air gap**
- **Fire resistant**
- **Life of the wall performance**
- **UV stable**



Flexible Stainless Steel Flashing

- Type 316 – Severe Environments
  - Close to the ocean
  - Chemical environment

Stainless Steel

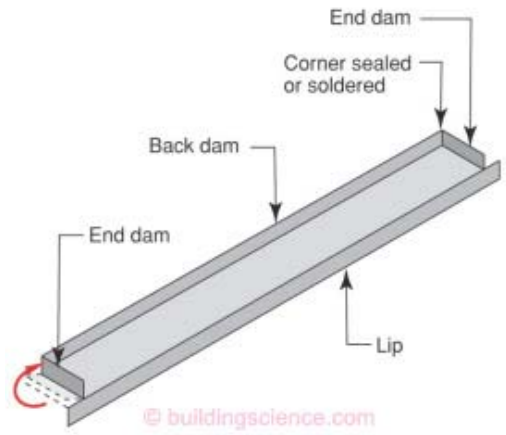
- **Specify DFARS Stainless Steel**
  (Defense Federal Acquisition Regulation Supplement)
  - **DFARS requires the stainless steel to be USA made**
  - **SS in picture was foreign made (different standards)**

Flexible Self-Adhering Stainless Steel Flashings

Self-Adhering Stainless Steel

Type 304 stainless steel with butyl adhesive used as:

- **Through-Wall Flashing**
- **Transition Flashing**
- **Parapet Flashing**
- **Lap tape**
- **Sill pans**



There are four essential characteristics of pan flashing:

1. the pan flashing surface is a durable waterproof material that provides a continuous water barrier without holes, tears or wrinkles that could retain water in the opening;
2. the pan flashing has a back dam or positive slope to direct water to the outside of the wall;
3. the pan flashing has end dams at the sides to prevent water from moving laterally into the wall;
4. the pan flashing laps over the drainage plane beneath the opening.

Quote and pictures from “Pan Flashing for Exterior Wall Openings” by Building Science Corporation

Active

Drainage

Flashings

Active Drainage Flashing

- **Flashing:**
  - Copper
  - Stainless steel
- **Active drainage fabric**
- **Fabric is a continuous weep**
- **Does not need mortar netting**

Rigid Sheet Metal

Rigid Sheet Metal

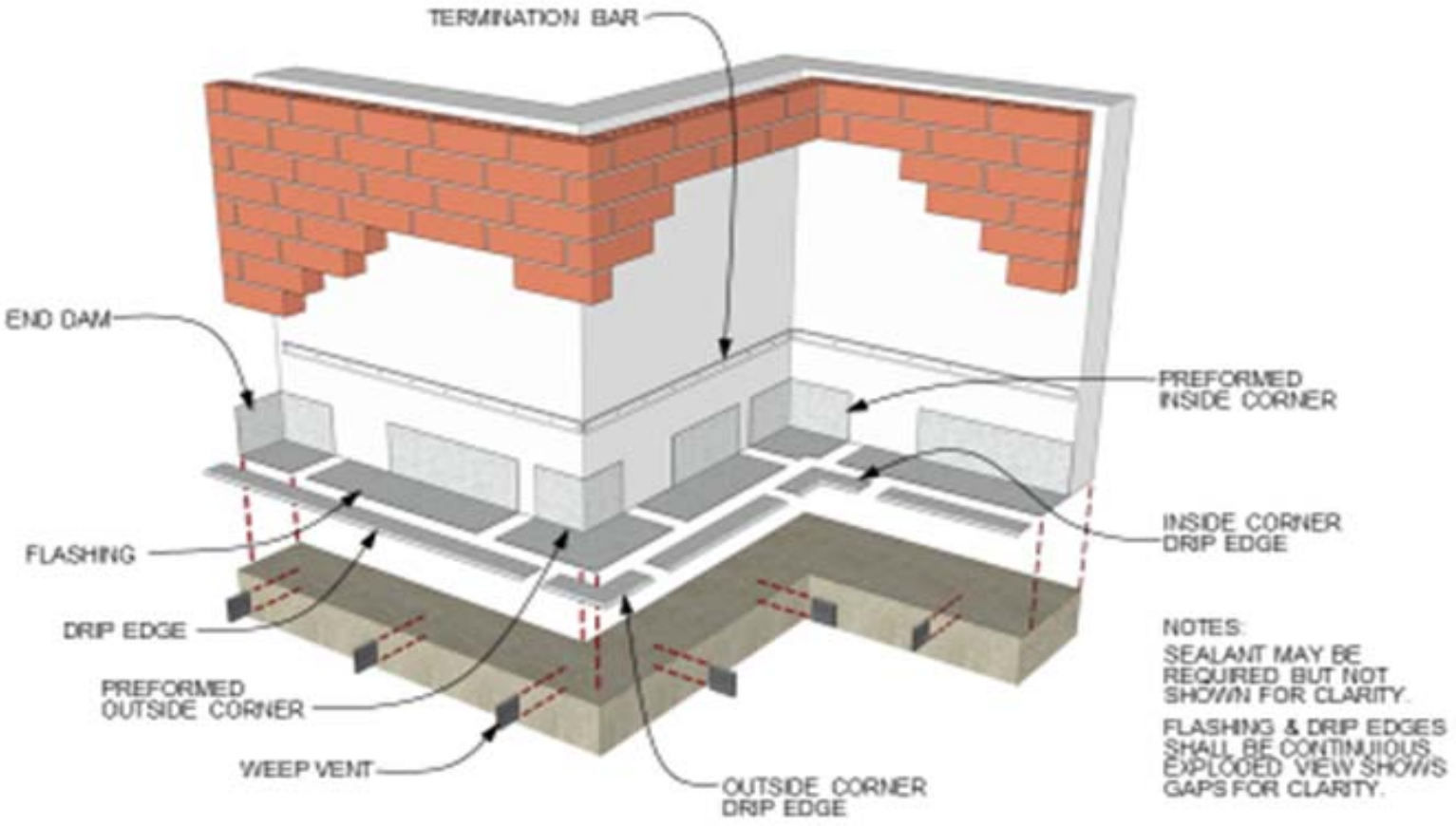
- Choices of Copper or Stainless Steel
- Mechanically bent
- Soldered or welded
- Highest material, waste and labor costs
- Longevity

Longevity

ARE THEY GREEN?

	Max Recycled Content	Recyclable	Maximum Warranty
PVC	80%	Yes	5 years
Peel & Stick	1%	No	5 years
EPDM	3%	No	10 years
Copper	90%	Yes	Lifetime
Stainless Steel	60%	Yes	Lifetime

Accessories



Terminations: Tucking

- Tucking puts the flashing at risk:
  - Falling blocks, tools, and mortar
  - UV exposure
  - Fatigue from flapping in the wind

Termination Bars

- **Materials:**
  - **Stainless Steel**
  - **Plastic/PVC**
  - **Aluminum**

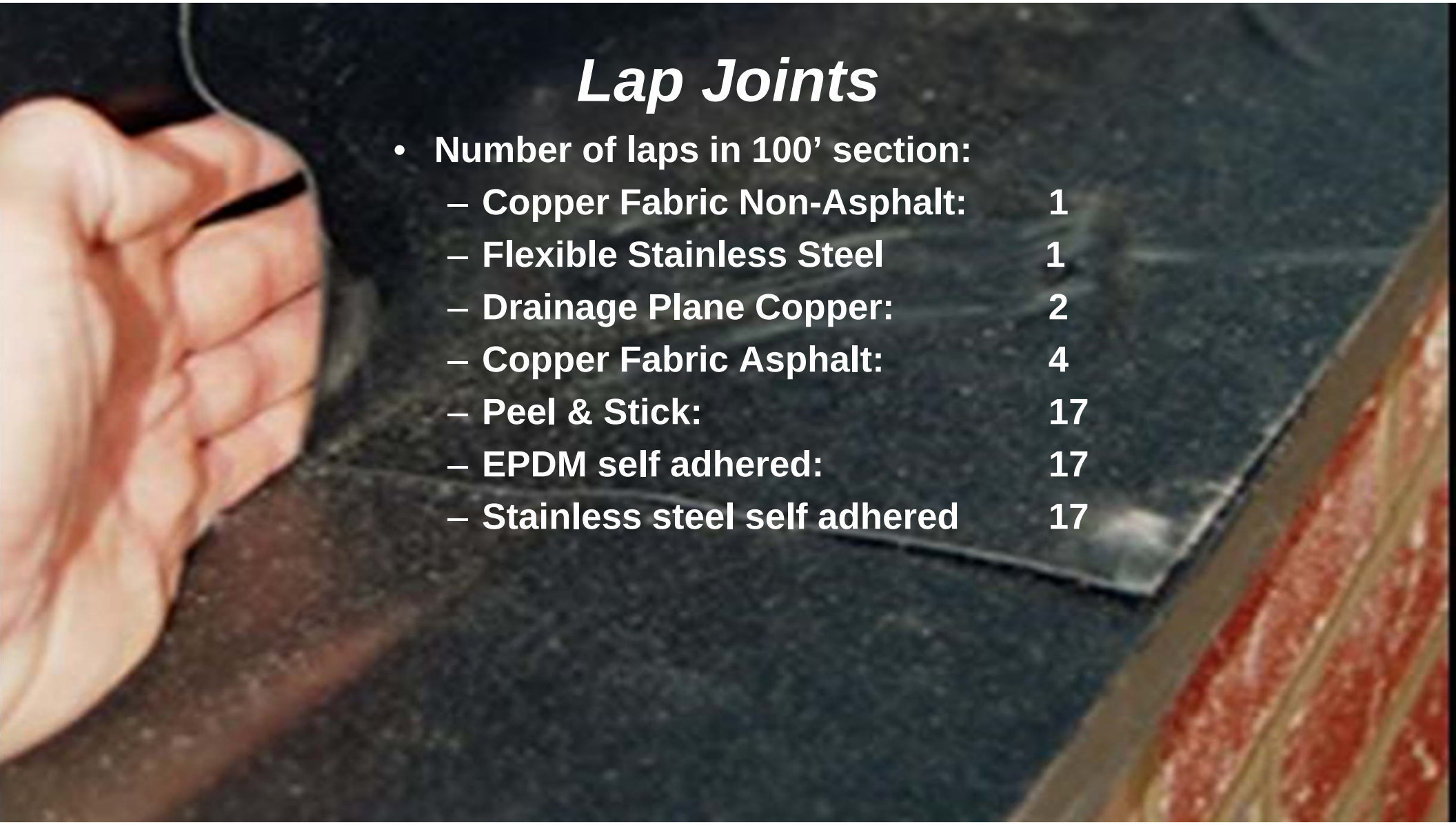
Termination Clamp

- **Installs in the backer wall**
- **Minimizes flashings exposure**
- **Compared to termination bar**
  - **Less dependent on sealant**
  - **Quicker and easier to install**

Sealants

- Be specific on what you want
- Chemical compatibility with <u>all components</u>
  - » Get it in writing

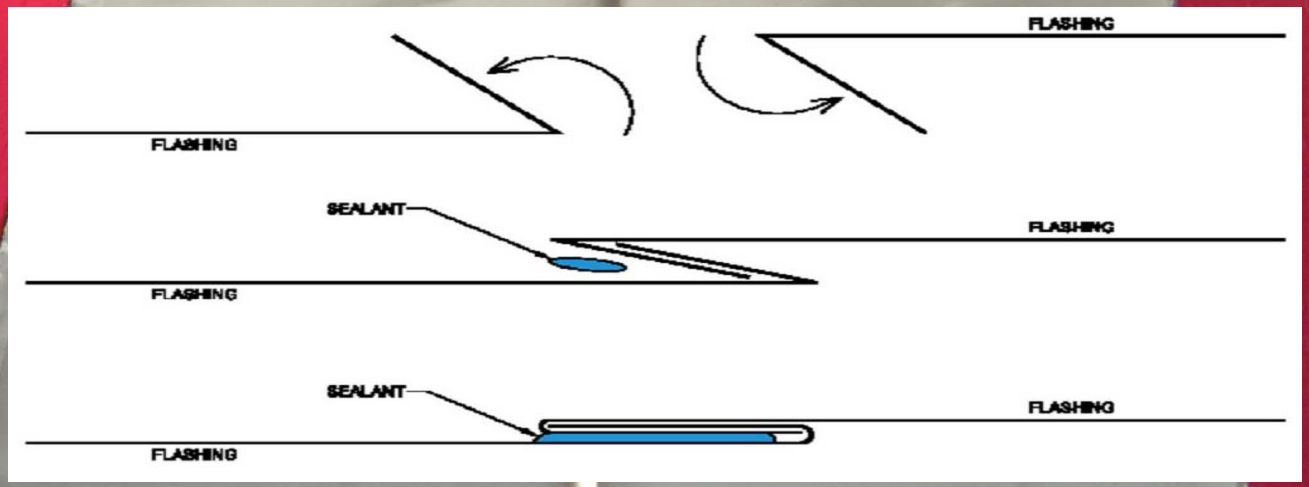
- Polyethers, butyls and some silicones recommended



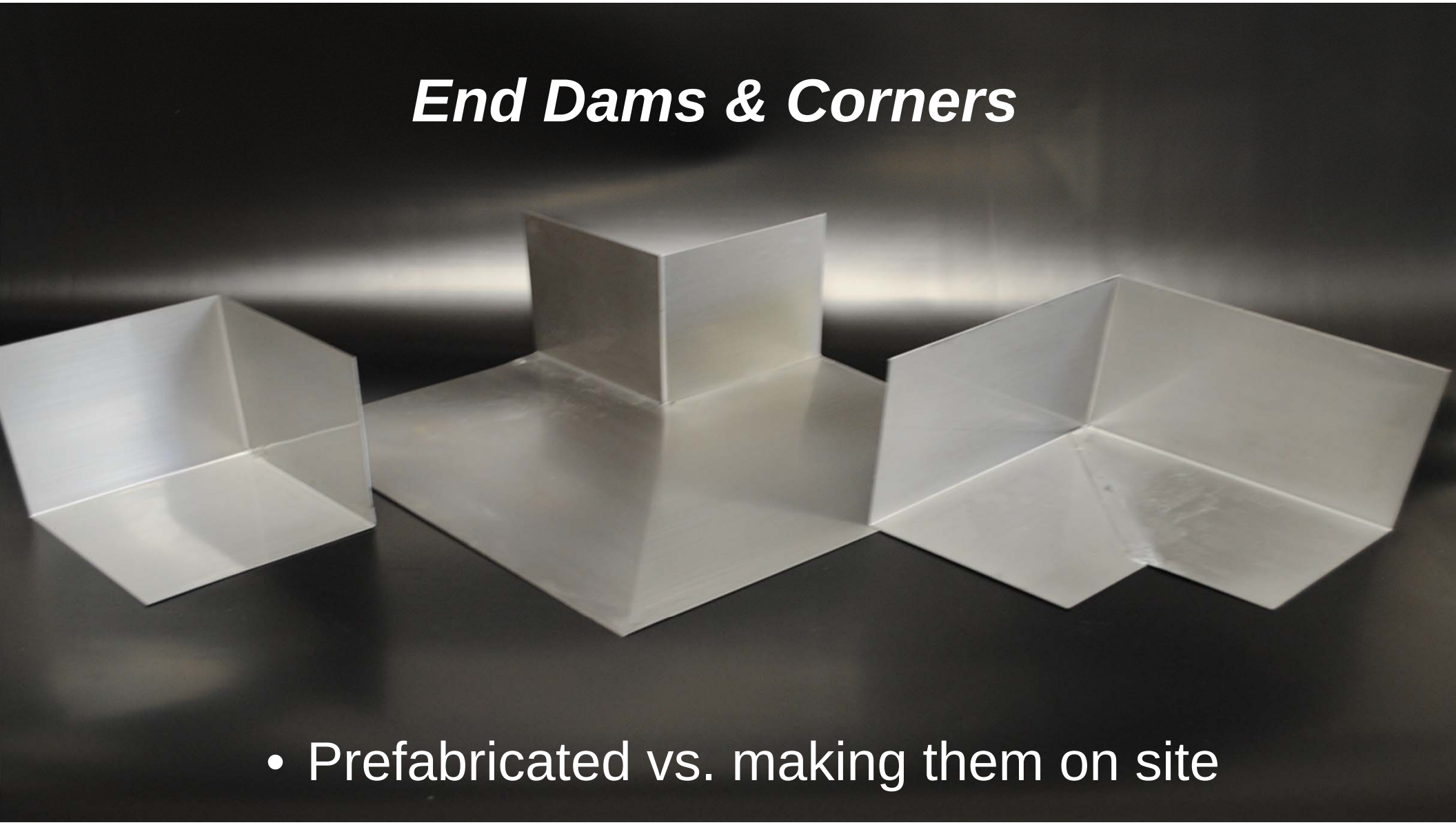
Lap Joints

- **Number of laps in 100’ section:**
  - **Copper Fabric Non-Asphalt: 1**
  - **Flexible Stainless Steel 1**
  - **Drainage Plane Copper: 2**
  - **Copper Fabric Asphalt: 4**
  - **Peel & Stick: 17**
  - **EPDM self adhered: 17**
  - **Stainless steel self adhered 17**

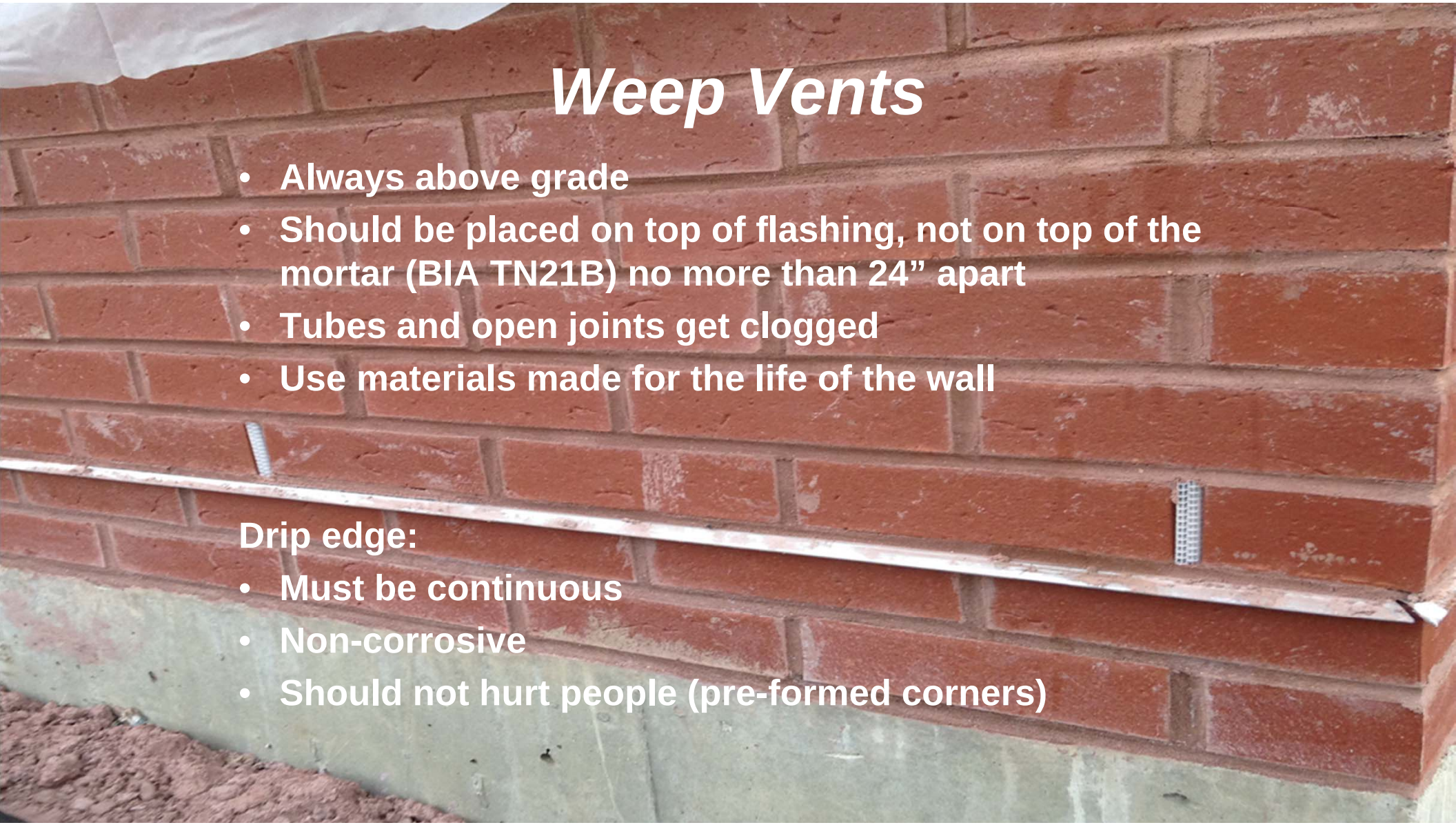
Lap Joints


FLASHING
FLASHING
SEALANT
FLASHING
FLASHING
SEALANT
FLASHING
FLASHING

End Dams & Corners



- Prefabricated vs. making them on site



Weep Vents

- **Always above grade**
- **Should be placed on top of flashing, not on top of the mortar (BIA TN21B) no more than 24” apart**
- **Tubes and open joints get clogged**
- **Use materials made for the life of the wall**

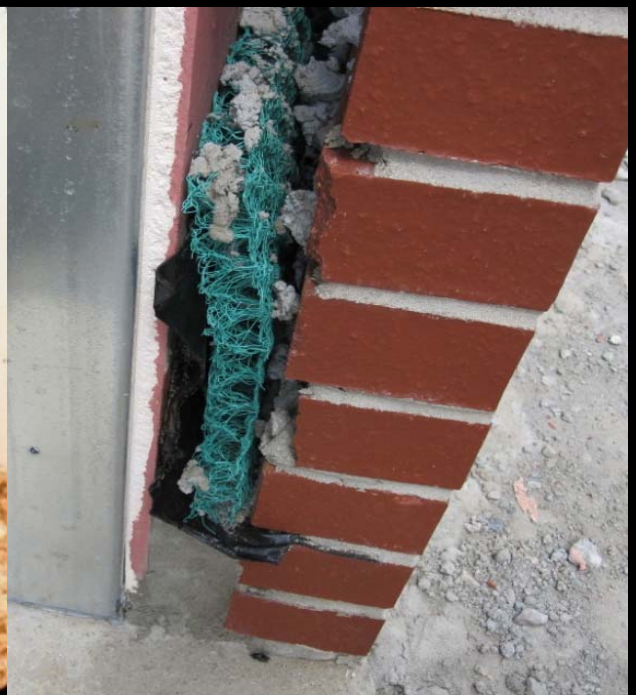
Drip edge:

- **Must be continuous**
- **Non-corrosive**
- **Should not hurt people (pre-formed corners)**

Weep Vent Protection

– Netting

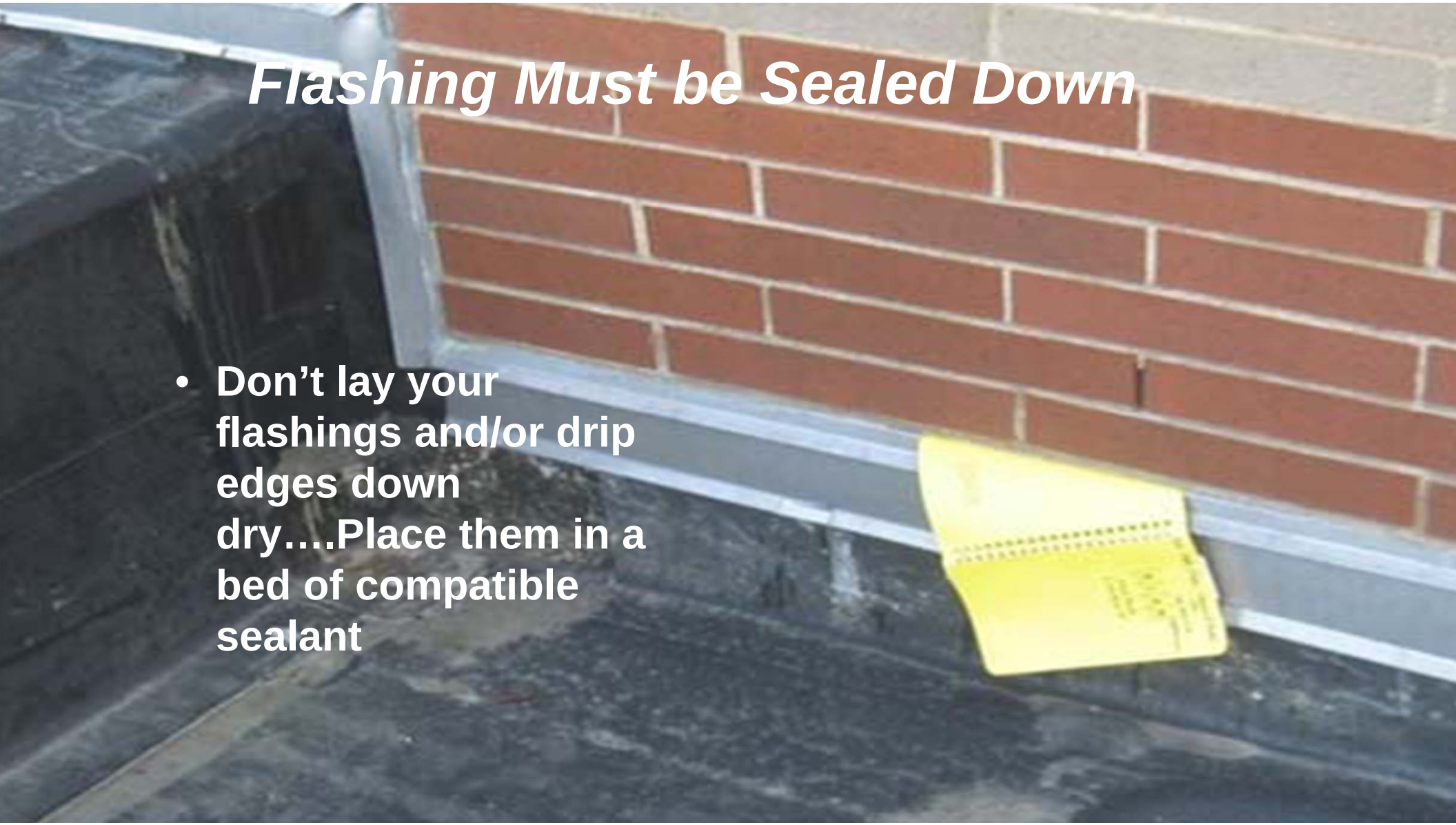
- Keeps mortar droppings from blocking the flow of water to the weeps
- Flashing must be 6” higher than netting
- Must fill entire width & depth of the air space



Weep Vent Protection

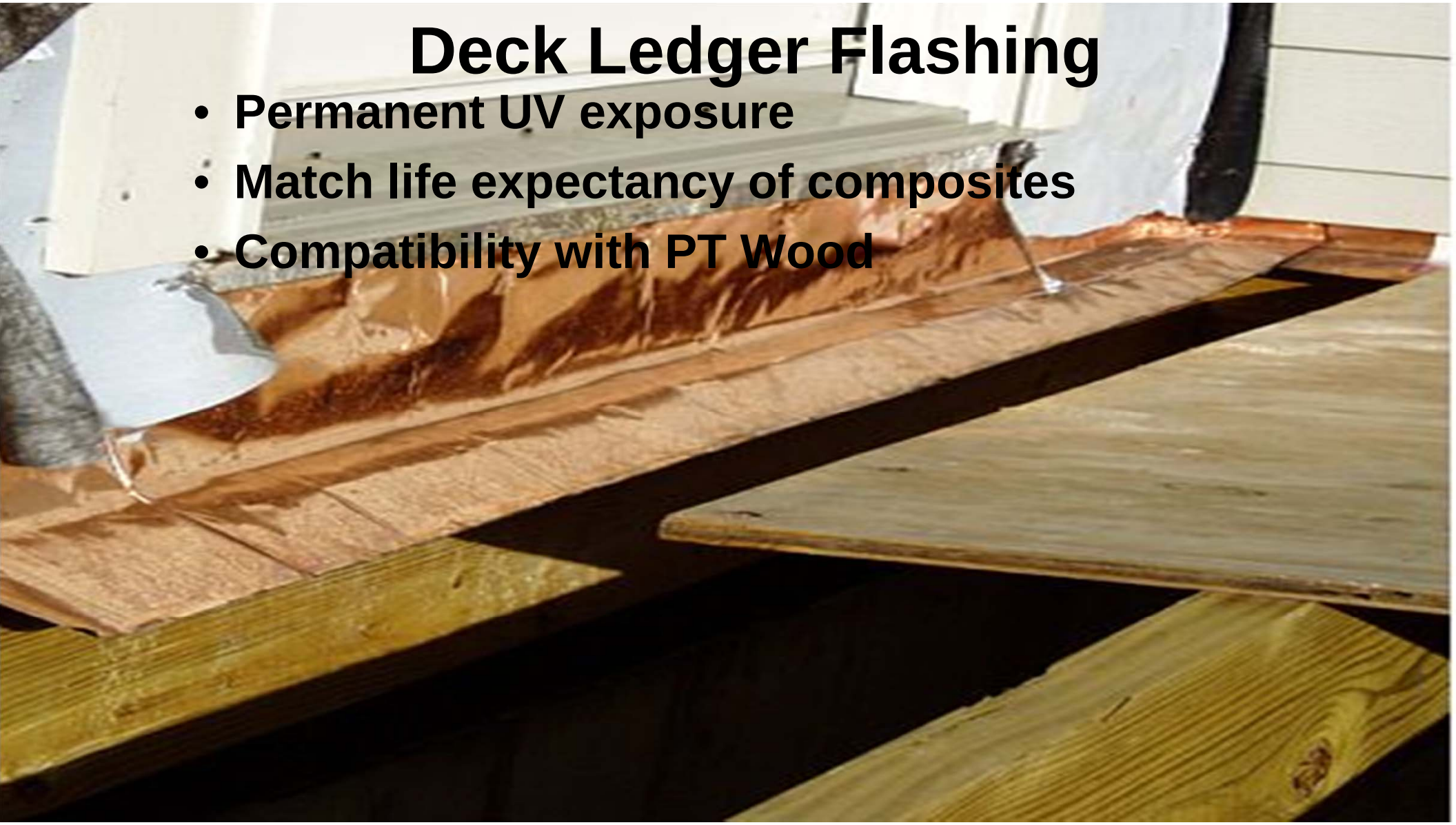
- Drainage filter fabrics
  - Keeps mortar droppings, dirt and debris from blocking weeps
  - Reduces efflorescence
  - Insect barrier
  - **One size fits all**

Flashing Must be Sealed Down

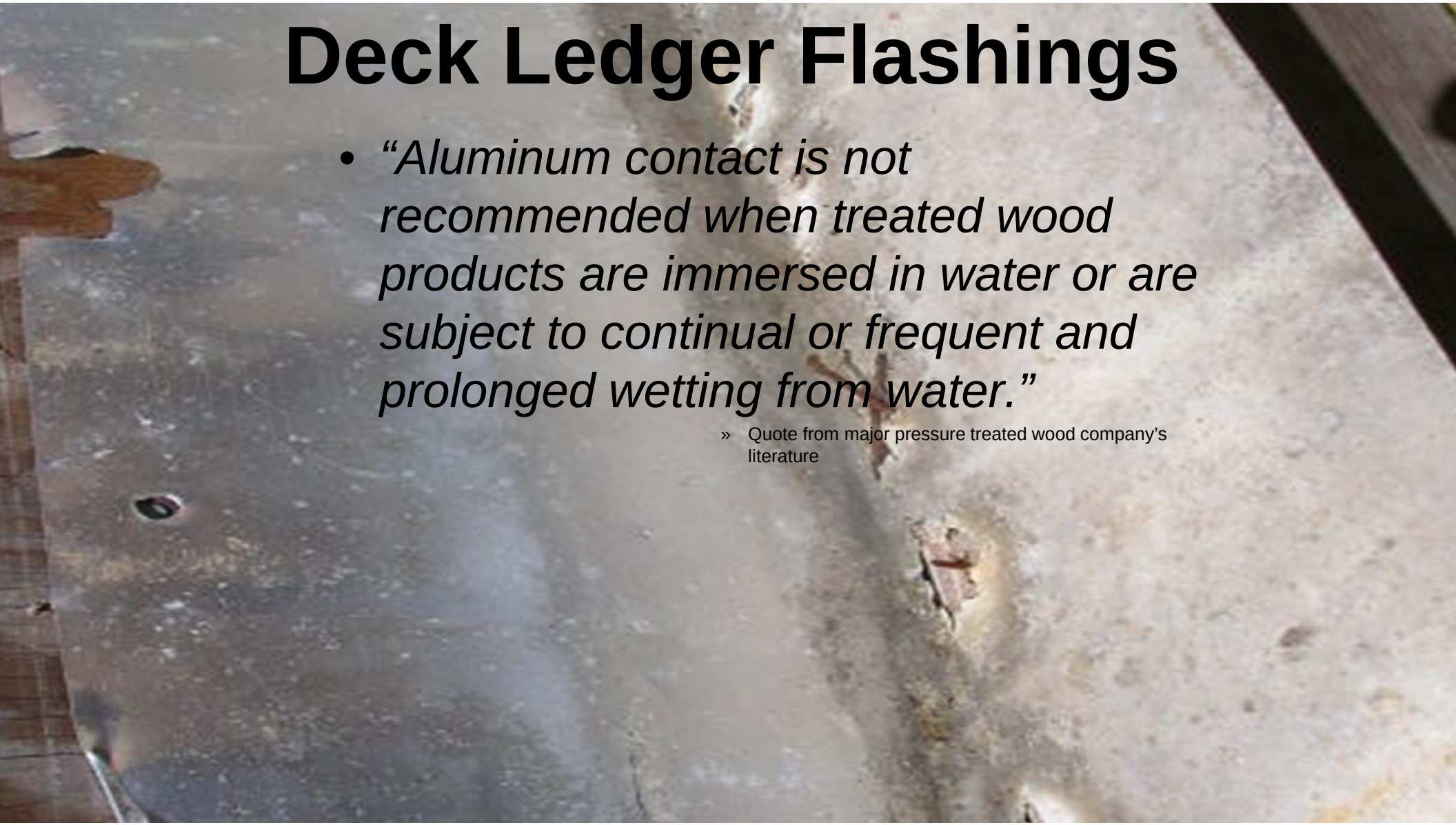


- **Don’t lay your flashings and/or drip edges down dry….Place them in a bed of compatible sealant**

Deck Ledger Flashing



- Permanent UV exposure
- Match life expectancy of composites
- Compatibility with PT Wood



Deck Ledger Flashings

- *“Aluminum contact is not recommended when treated wood products are immersed in water or are subject to continual or frequent and prolonged wetting from water.”*
  - » Quote from major pressure treated wood company’s literature

Conclusion/Questions

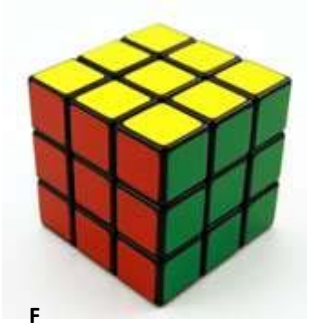
- Puncture resistance and tensile strength are “Critical to Quality” properties of through-wall flashings that are measurable and comparable.
- Add longevity, compatibility and ease of installation to selection criteria and increase each of these values as the life expectancy and complexity of the project increases.

*This concludes the AIA/CES Systems Program

GBCI CMP

CONTINUING EDUCATION AIA

Are They Compatible?



		AIR BARRIERS & INSULATIONS					
		Spray Polyurethane Foam	Liquid Applied Asphaltic Air Barrier	Liquid Applied Acrylic Air Barrier	Membrane Applied Asphaltic Air Barrier	Polystyrene Foam Insulation	Maximum Warranty
F							
L	Asphaltic copper fabric						None
A	Non-asphaltic copper fabric						**Lifetime**
S	Stainless Steel fabric						**Lifetime**
H	Copper Drainage Plane						**Lifetime**
I	EPDM						10 years
N	PVC						5 years
G	PVC KEE Self Adhered						10 years
S	Peel & Stick						5 years

NOT COMPATIBLE

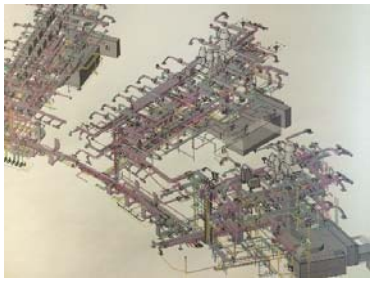
CAUTION

COMPATIBLE

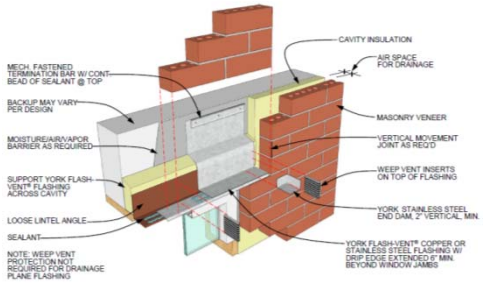
SPECIFIER'S NOTE: ALL MANUFACTURERS OF AIR BARRIER, INSULATION, SEALANT AND FLASHING PRODUCTS SHOULD PROVIDE LETTERS OF COMPATIBILITY FOR THESE PRODUCTS IN COMBINATION WITH EACH OTHER

YORK Flashings™

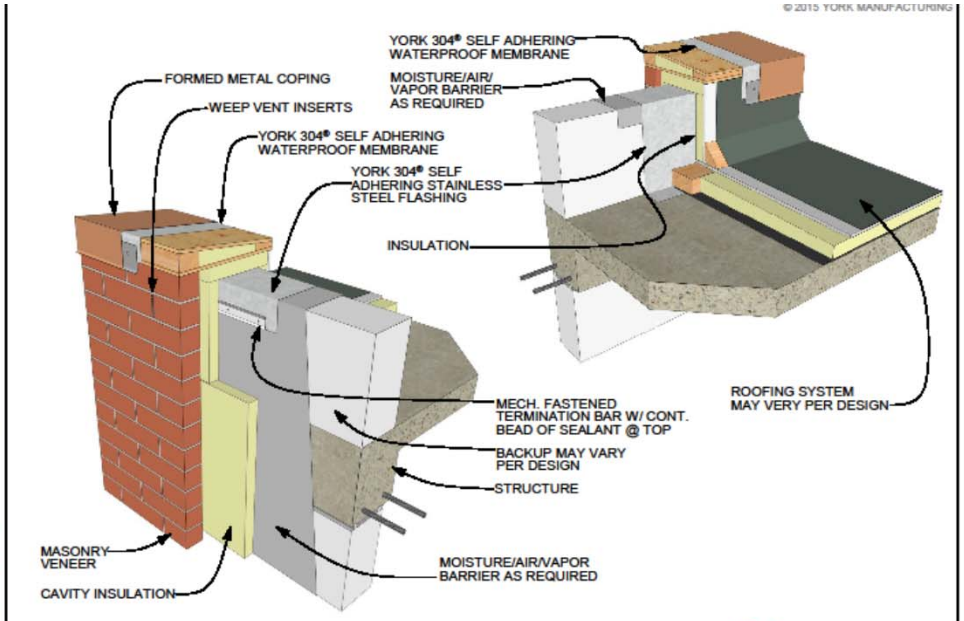
- **Life of the Wall Warranty**
  - **Zero Lifecycle Cost**
- **Health Product Declaration (HPD's):**
  - **Multi-Flash: copper and stainless steel**
  - **Flash-Vent: copper and stainless steel**
  - **York 304: self-adhering stainless steel**



BIM Objects



Details



ROOF TO WALL PARAPET — YORK 304® FLASHING

DRAWING NO. 07-05 REV. 12/24/14

YORK Since 1935

SEALANT

AS RECEIVER FOR COUNTERFLASHING

REQUIRED FOR DRAINAGE PLANE FLASHING

HIGH WALL/LOW ROOF DETAIL — YORK FLASH-VENT® FLASHING

DRAWING NO. 06-04 REV. 1/10/15

YORK Since 1935

WINDOW HEAD DETAIL — MULTI-FLASH® S.S. FLASHING RETURNED INTO BACKUP

DRAWING NO. 04-03A REV. 12/23/14

YORK Since 1935

SHELF ANGLE DETAIL — YORK MULTI-FLASH® COPPER FLASHING

DRAWING NO. 02-02 REV. 12/23/14

YORK Since 1935

BASE OF WALL DETAIL — YORK FLASH-VENT® FLASHING, NO DRIP EDGE

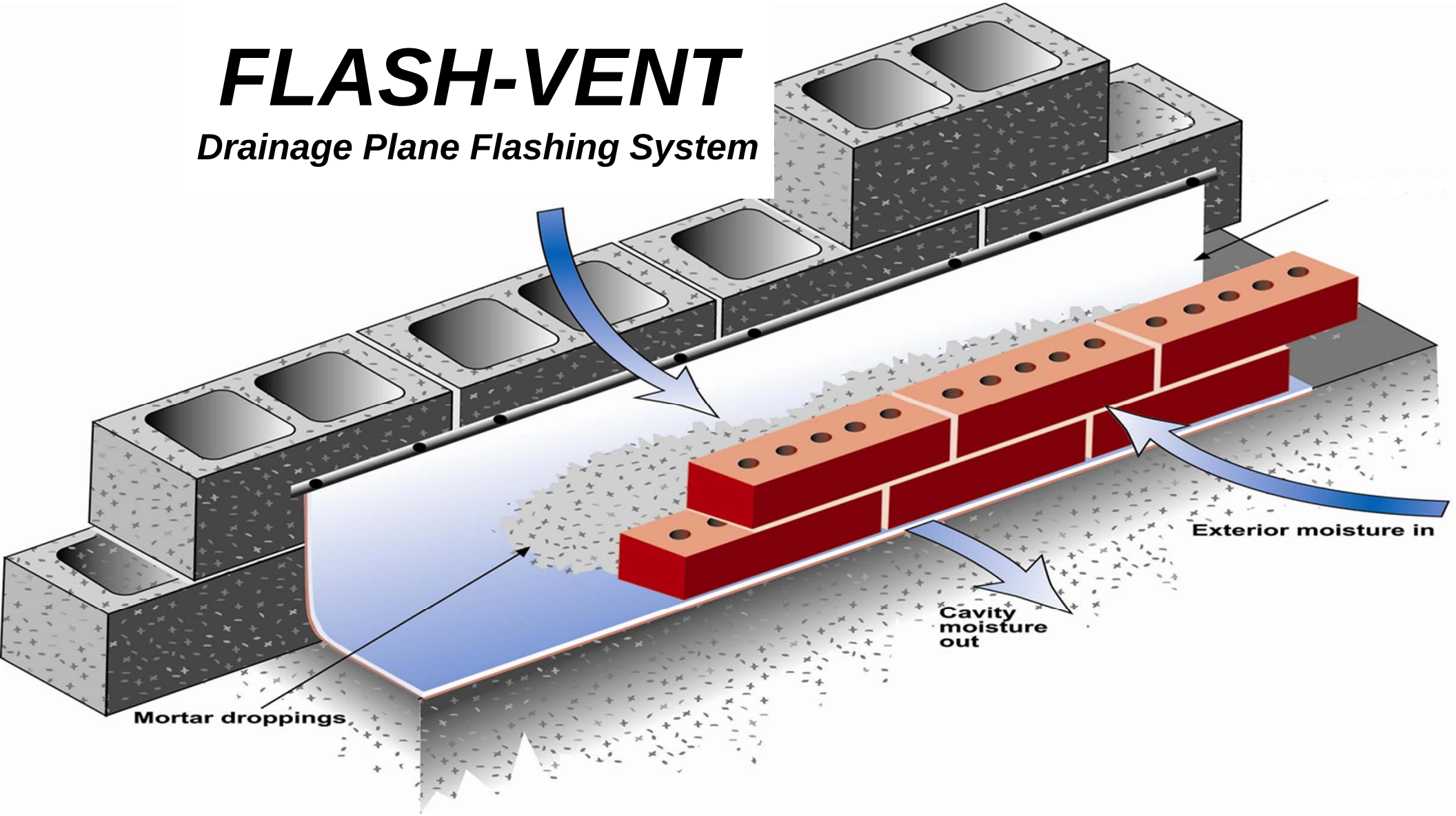
DRAWING NO. 01-04A REV. 12/23/14

YORK Since 1935


What is wrong with
this picture?

FLASH-VENT

Drainage Plane Flashing System



2004 FLASH-VENT DEMO

Cost Comparison: 9/26/2017

• Peel & Stick 24” width flashing	$1.08 PLF
• Stainless steel drip edge	$1.07 PLF
• Termination bar (plastic)	$0.37 PLF
• Primer (not including labor)	$0.29 PLF
• Mortar Net	$1.64 PLF
Peel & Stick total material cost	**$4.45 PLF**

• ***Flash-Vent*** SS 18” width flashing	$3.98 PLF
• Termination bar (plastic)	$0.37 PLF
Flash-Vent total material cost	**$4.35 PLF**

Cost Comparison: Labor

Installation based on mason hourly rate of $32.10 per hour (national average) for an eight foot section.

- **Peel and Stick (no primer)- 32 minutes @ $0.535/min = $17.12 or $2.14 PLF**
- ***Flash-Vent* system -17 minutes @ $0.535/min = $9.10 or $1.14 PLF**

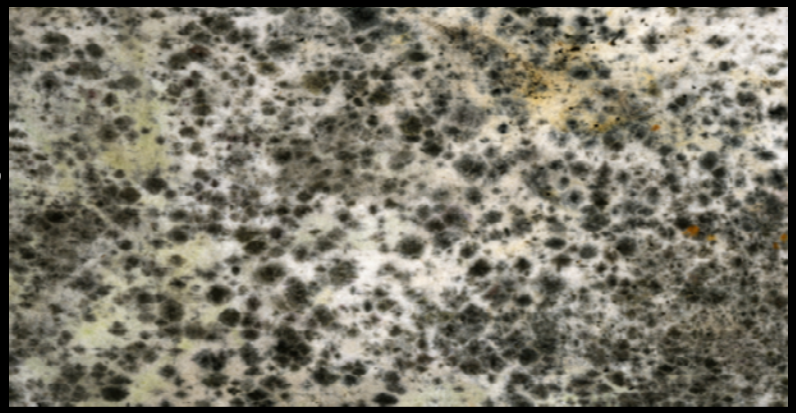
Cost Comparison: Total

- **Total installed cost per lineal foot:**
  - **Peel-and-Stick - $6.15 PLF**
  - **Flash-Vent SS - $5.12 PLF**
  - **Cost Savings - $1.03 PLF**

- **Warranty**
  - **– Peel & Stick – 5 years**
  - **– Flash-Vent SS– Life of the wall**

Flash-Vent

- **Mold:**
  - Passes ASTM D3273
  - Passes ASTM G21



- **Flame spread and smoke generation:**
  - Passes ASTM E84
    - Class A material

Weep Armor

- Geotextile filter fabric
  - Keeps weep vents clear of debris and mortar
- Hydrophobic
- Lowest cost weep protection system

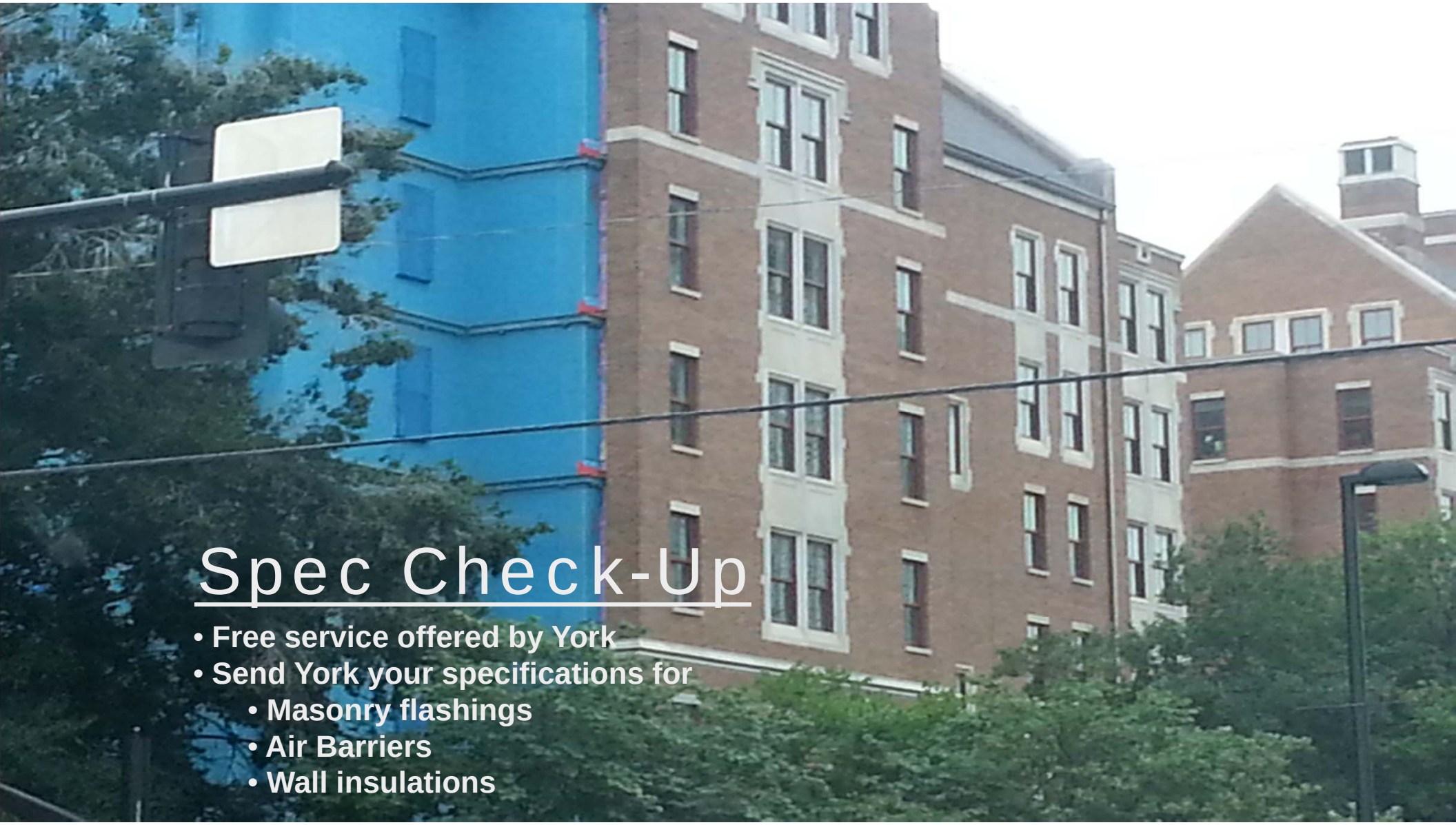
UniverSeal US-100

Roofing Contractor Magazine

"As contractors and specifiers become familiar with the attributes of polyether MS type sealants, they will rapidly displace the older, more familiar, technologies that now dominate the sealant market."

Polyether Sealants

- **Meets all VOC requirements**
- **No solvents**
- **100% Solids**
- **Compatible with almost all building components**
- **Approved for use with polystyrene by.**
  - **Owens Corning**
  - **Pactiv**
  - **Dow**

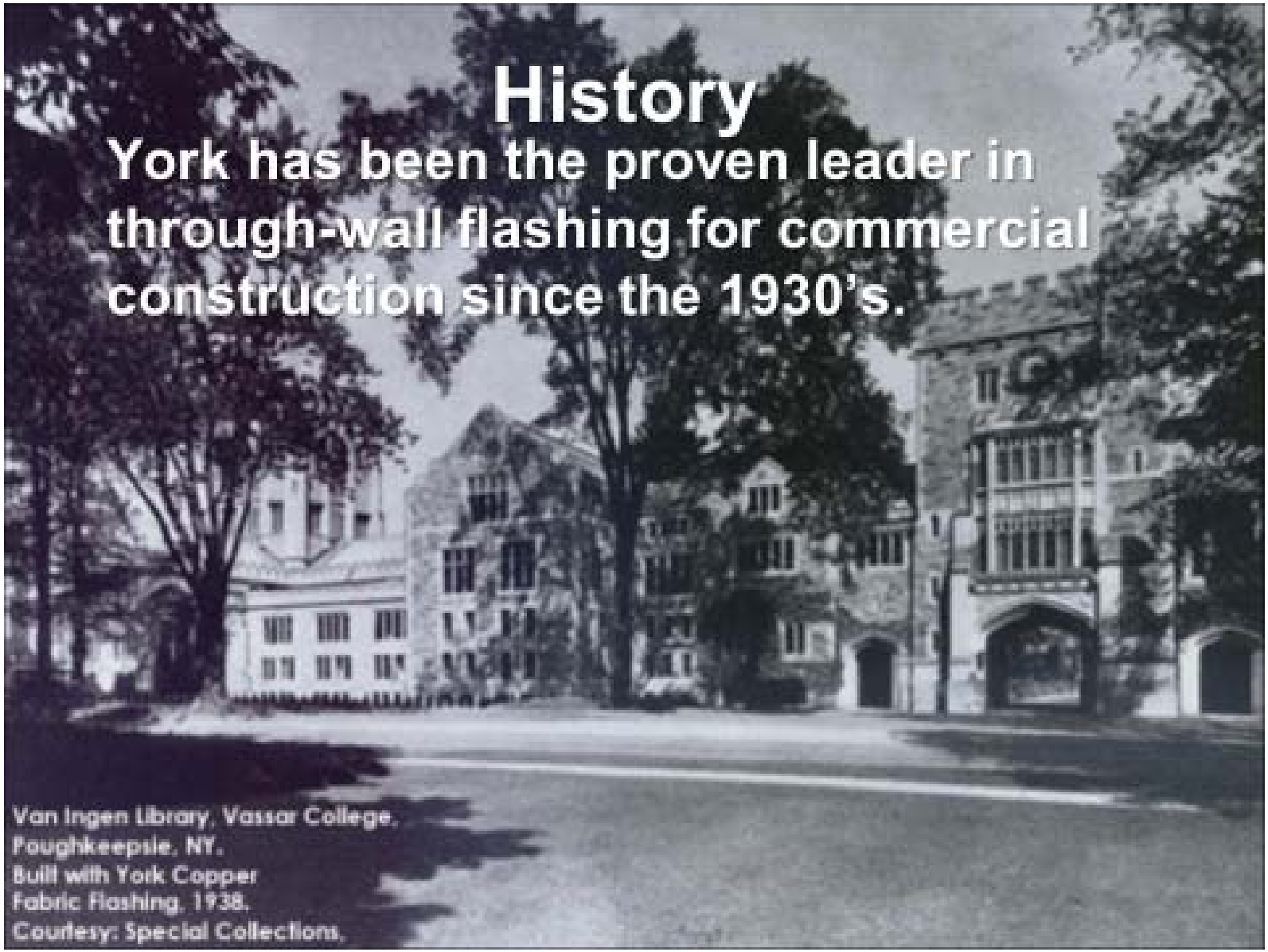


Spec Check-Up

- Free service offered by York
- Send York your specifications for
  - Masonry flashings
  - Air Barriers
  - Wall insulations

GBCI
CMP

Course #0090005315


History
York has been the proven leader in through-wall flashing for commercial construction since the 1930's.
Van Ingen Library, Vassar College, Poughkeepsie, NY.
Built with York Copper Fabric Flashing, 1938.
Courtesy: Special Collections.


What is wrong with this picture?