air barrier
abaa
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Air Barriers Installation & Inspections

Presented by Mr. Peter Spafford
Director of Quality Assurance
Air Barrier Association of America

AB-XX – 2.0 HSW/LU

ABAA M-115-998

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Learning Objectives

Installation & Inspection of Air Barriers

Learning Objectives

- Identify problems resulting from improperly installed systems
- Show typical installation requirements for the different types of air barriers
- Identify typical installation defects in an installed air barrier assembly

Learning Objectives

Installation & Inspection of Air Barriers

Points for discussion / research

- Re-emulsification of water based primers
- Re-emulsification of latex sealants
- Re- emulsification of water based fluid applied air barriers
- Drying / curing times for primers with varying thicknesses
- Drying / curing times for fluid applied membranes
- VOCs in primers & fluid applied systems
- Horizontal vs Vertical application of Self Adhered resulting deficiencies
- Color of SA membranes and heat related deficiencies
- How do primers affect the permeability of breathable membranes

Learning Objectives

Installation & Inspection of Air Barriers

Points for discussion / research (Continued)

- How does space between rigid insulation and the substrate effects the effective “R” value to avoid the dewpoint?

(When the insulation is installed without the top & bottom of the wall area being sealed in varied climate zones)

- What are the risks with using water based fluid applied air barriers in built up roof assemblies?

Learning Objectives

Installation & Inspection of Air Barriers

Points for discussion / research (Continued)

- These issues have and are resulting in a number of air barrier contractors going out of business because of the failures
- There have been significant delays in construction on many construction site as a result of these types of failures
- There has also been numerous law suites initiated because of the failures

Air Barriers

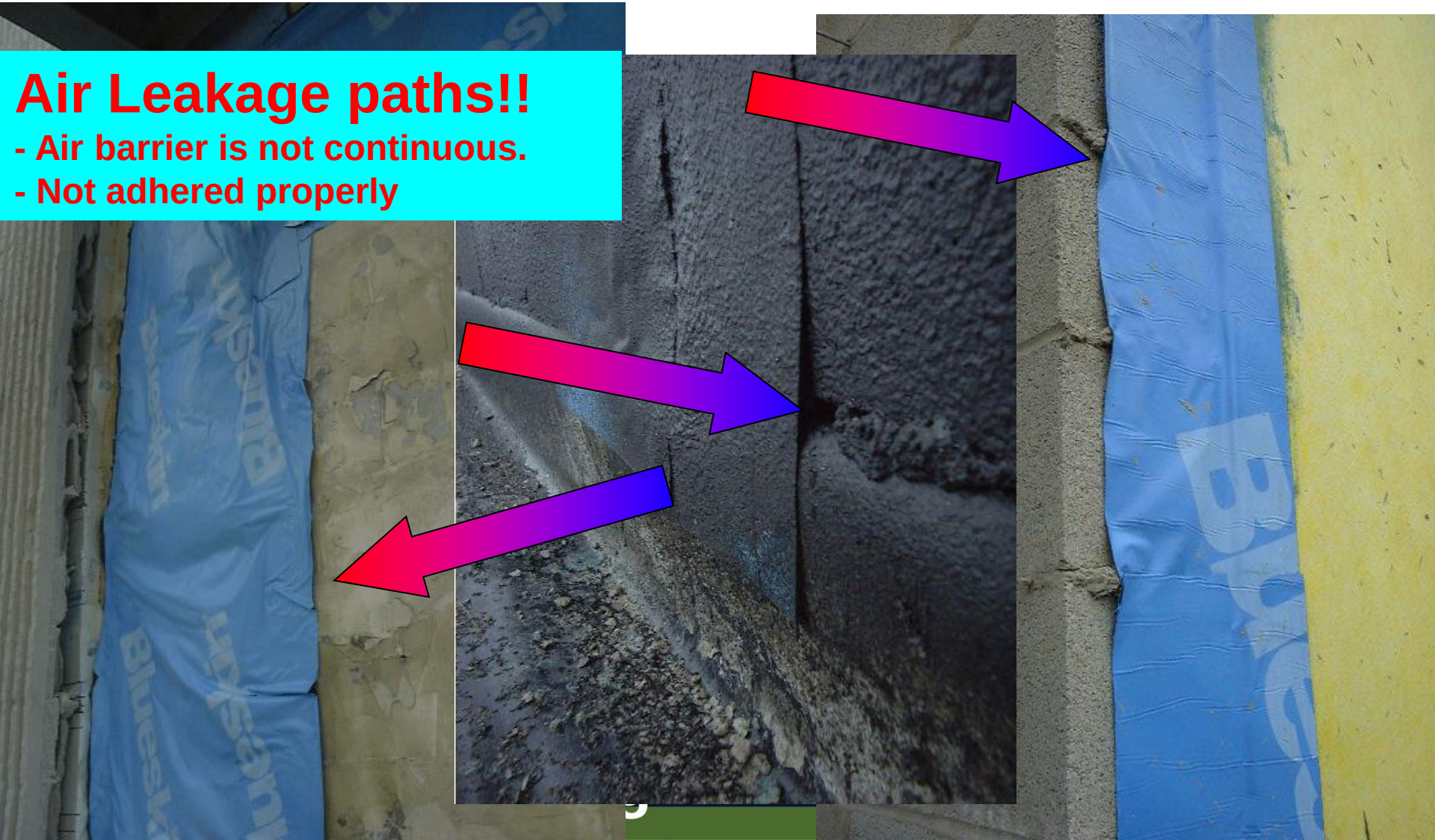
- What are the loads on an air barriers?
  - Wind Loads
  - Stack effect
  - Mechanical effect
  - Composite effect

Air Barriers

- What happens when there is no air barrier or the one that has been installed fails?


Result of Heat, Air &
Moisture flow.

Introduction to Air Barriers



What happens when the air barrier fails?!!

What happens when the air barrier fails?!!

What happens when the air barrier fails?!!

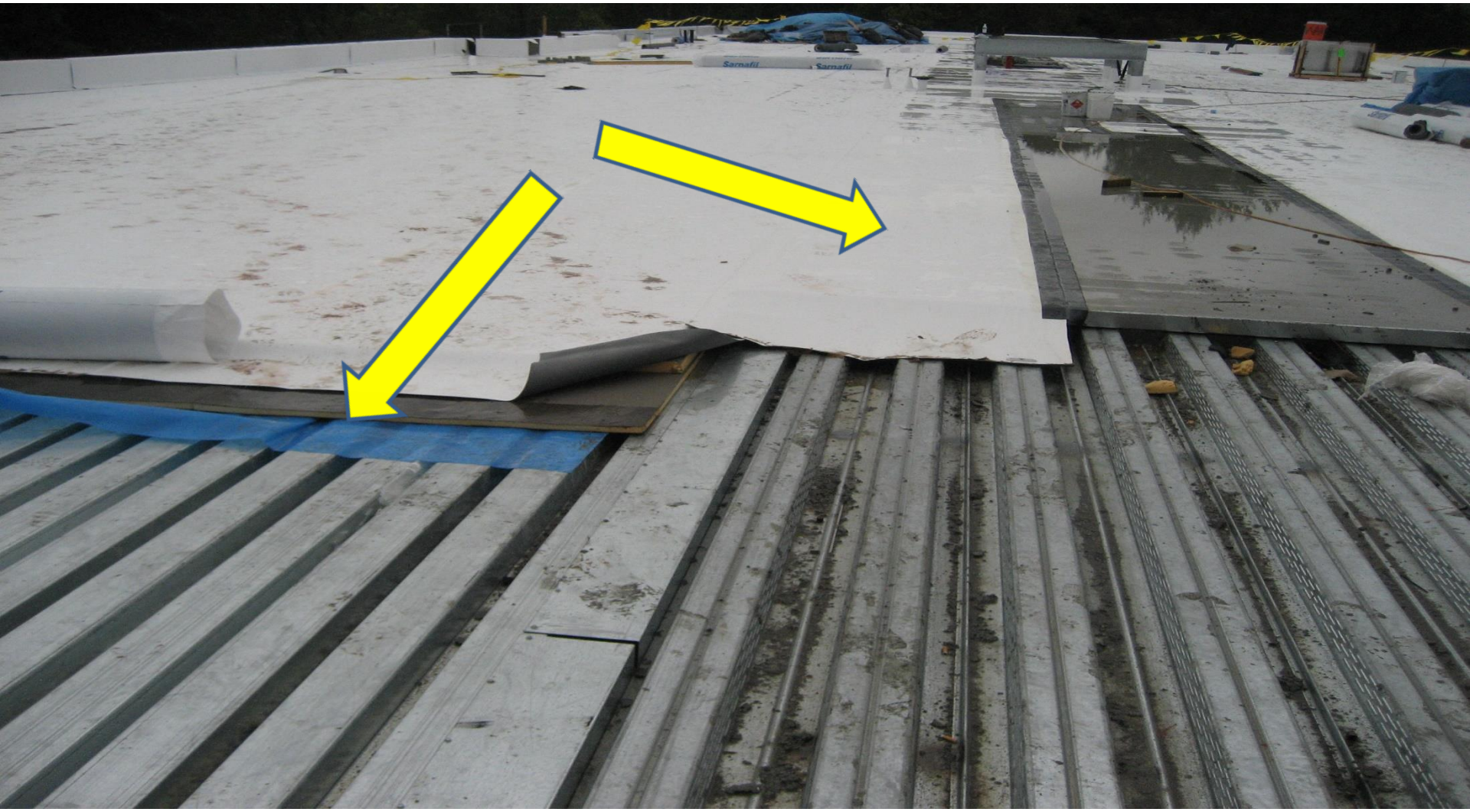

15.08.2011

In what climate zones is it acceptable to use the roofing membrane as an air barrier without have moisture damage in the roof assembly because of condensation on the under side of the roofing membrane?

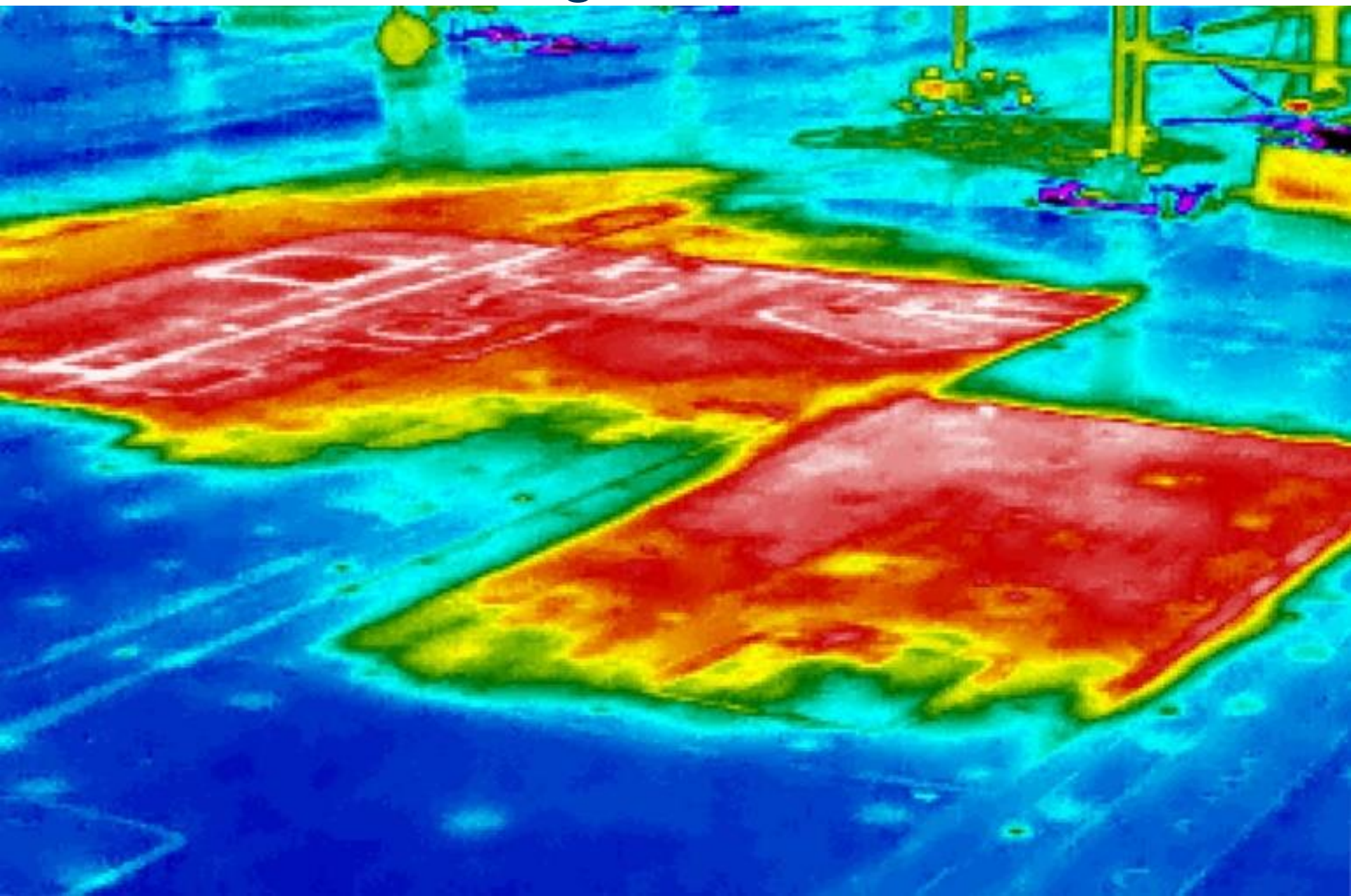
Where is the air barrier?

Where is the air barrier?

Where is the air barrier?



Moisture damage in roof assemblies!!



Moisture damage in roof assemblies!!

Membranes Not compatible!!

Membranes Not compatible!!

Tremendous cost to redo the roof assemblies!!

CMU Block substrates

- What issues result when CMU block is less dense & course when installing fluid applied systems?
  - Pin holes
  - Reduced coverage for fluid applied systems
  - Greater air penetration with the pin holes not repaired
  - Reduced water vapor transmission as a result of increased fluid applied membrane thickness to reduce pin holes
  - Possible condensation in the wall assembly
  - Possible structural damage in the wall assembly
  - Increased rick of mold and poor indoor air quality
  - Construction delays
  - Law suites
  - Contractor going out of business

CMU Block substrates Research Required?

- Why are many fluid applied systems experiencing pin holes on course CMU blocks?
  - More fly ash in the mix?
  - Less fly ash in the mix?
  - More or less air entrainment in the mix?
  - Other contaminants in the mix?
  - Source of fly ash and aggregates?
  - ?????????????

CMU Block substrates

- What are the Air Barrier contractors doing to resolve the pin hole issues?
  - Applying more material !

Pin Holes!!

Pin Holes!!

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Press: For:
1 Customer Service
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DEVOE
HIGH PERFORMANCE
COATINGS
WET FILM
1 TO 80 MIL SCALE

Craters from air in the equipment or contaminated materials from improper cleaning of the equipment results in air leakage

Self Adhered Membranes

- Factors affecting the installation & performance of self adhered membranes:
  - Horizontal application vs Vertical
  - Color of the material
  - Hot climates
  - Cold climates
  - UV exposure
  - High humidity conditions within the building
  - Insulation performance (Effective “R” values)
  - Rolling the membrane vs not rolling


Horizontal Application & dark color
GRACE
Perm-A-Barrier®


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CCW-705
Air & Vapor Barrier
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Vertical Application
CCW-705
DENSGLASS GOLD

Exposure to the external environment


219F membrane temp!!
9:00 am and 61 F ambient temp!!
East elevation!
HOLD
219
F
C
2192
MAX
Coatings & Wat


Material left exposed well beyond manufactures time limit and temperature range.

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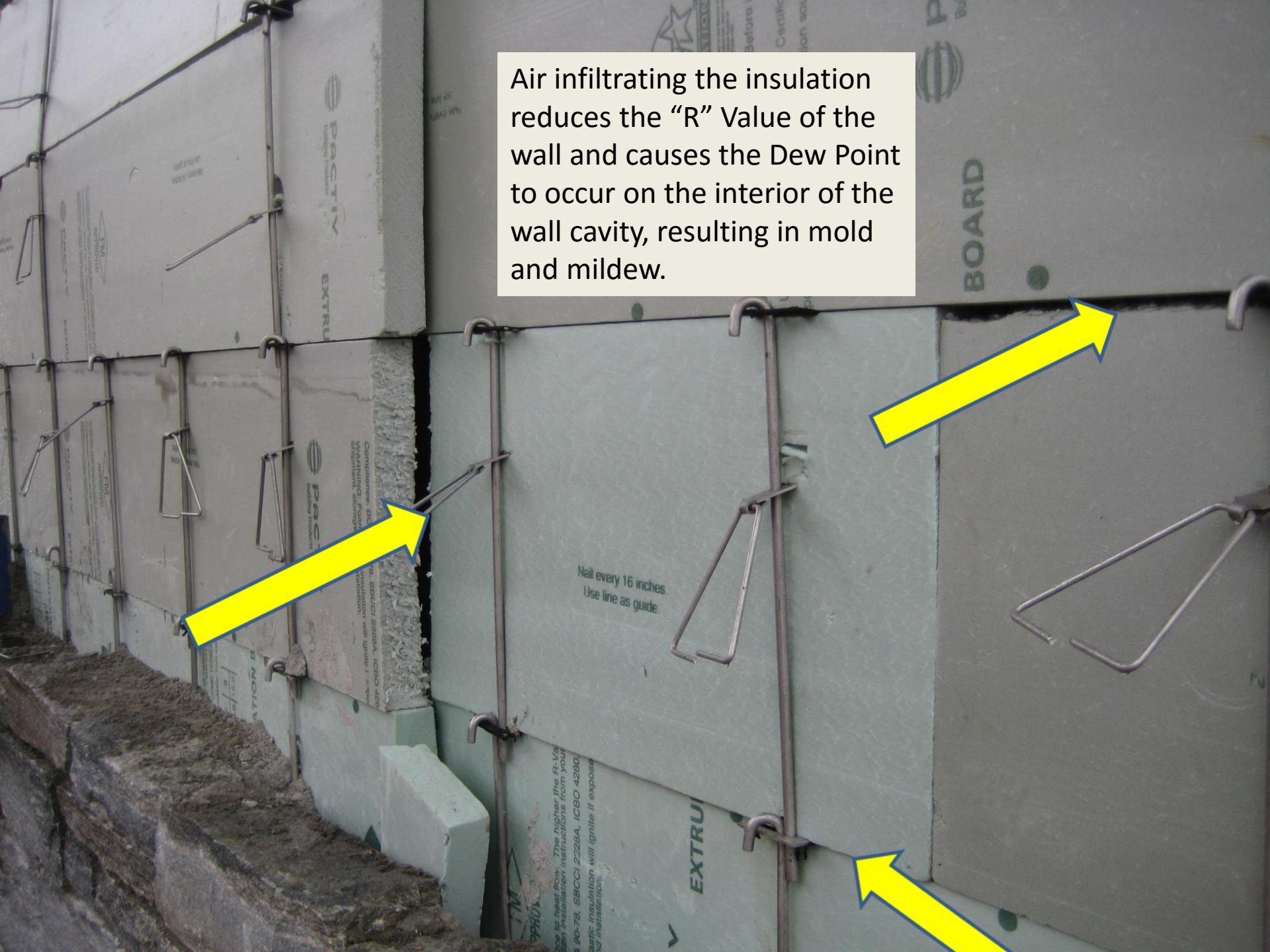
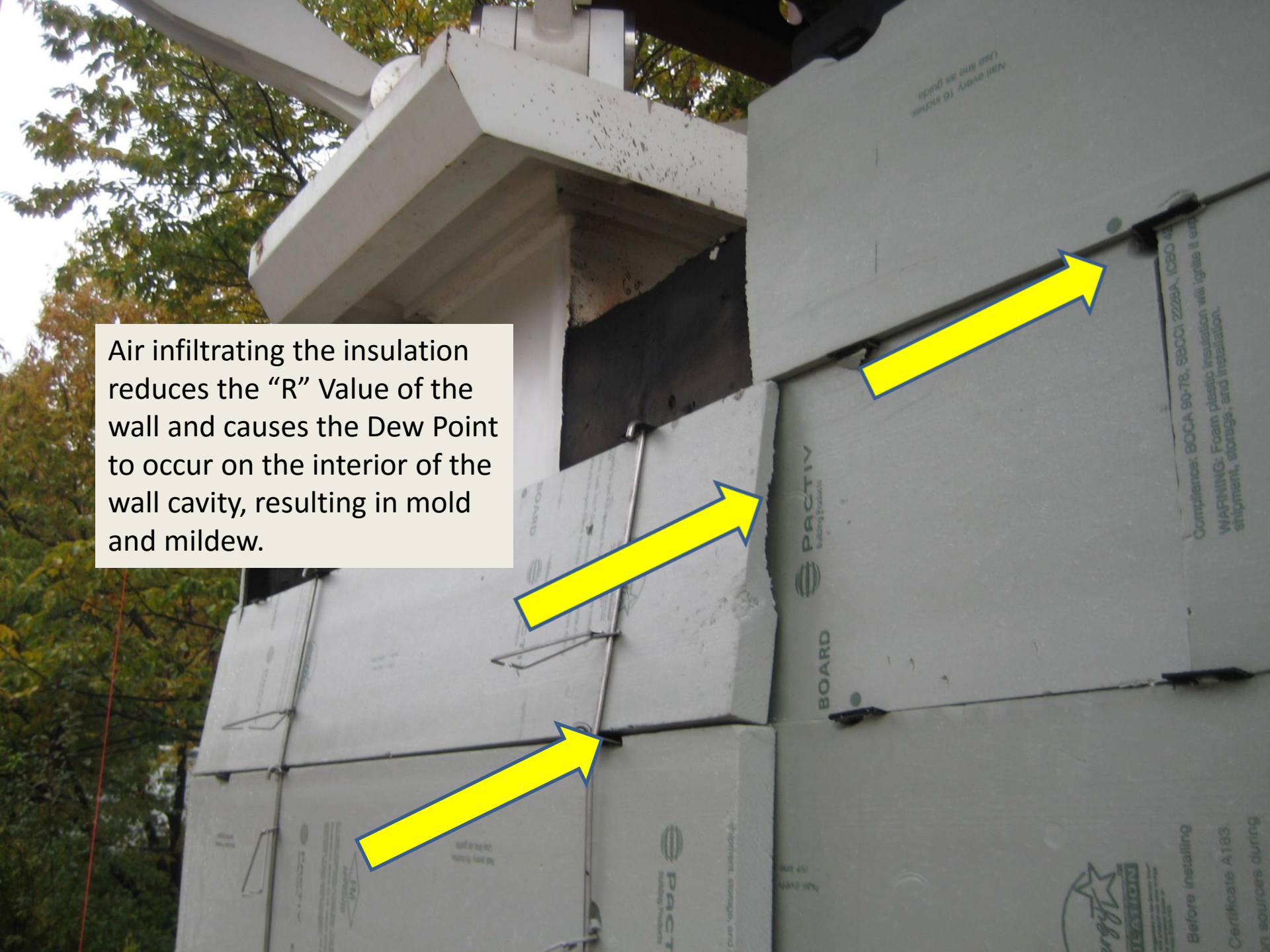
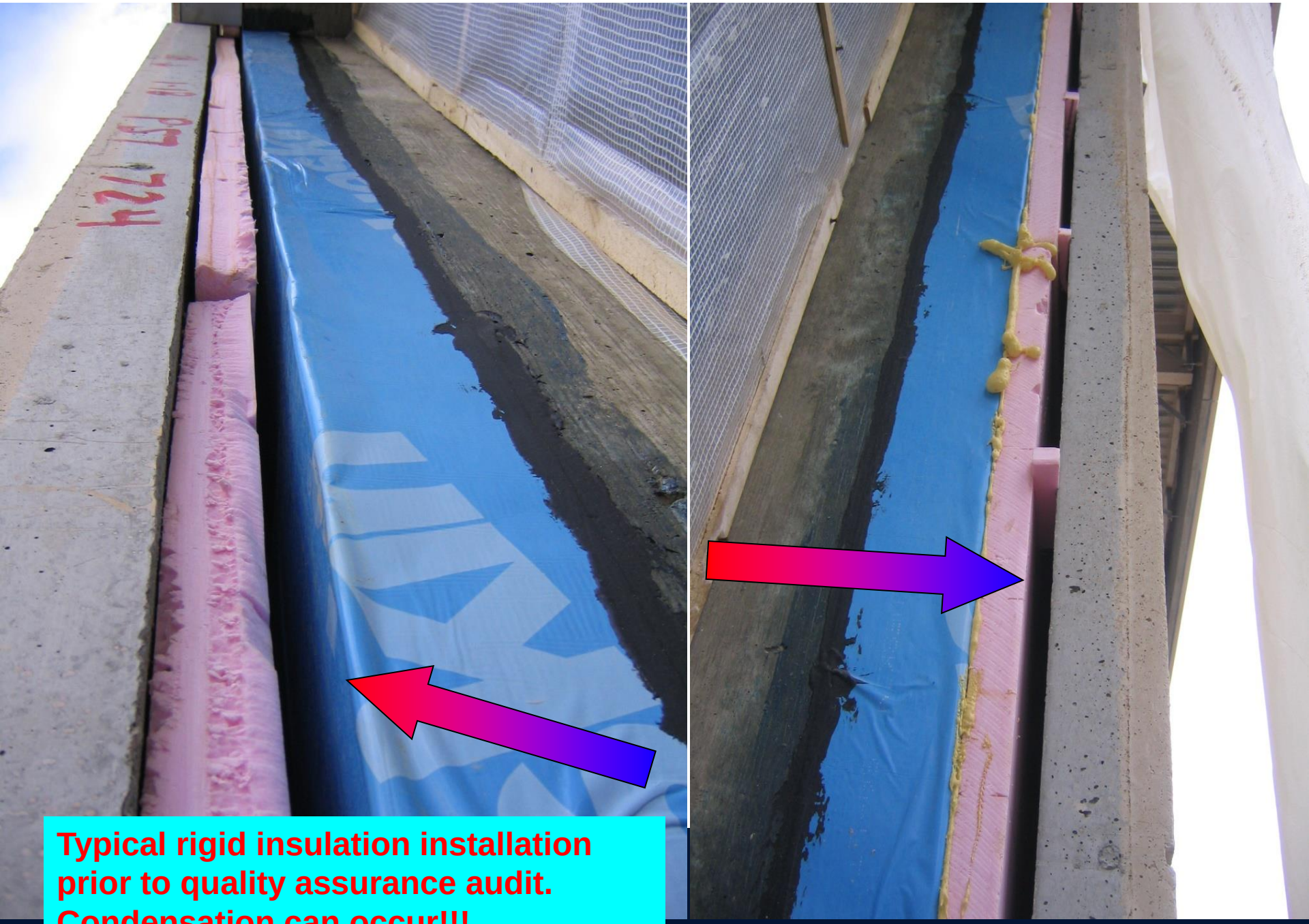
SELECT
1-800-HOLIDAY

Insulation affects the performance of the Air Barrier


Air infiltrating the insulation reduces the “R” Value of the wall and causes the Dew Point to occur on the interior of the wall cavity, resulting in mold and mildew.
Nail every 16 inches.
Use line as guide.
BOARD


Air infiltrating the insulation reduces the “R” Value of the wall and causes the Dew Point to occur on the interior of the wall cavity, resulting in mold and mildew.
PACTIV
BOARD



Typical rigid insulation installation prior to quality assurance audit. Condensation can occur!!!

Rolling vs Not Rolling the SA membrane

Latex Sealants

- Factors affecting the installation & performance latex sealants:
  - Substrates IE:
  - CMU
  - Exterior gypsum board joints
  - Concrete foundation to wall connections
  - Window sills
  - Anywhere there is a potential for standing water.


SECUROCK™
Glass-Mat Sheathing

Fluid Applied Air Barrier Materials

- Different types of fluid applied air barrier materials are:
  - 1. Water based fluid applied systems:
    - What happens during or after a prolonged rain event?
    - What happens after installation and the building is heated while there is very high humidity during the installation of interior CMU walls or concrete floors etc. ?
    - What happens after installation and the building is heated with propane?

Pressure from within the building during construction


EXOAIR

On Site Realities


GRADALL 5340-42
SKYJACK
CHEVROLET


Bluesk
Bluesk


25/01/2102131538-1


Blueskin


Blueskin
Blueskin TWF


Blueskin

WHAT AFFECT DOES THE THICKNESS OF THE PRIMER HAVE REGARDING:

- Cure times (Solvent Based & Water Based)
- Water vapor permeance


GREAT NORTHERN

Henry BlueskinVP160
Air Tight Water Tight Weather Tight

03/07/2014 16:22

Henry Blueskin VP160
Air Tight Water Tight Weather Tight
03/07/2014 16:23


Henry Blueskin VP160
Air Tight Water Tight
03/07/2014 16:30

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Installations have to start with proper substrate


GP
DENSGLASS GOLD
Exterior Sheathing
GP
DENSGLASS GOLD
Exterior Sheathing
GP
DENSGLASS GOLD
Exterior Sheathing

DENSGLAS

Exterior Sh

PERM-A-BARRIER

PERM-A-BARRIER

5¼

PERM-A-BARRIER
Wall Flashing ✣ Wall Flashing

DENSGLASS GO
Exterior Sheathing

Substrate Conditions & Preparation

- Surfaces must be clean & dry.

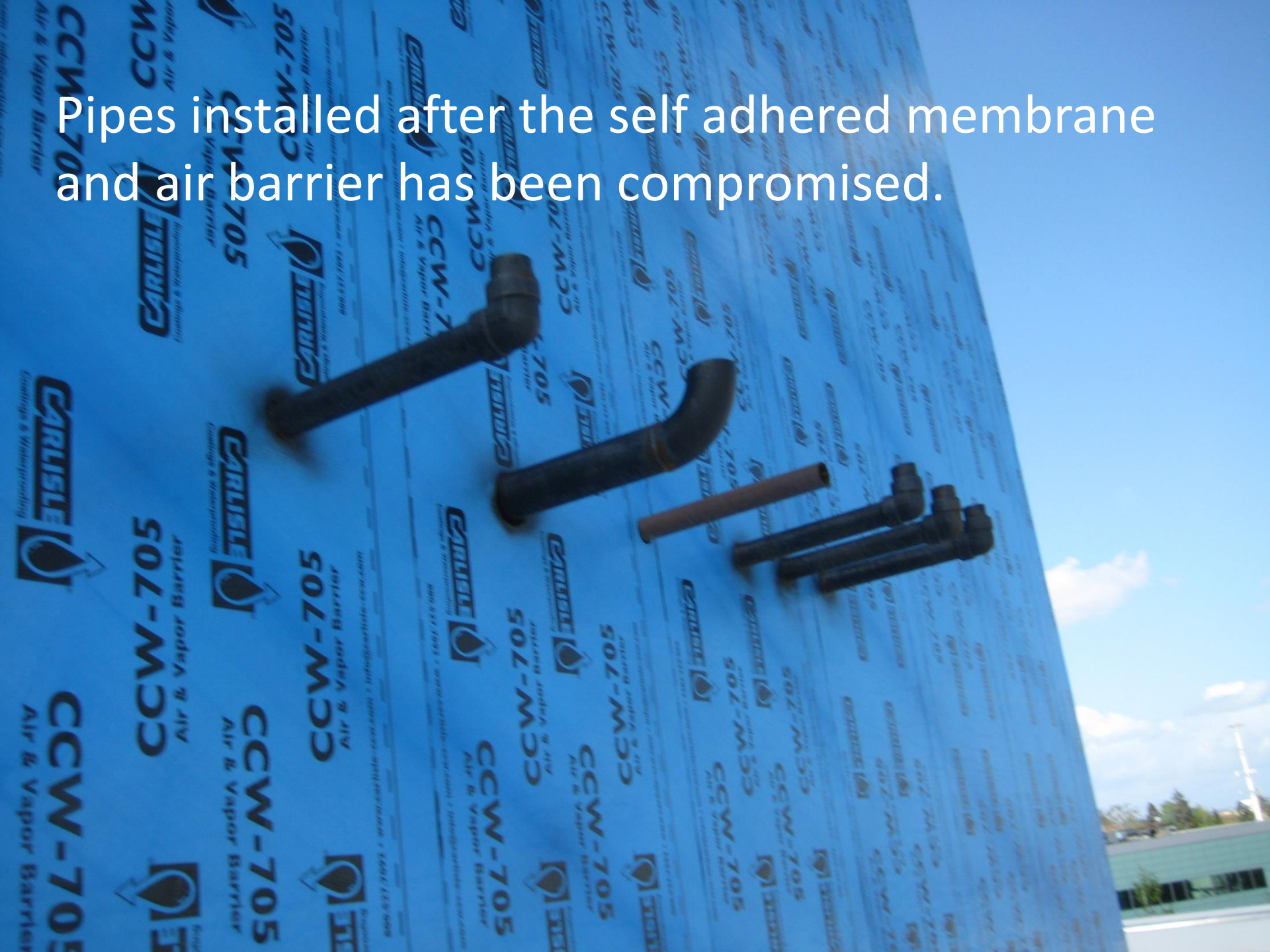
So you think that your design is great and your job is going to be completed as planned?


rlisle-ccw.com

Sequencing


Service penetration installed after the fluid applied membrane and air barrier has been compromised. Work in progress to repair the area.

VISUAL INSPECTION


Pipes installed after the self adhered membrane and air barrier has been compromised.
CCW-705
Air & Vapor Barrier

Installation by Certified installers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Installer Training

- Foundation for the SQAP is proper installer training on the installation of air barriers
- Training is provided for:
  - Self adhered
  - Fluid applied – non foaming
  - Fluid applied – foaming (spray polyurethane foam)
  - Mechanical fastened flexible membranes
  - Mechanical fastened boardstock – non insulating
  - Mechanical fastened boardstock – insulating
  - Flexible thin membranes
  - Sealants

www.airbarrier.org


RUB-R-WALL

LASS GOLD
terior Sheathing


DENSGLASS GOLD
Exterior Sheathing
CCW-705
Air & Vapor Barrier


INTERIOR SPRAY POLYURETHANE FOAM (SPF) INSULATION
PERSONAL PROTECTIVE EQUIPMENT

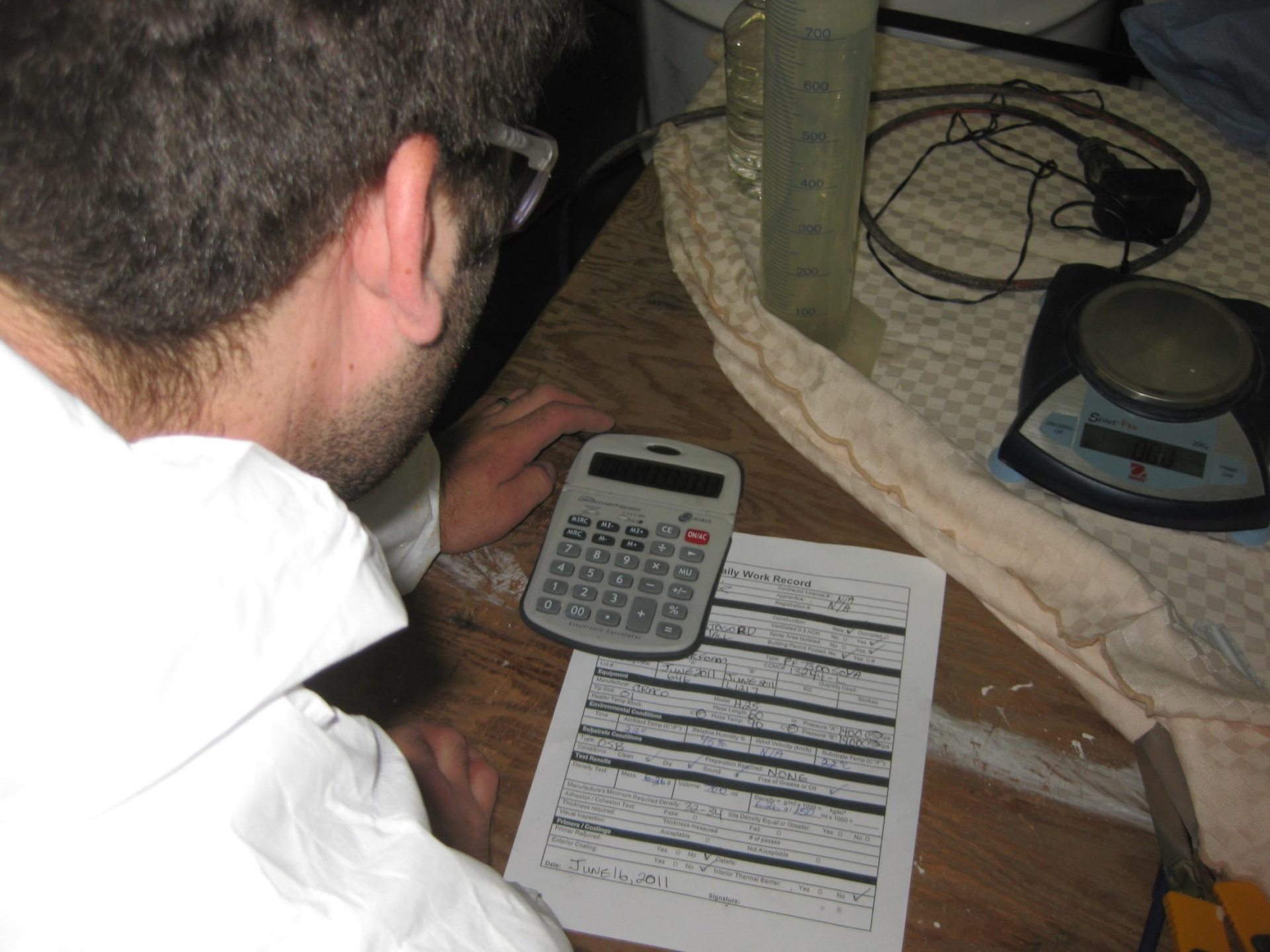

GenVec
Protective Garment


CUFCA
Daily Work Record
JUNE 16, 2011


FRANK VII
#7
#9
#12
#6
#1
GenVec


Azlon 1000:10ml
In 20 °C
1000
900
800
700
600
500
400
300
200
100
Home Foam
B


1000:10ml
1000
900
800
700
600
500
400
300
200
100


700
600
500
400
300
200
100
Daily Work Record
Date: JUNE 16, 2011
Signature:

Installers

- **During Construction Requirements**
  - **Adhesion testing daily (ASTM D4541)**
  - **Air Leakage testing (optional) and correct deficiencies daily**
  - **Perform work in a safe manner**
  - **Carry identification card at all times**


Blueskin

Installers

- **During Construction Requirements**
  - **Proper application of materials within material specifications and ABAA guidelines**
  - **Complete** Daily Job Site Reports
  - **Visual inspection and correct deficiencies daily**


4/17/04
7th fl
South elev.
C. 647
128.8

abaa association of america

Air Barrier Association of America

Job Site Report

Crew # 1 of 04

Job Site Report # 35
4/24/04

Lead Installer: Shawn Queenan — Certification #: 300622
Certified Installer: Michael Govoni — Certification #: 300184
Registered Apprentice: Richard McIntyre — Registration #: 300699-A
Registered Apprentice: _____ — Registration #: _____

Project Information

Air Barrier Contractor: The Waterproofing Co.
General Contractor: Turner Construction Co.
Project Name: Boston University Life Science & Engineering (A02-051)
Project Location: 24 Cummington St. Boston Ma.
Type of Air Barrier Installed: ☐ Torch Grade ☒ Self Adhered ☐ Spray-Applied ☐ Sheet Metal
Substrate Type: Dens glass **Substrate Temperature:** ___°C **Ambient Temp:** 60 °F
Substrate Surface Conditions and Preparation Required: All repairs on Dens glass done by T.J. McCartney
Substrate Conditions Acceptable for Application of Membrane: ☒ Yes ☐ No

Installation & Testing Location

Location of Installation for 4 locations:

# 1 Time Started: 7:00 Time Completed: 11:30	# 2 Time Started: 1:30 Time Completed: 3:15
On Gridline	On Gridline Southeast corner
Between Gridline: to	Between Gridline: to
Between Elevation: 8 to 9	Between Elevation: 6 to 7
Wall location: North (South) East West	Wall location: North South (East) West
# 3 Time Started: Time Completed:	**# 4 Time Started: Time Completed:**
On Gridline	On Gridline
Between Gridline: to	Between Gridline: to
Between Elevation: to	Between Elevation: to
Wall location: North South East West	Wall location: North South East West

Is Testing Equipment on-site ?:
Pressure Tester on-site: ☐ Yes ☒ No
Adhesion Tester on-site: ☒ Yes ☐ No

Testing Results

Visual Inspection:

Visual Inspection completed at: ☒ Location 1 ☒ Location 2 ☐ Location 3 ☐ Location 4

Visual Testing of	☒ laps	☒ t-joints	☒ seams	☒ wrinkles	☐ ties
	☒ adhesion	☒ creep	☒ compatibility of materials		

# of Deficiencies: 0 # of Deficiencies corrected: _____
Describe Deficiencies & Corrective Action Taken: _____

Pressure Testing:

Pressure testing completed at: ☐ Location 1 ☐ Location 2 ☐ Location 3 ☐ Location 4

Amount Completed on ties: ____ # of Deficiencies: ____ # Deficiencies corrected: ____
Amount Completed on seams: ____ # of Deficiencies: ____ # Deficiencies corrected: ____
Amount Completed on t-joints: ____ # of Deficiencies: ____ # Deficiencies corrected: ____
Describe Deficiencies & Corrective Action Taken: _____

Adhesion Testing:

Adhesion Testing completed at: ☐ Location 1 ☐ Location 2 ☐ Location 3 ☐ Location 4

Amount Completed : 0 # of Deficiencies: _____ # Deficiencies corrected: ____
Describe Deficiencies & Corrective Action Taken: Location 1 membrane was applied @ window heads on the 8th floor - no testing was done - Location 2 was just primed with perm-a-barrier WB primer

4/24/04
Date

S. P. Queenan
Lead Certified Installer /Certified Installer Signature

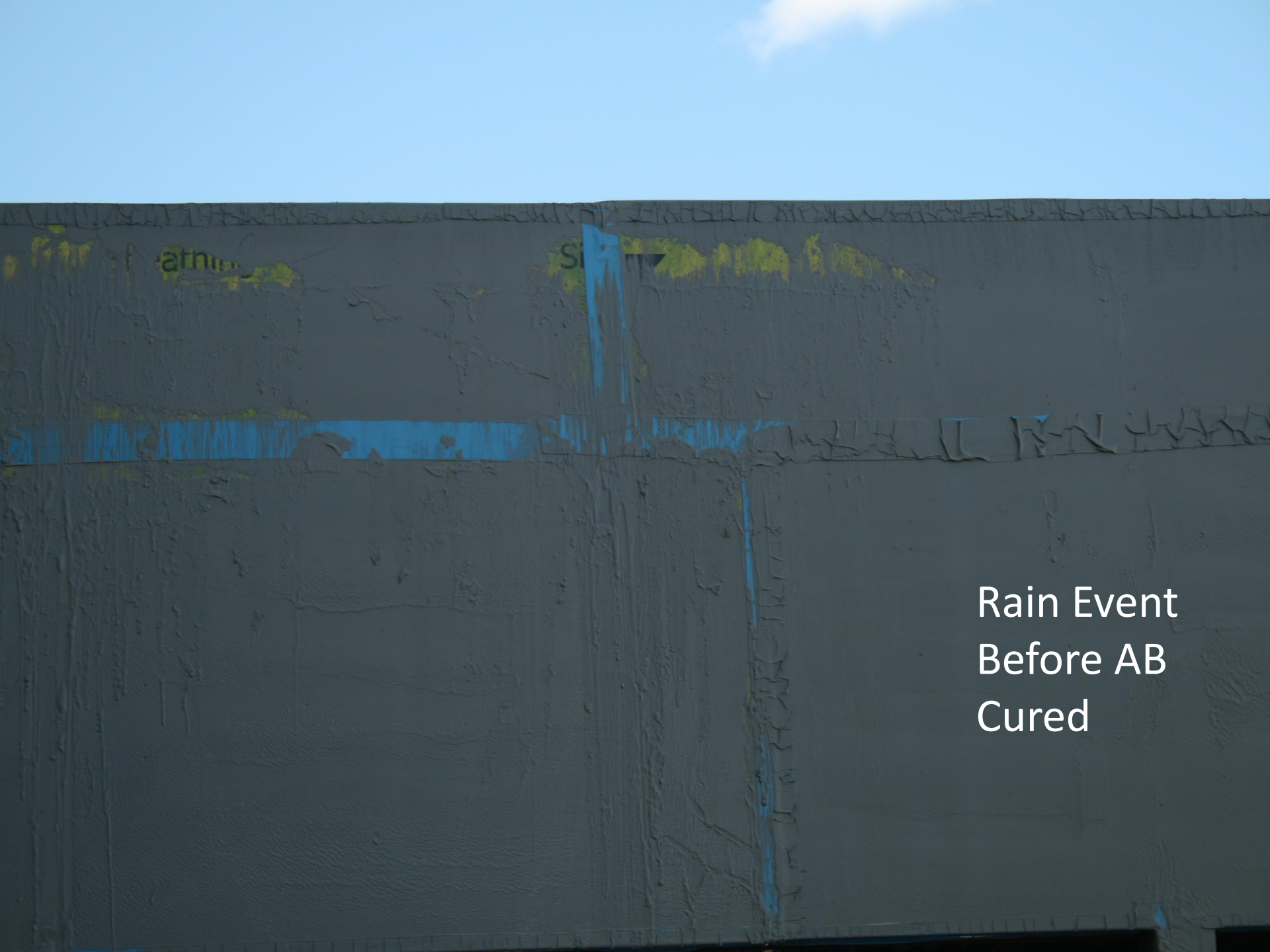
ABAA Site Quality Assurance Program

Confirmation

- ABAA provides a specialized audit process for the installation
- Goal is to resolve issues not inspect for issues
- Part of the on-going training process for all involved
- Supplements the owner's third party inspection/commissioning process

Auditor determining thickness of SPF


DENSGLASS GOLD
GP


Rain Event
Before AB
Cured


Energy-Saving, Moisture-Resis
Cavity Wall Insulation
R-10
2 inch

Therm-A-Barrier
Therm-A-Barrier

Report Distribution

- Site audit reports generated
- Provided to all the parties
  - Design professional / owner
  - General contractor
  - Air barrier contractor
  - Manufacturer
- Identifies issues to be addressed and provides guidance on corrections

Process for Correcting Defects

- Once an issue has been identified, the contractor is obligated under the SQAP to correct it.
- ABAA oversees the rework and provides technical support when required.
- When material issues are identified, ABAA brings in the manufacturer
- ABAA manages any conflict resolution when required

The ABAA continues to establish standards and reduce risk to the performance of buildings through research with many of the industry partners.

Additional Research Required

- More research is required to address many of the issues related to moisture affecting the performance of many of the components of air barrier assemblies.
- It has in some cases resulted in the bankruptcy of some air barrier contractors.
- It has also held up construction on numerous projects because of the failure of the material during construction.

What questions do we need answers to?

- What effect does water vapour transmission have on re-emulsifying primers under adverse / real world climactic conditions through substrates like CMU?
- What effect does water vapour transmission have on re-emulsifying latex sealants after application under adverse / real world climactic conditions through substrates like CMU, board
- What effect does water vapour transmission have on re-emulsifying fluid applied membranes under adverse / real world climactic conditions through substrates like CMU?


ABAA
Spray Polyurethane Foam Auditor

Thank you for your time!

ANY QUESTIONS??

This concludes The American Institute of Architects
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CONTINUING EDUCATION
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