air barrier abaa association of america
BUILDING ENCLOSURE CONFERENCE
RESTON VA
2022
MAY 10-11

Waterproofing as Part of the Continuous Air Barrier

John Posenecker and Trinidad Martinez

Terracon Consultants, Inc.
Facilities Division
Austin, Texas

Terracon
Explore with us

abaa EDUCATION

Air Barrier Association of America (ABAA) is a Registered Provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on 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.

air barrier abaa association of america

Terracon Explore with us

AIA Continuing Education Provider

John Posenecker, PE
Senior Principal, Facilities Manager

3913 Todd Lane, Suite 505 | Austin, Texas 78744
D (512) 840-7525 | M (972) 989-4925 | O (512) 827-3332
John.Posenecker@Terracon.com | Terracon.com

Trinidad Martinez, RRO, CEI, SPRAT I
Senior Staff Architect, Group Manager

3913 Todd Lane, Suite 505 | Austin, Texas 78744
D (512) 840-7539 | M (210) 286-7157 | O (512) 827-3332
trinidad.martinez@terracon.com | Terracon.com

air barrier abaa association of america
BUILDING ENCLOSURE CONFERENCE
2022 RESTON VA

Learning Objectives

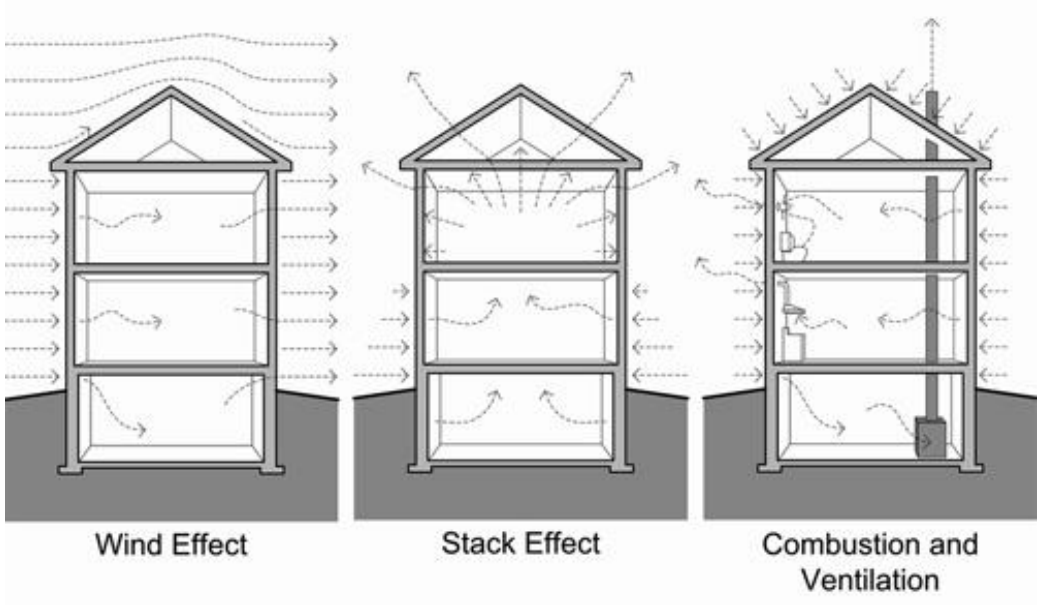
1. Understand how waterproofing may be part of a building's air barrier.
2. Review available waterproofing systems, their service life and warranty.
3. Review critical installation parameters and challenging details.
4. Review field testing methods available for waterproofing systems.

air barrier abaa association of america

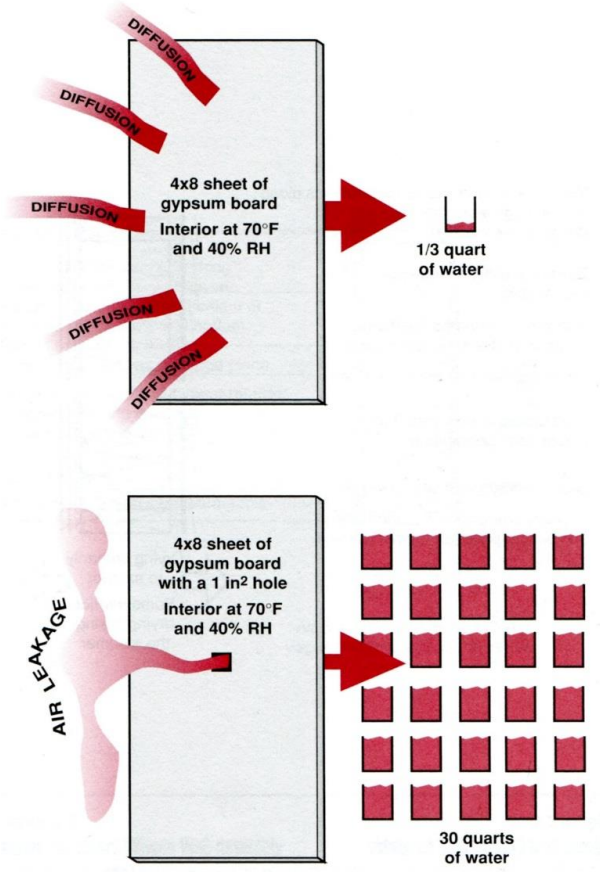
Terracon Explore with us

Control Layers

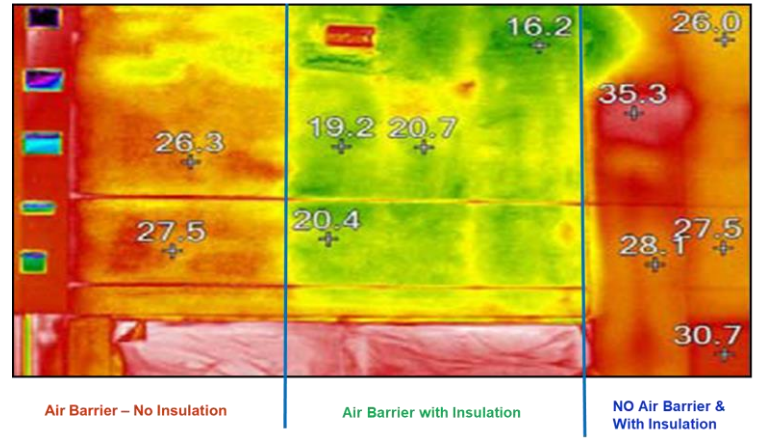
Air



Water Vapor



Thermal

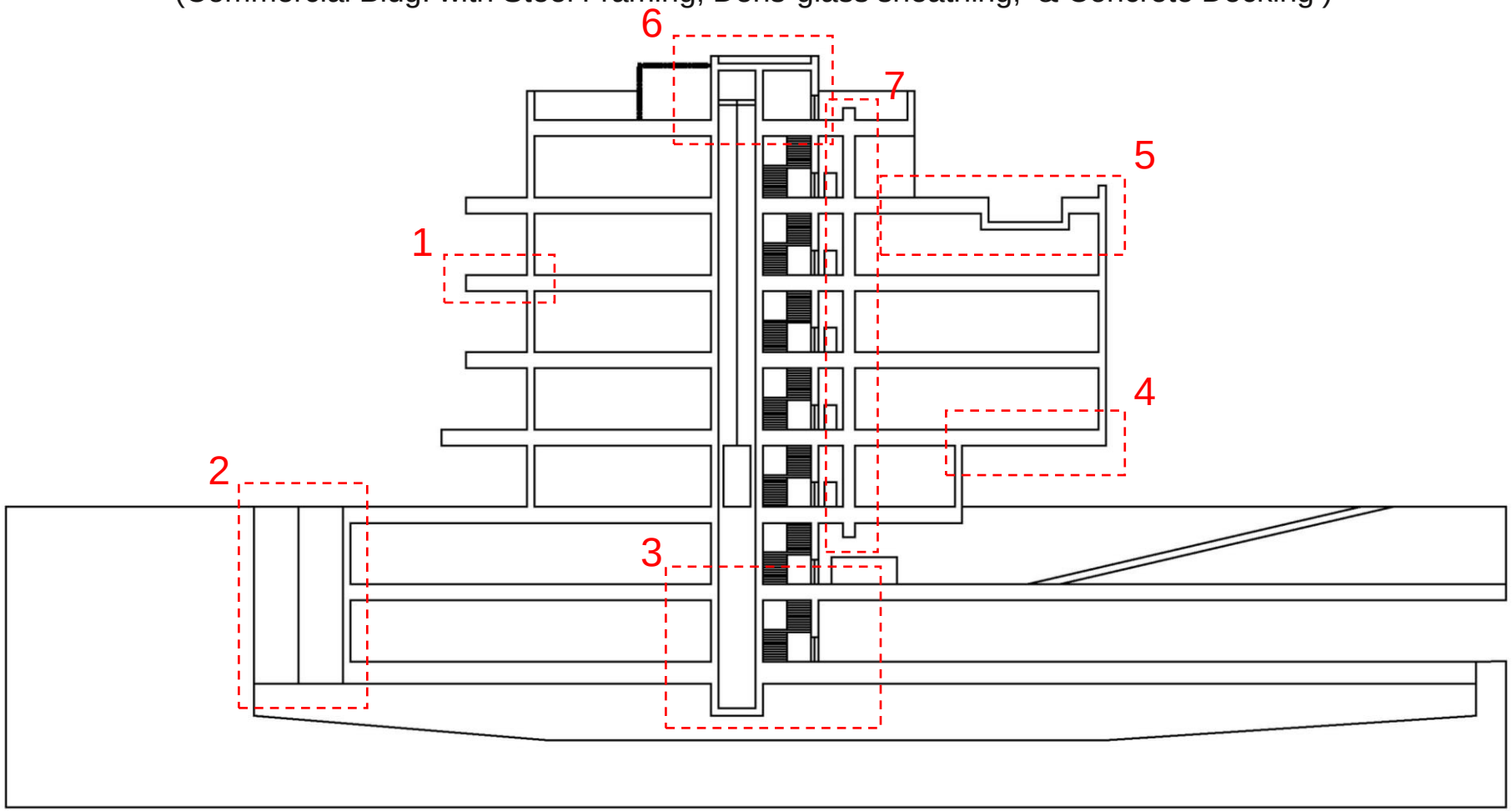


air barrier abaa association of america

Terracon Explore with us

Building Sections

(Commercial Bldg. with Steel Framing, Dens-glass sheathing, & Concrete Decking)

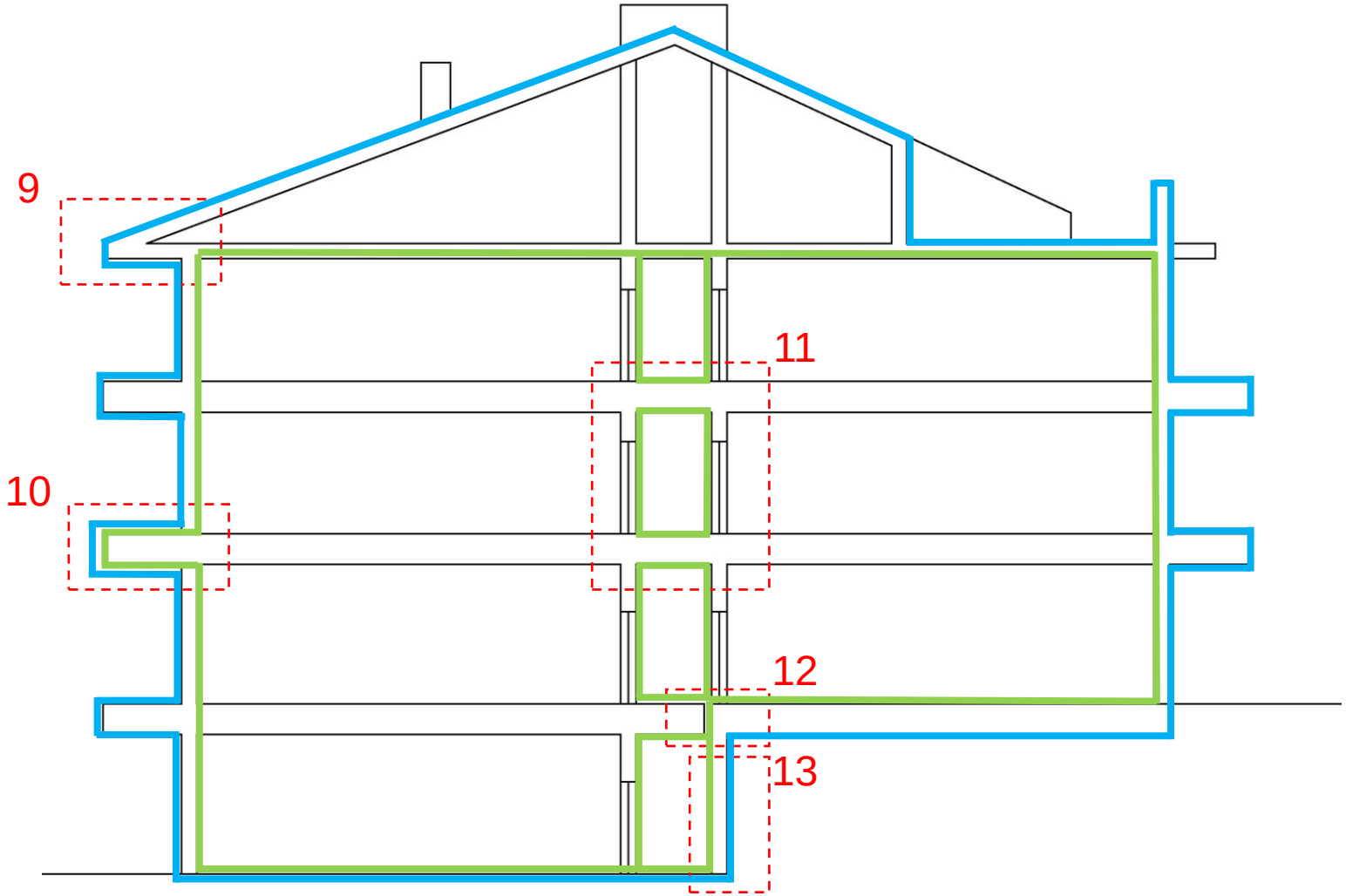


air barrier
abaa
association of
america

Terracon
Explore with us

Building Sections

(Multifamily Bldg. with Wood-based Framing, Sheathing, and Decking)



air barrier
abaa
association of
america

Terracon
Explore with us

Waterproofing

Below Grade

1. Walls
2. Underslab
3. Covered Lids

Elevated Decks

1. Terraces and Amenity Decks
2. Wearing Surfaces
    1. Pedestrian
    2. Vehicular
3. Balconies

air barrier abaa association of america

Terracon Explore with us

Below Grade Waterproofing

Post-Applied (Self-Adhered) Membranes

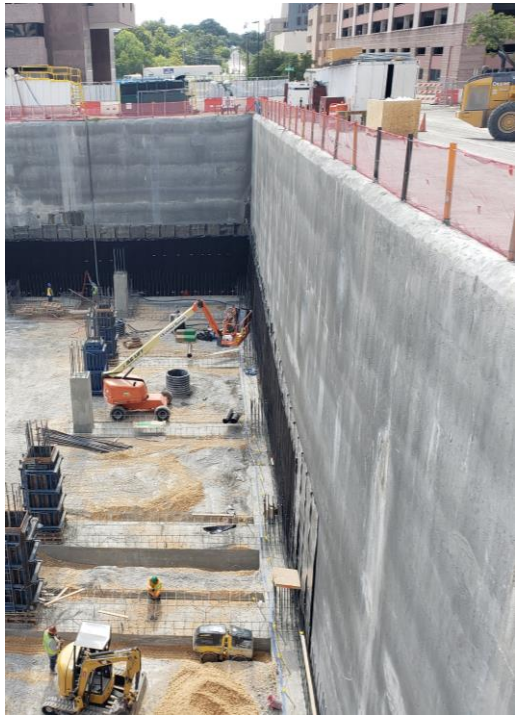
- Rubberized Asphalt
- 56 mils rubberized asphalt
- 4 mil polyethylene
- Concrete may need to be cured
- Moderate puncture resistance
- Limited “self-sealing characteristics
- Adhesion to concrete preferred

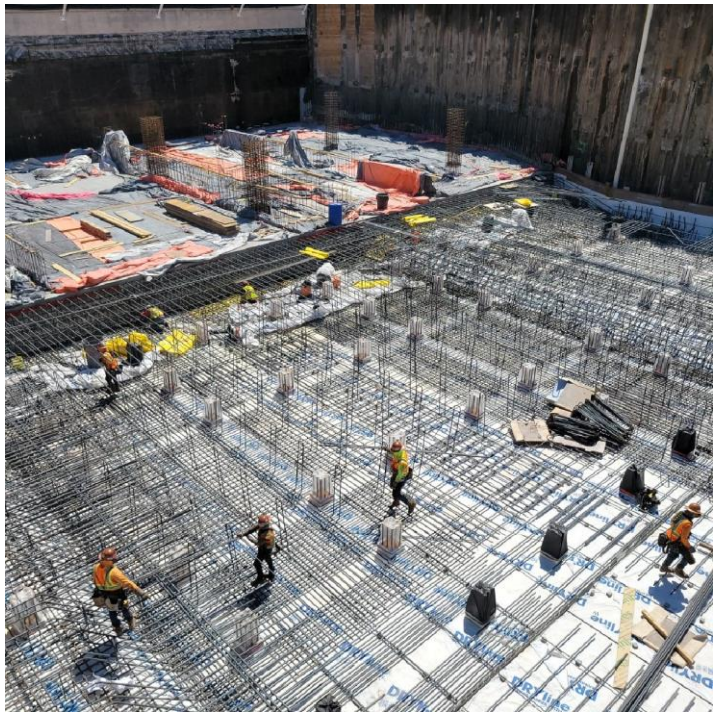
air barrier abaa association of america

Terracon Explore with us

Below Grade Waterproofing

Pre-Applied (Blindside) Membranes





- Typically applied to soils, mud slabs or lagging
- Loose laid horizontally
- Mechanically fastened vertically
- High puncture resistance
- Adhesion to concrete preferred

air barrier abaa association of america

Terracon Explore with us

Below Grade Waterproofing

Post-Applied (Fluid) Membranes

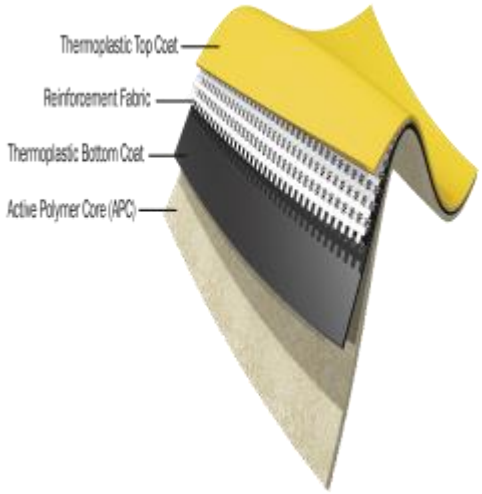
- Some products require curing of concrete prior to application
- Moderate puncture resistance
- Limited “self-sealing characteristics
- No Seams

air barrier abaa association of america

Terracon Explore with us

Below Grade Waterproofing

Other Membranes



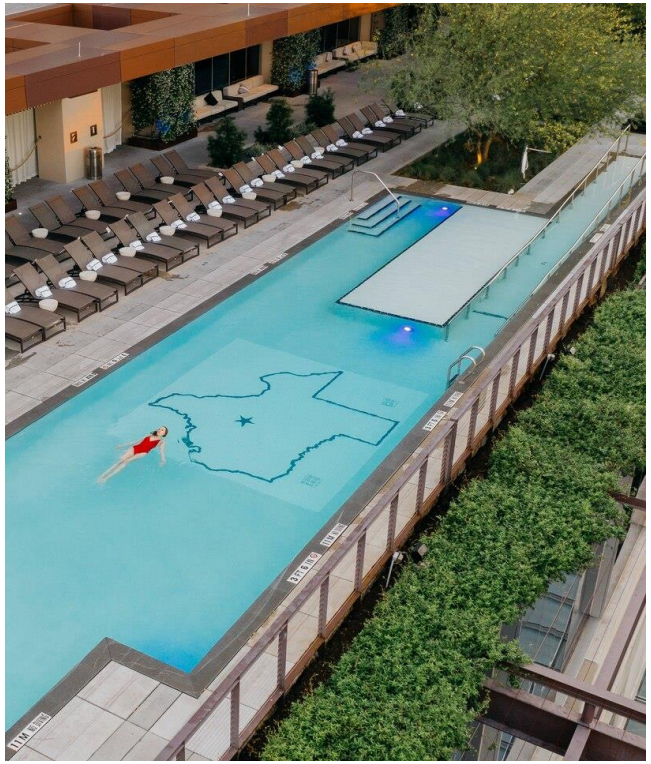
- Combinations of fluid and sheet membranes
- Heat welded seams
- Bentonite or expansive polymers
- Extended Warranties

air barrier
abaa
association of
america

Terracon
Explore with us

Waterproofing at Elevated Decks

Terraces and Amenity Decks



- Fluid and/or sheet membranes
- Adhesion to concrete preferred
- Drainage is important
- Overburden adds complexity

air barrier abaa association of america

Terracon Explore with us

Waterproofing at Elevated Decks

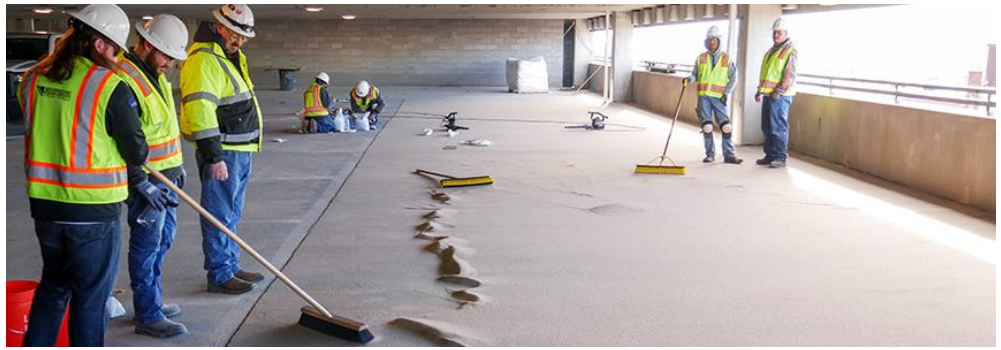
Terraces and Amenity Decks

air barrier
abaa
association of
america

Terracon
Explore with us

Waterproofing at Elevated Decks

Waterproofing Membrane as Wearing Surface



- Pedestrian and Vehicular Traffic
- UV stable topcoats
- More maintenance required than concealed waterproofing membranes
- Drainage is important
- Topping slab preferred

air barrier abaa association of america

Terracon Explore with us

Waterproofing at Elevated Decks

Balconies

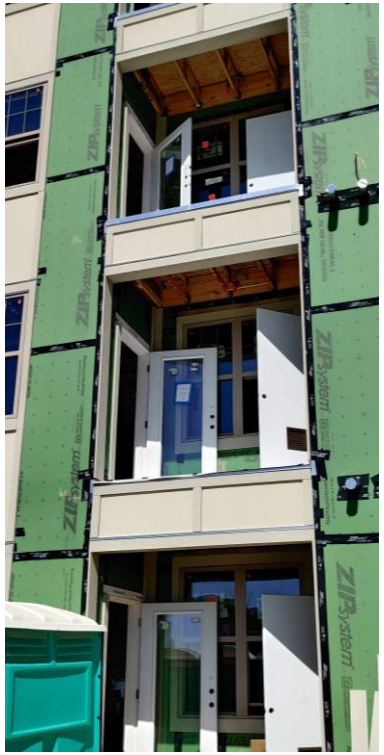
- Commercial concrete substrate
  - Pedestrian Coating
- Multifamily wood framed structures
  - Sheet or Fluid Membranes
- Drainage is important

air barrier abaa association of america

Terracon Explore with us

Waterproofing at Elevated Decks

Balconies



air barrier
abaa
association of
america

Terracon
Explore with us

Waterproofing at Elevated Decks

Balconies

Wood-Framed Balconies (2018 IBC)

2304.12.2.5 Supporting members for permeable floors and roofs. P

Wood structural members that support moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, shall be of naturally durable or *preservative-treated wood* unless separated from such floors or roofs by an impervious moisture barrier. The impervious moisture barrier system protecting the structure supporting floors shall provide positive drainage of water that infiltrates the moisture-permeable floor topping.

"2304.12.2.6 Ventilation required beneath balcony or elevated walking surfaces. *Enclosed framing in exterior balconies and elevated walking surfaces that are exposed to rain, snow, or drainage from irrigation, shall be provided with openings that provide a net free cross ventilation area not less than 1/150 of the area of each separate space."*

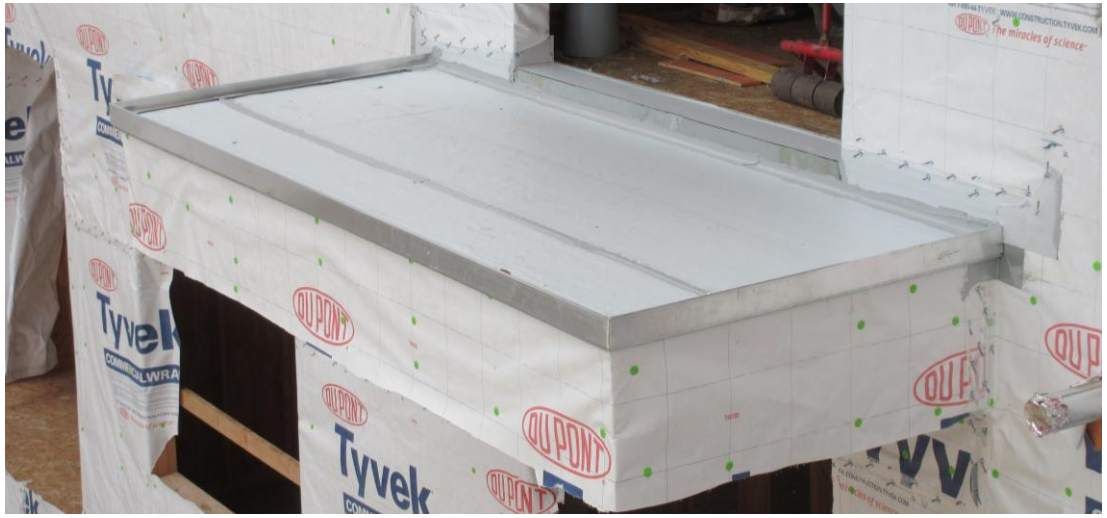
air barrier abaa association of america

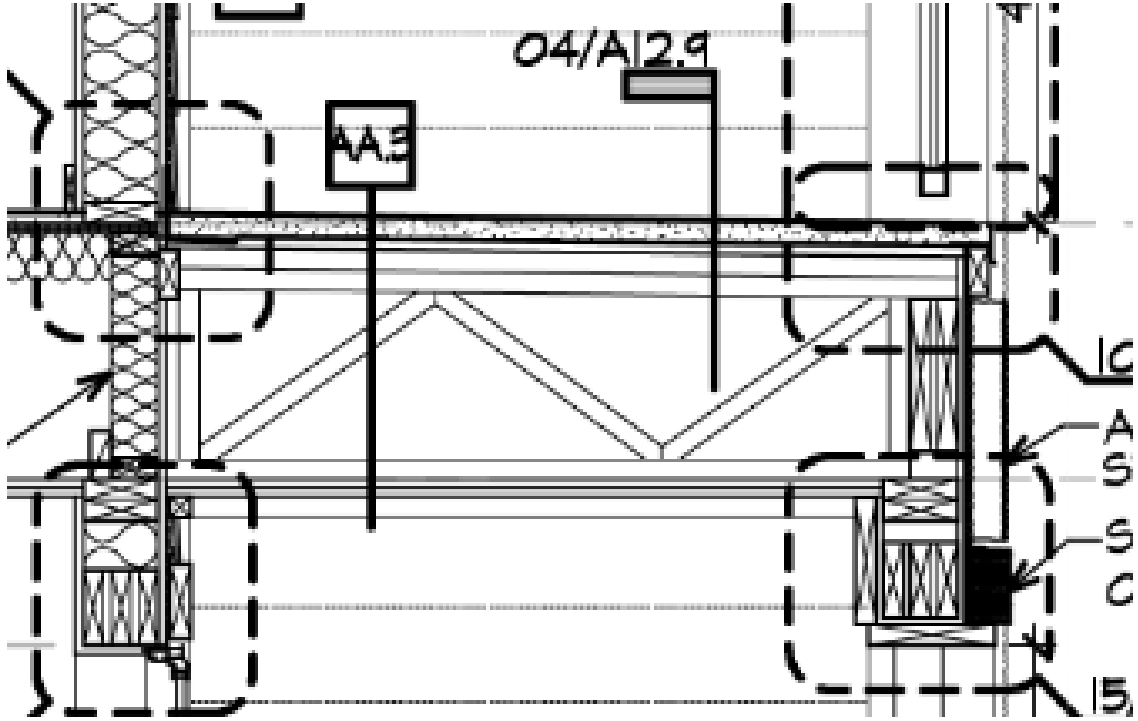
Terracon Explore with us

Waterproofing at Elevated Decks

Balconies

Wood-Framed Balconies





air barrier
abaa
association of
america

Terracon
Explore with us

Waterproofing at Elevated Decks

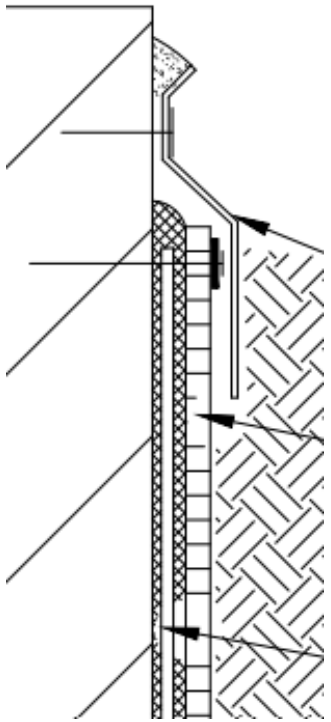
Balconies

air barrier
abaa
association of
america

Terracon
Explore with us

Waterproofing Auxiliary Components

- Drainage Boards
  - Pressure Ratings
  - Flow Capacity
- Root Barriers
  - Copper Sulfate in Drainage Board Fabric
  - HDPE (40 MIL) Taped
- Terminations
  - Term. Bars
  - Metal Flashing



air barrier abaa association of america

Terracon Explore with us

Field Testing Methods Waterproofing

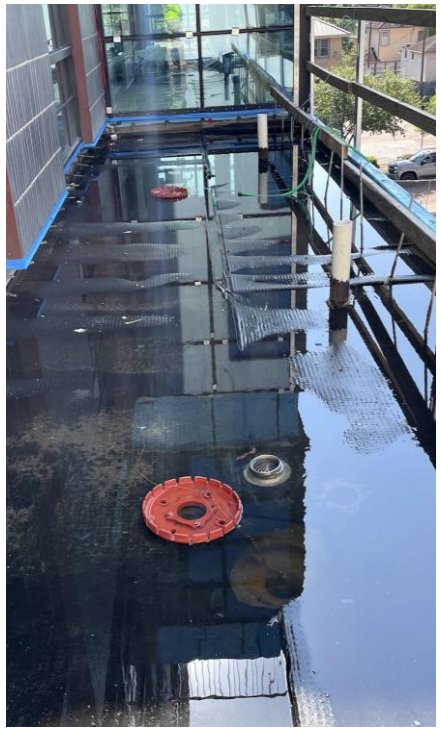
- Flood Testing
  - Water Source and Disposal
  - Sloped Decks and Temporary Dams
  - Visual Inspection and Water Level
- Electronic Leak Detection (ELD)
  - High Voltage
  - Low Voltage
    - Electronic Field Vector Mapping (EFVM)
  - Limitations
  - Accuracy

air barrier abaa association of america

Terracon Explore with us

Field Testing Methods Waterproofing

ASTM D5957 - Flood Testing Horizontal Installations

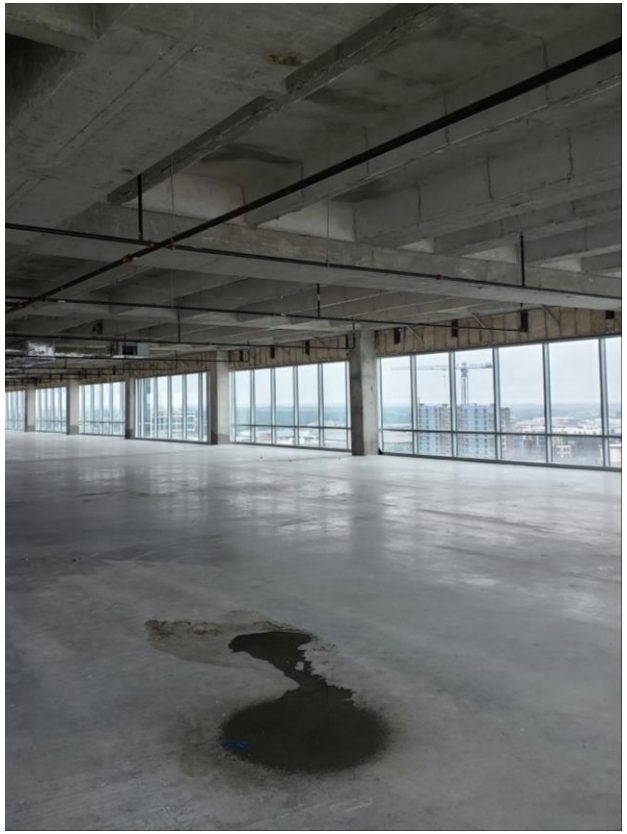


- Limitations
  - Time
  - Weather
  - Restricted Access
  - Water
    - Source
    - Disposal
  - Damage from Water Leak
  - Location of Leak?

air barrier abaa association of america

Terracon Explore with us

Field Testing Methods Waterproofing

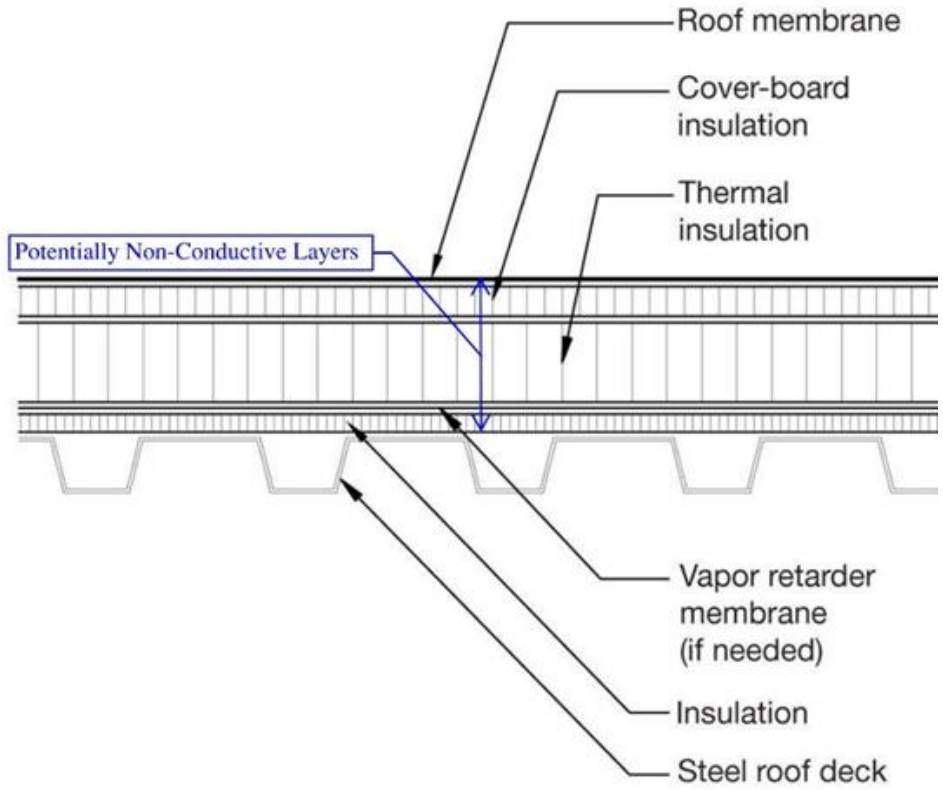


air barrier
abaa
association of
america

Terracon
Explore with us

Field Testing Methods Waterproofing

ASTM D7877 - Electronic Methods for Detecting and Locating Leaks



- Limitations
  - Caution When Testing Membranes Over Insulation
  - High Voltage
    - Membrane Must Be Dry
  - Low Voltage
    - Membrane Must Be Wet
    - Only Can Test Areas within Isolated Perimeter

air barrier abaa association of america

Terracon Explore with us

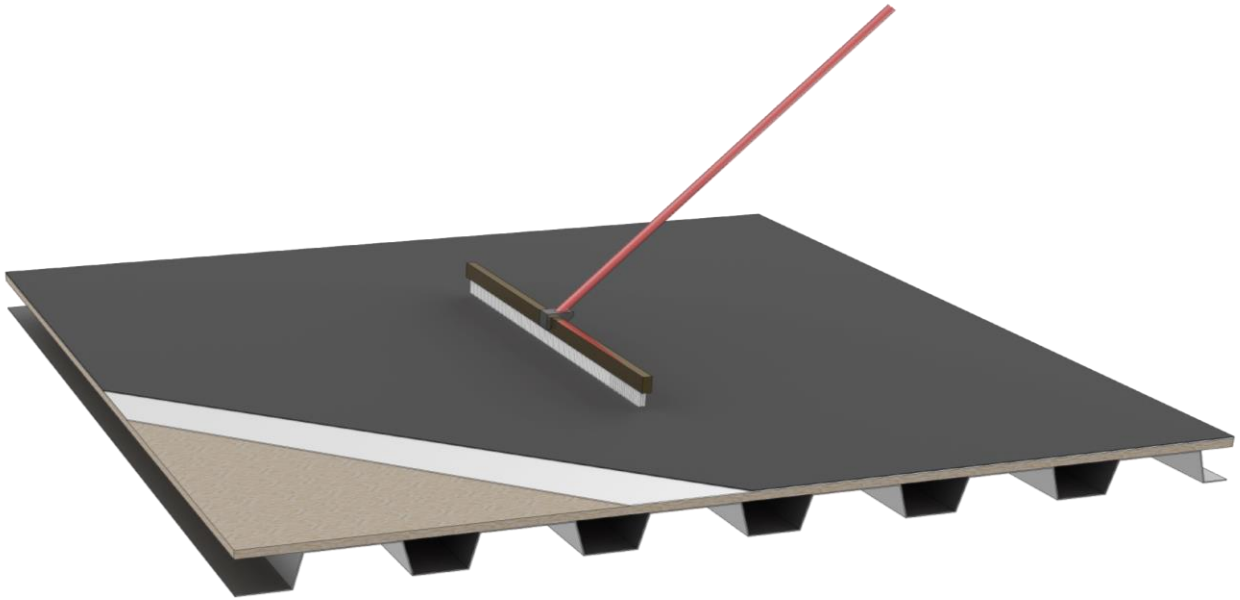
Field Testing Methods Waterproofing

air barrier
abaa
association of
america

Terracon
Explore with us

Field Testing Methods Waterproofing

- Non-Conductive Surface
- Conductive Substrate

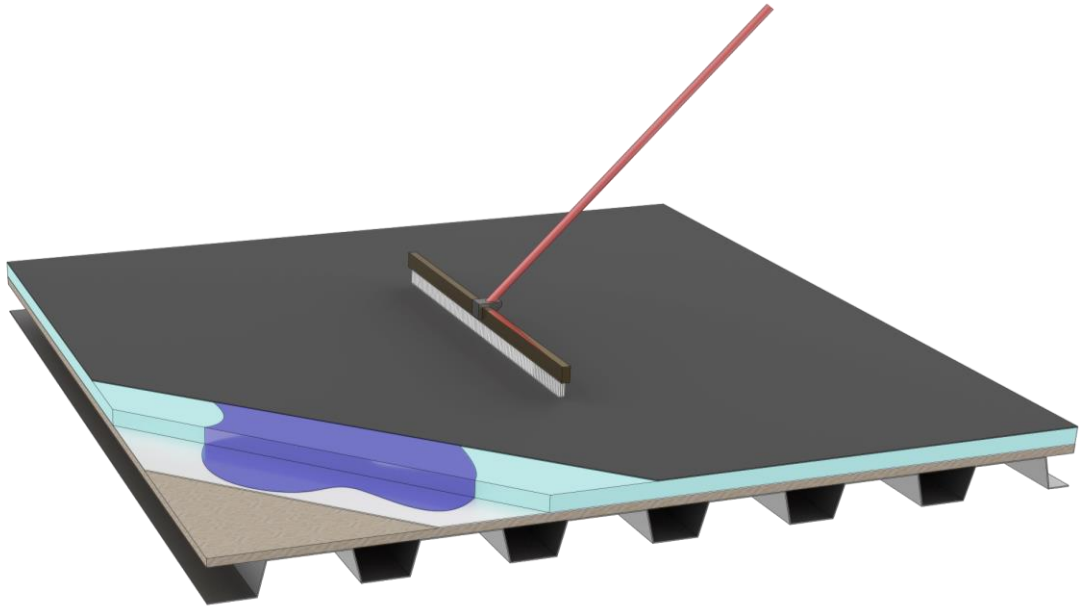


air barrier
abaa
association of
america

Terracon
Explore with us

Field Testing Methods Waterproofing

- Non-Conductive Substrate
- Foam Board Insulation (Water Saturated)
- Conductive Substrate



air barrier abaa association of america

Terracon Explore with us

Overburden

air barrier
abaa
association of
america

Terracon
Explore with us

Service Life and Warranties

Material	Service Life	Available Warranties	
		Standard	Maximum
Self Adhered Sheet	20+	5 yr material	10 yr material & labor
Hot Fluid	20+	10 yr material	20 yr material & labor
Cold Fluid	20+	5 yr material	20 yr material & labor
Polyurethane Coating	5+	5 yr material	5+5 yr material & labor
PMMA Coating Pedestriar	15+	10 yr material	20 yr material & labor
PMMA Coating Vehicular	15+	10 yr material	10 yr material & labor
Bentonite	20+	5 yr material	10 yr material & labor
Hybrid Sheet	20+	5 yr material	20 yr material & labor

air barrier
abaa
association of
america

Terracon
Explore with us

Comparative Costs

Material	Comparative Costs ($/ft^2)	
	Low	High
Self Adhered Sheet	$3.50	$5.00
Hot Fluid	$6.00	$8.00
Cold Fluid	$5.00	$8.00
Polyurethane Coating	$3.50	$5.00
PMMA Coating Pedestriar	$10.00	$15.00
PMMA Coating Vehicular	$12.00	$20.00
Bentonite	$4.00	$6.00
Hybrid Sheet	$8.00	$12.00
Rigid Insulation	$4/ 2" 60 PSI	$8/2" 100 PSI
Pedstals & Pavers	$20.00	$35.00

air barrier
abaa
association of
america

Terracon
Explore with us