We're here to talk about:

- Industry Standards
- Component Testing
- Assembly Testing
- Coordination/Specification
- Project Applications

Air Barriers As:

- **Material**
  - the principal element installed to provide a continuous barrier to the movement of air through building enclosures. (0.02 L/s/m² @ 75 Pa)

- **Components**
  - transitional elements installed to provide a continuous barrier to the movement of air through building enclosures (refers to the material or product used to connect different air-barrier materials together as an assembly to make the air barrier continuous) (0.20 L/s/m² @ 75 Pa).

- **Assemblies**
  - a collection of air barrier materials and air barrier components installed to provide a continuous barrier to the movement of air through building enclosures. (2.0 L/s/m² @ 75 Pa).
The Perfect Flashing

Requirements AAMA 711 vs AAMA 714

- Tensile Strength
- Water Penetration Around Nails
- Peel Adhesion
- Accelerated Aging
- Elevated Temperature
- Thermal Cycling
- Cold Temperature Pliability
- Water Immersion
- Crack Bridging
- Compatibility

Elongation
Cold Temperature Pliability

Nail Sealability

- D1970 (8.9) Self Sealability (Head of water test)

Exterior Gypsum Board

12" 12"
Fluid-applied synthetic vapor-permeable air barrier

Apply at Manufacturer's Recommended Thickness

Defined Wall Performance Standards

ASTM D 1970-09 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; Section 8.9 Self Sealability (Head of Water Test).

Gallon paint can with bottom removed

Paint can sealed to air barrier coating
Defined Wall Performance Standards

ASTM D 1970-09 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; Section 8.9 Self Sealability (Head of Water Test).

- Gallon paint can with deionized water for 3 days in refrigeration unit @ 40°F (4°C)
- No leakage observed

UV

- Cured for 5 days at Room Temperature
- Placed in QUV-A Chamber
- Exposed for 2 weeks
Bubbling

Control

Deterioration

Control

Slight Color Change

Control

Yellowing & Blistering

Control

Liquid Applied Membranes

Control
Cure Through – 77°F/50%RH

Cure Through – 45°F/75%RH

Wash Out

Temperature
**Water Immersion**

**Puncture Resistance**

- Diameter: 3.4"

- Test Seams: 60 lbf – 3.4"

- 1" Diameter
Compatibility – AAMA 713

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Material - Testing - Air Barrier Evolution

Testing of Air Barrier Materials

**MATERIAL** must have an air permeance of less 0.02 L/s m² @ 75 Pa

Air Barrier Evolution

ASTM E 2357
Air Leakage of Air Barrier ASSEMBLIES

Assembly

Next Logical Step Forward

Test Assemblies vs. Component Materials

ASTM E2357-05
Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
Air Barrier Evolution

ASTM E 2357
Air Leakage of Air Barrier ASSEMBLIES

ASTM E 331 Water Leakage

Test Facility

- Air Leakage Testing
- Water Spray Testing
- Connectivity of adjacent enclosure systems
  - Roof to Wall
  - Window to Wall
  - Above-grade to Below-grade

Assembly Testing

The Challenge

Provide an air barrier assembly that will perform behind stucco, with a seismic joint at the head of the window and a sill pan

Assembly Testing

- ASTM E283
  - Measure air leakage of an assembly.
- ASTM E2357
  - Measure air barrier system durability
  - Measure deflection to determine structural soundness.
**Assembly Testing**

- ASTM E331
  - Determine resistance for water leakage
  - Variable durations and pressure requirements.

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**Assembly Construction**
Assembly Construction

Test Results

Breakdown

<table>
<thead>
<tr>
<th>Wall Configuration</th>
<th>Air Flow Condition</th>
<th>Leakage Rate Test Air</th>
<th>ABAA Requirements Opaque</th>
<th>Leakage Rate Test Air</th>
<th>ABAA Requirements Open</th>
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</thead>
<tbody>
<tr>
<td>Opaque Pre Cond</td>
<td>Exfiltration</td>
<td>0.009</td>
<td>0.002</td>
<td>0.003</td>
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</table>

Test Results – What does this mean?

- ASTM E283
  - Results indicate the Air Barrier Assembly Leakage to be 0.003 cfm/ft²
- ASTM E2357
  - No damage to the system during wind conditioning

Test Results – What does this mean?

- ASTM E331
  - Tests were performed modified to meet the requirements of California Building Code
  - Increase spray duration from 15 minutes to 2 hours.
  - Increase pressure differential from 137 Pa (2.86 psf) to 300 Pa (6.24 psf)
  - Requirements – No water may penetrate into the wall cavity.
  - The Stucco Wall System passed the 2 hour water exposure with no water leakage into the assembly for the duration of the test.
Specifying Connections

Division 1  General Conditions

Section 01 43 39 Mockups
Section 01 83 16 Exterior Enclosure Performance Requirements
Section 01 91 17 Exterior Enclosure Commissioning
Section 01 93 13 Exterior Enclosure Maintenance Procedures

Specifications

Pre-construction Meeting

- The air barrier pre-construction meeting should cover at least the following activities:
- Reviewing all project drawings to determine if the proposed details can be constructed as intended by the designer.
- Review the system specifications
- Declaration by each trade of their selection of materials and a subsequent analysis of compatibility issues
- Review of construction details, including tie-in areas
- Sequencing the work of all trades working on the project with a comprehensive construction schedule
- Discussing project-specific considerations
Division 4  Masonry

- Struck Flush Joints
- Holes filled
- Mortar Droppings Cleaned
- No sharp or large changes in plane
- Protected before/after application
- Reference AB in Masonry section so mason knows the surface will receive a membrane
- Sequence wall to roof connection
- Recommend fluid vs. sheet on CMU
- Thru-wall flashing
Division 6
Wood, Plastics & Composites
- Joints Tight
- Sheeting Must be secured
- Broken Edges must be repaired
- Penetrations in before Air Barrier
- Pre-construction meeting must be prior to sheeting install
- Make sure you get AB manufacturer has tested on sheeting substrate

Hey, just look busy until the Tremco guy gets here. He must be smart!
Outside Corner, notice nice factory edge and tight seam

Now look at this edge, voids and protrusions of gyp. Should be rasped flush then filled with Tremflex 834

1st pc of tape starts from tip of arrow above and finishes on wall

2nd pc of tape starts at tip of arrow and finishes back on wall

Notice voids behind tape, this should be filled flush with TF 834 prior.

Center 3rd pc of 2" tape over corner overlapping other tape

Notice color of tape is Tremco Green. No but really the green tape is mildew resistant so I thought I would use it

Finished outside corner tape seam. Looks pretty good!
Install Exo230 with 2" roller and push material through mesh.

1st coat notice voids behind tape, this should have been pre-detalled with spackle knife and some Tremflex 834. But we could agree on which union trade was supposed to handle this so... What did we do?

Smeared on some more Exo230 pushing the material thru the tape to fill the voids. Wonder how its going to look the next day? Shrinkage? Stay tuned more to come tomorrow. Tony, Vinny, Vito and Tiny went for their mid morning coffee and never came back. Fugetaboutit!!
Division 7 Thermal & Moisture Protection

- SECTION 072500 WEATHER BARRIERS - Building paper and building wrap weather-resistant barriers and flexible flashing.
- SECTION 072713 MODIFIED BITUMINOUS SHEET AIR BARRIERS - Vapor-retarding, modified bituminous sheet type.
- SECTION 072726 FLUID-APPLIED MEMBRANE AIR BARRIERS - Elastomeric, modified bituminous and synthetic polymer membranes about 40 mils (1.0 mm) and thicker; vapor retarding and vapor permeable types.
- SECTION 072729 AIR-BARRIER COATINGS - Elastomeric, modified bituminous, and synthetic polymer coatings about 20 mils (0.5 mm) and thinner; vapor retarding and vapor permeable types.

Division 8 Openings

- Air Barrier Perimeter Seal to Windows, Doors, Curtain-wall and Storefront Systems:
Drift Joint
Working with the Architect & GC, we suggested and they agreed to shorten the steel lintel to not extend past the edge of the window frame. This allowed the 3D molded corner to make the transition at the corners.
Field Quality Control & Inspection

- Pre-Construction Mock-Up & Testing
- Troubleshooting Opportunity
- Installer Training

Field Quality Control & Inspection

- Visual Inspection
  - Sealing Engineered Transition Assembly Elements
  - Priming Where Required
  - Membrane Continuity
  - Proper Lapping & Detailing

Field Quality Control & Inspection

- Adhesion Testing
  - ASTM D4541

- System Pressurization
  - ASTM E1186
  - Looks for leaks at the details & transitions
Questions

Thank you