NEW COMPONENT CAPABILITIES HELP DELIVER HIGH-PERFORMANCE BUILDINGS
Exterior Air Barrier Systems
Sheet Membranes for Air and Moisture Management

- Air Barrier/Air Tightness Refresher
- Changing Requirements
- The Exterior Air Barrier
- Exterior Membranes for High Performance Buildings
WHY DO WE NEED AIR CONTROL?

- Airtightness critical for all climates
  - Indoor Air Quality
  - Comfort for occupants
  - Control condensation (summer and winter)
  - Energy waste
  - Sound & Odor Transmission
Things to Consider

- Requirements for an Air Barrier System
  - Continuous (most important)
  - Strong
  - Stiff
  - Durable
  - Air Impermeable barrier (least important)
Changing Requirements
2015 IECC Air Barrier Requirements

Continuous air barrier required except in:
• Climate zones 2b

Air barrier requirements:
• Placement allowed
  - inside of building envelope
  - outside of building envelope
  - located within assemblies composing envelope OR
  - any combination thereof
• Continuous for all assemblies
• Joints and seams to be sealed
• Where objects are installed that penetrate the air barrier, make provisions to maintain the air barrier’s integrity
Changing Requirements for Airtightness NYC

Recent Updates/Code Changes in NYC

- **September 2014** - *Passive House Standard* is central to NYC Mayor’s plan to reduce carbon emissions 80% by 2050

- **January 2015** – NYC DOB requires Air Barrier Compliance Path noted on Construction Documents and TR 8 form. Air Barrier clearly shown on details or work permit may be denied.

- **October 3rd 2016 - NYECC**
  - **Commercial Buildings** between 25,000 and 50,000 square feet must conduct a blower door test (0.4cfm/sf or less) and buildings over 50,000 square feet must test or inspect each type of air barrier joint or seam.
  - **Residential Buildings** require that builders run a blower door test on new residential buildings to ensure a maximum air leakage of 3 ACH
The Exterior Air Barrier
Air Control: Air Barrier Systems

• Support
  – structure is anything that works

• Control *continuity*
  – Rain control layer
    • Perfect barrier
    • Drained with gap
    • Storage
  – Air control layer
    • Air barrier
  – Thermal control layer
    • Aka insulation, radiant barriers
  – Vapor control layer
    • Retarders, barriers, etc

• Finish
  – interior and exterior

Fire Control may be needed
Sound Control optional
Commercial Buildings: Often exterior air barrier is the most practical solution
Why an Exterior Air Barrier? – Continuity

Interior Air Barrier Approach
- Interior connection to air barrier at ceiling/attic floor
- Complex transition at floors and interior walls
- *Also address interior service and mechanical penetrations (lighting, electrical, etc.)*
- Connection to below-grade air barrier components

Exterior Air Barrier Approach
- Parapet / Low-slope roof all exterior connection
- No interruption at floors and interior walls
- *Structural and mechanical penetrations must be addressed.*
- Connection to below-grade air barrier components
Wind Washing

Wind blowing through insulation
High Performance Exterior Membranes:
Fully Self-Adhered
Vapor Permeable
Open Joint Rain Screen
Fully Self Adhered Vs. Mechanical Fixed

- **negative pressure gust**
  - housewrap balloons outwards
  - air flows from interior into stud space

- **positive pressure gust**
  - housewrap pressed tight to sheathing
  - air flows out of stud space to interior
Vapor Permeable Polymeric WRBs

- **Perforated plastic sheet**
  Low perm, very low water resistance

- **Melblown**
  Only fibers
  High perms, low water resistance

- **Microporous film between spunbond fabrics**
  High perms, low to high water resistance

- **Coating on substrate**
  Low to high perms, high water resistance
Example Microporous Film

0.79 mil
20µm (0.02 mm)
Air Tight, Vapor Open – When to Consider?
Open Joint Cladding
1. Metal studs
2. Exterior grade gypsum
3. Air / vapor barrier
4. Exterior insulation

5. Fasten "L" brackets as per the manufacturer’s installation instructions

6. Fastened with 2" self-tapping screw with gasketed metal washer

7. Fasten "Hat" to the "L" brackets as per the manufacturer’s installation instructions

8. Fasten open joint cladding system as per the manufacturer’s installation instructions