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 Buidings

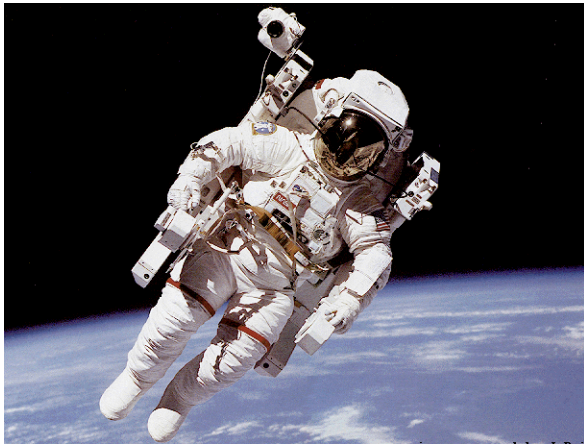
Air Barrier/Air Tightness Refresher

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

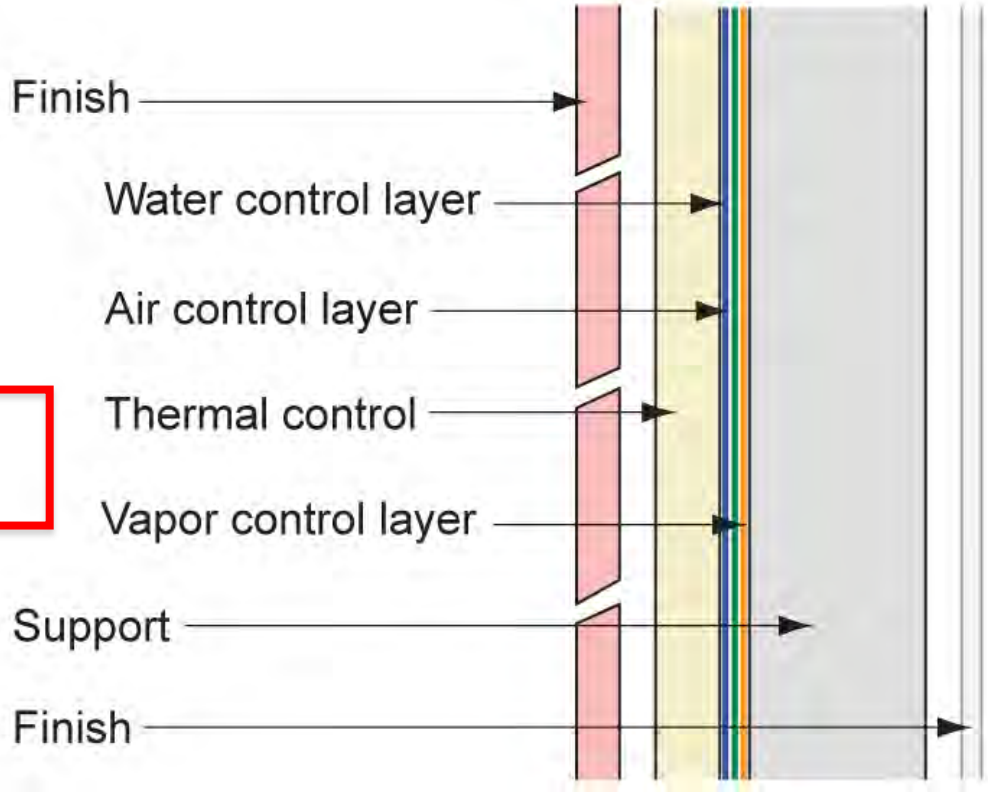
Recent Updates/Code Changes in NYC

- **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

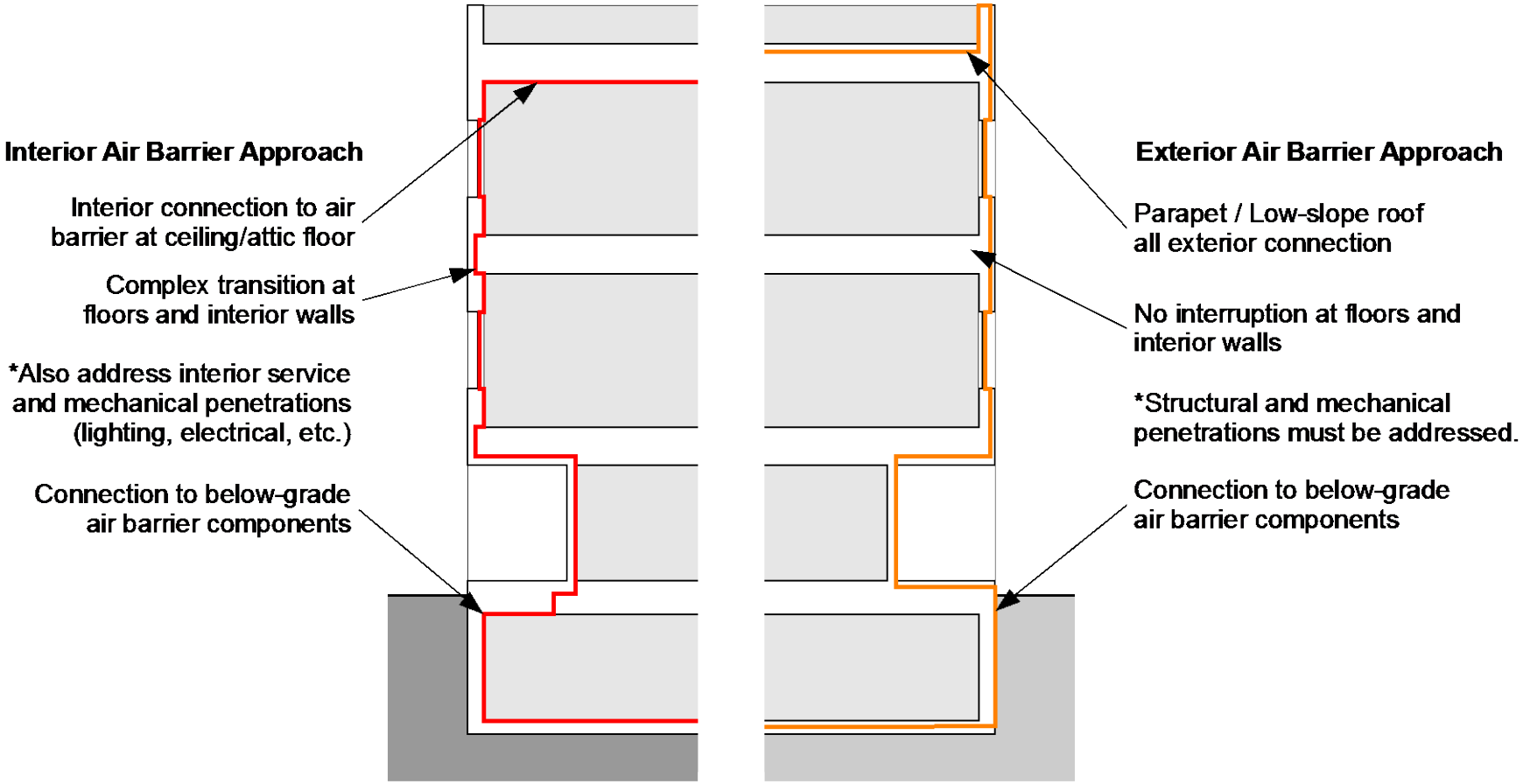
- Support
  - structure is anything that works
- Control *continuity*
  - Rain control layer
    - Perfect barrier
    - Drained with gap
    - Storage
  - Air control layer
    - Air barrier
  - Thermal control layer
    - Aka insulation, radiant barriers
  - Vapor control layer
    - Retarders, barriers, etc
- Finish
  - interior and exterior



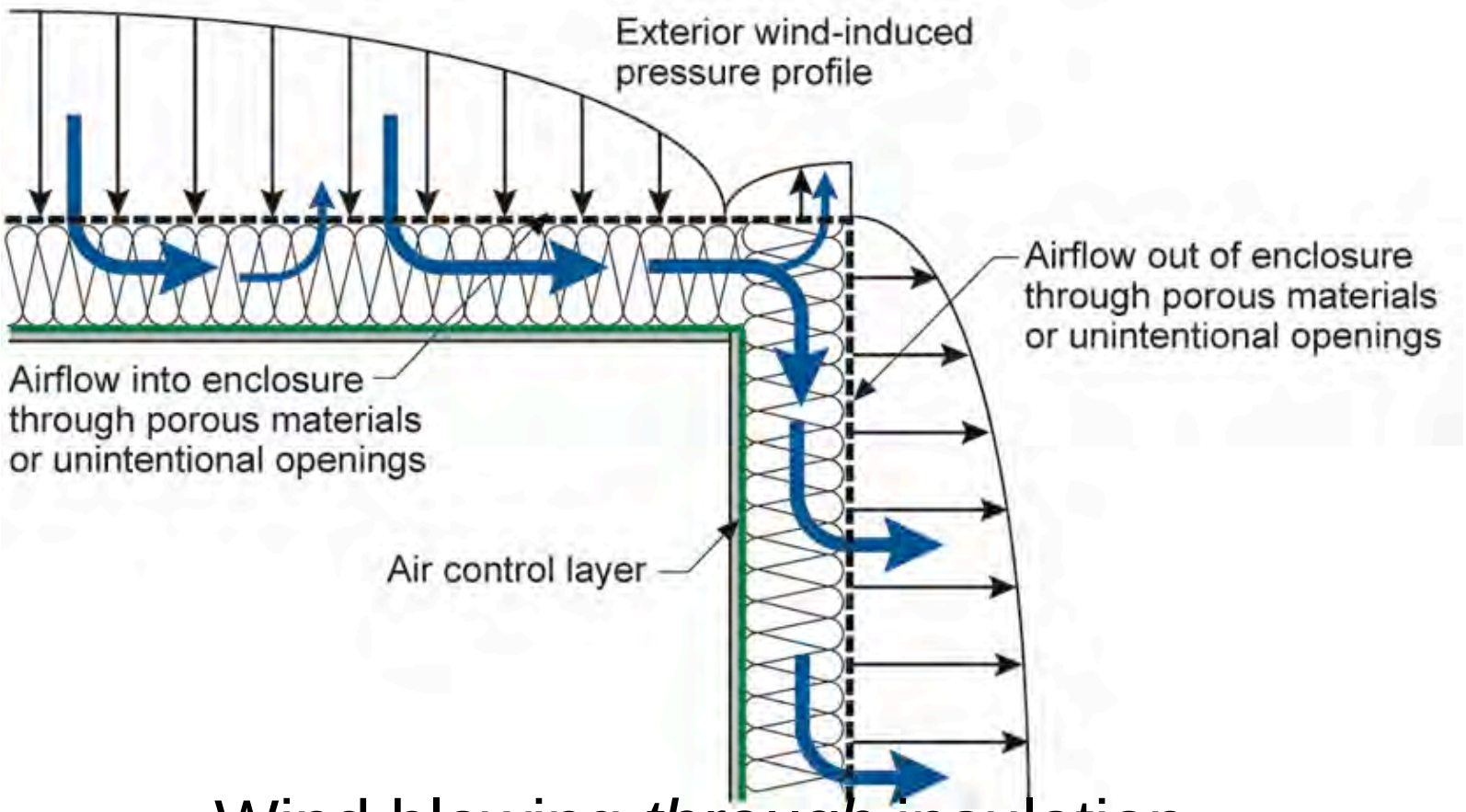
Fire Control may be needed
Sound Control optional

Commercial Buildings: Often exterior air barrier is the most practical solution

Why an Exterior Air Barrier? – Continuity



Wind Washing



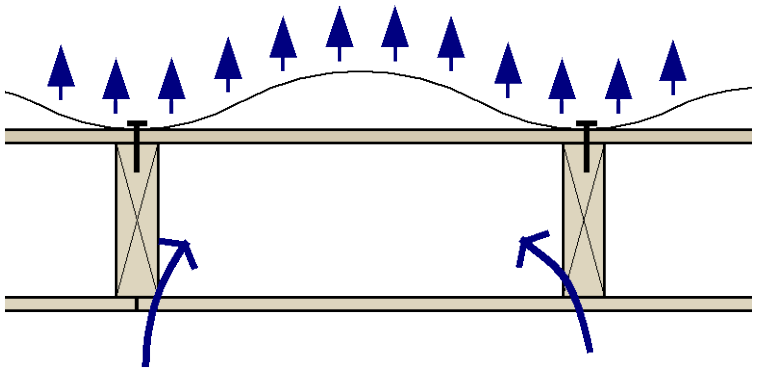
Wind blowing *through* insulation

High Performance Exterior Membranes:

Fully Self-Adhered
Vapor Permeable
Open Joint Rain Screen

Fully Self Adhered Vs. Mechanical Fixed

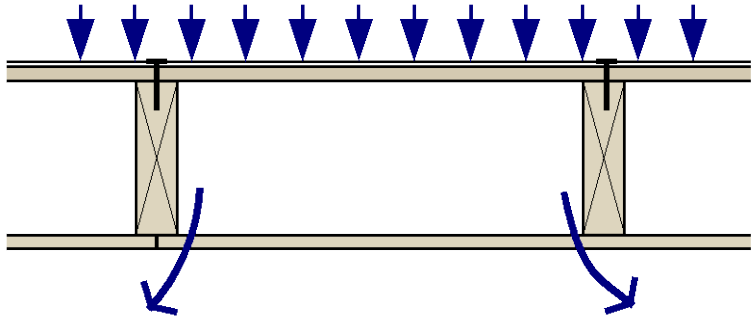
negative pressure gust



housewrap balloons outwards

air flows from interior into stud space

positve pressure gust



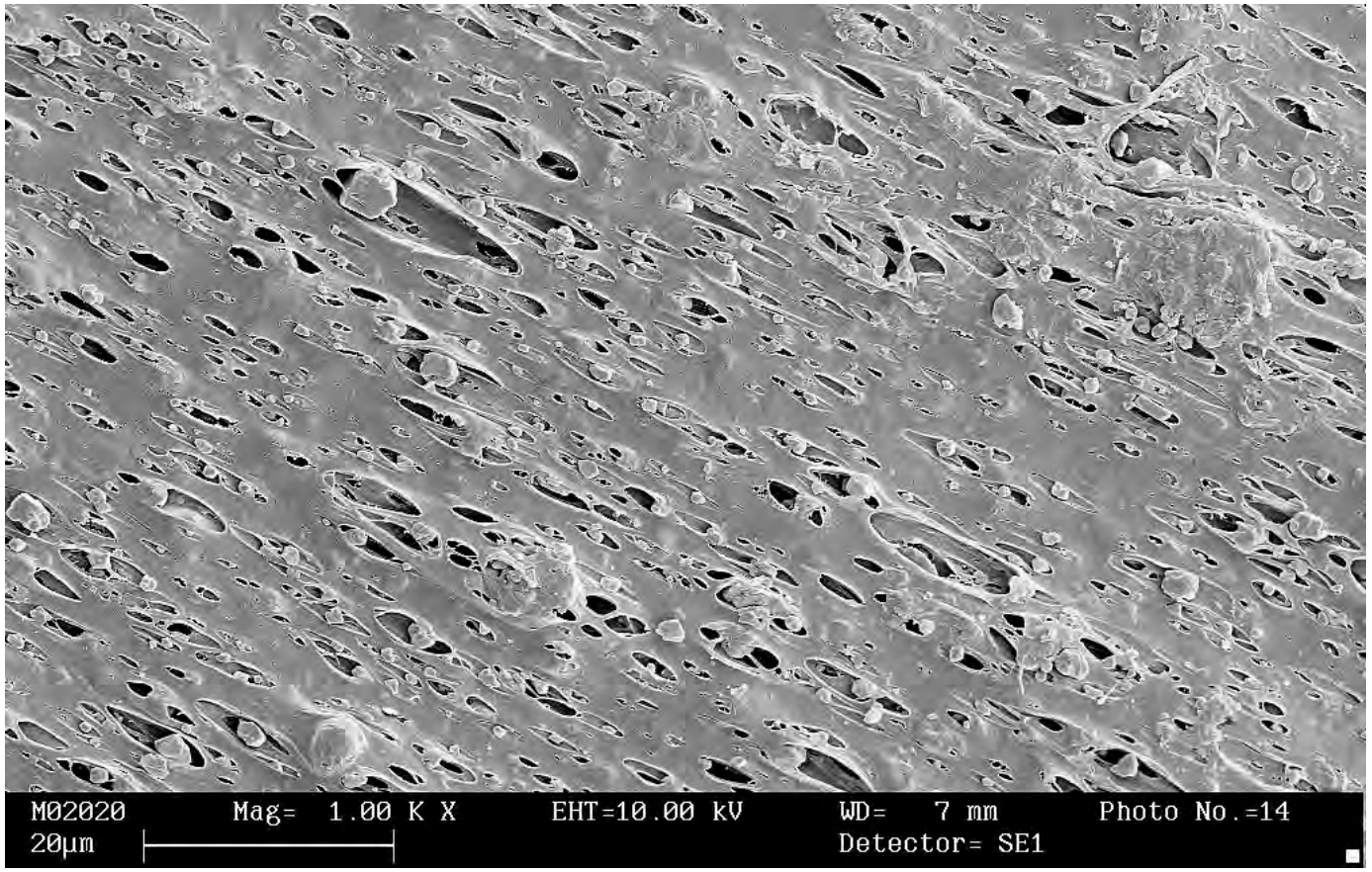
housewrap pressed tight to sheathing

air flows out of stud space to interior

Vapor Permeable Polymeric WRBs

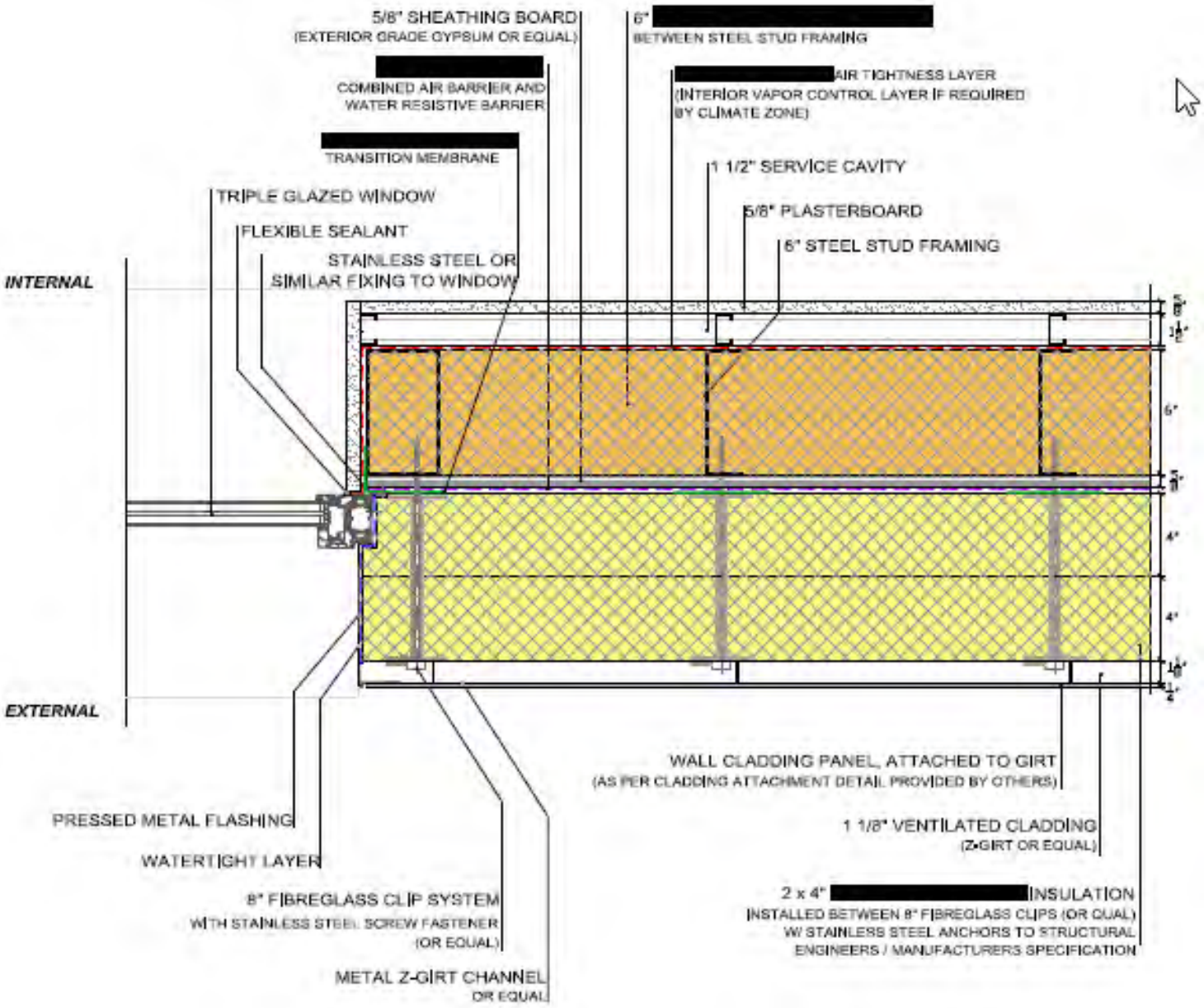
- **Perforated plastic sheet**
  Low perm, very low water resistance
- **Meltblown**
  Only fibers
  High perms, low water resistance
- **Microporous film between spunbond fabrics**
  High perms, low to high water resistance
- **Coating on substrate**
  Low to high perms, high water resistance

Example Microporous Film



0.79 mil
20µm (0.02 mm)

Air Tight, Vapor Open – When to Consider?

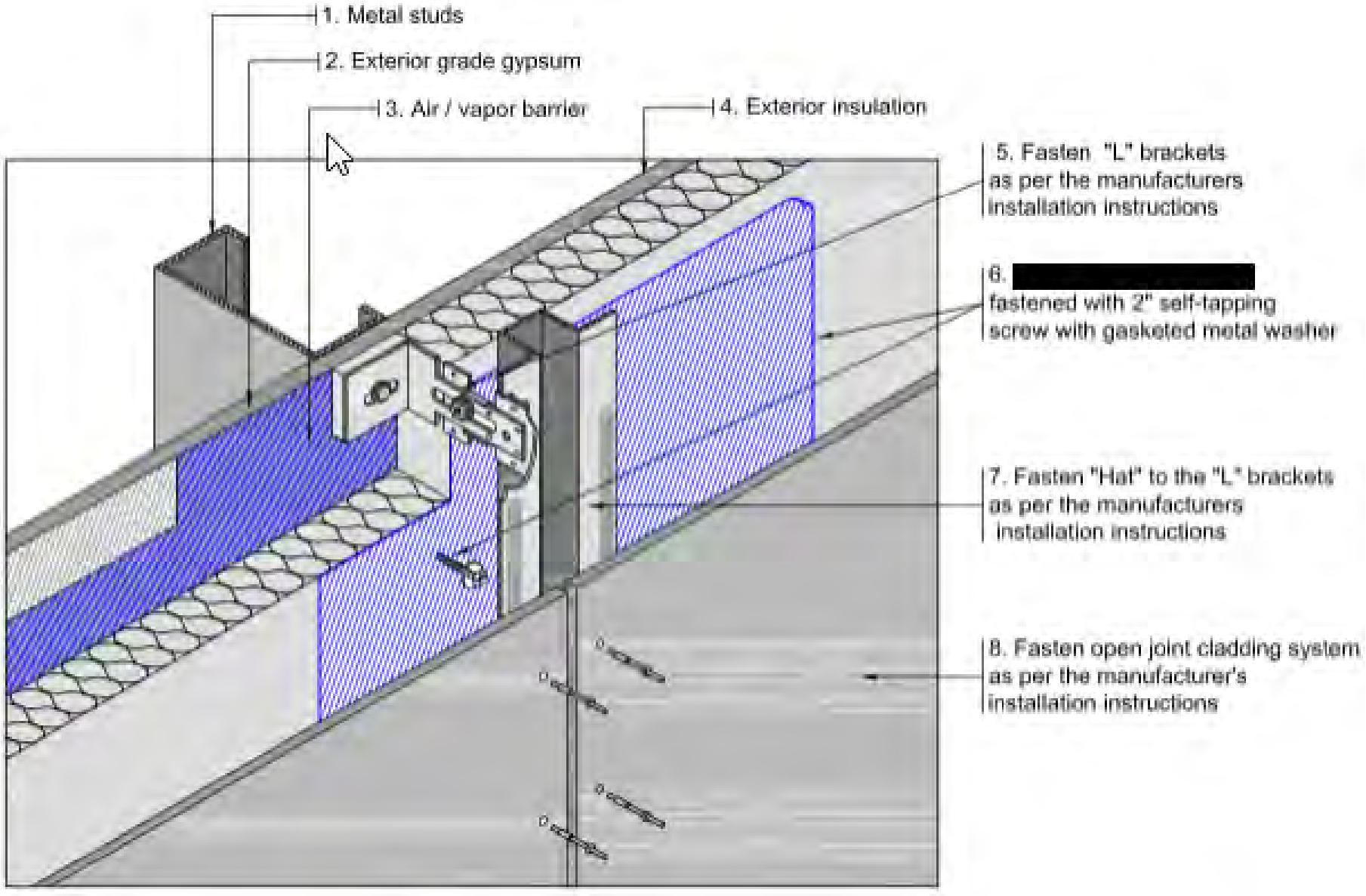


South Mountain Company - Martha's Vineyard, MA

. John Straube Guest House - Ontario, CA

The Lofts Project – Famingdale, NY

Open Joint Cladding


1. Metal studs
2. Exterior grade gypsum
3. Air / vapor barrier
4. Exterior insulation
5. Fasten "L" brackets as per the manufacturers installation instructions
6. [redacted] fastened with 2" self-tapping screw with gasketed metal washer
7. Fasten "Hat" to the "L" brackets as per the manufacturers installation instructions
8. Fasten open joint cladding system as per the manufacturer's installation instructions

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