Outline

- Water-Resistive Barrier
-
- WRB Installation
- Wall Flashings
- Drainscreens and Rainscreens
- Foam Installation Details

Water-Resistive Barrier

- 9.9% homes suffer from water damage
- Wall leaks result in more damage


Water-Resistive Barrier

- R703.1.1 Water Resistance
  - The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a water-resistant barrier behind the exterior veneer and a means of draining to the exterior water that enters the assembly."

Water-Resistive Barrier

- R703.1.1 Water Resistance
- Assumptions:
  1. Siding Leaks


Water-Resistive Barrier

- 11% of new homes - defect litigation
- 80% of those are due to water leaks


Water-Resistive Barrier

- R703.1.1 Water Resistance
- Assumptions:
  1. Siding Leaks
  2. Siding installations leak

Water-Resistive Barrier

- R703.1.1 Water Resistance
- Assumptions:
  1. Siding Leaks
  2. Siding installations leak
  3. We need a water-resistive barrier (WRB) behind siding

Water-Resistive Barrier

- Key features of WRBs
  - Hygrophobic
  - Vapor permeable

Water-Resistive Barrier

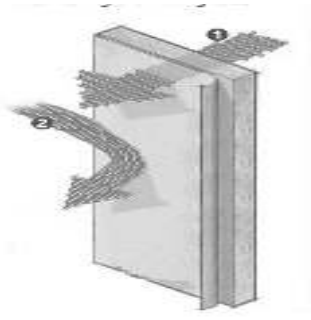
- What's the Function of a water-resistive barrier?

Water-Resistive Barrier

- What materials can be used as a Water-Resistive Barrier?

Water-Resistive Barrier

- What's the Function of a water-resistive barrier?
  - Last line of defense against liquid water



Water-Resistive Barrier

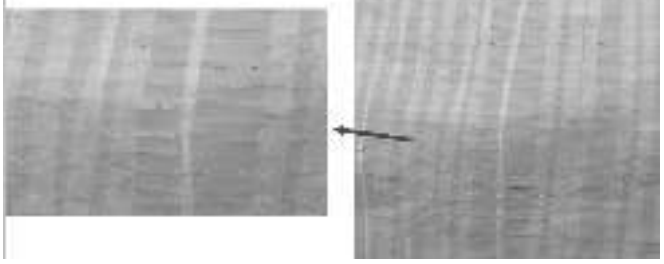
- What materials can be used as a Water-Resistive Barrier?
- R703.2 Water-resistive barrier
  1. #15 asphalt felt **[ASTM D 226]**
  2. Other 'approved' WRB

Water-Resistive Barrier

1. Asphalt felt:
   - **ASTM D 226 #15 [11.5 lb to 12.5 lb]**
   - Beware:
     - Unrated #15 [7.6 lb to 8.8 lb]
     - ASTM D 4869 #15 [8.0 lb to 9.7 lb]

Water-Resistive Barrier

- Microperforated

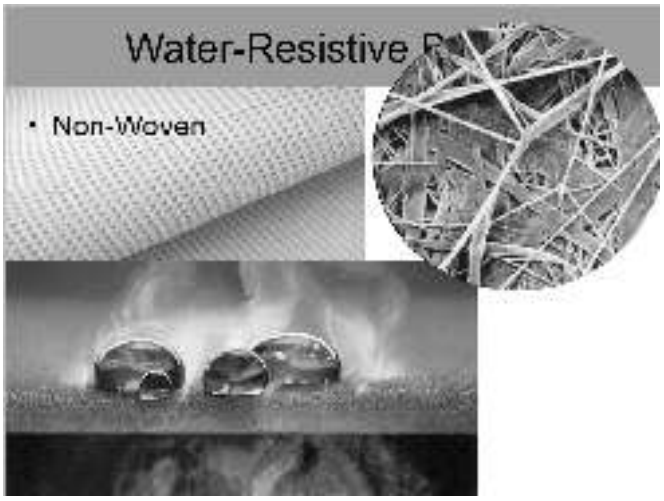


Water-Resistive Barrier

2. Other 'approved' WRB
   - Sheet-type [AC38]
     - Woven microperforated plastic
       - PinkWrap
       - HomeGuard
       - Barricade
     - Non-woven plastic
       - Tyvek
       - WeatherMate Plus
     - Non-woven -Coated
       - Typar

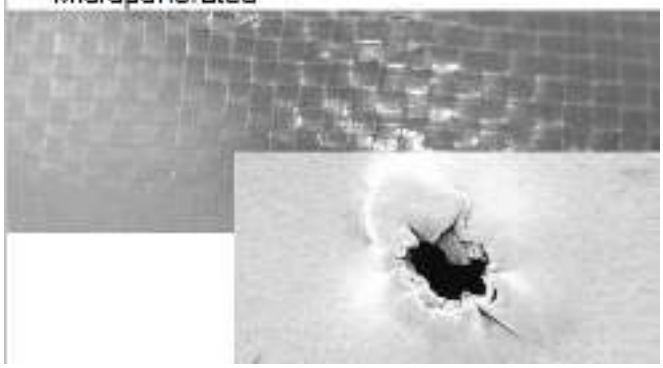
Water-Resistive Barrier

- Non-Woven



Water-Resistive Barrier

- Microperforated

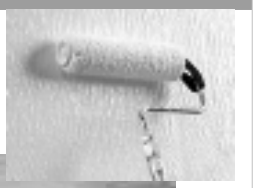


Water-Resistive Barrier

2. Other 'approved' WRB
   - Self-adhering sheet [AC38]
     - Perm-A-Barrier VPS
     - BluеSkin VP
     - WrapShield SA
     - Vycor enVs

Water-Resistive Barrier

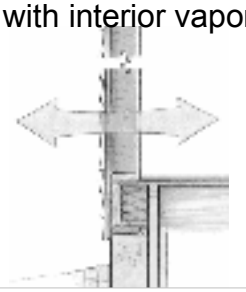
2. Other 'approved' WRB
   - Fluid-applied [AC212]
     - Vycor enV
     - DuPont
     - StoGuard
     - Henry



Water-Resistive Barrier

- If time later:

Vapor Permeability of Rigid Foam & Relationship with interior vapor retarders



Water-Resistive Barrier

2. Other 'approved' WRB
   - Rigid foam board [AC 71]
     - XPS (OC, Dow, Pactive)
     - Polyiso (Dow,)
     - EPS (Polar-R, Atlas)

Water-Resistive Barrier

2. R703.2 Water-resistive barrier
   - Other 'approved' WRB
     - Sheathing-integrated [AC 310]
       - Huber Zip & Zip R
       - Atlas ThermalStar LCI-SS
       - GP ForceField
       - LP WeatherLogic

Water-Resistive Barrier

2. Other 'approved' WRB
   - Rigid foam board [AC 71]
     - Concerns:
       - Vapor Permeability
       - Joint Tape!!
         - Follow ICC-ES Report

Wat

2. R703.2 Wa
   - Other 'ap

WRB Installation

- R703.2 Water-resistive barrier

WRB Installation

- R703.2 Water-resistive barrier
  - Free from Holes or Breaks
  - 2 in. horizontal lap
  - 6 in. vertical lap
  - Continuous to Top of Wall
  - Terminated at penetrations

WRB Installation

- R703.2 Water-resistive barrier

WRB Installation

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WRB Installat

- R703.2 Water-resistive bar

WRB Installation

- R703.2 Water-resistive barrier
  - Free from Holes or Breaks

WRB Installation

- R703.2 Water-resistive barrier
  - 6 in. vertical lap
  - Continuous to Top of Wall

WRB Installation

- R703.2 Water-resistive barrier
  - Terminated at penetrations

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WRB Installation

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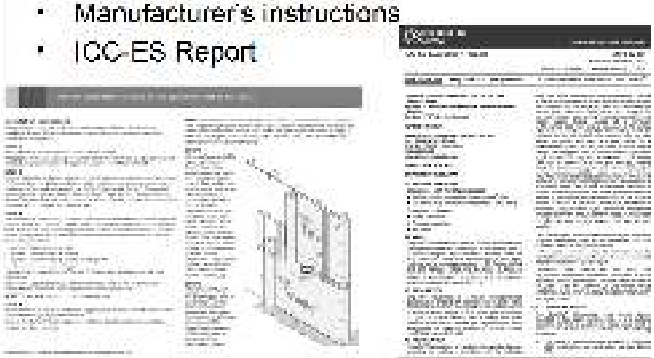
WRB Installation

- R703.2 Water-resistive barrier
  - Free from Holes or Breaks

WRB Installation

- R703.2 Water-resistive barrier
  - Manufacturer's instructions
  - ICC-ES Report



WRB Installation

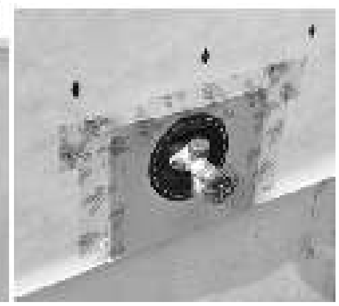
- R703.2 Water-resistive barrier
  - Manufacturer's instructions / Best Practices
    - 6 in. horizontal lap
    - 12 in. vertical lap

Construction Standards

- SECTION 24 MANUFACTURERS' SPECIFICATIONS
- All building materials and components utilized in the residential structure construction shall be installed in accordance with the adopted building codes and/or the manufacturers' installation instructions
- [illegible]
- If it is determined that the product was not properly installed, it will be the builder's responsibility to repair, replace or coordinate with the supplier / manufacturer, such defective product(s)

WRB Installation

- R703.2 Water-resistive barrier
  - Manufacturer's instructions / Best Practices
    - Flash Penetrations
    - Patch holes

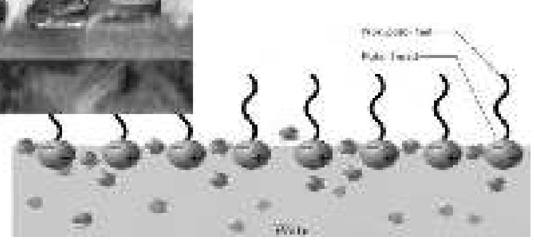


WRB Installation

- R703.2 Water-resistive barrier
  - Manufacturer's instructions / Best Practices
    - 1 inch cap fasteners (Staples or nails)
    - 12 in. to 18 in. oc

WRB Installation

- Plastic housewrap issue
  - Surfactants reduce water tension



WRB Installation

- Plastic housewrap issue
  - Surfactants reduce water tension
  - Water leaks through surfactant contaminated WRB

R703.4 Flashing

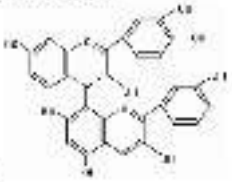
"Approved corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components.

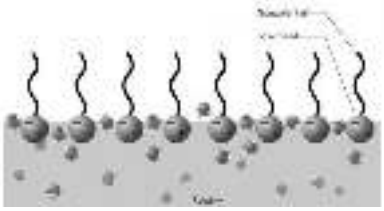
Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714.

Flashing shall extend to the surface of the exterior wall finish. Approved corrosion-resistant flashings shall be installed at he following locations:

WRB Installation

- Plastic housewrap issue
  - Surfactants common in construction:
    - Wood lignins
    - Soap, detergent
    - Latex paint offwash





Flashing

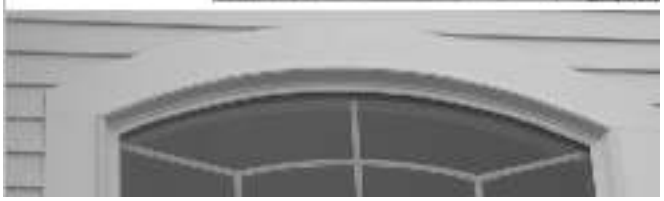
- R703.4 Flashing
  - **"Approved"**
  - **Corrosion resistant**
  - **Prevent water entry**
  - **Extend to surface of wall finish**

WRB Installation

- Plastic housewrap issue
  - Avoid / Isolate Surfactants
    - Raw wood to housewrap contact
    - Primed / Painted material to housewrap contact
    - Power washing

Flashing

- R703.4 Flashing [Locations]
  - Continuously above projecting wood trim



Flashing

- R703.4 Flashing [Locations]
  - Continuously above projecting wood trim

Flashing

- R703.4 Flashing [Locations]
  - Slab to wall

Flashing

- R703.4 Flashing [Locations]
  - Wall to Roof Intersections

[Roofing Session]

Flashing

- R703.4 Flashing [Locations]
  - Slab to wall

Flashing

- R703.4 Flashing [Locations]
  - Slab to wall

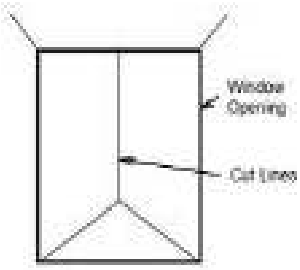
Flashing Windows

Flashing Windows

- R703.8 Flashing
  1. Flash accd. to Manufacturer instructions
     If no instructions:
     - Pan flashing sloped or sealed to direct water out
     - Side and head flashings
  2. Flashing design by registered design pro
  3. Other approved methods

Flashing Windows

- WRB Cut
  - **No** 'Y' cut

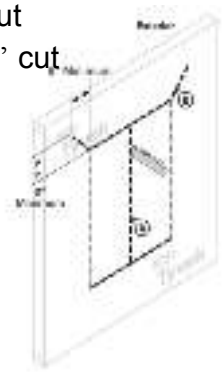


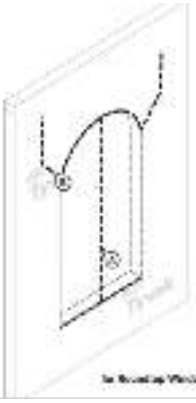
Flashing Windows

- WRB Cut
  - **No** 'X' cut

Flashing Windows

- WRB Cut
  - Yes 'I' cut



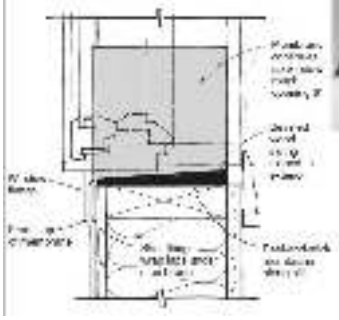


Flashing Windows

- WRB Cut
  - **No** 'X' cut

Flashing Windows

- Sill Pan Flashing
  - Slope or Backdam



Flashing Windows

- Sill Pan Flashing
  - Self-adhering flashing tape
  - Pre-formed pan

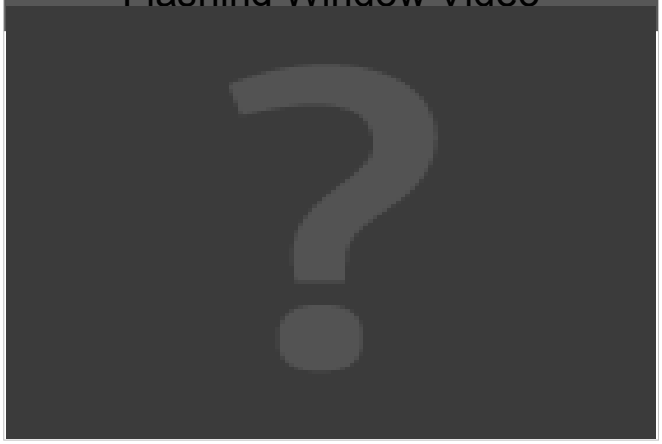
Flashing Windows

- Side and Head Flashing
  - Head flap

Flashing Windows

- Seal window per MFG instructions
  - ASTM C 920

Flashing Window Video

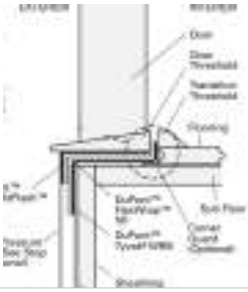


Flashing Windows

- Side and Head Flashing
  - J' roll

Flashing Doors

- Door Sill Pan Flashing
  - Backdam / Slope combination
  - Water channels



Flashing Doors

- Door Sill Pan Flashing

Flashing Doors

- Door Head Flashing

Flashing Doors

- Door Jamb Flashing

Flashing Door Video

Flashing Doors

- Door Jamb Flashing

Other WRB Stuff

- Canadian Maritime Provinces
  - WRB and Flashing Systems
    - Designed by licensed professionals
    - Inspected before exterior cladding

Other WRB Stuff

- Common element in the photos?

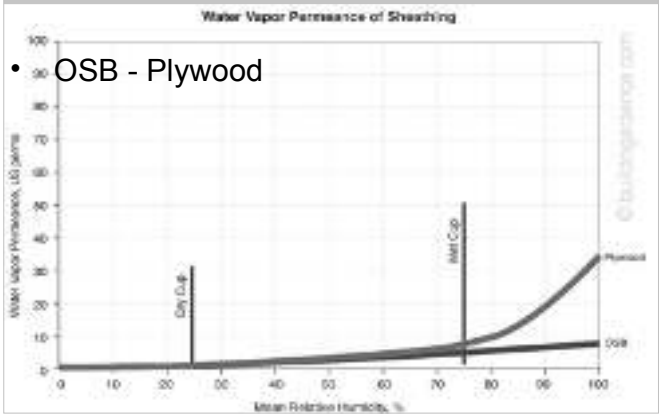

Other WRB Stuff

- What's the problem?
  - OSB?
  - Building practices over the past 30 yrs?
  - Plastic Housewraps?
  - Poor maintenance?
  - Insulation?
  - Something else?
  - Combination?

Other WRB Stuff

- Common element in the photos?


Other WRB Stuff



- OSB - Plywood

Other WRB Stuff

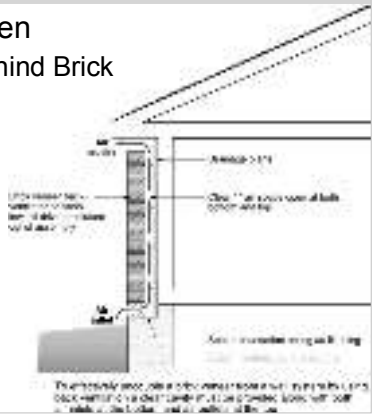
- Common element in the photos?
  - OSB

Other WRB Stuff

- Getting WRB details right it important
- Building to a higher standard improves performance (and reduces risk)

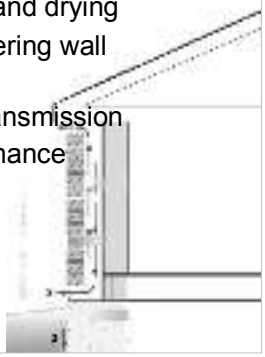
Rainscreens & Drainscreens

- Classic Rainscreen
  - 1 in. airspace behind Brick



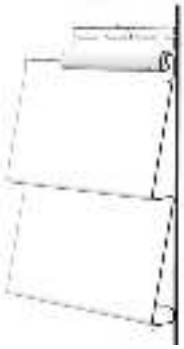
Rainscreens & Drainscreens

- Rainscreen: Why Bother?
  - Improves water drainage and drying
  - Reduces risk of water entering wall
    - Capillary break
  - Improves interior vapor transmission
  - Improves cladding performance
    - Less prone to decay
    - Finish lasts longer



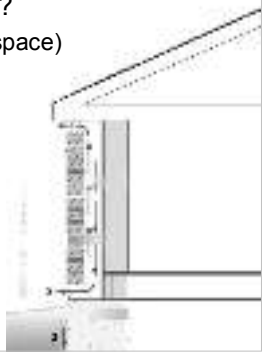
Rainscreens & Drainscreens

- Used behind any cladding



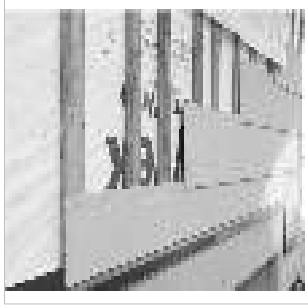
Rainscreens & Drainscreens

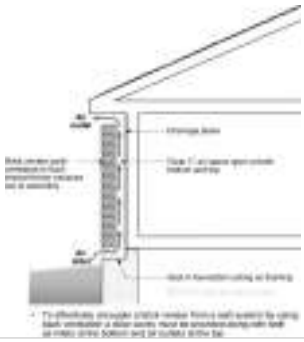
- Rainscreen: Why Bother?
  - Prepare for code changes?
    - Maritime Canada (3/16 in. space)
    - Parts of MN
    - OR (1/8 in. space)



Rainscreens & Drainscreens

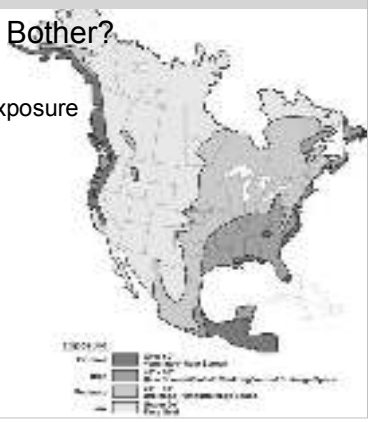
- Rainscreen: Why Bother?





Rainscreens & Drainscreens

- Rainscreen: Why Bother?
  - Best Practices
    - RI = High Rain Exposure

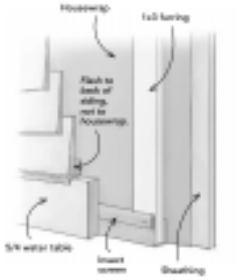


Rainscreens & Drainscreens

- How much space do you need?

Rainscreens & Drainscreens

- Lap siding details
  - Bottom edge vent
  - Furring / Battens

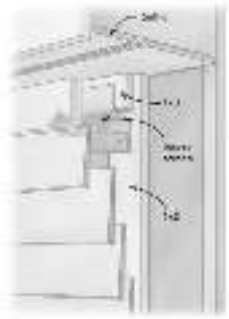


Rainscreens & Drainscreens

- How much space do you need?
  - ¼ in. – 1 in. [Rainscreen]
    - Improves water drainage
    - Allows ventilation air to dry cavity

Rainscreens & Drainscreens

- Lap siding details
  - Top edge vent

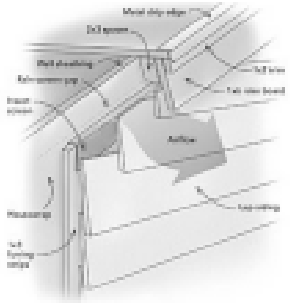


Rainscreens & Drainscreens

- How much space do you need?
  - ¼ in. – 1 in. [Rainscreen]
    - Improves water drainage
    - Allows ventilation air to dry cavity
  - 1/16 in. to 1/8 in. [Drainscreen]
    - Improves water drainage on WRB
    - No venting / drying

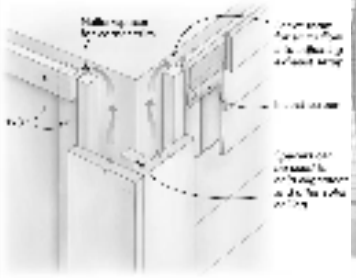
Rainscreens & Drainscreens

- Lap siding details
  - Rake wall top vent



Rainscreens & Drainscreens

- Lap siding details
  - Cornerboard isolated

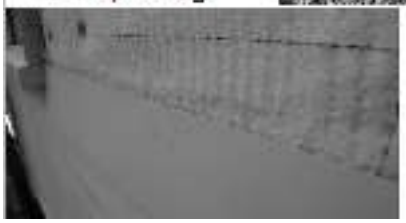


Rainscreens & Drainscreens

- Drainage mat
  - HomeSlicker [Obdyke]
  - Driwall [Keene]
  - Enkamat [Colbond]
  - Waterway [Stuc-O-Flex]
  - Others

Rainscreens & Drainscreens

- Drainage Mat - Spacer
  - Synthetic stone
  - Stucco
  - Shingles
  - Lap siding

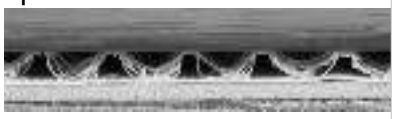


Rainscreens & Drainscreens

- Vented Rainscreen Siding
  - Interior vapor retarder can be Class III [Instead of Class II]
  - Latex Paint

Rainscreens & Drainscreens

- Drainage Mat - Spacer
  - Synthetic stone
  - Stucco
  - Shingles



Rainscreens & Drainscreens

- How much space do you need?
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    - Allows ventilation air to dry cavity
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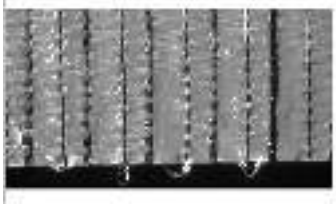
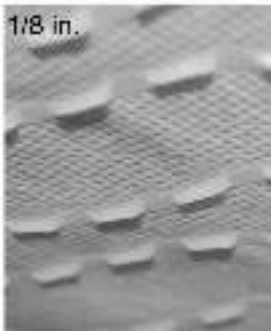
    - Improves water drainage on WRB
    - No venting / drying

Rainscreens & Drainscreens

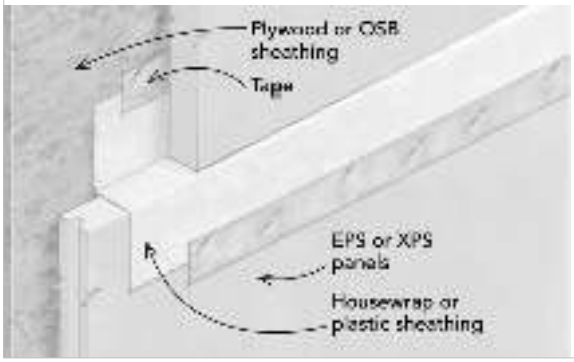
- Drainscreens
  - 3D housewraps
    - Space siding 1/16 in. – 1/8 in.





Rigid Foam Details

- Horizontal Slip Sheet Joints

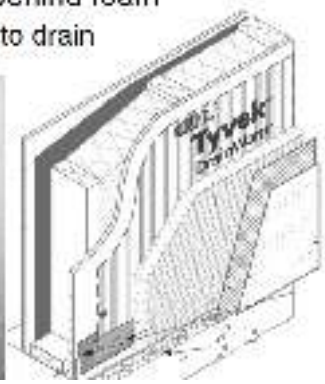


Rainscreens & Drainscreens

- Drainscreen Housewraps
  - RainDrop [Pactive]
  - TamlynWrap [Tamlyn]
  - DrainWrap [Dupont]
  - HydroGap [Obdyke]

Rigid Foam Details

- Drainscreen wrap behind foam
  - Encourages water to drain

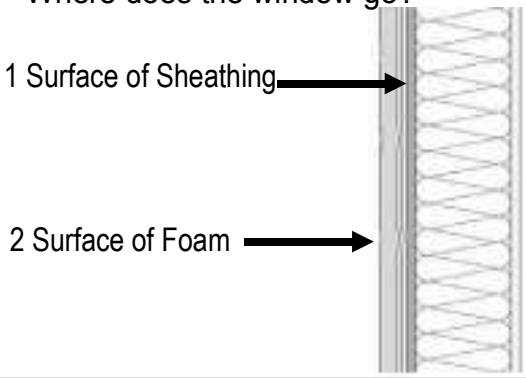


Rigid Foam Details

- Rigid foam as WRB ?
  - Building scientists: housewrap + foam
    - Concerns about shrinking
    - Concerns about tape seal at joints

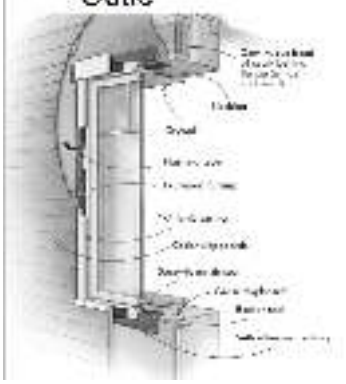
Rigid Foam Details

- Where does the window go?

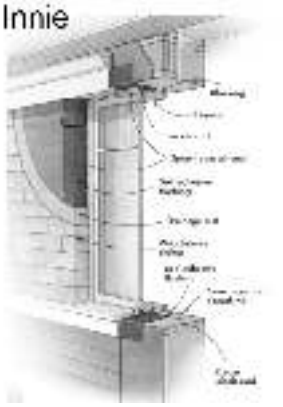


Rigid Foam Details

Outie

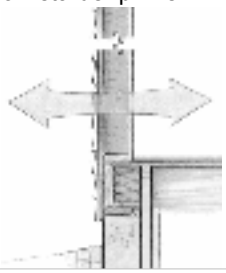


Innie



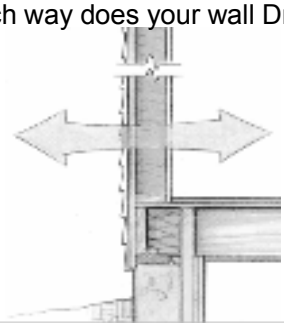
Rigid Foam Details

- Rigid Foam and Vapor Retarders
  - Vapor Retarder Classes
    - Class I : 6 mil poly
    - Class II : Kraft paper, Vapor retarder primer
    - Class III : Latex paint



Rigid Foam Details

- Rigid Foam and Vapor Retarders
  - Which way does your wall 'Breathe'?
  - Which way does your wall Dry?

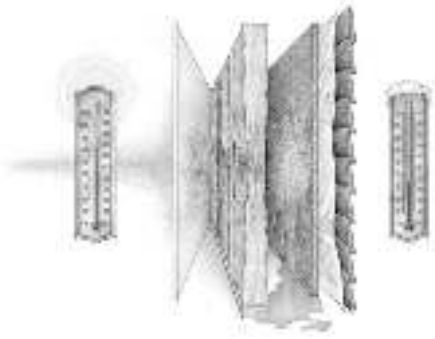


Rigid Foam Details

- Rigid Foam and Vapor Retarders
  - 2x6 wall
    - Cavity insulation alone
    - Class II vapor retarder on inside

Rigid Foam Details

- Rigid Foam and Vapor Retarders

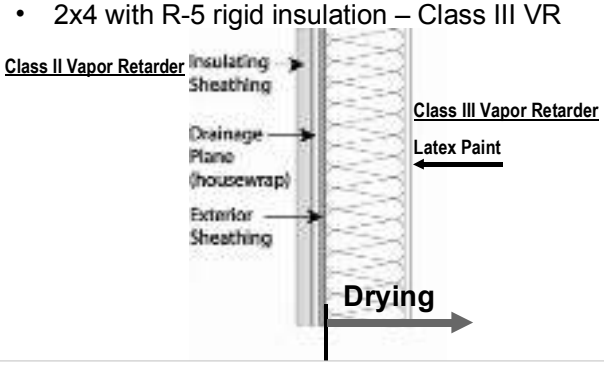


Rigid Foam Details

- Rigid Foam and Vapor Retarders
  - 2x4 with R-5 rigid insulation –
    - Class III vapor retarder on inside

Rigid Foam Details

- Rigid Foam and Vapor Retarders
  - 2x4 with R-5 rigid insulation – Class III VR



Rigid Foam Details

- Rigid Foam and Vapor Retarders
  - **2x6 with R-7.5 rigid insulation** – Class III VR