Don’t Do Stupid Things

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Life is Tough Enough As it Is…
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It’s Harder When You Are Stupid
Step 1
- Remove strip of OSB from each side of ridge

Step 2
- Create air seal with strip of vapor open membrane (tape seams)
- Vapor open membrane sheet sealed to OSB with acrylic caulk sealant
- Hold vapor open membrane sheet in place with metal strapping

Step 3
- Construct wood ridge vent with 2x2 furring
Definition of a Problem

People
Pollutant (hot, wet, UV, ozone)
Path
Pressure
Supply air into occupied zone returns to AHU by passing through deliberately porous dropped ceiling or through return grilles installed in dropped ceiling.

Air handling unit extracts air from dropped ceiling, conditions it and injects it into the occupied zones via supply ductwork.

Dropped ceiling depressurized by air handling units extracting air from dropped ceiling.
Air barrier system not present to prevent air from being extracted from roof assembly

Corrugated metal roof deck

Membrane roof

Rigid insulation

1. Return plenum operates under negative pressure relative to occupied space and exterior

2. Exterior sheathing

3. Building paper

4. Interior gypsum should extend to underside of roof deck and be sealed

Brick veneer

Suspended ceiling

Top chord bearing roof truss

Cavity insulation

Metal stud wall
Figure 5.10

HVAC System as Designed
Figure 5.12
Modified Pressure Relationship
Rain enters cup due to momentum ("kinetic energy")

Cup drains water to exterior
Rain enters cup due to momentum ("kinetic energy")

Wind enters cup—pressurizing cup; no rain entry due to wind driven rain

Entire wind pressure taken here

Cup can still drain water to exterior
Baffle to deflect raindrops hitting face of cup due to momentum ("kinetic energy")

Pressure in cup is same as pressure outside on face of baffle

Momentum driving force converted to gravity—water drains away

Wind enters cup—pressurizing cup; no rain entry due to wind driven rain

Cup can still drain water to exterior

Entire wind pressure taken here
Insulating glass unit

Seal (gasket)

Seal (tape)

Setting block (typically two per unit)

Hole providing drainage and pressurization

Frame

Rough opening
Outer seal sees water but not pressure; no pressure difference across this seal, therefore no rain entry.

Pressure in chamber is same as pressure outside on face of assembly.

Air enters and pressurizes chamber.

Key seal is interior seal as it takes maximum wind load but it does not see water.

Entire wind pressure taken here.

Pressure chamber.
Air enters joints in cover plate and pressurizes chamber.

Pressure in chamber is same as pressure outside on face of assembly.

Outer seal sees water but not pressure.

Entire wind pressure taken here.

Key seal is interior seal as it takes maximum wind load but it does not see water.
Wind pressurizes chamber between inner and outer seal.
Inner, protected seal

Outer, exposed seal

Drain and vent opening
Open Joints vs Closed Joints
Open Joints vs Closed Joints
Limits of Pressure Equalization
\[ \Delta P \text{ vs. time} \]
With 100% pressure equalization, gravity will drive leakage. If leaks deposit water on the water-air barrier, air pressure will encourage it to penetrate AWB. Drainage no longer can manage this leakage.
Pressure Equalization Needs to be Perfect
Pressure Equalization Reduces Drying
Prevention of Wetting Is Not As Important As Drying
Assume Things Get Wet...Design Them to Dry
Ventilated Claddings Promote Drying
2\textsuperscript{nd} Law of Thermodynamics
In an isolated system, a process can occur only if it increases the total entropy of the system

Rudolf Clausius
Heat Flow Is From Warm To Cold
Moisture Flow Is From Warm To Cold
Moisture Flow Is From More To Less
Air Flow Is From A Higher Pressure to a Lower Pressure
Wood or fiber cement siding

Furring or spacer strip

Building paper, housewrap or building wrap (PinkWrap® Housewrap)

Plywood or OSB sheathing

EcoTouch® Pink® Fiberglass Insulation in cavity

Gypsum board

Latex paint

Vapor Flow-Through Assembly
Wood or fiber cement siding

Furring or spacer strip

Exterior rigid insulation (Foamular® Extruded Polystyrene (XPS))

EcoTouch® Pink® Fiberglass Insulation in cavity

Gypsum board

Latex paint

Control of Condensing Surface Temperature Assembly
Interior Air Flow Retarder Using Drywall and Framing
Seal around rough openings of windows and doors

Seal along top plates on exterior walls

Seal along bottom plate on exterior walls

Partitions: seal at top plate where adjacent to an unconditioned space (see Figure 12.8)

Seal drywall to first stud in the wall (see Figure 12.7)

Seal along inside of bottom of first stud in interior wall (see Figure 12.7) or, hold back first stud to pass drywall behind stud (see Figure 12.8)