2001 Company
Wind Vented Roof Systems Since 1974

May 23, 2012

UNDERSTANDING THE EXCEPTION TO IBC BUILDING CODES

2001 Co. is NOT required to remove existing wet roofs because of the effectiveness of the 2001 Co. Self-Drying Wet Roof Technique.

In the 2009 IBC International Building Code, Section 1510 outlines reroofing requirements. Section 1510.3 explains Recovering vs. Replacement and clearly states:

> *"When the existing roof or roof covering is water soaked, it must be allowed to dry completely so as not to trap moisture beneath the new layer of covering. This could cause a rapid deterioration of the new covering material, as well as the existing sheathing. The existing covering is required to be removed if it cannot adequately dry out or if its physical properties have been permanently altered."*

The "Exceptional" 2001 Co. Self Drying Wet Roof System

Because 2001 Co. Wind Vented Roof Systems can dry out entrapped moisture and restore the existing roof assembly to a dry state, the removal of the existing wet roof covering is not required.

Basic Explanation of the 2001 Co. Existing Wet Roof Drying Technique:

First: When the existing roof is horizontally air-permeable, like a mechanically fastened existing roof, the Equalizer Valves™ are cut through the roof assembly components to the air sealed substrate or monolithic deck.

Second: When the existing roof assembly is *not* horizontally air-permeable, the existing waterproofing membrane or membranes are permeated by cutting the roof membrane 2' on center or by drilling a ½" diameter hole every two square feet to allow water vapor transmission up into the new 2001 Co. Wind Vented Reroof System.

Let your 2001 Co. Representative assist you in acquiring Building Permits in reroofing where two existing roofs and wet roofs exist.

2001 Co. Self Drying Wet Roof Techniques:

1. **Permeation**: A totally adhered hot moped built up wet roof assembly on a monolithic deck is *not* horizontally air-permeable; thus it is permeated by cutting the waterproofing membranes 2' on center or by drilling a ½" hole every two square feet through the roof membranes into the insulation. This allows water vapor to migrate up into the new 2001 Co. reroof assembly to be exhausted out through the Equalizer Valves™.
   Caution on Metal Decks: Do not permeate through the deck vapor barrier or air barriers.
2. **Convection Hot Air Currents**: Hot air creates a low pressure air current that rises from inside a building through the structural roof deck (metal, wood, and/or composite panel joints) and up into a wet roof substrate. Once there, it will cause entrapped water to vaporize in to water vapor due to its heat and low pressure. If this water vapor can flow down into the building or up into a Permeated 2001 Co. Wind Vented Roof Assembly to be exhausted out through 2001 Co. Equalizer Valves ™, then the wet roof will dry.
3. **Low Pressure Vaporization:** 2001 Co. Patented Equalizer Valves ™ are patented one way valves that are strategically placed in the Wind Vortex Intensity Zones on the building corners and perimeter edges that transfer wind uplift vacuum pressures into the roof assembly. When wind generated low pressure vacuums are created in a roof assembly through windward Equalizer Valves ™, liquid water vaporizes into the surrounding air molecules and is exhausted out of the roof assembly though the leeward Equalizer Valves ™.
4. **Controlled Air Exchange:** 2001 Co. patented Wind Vented Roof Assemblies are designed with Equalizer Valves ™ around all four sides of a building. On the windward side of a building (where the wind is blowing into the building creating low pressure vacuums), the one way valves cause air to be exhausted out of the roof assembly, bringing the total roof assembly down in low pressure. On the leeward side of the building roof, [the opposite side where the wind pressures are atmospheric regular pressure], the Equalizer Valves ™ allow a 2% leakage of air back into the roof assembly for a controlled air exchange. This slight air intake takes place on the underside of the loose laid

waterproofing membrane, so water vapor (high humidity loaded air molecules) can be exhausted from the roof assembly thus drying the wet roof assembly.

5. **Forced Air Exchange (2001 Co. Forced Air Drying Technique, Patent Pending):**
   A mechanical blower is installed in the center of a building roof to facilitate a faster rate of controlled air exchange and low pressure vaporization of water molecules entrapped in an existing wet roof assembly. A 2' X 2' mechanical exhaust fan is installed on the finished roof membrane and the roof substrate is removed under the curb to the monolithic deck or air barrier on an air permeable roof deck to expose all horizontal air permeable layers in the roof assembly. The mechanical blower sucks the roof assembly down in low pressure causing water in the roof assembly to vaporize into the surrounding air molecules.
6. **Structural Roof Deck Air Sealing:** 2001 Co.'s patented techniques for air sealing monolithic roof decks and air permeable roof decks is critical for the Wind Up Lift Transfer and retention of wind generated low pressures in a roof assembly to vaporize entrapped water into water vapor. *2001 Co. Patented air seal substrate techniques require Pre Installation Notice (PIN) approval on every roof project.*
7. **Perimeter and Through Roof Penetration Air Sealing:** 2001 Co.'s patented air sealing detail techniques for sealing against horizontal air infiltration into a roof assembly from perimeter and penetration construction techniques, in combination with deck air sealing techniques, is the Ziplock bag sealing strip that encapsulates a roof assembly. This roof deck to waterproofing membrane encapsulation facilitates the 2001 Co. wind uplift transfer to occur.
8. **Understanding why the 2009 IBC Building Code requires all wet roofs to be torn off when *conventional* roof application techniques are used in re-roof construction**:
   First: Because entrapped moisture in a roof assembly will degrade the roof assembly components.
   Second: The liquid water will vaporize, migrate, and condense again and again in freeze/thaw cycles, spreading moisture throughout the roofing system.

Third: This spreading moisture will migrate up into the new reroof under the waterproofing membrane throughout the total roof.

Fourth: Wet roof substrates that cannot self-dry moisture and condensation will rot and rust structural roof decks.

Fifth: Wet roof insulation has no R value for energy efficiency.

Sixth: Wet roofs promote mold, mildew, and fungicide spores that are a health hazard.

Seventh: Roof leaks are simply patched to stop the leak. Very seldom is the leak area taken up and the wet insulation and substrate removed and replaced. Thus this leak moisture can migrate and dissipate through out the total roof assembly.

9. **How moisture migrates in the roof assembly:** Internal hot air from a building heats the underside of the roof assembly. These low pressure hot air molecules absorb water vapor and continue to be driven upward and disperse out from the wet roof area in all directions. When this moist hot air hits a due point in the roof assembly, such as the underside of the roof membrane at night, a screw shank, or an insulation void, it will condensate back to water in the cool of winter or a summer night in radiant cooling. This condensed liquid water returns to water vapor in the next day's warming cycle and spreads out further into the roof assembly, migrating out from the wettest area to spread moisture over the whole roof assembly. Like a sponge in a Ziploc bag, it will achieve uniform wetness.

An easy experiment to demonstrate moisture dispersion throughout a roof is:

1) Take two pieces of 2' X 2' Plexiglas panels.
2) Lay dry sponges, (all the same size and weight), across one glass surface to simulate insulation panels installed on a roof deck.
3) Weigh your glass and sponges dry so that later the total sample and individual sponges can be weighed again to record how much water/moisture they absorbed from water vapor and condensation dispersion.
4) Pour a cup of water on the center of the sponge field simulating a roof leak.

5) Weigh the amount of water you are pouring on so you can record the water vapor transmission rate from the center wet sponges out to the dry peripheral sponges.
6) Cover your wet and dry sponges with another layer of 2' X 2' glass simulating a roof water proofing membrane.
7) Seal the edge of the two glass panels with duct tape and weigh the glass and wet sponge sample.
8) Leave your experiment outside and watch the water vapor condensate on the underside of the top glass in the cool of the night and the bottom of the glass in the heat of the day.
9) After 30 days, weigh the sample, cut the sealed edge and weigh the individual sponges. They should all weigh about equal, as the water vapor has dispersed and condensate daily to equally distribute moisture from a roof leak out over the rest of the roof area uniformly.

Another simple example to demonstrate this moisture migration is to put one quarter of a dry sponge into water and seal it up in a Ziploc bag and put it outside on your porch table to observe morning noon and night. In a few days you will have uniform moisture in the sponge and condensation coming and going on the inside surface of the Ziploc bag.

An Experiment in Controlled Air Exchange to Further Understanding of How 2001 Co. Wind Venting and Air Sealing Patented Technology Works:

1. Start with the end product of steps 1-9 of the previous experiment with a known weight of water in the wet sponge encapsulation double glass demonstrator.
2. Drill a hole on one side to install a vacuum pump (fish aquarium bubbler).
3. Drill a hole on the opposite side and corner for a controlled air exchange inlet.
4. Record the total weight when you start and weekly weigh the test sample as you vacuum, humid air out of the test sample.

An Overview of How This Technique Makes 2001 Co. Reroofs the Exception:

Because water from roof leaks are entrapped in a conventional roof assembly like a Ziploc bag, the new 2009 IBC International Building Code IBC requires wet roofs to be torn off.

2001 Co. Patented Wind Venting and Controlled Air Exchange Reroof Drying Technique is the Exception to the IBC tear-off requirements in Section 1510.3 (Recovering vs. Replacement) because it effectively transforms the roof into a giant horizontal drying apparatus.

Wind generated low pressures are transferred into a zip lock bagged, air sealed roof assembly through the equalizer valves, bringing the whole roof assembly down in low pressure across the whole roof.

The Equalizer Valves ™ on the windward side of the building perimeter edge transfer wind uplift generated low pressure into roof assembly, causing water to vaporize into water vapor, a moveable gas that can be easily moved and exhausted from the roof.

The Equalizer Valves ™ on the leeward (non windy) sides of the building perimeter edge are in atmospheric air pressure and by design leak 2% air back into the roof assembly to give a dry, less humid make-up to the air in the roof assembly under the 2001 Co. loose laid waterproofing membrane. This accommodates the loss of the humid, water vapor laden air molecules being exhausted out of the roof on the windward side through the Equalizer Valves ™.

Proven Effectiveness of 2001 Co. Wet Roof Drying Techniques

The 2001 Co. Self Drying Wet Roof Technique has been proven to work for over 30 years.

2001 Co. meets the 2009 IBC Code Requirements in section 1510.3 of the 2009 IBC Building Code "to dry out existing wet roofs completely so as not to trap moisture beneath the new layer of coverings causing deterioration," because the 2001 Co. Wind Venting low pressure transfer and controlled air exchange techniques are designed to self dry a roof assembly.

Testing Structural Roof Deck Integrity Without Tearing Off The Existing Roof Assembly

1. 2001 Company requires an underside of a roof deck screw pull test on wood and metal decks with wet roof assemblies in the leaking areas (only) to verify that the structural roof deck is of sufficient structural strength and is not rusted, rotted, or needing replacement.
2. Mold and biological decomposition elements are mitigated once the encapsulated air sealed roof assembly is dried out.
3. Most wet insulations return to 90% or better of their insulation R-value once dried out. Additional insulation can easily be added to a 2001 Co. reroof assembly and can be cost effective. The right roof installation is loose laid and weighted in place with Gypsum, Dens deck or cement tile boards ½ inch 4x8.