

CONDENSATION

& Attic Rain

What is Attic Condensation and Attic Rain?

Condensation is a naturally occurring phenomenon within attics in colder climate regions (such as Alberta) where a freeze thaw cycle occurs with regularity. Where a freeze thaw cycle lasts only a few days, attic condensation or frost build up does not normally occur; however, when the freeze cycle lasts for an extended period of time, the accumulation of frost within the attic may result in moisture ingress into the home.

The most common signs of condensation/ attic rain can appear as dripping or staining at upper level ceilings, around bathroom fans, and light fixtures.

When the thaw cycle begins, the build-up of frost within the attic space will melt, causing "Attic Rain", which in most cases drips onto the insulation. The insulation typically holds the moisture until it evaporates, and therefore remaining unknown to the resident living below, though with the case of extended cold periods, the saturation point of the insulation may exceed what it can hold and the excess moisture would then create a potential concern for ingress to the house. Although this may not cause noticeable damage inside the unit, and the moisture within the insulation may not exceed the saturation point, contact with moisture lowers the insulation R-value which could lead to additional heat loss. It's important to note that as a general rule, your attic should be the same temperature as the outside.

We often find that the effects of attic rain are more noticeable after the second cold snap begins to thaw, as the moisture within the insulation from the first melt, which may not have penetrated into the home, has not had the

What causes Attic Condensation and Attic Rain?

There are four main contributing factors to condensation within the attic:

Attic bypass

This is typically any protrusion passing through the attic floor from the unit below, for example furnace stacks, plumbing vents, dryer vents, pot lights, and bathroom fans. If the protrusion is not sealed correctly as it passes through the attic floor, it can permit heat from inside the unit into the attic. The attic floor vapour barrier is designed to be an air tight protection that separates the unit from the attic. Unfortunately, it is common to see missing, deteriorated, or compromised vapour barrier at the attic floor, allowing the heat transfer from the unit to the attic.

Lack of proper insulation levels/ R-value

The new industry standard for proper insulation levels inside the attic space is a R-60 value. This means approximately 16"-18" of blown-in loose insulation or an R-18 value (approximately 2.5" of closed-cell polyurethane) spray foam. Older homes within Calgary and area only have an R-16 value (approximately 3"-4" of fibreglass or loose fill cellulose) insulation. Lack of proper insulation R-value levels allows heat loss from inside the home into the attic space.

****Note**** Batten style insulation is notorious for allowing more heat transfer compared to blown-in insulation. This is due to it being very hard to close all gaps using the bats.

Calgary's climate, with its cycles of extreme, sub-zero temperatures, is perfect for the creation of condensation, or what is commonly known in the industry as 'attic rain', named for it's rain-like water droplets that often fall inside the attic space.

We see this phenomena often in newer homes (though certainly not limited to only new construction). This is due to modern building techniques and materials being much more air tight/energy efficient. While this is great for your power bill, it also does not allow for as much breathability through the homes building envelope. So during extreme winter cold snaps when windows and doors are rarely open, there is very little fresh air entering the home. Add to that, excess moisture and heat inside the home often has nowhere to go.... but up!

Here at Angel's Roofing we pride ourselves on specializing in all aspects of attic rain, including prevention, identification, and mitigation. Our highly skilled team of technicians are here to help with all your winter related attic and condensation repairs.

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What causes Attic Condensation and Attic Rain? (cont'd)

Poor attic ventilation

For optimum ventilation to occur within the attic space, both air intake and air exhaust vents must be balanced and considered in the design of the building. This is achieved by the incorporation of air intake vents to the soffit, while placing the exhaust vents near or at the ridge. The Alberta Building Code recommends a minimum of at least 1 square foot of attic ventilation (evenly split between intake and exhaust) for every 300 square feet of attic floor space. If there is a lack of proper ventilation, trapped heat and moisture can raise energy costs, lead to condensation, create ice dams, as well as damage roof system components. In extreme cases where temperatures reach 150 degrees F (65 degrees C) damage can occur to the attic's structural integrity as well as to nearby property. Proper ventilation will remove moisture and heat from the attic.

****Note**** Often buildings have enough ventilation to meet code requirements, though it may still require upgrades. This is due to two factors:

1. Building code requirements are a minimum guideline, not a best practice.
2. Building design/ configuration can cause certain areas of the attic to require additional vents to breathe correctly. Depending on the specific design of a building, unique ventilation solutions may be required.

Poorly installed/ connected vent/ ducting pipes

When vent pipes, such as bathroom fan exhaust pipes, are running through the attic, it's very important to ensure they are installed correctly to the roof deck. This is typically done by having an insulated flex pipe connected to a roof deck adapter, which is sealed to the roof deck and allows air to flow properly through the exhaust vent without allowing any moist air to escape into the attic space. Condensation, however, will tend to build up inside the flex pipe and turn into ice near the roof deck in cold conditions. When temperatures rise, this ice melts and runs back down the pipe. This is where a condensation trap (p-trap) in the flex pipe is necessary to collect excess moisture, ensuring extra moisture remains inside the pipe, with an opportunity to evaporate over time, rather than dripping back into the bathroom fan.

Additional Contributing factors:

- The humidity levels within the home - when levels are too high, condensation accumulation in the attic is common.
- Interior temperatures within the home if kept unnecessarily high.
- Deteriorated attic insulation due to previous contact with moisture.

How to help minimize humidity/ condensation concerns:

- Set household humidifier to the recommended settings.
- Utilize the kitchen and bathroom fans throughout the day, and while showering. Let the bathroom fan run for 30 minutes during and after each shower, and the kitchen fan while cooking, and for approximately 15 minutes.

Be prepared for this year's condensation:

Have your preferred restoration contractor on standby once the cold snap breaks.

When serious attic rain occurs, having a restoration company install industrial fans to dry out the home as soon as possible, and remove the wet insulation is the first course of action.

Call Angel's Roofing for identification and to repair the root cause of condensation issues to reduce the chance of them reoccurring.

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