



**TECHNICAL BULLETIN 27:
CONDENSATION AND BUILDING PRESSURES**

Condensation is humidity that reaches a surface temperature which is below the dew point of the air mixture that holds it. The Syseal® fabric of the Simple Saver System® should be properly sealed per instructions, because it's the vapor retarding membrane to restrict humidity from entering the insulation cavity. If there are pressure differences in the building and breaches in the vapor retarder, unwanted interior air would be able to be pushed into the wall and roof systems.

In addition to a high quality installed vapor retarder, it is important to avoid a positive pressure in buildings. Positive pressure will push humidity and air into the walls and roof of buildings and may create problems if it contacts any surface below the dew point of the air mixture. Dew point temperature is dynamic and changes with the relative humidity of the air at each temperature. So it is difficult to resolve without addressing these three things:

1. Effectively sealed vapor retarder to create resistance to the flow of humidity into the wall or roof spaces.
2. Confirm the pressure in the building is neutral and there is no positive or negative pressure that will pump humid air through holes or other breaches in the vapor retarder system.
3. Allow the humidity to escape at it highest point of concentration in the roof. There are multiple methods to consider including Thermal Design's *Humidity Relief Vent*.

How to determine positive or negative pressure in the building?

Close all exterior windows and doors and tape gaps as needed. All interior doors should be kept in their normal positions, open or closed. Take a sheet of light plastic, when the weather is calm, and tape it over a door frame or window frame and run your furnace and air conditioning unit through a cycle or two and watch the plastic sheet. If the plastic sheet moves outward when the furnace operates, it likely causes a positive pressure in the building. If it pulls inward, a negative pressure.

Avoid a positive pressure in the winter and cooler months, wherever there is an air leak, as air with humidity will be pushed into the roof and wall cavities. A negative pressure is not as bad in winter as a leak will pull cooler dry air in and the humidity should be condensed out of it (dew and frost outside).

When air conditioning in the summer, the process can be the reverse. So it is recommended to consistently maintain a pressure balanced building, but if need be, go slightly to the negative side and not the positive side relative to the outside pressure. If not neutral, then the systems needs to be balanced so the exhaust always equals the intake air volume.

How can humidity escape from the roof cavities?

Install weather vents at the roofs high point, such as the ridge or on each gable ends. This will allow the humidity to escape resulting in very little to condense or frost. Since the building is not in a vacuum, there will always be some condensation and possibly even some minor frost in extreme conditions. In sloped roof buildings the hottest air rises to the highest point of the roof through the corrugations, to the ridge. This is where there needs to be an escape route for the humidity and heated air (mixture) to escape. It will do this naturally and over time the roof will be relatively dry as the roof panels get hot in the summer heat.