



## **Cold Weather Heat Pump Operation Air to Air heat Pump Systems (Different for Water to Air Systems)**

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The basic theory behind the operation of a heat pump system is as follows. During the heating mode the unit extracts heat from the outside air and rejects it into the living space.

During the cooling mode the unit extracts heat from the inside space and rejects it outside.

As you can see from this operation the colder it gets the harder the machine has to work to extract heat from the outside air. At about 20 degrees with a newer heat pump system and at about 30 degrees with older ones (10 years or more) the unit cannot keep up with the heating demand of the space.

In most heat pump systems there is an auxiliary electric heat strip back up. This emergency heat strip is designed to start operating when the inside temperature continues to drop when heat is called for. If the thermostat is set for 72 degrees the heat pump compressor starts and the fan comes on to heat the space. If the outside temperature is too cold for the standard operation to keep up with demand the inside temperature will continue to drop. At 67 degrees the emergency heat strip with kick in and warm the space back up to 70 degrees. At this point the heat strip shut off. The fan continues to run and the compressor continues to run to heat the space to 72. This does not happen since it is too cold outside.

Analyzing the above operation we see that the system never shuts down during extreme cold weather. The indoor temperature never gets to 72 degrees. The constant running of the fan blowing cool to cold air during the time the heat strip shuts off until the temperature again drops to 67 is very uncomfortable and literally using electricity for no reason.

The solution to this comfort issue is to set the thermostat to emergency heat. When in the emergency heat mode the thermostat will turn on the heat strip at 70 degrees. Heat the space back to 72 degrees and the heat strip and fan will shut off. At no time will the fan be blowing cold air.

This is both more comfortable in cold weather and more cost effective. However, it is imperative that the thermostat get set back to normal heat when the weather warms up. If this does not happen the electric bills will skyrocket during temperature of 30 degrees and above when requesting heat.

This information may resolve many of your customer's complaints about heat during the temperatures we have been experiencing.