

Is the Humidity level still low in the home?

If you are not getting enough humidity into your home please read the following information to ensure you are getting the maximum performance out of your Desert Spring Humidifier.

It is important to note that if the home has not had a functioning humidifier operating for a while and the air was dry, it will take time for the air inside the home to gain humidity. Everything in the house that can absorb moisture such as wood construction/flooring materials, cabinets and furniture will initially remove the available moisture from the air, preventing the Relative Humidity ('RH') from climbing to the desired level. This process can take many days, sometimes several weeks to reach a steady state. Ultimately the run time of the furnace will determine how long it takes to get the level in the home up to the desired level. Setting the furnace fan to continuous operation will speed up the process and provide improved humidity control during normal operation.

Other important factors that influence the humidity level in a home are:

- House Construction. Tight homes with proper vapor barriers, well sealed doors and windows hold humidity better than old, loose homes.
- Rate of Mechanical and Natural Ventilation. HRV's, bathroom and kitchen exhaust fans, driers, open windows, doors, fireplace dampers and leaky attics all remove moist air from the home which is replaced with dry outside air.
- Stack effect. In a multilevel home, the top level is often warmer than the main floor. This is due the natural tendency of warm buoyant air to rise. The humidity also travels with the warm air, leading to a difference in humidity levels between floors by as much as 10-15%. This can be partly over come by balancing the system.
- Outside Air Conditions. A cold dry air mass outside will require more moisture to be added to the inside of a home compared to a milder air mass with precipitation. For example, outside air at 15F/50% RH that is heated to normal room conditions (72F/30% RH) requires the addition of roughly 25% more moisture than 30F/99% RH outside air brought to 72F/40% RH.
- Response Lag. In the event of a drop in outside temperature, a properly sized furnace can easily maintain the indoor temperature set point of the thermostat. However, a furnace mount humidifier only treats between 8-12% of the air volume a furnace can, so it takes roughly 8-12 times longer to respond to changes and re-satisfy the humidistat set point. Therefore, it is normal to see swings in the indoor humidity level even though the indoor temperature has remained constant.

A properly installed Desert Spring Humidifier will produce 14 gallons per day given the correct conditions, including furnace temperature and air flow. According to industry guidelines set by ARI this capacity should be sufficient for a tightly constructed home up to 3,200 square foot in size with 8 foot ceilings.



We cannot guarantee the humidity level in a home as homes are operated and constructed differently, as are the furnaces they are mounted on. Therefore we focus our attention on the Desert Spring Humidifier to ensure it is performing according to design given the local conditions onsite. To do this, we have devised a simple 15 minute test as outlined below.

Test the unit as follows:

- Mark the water level somewhere along the inside of the basin.
- Turn off the water supply at the saddle valve.
- Turn your humidistat to full 'ON' and turn your thermostat up to a high setting (Say 26C or 80F) to ensure the furnace will stay on for the entire 15 minute test period.
- Operate the furnace continuously for 15 minutes, then return your thermostat and humidistat to their normal settings.
- Using a measuring cup, fill the basin back up so the water level is back to the mark you placed inside the basin.
- Record how much water it took to return the water level to full.

How to calculate the results from your test:

Multiply your result from above by 4 to determine the rate of evaporation per hour. Multiply this number again by 24 to get the rate per day (Note: 1 US Gallon = 3.785 liters.)

- For example, if you measured 2.5 cups of water during the 15 minute test then calculate as follows: (Note: first convert units of measurement to Gallons. 16 cups = 1 gallon)
- $2.5/16 \times 4 \times 24 = 15$ gallons per day.

If you are not getting close to 14 gallons per day, check the following:

- Is the unit mounted on the cold air return? If not, it must be installed on the cold air return.
- Is the damper plate open on the hot air supply side? Ensure it is fully open.
- Is the flex duct securely fastened and the lid properly placed on top of the basin? Make sure the duct has not slipped off and the lid is sealed on the basin preventing air leakage.
- Is there sufficient air flow? There should be a strong velocity of air to the unit similar to a hair dryer on full. If not check the furnaces filter to see if it is plugged or dirty. A dirty filter will restrict air flow. Remove sags or kinks in the flex duct, the by-pass connection should be as short as possible.
- Is the water level in the basin high enough to cover the discs on the inside of the wheel? Unless the discs submerge, not all the surface area will get wet.



- Finally, is the wheel turning properly? If not, first check if the humidistat setting is sufficiently high to turn the unit on. Also check if the power supply is plugged in and working properly. If so, the wheel should turn freely, without resistance. If the wheel stops and starts the other way something is interfering with the wheel. Ensure the wheel is in its correct location, see owners manual. If the wheel skips or turns back the other way it may be out of alignment. Ensure the installation is square or plumb; ensure ridged ductwork is not pulling the unit out of square.

Still want more humidity?

- Consider supplying the humidifier with hot water. Instead of connecting to a cold water line, tap into a hot water line. This will boost the output as the warm water will evaporate quicker which is most noticeable when using the furnace fan with ambient air only.

Portable room units versus Whole-home humidification

While portable units are inconvenient, they can be effective at maintaining a high level of humidity in a particular zone. A whole-home unit uses the home's air distribution system to spread its output evenly throughout the home. It is common to have between 15 to 20 floor outlets in a home. Therefore, with the furnace in heating mode and the humidifier producing 14 gallons per day output, each outlet would deliver between 0.03 to 0.04 gallons per hour to that space and much less when the furnace fan is in circulation mode or nothing at all when the furnace is completely off. Over the span of a full day, the total humidity delivered to a particular zone within the home could be less than previously achieved in that zone with a portable unit resulting in a lower humidity level for that space. This is normal.

A final few words on humidification control

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) has developed guidelines for maximum safe humidity levels based on outside air temperature and concerns for occupant health. This information is available in chart form inside our installation manual and on the humidistat control itself. The guidelines recommend lower internal RH levels with colder outside temperatures in order to avoid excessive frost or condensation on windows. For example, at 20F/-7C outside, the inside RH should not exceed 35% and at 10F/-12C, the inside RH should be kept at or below 30%. However, sometimes specific objects inside the home such as a piano or hardwood floors require higher levels of RH in the 40-50% range. In that case, we suggest that you use the whole-home humidifier as recommended by ASHRAE and use a supplemental zone solution (room humidifier) in the space where higher levels are required. This will provide the extra humidity needed for that particular area without causing undue concern for the rest of the house.



A few words on hygrometers and humidistats. The sensor technology in both of these instruments are generally accurate to a +/- 5% range. Therefore, if placed side by side, these devices could read values that can be up to 10% different. Furthermore, a humidistat that is mounted on the return duct is sensing the average relative humidity of the entire home, while a hygrometer is only sensing the RH in a particular spot, which can lead to significantly different results. Please make allowances for these differences when diagnosing your system.