Humidification adds moisture to the CPAP air, reducing irritation to the nasal passages caused by the increased airflow. CPAP air is an irritant – to one degree or another – to everyone. In some cases the irritation dries out the nasal passages and may cause bleeding. It may also cause swelling, excess mucous, congestion or sneezing.

The irritation also creates a very fertile ground for infections to begin. The irritation may be cumulative, building up over time. The only way to reduce the irritation is to add moisture.

Humidification is therefore a critical part of CPAP Therapy.

Althea Bates began using continuous positive airway pressure in 1999. After an initial period of adjustment to the therapy, her CPAP machine produced benefits for both her health and quality of life. By preventing the pauses in breathing that disrupt sleep and cause severe daytime sleepiness, the CPAP treatment helped her feel more alert and less tired, with extra energy to get through the day.

The only problem was that it irritated her nose. Nasal dryness and congestion are common side effects of the treatment, according to Dr. Alexander Clerk, medical director of Sleep Medicine Services Clinic at O’Connor Health Center in San Jose, CA.

Once she added a humidifier to her CPAP unit, however, Ms. Bates, 63, of Cleveland, found that the added moisture made the treatment more comfortable.
"When I first started, I didn’t use a humidifier and it was very annoying to my nose," she said. "Now that I use a humidifier it makes a big difference. "The original CPAP humidifiers used cold, "Passover" humidification to reduce nasal dryness and congestion. Newer models now use heated humidification to provide patients with an extra measure of comfort. Some CPAP models come with the humidifier "integrated" into the unit, while others are compatible with attachable humidifiers.

The American Academy of Sleep Medicine recommends the use of heated humidification to improve the utilization of CPAP therapy, according to practice parameters published in the March 1 issue of the journal Sleep.

Dr. Clerk says that the need for humidification is a natural result of CPAP therapy and one of the best developments since CPAP was first introduced in 1981.

"With positive pressure therapy you’re blowing air through the nose," he said. "When you blow air over a surface, it dries out.

The nose is the humidifier for the body; by adding humidification to the CPAP system, you can offset the drying effect. That’s been one of the major breakthroughs over the past 20 years."

Dr. Clerk also sees humidification as one of a number of positive developments that have improved a treatment that was already highly effective.

"I think it’s always been a good therapy," she said. "I do think there are some patients who clearly benefit from the newer modifications over the last 10 years, such as newer masks and head systems and humidification."

Dr. Clerk also said that sleep apnea patients should work closely with their sleep doctor when beginning CPAP treatment.

A Sleep specialist can help patients with side effects such as nasal congestion, which will boost the effectiveness of the therapy and help patients maintain a long-term commitment to it.

"In the critical period around the diagnosis when the treatment is initiated," she said, "if the sleep physician is involved and engaged, they can help the patient work through any problems with CPAP, along with the other staff at the clinic."
**WHAT ARE THE BENEFITS OF USING A HUMIDIFIER?**

Many PAP users experience nasal congestion and dryness of the nose and throat during treatment. This is especially problematic for new users adapting to the treatment. Humidification adds moisture to the air, reducing systems of dryness and congestion.

Nasal congestion also leads to mouth breathing, which perpetuates the problem of dryness. If this is an issue for you, try a heated humidifier.

**WHAT IS A HEATED HUMIDIFIER?**

A heated humidifier uses heat to produce moisture. The heat is adjustable for more or less moisture, and the chamber is much smaller than a Passover humidifier.

It is our experience from over ten years of specializing in CPAP equipment, that patients who use heated humidifiers have a much higher rate of therapy effectiveness to CPAP therapy.

There are three types of heated humidifiers:

- **Stand Alone Humidifiers**
- **Integrated Humidifiers**
- **Built In Humidifiers**

**WHAT IS A STAND ALONE HUMIDIFIER?**

A stand-alone humidifier is a component that will work with any CPAP and does not attach directly to the CPAP. It uses its own power cord and typically a short hose is used to connect it to the CPAP. Usually it would sit next to the CPAP machine and is slightly larger than an integrated humidifier.

The advantage of a stand-alone humidifier is superior humidity and control and often a larger water capacity with the chamber. Also, the fact they may be used with any CPAP machine can be useful. The main disadvantage is that the size is often larger than either a “built in” or integrated humidifier with the short hose is needed to connect it to the CPAP machine.

**WHAT IS AN INTEGRATED HUMIDIFIER?**

An integrated humidifier is a component to a specific CPAP that fits directly to the CPAP, eliminating the need for a second hose and in some heated humidifiers, a second power cord. The advantage of an integrated humidifier is a more compact unit that uses fewer parts.
A disadvantage is that they may produce less moisture if used as Cold Passover humidifiers because the surface area is typically smaller. Also, most integrated humidifiers will function only with the CPAP for which they were designed.

**WHAT IS A COLD PASSOVER HUMIDIFIER?**

A Cold Passover humidifier is a chamber of water added to the CPAP to help moisten the airflow and reduce irritation to the nasal passages.

Air flows from the CPAP, through a short hose to the humidifier, then into the six foot hose to the mask. The air picks up whatever moisture it can as it “passes over” the water in the chamber.

Passover humidifiers may provide sufficient moisture with CPAPs set at lower-end pressures, but if not, there is no way to increase the amount of moisture produced. Furthermore, in cold climates, the water temperature in the chamber will drop, causing the CPAP air to become very cold and reduce the amount of moisture.

**HOW DO I CARE FOR MY HUMIDIFIER?**

The only care the humidifiers require is that you empty and clean the water tank after use in the morning. Be sure to use distilled water only in the tank.
WHY DO I NEED TO USE DISTILLED WATER WITH IN MY HUMIDIFIER TANK?

Using distilled water helps keep your humidifier clean and mineral deposit free. If you were to use tap water, the water would evaporate to leave a hard white mineral deposit in your tank or lead to mold growth. Cases of lung disease have been connected to using contaminated well water in a CPAP humidifier.* More info here

If you can't get distilled water where you live, use bottled water. You will need to rinse your tank out each morning and do not leave standing water in your tank between uses.

WHAT IS RAINOUT?

Rainout is the accumulation of water in a CPAP tube due to warm moist air cooling on its way from your CPAP machine to your CPAP mask.

The image below explains how rainout is formed. Warm moist air leaves the heated humidifier and travels down the CPAP tube. As the air travels down the tube the room temperature can cool the tube and therefore cool the air traveling down the tube. As the air cools, the air released its moisture and condensation occurs, otherwise known as rainout.

Solutions to rainout include:

- Raising the temperature of your bedroom.
- Keep your CPAP machine at the same level as your bed.
- Insulating your tubing with a hose cover like Snugglehose.
- Purchasing a CPAP machine with a rainout reduction comfort feature.
Cool air holds less moisture than warm air. If warm air from a heated humidifier cools while moving through the CPAP hose, water will accumulate inside the hose rather than travel to the user. The condensation that occurs inside the CPAP hose is referred to as "rainout."

Insulating the CPAP hose will help maintain the moisture in the airflow all the way to the nasal membranes.

**WHAT IS A HOSE COVER?**

A hose cover is placed over the hose in order to insulate the hose and to make the hose more comfortable. The simplest and most cost effective way to insulate a CPAP hose is to wrap it in an insulating fabric. This enables the hose to remain flexible and adds little weight.

Companies such as Snugglehose provide a cost effective tubing insulation available in several colors and styles. Not only will the covers reduce or eliminate rainout, they also provide a more personal and less institutionalized appearance. An example of a Snugglehose is shown below.
A heated CPAP hose contains copper coils embedded in or wrapped around it. These coils conduct a constant temperature through the hose. Heated hoses are more expensive alternatives to cloth tubing insulation, but they prevent rainout in nearly all cases. An example of a heated hose, the ClimateLine™ heated tubing shown below.

**DO MACHINES COME WITH RAINOUT REDUCTION FEATURES?**

Yes. Manufacturers have been working on developing ways to reduce rainout and better deliver humidification.

ResMed® has developed Climate Control technology. The Climate Control system is made up of the combination of the S9™ machines, H5i™ heated humidifier, and the ClimateLine™ tubing. Air is delivered at the temperature requested while five sensors, including one close to the mask, monitor multiple conditions to provide optimal humidification to avoid condensation.

**WHAT IS CLIMATE CONTROL TECHNOLOGY?**

Climate Control technology is a rainout reduction feature created by RedMed®. The Climate Control system is made up of the combination of the S9™ machines, H5i™ heated humidifier, and the ClimateLine™ tubing. Air is delivered at the temperature requested while five sensors, including one close to the mask, monitor multiple conditions to provide optimal humidification to avoid condensation. *More info here*
WHAT MAINTENANCE IS REQUIRED ON MACHINES?

The only care required for machines is to clean or change the filters at the air intake of the machine to keep the internal parts from accumulating dust.

There are other suggested actions to care for your machine:

- Keep the area around your machine clean. Remove any dust from around your machine to improve the air quality delivered to your machine.
- Keep the air intake of the machine unblocked. Curtains, bedding, and papers can easily block the air intake of your machine, reducing the airflow to your machine.
- If you have a humidifier, it is suggested that you do not pick up the machine with the humidifier attached. With most machines, it is easy to spill water from the humidifier into the machine and cause damage. To avoid this, it is suggested to remove the machine from the humidifier instead of transporting them together.
- If you have a humidifier, it is also suggested that you empty the water from the chamber every morning. Accidents happen. If a family pet, or family member moves the machine and humidifier, when there is water in the chamber, it is more likely an accident could happen where water is spilled into your machine.

CAN I USE MY HEATED HUMIDIFIER WITH MY MACHINE IF I AM RUNNING ON BATTERY POWER?

Using a heated humidifier on a 12volt battery power source will significantly reduce the amount of power provided. In most cases, usage is reduced to less than half the estimated operational time. CPAPs or BiPAPs requiring inverters reduce the power time even more.

Please note that some heated humidifiers are not capable of being operated on 12volt battery power sources. The later M Series heated humidifiers with the 6” ‘pigtail’ connectors are capable of running on 12volt DC power sources. Earlier model M Series heated humidifiers without the pigtail are not 12Volt capable, nor are the Legacy model REMstar™ and stand-alone H2 humidifiers.

For optimum performance of your battery, plan to use your CPAP without the heated humidifier. You may also have the humidifier connected and filled with water, but without the power turned on. This changes a typical heated humidifier into a passive humidifier.

We suggest testing the battery setup you are planning to use with your machine in advance. To determine the actual amount of power time you will receive and whether or not heated humidification is required for your comfort, test the battery at home before traveling.