

# Water Treatment and Pumping Facilities

## DESICAiR® Desiccant Dehumidification

### The Problem

Condensation forms when the temperature of an object is at or below the dewpoint temperature of the air surrounding it. This wet condition can lead to physical damage such as corrosion. It can also create an environment which encourages mold and fungus growth. The best way to prevent this costly scenario is by eliminating the conditions which cause it.

Water is essential to life as we know it. Our demand for water increases as our population grows. Water used for public consumption in the U.S. is processed through an EPA estimated 158,000 public water systems. These systems include pipes, valves, pumps, and electronic controls all in contact with or close proximity to the water. The temperature of this water is often below the dewpoint of the air. When the air dewpoint is greater than the object temperature, condensation occurs on the object.

Corrosion of pipes, valves, and pumps often result from this wet environment. Protective coatings can degrade and electronic devices may fail. The facility structure itself is even subject to damage in such a wet environment. Time consuming maintenance and costly repairs are then required to keep these facilities operating. Even when condensation does not occur, damage can still be done. The air temperature immediately around these cold objects will lower, this increases the relative humidity of the air. Some electronic sensors and controls may fail if subjected to high relative humidity.



### The Solution

The process water temperature is a given value, but the air conditions can be changed. By removing moisture from the air, the dewpoint is lowered. When the dewpoint is lowered below the object temperature, condensation can not occur.

DESICAiR® desiccant dehumidification systems can solve your condensation problems. DESICAiR® utilizes silica gel desiccant to remove water vapor from air. The amount of water held in the air is actually reduced. The result is dry air supplied to the facility so the air dewpoint around cold objects is lower than the object temperature, thus preventing condensation.

Another method utilizes refrigeration dehumidifiers. These systems rely on cooling the air below the air dewpoint and condensing water. This method may work during peak humidity conditions, such as summer. However, during lower conditions, such as fall and spring, their capacity is limited. Since they rely on condensation, dewpoints below freezing can create ice or frost on the cooling coils. Once freezing takes place, dehumidification capacity is reduced or lost as the refrigerant dehumidifier coils must be defrosted.

The desiccant dehumidification process does not rely on condensation as in refrigerant systems.

DESICAiR® desiccant dehumidifiers are effective year round, even in sub-freezing conditions. Our dehumidification systems are an efficient and cost effective solution to your condensation control problems.

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## DESIGN CONSIDERATIONS FOR DEHUMIDIFICATION

Only DESICAiR has the C-Trol® condensation control. The C-Trol® condensation control compares a cold surface temperature to the air dewpoint. Reactivation energy is modulated to maintain the air dewpoint below the cold surface temperature. The difference between the air dewpoint and the cold surface temperature is an adjustable value, allowing the user to select the optimum setpoint for the facility. When loads are less, the reactivation energy is reduced, thereby lowering utility consumption. During periods of no load, the reactivation can be programmed to turn off to further save energy.



Properly sizing a dehumidification system requires calculating the moisture load in the facility. Moisture infiltration, open water area, make-up air, and people all factor into the moisture load. Most applications require the dehumidifier air volume to provide 2 to 4 air changes per hour. This volume should be determined by the actual moisture load. DESICAiR® desiccant dehumidifiers can use electric, steam, propane, or natural gas for reactivation. Units can be configured for indoor or outdoor installation. Cooling and heating options are also available to provide complete environmental control of the facility.