

## PRODUCT COMPARISON BETWEEN DESICCANT WHEEL AND VENTILEX DRYGENIC® AIR DEHUMIDIFIERS

### INTRODUCTION

Humidity control is crucial in various industrial and commercial settings to ensure product quality, safety, and operational efficiency. This white paper compares two advanced dehumidification technologies: desiccant wheel dehumidifiers and Ventilex DryGenic air dehumidifiers based on liquid desiccant. We will explore their mechanisms, applications, advantages, and disadvantages to help you make an informed decision.

### EXECUTIVE SUMMARY

#### Desiccant wheel dehumidifiers

- **Technology:** Uses a solid desiccant material (e.g., silica gel) embedded in a rotating wheel to adsorb moisture.
- **Process:**
  - **Process air stream:** Moist air passes through the wheel, where the desiccant adsorbs moisture.
  - **Regeneration air stream:** The wheel rotates to expose the desiccant to heated air, releasing the absorbed moisture.
- **Efficiency:** Effective at high air velocities and temperatures, with a typical lifespan of up to 10 years with proper maintenance.
- **Applications:** Commonly used in HVAC systems for dehumidification and indoor air quality improvement, suitable for commercial buildings, storage facilities, and industrial processes.

#### Ventilex DryGenic dehumidifiers

- **Technology:** Uses a liquid desiccant solution (DrySol®) to absorb moisture from the air.
- **Process:**
  - **Conditioning:** Humid air is processed through a spray chamber with DrySol®.
  - **Regeneration:** The moisture-laden DrySol® is heated to release absorbed moisture, which is then condensed and separated.
- **Efficiency:** Thermodynamically and economically efficient, suitable for precise humidity control in industrial applications.
- **Applications:** Ideal for environments requiring stringent humidity management, such as food processing, pharmaceuticals, and other industrial settings.

#### Key differences

- **Desiccant type:** Ventilex DryGenic uses a liquid desiccant, while the desiccant wheel uses a solid desiccant.
- **Regeneration method:** Ventilex DryGenic regenerates the desiccant by heating and condensing the moisture, whereas the desiccant wheel uses heated air to release moisture.
- **Applications:** Both systems are used for dehumidification, but Ventilex DryGenic is more suited for precise industrial humidity control, while desiccant wheels are versatile for various HVAC applications.



## VENTILEX DRYGENIC AIR DEHUMIDIFIERS

**Mechanism:** The Ventilex DryGenic is a liquid desiccant air dehumidifier that uses a liquid desiccant solution, typically lithium chloride, to remove moisture from the air.

**Basic principle:** The Ventilex DryGenic consists of a conditioner where the humid air is processed and a regenerator that regenerates the desiccant solution by removing the absorbed moisture.

### Operation:

1. **Air intake:** Humid air is drawn into the conditioner through a fan.
2. **Contact with desiccant:** The air passes through a spray chamber where it comes into contact with the DrySol® solution. The DrySol® absorbs moisture from the air due to its strong hygroscopic properties.
3. **Cooling:** The DrySol® is cooled before spraying, which helps in controlling both air temperature and humidity.
4. **Moisture absorption:** The DrySol® absorbs water vapor from the incoming air, making the air drier.
5. **Regeneration:** The moisture-laden DrySol® is then heated in the regenerator to release the absorbed moisture. This process involves:
  - **Heating:** The DrySol® is heated to a high temperature, causing the water vapor to evaporate.
  - **Moist air generation:** The water vapor is released as hot, moist air.
  - **Condensation:** The hot, moist air is cooled to condense the water vapor into a liquid form, which is then separated from the desiccant.
  - **Re-concentration:** The concentrated DrySol® solution, now free of moisture, is returned to the conditioner for further dehumidification.
6. **Exhaust:** The warm, moist air generated during the regeneration process is exhausted outside.

### Applications:

- Industrial production areas
- Pharmaceutical manufacturing
- Food processing (e.g., chocolate, candy, milk powder processing, gelatin manufacturing)
- Environments sensitive to moisture, temperature changes, or microorganisms

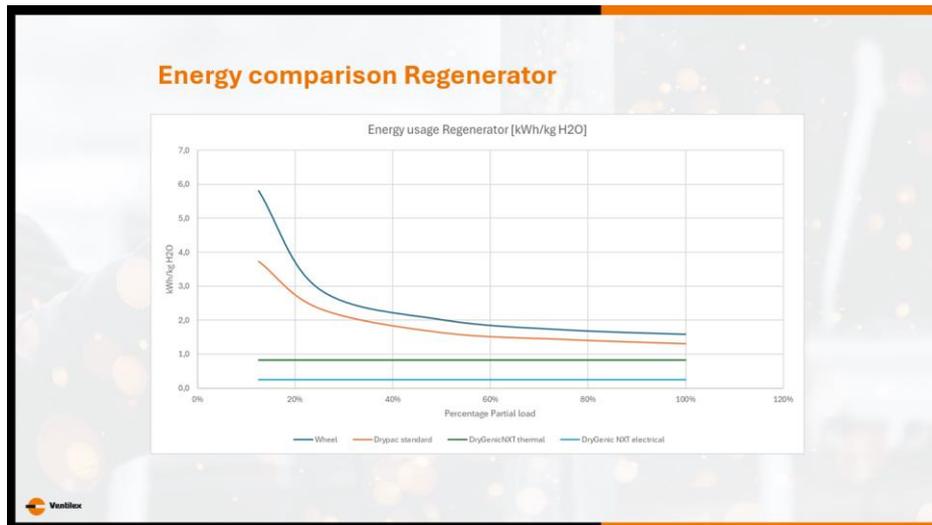
### Advantages:

- Energy-efficient, with up to 60% lower energy consumption than traditional air handling units (AHUs)
- Regeneration temperature around 80-90 °C, so interesting for heat pumps
- Reliable and capable of handling large air volumes
- Sterilizes air by removing 99.9% of airborne bacteria, viruses, and molds
- Minimal maintenance and long lifespan

### Disadvantages:

- Initial setup costs can be high
- Requires specific conditions for optimal performance

## ENERGY COMPARISON REGENERATION PROCESS



## FEATURE COMPARISON

Feature	Desiccant wheel dehumidifiers	Ventilex DryGenic air dehumidifiers
<b>Mechanism</b>	Rotating desiccant wheel	Liquid desiccant system
<b>Temperature efficiency</b>	Effective at low temperatures	Effective across a wide range
<b>Energy efficiency</b>	High due to heat recovery	Up to 60% lower energy consumption
<b>Humidity levels</b>	Very low achievable	Constant, exact control
<b>Air sterilization</b>	Not typically included	Removes 99.9% of airborne pathogens
<b>Maintenance</b>	Higher maintenance costs	Minimal maintenance
<b>Applications</b>	Specialized industrial uses	Broad industrial and commercial uses

## CONCLUSION

Both desiccant wheel and Ventilex DryGenic air dehumidifiers offer unique advantages depending on the specific requirements of your environment. Desiccant wheel dehumidifiers are ideal for achieving very low humidity levels in specialized settings, while Ventilex DryGenic dehumidifiers provide energy-efficient, reliable, and sterile air conditions suitable for a wide range of industrial applications with minimal maintenance.

Would you like more detailed information on any specific aspect of these dehumidifiers?

[DryGenic liquid desiccant working principle - Ventilex](#)