Desiccant Dehumidification

for Lithium-Ion Battery Giga Factories

ELH Key Results

- **Ultra-low Dew Points**
- **Thermal Break Panels**
- **Seamless System Integration**
- **Low Leakage Design**
- **Energy-Efficient Design**

Overview

Lithium-ion battery factories require strict temperature and humidity control. Lithium is highly moisture-sensitive, and excess moisture—from people, ventilation systems and manufacturing processes—can degrade battery performance and sensitivity. Extreme low humidity (ELH) solutions with precise environmental controls are required to meet stringent low dew point requirements.

•Location

Midwestern, United States

•Industry

Lithium-Ion Battery Manufacturing

•Use Case

Dehumidification Unit (DHU) Structural Design

Desiccant Dehumidification Systems

Thermal Break Panels

•Project

74 extreme low humidity (ELH) systems in 3 locations

•System Specs

☐ Low humidity – Dew point of -38OF to -42OF in critical areas.

☐ Cleanroom classification – ISO 8, ISO 7 or ISO 6 cleanliness class, especially in electrode manufacturing and battery assembly areas.

The Challenge

Cleanrooms and dry rooms must account for the airborne moisture produced by people, ventilation systems and manufacturing processes. Refrigeration (air conditioning) alone cannot achieve the low dew points required for efficient, high-quality lithium-ion battery production. Furthermore, air and thermal leakage can introduce moisture into the production environment and/or prevent optimal thermal control.

Solution

Air_2O Extreme low humidity (ELH) solutions are engineered to meet the lithium-ion battery industry's stringent standards through:

- Ultra-low humidity – Desiccant rotor systems that use adsorption drying to remove moisture effectively. High-temperature air breaks the bond between water vapor and silica gel, ensuring an ultra-dry air supply.

- Air leakage control – Single section design prevents leaks from multi-section assemblies. Triple gasket panels and caulking ensure near-zero air leakage, even at 10-inch negative pressure.

- Thermal leakage control – Air_2O's 4-inch thermal break panels are engineered with fully insulated walls to minimize heat transfer, preventing unwanted heat loss between the supply, purge and reactivation air streams.

Results

The demand for efficient and effective humidity control solutions continues to rise with the increasing prominence of lithium batteries in various industries. Air_2O ELH units comprise advanced features, including precise humidity control, energy efficiency and easy integration into existing systems. Air2O's desiccant dehumidification systems help lithium-ion battery factories maintain ultra-low humidity, ensuring:

- Reliable dew points from -65°F to -75°F.

- Minimal air and thermal leakage.

- Minimum or zero air leakage to maintain cleanliness class.

"Our ELH systems meticulously maintain the ultra-low humidity conditions crucial for preserving material integrity, optimizing battery performance and ensuring plant safety. We are confident that Air_2O ELH units will make a positive impact and contribute to the success of this fast-growing industry's advanced facility requirements."

Mike Sullivan, CEO-Air_2O

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Air_2O, was named Arizona Small Company Innovator of the Year in recognition of its technologically-advanced solutions for lithium-ion battery manufacturing plants, and other large-scale environments. The annual award, presented at the 2024 Governor's Celebration of

na Technology Council in partnership with the Arizona Commerce Authority, recognizes the state's most inspired technology achievements.

Explore ELH solutions for lithium-ion battery production at

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