

The Plight of the Falcon

A Humidity-Control Solution for Endangered Birds in UAE

For centuries, falcons have been revered in the Arab world for their extraordinary hunting abilities. However, today these magnificent birds find themselves on the endangered species list, leading to extensive conservation efforts in

the UAE. In particular, falcons have long been a part of Arabian culture, and conservation programs are now underway to protect and breed them.

The UAE President, Sheikh Zayed bin Sultan Al Nahyan, an avid

environmentalist, initiated a falcon conservation and breeding program at Falcon House in Al-Ain. The Pro-Falcon Project, established in 1996, is one of the largest captive falcon breeding programs in the Middle East. Its aim is not only to protect wild falcons but also to foster a sustainable population of these majestic birds.

Creating the Perfect Environment for Falcons

To succeed, the breeding facility needed a carefully controlled environment. The air quality had to be pristine, with reduced oxygen and high levels of carbon dioxide and humidity. While fresh air was constantly introduced to reduce contaminants like dust and gases such as methane and ammonia, the moisture in the air posed a significant problem. Achieving ideal humidity levels for the falcons was crucial to their health and well-being.

The Bry-Air Solution

It was determined that the breeding environment must be maintained at a temperature of 3°C to 4°C and a humidity level of 35% ± 5% RH. To achieve this, Bry-Air designed and installed a custom-built desiccant dehumidifier with pre- and post-cooling capabilities, along with fan coil units to circulate the air. This system successfully maintained the desired temperature and humidity, creating an optimal environment for the falcons.

Since the installation of Bry-Air's dehumidification system, the atmosphere in Falcon House has significantly improved. The project has been a success, much to the delight of Sheikh Zayed and the falcons themselves, whose living conditions are now far more suitable for breeding and conservation.



His Majesty, King Croc!

Bry-Air Eliminates Fogging for Better Viewing

The Dubai Aquarium and Underwater Zoo, one of the largest of its kind in the world, is home to over 33,000 aquatic animals, including a giant Pacific octopus and sand tiger sharks. One of its most thrilling exhibits is King Croc, a 750-kilogram crocodile imported from Queensland, Australia. At over five metres long, King Croc is a magnificent creature, and zoo authorities ensured that the enclosure was designed to replicate his native

Queensland environment as closely as possible. The water temperature was maintained between 27°C and 30°C, and the enclosure was three times the size recommended by the World Association of Zoos and Aquariums to accommodate King Croc's potential growth over the next fifty years.

The Humidity Problem

However, the enclosure began to face significant challenges. High humidity

levels were causing condensation on the viewing glass, impairing visibility. Additionally, mold and fungus started to form on walls and glass surfaces, while wooden fixtures began to rot. It was clear that the enclosure needed to be dehumidified to maintain a safe and clean environment for both King Croc and his visitors.

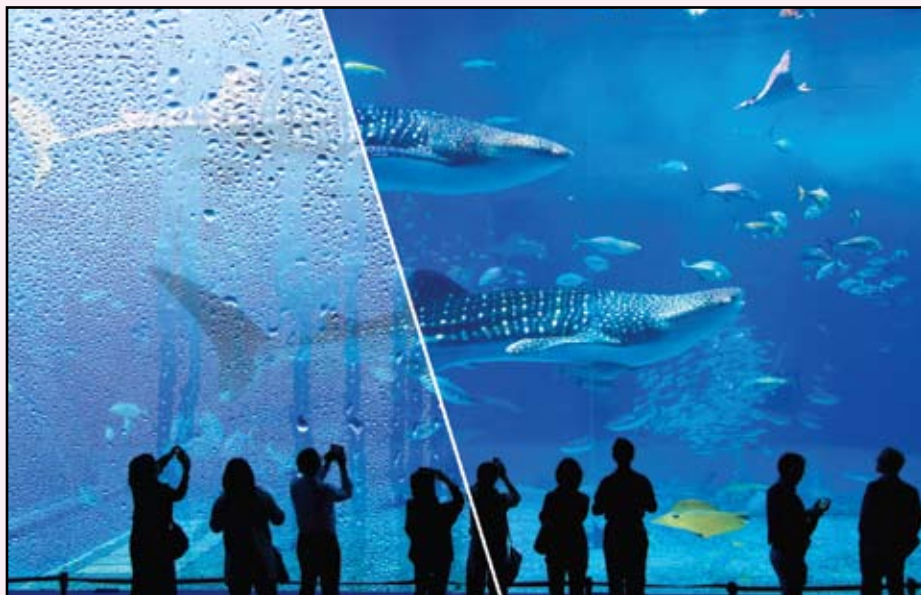
The Solution: Bry-Air Dehumidification

To address these issues, the Bry-Air FLI 4200 Dehumidifier was installed to maintain a consistent temperature of 24°C and humidity at 55% RH, with the pool temperature kept at 27°C. The dehumidification

system immediately reduced the condensation on the viewing glass, restoring visibility. It also eliminated the fog in the atmosphere and halted the wood decay, mold, and fungus growth, creating a healthier environment for King Croc.

The success of the Bry-Air system in King Croc's enclosure demonstrates the importance of controlling humidity to maintain the integrity of animal enclosures and improve visitor experiences.

Bry-Air's dehumidification technology has proven to be an essential part of preserving both the environment and the exhibits in the Dubai Aquarium.



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Harnessing the Potential of Fungi

A New Era in Biopesticides for Agriculture

Insect pests pose a significant threat to crop productivity, leading to considerable losses for farmers. While chemical insecticides have been effective in mitigating these losses, their widespread use has had damaging environmental consequences. As a result, there has been a growing shift towards more sustainable agricultural practices that focus on biopesticides to control insect pests.

One such biocontrol agent gaining traction is *Trichoderma*, a genus of filamentous fungi known for its ability to combat plant diseases. This fungus is used as an eco-friendly solution for pest control in agriculture, offering a natural alternative to chemical pesticides.

Nodusoja Industria e Comercio Ltd: A Pioneer in Biotechnology

Based in Brazil, Nodusoja Industria e Comercio Ltd is at the forefront of modern agricultural practices. The company uses cutting-edge biotechnology to develop innovative, high-quality, eco-friendly solutions designed to improve plant and crop health, as well as increase yields.

Among the solutions offered by Nodusoja is *Trichoderma*, which is produced for use as a biocontrol agent. This fungal product is used in seed and soil treatments to protect plants from pests, microparasites, and various plant diseases.

Mastering the Art of Fungus Drying

The commercial production of microbial-based products, such as *Trichoderma*, requires specific conditions to ensure their successful

structure of the fungus, and if the drying process takes too long, bacterial growth can occur.

Desiccant dehumidification has proven to be a highly effective solution. By using a drying room maintained at 25°C and 25% relative humidity (RH), Bry-Air's



commercialisation. These products must remain effective, free from contaminants, stable, and have a relatively long shelf life.

After harvesting, the fungus must be dried and powdered. Traditional drying methods, such as mechanical and natural drying, often fall short. High heat can damage the cellular

dehumidifiers were able to reduce the drying time from 8 days to just 3 days, all while ensuring the product's viability and quality remained intact.

Bry-Air's Impact on Fungus Production

Commercial fungi production requires a controlled environment for both temperature and humidity. A major challenge faced during the growth phase of *Trichoderma* is the accumulation of carbon dioxide (CO₂) and other volatile compounds, which can reach concentrations above 2,000 ppm in growth rooms. This creates damp surfaces on walls, ceilings, doors, and floors, hindering fungal growth and promoting the spread of invasive microorganisms.

To address this, Bry-Air introduced ventilating equipment (ERV) that successfully reduced CO₂ concentrations from 2,000 ppm to 1,000 ppm. This intervention significantly improved the yield of *Trichoderma*, resulting in a more efficient and productive process.

"I am very satisfied with the Bry-Air equipment and recommend it to everyone working with the production of bioproducts."
Dr. Mayara Barbosa, Biological R&D, Nodusoja

Unlocking the Properties of 'The Miracle Tree'

Moringa's Nutritional and Medicinal Benefits

Moringa Oleifera, often referred to as the "Miracle Tree", is renowned for its wide array of medicinal properties. Almost every part of the tree, including its leaves, fruit, sap, oil, roots, bark, seeds, pods, and flowers, is packed with nutritional and therapeutic benefits.

Found in sub-tropical regions, Moringa is highly valued for its exceptional nutritional profile. Moringa leaves, in particular, are rich in vitamins, minerals, and antioxidants. These leaves possess anti-inflammatory properties and are known to boost immunity and support detoxification.

Moringa powder is increasingly used in the production of medicines, as well as beauty and wellness products. However, in order to preserve its full nutritional value, Moringa leaves must be carefully dried before they can be converted into powder.

The Challenge: Drying Moringa Leaves Without Losing Nutritional Value

After harvesting, Moringa leaves are washed in chlorinated water,

then shaken to remove excess moisture before being spread on mesh to further dry. However, the drying process poses significant challenges. Common methods such as shade drying, sun drying, solar drying, and oven drying all result in either a loss of vitamins or the growth of mold and fungus.

To optimize the drying process, it is essential to find the right balance of air movement, temperature, and humidity. The goal is to preserve the nutritional value of the leaves while ensuring that they are dried efficiently and safely.

Mauswag Agribusiness Inc. Faces Drying Challenges

Mauswag Agribusiness Inc. (MAI) in the Philippines faced significant challenges with its drying process, particularly high electricity costs due to the use of large electric ovens. The drying process was not only expensive but also time-consuming. Attempts to use alternative fuels to run the ovens resulted in carbon deposits on the dried leaves, making them unsellable.



The Bry-Air Solution: Efficient Drying with Desiccant Dehumidification

Bry-Air engineers worked with MAI to install a desiccant dehumidifier that provided dry air directly to their drying room in a 100% recirculation mode (closed loop). A separate air conditioning unit was also installed to keep the temperature below 40°C, ensuring optimal drying conditions for high-quality results.

Switching to desiccant dehumidification allowed MAI to reduce drying time by 300-800% while also saving on electricity costs. This solution not only improved drying efficiency but also maintained the nutritional integrity of the Moringa leaves.

How Desiccant Dehumidification Works

In desiccant dehumidification, the evaporative potential of the air increases through the process of physical adsorption. This allows for precise control over humidity levels, creating the ideal drying conditions for a variety of products, including Moringa leaves.

MAI's management was very pleased with the performance and benefits of using Bry-Air dehumidifiers, as the system provided both economic and product quality improvements.



Data is the New Gold



Meeting the challenge of retaining its shine



Data centers are often referred to as the "new gold mines" of the digital age. In a world increasingly driven by data, these facilities serve as the vital reservoirs where businesses, individuals, and connected devices store and manage their most valuable asset – data.

At its core, a data center is a physical facility that houses the computing infrastructure required for IT systems, such as servers, data storage drives, and networking equipment. These centers are essential for storing and processing the digital information that powers everything from cloud computing services to real-time data access.

Over the past few years, the number and size of data centers have grown exponentially. This growth is primarily driven by the massive volume of data generated by users, businesses, and Internet of Things (IoT) devices. As the demand for cloud services rises, data centers are expanding rapidly to keep up with the increasing need for storage, processing, and real-time access to this data.

To handle this exponential increase in capacity, data centers have had to innovate and advance in both technology and infrastructure. The focus is not only on increasing capacity but also on maintaining optimal performance, efficiency, and minimizing downtime. One crucial factor that ensures the long-term reliability of these systems is the careful management of environmental conditions, particularly temperature and humidity.

The Role of Dehumidification in Data Centers

Data centers generate significant amounts of heat due to the operation of servers, networking equipment, and other hardware. Cooling systems are used to dissipate this heat and maintain an optimal operating temperature. However, cooling processes can inadvertently lead to high humidity levels within the facility, creating a risk of condensation, corrosion of sensitive equipment, and even potential

data loss, which can result in costly downtime.

To mitigate these risks, desiccant dehumidification solutions offer an effective way to control humidity levels within the data center. These systems help maintain the ideal relative humidity, ensuring that condensation does not form on sensitive electronic equipment, which in turn prevents corrosion and the associated risks of equipment failure.

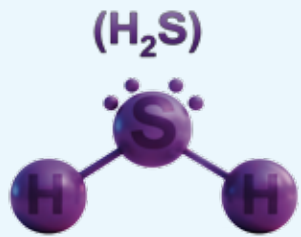
Case Study: Sify Technologies – Safeguarding Data Centers with Bry-Air Dehumidifiers

Sify Technologies, one of India's largest and most comprehensive ICT service providers, operates 11 state-of-the-art data centers across the country. Serving a wide range of clients, from startups to large enterprises, Sify's data centers in Noida, Mumbai, Hyderabad, and Chennai are among the most advanced in the region.

To ensure that their data centers operated efficiently and that their equipment remained free from corrosion, Sify installed Bry-Air dehumidifiers at multiple sites. These dehumidifiers maintained humidity levels at 55% relative humidity (RH) and a temperature of 23°C in the cold aisles, ensuring that moisture did not condense on equipment. The hot aisles were maintained at 35°C and 25% RH, with a dew point of 12°C to prevent condensation.

At these ideal humidity levels, Bry-Air dehumidifiers have successfully protected Sify's servers and networking equipment from the harmful effects of copper, silver, and creep corrosion. Bry-Air's high-performance desiccant dehumidifiers use fluted metal silicate rotors, which are compact, lightweight, and ideal for both indoor and outdoor environments. These dehumidifiers are trusted by industry giants such as Dell, HCL, Accenture, Wipro, Mercer, IBM, HP, and Sify.

When the air needs a good scrub



Data Center Corrosion: The Silent Killer

Data centers house vast amounts of electronic equipment, all of which are susceptible to the damaging effects of prolonged exposure to humidity and toxic gases. Contaminants from outside sources, such as sewage systems, high-traffic areas, or nearby industrial processes, can infiltrate the data center environment, accelerating the corrosion of electronic components. This corrosion can lead to significant downtime, lost revenue, and expensive repairs, as well as warranty non-compliance and PCB failures.

Common components affected by corrosion include hard disk drives, graphics cards, motherboards, DIMMs, edge connectors, switches, routers, hubs, data storage devices, and capacitors. Corrosion-induced failures can cause ghost signaling, electrical malfunctions, and even catastrophic device failures.

Copper Corrosion: A Threat to Connectivity

Copper corrosion occurs when copper components are exposed to pollutants such as hydrogen sulfide (H₂S) and moisture. These contaminants can alter the surface properties of copper at ambient temperatures, forming a layer that significantly reduces the adhesion of soldering alloys or conductive resins. This process leads to failure of printed circuit boards (PCBs) and microelectronic devices, jeopardizing the entire data infrastructure.

Silver Corrosion: The Insidious Threat to Microelectronics

Silver corrosion is another significant concern for data centers. When silver is exposed to low concentrations of gaseous contaminants and moisture, silver sulfide corrosion products can form on contact surfaces, creating insulating layers. This corrosion disrupts electrical conductivity, leading to failures in microelectronic devices, potentially causing catastrophic system malfunctions.

Creep Corrosion: A Silent Destroyer of Electronic Equipment

Creep corrosion is a phenomenon that occurs in electronics exposed to corrosive elements, particularly sulfur, in humid environments. It is a common issue with immersion silver, which is widely used in electronic devices. This type of corrosion can cause long-term damage to vital components, further emphasizing the need for effective dehumidification and air purification solutions.

Why Protect Your Servers and Data with Bry-Air DAP?

Reduce Downtime, Increase Uptime
Bry-Air's Data Centre Air Purifier (DAP) plays a crucial role in protecting sensitive equipment from corrosion. It automatically removes airborne contaminants and moisture before they can damage servers and networking equipment. By preventing corrosion and ensuring the longevity of electronic components, DAP helps reduce downtime and increase operational uptime, allowing equipment to generate more revenue.

Designed to meet the ISA standard 71.04-2013 for corrosion and gases, as well as IEC and other environmental standards, Bry-Air's DAP systems use honeycomb matrix technology. This technology reduces the size of the unit while increasing its efficiency and lifespan, all while reducing energy consumption.

Enhance Data Center Air Quality

Data centers are constantly at risk from harmful gases and fluctuating humidity levels. Bry-Air's compact desiccant dehumidifiers and DAP systems offer an innovative solution for providing clean, dry air. These systems can operate in standalone mode or with a control panel, ensuring optimal protection from any contaminants that might infiltrate the environment.

Bry-Air dehumidifiers and DAP systems are used by Sify Technologies to maintain clean, dry, and safe air for their data center operations. The Ecosorb Gas Phase Filtration System, which removes suspended particles, corrosive gases, and odors, is also employed in industries like petroleum refining, food processing, and sewage treatment.

Conclusion: The Importance of Air Quality Management in Data Centers

As data centers continue to grow in importance and size, protecting their equipment from the damaging effects of humidity and corrosive gases is paramount. Bry-Air's advanced dehumidification and air purification solutions provide data centers with the tools they need to safeguard their infrastructure, reduce downtime, and ensure the long-term reliability of their systems. In the race to store and process the world's data, the right environmental management solutions are key to staying ahead.



Power of Dry Air

The Crucial Role of Dehumidification in Lithium Battery Manufacturing



The Importance of Lithium-ion Batteries

As global concern about climate change grows, governments and policymakers are prioritising decarbonisation and the reduction of fossil fuel consumption, with a strong emphasis on encouraging the production of electric vehicles (EVs). Batteries play a pivotal role in this energy transition, powering vehicles and equipment with clean energy.

Lithium-ion batteries (Li-ion) have emerged as the undisputed leader in high energy density, long cycle life, and energy storage. From smartphones to electric vehicles and even grid-scale energy storage, Li-ion batteries are driving the electrification of the modern world. Their superior performance has made them a critical component in today's energy landscape.

Continuous research and development by universities, research institutions, and industries is focused on improving the efficiency, power capacity, affordability, and environmental sustainability of the next generation of batteries.

Lithium-ion Cells: Components and Chemistry

Li-ion cells consist of four main components: two electrodes (an anode, which holds Lithium ions when charged, and a cathode, which holds Lithium ions when discharged), a separator that prevents short circuits, and an electrolyte that facilitates the movement of Lithium ions between the electrodes.

Lithium ions move from the cathode to the anode during charging and from the anode to the cathode during discharging. Electrons are released from the anode to supply energy to the application. All components are enclosed in a

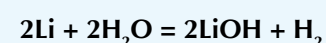
casing, with tabs exposed for the positive and negative terminals.

The manufacturing process for Lithium-ion battery cells includes three main stages: electrode manufacturing, cell assembly, and cell finishing and testing. Each stage contains several sub-processes, starting with coating the anode and cathode, followed by the assembly of the various components, and concluding with testing and packaging of the cells.

Li-ion cells are typically produced in three main designs: prismatic, cylindrical, and pouch cells. While the designs vary, the manufacturing processes are quite similar.

When Moisture Becomes a Threat

Among the various materials used in battery production, Lithium metal (used in Lithium-air, Lithium-sulphur, and some solid-state battery designs) is the most sensitive to moisture. Even trace amounts of moisture can react with Lithium to form Lithium hydroxide, as shown in the chemical reaction:



This reaction causes swelling, reduces the battery's life cycle, and decreases its energy storage capacity. In extreme cases, excessive moisture can lead to battery explosions. Depending on the specific battery chemistry, elemental Lithium present during manufacturing can react violently when exposed to even minimal moisture.

The consequences of failing to manage moisture can be catastrophic for product quality, battery life cycle, and manufacturing safety.

Manufacturing Lithium-ion batteries is a complex process with numerous challenges – chief among them is the need for extremely low humidity conditions, typically below 0.5% RH (-40°C to -60°C dew point). This requirement extends to a low particulate environment for the electrolyte filling during cell assembly of Lithium electrodes used in battery cells.

A dry room is a hermetically sealed room, designed to maintain low humidity levels, and provide particle filtration. This controlled environment is essential for manufacturing cells in an ultra-dry and clean setting. For electrolyte filling during cell assembly, humidity must be maintained at -40°C dew point or lower, and for electrode making, humidity should be maintained around 5% to 20% RH, achieved with desiccant dehumidification systems.

Dry Rooms

A Very Essential Part of Li-ion Battery Manufacturing

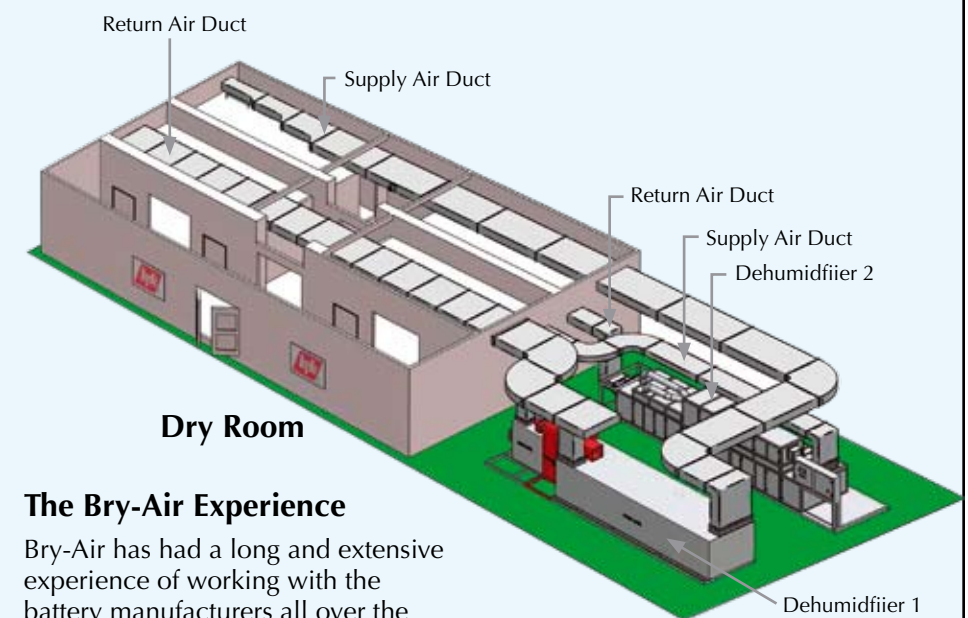
Dry Room Conditions

Best Practices

- Moisture levels in cell assembly areas should be kept below a -35°C dew point or a moisture content of 0.14 gm per kg of dry air.
- Room temperature should be maintained at 24°C with a tolerance of $\pm 2^\circ\text{C}$.
- Air change rates should range from 10 to 20 per hour, with minimal fresh air introduction to maintain positive pressure and adequate ventilation for personnel

Critical Areas of Moisture Control in Battery Production

- Electrode production
- Electrolyte filling in cells
- Electrode insertion
- Cell assembly area



The Bry-Air Experience

Bry-Air has had a long and extensive experience of working with the battery manufacturers all over the world. Whether it is a company or institute working at the R&D stage with a requirement of small Dry Room, or a pilot plant before full scale production or giga factories with full scale production and large Dry Room requirement, Bry-Air has participated in many projects all over the world.

Bry-Air Desiccant Rotors

At least a thousand plus rotors have been supplied in China, Korea, Europe, USA, and Asia battery projects. These rotors which are the heart of the dehumidifiers have special metal silicate synthesised on inorganic fibre substrate which are suitable for achieving very low dew points down to (-)75°C. It has the highest dry process air flow / kW. The rotor is made up of PH neutral and chemical resistant material which is inert to gases such as Hydrogen Fluoride (HF) generated during the cell assembly.

EVE China Battery Project 2024 alone is using 120 rotors.

Dry Rooms for R&D Projects

Bry-Air has successfully designed and executed projects for R&D for Lithium batteries. **Special low dew point dehumidifiers have been successfully commissioned in the USA, Europe, Malaysia, and India for large giga manufacturing facilities.** Bry-Air, with its cutting-edge technology backed by continuous R&D into new materials, will remain the frontrunner for energy-efficient, sustainable dehumidification and dry room solutions. Some of our esteemed clients are *Nash Energy, Indi Energy, QPI Volta, ARCI, LG, Amprius, University of Michigan, Amara Raja, Vikram Sarabhai Space Centre, Hindustan Petroleum Corporation Ltd., Indian Institute of Technology Kharagpur, and Defence Research & Development Organisation*, to name a few.

Lending Critical Support to GM Shanghai R&D Center, Schlumberger, and Tianjin BaMo in China

Given that Li-ion battery production in China accounts for about 70% of the total global output, it is not surprising that many major companies have been investing in the country's Lithium-ion battery industry. Bry-Air, of course, plays a key role in its development. The company's dehumidification systems are used by GM Shanghai R&D Center, Schlumberger's Qingpu unit, and Tianjin BaMo in their Lithium battery production environments. Bry-Air provided customised dry room solutions to help these clients deliver products to the most demanding international standards.

The Bry-Air Advantage

Bry-Air's Green DryPurge (GDP) patented technology for dehumidifiers ensures optimum performance even at ultra low dew point up to (-)80°C. The units range from 2000 CMH to 45000 CMH. These dehumidifiers are most energy efficient as they recycle waste heat for reactivation, saving up to 30 to 60% energy. The units can be built in a modular approach and are easily transportable and can be quickly assembled at site. Some of our clients are Schlumberger, Mercedes, BHEL, BYD, Wuhan Design Institute, Beijing University, GM Shanghai, Guizhai Mei Ling hi Bat, BaMo Battery and Northvolt – The list is not complete, but growing daily.



So, whether it is rotors, packaged low dew point units, compact dry rooms, R&D facilities, pilot projects or giga manufacturing factories, Bry-Air has the knowledge and the expertise to provide a one-stop solution.

Into the Looking Glass

As the battery world starts focusing on next-generation batteries like solid state and sodium, the need for highly effective environmental control will get more stringent. Newer materials and technologies like sulphide-based solid-state batteries often need even drier conditions than Lithium batteries: as low as (-)60°C dew point. In the presence of moisture, the solid-state electrolytes get hydrolysed, forming H₂S (Hydrogen Sulphide).



Pack the Garment, Not the Moisture



Bangladesh's readymade garment industry has grown to become the largest exporter of ready-to-wear apparel globally. However, the country's predominantly humid and warm climate presents a significant challenge for garment exporters. While garments are in good condition when packed, they often arrive at buyers' warehouses in Europe and America covered in fungus or mildew, accompanied by unpleasant odours, making them unsellable. This has led to frequent shipment rejections, leaving the industry searching for a solution.

The Root of the Problem

The primary culprit behind the garment damage is moisture. During processing and packaging, the garments absorb moisture from the warm, humid air. Additionally, the inadequate sealing of packaging materials allows external moisture to infiltrate during long ocean shipments. Shipping containers travel through various climatic zones, causing temperature fluctuations and condensation inside sealed polythene packaging. Poor ventilation in storage facilities further contributes to high humidity levels, exacerbating the issue.

The Simple Solution

Once the cause was identified, the solution was straightforward. However, convincing garment manufacturers of its efficacy proved challenging. A pilot project was therefore initiated with Smart Jeans, a prominent exporter. In a

20 ft x 10 ft x 10 ft room, an FFB 600 dehumidifier was installed to maintain a relative humidity (RH) level of 35% ± 5% at ambient temperature. The drying process was conducted in batch mode, with garments placed inside the room for two hours prior to packaging. The packaging itself was also carried out in a controlled environment to prevent moisture from being reabsorbed.

Successful Pilot, Widespread Adoption

The results of the pilot project were clear: moisture-related rejections dropped significantly, leading to improved product quality. With this success, other garment manufacturers followed suit.

Bry-Air's solutions were soon adopted by major customers such as AKN, Square, Standard Group, and Beximco. Global buyers like GAP, Marks & Spencer, Uniqlo, Levi's, and H&M also recognized the benefits of Bry-Air's moisture control technology.

The case of Bry-Air's desiccant dehumidifiers in Bangladesh's readymade garment sector underscores the critical need for effective moisture control in garment packaging and storage. By maintaining optimal humidity levels and advising controlled packaging environments, Bry-Air's solutions have dramatically improved product quality and gained widespread industry recognition.

The X Factor in P95°X Dehumidifiers

Trendsetters in the Pharma Industry

For over fifty years, Bry-Air has been a trusted partner for the pharmaceutical industry, providing top-notch humidity control solutions across manufacturing, storage, and packaging processes.

The pharmaceutical industry is known for its forward-thinking approach and commitment to technological innovation, always on the lookout for energy-efficient solutions. Bry-Air, with its strong focus on in-house R&D, has consistently remained at the forefront of these technological advancements, enhancing the performance, energy efficiency, and reliability of its dehumidifiers.

The P95°X Breakthrough

Bry-Air's latest innovation, the P95°X dehumidifier, represents a major breakthrough in desiccant rotor technology. After years of research and development in material science, Bry-Air has created the new generation G4 desiccant rotor, which enables regeneration at just 95°C, a significant reduction from the current 120°C required by traditional rotors. This change leads to impressive cost savings – greater than 30% in energy consumption!

Designed specifically for the pharmaceutical industry, the P95°X features a stainless-steel welded framework that is not only durable but also bactericidal, preventing fungal growth. Its vapor-tight construction ensures zero leakage and complies with SMACNA Class 6 standards. Additionally, the unit is both FDA and CGMP compliant, meeting the strictest industry regulations.

A Case Study in Energy Efficiency: Tirupati Group

Tirupati Group, a prominent player in the pharmaceutical industry based in Paonta Sahib, Himachal Pradesh, has been using Bry-Air dehumidifiers for all its processes. The company had been relying on 40 units of the Bry-Air FLP Series, which had been performing satisfactorily. However, when introduced to the energy-efficient P95°X series, Tirupati's Managing Director, Mr. Arun Goyal, eager to enhance their facility's efficiency, requested a feasibility report.

Bry-Air conducted a detailed evaluation of Tirupati Group's existing dehumidification system and proposed the P95°X range as the ideal replacement. A lifecycle analysis was performed, and five units of the P95°X series were installed to replace the existing FLP series. The result? Substantial energy savings, enhanced performance, and reduced maintenance needs.

A Growing Trend in the Pharma Industry

Currently, over 100 P95°X systems are operational across the pharmaceutical industry in India and Asia. This advanced dehumidification solution is quickly becoming a winner in all respects – combining energy efficiency, high performance, and minimal maintenance requirements to meet the evolving needs of the pharma sector.



Cadbury's Special Ingredient

The Role of Dehumidification in Ensuring Chocolate Quality

Humid conditions often lead to food contamination by fungi, molds, and other microorganisms. To address this, Cadbury and Hershey rely on Bry-Air's dehumidification solutions to create low-humidity environments during key stages of the food production process.

Companies involved in chocolate, candy, and confectionery production must ensure that their products are processed, packaged, and stored in low- or zero-humidity environments. This prevents the growth of fungi, molds, and other microbes that could contaminate the products, causing production losses.

Although degradation can occur at any point during the production process, it is most common before production begins. Raw materials stored in humid conditions in warehouses are particularly vulnerable to contamination. Therefore, it is essential to properly dehumidify storage spaces to ensure that only clean, uncontaminated materials are used in production and that finished products leave the factory in pristine condition.

Cadbury turned to Bry-Air's expertise in dehumidification for its chocolate processing unit



in Andhra Pradesh. Specifically, this involved the packing areas for Cadbury Dairy Milk and Cadbury 5-Star, as well as the chocolate silo tipping area.

Bry-Air provided several dehumidification units tailored to each area's needs: an FLI 9500 series dehumidifier for the Dairy Milk packing section, an FLI 10500 series for the 5-Star packing area, and an FLB 20000 series for the chocolate silo / tipping area. These systems included heat recovery units, filters, and pre- and post-cooling coils. In addition to lowering humidity to acceptable levels, they also fine-filtered the air to prevent any degradation of the chocolate in the processing areas.

For Hershey, Bry-Air supplied advanced dehumidification solutions for the company's storage facilities in Johor, Malaysia. These storage rooms were pressurised with fresh air to prevent contamination through infiltration. The room temperature was maintained at 65°F, and the humidity was kept within the 35% RH to 50% RH range. Hershey was extremely satisfied with the results, which met the specifications required for its U.S. plants.



Serving Perfect Salami

The Importance of Controlled Drying in Sausage Production

The meat processing industry is experiencing rapid growth to meet the ever-increasing demand for food. However, bacterial contamination, particularly in products like sausages, salamis, and hamburgers, remains a significant challenge.

Ground meat is more susceptible to contamination than whole cuts. In the case of whole cuts, bacterial contamination is typically limited to the outer surfaces.

However, with ground meat, bacteria spread throughout the meat mass, proliferating in an environment that contains small air pockets and moisture.

Dehydration is another critical issue that must be addressed. During sausage production, if moisture is

lost too quickly during the drying period, the surface of the sausage can harden into a crust, preventing even moisture distribution throughout the sausage, which leads to spoilage. On the other hand, excessive humidity in the drying room can cause molding. The ideal drying conditions involve maintaining a temperature of 20°C, humidity below 10% RH, and approximately 30 air changes per hour.

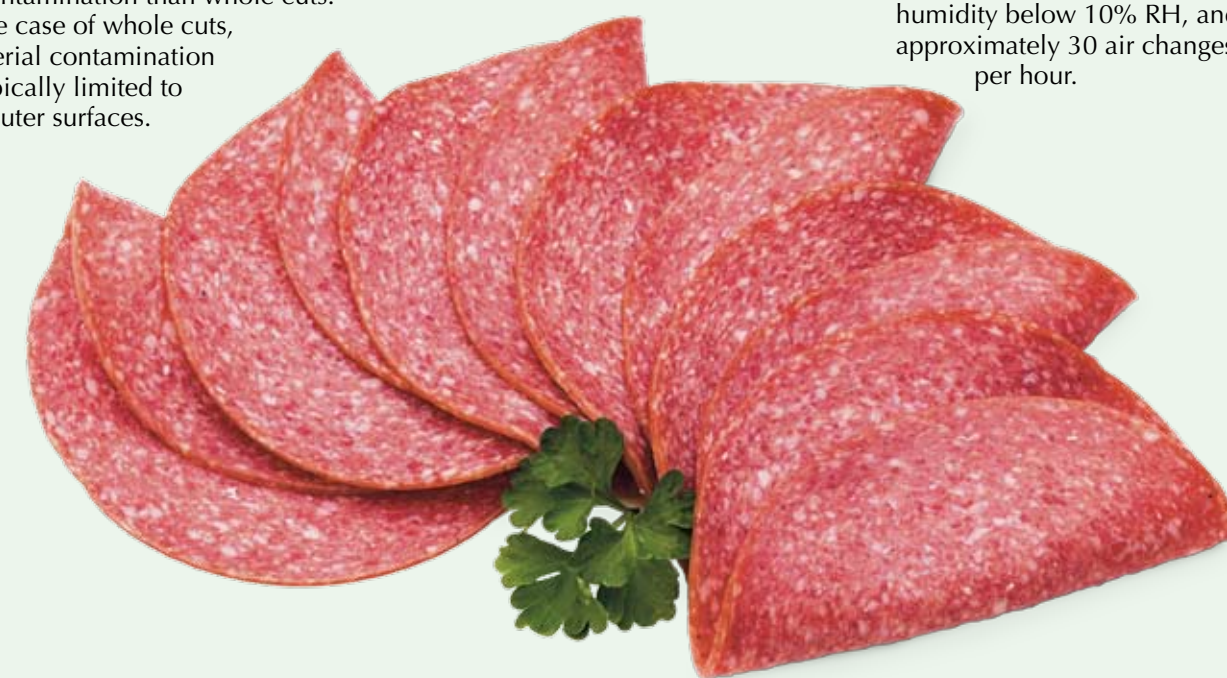


Striking the Right Balance

At the start of the drying process, the relative humidity (RH) can be as high as 97%. As the process progresses, however, the humidity must be reduced to prevent a rapid drying rate at the surface of the sausage. Proper control of drying requires equipping the drying room with a fan, a dehumidifier, and humidity and temperature control instruments to ensure a balanced environment throughout the process.

Bry-Air Gets It Right

Bry-Air's dehumidification solutions have been widely adopted in sausage and salami processing facilities worldwide. Typically, these solutions incorporate a Bry-Air desiccant dehumidifier, which can maintain a dew point as low as -60°C, along with a fan for optimal air distribution. Bry-Air dehumidifiers are known to dry sausages with precision while preserving their nutritional value and flavour.



The Bry-Air Story

A Legacy of Innovations and Breakthroughs



The story of Bry-Air began in 1964 when Art Harms started manufacturing dehumidifiers in a rented warehouse in New Jersey. Prior to this, Harms had worked with the Bryant Organization, a division of Carrier Corporation, where he gained valuable experience in dehumidification systems. After Carrier decided to exit the dehumidification business, Harms seized the opportunity to acquire the Bryant Organization and embark on his own entrepreneurial journey. The “Bry” in Bry-Air reflects this pivotal moment, marking the beginning of a new company that would revolutionize the industry.

From Humble Beginnings to Global Presence

The journey of Pahwa Group is a testament to vision, partnership, and an unwavering commitment to excellence. In 1981, Deepak Pahwa, driven by a passion for innovation, partnered with Bry-Air USA to establish manufacturing operations in India. This collaboration led to the creation of Bry-Air India, a joint venture that set the stage for

groundbreaking advancements in dehumidification technology.

Strategic Collaborations: Expanding Horizons

In 1988, Bry-Air took another significant step forward by forming a joint venture with Delair Netherlands, resulting in the establishment of Delair India. This strategic partnership expanded the product portfolio and strengthened Bry-Air's position as a leader in providing superior air treatment solutions across diverse sectors.

Diversification and Expansion

The expansion continued with the formation of Desiccant Rotors International (DRI) in North America in 1996, focused on developing advanced rotor products. This move solidified the company's reputation as an innovator and global market leader in air treatment solutions.

Two years later, in 1998, Bry-Air launched TDS, a service-oriented company offering short-term



dehumidification solutions. This new venture showcased Bry-Air's adaptability and responsiveness to customer needs, cementing its reputation as a comprehensive provider of air management solutions.

A Commitment to Excellence

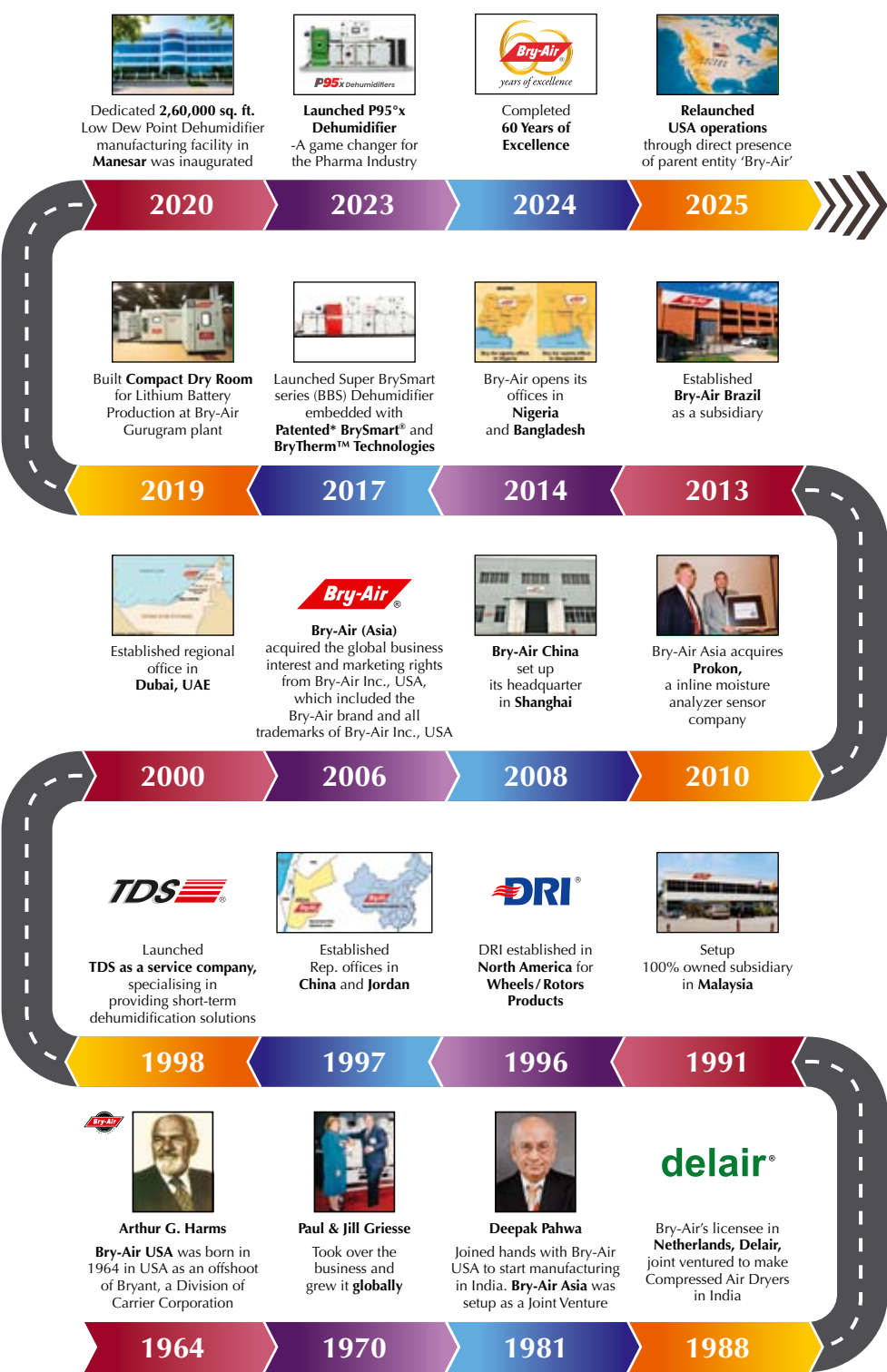
Throughout these milestones, Bry-Air laid the foundation for continued global growth, including the establishment of regional offices across Asia and the Middle East. The company's ever-expanding footprint reflects the Pahwa Group's relentless pursuit of excellence and customer satisfaction.

Looking Ahead: The Future of Pahwa Group

Today, Bry-Air stands as a beacon of innovation and resilience within the industry. With a broad range of products and solutions, the Pahwa Group is well-equipped to tackle the challenges of tomorrow while staying true to its core values. As the company continues to grow and evolve, the journey of Bry-Air serves as a powerful reminder that with vision, collaboration, and dedication, the possibilities are limitless.

Bry-Air Celebrates 60 Years of Excellence in Quality Air Solutions

This milestone is a testament to our team's dedication, challenging norms, and setting new standards.



New Technologies

Air to Water Generator

A sustainable solution to produce water from the surrounding air, even in arid and semi arid regions.

NMP Recovery (N-Methyl-2-Pyrrolidone)

To capture NMP from the evaporated gas released during cathode production process.

Carbon Capture

Bry-Air is developing advanced materials to enter direct air capture domain on the principle of adsorption technology

VOC Abatement

To remove VOCs from air emissions, ensuring compliance with environmental regulations.

