

# Bry-Air Dehumidifier helps increase throughput of Spray Drying of instant coffee at HUL by 20%



Moisture & Humidity Control

Country	- India
Location	- Mysore & Hosur in Karnataka
Industry	- Instant Coffee
Client Name	- Hindustan Unilever Limited
Application Area	- Spray Drying
Challenge	- Increasing Throughput
Solution	- Inlet Air Dehumidification
Benefit	- Increased Throughput

Hindustan Unilever Limited (HUL) is India's largest Fast Moving Consumer Goods Company with a heritage of over 75 years in India and touches the lives of two out of three Indians. HUL Manufactures Instant Coffee Powder at its state-of-the-art Mysore & Hosur plant in Karnataka.

Instant or soluble coffee was invented and patented in 1890 by Mr David Strang of Invercargill, New Zealand under patent number 3518. Instant coffee is just regularly brewed coffee with nearly all the water removed. Instant coffee, also called soluble coffee and coffee powder, is a beverage derived from brewed coffee beans. Approx. 20 % or more of the world's coffee bean production is processed into instant coffee products.

## Instant Coffee Making Process

Spray drying is the preferred drying process because of its economy, short drying time, and usefulness when dealing with the fine, rounded particles it produces. Spray drying is a simple process of evaporating the water content of a concentrate using hot air in a closed chamber. Ground coffee beans are first mixed with water to form a concentrate with 75-85% water content and is pressed through an atomizer. As the droplets fall through hot air, water evaporates. Dry crystals of coffee fall to the bottom of the chamber and are collected there.

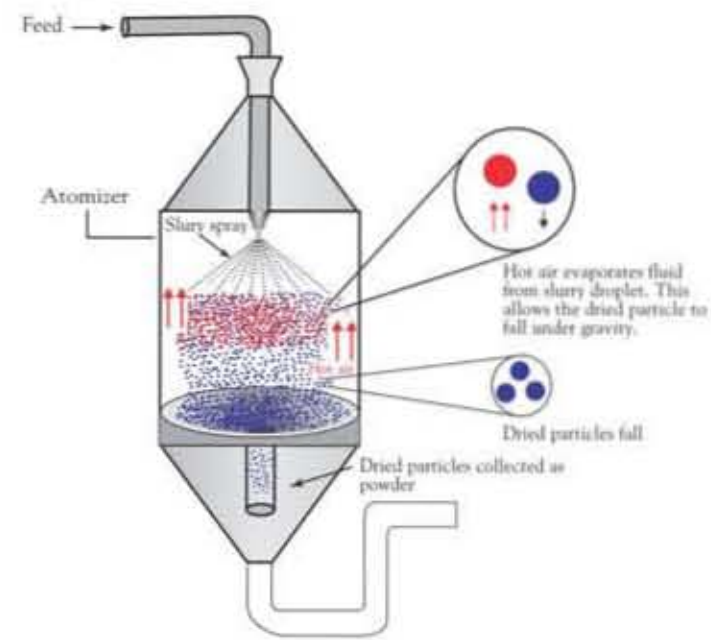
Spray drying produces spherical particles of about 300 micro metre (0.012 in) size with a density of 0.22 g/cm<sup>3</sup>. To achieve this, nozzle atomization is used. Various ways of nozzle atomization can be used, each having its own advantages and disadvantages. High speed rotating wheels operating at speeds of about 20,000 rpm are able to process up to 60,000 pounds (27 tonnes) of solution per hour.

- Completed in 5-30 seconds (depending on factors such as heat, size of particle, and diameter of chamber).
- Moisture content change: IN = 75-85% OUT = 3-3.5%

# Challenges in Spray Drying

Spray dryers require large quantities of hot air for drying. The quality of the final product is affected by the quality of inlet air entering the dryer. The Spray Dryer mixes heated air with an atomized (sprayed) liquid stream within a vessel (drying chamber) which leads to evaporation and produces free-flowing dry powder with a controlled average particle size. Thus, the inlet air has to be dry, free of contamination, foreign particles and odourless. However, since the ambient changes throughout 24 hrs, 365 days a year, the humidity present in the air, entering the spray dryer is not constant. Thus, the drying temperature and time inside the dryer needs close monitoring to restrict loss due to varying levels of humidity present in the inlet air. These varying inlet conditions need to be monitored by an experienced operator to adjust the parameters for a stable outlet condition.

Spray Dryer



Throughput varies with outside environmental conditions

Extra moisture in the inlet air increases drying cycle time

Varying outside conditions result in inconsistent powder quality

Higher downtime due to sticking of material on Spray Dryer walls

## Bry-Air Solution

Bry-Air has specially developed high performance dehumidifiers for supplying precisely controlled, stable and consistent dehumidified air to the inlet of spray dryers. Providing stable and consistent inlet air enables higher performance and output from spray dryers and improves the quality of coffee powder. It reduces your dependence on operator for a constant adjustment of parameters on account of varying outside environment. It also reduces your energy bills of heater for heating the inlet air up to the required temperature. Dehumidifying the inlet air also increases its temperature, as a result of which the heater has to do less work now to heat the air to the required temperature.

At HUL - The fresh air is taken through the Bry-Air dehumidifier after pre-cooling, and the outlet of dehumidifier, which is at lower grains, is further heated and passed to the spray drier.

## Benefits of Inlet Air Dehumidification

The dehumidification of the air helps tea and coffee to dry fast, and allows smooth and free flow operations. Bry-Air has developed a range of special high performance dehumidifiers which enable this to happen. Bry-Air dehumidifiers control precisely the moisture content of the incoming air. It results in following advantages:

Stable & consistent Drying Conditions throughout the year with no affect of outside conditions

Reduced dependence on operator for constant monitoring and parameter adjustment

Increased efficiency and throughput - up to 30% in some cases

Improve rate of solution by avoidance of the clumping caused by fine particles



## Bry-Air Advantage

- Short set-up time
- Precise and consistent results
- Lowest energy consumption
- Widest service network



CE certified

## Some of Our Customers



### About Bry-Air

Bry-Air Dehumidifiers are being used all over the world by leading manufacturers in the Food, Pharma and Chemical Industry for drying their products faster and ensuring consistent quality round the year, while retaining the original goodness of their products.

Bry-Air is a global leader in desiccant drying. With nearly 50 years of experience in Humidity and Moisture control, Bry-Air offers moisture control solutions for a wide array of applications. It specializes in designing and manufacturing desiccant based engineered dehumidification systems capable of handling a wide variety of applications in various industries like Food Processing, Pharmaceutical, Defense, Spices, Electronics, Automobile, Power, Engineering, Cold Store, Lithium Battery, etc.

The group has always been in the forefront of technology and innovation through extensive R&D in moisture control, air treatment and optimization of energy usage. R&D lab set up at Bry-Air is recognized by Ministry of Science and Technology. We have spent over 500 man years of research in the field of environmental control solutions. The group today has nine patents to its credit and many more are in the process of being granted. Bry-Air has several awards and recognitions to its credit. We are a regular recipient of Silver Shield by EEPC in star group category since the last one decade. With more than 25,000 installations worldwide in various industry sectors, Bry-Air today is the most preferred brand in the field of dehumidification, drying, storage, preservation and Gas Phase Filtration.

Bry-Air (Asia) has plants in Malaysia, China and representative offices in Middle East, South Africa, Philippines, Italy, Japan and Australia. The company's range of products finds applications globally across 40 countries including South East Asia, China, CIS countries, Indian subcontinent, West Asia, Middle East and Africa including South Africa and Australia as well as USA and Japan.



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