

# Chemical Processing

Drying, Cooling & Calcining Systems for organic, inorganic, bulk & specialty chemicals



# Airstream Solutions



## Flash and Ring Dryers

For products that dry rapidly owing to the easy removal of free moisture or where any required diffusion to the surface occurs readily. Applications include drying of filter cakes, crystals, granules, pastes, sludge and slurries, in fact, almost any material where a powdered product is required.

Wet material is introduced into a stream of heated air where it dries rapidly due to the high rates of heat and mass transfer, whilst being conveyed through the drying duct system.

Ring Dryers incorporate a centrifugal classifier giving selective internal recirculation of semi-dried solids effectively lengthening and retention time of larger particles in the dryer while finer material, which dries more rapidly, exits the dryer with the exhaust air.

## Fluidized Bed Dryers and Coolers

Used for the controlled removal of surface and bound moisture in powder, crystalline and granular materials by gently drying or cooling over extended residence times.

Hot or cold air is passed up through a perforated distributor plate at a velocity required to fluidize the material, that is, to take on the characteristics of a bubbling liquid. The gentle but intimate contact of drying/cooling gas with the product ensures minimal attrition and dust creation.

Vibrating, stirred and deep fluidized beds with internal heat exchange tubes can be offered, incorporating integral drying and cooling zones and multiple stages dependent on product and application.

## Rotary Dryers, Coolers and Calciners

Combining flexibility with reliability, this type of dryer handles a vast range of materials and is suited to the most arduous conditions. The design also permits the use of the highest possible drying temperatures and is not sensitive to wide variations in material size, moisture content or throughput.

As the dryer rotates, material cascades through a hot gas stream, using a series of peripheral flights to lift, distribute and transport the material. The flights are designed to suit the particular characteristics of the material, which may vary with increasing dryness.

Other systems include Direct and Indirect Rotary Coolers, Direct Fired Rotary Calciners and indirectly heated Rotary Dryers and Calciners for fine and dusty materials and lower temperature calcining applications.



### Superheated Steam Dryers™

The unique SSD™ drying system is a closed loop pneumatic dryer, where wet material is dried in a stream of pressurized superheated steam, rather than air as used in conventional flash dryers. Drying in a steam atmosphere eliminates the risk of fire or explosion, and the closed pressurized system ensures no gaseous emissions to atmosphere.

Conveying steam at up to 4.0 barg is indirectly superheated via a shell and tube heat exchanger, using high/medium pressure steam or hot combustion gases. The moisture evaporated from the solids creates excess steam, which is continuously discharged at system pressure.

Up to 90% of the energy used for drying can be easily recovered from the excess generated steam and used in another process.



### Rosinaire™ Paddle Dryer

This indirectly heated contact dryer is particularly suitable for processing hazardous materials and for evaporation and recovery of solvents in closed cycle operation.

Wet material is conveyed into the stationary horizontal drying chamber. The internal rotating paddles create a thin layer of material along the jacketed wall of the vessel. Heat is transferred by conduction and moisture is vaporized. A small counter-current flow of gas is used to carry the evaporated vapor out of the Rosinaire™.

The paddles are adjustable in order to set the residence time of the solids, within the vessel, typically from 0.5 to 20 minutes. The Rosinaire™ can be designed with multiple zone heat transfer jacket sections, which can utilize a variety of heating media.



### Column Dryers and Coolers

For drying free flowing materials such as amorphous or crystalline powders and granules to very low residual moisture or volatile content. With long residence times obtainable, columns are frequently used for diffusion-controlled processes.

The column is designed for plug flow and incorporates a special gas distribution cone to ensure uniform counter-current gas flow up through the material. Residence time can vary from 1 to 24 hours, depending on the required diffusion rate of moisture through the material.

Column Coolers transfer 90-100% of heat to cooling water flowing through tubes suspended across the column of slowly moving hot material. The column is designed as a mass flow vessel giving uniform residence time and even cooling to all the solids.



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