

# Raymond® Flash Drying Systems

## Proven Equipment for Your Drying Needs

For over eighty years, Raymond® Flash Drying Systems have been successfully providing solutions for the chemical, petrochemical, ceramic, pharmaceutical, food, fertilizer, plastic and other industries worldwide.

With our expertise, we can help you develop plans for your particular processing needs, from the earliest conception through design, fabrication, installation, and start-up. Our capabilities include pilot plant and laboratory testing in a state-of-the-art facility to determine physical and chemical data for process development and proper equipment selection.

Raymond® flash dryers are simple to operate and well known for their high on-line availability for tough applications involving fine, non-metallic, low to medium abrasive, sticky and heat sensitive materials. Raymond® flash drying systems have been used for flash calcining in various applications.

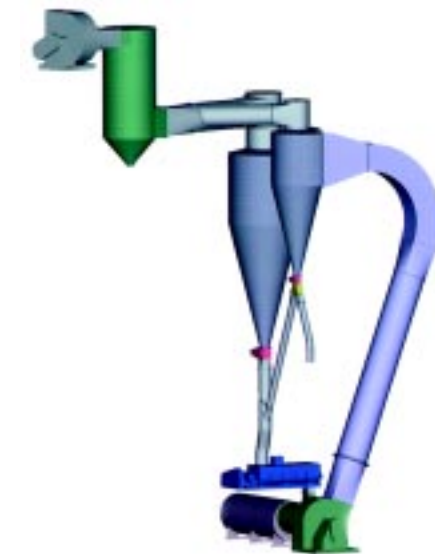
### The Flashing Drying Process

Flash drying is the rapid removal of moisture from mesh and micron sized solids which give off moisture easily, primarily as surface water. The wet material is dried by conveying it in a high velocity hot air stream. The short retention time in a flash drying system provides for maximum control of product quality.

There are four factors which influence the evaporation of moisture during flash drying:

#### ■ Moisture dispersion

Filter cakes and feed with sticky consistencies can be conditioned for more effective drying by mixing with previously dried material. The dry material can be au-



Twin Cyclone Flash Drying System

tomatically diverted to a mixer from the cyclone's dry product discharge and when mixed with wet feed will create a free flowing material with the moisture dispersed over a large surface area.

#### ■ Particle size

Shape and size are related to moisture dispersion since the moisture within the particle must reach the surface by capillary action. The smaller the particle, the more rapid the moisture removal. Operations requiring simultaneous grinding and drying are particularly suitable for the flash drying process. Materials reluctant to release moisture are candidates for multi-stage drying.

#### ■ Temperature differential

High inlet temperatures can be utilized in flash drying. This is possible because the drying occurs quickly, in a matter of

minutes. The material is dried and removed from the hot gas stream before it ever reaches the wet bulb temperature of the conveying gas. It is possible to use inlet design temperatures of up to 1200°F (650°C) for highly combustible products such as sewage sludge and grain with proper design considerations.

#### ■ Agitation

Rapid drying also results from the agitation and the turbulence of the particles. High gas velocities in the flash dryer accomplish this. In a system incorporating disintegration, the mill contributes to the agitation. The vapor film is continuously swept away from the moist particles so that evaporation is practically instantaneous.

### Typical Materials Processed:

Coal, Amine Crystals, Sodium Chloride, Potassium Persulphate, Potassium Perchlorate, Chlorine Bleach, Pharmaceuticals, Synthetic Resins, Wheat Flour, Potato Granules, Wood Flour, Limestone, Fluorspar, Phosphate Rock, Sodium Sulphite, Alumina, Gypsum, Iron Oxide, Electrolytic Manganese Dioxide, Kaolin and other clays, Calcium Phosphate, Calcium Citrate, Bentonite, Zinc Residue, Catalysts, Sewage Sludge, Paper Mill Sludge, Corn Gluten, Spent Distiller's Grain



Air Preheater Company  
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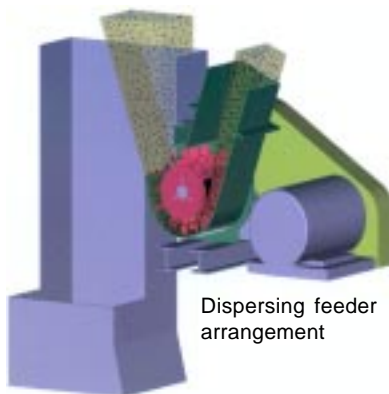
### Raymond® Equipment and Options

The essential components of a basic flash drying system are an air heater, feeder to introduce the wet material into the system at a controlled rate, cyclone collector, secondary dust collector, vent fan and necessary connective duct work.

The heating medium is typically products of combustion from a gas or oil burner, mixed with tempering air to achieve an inlet temperatures of up to 1300°F (705°C). Designs using other indirect heat transfer mediums such as thermal fluids or electrical heating elements are also available.

Airstream flash dryers are designed to bring wet scatterable products into contact with a high velocity hot air stream. The patented dispersing feeder is particularly well suited for use on airstream flash drying systems which process heat-sensitive products. This high speed rotary feeder is designed such a way that wet, even sticky material is deagglomerated and evenly dispersed into the hot air stream at high velocity and parallel to the flow of gas.

The dispersing feeder is completely separate from the drying column and hot gases do not flow through the feeder. This arrangement eliminates the wet process material from contacting or being deposited on the hot surface of the drying column.



Dispersing feeder arrangement

In addition, flash drying can be simultaneously combined with other functions such as pulverizing, separation, classification and conveying for utilization in additional process applications.

- Cage Mill Flash Dryers: Designed to bring wet, lumpy, and dispersable products into contact with a high velocity hot gas stream. The agitation and turbulence created by the cage mill assists in drying of surface moisture.
- Imp Mill Flash Dryers: Selected when size reduction of the process material is also required.
- Twin Cyclone Systems: Solves the problem of uneven drying and produces material having uniform moisture characteristics. Heavier particles that may contain excess moisture are directed into the lower cyclone to be reintroduced to the hot gas stream.

### Typical Capacities and Dimensions for Flash Drying Systems

Size	Airflow (cfm@vent)	Approx. Heat Input Million (Btu/hr)	Approx. Power Requirement (kW)	Max. H <sub>2</sub> O Evaporation (lb/hr)	Overall Height (ft)	Overall Width (ft)	Approx. Weight (lb)
3	1,700	1.1	12	700	31	24	12,000
4	3,000	1.9	18	1,200	34	27	17,000
5	4,700	2.9	28	1,900	36	28	21,000
6	6,800	4.2	38	2,700	39	30	28,000
7	9,200	5.7	52	3,700	42	32	32,000
8	12,000	7.4	66	4,800	47	34	37,000
9	15,000	9.3	81	6,000	51	37	44,000
10	19,000	11.0	99	7,500	52	38	51,000
12	27,000	17.1	143	11,000	58	40	64,000
14	37,000	23.3	198	15,000	65	43	74,000
16	48,000	29.5	237	19,000	73	46	87,000
18	61,000	37.2	294	24,000	83	50	116,000
20	75,000	46.5	367	30,000	92	54	125,000
22	90,000	55.8	432	36,000	102	58	135,000

