

TECHNICAL BULLETIN – DDR15

SUBJECT: DRUM DRYING RESOURCES DRY PRODUCT PROCESSING AND PACKAGING SYSTEM

Dry product produced by drying on the steam heated drums of a drum dryer is usually conveyed, cooled, sized, screened, accumulated and stored for packaging, and finally filled into a commercial package for sale. The DDR basic dry product processing and packaging system describes the elements of the equipment and operations dedicated to accomplish this objective after the drum drying process.

Discussion

Dry product leaving a drum dryer is hot due to the drying process and usually of random sized pieces as it is scraped from the drying rolls into an accumulating conveyor. Product specifications usually call for a uniformly sized product flake, particle, or powder form and cooled to ambient temperature for proper storage and packaging. Also, variations in the final product characteristics due to the formulation and processing of the product slurry may occur. This requires the accumulation and blending of various segments of the dryer production to yield a more uniform final product.

DDR System Description

1. Pneumatic Conveying (Negative System)

Dry product is picked up and conveyed to a cooling screen, where cool dehumidified air is introduced to prepare the product for the sizing flaker/mill. At the product pick-up point at the dryer, the light dry product is separated from any heavy damp reject product. Only light dry product is conveyed to the cooling screen with clean filtered air from an air conditioning unit.

2. Product Cooling Screen

Product is cooled in a vibrating screen separator with clean, cool, and dehumidified air from a central air conditioning unit. The cooled product is conditioned for size reduction in the DDR flaker/mill. Cooling sets the product for milling or flaking to proper size characteristics with cool dehumidified air to prevent moisture pick-up.

3. Milling/Flaking Machine

The flaking mill reduces the dry product to size and density specifications. The DDR flaker/mill reduces the product by abrading the product through a sizing screen without generating heat in the process. The flaker is purged with cool dehumidified air from the central air conditioning unit.

4. Pneumatic Conveying (Positive System)

Product is discharged from the flaking mill through a rotary air lock to the pneumatic conveying system that delivers the product to a series of storage bins. The product is blown into the selected storage bin where conveying air is vented from the bin through an air filter.

TECHNICAL BULLETIN – DDR15

5. Storage Bins

A series of storage bins receive and store the final product. Each bin stores the product produced over a definite time period, or the product produced by a particular slurry formulation batch. Segregation of production and determination of product characteristics permits blending of product production lots for a more uniform final product. Rotary discharge valves on each bin with programmable variable speed drives discharge product to a continuous blending screw conveyor. Each bin can be programmed to deliver all or a percentage of product to the final product blend.

6. Blending Screw Conveyor

A blending screw conveyor receives product from any of the storage bins in any selected volume and in a continuous and uniform manner blends the product for delivery to a filling and packaging station. The conveyor and bin discharge valves are programmed and controlled from a central electrical control panel. The product can be blended by a percentage of product delivered from one or all of the bins and at a volume that satisfies the filling demand.

7. Filling and Packaging

The filling operation is determined by the customers packaging requirements. DDR can fulfill almost any filling and packaging requirement, from individual retail containers to bulk filling containers with nitrogen flushing or vacuum packaging.

8. Central Air Conditioning Unit

A commercial central air conditioning unit provides sanitary filtered conditioned air for the pneumatic conveying systems, product cooling screen, and the milling/flaking machine. The air conditioning unit filters ambient air, dehumidifies the air, and discharges the air at a temperature that cools the product but does not cause condensation at ambient operating conditions.

DDR can design and specify a system to meet a particular customer's requirements and specifications. Once a system is determined, DDR can supply the system and contract for a turn-key installation and start-up.

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