

TECHNICAL BULLETIN – DDR17

SUBJECT: DRUM DRYING RESOURCES (DDR) DRY PRODUCT SYSTEM

Manufacture of a quality dry food product on a double drum dryer requires the following basic production systems:

PRODUCT SLURRY

Product slurry is usually defined as a formulation of dry ingredients and water containing a medium range percentage of solids (5 to 30% of solids), or a slurry of pulp from fruits and vegetables. The slurry system consists of the following:

1. A sanitary cone bottom surge tank of approximately 200 gallons. An option is a vacuum system on the tank to deaerate the slurry prior to the drying for better product quality. The tank is fitted to a weigh cell which indicates and can control the level of slurry in the tank.
2. A sanitary circulating pump and the piping necessary to deliver the slurry to the drum dryer.
3. A sensing probe, a level selection and control system and a sanitary slurry flow control valve maintain a uniform level of slurry in the drum dryer slurry puddle.
4. Two swinging pendulum feed pipes distribute slurry uniformly along the length of the drying drums.

PRODUCT DRYING

The slurry is dried on the surface of two steam heated drums and is removed as a dry product (2 to 4% moisture), by peeling the dry product from the drums with doctor knives. The major features of the dryer are as follows:

1. Two cast iron or steel steam heated drying drums with or without a surface coating of chromium or other materials, to dry the slurry. The drums are supported by heavy-duty bearings mounted on steel frames. One drum is adjustable in order to provide a small gap between the drums (the nip), which controls the thickness of the dry product on the drums. A variable speed drive system rotates the drums at the required speed.
2. Sharp doctor blades mounted on a heavy-duty support system with knife pressure adjustment remove the dry product from the drums.
3. A steam and condensate system delivers steam to the drying drums and removes condensate from the drums through a rotary steam joint on each drum. An adjustable steam pressure valve maintains a uniform steam pressure in the drums.
4. End dams at each end of the dryer drums seal the liquid slurry between the drums to form the slurry puddle.
5. A vapor hood and shields collect the steam vapors generated by the drying process and direct them to a vapor removal system. An optional vapor scrubber removes dry product and slurry droplets, which may be

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entrained in the vapor stream. Removal is important, because this material would contaminate the vapor removal system and the environment.

6. Conveyors collect the dry product from the dryer and transport the product to the dry product processing system.

DRY PRODUCT PROCESSING

Dry product removed from the dryer contains some reject material (heavy product, damp product, etc.). Reject material is separated from the product stream and the remaining dry product is milled to a flake or powder size. During the milling process, the product is cooled and purged with liquid nitrogen prior to packaging. The dry product processing includes the following:

1. An aspirator to separate heavy reject product from light acceptable product in a controlled air stream. The unit includes a sanitary housing, an air fan and adjustable baffles.
2. A sanitary mill with slow speed rotor and changeable sizing screens controls the dry product particle size and bulk density. The rotor is driven by a variable speed drive. Nitrogen gas is metered into the mill chamber to purge and cool the dry product.
3. A sanitary surge hopper receives the dry product from the mill and compensates for the surges to the filling operation due to package changes, etc. The surge hopper is nitrogen purged to reduce oxygen levels in the final product.
4. Nitrogen regulators and flow controls to purge and cool the dry product at milling and filling.

BULK FILLING

The final product can be accumulated in storage bins for later packaging or, accumulated in bulk packaging containers as final packaging or for temporary storage. The bulk packaging includes the following:

1. A sanitary distribution screw conveyor with outlet stations to deliver product to the package weighing stations. The conveyor is nitrogen purged and outlet valves controlled by the product weigh scales control the package weight.
2. Bulk filling stations accommodate packages of various sizes, from super sacs to smaller packages. Each station includes an electronic scale with controls for weight control and nitrogen purging of the container.
3. For containers requiring heat sealing, a nitrogen shrouded sealing machine is provided.

Please contact Drum Drying Resources for additional information.

Drum Drying Resources supplies new, rebuilt, and retrofitted Double Drum Dryers to the drying industry. Each dryer is configured to specific designs, specifications, and systems to produce your product at maximum quality, sanitation, and productivity levels.

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