

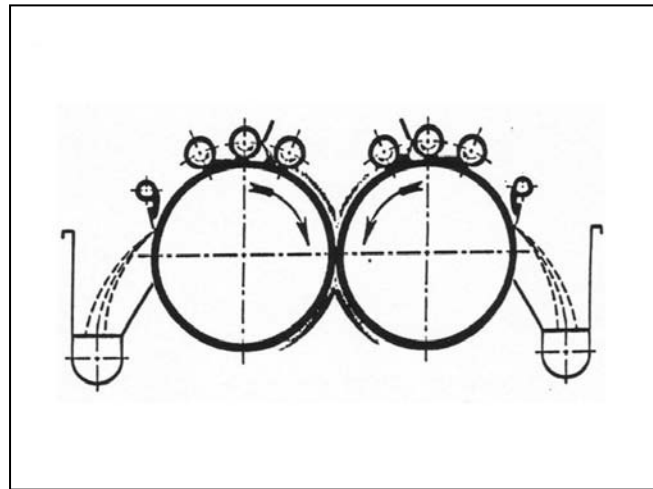
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SUBJECT: DOUBLE DRUM DRYER CONVERSION TO MULTIPLE SLURRY APPLICATOR ROLLS

A double drum dryer can be converted to operate as a double drum dryer with applicator rolls or as two single drums with applicator rolls. (See the following diagrams.) Applicator rolls permit the production of a wider range of products and slurries. They also allow for the utilization of more of the drum drying surface, which increases a dryers drying capacity.

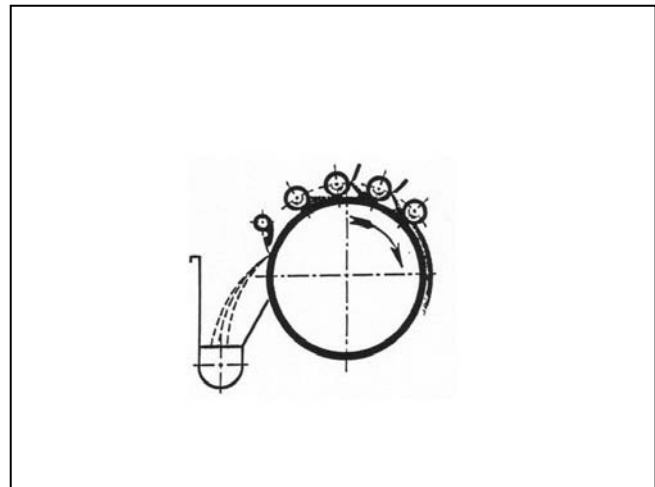
Double Drum Dryer with Applicator Rolls

Double drum dryers with applicator rolls are in fact a multi-functional combination of a single and a double drum dryer. They therefore find their use in those industries which have such a variety in their product range that both, a single drum and a double drum dryer are required. This type of drum dryer is used in the baby food and instant food industry.



Single Drum Dryer with Applicator Rolls

On the single drum dryer, the feeding of the wet product is done by means of applicator (doctor) rolls. According to the number of applicator rolls used, the layer formed on the drying drum is thicker or thinner. The special construction of this dryer makes it particularly suitable for processing pasty or pulpy products. This is due to the applicator system, which ensures a perfect distribution of the product along the whole length of the drum.



In addition, the rolls -as a result of their kneading effect- prevent sticky products from forming lumps. The applications for this type of setup are: pre-gelatinized starch, cereal based baby food, potato flakes, caseinate, fruit flakes and a large number of chemical products. During the

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drying of baby food and mashed potatoes, instant properties are obtained through the ready-cooking effect while drying.

I. Discussion

When a double drum dryer is converted to production operations using applicator rolls for applying slurry to the drying drums it requires the conversion of the dryer to be operated as two (2) single drum dryers on a common frame. Single drum dryers have the following operational characteristics:

1. Slurry must be precisely metered to the drum applicator rolls.
2. Slurry must be applied evenly to the applicator rolls.
3. The applicator rolls, including the number of rolls, the positioning of the rolls and the adjustment of the rolls must be determined by the characteristics of the slurry being dried and the final dry product being removed from the drum.
4. The doctor knife holder must be positioned properly relative to the applicator rolls, for removal of the dried product from the dryer drum.
5. The temperature of the drum surface -which is controlled by the internal drum steam pressure-, must be adjustable and stable.
6. The speed of the drum must be adjustable through a speed range which will result in a sheet of dry product being produced at acceptable moisture content.

These characteristics control the variables of time, temperature, and uniformity associated with the single drum dryer drying process.

II. Double Drum Dryer Conversion

To convert a double drum dryer to operate with applicator rolls requires several considerations. First, the operating criteria for the product to be run must be defined. This information is determined by experience in the operation of a single drum dryer and experience with the product to be produced, or through tests made with the product on a pilot plant dryer. The information required includes:

1. Slurry characteristics
 - Percent of solids
 - Slurry viscosity
 - Temperature when delivered to the dryer
2. Applicator rolls and doctor knife holder
 - Number of rolls
 - Positioning of the rolls on the dryer drum
 - Positioning of the doctor knife holder
 - Diameter of the rolls relative to the drum diameter
 - Running clearance range of adjustment for the rolls
3. Steam and condensate system
 - Operating steam pressure in the drum
 - Line steam pressure available
 - Quality of the steam supply

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- Condensate return line back pressure and size
4. Drum operating speed range
 - Drum speed RPM, maximum and minimum
 - Horsepower required at the drum
 5. Technical information required
 - Existing dryer dimensional information
 - Detailed dryer frame dimensions
 - Dryer drum dimensions and location, relative to the frames
 - Drum bearings type, location
 - Drum drive type, location
 - Steam & condensate diagram and controls
 - Doctor blade holder location, dimensions
 - Side screw conveyors location, dimensions
 - Take away rolls location, dimensions
 - Vapor hood location, dimensions
 - Electrical system configuration
 6. Product production data
 - List of products
 - Slurry characteristics
 - Production dryer operating conditions
 - Product
 - Steam pressure
 - Drum RPM
 - Doctor knife pressure
 - Drum gap
 - Sheet thickness
 - Moisture in final sheet

III. **Hardware**

The applicator roll conversion requires the following dryer components and changes to complete the conversion of the double drum dryer to operating as a double drum dryer with applicator rolls or two single drum dryer rolls:

1. Anchor the adjustable drum to a stationary drum position.
2. Relocate the existing doctor blade holder or install a new doctor blade holder at the position. Drum Drying Resources can supply proper doctor blades and holders.
3. Convert the gear or chain double drum drives to independent drives for each drum. Drum Drying Resources can supply compact single drum drives mounted to each drum without chains or sprockets. A variable frequency controller controls the drum speed.
4. Each drum should have an independent steam supply and steam pressure control. Drum Drying Resources can supply properly sized and selected steam and condensate components.

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5. A separate slurry supply and metering pump is required for each drum. A special slurry applicator header sized for the product being handled is required for proper metering and distribution of the slurry to the applicator rolls. Drum Drying Resources can supply a complete slurry delivery system.
6. The main Drum Drying Resources roll system includes the following elements:
 - a. Stainless steel applicator rolls. The number of rolls depends upon the product being run. Usually two to four rolls are required.
 - b. Each roll is mounted to the roller support frame with heavy duty bearings and a roller nip adjustment mechanism.
 - c. The support frame is heavy duty stainless steel and is designed to be mounted to an existing double drum dryer cast iron or fabricated framework. The framework is designed to support and position the applicator rolls, roll drive, and all operating hardware.
 - d. The rollers are driven by a single electric motor speed reducer with a variable frequency speed control to synchronize the applicator rolls speed to the dryer drum speed.

Please contact Drum Drying Resources for further information for converting existing double drum dryers to the applicator roll drying system.

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.

Check our Technical Bulletin section often in order to learn more about how our products and services can help you become more productive.