

Technifax

LOW SOLIDS DRYING

DRYING HEAT SENSITIVE LOW PERCENT SOLIDS

The Littleford Day drying technology offers a highly efficient and economical means of drying heat sensitive low percent solids solutions. A considerable portion of the ingredients for the Food, Pharmaceutical, Nutraceutical and Biotechnical Industries is manufactured from the extraction or reaction of plant materials using solvents (water, alcohol, hexane, etc.). This Process leaves the processor with a product in the form of a liquid with a very low percent solids level (Hydrolyzed Vegetable Protein, St. John's Wort, Echinacea, and other Nutraceutical products).

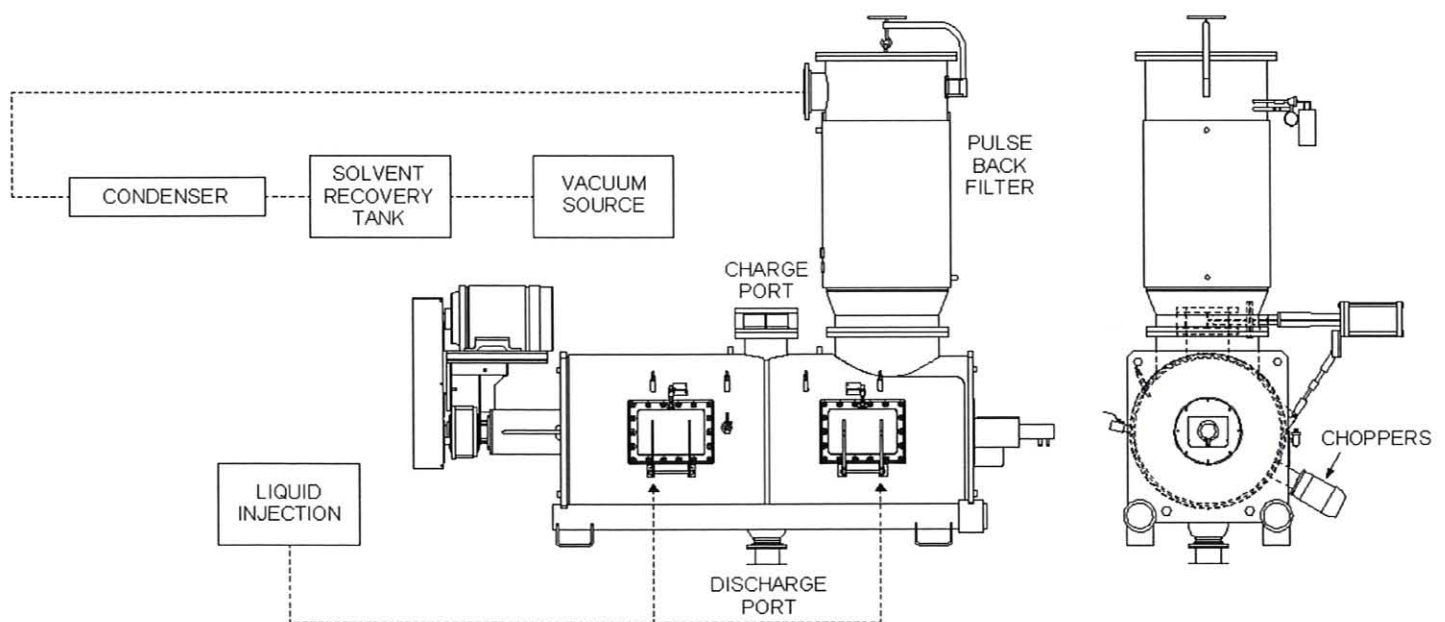
Processors have been searching for an economical way to dry these products. In the past, due to the stickiness of the product during drying, the processor was forced to utilize drying methods such as freeze drying, spray drying, tray dryers, etc., expensive methods which did not rely on mechanical agitation of the product through the high viscosity "power phase."

Littleford Day has drawn upon its process technology and advanced Ploughshare® action to develop a system for the drying of these products. The Littleford system vacuum dries and cools the product all in the same vessel. The Littleford system allows the processor to accurately control the product temperature during drying to maintain the quality of the product.

Typically the Littleford vacuum drying process follows these steps:

1. Product is placed in the Littleford Ploughshare® Vacuum Dryer. Agitation is initiated (plows and choppers optional) followed by circulating heating media (hot water, steam, hot oil) in the vessel jacket to raise the temperature of the product in the dryer to the predetermined drying temperature.
2. With the vessel under vacuum, a fine spray of the low solids solution is atomized into the heated bed of dried material. The rate of spray is matched to the rate of vapor evolution in order to maintain the bed of materials as a dry medium.
3. After sufficient material has been dried to raise the batch size to a 70% fill, the product is cooled (via cooling media on the vessel jacket) to the required temperature for subsequent processing (other ingredients added, product granulated, etc.) or discharge.

The Littleford equipment used to accomplish this advanced process is the Littleford Ploughshare® Vacuum Dryer. The Littleford Ploughshare® Vacuum Dryer combines the operational features of liquid injection, vacuum operation and effective heat transfer (heating or cooling) to dry product in a single processing unit.



**Littleford
Ploughshare®
Vacuum Dryer**

The Littleford Ploughshare® Vacuum Dryer operates according to the proven "fluidized bed" mixing principle, whereby the materials being processed are maintained by the plow shaped mixing elements in a mechanically fluidized "suspended" state. This permits liquid and solid media to achieve intimate, individualized, rapid contact with each other and the heat transfer surfaces. In addition, the Littleford Ploughshare® Vacuum Dryer may be equipped with independently operated, high shear "chopper" devices to reduce the size of any lumps or agglomerates, exposing undried materials thereby ensuring thoroughly dried particle interiors. This deagglomeration further shortens the drying time required. The Littleford Ploughshare® Vacuum Dryer, specifically engineered to maximize heat transfer, yields overall heat transfer coefficients that are many times higher than those of traditional dryers. This advanced heat transfer technology generates rapid drying in a single process vessel.

The Littleford Ploughshare® Vacuum Dryer can be enhanced with an optional Littleford Pulse Back Filter to effectively handle the vapor stream created during drying. The Littleford Pulse Back Filter is used to filter the vapor stream from the Dryer in order to prevent product

carry-over into the condenser. The filter housing is heated slightly higher than the dew point of the vapor, thus preventing condensation. Filter bags of proper porosity are mounted over stainless steel cages and can easily be removed through the top section of the filter housing. A pneumatic pulse jet system (using air, N₂ or suitable gas) provides continuous automatic bag cleaning through a venture at the top of the bag. Since this pneumatic shock wave clears only one row of bags at a time, there is no interruption of vapor flow through the filter. This provides a smoothly operating dust control system for the Vacuum Dryer.

Customers report the advanced Littleford process will result in:

1. Controlled drying through effective/optimum heat transfer.
2. Improved drying rates.
3. Increased efficiencies of drying.
4. Efficient single unit processing of the entire process.

The Littleford process enables the processor to produce an excellent, dried product with solvent levels well below the limits set by the FDA.

The Littleford Ploughshare® Vacuum Dryer is designed and constructed according to "GMP" and can be specified to meet or exceed FDA, 3A, USDA compliance as specified by the customer.

This proven Littleford Day technology has been applied to numerous complex and difficult applications in the Food, Pharmaceutical, Nutraceutical and Biotechnical Industries. Littleford Ploughshare® Vacuum Dryers can be purchased in a variety of sizes to meet most production requirements. Littleford Day can interface its system controls with existing equipment or supply fully automated process control systems.

For a free brochure or a detailed discussion, contact us at:

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Littleford Day
Where Processing Ideas Become Reality

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