Tetra Magna™ Dryer TWB (Tall Wide Body)

Continuous infant formula spray drying system

Highlights

- Flexibility in product range and powder functionalities
- Proven technology
- Long production runs due to controlled air flow
- Fully cleanable (Cleaning in Place)

Application

Tetra Magna Dryer TWB provides a fully automatic and continuous spray drying system. Tetra Magna Dryer TWB is suitable for the production of the complete range of infant formula products.

The system is customer specific designed, and therefore available for a wide range of product compositions and capacities.

Working principle

From the feed tank product is pumped through the concentrate heater and a high pressure (HP) pump with homogenisation valves pumps it to the HP nozzles. Drying air is pre-filtered and heated by means of heater, using steam, natural gas, electricity or oil as energy source.

In the Sunflower air distributor drying air is guided in a controlled and well defined way via a venturie into the centre of the drying chamber. Product is sprayed in the airflow as fine droplets. If agglomeration is required, fines are fed into the flow as well.

In order to guarantee the optimal position of the nozzles, each lance is positioned on a swivel, wherewith we can adjust the nozzle orientation. If a non-agglomerated product is run, the fines returns to the shaking bed instead of the top of the dryer, and lances can be positioned in a more outward position.

The airflow inside the drying chamber follows a co-current reverse flow, which means air travels down with the product and in the cone product travels towards the cone outlet, whereas air leaves the drying at the top.

As infant formula products typically contain relatively high sugar contents a longer drying trajectory is used, resulting in an extended drying chamber; Tetra Magna Dryer Tall Wide Body.

Product falls into the integrated Tetra Magna Static bed, where product is dried to the final moisture content. The air that is used for this Tetra Magna Static bed ensures drying and cooling of the powder, and furthermore decreases the relative humidity and thus stickiness; forming a curtain along the cone to reducing deposits in the wall.

From the static bed powder falls into Tetra Magna Shaking bed, whereby cooling air is used to fluidise and cool product. The sheet has a zig-zag pattern to ensure a well defined heat treatment and residence time.

Powder falls into a sifter to remove lumps, if any, ready to transport to silos and packing.

Exhaust air from dryer and shaking bed are fed to a cyclone to separate fines from the air.

A temperature controller in the exhaust air is used to set the speed of Tetra Alex high pressure pump.

Capacity

Capacity of the spray drying system depends on product range. For example a system to produce 3,000 kg/hr infant formula powder could consist of the following scope of supply:

Scope of supply

- Feed system: feed tank (2x), feed pump and concentrate heater
- Tetra Alex pump and high pressure set
- Tetra Magna Dryer TWB, Tetra Magna Static bed and Tetra Magna Shaking bed
- Air supply system, including filter, main air heater, fans and ducting
- Air exhaust system, including ducting, fan and cyclone (2x)
- Instrumentation and automation
- Documentation and engineering

Options

- CIP-able bagfilter
- Fines dosing system
- Open fines transport
- Heat recuperation

Consumptions

Based on a capacity of 5,850 kg/hr concentrate from 50 to 97.5 TS% and during normal production:

Steam	10 bar 8,000 kg/hr (at 10°C and excluding winter coil)
Electricity	580 kW (absorbed)
Ice water	20 m^3/hr with 2 °C in and 8 °C out
Compressed air	6 m^3/hr

Tetra Pak