

Solutions for Your TOUGHEST
MIXING Applications in

FOOD

Introduction

Manufacture of Baby Milk

The Process

and Infant Formula

The Problem

The Solution

The Advantages



FOOD

Manufacture of Baby Milk and Infant Formula

Baby milk or infant formula is primarily used as a substitute for human milk. Other uses include “Follow-up” products as a dietary supplement for older infants, and special formulations for specific nutritional needs or to overcome allergies e.g. soya based milks for lactose intolerant infants. The finished product is either supplied as a spray dried powder which is reconstituted as required, or in liquid form, typically packed in cans. Typical added ingredients include Milk Proteins, Lactose, Soya protein, Maltodextrin, and various vitamins and minerals.

The selection of raw materials, formulation, manufacturing and storage of baby milks is one of the most stringently regulated in the food industry.

The Process

A typical mix would be prepared in the following manner:

- The base liquid which may be either milk or water is weighed/metered into the process vessel. The liquid may be heated to aid dissolving/hydration of powdered ingredients.
- Powdered ingredients - milk proteins, etc. are added to the liquid and mixed until dispersed. Some heat-sensitive ingredients (e.g. vitamins) may be added at a later stage.
- The premix is usually homogenized by passing through a high pressure homogenizer
- The product is heat sterilized/pasteurized.
- The product may be spray dried before packing.

The Problem

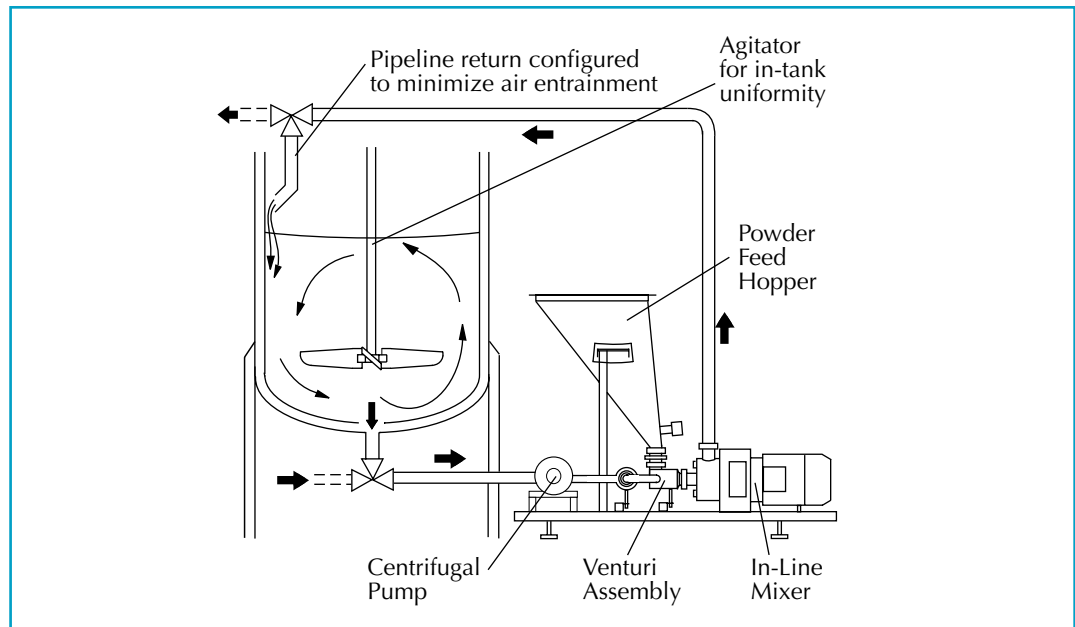
Preparation of the premix is subject to a number of problems when using agitators and conventional powder/liquid blending systems:

- The powders are very cohesive, and must be added at a controlled rate to reduce lump formation.
- Conventional systems do not produce sufficient shear to break down agglomerates.
- Long processing times are required to complete dispersion and achieve a lump-free premix for homogenization.
- The vigorous agitation required to disperse the powder can lead to foaming.
- The process must be carried out in the most hygienic manner possible. Problems can arise with conventional systems as they tend to allow a build-up of partially hydrated powder on vessel walls and mixer shafts etc. raising potential hygiene issues.
- Premixing the ingredients at raised temperatures increases the risk of bacterial contamination

The Solution

A Silverson High Shear mixer can produce an agglomerate-free premix in a fraction of the time taken by conventional methods.

For the large volumes typical of most production facilities, the Silverson Flashblend is most suitable (see below). Other models may be used depending on certain factors (see overleaf).



The base liquid is drawn from the vessel by the centrifugal pump and passed through the venturi assembly into the In-Line Mixer. The high velocity flow through the venturi creates a vacuum in the chamber below the powder hopper. The liquid is returned to the vessel by the self-pumping In-Line Mixer.

The powder is fed into the specially designed hopper. Once the liquid is recirculating the powder feed valve is opened. The powder is drawn into the venturi, where the liquid and powder streams are instantly mixed and pass immediately to the inlet of the high shear In-Line mixer. The liquid and solids are subjected to intense high shear in the workhead of the In-Line Mixer.

When powder addition is complete the bypass valve is opened, switching the Flashblend to high speed recirculation mode. The entire contents of the vessel pass through the Flashblend in a short mixing cycle, accelerating the hydration process.

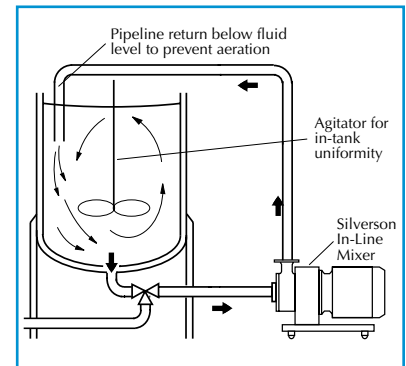
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Silverson Flashblend

- Up to 48% solids can be dispersed into water
- The Flashblend is designed to work efficiently at ambient temperatures, reducing the risk of bacterial contamination and damage to nutrients such as vitamins and minerals
- Premixing of powdered ingredients is not necessary
- Ideal for large batches
- Capable of rapidly incorporating large volumes of powder
- Agglomerate free mix
- Rapid Mixing times
- Controlled powder addition rate
- Designed for CIP (Cleaning in Place) and can be supplied for SIP (Sterilize in Place) operation
- Improved process hygiene
- Optional hopper flow aids available for difficult powders
- Minimized aeration
- Minimum operator input required

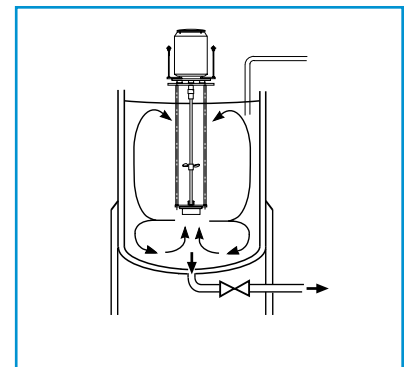
High Shear In-Line Mixers

- Easily retro fitted to existing plant
- Should be used in conjunction with an efficient in-tank agitator to wet out powder
- Aeration free
- Self pumping
- Can be used to discharge vessel
- Models for CIP and SIP available
- Ultra Hygienic models available



High Shear Batch Mixers

- Suitable for R&D and pilot scale
- Can be used on mobile floor stands
- Can easily be moved from vessel to vessel



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Issue No. 49FA1

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