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powder dispersing mixers

the first name in high shear mixers

SILVERSON®

Silverson Powder/Liquid Mixers

Silverson has over 60 years' experience in powder/liquid mixing and offers mixers for a wide range of materials and batch sizes.

The new **Flashmix** is a modular unit that provides a simple, effective and hygienic means of incorporating powders into liquids, even at higher viscosities. and at elevated temperatures.

The **Flashblend** is a semi-automated system designed for bulk powder dispersion and ultra-hygienic applications.

The Silverson approach to powder/liquid mixing offers a number of advantages:

Repeatability

Most problems that occur when adding powders into liquids are typically due to operator error - for example adding powders too quickly. With a Silverson mixer the machine dictates the powder addition rate, so repeatability is assured and a consistent homogeneous product will be produced time after time.

Speed

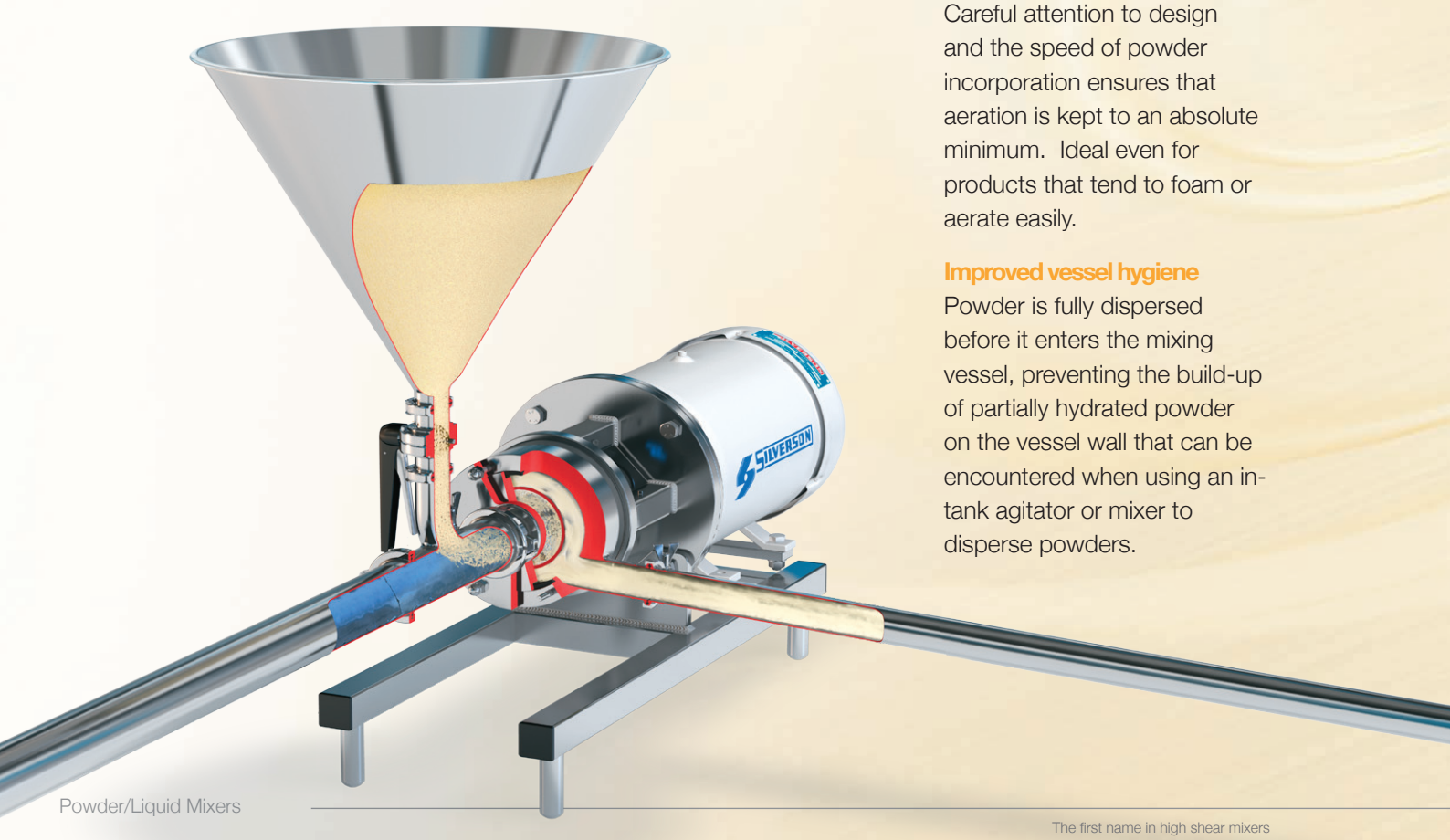
Powder incorporation rates of up to 15,000 Kgs/hour substantially reduces process times compared with conventional methods of powder dispersion.

Minimum aeration

Careful attention to design and the speed of powder incorporation ensures that aeration is kept to an absolute minimum. Ideal even for products that tend to foam or aerate easily.

Improved vessel hygiene

Powder is fully dispersed before it enters the mixing vessel, preventing the build-up of partially hydrated powder on the vessel wall that can be encountered when using an in-tank agitator or mixer to disperse powders.



Typical powder dispersion applications

Food industry:

Gum dispersions: *Xanthan, Guar, Acacia etc.*
Sugar solutions
Ice cream: *Milk powder, Sugar, Cocoa, Stabilisers, etc.*
Yoghurt: *Milk powder, Sugar, Pectin, Gelatin, etc.*
Baby milk: *Skimmed milk powder, Lactose, Soya protein, Maltodextrin, Fat*
Flavoured milk drinks: *Milk powder, Cocoa, Chocolate crumb, etc.*
Soups: *Starch, Milk powder, Powdered cream, etc.*
Sauces and dressings: *Starch, Xanthan gum, Guar gum, Alginates, CMCs, etc.*
Flavourings: *Acacia gum*
Low fat spreads: *Caseinates, Gelatine, Starch, etc.*
Standardisation of milk: *Milk powder, Lactose*
Sweetened condensed milk: *Sugar, Milk powder*
Jams and preserves: *Pectin solutions*
Pet foods: *Starch, Guar gum, Xanthan gum, Alginates*

Beverage and brewing:

Soft drinks: *CMC, Pectin, etc.*
Beer: *Head retaining agents, Finings*
Cream liqueurs: *Caseinates, Sugar*

Pharmaceuticals

Tablet coatings: *Polymer dispersions*
Contact lens solutions: *Thickening agents, Salts, etc.*
Nutrient broths and media: *Yeast extracts, Proteins, Sugars, Minerals, etc.*
Syrups and linctus: *Sugar, Thickening Agents, Active ingredients*
Oral suspensions: *Thickening agents, Active ingredients*

Cosmetics and toiletries:

Carbopol dispersions
Hair gels: *Carbopol*
Hairsprays and mousses: *Resin into alcohol*
Shampoos: *Sodium Laureth Sulphate (SLES) into water*
Deodorants: *CMC, Active ingredients*
Dental adhesives: *Polymer dispersions*

Chemical and petrochemical:

Fumed silicas *into oils, Resins and water*
Specialty chemicals: *Crystalline powders into solvents*
Drilling muds: *Continuous production of Bentonite muds*
Oil Blending: *Incorporation of lime, etc.*

Agrochemicals:

Suspending agents: *Bentonite, Xanthan gum, etc.*
Dispersion of active ingredients

The new Silverson Flashmix - taking the complexity out of powder/liquid mixing

The new Silverson Flashmix takes a revolutionary approach to powder/liquid mixing. Unlike many powder/liquid mixers, which use vacuum to pull in powders, the Flashmix literally forces powder into the liquid stream. This not only allows it to disperse and hydrate large volumes of powders, it means it can be used at higher temperatures and with higher viscosity mixes - offering the advantages of high shear mixing to a wide range of applications that were previously not possible.

Advantages

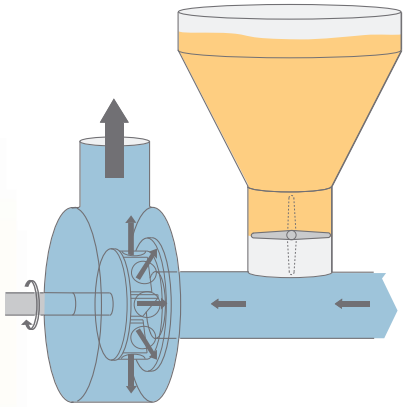
- **Fast powder incorporation rates of up to 15,000 kgs/hour**
- **Agglomerate-free, consistent product, time after time**
- **Suitable for operation at higher temperature**
- **Suitable for higher concentrations of gums and thickeners**
- **Minimum aeration**
- **Hygienic - the Flashmix is based on an EHEDG and 3-A Certified hygienic mixer**
- **Modular construction with a range of options to suit requirements**
- **Low power requirement; no additional pump required**
- **Low level, ergonomic design**
- **Simple - the Flashmix is easy to install, easy to operate and easy to clean**

PATENT PENDING

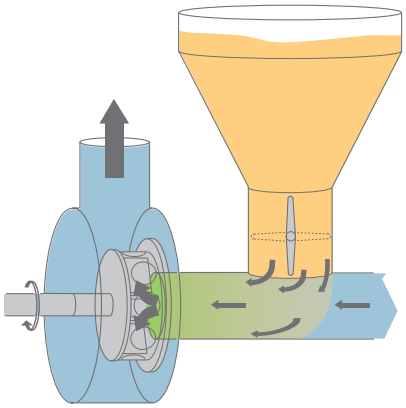
Flashmix Operating Principle

The Silverson Flashmix offers a unique method of incorporating powders into liquids, producing an agglomerate-free and homogeneous product

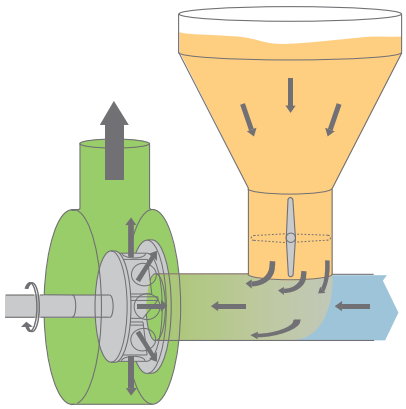
Stage 1
The specially modified Silverson In-Line mixer recirculates liquid from the process vessel through the Flashmix at high velocity.



Stage 2
The powder feed valve is opened, and the high pumping action of the In-Line mixer forces the powder into the liquid stream.



Stage 3
The powder and liquid components are introduced straight into the high shear zone of the mixer, and are instantaneously combined as they are subjected to intense mechanical and hydraulic shear. The resultant mix is passed back to the vessel by the self pumping Flashmix.



Flashmix Operation and Performance

Operation

The Flashmix is designed for use in a recirculation system as shown below. Powder is rapidly incoprporated by the self-pumping Flashmix, and a brief period of recirculation results in an agglommerate-free, homogeneous dispersion.

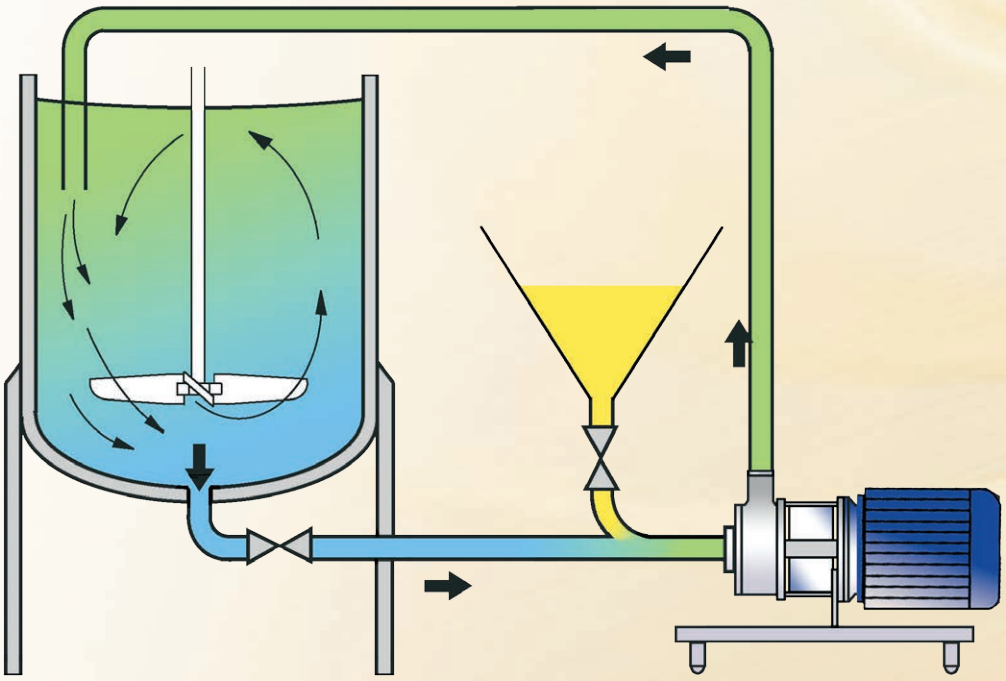
An auxiliary in-tank mixer or agitator will normally be required to maintain uniformity in the process vessel.

Performance

Typical liquid flow and powder incorporation rates are given in the table.

Model	Liquid flow rate (tonnes per hour)	Typical powder incorporation rate (kilos per hour)		
		Gums & thickeners	Milk protiens	Sugars
FMX25	20	600	1,700	1,000
FMX50	40	1,100	7,000	3,500
FMX75	90	2,600	14,000	10,000

Figures given are based on repeated practical testing and represent typical values for guidance only.



Technical Specifications and Options

Materials of Construction
All product contact parts are in 316L stainless steel. The chassis is constructed from 304 stainless steel.

Motor specifications
TEFV (Totally Enclosed Fan Ventilated) motors are available as standard. Other types of motor and enclosures are available as options.

Inlet and outlet connections
Tri-clamp fittings are standard. Other fittings on request.

Sealing
Hygienic single mechanical shaft seals are standard. Double mechanical shaft seals available.

Valves
Manual butterfly valves are standard.

Cleaning
Designed for Cleaning-In-Place (CIP).

Hopper
Various hoppers are available according to model and application, including profiled hopper for minimal aeration.

Sack Table
A stainless steel sack table is available for FMX 25 and 50.

Automation
As an optional extra the Flashmix can be supplied with pneumatic valves coupled to a powder sensor for semi-automatic processes.

FMX25 with 40 litre hopper and manual valve

FMX50 with 100 litre hopper and manual valve

FMX75 with 300 litre hopper, pneumatic valve and powder sensor

Flashblend powder/liquid mixing system

The Silverson Flashblend is designed to incorporate large volumes of powders on a continuous and semi-continuous basis, at rates of up to 15,000 kgs/hour. The semi-automated system can be specified for ultra-hygienic applications and custom built to suit client's specific requirements There are over 500 Flashblend systems in use worldwide, throughout all sectors of the process industry.

Advantages

- **Suitable for large scale production**
- **Can be incorporated into automated systems**
- **Fully sterilisable units available**
- **Can be customised to suit client requirements**
- **Agglomerate-free product**
- **Repeatability**
- **Speed**
- **Minimum aeration**
- **Improved vessel hygiene**

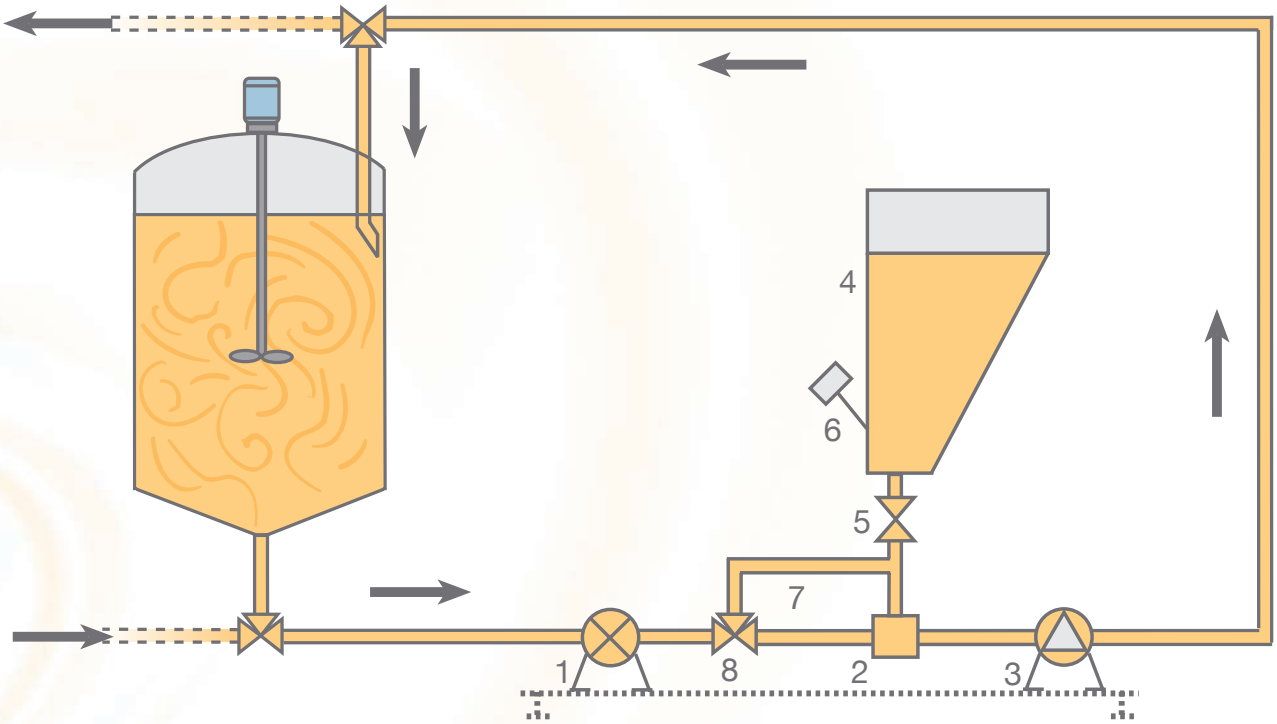
The hopper can be modified to accommodate various conveyors, bulk containers, feed systems and dust extraction units.

Electrical:
Facilities to control ancillary equipment can be incorporated in the panel at the design stage.

ATEX

Units suitable for use in Zone 22 areas are available.

Flashblend operating sequence



Liquid is forced through the system by the pump (1). The liquid flow through the venturi assembly (2) creates a vacuum, boosted by the pumping action of the Silverson In-Line mixer (3). When powder is present in the hopper (4) the valve (5) can be opened and powder is drawn down into the venturi by the vacuum.

The powder/liquid mix immediately passes into the high shear rotor/stator assembly of the Silverson In-Line mixer, ensuring a finely dispersed and agglomerate-free mixture. The resultant product is passed back to the process vessel by the pumping action of the machine.

Once the hopper is empty, the sensor (6) will automatically shut the valve, minimising aeration. When the powder sensor closes the powder feed valve, product flow can be diverted round a by-pass line (7) by the divertor valve (8).

The high flowrate in this mode ensures a scouring action of the venturi housing, keeping the area free of any build-up of partially hydrated powder.

The bypass position is also used for Cleaning-In-Place (CIP), ensuring that the venturi area is cleaned to as high a standard as normal sanitary piping.

Technical Specifications and Options

Materials of construction

All product contact parts are constructed in 316L stainless steel. The chassis is constructed from 304 stainless steel square tube and is used to carry the motor wiring and valve pneumatics.

Motor specifications

TEFV (Totally Enclosed Fan Ventilated) motors are available as standard. Other types of motor and various enclosures are available as options.

Inlet and outlet connections

All standard sanitary screw or flange fittings are available (RJT, ISS, SMS, ASA, DIN, Tri-clamp, etc.).

ATEX

Units suitable for use in Zone 22 areas are available.

Electrical

The standard Flashblend has an integral Stainless Steel control cabinet. The panel, switches, lights, etc., are to IP65 and all control voltages are 24V AC. All process functions are controlled from this cabinet which includes a mimic to show the operator the chosen operating mode and the current stage of the process. 460V power requirements are standard; other voltages are available on request.

Sealing

The pump and Silverson In-Line mixer are normally sealed by a single mechanical shaft seal. Double mechanical shaft seals are required when processing products that are abrasive, sticky, viscous or hazardous.

Options

Hopper:

The inside of the hopper can be coated with food grade nylon to improve the flow of cohesive powders. This finish is not suitable for use in Flameproof areas. Electropolished finish is also available.

Powder Feeding:

The hopper can be modified to accommodate various conveyors, bulk containers, feed systems and dust extraction units.

Electrical:

Facilities to control ancillary equipment can be incorporated in the panel at the design stage.

Other Silverson Mixers

From laboratory units to 30,000 litre production scale machines, Silverson High Shear mixers are suitable for the widest range of applications - mixing, emulsifying, homogenising, disintegrating and dissolving - with an efficiency and flexibility unmatched by other machines.

Laboratory Mixers

Silverson Laboratory Mixers offer unrivalled efficiency and versatility and provide accurate means of forecasting the performance of larger Silverson machines under full-scale working conditions. Ideal for everyday laboratory work and small scale production, the laboratory range has a capacity from 1ml up to 12 litres.

Batch Mixers

These highly efficient mixers can dramatically improve product quality and offer considerable reductions in processing times. For increased flexibility, small to medium scale machines can be used with a mobile floor stand. Large scale mixers with a capacity of up to 30,000 litres are designed for vessel mounting, and are custom built to suit each customer's specific requirements.

Ultramix

The Silverson Ultramix is designed for applications which are beyond the capabilities of a conventional agitator or stirrer but do not necessarily require the intense high shear of a Silverson rotor/stator mixer. The Ultramix features an innovative single-piece dynamic mixing head,combining superior performance with minimised cleaning and maintenance requirements.

In-Line Mixers

For continuous processing or batch recycling, Silverson has a complete range of high shear In-Line mixers including the Ultra Hygienic UHS range for applications in the food, pharmaceutical and cosmetics industries. General Duty models are available for the chemical and petrochemical industries. Self-pumping and aeration-free, Silverson In-Line mixers have throughputs from 20 litres/minute up to 200,000 litres/hour.

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