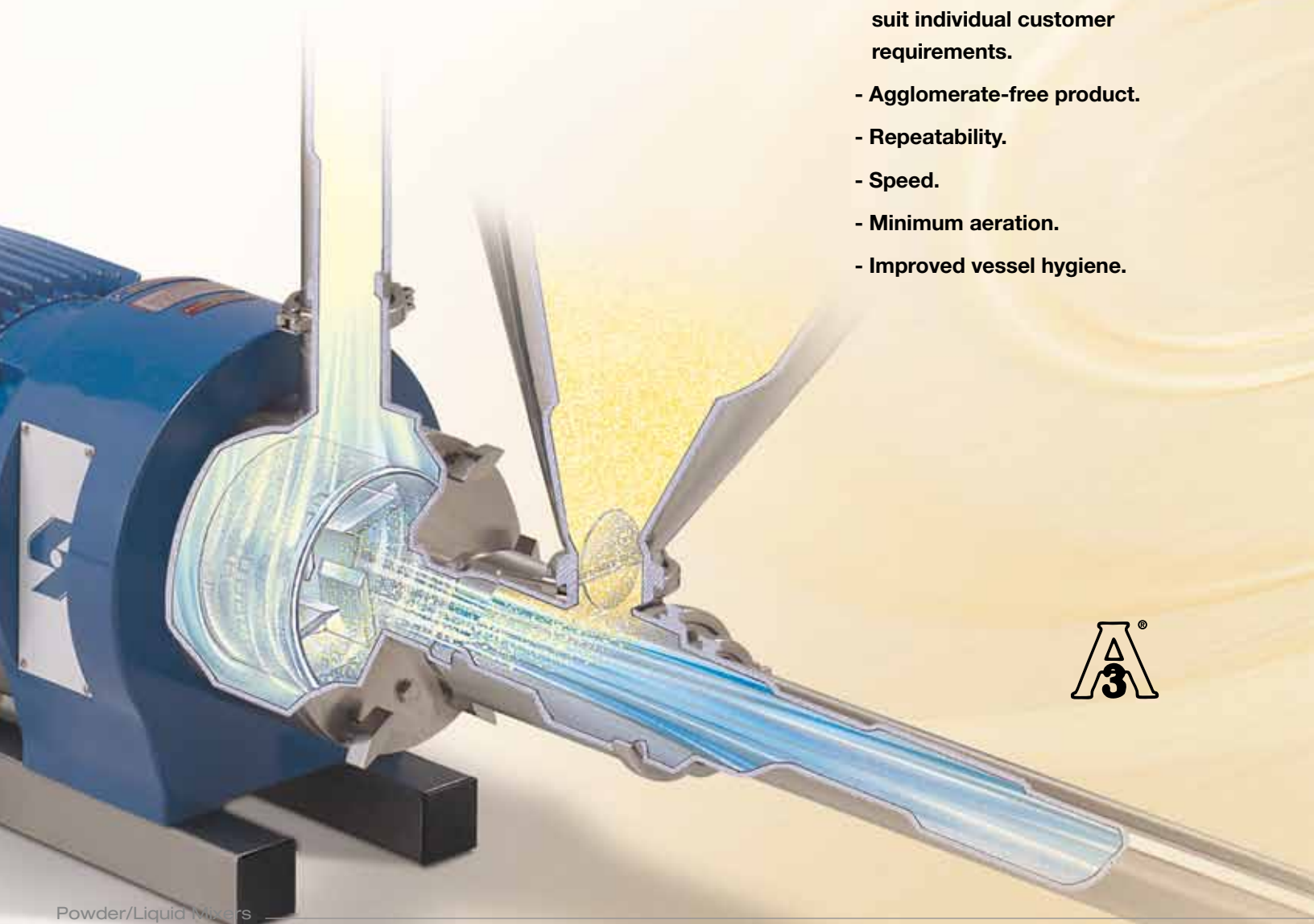


## Flashblend powder/liquid mixing systems

The Silverson Flashblend is designed to incorporate large volumes of powders on a continuous and semi-continuous basis, at rates of up to 500 lbs/minute. The system can handle a wide range of viscosities from low viscosity products through to viscous gels.

### **Advantages**

- **Suitable for large scale production.**
- **Easy to incorporate into automated systems including Big Bag discharge units.**
- **Fully sterilizable units available.**
- **Can be customized to suit individual customer requirements.**
- **Agglomerate-free product.**
- **Repeatability.**
- **Speed.**
- **Minimum aeration.**
- **Improved vessel hygiene.**



# Flashblend mixing principle

The Silverson Flashblend offers a unique method of incorporating powders into liquids, producing an agglomerate-free and homogeneous product in a single pass.

## Stage 1

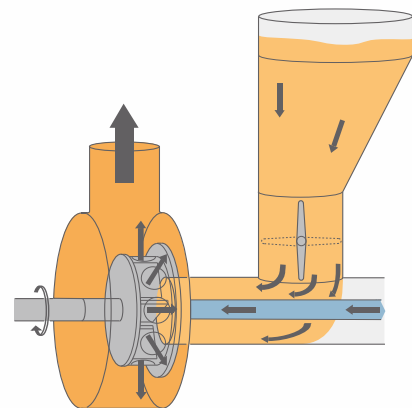
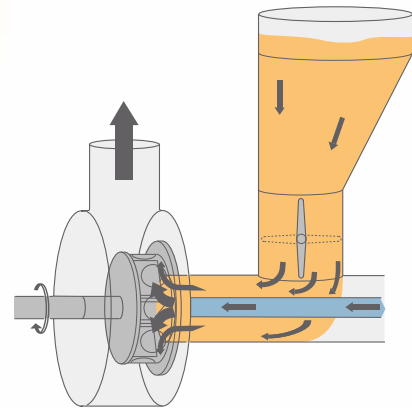
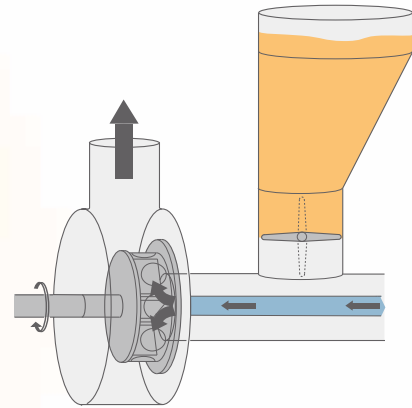
The process liquid is pumped at high velocity into the venturi chamber and passes into the In-Line mixer. The combination of the pump, venturi and the pumping action of the In-Line mixer creates a high vacuum in the venturi chamber.

## Stage 2

When powder is present in the hopper, the powder feed valve can be opened. The vacuum rapidly draws the powder down into the venturi chamber where it passes with the liquid stream at high velocity into the rotor/stator assembly of the Silverson In-Line mixer.

## Stage 3

The powder/liquid mix is then subjected to intense mechanical and hydraulic shear which ensures that it is completely dispersed and agglomerate-free. The resultant product is then passed back to the process vessel by the pumping action of the machine.



## Flashblend operating sequence

### Operation

Liquid is forced through the Flashblend by the pump (1). The action of this flow through the venturi assembly (2) creates a vacuum which is then boosted by the pumping action of the Silverson In-Line mixer (3). The venturi is separated from the powder hopper (4) by a valve (5) which is controlled by a powder sensor (6). When powder is present in the hopper the valve can be opened and the powder will be drawn down into the venturi by the vacuum.

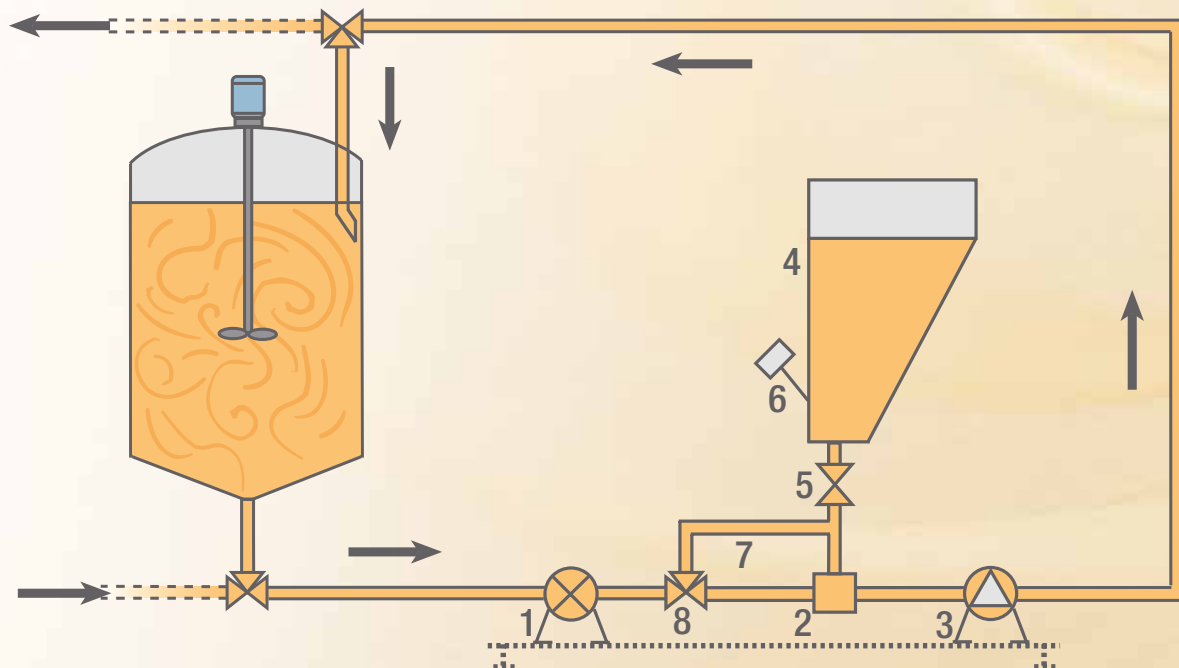
The powder/liquid mix immediately passes into the high shear rotor/stator assembly of the

Silverson In-Line mixer where it is subjected to intense mechanical and hydraulic shear. This ensures that it is completely dispersed and agglomerate-free. The resultant product is then passed back to the process vessel by the pumping action of the machine. Once the hopper is empty, the sensor will automatically shut the valve, minimizing aeration.

Integral with the venturi is a by-pass line (7) which ensures that the venturi area is kept free from any possible powder build-up. When the powder sensor closes the powder feed valve,

a divertor valve (8) is actuated which sends the product around the outside of the venturi nozzle. The flowrate is much higher in this mode than in the powder absorbing mode. This increased throughput ensures a scouring action of the venturi housing and guarantees that the area is kept free of any build-up of partially hydrated powder.

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



## Advantages

### **Agglomerate-free product**

The combined action of the machine's venturi and High Shear In-Line mixer guarantees a totally agglomerate-free and homogeneous product in a single pass.

### **Repeatability**

Most problems that occur when adding powders into liquids are typically due to operator error - for example adding powders too quickly. With the Flashblend system it is the machine that dictates the powder addition rate, not the operator. Repeatability is assured and a consistent homogeneous product will be produced time after time.

### **Speed**

Powder incorporation rates of up to 30,000 lbs/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.

### **Installation**

The Flashblend is designed to be installed close to the vessel outlet and at floor level. The low open hopper is easy to charge and this overcomes the traditional problem of having to lift powders to the top of the mixing vessel.

### **Improved vessel hygiene**

All powder is dispersed and hydrated before it enters the mixing vessel, overcoming 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.

### **Liquid/liquid mixing**

Viscous liquids can be incorporated into the bulk liquid by adding them via the hopper. This can be achieved without aeration or foaming. Liquid additives can also be pumped directly into the venturi.



## Technical specifications

### **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**

TEFC, washdown duty and explosion proof motors are available as standard. Inverter rated, stainless steel and other motors are available as optional extras.

### **Inlet and outlet connections**

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

### **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.





## Typical powder dispersion applications

### Food industry:

**Low fat spreads:** Caseinates, Gelatine, Starch, etc.

**Ice cream:** Milk powder, Sugar, Cocoa, Stabilizers, etc.

**Yogurt:** Milk powder, Sugar, Pectin, Gelatin, etc.

**Baby milk:** Skimmed milk powder, Lactose, Soy protein, Maltodextrin, Fat

**Flavored 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.

**Standardization of milk:** Milk powder, Lactose

**Sweetened condensed milk:** Sugar, Milk powder

**Jams and preserves:** Pectin solutions

**Pet foods:** Starch, Guar gum, Xanthan gum, Alginates

### Cosmetics and pharmaceuticals:

**Deodorants:** CMC, Active ingredients

**Hair gels:** Carbopol

**Hairsprays and mousses:** Resin into alcohol

**Shampoos:** 70% Sodium Laureth Sulphate (SLES) into water

**Tablet coatings:** Polymer dispersions

**Dental adhesives:** 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

### Beverage and brewing:

**Cream liqueurs:** Caseinates, Sugar

**Soft drinks:** CMC, Pectin, etc.

**Beer:** Head retaining agents, Finings

### 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**