

Solutions for Your TOUGHEST  
MIXING Applications in

# FOOD

**Introduction**

Soft Drink Manufacture -

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Dispersion of Artificial

**The Problem**

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# FOOD

## Soft Drink Manufacture - Dispersion of Artificial Sweeteners

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“Low Calorie”, “Sugar-free”, or “Diet” soft drinks are formulated with artificial sweeteners such as Aspartame, Acesulfame K and Saccharin. These ingredients are more expensive than the sucrose sugar used in “original” formulations, however a small percentage of artificial sweetener can replace a high sugar content. A disadvantage is that they cannot replicate the viscosity and texture (properties known as “mouthfeel”) of sugar based formulations, and thickening agents such as CMC are often added to compensate for this.

## The Process

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In small scale production, liquid sweetener may be used, simply requiring blending with the water. Alternatively powdered sweetener is dispersed along with other powdered ingredients on an individual batch basis. Larger scale operations typically make up a dispersion of sweetener in bulk which is held in a vessel before use, or blended on stream with the remaining ingredients.

In each case, a number of processing factors must be considered:

- Some artificial sweeteners do not dissolve easily.
- Heating may be required to aid solubilizing.
- Mixing equipment must be capable of rapidly incorporating the powders which are very fine and have a tendency to float or “raft” on the surface of the base liquid.

## The Problem

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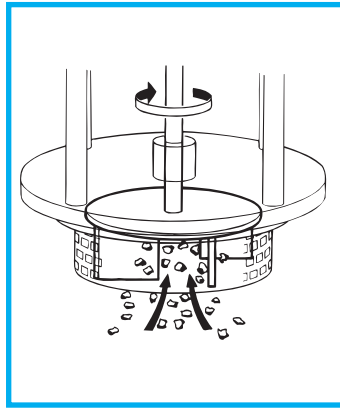
Although easier to use, liquid sweetener is considerably more expensive than powdered forms.

When dissolving powder with conventional agitators, a number of difficulties can be experienced :

- Even with heating, dissolving by simple agitation is a slow process.
- Heating of the mixture to aid solution is energy inefficient.
- The cooling process further adds to costs and process time.
- Wastage due to incomplete dissolving and build up of material on the vessel walls and parts of the agitator adds to costs.
- Dusting must be minimized to prevent waste and potential Health & Safety problems.

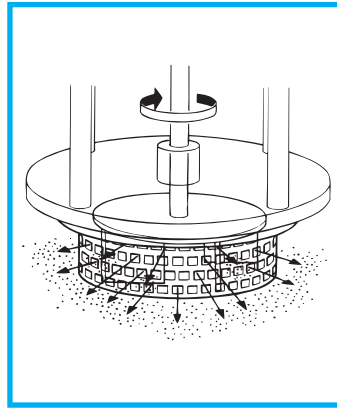
## The Solution

A Silverson High Shear Mixer can overcome these problems. The 3 stage mixing cycle accelerates the dissolving process as follows:



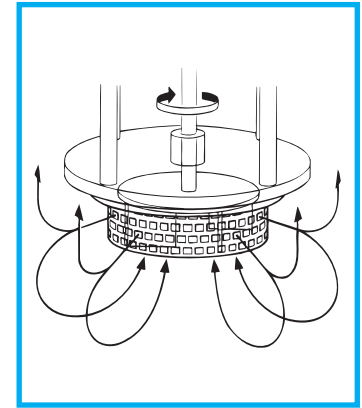
*Stage 1*

The vessel is charged with liquid and the mixer is started. The high speed rotation of the rotor blades creates a powerful suction which draws the liquid and powdered ingredients into the workhead where they are rapidly mixed.



*Stage 2*

The particles are reduced in the gap between the rotors and stator wall. The product is forced out of the stator and projected radially back into the body of the mix as fresh ingredients are drawn into the workhead.



*Stage 3*

In a short mixing cycle all the material passes through the workhead, progressively reducing the particle size and exposing an increasing surface area to the surrounding liquid, accelerating the dissolving process.

## The Advantages

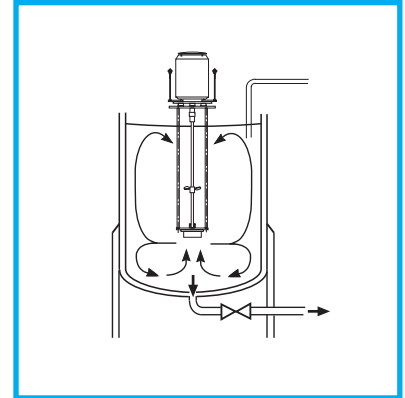
- Dramatic reduction in mixing times
- Heating is not required
- Maximized yield
- Sweeteners can be added along with other powdered ingredients - premixing is not necessary
- Sweeteners will be wetted and other ingredients fully hydrated in one operation
- Improved vessel hygiene

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There are several products in the Silverson product line suitable for this application, the selection of which is dictated by individual process requirements including batch size.

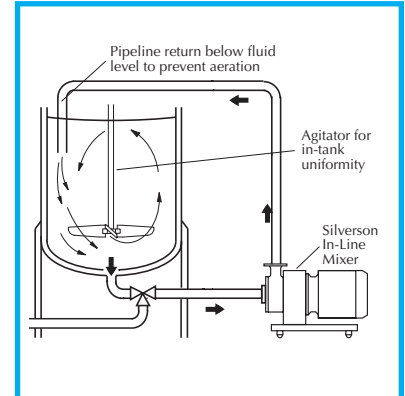
### High Shear Batch Mixers.

- Suitable for batch sizes up to 500 Gallons
- Smaller units can be used on mobile floor stands
- Small units available for R&D and pilot production



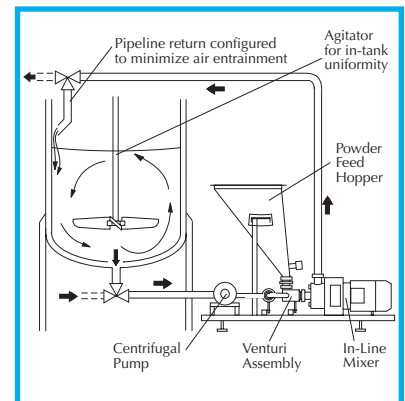
### High Shear In-Line mixers.

- Ideal for larger batches
- Aeration-free
- Easily retro fitted to existing plant
- Self pumping
- Can be used to discharge vessel
- Ultra Hygienic models available



### Flashblend

- Ideal for larger batches
- Capable of incorporating large volumes of powder
- Minimized cleaning requirements
- Minimum operator input required
- Easily automated
- Minimized dusting



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