

Solutions for Your TOUGHEST
MIXING Applications in

FOOD

Introduction

Soft Drink Manufacture -

The Process

Preparation of

The Problem

Sugar Syrups

The Solution

The Advantages



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Soft Drink Manufacture - Preparation of Sugar Syrups

The sugar content of carbonated and still soft drinks varies considerably according to whether the product is to be supplied ready to drink, or as a concentrate (often referred to as a “syrup”).

A typical formulation would also contain flavoring or concentrated fruit juice, acidity regulators, preservatives, stabilizers, antioxidants and coloring.

With “Diet”, and other “sugar free” drinks the sugar content is replaced with artificial sweeteners such as Aspartame (covered in a separate report).

The Process

One of the first stages in a typical manufacturing process is preparation of a sugar syrup. Sugar is used in either granulated or liquid form. Liquid sugar simply requires blending with water, however when granulated sugar is used, a number of processing factors must be considered:

- Small scale production of syrups with a low sugar content can be carried out at ambient temperature. However with some concentrated products, sugar solutions at 60% or above are not uncommon, requiring heating of the water to aid dissolving.
- In large scale operations, heating to around 35°C (95°F) may be carried out to speed up dissolving.
- Other powdered ingredients may be dry premixed with part of the sugar, which helps to prevent them from agglomerating and “weights” light powders which tend to float.

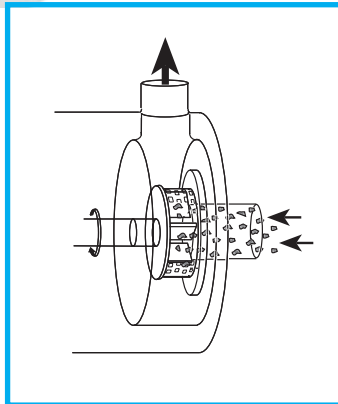
The Problem

- Liquid sugar can be considerably more expensive than granulated sugar.
- Dissolving of granulated sugar by simple agitation is a slow process.
- Conventional agitators cannot dissolve high concentrations of sugars at ambient temperatures.
- Heating the water to aid solution adds to costs and is energy inefficient.
- The cooling process further adds to costs and process time.
- Crystallisation of the syrup can occur during heating/cooling.
- Incomplete solubilization can lead to sedimentation or even blocking of vessel outlets.

The Solution

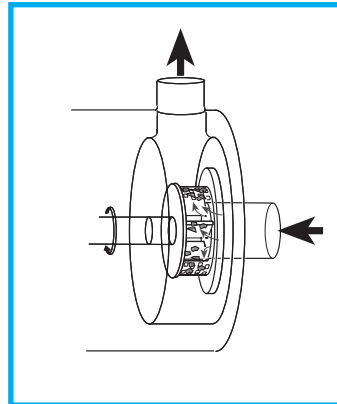
A Silverson High Shear Mixer can substantially reduce mixing times and eliminate the need for heating the water.

This can be achieved with in-tank Batch Mixers or by adding a Silverson In-Line Mixer to the existing process. This operates as follows:



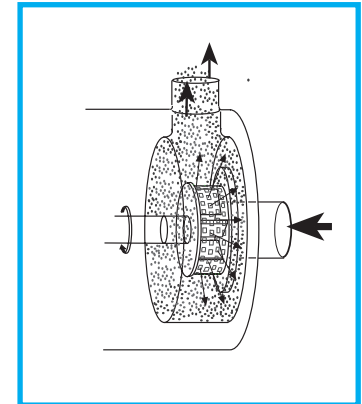
Stage 1

The high speed rotation of the rotor blades creates a powerful suction which draws the water and sugar granules from the vessel into the workhead.



Stage 2

Centrifugal force drives the materials to the periphery of the workhead where they are subjected to a milling action in the gap between the rotor and the stator wall.



Stage 3

The product is forced out through the stator as fresh materials enter the workhead. In a short mixing cycle all the material passes through the workhead, progressively reducing particle size and exposing an increasing surface area of sugar to the surrounding liquid, accelerating the dissolving process.

The Advantages

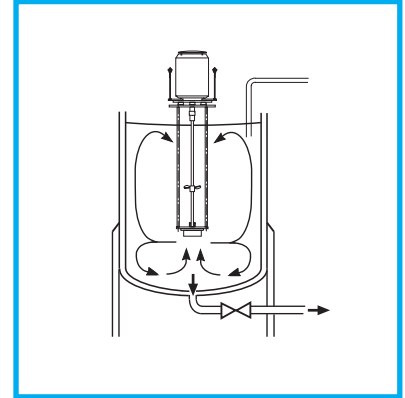
- The combination of granule size reduction and vigorous mixing dramatically reduces mixing times.
- A 66% sucrose syrup can be produced at ambient temperature
- Increased versatility allows the manufacturer to use sugar in granulated or syrup form
- A Silverson mixer can also disperse and hydrate thickening and stabilising agents such as CMCs and Xanthan gum in a fraction of the time taken by other means.

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Batch mixers operating in the vessel or In-Line mixers for larger volumes are generally used for this application:

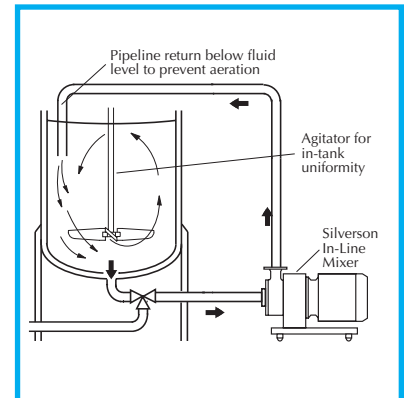
High Shear Batch Mixers.

- 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 up to 10,000 Gallons and continuous processes
- Easily retro fitted to existing plant
- Aeration-free
- Self pumping
- Can be used to discharge vessel
- Ultra Hygienic models available



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