SULZER

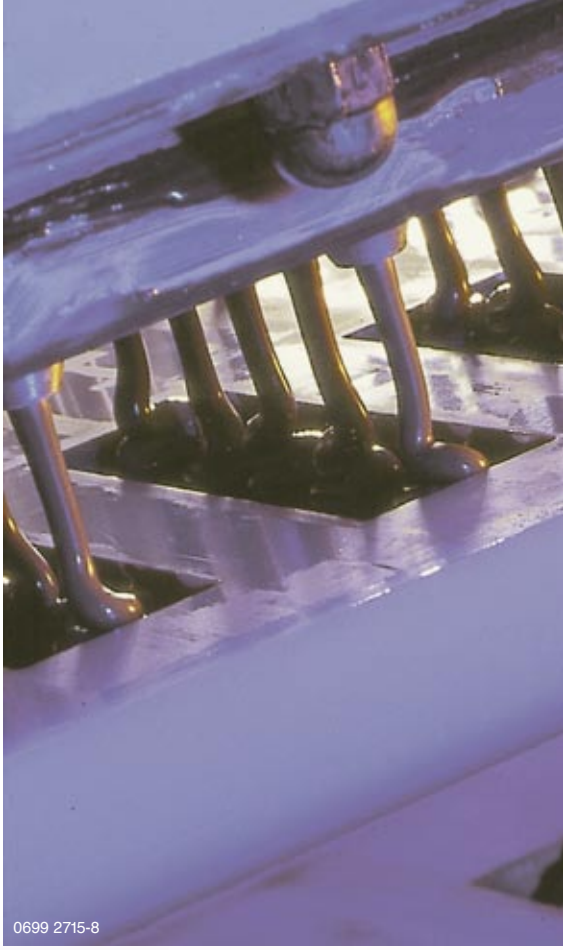
Sulzer Chemtech

Static mixers for the food processing industry

Innovation as a continuous process

Leading technologies

Static mixers and mixing systems have an established place in many industries. They are used for continuous processes and offer the customer a whole range of technical and economic advantages. Sulzer Chemtech is recognized worldwide as the leader in the static mixing industry and is continually setting new standards based on innovative ideas.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Static mixing means homogenisation without moving parts. In contrast to dynamic mixing technology, different components are mixed solely through the utilization of flow energy. The actual mixing effect is generated from the continuous split-off, dilatation and redistribution of product streams. The required energy for mixing is supplied by flow generation equipment such as pumps, screws or blowers.

Decisive advantages

Sulzer mixers are based on an advanced method of construction with open, cross-over flow channels. This unique technology ensures that the mixing sequence is not incidental but takes place according to a predetermined geometric pattern and is thus regular and reproducible. The result is increased efficiency, lower energy consumption, lower operating costs.

The specific advantages of using static mixers are:

- The absence of moving parts reduces downtime for servicing and repairs to a minimum.
- The closed system permits totally hygienic product processing in a germ-proof environment.
- Low shear forces and the absence of gas overlays enable gentle processing in the shortest possible time.
- Semi-batch-processes can also be operated continuously, even when volumes are low.

  The result: maximum flexibility, high security, no additional reservoir and products that are always fresh.

Most important end effects are:

- Excellent cleaning-in-place characteristics (CIP)
- No sealing problems
- No production losses
- No unwanted air inlet
- Small volumes, short residence times
- Low space requirement
- Straightforward installation in existing plant
- Low investment costs

The outlook is good

Sulzer Chemtech has brought static mixing technology to the highest level. Step-by-step, we have optimised the different process technologies, and can carefully adjust our systems to suit your individual requirements. Accordingly, with our range of products, we are today in a position to offer you solutions for more than 60 applications that are guaranteed to meet your expectations in full. On request, we will even furnish you with a suitable test unit.

At a glance:

Static mixing can be applied typically to the following basic processing operations:

- The mixing of low- and high-viscosity liquids
- Dispersion of immiscible liquids
- Homogenisation of gas flows with regard to concentration or temperature
- Intimate and intensive contacting of liquids with gases for increased mass transfer
- Controlled reactions over a narrow residence time distribution

Gentle heating of temperature-sensitive products, as well as cooling whilst providing a simultaneous mixing action

Systems that stimulate the appetite

Static mixers fulfil important tasks in the food processing industry. It is particularly suitable for admixing additives such as fragrances, flavours and dyestuffs, minerals, trace elements, vitamins, emulsifiers and preservatives. Pasteurisation and sterilisation are further important areas of application.

Sulzer Chemtech has the right solution for all mixing and reaction processes in the food industry. There are 5 different mixer types covering the entire application spectrum. They can all be tuned to the specific needs of individual processes.

Low-viscosity, turbulent mixing

The SMV static mixer is primarily used for mixing low-viscosity media (e.g. fruit juices with fragrances), dispersing immiscible liquids (e.g. desliming vegetable oils with phosphoric acid) and contacting liquids with gas for mass transfer (e.g. carbonization of water).

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Benefits:

- Savings in additives due to complete, immediate mixing
- Simple separation and high mass transfer due to uniform, small drop-size/bubbles

Typical Applications:

Beverage industry; oil and fat industry

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Mixing of liquids containing solids

Sulzer's SMF mixer is used for product flows that contain solids (e.g. fruit pieces in yoghurt). The large, clear cross section in the tube and open structure design of the mixing chamber guarantee a reliable operation that safeguards integrity of processed solids and is not prone to clogging – even less so thanks to the inclined guide elements which, in addition to actual mixing, allow a continuous flow of particles downstream.

Benefits:

- No clogging when introducing fruit pieces or solid particles, and no destruction of the fruit structure

Typical Applications:

Dairy processing industry

High-viscosity, laminar mixing

The SMX static mixer is suitable for the homogenisation of high-viscosity liquids (e.g. sweet masses), the mixing of low-viscosity additives into high-viscosity media (e.g. fragrances into chocolate), the creation of a marble effect in ice cream, as well as the colouring of dough prior to extrusion.

Benefits:

- Maintaining product structures due to low shear forces
- Streak-free mixing over a short physical length

Typical Applications:

Confectionary industry, ice cream industry

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Sulzer mixer/heat exchanger SMR and SMXL

The Sulzer mixer/heat exchanger has an extremely wide spectrum of applications and is used for the cooling and heating of high-viscosity media (e.g. chocolate, creams, purées). Simultaneously with the exchange of heat, the product is mixed over the entire tube cross section to enable mild and gentle processing.

The SMR-type mixing elements (throughput from approx. 200 kg/h) are manufactured in complex tubular form through which heat transfer medium flows at predetermined rate. The product flows around the tubes, which thus become active heat-exchange surface. The SMR is used in place of scraped surface heat exchanger, for example, for products at temperatures above freezing point.

The SMXL version (throughput up to approx. 150 kg/h) is used as a mono- or multi-tube heat exchanger. The boundary layer close to the tube wall on the double-shell heat exchanger is subjected to constant out renewal, and thus brings a great improvement to the transfer of heat while preventing settling, fouling and clogging.

Benefits:

- Gentle and uniform product processing thanks to a low shear rate
- Savings in energy and investment costs
- Narrow residence time distribution, optimum quality
- Minimal pressure loss and short residence times

Typical Applications:

Confectionery industry, dairy processing industry

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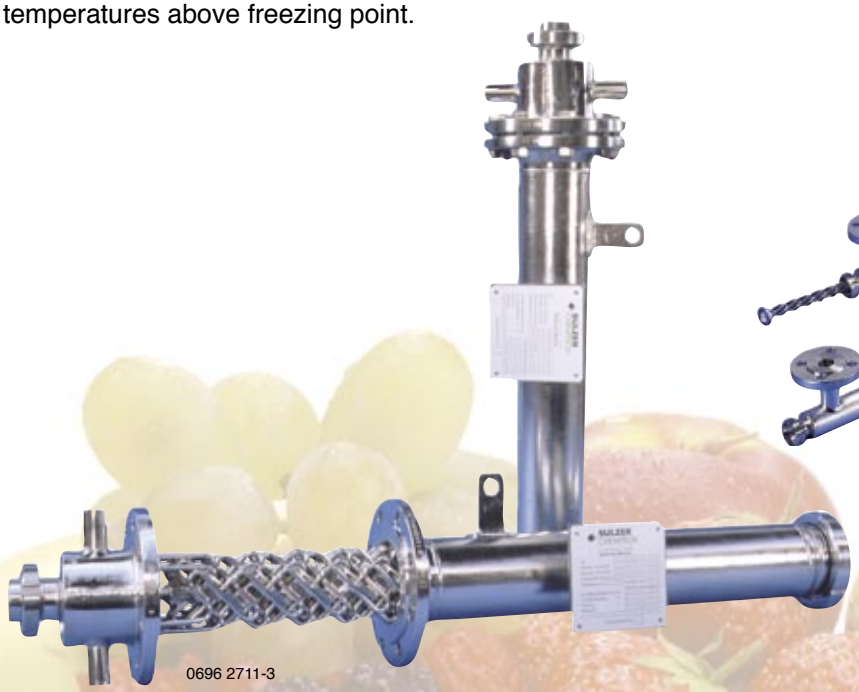

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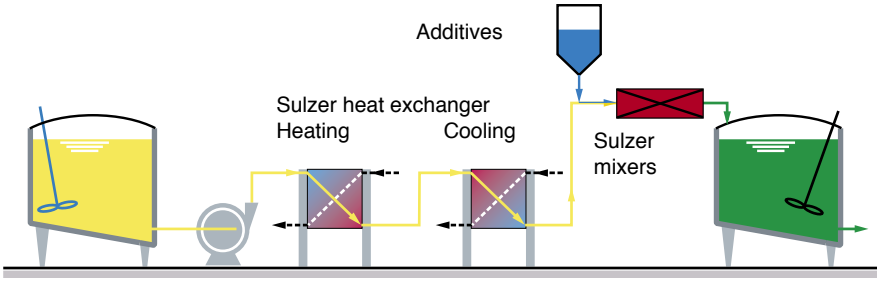
Solutions that melt on the tongue

Satisfied customers form the best argument for static mixers and heat exchangers supplied by Sulzer Chemtech. This is especially true in the food processing industry, not only because absolute perfection is the order of the day, but also that the modern consumer also eats with his eyes as well as his mouth.

Static mixers from Sulzer Chemtech can be used in a wide variety of applications. Whether for low-viscosity liquids or high-viscosity chocolate masses, they can be flexibly tuned to the specific requirements of the customer.

Sulzer Chemtech brings benefits over the wide spectrum of applications.

Pasteurisation of curds and cream products



Milk and dairy products

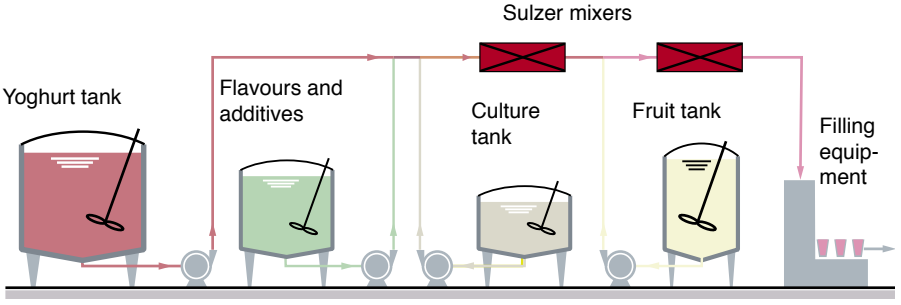
Additives such as vitamins or flavours are admixed to the milk inline. Insoluble components such as vegetable oils are predispersed, for example the acidification of milk during protein production (cheese manufacture).

Through injection of steam to production flow, microorganisms can be destroyed and enzymes rendered inactive. It is therefore important that the distribution of steam is both rapid and uniform in order to avoid local overheating.

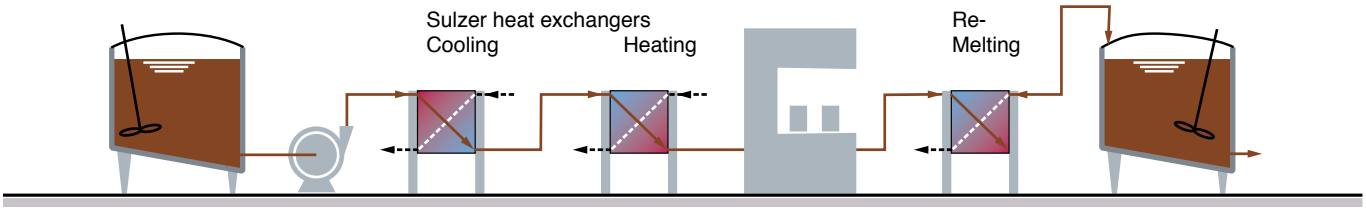
Static mixers are also suitable for adding flavours to yoghurt and kefir, for mixing yoghurt with cream or cream with curd, for cooling dessert creams and for adding fruit concentrates and colouring. When only a few mixing elements are used for mixing, it is possible to create stripes of chocolate or fruit pastes.

SMF mixer for the dairy processing industry

Yoghurt processing



Tempering of chocolate



Chocolate and confectionery

In order to perform deodorisation, cacao butter is contacted with steam in vacuum. Sulzer mixers create the required interface for satisfactory removal of odors. The addition of lecithin, hazel nut paste and flavourings to chocolate masses is another successful application.

Mixer/heat exchangers are also used in different ways for cooling chocolate or marzipan masses. Here, continuous temperature homogenisation and a narrow residence time distribution of the shortest possible duration is essential for good product quality.

Mixing tasks that are carried out inline during the manufacture of sweets are, for example, the addition of citric and apple juices to a sugar solution, the mixing of dyestuffs or air into semi-frozen liquid ice cream and of stabilisers into jelly.

Sulzer SMR
mixer/heat exchanger

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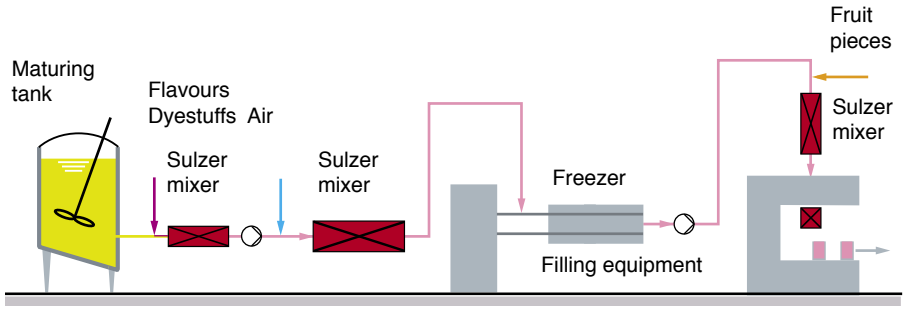
Ice cream manufacture



À la carte

Beverages
Mineral water
Fruit juice
Soft drinks
Beer
Wine
Coffee

Dairy products
Milk
Cream
Yoghurt
Kefir
Cheese
Curd
Ice cream

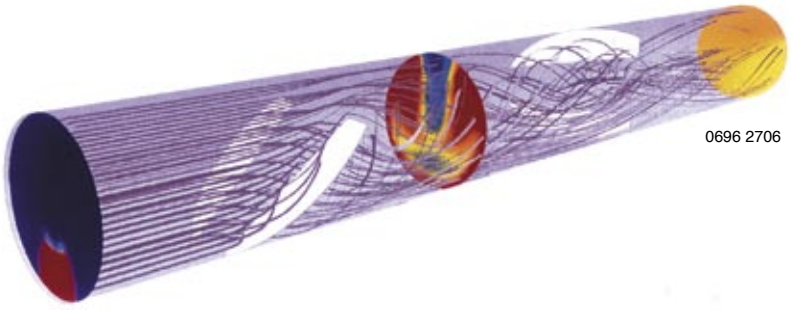
Sugar
Sugar
Yeast
Molasses
Juice concentrate

Starch
Starch mash
Potassium solution

Sweets
Chocolate
Cocoa butter
Jams
Sweets
Creams
Fillers

Fats
Nutrient fat
Salad oil
Mayonnaise

Condiments
Liquid spices
Sauces
Pastes etc.



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The advantages of static mixers from Sulzer Chemtech:

- The mixing action is uniform and reproducible thanks to open, cross-over flow channels
- No moving parts, and thus minimum downtime for maintenance work
- Totally hygienic product processing inside a contained system
- Gentle processing thanks to low shear forces and the absence of gas overlay
- Semi-continuous-processes can also be operated continuously during the production of small volumes
- Easy retrofit and installation into existing plant

Thanks to unique technology:

– lower investment cost

– lower operating costs (maintenance, energy)

– greater efficiency

– reliable operation

Yesterday

Today/Tomorrow

We will be pleased to advise and support you with your mixing and heat exchanging problems.

Contact us today!

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Sulzer Chemtech Ltd, a member of the Sulzer Corporation, with headquarters in Winterthur, Switzerland, is active in the field of process engineering and employs some 1200 persons worldwide.

Sulzer Chemtech is represented in all important industrial countries and sets standards in the field of mass transfer and static mixing with its advanced and economical solutions.

The activity program comprises:

- Process components such as trays, structured and random packings, internals for separation columns and reaction technology
- Engineering services for separation and reaction technology such as optimizing energy consumption, plant optimization studies, pre-engineering for governmental approval, basic engineering
- Separation and purification of organic chemicals by means of crystallization and membranes
- Mixing and reaction technology with static mixers

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