



# High Shear Mixers

Tetra Pak® Product Portfolio

# Efficient and reliable high shear mixers for optimal results

We deliver efficient and reliable mixing solutions which enable you to meet your customers' demands on safe and attractive food products.

Our mixers are configurable to meet any requirement, sold as a standard unit with additional customizable options to fit all applications, as well as meet your process and automation needs.

Our range of high shear mixers combine high performance with cost efficiency and low environmental impact.

Our mixers are configurable to meet any requirements.



The Tetra Pak® High Shear Mixer is the result of more than 30 years of experience and knowledge. It includes a broad range of high-quality mixers for a wide range of demanding applications, including food processing, emulsion, and high-viscous ingredients. We offer solutions for all purposes within mixing processes – these include high shear batch mixing, re-circulation mixing, and continuous mixing, from very simple solutions, to high-complexity applications.

### **Choose the right high shear mixers for all your needs**

Mixing is a highly complex operation and often takes place early in the process of food production. Thus, it is crucial for food processors to have the right mixing solution from the start and ensure complete control over the many factors that affect mixing efficiency and end-product quality. This overview of mixing technology covers guidelines for producing various common consumer products and ingredients, important mixing parameters, formulations, and explains how to overcome the key challenges within mixing.

### **Get the most at the best price**

Our standard mixer portfolio is fully customizable with various options. Thanks to our patented

dynamic stator, we can in the same mixing process do high shear mixing and gentle blending. Adding on vacuum-systems, CIP-systems, powder handling, agitators, pressure vessels, ATEX and various heating and cooling options. This enables endless production possibilities.

### **Food safety and guaranteed quality of the end products**

There is no risk of contamination entering the system since it is completely sealed to maintain product hygiene. In fact, the whole mixer is designed for sanitary execution, and can be configured to meet the regulations for both EHEDG and 3A. The shelf life of the end product is also lengthened by deaeration, since it makes the environment inhospitable for microorganisms.

### **Reduce your costs**

Our unit for powder dosing offers the choice of dosing powder ingredients automatically or manually. Automatic dosing works in a controlled and reliable manner. It draws ingredients into the mixer, eliminating the need for an operator. On the other hand, manual dosing is a good solution for price sensitive customers, enabling us to offer a Tetra Pak® High Shear Mixer at a lower investment cost.

### **Environmental advantages**

Our mixing technology is designed to be environmentally friendly and economical in the use of utilities. For example, when there is a need to use a vacuum mixer, once 500 mb has been reached in the tank, a frequency converter fitted to the mixer's vacuum system, regulates the motor to the necessary level. The control system communicates the amount of vacuum (under-pressure) needed at any given step in the process. Whenever the motor slows down, it heats the water (used to seal the vacuum pump) less. The water therefore remains at the correct working temperature for a longer period. This reduces overall water consumption by up to 50% and energy consumption by up to 70%.

### **Efficient, fast and repeatable mixing**

This is the heart of the high shear mixer unit. Shear and energy dissipation rates are significantly higher here than in conventional mixing vessels. The mixer is therefore suitable for solid to liquid dispersion, dissolving and emulsification, as well as liquid to liquid homogenization

and emulsification. The mixing process is so intense it can even dissolve notoriously difficult ingredients like pectin in seconds.

### **Easy and trouble-free powder handling**

The vacuum system allows for automatic dosing of powder ingredients in a controlled and reliable manner. It draws ingredients into the mixer, eliminating the need for an operator to do this heavy work. The product is deaerated (i.e. the air is removed from it) enabling higher up-time in the rest of your downstream line. When there is air in the product, this causes burn-on in the downstream equipment, implying a need for more frequent cleaning. The powder valve is unique to our high shear mixers. It closes immediately if there is a loss of vacuum for any reason. This eliminates the risk of back flow into the powder system, and prevents blockages, which would stop production.

### **Reliable operation**

Tetra Pak has a global presence in more than 80 countries and that gives us one of the biggest worldwide service coverage. On top of that, Tetra Pak mixers have 98% availability for spare parts. We have been making mixers for more than 30 years and have a global installed base of more than 3,300 units. We are a long-term partner, and our offer includes everything from units to product, application support, commissioning, installation support, as well as maintenance. Rapid-response service is a prerequisite for our continuous growth over the years.

# Main applications

| DAIRY                 | I200/300 | R200 | R200/300V | R370 | B200/300R | B200/300VR |
|-----------------------|----------|------|-----------|------|-----------|------------|
| Dairy                 | ●        | ●    | ●         | ●    | ●         | ●          |
| Yoghurt milk          | ●        | ●    | ●         | ●    | ●         |            |
| Baby milk             | ●        | ●    | ●         | ●    | ●         |            |
| Flavoured milk        | ●        | ●    | ●         | ●    |           |            |
| Chocolate milk slurry |          |      | ●         | ●    | ●         | ●          |
| Recombined milk       | ●        | ●    | ●         | ●    | ●         | ●          |
| Dairy dessert         |          | ●    | ●         | ●    | ●         | ●          |

| BEVERAGE         | I200/300 | R200 | R200/300V | R370 | B200/300R | B200/300VR |
|------------------|----------|------|-----------|------|-----------|------------|
| Coconut water    | ●        | ●    | ●         | ●    |           |            |
| CSD concentrates |          |      |           | ●    | ●         | ●          |
| Smoothies        |          |      |           | ●    | ●         | ●          |
| Ice tea          | ●        | ●    | ●         | ●    |           |            |
| Sports drinks    |          |      | ●         | ●    |           |            |
| Still drinks     | ●        | ●    | ●         | ●    |           |            |
| Soy drinks       |          | ●    | ●         | ●    | ●         | ●          |
| Sugar dissolving | ●        | ●    | ●         |      |           |            |

| PREPARED FOOD                | R200/300V | R370 | B200/300R | B200/300VR | B120/200VA |
|------------------------------|-----------|------|-----------|------------|------------|
| Dessert, Pudding and Custard | ●         | ●    | ●         | ●          | ●          |
| Coffee creamer               | ●         | ●    | ●         | ●          | ●          |
| Infant formula               | ●         | ●    | ●         | ●          | ●          |
| Hummus                       |           |      | ●         | ●          | ●          |
| Fruit Preparations / Jam     |           |      | ●         | ●          | ●          |
| Mayo / cold emulsions        |           |      | ●         | ●          | ●          |
| Tomato products              |           |      | ●         | ●          | ●          |
| Soups and sauces             |           |      | ●         | ●          | ●          |

**I200/300:** Inline units

**R200:** Recirculation units

**R200/300V:** Vacuum + recirculation units

**R370:** Recirculation deaeration

**B200/300R:** Batch + recirculation units

**B200/300VR:** Vacuum + recirculation units

**B120/200VA:** Batch process units



# A full range of technology

| BATCH                          | CAPACITY (1-4 batches/h) | RECIRCULATION | FINAL PRODUCT       |
|--------------------------------|--------------------------|---------------|---------------------|
| B200-300                       | 300 - 1,200 l/h          | I200-300      | 30,000 l/h          |
| B200-3A                        | 800 - 3,200 l/h          | R200-200      | 12,000 l/h          |
| B200-800                       | 800 - 3,200 l/h          | R200-200-3A   | 12,000 l/h          |
| B300-2000                      | 2,000 - 8,000 l/h        | B200-3A*      | 18,000 l/h          |
| B200-800V                      | 800 - 3,200 l/h          | R200-400      | 18,000 l/h          |
| B300-2000V                     | 2,000 - 8,000 l/h        | R200-200V     | 15,000 l/h          |
| B120-25VA                      | 25 - 100 l/h             | B200-800V*    | 20,000 l/h          |
| B200-100VA                     | 100 - 400 l/h            | B300-2000V*   | 28,000 l/h          |
| B200-250VA                     | 250 - 1,000 l/h          | R300-2500V    | 30,000 l/h          |
| B200-500VA                     | 500 - 2,000 l/h          | R370-1000D    | <Viscosity 2 000 cP |
| B200-500VAA                    | 500 - 2,000 l/h          |               |                     |
| B300-1500VAA                   | 1,500 - 6,000 l/h        |               |                     |
| B400-2500VAA                   | 2,500 - 10,000 l/h       |               |                     |
| * Batch unit for recirculation |                          |               |                     |
| CONTINUOUS                     | CAPACITY                 |               |                     |
| C300-1500AA                    | 5,000 - 20,000 l/h       |               |                     |
| C300-1500VAA                   | 5,000 - 20,000 l/h       |               |                     |

# +20

**standard mixers for endless possibilities!**



# Key features

- Reduce air incorporation
- Increase product stability
- Equipment can be adapted to meet specific needs
- Obtain desired particle size
- Improve mouthfeel
- Obtain desired viscosity



# Three mixing process

Batch, recirculation, and continuous

Discover your optimal mixing solution depending on viscosity, capacity, and application needs.



## Batch

For traceability and optimal recipe control



## Recirculation

High flexibility, simple and cost-efficient set-up



## Continuous

Optimal for high capacity and family-pack lines

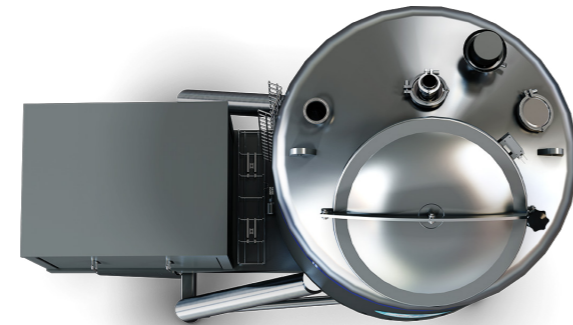
# Tetra Pak® High Shear Batch Mixer

## Versatile ingredients mixing

Designed to give the highest quality you want as well as being cost-efficient by utilizing the ingredients to the fullest. Cooking, grinding, mixing and cooling all in one mixer leads to fast batch times and enhanced flexibility.

When dealing with difficult powders and highly viscous products, batch mixers, with the mixing unit inside the mixer tank, are the ideal solution. Since there are no circulation loops around the mixer, the entire mixture in the vessel is forced through the mixing head more often than in conventional systems with circulation loops.

Tetra Pak® High Shear Batch Mixers are ideal for a wide variety of applications and dealing with high viscous applications such as sauces, dressings, spreads, toothpaste, and more.



Designed to give the highest quality you want as well as being cost-efficient.



# How it works

With a batch mixing system, the main component is the mixing tank. It starts with dosing in the ingredients, followed by mixing everything to the desired result with the bottom mounted mixing head.

This mixing head is based on a rotor/stator unit. The rotor draws the ingredients into the mixing head and pushes them out through the holes in the stator. During this process the impeller at the bottom of the rotor subjects the product to the desired shear. This rotor/stator design ensures optimal mixing, even particle distribution and consistent high quality. The final step is discharging the batch for further processing.

- Tank / batch size 25 l to 20.000 l
- Powder capacity up to 15.000 kg/h
- Maximum solid (normal recombination)  $\leq$  80%
- Vacuum or no vacuum
- Viscosity 0-100.000 cP
- Heating, (flash) cooling
- Particle size  $\leq$ 10mm
- Pressure vessel

## Application examples



Non-dairy cream



Cream cheese and spreadable cheese



Mayonnaise and dressings



Ice-cream



Fruit preparations



Hummus and refried beans



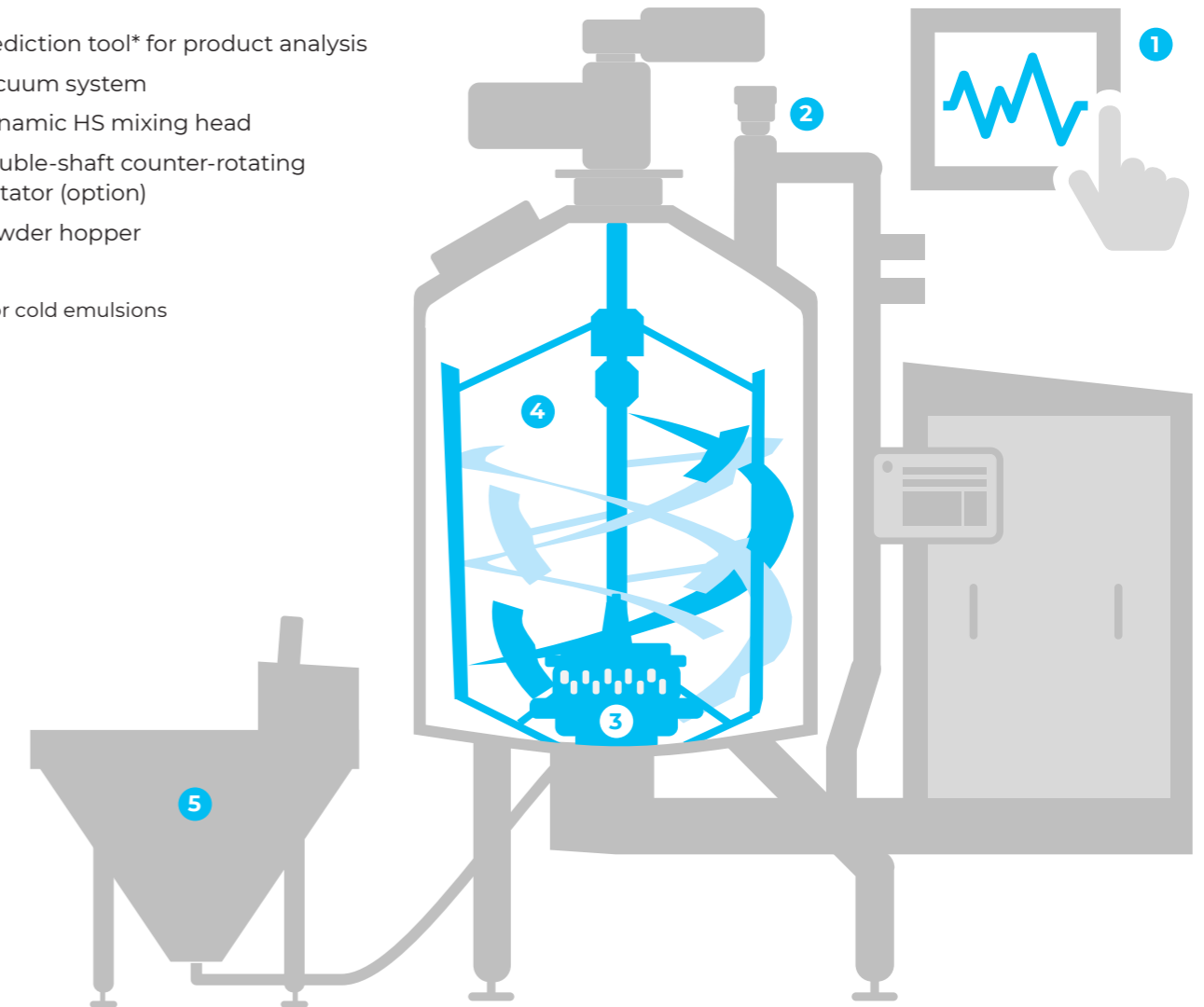
Soups



Tomato products and others

- 1 Prediction tool\* for product analysis
- 2 Vacuum system
- 3 Dynamic HS mixing head
- 4 Double-shaft counter-rotating agitator (option)
- 5 Powder hopper

\*Only for cold emulsions



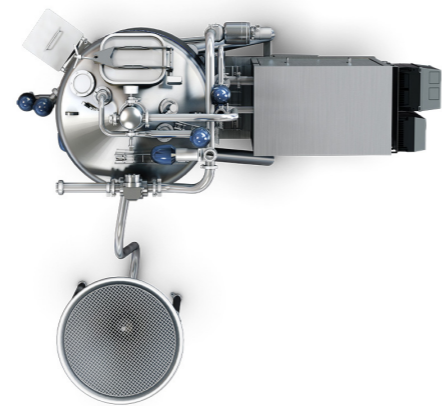


# Tetra Pak® High Shear Mixer for recirculation

Agile and cost-efficient to meet your needs today and in the future

The Tetra Pak® High Shear Recirculation Mixer is designed for a wide range of application in the dairy, beverage and food industry. To meet every customer needs, our High Shear Mixers ranges from manually operated systems to fully automated mixing solutions. Our recirculation mixers are available in different sizes and are designed to produce large scale production with minimal production and operational costs.

The efficient mixing system It is widely used for driving large capacity on small equipment. It efficiently dissolves powder in to liquid, and produces a homogeneous and lump-free product, suitable for viscosities up to 2000cP. This includes applications like recombined milk, fortified milk, juices and beverage blends and various dairy desserts. This type of mixer can also be used for a continuous production setup. The efficient mixing system produces homogeneous and lump-free products



Designed to enable mixing of low-viscous products in recirculation setups.



# How it works

The main component is a vacuum mixing tank with a turbo unit, located in a pump housing at the centre outlet of the tank. The turbo unit with a rotor and perforated stator ensures optimal wetting and processing.

The mix tank is first filled with liquid product, and when it reaches the correct level, recirculation over the high shear mixer begins. Vacuum is applied in the high shear mixer, and once the right vacuum level (500 mb) is established, powder starts to be added automatically. The load cells on the high shear mixer maintain an adequate level of liquid product to enable the continuous dosing of powder ingredients.

- Product capacity 3.000-40.000 l/h
- Powder capacity up to 15.000 kg/h
- Tank size from 200 l to 6.000 l
- Vacuum or no vacuum
- Viscosity 0-1.000 cP

## Application examples



Recombined and flavored milk

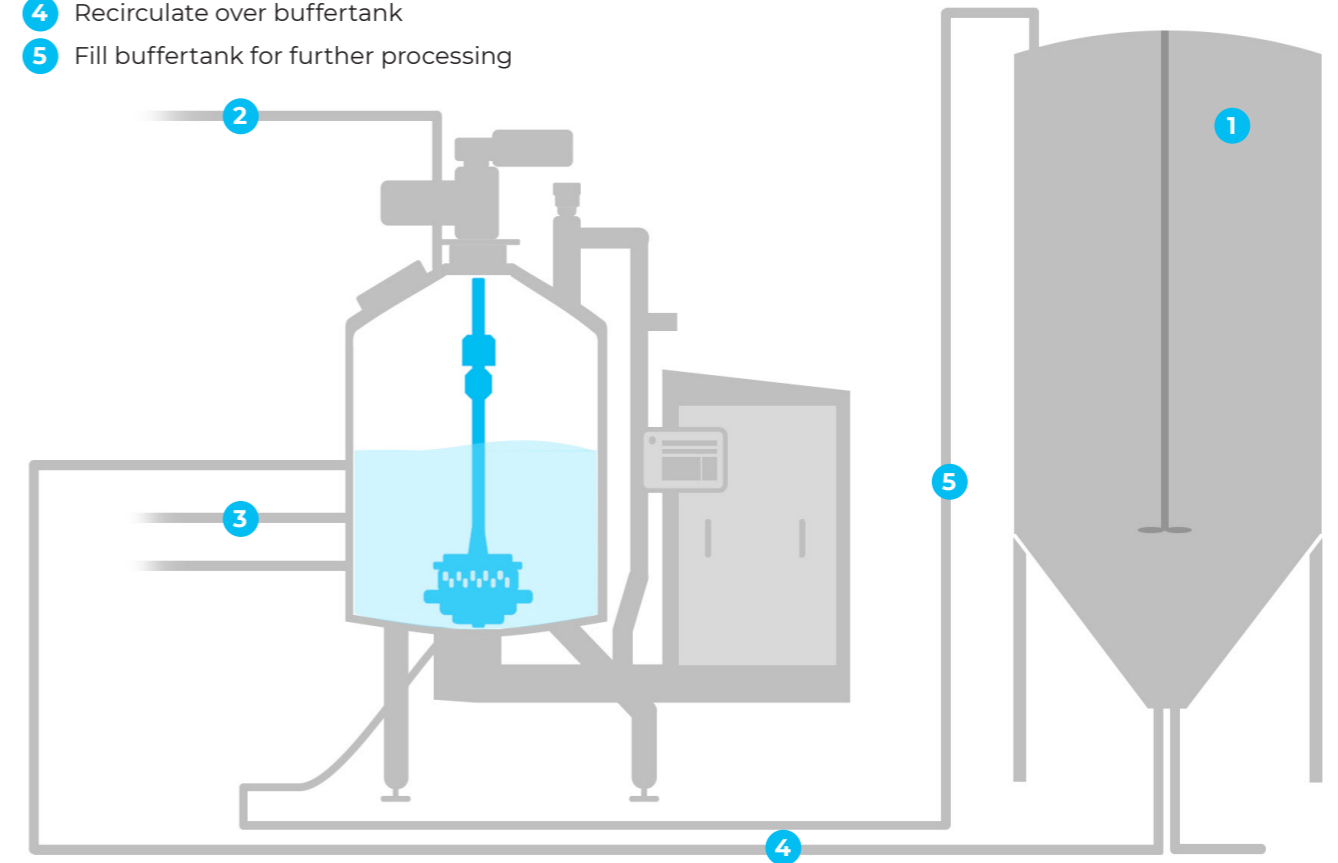


Juice, nectar and still drinks



Pectin solution

- 1 Start filling buffertank
- 2 Start filling mixer
- 3 Add powder and or oils
- 4 Recirculate over buffertank
- 5 Fill buffertank for further processing



# Tetra Pak® High Shear Mixer R370-1000D

Agile and cost-efficient to meet your needs today and in the future

The high shear mixer for recirculation is designed to enable mixing of low-viscous products in recirculation setups. It achieves superior emulsification, powder dissolving and deaeration performance and it represents an ideal solution for producing high volumes of most concentrated food products.

The Tetra Pak® High Shear Mixer for recirculation is a patented solution, revolutionizing the mixing process for huge potential improvements in cost savings and product quality. The innovative new design moves the mixing head and high viscosity pumping device outside of the traditional mixing tank – and it replaces the mixing tank with a dedicated deaeration unit.

Tetra Pak High Shear Mixers for recirculation are perfect for all kinds of mayonnaise, cold emulsion sauces, dips, beverage concentrates, ice cream mixes, infant formulas, dairy desserts and more.



Designed to enable mixing of low-viscous products in recirculation setups.



# How it works

The mixer circulates over a batch tank, from which it is fed via an external pump. Two separate frequency-controlled devices handle internal pumping and mixing actions – a self-priming twin-screw pump and a high shear mixer based on the rotor-stator principle.

The pump circulates both low and high-viscous products even under very poor suction conditions. The high shear mixing device creates high shear and turbulence to disperse, emulsify and dissolve liquid and powder ingredients. The pump and mixer are connected to a vacuum deaerator. No air is incorporated since all rotating devices have been removed from the deaerator tank. This means that mixing speed is freely adjustable and is not limited by vortex and foam constraints.

## Application examples



Recombined and flavored milk



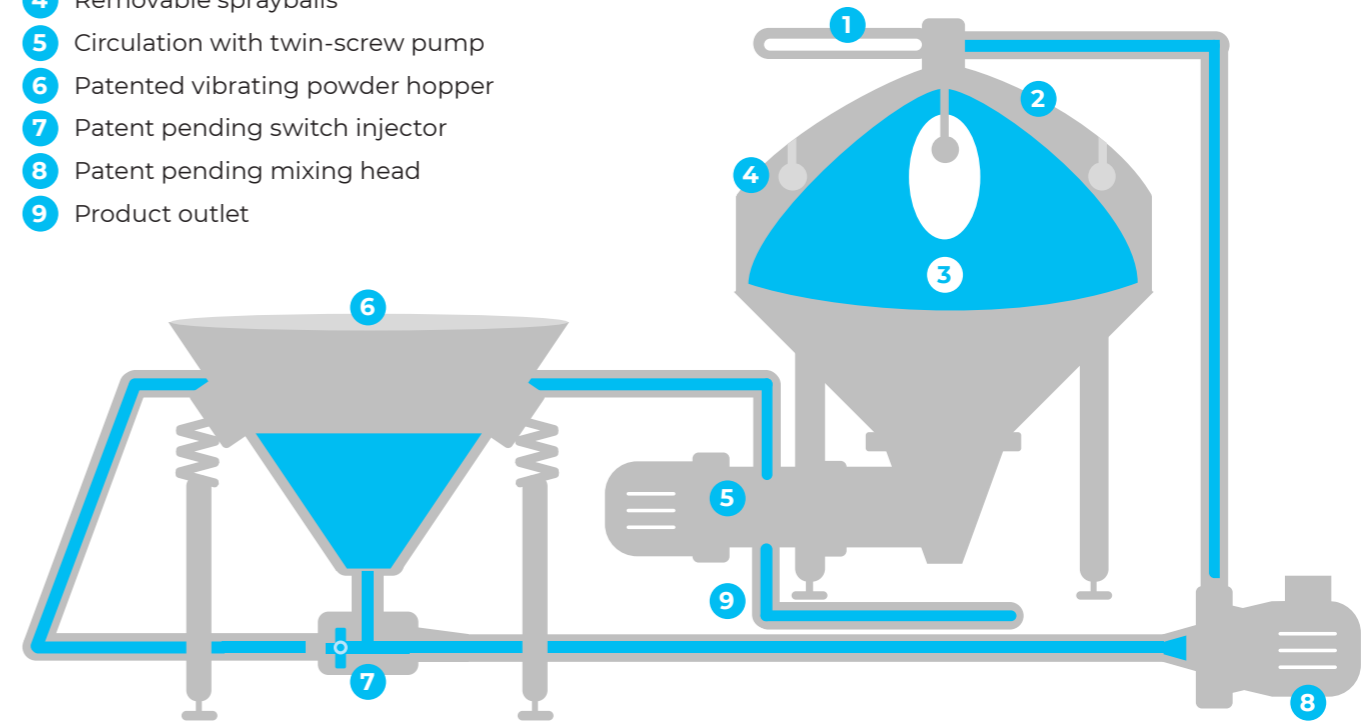
Juice, nectar and still drinks



Pectin solution

- Product capacity 3.000-40.000 l/h
- Powder capacity up to 15.000 kg/h
- Tank size from 200 l to 6.000 l
- Vacuum or no vacuum
- Viscosity 0-2.000 cP

- 1 Liquid inlet
- 2 Vacuum deaerator
- 3 Product flow cone
- 4 Removable sprayballs
- 5 Circulation with twin-screw pump
- 6 Patented vibrating powder hopper
- 7 Patent pending switch injector
- 8 Patent pending mixing head
- 9 Product outlet

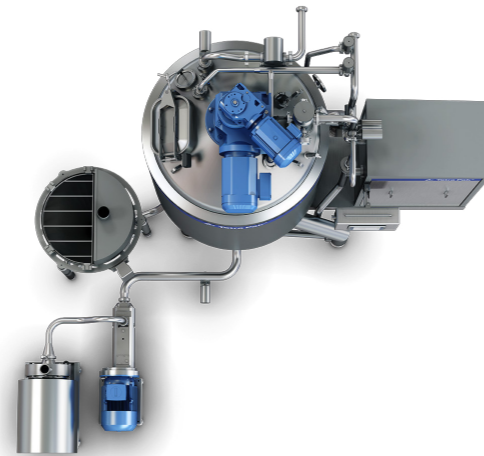


# Tetra Pak® High Shear Mixer for continuous production

Ideal for high capacity production  
of a single product

With a small add-on, the Batch Plus concept can be re-configured to a continuous production process. This is done by equipping all the ingredient intake lines and the product outlet with flow meters and control valves. This means you can use the same equipment in a continuous process, and can still produce in a batch process when needed, for ensured flexibility.

The continuous process means maximised efficiency. Precise control of flow and product composition enables the fastest production without jeopardizing product quality. This speeds up your customers' process for larger volumes – giving the lowest operational cost.



Precise control of flow and  
product composition enables  
the fastest production  
without jeopardizing  
product quality.



# How it works

There are two key features of high shear mixer for continuous production. First, we have introduced an accurate control system for inlet and outlet flows, in order to enable a consistent quality of the end product.

With control valves and mass flow meters on every ingredient inlet and outlet, you can ensure correct inlet flow of ingredients according to specific recipe and production capacity. This also ensures that the outgoing product flow matches the inlet flow – keeping the level in the mixing tank constant. This means rapid, and homogeneous mixing.

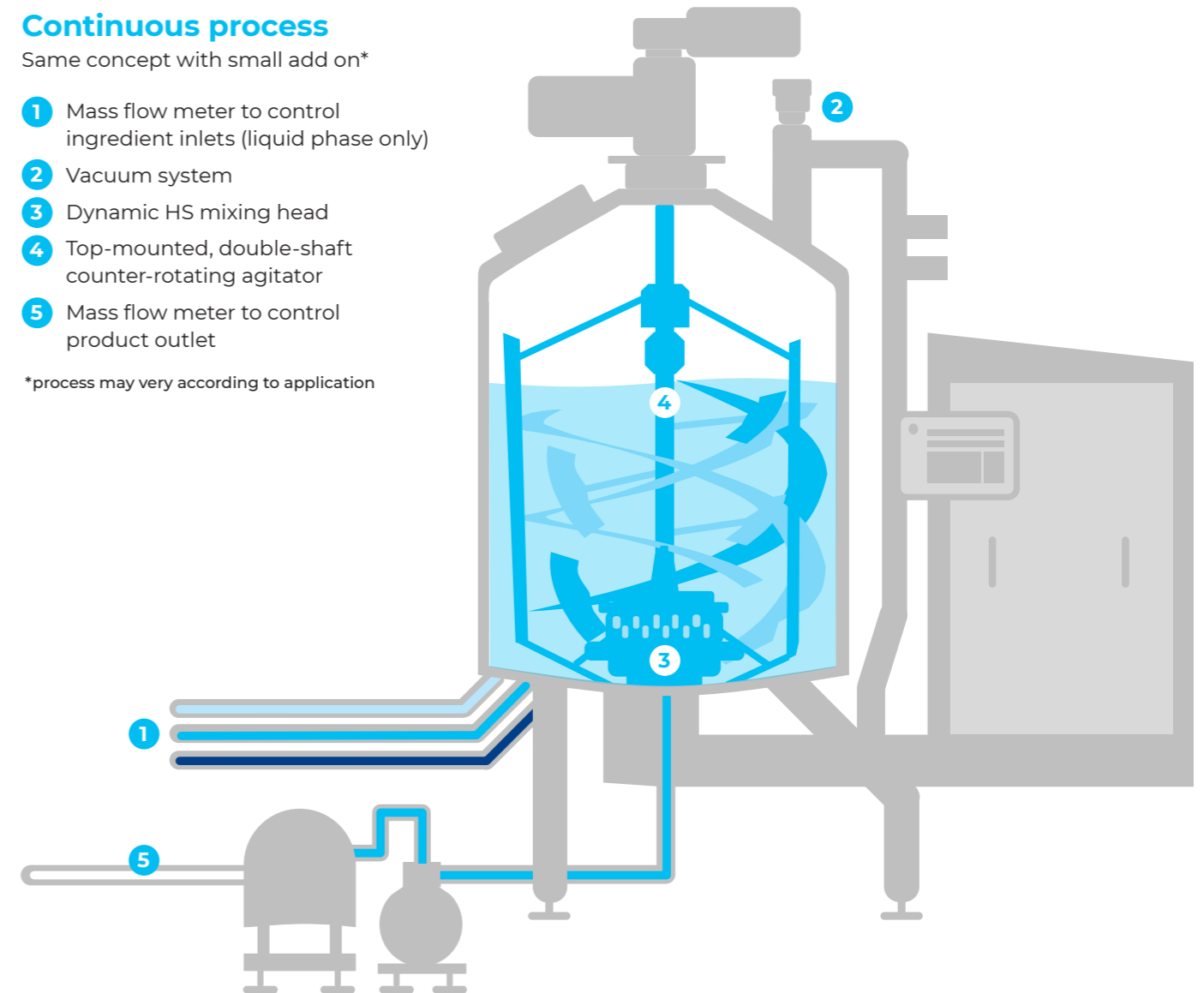
The second feature unique to the continuous production process is the in-line product composition monitoring system. This continuously measures density and pH value of the outlet flow, as well as regulates quality – checking parameters and adjusting ingredient introduction accordingly. Product composition stays within specification, all the while offering a high level of flexibility to set, change and adapt recipes in large scale productions.

## Continuous process

Same concept with small add on\*

- 1 Mass flow meter to control ingredient inlets (liquid phase only)
- 2 Vacuum system
- 3 Dynamic HS mixing head
- 4 Top-mounted, double-shaft counter-rotating agitator
- 5 Mass flow meter to control product outlet

\*process may vary according to application



# Simple mixing solutions

Compact design at a lower cost for high capacity production

The Tetra Pak High Shear Mixer I200/300 and R200/300 secure efficient mixing of liquids, including emulsification. They are also ideal for mixing concentrates and minerals into base concentrates and slurries, for example oils into non fat milk concentrates. The mixers can handle products up to 300 cP.

The main product is pumped through the mixer. Additives are pumped into the main stream via the inlet pipe. Mixing then takes place and the blended product passes through turbo unit.

Low maintenance, safe operation with high energy efficiency.



# Available options

To meet all capacity and application needs

## Equipment options

### Shear rate (stator)

- 1 mm to 10 cm

### Mixing head size

- 120 – 500 ø mm

### Propeller options

- Knives or flow

### Agitator

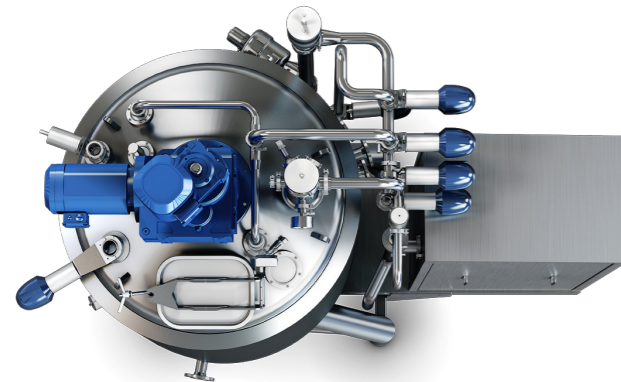
- None, single or double

### Cleaning standard

- CIP or SiP

### Heating and cooling

- 10°C to 145°C



## Mixing principles

### Vacuum

- Yes or no

### Powder handling

- Yes or no

### Tank size

- 25 to 20,000 liters

### Pressure

- Yes or no

### Materials

- 316L to SMO254

### Special conditions

- Earthquake proof or ATEX







# Optimal mixing with the right mixing head

True shear is the heart of the mixer and key to performance

- Ensure even particle distribution and consistent high quality
- Get flexible configurations of sizes, materials, knives, propellers
- Optimally mix everything from toothpaste to whole cheese blocks

- Configure your mixing head to your needs
- Propeller options
- Dynamic or static
- Type of steel
- Knife options



# Dynamic stator

Variable shear system that enables gentle blending for sensitive ingredients

With the dynamic stator you can control the shear from gentle blending to high shear. This is ideal when dealing with shear sensitive ingredients.

- Get fast ingredient dosing while protecting product quality
- Achieve homogeneous, shelf-stable products
- Produce smooth and particulate products in one mixer – no need for extra equipment



# Agitators

Optimal mixing with the right agitator solution

When dealing with a more viscous product, an agitator or even two is needed to ensure the right flow inside the tank. A right flow is needed for:

- Consistent mixing treatment throughout the vessel
- Control of several quality parameters
- Preventing burns



# Vacuum system

Deaerates the product during mixing

The vacuum system allows for automatic dosing of powder ingredients in a controlled and reliable manner. It draws ingredients into the mixer, eliminating the need for an operator to do this heavy work. The product is deaerated (i.e., the air is removed from it) enabling higher uptime in the rest of your downstream line.

With the vacuum system, you reduce:

- Air in their downstream process
- Risk of product oxidation
- Fouling in heat treatment equipment
- Hydration time

**Direct**  
Funnel 100  
and 200 litres



# Powder delivery methods

High shear mixing feeding options

**Direct**  
Big bags

**Tipping station**  
Tipping station CIP

**Feed**  
Funnel 2,000 litres

**Station & Buffer**



# Tetra Pak® Aline

## Static in-line mixing of fluids

The Tetra Pak® Aline mixer is a static mixer installed in a vertical or horizontal pipe. The modular design is built up from a number of twisting elements which mix the products. Every second element turns the product flow to the left, and the next to the right, to guarantee thorough mixing. An external pipe holds the twisting elements, and o-rings ensure sanitary sealing. The ends of the external pipe are equipped with leakage indication holes.

For aseptic processing, a version with clamped mixing elements is available. The elements can be sterilized during the cleaning-in-place cycle.

### Key benefits

- Gentle product treatment
- Suitable for products with particles
- Modular design from 7, to 9 or 11 elements

### Applications

- Viscous and particulate products
- Sugar solution into juice
- Fruit into yoghurt
- Diced carrots with peas

### Dimensions

- 7 mixing elements  
Length: 925 mm
- 9 mixing elements  
Length: 1,125 mm
- 11 mixing elements  
Length: 1,325 mm

The modular design is built up from a number of twisting elements which mix the products.





# The benefits for you

## Benefits for you

### Flexibility in recipe, ingredients & equipment

#### Obtaining desired product quality

- Eliminating lumping and sedimentation
- Reducing air in product
- Ensuring consistent fill volume in final packages

#### Reduced processing costs thanks to

- Less raw material and higher ingredients yield
- Lower energy consumption
- Fast process time

## Tailored to your needs

### Full portfolio for every demand

- Regarding price, flexibility and complexity
- From manual to fully automated
- From standardized to a fully customizable solution
- Low TCO, and high product quality

### More than just a mixer

- Consistent high quality
- Global company worldwide coverage with local support



# Success story: superior quality mayonnaise and dressings in Europe

## Fully-automated, advanced mixing installation

### Challenge

A mayonnaise producer in Europe wanted to grow their mayonnaise and dressings business by increasing capacity and overcoming quality issues to guarantee high, consistent product quality.

### Solution

The customer tested their own recipe on one of our mixers, and were surprised by the good results. We delivered a fully-automated, advanced mixing installation with only seven months from project to commercial production. The solution can even be run remotely by us.

### Results

The solution improves accuracy, enabling the customer to guarantee high, consistent product quality with improved appearance and texture of both low-fat and full-fat mayonnaise. It also enables flexibility in changing parameters, more hygienic and safer production with automated CIP, and faster preparation, dosing and emulsification. The customer highly appreciated the combination global supplier and local support we offer.





New process  
with reduced  
processing time.

# Success story: from beans to paste in one hour

## Revolutionary new process for making refried beans in Guatemala

### Challenge

Processing beans can be time-consuming, with the raw material requiring soaking for as long as 12 hours before it can be heated, ground and mixed. And each step takes place in a separate machine.

### Solution

We developed a revolutionary new process that reduces this processing time to just 15 minutes. The washed beans are put into mixer with a little water. Then we start grinding them down and heating them up at the same time. The process is being used at a customer in Guatemala to make refried beans, a popular dish in Latin America.

### Results

The new process has reduced processing time for refried beans to just 15 minutes – and it is carried out in a single piece of equipment, the Tetra Pak® High Shear Mixer, opposite today's industry standard where multiple equipment's are utilized.

# Success story: save hours of processing time with fast, reliable capacity

Higher concentrations, fewer batches for a juice producer in South Africa

## Challenge

To meet the daily demand, the customer had to make too many batches of gum slurry with their existing system and experienced unreliable product quality.

## Solution

With our Tetra Pak® High Shear Mixer, we provided a solution where the customer was able to make a higher concentration slurry and significantly decrease the number of batches needed to maintain the same result, while giving a consistent and uniform result every time again.

## Results

This solution managed to meet the daily demand of juice production in an efficient and smart way. Additionally, we increased flexibility, and as a result the customer is currently making at least the different kind of product lines in our mixer.







# Mixing technology test centre in Aalborg, Denmark

Get full support to find your optimal mixing solution

Got a great product idea? Test it yourself in our test center. Whatever product you're mixing, we will help you find the optimal way to do it. If you're wondering about...

- Equipment
- Mixing time, speed or shear force
- How to scale up for successful commercial production
- A new recipe and its mixing challenges
- How to optimize the use of expensive ingredients

... our experts will work alongside you to solve all your mixing challenges and get the exact result you're after. Any trial done in the Mixing Technology Test Center can easily be scaled up to a commercial production set-up.

# Offering you innovation excellence

With outstanding food application expertise and high shear mixer solutions, Tetra Pak is a market leader in technical innovation and a source of exceptional food know-how for industry partners.

## Your success – at the heart of everything we do

We dedicate ourselves to understanding your needs, using our global presence and proven application expertise to help you fulfil your performance targets.

The Tetra Pak portfolio enables you to deliver premium performance and support throughout the whole lifecycle.

Having Tetra Pak as a partner gives you the portfolio, people, support and service to achieve your business ambitions.



## A world of expertise with a reliable portfolio

### Superior level of support

- Expertise & presence
- Everywhere at anytime
- Global & Local Service support
- Best Product selection based on application
- Support throughout the product's entire lifecycle

### One portfolio

- Wide portfolio manufactured by Tetra Pak
- Components sourced from leading suppliers
- Get value in sourcing components in single, bundled or complex orders

### Reliable & high quality

- Trustworthy partnership with reliable products
- Support throughout the product's entire lifecycle



# CONTACT



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