



# Tetra Pak® High Shear Mixer

R370-1000D



## Application

The new generation high shear mixer is designed to enable mixing of high-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 including beverage concentrates, ice cream mixes, infant formulas and dairy desserts.

## Highlights

- Handles high-viscous products in recirculation setup
- Achieves superior emulsification, powder dissolving and deaeration performance
- Enables lowest total cost of ownership and smallest carbon footprint
- Handles highest capacity for viscous products
- Secures flexible and trouble-free powder handling and powder introduction
- Enables compatibility with Tetra Pak® PlantMaster

## Working principle

The mixer is set up to circulate over a batch tank, from which it is fed via an external pump. A control valve regulates the feed flow to a pre-defined set point, based on input from a flow transmitter located upstream. Two control valves maintain a constant level in the vacuum deaerator by recirculating part of the outlet stream back into the vacuum deaerator and returning the remaining part to the batch tank. The level feedback to the control valves is calculated based on the pressure difference between the headspace pressure transmitter and the outlet pressure transmitter.

Two separate frequency-controlled devices handle internal pumping and mixing actions – a self-priming twinscrew 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 twin screws impart very low shear and allow passage of large particles – up to 20 millimetres in diameter depending on screw pitch.

The pump is driven by an 18.5kW motor, sufficient to circulate more than 65m<sup>3</sup>/h at 3 bar for low viscous products and more than 35 m<sup>3</sup>/h at 3 bar for high viscous products. These capacities allow extensive recirculation for improved product mixing and deaeration as well as recirculation and return of CIP fluids.

The high-shear mixing device creates high shear and turbulence to disperse, emulsify and dissolve liquid and powder ingredients. The rotor-stator system creates little to no pumping effect. The mixing device is available in two sizes. Tetra Pak® High Shear Mixer R370-1000D contains five concentric rotor-stator stages driven by a 37 kW motor.

The concentric stages are serially connected ensuring that the product passes through all stages when going through the device once. In combination with the rotor-stator design, this secures that only a very small fraction of the product is able to bypass the high intensity regions, enabling this mixer to operate in pure single pass operations. The pump and mixer are connected to a vacuum deaerator. The pump is located at the deaerator outlet and the mixer is in a recirculation loop going back to the deaerator inlet. 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. The only air introduced is that embedded in the ingredients.

Specially designed nozzles distribute the two inlet streams smoothly over a conical structure inside the vacuum deaerator. This generates a thin product film with a large surface area that enhances deaeration. It also prevents splashing and thus foam generation.



Ingredients are introduced into the recirculation loop between the pump and the mixer via ingredient intake valves. Thus all ingredients go through the mixer at least once before entering the deaerator. Depending on the vacuum level in the deaerator, the product viscosity and speeds of pump and mixer, this area can be pressurized. Vacuum ejectors create sufficient vacuum at ingredient entry points. These can be switched on and off, much like valves. When the ejector is active the liquid is forced through a small gap, accelerating flow and creating a vacuum zone where ingredients can be introduced. When the ejector is off, product can pass with only a very limited pressure drop.

This prevents unnecessary energy loss and allows several ejectors to be serially connected. These ejectors are best located directly underneath the ingredient containers on the recirculation route loop, eliminating the need for suction lines and allowing freedom regarding the relative location of the mixer and powder containers.

### Basic unit

- Mixing unit
- Circulation pump
- Deaerator unit
- Single switch injector for powder inlet
- Double switch injector with funnels for minor ingredients
- Liquid inlet
- Control system with Allen Bradley PLC and HMI

### Options

- Vibrating powder hopper for powder inlet
- Single switch injector for extra powder inlet
- Vibrating powder hopper for extra powder inlet
- Control system with Siemens PLC and HMI
- Air cooler for control panel cabinet
- Non-standard power supply, e.g., 3x200V or 3x575V

### Embedded automation based on Tetra Pak® Plantmaster Technology

Our new automation option gives you seamless, robust embedded automation based on Tetra Pak® PlantMaster technology in the mixer of your choice whether in a line or as a stand-alone solution. The automation is standardized and proven for all combinations of mixers and options to guarantee smooth operation of all functionalities.

It makes recipe handling and recipe adjustments fast and easy, with recipe changes completed in minutes whether you have 10 or 100 recipes.

You also get a complete system with basic navigation including step sequence information, alarm history and events, data logging for CIP and production history, communication signals for maintenance and support and much, much more.

Select this option to make the most of you mixer, get more smart functions and effortless integration, optimize your mixing and enable full traceability with uncompromising food safety.

### Materials

- All metal parts in contact with product are AISI316 stainless steel
- Other metal parts are AISI304 stainless steel
- All elastomer parts in contact with product are VITON
- CIP lid

### Control panel

The Tetra Pak® High Shear Mixer R370-1000D is equipped with a Danfoss VLT drive with product temperature read out, a start/stop button for the mixing head, an emergency stop, a main switch and a potentiometer for fast control of mixing speed.

### Capacity

- 300 litres, net volume
- 1-4 batch/hour



## Technical data

### Supply and consumption data

Voltage, V (Hz)	380-480 (50/60)
Power, kW	58.2
Water, l/h	100
Compressed air, NI/h	100

### Mixing parameters

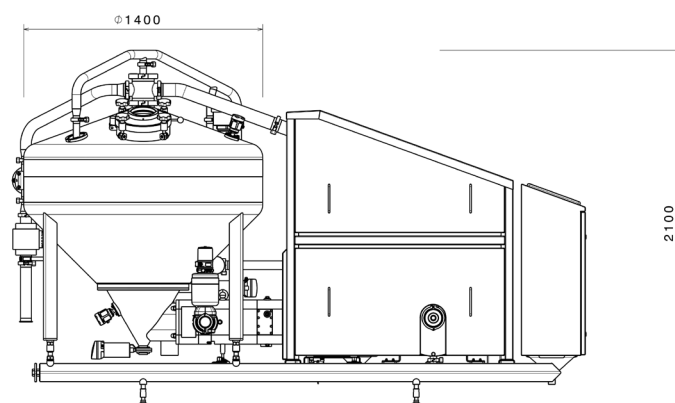
Stages	5
Shear rate, s <sup>-1</sup>	100 000

### Processing parameters

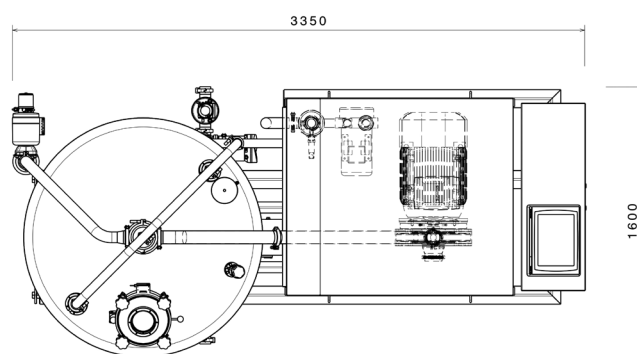
Final product capacity, kg/h	< 35 000
Viscosity, cP	≤ 2 000
Mixing temperature, °C	80
Oil addition rate, kg/min	75
Powder addition rate*, kg/min	175

### Dimensions

Length, mm	3 350
Width, mm	1 600
Height, mm	2 100



Front view  
Scale: 1:15



Top view  
Scale: 1:15