

Solutions for Your TOUGHEST  
MIXING Applications in  
**CHEMICALS**



High Speed Dispersion  
of Titanium Dioxide

THE FIRST NAME IN HIGH SHEAR MIXERS

# High Speed Dispersion of Titanium Dioxide

Titanium dioxide (TiO<sub>2</sub>) is chemically inert and has exceptional opacity and whiteness. These properties have led to its widespread use in many industries, illustrated in table 1:

## The Process

Titanium dioxide is most commonly supplied in powder form but may also be predispersed in oil or aqueous systems. The diversity of applications leads to many different methods of processing, however process requirements are basically the same:

- TiO<sub>2</sub> is usually supplied in powdered/premicronised form and particle size reduction (grinding) is not applicable in most cases.
- To maximise opacity and gloss properties, TiO<sub>2</sub> must be fully dispersed and evenly distributed throughout the product
- Dust/solvent emissions must be minimised

## The Problem

The following problems can be encountered when using conventional mixers and agitators:

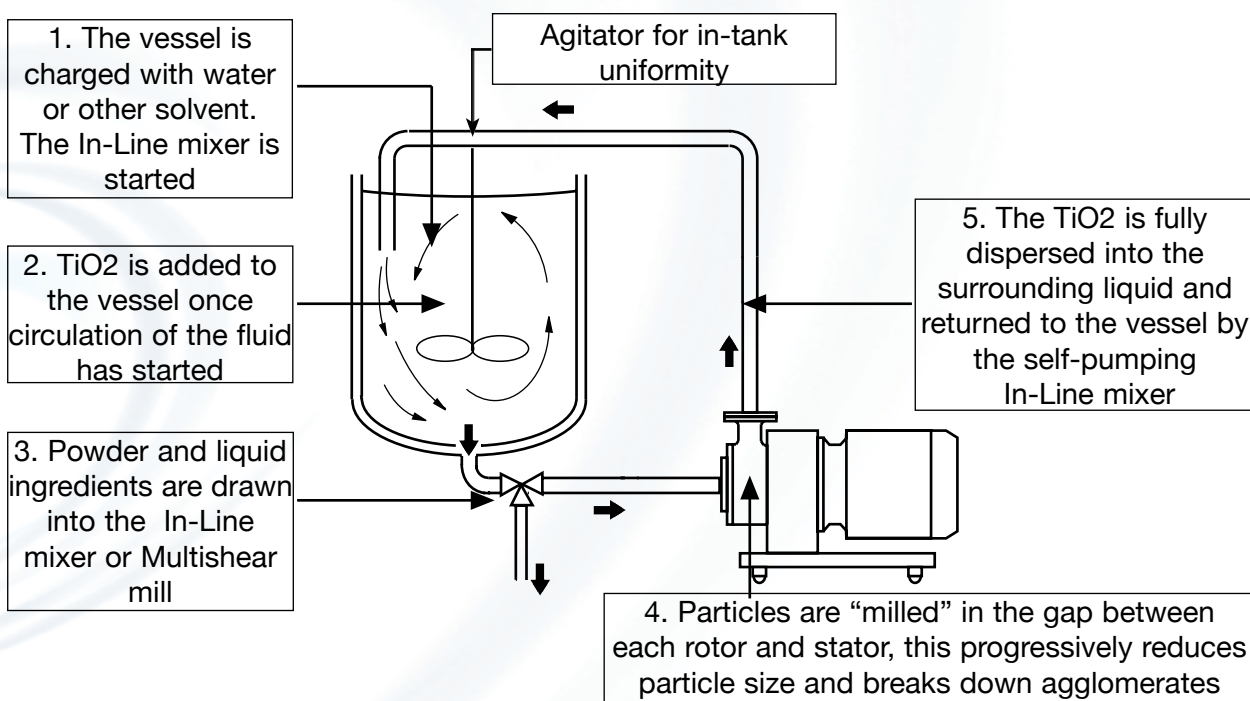
- On addition to the water, solvent, varnish or other media the particles tend to re-agglomerate.
- Conventional mixers cannot break these down effectively
- Long mixing cycles are required to obtain uniform dispersion.
- Extended processing time contributes to solvent emissions.
- Conventional systems are difficult to clean.
- Powder has to be added under controlled conditions which can be time consuming and leads to increased dust emissions

## The Solution

The high speed, high shear operation of a Silverson mixer provides the solution to these problems.

The rotor/stator workhead rapidly disperses the TiO<sub>2</sub> particles into the surrounding liquid, leading to a more uniform product and shorter processing times.

This can be achieved using a batch mixer immersed in the processing vessel, or by the addition of a Silverson In-Line mixer to an existing process in a recirculation system as illustrated



## The Advantages

- The TiO<sub>2</sub> is added to the aqueous or organic solvent at a much faster rate, reducing dust emissions.
- The rotor/stator workhead provides an intense shearing action capable of breaking down even hard agglomerates.
- Operation can be carried out in a closed system, reducing solvent emissions.
- It is more energy efficient and economical.
- The shorter processing times required to obtain a uniform dispersion reduce wear and therefore maintenance and spare part costs.

The batch size, formulation, type of ingredients and the viscosity of the end product dictate which machine from the Silverson product range is best suited to individual processing requirements. See overleaf for details:

### High Shear Batch Mixers:

- Suitable for batch sizes up to 1000 litres
- Can be used on mobile floor stands
- Sealed units available to control solvent/dust emissions



### 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



### Multishear Mill and Multi-stage In-Line Mixer

Offer the advantages of In-Line mixers plus:

- Designed specifically for dispersion of harder pigments and dyestuffs.
- The intense high shear imparted by the series of concentric rotors and stators can eliminate the need for conventional milling.
- Where conventional milling is required, the product supplied by the Multishear Mill or Multi-stage In-Line mixer allows the mill to operate with greater efficiency and reduces the number of passes required.



### Flashmix

- Ideal for larger batches
- Capable of rapidly incorporating large volumes of powder
- Minimised aeration.
- Minimised cleaning requirements.
- Suitable for higher viscosity mixes.
- Suitable for operation at higher temperatures.
- Minimum operator input required.

