fluitec
mixing + reaction solutions

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## Static Mixers for Food Processing

# CSE-W® and CSE-X®

Static mixers are used for a wide range of applications in the food industry. The CSE-W® helical shaped mixer has been employed successfully for many years to mix low-viscosity fluids. High-viscosity mixing tasks with high viscosity ratios are increasingly solved with CSE-X® mixers, which offer a significantly better mixing efficiency.

**Static mixers**
Static mixers are apparatus with fixed, geometrically shaped elements that mix the product flowing through them with the help of kinetic energy only. They are used not only for continuous homogenisation but also increasingly for batch homogenisation and dispersion in all areas of chemical process technology.

Static mixers are normally preferred for the following applications:
- Mixing pumpable fluids
- Dispersing and emulsifying insoluble liquids (cleavage)
- Mixing reactive liquids
- Contacting gas and liquid phases
- Mixing gases
- Tempering viscous media

**Wide range of mixer geometries**
The most diverse mixer geometries are employed to achieve a homogeneous mixture, depending on the application and the flow regime. The choice of geometry is determined by the Reynolds number and the properties of the fluids to be mixed. Two basic mixer types are used in the food processing industry. The CSE-W mixer (top) is ideal for low-viscosity applications or as a heat exchanger. CSE-X mixers are more popular for complex mixing tasks involving high viscosity ratios or for gasification with FSBR reactors.

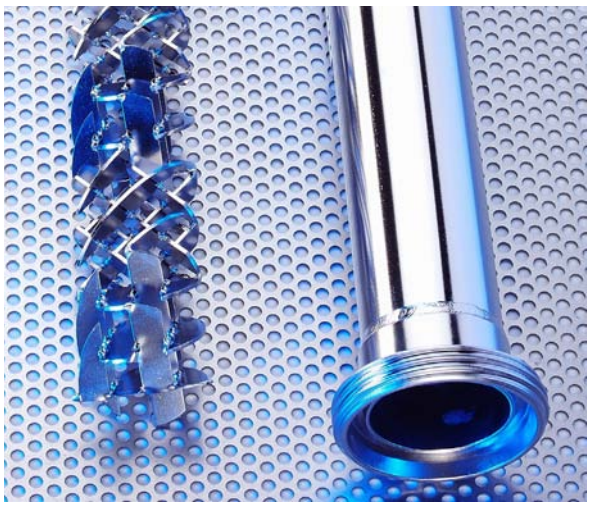

Fig. 2 CSE-X DN50 mixer

**Hygienic and low on maintenance**

Fluitec CSE-W and CSE-X mixers destined for the food processing industry have electropolished surfaces and are manufactured with dairy couplings or Tri-Clamp connections, so that they are suitable for use in sterile areas. Static mixers are a particularly efficient alternative for the following types of process:

- Admixing aroma compounds
- Diluting extracts
- Heating and cooling chocolate masses
- Gasifying beer, wine, juices or coffee extracts
- Pasteurising foods with steam
- Making mustard, fruit yoghurt or jams

CSE-W and CSE-X mixers traditionally play an important part in many different applications.

**Standard mixer: CSE-W**

Fluitec CSE-W mixing elements are manufactured to a very high quality. They are made of high-grade stainless steel, welded and electropolished. A conscious decision was taken against soldered mixers because they cannot be removed and visual inspections are therefore problematic. With an L/D ratio of 1.5 to 2.0, CSE-W mixers are particularly suitable as monotube heat exchangers.

Fig. 3 CSE-W mixer/heat exchanger

**Static mixer: CSE-X**

Fluitec CSE-X mixers are notable for their high mixing efficiency and short installation length. Numerous tests have confirmed the CSE-X mixer's optimal residence time distribution. It can be seen from Figure 4 that the mixer behaviour approximates an ideal plug flow regime. This is an indication of good self-cleaning efficiency, which is especially important in hygienic applications. The tests were carried out using glucose syrup with various viscosities from 10 to 40 Pas. Whereas in the empty tube additives still adhered to the wall, they were no longer visible in the CSE-X mixers.

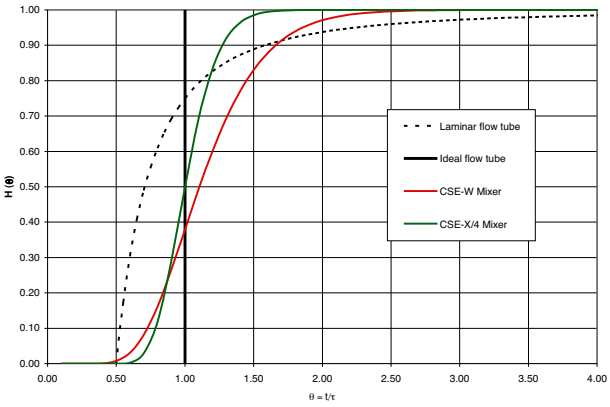


Fig. 4 Residence time distribution in mixers

Fig. 5 CSE-X DN50 chocolate mixer

**Fluitec, the mixer expert**

Fluitec is not simply a specialist for static mixing and reaction technology. Our philosophy is to develop the optimum mixer geometry for any application. Our CSE-XR mixer represents a new generation of mixer/heat exchangers offering unbeatable performance with highly viscous fluids. It reduces the product volume and combines high mixing efficiency with simultaneous heat exchange.

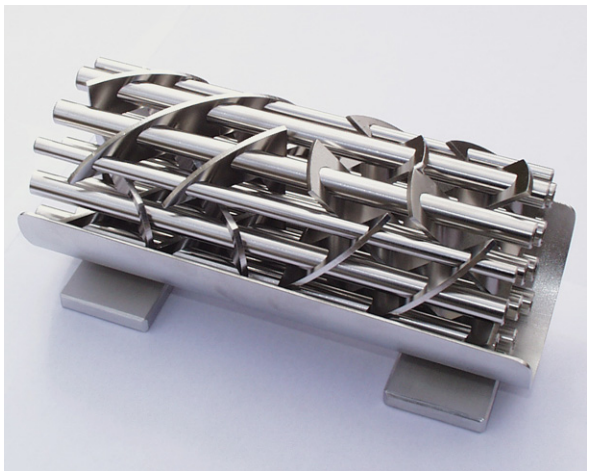

Fig. 6 Heat exchanger for viscous fluids