STRIKO
VERFAHRENSTECHNIK

Static mixers and heat exchangers

You are safe with STRIKO.

STRIKO - STATIC MIXERS

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FOREWORD

STRIKO Verfahrenstechnik is a reliable partner to the industry since 1973. The company is located in Reichshof-Wehnrath, right in the heart of Europe. From here we advise and supply well-known companies at home and abroad. In addition to our standard program, we offer you individually tailored solutions.

STRIKO maintains long-standing business relations with companies of the following industrial sectors:
- chemistry
- oil and gas
- plant engineering
- pharmaceutical industry
- food industry
- transport and logistics.

Our high-quality products, combined with engineering services, guarantee highest plant and process safety for your operations - as a result of many years of experience of our employees as well as the specialization in design of pressure vessels, according to the effective rules and standards. Product-specific parameters such as the required minimum net flow area of rupture discs, the pressure loss and mixing quality of static mixers and heating and cooling capacity for heat exchangers are calculated and the results checked in our own test facilities if required.

The project-related design is made in 3D models from which the drawings will be derived. We are pleased to provide our products also in STEP format AP202DIS according to ISO 10303.

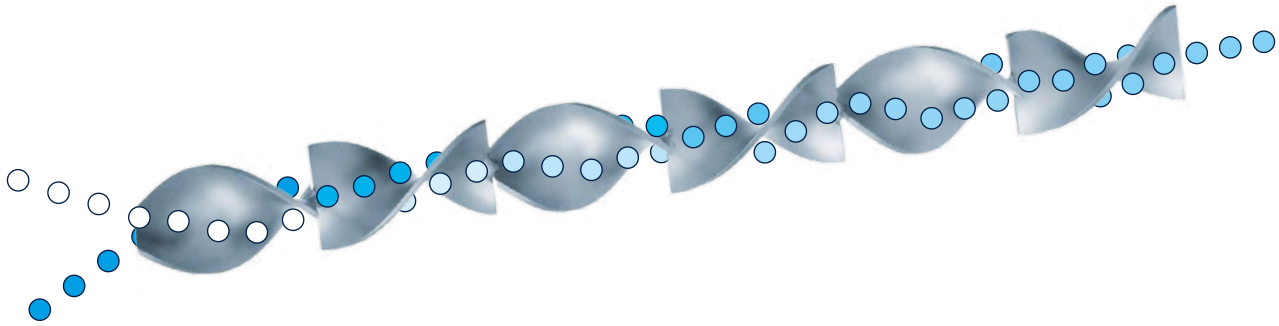
STATIC MIXER

FROM STRIKO

Static mixers from STRIKO are used with great success in a wide range of mixing, dispersing, emulsifying, heat exchange and reaction applications in various branches of industry. The use of static mixers means the lowest investment and operating costs, which is due to the fact that the energy is not supplied externally, but is taken from the kinetic energy of the product flow.

Static mixers work in continuous operation in a closed pipework system. They contain no moving parts and are therefore virtually wear-free. Static mixers can be cleaned, sterilised and steamed inline and can be completely dismantled for optimum cleaning if required. Connection types and dosing points are customised according to customer requirements.
STRIKO mixing elements are also used in heat exchangers. The continuous movement of the medium from the inside of the tube to the tube wall and back significantly increases the heat transfer, which increases the heat output and prevents the product from sticking to the inner tube wall, also known as „fouling“.

For a detailed and personal consultation the experts at STRIKO Verfahrenstechnik will be pleased to at your disposal.



FUNCTIONAL PRINCIPLE

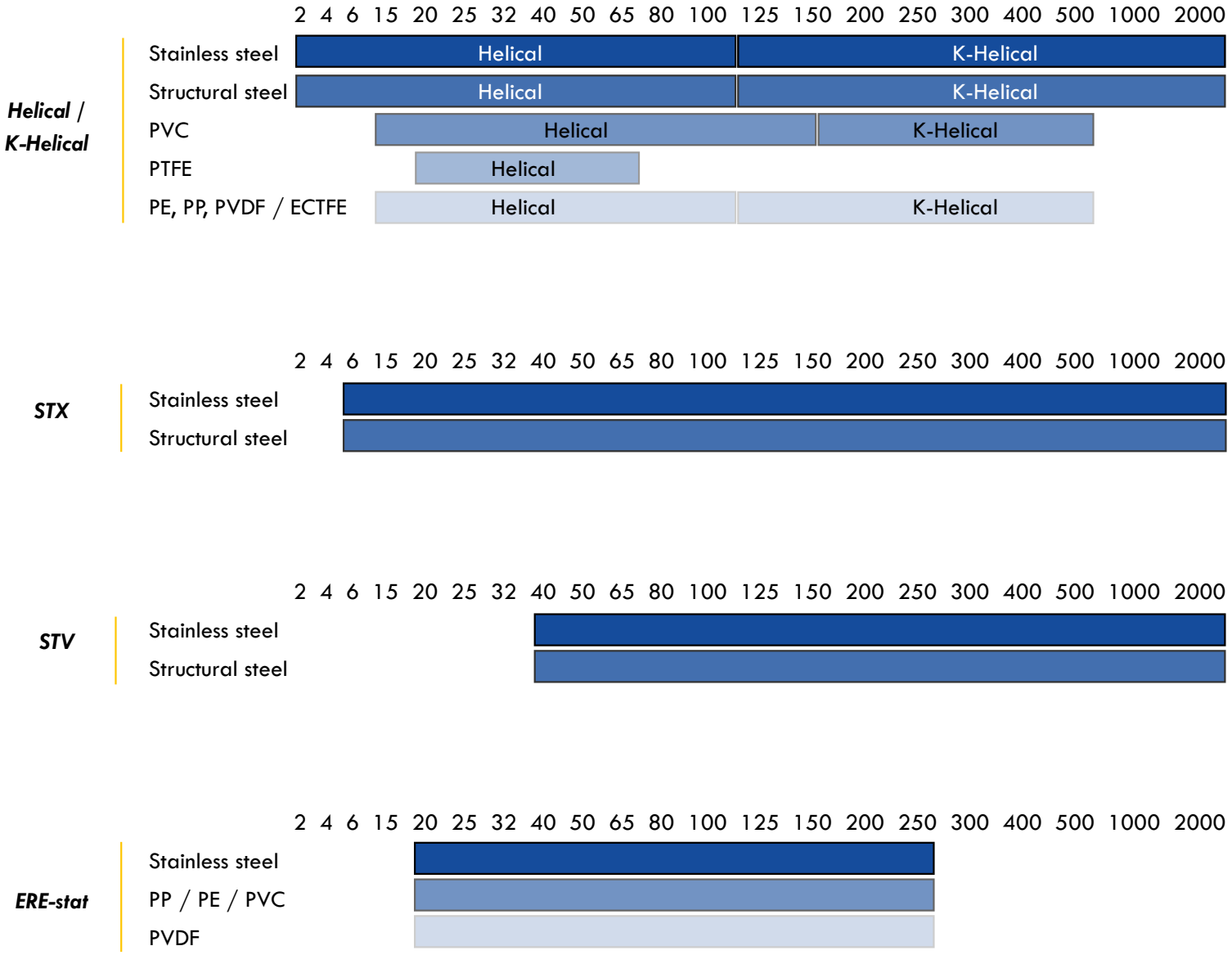
The core task when designing a static mixer is to find out how many mixing elements of a certain type need to be arranged in series in order to achieve the required mixing quality with an acceptable pressure loss. In simple mixing applications where, for example, low-viscosity components such as water mix easily, just a few elements are often sufficient to achieve very good homogeneity. In other cases, twenty or more elements are required to achieve an acceptable result. The target is to achieve a mixing quality of at least 95 %. This is referred to as technically homogeneous mixing.

Whether for food, viscous media or universal applications - static mixers from STRIKO are efficient, cost-effective solutions for demanding applications. Our mixers are used successfully every day in a wide range of industries.

MATERIALS / NOMINAL WIDTHS

OVERVIEW

NOMINAL WIDTHS



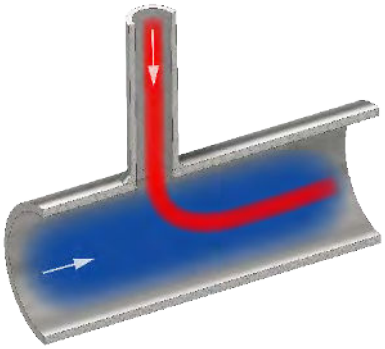
MATERIALS*

- → 1.4404/1. 4571 (Standard)
- → Div. SS (Stainless steel)
- → CS (carbon steel)
- → PE, PP, PVC also GFK reinfoced
- → PVDF
- → PTFE/PFA lined SS or CS-mixer

* other materials on request

DOSING POINTS

OVERVIEW

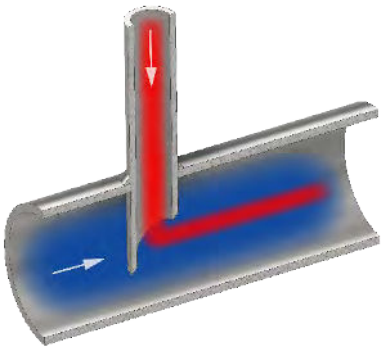


T-piece:

Description

Cost-effecitve/standard

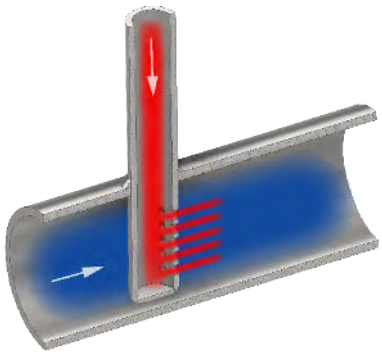
Recommended if the dosed media flow has approximately the same speed as the main flow.



Centerline:

Description

Recommended if the dosed media flow has a significantly lower speed than the main flow.



Dosing lance:

Description

Recommended if the dosed media flow has a significantly lower speed than the main flow. Used for pre-distribution of the metered media flow before the mixer.

CONNECTION TYPES

OVERVIEW

Standard connections
- DIN EN1092-1
- ASME B16.5 / B16.47

Lose flange DIN1092-1

Welding neck flange DIN1092-1

Hygiene applications / ASME BPE

Screw connection
- DIN 11864-1(Aseptic)
- DIN 11851 “Milk pipe fitting“
- BioConnect-screw connection
- SMS-Screw connection

Hygiene screw connection

Flange connection
- DIN 11864-2 (Aseptic)
- BioConnect-Flange connection

Hygiene flange

Clamp connection
- DIN 32676 (TriClamp)
- DIN 11864-3 (Aseptic)
- BioConnect-Clamp connection

Hygiene clamp

Plastic connection:
- Various collars with loose flanges (PP with steel core)
  Hole plattern according to DIN EN1092-1
- Clamp connections similar DIN 32676
- Screw connection
- Flanges for GRP reinforced mixers (DIN 16966-6)

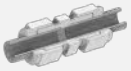
plastic Screw connection

Plastic flange

Plastic GRP-DIN16966-6

Plastic flange, fixed

Other connections / designs:
- Threaded socket/nipple, turned thread e.g. BSP/G thread
- Twin ferrule fittings (heavy duty/Swagelok)
- Weld seam preparation (bevelled/chamfered pipe ends)
- Pipe ends (cartridge)
- Mixing chain only (with and without stop ring for clamping between flanges)

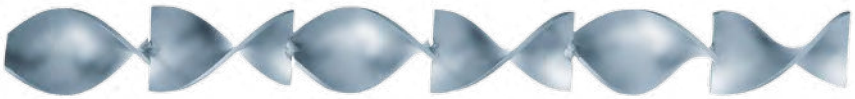


Twin ferrule fittings

MIXING ELEMENTS

OVERVIEW

Application examples



Helical / K-Helical from STRIKO are static tubular mixer types for mixing low to high viscosity fluids. The areas of application are wide-ranging, from electropolished laboratory mixers to heavy-duty applications in the oil industry.

HELICAL / K-HELICAL
- the universal mixer -

- Low to high viscosity liquids
- Sterile applications
- Food industry
- Plastics processing

The type STX mixer is designed for mixing highly viscous to extremly viscous media. Particular attention must be paid to the flow velocity when designing the mixer, as high shear forces are inherent in the design. The STX achieves a high mixing quality with a low number of elements.

STX
- the viscous mixer -

- Colouring silicone compound
- Mixing lubricating grease
- Homogenising plastic and polymer melts

The static mixer type STV is mainly used for mixing gas flows and produces a high mixing quality with low pressure loss.

STV
- the gas mixer -

- Temperature homogenisation in flue gas streams
- Exhaust gas aftertreatment for denitrification of flue gases
- Mixing finely atomised liquids into high-volume gas flows

The EREstat® mixer from STRIKO is a self-cleaning static mixer designed primarily for carbonating and aerating fluids.

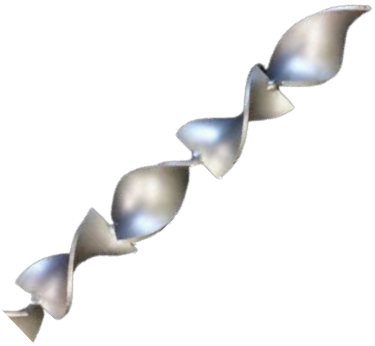
EREstat®
- the two-phase-mixer -

- Gas/liquid applications
- Food sector

HELICAL / K-HELICAL

THE UNIVERSAL MIXER

The mixing element chains of the Helical type are made up of axially twisted elements arranged one behind the other in opposite directions. This means that the volume flow is divided again after each mixing element, resulting in an increased division depending on the number of elements used. In addition to turbulent flow, which occurs at low viscosities and high flow velocities, the potentiated division and thus a high mixing quality is also achieved with laminar flow. The number of mixing elements and thus the length of the mixing element chain depend on the application, the available installation space and other project-related boundary conditions such as pressure loss and the mixing quality to be achieved. Due to the design and flexible production of the mixing elements at STRIKO, a wide variety of materials can be used. Mixing elements of the Helical type are generally manufactured up to DN100, larger nominal diameters are equipped with elements of the K-Helical type. A static mixer equipped with mixing elements of the Helical or K-Helical type is ideally suited for the homogeneous mixing of turbulent or laminar flowing media. The static mixer must be designed for all applications; this is done in close consultation with the customer and always specifically for a particular application, as the range of applications for the Helical / K-Helical can be categorised as very wide.



Helical

K-Helical

HELICAL / K-HELICAL - „THE UNIVERSAL MIXER“

Helical / K-Helical from STRIKO are static tubular mixers for mixing low-viscosity media (liquids and gases). The areas of application are wide-ranging, from electropolished laboratory or food mixers to heavy-duty applications in the petroleum industry.

Helical

Materials:
All common stainless steels, structural steels, plastics, special materials

Nominal widths:
DN2 - DN2000*

Application examples:
- Sterile applications
- Food sector (homogenisation of mayonnaise)
- Plastics processing (in combination with heat exchangers for homogenising and tempering the mixing material before injection moulding)
- Mixing of liquids such as colours
- Can be combined with other mixing element types for further applications

* Depending on the material, other nominal sizes on request

STX

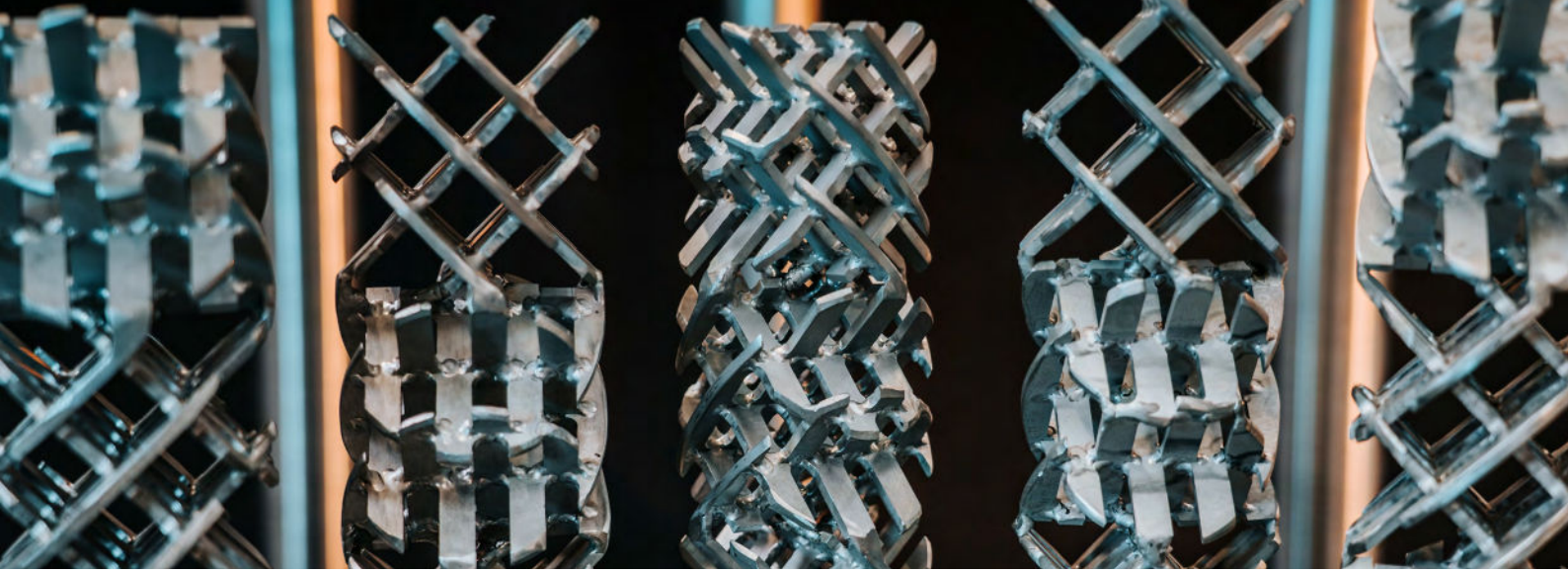
MIXER FOR VISCOUS LIQUIDS

STX - a barrier mixer

Intersecting webs are evenly distributed across the pipe cross-section and arranged one behind the other. Each package is inserted into the pipework at a 90° angle to the previous one. The number of mixing elements required depends on the application - the volume flow, the nominal diameter, the medium with its properties (viscosity, density) and the boundary conditions such as permissible pressure loss and the required minimum mixing quality. As very high shear forces can occur when using STX mixing elements in combination with viscous to highly viscous media, the flow velocity is kept correspondingly low.

STX – for mixing liquids

The STX mixer is ideal for homogenising liquids (pumpable media) with a viscosity of up to 600Pas. The design of the static mixer is required for all applications. This is done in close consultation with the customer and always specifically for an application, as the above points must be taken into account when using an STX. We would be happy to advise you! Like all static mixers from STRIKO, the STX can also be manufactured from a wide variety of materials; whether carbon steels, stainless steels or plastics - depending on the application and requirements in accordance with the project-related design. In addition to the production of complete static mixers, consisting of mixer housing with injector connection and mixing elements, it is also possible to manufacture mixing element chains that are inserted into the customer‘s existing pipework. This can save additional costs for approvals by a notified body, pressure, X-ray or dye penetration tests.



STX - „THE VISCOUS MIXER“

The static mixer type STX is designed for mixing viscous to highly viscous media and can also be used for gassing liquids. Particular attention must be paid to the flow velocity during design, as high shear forces are inherent in the design.

Materials:
All common stainless steels, structural steels, plastics, special materials

Nomional widths:
DN6 - DN2000*

Application examples:
- Mixing ammonia into pea starch
- Processed cheese production (adding spices / ingredients)
- Colouring silicone mass
- Homogenising the temperature of plastic melts
- Adding flavouring / colouring to candy mass

* Depending on the material, other nominal sizes on request

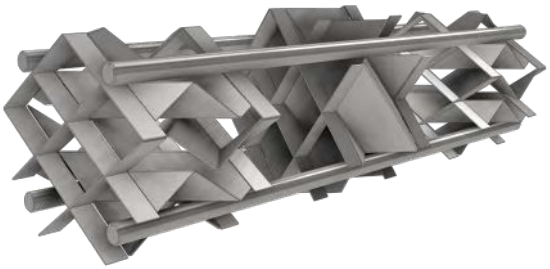
STV

FOR LOW-VISCOSITY MEDIA

The mixing elements of type STV are made of corrugated metal sheets and arranged offset to each other so that the channels of the individual corrugations cross. The height of the corrugation and the length of the mixing element depend on the application. Due to the design, a wide variety of materials can be used. A static mixer equipped with mixing elements of type STV is ideally suited for the homogeneous mixing of turbulent flowing media (gases, aqueous liquids).

STV - for mixing gases

The type STV mixer is ideal for homogenising gas flows. In the event of density or temperature differences, the STV prevents stratified flow and ensures a stable mixture over a very short mixing distance with low pressure loss. The extremely short design is often ideal for large nominal diameters in particular.



STV - „MIXER FOR GASES“

The STV static mixer is mainly used for mixing large-volume gas flows. The STV also achieves excellent mixing results in the production of emulsions and foams, although these are special applications that require detailed calculations.

Materials:
All common stainless steels, structural steels, plastics, special materials

Nominal withs:
DN40 - DN2000*

Application examples:
- Exhaust gas aftertreatment for denitrification of flue gases
- Combination of different mixer types (depending on permissible pressure loss and required mixing quality)

* Depending on the material, other nominal sizes on request

EREstat®

MIXER FOR FOOD

The static tube mixer type EREstat® achieves its mixing effect through the forced and continuous and continuous division of the product volume flows to be mixed. The resulting partial flows are divided divided from mixing stage to mixing stage and geometrically geometrically offset. In addition, the partial flows undergo a change of direction in each stage. By using the appropriate number of mixing stage elements, the desired mixing quality is predetermined, among other things. In addition to this mixing quality caused by the formation of layers, the medium to be mixed rotates around the hydraulic center of each flow channel in both laminar and turbulent flow. This rotation effect achieves an additional radial mixing effect. The guide elements are arranged on the core of the mixing body using special geometric conditions so that the four resulting flow channels each have significantly different cross-sections in the direction of flow. In addition to the layer formation and rotation effects, there is also the shearing flow, which has a positive effect on dispersion processes, for example. The optinal electropolished mixing body of the EREstat® consists of a certain number of mixing elements. The inlet and outlet cones are attached to the mixer core at the beginning and end of the mixing chain. The most commonly used material is stainless steel. Of course, the EREstat® can be supplied in all conceivable designs, e.g. in PVC, PE-HD, PP, PVDF or even mild steel. Examples of the use of EREstat® mixing elements include the gentle mixing and heating of photo emulsions, the treatment of polymer solutions, the thermo-homogenization of chocolate masses in the confectionery industry and the mixing and slow cooling of candy masses.

ERESTAT® „THE FOOD MIXER“

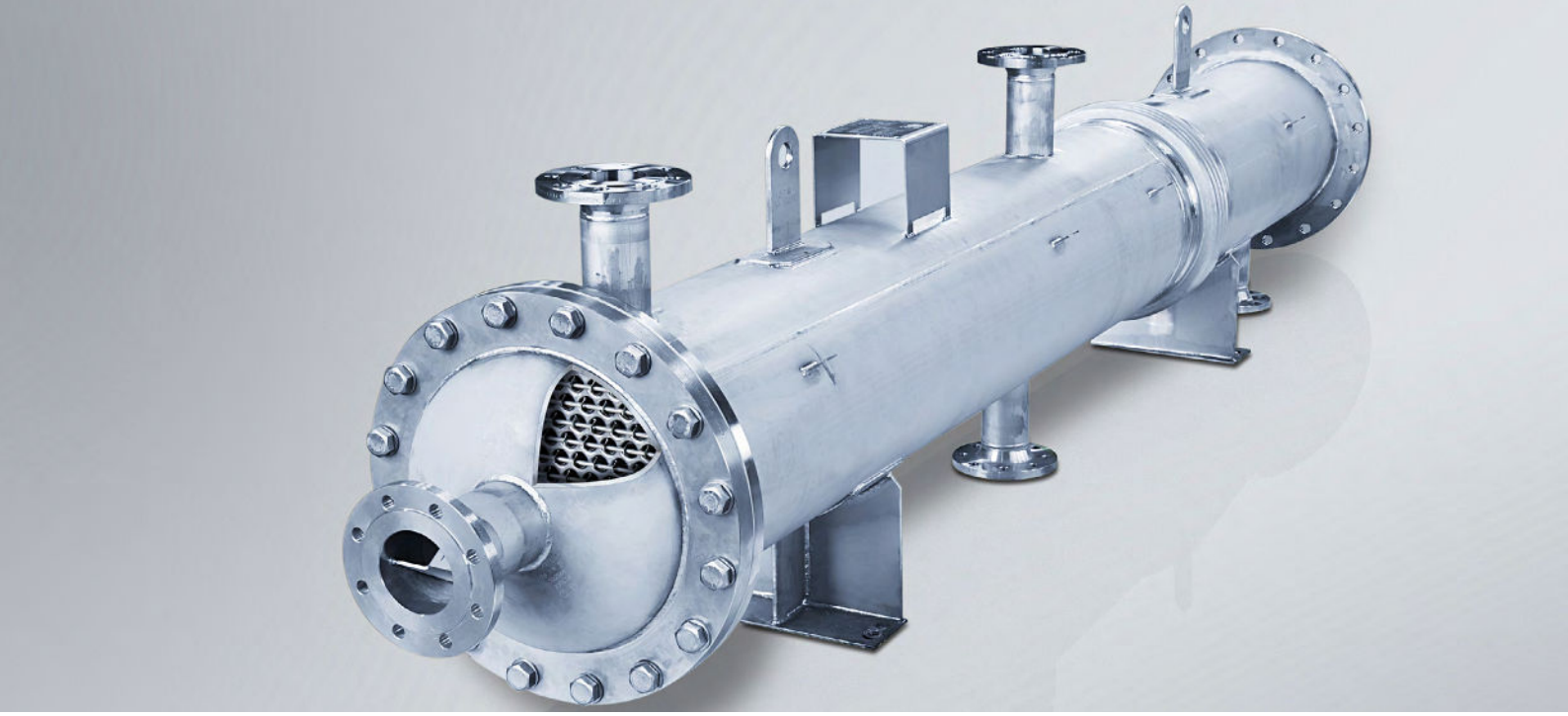
EREstat® from STRIKO is a self-cleaning static mixer for carbonating and aerating fluids and mixing various media. The main area of application is in the food industry, although this always depends on the application.

Materials:
All common stainless steels, structural steels, plastics, special materials

Nominal withs:
DN20 - DN250*

Application examples:
- Production of ice cream
- Mixing fruit pieces into yoghurt
- Dissolving CO2 in beverages of all kinds
- Air injection into hair gel, inclusion of air bubbles

* Depending on the material, other nominal sizes on request



HEAT EXCHANGER FOR VISCOUS MEDIA

MULTI-TUBE HEAT EXCHANGER

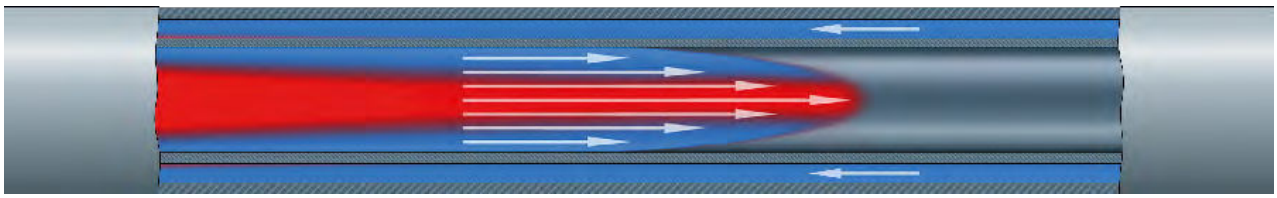
STRIKO heat exchangers are specially designed to control the temperature of viscous to highly viscous media. The units are designed as straight-tube heat exchangers in which the medium to be tempered is always channelled through the tubes (not around the tubes). The product space tubes are equipped with S-Helical mixing elements, which greatly minimise fouling or caking of the product on the inner tube wall through continuous mixing, even at single-digit Reynolds numbers. In addition, the efficiency of the heat exchanger is significantly increased by increasing the heat transfer on the product side, which leads to smaller dimensions and thus to a reduction in costs. The mixing element chains are integrated removably into the product chamber tubes so that any cleaning work can be carried out effectively and thoroughly.

STRIKO heat exchangers are characterised by

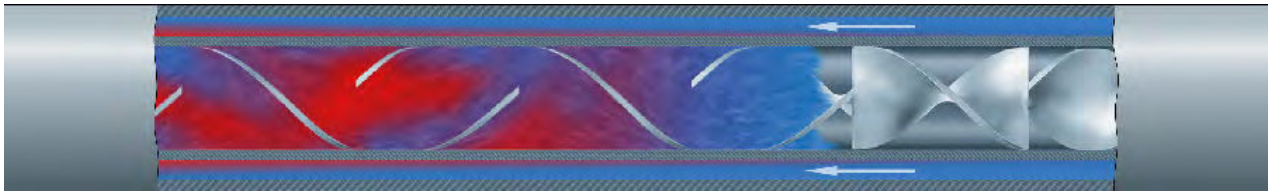
- Temperature control and homogenisation of highly viscous media
- High efficiency, compact length
- Increased heat transfer on the product side
- effective cleaning
- Cost-effective due to patented mixing element chains
- Ready-to-install delivery

FUNCTIONAL PRINCIPLE

When conveying media with a higher viscosity, the flow velocity is unevenly distributed in the product chamber, resulting in a so-called single-parabola flow profile or poiseuille flow. This effect is intensified by increasing viscosity when cooling media. Under certain circumstances, individual pipes become completely clogged. This effect and the fouling of the transfer surface is significantly reduced or even completely avoided by using STRIKO S-Helical mixing elements. As a result, the heat exchanger can be operated at a consistently high performance over long periods of use, which can significantly reduce downtimes and maintenance costs.



Single parabolic flow profile without S-Helical mixing elements



Flow with S-Helical mixing elements

Materials:
All common stainless steels, structural steels, plastics, special materials

Nominal withs:
double pipe: DN10 - DN400
Tube bundle: Coat DN100 - DN1000

Application examples:
- Cooling of silicone, bitumen, hexane
- Heating of sugar-starch syrup, PE petrol solution, viscous oils
- Trace heating of static mixers (double jacket)
- Tempering of plastic melts

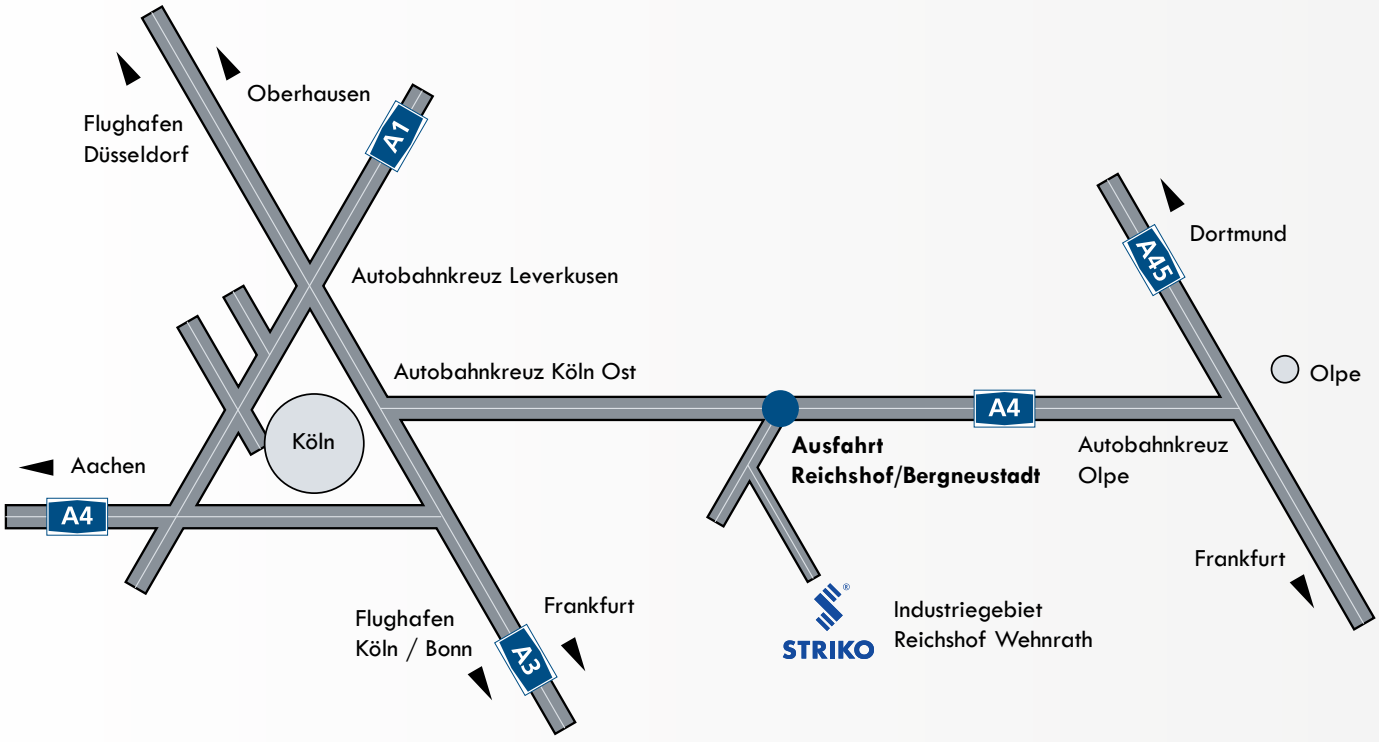
How you can reach us

Rupture Disc:
rupturedisc@striko.de

Static Mixer
mixer@striko.de

Heat Exchanger
heatexchanger@striko.de

where you find ous



STRIKO Verfahrenstechnik GmbH

Gewerbeparkstraße 27
51580 Reichshof-Wehnrath
02261 9855-0
info@striko.de

You are safe with **STRIKO.**

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