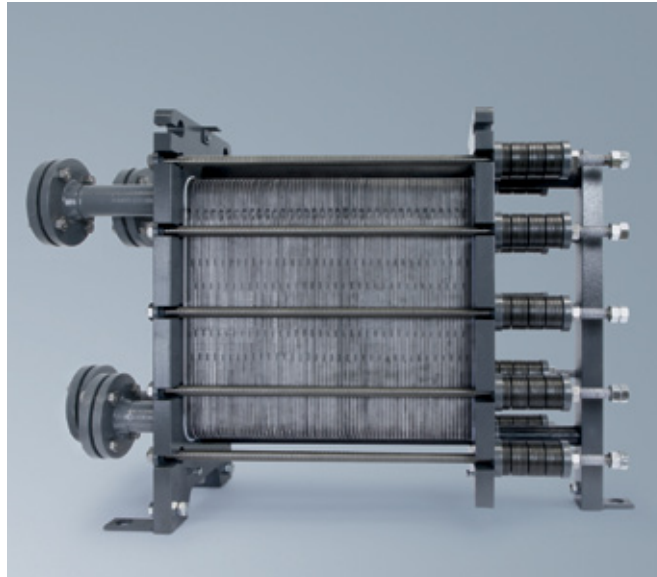




EKasic[®] SILICON CARBIDE PLATE HEAT EXCHANGERS

ESK manufactures plate heat exchangers of sintered silicon carbide high-performance ceramics for extremely corrosive or particle-laden process fluids.



Gasketed EKasic[®] silicon carbide plate heat exchangers

Fields of Application

EKasic[®] silicon carbide plate heat exchangers are used in the chemical industry or similar sectors, especially where highly corrosive media must be heated and cooled, or evaporated and condensed. EKasic[®] silicon carbide plate heat exchangers are also used in applications that must withstand the wear of particle-laden liquids.

The very compact plate heat exchangers offer very high transfer performance in a small space. Thanks to the excellent corrosion resistance of SiC ceramics, EKasic[®] plate heat exchangers permit long service lives, high reliability and improved product quality. The heat exchangers are further characterized by outstanding thermal shock resistance and resistance to cavitation.

Apparatus Types and Function

The SiC plate heat exchanger family currently consists of two apparatus types:

The K585 series plate condensers are specially designed for condensation and evaporation processes. The flange size DN150 is intended for throughputs of 3,000 m³/h.

The series B500 and B260 plate heat exchangers are designed for heat exchange between liquids. They are available with DN50 for 40 m³/h throughput, or DN25 for 10 m³/h.

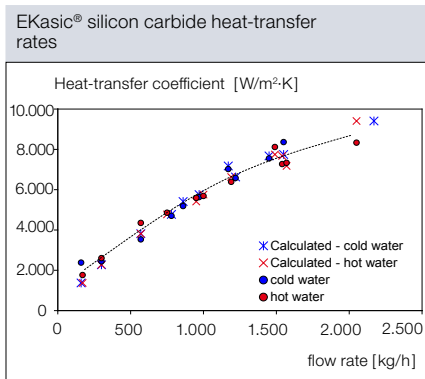


Fig. 1

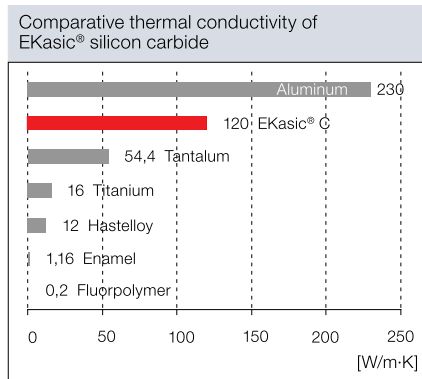


Fig. 2



K585 gasketed EKasic® silicon carbide plate condenser

Designs

EKasic® silicon carbide ceramic plate heat exchangers meet all the requirements for a robust design, customized performance and ease of maintenance. They are planned, designed and produced in compliance with the European Pressure Equipment Directive 97/23/EC.

The plate packs are assembled in standard frames with tie bolts. The plate packs are optionally available as gasketed, monolithically fully welded or semi-welded models.

The gasketed version employs highly resistant PTFE gaskets that can be easily replaced if necessary. The fully welded models, with a hermetically tight

monolithic block, operate gasket-free. Monolithic SiC plate heat exchangers offer the greatest protection against leakage. This model offers maximum safety for handling especially hazardous substances. It is designed for a process window of 16 bar operating pressure and -30/+200°C operating temperature. The plates are designed so that the full operating pressure can even be applied at one side.

The DIN flanges of the frames are lined with PTFE for corrosion protection. Fouling of the apparatus is minimized. EKasic® plate heat exchangers make cleaning-in-place easy if it is required. For maintenance and cleaning, the apparatus can be completely drained without disassembly.

ESK plate heat exchangers are also available in special designs for extremely challenging applications. For example, special configurations of the plate packs are possible. Thus, the single-stream flow can be replaced by multi-stream mode or hybrid configurations. They can also be modified for multi-flow operation or elevated throughputs at one side.

The heat exchangers are individually designed using special software. Material data can be obtained from the AspenTech database.



ESK-design EKasic® silicon carbide plates



B500 gasketed EKasic® silicon carbide plate heat exchanger

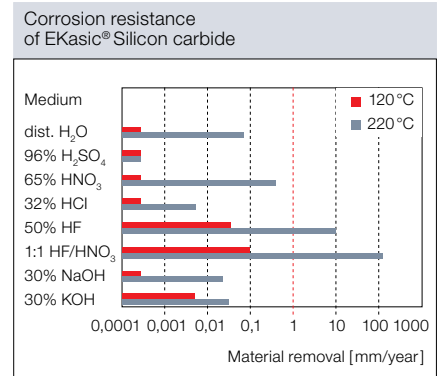


Fig. 3

Plate Concept

The plate heat exchangers of the patented ESK design operate by the counter-flow principle as standard. ESK plates are specially designed for liquid process fluids by CFD simulation (computational fluid dynamics). This design is the reason for their outstanding heat transfer performance (cf. Fig. 1) with minimum pressure loss.

The extremely good thermal conductivity (cf. Fig. 2) of the very lightweight EKasic® silicon carbide is responsible for their high thermal efficiency. The dimensions and weight of the plate heat exchangers can be kept astonishingly small; as a result the apparatus is kept very compact.

On request, heat transfer components of EKasic® silicon carbide can be fabricated to customer specific designs.

Materials

The heat transfer plates are made of a specially developed high-performance ceramic: EKasic® silicon carbide is universally corrosion resistant (cf. Fig. 3) to acids, alkalis and hot water. Moreover, EKasic® SiC is extremely hard and wear resistant. It does not release either particles or metal ions. The material is approved for drinking water applications according to FDA, KTW, WRAS and Fresenius, and is also harmless for food-contact applications.

The gaskets are made of PTFE. This material, like the SiC, is universally corrosion resistant, FDA certified and food compatible. Its temperature resistance is limited to the range -200 to +300°C.

The standard material for the frames is P265GH steel.

Other steels can be used if required. The frames can be protected against environmental effects by painting with a silicone lacquer.



Advantages

- EKasic® SiC is a general-purpose material with a prolonged service life even in the most corrosive of media
- High wear resistance significantly increases product quality
- ESK plate design: low pressure loss, high thermal efficiency and low fouling
- Compact, lightweight apparatus for tight spaces and easy installation
- Pressure difference up to 16 bar
- Minimum-gasket design (monolithic or semi-welded) for extremely high safety

Applications

- Concentrated sulfuric acid, hydrofluoric acid and caustic soda media
- Condensation of corrosive vapors
- Solid-laden suspensions