

CORE-THERM QVF® HIGH PRESSURE HEAT EXCHANGER





P136e.4

GENERAL

Heat exchangers made of inert, non-metallic materials are a requirement in the chemical and pharmaceutical industries where it is essential to avoid any interaction between the materials of construction and the substances being processed. In addition to chemical resistance there is a prime requirement for resistance to abrasion and ease of cleaning in equipment of this type.

It is usually not possible to fuse-join or weld non-metallic materials which meet these requirements, so that the quality of these combinations of materials rests on the reliability of the seals between the heat exchange tubes and the tube plate.

In view of the different thermal expansion coefficients and the possible temperature differences in the equipment, these seals must be capable of taking up any linear expansion that occurs.

-  Single tube seal with double clamp rings
-  Diffusion-resistant tube plate
-  DN 100-DN 300: -1/10 bar, -40/+200°C
-  0,4 - 20 m² heat transfer area

QVF® SINGLE TUBE SEAL

The pure PTFE clamp seal for the individual tubes used by QVF® provides a high degree of security here. Every seal is set to the required sealing force and when maintenance work is being carried out and the tube is changed it can be reset to the optimum setting.

The slopes on the contact surfaces between the screw connection and the clamp seal on the one side and between the clamp seal and the tube plate on the other have been selected to ensure that the sealing ring applies pressure to the heat exchange tube in a double linear fashion. Together with the polished ends of the SiC tubes used, this principle guarantees high and controlled sealing forces and, as a result, maximum freedom from leaks even after a long time in service.

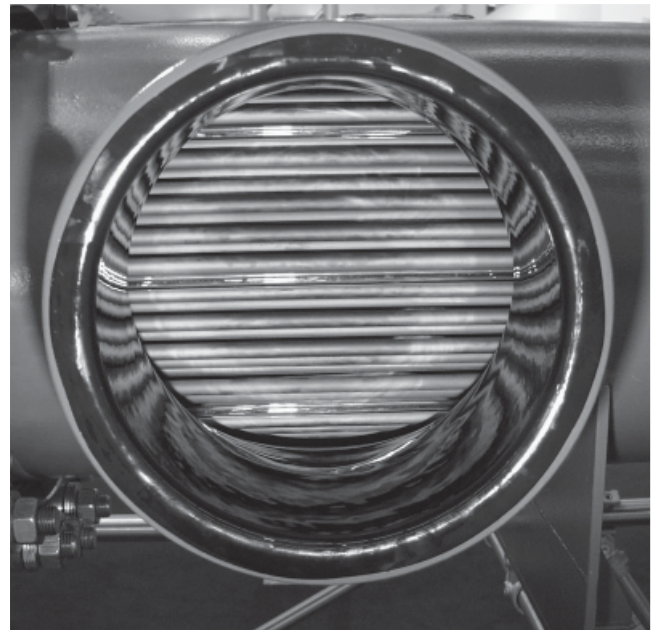


Fig. 1: QVF® high pressure heat exchanger

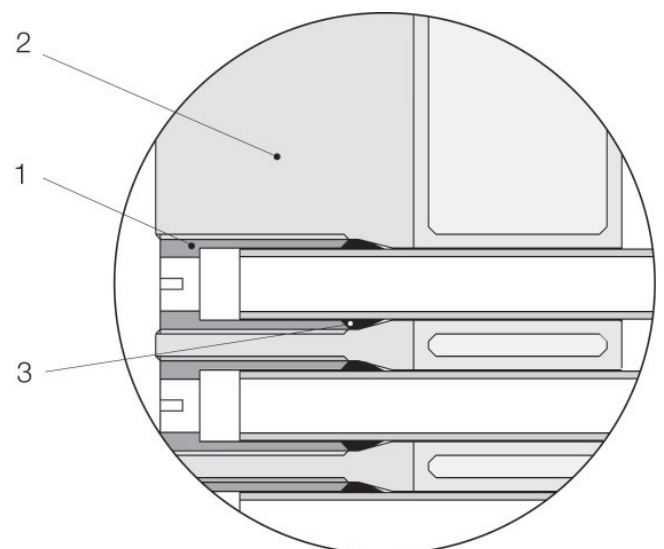


Fig. 2: QVF® Single tube seal with screw connection (1), tube plate (2), clamp ring seal (3)

CLEANING THE SERVICE SIDE

In actual operation it is often not possible to prevent soiling of the heat exchanger tubes on the service side by the cooling water mains, so that efficient cleaning is one of the main criteria in the selection of a heat exchanger. CORE-Therm provides the possibility of cleaning the heat exchange tubes mechanically and replacing them individually without affecting the sealing force on the other tubes. Even when the service header is removed the tube plate remains clamped to the shell.

THE NEW TUBE PLATE

The diffusion-resistant CORE-THERM tube plate with its integral support plate and the corrosion-resistant materials PFA and PTFE can be used at high pressures up to 10 bar and also operated under vacuum. Because of the corrosion resistance of the heat exchange tubes and the shell the service and product sides can be selected to suit the particular operating requirements. Only the standard stainless steel headers need replacing with special corrosion-resistant headers.

The optimised tube layout permits the maximum number of tubes per diameter stage.

SILICON CARBIDE HEAT EXCHANGE TUBES

SiC of course meets all the requirements of an optimum heat exchange tube because of its heat conductivity of 125 W/mK and its high corrosion resistance.

The benefits of SiC are:

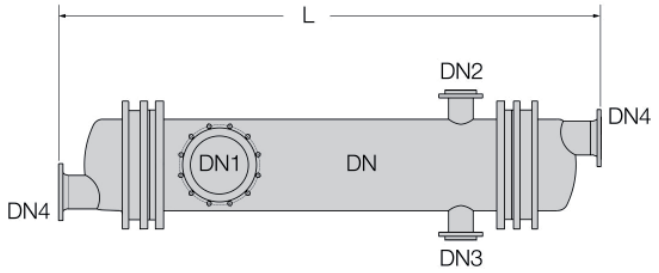
- Very good chemical resistance, similar to borosilicate glass
- High pressure resistance
- Very good thermal conductivity
- Very good temperature and thermal shock resistance

Sintered SiC is a monolithic material which contains no further constituents in its structure other than SiC.

DDPS ENAMELLED SHELL

The usual way to operate a shell-and-tube condenser is with the product in the shell. This means that the same requirements as regards corrosion resistance and mechanical stability apply to both the shell and the heat exchange tubes. In such cases, particularly when operating alternately under vacuum and pressure, DDPS enamelled shells have proved their suitability in addition to glass. The special roundness of DDPS enamelled shells guarantee optimum sealing of the baffles.

TECHNICAL DATA



DN	Area [m ²]	L [mm]	DN1	DN2/3	DN4
100	0,4	1588	80	50	25
	0,7	2368			
	1,0	3368			
	1,6	4588			
150	1,3	1588	100	50	50
	2,2	2368			
	3,5	3368			
	5	4588			
200	2,3	1638	150	50	80
	4	2418			
	6,2	3418			
	8,7	4638			
300	5	1739	250	80	100
	8,7	2519			
	13,5	3519			
	19,2	4739			

OPTIONS

- Corrosion-resistant turbulence promoters for the heat exchange tubes