

# Self-cleaning Heat Exchanger to heat up Zinc Phosphate Solution



**Industry:** Steel Coating Industry  
**Application:** Zinc Phosphate Solution  
**Location:** Turkey  
**Year of installation:** 2019

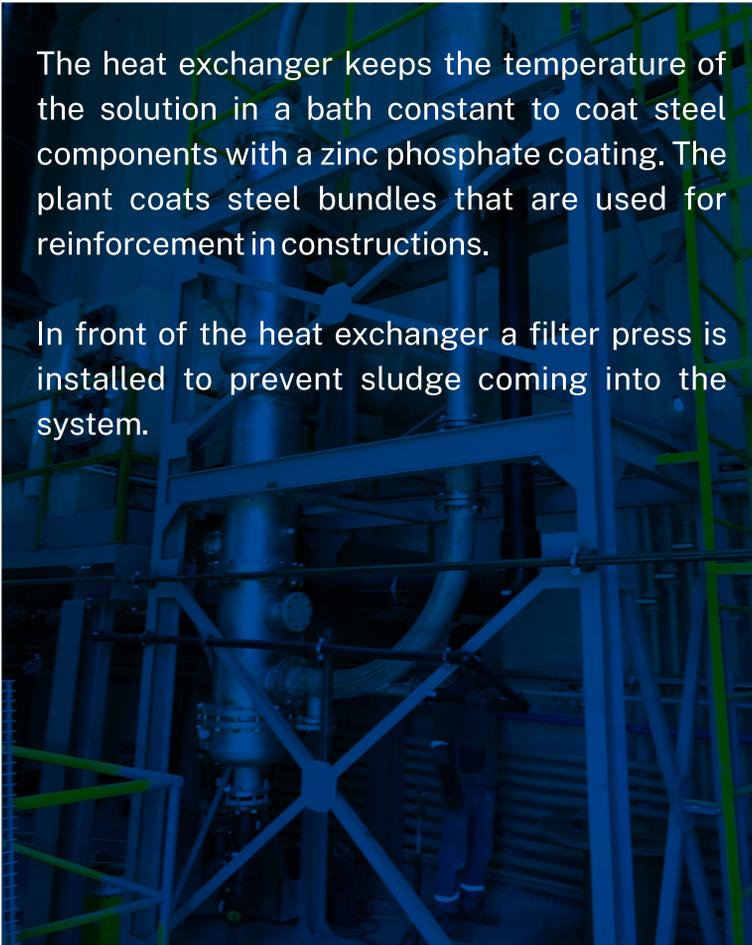
## KLAREN Self-cleaning Heat Exchanger Technology

The KLAREN-System, a self-cleaning fluidized bed heat exchanger, provides a continuous cleaning method to solve fouling of shell and tube heat exchangers up to zero-fouling operation. The KLAREN-System uses cleaning particles that are carried and fluidized by the upward flow of the fouling liquid in the tubes and are evenly distributed over all tubes. The upward flow directly implies that the heat exchanger will be vertical.

The cleaning particles made of ceramic or cut metal wire and with diameters varying from 2 to 4 mm create a scouring effect on the tube wall surface and remove the developing fouling layer at an early stage of formation. After passing through the heat exchanger, the cleaning particles are disengaged from the liquid in a special designed separator and are returned to the inlet channel through an external downcomer and the cycle is repeated.

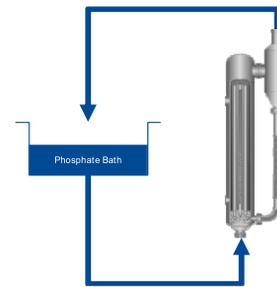
The heat exchanger keeps the temperature of the solution in a bath constant to coat steel components with a zinc phosphate coating. The plant coats steel bundles that are used for reinforcement in constructions.

In front of the heat exchanger a filter press is installed to prevent sludge coming into the system.



### Heat exchanger specifications

Number of tubes	43
OD Tubes	33.4 mm
ID Tubes	27.9 mm
Length Tubes	2500 mm
Total Length Heat Exchanger	5000 mm
Particle/Liquid Separator	Gravity Separation
Material of Construction	SS 304
Particle Type	Al <sub>2</sub> O <sub>3</sub>
Particle Size	3 mm



	Tubes Side		Shell Side	
Medium	Zinc Phosphate Solution		Hot Water	
Flow (m <sup>3</sup> /h)	60		30	
Temperature (°C)	In	Out	In	Out
	70	71	80	78
Duty	98 kW			



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