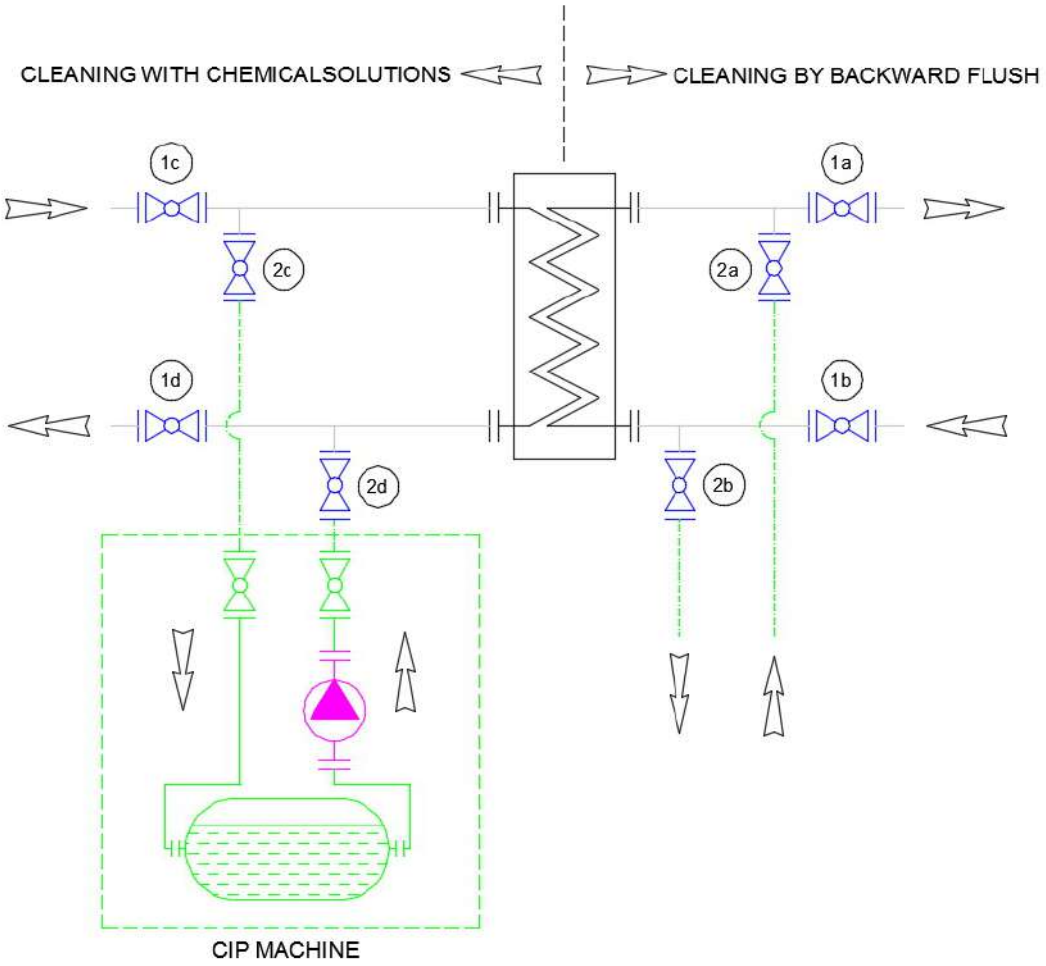
EURO HEAT – PRODUCTION OF PLATE HEAT EXCHANGERS
34000 Kragujevac, Industrijska bb, phone: 034 345055 fax:034 341 342
office@euroheat.co.rs - www.euroheatphe.com – www.euroheat.co.rs

SUGGESTIONS FOR CLEANING PLATE HEAT EXCHANGER BY CIP (CLEANING IN PLACE) METHOD

Reasons for cleaning plate heat exchanger can be many, depending of type of heat exchanger, application in which heat exchanger is used, etc. If there is possibility of fouling it is necessary to monitor performance of heat exchanger by measuring inlet/outlet temperatures and also pressure drop on primary and secondary side of heat exchanger. If working parameters differ much from designed, it is time to clean heat exchanger.



CLEANING BY BACKWARD FLUSH

In cases when deposits on inner plates are created by loose materials or organic compounds and deposits are not solid, most commonly used cleaning method is backward flow.
Warm water or cleaning medium is flushed through heat exchanger with high velocity (velocity should be 2÷3 times greater than normal velocity) through primary/secondary side of heat exchanger in direction opposite to working direction. Valves connecting heat exchanger to pipes must be closed and drain valves on pipelines must be open. Cleaning medium (dirty) that was used for cleaning heat exchanger must be disposed in accordance with law regulations.

Description of backward flush method :

- close valves 1a and 1b

- wait till temperature of heat exchanger drops between 10°C and 30°C

- drain working fluid on primary/secondary side of heat exchanger (side that is to be cleaned) by opening drain valve 2b

- connect a hose to valve 2a

- start water flow through heat exchanger during 20÷30 minutes

- check dirt and organic dirt that is flushed from heat exchanger

- stop water flow and close valve 2a

- fill heat exchanger with working fluid in accordance with startup procedure for heat exchanger

- close valve 2b

If it is impossible or insufficient to clean inner plates by this procedure (using only warm water) it is necessary to use some detergent.

CLEANING WITH CHEMICAL SOLUTIONS

When it is necessary to use chemical solutions for cleaning heat exchangers it is highly recommended that cleaning is performed by company or individual that already has experience with this kind of procedures.

When using chemical solution for cleaning heat exchangers, CIP (Cleaning In Place) machine should be used. There is large number of this kind of machines on the market and it is possible to use any of them.

Cleaning is done by use of common cleaning fluids designed for cleaning heat exchangers that are available on market. Cleaning fluids must contain chemical additives that make cleaning more effective and also prevent corrosion. EURO HEAT strongly suggest that before acquiring cleaning fluid one should contact fluid manufacturer and inform them about kind of deposits and dirt that needs to be cleaned and also about materials that heat exchangers are made of.

If deposits and dirt can not be cleaned and removed by water back*ward flush or use of commercial* cleaning fluids it is possible to use some of flowing solutions :

- water solution of soda or caustic soda in concentration up to 2%

- water solution of nitric acid (HNO_3) in concentration up to 0.5%

- water solution of sulphamic (H_3NSO_3) (NOT SULPHIRIC ACID) in concentration up to 5%

- water solution of phosphoric (H_3PO_4) in concentration up to 5%

Temperature of cleaning fluid should not overstep 60°C

TYPE OF DEPOSITS AND FOULING	SUGGESTED CLEANING SOLUTIONS
Calcium Sulphate, Silicates	Citric, Nitric, Phosphoric or Sulphamic Acid
Calcium Carbonate	Nitric Acid
Alumina, Metal Oxides, Slit/Sludge, ….	Citric, Nitric, Phosphoric or Sulphamic Acid
Biological growth	Sodium carbonate or sodium hydroxide

(keep in mind recommended concatenations)

Description of backward flush method :

- close valves 1c and 1d

- wait till temperature of heat exchanger drops between 10°C and 30°C

- drain working fluid on primary/secondary side of heat exchanger (side that is to be cleaned) by opening drain valve 2d

- connect a hose of CIP machine to valves 2c and 2d

- fill the tank of CIP machine with cleaning fluid

- start CIP machine and let it run for 30÷60 minutes

- during cleaning process check activity and concentration of cleaning fluid on inlet and outlet of side of heat exchanger

- stop cleaning when there are no more changes in cleaning fluid

- when dirt is removed, drain cleaning fluid from heat exchanger and CIP machine

- disconnect CIP machine from pipelines

- connect a hose to valve 2d

- start water flow through heat exchanger during 10÷15 minutes

- stop water flow and close valve 2c

- fill heat exchanger with working fluid in accordance with start up procedure for heat exchanger

- close valve 2d

Depending on nature of fouling and dirt and cleaning fluid that is used there is possibility that cleaning process must be repeated.
If it is not possible to clean heat exchanger using CIP method it is necessary to perform mechanical (physical) cleaning.

WARNINGS

Handling chemical solutions and dirt from heat exchangers can be dangerous and it is necessary to take all necessary safety measures so persons that are performing cleaning wouldn't be harmed.

Handling (keeping and storing) cleaning fluids and dirt from heat exchanger must be done in accordance to law and legal procedures.

After using soda, acid or some other cleaning fluid (detergents) it is necessary to thoroughly clean heat exchanger with clean water.

Never use hydrochloric acid (HCl) to clean parts made of stainless steel, even in low concatenations.

Never use phosphoric or sulphamic acid to clean parts made of titanium, even in low concatenations.