Heat Matrix

INFOSHEET

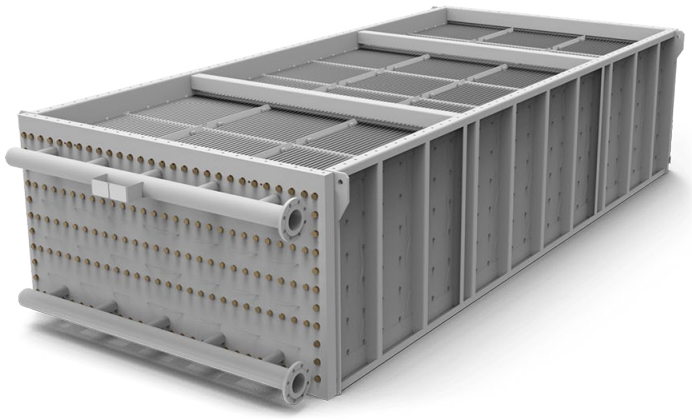
Managing fouling in Polymer Economisers

How the economiser cleans itself and is kept free from fouling

Abstract

Significant energy savings can be achieved when heat is recovered from hot flue and exhaust gases. When these hot flue and exhaust gases are fouling, management of this fouling is important in order to avoid heat exchanger blocking. The Heat Matrix polymer economisers have operated successfully in duties where the hot gas was dirty.

- Ultra High Performance Polymers with a very low affinity to bind with inorganic elements and dust particles
- Removal of the heavy fouling with an optional in-line cleaning system



Heat recovery opportunity

Siginificant amounts of energy are lost via flue gas or dryer exhaust air every day in the industry. These losses can be as high as 20% of the total energy consumed by thermal processes. By recovering heat from such hot flue and exhaust gases, significant energy savings can be achieved.

Fouling challenges of heat recovery

The main challenges when recovering heat from flue and exhaust gases are:

1. Fouling on the hot gas side which may lead to pressure drop increase and, if left unattended, may lead to blockage.
2. Condensation of acids when temperatures drop below the acid dew point.

This infosheet explains how the Heat Matrix Polymer Economiser cleans itself and is kept free from fouling, even in heavy duty environments.

The Heat Matrix Polymer Economiser

What is a polymer economiser?

Heat Matrix engineers an innovative polymer-based heat exchange technology for drying, oven and combustion processes, which makes heat recovery from corrosive and/or fouling exhaust gases possible. The recovered heat is used, for example, to warm up water or a water/glycol mixture.

What is the hot gas side?

Figure 1 shows a Heat Matrix Polymer Economiser in which the hot flue gas or exhaust air enters the top of the unit via nozzle N1, passes in between the tubes and leaves via the bottom nozzle N2. This is referred to as the hot gas side. The hot gas is cooled with cold water or a water/glycol-mixture that is fed flowing through the tubes.

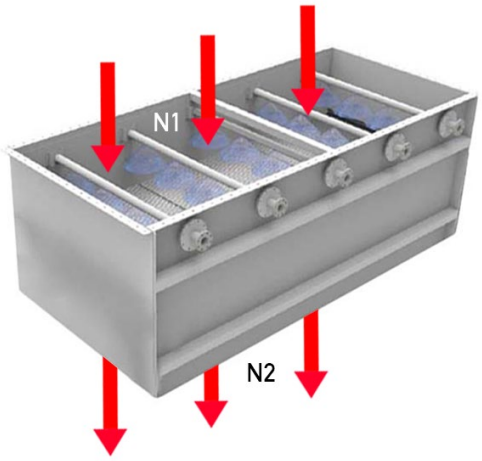


Figure 1: Hot gas flows in the polymer economiser

Managing fouling on the hot gas side

What causes hot gas side fouling?

Cooling of flue gas or exhaust air leads to a wet surface due to condensation of moisture or acids present. Dust particles present in the flue gas or exhaust air are trapped and get stuck on the wet surface. Continuous presence of a wet surface in combination with dust particles eventually leads to fouling.

How is hot gas side fouling prevented?

Heat Matrix economisers contain Ultra Performance Polymers which are resistant to corrosion and fouling. Acids do not corrode the polymer surface in any way. The use of polymers makes it possible to operate the economiser at temperatures below the acid or water dew point.

The polymer technology offers a significant smoother surface than metal surfaces. In addition, due to its nature, the polymer has a lower propensity to bind inorganic chemicals or dust particles. The vertical downward flow of the hot gas ensures that dust, acids and dirt are collected in the bottom of the economiser.

How is fouling on the hot gas side removed?

When operated in highly fouling duties, the installation of a spray cleaning system allows for a quick removal of any fouling accumulation.

When (deep) cleaning is needed, detergents and even acids can be applied to provide the cleaning required. Please consult Heat Matrix before you start using such cleaning liquids.

Above the tubes, spray nozzles are positioned for the effective cleaning of the tubes. In case there are many tube rows below each other, it is also possible to position a spraying system in the middle of those rows besides the one which is positioned above the top row.

Field experience

Managing fouling in Polymer Economisers

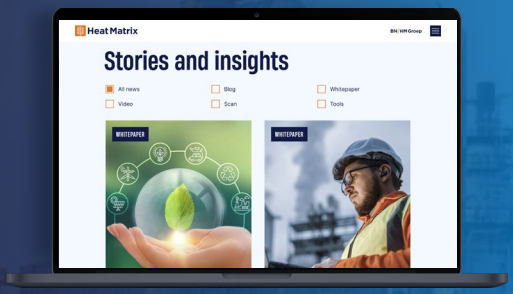
Heat Matrix Polymer Economisers have proven themselves extensively in fouling flue gas and dryer exhaust air duties. For example, they have been operated in the following duties:

- Biomass fired boiler in the industry with ash, soot and acid
- Heavy oil fired boilers
- Incinerators

Want to learn more?

Discover our insights

Visit our blog and learn more about heat recovery from flue gas and exhaust air.



Visit the blog

Your savings potential?

Our Heat Recovery Scan gives you insight into the most promising heat-integration concepts and their payback period.

Rik Kuenen

Heat Matrix
Hoogeveenenweg 5
2913 LV Nieuwerkerk aan den IJssel
The Netherlands

+31 85 130 2790
info@heatmatrix.nl
wwww.heatmatrix.nl