

FLUE GAS CONDENSER

Technology for increasing efficiency and decreasing dust emissions in combustion gas boilers combusting damp wood matter

The basis of the equipment is a direct heat and matter exchanger. The damp exhaust gases are led through a transversal tube, where they are intensively showered in process water. The exhaust gases are cooled to the temperature of the dew point and the steam from the exhaust gases is condensed. At the same time the dust particles are captured by the process water. The energy withdrawn from the exhaust gases – partly by reducing the temperature of the exhaust gases and partly by the condensation of the steam – is led out of the system to the heating system of the boiler.

The resulting condensate from the steam engaged in the exhaust gases increases the volume of the process water. The residue of the process water containing the captured dust particles is led away to a water treatment plant and cleaned and when neutralized it is released into the sewage system.



Water treatment system

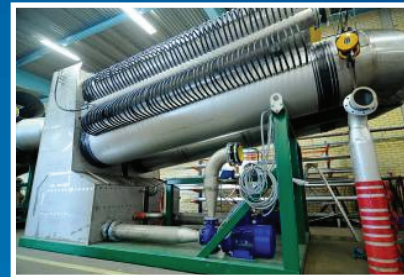
The water cleaning plant is made up of three basic parts:

- A lamellate separator
- A sand filter
- A tank for the cleaned water

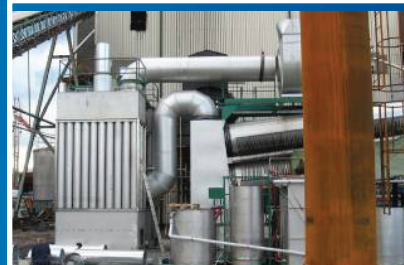
The condensate first enters the lamellate separator where the sediment settles. This sludge is then re-pumped to the fuel paths of the boiler – the fly ash travels across the grid of the boiler - it is dried and remains in the ash container. The partly cleaned condensate progresses to the sand filter with return regeneration. The cleaned water is collected in the tank, and the water from the tank is used for the return regeneration of the sand filter and the surplus is removed into the sewage system.



Třebíč 3 MW



Örkelljunga 7 MW



Vilnius 62,5 MW



Lessebo 23 MW

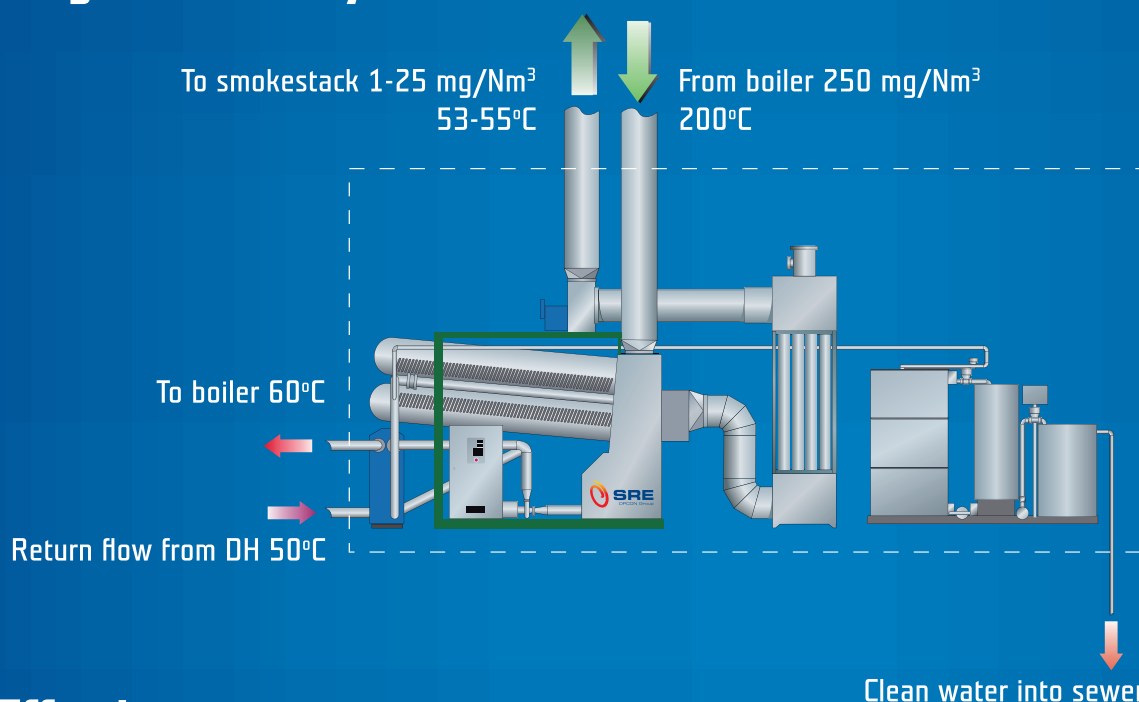


Cleaning the exhaust gases

The independent spray condenser separates only coarse dust particles from the exhaust gases. In order to separate fine dust particles a wet electro-filter is installed. The wet electro-filter connected to the spray condensing exchanger has very small dimensions and 100% functionality partly because exhaust gases cooled to dew point have a small size and at the same time they are completely saturated. The separated dust is in the form of a sludge washed through by the process water of the condensing exchanger into the water cleaning plant.



Diagram of the system



Effective use

A vital condition for the efficient operation of the system is the sufficient dampness of the combusted fuel (50 to 60%) and a sufficiently low temperature in the return water from the system (max. 55°C).

Energy benefits

Within the optimal operating parameters the installation of a condensing exchanger can increase the efficiency of a boiler combusting wood matter by up to 95%!