



### Heat recovery

In times of increasing costs for energy heat recovery systems are becoming more important. Depending on the application there are two different systems of heat recovery possible.

Using a **direct heat recovery** the waste heat of an exhaust gas is being transferred directly to a gaseous or liquid medium which can be used in subsequent processes.

Typical applications are:

- pre-heating of raw gas by using exhaust gas from a combustion plant
- using waste heat for steam generation
- directly linked cold water-warm water heat exchange

Pre-heating of raw gas is the mostly used application of a direct heat recovery. It is executed by using a gas-to-gas system. Steam generation is effective in case of using high flue gas volume flows with high temperature due to the high evaporation performance. To increase the efficiency of usage of waste heat arising of high temperatures a combined system of bare and fin tubes can be used.

Using an **indirect heat recovery** the waste heat of an exhaust gas is being transferred to a gaseous or liquid medium by means of a circulating transfer medium e.g. water or thermal oil.

This system allows a decentralised arrangement of heat exchangers and is either used at lower exhaust gas temperatures or using waste heat with dehumidification.

Typical applications are:

- heat transfer between two pressureless gases at low temperatures
- using condensation heat of humid exhaust gas
- indirect raw gas pre-heating using circulating thermal oil which is heated by hot exhaust gas