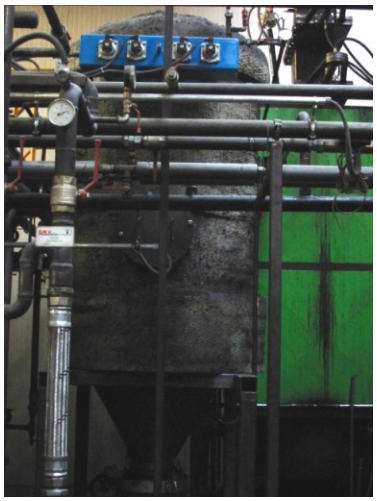
Process: Gas cleaning after a Biomass Gasifier



The Task

The gasification of wood and other solid biomass fuels in autothermal pyrolysis reactors is a coming technology for the generation of thermal and electric energy in district heating power stations. A gas engine generator is run with the pyrolysis gas.

The main problem of this technique is the content of dust and long chained hydrocarbons (”Wood Tar”) in the pyrolysis gas.

Without an effective gas cleaning there is no gas engine operation possible, a bad gas quality causes short oil changing intervals and damages at the cylinder liners.

The level of the gas temperature at the reactor outlet is between 350 and 450° C. The generated oxygen-free gas is fuel, all parts of the installation has to be absolutely gas- tight.

At start up and shut down the whole installation has to be purged with inert gas (N_2).

In the past, one tried to solve these problems with a wet scrubber direct after the reactor. This, however, caused problems with the disposal of the scrubbing agent, also the dust collecting efficiency of the wet scrubber was insufficient. An additional filter has to be installed before the gas engine.

The Solution

The Herding ALPHA Filter is a surface-coated candle filter and operates with surface filtration. The filter is online jet-pulse cleaned.

This inorganic mineral-based filter media is non-inflammable and has a high resistance to chemicals. The maximum service temperature is 450° C. To avoid a recondensation of the long-chained hydrocarbons the minimum service temperature has to be above 280° C.

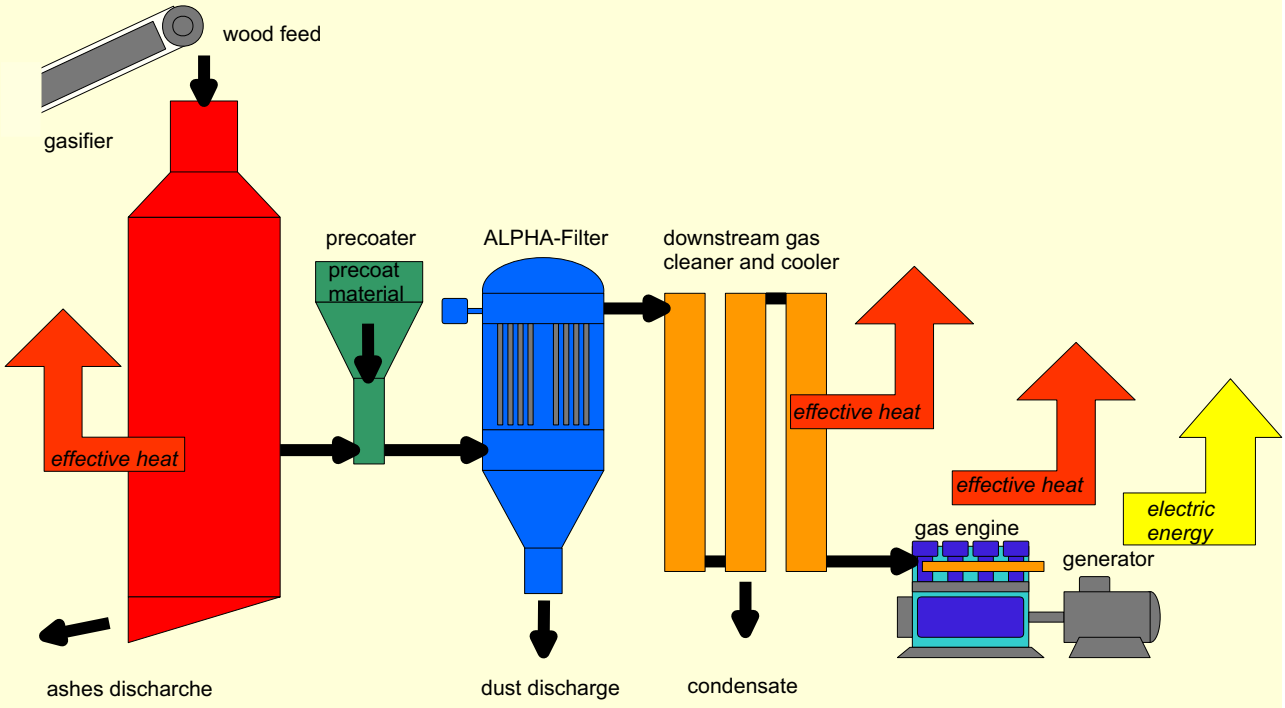
The guaranteed residual dust concentration in the clean gas is below 2 mg/m³. This gas quality is applicable for gas engine operation.

The filter is equipped with a precoating device, which, together with the differential pressure-controlled filter cleaning system, applies an additional filtering layer of inert powder and renews it at every cleaning cycle. The function of this additional filtering layer is to catch and bond in eventuality occurring sticky particles at the start up and in operation, and to avoid that they reach the filter surface and block it.

The duration of the cleaning cycle is approx. 1.5 to 2 hours, the maximum pressure drop reached is approx. 25 mbar.

The jet pulse cleaning and the precoating is done with inert gas (N_2).

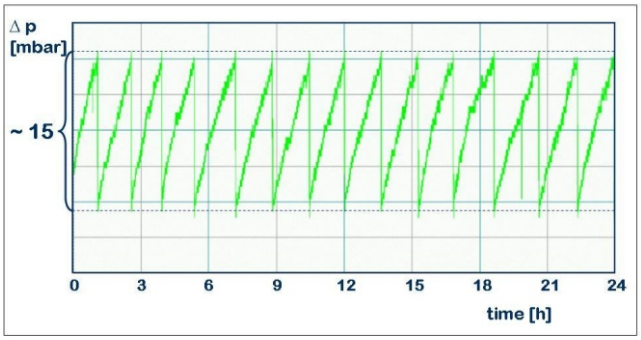
Application: Gas cleaning after a Biomass Gasifier



Operating principle wood pyrolysis district heating power station, dry gas cleaning with **Herding ALPHA Filter technology**

Performance characteristics:

The downstream gas cleaning and cooling stages remain nearly dust-free and are for that result easy to clean.



The pressure drop of the ALPHA Filter remains constant. The above plotting shows the performance characteristics with precoating and dP-controlled cyclic filter cleaning over a period of 24 hours. During the recording, the filter intake temperature was between 380 and 420° C.

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