

THERMOFLEX – FOR ANALYSING THERMO-DYNAMIC AND HYDRAULIC PROCESSES

MASS AND ENERGY BALANCES

District heating companies focus increasingly on establishing high-temperature heat pumps and biomass boilers. In our consultancy, Thermoflex is an important analysis tool that helps ensure the best solution.

We use Thermoflex for the analysis of complex thermodynamic and hydraulic processes. I. e. calculations on boilers, turbines, carbon capture processes, heat pumps, etc.

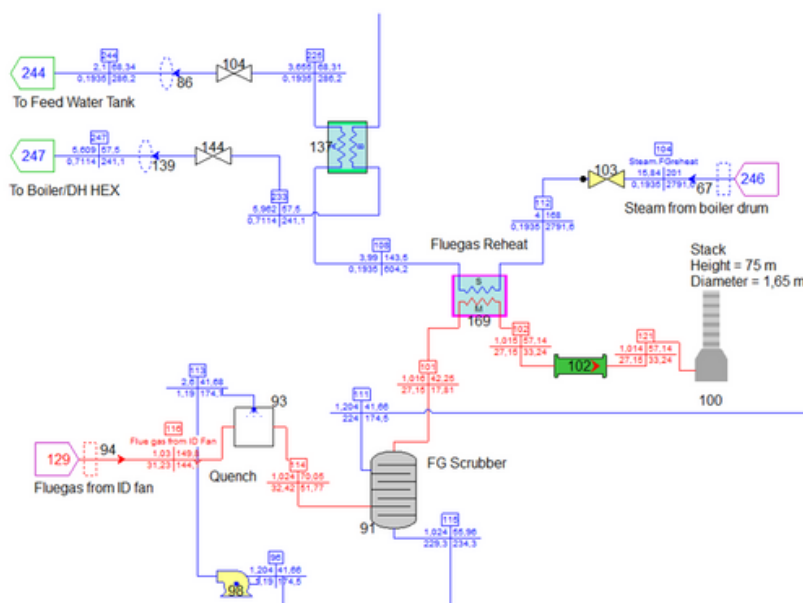
By using Thermoflex, we can form complete mass and energy balances for all relevant parts of a plant, including the changed composition of flue gas from the combustion process in the boiler room through the flue gas cleaning and flue gas condensation system to the stack.

Due to its validated models, Thermoflex is a powerful tool for the analysis of widely diverse, complex thermodynamic and hydraulic processes.

How we use Thermoflex:

Mass and energy balances calculated with Thermoflex are used in all lifetime phases of a process plant, such as:

- in the design phase to create a process overview and as support for laying out plant components
- for 3rd party control of supplier calculations of e.g. plant components
- in the operating phase for "troubleshooting", usually always based on specific measured plant
- for "What-if" analyses, e.g. when considering switching on flue gas condensation



Graphics: Thermoflex model diagram of section of flue gas from Quench over scrubbers and flue gas superheaters to the stack.

High temperature heat pumps and refrigerants

In recent years, district heating companies have increased their focus on replacing fossil-fired district heating boilers with more environmentally friendly district heating production technologies. In this green transition, high-temperature heat pumps, i.e. heat pumps with a supply temperature of up to approx. 125 °C, are of great interest.

When using traditional refrigerants such as ammonia and R1234ze(E), the district heating temperature can only reach 90 °C. To achieve a higher temperature, an extra step using hydrocarbon as refrigerant is added; so-called hybrid heat pumps. For this purpose, we use the Thermoflex refrigerant libraries for process analyzes on both screw- and turbo-based compressors.

