

## Synthesis gas utilization

We can solve your problems

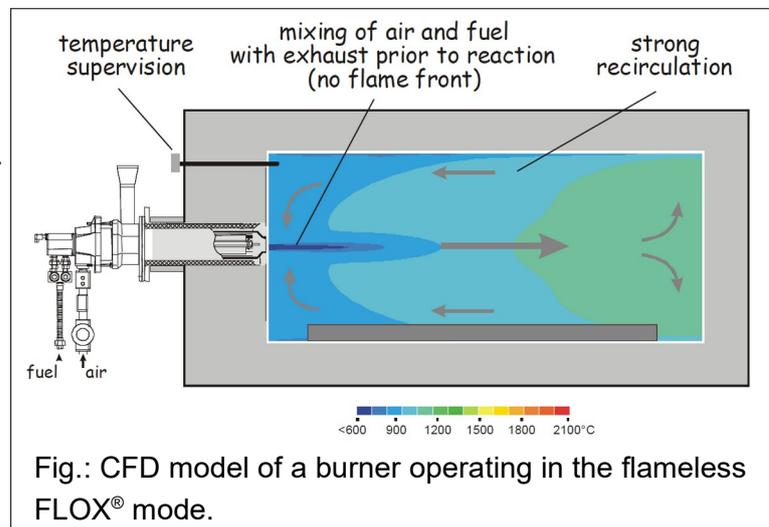
Torrefaction, gasification, pyrolysis, biochar production. Whenever we see thermo-chemical conversion processes of our customers, we encounter the following typical problems:

1. Synthesis gas quality - composition: tar and carbon black are components of the hot synthesis gas. When you try to cool or purify this gas, you run into problems and need sophisticated processes.
2. Syngas quality - evolution: When starting up or shutting down, or if there are operational problems, the gas quality can be poor and the gas will not burn or you will not get a flame signal. For this you need a process that is suitable for all gas compositions.
3. Syngas pressure: The conversion stage is normally operated at ambient pressure to prevent air from entering the process and syngas from escaping into the environment (odor). To burn the gas, you need a certain pressure, which you do not have. But the efficient use of blowers for syngas requires cold and clean syngas.

### Our solution for syngas quality problems:

E-flox combustion chambers are operated with flameless FLOX® technology. FLOX® (Flameless Oxidation, Fig) is a hot combustion without catalyst or ceramic reaction bed. Fuel and air jets are mixed in a strong flue gas backflow prior to the reaction. Since the formation of a flame is suppressed, reaction temperatures can be kept below the temperature range of NOx formation. This results in the following advantages:

1. The avoidance of thermal NOx even with highly efficient preheating of the combustion air.
2. The absence of a flame allows a constant, robust conversion of gaseous fuels completely independent of gas quality, such as fluctuating calorific value. The robustness of FLOX® is suitable for a wide range of special gases.



3. The thermo-chemical conversion does not take place at the burner nozzle, but in the entire volume of the combustion chamber. This protects the burners from temperature corrosion or fouling and significantly increases their service life.

FLOX® burners from e-flox are designed for hot, dirty gases with low calorific value. They are the ideal technology for product gases from gasification, pyrolysis and torrefaction. With e-flox, our customers can burn the hot syngas directly before cooling and cleaning without losing energy in a cooling stage.

#### **Our solution for the pressure problem:**

As mentioned earlier, the pressure problem occurs when you do not want to cool and clean your gas before burning. The solution to this problem is simple if you want to use your waste heat. Using flue gas blowers downstream of the waste heat recovery system to keep the entire system under negative pressure eliminates the need to compress the hot gas. We supply turnkey solutions for your synthesis gas.

We convert the heat into what you need:

- Steam processes with steam turbine, EFGT
- ORC process
- Hot and warm water for heating purposes
- thermal oil for industrial processes
- Air preheating for drying processes

We can also supply self-aspirating burners. These burners provide sufficient suction pressure in the combustion system. They are therefore sufficient for combustion-only solutions or reduce the power consumption of flue gas blowers.

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