

USER MANUAL FLUEGAS CONDENSOR

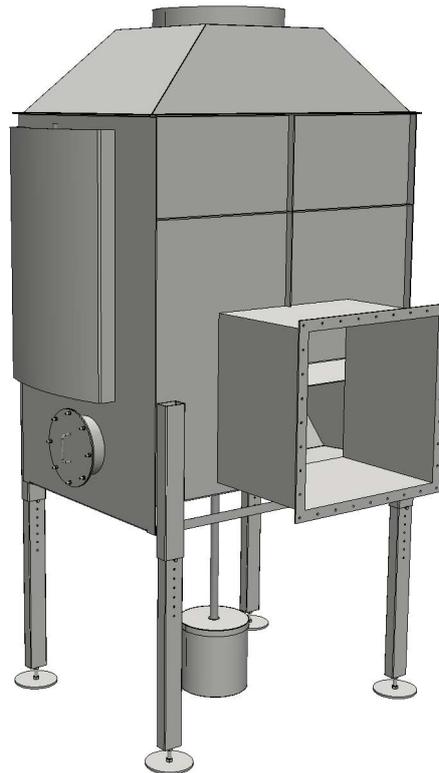


Table of content

| | | |
|----------|-----------------------------------|----------|
| 1 | Content of delivery | 2 |
| 2 | Mounting on site | 3 |
| 2.1 | General..... | 3 |
| 2.2 | Flue-gas side..... | 3 |
| 2.3 | Waterside | 3 |
| 2.4 | Equipment | 3 |
| 2.5 | Condensatedrain | 4 |
| 2.6 | Co ₂ collection..... | 4 |
| 3 | Operation – Start-up | 5 |
| 4 | In operation | 6 |
| 5 | Maintenance | 7 |
| 5.1 | Flue-gas side..... | 7 |
| 5.2 | Water side | 7 |

1 Content of delivery

The flue gas condenser is delivered with a loose set of additional equipment.
This includes:

- 2 flue gas temperature indicators
- 2 water temperature indicators
- 1 pressure switch with two 1/4" pipes and one 1/4" elbow
- 1 position switch for the by-pass valve
- 1 set of nuts and bolts for the aluminum hood
- 1 set of nuts and bolts for the supports of the flue-gas condenser
- 1 temperature switch
- 1 safety valve
- 2 tubes of heat resistant silicon sealant
- 1 Condenser supports

In case of flue-gas condensers with two separate water circuits then the delivery consists of:

- 2 flue gas temperature indicators
- 4 water temperature indicators
- 1 pressure switch with two 1/4" pipes and one 1/4" elbow
- 1 position switch for the by-pass valve
- 1 set of nuts and bolts for the aluminum hood
- 1 set of nuts and bolts for the supports of the flue-gas condenser
- 2 temperature switch
- 2 safety valve
- 2 tubes of heat resistant silicon sealant
- 1 Condenser supports

2 Assembly on site

2.1 General

Before the flue gas condenser is installed on site, first check whether no loose parts are left in the flue-gas condenser.

For transport and installation, the flue gas condenser may only be lifted, using the lifting lugs.

The condenser needs to be placed upon the support structure, the condenser needs to be fixed by a bolted connection.

2.2 Flue gas side

It is very important the installation is free of tension. The chimney can either be connected at the top of the flue-gas condenser, in which case the weight of the chimney may not exceed 150 kg. Or the condenser can be connected to a chimney with a flue gas channel.

2.3 Waterside

The water-side connection has a flanged connection so that the flue-gas condenser can be dismantled.

The piping has to be well supported to avoid additional tension on the connections of the flue-gas condenser.

Important: too large loads can cause leakage in the flue-gas condenser.

As a good solution we recommend a "compensator" between piping and flue-gas condenser.

No mounting, welding or connecting on the flue-gas condenser, this can cause flue-gas or waterside leakage.

2.4 Equipment

The pressure switch must be mounted horizontally on the inlet of the flue gas condenser. The pressure switch has a ¼" process connection, to prevent fluids in this connection a 90° Elbow is mounted before the pressure switch.

The pressure switch is a safety device for the flue-gas condenser. In case of blockage of the flue-gas channel, the burner is shut off.

The burner has to be shut off, when there is increased resistance in the flue-gas channel, as this results in a decrease in the efficiency of the combustion.

Setting: nom. pressure on full load $\pm 20\%$.

The temperature switch in the water circuits are the safety devices to prevent overheating of the flue-gas condenser. This switch will trip the burner.

Settings will be made according to design.

2.5 Condensatedrain

During the operation of the flue-gas condenser a lot of condensation is formed within the flue-gas condenser.

The water has to be drained immediately to avoid a build-up of corrosion active condensate. Absence of enough draining can increase pollution within the flue-gas condenser, which has a negative influence on the heat transfer within the flue-gas condenser.

The condensate drain must be connected through the condensate collector to the sewer with no restrictions by means of smaller piping.

2.6 Co₂ collection

If the Co₂ vent is mounted above the flue-gas condenser special attention must be given to condensate water which escapes the Co₂ vent connections and drops upon the flue-gas condenser. This will increase the possibility of corrosion of the flue-gas condenser. To avoid leakages, the Co₂-cover and the connection between Co₂-collector channel and Co₂ vent must be sealed off.

3 Operation – Start-up

Before the flue-gas condenser is put into operation check whether the flue-gas condenser is filled with water (on the water side) and is properly vented.

The safety equipment must be mounted and tested before the flue-gas condenser is put into operation.

To start up for the first time, HKB. recommends, to put the by-pass valve into the downward position so the flue gasses are led through the by-pass channel and not through the heat exchanger. (Because of the build-up of solid parts in the flue-gasses, pipes can get clogged).

In case of mounting the flue-gas condenser behind an existing boiler, the burner must be put into operation by a qualified service technician.

Note :The flue-gas condenser may never be put into operation without the minimal flow over the condenser according to design specifications.
This may cause substantial damage to the flue-gas condenser.

4 In operation

The flue-gas condenser is suitable for heat recovery of flue-gasses by gas fired boilers. In case of oil or solid fuel firing of the boiler, the by-pass valve has to be closed so the flue-gasses are led into the by-pass channel.

The flue-gasses must be free of polluting elements such as sulphur, chlorides and "Halogen" gasses. Sulphur < 10 mg/m³, Ch condensate 1 mg(l).

If above mentioned chemicals are present, considerable damage to the internal piping or aluminum fins of the flue gas condenser can occur.

The presence of solids in the flue-gasses can cause blockage of the free space between the aluminum fins which increases the backpressure of the boiler flue-gas configuration. Because of this, the firing and the total system heat recovery decreases.

For proper functioning of the condenser there must be a continuous water flow over the condenser.

For steel condensers (not stainless) the water quality must be PH-neutral < 7, cle 200 ppm. Without any NH₃ and/or O₂ present in the water to avoid water corrosion (we refer to the enclosed water regulations). Neglecting these requirements increases the risks of damaging the complete installation substantially.

Requirements for boiler feedwater and boiler water quality according DIN EN 12953-10

5 Maintenance

5.1 Flue-gas side

The flue-gas condenser must be cleaned internally 1 or 2 times a year. (function of "pollution"). Special attention must be given to the inlet of the flue-gas condenser because there it is the most likely, where pollution would build up.

Where there is only a slight build-up of pollution, it is enough to clean the fin tubes with a high-pressure water cleaner. Be careful with a high-pressure water cleaner to avoid possible damage to the piping and/or aluminum fins.

Corroded parts for the boiler/chimney can build up at the bottom of the end top of the Aluminum heat-exchanger. This can increase corrosion of the piping and aluminum fins at these parts, so they have to be removed regulator.

On the flue-gas condenser a max. pressure switch is mounted which is a safety that shuts off the burner in case of blockages. This pressure switch must be tested and cleaned annually by a qualified service technician.

5.2 Water side

The flue-gas condenser must be air-vented regularly.

A presence of solids in the water, can lead to a blockage within the heat exchanger. In such a case the flue-gas condenser must be regularly cleaned with a special fluid capable of cleaning the source of the pollution.

In case of doubt contact a qualified water treatment company.

At the outlet of the flue-gas condenser a max. temp. control must be present to shut of the burner in case of a to high temperature to avoid damage to the flue-gas condenser.

The water flow must be checked regularly. A water flow to low can cause the water to boil within the flue-gas condenser which can damage the flue-gas condenser piping.