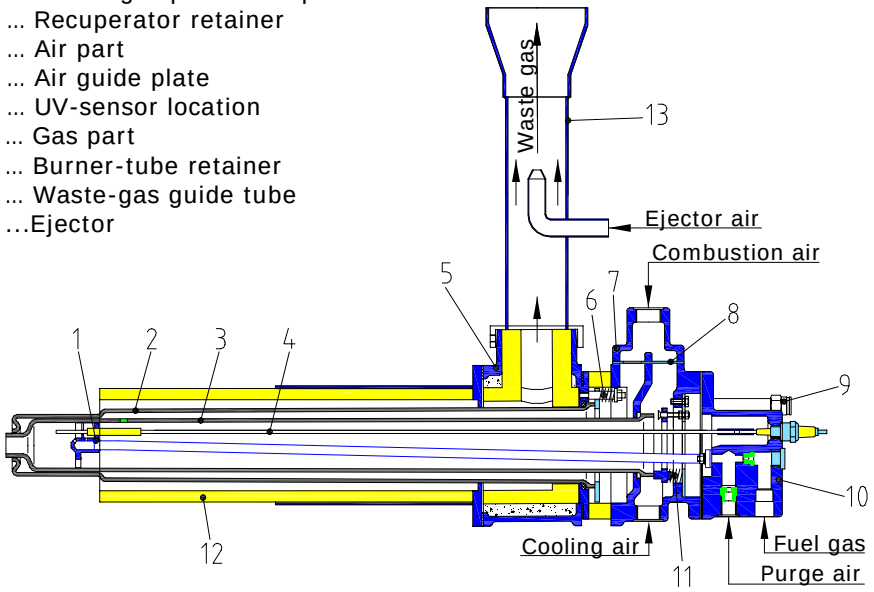
Recuperated High-Velocity Burner NOXMAT® K-RHGB
- direct heating –

Constructive design / Mode of function

1 … Gas lance with swirl plate
2 … Ceramic recuperator
3 … Ceramic burner tube
4 … Electrode
5 … Waste-gas part / Gas part
6 … Recuperator retainer
7 … Air part
8 … Air guide plate
9 … UV-sensor location
10 … Gas part
11 … Burner-tube retainer
12 … Waste-gas guide tube
13 …Ejector



The **burner** is comprised of a three-part burner head, recuperator as well as such components as burner tube, gas lance, and electrode installed inside.

Combustion air is flowing via connecting line through air part and recuperator being preheated there by utilizing the waste-gas heat. The major portion of combustion air (primary air) is flowing from recuperator outlet through holes into the interior of burner tube and, further, through swirl plate into the combustion chamber. The minor portion of combustion air (secondary air) exits the recuperator in the annular gap on combustion-chamber mouth and is mixed with the flame gases escaping from the combustion chamber.
The air guide plate is to split-up the volumetric combustion-air flow at the intake of air part.
Combustion air may flow either completely through recuperator or partially directly through burner tube inside the burner.

This is to protect the inner burner components from overheating in case of high thermal loads.

Fuel gas is flowing via connecting line through gas part and gas lance to swirl plate. The gas flow is dividing there. The major portion of fuel gas flows into the combustion chamber and is mixed there with the intensively swirled combustion air. The minor fuel-gas portion is led into the ignition chamber of swirl plate and ignited there by means of high-voltage ignition spark. Exactly matched conditions in the ignition chamber ensure eased ignition and start-up of burner (cold start).
The flame gases escape with high velocity from the burner tube. They are mixing with secondary air, thus achieving complete combustion. Graded fuel-gas and combustion-air supplies effect a delayed combustion process, entailing a low combustion temperature and, thus, reduced NO_x-emission.

Waste gas is flowing through waste-gas guide tube via recuperator into the waste-gas part and finally exits the burner from there. The waste gas conveys a part of its heat to combustion air in the recuperator to preheat the combustion air. Said preheating cycle entails fuel savings.

An ejector is fitted to the waste-gas fitting of waste-gas part. **Ejector air** is led into the ejector via ejector nozzle. A pressure below atmospheric is generated directly behind the ejector-nozzle mouth, effecting exhaust of waste gas from the burner.
Purge air is supplied to fuel gas in the gas part through a purge-air nozzle in metered quantities to achieve excellent conditions for ignition. Further, said purge air is purging the gas lance to remove residual fuel gas in case of burner shutdown. So, any afterburning is precluded.

NOXMAT Recuperated Burners are equipped with a separate cooling-air connection. **Cooling air** is directly flowing from there through burner tube into the furnace chamber. The ejector can be fitted at its outlet with a mechanically or electrically operated waste-gas flap to prevent any outflow of hot gases from furnace chamber via burner.
Further, the ejector air can also be used for cooling of furnace chamber with waste-gas flap being closed whereby the furnace chamber must be equipped with a special waste-gas piping.
Flame monitoring takes place as a function of process via flame monitoring current of an UV-sensor or ionization current of electrode, concurrently acting as ignition and monitoring electrode.