



Refinery Gas Combustion

PCK Schwedt, Refinery (Germany)

By-product becomes main fuel

Usually it pays off double to provide for thermal utilization of existing substances in the production cycle: it provides relief for the budget and also protects the environment. The example of the PCK Schwedt refinery shows that even technically demanding combustion of refinery gas pays off within an extremely short period of time.



TF-DDZG/DDG burners

PCK Raffinerie GmbH in the eastern German city of Schwedt process around 12 million tons of Russian crude oil a year into petrol, diesel and aircraft fuel. Thermal utilization of a number of refining by-products is possible with the solution installed by SAACKE, supplying both heat and power for the production process.

By-products with fluctuating heating value

Refinery gas	3x 35 MW each boiler (2x)
Lower heating value (LHV)	15 – 60 MJ/m ³
Residual oil (similar to HFO)	
Lower heating value (LHV)	LHV 40.7 MJ/kg

Although the majority of the crude oil can be exploited in the production of fuels, refinery gases and heavy components are left over. So-called reraffinate is part of these heavy oils and places special demands on combustion. Refinery gas is just as demanding: 70% of it is made up of hydrogen and its combustion differs substantially from the standard fuel natural gas.

The installed plant consists of two steam boilers with a total capacity of 240 t/h at a boiler pressure of 90 bar and a mean boiler temperature of 520 °C. Six SAACKE TF-DDZG burners with air preheater replace the previous heavy fuel oil firing system consisting of eight burners and now use refinery gas as the main fuel. The modernization of the plant not only enables combustion of an existing substance from the production process, but also saves a lot of money.

The burners used meet all limits of the current TA Luft (Technical Instructions on Air Quality Control in Germany), of course.

The special features at a glance

- Combustion of refinery gas and residual oil
- Maximum reliability and availability
- Reliable compliance with limits required for NO_x
- Savings in standard fuel natural gas

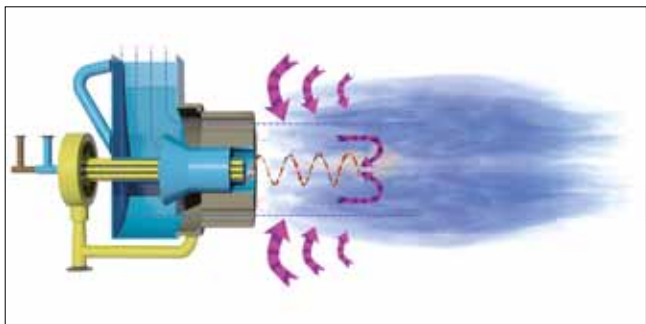


TF- DDZG: stable flame and low-emission combustion

Because residual oil is used as the second fuel in addition to refinery gas, the SAACKE TF-DDZG burners provide enough reserves to meet all limits – even given the fluctuating quality of this oil.

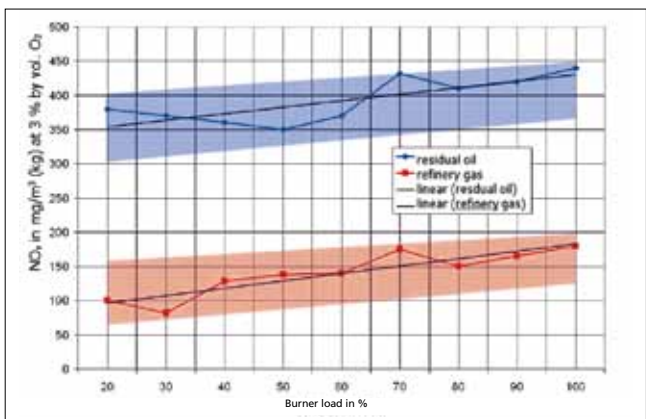
TF-DDZG: Guarantee for low emissions

The firing system is composed of six adapted SAACKE TF-DDZG burners. These steam atomizers combine the advantages of rugged steam pressure atomizer technology with internal recirculation.



The burner principle: internal recirculation

The ultra low NO_x technology is a further development of the proven DDZ burners and has a number of advantages over conventional measures for NO_x reduction. In principle, for example, the burner is suitable for nearly all fuels and ensures minimal emission values thanks to an internal recirculation rate of approx. 50 %. This means external recirculation is frequently superfluous.



Emissions PCK Schwedt, 6 x TF-DDZG

Summary

Utilization of the existing by-products guarantees an enormous cost advantage and, above all, a low emission level. The integrated air preheater increases the efficiency of the facility and additionally saves fuel. Compared to the old facility, the firing system installed now needs only six instead of eight burners – this not only reduces the maintenance expense, but also lowers investment costs.

With the TF-DDZG, SAACKE offers a highly available solution that burns refinery gases and reraffinate reliably and efficiently even under extreme conditions.

Technical data

Application	2x steam boilers 240 t/h, 90 bar, 520 °C
Burner model	TF-DDZG
Burner output (max.)	3x 35 MW (each boiler)
Combustion air temperature	180 °C
Refinery gas	
Emission values	NO _x : < 200 mg/m ³
Lower heating value (LHV)	15 – 60 MJ/m ³
Control range	1:6
Residual oil (similar to HFO)	
Emission values	NO _x : < 450 mg/m ³
Lower heating value (LHV)	40.7 MJ/kg
Control range	1:5

For further information, please visit: www.saacke.com