

POLFLAME® clinkering zone burner.



Polysius



ThyssenKrupp

Future-oriented flexibility.

POLFLAME® clinkering zone burner – one burner for many types of fuel.

Modern burners not only have to assure full combustion of widely differing types of fuel, but also have to do so for frequently changing fuel mixtures. This far from simple requirement profile is reliably fulfilled by the POLFLAME® clinkering zone burner.

Polysius offers the new burner generation for the cement and minerals industry, for the manufacturing of grey and white cement, for new investments and for plant upgrades.

Custom-tailored, innovative and technically mature. A very broad range of fuels can be burnt – standard fuels or secondary fuels, as a single fuel input or as a complex fuel mixture. The burners can also be specially dimensioned for widely differing production capacities – from below 1,000 tonnes to more than 12,000 tonnes of clinker per day and kiln line. Thermal outputs range from 10 MW to 300 MW.

Innovative design

The burner consists of three different sectors:

Centre: The central sector of the burner contains the flame monitors, the ignition burner and the infeed openings for start-up fuel and for solid and liquid secondary fuels.

The POLFLAME® convinces due to:

- Variable burner adjustment without interruption of kiln operation
- Complete combustion of the different fuels within the clinkering zone / burnout zone
- High rate of fossil fuel substitution by secondary fuels
- Constant combustion and high flame stability at different burner settings
- Reproducible setting of the flame shape depending on kiln operating conditions and type of fuel
- Easy operability of the adjusting device

Nozzle ring: If the burner is operated with coal or another ground solid fuel, primary air is supplied through this ring of nozzles, which is located before the outer channel. Otherwise the nozzles can be used for gaseous fuels.

Annular gap: If the burner is operated with coal, the coal is injected through the outer channel of the burner. If gaseous fuels are being used, a small amount of air is passed through the outer channel to assure adequate cooling of the burner casing.

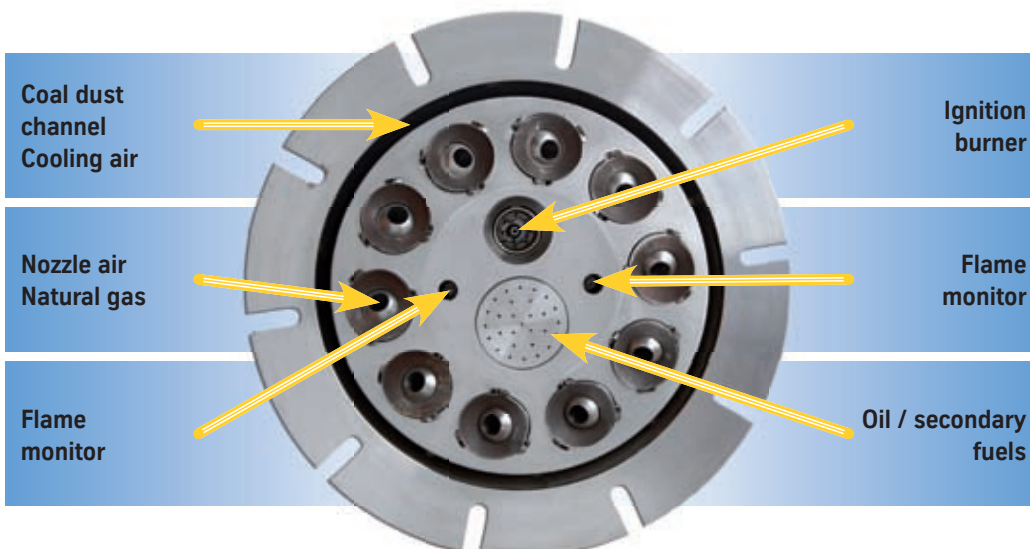
Thanks to the sophisticated nozzle adjustment mechanism (Polysius patent), all the nozzles can be adjusted not only radially but also tangentially, independent of the radial setting. This enables stepless adjustment of the flame swirl between 10° and 40° and of the flame divergence between -5° and 15°. Every desired variation between swirl and divergence is possible.

The nozzles are locked in place by a bayonet catch. This enables quick and straightforward changing of the nozzles if this becomes necessary for process technological reasons.

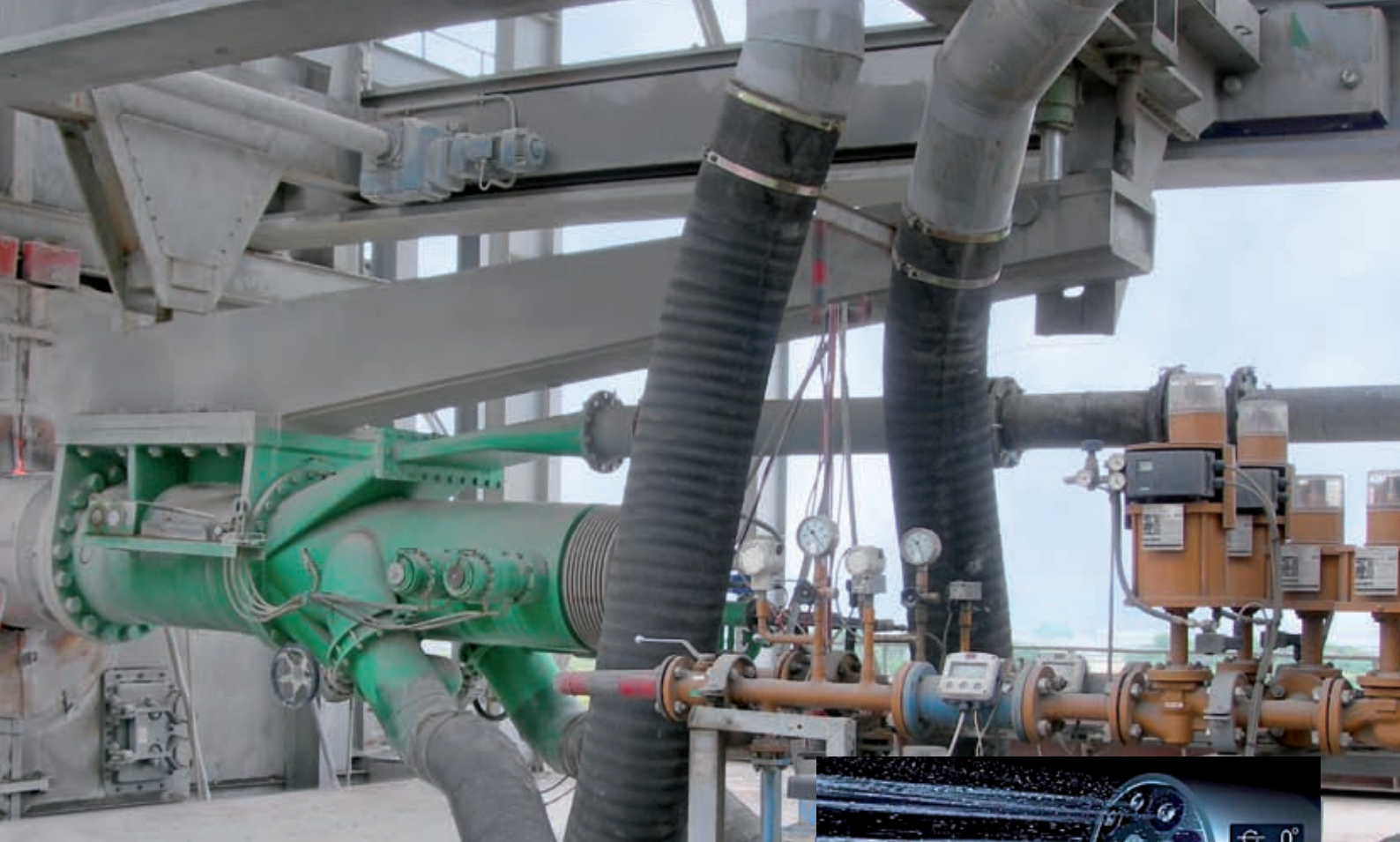
Convincing burner operation

The innovative trio – nozzle design, nozzle arrangement and fuel supply system – first assures an intensive mixing of fuel and oxygen and then their rapid and complete conversion into heat.

The mixing of fuel and oxygen is the slowest part of the combustion process and therefore determines the speed of combustion. The POLFLAME® not only greatly shortens this mixing process, but also specifically controls it.



Depending on the process technological requirements, the burner is equipped for the traditional fuels such as coal, anthracite, oil, petcoke and natural gas or for the use of solid and liquid secondary fuels such as animal meal, dried sewage sludge, fluff etc.



The nozzles act as injectors and thus allow very rapid mixing that can be varied over a broad range. This is assisted by the coal dust channel around the periphery of the burner.

This flexibility is the prerequisite for optimum setting of the desired flame parameters to suit the fuel or the kiln operating point. The controllability of flame shape and flame length permits active regulation of the formation of coating in the kiln, counteracting the formation of rings at the beginning or end of the clinkering zone.

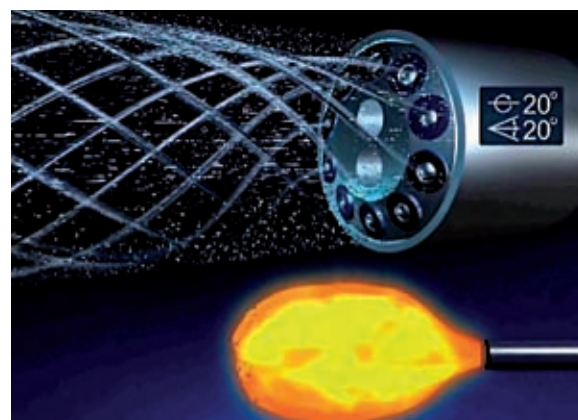
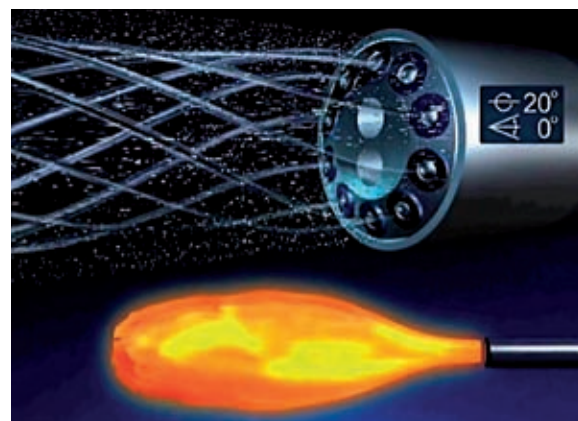
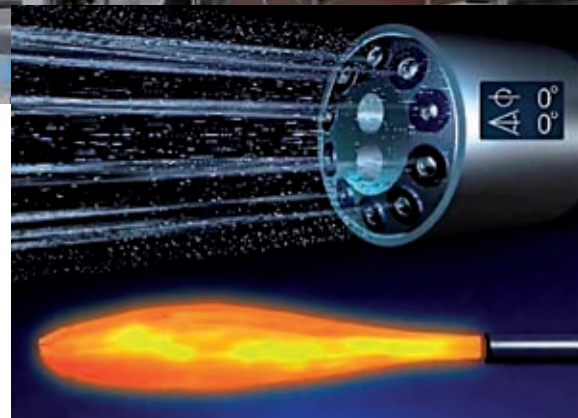
By shifting (shortening or lengthening) the temperature profile, undesirable coatings in the kiln can be greatly reduced or even eliminated, as operating experience has impressively proven.

The strength of the POLFLAME® burner – optimum combustion of a very broad range of fuels, including difficult types – is primarily due to the design concept with individual nozzles.

The combination of adjustable individual nozzles for primary air and peripheral coal

dust channel is the key to the numerous possible combustion variations offered by the POLFLAME®.

By adjusting the swirl and divergence settings of the nozzles, the reaction zone can be significantly shortened, increasing the flame temperature and making the combustion more intensive. This is particularly advantageous when burning slow-reacting secondary fuels that are difficult to ignite, or when burning anthracite coal. It not only enables a high rate of primary fuel substitution by secondary fuels but also assures the combustion of secondary fuels within the clinkering zone.



All the nozzles can be adjusted radially and tangentially. The figures schematize the various possible swirl and divergence settings, including the resultant flame shape.