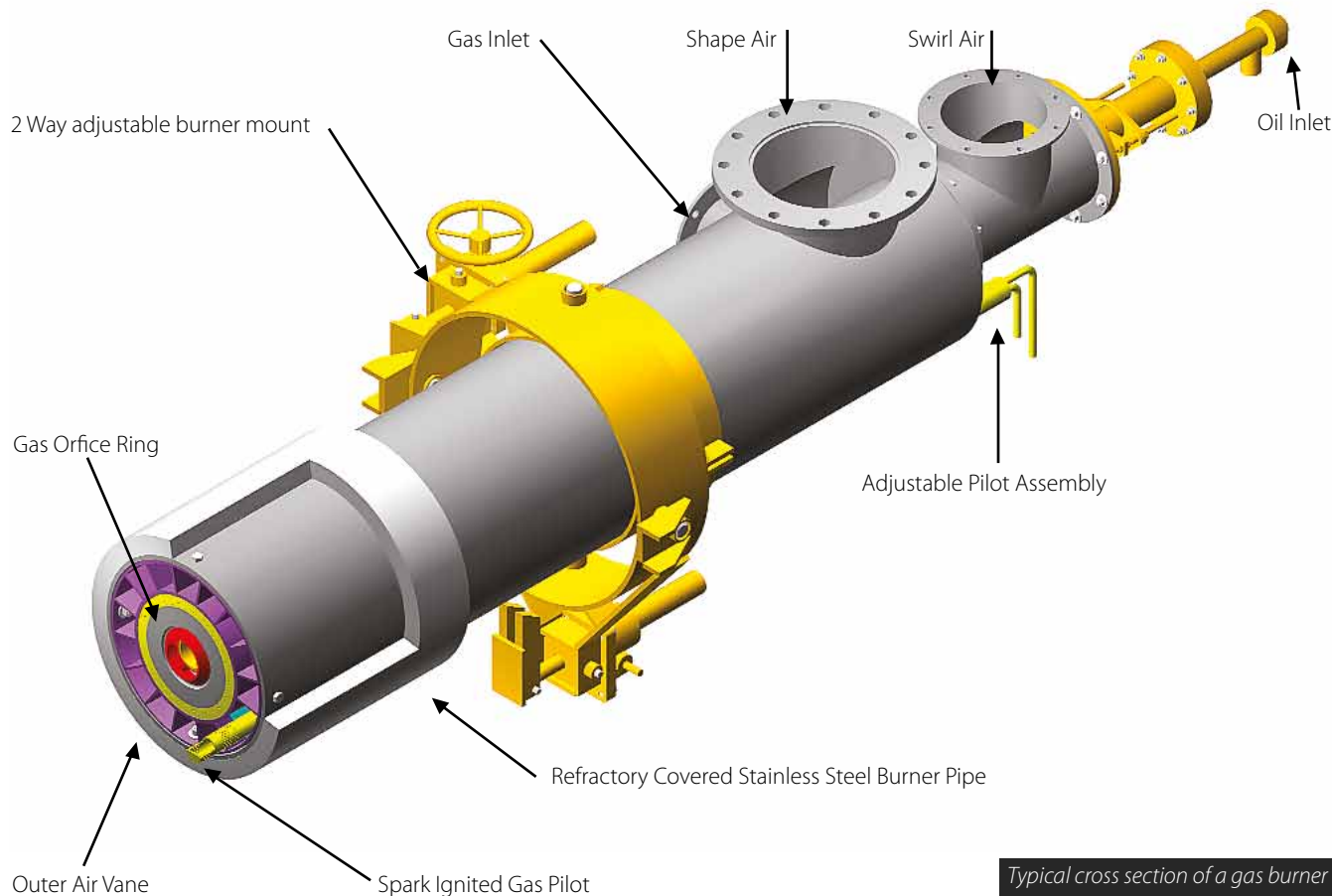


Burner systems for rotary kilns





Typical cross section of a gas burner

State of the art burner systems

The combustion system is a key element in efficient thermal processing of ores, minerals, and similar bulk solids in a rotary kiln. The process requirements are stringent in a variety of thermal processing systems such as in coke calcining, limestone calcining, recovery of lime in pulp mills, and the combustion of wastes to name a few.

The burner system is an important and an integral component of a rotary kiln system to optimize the combustion of fuels to release heat in the kiln.

Safety considerations, ease and flexibility of operation, product quality, energy efficiency, maintenance costs, and the environmental impact of the products of combustion are some of the most critical areas that a kiln operator must evaluate in selecting a kiln burner. Metso, with over half a century of experience in designing and manufacturing rotary kiln-based thermal processing systems, has the technical expertise and capability to provide rotary kiln operators with a kiln burner system that best meets their requirements.

Since 1950 Metso has successfully engineered and supplied more than 300 burner systems

Kiln Burners – engineered for specific job requirements

All burner systems are designed based on Metso’s vast burner experience. When designing a burner system, Metso’s engineers consider: the process, primary and secondary air momentum, system temperature profile requirements, and emissions requirements. Reduced NOx emissions and optimum flame shape is achieved with the use of two primary air chambers.

- Multi-fuel capability designed to handle gas, oil, pulverized coal, petroleum coke, or non-condensable gases separately or in combination are available.



A typical gas valve train

- Flame is directional adjustable, and flame shape control is obtained by dual air channels.
- Low primary air design is used to maximize fuel efficiency and energy recovery from auxiliary cooling devices.
- Design features include mechanical or steam atomization of oil and sturdy, rugged construction for high temperature duty.
- Burner systems range from preheat to 300 MBtu/hr. (315 GJ/hr.).

Engineered and custom designed valve trains for safe, efficient, reliable combustion are provided

Valve drains are pre-piped and pre-tested and shipped as an assembled module ready for connection to customer's piping and wiring. Engineered pump and heater sets for heavy oil service or for light oil duty, in simplex or duplex models are available.

Burner system management

- Flame safeguard, and burner management systems are designed specifically for applications to rotary kilns firing gas, oil or solid fuels.
- Programmable Logic Controlled (PLC) systems perform all required limit checking and operator input checking during burner light-off.
- Alpha-numerical message display on local flame safeguard panel guides operators through burner start-up procedure.
- Remote start/stop capabilities can be provided to the plant Distributed Control System (DCS).



Typical burner management system

- Systems provide increased diagnostics and ease of operation, flexibility and space savings.
- Systems conform to FM, CSA, Ontario Hydro, NFPA, and IRI.

Metso can design a firing system for your application.



A typical pulverized fuel/gas burner

Burner combustion system

The Metso combustion system is designed with the flexibility to suit the following specific kiln firing applications:

- Wide selection of components including burner, primary air fan, fuel valve trains, pumps and heater sets, flame management system with panel.
- Single or multiple fuels.
- Steam or mechanical fuel oil atomization.

Maximum flame shape and location control for optimum kiln performance

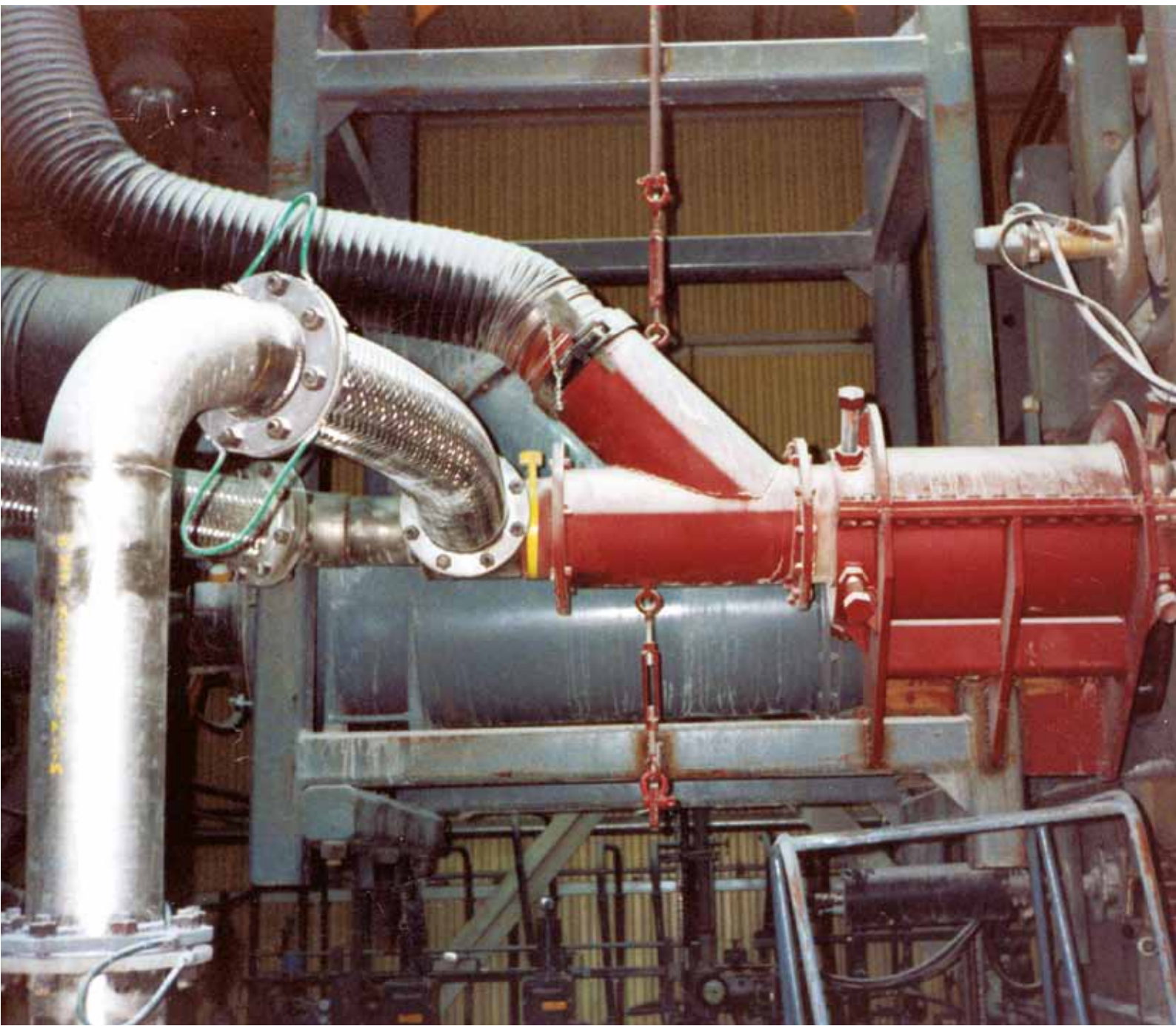
Based on the extensive field experience of Metso engineers, the critical factors of flame shape and location to complement kiln internals is applied to burner design.

Burner design features include single or dual primary air path, dual (axial and radial) natural gas paths, easily changeable fuel oil nozzle, adjustable fuel nozzle to primary air nozzle relationship, and easily adjustable burner mount and primary air flow.

The Metso Non-Condensable Gas (NCG)

The NCG incineration gun is a separately mounted and separately aimable assembly to conform with our experience that NCG introduction via the main kiln burner is detrimental to main flame development and space controls, as well as to overall process control. Separate NCG introduction and placement of the NCG stream in relation to the main flame enables proper main flame development and achievement of peak temperature, resulting in stable kiln operation and maximum incineration of the NCG's thus minimizing TRS emissions.

NCG incineration gun features include separate gas paths for each NCG stream to be incinerated, outer cooling air path, 316 stainless steel construction for parts in contact with NCG's, 304 stainless steel outer cooling air blast pipe with 3" thick insulating castable lining, flanged connections for NCG and cooling air paths, mounting flange with adjusting mounting screws, and a cooling air fan.





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