



# SMART FLAME™ BURNERS

SMART FLAME™ burners are the most advanced technology developed by FLAME COMBUSTION for rotary kilns firing pulverized fuel. Using three shaping airflows and a unique design – two of the airflows rotate to enfold the solid fuel injection flow – it allows, through simple procedures, to optimize complex fuel firing and great control over NO<sub>x</sub> emissions.



## SMART FLAME™ main features

- Greater control over NO<sub>x</sub> emissions
- Enhanced control over ring formation
- Greater control over the sulfur cycle
- Better product quality
- Longer refractory lifetime
- Greater flexibility on flame control
- Better process stability



FLAME COMBUSTION  
PROJETOS & EQUIPAMENTOS

SMART FLAME™ burners were developed to meet, with flexibility and without any efficiency loss, the specific necessities of rotatory kilns used to make white and grey clinker, lime pozzolana, among others products.

SMART FLAME™ burners are customized to deliver thermal power up to 150 Gcal/h. They can use just one or multiple fuels, with variable mix, as:

- Solid fuels: petcoke, anthracite, lignite, bituminous coal, charcoal, etc.
- Liquid fuels: light and heavy fuel oil, diesel oil, vegetable oils, etc.
- Gas fuels: natural gas, lean gas, etc.
- Liquid waste: solvents, paint waste, water from cleaning oil products tanks, sewage sludge, etc
- Solid waste: animal flour, plastic chips, sawdust, biomass, used tyres, etc.

With three independent air inlets, SMART FLAME™ burners deliver a flame with the best shape and settings for the production process, feedstock and fuel mix. Through simple procedures as opening (or closing) inlet air valves, kiln operators can optimize firing conditions in a way that is not possible for burners that do not count on SMART FLAME™ features.

SMART FLAME™ burner versatility – that includes the capability to be operated locally or through a network – and features make it the best option for applications where NO<sub>x</sub> emissions control are mandatory or when the firing includes complex fuels.

Primary air	Overall primary air flow (shaping air + solid fuel conveying air flows)		From 10% to 13% of the stoichiometric air
Shaping air	Flow as percentage of stoichiometric air	External air	4,0% a 6,0%
		Tangential air	1,5% a 3,0%
		Dispersion air	1,5% a 3,0%
	Pressure at burner inlet	External air	180 a 350 mbar (man)
		Tangential air	100 a 250 mbar (man)
		Dispersion air	50 a 180 mbar (man)
Petcoke or coal conveying air	Fuel/air ratio	3,2kg/Nm <sup>3</sup> a 7,0 kg/Nm <sup>3</sup>	
	Conveying air flow	2,0% a 3,5% of the stoichiometric air	
Solid waste conveying air	Fuel/air ratio	2,0 kg/Nm <sup>3</sup> a 2,6 kg/Nm <sup>3</sup>	
	Conveying air flow	1,5% a 2,0% of the stoichiometric air	
Flame momentum	Overall primary air flow (shaping air + solid fuel conveying air flows)		

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