



LOW BTU GAS POWERS STEEL PLANT

SITUATION

De Jong-Coen has been awarded with an order for the burner installation for an auxiliary boiler at a steel plant in Italy. The firing system had to be designed for firing **Blast Furnace Gas (BFG)**, **Coke Oven Gas (COG)** and **Natural Gas (NG)**. The auxiliary steam boiler will produce the steam necessary for the steam turbine for power plant operation and the process steam for the steel mill when the HRSG associated to a gas turbine is out of service. De Jong-Coen supplied six (6) register burners for installation in two rows of three burners in a common windbox, fuel shut-off and control valves and the burner management and safeguarding system.

Name:	Centrale di Cogenerazione		
Location:	Servola (TS), Italy		
Boiler:	Ansaldo Energia S.p.A		
Capacity:	180 tons/hr @ 73 barg, 520° C		
Burners:	Six (6) De Jong-Coen DAZ 42		
Fuels:	Blast Furnace Gas (BFG)		
	Coke Oven Gas (COG)		
	Natural gas (NG)		
Pressures:	BFG	21.5	mbar
	COG	60	mbar
	NG	2	barg
	Furnace pressure	0	mbar
	Combustion air	12.5	mbar
Emission Limits:	All cases, corrected to 3% O ₂ (dry)		
	NO _x	<160	mg/Nm ³
	CO	< 90	mg/Nm ³
	Particulates	< 18	mg/Nm ³

SOLUTION

The burner design had to be based on the very low BFG and COG gas supply pressures. De Jong-Coen designed special **Dual Air Zone (DAZ) registers with a scroll burner for BFG, retractable axial spuds for COG and a center fired gas gun for NG**. The BFG can only be fired with minimum 10% support fuel of COG or natural gas. The two (2) registers of the DAZ burners are set at start up for optimum flame control and air distribution and also used for shut off of the individual burners when not in operation.



Burner Assemblies With BFG Inlet

RESULTS

After start-up the results were better than guaranteed.

- ✓ **LOW NO_x** -- NO_x below 80 mg/Nm³ at all firing conditions **without the use of FGR**
- ✓ **LOW CO** – CO measured below 50 mg/Nm³ over turndown ratio's of all fuels
- ✓ **LOW PARTICULATES** – Particulates below 5 mg/Nm³ at all firing conditions
- ✓ **LOW GAS PRESSURE** – BFG pressure at battery limit only 21 mbar avoiding the need of a compressor and still allowing a 3:1 turndown.
- ✓ **LOW O₂** -- Oxygen content between 1% and 3% from 100 to 50% burner loads.
- ✓ **LOW COMBUSTION AIR PRESSURE DROP**
Only 6 mbar at MCR

