

HEAT PROCESSING

INTERNATIONAL MAGAZINE FOR INDUSTRIAL FURNACES · HEAT TREATMENT PLANTS · EQUIPMENT

Iron reduction in blast furnaces with natural gas

In many countries of the world, the iron reduction will be done mainly in blast furnaces with coke as reduction source. In countries however, where coke and coal are not available, or very expensive, but natural gas is a cheap

and Carbon Monoxide (CO) which acts as reducing agent. These reducing agents can be produced from natural gas in cheap and reliable methods. During the process i.e. start or shut down of the complete unit and during troubles of

the reaction unit, the whole reaction source unit of the system can create high risk due to an explosive mixture. In case of eventual arising extensive malfunctions of the system, the risk of destroying of the whole system is in the worst case possible. Especially during shut down, heat up phase and shut down of the reformer, trouble can come up. In



such a case, huge amounts of Inert gas must be available in a short time. The FK Inert gas system will be used in the following cases:

source and available (Middle East, South America, Australia, India). The acceptance of Direct Reduced Iron (DRI) and its equipment is increasing. During the "Direct Iron Reduction", iron Oxide pellets will be converted in pure iron by a reducing gas produced from natural gas or coal. The reducing gas is a mixture majority of Hydrogen (H₂)

and available (Middle East, South America, Australia, India). The acceptance of Direct Reduced Iron (DRI) and its equipment is increasing.

- Leakage of explosive gases from the shaft furnace during operation
- Removal of combustible gases and backwash of the system during shut down of the system

- To pressurize the system (filling of the system with inert gas) during start up process of the system.
- To keep a positive pressure in the reactor unit (filling with inert gas) during standstill of the system in order to prevent re-oxidation of the still hot product.

Oxygen and natural gas will be mixed in a burner especially designed for the purpose. The Oxygen/natural gas mixture will be blown into a double walled, water-cooled Stainless Steel combustion chamber. The ignition of the burner will be carried out by

means of a high voltage electrode. Flame control during the burning process will be done by a UV. Diode (optical flame control). The whole system operates fully automatically by means of Inert gas analysis control – operators are not required. In just 30 min (from start up till production) is a respective big Inert gas amount available (i.e. 3.500 Nm³/h). During the operation the Inert gas generator adjusts itself with regard to the requested amount of Inert gas.

FK Industrieofenbau + Schutzgastechnik GmbH

www.industrieofen-schutzgas.de

Hall 9 / Booth B22