

# Robust Gas Shutoff Valves Enhance Pulse Firing of Coke Oven Gas for a Higher Combustion Efficiency at a Steel Mill in China

## RESULTS

- EN 161-certified valve for use with Coke Oven Gas in steel plants.
- Improved combustion efficiency, reduced cost and decreased emissions.
- Fast, easy commissioning process-facilitating time to market.



## APPLICATION

Safety shut-off valves for steel re-heating furnaces in steel plants.

## CUSTOMER

Steel furnaces manufacturer.

## CHALLENGE

A furnaces manufacturer has been contacted by a steel group in China in aim to provide re-heating furnaces for 2 new steel plants. For these applications, the furnaces needed to integrate a pulse firing function to maintain an accurate temperature, reduce fuel consumption and decrease the NOx & CO2 emissions. In aim to meet that requirement, the furnaces designer developed a system for lighting-on and off the burners every 3 to 5 seconds — requiring reliable and long lifetime safety Shutoff valves.

At this part of the steel plant, the operator wanted to re-use Coke Oven Gas released in upstream steel processes as a fuel, this type of gas contains soot and have a low calorific value—requiring safety shutoff valves that could withstand dirty fuel with superior flow.

The manufacturer wanted a valve with pilot air control and positioning feedback capabilities, as well as an air treatment unit.

*The furnace manufacturer was able to install two re-heating furnaces at the Chinese steel mill, burning Coke Oven Gas with a pulse firing combustion function for reducing fuel consumption and emissions. The valves on the fuel train needed a long and safe lifetime even with high cycling and dirty gas with low calorific value.*

Other requirements included:

- Fast opening and fast closing: < 1sec
- EN161 rating to match EN746-2 furnaces standard
- Reliability—with at least a two-year warranty
- Ready to install safety shutoff valves
- Quick turnaround time: 2,500 valves in nine weeks and 3,200 valves in six weeks.
- Stainless Steel body material and PTFE sealings for complex media handling

### SOLUTION

To meet these technical requirements, Emerson provided ASCO™ Series 290 air-operated angle seat valves, which incorporate a high flow and low pressure drop and are EN 161. Experts also outfitted these models with pilot solenoid valve and filter for air.

In addition to providing the necessary position feedback for the burner management system, these valves integrate many durable features that made them an excellent, reliable fit for the high duty at the steel plants:

- The rugged, watertight actuator is made from a tough fiber composite and is protected with a double O-ring seal.
- Two oversized bearings guide the smooth stem movements.
- The externally sealed stuffing box uses a flat embedded seal ring.
- A spring-loaded stem seal and FKM fluoroelastomer wiper keep harmful grit away from the stem area.

By mounting the pilot valves, air filter and signaling boxes at an ASCO facility, experts also saved the manufacturer valuable commissioning time.

Together, this valve package provided many benefits, including:

- Reduced commissioning time
- Safe, EN 161-certified technology for compliance with EN746-2 thermoprocessing equipment safety standard
- An ability to handle specific dirty gas (coke oven) safely
- High flow and low pressure drop, improving combustion efficiency
- Long lifetime design for pulse fire application

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