Installation of the EnviBat™ Pressure Regulation System at existing coke plants - an effective measure for the reduction of coke oven emissions

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ThyssenKrupp
Industrial Solutions
Introduction

1. Motivation

2. EnviBat™ Pressure Regulation System
   • History – Track record
   • Function
   • Technical description
   • Constructional innovations and developments

3. Option for the configuration of Pressure Regulation System

4. Summary
Motivation

Emissions

Coke Oven Plant Emissions

- During oven charging at the charging holes
- During leveling at the leveler doors
- During the whole coking time at oven doors, standpipe lids and charging holes

Inadequate control of the GCM pressure
- Insufficient suction by the high pressure liquor or charging steam system
- Unsealed oven doors, leveler doors and charging lids

Pressure Regulation System
History
Track record

- Invention and Development of a System to Control the Pressure in Each Single Oven by DMT, Germany, known as PROven*-System,
- Exclusive License Agreement between DMT and TKIS for the Marketing,
- Development of the Overflow Regulation System and further improvements by TKIS,
- Implementation of the System at the Coke Oven Plant August Thyssen,
- Installation of the System at the Coke Oven Plant Schwelgern,

*PROven is a registered trademark of TÜV NORD AG and it is still used by DMT GmbH & Co.KG.
EnviBat™ Pressure Regulation System - world wide today

Schwelgern, Germany

Hyundai Steel Co. - South Korea

POSCO / Gwangyang, South Korea
EnviBat™ Pressure Regulation System

Function

- Oven pressure as a function of the actual raw gas production
- Low pressure at the beginning of carbonization prevents emissions
- Increasing pressure at the end of the coking time prevents air ingress
- Suction in the GCM (-3.5 mbar) allows unsurpassed exhaustion of the charging gases
EnviBat™ Pressure Regulation System
Technical description

Arrangement Schematic

Overflow regulation device

FixCup in GCM

Control device at the gooseneck

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**EnviBat™ Pressure Regulation System**

**Technical description**

- **Charging position**
  - Raw gas from oven
  - Crown tube completely immersed

- **Control position**
  - Pneumatic piston for ashpit regulation
  - Spray nozzle
  - Fast flooding pipe closed
  - Gas flow uncontrolled

- **Pushing position**
  - Water flow through ashpit tube
  - Oven disconnected

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EnviBat™ Pressure Regulation System
Constructional innovations and further developments

Adaptation for small and medium-sized coke ovens

Test rig for small-sized coke ovens

Implementation of the Pressure Regulation System
5 m battery, Essar Algoma plant in Canada
EnviBat™ Pressure Regulation System
New modular system

Retrofit-installation

- Installation on the top of the GCM without removal of the existing GCM valve
- All mounting steps for the components can be handled easier
- Insensible to any movement of the battery due to the concentric arrangement
Options for the configuration of the EnviBat™ Pressure Regulation System

Configuration

Coke Oven Batteries

New Coke Plants

28 coke oven batteries:
- at Schwelgern, HKM – Germany;
- POSCO - Pohang, POSCO Gwangyang, HYUNDAI - South Korea;
- TISCO, Shougang, Shagang, Magang, Wugang – China;
- USS Clairton – USA

Existing Coke Plants

8 coke oven batteries

Combined installation of the system and a new GCM

CST and CSN – Brazil, Essar Algoma – Canada

Installation without exchange of the GCM

August Thyssen – Germany (in cooperation with DMT)
Summary

By application of the pressure regulation system the fugitive emissions of the traditional coke oven batteries can be reduced considerably.

ThyssenKrupp Industrial Solutions (TKIS) is in the position to supply EnviBat™ pressure regulation systems in different configurations for a customer:

- in combination with a complete new battery,
- for existing coke plants in combination with an exchange of the GCM,
- for existing coke plants without changing the existing GCM by use of the new modular system.
Thank you very much for your attention!