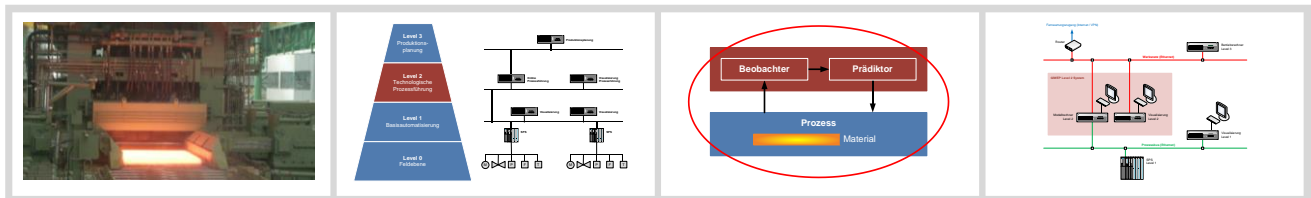


Process Control Systems / Level-2 Systems

Since the late 1980ies GIWEP is developing and implementing – in those days as one of the first companies – computer-based process control systems for optimization of thermal-metallurgical plants and is one of the leading companies in this sector to this day.

GIWEP process control systems are computer-based level-2 systems for technological process control and process optimization. In a plant's automation structure they have to be classified between basic automation (level 1) and production planning (level 3).

In the course of the years a large number of thermal-metallurgical plants in steel and nonferrous metal industry worldwide has been equipped with GIWEP process control systems – from reheating furnaces, heat treatment furnaces and melting furnaces up to cooling plants. The end products which are produced in these plants are i. a. profiles, semi-finished products, seamless tubes, plate, steel bars, wires, hot strip and cold strip.



Motivation

for the implementation of GIWEP process control systems:

- Improvement and stabilization of product quality
- Increasing diversity of end products and the associated additional flexibility of production
- Optimization of plant throughput
- Rising costs of energy and energy-related charges
- Request for complete documentation of the production process
- Workload reduction for operating staff

Each of our process control systems will be designed according to individual requirements of plant, products to be processed as well as requests of our customers.

Implementation is based on complex thermal models and state-of-the-art software technologies.

Effects and Benefits

by use of GIWEP process control systems for production:

- Increase of reproducibility and accuracy of process control
- Fully automatic plant operation
- Reduction of energy consumption by up to 10%
- Reduction of material loss from scale formation by up to 30%
- Increase of plant throughput
- Automatic adaption of process control to new products
- Comprehensive documentation about process and heated material, comprising manifold features for examination and evaluation

**Walking beam
furnaces**

**Walking hearth
furnaces**

**Pusher type
furnaces**

**Rotary hearth
furnaces**

**Roller hearth
furnaces**

**Double walking
beam furnaces**

Floater furnaces

Bell type furnaces

Chamber furnaces

**Bogie hearth
furnaces**

Electric arc furnaces

Induction furnaces

Cooling plants

Optimizing your thermal-metallurgical process

In the following we would like to give you a review about the basic configuration of our process control systems.

Functional Principle

GIWEP process control systems work according to **observer-predictor principle**:

- The **observer** continuously calculates current material condition (e. g. temperature). Here a three-dimensional mathematical-physical process model will be used, which will set actual process values as input parameters
- The **predictor** determines the setpoints for the process in that way, that material will be processed and treated according to its requirements.

That way a **control loop for material characteristics** will be established, ensuring that material will leave the process meeting the required target conditions. (e. g. discharging temperature and temperature uniformity).



Additional Functions

GIWEP process control systems may be extended with various project-specific functions for an optimized adaption to technological requirements of corresponding process. The following list shows **options** of potential additional functions:

Plant-Specific Functions

- Gas flow setpoint instead of temperature setpoints for the bottom furnace zones
- Specification of air ratio for gas/air control loops
- Integration of an oxygen control of the furnace atmosphere
- Burner switch-off at low throughputs

Technological Functions

- Automatic heating down and up at weekends
- Heating of material considering holding times (e. g. annealing)
- Feedback of temperature and torque measurements from the rolling mill
- Long-term archiving and trending for quality assurance

Offline Functions

- Verification of furnace dimensioning
(for reference productions and calculation of energy consumption to be expected)
- Calculation of possible furnace power for new products with new alloys, new dimensions or new discharging temperatures
- Simulation of production programs (sequence of several charges) and evaluation of temperature setpoints, possible discharging cycles and calculated heating curves

Further Information

For inquiries and further information we should be glad to pay a visit to your premises for a detailed discussion.

Walking beam
furnaces

Walking hearth
furnaces

Pusher type
furnaces

Rotary hearth
furnaces

Roller hearth
furnaces

Double walking
beam furnaces

Floater furnaces

Bell type furnaces

Chamber furnaces

Bogie hearth
furnaces

Electric arc furnaces

Induction furnaces

Cooling plants