

## Optimizing your thermal-metallurgical process

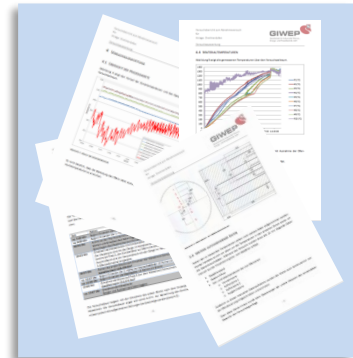
### Services

#### Engineering

- Technological and conceptual consulting and project planning for installation and modernization of thermal-metallurgical plants
- Thermal calculations for dimensioning of components and plants
- Studies on hermos-technical problems
- Evaluation of optimization and modernization potentialities at thermal-metallurgical plants

#### Measurements and examinations

- Measurements and examinations on thermal-metallurgical plants
- Process data analysis
- Evaluation of current plant status
- Suggestions for improvements and extensions at the examined plants



#### Performance tests and certifications

- Execution of performance tests for the acceptance of thermal-metallurgical plants
- Measurements for the certification and supervision of heat treatment plants (such as TUS and SAT) according international and customer specific standards

#### Temperature measurement tests

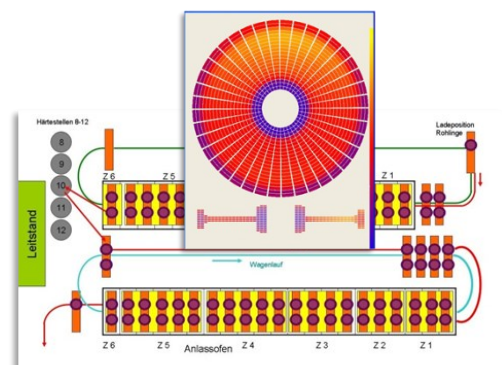
- Temperature measurement tests with own equipment at reheating and heat treatment plants
- Examination of heating process and heating quality
- Evaluation of the constructive, heating and control situation of the plant

#### Software development

- Solutions for individual tasks in industry
- Calculation tools in mathematical and physical contexts
- Realization of data and graphical user interfaces
- Development of data base and data analysis systems

#### Training

- Individual training for furnace plants, comprising:
  - Fundamentals of furnace technology and heat transfer
  - Thermal characteristics of metals
  - Energy balance and increase of efficiency of furnaces
  - Safety regulations for furnaces



#### Plant modernizations

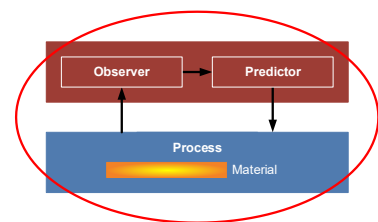
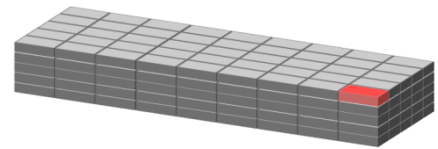
- Recording of actual plant state
- Planning, conceptual design, and compilation of specification
- Project supervision

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### Products

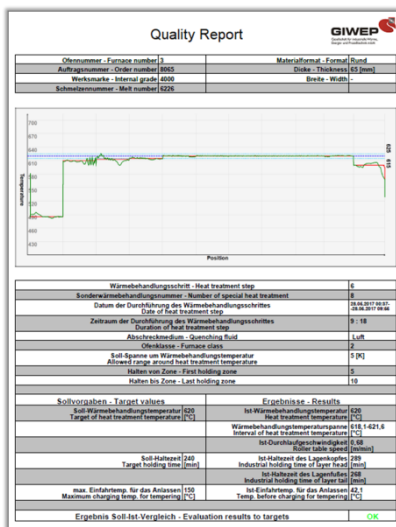
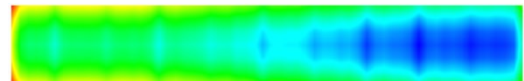
#### Process control system GIWEP FL2S

- Level 2 process control system for fully automatic operation of melting, heating and cooling processes, comprising:
  - Predictive, mathematical-physical model
  - Automatic model adaption by use of data mining and artificial intelligence
  - Intuitive visualization and operation
  - Presentation of process information on smartphones and tablets
- Machine learning functions for process supervision



#### Offline models

- Calculation of heating and cooling curves as well as three-dimensional temperature distributions in material
- Optimization of production sequences
- Evaluation and comparison of energy saving measures
- Determination of furnace layout and necessary firing capacity
- Calculation of obtainable furnace throughput and expected energy consumption



#### Software for quality data analysis

- Complete documentation of the production process in reheating and heat treatment plants (e.g. according to AMS, CQI-9, API, NORSOK etc.)
- Consolidation of all relevant information from the production process, including the results of TUS and SAT tests
- automatic checking and evaluation of the furnace process based on customer-specific quality requirements
- Automatic generation of the necessary reports for internal and external documentation
- Feedback to the production staff regarding necessary re-examination or reworking
- Connection to maintenance management

#### Measuring technology

- Selection of suitable sensors and evaluation devices
- Selection of suitable measuring positions in the plant
- Configuration and parameterization of the measuring devices
- Processing and plausibility check of measurement values
- Determination and execution of maintenance measures for the preservation of the functionality and accuracy of the measurements

