QUALITY GUARD & QUALITY LAB
STEEL PROPERTY PREDICTION WITH ARTIFICIAL INTELLIGENCE

MASTER THE CHALLENGE

In quality and product development departments, quantifying fast and precisely the impact of various influences on the properties of a product is crucial for correct decision-making.

Therefore, we consider it advantageous to have responsive tools embeddable into a quality management system that can trigger actions such as releasing, locking, or repairing material units before or even without mechanical testing and provide information about the main variables and their respective influences on the properties of the product

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AI-BASED SOFTWARE SOLUTIONS & PREDICTION

We have developed two customizable software solutions based on artificial intelligence and machine learning using tuned algorithms and comprehensive simulations called "Quality Guard" & "Quality Lab.".

QUALITY GUARD & QUALITY LAB

Both solutions calculate the mechanical properties of a hot-rolled, annealed, or galvanized steel strip via data analytics in real-time, enabling highly accurate virtual optimization without additional equipment.

Quality Guard predicts mechanical properties, such as yield strength, tensile strength, and fracture elongation, while Quality Lab estimates the impact of parameters on targets.

22% LESS SAMPLING COSTS

5% HIGHER PRODUCT SAFETY

PRIMETALS
TECHNOLOGIES

QUALITY GUARD

Quality Guard is a machine learning tool designed and tuned to predict technological and mechanical properties, such as:

- yield strength
- tensile strength and
- fracture elongation

Our tool supports the quality assurance process and the decisions of quality managers and engineers.

While Quality Guard learns to quantify the relation between numerous measured parameters and material properties, it is also possible to calculate these properties over the whole strip length.

The tool sends results back to the mill's data storage and processing system immediately after the calculation is finished. Results are then available for further use in a comprehensive quality management system.

Quality Guard supports the change process switching from the dependence on the individual towards complete automation of this process.

QUALITY LAB

Quality Lab is a simulation tool that enhances the possibilities of Quality Guard.

It acts independently from daily production and provides a solution for product developers and quality and production engineers who must investigate the effect of different scenarios.

With its comprehensive user interface, Quality Lab helps identify cost savings and find stable process windows with ease. It can also be used to optimize and improve new steel grades.

The built-in explainable Artificial Intelligence feature provides structured visualization where graphs show how parameter variation influences the prediction result.

PREPARED FOR THE FUTURE

Data-based models for determining mechanical proper-ties may be used to substitute conventional testing if the models fulfill specific criteria and are evaluated regularly.

Substitution of conventional testing has already been put into practice, for example, in the European Standard EN 10373:2021 Determination of steels' physical and me-chanical properties using data-based models.

MAIN BENEFITS

Quality Guard:

- Improve quality assurance and product safety without additional mechanical testing
- Reduce claim rate and repair costs
- Reduce reaction time on deviations

Quality Lab:

- Quantify the effect of process variations
- Boost product development and continuous improvement
- Optimize alloying concepts and identify cost savings
- Investigate the stability of process windows

REFERENCES

Tangshan HBIS Upstream
Tangshan HBIS Downstream

INDUSTRY 4.0

ENHANCED QUALITY

ENHANCED PRODUCTIVITY