
London, October 23, 2025

Advanced Systems Implemented at Rizhao Steel Enable Full Plant Automation

- **Meltshop optimization systems from Primetals Technologies commissioned at Rizhao Steel**
- **95 percent of the meltshop processes successfully automated and digitalized, enabling “one-button steelmaking”**
- **Digital transformation boosts quality, consistency, and plant efficiency**

Primetals Technologies has successfully commissioned advanced process automation systems and technological packages at Rizhao Steel’s integrated plant in Rizhao, China. The project includes Level 2 automation systems for LD converters (BOF), ladle furnaces, and RH plants, enabling centralized, highly automated steel production – “one-button steelmaking”.

Thanks to the upgrade, 95 percent of the steelmaking process is now automated. Rizhao Steel has become a leader in smart steelmaking, applying advanced digital technologies to automate and optimize the steel production process. The solution integrates powerful metallurgical models, dynamic process control, and precise calculations of input materials. Operators can now manage the entire meltshop with minimal manual intervention, improving consistency, efficiency, and product quality.

A Benchmark for One-Button Steelmaking

The automation systems meet all performance guarantees for chemical analysis and temperature hit rates. Operators benefit from real-time insights as the plant moves closer to full digitalization.

“The Primetals Technologies team did an outstanding job commissioning the 300-ton automation upgrade. The project was completed ahead of schedule, meeting all targets,” says Zhou Yong Zhi, ESP Plant Production Chief at Rizhao Steel. “The Primetals Technologies Level 1 and Level 2 teams’ technical expertise and teamwork helped manage the complexity of process routes, equipment conditions, and raw materials smoothly. This project sets a strong example for our digital transformation and will be a benchmark for large-tonnage converter “one-button steelmaking” and automation upgrades in the steel industry.”

Automation Systems Drive Meltshop Optimization

Primetals Technologies implemented Level 2 automation systems – BOF Optimizer, LF Optimizer, and RH Optimizer – across three LD converters (BOF), four twin ladle furnaces, and two twin RH plants. The converters were also equipped with LOMAS offgas analysis systems, which enable dynamic end-of-blow control and ensure higher carbon hitting rates. In addition, the BOF Optimizer uses input from subblance

in-blow measurements, combined with offgas data, to determine the optimal treatment and ensure precise control of the blowing endpoint.

Standardized Production with Minimal Manual Input

A key objective of the project was to reduce the amount of manual operator input required during heats. The automation package uses intelligent models that guide operators through each process step and systems calculate all key process parameters.

For the LD converter (BOF), the system generates a complete setpoint table for the main blowing process, including oxygen volume, material addition with distribution pattern, and lance and stirring patterns.

At the LF, the system provides real-time, dynamic suggestions for slag modification, alloy additions, calcium treatment, and arcing and energy input based on caster pacing and equipment status.

The solution also delivers automated vacuum and liftgas patterns for the RH plant, as well as recommendations for the amount and timing of oxygen and alloy wires or pieces. These features result in a standardized, efficient, and reproducible process across all shifts, ensuring consistent quality and efficient decision-making with real-time operator guidance and minimal manual adjustments.

About Rizhao Steel

Founded in 2003, Rizhao Steel is a subsidiary of the Rizhao Steel Holding Group. The company is located about 30 kilometers outside Rizhao Port in southern Shandong Province. Rizhao Steel has an annual crude steel output of 12 million tons and employs 12,000 people. Its product portfolio includes hot-rolled coils, wire, bars, and small I-beams, which are primarily sold to customers in China. Thanks to the implementation of the energy-efficient Arvedi Endless Strip Production (ESP) technology supplied by Primetals Technologies, Rizhao Steel holds a leading position in the Chinese steel industry.



Part of the project team from Primetals Technologies commemorating the implementation of advanced automations systems at Rizhao Steel's plant.



Thanks to the upgrade from Primetals Technologies, 95 percent of the steelmaking process at Rizhao Steel is now automated, making it a leader in smart steelmaking.

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