



EAF QUANTUM

INNOVATION IN STEELMAKING – FURNACE TECHNOLOGY OF THE FUTURE

Based on an optimized preheating and melting concept, the EAF Quantum delivers minimum conversion costs, maximized output, and environmental compliance.

REDESIGNED PREHEATING AND OFF-GAS PROCESSING

Thanks to 100% scrap preheating, the efficient recovery of energy results in energy consumption down to 280 kWh/t. This is made possible by a trapezoidal shaft design in combination with a redesigned retaining system, which results in an optimal allocation of scrap and improved offgas routing for efficient heat transfer. This new approach is rounded out by an off-gas processing system with automated off-gas stream modification, maximized leak control, and a special hood to manage dust and off-gas emissions.

SCRAP CHARGING VIA ELEVATOR

The new charging concept – an elevator system with a chute for scrap transfer from a subsurface dumping station into the furnace – results in flexible charging logistics. A crane or basket for scrap charging is not required. In addition, based on a precise duty cycle and charging time, a full-fledged automation solution can be implemented.

PURE FLAT-BATH OPERATION

Melting scrap in large liquid heels results in pure flat-bath operation with the lowest possible flicker, and also supports preheating efficiency. In combination with the Furnace Advanced Slag-free Tapping system (FAST – siphon design), this new furnace concept allows charging, tapping, and taphole refilling under power-on conditions. The result: the highest productivity with the lowest tap-to-tap time and virtually no power-off time.

280 KWH/T
ENERGY
CONSUMPTION



Automated scrap charging system via elevator



Preheated steel on the finger system

MINIMIZED FURNACE MOVEMENT

A specially designed shell transfer and moving concept utilizing a closed roof reduces furnace movements, improves system tightness and energy processing, and simplifies maintenance through quick shell exchange.

FIRST REFERENCE

Talleres y Aceros, after successfully operating an electric steelmaking facility for 20 years, desired a production increase and modernization. Recently a new compact steelmaking plant with a capacity of 1.2 million tons of steel per annum was commissioned in Ixtaczoquitlán. The heart of the plant is a Quantum electric arc furnace. This new furnace design reduces the conversion cost for the electric steelmaking production by 20 percent. The plant also involves the provision of secondary steelmaking facilities and a flexible 6-strand continuous caster including state of the art water treatment and dedusting.

The Mini Mill is equipped with a Quantum electric arc furnace with a tapping weight of 100 tons, a twin ladle furnace, and a twin vacuum degassing plant. The plant has a capacity of around 1.2 million tons of alloy steel, low, medium and high-carbon steel per annum. The steel it produces is cast in a six-strand continuous caster into billets with cross-sections ranging from 130x130 millimeters to 200x200 millimeters, as well as rough profiles with dimensions of 300x200x80 millimeters.

FEATURES OF EAF QUANTUM

- Energy consumption down to 280 kWh/t
- Tap-to-tap time of 33 minutes
- Charging, tapping, and taphole refilling under power-on conditions
- Direct energy recovery due to 100% scrap preheating
- Smaller transformer installation
- Highest output even with weak power grids – thanks to pure flat-bath operation and lowest possible flicker
- Full automation concept is feasible
- No crane movement in furnace area reduces danger from moving loads

MAIN BENEFITS

- Increased productivity of 1.35 million t/a with an 100-t EAF arrangement and a three-batch process
- Optimized environmental compliance due to revolutionary off-gas processing
- Up to 30% reduction in electrode consumption
- Safety improvements
- Short ROI

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