

PI-17

TUNNEL KILN



Fig. 1. Ignition via lances. View through the sight glass.

Tunnel Kiln Modernization

In 2013, PTC PIECOSERWIS completed a comprehensive modernization of the heating system for a tunnel kiln at the Magnesite Department. Originally, the kiln was designed for firing magnesite products with a capacity of 24,000 tonnes per year (2,000 tonnes per month).

Following the modernization, the original production capacity was maintained. Furthermore, the new installations allow for a potential increase in output, as well as the ability to reduce production by up to 40% while maintaining high energy efficiency throughout the firing process.



Fig. 2. Burner installations.

Design Phase

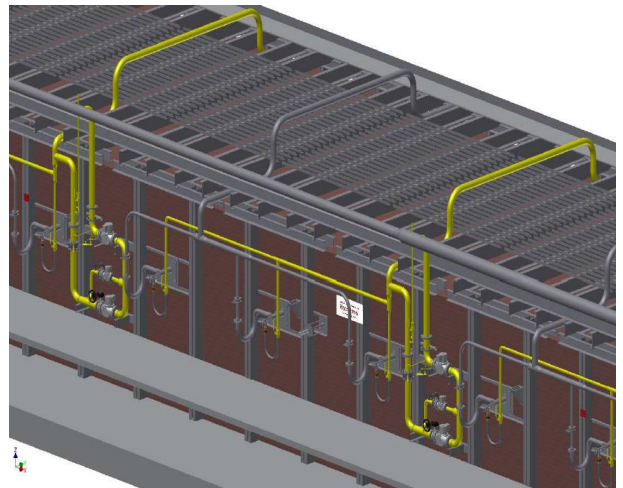


Fig. 3. Burner installations.3D model.

Spatial modeling (3D CAD/BIM) has been our core engineering standard for many years. We utilize advanced 3D design tools to ensure precision, collision-free integration, and optimal spatial management within industrial facilities.

Process&Instrumentation Diagram

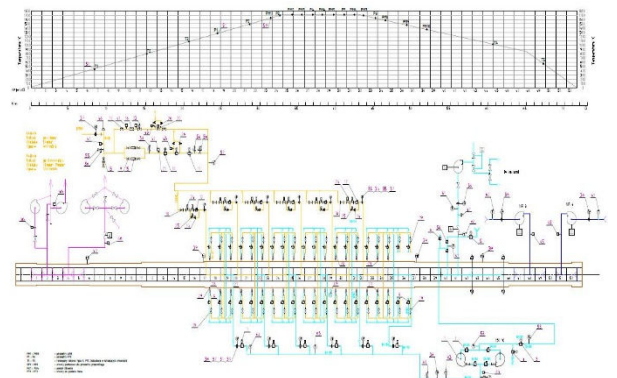


Fig. 4. Furnace P&ID.



Technical Specifications

- Dimensions dryer, kiln and car

• Total kiln length:	156m
• Pre-heating zone length:	51m
• Firing zone length:	51m
• Cooling zone length:	54m
• Number of kiln cars inside:	52units
• Tunnel width:	3.2m
• Clearance height:	0,955m
• Kiln car length:	3,1m
• Kiln car height:	1,73m

- Burner system

• Fuel:	Coke oven gas (COG) LHV 17,49 MJ/Nm³ , or natural gas GZ50 LHV 34,33 MJ/Nm³
• Coke oven gas (COG) pressure:	2,8÷6,5 kPa
• Natural gas (GZ50) pressure:	1,0 bar
• High-velocity burners:	36 units
• Nominal burner capacity:	130 kW

- Transport system

- The transport system is integrated with the facility's existing infrastructure, utilizing proven mechanical components synchronized with new automation layers. The system consists of:
 - Existing Kiln Cars
 - Transfer Cars / Traversers
 - Car Pullers / Winches
 - Hydraulic Pusher

- Control and Instrumentation System

- The furnace control system is based on the Siemens SIMATIC S7-300 PLC platform, featuring full process visualization and comprehensive data management. The system monitors and logs all measured parameters, including detailed firing records which are transmitted directly to the Production Control Center. The control cabinets have been custom-engineered and equipped to meet the specific technical requirements of the installed fans and associated control devices.



Fig. 5 Gas station.



Fig. 6 Ignition vis lances. Tunnel kiln rear view.

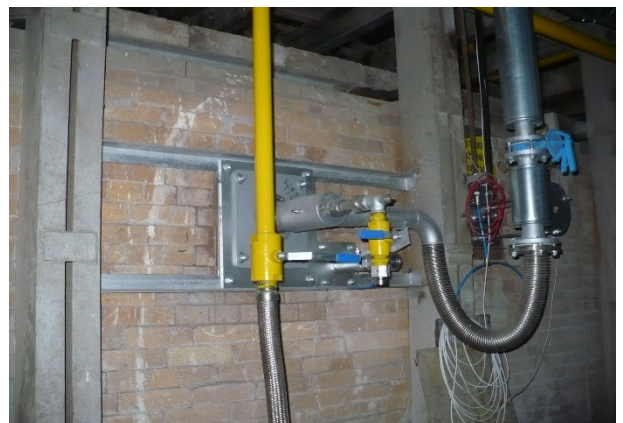


Fig. 7 Burner installation.