Danieli Olivotto Ferrè is a leading specialist in industrial heat-treatment facilities for ferrous and non-ferrous metals.

The company’s long experience enables it to design and manufacture any type of pit, pusher, and batch furnaces for reheating and homogenizing of aluminium slabs.
Customized furnace
for ALRO plant (Vimetco Group), Romania

Aluminium slab homogenization requires extremely high thermal power during the heating phase, and precise temperature control during soaking.

Main features
The plant is comprised of a hydraulic charging/discharging machine and two homogenizing furnaces. The first furnace and the charging machine were completed successfully in 2006, while the second furnace was commissioned in August 2012. The charging/discharging machine is designed to carry 76-t loads (eight slabs, including treatment fixtures) at 600 °C from the homogenizing furnace to the collection area. The homogenizing furnace is equipped with twelve 350-kW burners for direct material heating. The furnace chamber is divided into six zones, each equipped with its own loop for temperature monitoring and control. Heat distribution and transmission are guaranteed by three centrifugal fans located on the furnace roof. During the heating phase, burners and recirculation fans work under high power to ensure superior material heating. During the soaking phase burners operate in on-off mode using minimal heat power (approximately 10% of the maximum). This strategy, combined with good fan management, ensures temperature control at any point on the material within a range of less than ±5°C.

The main frame and door of the furnace were constructed according to gas tightness criteria to avoid entry of any cold air into the chamber during treatment. The production capacity is 24,000 tpy.

Performance
The furnace complies with Aerospace Material Specification requirements (AMS 2750D). Thermocouples for temperature control and monitoring were certified at three different temperatures (350 °C, 450 °C, and 550 °C) and, together with the relevant instrumentation, submitted to the System Accuracy Test (SAT) to guarantee errors were lower than ±1.1 °C.

The furnace was tailored to suit the customer’s specific requirements, and forms part of the homogenizing plant for aluminum slabs designed and commissioned by Danieli Olivotto Ferrè.

The Temperature Uniformity Survey (TUS) was performed at two different working range temperatures to demonstrate the ±5 °C precision. Thirty-five thermocouples were distributed uniformly on the material sides, and their signal recorded during approximately 40 hours of treatment. Tests were successful both at 610 °C and at 450 °C. Gas consumption for a treatment cycle at 440 °C with a charge of 140 t also proved to be lower than 23 Nm³/h/t, while electrical energy consumption was 35 kWh/t.