CASE STUDY

LEVERAGING THE FAST DRY TECHNOLOGY IN FULL FURNACE RELINING

Accelerated start-up and reduced energy demand under constrained dry-out conditions.

calderys

BACKGROUND
Customers needs

The background situation

A 25-ton aluminum melting furnace required a full refractory relining as part of a planned shutdown. Historically, such projects have been executed using split refractory scopes, with Calderys supplying specific zones such as hearth, or hearth-related areas in the furnace.
In parallel, the customer was facing increasing pressure to reduce shutdown duration, lower energy consumption during commissioning, and optimize overall relining costs, without compromising operational reliability.

The request from the customers

The aluminum producer requested a refractory solution that wouldn't require any repairs or revamping for the next **12 to 15 months** period. After multiple technical discussions the expectations of the solution evolved into the following requirements:

- Enable a full furnace relining under a single, coherent technical concept.
- Reduce furnace downtime, particularly during the dry-out and commissioning phase.
- Contributes to lower energy consumption during start-up.
- Maintain high operational safety and lining integrity, despite the absence of existing full-scale references for accelerated dry-out technologies.
- Ensure reliable performance in areas exposed to liquid aluminum contact or infiltration risk.

The 25-ton aluminum melting furnace during the wrecking of the old refractory lining.

CONCEPT
Calderys solution

Analysis of the customer request

The Calderys technical analysis identified that a conventional refractory approach would not allow the client to achieve the desired reductions in downtime and energy consumption.
Furthermore, while the Fast Dry (FD) / Steady Dry (SD) technologies had already demonstrated strong performance in partial furnace repairs, almost no reference existed for a complete furnace relining using exclusively FD/SD products. This required a careful assessment of:

- Moisture evacuation behavior across the entire lining system.
- Dry-out risks associated with restricted water drainage paths, due to the non-drillable system beneath the hearth.
- Zoning requirements to manage areas with different thermal, mechanical and chemical exposures.

The analysis concluded that a fully integrated FD lining concept, combined with strict installation control and an adaptable dry-out strategy, could meet the customer's objectives while managing technical risks.

Description of the solution developed by Calderys

Calderys developed a 100% FD & SD-based castable refractory concept, engineered specifically for the furnace design and operational constraints.

The solution combined:

- Fast Dry technology in zones where accelerated moisture removal and reduced commissioning time were critical.
- Steady Dry technology in upper structural zones to ensure controlled drying behavior and thermal stability.
- Newly developped drainage system compatible with the lining concept.

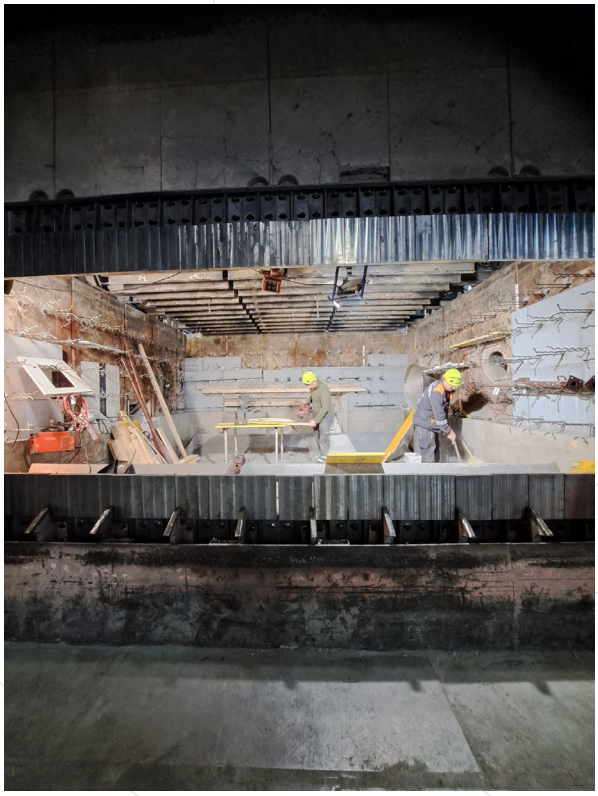
SUMMARY
Recap of the solution

Benefits brought by Calderys' solutions

The developed solution delivered measurable technical and business benefits:

- Reduced dry-out time reduced by more than 50% hours compared to conventional practice.
- No damage observed during or after dry-out (no explosive spalling or repair requirements).
- Reduced burner runtime during commissioning, leading to lower energy consumption and associated CO2 emissions.
- Use of a single refractory concept for the entire furnace.
- Accelerated production restart, which has since operated continuously without any refractory-related issues.

The Neuwied production plant, located in Germany, is a central hub for all aluminum producers in Europe.



The Calderys team working on the refractory installation of ALKON® FD and SD.

RESULTS
Concret benefits

Product presentation

The refractory lining was composed **exclusively** of FD/SD products, selected and zoned according to operational exposure:

Metal contact / high-risk zones:
- CALDE® CAST GIBRAM FD - sill.
- ALKON® CAST LB 85 FD - hearth and lower walls.

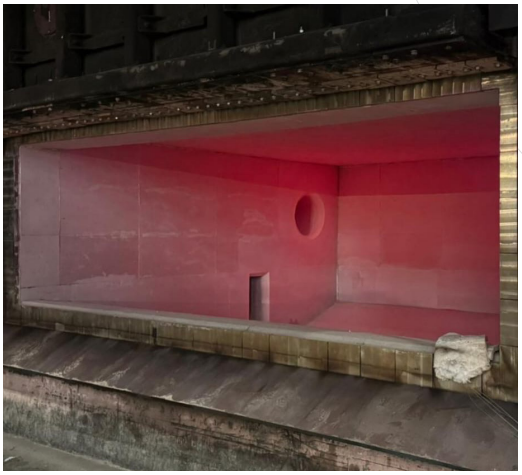
Upper structural zones:
- CALDE® CAST M 28 D HR SD - upper walls and roof.
- CALDE® CAST LX 58 SD - lintel.

This zoning approach ensured **optimal performance** in each furnace area while supporting accelerated and controlled dry-out behavior across the entire lining system.

Services - Expertise

Beyond product supply, Calderys provided comprehensive technical expertise, including:
- Detailed lining concept engineering and zoning design.
- Technical and supervisory support during the entire installation and dry-out process.
- Real-time on-site marking of drill spots and precise placement of water evacuation paths.
- On-site guidance during commissioning and dry-out.

This combination of **advanced refractory materials** and experienced field expertise was key to successfully delivering the first full-scale FD/SD furnace relining, under challenging design constraints and within an accelerated commissioning framework.



The 25-ton Aluminum melting furnace after the relining.

INTERESTED BY THE SOLUTION DISPLAYED IN THIS CASE STUDY?

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