



Title: OPTIMELT™ Thermochemical Regenerator (TCR) Technology – Path to Step Change Improvement in Melter Efficiency and Emissions Reduction

Linde's OPTIMELT TCR technology provides a novel and cost-effective means of recovering a substantial portion of the waste heat from flue gas exiting an oxy-fuel glass furnace. Key benefits vs air-regen furnaces include:

- Up to 30% reduction in natural gas consumption & corresponding reduction in CO₂ emissions,
- Glass quality improvement,
- >80% reduction in NO_x emissions,
- Smaller furnace footprint, and
- Step change decrease in flue gas volume resulting in significant operating and capital cost savings associated with the flue gas treatment system.

To date, OPTIMELT TCR systems have been installed in tableware, container glass and sodium silicate furnaces. The system at Leerdam Crisal Glass' high quality tableware furnace in the Netherlands is in its ninth year of operation. The presentation will provide a summary of the results, including the unique "self-cleaning" mechanism, which eliminates the maintenance issues associated with traditional regenerators in air-fuel furnaces. Preliminary results from the OPTIMELT TCR systems installed in 2025 & 2026 will also be shared.

Converting an air-fuel furnace to oxy-fuel furnace with OPTIMELT TCR technology will enable glass companies to significantly lower capital and operating costs while positioning them to achieve the nearterm goal of 30% reduction in CO₂ emissions.