

# All-electric furnace innovation by FIVES and VERALLIA explained

Jointly commissioned by FIVES and VERALLIA, the all-electric 180-tonne Prium® E-Melt melting furnace for container glass reduces CO<sub>2</sub> emissions by 60 percent. In this article, Business Development Director - Glass at Fives Andy Reynolds explains how this milestone exemplifies the feasibility of low-carbon glass manufacturing without high emissions.

## **C**OMMITMENT TO THE ENVIRONMENT

As a leading industrial engineering group, Fives has been consistently committed to reducing CO<sub>2</sub> emissions by 30 percent in all its activities by 2030 as it continues to develop sustainable solutions for industries to improve their environmental performance and focus on markets that contribute to the low-carbon transition. Verallia, the world's third largest glass packaging pro-

ducer for food and beverage, has likewise embarked on an ambitious policy to enhance sustainability and significantly reduce its operational emissions (scopes 1 and 2) by 46 percent by 2030 compared to 2019. As part of this strategy, Verallia announced in 2021 the construction of its first 100 percent electric glass furnace with an investment of EUR 57M - marking a major milestone towards more sustainable production.

## STRATEGIC PARTNERSHIP

Melting is the most heat intensive stage of the production process and a move to increased electrification is therefore necessary in achieving these objectives. Here Fives and Verallia have jointly formed a strategic partnership to install an all-electric furnace at Verallia's plant in Cognac in France. This furnace represents a breakthrough in the production of flint and extra-flint glass.



**Prium® E-Melt, all-electric furnace at Verallia's plant in Cognac**

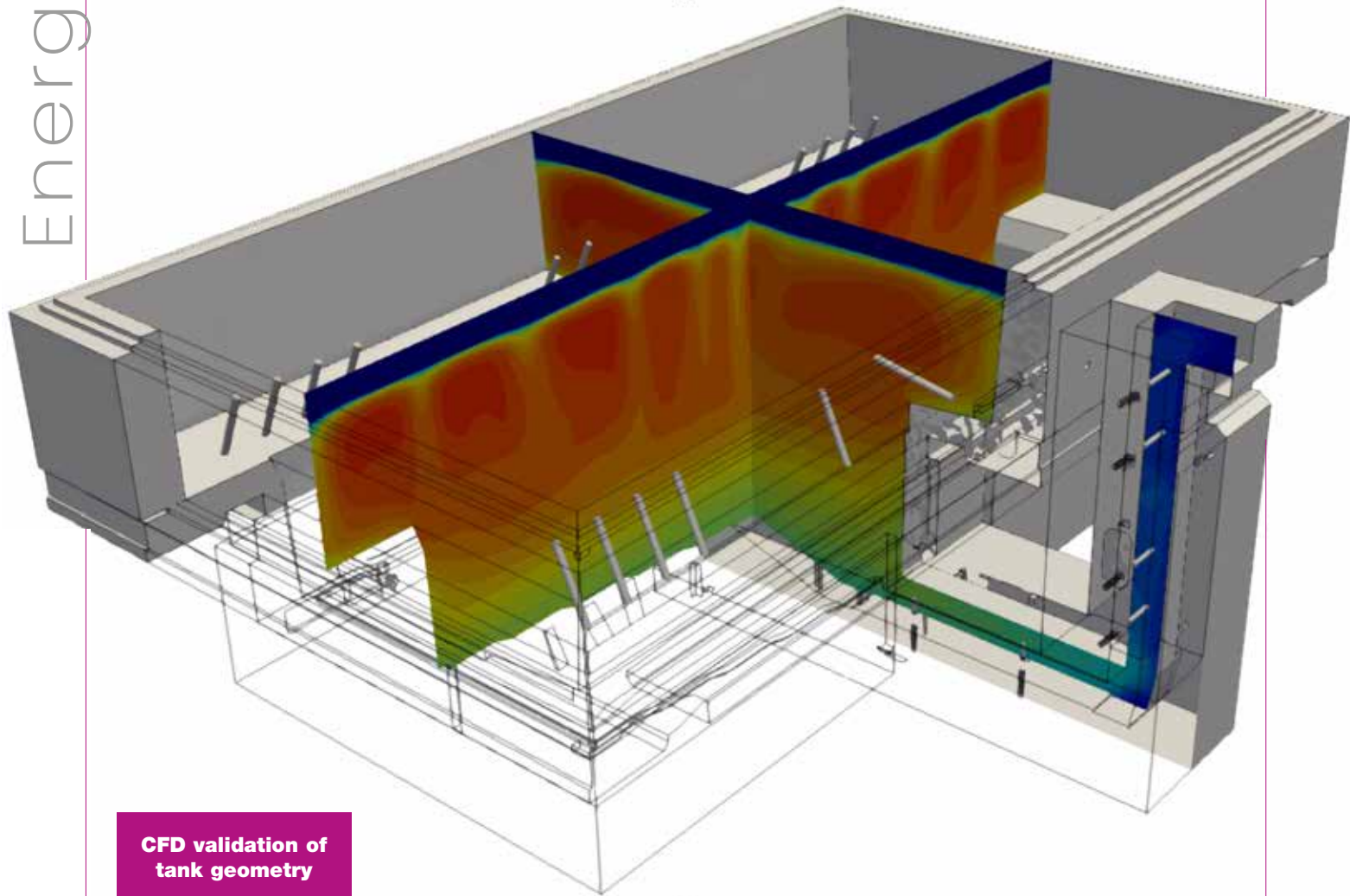
With a daily capacity of 180 tonnes, equivalent to 300,000 bottles, it reduces CO<sub>2</sub> emissions by 60 percent compared to a traditional gas furnace. With the contract for the first furnace signed in September 2022, pre-engineering and design work started immediately. Construction occurred throughout 2023, with heat-up in March of 2024. The Prium® E-Melt furnace entered production at nominal design loads in April 2024.

#### **PROJECT CHALLENGES**

Historically all-electric cold-

top vertical melting (CTVM) technology has been applied to specialist glass types where quality and/or compositional factors have favoured cold-top operation. In such cases, production load requirements are low compared to container furnaces, commonly being in the range of 50 - 80 tonnes/day. Upscaling existing all-electric designs to higher capacities imposes challenges in designing, building and operating the furnace. Furnace geometry, structure, batch charging, power delivery and control are all important elements in achieving the

correct furnace performance. In developing the new furnace Fives has taken advantage of its many references in all-electric melting. Maintaining client relationships allows design and operational parameters to be continuously assessed and post campaign inspections made. This approach provides data to develop and validate the advanced CFD modelling that is a key tool in overcoming the numerous design challenges resulting from upscaling the technology. Fives considers that the commissioning of the Prium® E-Melt furnace in



#### CFD validation of tank geometry

Cognac has fulfilled two strategic objects, namely:

- CTVM technology can be applied to container production at intermediate capacities (100-200 tonnes/day)
- Validate key design features that will facilitate even larger furnaces up to and beyond 300 tonnes/day. Here Fives is actively-engaged in development programmes to design and validate such production units.

#### CONCLUSIONS

Cold-top, all-electric technology is not a universal panacea; its application today is applicable (practically) only to oxidised glasses. However, where it can be applied it is the best practice and proven technol-

ogy in reducing CO<sub>2</sub> emissions for the melting process. Prium® E-Melt furnace from Fives represents a key milestone in achieving the goals of both companies. Currently the largest all-electric furnace for the glass packaging industry, it produces high-quality container glass with zero combustible emissions which represents a 60 percent reduction in furnace emissions compared to the classic technology that was replaced. Fives technology coupled with Verallia's foresight and commitment has created an installation which can serve as a benchmark for the glass industry, paving the way for further developments into even larger glass furnaces in the future. ■



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