



An insight into decarbonised melting technology

Industrial engineering group Fives has enjoyed double success in France recently with the installation of its electric melting technology in Verallia's Cognac site and a contract for its hybrid technology in O-I's Veauche plant. Alexandre Brusset* discusses the decarbonising technology.

It has been a strong year for Fives in the container glass industry. The French-headquartered engineering group has enjoyed success with its decarbonisation technology at two major glass manufacturing facilities.

After providing Verallia with its fully electric melting furnace at the glassmaker's Cognac France plant earlier this year, the technology supplier is celebrating again after being appointed to provide its hybrid technology to O-I's Veauche facility.

Once in place, the furnace at the facility located in the Loire department in central France, about 20km from Saint-Etienne, will be 70% electric-fired with the remainder from combustion.

Fives' Vice President for Glass, Alexandre Brusset (pictured above), said discussions around the environment were much more commonplace now.

"We at Fives are pushing this type of change and technology because we trust in decarbonisation.

"It's very exciting for the teams to see the impact they can have on the glass industry. You can only experience this a few times in your career because of the lifetimes of a furnace, so now is an exciting time."

He added: "There has been a strong push from the glass packaging industry for decarbonised solutions and we have approached them with two solutions.

A key theme of the technology at the

O-I facility, he said, is its flexibility.

"With the hybrid furnace, operators can more easily adapt furnace pull. When you are producing bottles, you can change the frequency of the type of bottles you produce very often.

"So this speed of change in the pull is important for the operational teams who have combustion in the furnace to help to manage this frequent change in production."

The flexibility is also important for customers which produce several types of coloured bottles.

A small percentage of combustion helps manage the atmosphere on the top

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of the glass tank which helps with the colouration of the glass.

"The combustion of the fuel could be in the range of 20-30% for a hybrid technology, which provides flexibility for the type of glass and the type of quality of glass that you want," he stated.

He compared the hybrid solution to that of buying an electric car – while some customers may not be fully committed just yet to fully electric, a hybrid solution is ideal for those looking towards full electrification at a later date.

The technology, named Prium Eco-Flex (below), has already been installed in pharmaceutical and at fibre glass production sites. For O-I's Veauche's plant, this will be the first time in the packaging glass industry and on such a large scale, stated Mr Brusset.

"Today the push is from packaging glassmakers but we already have experienced a lot with speciality glassmakers with smaller capacities.

"In some ways it is a first of its kind project but also something which we had experienced previously, especially regarding electric melting, it is a case of upscaling or combining those elements together for this application."

While the patent for the technology was filed in 2015 Mr Brusset noticed that there has been a real push for such energy-saving equipment since the Covid pandemic in particular.

It was caused by a combination of a focus on the environment as well as consumers more aware of decarbonisation.

From a technological point of view, it coincided with the failed Furnace of the Future (F4F) project in which many European glassmakers had participated.

While the project was eventually disbanded after the European Union

denied it funding, a lot of the detailed technical and operational conversations about a decarbonised furnace enabled engineering companies to fine tune their concepts.

"For us it was important to be ready for when the market required this type of technology, rather than only developing something when the market was ready.

"It sometimes takes time for the market to adopt this type of technology, but now we can see that the glass industry is supportive of it. We patented the technology and the first industrial application was in 2015 in the pharmaceutical glass industry."

This experience of working with all-electric and hybrid technologies has also enabled Fives to help glass companies with their transition to a decarbonised path, both operationally and in terms of staff training. For a furnace operator in particular, a new hybrid furnace can have many variables and requires a new way of thinking.

"When you speak about a hybrid furnace, the majority of the power is from electricity, so bringing our experience makes the projects safer.

"Based on our long experience in this field, we can accompany the customer in the transition. There is a kind of change management to be handled.

"We support the customer in that change with training at an early stage of course, but also with solutions such as digital systems which support the teams in how to define the settings of the furnace to maximise its efficiency.

"It is not easy for operators as there are many variables on a hybrid furnace, such as reducing the power of the individual burners or switching off one burner and keeping the other on.

"So training is the first step but there are also tools on board the furnace to assist in its operations."

Other specifics which Fives can take care of revolve around the civil engineering works of a facility, particularly as many glass sites are brownfield and will be constrained by current building

structures.

Another important point, is how much electricity supply the site will receive from the grid? Is the grid ready to serve an industrial furnace?

"It is not an easy question, and it has to be anticipated long in advance because if there is a change to be done locally from the electricity supply it has to be done several years before. You have to connect with local authorities to ensure there is enough energy from the grid."

While glassmakers from container, specialty and pharmaceutical glass have started to implement electric-fired or hybrid furnaces on a small or medium scale, the next challenge is with float furnaces, Mr Brusset believes.

Such furnaces, usually larger in size, would require a significantly higher supply of electric energy.

"My dream is that for tomorrow we can also apply such technology to the float industry. It will go step by step some higher boosting at first, but I'm sure that the concept of a hybrid furnace providing quality glass will generate new ideas and new solutions for the float sector."

Mr. Brusset believes that several "green" solutions will be available to glass manufacturers in the future, both in terms of fuels such as hydrogen and bio-gas, as well as electricity and combustion.

"I'm sure there will be more than one solution. While all-electric melting technology is a proven solution available today, it doesn't answer all the applications and has less flexibility in terms of operation than a combined solution with combustion. We will certainly still need combustion, especially with coloured glass, so I have no doubt that both solutions - all-electric and hybrid technologies - will coexist in the future.

"Wherever combustion is used, the issue is how to decarbonise the technology and there is good hope around bio-gas or ultimately hydrogen.

"However I think the need of other industries will outweigh glass because they don't have electric solutions to decarbonise available to them.

"So I think the availability of hydrogen may be limited to the glass industry so that is why I think a hybrid furnace served by 80% electricity and 20% bio-gas combustion is ultimately a solution that is well suited to the glass sector." ■

***Vice-President-Glass, Fives, Paris, France**
<https://www.fivesgroup.com/glass>

