

The furnace of the future?

Glassmakers face increased environmental pressure over their emissions during the manufacturing process. Consumer trends and legislation dictate that emissions must be as low as possible. Dr Hartmut Hegeler* discusses some of the options for glassmakers when they choose their next furnace.

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1) In your experience of talking to glass manufacturers, does the topic of the environment/energy efficiency/emission reduction often crop up when discussing new projects?

"This topic crops up in nearly all discussions. The new building or the renewal of a furnace is an investment for about the next 10 years. Of course, every operator endeavours to make future-oriented investments, also because of economic constraints."

2) Has the topic become much more popular in recent years?

"Yes, absolutely. The increasing uncertainty about the boundary conditions such as emissions, energies and especially costs make this necessary. And as the uncertainties tend to become rather more than less, the need for discussion also increases."

3) Can you describe some of the advances that Sorg has made in this particular topic?

"On the one hand, we think that Sorg can give customers good advice on these issues and provide them with suitable solutions. On the other hand, Sorg already has technologies in its portfolio that support the customers. Examples include the proven all-electric furnace VSM or the electrical auxiliary systems for conventional melting furnaces."

4) Are there any housekeeping tips/quick gains you could suggest to a glassmaker for them to improve the efficiency of their furnaces?

"Certainly, there are some points to name. This begins with the energetically optimised melting furnace design, especially the regenerative chambers, with regard to combustion technology, energy consumption and emission efficiency, and also the furnace controls. Furthermore, the optimised insulation of the furnace and the sealing of the system to avoid false air inlets must be named. These are all points that Sorg already takes into account during the furnace design and are thus provided in every Sorg furnace."

5) Do you envisage a focus on heat recovery options in the near future, such as a batch or cullet preheaters?

"Many years ago, Sorg began to successfully integrate cullet preheaters and then also batch preheaters into the furnace concepts. The systems show energy savings of up to 16%, and therefore also CO₂ reductions of this scale. In addition, if the energy is used to increase the melting capacity, the 'carbon footprint' improves once again. Another advantage of the preheaters is that the energy is retained in the system, which enables a higher efficiency compared to other systems. So yes, for Sorg, the use of preheaters is an elementary component for energy and CO₂ reduction."

6) European glassmakers in particular have to meet stringent future legislation in regards to emissions by 2050. How can Sorg help glassmakers both prepare and to meet this forthcoming legislation?

"Of course, in order to meet the requirements, the initial situation must first be analysed in order to subsequently define the necessary measures. Obviously, this should be compared with the local conditions and possibilities. Customer-specific concepts have to be developed, which, as a basis, include the energetic optimisation of the plant in relation to the entire plant and not just the melting furnace. This is often described by the term 'housekeeping' and is carried out by Sorg, but necessarily together with the customer. This has to be seen as a basis for further measures, such as the above-mentioned possibilities of electric melting, electric auxiliary heating and preheaters, to name only the most important topics. In addition to these measures, Sorg has also developed the SORG S Hybrid Melter. Of course, also the use of alternative renewable fuels comes into consideration."

7) How do you anticipate furnaces to evolve over the next, say, 10 years? Are we likely to see increased use of electrical furnaces?

"At the moment, and on the basis of the current discussion and political situation, it seems clear to go in the direction of electric furnaces. Politicians everywhere are driving forward the expansion of renewable energies in order to replace fossil fuels. But to reach the

100% replacement, there is still a long way to go. So nothing speaks against the replacement of 'conventional' furnaces by electric furnaces."

8) Melting concepts such as syngas, plasmelt and induction have been mentioned at recent glass conferences. What is the likelihood of any of these alternative concepts becoming mainstream?

"All these concepts are very interesting. However, most of them have only been operated maximally on a laboratory scale so far and therefore, are still very far away from industrial use in the glass industry. It is definitely worth pursuing these concepts and of course Sorg will track these melting concepts."

9) Is the future furnace likely to be a hybrid melter? If so, will this type of furnace be restricted by size i.e no larger than 200 t/day?

"Sorg currently sees the future of glass melting in the hybrid melter. Years ago, Sorg built the largest electric furnace VSM with 200tpd. For the previous electric furnaces we see the limit of melting performance reached at 200tpd. However, as the market requires tonnages of more than 200tpd for economic reasons, we have developed the SORG S Hybrid Melter. With this furnace, tonnages up to 400tpd for container glass or even up to 600tpd for float glass can be melted. Further developments will certainly make higher melting performances possible in the future.

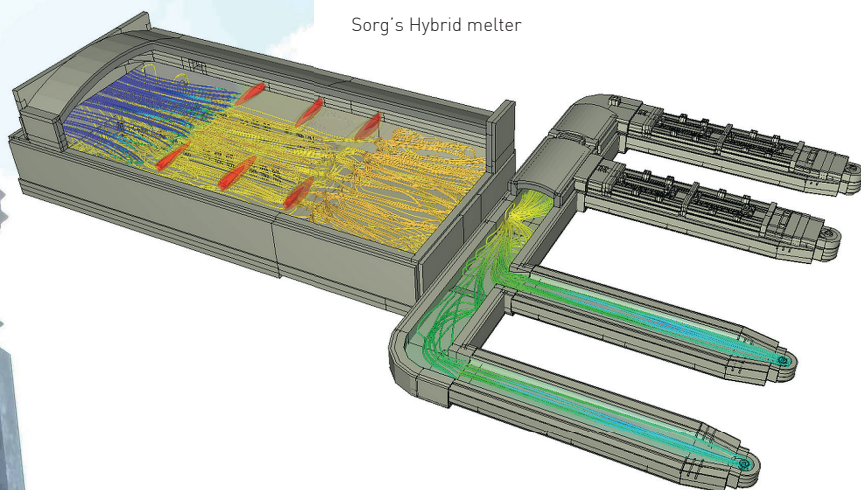
And another important point is listed for the SORG S Hybrid Melter: The previous electric furnaces are limited in terms of glass colours. In the SORG S Hybrid Melter, amber glass can also be melted without any problems!"

Batch preheater





Sorg's Hybrid melter



10) In discussions with glassmakers, what steps do you recommend they take when planning their next furnace? Does your recommendation vary on a regional basis and various local conditions?

"A general recommendation cannot be given in the current situation. The reason for this is that, although the rough goal of the drastic CO₂ reduction is given, the implementation route is still unclear. Which regenerative energies are sufficiently and consistently locally available? What is the price situation? Especially the economic situation has to be clarified with the customers – including the investment costs for the plant adaptation: can prices be maintained or do they increase? And if so, which cost increases approach the end customer?

Of course, the recommendation will be heavily dependent on local conditions and possibilities, as local factors are too diverse. But this is already the case today. Only that – due to the CO₂ discussion – further variables in the concept development have to be considered.

A general recommendation regarding furnace type or heating method will certainly not exist anymore in the future. Customer and site-specific solutions have to be created, which of course means an intensive consultation and concept phase for the furnace manufacturer in cooperation with the customer."

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