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Welcome to our 11th Modeling Seminar edition of Glass Service Newsletter

By Josef Chmelar
President of Glass Service Group

Dear customers, partners and friends,

Welcome to our Glass Service (GS) newsletter. This edition is dedicated to our 11th International Seminar on Furnace Design Operation & Process Simulation and also the 3rd Glass Forming Simulation Workshop - a very important bi-annual event for us and our customers. The GS Seminar is recognized as the world-leading event for all people who optimize furnace designs with the help of advanced modeling tools. It is an excellent way to meet each other in a very relaxed, efficient and pleasant way. It is even more special this year because we celebrate the 20-year anniversary of the seminar. We can look back on a steady growth of attendees. For the last sixteen years the seminar was organized in a very professional way by our management's team of assistants. Many of them are involved not only with their minds but also with their hearts on making the Seminar a positive experience for all involved. I would like to especially thank Jana Schachlova and Jana Chovancova in the name of GS and all participants for taking up the organization once again.

In this 5th edition we would like to share with you some of our recent developments, achievements and thoughts for the future. We have survived the crisis time as luckily all of our customers have. At the moment all departments are working at full steam with project ideas from many of our customers.

It seems that the economic situation for most of our customers is almost back to before-crisis levels, but nevertheless with increasing fuel prices the effort is on continuous quality monitoring and improvement, as well as keeping costs and emissions levels down. As always GS (software) solutions can help to obtain the maximum benefits from glass production.

We are looking forward to meet you in person at our Seminar and to have very interesting personal discussions.

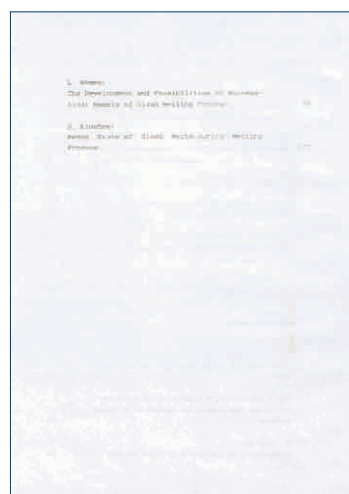
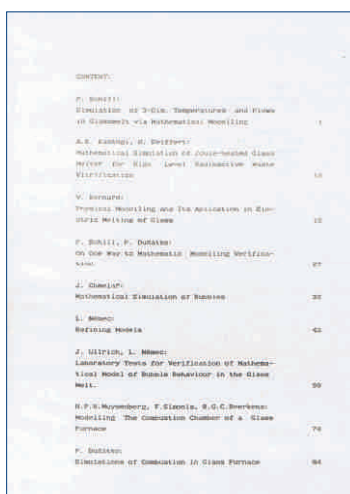
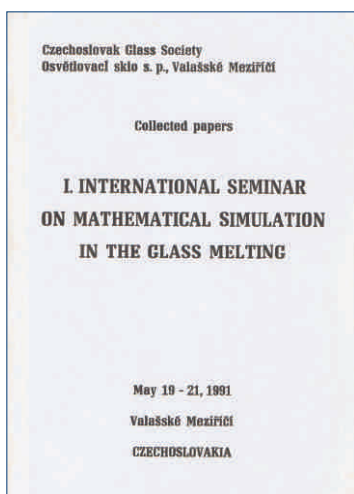
Josef Chmelar



Main organizing team

1st modeling seminar 20 years ago in 1991

Although Glass Service organised the 1st modeling seminar in 1991, the history of the meetings began much earlier. Before 1990 there was a group of Czechoslovakian glass scientists meeting every year to discuss how to improve the glass melting process. They always had chosen for this a pleasant environment, which often meant some cottages or hotels, and some drinks to stimulate the brainstorming. Then, after the borders opened and Glass Service was started as an international service provider, the idea to organize an International seminar was born. The 1st international seminar was attended by only 2 foreigners - Frank Simonis and Erik Muijsenberg, both working for TNO at that time. (Slovak attendance could not be considered international in 1991, as the country was still an undivided Czechoslovakia.) Today, more than 120 people from around the world are attending the GS seminar. For your interest, we have added below the agenda presented at the first seminar. See original copy from 1991:



Scan of 1st seminar proceedings

GS Modeling Award 2011 and its short history

Beginning 2005 Glass Service has recognised accomplished persons who have contributed to the use and acceptance of modeling the glass melting processes. The first award was given to Dr. Matthias Lindig who has made over his life experience many modeling studies and presentations to the international community. When he received the award he was working for SORG, but he started his career at Schott Glass in Mainz Germany.

At the next seminar in 2007 the prestigious award was given to Dr. Manoj Choudhary from Owens Corning Fiberglass.

The 2009 Modeling Award was presented to Fabrice Fasilow while working for AGC Jumet Belgium. He received the honor for work done as a member of their R&D team, and has since moved on to a new position within AGC. See photo of Fabrice Fasilow with the Glass Diamond that is given every year to the awardee.

This year the committee has again selected a person with a long and high level of furnace modeling experience.



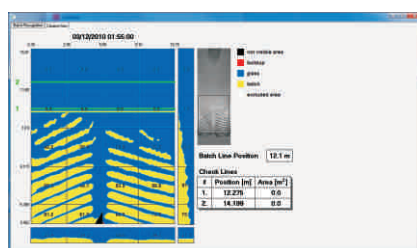
Glass Service – adding batch visualization and automatic control as *ES III™* extension



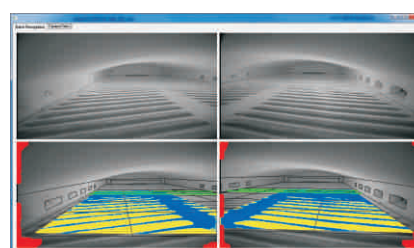
By Robert Bodi

Glass Service has installed more than 85 advanced control solutions and *Expert System ES III™ (ES III™)* in glass plants worldwide through mid 2011. Our main areas in glass production are:

- Float and Sheet Glass
- Solar Glass
- Composite Fiber
- Insulation Fiber
- Container Glass
- Specialty Glasses



Batch visualization

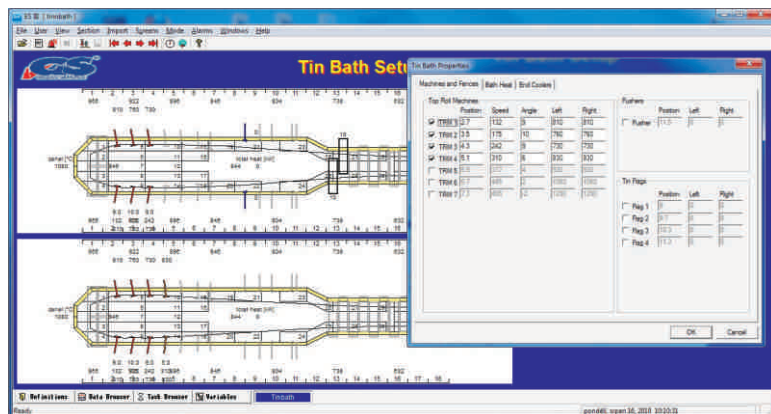


Many of our customers have told us of their interest to better visualize the batch position without the need of the operator to look into the furnace each time. A reliable camera system can give more consistent and reproducible batch position monitoring. Further digitizing of the batch position and feeding it into *ES III™* allows the operator to make control adjustments to the automatic furnace operation, thereby stabilizing the furnace operation and making the lives of operators much easier.

Float tin bath – benefits from *ES IIITM* and modeling

By Erik Muijsenberg

In the last years GS has continued to develop our understanding and ability to optimize the tin bath with online as well as offline tools. Our GFM mathematical modeling package, which was developed in-house, has been extended to allow us to model most parts of the tin bath operation. Additionally, our Expert System



department has developed a specialized package called, “**Float Tin Bath Expert (FTBE)**,” that works as a knowledge base and rule base software to help operators optimize tin bath settings continuously during operation.

Both tools are also available for annealing Lehrs.

Float Tin Bath Expert screen

FlammaTec Flex burners „rock” Advanced combustion technology for glass furnaces

By Petr Vojtech



The sales for GS daughter company FlammaTec are growing exponentially. The FlammaTec Flex line of burners has received a great response from many glass producers all over the world. The advanced remote reproducibility of optimal flame settings of our FlammaTec underport flex burner is especially appreciated by our customers. This results in optimal melting performance while allowing flexible operation. To date, sales in 2011 have already tripled 2010 sales, which itself tripled the sales in 2009. The burner is so successful that even other suppliers to the industry appreciate its innovative approach.



Thermal efficient combustion and lower emissions is our focus for the complete burner line.

To date we have achieved an impressive record of references on existing as well as greenfield projects for float and container glass using FlammaTec burners.

For more information please contact:
Petr Vojtech, FlammaTec, spol. s r.o.
(petr.vojtech@flammatec.com)

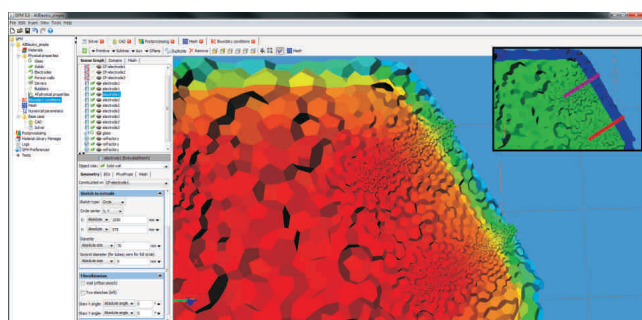
FT Flex LoNOx Gas Underport Burner

GS Glass Furnace Model (GS GFM) – market leader in glass furnace modeling

By Erik Muijsenberg

The GS Glass Furnace Model is used by the majority of leading glass manufacturers who wish to design an efficient and high quality furnace. Due to the wide base and acceptance of GS GFM in the market place, it is becoming a standard for furnace modeling. Most of our customers tell us that not only the ease of use, reliable outputs, and excellent user support are making them happy using GS GFM, but the possible exchange of information with suppliers is the cream on the cake. Due to the fact that many suppliers are also using GS GFM, a glass producer can give virtually his furnace to the supplier, within which the supplier can build in his dedicated solution, and then return the results to the glass producer, i.e. oxy-gas burner installations, new doghouse designs, etc. This allows the glass producer to better validate what can be expected and enables close cooperation with the supplier to find an optimal virtual solution – before the furnace is built. Today most of our users are using GS GFM version 4.14.

For the past five years GS has been investing and working behind the scenes on the new advanced version 5. Version 5 offers advanced capabilities over version 4, including one of the most important improvements of full automatic non-structured grid generation. The development is coming to its completion and we estimate version 5 could see its beta release around the end of 2011.



All-electric furnace model in GFM 5.0 – temperature field in a cross-section at the position of electrodes. In the right upper corner, domains are highlighted (glass – green; refractory – blue; electrodes – red and magenta). Unstructured, geometry aligned mesh with local refinement around electrodes introduces more precision and computing efficiency.

GS Goes 3D

Even with version GFM 4 today it is possible to make impressive 3D movies. This is not only good for marketing but really helps to understand better 3D complex flows in glass melters. Some premiere 3D movies will be demonstrated during the 11th International seminar on furnace design.

Glass Service supply of raw materials applied successfully for REACH

By Jiri Uhlir and Tomas Chmelar



Glass Service has been supplying special raw materials to many of our existing customers for over two years. We have recognized that supply of reliable high quality raw material for a good price has become critical in order to produce optimal quality with profitable conditions. We are therefore able to supply the following raw materials:

Commodities
Special raw materials
Rare earths oxides
Polishing compounds

As a special note, concerning most of these materials we are the sole company that has applied for REACH certification and can thereby continue to supply these materials with the European Union (EU) certifying their safe use.

What is REACH?

REACH stands for the Regulation for **Registration, Evaluation, Authorisation and Restriction of Chemicals**. Enforced since 1 June 2007, REACH is a strict and restrictive health, safety and environmental regulation, which maps and controls the use of chemicals throughout the EU. It provides parameters for safety during all stages of chemical life cycle, including composition, storage, and handling.

REACH registration

Each chemical which poses even a minor risk to the environment and/or human health **must be registered** under REACH. The registration obligation rests on the body responsible for placing the chemical on the EU market (i.e. import/manufacture/ formulation).

Registration is a robust task: it requires submitting highly detailed information (several thousand pieces) on the chemical to the **European Chemicals Agency (ECHA)**. A single REACH registration often requires several years of work and modern large companies devote whole new departments to meeting these requirements.

Does REACH affect us?

REACH affects virtually every single industrial business in the EU, and there is zero tolerance. Failing to meet requirements laid out by REACH means **NO market**. (Prohibition to sell and/or use the particular chemical is immediate if regulations are not adhered to.)

GLASS SERVICE and REACH

All raw materials supplied by GS, including Barium carbonate, Zinc oxide, Diantimony trioxide and Lead silicate, are registered by REACH or awaiting registration prior to a relevant deadline. It is interesting to note that GS is the only company holding a registration for Lead silicate. All registered chemicals are assigned a **REACH registration number** by ECHA as a token of the registration being successful, which GLASS SERVICE provides to all customers as proof of compliance.

Current market and REACH

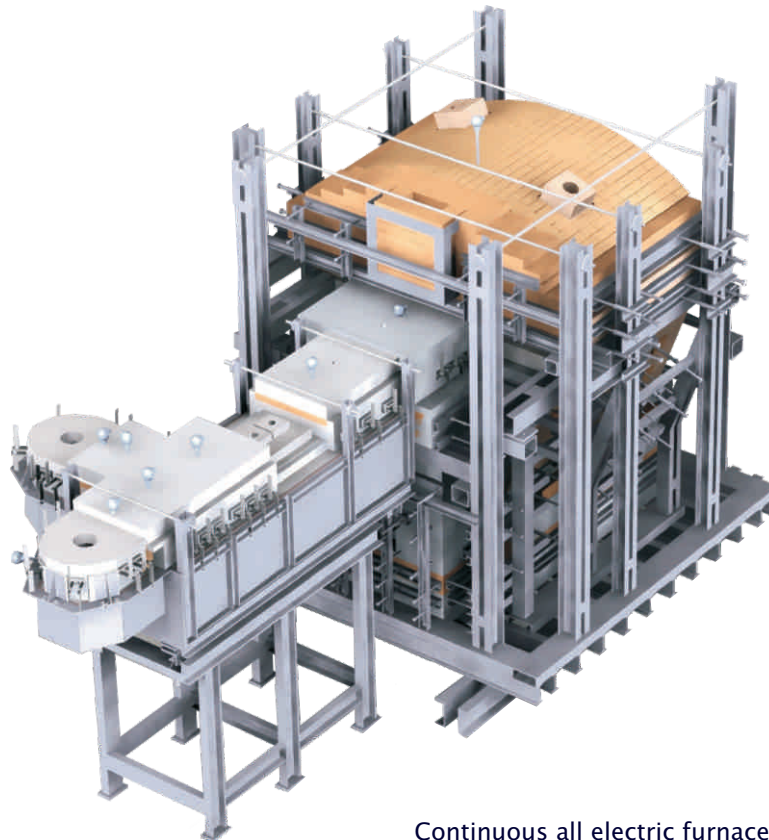
Many companies will inevitably try to bypass REACH or delay its integration into their workflow, as complying with REACH is expensive and difficult. This is not the attitude of GLASS SERVICE. Under a zero-risk policy, we have dealt with REACH head on and met **all** of its requirements to assure maximum safety for our customers. In this regard, Glass Service has become a foremost source of premium quality raw materials, with a steady and secure supply stream.

Engineering services

Do not forget, if you need turn key engineering solutions with very high quality and low tonnage, then ask our engineering department for assistance.

During its existence, Glass Service has become known in the glassworker's community as a promoter of simulation of the melting process by means of mathematical methods.

Also vital to the strength of our business is our engineering and consulting activity, where we utilize the latest knowledge from glass industry science and research and our experience from the practical operation of various types of melting aggregates.



Continuous all electric furnace

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