

Online Glass Engineering (OGE). Process analysis in glass manufacturing.



Introduction

The production of glass is a complex process depending on several parameters. Moreover, environmental regulations are getting more and more restrictive and energy costs are rising – with the result that glass manufacturers are faced with an increasingly competitive market. In order to improve the workflow, reduce energy consumption and enhance the ability to produce customised goods, glass manufacturers need to improve their processes and make them more economical. Therefore, optimisation of all parameters involved in the various glass production steps is essential.

Linde Gas, the market leader in glass treatment technologies and services, and OGIS GmbH (operator of the most comprehensive online glass portal worldwide) cooperated in establishing an online analysis tool for the glass industry. Online Glass Engineering (OGE) is an intelligent online software for the quick and easy analysis of complex parameters of the glass manufacturing process, from ingredients to operating data and batch analysis – a true glass expert, available 24 hours every day.

Features and benefits

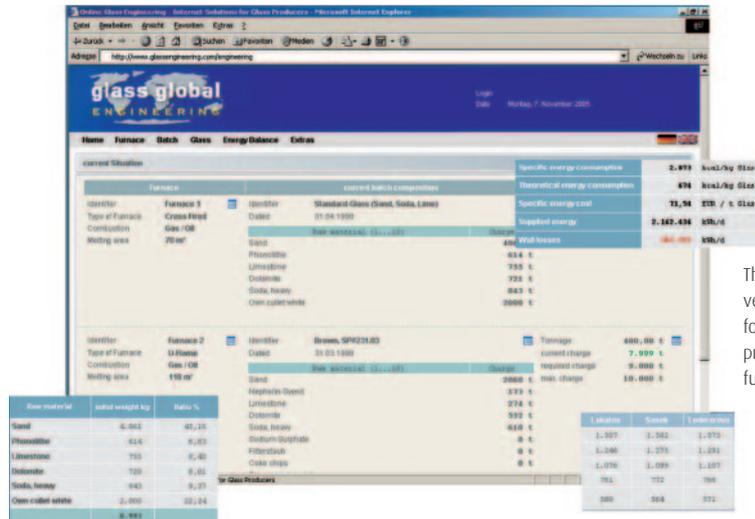
OGE is an easy-to-use tool on the Internet, available at www.glassglobal.com/engineering. With the goal of optimising productivity, it provides excellent transparency of glass melting processes, guiding the customer through the menu and placing automatic questions about necessary input data. SSL encryption ensures that all data and queries are totally secure and cannot be retraced. For a maximum of safety and independence, the OGE program is also available on a USB stick. The program works system-independently and involves only low maintenance costs, since all updates are free. The OGE program has full acceptance among international glass manufacturers. It covers the most important points in the glass manufacturing process, such as furnace settings, management of the glass composition, or possible process modifications.

Principle and structure

OGE is based on the following program modules that analyse the respective parameters of the glass manufacturing process:

- Batch and glass calculations and forecasts
- Calculation of the glass properties
- Raw materials inventory, ordering etc.
- Energy and mass balance analyses and forecasts
- Heat transfer calculations

In order to determine the ideal furnace setting (including capacity, type of fuel or air and preheating options), individual basic furnace data can be used. Even a complete default profile including chemical analysis details and costs can be matched with specific target combustible characteristics for specific gases/oils as well as refractory materials.



The energy equation reveals areas offering scope for greater efficiencies and provides solid pointers for future investments.

The batch mixture is calculated to deliver the required glass properties.

Example: calculation of the viscosity values with different models.

For the optimisation of batch composition management, the program allows for the saving and management of batch compositions, silo set-ups and evaporation rates. It provides an extensive material database, containing default values for glass compositions that can be supplemented with specific settings.

In order to determine the ideal glass composition, the program allows for analyses of individual glass compositions, determination of ideal oxides within the glass and the creation of customised glass compositions. Furthermore, the following parameters can be calculated: viscosity, fusibility, density, specific thermal capacity, thermal expansion and conductivity, elastic characteristics, electrical conductivity, kinetics, dielectric properties etc., using more than 45 different models of, e.g. Lakatos (VFT), Sasek, Appen, Ledererova, Braginskii, Huggins and Sun.

With the objective of reducing process costs, OGE allows for the assessment of the impact of oxy-boosting on melting, heat recovery and wall or melting losses. Based on this assessment, the customer can determine a possible modification of the furnace and decide whether the investment is profitable.

Benefits

- Furnace design add-ons, e.g. thermal transfer calculations
- Optimising the batch composition, e.g. by finding less expensive raw materials while using the same glass analysis and glass properties
- Simplifying the work procedures (and reporting) within batch/glass properties reduces the costs
- Optimised melting generates better glass qualities
- Optimising the melting process with the balance forecasts helps to reduce energy costs up to 5%

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