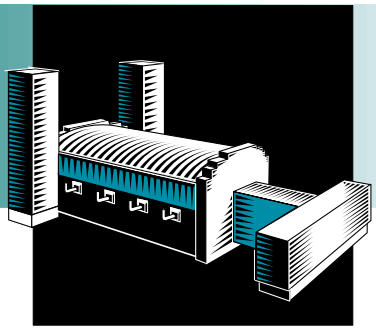
GLASS
Project Fact Sheet



Development, Experimental Validation, and Application of Advanced Combustion Space Models for Glass Melting Furnaces

Benefits

- Reduced glass melting energy consumption and pollution (by at least 25 percent)
- More cost-effective method for prototyping new energy and pollution reduction concepts

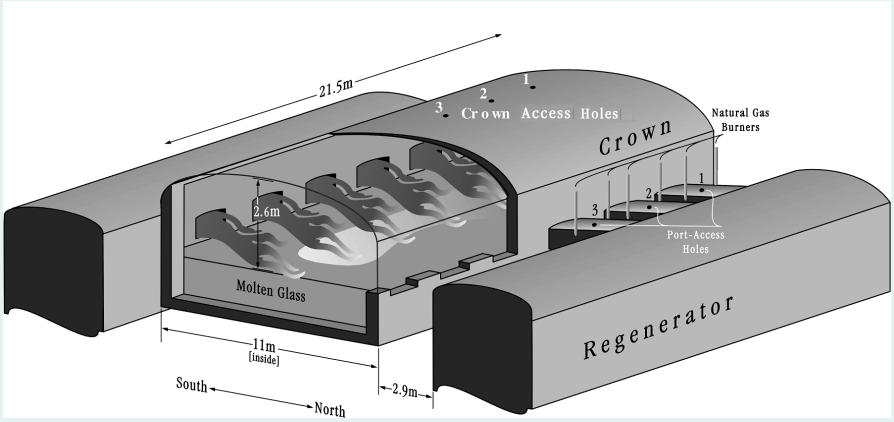
Applications

The models developed and validated during this project will be predictive tools that can aid in the design of more energy-efficient glass melting furnaces.

Combustion space models will allow cost-effective furnace design and modification for increased energy efficiency

One of the greatest obstacles to improving energy efficiency in the glass making industry is the inability to regulate heat flux distribution on the batch and glass melt surfaces. Heat flux distribution directly influences product quality, production time, and energy efficiency since it impacts melt recirculation patterns, batch chemical reactions, and residence time. While concepts to control the distribution exist, the associated furnace modifications are far too costly to implement. Researchers at Brigham Young University have teamed with Visteon Glass Systems, a division of Ford Motor Company, to develop, validate, and apply three-dimensional combustion space/melt tank/batch melting models, using real-world furnace data and conditions. The models will allow manufacturers to evaluate heat flux distribution control concepts fully and cost-effectively.

Crown Heat Flux Characterization and Glass Surface Temperature Measurement



In FY98, project researchers used combustion space models to characterize crown heat flux and measure glass surface temperature in a sideport furnace environment.

Project Description

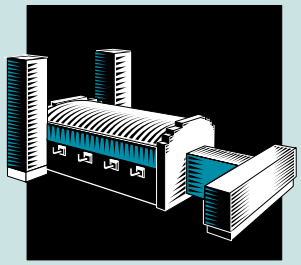
Goal: Develop and validate three-dimensional combustion space models using real-world melt data in order to optimize current furnace configurations and aid in the design of new furnaces.

The objective of the program is threefold:

1. Develop models for prediction of industrial furnace behavior
2. Validate the models through comparison with real-world furnace data
3. Apply the validated models to explore new furnace technology (e.g., oxygen enrichment, reburning).

Progress and Milestones

- A comprehensive numerical model for air-fuel furnaces was developed in FY96 while an oxyfuel model is currently in development.
- Models are being validated at Visteon's flat glass facility in Oklahoma.
- Exploration of new furnace combustion concepts is ongoing.



Project Partners

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