

1-4 Automatic glass screening apparatus

## SCREENING APPARATUS FOR GLASS DEVELOPMENT

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### Motivation

The production or introduction of new special glasses requires a long and expensive period of development. Time-intensive melting processes needed to analyze properties and melting behavior of the new glasses still further increase the costs. It takes a great effort to technologically enable accurately reproducible casting processes. Even a delay of only a few seconds during the casting can significantly change some properties.

### The automatic approach

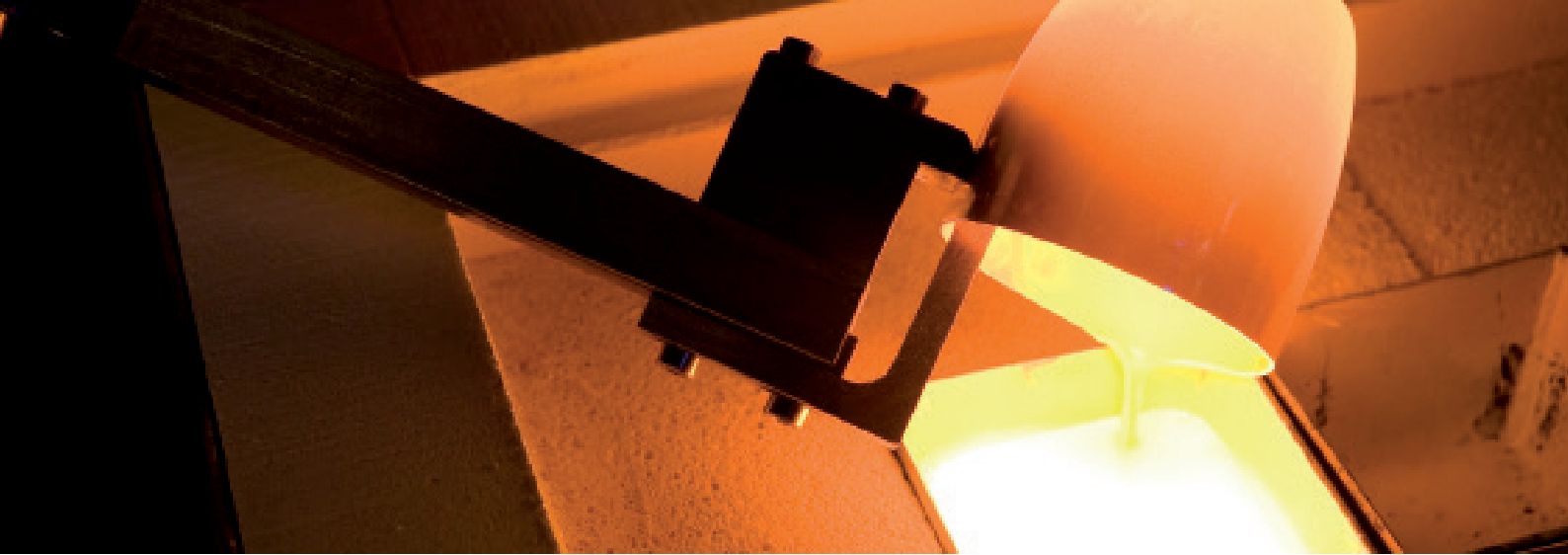
The automation of the melting process for a systematic development of glass systems reduces costs significantly and improves the reproducibility.

The automatically produced samples can be characterized quickly and efficiently in our laboratories; some properties can be determined in situ during the melting process.

### The screening apparatus

The worldwide unique screening apparatus developed at Fraunhofer ISC consists of a weighing unit for 14 components and an electrically heated furnace (up to 1700 °C).

A robot performs the powder mixing and then transfers the homogeneous powder into the furnace chamber. The glass is melted and homogenized in a platinum 100 ml crucible. Then the liquid glass is poured out into a stainless steel crucible.



The glass is cooled down slowly in a separate furnace to relieve stress. This allows for a production of 16 different samples of glass with a defined batch composition of high optical quality within 20 hours.

The following parameters are variable:

- Automatic raw material dosing of up to 14 components
- Adjustable melting program for individual samples
- Selection of thermodynamic models for possible glass systems

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### Our range of services

- Advice on the selection of appropriate glass systems for the development of new types of glasses according to your specifications
- Screening of new glass systems
- Characterization and interpretation of the properties of the samples produced by the glass screening apparatus according to your specifications

### Summary of selected properties of the high throughput glass screening apparatus

	Property	Precision
powder dosing unit	14 ports, capacity 1 kg + 5 kg	+/- 10 mg (1 kg) +/- 15 mg (5 kg)
melting furnace	5 ports	
melting temperature	1700 °C (continuously)	+/- 2 K
cooling furnace	16 ports	+/- 5 K
	1100 °C +/- 1K	
powder mixing	100 g, homogenization by shaking	
robot	Stäubli TX60L	-
sample throughput	16 samples/day	
melting crucibles	Pt, Al <sub>2</sub> O <sub>3</sub> , SiO <sub>2</sub>	