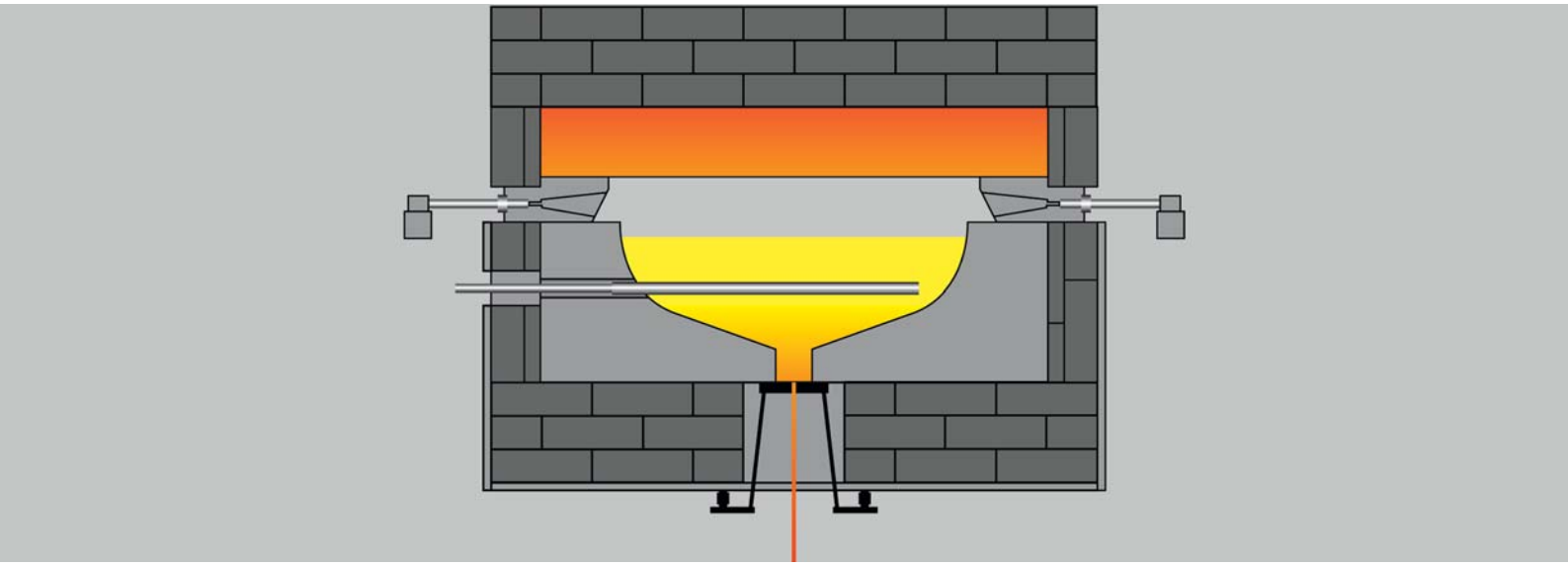


SORG

Conti-Drain

Perfect Solutions for the Glass Industry

CONTI-DRAIN®

In some sectors of the glass industry such as tableware and even flacons cord-free glass has always been a basic requirement. However, in recent years even the manufacturers of normal containers have been experiencing increasing problems with zircon cords, even though there is no evidence that the cords actually affect the physical properties of the containers.

Most attempts to eliminate the cords by stirring have been unsuccessful, mainly because the zircon-rich glass which causes the cords is often found right on the channel bottom, where it is not accessible to stirrers.

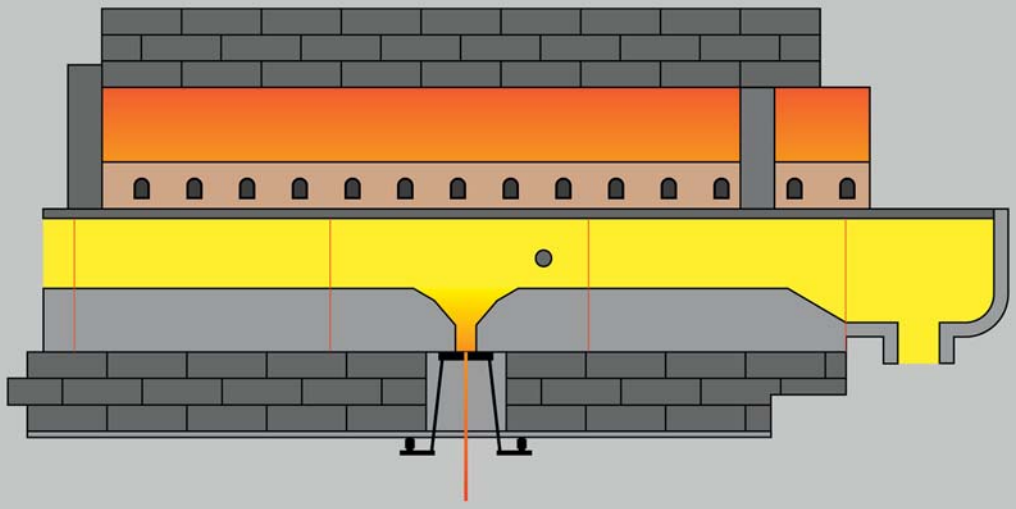
The SORG forehearth CONTI-DRAIN® system has been in use to reduce or eliminate zircon cord since 1999, with an average of one system per month being supplied over the intervening time period.

Typical “cat scratch” zircon cord

Principle

The zircon-rich glass that causes the cords is often found right on the channel bottom, and it can be removed by a drain. However if bottom glass is to be drained it is vital that a slow-running, controllable drain is used. If too much glass is removed, a funnelling effect is established, by means of which hotter and less viscous glass from upper areas of the glass bath enter the drain, whilst the colder and more viscous glass from the bottom is not removed.

The forehearth CONTI-DRAIN® provides exactly what is needed – a controllable drain which can be operated at very slow flow rates.



Forehearth CONTI-DRAIN® – longitudinal section

The System

The forehearth CONTI-DRAIN® system comprises a special channel block together with an electrically heated drain unit.

The channel block features a drain hole at the bottom of a specially shaped well. The block itself is usually fused cast AZS material but other materials have also been used.

The drain itself consists of a high-temperature resistant steel plate, which acts as an outlet nozzle, and as an electrode.

This plate is placed up against the underside of the outlet hole in the channel block. A simple ceramic holder assembly is used to keep the metal plate in position and provide electrical insulation. The temperature of the outlet nozzle is measured by a thermocouple.

The electrical heating system comprises a small double wound transformer with a thyristor unit in the primary circuit to provide stepless voltage variation.

The electrical current flows from the outlet nozzle to a counter electrode in the glass bath. A temperature controller is used to give the necessary operational stability. All power and control equipment is contained in one compact control panel, which can be installed on the shop floor.

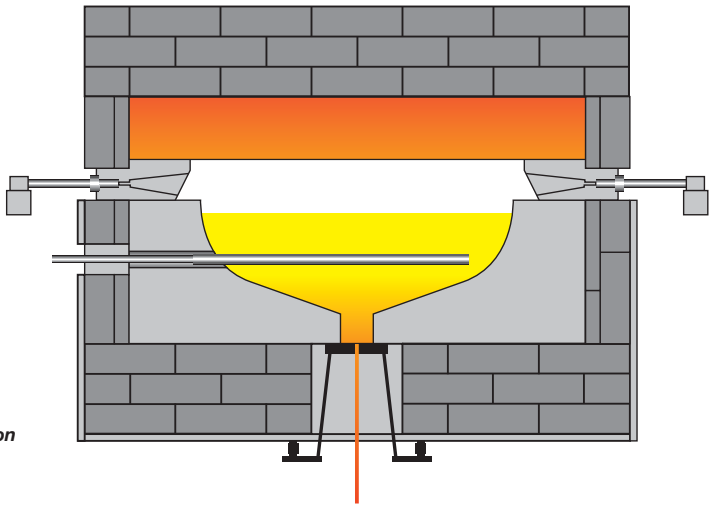
Operation

The basic amount of glass which can be drained is determined by the size of the opening in the outlet nozzle. The electric heating system is used to maintain a constant temperature at the outlet nozzle, which results in a constant flow rate of the glass. Adjustment of this temperature changes the amount of glass being drained.

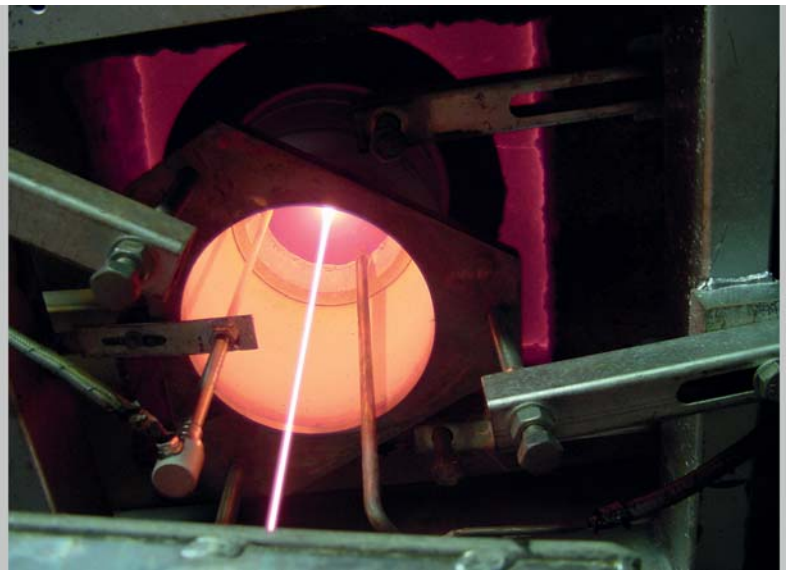
In most cases, the drain is operated continuously. However, as the drain can be easily stopped and started discontinuous operation is also possible and some manufacturers only run the drain when a better quality is required for a specific product.

The amount of glass which must be removed depends on a number of factors, but experience has shown that a glass drainage of between 500 and 1300 kg/day per line is normally sufficient. This glass can be returned to the furnace as cullet.

An electrical power consumption of approx. 1.0 to 2.5 kW can be taken as a typical value under normal operating conditions.



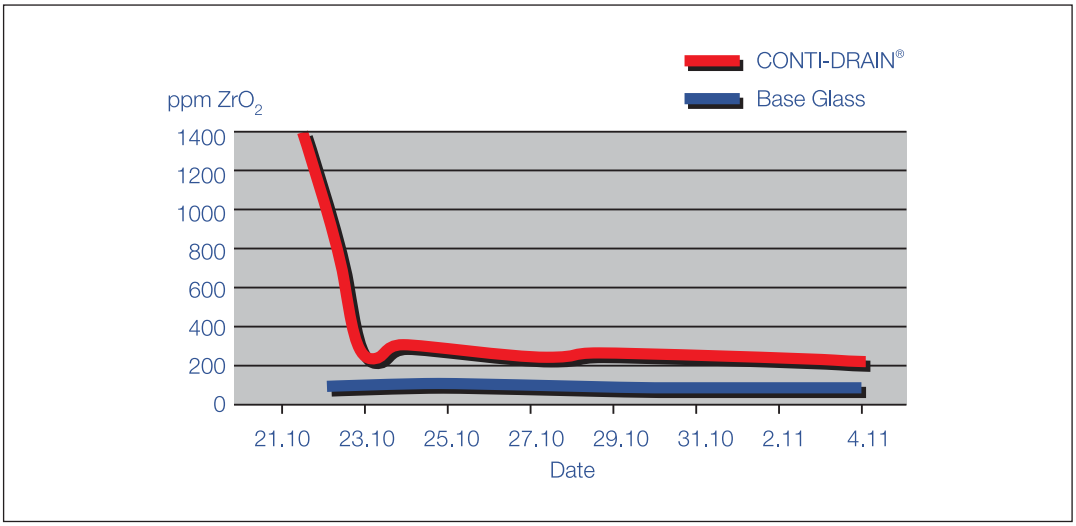
Forehearth CONTI-DRAIN® – cross section



Results

The first operational forehearth CONTI-DRAIN® system was installed in October 1999 on a production line that suffered from extremely strong cords. Within a few hours the cords had been reduced significantly and, with further adjustment of the system, they were eliminated completely. In order to test the reproducibility of these results the CONTI-DRAIN® was switched off a few days later. Within hours the cord had returned so the drain was switched on again. Less than one day later the production was once again cord-free.

Since then many systems have been installed and in almost all cases the intensity of the zircon cord has been reduced or the cord has been eliminated completely.



Important Note

The operating conditions and the quantity of contaminated glass are subject to considerable variation on different lines. In addition, it cannot be guaranteed that the contaminated glass will be found on the channel bottom. It is therefore not possible to predict exactly how much the zircon cords will be reduced by the installation of this system.

Some glass manufacturers install the CONTI-DRAIN® block in their forehearths at a repair and wait to see how bad the cords become. The drain can be activated at any time by adding the mechanical and electrical equipment.

Alternative Versions

A special drain block is an integral part of a standard forehearth CONTI-DRAIN®, but if this block is not available on an operating forehearth it may still be possible to install and operate a CONTI-DRAIN®. An approximation to the required drain block profile can be produced by drilling from outside the forehearth, and this limits the disturbance of the forehearth operation to about one day.

The standard CONTI-DRAIN® system utilises a molybdenum counter electrode in the glass bath. In the case of highly oxidised soda-lime flint glasses this can lead to blister formation and although most of these will be removed by the drain, a few may be found in the production. For these applications we have developed a version of the forehearth CONTI-DRAIN® that does not need a counter electrode in contact with the glass bath. The basic principle is the same as the standard system and it can therefore achieve the same excellent results.

Nikolaus Sorg GmbH & Co KG

Postfach 1520
97805 Lohr am Main
Germany

Tel.: +49 (0) 9352 507 0
Fax: +49 (0) 9352 507 196

nsorg@sorg.de
www.sorg.de

At Home in the World of Glass

Glass melting technology

Glass conditioning

Components

Service