

# Forehearth and Working End Technology

## ZEDTEC

Part of the TECO Group

ZEDTEC is part of the TECO Group of companies, one of the world leaders in glass furnace design and melting technology.

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Zedtec provide forehearth and working end solutions and have been at the forefront of the industry for over 30 years. Our technical innovation and tailor made designs are trusted by our customers with over 1,000 Zedtec installations worldwide.

Innovations include our Rapid Cool Technology which continues to remain the most effective cooling technology available.

We are able to provide a glass conditioning strategy that is best suited to your manufacturing process with our professional service including:

- Computer modelling, head loss calculations and temperature profiles
- Expert designed combustion systems, cooling air systems, refractory structures and control
- Site installation
- Commissioning
- Technical back up at every stage of your project.

## The Zedtec difference:

- Higher pull for a given forehearth length
- Reduced length of forehearth for a given pull
- Improved flexibility/wider tonnage range
- Ability to delay cooling to minimise head loss
- Better control of heat/cool operation
- Better glass homogeneity; improved glass quality
- Reduced maintenance
- Faster job changes

For more information, please contact us:

Telephone: +44 (0) 114 275 1248  
Email: [sales@zedtec.com](mailto:sales@zedtec.com)  
[www.zedtec.com](http://www.zedtec.com)

# Unique designs, cutting edge technology

## Forehearth simulation tools

Zedtec uses a number of simulation tools which help develop and prove design concepts.

Designed and developed by Zedtec, our “FRAME” tool (Forehearth, Refiner and Mathematical Emulator) is a unique piece of software. It calculates head losses, residence time, gas consumption and valve positions in both heating and cooling modes. This is used as a key design tool for all of our forehearth and distributors.

The FRAME calculation simulates the production conditions of any given design where the customer wants to introduce any change in:

- Glass colour
- Tonnage
- Glass depth
- Glass inlet temperature
- Required zone temperatures
- Gob temperature

## Rapid cool technology

Zedtec’s Rapid Cool Technology enables cooling air to be introduced in greater volumes due to the patented design of the superstructure arch blocks. This unique arch block design also allows efficient centre line cooling along the length of forehearth zones.

The basic physical operation of cooling is to introduce cooling air down the central flue channel and allow this to enter the combustion chamber, to cool the central area of the glass stream. This air removes heat from the superstructure and central glass stream and thus heats and expands. This heated air then exits through the side flue channels and exhausts through the dampers, which then act as a chimney or a controlled vent.

## Universal Archblock

The archblocks have a unique and versatile design which can be easily converted between standard and rapid cooling mode if production requirements change. These are all modular which allow for fast, simple construction.

## ZEDCEL™ substructure design

Our unique and innovative design of forehearth channel blocks and the substructure insulation package assists in evenly balancing heat losses across the full width of the forehearth.



Cross section through Air Damper

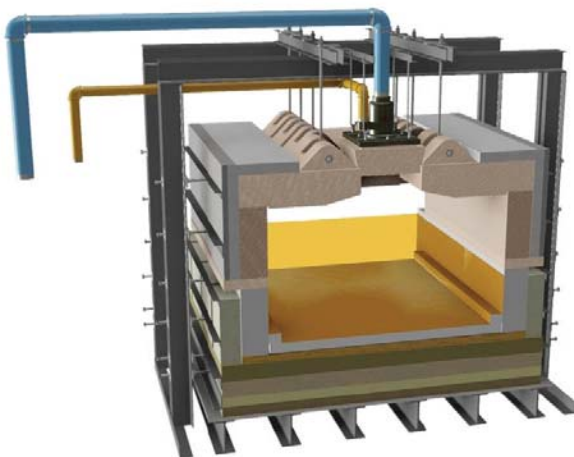
### High pressure firing

Initially developed by ZEDTEC and now accepted as the industry standard, the high pressure firing system gives a greater turn down ratio between high and low fire, enabling better control of forehearth zone temperatures.

### Hot spot burners for working ends

These low maintenance, roof mounted burners enable efficient raising and lowering of glass temperatures. Burners produce a luminous ball of heat that provides direct radiation on to the surface of the glass and secondary radiation on to the glass via the arch and side wall blocks.

In cooling, air is passed through the burner which generates a spiralling effect to the air flow prior to entering the combustion chamber. This cold, dense air then removes heat from the surface area of the arch and side wall blocks, which then remove heat from the glass via radiation as they become a black body receiver.



#### Working End Construction

Hot spot burners provide uniform heat release across the glass surface.

### Air dampers

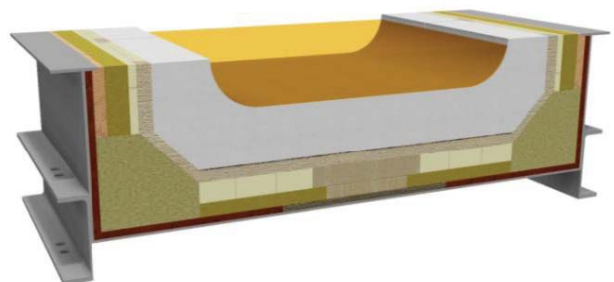
These units control combustion chamber pressure on the superstructure of forehearths and working ends using a unique air curtain design. No moving mechanical components on the superstructure minimises maintenance requirements.

### LFV burners for conditioning zones

ZEDTEC has developed low forward velocity (LFV) burners to improve glass homogeneity. This allows short radiant flames to apply heat to the outside of the glass, away from the centre-line of the forehearth. LFV burners are normally employed in the conditioning section of the forehearth where heat is required local to the side wall of the channel block to compensate for heat losses throughout the refractory structure.

### Colour forehearths

To give our customers increased flexibility on their product and colour ranges, ZEDTEC can provide colour forehearths to enable a wide range of coloured glass to be produced on a single forehearth.



#### ZEDCEL substructure design

Improving glass homogeneity in forehearths.



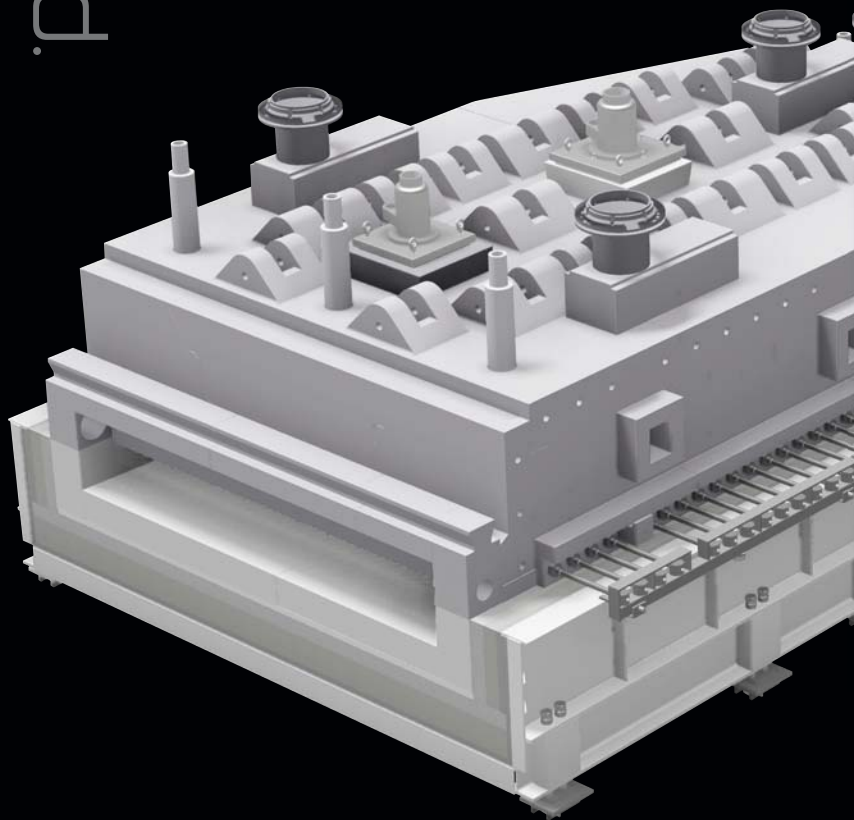
A collection of glass products including bottles, jars, and a glass, arranged on a reflective surface. The background is dark, and the glass items are illuminated, creating highlights and reflections. A red rectangular box is overlaid on the right side of the image, containing the title and a list of glass types.

## Leading the way:

- Container glass  
(flint/amber/green/coloured)
- Fibreglass
- Lighting
- Rolled glass
- Tableware
- Cosmetic glass
- Speciality glasses



Zedtec Ltd.



## ONE GROUP - SIX COMPANIES

As part of the TECO Group, Toledo Engineering, Tecoglas and KTG Systems can offer complete capabilities in glass furnaces of all types, with KTG Engineering supporting this activity as glass plant equipment manufacturers. Zedtec are the TECO Group specialists in forehearth and working end technology. EAE Tech provides high quality industrial automation engineering services and custom control systems.

The TECO Group has been serving the world's primary glass manufacturing industry since 1927.



[www.teco.com](http://www.teco.com)

## ONE GROUP - SIX COMPANIES

**TECO**

### TOLEDO ENGINEERING CO.

Toledo Engineering Co., Inc.  
3400 Executive Parkway  
P.O. Box 2927  
Toledo  
OH 43606-2927  
USA

Telephone:  
+1-419-537-9711

Email:  
[sales@teco.com](mailto:sales@teco.com)

[www.teco.com](http://www.teco.com)

### TECOGLAS

Tecoglas Ltd.  
60 Savile Street East  
Sheffield  
South Yorkshire  
S4 7UQ  
United Kingdom

Telephone:  
+44 (0) 114 275 9020

Email:  
[sales@tecoglas.com](mailto:sales@tecoglas.com)

[www.tecoglas.com](http://www.tecoglas.com)

### ZEDTEC

Zedtec Ltd.  
60 Savile Street East  
Sheffield  
South Yorkshire  
S4 7UQ  
United Kingdom

Telephone:  
+44 (0) 114 275 1248

Email:  
[sales@zedtec.com](mailto:sales@zedtec.com)

[www.zedtec.com](http://www.zedtec.com)

### KTG ENGINEERING

KTG Engineering Ltd.  
60 Savile Street East  
Sheffield  
South Yorkshire  
S4 7UQ  
United Kingdom

Telephone:  
+44 (0) 114 275 9955

Email:  
[sales@ktgengineering.com](mailto:sales@ktgengineering.com)

[www.ktgengineering.com](http://www.ktgengineering.com)

### KTG SYSTEMS, INC.

KTG Systems, Inc.  
Stonewood Commons I  
101 Bradford Road  
Suite 110  
Wexford  
PA 15090-6909  
USA

Telephone:  
+1-724-940-0330

Email:  
[sales@ktgsi.com](mailto:sales@ktgsi.com)

[www.ktgsi.com](http://www.ktgsi.com)

### EAE TECH

EAE Tech, Inc.  
3400 Executive Parkway  
Toledo  
OH 43606  
USA

Telephone:  
+1-419-873-0000

Email:  
[admin@eaetech.com](mailto:admin@eaetech.com)

[www.eaetech.com](http://www.eaetech.com)