

Elster Thermal Solutions

AFGM 39th ASEAN GLASS CONFERENCE

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October 2015



elster
Thermal Solutions

1. Overview of the new company.

Company profile

2. How we can better support the Glass Industry with our Combustion Solutions

Local manufacturing, service and sales thought-out Asia

3. Review of Kromschröder / Eclipse Premix Forehearth Zone Controls.

The Kromschröder gas controls offer a unique method of safely and accurately mixing air and gas for forehearth combustion control systems used in the Glass Industry. The details of this equipment will be reviewed.

4. Brief introduction to our new BrightFire 200 underport and side of port Natural Gas burner for regenerative furnaces.

Eclipse has now installed our new BrightFire 200 burner in several float, container and tableware furnaces. The burner has shown significant reductions in NO_x as well as improvements in energy use compared to other burners in the market.

The Best Just Got Better...

1. What Did We Do & Why?
2. Why is it Good for You and Your Customers?
3. Where Do We Go From Here?



2 Best-in-Class Companies Come Together

Global Leader in Burners &
Combustion Systems



Global Leader in Combustion
Control Solutions



Individual Competencies

ECLIPSE®



**krom
schroder**

Burners

Applications &
Systems

Global Process Air Heating and Furnace Applications



Drying
paper, textile, gypsum



Metals
ferrous and non-ferrous



Surface finishing
automotive, coating



Glass
melting and finishing



Food
baking, spray drying, malting



Ceramic
sanitary, technical, bricks



Fluid heating
hot water, steam, petrochem.

Others.



Asphalt
road construction

Controls

Burners

Applications &
Systems

Our Combined Competencies

The First Benefit to You and Your Customers...



ECLIPSE[®]

+

**krom
schroder**

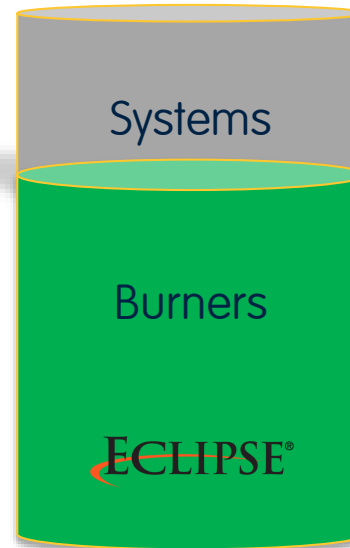
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1 + 1 = 3



safe and reliable...



efficient and clean...



with added value

Why is it Good for You?

ECLIPSE®

+

krom
schroder

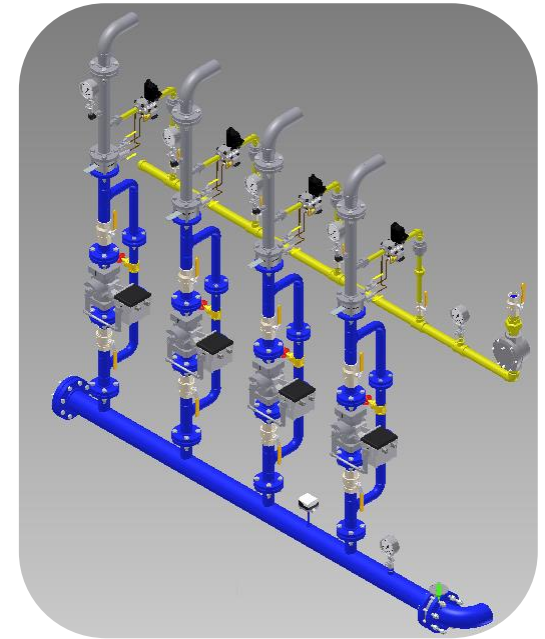
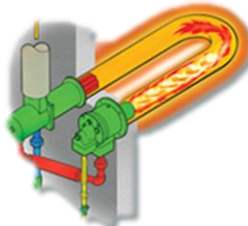
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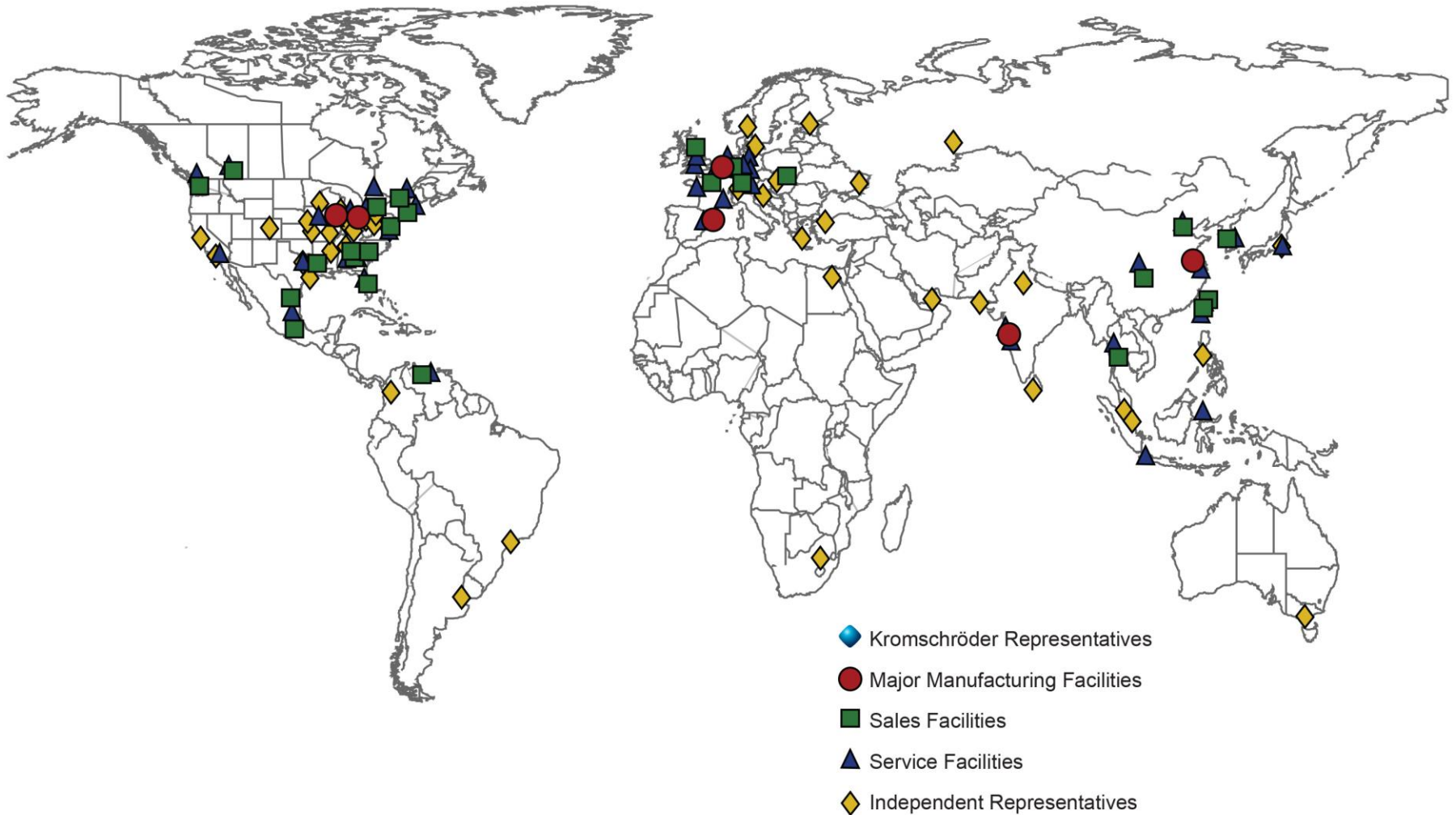
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Industry-Leading Application & Customized Solution Support

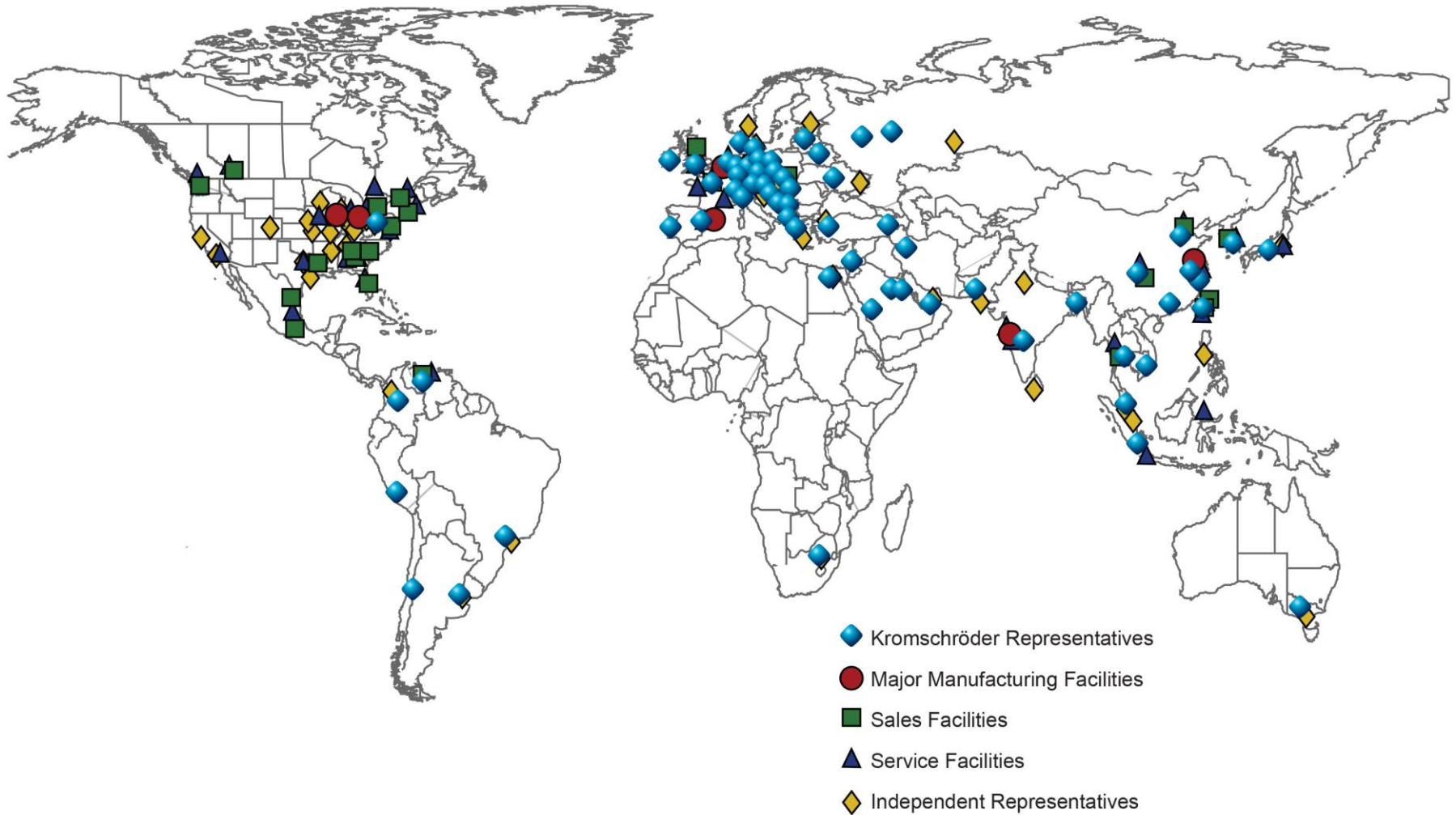
- Global Knowledge... Local Expertise
- Application Know-How in All Major Industries
- Safe, Reliable, Efficient & Clean Solutions Designed Specifically for Your Thermal Processing Needs
- Controls and safety systems from Kromschöder
- Lehr Burners
- Low temperature safety systems
- Enhanced Forehearth Zone Controls



Eclipse Presence



Combined Presence



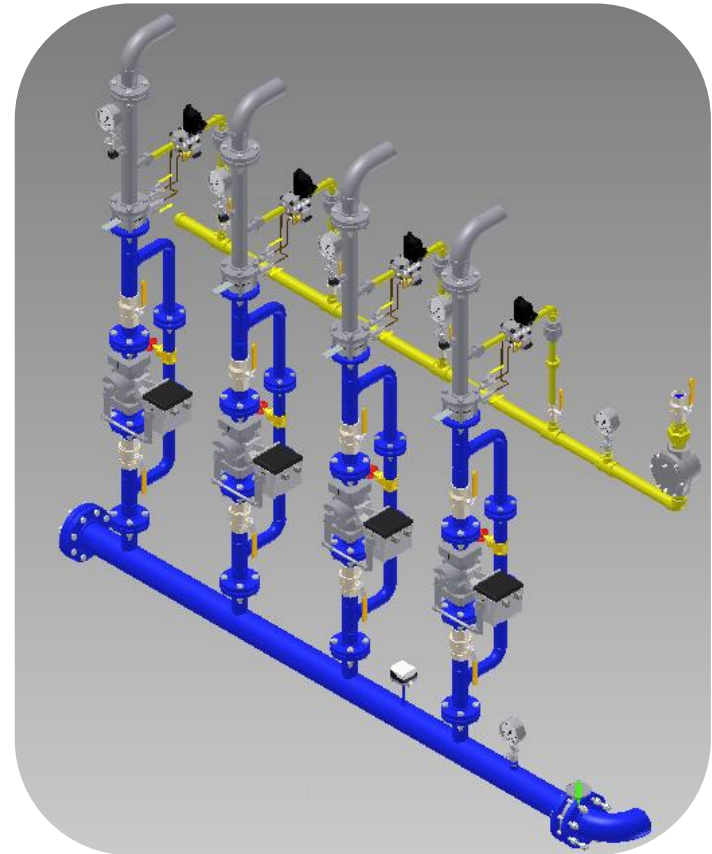
Combined Efforts

Forehearth systems

Eclipse Oxy Forehearth



Kromschröder Air / Gas Controls



Premix Air-Gas Forehearth Control System

Pressure
Gauge

VAH

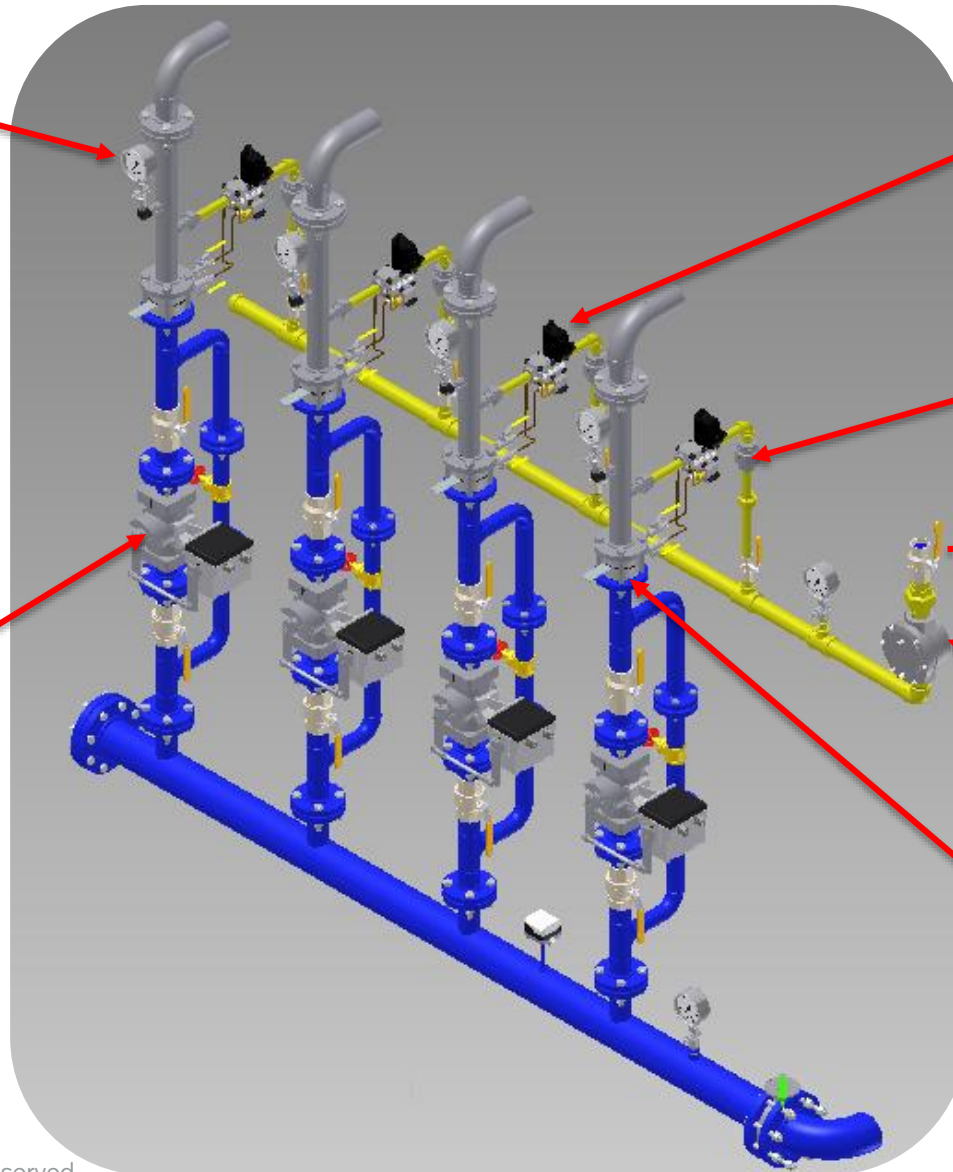
GRSF

Main
Gas

Gas Filter

Metering
Orifice

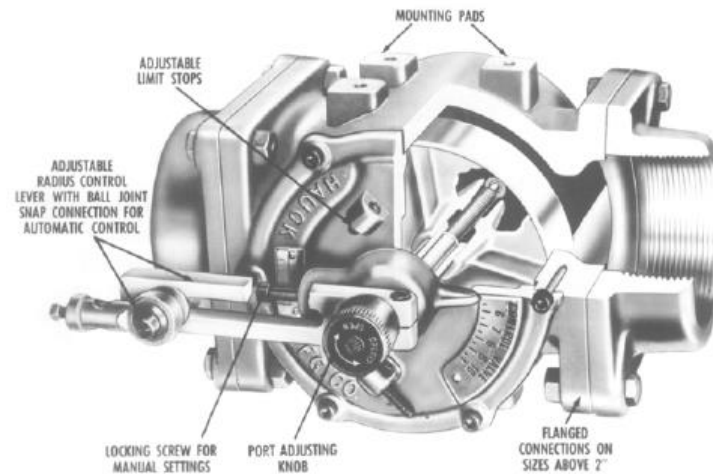
Hauck
APV with
Actuator



Hauck APV with Actuator

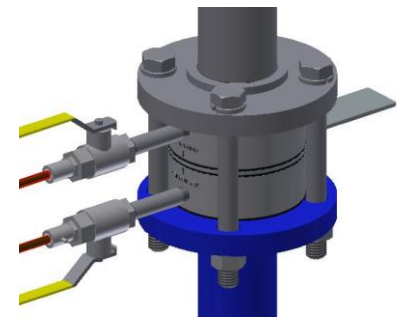
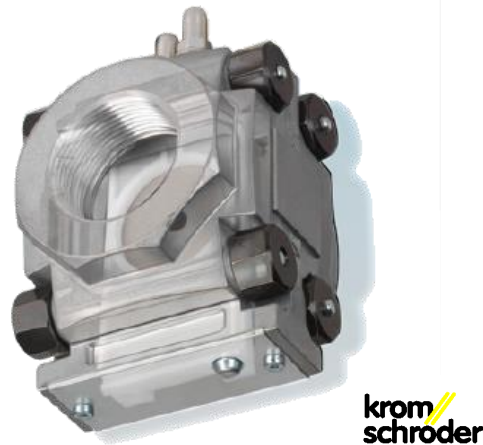
Hauck Adjustable Port Valve

- As part of the Elster acquisitions, Hauck is now part of the overall team.
- Hauck equipment is manufactured at our facilities in Rockford, IL
- Actuator controlled using Kromschöder IC actuator series, Honeywell 7284, Honeywell Herculine, Barber Coleman EA57, or Siemens SQM5



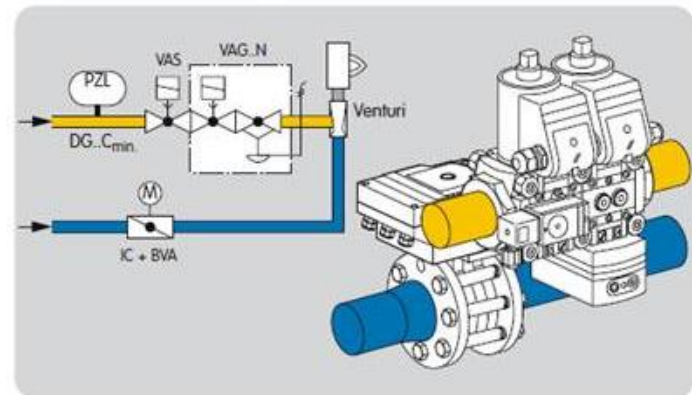
Metering Orifice

- For use as a measuring or restricting orifice
- The air dP is tied to the VAH valve to control the gas flow
- Easy installation thanks to flanges with internal thread
- Hauck, Kromschroder or Eclipse have options for metering



Pressure Regulator with Solenoid Valve

- Safety shutoff valve
- Used to maintain constant air/gas ratio for modulating controlled and stage-controlled burners.
- Gas Flow rate is controlled proportionally to the air flow rate
 - The air-gas flow mixture is set and controlled via the Air dP through an orifice plate, not a typical zero governor or ratio regulator
- Better than a mixer and zero governor because
 - Easy accurate adjustment of air fuel mixture
 - No need for mixing rods
 - Linear control of mixture setting
 - Single, compact component



Gas Controls

Gas Filter



krom/
schroder

Flow Meters



Gas Regulators



Safety Valves



BrightFire 200 Eclipse History

Eclipse has a long, successful history with regenerative natural gas burners.

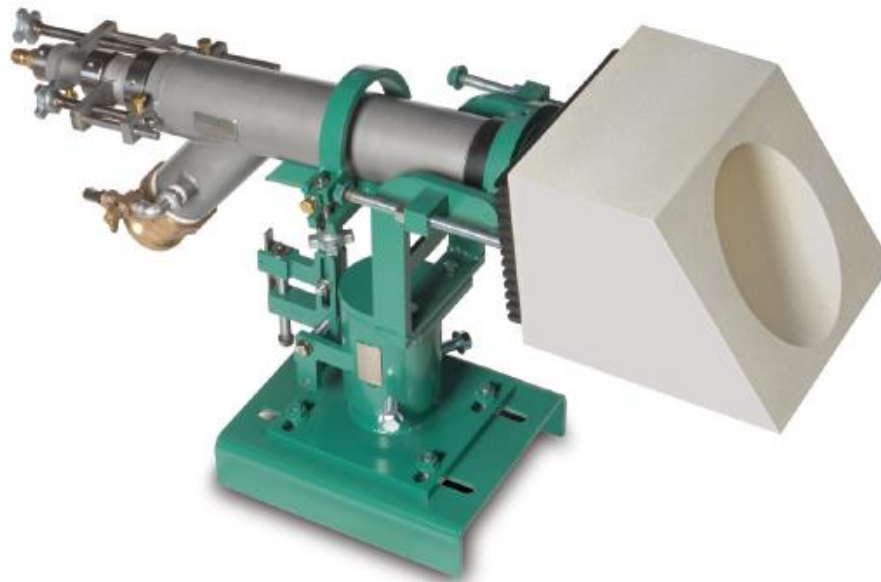
- The 03R and 03V were developed in the late 1970's and 1980's.
 - First Sealed-in-Burner which transformed the industry and reduced energy.
 - First easily adjustable burner for flame length and flame profile.
 - "Gas Burner Firing Practices" published, considered industry standard.
- The BrightFire was developed in the mid 1990's.
 - Used the basic principles of sealed-in design.
 - Development of dual gas injection for lower NO_x and reduced fuel use.

The glass industry continued to push for the following improvements in gas burner technology.

- Improved flexibility in flame adjustment and performance.
- Improved heat transfer for lower energy use.
- Lower NOX.
- An easy to use, adjustable burner with a single gas inlet.

BrightFire 200 Features

- Superior flame control
- Ability to control the location of heat release into the glass bath, independent of flame length.
- Highly adjustable flame length
- No additional gas line required as other burners in the market require.
- Direct replacement of our original BrightFire burners in almost all cases.



BrightFire 200 Features

The BrightFire 200 adds a second, inner flow valve adjustment.

- Area Adjustment increases or decreases the area between the Outer and Inner nozzles.
 - Excellent for changing the length of the flame.
- Flow Adjustment changes the distribution of gas flow between the inner and outer nozzles.
 - Can be used to lower NOX.
 - Changes where the heat is released into the glass bath.

AREA ADJUSTMENT

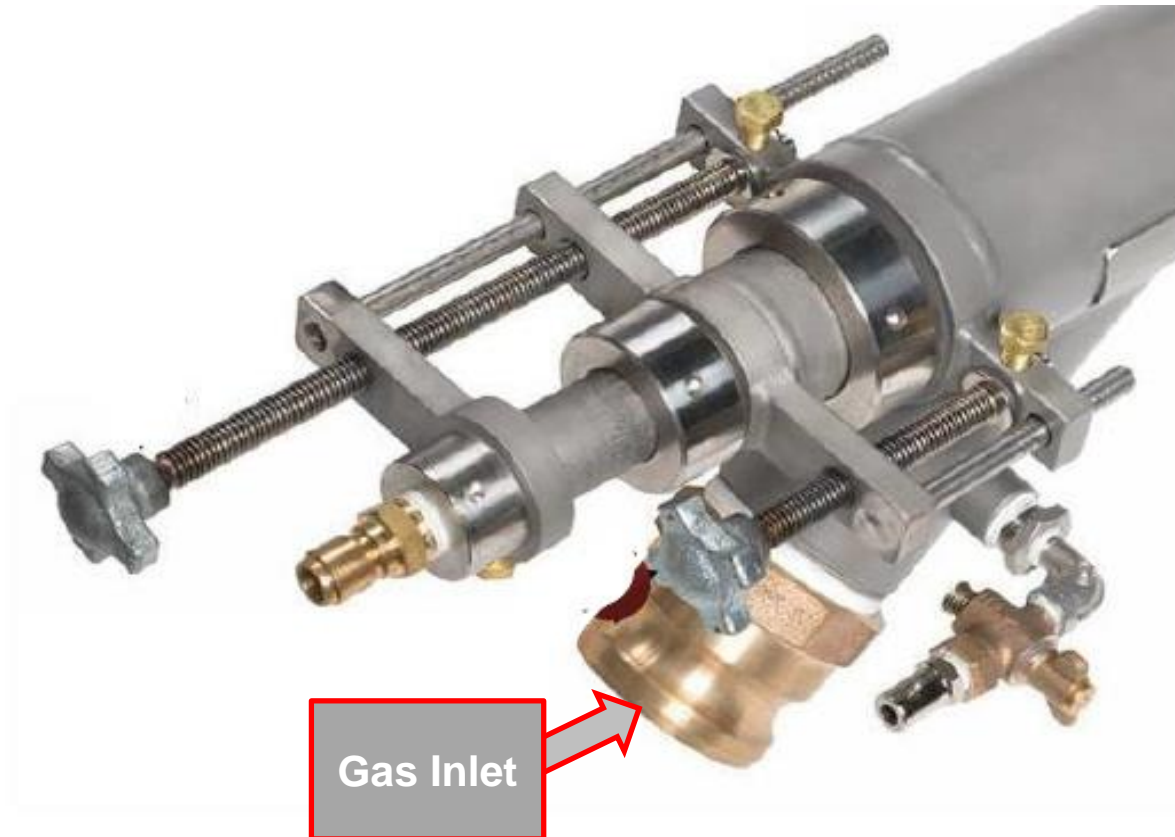


**FLOW ADJUSTMENT
NEW!**



BrightFire 200 Features

Single gas connection for simplified, cost effective application.



BrightFire 200 Features

The BrightFire 200 direct replacement for Eclipse burners and most other burners available today



BrightFire 200 Results

Container USA-End Port

- Bottom power reduced 15%, total energy 2%
- NOx reduced over 15%

Tableware USA-Side Port

- Batch line pulled back- seeds reduced
- Energy use stable as customer more concerned with quality

Float Vietnam

- Demonstrated flame adjustment from 30 to 80% of furnace width
- Ease of change to oil firing with our Dual Fuel set up.

Float-Ultra Thin Glass China

- Fuel use reduced at least 1 to 2%, remainder of furnace being converted

Float Europe

- Improved flame adjustability bringing flame length from less than half to over 75% as needed.

Specialty Glass Europe

- NOx reduction of 20% to below 550 mg/m³

Elster Thermal Solutions - Summary

- The new company was introduced
 - The new company is better aligned to support industries globally
- Kromschröder gas controls for Air Gas Forehearth systems
 - The use of this equipment is well demonstrated in our industry and with the Eclipse Suzhou China base we can support these products locally.
- The BrightFire 200 is now available and has shown superior performance in the field.

Thank You