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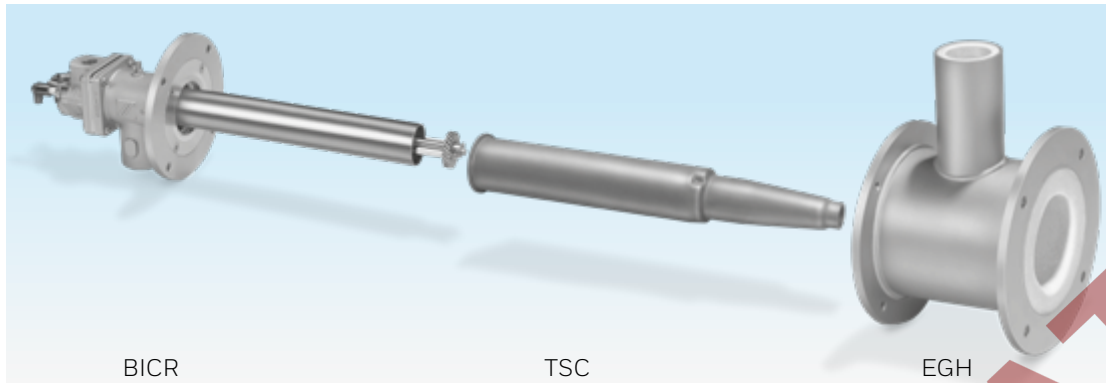
BICR

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## **Burner with integrated recuperator**

- Economical, energy-saving operation by virtue of internal air preheating
- Lightweight construction for minimum weight
- High outlet velocity ensures uniform temperature distribution
- As a result of its compact design it is ideal for replacing the heating elements in radiant tubes which were originally electrically heated

## Application



The burners with integrated recuperator BICR are for use on heating either direct or indirect furnace systems.

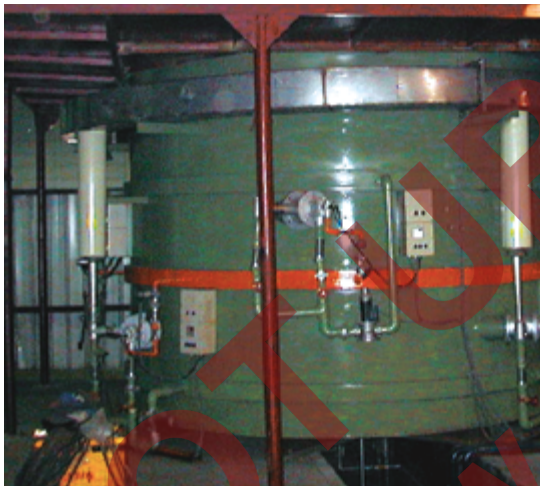
### Indirect heating

BICR recuperative burners in conjunction with radiant tubes are used as indirect heating equipment where the combustion gases must be separated from the product or a certain furnace atmosphere must be achieved.

### Direct heating

In conjunction with an inductor to return the flue gas, the burner is used to save energy in a direct heating system.

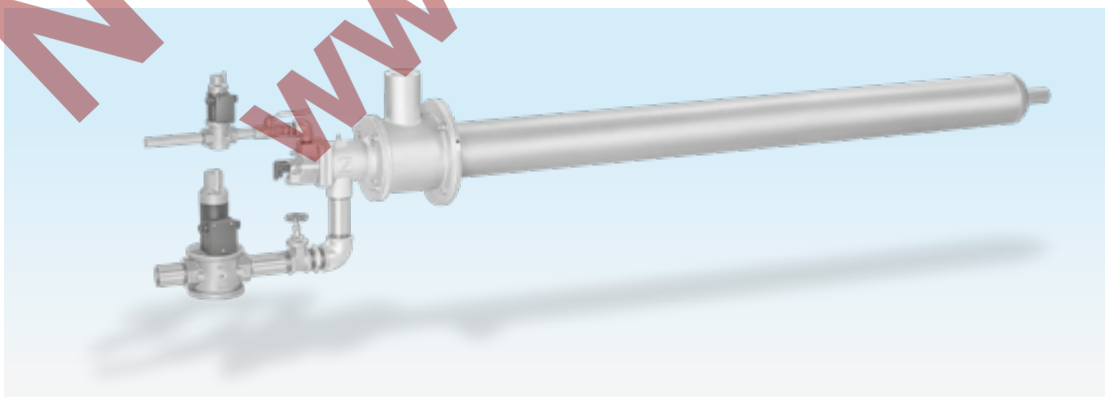
Applications include industrial furnaces and firing systems in the iron and steel industry and in the non-ferrous metals industry.



*Direct heating of a bell furnace for annealing.  
Flue gases are recycled via the inductor.*

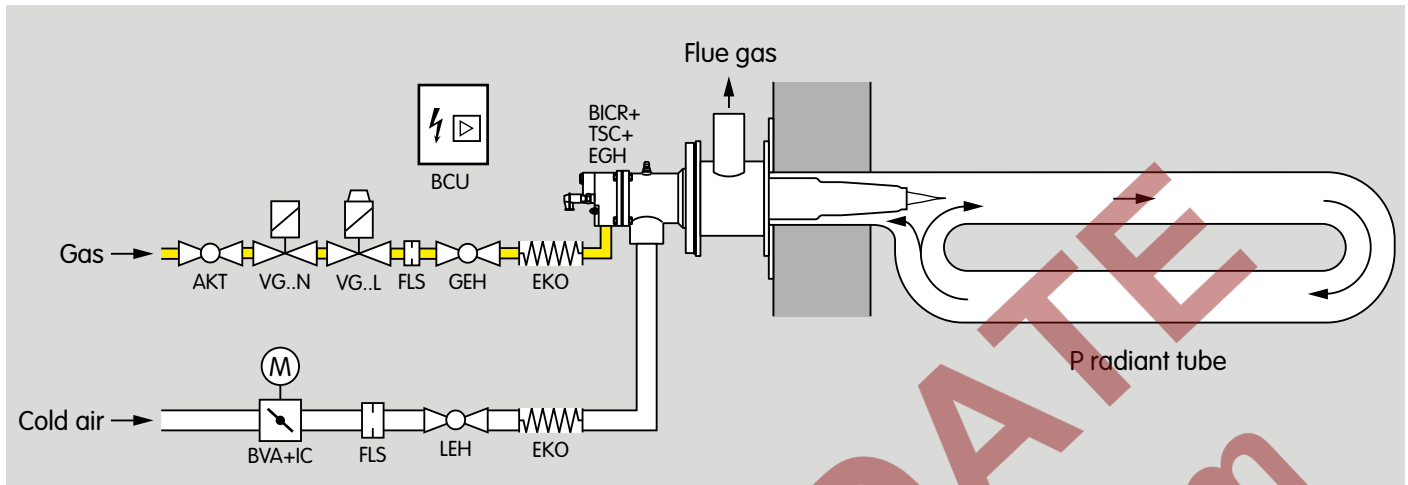


*Direct heating of a roller hearth furnace.*



*Indirect heating in a single-ended radiant tube*

## Example applications



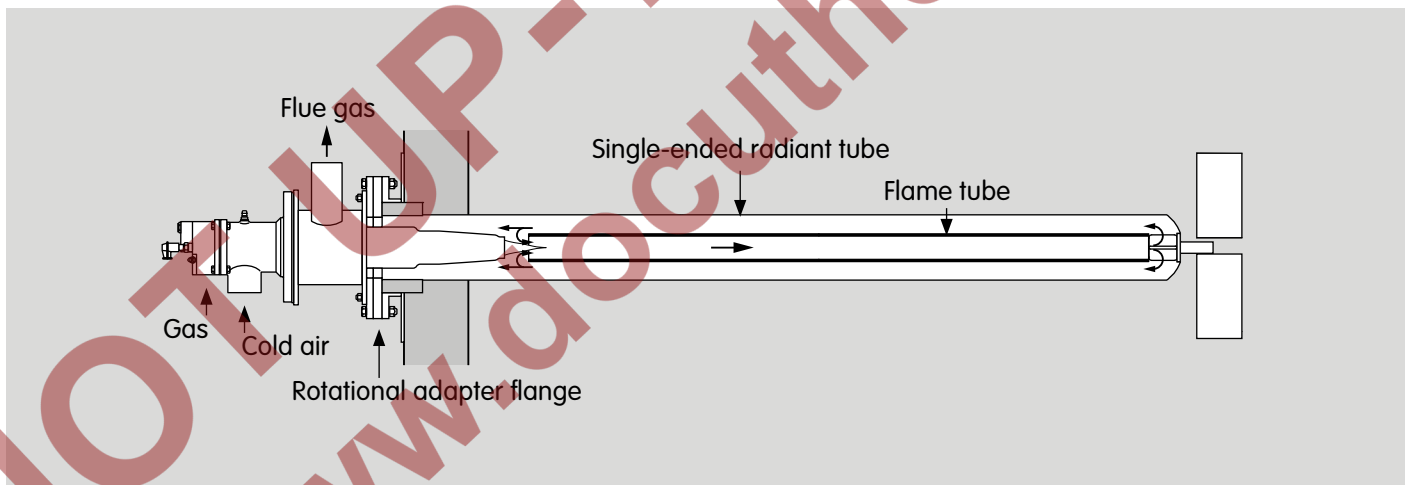
### BICR in a P radiant tube

Example application for indirect heating.

The high outlet velocity of the combustion gases generates a pressure at the outlet of the ceramic burner tube, resulting in the recirculation of the flue gases. This leads to the following:

- A reduction in NO<sub>x</sub> emissions,
- A uniform radiant tube temperature.

The hot flue gases are fed through the ceramic heat exchanger, heating the additional cold combustion air supply. The maximum achievable air preheat temperature is approx. 400°C.



### BICR in a single-ended radiant tube

Example application for indirect heating.

The high outlet velocity of the combustion gases generates a pressure at the outlet from the ceramic burner tube resulting in the recirculation of the flue gases. This leads to the following:

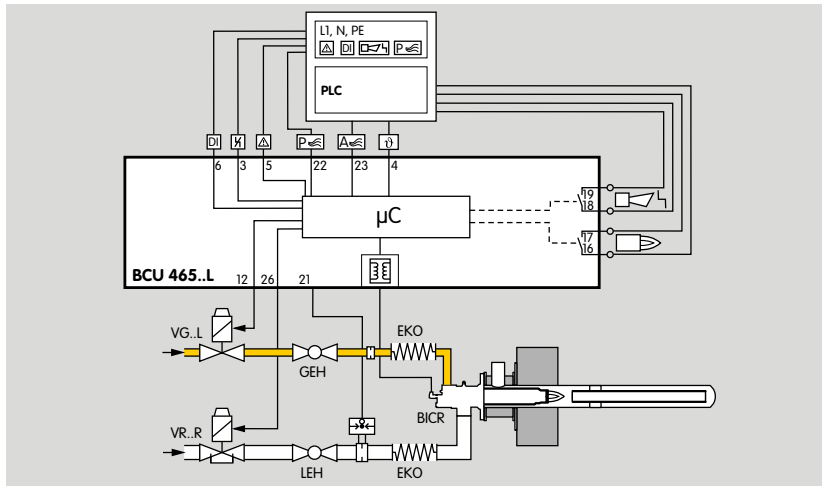
- A reduction in NO<sub>x</sub> emissions,
- A uniform radiant tube temperature.

The hot flue gases are fed through the ceramic heat exchanger, heating the additional cold combustion air supply. The maximum achievable air preheat temperature is approx. 400°C.

An internal flame tube must be fitted in the single-ended radiant tube to guide the hot flue gases.

If metal single-ended radiant tubes are fitted horizontally then provision must be made for rotating the tube 180 degrees periodically to extend its working life.

As the BICR burner is slim and compact, it can also be used in radiant tubes that were formerly electrically heated.

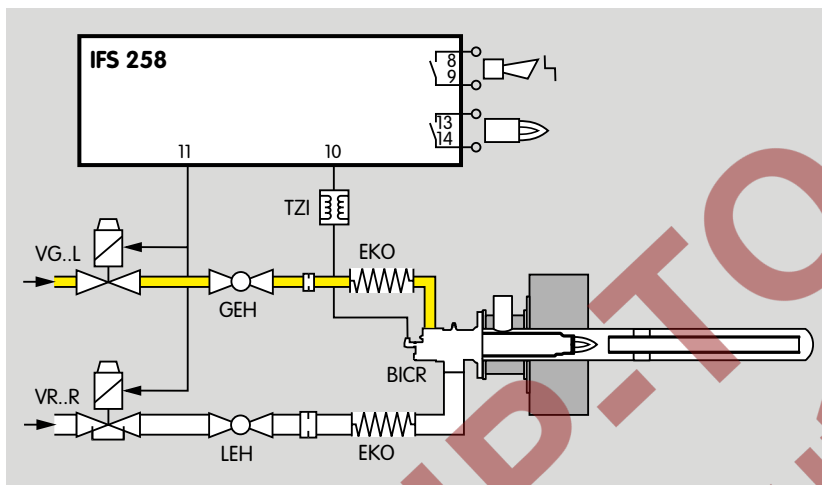


### BICR in a single-ended radiant tube with burner control unit

Control example application:

ON/OFF with burner control unit BCU 465..L.

The gas/air mixture is adjusted to the requirements of the applications using the differing parameters of air supply and air post ventilation. The pressure switch monitors the air flow in the air supply line or in the flue gas exhaust.

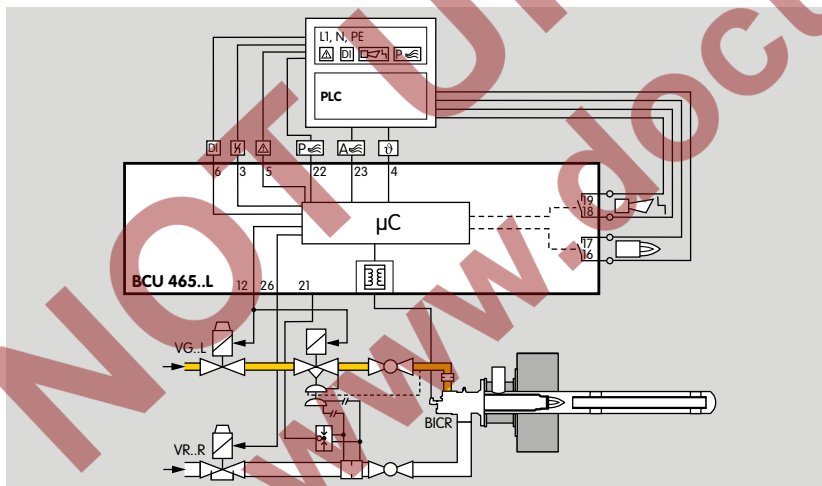


### BICR in a single-ended radiant tube with automatic burner control units

Control example application:

ON/OFF with automatic burner control units IFS 258 and ignition transformer TZI, external air fan control and central pre-purge.

Gas valve and air valve are activated simultaneously. The burner is ignited and monitored by a single electrode. There is an immediate fault lock-out following flame failure.

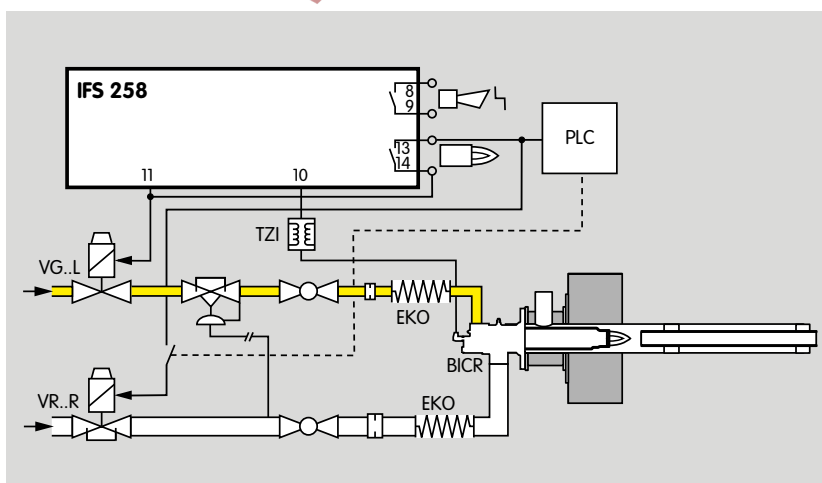


### Single-stage-controlled BICR in a single-ended radiant tube with pneumatic link to the burner control unit

Control example application:

ON/OFF with burner control unit BCU 465..L.

The BCU provides the cooling and purging processes. The variable air/gas ratio control compensates for gas/air pressure fluctuations. The pressure switch monitors the air volume during pre-purge and operation. The gas/air mixture is adjusted to the requirements of the applications using the differing parameters of air supply and air post ventilation.

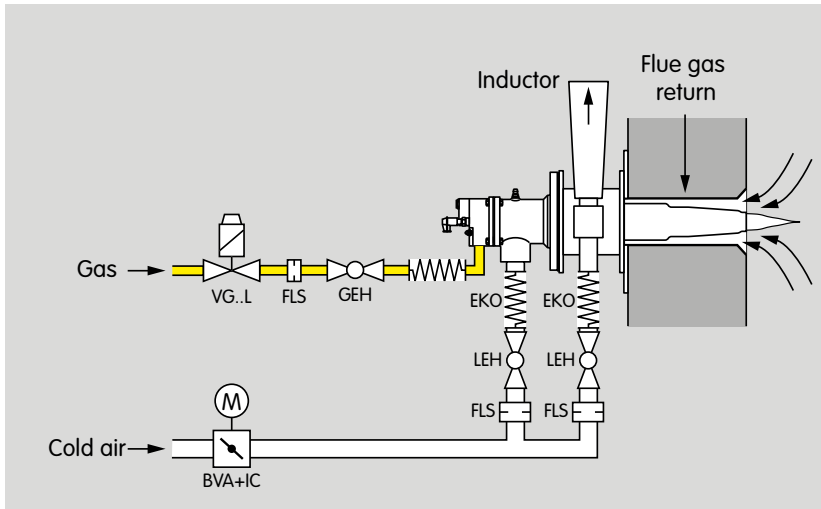


### Single-stage-controlled BICR in a single-ended radiant tube with pneumatic link to the automatic burner control unit

Control example application:

START/HIGH/OFF with automatic burner control units IFS 258.

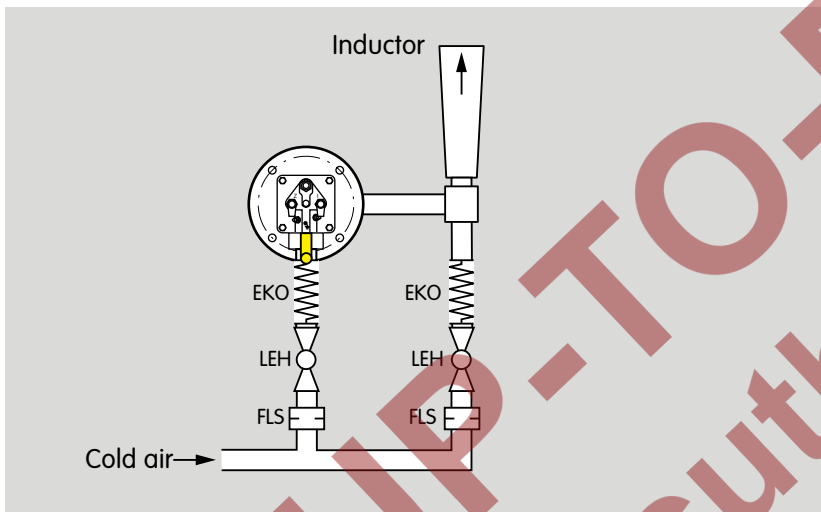
The burner starts at low-fire rate, and a PLC opens the air valve after the operating state has been signalled and thereby switches the burner to high-fire rate. In the event of a flame failure, there is an immediate fault lock-out or a restart.



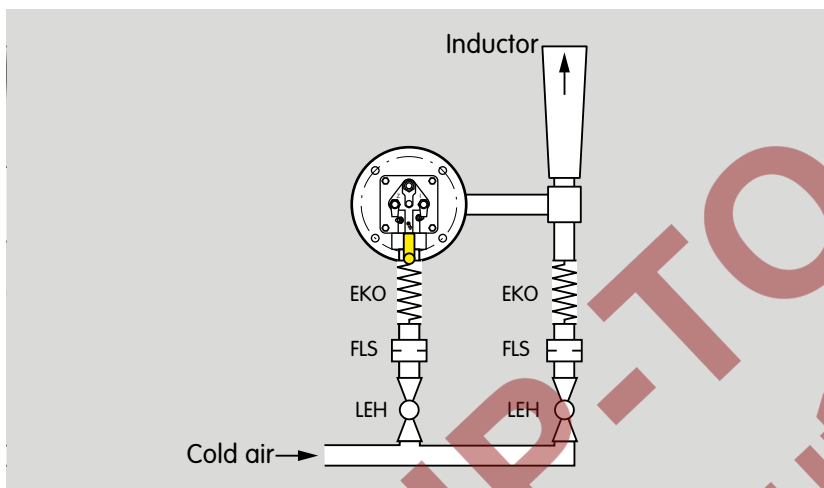
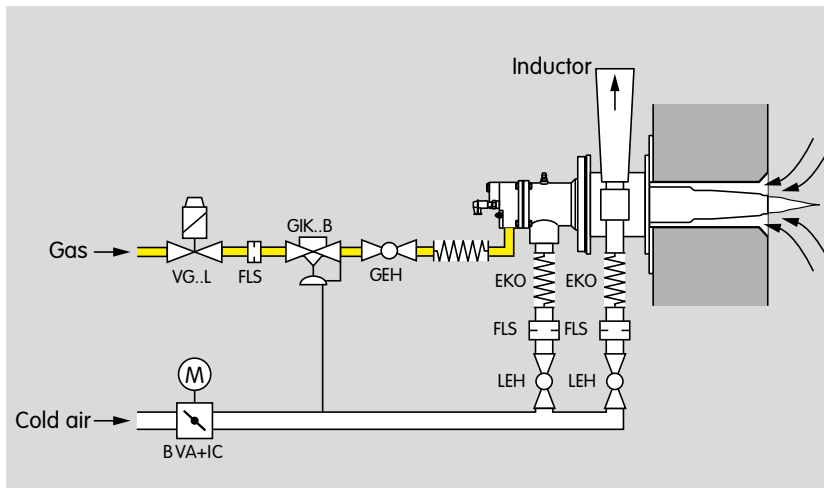
## BICR for direct heating systems

BICR recuperative burner in a direct heating system with optional inductor at the outlet from the exhaust-gas housing (EGH) to evacuate the flue gases from the furnace. The inductor generates a vacuum with a centrally positioned nozzle and thus draws the flue gases out of the furnace chamber through the burner's heat exchanger. The maximum achievable air preheat temperature is approx. 400°C.

- Low air connection pressure at the inductor is required.
- 100% flue gas return through the burner is possible.







## BICR for direct heating systems with air deficiency cut-out

BICR recuperative burner in a direct heating system with optional inductor at the outlet from the exhaust-gas housing (EGH) to evacuate the flue gases from the furnace. The inductor generates a vacuum with a centrally positioned nozzle and thus draws the flue gases out of the furnace chamber through the burner's heat exchanger. The maximum achievable air preheat temperature is approx. 400°C.

- Low air connection pressure at the inductor is required.
- 100% flue gas return through the burner is possible.

The air/gas ratio control GIK regulates the gas supply dependent on the cold air supply.

### Legend

- BCU = Burner control unit
- VG..L = Solenoid valve for gas, slow-opening
- GEH\* = Flow adjusting cock for gas
- EKO = Stainless steel bellows unit
- FLS\* = Measuring orifice
- BICR = Burner with integrated recuperator
- TSC = Ceramic tube
- EGH = Exhaust-gas housing
- BVA = Butterfly valve for air
- IC = Actuator
- LEH = Flow adjusting cock for air

\* Required in the gas circuit on BICR 65/50 only

## Type code

### BICR

Code	Description
BICR	Burner with integrated recuperator
65, 80, 100	Housing size
/50, /65, /80	Burner size
H	Flame shape "Long flame"
B	Type of gas
G	Natural gas
	LPG
-0	Length of burner extension 0 mm
/335, /385, /435, /485...	Position of burner head (L2) [mm]
-(1A), -(2A), -(3A), -(4A), -(5A)...	Burner head identifier
A, B, C, D, E...	Construction stage

### EGH

Code	Description
EGH	Exhaust-gas housing
65, 80, 100	Housing size
/50, /65, /80	Burner size
-190*, -240, -290, -340, -390	Length of exhaust-gas housing (L8) [mm]
BICR 65/50 BICR 80/65 BICR 100/80	To be combined with BICR 65/50 BICR 80/65 BICR 100/80

### TSC

Code	Description
TSC	Ceramic tube set
65, 80, 100	Housing size
/50, /65, /80	Burner size
B	Tapered shape
022, 030, 040	Outlet diameter [mm]
-500, -600, -700, -800, -900 -550, -650, -750, -850, -950	Tube length (L7) [mm]
/385, /485, /585, /685, /785 /335, /435, /535, /635, /735	Position of burner head (L2) [mm]
-Si	Ceramic tube made of silicon-infiltrated SiC
-1350	Up to 1350 °C
BICR 65/50 BICR 80/65 BICR 100/80	To be combined with BICR 65/50 BICR 80/65 BICR 100/80

Technical data

Burner length increments: 100 mm.

Types of gas: Natural gas or LPG (gaseous); other gases on request.

Heating: Direct with inductor or indirect in radiant tube.

Control type: On/Off.

Flame velocity: High.

Most of the burner components are made of corrosion-resistant stainless steel.

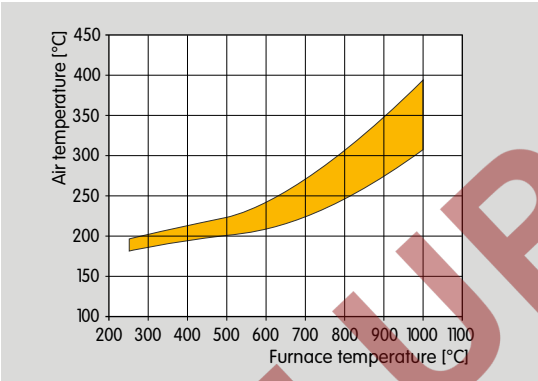
Exhaust-gas housing EGH with internal ceramic fibre insulation (RCF).

Flame control: Direct ionisation control.

Ignition: Direct, electrical.

Maximum furnace temperature: approx. 950°C for indirect heating, approx. 1050°C for direct heating.

Air temperature (indirect heating):

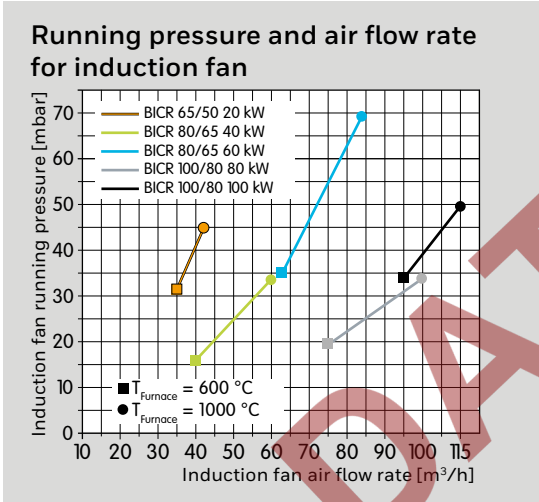


Burner output and required connection pressure at a furnace temperature of 900 °C for indirect heating with natural gas in a radiant tube:

Burner	Output	Gas	Air
	kW	mbar	mbar
BICR 65/50	20	27	35
BICR 80/65	40	25	30
BICR 80/65	60	51	55
BICR 100/80	80	26	32
BICR 100/80	100	41	48

The reverse flow pressure via the radiant tube is to be taken into consideration.

Burner output and required connection pressure for other furnace chamber temperatures, heating modes or LPG: On request.



Maintenance cycles

Twice per year, but if the media are highly contaminated, this interval should be reduced.

**Technical Information bulletin for this product**

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

Search term: BICR

**Contact**

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