

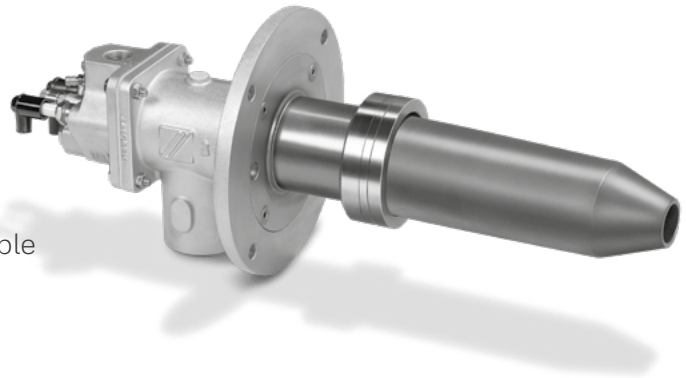
Honeywell

krom
schroder

Excess air burner BIC..L

Technical Information · GB
7 Edition 06.18

- Reliable electrical ignition and safe flame control using a flame rod
- Excess air capability of up to approx. 1500% possible
- High pulse magnitude even at a low burner rating
- High flame outlet velocity
- Length increments enable individual adjustment to the wall thickness of the system

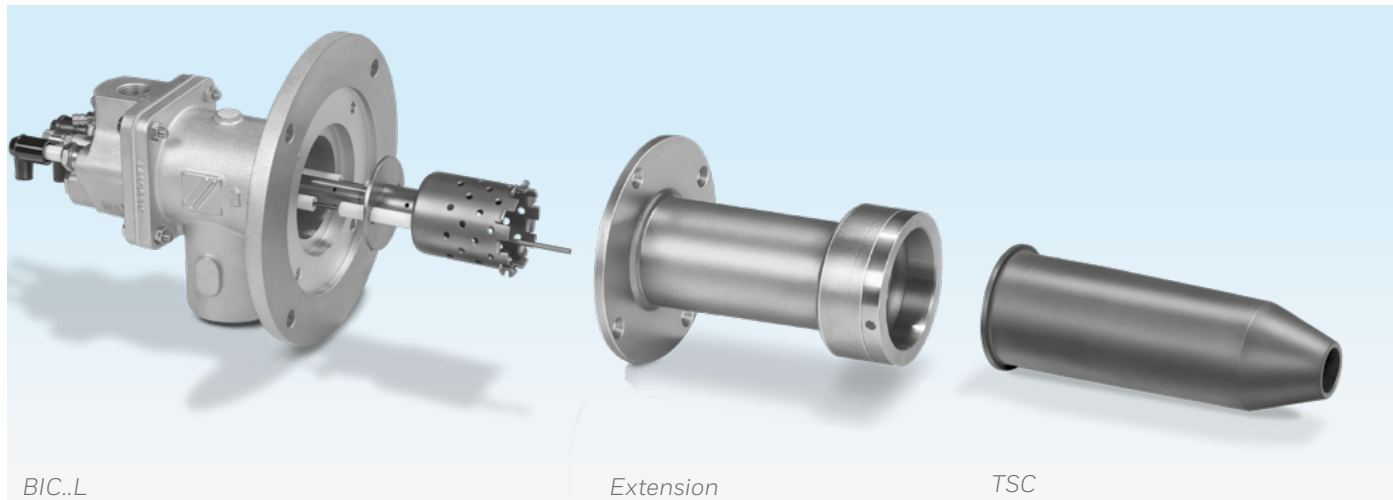


EAC

Contents

Excess air burner BIC..L	1	6.9 Emissions	18
Contents	2	6.10 Gas line connection	18
1 Applications	3	6.11 Air line connection	19
1.1 Application examples	5	6.12 Gaskets for higher connection pressures	19
1.1.1 Modulating zone control with constant air volume	5	6.13 Condition on delivery	19
1.1.2 Modulating control with pneumatic ratio control system and lambda adjustment	5	6.14 Intermittent operation	19
1.1.3 ON/OFF cyclic control	6	6.15 Build up of noise	19
2 Certification	7	6.16 Installation in a humid environment	19
3 Mechanical construction	8	6.17 Heat guard	19
3.1 Burner body (furnace flange)	8	7 Accessories	20
3.2 Burner insert	9	7.1 NPT adapter set	20
3.3 Ceramic tube set TSC	9	7.2 Ceramic paste	20
4 Function	10	8 Technical data	21
5 Selection	11	8.1 Dimensions [mm]	22
5.1 Burner type and size	11	8.2 Dimensions [inch]	23
5.2 Burner head	11	9 Maintenance cycles	24
5.3 Burner length for horizontal installation	12	10 Legend	25
5.4 Burner length for installation at an angle	13	10.1 Converting units	25
5.5 Selection table	14	Feedback	26
5.5.1 BIC..L type code	14	Contact	26
5.6 Selection of ceramic tube TSC	15		
5.7 TSC type code	15		
6 Project planning information	16		
6.1 Installation	16		
6.2 Ignition	16		
6.3 Recommended ignition transformer	17		
6.4 Non-return gas valve	17		
6.5 Flame control	17		
6.6 Hot air operating mode	17		
6.7 Chemical resistance of the ceramic tube TSC	18		
6.8 Purge air/cooling air	18		

1 Applications



The BIC..L burner is perfectly designed for use in tunnel kilns, in systems of the heavy clay and fine ceramics industry, as well as in dryers and hot air generators.

The burners can be used with the ceramic tube set TSC in fibre-lined furnaces (also in furnaces with a brick lining) as an overhead or side heating system. No burner block is necessary.

The stainless steel extensions allow for individual length adjustment to the most diverse furnace wall thicknesses.

Thanks to the high excess air capability of up to approx. 1500%, variable flue gas temperatures of up to approx. 100°C ($\lambda = 16$) can be reached.

Ignition over the entire burner output range enables a simple construction of the gas and air circuit.

Due to their high outlet velocity when operating at low capacity, the burners are ideal for industrial furnaces in which a uniform temperature distribution is required.

Applications



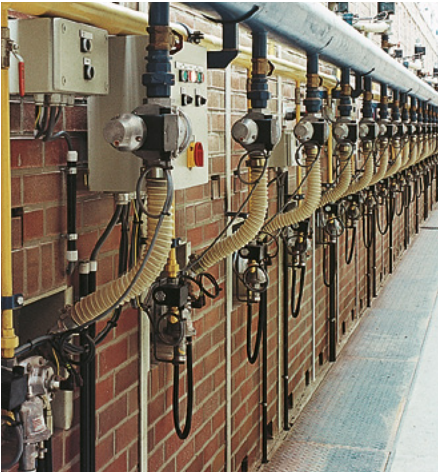
Ceramics kiln with temperature control via impulse system



Overhead heating with burner BIC



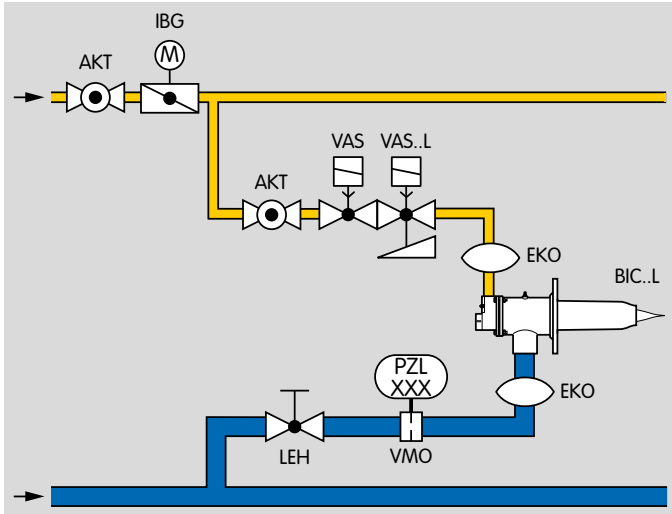
Batch furnace



Tunnel kiln

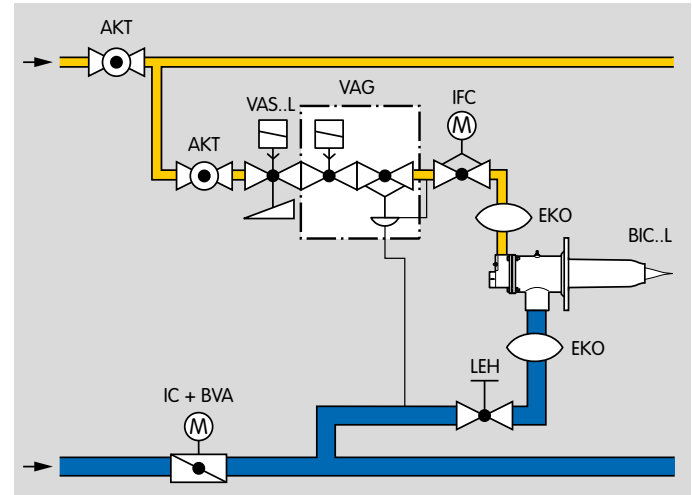
1.1 Application examples

1.1.1 Modulating zone control with constant air volume



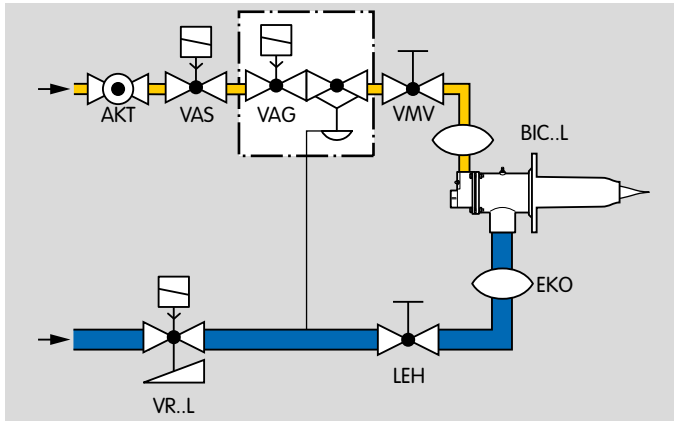
After being released by the burner control unit, the gas solenoid valves VAS and VAS..L open. The burner starts. The gas flow rate can be adjusted continuously using the IFC. The air flow rate remains constant.

1.1.2 Modulating control with pneumatic ratio control system and lambda adjustment



The burner capacity is controlled in modulating mode by adjusting the butterfly valve with actuator IBA. The pneumatic ratio control system controls the gas volume and ensures a constant mixture of gas and air in the burner. The gas flow rate can be adjusted continuously using the linear flow control with actuator IFC.

1.1.3 ON/OFF cyclic control



With ON/OFF cyclic control, the input into the process is controlled by means of a variable ratio of the operating time to the pause time. The pneumatic ratio control system controls the gas volume and ensures a constant mixture of gas and air in the burner. In accordance with EN 746-2, this type of control can only be used for burner capacities of up to 360 kW (1229 × 1033 BTU/h). Depending on the furnace temperature, there must be a certain air flow when the burner is switched off, see page 18 (Purge air/cooling air). The high output pulse frequency at the burner produces a uniform temperature distribution and good circulation of the kiln atmosphere, e.g. in kilns for heavy clay and fine ceramics.

2 Certification

Eurasian Customs Union



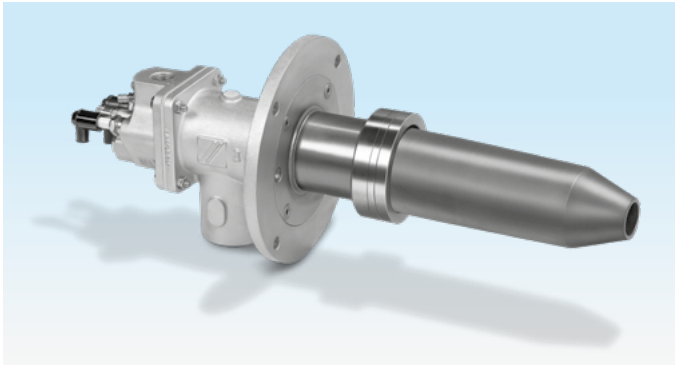
The product BIC..L meets the technical specifications of the Eurasian Customs Union.

Declaration of Incorporation pursuant to the Machinery Directive

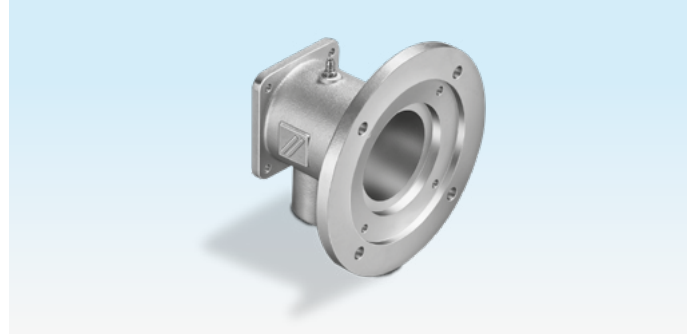
Burners BIC..M L comply with the requirements of EN 746-2 and the Machinery Directive 2006/42/EC. This is confirmed by the manufacturer's Declaration of Incorporation.

3 Mechanical construction

The burner is composed of the following modules: burner body, burner insert and ceramic tube. This structure enables easy adjustment to suit the respective process or integration into existing systems. Maintenance and repair times are reduced, and existing furnace installations can easily be converted.

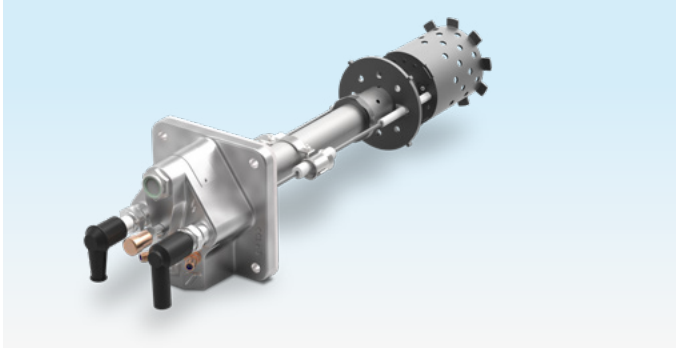


3.1 Burner body (furnace flange)



The burner is secured to the furnace by the burner body. The burner body accommodates the burner insert and the ceramic tube, and routes the combustion air. The combustion air pressure can be measured using an air pressure test nipple.

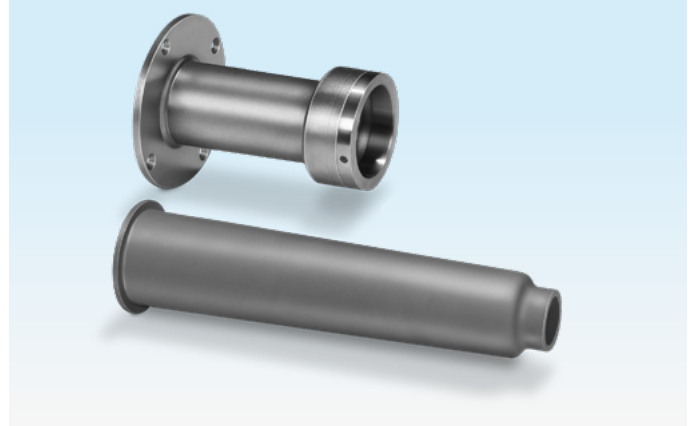
3.2 Burner insert



The fuel gas is supplied to the burner head via the gas connection and the gas nozzle. The burners are nozzle-mixing burners. Gas and air are mixed only once they are in the burner head. This prevents explosive gases from being generated in the pipelines.

The gas connection flange assembly includes the sight glass, ground screw and spark plugs with right-angle terminal boots. The connection flange is equipped with an integrated measuring orifice for easy measuring and flow adjustment for exact adjusting of the gas flow rate. Spark electrode and flame rod are screwed into the connection flange. The length of the burner insert has been selected so that the burner head is always positioned in the ceramic tube TSC.

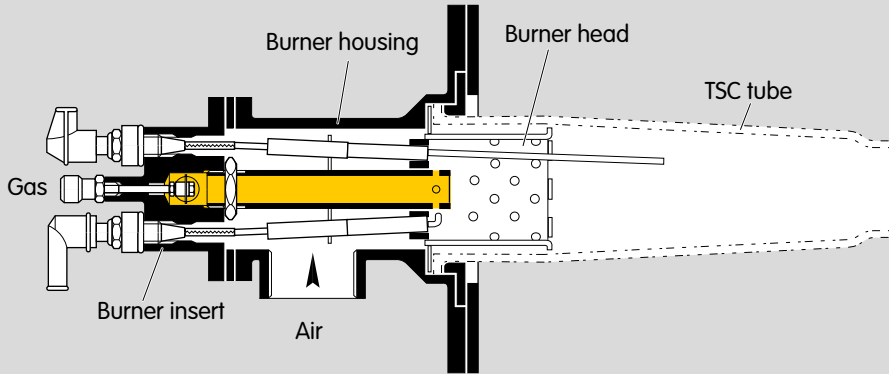
3.3 Ceramic tube set TSC



A SiC ceramic tube, lightweight in design, serves as combustion chamber. The ceramic tube ensures complete combustion so that no burner block is required. The ceramic tube is not supplied with the burner and must be ordered separately.

The burner length can be adjusted perfectly to the furnace wall thickness using the burner extension.

4 Function



The burner control unit opens the gas and air control valves. Gas flows through the gas connection flange and air flows through the burner body as far as the nozzle-mixing burner head.

The combustible gas/air mixture is produced downstream of the burner head. The gas/air mixture is electrically ignited directly by a spark electrode. A flame forms which is monitored using a flame rod.

The required flame velocity and burner capacity are achieved by combining the with an appropriately shaped ceramic tube.

5 Selection

As far as the capacity data are concerned, it should be noted that the capacities in kW and the energy densities in kWh/m³ relate to the lower heating value H_u. Capacities quoted in BTU/h and energy densities in BTU/scf relate to the higher heating value H_o.

Units	Relative to
kW	Lower heating value H _u
kWh/m ³	Lower heating value H _u
BTU/h	Higher heating value H _o
BTU/scf	Higher heating value H _u

5.1 Burner type and size

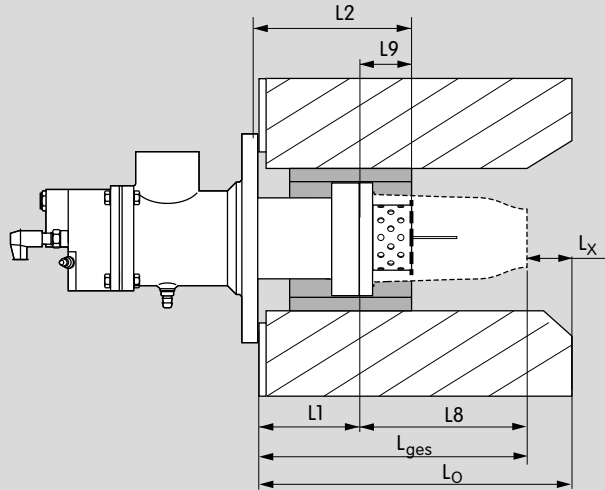
Type	Housing material	Combustion air temperature		Burner size	Available with rated capacity*	
		[°C]	[°F]		[kW]	[BTU/h]
BIC	Cast steel	< 250°C	< 482	80	85	320
					140	530
				100	180	680
					210	795
				140	300	1135
					440	1664

5.2 Burner head

Use	Burner head code letter	Air temperature		Furnace temperature	
		°C	°F	°C	°F
Excess air	L	250	482	1250	2282

Gas type	Code letter	Heating value range		Density ρ	
		kWh/m ³ (n)	BTU/scf	kg/m ³	lb/scf
Natural gas L and H quality	B	8 - 12	810 - 1215	0.7 - 0.9	0.041 - 0.053

5.3 Burner length for horizontal installation



The burner length is to be selected so as to ensure that the opening of the TSC tube is flush with the interior furnace wall ($L_x = 0$). The opening may not be more than 50 mm (1.97 inch) back from the surface of the interior furnace wall ($L_x \leq 50$ mm (1.97 inch)). Provided that mechanical damage to the TSC tube can be excluded (due to moving parts in the furnace, for example), the TSC tube may also protrude into the furnace chamber. The burner head should always be surrounded by the furnace insulation. The shortest burner installation length is equal to the length of the ceramic tube. It can be extended with steel extensions in increments of 100 mm.

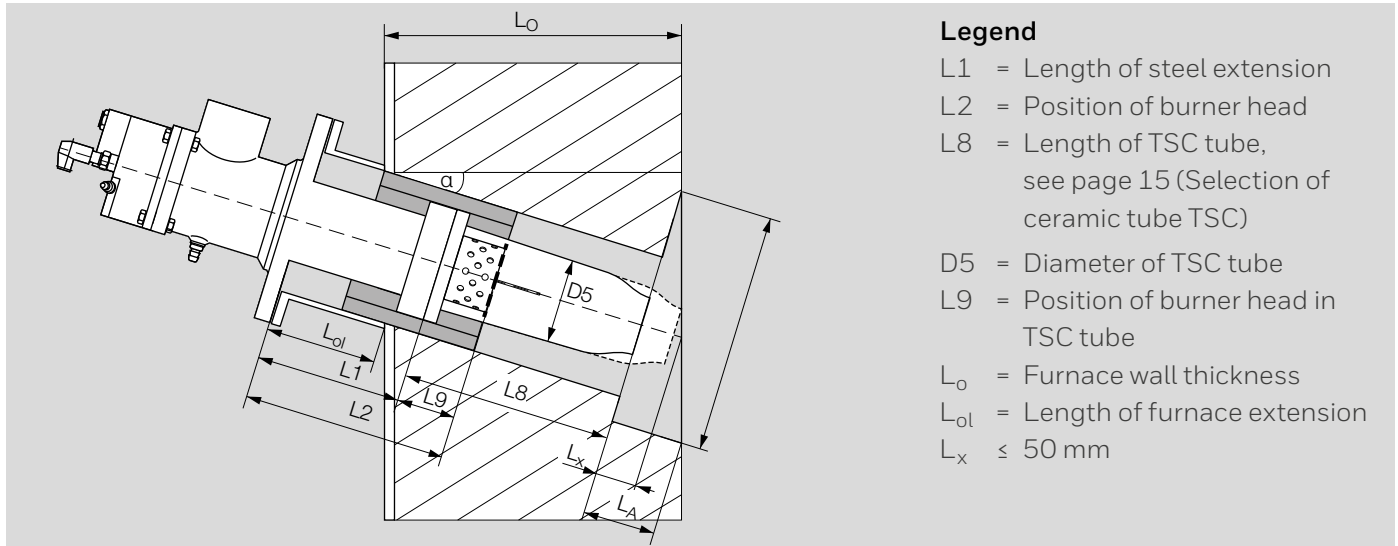
Legend

- L1 = Length of steel extension
- L2 = Position of burner head
- L8 = Length of TSC tube,
see page 15 (Selection of ceramic tube TSC)
- L9 = Position of burner head in TSC tube
- L0 = Furnace wall thickness
- $L_x \leq 50$ mm
- L_{ges} = Total length ($L_0 - L_x$)

Calculating the steel extension

www.kromschroeder.de/marketing/adlatus/brenner-laenge_bic/brennerlaenge_bic_zic.html

5.4 Burner length for installation at an angle



Legend

- L1 = Length of steel extension
- L2 = Position of burner head
- L8 = Length of TSC tube,
see page 15 (Selection of ceramic tube TSC)
- D5 = Diameter of TSC tube
- L9 = Position of burner head in TSC tube
- L_o = Furnace wall thickness
- L_{o1} = Length of furnace extension
- $L_x \leq 50$ mm

Ideally, the burner length is to be selected so as to ensure that the opening of the TSC tube is in the interior furnace wall.

The distance L_x between the opening and the interior furnace wall must be max. 50 mm (1.97 inch). If the distance is $L_x = 0$ mm, the opening of the TSC tube will extend into the furnace chamber. Provided that mechanical damage to the TSC tube can be excluded (due to moving parts in the furnace, for example), the TSC tube may also protrude into the furnace chamber. The burner head should always be surrounded by the furnace insulation.

The burner installation length can be extended with steel extensions in increments of 100 mm.

Calculating the steel extension

www.kromschroeder.de/marketing/adlatus/brenner-laenge_bic_winkel/brennerlaenge_bic_zic_winkel.html

5.5 Selection table

	80	100	140	L	B	-0.	/35-...	(1)-(199)	E-H
BIC	●	●	●	●	●	●	●	●	●

● = standard, ○ = available

Order example

BIC 80LB-0/35-(16)F

5.5.1 BIC..L type code

Code	Description
BIC	Excess air burner
80, 100, 140	Burner size
L	Excess air
B	Gas type: Natural gas
-0, -100, -200, ...	Length of burner extension [mm]
/35-, /135-, /235-, ...	Position of burner head [mm]
(1), (2), (3), (4), (5), ...	Burner head identifier
E-H	Construction stage

5.6 Selection of ceramic tube TSC

	B	033	040	050	055	070	-250	-300	/35-..	/105-	Si-1500
TSC 80	●	●	●				●		●		●
TSC 100	●		●	●				●	●	●	●
TSC 140	●					●		●	●		●

● = standard, ○ = available

Order example

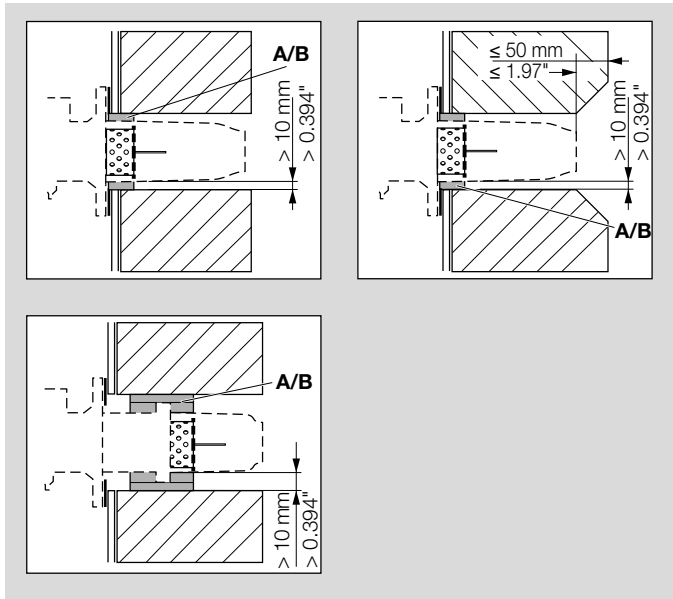
TSC 80B033-250/35-Si-1500

5.7 TSC type code

Code	Bersreibung
TSC	Keramikrohrset
80, 100, 140	Passend für Brennergröße
B	Form eingezogen
033, 040, 050, 055, 070	Austrittsdurchmesser [mm]
-250, -300	Rohrlänge [mm]
/35 -, /105-	Lage des Brennerkopfes [mm]
Si-1500	Keramikrohr-Material

6 Project planning information

6.1 Installation



Installation position as required.

Gas and air connection: can be rotated in 90° steps. Install flexible tubes or bellows units to prevent mechanical stress or vibrations.

Insulate the TSC tube and burner extension as shown. Use high temperature resistant shaped parts **A** or high temperature resistant ceramic fibrous material **B** for insulation.

The TSC tube may be insulated up to the front edge of the burner head – beyond this point, the insulating material must not come into contact with the TSC tube in the flame formation area. Allow a gap of at least 10 mm (0.394 inch) around the TSC tube.

6.2 Ignition

The burners can be ignited within the entire capacity range.

6.3 Recommended ignition transformer



≥ 7.5 kV, ≥ 12 mA, e.g. TZI 7,5-12/100 or TGI 7,5-12/100.

6.4 Non-return gas valve

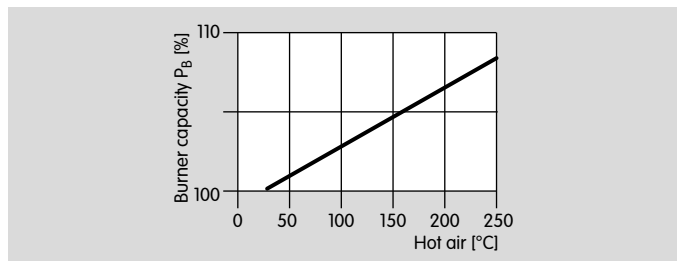
Non-return gas valves are not required, since the burners are of the nozzle-mixing type.

6.5 Flame control

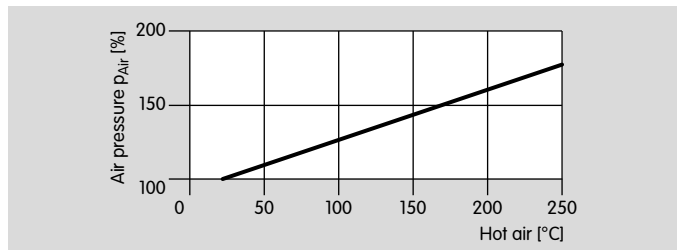
The burners BIC..L are supplied as standard with a flame rod for flame control.

6.6 Hot air operating mode

The total input into the process in hot air operating mode is calculated from the total gas capacity and the energy content of the hot air. The diagram shows the relative total capacity as a function of the air temperature. Operating the burners at rated capacity is also possible using hot air.



For applications with air preheating via a central recuperator, hot air compensation is performed by changing the air pressure depending on the air temperature. The air pressure is increased as the air temperature rises in order to keep the air index λ constant.



As the air temperature increases in flame mode, the counterpressure due to the flame in the ceramic tube TSC also increases, so that the gas pressure needs to be readjusted accordingly. The burner is suitable for a cold start with excess air. Therefore, the gas-air mixture is set during operation with hot air.

6.7 Chemical resistance of the ceramic tube TSC

In atmospheres containing alkalis (e.g. sodium or potassium compounds), the ceramic tube is subject to increased wear. This means that ceramic material is eroded. Even low concentrations in the furnace atmosphere result in alkali accumulation on the ceramic material.

Ceramic materials should not be used when melting aluminium.

6.8 Purge air/cooling air

While the burner is switched off and depending on the furnace temperature, there must be a certain air flow (2 to 6% of the rated capacity) in order to ensure safe ignition and monitoring of the burners, and for cooling the burner components.

6.9 Emissions

Emission values only on request. NO_x and CO formation depends on the temperature, burner head, combustion chamber, furnace chamber, control type, λ value and capacity.

6.10 Gas line connection

The distance between the burner gas connection and the regulator or control element for gas should be max. 0.5 m in order to ensure the maximum burner turndown is achieved. The greater the distance, the smaller the turndown.

To ensure accurate measurements of the pressure differential on the integrated gas measuring orifice for burners BIC..L as from construction stage E, the following applies to the design of the gas connection:

- Ensure undisturbed flow to the gas connection on the burner inlet for a distance of $\geq 5 \times \text{DN}$.
- Use a bellows unit with the same nominal dimensions as the gas connection on the burner.
- Use a pipe elbow up to an angle of 90° with the same nominal dimensions as the gas connection on the burner.
- Only use reducing nipples with an external thread at both ends in order to reduce the nominal diameter on the burner (e.g. from 1" to ¾").

We recommend the following to ensure optimum flow and to avoid incorrect measurements and burner operation with excess gas:

- Do not screw the manual valve directly into the burner.

6.11 Air line connection

Ensure there is a bellows unit and an air adjusting cock upstream of the burner.

6.12 Gaskets for higher connection pressures

The standard gaskets for the burners are suitable for a connection pressure of up to max. 100 mbar (gas and air).

Special gaskets are available on request for higher connection pressures of up to max. 500 mbar.

6.13 Condition on delivery

Gas and air connections are fitted opposite one another at the factory.

6.14 Intermittent operation

Note the opening and closing times of the control elements when determining the cycle times. Unnecessarily high numbers of operating cycles should be avoided.

6.15 Build up of noise

The noise volume of a burner in the open air is approx. 105 dBA at a distance of 1 m from the burner tube end (measured at an angle of $< 45^\circ$ to the flame).

If the burner is installed in a furnace, the noise volume is greatly reduced by the furnace insulation (with a 300 mm (11.8") fibre lining, the noise volume is approx. 85 dBA).

6.16 Installation in a humid environment

The burners can be installed in a humid environment. It must be noted that the paint-coated burner body may rust in a humid environment. The corrosion will not affect the function of the burners. We recommend the application of an anti-corrosion coating in a humid environment to prevent corrosion.

6.17 Heat guard

During operation, the burner body can reach surface temperatures of over 80°C. We recommend that warning signs and a contact guard be fitted, for example made of perforated sheet metal.

7 Accessories

7.1 NPT adapter set



For connecting BIC..L burners to NPT/ANSI connections.

Burner	Adapter set	Gas connection	Air connection	Order No.
BIC 80L	BR 80 NPT	¾" - 14 NPT	2 - 11.5 NPT	74922632
BIC 100L	BR 100 NPT	1" - 11.5 NPT	2 - 11.5 NPT	74922633
BIC 140L	BR 140 NPT	1½" - 11.5 NPT	Ø 3.57"	74922635

7.2 Ceramic paste

For avoiding cold-setting on screw connections after replacing burner components.

Order number: 05012009.

8 Technical data

Gas and air supply pressure each depend on the type of use.

gas and air pressures: see burner diagrams at www.docuthek.com, Type of document: Flow rate curve.

Gas types: natural gas; other types of gas on request.

Combustion air: the air must be dry and clean in all temperature conditions and must not contain condensate.

Overall lengths:

0 to 400 mm (0 to 15.7"),

100 mm (3.94") length increments

(other lengths available on request).

Control type: staged/modulating.

Control: with flame rod.

Ignition: direct spark ignition.

Ignition range: entire capacity range.

Burner body: GG.

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

Ambient conditions: -20°C to +180°C (68°F to 356°F) (outside the thermoprocessing system); no condensation permitted, painted surfaces may corrode.

Max. furnace temperature: 1250°C (2282°F) (higher temperatures on request).

Hot air: up to 250°C (482°F).

Flame outlet velocity: high.

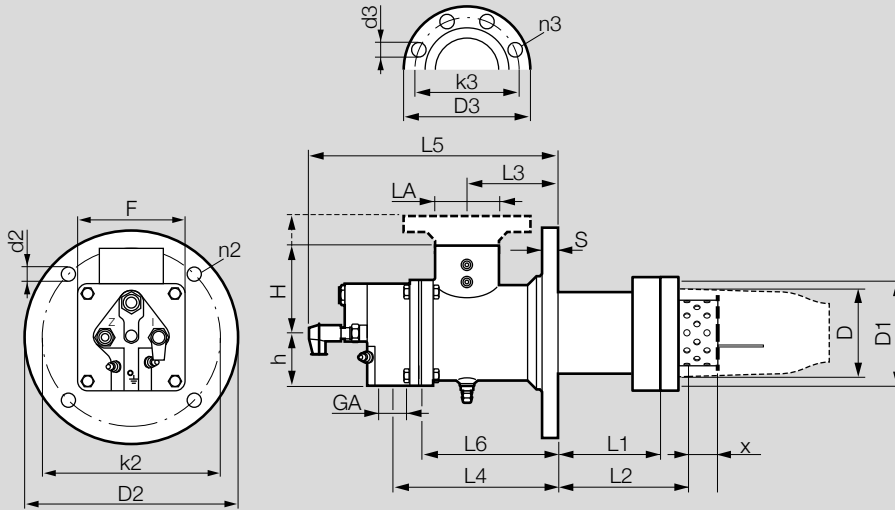
The flame diameter is one to two times that of the burner tube outlet diameter.

Integrated flow measuring orifice in the gas and air circuit.

Burner size	Ceramic tube	Rated capacity		Gas pressure		Air pressure	
		[kW]	[BTU/h]	[mbar]	["WC]	[mbar]	["WC]
80	TSC 80B033	85	320	49	19.3	74	29.1
	TSC 80B040	140	530	57	22.4	74	29.1
100	TSC 100B040	180	680	68	26.8	64	25.2
	TSC 100B050	210	795	55	21.7	52	20.5
140	TSC 140B055	300	1135	40	15.7	48	18.9
	TSC 140B070	440	1664	35	13.8	51	20.1

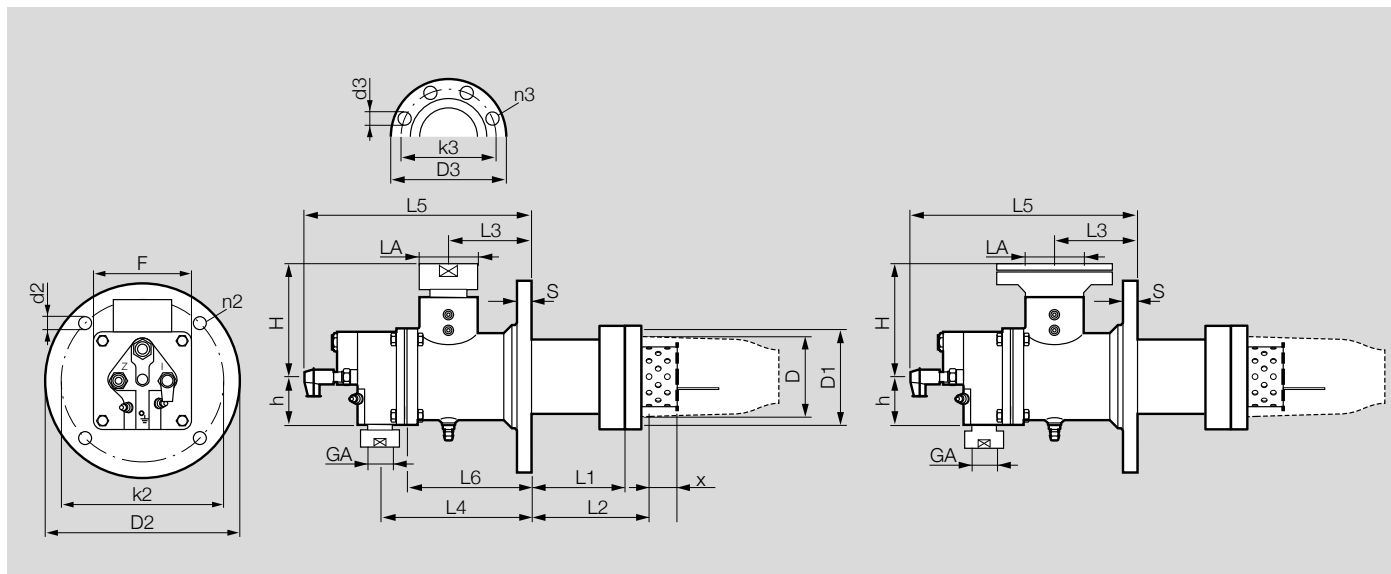
Burner size	Ceramic tube	Rated capacity		Flame length		Outlet velocity	
		[kW]	[BTU/h]	[mm]	[inch]	[m/s]	[ft/s]
80	TSC 80B033	85	320	450	17.7	175	5.76
	TSC 80B040	140	530	600	23.6	195	6.42
100	TSC 100B040	180	680	600	23.6	250	8.23
	TSC 100B050	210	795	700	27.6	190	6.25
140	TSC 140B055	300	1135	700	27.6	220	7.24
	TSC 140B070	440	1664	900	35.4	200	6.58

8.1 Dimensions [mm]



Type	Connections		Dimensions [mm]																	No. of drillings		Weight [kg]
	Gas	Air	D	D1	H	h	S	x	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2	n3	
BIC 80L	Rp 3/4	Rp 2	87	114	112	55	14	15	90	172	268	140	240	210	14	110	-	-	-	4	-	10.7
BIC 100L	Rp 1	Rp 2	104	125	100	60	16	75	103	185	284	153	240	200	14	120	-	-	-	4	-	11.7
BIC 140L	Rp 1 1/2	DN 80	142	168	150	80	18	77	130	271	380	232	300	265	14	160	200	160	18	4	8	26.7

8.2 Dimensions [inch]



Type	Connections		Dimensions [inch]																	No. of drillings		Weight [lbs]
	Gas	Air	D	D1	H	h	S	x	L3	L4	L5	L6	D2	k2	d2	F	D3	k3	d3	n2	n3	
	GA	LA																				
BIC 80L	¾ NPT	2 NPT	3.43	4.49	5.71	3.19	0.55	0.59	3.54	6.77	10.6	5.51	9.45	8.27	0.55	4.33	-	-	-	4	-	23.5
BIC 100L	1 NPT	2 NPT	4.09	4.92	5.24	3.50	0.63	3.00	4.06	7.28	11.2	6.02	9.45	7.87	0.55	4.72	-	-	-	4	-	25.7
BIC 140L	1½ NPT	3"	5.59	6.61	6.98	4.41	0.71	3.00	5.12	10.7	15	9.13	11.8	10.4	0.55	6.3	7.87	6.3	0.71	4	8	58.7

9 Maintenance cycles

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

10 Legend



Manual valve



Gas solenoid valve



Air/gas ratio control with solenoid valve



Flow adjusting cock



Butterfly valve with actuator



Butterfly valve with manual adjustment



Gas solenoid valve, slow opening



Air/gas ratio control with bypass nozzle

10.1 Converting units

See www.adlatus.org

(also optimized for smartphones)

Feedback

Finally, we are offering you the opportunity to assess this “Technical Information (TI)” and to give us your opinion, so that we can improve our documents further and suit them to your needs.

Clarity

- Found information quickly
- Searched for a long time
- Didn't find information
- What is missing?
- No answer

Comprehension

- Coherent
- Too complicated
- No answer

Scope

- Too little
- Sufficient
- Too wide
- No answer



Use

- To get to know the product
- To choose a product
- Planning
- To look for information

Navigation

- I can find my way around
- I got “lost”
- No answer

My scope of functions

- Technical department
- Sales
- No answer

Remarks

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www.kromschroeder.de/Weltweit.20.0.html?&L=1

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