



Accessories & BURNERS for the glass industry

## BURNERS and ACCESSORIES





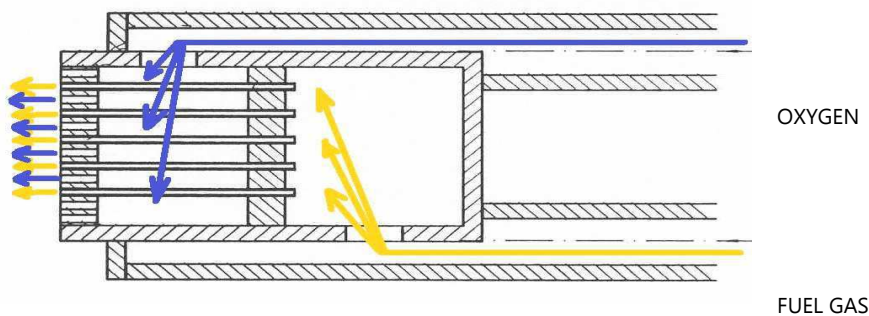
## Principle:

Oxygen with Natural Gas or LPG is used for burner operation.

Thanks to a special design the gases are supplied separately up to the outlet of the burner head.

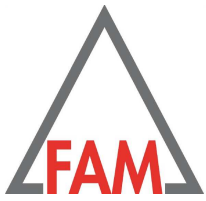
This design gives the possibility to control the flame characteristics in a wide range of outputs without affecting the flame stability.

simplified scheme



## Features of surface mixing burners

- no risk of flashback, very safe
- easy to switch on/off
- easy flame adjustment
- multifuel (Natural Gas, LPG, Hydrogen)
- wide range of flame character (reducing/oxidising)
- slower mixing - longer flame and easier adjustment for different shapes of glass product
- no High-Pressure media
- no any mixer
- no need of back valves or flashback arrestors
- wide range of shapes and sizes
- several possible ways of connection of feed pipes to a burner body



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## Media:

### Typical Fuel Gas:

- NG – (Natural Gas),
- LPG – (Liquid Propan Gas),
- Hydrogen

Working Pressure: 50kPa - 0,3MPa

Pressure about 0,1 MPa or higher is preferred because of higher available power and easier flame adjustment.

Oxygen: Technical purity 93 - 99,99%

Working Pressure: 0,1-1 MPa

Pressure about 0,6 MPa is preferred because of higher available power and easier flame adjustment.

## Glass Industry applications:

### Flame polishing of pressed glass

- Fast reheating of glass surface layer without shape changes
- Removing of "orange peel"
- Rounding of sharp edges
- Removing of cold waves
- Making glass surface smooth



The burners are earmarked for fire polishing of glass surfaces, and for the elimination of edge mould marks.

They also find application in glass handling lines where the glass cooling and the formation of strains in glass articles must be prevented.

The burners have been applied successfully to the fire polishing of lead crystal and no reduction of lead oxide to elemental lead has been observed.



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### **Edge (rim) melting**

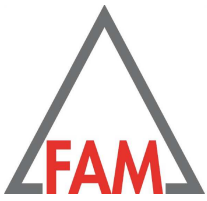
- Reheating and surface melting of edges on blown glass
- Rounding of sharp edges
- Strengthening of the edge



### **Local reheating**

- Reheating of glass before forming
- Pressed glass reshaping
- Reheating for stem pulling
- Smoothing of bottoms of blown tumblers
- Sticking and reshaping of handles, jug mouth etc.



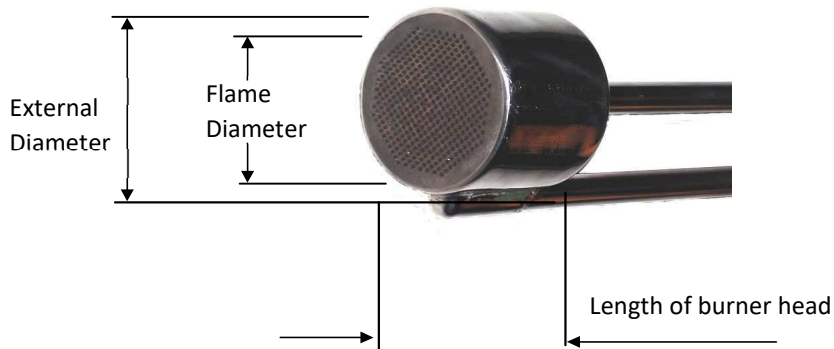


## ROUND BURNERS

In our TFC (round concentric nozzle) and TFS (round separate nozzle) the gases are supplied separately up to the outlet of burners head. These burners have been applied successfully to the fire polishing of Lead Crystal, for fire polishing of glass surfaces and the elimination of mould marks.

The diameter of the flame outlet ranges from 10 to 45 mm, with the external dimensions ranging from 15 to 50 mm for length of 50 mm.

### Standard Burner dimensions straight and angled type



Burner Power KW	External Diameter	Flame Diameter
5,2	15 mm	10 mm
9,1	20 mm	15 mm
14,0	25 mm	20 mm
25,5	30 mm	25 mm
38,2	35 mm	30 mm
53,0	40 mm	35 mm
67,6	45 mm	40 mm
91,20	50 mm	45 mm



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## Straight version



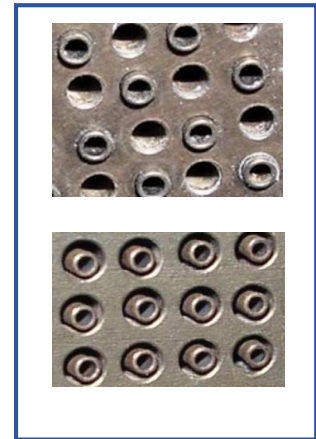
## Angled version



## Nozzles Configuration

Zig-Zag nozzles

Concentric nozzles



## Types of connection threads

Stainless steel threaded pipe terminal  
(without a sealing cone) G1/8" - G1/4" - G3/8" - G1/2"



Threaded conical connection left or right hand, (GAS, NPT, BSP) 1/4" - 3/8", welded silver brazed with an internal sealing.

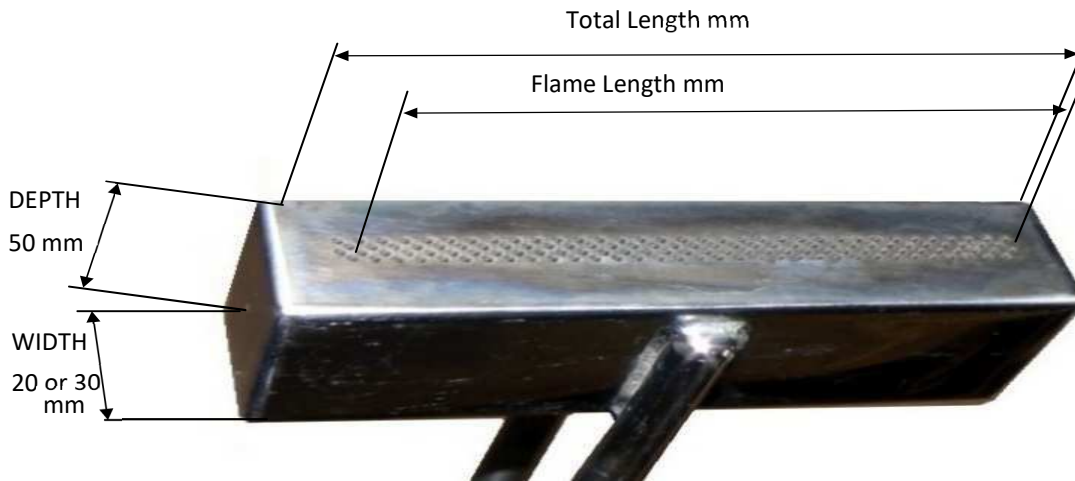




## FLAT BURNERS

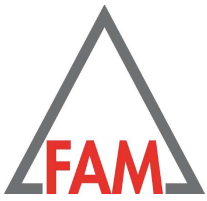
The burners of our series P are bored, and the gases are supplied separately, the mixing takes place at outlet. The distance between the rows of gas nozzles is 2 mm. In their maximum configuration, the flame temperature which can reach the burners of the P series is above 1.500° C.

### Standard dimensions straight and angled type



Total Length mm	Flame Length mm	Power Kw
40	20	3,60
50	30	3,96
60	40	4,36
70	50	4,79
80	60	5,27
90	70	5,80
100	80	6,38
110	90	7,00
120	100	7,70
130	110	8,47
140	120	9,32

Total Length mm	Flame Length mm	Power Kw
150	130	10,25
160	140	11,26
170	150	12,39
180	160	13,63
190	170	14,99
200	180	16,49
210	190	18,14
220	200	19,95
230	210	21,95
240	220	24,15
250	230	26,56

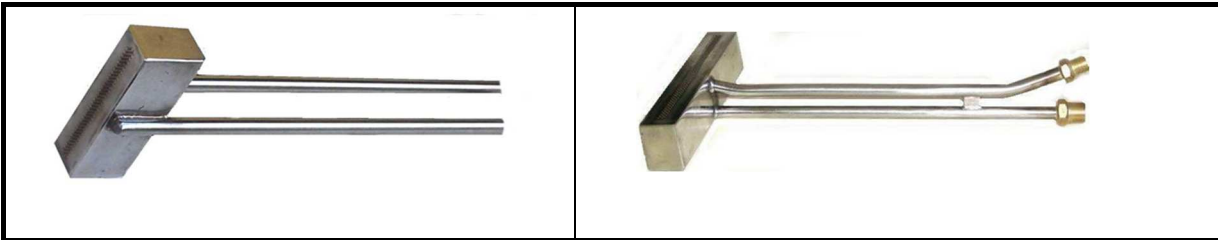


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The power is for burner with 2 rows, the numbers of rows available are from 2 to 10

### Straight version

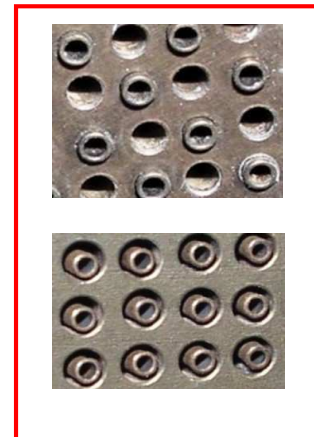
### Angled version



### Nozzles Configuration

Zig-Zag nozzles

Concentric nozzles



### Types of connection threads

Stainless steel threaded pipe terminal

(without a sealing cone) G1/8" - G1/4" - G3/8" - G1/2"



Threaded conical connection left or right hand, (GAS, NPT, BSP) 1/4" - 3/8", welded silver brazed with an internal sealing.







## CONE SHAPED FLAME BURNERS

The burners with a round nozzle plate represent another type of gas-oxygen edge-melting burners. They produce a cone-shaped flame defined by the apex angle  $\alpha$ .

The water-cooled burners are suitable for edge melting of axially symmetrical pressed glassware; they can also be operated safely with hydrogen/oxygen.

The burners with a diameter of the round nozzle plate varying from 22 to 53 mm are currently supplied.



TYPE	CODE	FLAME SIZE Diameter mm	GAS CONSUMP.	OXYGEN CONSUMP.	POWER
ZH 22	396 554 040 960	22 with 80° angle	1,5 m <sup>3</sup> /h	2,2 m <sup>3</sup> /h	15,1
ZH 28	396 554 040 660	28 with 90° angle	1,9 m <sup>3</sup> /h	2,9 m <sup>3</sup> /h	19,1
ZH 36	396 554 040 670	36 with 90° angle	2,5 m <sup>3</sup> /h	3,7 m <sup>3</sup> /h	25,1
ZH 46	396 554 040 680	46 with 90° angle	3,1 m <sup>3</sup> /h	4,7 m <sup>3</sup> /h	31,2
ZH 53	396 554 040 260	53 with 100° angle	4,0 m <sup>3</sup> /h	6,0 m <sup>3</sup> /h	40,2



## SPECIAL BURNERS

Feed pipes oriented along the burner head



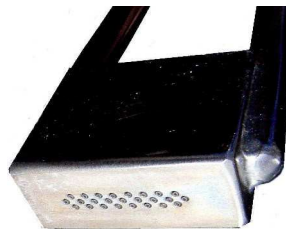
Burner with a handle



Burner with an outer oxygen distributor and front groove for protection of nozzles



Feed pipes connected on sides of the head



Row burner angled by 45°

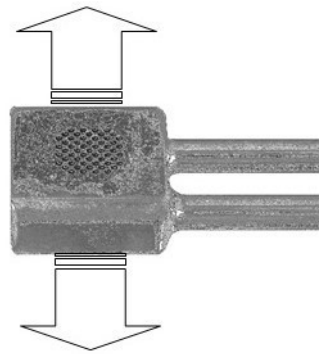




Split ring burner



The burners of the Q series can be supplied single or double-sided flame. These burners are suited for heating glass in stemware production, for instance if the stem is welded to the foot.



Water cooled burner series, and can be supplied flat or round shape profile

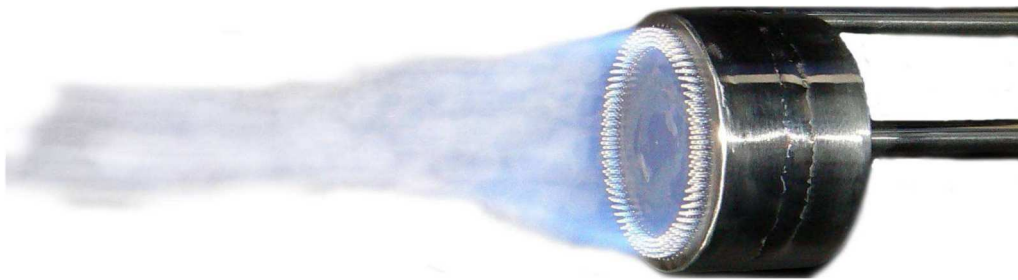




Concentric flame burner



Rim melting burner (aimed downwards)

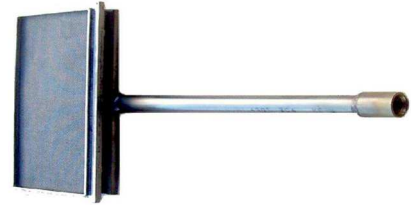


Capillaries segment burner



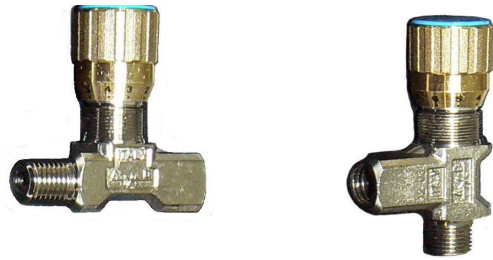


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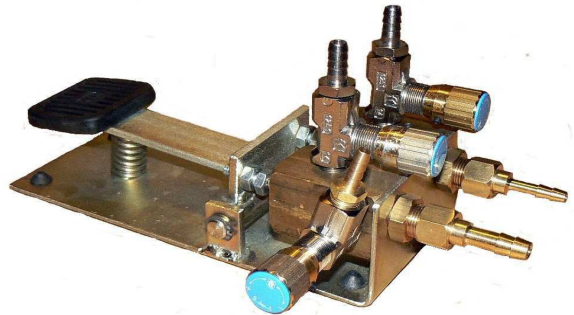


Radiant burner for low temperature applications

Needle valves



Media economiser (foot switch)





## BURNER ORDERING PARAMETERS

Parameter	Options
Fuel gas:	NG, H2, LPG
Available pressure:	min. MPa - max MPa
Oxygen available pressure:	min. MPa - max MPa
Nozzle configuration:	Concentric or zig-zag
Shape of burner head:	Round or linear
Flame root length:	10, 20,30,40,50,60,70, and more in mm
Flame width:	in mm and number of rows of nozzles
Flame diameter:	5, 10, 15, 20, 25, 30, 35, 40, 45, 50mm
Feed pipes configuration:	straight or angled
Feed pipe length:	mm
Feed pipes diameter:	mm – (Standard 10 mm)
Type of connection:	welded thread, brass thread with an internal cone
Size of thread connection Fuel Gas:	1/8", 1/4", 3/8", or others
Size of thread connection Oxygen:	1/8", 1/4", 3/8", or others
Type of thread Fuel Gas:	left, right hand
Burner body width:	20mm, 30mm
Special on demand:	45° Angled burner head reduced size of burner head water cooling, special shape etc.

## Physical properties of gases

Type of gas	Formula	m <sup>3</sup> -15°C - 1bar	litre of liquid	kg	Caloric value MJ/m <sup>3</sup>	Combustion ratio O <sub>2</sub> /Fuel gas	Normal flame (O-F) temperature °C
Oxygen	O <sub>2</sub>	1,000	1,172	1,337	-	-	-
		0,853	1,000	1,141			
		0,748	0,876	1,000			
Metan	CH <sub>4</sub>	1,000	1,588	0,671	35,9	1,8	2770
		0,630	1,000	0,423			
		1,490	2,366	1,000			
Hydrogen	H <sub>2</sub>	1,000	1,188	0,084	10,8	0,4	2834
		0,842	1,000	0,071			
		11,891	14,124	1,000			
Propane	C <sup>3</sup> H <sup>8</sup>	0,311	1,000	0,582	93,2	4,0	2810
		1,000	3,215	1,871			
		0,534	1,718	1,000			